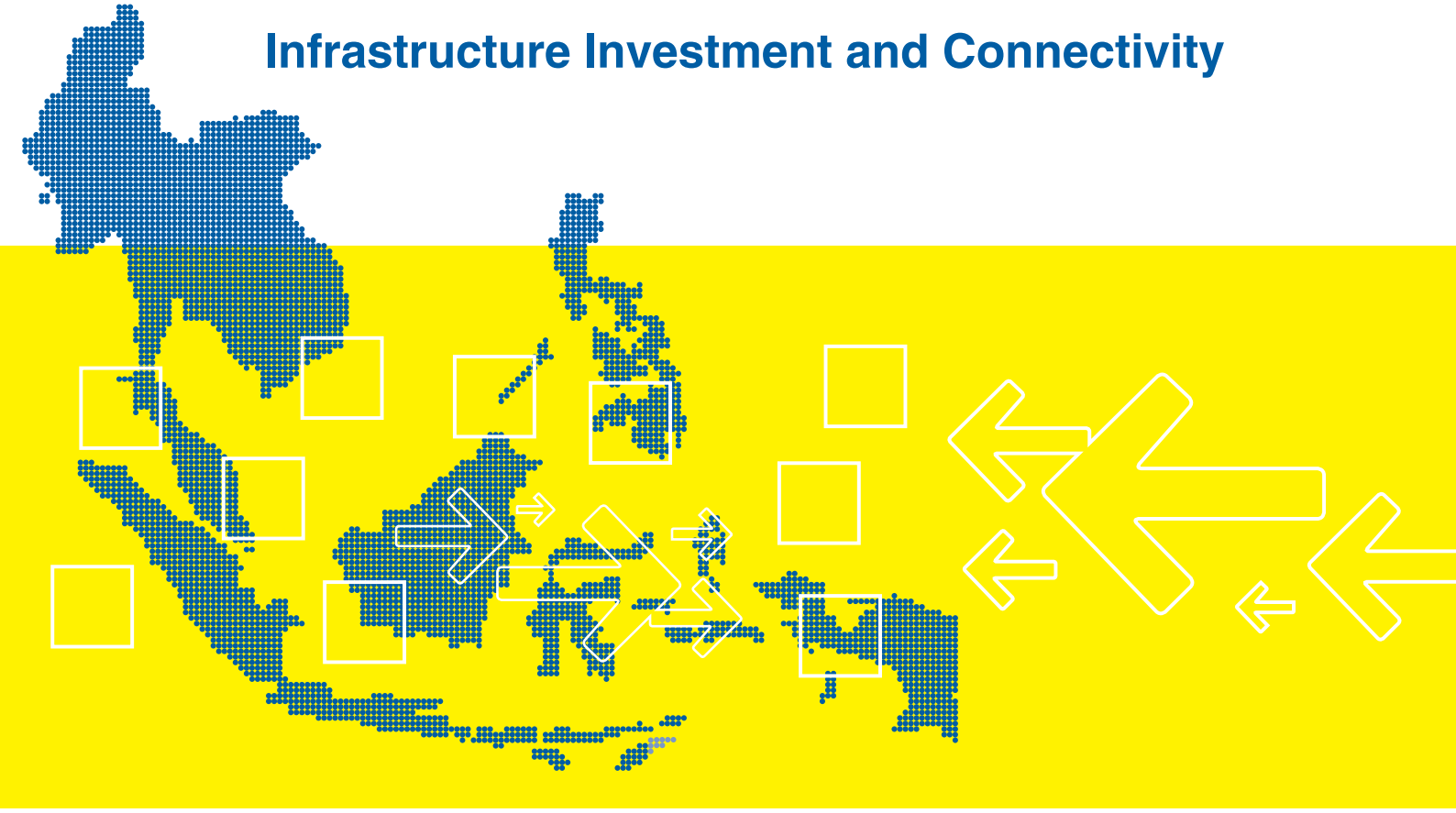
ASEAN Investment Report

2015

Infrastructure Investment and Connectivity



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ASEAN Investment Report 2015

Infrastructure Investment and Connectivity

The ASEAN Secretariat

United Nations Conference on
Trade and Development

The Association of Southeast Asian Nations (ASEAN) was established on 8 August 1967. The Member States of the Association are Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand and Viet Nam.
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General information on ASEAN appears online at the ASEAN Website: www.asean.org

Catalogue-in-Publication Data

ASEAN Investment Report 2015
Jakarta: ASEAN Secretariat, November 2015

332.67395
1. Investment - ASEAN
2. Economics - Foreign Direct Investment

ISBN 978-602-0980-51-5

ASEAN: A Community of Opportunities

This publication was prepared by the ASEAN Secretariat and the United Nations Conference on Trade and Development (UNCTAD), and supported by the Government of Australia through the ASEAN-Australia Development Cooperation Program Phase II (AADCP II).

The map in this publication is only indicative and is not drawn to scale.

Disclaimer

The ASEAN Investment Report is produced to facilitate a better understanding of FDI developments in ASEAN. The findings, interpretations, and analysis in the Report should be treated with care, as work on harmonising and improving FDI quality across the region is on-going.

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FOREWORD

Foreign Direct Investment (FDI) into ASEAN has risen for the third consecutive year from $117.7 billion in 2013 to $136.2 billion in 2014. Despite a 16% decline of global FDI flows in 2014, ASEAN Member States have collectively received the largest FDI among developing countries. Due to robust regional economic fundamentals, cost advantages, regional integration, and on-going efforts to improve the investment environment in ASEAN, the region is now seen as a prime investment destination, attracting investments and influencing corporate strategies in the region.

Investments from ASEAN Member States also continue to rise, reaching $24.4 billion in 2014 from $19.4 billion of the previous year. With intra-ASEAN investment accounting for 18% of the total FDI into the region, ASEAN is now the 2nd largest investor in its own region, manifesting greater interest from the business community to have a stronger regional presence in light of the establishment of the ASEAN Economic Community by the end of 2015.

This year's ASEAN Investment Report focuses on infrastructure investment and connectivity – both critical in supporting the region's economic growth as they improve logistical efficiency, reduce transaction costs and support greater flow of trade and investment. Highlighting the important role of the private sector in helping governments to bridge the infrastructure gap in ASEAN and the linkages of various players across the infrastructure value chain, this Annual Report continues to provide useful updates on the latest developments in the ASEAN investment landscape.

With strategic measures in the ASEAN Community Vision 2025 aimed to establish an open, transparent and predictable investment regime in the region beyond 2015, ASEAN will continue to make the region a foremost investment destination globally.

LE LUONG MINH
Secretary-General of ASEAN

ACKNOWLEDGEMENTS

The ASEAN Investment Report 2015 was prepared under a technical cooperation arrangement between the ASEAN Secretariat and the UNCTAD Division on Investment and Enterprise (DIAE).

The Report was prepared and written by Wee Kee Hwee and Hafiz Mirza. It was overseen by Lim Hong Hin, Deputy Secretary-General of ASEAN for ASEAN Economic Community, ASEAN Secretariat and James Zhan, Director, DIAE, UNCTAD.

The Report benefited from support and contribution provided by the teams at the Services and Investment Division (SID) and the Infrastructure Division at the ASEAN Secretariat. The SID team was led by Tan Tai Hiong and supported by Madelyn Joy Almazora.

The Report benefitted from specific inputs provided by Michael Minges and Torbjorn Fredriksson, Maricel Macesar, Yanfei Li, Christie Richards, Eddy Krismeidi Soemawilaga and Joerg Weber. Other materials for the Report were provided by Paul C.G. Gwee, Jan Hoffmann, Florian Kitt, Sarianna Lundan, Noelia Garcia Nebra, Tran Dong Phuong, Giang Thanh Tung and Megasari Widyaty.

Comments at different stages in the preparation of the Report were provided by members of the ASEAN Coordinating Committee on Investment (CCI) and Choo Wai Meng. The Report has also benefitted from the work of the ASEAN Working Group on International Investment Statistics.

Statistical assistance was provided by Elizabeth Alarilla, Brad Boicourt, Michael Hanni and Sri Wardhani. Hilvy Hanriany, Anne Bouchet, Catherine Corpuz and Sovyana Putranti provided administrative support.

The manuscript was copy-edited with the assistance of Lise Lingo and typeset by Tess Ventura.

Research assistance was provided by Karim Kirollos and Nattanit Mei Fang Wee.

The financial support of the Government of Australia is gratefully acknowledged.

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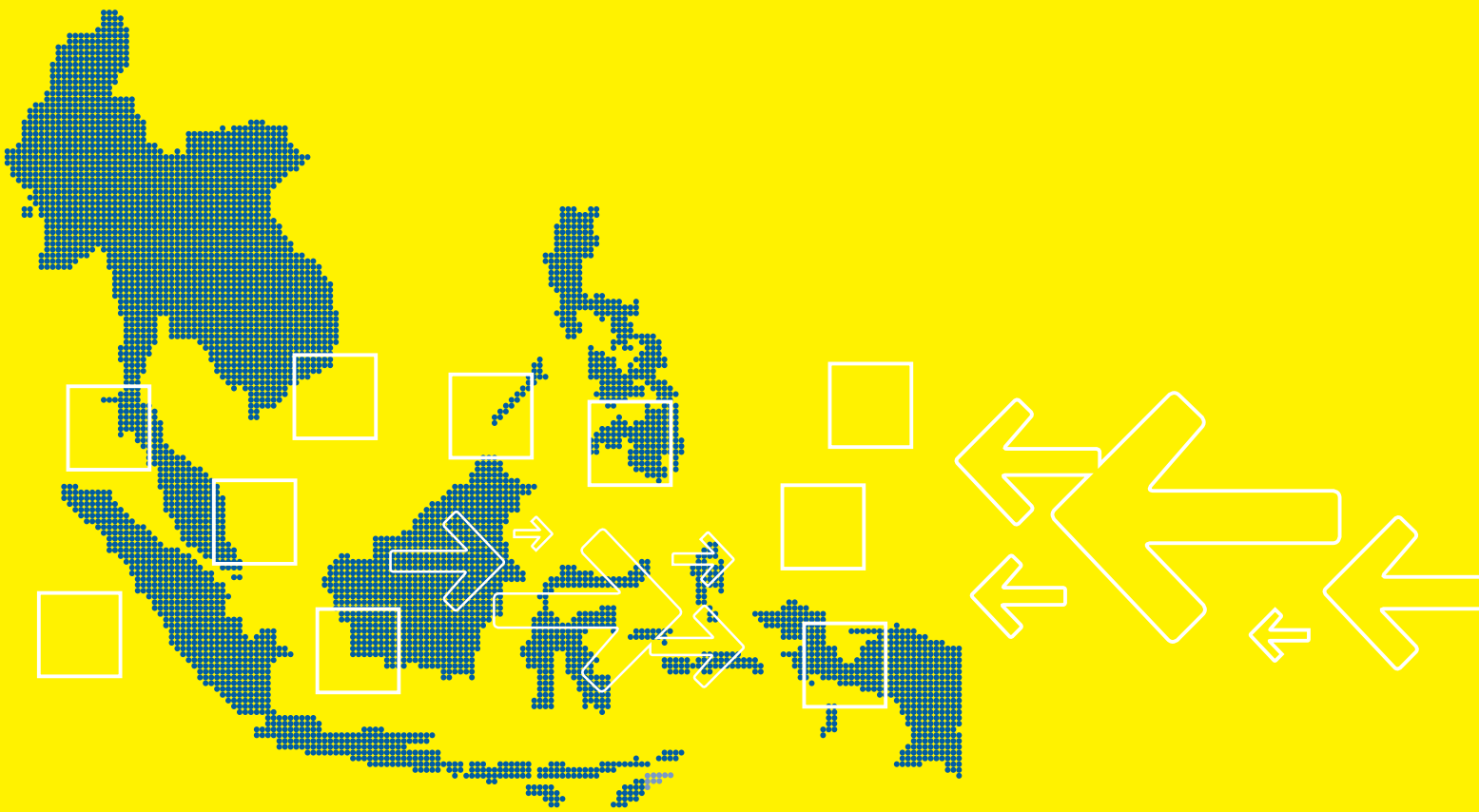
PART TWO: INFRASTRUCTURE INVESTMENT AND CONNECTIVITY IN ASEAN

ABBREVIATIONS

ACIA	ASEAN Comprehensive Investment Agreement
AEC	ASEAN Economic Community
AFAS	ASEAN Framework Agreement on Services
AFTA	ASEAN Free Trade Area
AHN	ASEAN Highway Network
AIA	ASEAN Investment Area
AICO	ASEAN Industrial Cooperation
AIR	ASEAN Investment Report
APG	ASEAN Power Grid
ATIGA	ASEAN Trade in Goods Agreement
BITs	bilateral investment treaties
BOT	build-operate-transfer
BOO	build-operate-own
BTO	build-transfer-operate
CEPT-AFTA	Common Effective Preferential Tariff Scheme for AFTA
DTTs	double taxation treaties
EPC	engineering, procurement and construction
FDI	foreign direct investment
FTAs	free trade agreements
GDP	gross domestic product
GFCF	gross fixed capital formation
GLCs	Government-linked companies
HAPUA	Head of ASEAN Power Utilities/Authorities
ICT	information and communication technology
IIA	international investment agreements
IPP	independent power producer
M&A	mergers and acquisition
MDB	multilateral development bank
MLA	mandated lead arranger
MNEs	multinational enterprises
MRA	mutual recognition arrangement
MW	megawatts
NEMs	non-equity modalities
O&M	operation and management

OBM	original brand manufacturer
ODA	official development assistance
OFDI	outward foreign direct investment
PPA	power purchase agreement
PPI	private participation in infrastructure
PPP	public-private partnership
RCEP	Regional Comprehensive Economic Partnership
RORO	Roll-On/Roll-Off
RVCs	regional value chains
SEA-ME-WE	South East Asia–Middle East–Western Europe
SEZ	special economic zone
SIM	subscriber identity module
SKRL	Singapore-Kunming Rail Link
SOEs	State-owned enterprises
SMEs	small and medium-sized enterprises
SWF	sovereign wealth fund
TAGP	Trans-ASEAN Gas Pipeline
TEU	twenty-foot equivalent unit
UNCTAD	United Nations Conference on Trade and Development
WIR	World Investment Report
WSS	water supply and sanitation

OVERVIEW



OVERVIEW

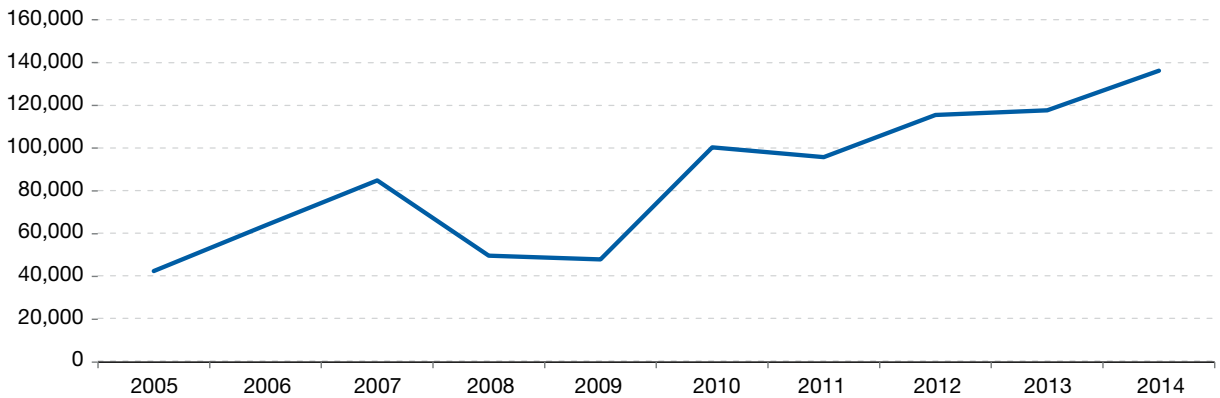
FDI DEVELOPMENT AND CORPORATE INVESTMENT STRATEGIES

FDI flows to ASEAN rose for the third consecutive year, from $117.7 billion in 2013 to $136.2 billion in 2014, despite a 16% decline in global flows (figure 1). This level exceeded inflows to China for the first time since 1993, making ASEAN the largest recipient of FDI in the developing world. Most Member States witnessed an increase in FDI flows last year.

A number of key developments contributed to the further annual rise in FDI. Foreign MNEs and other ASEAN companies continued to expand their operations in the region in a range of industries for a number of various reasons. Regional expansion strategies of foreign and ASEAN companies remain a key aspect of the region's investment landscape in 2014 and 2015. FDI in services increased significantly last year. The region's investment environment also improved further as more regional and national measures favourable to FDI were introduced or announced. Behind these motives are strong regional economic fundamentals such as cost advantages and market factors, including regional integration, attracting investment and influencing corporate strategy in ASEAN. The major sources of investment in 2014 remained largely the same as in 2013, with two-thirds of FDI continuing to come from the top five investment source regions and economies, namely the European Union (EU), intra-ASEAN and Japan, the United States as well as Hong Kong (China).

The rise in FDI in 2014 was also driven by an increase in intraregional investment and strong FDI flows from a majority of ASEAN's Dialogue Partners. They include Australia, China, the EU, the Republic of Korea and the United States. However, FDI flows from

Figure 1. **FDI flows to the region rose by 16%, to $136 billion in 2014 – making ASEAN the largest FDI recipient in the developing world**
(Millions of dollars)



Source: ASEAN Secretariat, ASEAN FDI Database (accessed 1 July 2015).

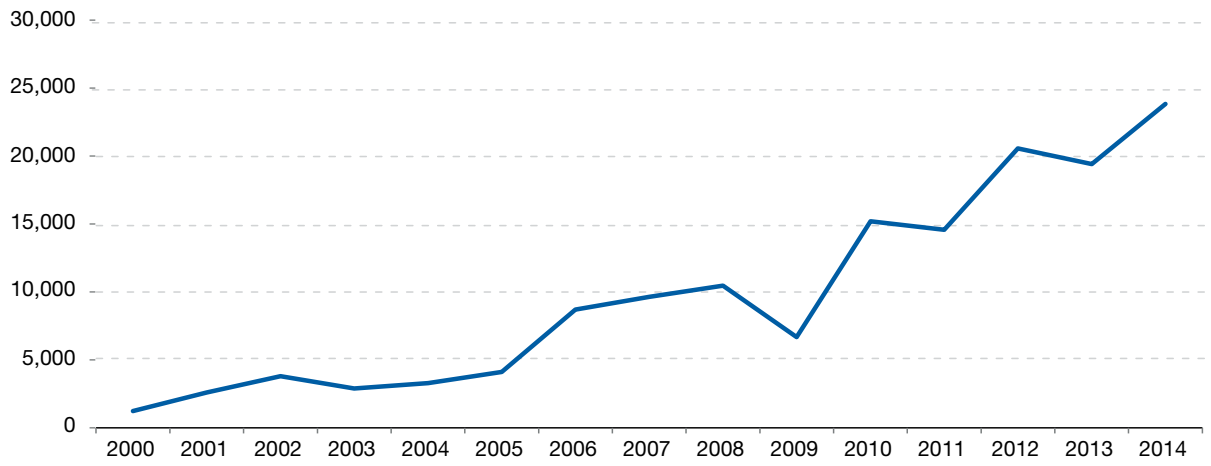
Japan to the region plummeted by 39%, to $13.4 billion, reflecting the general downward global FDI trend of Japanese investment in 2014. Notwithstanding the FDI decline, Japan remained the largest investor in manufacturing activities in the region last year. The EU was the largest investor as a whole, followed by ASEAN. Increased FDI from France, Luxembourg and the United Kingdom contributed to the rise in the EU's investment.

Intra-ASEAN investment rose by 26%, from $19.4 billion in 2013 to $24.4 billion in 2014 – accounting for 18% of total inflows into the region (figure 2). This upward intraregional investment trend suggests a growing interest of ASEAN companies in establishing a stronger regional presence, in particular in recent years, in light of emerging opportunities and the influence of the impending ASEAN Economic Community (AEC) 2015.

Manufacturing FDI declined to $22.2 billion from $33.3 billion in 2013 but this was compensated for by a strong surge in FDI in finance, from $28.3 billion in 2013 to $43.1 billion. FDI in agriculture also rose from $2.3 billion to $4.5 billion, while investment in the extractive industries declined from $8.0 billion to $7.3 billion. FDI from the EU and the United States dominated in finance, while investments by ASEAN companies were to the fore in the primary sector (agriculture and mining activities) and real estate.

A notable aspect of the changing landscape of FDI in ASEAN is the growing frequency of transfers of labour-intensive manufacturing activities from higher-cost locations in other Asian economies and within ASEAN to the CLMV (Cambodia, Lao PDR, Myanmar and Viet Nam) countries, as well as other ASEAN Member States such as Indonesia. This development is strengthening further regional production networks and regional value chains - boosting connectivity between CLMV countries and the other ASEAN Member States as production from the former is supplied to affiliates or customers based in the latter. This industrial connectivity is contributing to the development of supporting industries and

Figure 2. **Intra-ASEAN investment rose by 26% to $24.4 billion in 2014**
(Millions of dollars)



Source: ASEAN Secretariat, ASEAN FDI Database (accessed 1 July 2015).

increasing the region's manufacturing competitiveness, which draws on the complementary locational advantages increasingly being tapped by multinational enterprises (MNEs) and ASEAN companies. Furthermore, the rise in regional economic activities by MNEs and companies from the other ASEAN Member States is helping bridge the development divide in the region through investment.

In 2014–2015, ASEAN Member States continued to introduce measures favourable to investment. They included measures to make investing easier, increase transparency and improve the investment environment. Others included national investment policy reforms, industrial development policies, incentives and tax reforms, investment facilitation, streamlining of investment procedures, strengthening of institutional support for investors, establishment of more economic zones and infrastructure development. The ASEAN Member States are also involved with other investment-related agreements at the bilateral, plurilateral and regional levels, at various stages of negotiation and development. They include investment agreements for ASEAN free trade agreements with Dialogue Partners and the Regional Comprehensive Economic Partnership. Some Member States continue to negotiate and implement bilateral and plurilateral free trade agreements that include investment agreements or chapters, and bilateral investment treaties.

Achieving a fourth consecutive year of higher FDI inflows in 2015 is likely to pose a challenge for the region. Cross-border merger and acquisition (M&A) sales and FDI flows to ASEAN in the first half of 2015 were down, against the backdrop of global economic fragilities and slower regional growth. However, the level of inflows will remain high – close to the level of 2014. The outlook for 2016 is cautiously optimistic, but much depends on the health of the global economy and corporate investment plans as well as the delivery of the AEC benefits in both depth and scope. Supporting further investment into the region in 2016 and beyond are the region's strong macroeconomic fundamentals, economic resilience, increasingly affluent consumers and influences of regional integration, as well as the cost competitiveness of the region, the strong cash holdings of ASEAN companies and the continued regional investment expansion plans of investors. Various recent surveys of companies highlight that a growing number of MNEs have favourable perceptions of the region that have translated into investment. Many have investment plans that target the region in the next few years.

ASEAN is also a major source of FDI for other developing countries. Outward FDI flows from the region to the world rose by 19% in 2014, to $80 billion. In perspective, this is greater than the outward flows of France and Spain combined, and more than 2.5 times those of the Republic of Korea in 2014. Companies from the region are expected to continue to internationalize in 2015 and beyond, including using more M&A strategies in accessing markets – further strengthening South-South partnerships. The increasing financial strength of ASEAN MNEs – their strong profitability and cash holdings – is encouraging them to regionalize and internationalize. Emerging investment opportunities abroad are also driving investment overseas. The top 100 ASEAN companies by market capitalization had combined cash holdings of $228 billion and combined assets of nearly $3 trillion in 2014. Most of them have operations in other ASEAN Member States (table 1).

Table 1. **Top 100 ASEAN companies have strong assets and significant cash holdings, 2014** (Millions of dollars)

Company	Country	Industry	2014			
			Net income	Total assets	Market capitalization	Cash or near cash holding
Singapore Telecommunications	Singapore	Telecommunication	2,901	31,249	46,219	410
DBS Group Holdings	Singapore	Banks	3,194	332,653	38,447	14,733
Overseas-Chinese Banking Corp	Singapore	Banks	3,033	302,881	31,457	19,109
United Overseas Bank	Singapore	Banks	2,565	231,551	29,678	26,484
PTT	Thailand	Oil, gas and consumable fuels	1,718	54,062	28,120	6,199
Bank Central Asia	Indonesia	Banks	1,391	44,443	26,034	4,710
Malayan Banking	Malaysia	Banks	2,053	182,864	24,405	18,858
Bank Rakyat Indonesia	Indonesia	Banks	2,045	64,518	23,121	5,935
Advanced Info Service	Thailand	Telecommunication (wireless)	1,110	3,839	22,675	434
Telekomunikasi Indonesia	Indonesia	Telecommunication	1,235	11,335	22,629	1,424
Tenaga Nasional	Malaysia	Electric utilities	2,000	34,993	22,093	2,565
Avago Technologies	Singapore	Semiconductors	263	10,491	21,936	1,604
Bank Mandiri	Indonesia	Banks	1,676	68,788	20,227	5,746
Public Bank	Malaysia	Banks	1,381	98,735	20,181	3,220
Siam Commercial Bank	Thailand	Banks	1,642	82,033	18,771	1,282
Sime Darby	Malaysia	Industrial conglomerates	1,034	15,871	18,271	..
Axiata Group	Malaysia	Telecommunication (wireless)	718	14,030	17,279	1,457
Kasikornbank	Thailand	Banks	1,421	72,596	16,653	1,’764
Siam Cement	Thailand	Construction materials	1,035	14,154	16,335	579
Wilmar International	Singapore	Food products	1,156	43,558	15,642	3,127
Maxis	Malaysia	Telecommunication (wireless)	525	5,172	14,685	437
SM Investments Corp	Philippines	Industrial conglomerates	640	15,912	14,506	1,546
Philippine Long Distance Tel	Philippines	Telecommunication (wireless)	768	9,752	14,030	596
Digi.Com	Malaysia	Telecommunication (wireless)	621	1,229	13,700	150
PTT Explor & Prod Public Co	Thailand	Oil, gas and consumable fuels	662	23,328	13,511	3,947
CIMB Group Holdings Bhd	Malaysia	Banks	950	118,280	13,376	10,332
Thai Beverage	Thailand	Beverages	668	5,226	13,079	68
Petronas Gas	Malaysia	Gas utilities	563	3,787	12,523	182
Petronas Chemicals Group	Malaysia	Chemicals	754	8,129	12,452	2,584
Keppel Corp	Singapore	Industrial conglomerates	1,488	23,820	12,104	4,330
Perusahaan Gas Negara	Indonesia	Gas utilities	723	6,215	11,719	1,216
CP	Thailand	Food and staples retailing	313	9,918	11,601	980
IHH Healthcare	Malaysia	Health care	231	8,179	11,258	704
Bangkok Bank	Thailand	Banks	1,119	83,862	11,252	1,822
SM Prime Holdings	Philippines	Real estate	414	8,691	10,999	788
Ayala Land	Philippines	Real estate	333	8,693	10,689	641
Capitaland	Singapore	Real estate	916	33,301	10,641	2,043
Airports of Thailand	Thailand	Transportation infrastructure	379	4,741	10,525	216
IOI Corp	Malaysia	Food products	1,040	4,777	10,396	..
JG Summit Holdings	Philippines	Industrial conglomerates	411	12,489	10,352	838
Global Logistic Properties	Singapore	Real estate	685	13,947	10,025	1,446
Genting Singapore	Singapore	Hotels, restaurants and leisure	501	9,566	9,870	2,791
Singapore Airlines	Singapore	Airlines	286	17,995	9,786	3,826
Krung Thai Bank	Thailand	Banks	1,022	83,238	9,640	2,269
Ayala Corporation	Philippines	Diversified financial services	419	16,228	9,609	2,030
Genting	Malaysia	Hotels, restaurants and leisure	553	20,932	9,419	4,681
Gudang Garam	Indonesia	Tobacco	453	4,684	9,396	128
MISC	Malaysia	Marine	674	11,876	9,204	1,382
Bank Negara Indonesia	Indonesia	Banks	910	33,514	9,152	2,904
Universal Robina Corp	Philippines	Food products	262	1,734	9,078	224
BDO Unibank	Philippines	Banks	514	41,655	8,788	6,951
Great Eastern Holdings	Singapore	Insurance	694	49,579	8,572	2,457

Table 1. **Top 100 ASEAN companies have strong assets and significant cash holdings, 2014** (Millions of dollars) (concluded)

Company	Country	Industry	2014			
			Net income	Total assets	Market capitalization	Cash or near cash holding
Bank of the Philippine Islands	Philippines	Banks	406	32,414	8,262	5,598
Bangkok Dusit Med Service	Thailand	Health care	228	2,833	8,096	109
Singapore Tech Engineering	Singapore	Aerospace and defense	420	6,280	8,003	1,104
Sapurakencana Petroleum	Malaysia	Energy equipment and services	343	7,948	7,856	345
Hong Leong Bank	Malaysia	Banks	648	53,079	7,735	..
Semen Indonesia	Indonesia	Construction materials	469	2,761	7,731	397
Intouch Holdings	Thailand	Telecommunication (wireless)	455	1,662	7,672	90
Telekom Malaysia	Malaysia	Telecommunication	254	6,461	7,308	853
Aboitiz Power Corp	Philippines	Independent power producers	376	4,845	7,056	900
City Developments	Singapore	Real estate	608	14,872	7,050	2,817
PTT Global Chemical	Thailand	Chemicals	463	12,299	7,021	469
Dynasty Ceramic	Thailand	Building products	38	158	7,005	6
Total Access Communication	Thailand	Telecommunication (wireless)	330	3,234	6,943	177
Kalbe Farma	Indonesia	Pharmaceuticals	174	1,'000	6,901	153
Kuala Lumpur Kepong	Malaysia	Food products	307	3,928	6,842	395
AMMB Holdings	Malaysia	Banks	557	40,643	6,646	3,771
Genting Malaysia	Malaysia	Hotels, restaurants and leisure	363	5,940	6,591	791
Aboitiz Equity Ventures	Philippines	Industrial conglomerates	414	6,281	6,524	1,129
Manila Electric Company	Philippines	Electric utilities	407	6,014	6,449	1,553
Petrovietnam Gas Joint Stock	Viet Nam	Gas utilities	667	2,516	6,249	1,126
Central Pattana	Thailand	Real estate	225	2,705	6,205	76
Sembcorp Industries	Singapore	Industrial conglomerates	632	12,966	5,994	1,254
Singapore Exchange	Singapore	Finance	254	1,316	5,963	..
Big C Supercenter	Thailand	Food and staples retailing	223	3,123	5,941	347
RHB Capital	Malaysia	Banks	623	62,646	5,598	6,185
Charoen Pokphand	Thailand	Food products	325	12,664	5,472	1,021
Starhub	Singapore	Telecommunication (wireless)	292	1,500	5,412	199
Singapore Press Holdings	Singapore	Media	322	5,326	5,371	355
Capitaland Mall Trust	Singapore	Real estate investment trusts	489	7,442	5,332	853
Siam Makro	Thailand	Food and staples retailing	150	1,327	5,287	139
Hong Leong Financial Group	Malaysia	Banks	526	59,256	5,268	..
International Container Terminal Services	Philippines	Transportation infrastructure	182	3,401	5,235	194
YTL Corp	Malaysia	Multi-utilities	479	19,020	5,231	..
Sembcorp Marine	Singapore	Machinery	442	6,219	5,143	813
Globe Telecom	Philippines	Telecommunication (wireless)	301	4,012	5,133	375
Jollibee Foods Corp	Philippines	Hotels, restaurants and leisure	121	1,210	5,127	170
Alliance Global Group	Philippines	Industrial conglomerates	298	9,156	5,114	1,835
Metropolitan Bank & Trust	Philippines	Banks	453	35,864	5,092	5,594
Charoen Pokphand Indonesia	Indonesia	Food products	147	1,678	4,987	71
Petronas Dagangan	Malaysia	Oil, gas and consumable fuels	153	2,725	4,857	525
PPB Group	Malaysia	Food products	280	5,313	4,842	194
DMCI Holdings	Philippines	Industrial conglomerates	243	3,066	4,659	341
Astro Malaysia Holdings	Malaysia	Media	141	2,121	4,564	372
Vietnam Dairy Products Jsc	Viet Nam	Food products	286	1,205	4,467	71
Golden Agri-Resources	Singapore	Food products	114	14,667	4,458	323
Ascendas Real Estate Investment Trust	Singapore	Real estate investment trusts	383	5,848	4,317	30
SIA Engineering	Singapore	Transportation infrastructure	211	1,357	4,291	44
Comfortdelgro Corp	Singapore	Road and rail	224	3,949	4,199	623
Total			70,553	2,928,468	1,131,906	228,137

Source: UNCTAD 2015b, based on Bloomberg.

INFRASTRUCTURE INVESTMENT AND PRIVATE SECTOR PLAYERS IN ASEAN

Infrastructure plays an important role in the region's economic, social and environmental development, including through boosting connectivity. As the backbone of the economy in all the ASEAN Member States, it contributes to improving the region's investment environment for attracting FDI. Greater connectivity of national transport infrastructure enhances logistical efficiency and supports the growth of investment, trade and commerce. Investment in power infrastructure increases energy security, provides electricity to industrial estates in rural areas and is essential for achieving universal access for all. As with other infrastructure sectors, the provision of information and communication technology (ICT) infrastructure supports downstream businesses such as e-commerce and connects Member States with each other, as well as with the world. Infrastructure development plays an important role in reducing the transaction costs of doing business in the region.

ASEAN Member States have invested in infrastructure to varying degrees in terms of spending and development. However, further infrastructure investment is needed across a wide range of economic, social and environmental sectors if Member States are to achieve their economic plans and other objectives, including those related to national and regional connectivity. The private sector has been a significant player in the region's infrastructure development. The roles of banks, other financial institutions and donors of official development assistance (ODA) in supporting infrastructure development have also been important.

The infrastructure investment needs for the region through 2025 – covering power, transport, ICT, and water and sanitation – are huge. Some $110 billion a year will be needed for infrastructure investment in these sectors. Given the current spending by Member States, the infrastructure investment gap will be equally huge but resources need to be found if the gap is to be filled and future demand is to be met. The private sector can play a greater role to help bridge the gap. There is a need for a more concerted effort by all stakeholders to mobilize and channel investment from additional potential resources to infrastructure in the region. Filling the gap is possible. For instance, in addition to resources outside the region that can also be tapped, there is at least $10 trillion worth of assets in ASEAN Member States – mostly with the private sector – that can be potential sources of funding.

The private sector participates in the region's infrastructure development through a number of modalities. They include FDI, M&As, privatization, non-equity modalities (concessions and contracts), and partnership or consortium arrangements. Some modalities are more significant than others for private sector participation. The privatization of public infrastructure and the maturity of the M&A environment, including opportunities to acquire assets in a host country, can influence private sector participation. Firms' experience, skill sets and ability to win contracts are additional influences. MNEs from developed and developing economies, including from ASEAN, are participating in infrastructure

development in the region through contractual arrangements, whether as engineering, procurement and construction (EPC) contractors or subcontractors (table 2). They also invest, build, operate and manage infrastructure assets. Concessionary arrangements and contracts, a form of NEM, continue to be key features of MNEs' participation in infrastructure development in ASEAN.

Table 2. MNEs from both developed and developing economies participate in ASEAN infrastructure development (Selected cases)

MNEs	Home country	Industry
Sumitomo Corporation	Japan	Power and electricity
Mitsubishi Corporation	Japan	Power and electricity
Itochu Corporation	Japan	Power and electricity
Kyushu Electric Power	Japan	Power and electricity
Toshiba	Japan	Power and electricity
Electric Power Development Company	Japan	Power and electricity
Marubeni	Japan	Power and electricity
Ormat International	United States	Power and electricity
APR Energy	United States	Power and electricity
AES Corporation	United States	Power and electricity
GE	United States	Power and electricity
Xylem	United States	Power and electricity
ACO Investment Group	United States	Power and electricity
SunEdison	United States	Power and electricity
Open Systems International	United States	Power and electricity
Alstom	France	Power and electricity
Prysmian Power Link SRL	Italy	Power and electricity
Conergy AG	Germany	Power and electricity
Statkraft Norfund Power Invest AS	Norway	Power and electricity
China Southern Grid International	China	Power and electricity
China Huadian Corporation	China	Power and electricity
China National Heavy Machinery Corporation	China	Power and electricity
China Datang Corporation	China	Power and electricity
Hydrolancang International Company	China	Power and electricity
Southern Power Grid Company Limited	China	Power and electricity
China Power International Holdings Limited	China	Power and electricity
Korean Electric Power Corporation	Republic of Korea	Power and electricity
Hyundai Engineering Company	Republic of Korea	Power and electricity
Daelim Industrial Company	Republic of Korea	Power and electricity
Doosan Heavy Industries and Construction	Republic of Korea	Power and electricity
SK Engineering and Construction	Republic of Korea	Power and electricity
South Korea Electric Power Corporation	Republic of Korea	Power and electricity
Korea Western Power	Republic of Korea	Power and electricity

Table 2. **MNEs from both developed and developing economies participate in ASEAN infrastructure development** (Selected cases) (concluded)

MNEs	Home country	Industry
Sumitomo Mitsui Construction	Japan	Transport
Mitsui Company Limited	Japan	Transport
Tokyu Corporation	Japan	Transport
Obayashi Corporation	Japan	Transport
Shimizu Corporation	Japan	Transport
Takenaka Corporation	Japan	Transport
GE	United States	Transport
Alstom Transport	France	Transport
Invensys Rail	United Kingdom	Transport
Damen	Netherlands	Transport
A.P. Moeller-Maersk	Denmark	Transport
Fraport AG	Germany	Transport
Vinci Group	France	Transport
TUV Rheinland Group	Germany	Transport
China Railway Group	China	Transport
Guangxi Beibu International Port Group	China	Transport
China Merchants Group	China	Transport
China CAMC Engineering Company	China	Transport
China Harbour Engineering Company	China	Transport
Shanghai Tunnel Engineering Company	China	Transport
China Railway No. 5 Engineering Group Company	China	Transport
Yunnan Sunny Road and Bridge Company	China	Transport
Lotte Engineering and Construction	Republic of Korea	Transport
Samsung C&T Corporation	Republic of Korea	Transport
Daelim Industrial Company	Republic of Korea	Transport
Daewoo Engineering and Construction Company	Republic of Korea	Transport
NTT Docomo	Japan	Telecommunication
KDDI	Japan	Telecommunication
Huawei	China	Telecommunication
ZTE	China	Telecommunication
China Telecom Global Limited	China	Telecommunication
China Telecommunications Corporation	China	Telecommunication

Source: UNCTAD, based on Table 2.9.

MNEs from developed countries have been involved in infrastructure development in ASEAN for a long time. More recently, Chinese infrastructure-related companies have become notable players in building infrastructure in ASEAN in a very short period of time. These Chinese players not only operate as contractors, but also invest in, own and operate infrastructure. Some have an extensive regional presence through contracts and subsidiaries. In 2014, 62 Chinese companies were among the top 250 international

contractors in terms of revenues, and a majority of these companies are in or are expanding their operations in ASEAN.

The number of ASEAN companies involved in infrastructure development is increasing; such companies are also investing outside the region and building infrastructure in other developing countries. In addition to winning contracts, infrastructure-related companies from Indonesia, Malaysia, the Philippines, Singapore, Thailand and Viet Nam have established subsidiaries in other ASEAN Member States (table 3).

Various types of infrastructure financiers have been playing an important role in providing or arranging finance for infrastructure development in ASEAN. They include ODA donors, MDBs, specialized infrastructure funds, private equity investors, commercial banks and sovereign wealth funds. A significant part of financing for infrastructure projects in the region comes from these sources.

Table 3. Increasing regional presence from some infrastructure–related companies from ASEAN, 2014

Name of company	Home country	Industry	Market capitalization ($ million)	Total revenues ($ million)	ASEAN locations of selected subsidiaries or contract operations
Adhi Karya	Indonesia	Construction, engineering	249	698	Singapore
Axiata Group	Malaysia	Telecommunication	12,583	5,398	Cambodia, Singapore
Ayala Land	Philippines	Real estate	10,898	2,011	Malaysia
Bangkok Dusit Medical Services	Thailand	Hospitals	8,347	1,720	Cambodia, Singapore
Banpu	Thailand	Mining, electricity	1,607	3,098	Indonesia, Singapore, Thailand
Bukit Asam	Indonesia	Mining, electricity	948	1,053	Other ASEAN Member States
CapitaLand	Singapore	Real estate	8,438	3,376	Malaysia, Viet Nam
City Developments	Singapore	Real estate	5,275	3,118	Indonesia, Malaysia, Myanmar, Philippines, Thailand, Viet Nam
EGAT	Thailand	Electricity	..	16,508	Lao PDR, Myanmar
EGCO	Thailand	Electricity	..	78	Indonesia, Lao PDR, Philippines and Thailand
Enco Holdings	Malaysia	Engineering	..	..	Indonesia and Thailand
First Philippine Holdings Corporation	Philippines	Conglomerate	2,260	874	Indonesia, Singapore, Thailand
Gamuda	Malaysia	Infrastructure	2,675	775	Viet Nam
Genting Berhad	Malaysia	Conglomerate (Electricity)	6,912	5,486	Indonesia
Gunkul	Thailand	Electricity	660	91	Singapore
IHH Healthcare	Malaysia	Hospitals	11,457	2,175	Indonesia, Singapore
International Container Terminal	Philippines	Harbour facilities	3,945	1,119	Indonesia
Intouch Holdings	Thailand	Telecommunication	6,893	315	Cambodia, Singapore
Italian-Thai Development	Thailand	Infrastructure	1,231	1,477	Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Viet Nam
Keppel Corporation	Singapore	Conglomerate[a]	9,190	10,086	Indonesia, Malaysia, Myanmar, Philippines, Thailand, Viet Nam
KPJ Healthcare	Malaysia	Hospitals	1,056	766	Indonesia, Singapore, Thailand

Table 3. Increasing regional presence from some infrastructure–related companies from ASEAN, 2014 (concluded)

Name of company	Home country	Industry	Market capitalization ($ million)	Total revenues ($ million)	ASEAN locations of selected subsidiaries or contract operations
Malaysia Airports	Malaysia	Airports	2,252	991	Manages airports in Cambodia and outside ASEAN
Manila Water	Philippines	Water	918	367	Singapore, Viet Nam
Maxis	Malaysia	Telecommunication	11,985	2,429	Indonesia, Singapore
Metro Pacific Investments Corp.	Philippines	Road construction	2,997	932	Indonesia, Thailand, Viet Nam
Muhibbha	Malaysia	Infrastructure, engineering	..	..	Cambodia, Philippines, Singapore
Nusa Konstruksi Enjiniring Tbk	Indonesia	Construction, engineering	27	165	Malaysia
Philippine Long Distance Telephone	Philippines	Telecommunication	12,006	3,832	Malaysia
Port of Singapore Authority	Singapore	Ports	..	2,877	Indonesia, Thailand, Viet Nam
PTT	Thailand	Oil and gas	20,174	86,545	Cambodia, Indonesia, Malaysia, Myanmar, Philippines, Thailand, Viet Nam
Ratchaburi Electricity Generating Holding	Thailand	Electricity	2,135	1,702	Cambodia, Lao PDR, Singapore
Salcon	Singapore	Engineering	106	77	Singapore, Viet Nam
San Miguel	Philippines	Conglomerate[a]	2,328	17,569	Malaysia, Singapore, Thailand, Viet Nam
Sembcorp Industries	Singapore	Conglomerate[a]	4,432	8,317	Indonesia, Malaysia, Philippines, Viet Nam
Semen Indonesia	Indonesia	Building materials	4,243	2,182	Viet Nam
Siam Cement	Thailand	Building materials	1,384	14,945	Cambodia, Indonesia, Malaysia, Philippines, Lao PDR, Singapore, Viet Nam
Singapore Telecommunication	Singapore	Telecommunication	42,060	12,618	Indonesia, Philippines, Malaysia, Philippines, Thailand
Supalai PCL	Thailand	Real estate	882	566	Philippines, Singapore
Telekom Malaysia	Malaysia	Telecommunication	6,097	3,256	Indonesia, Singapore
Telekomunikasi Indonesia	Indonesia	Telecommunication	20,081	7,307	Singapore
Tenaga Nasional	Malaysia	Electricity	16,103	13,760	Cambodia, Indonesia, Lao PDR, Thailand, Viet Nam
Total Access Communication	Thailand	Telecommunication	4,445	2,752	Malaysia, Singapore
Truba Alam Manunggal Engineering	Indonesia	Construction, engineering	57	105	Singapore
United Envirotech	Singapore	Engineering	1,224	267	Malaysia
UPP Holdings	Singapore	Electricity	89	88	Malaysia
Viettel	Viet Nam	Telecommunication	..	..	Cambodia, Lao PDR
YTL	Malaysia	Utilities	4,043	6,245	Cambodia, Indonesia, Singapore, Thailand

Source: UNCTAD 2015b, based on companies' information and Orbis.

Note: real estate includes commercial and industrial estates.

[a] Includes various infrastructure.

INFRASTRUCTURE VALUE CHAINS AND MOTIVATIONS OF MNES IN ASEAN

Infrastructure value chains in ASEAN are complex and involve networks of players. In segments of these chains, MNEs contribute specific technology and skill sets that support the delivery of infrastructure. Among other roles, MNEs participate as equipment and material suppliers; solution providers; engineering, procurement and construction (EPC) companies; subcontractors; owners or sponsors; and project financiers (figure 3).

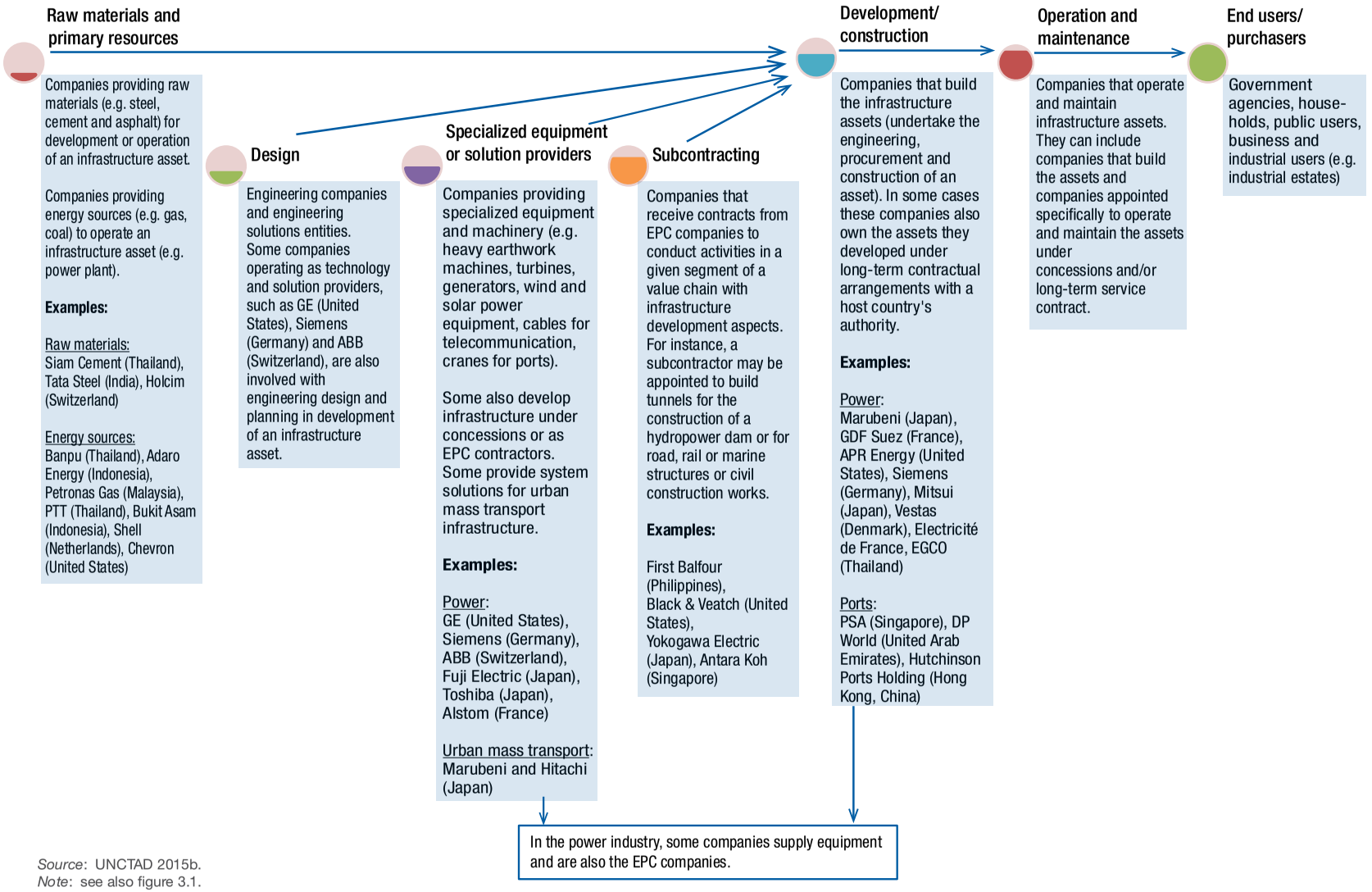
MNEs' motives for investing in infrastructure in ASEAN vary. Winning an infrastructure contract is an important consideration that can influence the establishment of a subsidiary or representative office in a host country or in a region. Most motives are related to market and strategic considerations. Some MNEs invest in infrastructure to support their core business; for instance, shipping companies develop port terminals or telecommunication service providers establish ICT infrastructure in order to achieve overall operational efficiency. Some upstream MNEs invest in downstream infrastructure to establish an integrated business – for example, from mining to power generation. Others invest to diversify into or across infrastructure chains or segments to generate revenues, reduce risk or increase corporate valuation. Yet others pursue a horizontal expansion strategy, investing overseas in order to maximize returns from exploiting their proprietary advantage, knowledge or skill sets (e.g. airport companies invest in or build airport infrastructure abroad).

In general, the value chain of infrastructure industries ranges from design, construction and development to operation and management (O&M). Different companies may be involved at each stage. In some cases, the same company may be involved across a number of segments from development to O&M, which reflects such companies' integrated business strategy, diversified skills and ability to win multiple contracts. Other companies might be involved at the construction or development stages; and, in a similar vein, companies may also provide only equipment or solutions to EPC contractors in the value chain. Each infrastructure sector has its own specific features and interconnections of different players, involving both local and foreign-owned entities. In some countries and sectors, key value chain segments are dominated by MNEs (e.g. EPC contractors, equipment suppliers, solution providers).

In electricity infrastructure across ASEAN, MNEs frequently operate as EPC contractors of power plants, transmission lines and power stations. Some also invest in and own power plants. These MNEs come from both developed and developing economies.

The telecommunication value chain can be broadly segmented into the provision and construction of infrastructure, the operation of telecommunication services and the provision of value added services. Of particular importance are the inputs used for investment in telecommunication infrastructure. Operators are at the centre of the telecommunication

Figure 3. **Players in different segments of an infrastructure value chain are interconnected (a simplified illustration)**



Source: UNCTAD 2015b.
Note: see also figure 3.1.

sector value chain. They make the decisions regarding infrastructure investment, users subscribe to their services, and third parties use their networks to provide add-on applications. The starting point for an analysis of ASEAN's telecommunication segmentation is the operators themselves, particularly retail operators that have facility-based licenses. The ASEAN telecommunication service market has two salient features. One is a relatively high level of privatization. Almost 60% of telecommunication operators are private or partly private entities. The second is foreign involvement with major telecommunication MNEs investing in the region, including supplying ICT equipment and system solutions.

The transport infrastructure value chain is also complex. In ports, for instance, it involves engineering design, construction, development, equipment and material supply, and road and rail construction both in and linking to the port. In road infrastructure, a similar sequence of value chain segments exists. Aside from investors in ports, other players also contribute to ports development by designing or building them. Foreign and local companies in ASEAN also play an important role in airports development in the region. For urban mass rapid transportation systems in the region, a portfolio of local and foreign companies with different skill sets work together to deliver the infrastructure. They include companies contracted for engineering design, rail network construction, station development, civil construction works, tunneling and production of equipment and system solutions, including train sets. A combination of players is also involved at different stages of the road and bridge development process. They include companies providing services for technical design, materials, construction, subcontracting, tunneling, equipment manufacturing and supply, and technology or solution systems.

The strong interconnection of ICT and other downstream businesses has been well documented. The value chain of ICT, in particular telecommunication infrastructure, extends to downstream business operations such as e-commerce. Without ICT infrastructure, e-commerce would not exist in its present form. E-commerce is increasingly an important platform for trade, commerce and business development in the region, which is an important channel for promoting entrepreneurship and small and medium-size enterprises. More and more goods and services are delivered over ICT networks in ASEAN.

Understanding the value chain of infrastructure, the interconnection of different players and their motives for participation is essential. Understanding who plays what roles in which segments of the chains can help governments design or package infrastructure projects for fund raising or skill-acquiring purposes.

INFRASTRUCTURE AND ECONOMIC CONNECTIVITY IN ASEAN

Infrastructure is an important driver of regional connectivity in ASEAN. But connectivity is not confined to just physical aspects or through infrastructure. Regional economic connectivity through production, investment and trade carried out by MNEs and ASEAN companies operating in the region is just as important.

Regional physical connectivity in the region is shaped by development taking place at three levels: nationally, subregionally and regionally. It is also taking shape in three interrelated sectors or clusters of industries: infrastructure, infrastructure-enabled industry and infrastructure services, which have implications for attracting investment. These three levels are not just closely related but also mutually connected. In each of these infrastructure-related areas, foreign and local companies are involved. They help build, own, invest, manage and finance projects. Other sources of regional connectivity are also important: they include institutional and people-to-people connections, which are not covered in this report.

Aside from contributions from national and subregional infrastructure development, ASEAN is also increasingly connected through various regional projects and infrastructure cooperation arrangements among Member States. They include the ASEAN Power Grid, the Trans-ASEAN Gas Pipeline, the ASEAN Highway Network, the ASEAN Single Aviation Market, and the many intra-country bridge and road links. Other developments – such as the growing number of power purchase agreements, the Singapore–Kunming Rail Link (SKRL) network and the ICT cable links, including undersea cable connection projects that involve various ASEAN Member States – are providing further impetus for regional physical connectivity.

ASEAN is also increasingly connected through economic development, in particular through regional value chains and regional production networks of MNEs and ASEAN companies operating in the region. These companies are tapping the complementary locational advantages offered by the region, which are also made possible by strong institutional development that has helped lower transaction costs (e.g. zero tariffs for intra-ASEAN imports). In achieving production efficiency, MNEs and ASEAN companies operating through a web of producers, contract manufacturers, suppliers and through intra- and inter-firm linkages – where many of these players operate in different ASEAN Member States or also have multiple operations across the region – are contributing to regional connectivity.

A ‘connected ASEAN’ has important implications. It will increase further the competitiveness of the region, enhance production efficiency, reduce transaction costs and attract FDI. Infrastructure connectivity facilitates easier movement of people and goods, reduces travel time, enables access to interconnected grid-based electricity, ensures energy security and provides cost-saving solutions to meeting the region’s growing energy needs. Infrastructure connectivity also generates spillover impacts on the development of

downstream businesses and other economic activities that are dependent on the provision of quality infrastructure. They contribute to downstream infrastructure-enabled business development such as in logistics, business process outsourcing, tourism and e-commerce, all of which have implications for business-to-business and regional connectivity.

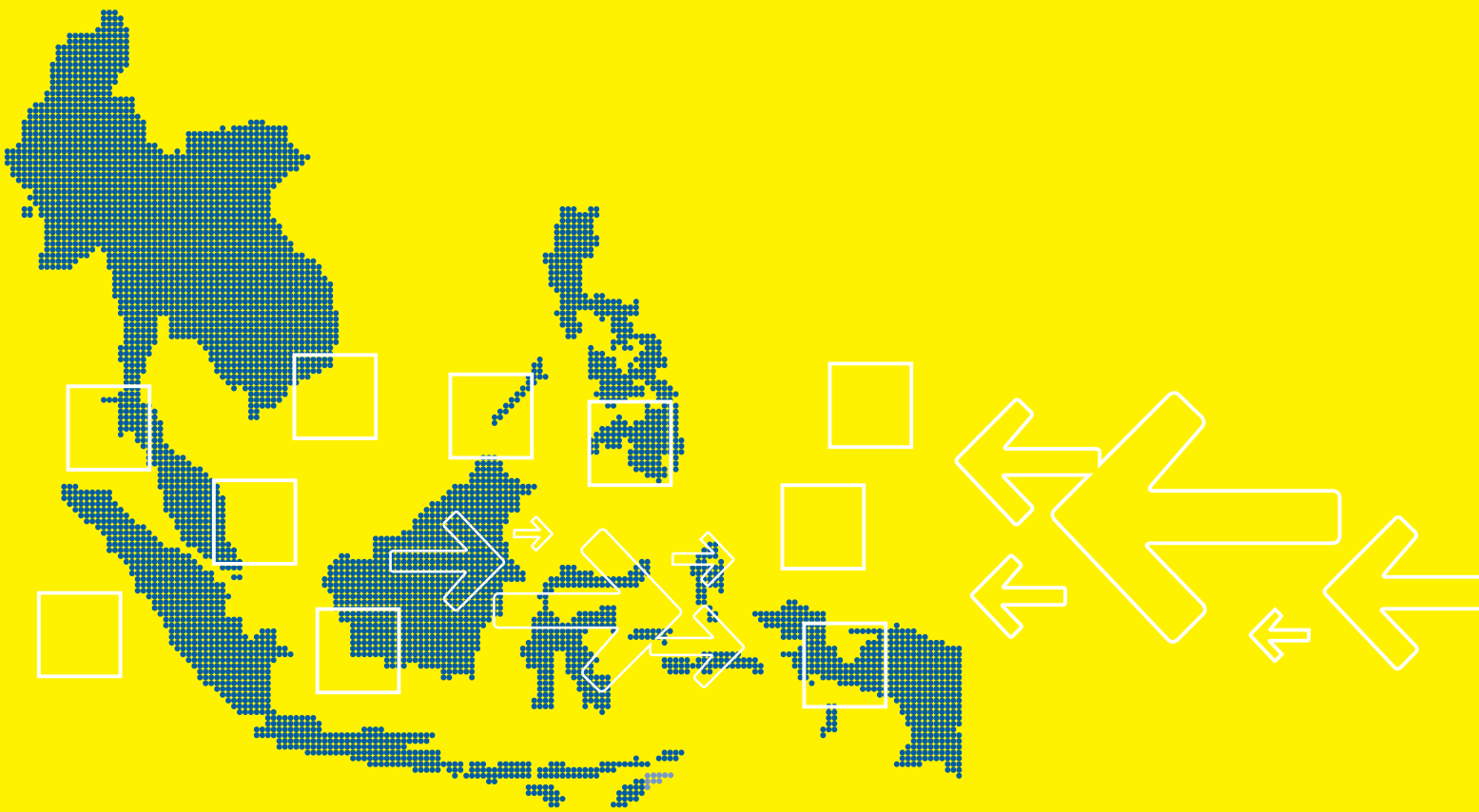
With completed projects, significant plans and ongoing infrastructure development across the region, the landscape of ASEAN physical connectivity is expected to be considerably more densely drawn by 2030 than it is today. For example, the electrification rate is expected to reach nearly 100%, providing universal access to all in the region by 2030. More grid interconnections have been agreed and most are to be completed by 2026, which involves various ASEAN Member States. The ICT penetration rate is expected to rise significantly, providing modern connections to more homes and industries, and thus supporting development of more competitive downstream infrastructure-led businesses. In transport, the SKRL – which involves several ASEAN Member States – is expected to significantly reduce travel time and generate benefits along the route. With the completion of the last missing national roads in the AHN in 2015, ASEAN Member States are now physically interconnected by 38,400 km of road routes. Air transportation is expected to grow rapidly as a consequence of the increasingly affluent society, greater ASEAN connectivity and growing regional cooperation to realize a single ASEAN aviation market. ASEAN Member States are upgrading and expanding their major airports to cope with rising demand. The numbers of ASEAN based carriers including budget airlines have grown and the numbers of planes operated by them increased rapidly in recent years – supporting greater movement of people across the region.

On regional economic connectivity, local firms and foreign MNEs have been key actors – contributing through their activities in regional production networks and regional value chains involving different ASEAN Member States. The interrelationship of MNEs, suppliers, contract manufacturers, and inter- and intra-firm linkages will further strengthen regional connectivity. With a connected ASEAN, the environment for regional value chain and production network operations will become even more conducive, which in turn will encourage more such activities, strengthening further ASEAN's integration.

In summary, ASEAN Member States are increasingly interconnected, both physically and economically. This growing regional connectivity has important implications for building competitiveness, for achieving regional integration and for realizing the goals of the AEC. The private sector – MNEs and ASEAN companies – has been and will remain a central contributor to a progressively connected ASEAN in the future.

PART ONE

FDI AND MNEs' DEVELOPMENT IN ASEAN



CHAPTER 1

FDI DEVELOPMENT AND CORPORATE INVESTMENT STRATEGIES

1.1. Introduction

FDI flows to ASEAN rose for the third consecutive year, to $136.2 billion, in 2014. A number of key developments contributed to the further annual rise in FDI. MNEs and other ASEAN companies continued to expand their operations in the region, and some also announced plans to invest more in the post–AEC 2015 environment as the region establishes a single market and production base. Intra-ASEAN investment remained strong and growing, with ASEAN companies using more greenfield strategies. The CLMV countries (Cambodia, Lao PDR, Myanmar and Viet Nam) attracted higher levels of FDI, including in infrastructure and manufacturing activities. FDI in services, in particular finance, rose significantly. The region's investment environment improved further as regional and national measures favourable to FDI were introduced or announced.

This chapter analyses FDI development and corporate investment activities in ASEAN in 2014 and the first half of 2015. It examines FDI into ASEAN, intra-ASEAN investment, cross-border M&As and the operating strategies of foreign and regional MNEs.

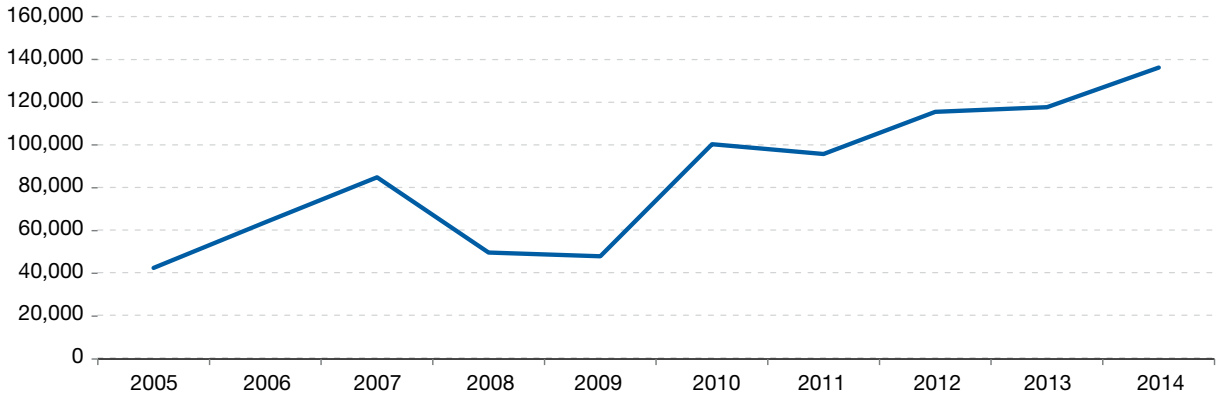
1.2. FDI trends and developments in 2014

The region saw the strongest rise in FDI inflows in 2014 with levels exceeding inflows to China for the first time since 1993, making ASEAN the largest recipient of FDI in the developing world. FDI flows into the region rose by 16%, from $117.7 billion in 2013 to $136.2 billion in 2014, despite the fragility of the global economy and a 16% decline in global flows (figure 1.1). Most ASEAN Member States witnessed an increase in FDI flows, while a few recorded a small decline (annex table 1.1). Strong regional economic fundamentals, cost advantages and market factors including regional integration were the key forces attracting investment and influencing corporate strategy in ASEAN (section 1.2.4). Major sources of investment in 2014 remained largely the same as in 2013, with two-thirds of FDI continuing to come from the top five investors (table 1.1). Some 76% of FDI into the region last year came from the top 10 economies.[1] China, with increased FDI into the region, continued to dominate in Cambodia, Lao PDR and Myanmar, but significant investment by Korean electronic MNEs pushed the Republic of Korea to become the largest investor in Viet Nam that year.

1.2.1. FDI in ASEAN

The rise in FDI in the region in 2014 was driven by a 26% increase in intraregional investment and strong FDI inflows from a majority of Dialogue Partners. In

Figure I.1. **FDI flows to the region rose by 16%, to $136 billion in 2014 – making ASEAN the largest FDI recipient in the developing world**
(Millions of dollars)



Source: ASEAN Secretariat, ASEAN FDI Database (accessed 1 July 2015).

particular, FDI flows from the United States rose by 165%, followed by increases from Australia (63%), the European Union (EU) (31%), the Republic of Korea (22%) and China (31%). Investment from Hong Kong (China) rose by 82%, to $9.5 billion (annex table 1.2). However, FDI flows from Japan to the region plummeted by 39%, to $13.4 billion, reflecting the general downward global trend of Japanese FDI in 2014. The EU was the largest investor as a whole, followed by ASEAN. Increased FDI from France, Luxembourg and the United Kingdom contributed to the rise in the EU's investment in the region.

Inflows concentrated in finance and services, including in infrastructure. Manufacturing FDI declined to $22.2 billion from $33.3 billion in 2013 but was compensated by a strong surge in FDI in finance, from $28.3 billion in 2013 to $43.1 billion in 2014. FDI in agriculture rose from $2.3 billion to $4.5 billion, while investment into the extractive industry declined from $8.0 billion to $7.3 billion.

FDI from different source countries concentrated in different industries. EU investors were active in finance ($13.9 billion), manufacturing ($4.2 billion) and the extractive industry ($2.3 billion). These three industries accounted for 70% of the EU's FDI into the region in 2014. A majority of the investment from Australia, Canada, Hong Kong (China), India, Taiwan Province of China and the United States was also in finance. The European Union, United States and Hong Kong (China) contributed 56% of investment in the finance industry.

Asian investors, including those from Japan and the Republic of Korea, continued to have significant investment in the manufacturing industry. FDI from China flowed primarily to real estate, finance, and wholesale and retail trade.

Intra-ASEAN investments were particularly strong in manufacturing ($6.6 billion) and real estate ($4.6 billion). Investment from within ASEAN dominated in the primary sector (agriculture and forestry), with a 146% rise, from $1.6 billion in 2013 to $3.9 billion in

Table 1.1. The top 5 investors accounted for 65% of FDI flows and the top 5 industry recipients accounted for 73% in 2014
(Millions of dollars)

Investing country			
2013		2014	
Economy	Amount	Economy	Amount
European Union	22,255.7	European Union	29,268.5
Japan	21,766.1	ASEAN	24,377.4
ASEAN	19,399.6	Japan	13,381.1
China	6,778.5	United States	13,042.0
Hong Kong (China)	5,230.2	Hong Kong (China)	9,504.9
Total top 5	$75,430.1	Total top 5	$89,574.9
Top 5 share of total FDI flows in ASEAN	64%	Top 5 share of total FDI flows in ASEAN	66%

Industry recipient			
2013		2014	
Industry	Amount	Industry	Amount
Manufacturing	33,342.1	Finance	43,052.2
Finance	28,263.7	Manufacturing	22,215.3
Wholesale & retail trade	13,946.6	Wholesale & retail trade	17,055.2
Real estate	9,821.5	Real estate	10,040.0
Extractive activities (mining & quarrying)	8,042.2	Extractive activities (mining & quarrying)	7,295.1
Total top 5	$93,416.1	Total top 5	$99,657.9
Top 5 share of total FDI flows in ASEAN	79%	Top 5 share of total FDI flows in ASEAN	73%

Source: ASEAN Secretariat, ASEAN FDI Database (accessed 1 July 2015).

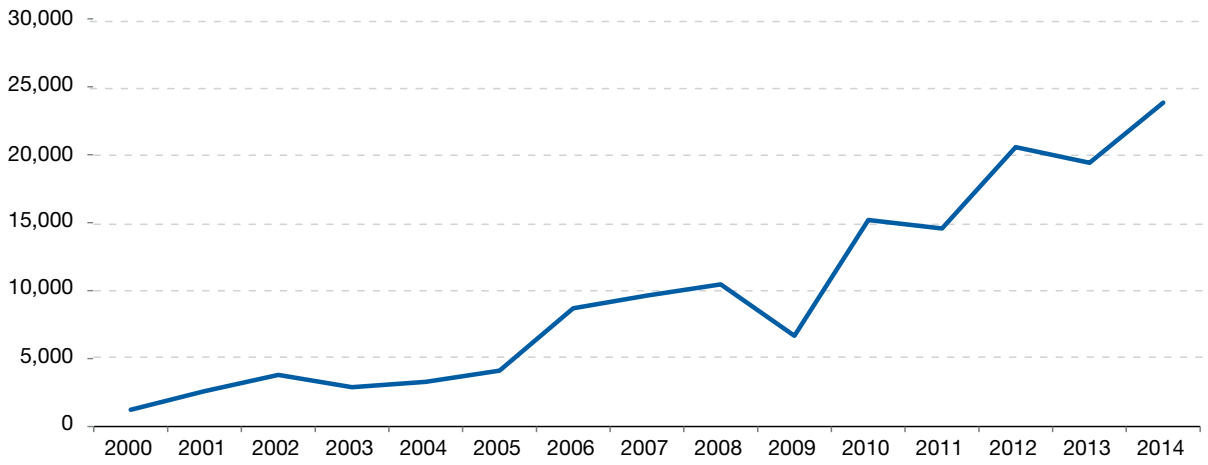
2014. Intra-ASEAN investment alone accounted for some 88% of total FDI flows into this economic sector in 2014. These three industries (manufacturing, real estate, agriculture) received 62% of all investment originating within the region.

In the extractive industry, the European Union, ASEAN and China were the three largest investors. Their combined $4.6 billion investment contributed 63% of FDI inflows into this industry. Active foreign participation through contractual arrangements and direct investments is contributing to the growth of activities in the infrastructure industry. FDI flows in construction, real estate and information and communication technology (ICT) rose (annex table 1.2). Companies from Asia and ASEAN are major players in the infrastructure industry, including real estate (chapter 2).

1.2.2. Intra-ASEAN investment

Intra-ASEAN investment rose from $19.4 billion in 2013 to $24.4 billion in 2014, accounting for 18% of total inflows into the region (figure 1.2, annex table 1.2). This upward intraregional trend suggests a growing interest of ASEAN companies in establishing a stronger regional presence, particularly in recent years, in light of emerging opportunities and AEC-2015 influences.

Figure I.2. **Intra-ASEAN investment rose by 26% to $24.4 billion in 2014**
(Millions of dollars)



Source: ASEAN Secretariat, ASEAN FDI Database (accessed 1 July 2015).

Intraregional investment is a major source of FDI for the region. For instance, ASEAN was the largest investor in Indonesia, accounting for 60% of FDI flows into that Member State last year, primarily in agriculture, manufacturing and finance. ASEAN investments in CLMV countries were also significant. In Viet Nam they were mainly in manufacturing, while in Cambodia they were mainly in agriculture.

Investors from different Member States dominated in different industries. Singapore was the largest source of regional investment in a number of industries; Malaysia led in investment in construction, transportation and storage, and ICT.

ASEAN companies also invest in the region through mergers and acquisitions (M&As), which contributed to a stronger intraregional investment scenario. Singaporean and Malaysian companies were active regional acquirers in a range of industries (section 1.3).

The intraregional analysis for 2014 highlights a few important developments:

i. Malaysian investors continued to be active in infrastructure-related industries, including in real estate and construction activities (table 1.2). They do so to expand markets and diversify revenue sources, given the limited home market. Investment from Malaysia rose by 146% to $3.9 billion, primarily in real estate, services and ICT.

ii. Thai companies, while continuing to invest regionally, were less active in cross-border M&A activities, which contrasted significantly with the situation in 2013 (section 1.3.3). Thai companies made only $1.6 billion in acquisitions in ASEAN in 2014 as compared with $13.3 billion in 2013. However, Thai direct investment in the region rose from $131 million to $818 million in 2014; with most investment in manufacturing activities, followed by finance and mining.

iii. Companies from Viet Nam continued to focus on investment in agriculture and extractive industries in neighbouring Member States such as Cambodia and Lao PDR.

Table 1.2. Intra-ASEAN investments rose, especially in key industries (Millions of dollars)

Source country 2013	Brunei Darussalam	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Viet Nam	Suppressed data	Total
Agriculture, forestry, and fishing	0.1	..	1.1	..	145.3	..	..	1,303.4	33.3	116.2	..	1,599.3
Mining and quarrying	0.7	..	20.0	..	(5.9)	..	(0.8)	206.0	129.9	129.4	..	479.3
Manufacturing	27.6	(0.7)	128.0	0.1	305.3	(0.4)	(38.5)	5,535.7	(17.1)	16.1	(148.9)	5,807.2
Electricity, gas, steam and air conditioning supply	3.2	..	1.5	(0.2)	14.7	..	..	213.1	15.7	..	..	248.0
Water supply; sewerage and waste management	0.1	..	..	..	1.0	..	..	23.7	0.4	..	..	25.1
Construction	0.3	..	0.2	(26.1)	(24.5)	..	0.4	27.8	0.8	0.5	0.9	(19.6)
Wholesale and retail trade; repair of motor vehicles and cycles	1.5	0.1	(21.1)	..	126.0	10.5	8.3	474.4	47.4	7.4	0.6	655.0
Transportation and storage	0.1	..	23.1	..	266.8	..	..	10.5	(40.3)	(0.3)	11.3	271.1
Accomodation and food service activities	(2.6)	..	(0.7)	..	10.3	..	..	101.5	1.9	4.1	..	114.4
Information and communication	0.2	..	1.5	..	322.5	..	0.6	63.6	0.2	0.5	..	389.0
Financial and Insurance activities	0.4	..	361.0	(19.4)	(1,186.8)	..	125.4	3,352.1	(594.4)	(61.9)	959.0	2,935.4
Real estate activities	2.0	0.2	1,784.9	1.0	1,218.6	80.6	(69.0)	1,694.6	7.4	57.1	26.7	4,804.0
Professional, scientific and technical activities	1.3	..	10.4	..	2.0	..	(0.8)	57.5	4.2	1.5	..	76.2
Administrative and support service activities	..	..	..	..	1.5	..	..	106.5	(3.6)	0.1	..	104.5
Education	0.2	..	0.1	..	0.3	..	..	12.8	0.9	..	..	14.4
Human health and social work activities	0.1	..	0.1	..	0.2	..	..	14.4	0.7	..	..	15.5
Arts, entertainment and recreation	0.1	0.1	..	..	0.1	..	..	(1.0)	0.4	..	..	(0.3)
Other services	36.5	2.0	55.9	..	370.6	3.8	(508.5)	537.4	31.9	60.0	(0.2)	589.5
Others/Unspecified	..	..	..	..	..	..	..	..	..	..	..	104.6
Data suppressed by a Member State for confidential reason	781.4	..	(169.5)	..	..	(2.0)	23.8	..	16.7	9.4	..	..
Myanmar's data	0.7	..	16.4	..	4.0	..	..	654.8	494.5	16.4	..	1'186.8
Intra-ASEAN investment from:	853.9	1.7	2'212.8	(44.6)	1,572.1	92.5	(458.9)	14,388.7	130.7	356.5	894.4	19,399.3

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Table 1.2. Intra-ASEAN investments rose, especially in key industries (Millions of dollars) (concluded)

Source country 2014	Brunei Darussalam	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Viet Nam	Suppressed data	Total
Agriculture, forestry, and fishing	0.2	..	17.3	..	162.7	..	0.1	3,575.4	10.9	162.3	..	3,928.9
Mining and quarrying	1.0	..	46.6	..	467.3	..	3.5	425.5	202.5	66.9	..	1,213.4
Manufacturing	30.6	0.5	50.5	..	352.9	6.6	(25.3)	6,062.4	287.1	(7.7)	(171.7)	6,585.8
Electricity, gas, steam and air conditioning supply	0.4	..	0.2	..	(0.1)	..	0.1	(59.3)	4.3	0.5	..	(54.0)
Water supply; sewerage and waste management	0.1	..	0.1	..	3.0	..	..	5.4	0.3	..	..	8.9
Construction	1.8	..	(1.4)	..	129.4	..	0.2	43.9	4.0	4.3	0.5	182.7
Wholesale and retail trade; repair of motor vehicles and cycles	(1.0)	0.2	236.0	..	(416.5)	10.0	1.6	1,448.9	(219.7)	11.8	0.5	1,071.7
Transportation and storage	0.3	..	5.1	(0.1)	290.0	..	..	42.7	97.3	..	(16.9)	418.4
Accomodation and food service activities	(2.1)	..	0.5	..	3.4	..	0.1	(47.9)	4.8	5.4	..	(35.8)
Information and communication	0.1	..	2.3	(0.1)	679.0	(0.1)	(0.0)	(244.3)	(1.4)	0.3	..	435.7
Financial and Insurance activities	(3.9)	19.0	112.3	(0.0)	(470.5)	20.7	22.9	3,530.4	252.4	2.5	(0.6)	3,485.0
Real estate activities	15.2	1.1	1,518.4	1.9	1,434.5	65.2	(43.5)	1,463.9	12.8	39.3	58.6	4,567.5
Professional, scientific and technical activities	1.0	..	2.2	..	3.5	(0.9)	0.7	120.8	0.5	(3.0)	..	124.7
Administrative and support service activities	..	..	0.0	..	5.3	..	..	59.2	1.4	..	..	65.8
Education	0.1	..	0.1	..	0.6	..	..	7.4	0.4	0.1	..	8.7
Human health and social work activities	0.7	..	0.4	..	3.2	..	0.1	33.6	1.9	..	..	39.9
Arts, entertainment and recreation	(0.1)	..	(0.1)	..	(0.6)	..	..	(3.6)	(0.4)	(0.2)	..	(5.1)
Other services	0.5	..	93.3	..	1'222.9	7.8	126.6	29.5	78.2	13.6	0.1	1,572.6
Others/Unspecified	..	..	..	..	..	..	..	..	..	..	..	683.6
Philippine's data	..	..	..	..	..	..	..	33.6	45.0	..	..	78.6
Data suppressed by a Member State for confidential reason	0.6	..	(183.1)	..	..	0.4	(18.7)	33.6	36.2	13.3	..	..
Intra-ASEAN investment from:	45.5	20.9	1,900.7	1.8	3,870.0	109.8	68.3	16,526.0	818.3	309.3	(129.5)	24,377.4

Source: ASEAN Secretariat, ASEAN FDI Database (accessed 1 July 2015).

iv. Indonesian companies remained active in regional real estate. Some 80% of the country's investments in the region in 2014 were in real estate activities, suggesting the growing interest of Indonesian companies in investing regionally, particularly in this industry.

v. Singapore remained the largest regional investor. In 2014, investments from Singapore accounted for 68% of all intra-ASEAN direct investment. This includes both investment from indigenous companies and those made by foreign affiliates based in Singapore. Four industries continued to attract much of Singapore's regional investment: manufacturing, agriculture, finance and real estate.

1.2.3. CLMV recipients: bridging the development divide through investment

The CLMV countries are benefiting from cost advantages, economic growth and natural resource endowment in attracting FDI. Inflows to the CLMV countries declined marginally, by 3%, to $12.8 billion in 2014 because of the huge and surprising drop in FDI inflows to Myanmar (table 1.3). However, FDI to Cambodia, Lao PDR and Viet Nam rose, with a significant amount of investment directed to manufacturing, infrastructure, real estate and construction. FDI to these industries reflects the rapid economic growth and rising demand in these Member States. FDI in finance was also significant, reflecting investment opportunities in the industry, economic development and the desire of foreign banks to establish facilities to capture customers from home, local and other foreign clients that are operating in these economies.

Table 1.3. Most CLMV countries saw a rise in FDI in 2014
(Millions of dollars)

	2010	2011	2012	2013	2014
Cambodia	782.6	891.7	1,557.1	1,274.9	1,726.5
Lao PDR	332.6	466.8	294.4	426.7	913.2
Myanmar	2,248.8	2,058.2	1,354.2	2,620.9	946.2
Viet Nam	8,000.0	7,519.0	8,368.0	8,900.0	9,200.1
CLMV Total	11,363.9	10,935.8	11,573.7	13,222.5	12,786.1

Source: ASEAN Secretariat, ASEAN FDI Database (accessed 1 July 2015).

More foreign companies are building manufacturing facilities in these locations in 2014-2015.[2] Some, such as LG and Samsung, are also making huge manufacturing investments. Some foreign companies with operations in China invested or announced plans to set up operations in the CLMV countries to tap the relatively low labour costs. Some foreign and ASEAN companies in higher-cost Member States are also doing the same by setting up operations in these lower-cost locations.

Investments to CLMV countries were dominated by sources from China, ASEAN, the Republic of Korea and other Asian economies; all these investments grew last year (table 1.4). Although the major sources of FDI were similar across the four Member States, there are differences in terms of industry destination, reflecting in part these countries' respective natural resource endowments and labour supply situations. Korean investment to Viet Nam in 2014 stood out in particular. Chinese investment dominates in Cambodia, Lao PDR and Myanmar.

Table 1.4. The top 10 investors in Cambodia, Lao PDR, Myanmar and Viet Nam are mainly from Asia

Cambodia				Lao PDR	
2013		2014		2014	
China	286.8	China	553.9	China	614.3
Korea, Republic of	178.2	Viet Nam	179.7	Thailand	102.9
Taiwan Province of China	173.3	Hong Kong (China)	136.2	Hong Kong (China)	48.2
United Kingdom	116.0	Taiwan Province of China	122.2	Netherlands	47.8
Malaysia	97.9	Korea, Republic of	106.3	Switzerland	28.0
Singapore	83.7	Malaysia	85.2	Cambodia	19.0
Hong Kong (China)	82.8	Japan	84.9	Australia	15.8
Thailand	61.8	Singapore	60.8	Korea, Republic of	12.6
Viet Nam	54.3	United States	50.3	Viet Nam	10.8
Japan	38.5	United Kingdom	46.7	Malaysia	3.7
Top 10 total	1,173.2		1,426.2	Top 10 total	903.0
Total FDI	1,274.9		1,726.5	Total FDI	913.2
Top 10 share of total FDI (%)	92.0		82.6	Top 10 share of total FDI (%)	98.9

Myanmar				Viet Nam			
2013		2014		2013		2014	
China	792.6	Singapore	578.5	Japan	2,365.2	Korea, Republic of	3,248.2
Singapore	654.8	Hong Kong (China)	113.4	Singapore	1,801.1	Hong Kong (China)	1,280.1
Thailand	494.5	Thailand	82.4	Korea, Republic of	1,766.8	Singapore	1,219.5
Hong Kong (China)	272	China	70.5	China	948.2	Japan	969.2
France	202.3	Japan	37.7	Russian Federation	420.5	Taiwan Province of China	518.1
United Kingdom	68.9	United Kingdom	28.3	Hong Kong (China)	288.9	Virgin Islands, British	291.7
Japan	36	Viet Nam	22.7	Taiwan Province of China	245.0	China	209.6
Korea, Democratic People's Republic of	29.8	Korea, Republic of	11.1	Thailand	167.0	Malaysia	163.7
Netherlands	24.4	India	0.7	Netherlands	162.1	United Kingdom	146.0
Indonesia	16.4	Samoa	0.7	Cayman Islands	147.6	United States	130.5
Top 10 total	2 591.7		946.0	Top 10 total	8,312.4		8,176.6
Total FDI	2 620.9		946.2	Total FDI	8',900.0		9,200.1
Top 10 share of total FDI (%)	98.9		100.0	Top 10 share of total FDI (%)	93.4		88.9

Source: ASEAN Secretariat, ASEAN FDI Database (accessed 1 July 2015).

An important feature of the rise in manufacturing FDI in CLMV countries is that it expands regional production networks and strengthens regional value chains, boosting connectivity between CLMV countries and the other ASEAN Member States as production from the former is supplied to affiliates or customers based in the latter. This connectivity is contributing to the development of supporting industries and increasing the region's manufacturing competitiveness, which draws on the complementary locational advantages tapped by MNEs and ASEAN companies. The rise in regional economic activities by MNEs and companies from the other ASEAN Member States is helping bridge the development divide through investment.

Cambodia: Manufacturing industry and Chinese companies continue to dominate in FDI flows

FDI flows into Cambodia increased by 35% in 2014 to $1.7 billion (table 1.5). China remained the largest investor, followed by ASEAN and Hong Kong (China). These economies accounted for about 60% of FDI inflows to the country last year.

Chinese companies were the largest manufacturing investor, responsible for about 46% of FDI into that industry. Some Chinese companies are relocating their operations to the host country because of increasing production costs at home. More foreign companies, particularly Asian MNEs, are also opening factories in labour-intensive industries such as garments.

Investments in agriculture activities in Cambodia were also considerable and dominated by ASEAN, in particular Viet Nam. Malaysia was a significant regional investor in finance. ASEAN companies were also the largest investors in construction and real estate in 2014.

Automotive part and component manufacturers are setting up factories in Cambodia's industrial zones near Thailand because of low labour costs and proximity to customers based in Thailand. NHK Spring (Japan), a Toyota supplier, is building a factory in 2015 in an industrial zone near the Thailand–Cambodia border.[3] Denso (Japan) and Yazaki (Japan) are operating in Cambodia to produce automotive parts and components, which will be supplied to customers in the region. In 2015, these companies announced plans to expand further in the host country with additional production facilities. Sam Chai Steel (Thailand) is also planning to build a factory in the industrial zone. Siam City Cement (Thailand) entered into a joint venture in 2015 with a local company to operate a cement plant. Crystal Group (Hong Kong, China) opened a new garment factory in 2015, while Rojana (Thailand) announced that it is planning to build an industrial park in Cambodia.

As with other major MNEs, Toyota is planning to build a new showroom, warehouse and training centre in the Phnom Penh special economic zone (SEZ), with construction due to start in 2016. Coca-Cola (United States) is building another factory worth $100 million, which will be located in the Phnom Penh SEZ; and AEON (Japan), which opened a mall in 2014, is planning to open a second one in Phnom Penh.

Table 1.5. Manufacturing and finance dominate FDI flows in Cambodia, 2013–2014 (Millions of dollars)

2013	Japan	United States	European Union	Emerging Markets of East Asia					India	Australia	Russian Federation	ASEAN	Canada	Other countries	Total
				Korea, Republic of	Hong Kong (China)	Taiwan Province of China	China	Subtotal							
Agriculture, forestry, and fishing	-	4.7	14.3	29.9	-	-	58.1	87.9	5.1	4.5	-	191.0	-	2.6	310.1
Manufacturing	5.7	2.2	40.8	65.8	55.4	52.8	166.3	340.4	-	-	-	42.5	3.9	27.2	462.7
Accomodation and food service activities	-	2.1	4.0	13.9	4.4	-	4.8	23.1	-	2.2	2.2	19.9	-	-	53.4
Financial and Insurance activities	5.3	16.3	12.4	25.7	10.2	119.2	10.8	165.8	1.0	8.0	-	25.8	(10.7)	(20.1)	203.8
Other services activities	27.5	8.6	44.0	42.9	12.8	1.3	46.7	103.7	-	4.5	8.6	19.6	-	28.5	244.9
Total	**38.5**	**33.9**	**115.5**	**178.2**	**82.8**	**173.3**	**286.8**	**721.0**	**6.1**	**19.1**	**10.8**	**298.8**	**(6.8)**	**38.1**	**1,274.9**

2014	Japan	United States	European Union	Emerging Markets of East Asia					India	Australia	Russian Federation	ASEAN	Canada	Other countries	Total
				Korea, Republic of	Hong Kong (China)	Taiwan Province of China	China	Subtotal							
Agriculture, forestry, and fishing	-	3.9	12.0	13.1	9.9	-	46.4	69.4	3.2	7.1	-	194.4	-	-	290.1
Mining and quarrying	-	-	-	-	-	-	17.4	17.4	-	-	-	-	-	-	17.4
Manufacturing	9.7	9.5	33.0	27.8	73.5	56.1	243.6	401.0	-	2.1	-	32.7	4.5	31.4	523.9
Construction	-	-	-	-	-	-	1.2	1.2	-	4.9	-	16.1	-	-	22.2
Accomodation and food service activities	-	1.2	5.3	32.3	30.9	-	18.9	82.1	-	-	-	11.0	-	-	99.6
Information and communication			-					-				-		-	-
Financial and Insurance activities	10.8	25.7	67.2	9.7	12.6	62.0	19.7	103.9	0.0	16.7	-	70.6	-	29.7	324.6
Real estate activities	-	-	-	1.5	-	-	-	1.5	-	-	-	17.4	-	-	18.8
Other services activities	64.4	10.0	21.3	22.0	9.3	4.2	206.7	242.2	-	2.4	2.3	30.3	-	56.9	429.9
Total	**84.9**	**50.3**	**138.8**	**106.3**	**136.2**	**122.2**	**553.9**	**918.6**	**3.3**	**33.3**	**2.3**	**372.5**	**4.5**	**118.0**	**1,726.5**

Source: ASEAN Secretariat, ASEAN FDI Database (accessed 1 July 2015).

Chinese companies continued to dominate in infrastructure (chapter 2). China National Heavy Machinery Corporation (CHMC) started operation of the $540 million, 246 MW Tatay River hydropower plant in 2014; it will sell electricity from the plant to the State-owned Electricity of Cambodia for 42 years.[4] Smart Axiata, a subsidiary of Axiata (Malaysia), expanded the 4G LTE network in Cambodia in 2014. South East Asia Telecom Group (China), through its subsidiary in Singapore, announced plans to expand in Cambodia in 2015, with a $400 million investment in telecommunication infrastructure. It has already invested $100 million in upgrading the Cambodian subsidiary's networks.[5]

Lao PDR: Chinese FDI dominates, concentrated in infrastructure

FDI into Lao PDR rose by 113% to $913 million in 2014. Infrastructure remained the principal target sector. Investment in SEZs also rose in the same year. Some two-thirds of FDI in 2014 came from China. More than 90% of Chinese FDI in Lao PDR was in infrastructure, of which 73% ($420 million) went to power generation activities. Companies such as China Huadian, China National Heavy Machinery Corporation, and China Electric Power Technology Import and Export Corporation are building power plants with expected commercial operation dates in 2015. In addition to investors from China, MNEs from other countries are active in the infrastructure industry. For instance, SN Power (Norway) bought a 20% stake in the 500 MW Theun-Hinboun Hydropower Company from Statkraft (Norway) in 2014. Velcan Energy (France) received an approval in 2014 to develop a $150 million hydropower project.

In addition, Lao PDR is receiving investment in manufacturing activities, albeit at a low level. For instance, Toyota Boshoku has started producing automotive seat covers at its plant in the country to supply Toyota's operation in Thailand. Mitsubishi Materials is building an $8 million factory to produce thermostats and temperature control equipment. Nikon and Minebea are also operating plants in the country. Given the geographical proximity, Thai companies are also expanding their presence. Siam Cement is building a $309 million cement factory and Kasikorn Bank opened an operation in 2014.

Myanmar: Surprising decline in FDI flows; but investment in infrastructure and manufacturing continue to be strong

FDI flows to Myanmar plummeted, from $2.6 billion in 2013 to just less than $1 billion in 2014. This decline contrasts with media reports and company news announcements that indicate growing investment in Myanmar in recent years, including in large projects. Within this statistical context, about 44% of FDI in 2014 was in transportation and storage – the single largest recipient industry. Chinese companies continue to be the largest investors, active in extractive industries and in infrastructure projects. For instance, Zhejiang Orient Engineering is building a hydropower plant to be completed by 2016.

Myanmar also attracted more FDI in the manufacturing industries in 2014. Some Japanese automotive companies such as Toyota and Nissan are investing in Myanmar, and Denso – a parts and components manufacturer – has set up a subsidiary in the country, driven by cost

reasons. Suzuki (Japan) is building an additional factory to produce automotive parts in the Thilawa SEZ. Twelve of 26 companies that committed to establish plants in the Thilawa SEZ in late 2014 were Japanese, including automotive part manufacturers such as Koyo Radiator. Acecook (Japan) is constructing an instant noodles factory in the SEZ in 2015.

Other automotive MNEs such as Mitsubishi (Japan), Ford (United States), Chevrolet (United States), Mercedes-Benz (Germany), KIA (Republic of Korea) and Hyundai (Republic of Korea) have opened showrooms and service centres in the country. Jaguar, Land Rover, BMW and Mazda are also opening centres in the country.[6] APM Automotive Indochina, a subsidiary of Tan Chong Motor Holdings (Malaysia), is building a factory in the Bago region to assemble Nissan cars. Investment in the factory is expected to reach more than $200 million over the next few years. Colgate-Palmolive (United States) received a license in 2014 to operate in Myanmar, and Nestle (Switzerland) is investing in the country. Foreign garment manufacturers such as Fu Yuen Garment from Macao (China) and three Taiwanese companies with local registered names (Eslite Garment, Polar North Garment and Eusebio Sporting Company) were given licenses in 2014 to start manufacturing.[7] In addition, Ball Corporation (United States) and Foster Electric (Japan) are building factories in the Thilawa SEZ. The latter has recently established a sub-subsidiary in Myanmar to manufacture and sell speakers, headphones and related parts with $3 million in registered capital.

In other manufacturing activities, Asahi (Japan) formed a joint venture in 2014 with a local partner to manufacture beverages in the country.[8] Carlsberg (Denmark) opened a $75 million brewery with a local joint venture partner in May 2015. Other beer manufacturers such as Heineken (Netherlands) are also planning to open breweries through joint ventures.[9] Yum Brand (United States) opened a KFC store with a local partner in June 2015.

In finance, Myanmar granted provisional foreign banking licenses in October 2014 to banks from Malaysia, Singapore, Thailand, Australia, China and Japan.[10] Some of these banks, such as OCBC (Singapore), UOB (Singapore), Maybank (Malaysia), Sumitomo Mitsui (Japan) and Bank of Tokyo-Mitsubishi (Japan), opened a branch each this year. Dongbu Insurance (Republic of Korea) also opened a branch in 2015.

In real estate and infrastructure, Accor (France) is constructing two new hotels. Mitsubishi Corporation (Japan) and Hitachi (Japan) signed a $20 million contract to supply and install railway signaling systems. JGC Corporation (Japan), together with its Singapore consortium partners, in 2014 won a $1.4 billion contract to build the new Hanthawaddy airport, while Mitsubishi and Jalux won contracts to renovate and operate the Mandalay airport.[11] Vestas (Denmark) announced in 2015 that it is developing a wind power project with an initial investment of $3 million.

A number of foreign companies have established a presence or an office in Myanmar in 2014–2015. These companies include ThyssenKrupp (Germany) and ABB (Switzerland).

Some ASEAN companies have announced significant investment plans to enter Myanmar in the next few years. For instance, Lippo Group (Indonesia) is planning to invest about

$600 million to $1 billion in a number of industries, which include hospitality, health care and education services. Global Power Synergy (Thailand), together with its consortium partners, is building a 400 MW gas power plant in Thilawa SEZ, and MDR (Singapore) established in 2015 a subsidiary for providing graphic design solutions and large format digital inkjet production.

Viet Nam: Significant rise in Korean investment and FDI in manufacturing dominates

FDI to Viet Nam increased from $8.9 billion in 2013 to $9.2 billion in 2014, induced by a significant rise in investment from the Republic of Korea and Hong Kong (China) (table 1.6). These two economies together with ASEAN were the three largest investors in 2014, contributing 66% of FDI.

FDI in manufacturing rose significantly, accounting for 71% of total inflows, as a result of the surge in Korean investment. Manufacturing FDI from ASEAN, Hong Kong (China) and Japan was also significant. Real estate and construction were the second and third largest recipients of FDI inflows, and also rose significantly, the former to three times and the latter to five times the level of 2013.

Korean FDI grew by 8.6 times last year, with MNEs such as Samsung expanding significantly in the country with new production of electronic products and mobile phones. Samsung opened a $2 billion smartphone plant in March 2014 and in November announced plans to further expand its mobile phone facilities in the country with another $3 billion plant.[12] As a consequence, Viet Nam is now the largest mobile phone production facility for Samsung: about 50% of Samsung's mobile phones are manufactured there, with the remaining share coming from its production bases in Brazil, China, India, Indonesia and the Republic of Korea.[13] In addition to mobile phone operations, Samsung is also building factories for display panels, home appliances and electrical components in Viet Nam.[14]

Other Korean companies are also expanding in Viet Nam. They include LG Electronics, Kumho Tire and Lotte. The number of Lotte Mart stores increased to 10 in 2014 with the inauguration of 5 new supermarkets.[15] Lotte has announced that the group will open a few more in 2015 and plans to have a total of 60 supermarkets in Viet Nam by 2020. It plans to also open 70 cinemas in the next few years, and the number of its Lotteria fast food outlets has more than doubled, from 100 outlets in 2011 to 207 in 2014. In March 2015, the group was involved in a $250 million coffee plantation project in the host country.

In addition to Korean FDI in manufacturing, investments from Korean companies in construction and real estate also rose significantly. Construction saw a considerable increase, from $17 million in 2013 to $161 million in 2014; and real estate climbed from $78 million in 2013 to $422 million in 2014.

Japanese companies such as Panasonic and Canon that have operations in other ASEAN Member States are also expanding into Viet Nam. Yazaki and Bridgestone started operations in the country in 2015. AEON (Japan) opened two shopping centres in 2014 and expanded

Table 1.6. Manufacturing continues to dominate FDI flows to Viet Nam, 2013–2014 (Millions of dollars)

2013	Japan	United States	European Union	Emerging Markets of East Asia					India	Australia	New Zealand	Russian Federation	ASEAN	Canada	Other countries	Total
				Korea, Republic of	Hong Kong (China)	Taiwan Province of China	China	Sub-total								
Agriculture, forestry, and fishing	9.5	0.2	1.4	7.1	1.2	1.0	3.8	13.0	0.00	0.2	0.0	1.7	8.3	0.0	1.3	35.7
Mining and quarrying	8.7	0.2	1.3	6.5	1.1	0.9	3.5	12.0	0.00	0.2	0.	1.6	7.7	0.0	1.2	32.9
Manufacturing	1,819.4	39.7	269.5	1,359.1	222.2	188.5	729.4	2,499.1	0.9	40.1	0.5	323.5	1,598.9	8.1	246.4	6,846.1
Electricity, gas, steam and air conditioning supply	222.1	4.8	32.9	165.9	27.1	23.0	89.1	305.1	0.1	4.9	0.1	39.5	195.2	1.0	30.1	835.9
Water supply; sewerage and waste management	5.6	0.1	0.8	4.2	0.7	0.6	2.2	7.7	0.0	0.1	0.0	1.0	4.9	0.0	0.8	21.1
Construction	23.1	0.50	3.4	17.3	2.8	2.4	9.3	31.7	0.0	0.5	0.0	4.1	20.3	0.1	3.1	86.9
Wholesale and retail trade; repair of motor vehicles and cycles	59.6	1.3	8.8	44.5	7.3	6.2	23.9	81.9	0.0	1.3	0.0	10.6	52.4	0.3	8.1	224.3
Transportation and storage	4.9	0.1	0.7	3.6	0.6	0.5	2.0	6.7	0.0	0.1	0.0	0.9	4.3	0.0	0.7	18.4
Accomodation and food service activities	26.3	0.6	3.9	19.6	3.2	2.7	10.5	36.1	0.0	0.6	0.0	4.7	23.1	0.1	3.6	98.9
Information and communication	6.6	0.1	1.0	4.9	0.8	0.7	2.7	9.1	0.0	0.2	0.0	1.2	5.8	0.0	0.9	24.9
Financial and Insurance activities	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.4
Real estate activities	104.0	2.3	15.4	77.7	12.7	10.8	41.7	142.9	0.1	2.3	0.0	18.5	91.4	0.5	14.1	391.3
Professional, scientific and technical activities	45.4	1.0	6.7	33.9	5.5	4.7	18.2	62.3	0.0	1.0	0.0	8.1	39.9	0.2	6.2	170.8
Administrative and support service activities	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0. 0	0.0	0.1	0.0	0.0	0.3
Education	12.9	0.3	1.9	9.6	1.6	1.3	5.2	17.7	0.0	0.3	0.0	2.3	11.3	0.1	1.8	48.5
Human health and social work activities	9.8	0.2	1.5	7.3	1.2	1.0	3.9	13.2	0.0	0.2	0.0	1.7	8.6	0.0	1.3	36.9
Arts, entertainment and recreation	5.5	0.1	0.8	4.1	0.7	0.6	2.2	7.6	0.0	0.1	0.0	1.0	4.9	0.0	0.8	20.8
Other services activities	1.6	0.0	0.2	1.2	0.2	0.2	0.6	2.2	0.0	0.0	0.0	0.3	1.4	0.0	0.2	5.9
Total	2,365.2	51.6	350.4	1,766.8	288.9	245.1	948.2	3,248.9	1.1	52.2	0.6	420.5	2,078.6	10.5	320.4	8,900.0

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Table 1.6. Manufacturing continues to dominate FDI flows to Viet Nam, 2013–2014 (Millions of dollars) (concluded)

2014	Japan	United States	European Union	Emerging Markets of East Asia					India	Australia	New Zealand	Russian Federation	ASEAN	Canada	Other countries	Total
				Korea, Republic of	Hong Kong (China)	Taiwan Province of China	China	Sub-total								
Agriculture, forestry, and fishing	6.1	0.8	3.5	20.3	8.0	3.2	1.3	32.9	0.1	0.4	0.0	0.0	9.7	0.8	3.3	57.5
Mining and quarrying	4.8	0.6	2.7	16.0	6.3	2.6	1.0	25.8	0.1	0.3	0.0	0.0	7.6	0.6	2.6	45.2
Manufacturing	688.6	92.8	392.3	2,307.8	909.5	368.1	148.9	3,734.3	13.4	44.1	1.3	3.4	1,099.2	89.0	378.3	6,536.7
Electricity, gas, steam and air conditioning supply	10.1	1.4	5.8	34.0	13.4	5.4	2.2	55.0	0.2	0.7	0.0	0.1	16.2	1.3	5.6	96.3
Water supply; sewerage and waste management	2.8	0.4	1.6	9.4	3.7	1.5	0.6	15.3	0.1	0.2	0.0	0.0	4.5	0.4	1.5	26.7
Construction	48.2	6.5	27.4	161.5	63.6	25.8	10.4	261.3	0.9	3.1	0.1	0.2	76.9	6.2	26.5	457.3
Wholesale and retail trade; repair of motor vehicles and cycles	18.0	2.4	10.2	60.3	23.7	9.6	3.9	97.5	0.4	1.2	0.0	0.1	28.7	2.3	9.9	170.6
Transportation and storage	7.9	1.1	4.5	26.3	10.4	4.2	1.7	42.6	0.2	0.5	0.0	0.0	12.5	1.0	4.3	74.5
Accomodation and food service activities	21.9	3.0	12.5	73.5	29.0	11.7	4.7	119.0	0.4	1.4	0.0	0.1	35.0	2.8	12.1	208.3
Information and communication	3.4	0.5	1.9	11.3	4.5	1.8	0.7	18.3	0.1	0.2	0.0	0.0	5.4	0.4	1.9	32.0
Financial and Insurance activities	0.4	0.1	0.2	1.4	0.6	0.2	0.1	2.3	0.0	0.0	0.0	0.0	0.7	0.1	0.2	4.1
Real estate activities	125.8	16.9	71.7	421.6	166.2	67.3	27.2	682.3	2.5	8.1	0.2	0.6	200.8	16.3	69.1	1,194.2
Professional, scientific and technical activities	12.4	1.7	7.1	41.5	16.3	6.6	2.7	67.1	0.2	0.8	0.0	0.1	19.8	1.6	6.8	117.4
Administrative and support service activities	0.4	0.1	0.2	1.3	0.5	0.2	0.1	2.1	0.0	0.0	0.0	0.0	0.6	0.1	0.2	3.6
Education	3.4	0.5	2.0	11.5	4.5	1.8	0.7	18.7	0.1	0.2	0.0	0.0	5.5	0.4	1.9	32.7
Human health and social work activities	18.5	2.5	10.5	61.9	24.4	9.9	4.0	100.1	0.4	1.2	0.0	0.1	29.5	2.4	10.1	175.3
Arts, entertainment and recreation	-3.7	-0.5	-2.1	-12.5	-4.9	-2.0	-0.8	-20.2	-0.1	-0.2	-0.0	-0.0	-6.0	-0.5	-2.1	-35.4
Other services activities	0.3	0.0	0.2	1.1	0.4	0.2	0.1	1.8	0.0	0.0	0.0	0.0	0.5	0.0	0.2	3.1
Total	969.2	130.5	552.1	3,248.2	1,280.1	518.1	209.6	5,255.9	18.9	62.1	1.8	4.8	1,547.1	125.2	532.5	9,200.1

Source: ASEAN Secretariat, ASEAN FDI Database (accessed 1 July 2015).

further with the acquisition of a stake in two major local retailers in 2015. Technology companies from Europe and the United States such as Nokia, Intel and Microsoft are investing or expanding their presence in the host country too.

ASEAN companies have been active in expanding into Viet Nam. Amata Corporation (Thailand), which already has a presence in the host country, is building a new integrated city industrial estate. Its subsidiary, Amata Vietnam, received official approval in August 2014 to develop the $530 million Amata City Long Thanh industrial park in Dong Nai.[16] Semen Indonesia bought a significant stake in Thang Long Cement (Viet Nam) in 2012 and is planning to further expand its operations in the country in 2015. It will increase capacity with a $300 million investment in a new plant as part of its business expansion strategy in ASEAN.

1.2.4. Factors and reasons for 2014 developments

A number of factors contributed to a further annual rise in FDI flows in ASEAN in 2014. The continued drive for regional expansion by MNEs was an important factor. The improving regional perception among international investors and increasing investment opportunities in the region helped attract more FDI. ASEAN companies also invested more last year as they continued to pursue regional investment plans.

Economic growth and anticipation of the AEC have encouraged foreign and ASEAN MNEs to invest in the region (AIR 2014). These factors together with rapidly growing per capita income and increasingly affluent consumers have led to rapid growth in market-seeking FDI, such as that in the retail industry (table 1.7). For instance, Lotte (Republic of Korea), Parkson (Malaysia) and AEON (Japan) opened more stores in the region in 2014 and plan to open more branches in 2015. The expected increase in demand for automotive vehicles further attracted major global automotive assemblers to increase their investment and expand production capacities in the region.

Rapid growth of industries such as the electronics and automotive industry, including parts and components production, is encouraging the expansion of regional investment into new plants and new product categories. For instance, many Japanese MNEs in Indonesia and Thailand expanded in these Member States in 2014. Japanese automotive MNEs such as Mazda, Nissan, Mitsubishi, Toyota and Honda, which already had significant presence in these Member States, have been expanding their production capacities into so-called eco-cars in Thailand and automotive manufacturing in Indonesia.[17] Some Japanese automotive makers have been expanding also in the Philippines. Daihatsu is expanding in Malaysia with a new engine plant. As automotive

Table 1.7. Strong macroeconomic fundamentals continue to characterize ASEAN, 2005 and 2010-2014

Selected indicators	2005	2010	2011	2012	2013	2014
GDP at current prices ($ billions)	922.6	1 898.1	2 205.9	2 336.9	2 402.0	2 570.5
GDP per capita ($)	1 675.2	3 215.9	3 683.1	3 850.8	3 907.6	4 129.8
Population (millions)	550.7	590.2	598.9	606.9	614.7	622.4

Source: ASEAN Secretariat, ASEANStat.

assemblers expand their operations in the region, they are encouraging more of their suppliers to establish facilities close to them to achieve efficient supply chain networks. LG has been encouraging some of its suppliers and business partners to set up operations near to its facilities in Viet Nam. More automotive part and component manufacturers have invested in the region to be close to major hubs and places where the industry is booming in the host countries.

Cost advantages (e.g. low labour costs) in some Member States are attracting greater manufacturing FDI from outside and within the region. This investment is contributing to a growing regional division of labour and value chains that are connecting the ASEAN Member States more closely. Many automotive part and component MNEs, including major global electronic players such as LG, Samsung, Panasonic, Nikon and Intel, set up operations or expanded in the region last year. Some Chinese companies and foreign MNEs based in China are moving parts of their manufacturing operations to lower-cost ASEAN locations such as the CLMV countries. These MNEs include garment manufacturers as well.

Rapid urbanization, rising per capita income and growing populations are increasing demand for various infrastructure services, which in turn increases private investors' interest in infrastructure investment in the region. Many foreign and ASEAN MNEs were involved in infrastructure developments in the region in 2014–2015 through contracts and concessions (chapters 2, 3 and 4). The announcement of huge infrastructure plans by and commitments of ASEAN Member States to deliver better-quality infrastructure services in the near and long term also contributed toward the rise in infrastructure investment.

Corporate aspirations to regionalize or to be major regional players in conjunction with increasing costs and market limitations at home continue to drive ASEAN companies to invest in neighbouring Member States. Strong corporate profitability and the growing cash reserves of the major ASEAN companies have added impetus to their regionalization and internationalization plans, which are also helping strengthen South-South cooperation (section 1.6).

The ongoing improvement of the region's investment environment through policies introduced in past years (AIR 2013, AIR 2014) and emerging investment opportunities was another key contributory factor in the 2014 FDI situation.

The strong FDI inflows in 2014 can also be explained by motivations for investment in different industries, which in general do not differ from the past. FDI and intra-ASEAN investment in the extractive industry has been motivated largely by access to natural resources such as in mining of coal, oil and gas, and other minerals in resource-rich Member States. For this reason, Indonesia and Myanmar received significantly more extractive FDI than others in the region, including through production sharing and concession arrangements.

Agriculture investment in the region has been influenced by agro-climatic factors and by access to agricultural land and low-cost labour supply. Indonesia continued to attract significant palm oil and agriculture investment. Other ASEAN Member States such as the CLMV countries also attracted notable amounts of FDI in agriculture.

FDI into the manufacturing industry continued to be influenced by cost and market factors. Much depends also on the host country and the stage of development of an industry in the different Member States. For instance, investment in low value added manufacturing of electronics and of automotive parts and components in CLMV countries is generally motivated by cost reasons alone. Investment in textiles, garments and shoe manufacturing such as in Indonesia, Cambodia, Myanmar and Viet Nam is also cost oriented. Keeping costs low is an important motive. For some products and in some Member States – such as Indonesia, Thailand and the Philippines – investments are influenced by both cost and market factors (e.g. automotive manufacturing).

As in past years, FDI in services continued to be influenced by access to markets and in some cases strategic assets such as in finance and banking. The rapid growth of demand for residential property, commercial and industrial real estate, and construction led to an increase in FDI in these industries in some ASEAN Member States last year.

Some MNEs are also establishing regional operational headquarters in some ASEAN Member States, where these subsidiaries subsequently have made investment in the region on behalf of the parent. In some cases, these subsidiaries also supervised regional operations and have been tasked with the responsibilities of coordinating intra-company regional logistics and investment expansion plans. For instance, Japanese affiliates based in Singapore have been investing directly in CLMV countries and in the other ASEAN Member States. Many investment applications to the Board of Investment (BOI) of Thailand in 2014 for automotive, and parts and components production came from MNE affiliates operating in Singapore and other ASEAN Member States.

These reasons and motivations also apply to intraregional investment. Close cultural affinity and geographical proximity played significant roles in attracting intraregional investment in the region, as did the drive of ASEAN MNEs to become more significant regional players as ASEAN becomes more integrated. These additional and important reasons encouraged more ASEAN companies to plan regionally, including undertaking investment expansion plans targeting the region.

1.3. MNEs' strategies and operations in 2014-2015: *regional investment expansion strategies continue with the AEC a growing influence in investment plans*

AIR 2014 highlighted that *regional investment expansion* by MNEs from developed and developing economies was a key contributory factor explaining FDI flows into the region in 2013. The regional expansion strategies of foreign and ASEAN companies remained a key aspect of the region's investment landscape in 2014 and 2015. The strong regional expansion by MNEs again played an important role in pushing FDI to a higher level in 2014.

MNEs continue to expand their operations and regional footprints in ASEAN for various reasons. Notwithstanding the general decline in Japanese FDI, some Japanese companies continued to expand their regional presence by undertaking new and expansion projects

in the same host country and in other ASEAN Member States. Some retail-based MNEs continue to expand regionally by establishing more stores in different Member States to capture market share and strengthen their foothold in light of market potential. Many MNEs are participating in the development of infrastructure in the region by winning contracts and concessions in 2014–2015, and operating through non-equity modalities (NEMs).

The role of contractors and subcontractors in infrastructure activities cannot be overlooked. Although their NEM operations are not captured in the FDI numbers, they nonetheless are important value chain players in the industry. Foreign investment and MNEs' operations through NEMs are driving the rise in infrastructure activities in some ASEAN Member States. This aspect of corporate operation through contracts and concessions in ASEAN is an important feature of MNEs' strategies which has significant implications for infrastructure developments in the region. In addition, by developing infrastructure and building their regional value chains, MNEs are helping ASEAN Member States become better connected (box 1.1).

Another significant development in MNEs' operations in the region is the growing frequency of transfers of labour-intensive activities from higher-cost locations in other Asian economies and within ASEAN to the CLMV countries, as well as other ASEAN Member States such as Indonesia. MNEs making such transfers include manufacturing companies in textiles and garments. Mitsubishi's trading house, with a local joint venture partner, is investing $60 million to build seven factories in Central Java, Indonesia, in 2014. Other garment manufacturers, such as Aoyama Trading (Japan) and Makalot Industrial (Taiwan Province of China), are shifting production from China to Central Java, Indonesia, because of cost reasons.[18]

An important implication of the ongoing corporate regional strategy is the contribution such MNEs make to the growth of intraregional production arrangements and supply chain connectivity. For instance, Nikon's recent operation in Lao PDR is linking production facilities and operations with other Nikon affiliates in Thailand, as components produced in Lao PDR are exported to Thailand.

In 2014 and 2015,[19] many automotive MNEs expanded and continued to expand production facilities in the region to support growing production volume and new product lines and to increase production of parts and components. These MNEs also expanded regionally with new investment projects and expansions of existing ones.

Another notable corporate strategy in 2014 was that foreign corporations – including those headquartered in ASEAN – made fewer cross-border M&As in the region in terms of high-value deals.

1.3.1. Foreign MNEs' continued regional expansion

Foreign and ASEAN MNEs continue to expand their activities in the region in a range of industries. They expanded operations through projects that increase production capacities

Box 1.1. ASEAN Connectivity: lowering transaction costs and increasing regional competitiveness

A key element of ASEAN's regional integration is connectivity and its implication for lowering the transaction costs of doing business and investing in the region (chapter 4). Regional connectivity increases the competitiveness of ASEAN in attracting investment and enhances production efficiency. Connectivity can be an important locational determinant of FDI and will further support ASEAN's efforts to attract investment in the post–AEC 2015 environment.

Regional physical connectivity, through development in different infrastructure sectors, can reduce logistical costs, ease the movement of goods, expand access to electricity and improve the overall investment-enabling environment.

Physical connectivity has a broader nuance (chapters 2 and 4). It is not just building infrastructure and connecting countries but also generates spillover effects to other complementary industries and investment in them. They relate to, for instance, telecommunication infrastructure that enables the use of the Internet and mobile phones and supports e-commerce businesses; transport infrastructure that supports logistic businesses and the movement of people; port infrastructure that supports shipping operations and the movement of goods; airport infrastructure that supports connectivity of tourism and hospitality businesses; electricity infrastructure that enables power pooling; and industrial estates development that enables the establishment of many factories and manufacturing industries.

The operations of MNEs and FDI also contribute to strengthening regional connectivity (chapter 4), through investment and participation in physical infrastructure development, regional production networks, regional value chain activities (AIR 2014) and company linkages. MNEs' regional expansion, which includes the distribution and coordination of production facilities across the region, is also contributing to further growth in connectivity between Member States.

The rise in FDI and MNEs' participation in the region will further strengthen regional connectivity as ASEAN moves forward with the AEC.

Source: UNCTAD and ASEAN Secretariat.

by adding production lines and new plants and by expanding factories for manufacturing of existing product categories (AIR 2014). They also invested in new plants producing products in new categories in the same host country and in other ASEAN Member States. Some MNEs that already have significant presence in the region invest in new facilities in lower-cost ASEAN Member States that are connected to those MNEs' former regional production networks. Some are expanding by taking on a portfolio of infrastructure projects concurrently across the region. Other MNEs have expanded into different business operations in different ASEAN Member States.

Marubeni Corporation (Japan), a major trading and investment business conglomerate, made a number of investment expansions in 2014-2015 in the region. It invested in Cambodia's power sector through the acquisition of a 20% stake in a foreign independent power producer in 2014. Together with Tokyo Electric Power (Japan), it is currently building more power plants in the Philippines, with a new power plant to commence operation in 2017. It

also expanded in 2014 by operating turnkey contracts to build power plants with consortium partners such as Mitsubishi Hitachi Power Systems (Japan) and Daelim Industrial (Republic of Korea). The company is starting a corrugated container business in Myanmar through a joint venture and has signed an agreement, together with Mitsubishi Corporation (Japan) and Sumitomo (Japan), to establish Myanmar Japan Thilawa Development Ltd. to market and sell Myanmar Thilawa SEZ to investors. In early 2014, Marubeni announced further involvement in the Indonesian power infrastructure and the building of another power plant worth $900 million in Viet Nam. In 2015, the company announced plans to build a major gas-fired power plant in Myanmar. With Alstom (France), Marubeni won a contract in 2015 to jointly build a $1 billion power plant in Thailand.

AEON, a major Japanese retailer, has expanded rapidly in ASEAN in recent years. The company plans to expand by opening more stores in the region between 2014 and 2016. In 2014, it opened its first stores in Cambodia and Viet Nam, and announced that it will open more outlets in these Member States. In the same year, it also opened a number of stores in various states in northern Malaysia. In May 2015, AEON expanded to Indonesia by opening its first store there; it plans to open 20 more new malls in West Java and Jakarta after 2016.

Hitachi, which already has a range of business operations in various ASEAN Member States, is expanding its infrastructure systems business in the region. It established Hitachi Infrastructure Systems (Asia) in Singapore in April 2014 to supervise the company's infrastructure businesses in the region. The company won a significant contract in 2014 to expand the capability of the Sentosa Express light-rail system with a new wireless signaling system and another train set in Singapore. Hitachi, together with a local company, won an engineering, procurement and construction (EPC) contract in November 2014 to supply and construct the Chaiya Phum substation in Thailand by 2016. In partnership with Mitsubishi Corporation, it won a contract in 2015 to supply and install railway signaling systems in Myanmar by 2017. Mitsubishi Hitachi Power Systems announced plans in April 2015 to transfer the manufacturing of small- and medium-scale boilers from Japan to its production base in the Philippines. The company built a new plant in Indonesia in 2015, under its subsidiary Hitachi Automotive Systems Indonesia, which was established in November 2014. In January 2015, Hitachi acquired Aqua Works and Engineering (Singapore) to expand its infrastructure operations in that host country. The company also plans to build industrial parks in ASEAN Member States such as Cambodia.

A consortium of MNEs comprising Hitachi (Japan), Veolia (France) and Posco Engineering and Construction (Republic of Korea) was awarded a $130 million contract in February 2015 to expand a large-scale sewage treatment facility in Viet Nam. Mitsubishi Hitachi Power Systems (Japan) and Daelim (Republic of Korea) won a turnkey contract in June 2014 to build a 420 MW coal-fired power generation plant in Quezon Province, in the Philippines, for Pagbilao Energy (sponsor). The sponsor is jointly owned by TeaM Energy Corporation (Japan) and Aboitiz Power Corporation (Philippines). The former is owned equally by Marubeni Corporation and Tokyo Electric Power.

MNEs from the United States are expanding in the region. Having opened a bottling plant in Myanmar in 2013, Coca-Cola (United States) plans to invest $200 million over five years in the country and is expanding its factory in Cambodia with an additional $100 million investment from 2014 to 2018. Windsor Holdings, based in Singapore and owned by Square1 Infrastructure (United States), won a contract in 2015 to build 500 telecommunication towers in Myanmar for Ooredoo (Qatar).[20]

Volvo (Sweden) announced in 2014 that it is investing $23 million in the next three to five years to expand its network in Malaysia. Volkswagen (Germany) plans to build a $140 million factory in Indonesia in 2015. The company announced plans in 2014 to invest $1.29 billion to build a new manufacturing plant in Thailand to produce fuel-efficient cars; it is expected to go on line by 2019.[21]

Another indicator of MNEs' expansion drive in the region is the increasing number of investment applications made by foreign companies for expansion purposes in ASEAN Member States. For instance, 55% of the approved manufacturing projects with foreign participation in Malaysia in 2014 were for the expansion of existing facilities and for the diversification of operations into new product development. They were associated with reinvestment from existing foreign investors, which suggests the confidence of these investors in operating in Malaysia. Some 203 expansion projects were approved in Malaysia in 2014, as compared with 196 in 2013. And MNEs operating in different industries were reported to have started operations on those projects. The companies include Honda (Japan), Tokuyama (Japan), Advanced Micro Devices (United States), Infineon Technologies (Germany), Ibiden Electronics (Japan), Flextronics (Singapore), FMC Technologies (United States) and Kiswire (Republic of Korea).

Similarly, the Thai BOI received more applications for FDI expansion projects than for new ones in 2014 (box 1.2). UOB (2015) found that one in four Asian enterprises plans to expand into Myanmar in 2015. They include companies from China, Hong Kong (China) and ASEAN.

In addition, some MNEs are not just expanding in the same host country. Their other subsidiaries are also expanding concurrently in other ASEAN Member States. Denso (Japan), with approval to expand its facilities in Thailand in 2014, is opening a plant in Cambodia to produce magnetos and sensor components, setting up a subsidiary in Myanmar, and operating a new plant in Indonesia. Suzuki plans to expand operations in Thailand to produce eco-cars; it will start construction of a second facility in Myanmar and started a new plant in Indonesia in 2015. With approval for new operations in Thailand, Mitsubishi is expanding in Indonesia, with a new plant to start operation in 2017. Toshiba (Japan) plans to invest $1 billion between 2014 and 2018 to expand its operations in the ASEAN region. Other Japanese MNEs that already have significant presence in the region have also further expanded in various ASEAN Member States in 2014–2015. They include Yazaki, which started auto parts production in Cambodia and Daihatsu, and is building a new engine plant in Malaysia.

Box 1.2. Investment expansion of foreign companies in Thailand

The numbers of investment applications by foreign companies for expansion purposes in Thailand rose from 671 in 2013 to 1,087 in 2014. These numbers indicate the interest of these foreign companies to expand in the host country. A majority of them are Japanese companies with expansion plans in the assembling and manufacturing of automotive parts and components (box table 1.2.1). Some foreign automotive companies also made more investments into manufacturing of new products (e.g. eco-cars).

Box table 1.2.1. Investment expansion and new projects from selected countries and regions, 2013-2014

		2013		2014	
		No. of projects	Investment (Billions of baht)	No. of projects	Investment (Billions of baht)
Japan	Expansion projects	356	253.4	528	260.2
	New projects	206	29.4	144	33.1
ASEAN	Expansion projects	81	45.8	129	93.4
	New projects	54	8.7	55	6.1
United States	Expansion projects	31	10.9	46	50.2
	New projects	24	0.7	28	80.8
European Union	Expansion projects	66	22.0	67	62.4
	New projects	66	9.4	164	91.2
Korea, Republic of	Expansion projects	24	3.3	35	6.9
	New projects	22	0.6	28	11.4
China	Expansion projects	19	24.7	32	23.2
	New projects	26	17.8	42	10.6

Source: BOI, Thailand.
Note: On net application basis.

Companies such as Suzuki, Honda, Nissan, Mitsubishi and Mazda – all from Japan and already with significant presence in Thailand – are expanding in the country. Japanese auto part and component manufacturers such as Aisin Ai, JTEKT, Bridgestone, Denso, Boshoku Automotive, Hitachi Automotive Systems, Calsonic Kansei and GS Yuasa received approval in 2014 from the Thai BOI to expand operations in the host country. Similarly, Japanese electronics manufacturers such as Furukawa Fitel, Rohm, Sharp, NMB-Minebea, Panasonic, Murata, Nidec, MMC Electronics and Fuji Electric have received official approval to expand operations in Thailand.

Other companies, which include Ford Motor, General Motors, Hutchinson Technology, Pepsi-Cola, Johnson Controls and Visteon (all from the United States), and Saint-Gobain (France), Robert Bosch (Germany), Electrolux (Sweden) and Aeroworks (Netherlands), are expanding in the host country.

Source: UNCTAD based on BOI, Thailand.

1.3.2. Regional players and intraregional corporate investment

Companies from ASEAN Member States have been actively investing and expanding regionally too – a trend more visible a few years ago (AIR 2014). ASEAN companies that made regional investment in selected activities in 2014-2015[22] include the following:

TOA Paint (Thailand), which already has operations in other ASEAN Member States such as Lao PDR, Malaysia, Myanmar and Viet Nam, is planning to expand operations to Cambodia and Indonesia later in 2015.[23] The aim is to further increase the company's production base regionally and to prepare for the AEC. Other Thai companies are also expanding in the region in 2014. They include Siam Cement in Lao PDR, Saha Group in Myanmar and a number of Thai banks. Thai Oil, a refinery company of PTT (Thailand), is planning to expand in Indonesia and Myanmar with new refinery capacity.

Parkson, a subsidiary of the Lion Group (Malaysia), has been expanding in ASEAN. With 14 stores already in Indonesia, 1 in Myanmar and 9 in Viet Nam, Parkson is opening its first store in Cambodia later in 2015. The company opened a store in Indonesia in 2014 and another in Viet Nam in January 2015, and it plans to open more stores in the region.

Wah Seong (Malaysia), through its subsidiary in Cambodia, is investing to build a biomass power plant; it signed a power purchase agreement with Baitang Plc (Cambodia) in December 2014. The plant will start operation in 2016. The company also expanded its business portfolio regionally in 2014, when it ventured into a river port business in Myanmar. The company plans to expand the port services, including constructing more storage tanks and a fabrication yard to serve customers operating in the Thilawa SEZ.

Keppel Land (Singapore) is expanding its foothold in real estate operations in ASEAN and further afield. In ASEAN, it is building Phase 2 of the Saigon Centre in Ho Chi Minh City, Viet Nam, as well as Phase 1 of the International Financial Centre Jakarta in Indonesia, to be completed by 2015, with Phase 2 to be completed by 2020. The company is developing Phase 2 of its SM-KL Project in the Philippines and has acquired a 40% stake in a joint venture to develop the Junction City Office Tower in Yangon, Myanmar.

Sembcorp (Singapore) is building an integrated port and industrial estate in Indonesia and won a contract in 2015 to develop and operate a $300 million, 225 MW, gas-fired power plant in Myanmar. The company also started to build its seventh Vietnam Singapore Industrial Park in Nghe An Province in 2015.

ASEAN banks and insurance companies have been making new investments or undertaking expansion in the region. Many of the top 20 ASEAN banks, which had combined assets of $2.1 trillion in 2014, expanded their operations regionally in 2014-2015 (table 1.8). In addition to Thai banks such as Bangkok Bank, Kasikorn Bank and Siam Commercial Bank, other ASEAN banks, including United Overseas Bank (Singapore), OCBC (Singapore), Maybank (Malaysia), CIMB (Malaysia) and RHB Capital (Malaysia), also expanded activities in other ASEAN Member States in 2014 and 2015. Vietnamese banks are also expanding in neighbouring ASEAN Member States. Some were granted approvals in 2014 from the State

Bank of Vietnam to upgrade or open subsidiaries in Lao PDR and Cambodia. They include Sacombank, Saigon-Hanoi Bank and Vietinbank.[24]

Other companies are also expanding in neighbouring countries. For example, Vinamilk (Viet Nam) is to start operation in Cambodia in 2015 (see box 1.4).[25]

Furthermore, many ASEAN companies, large and small, invested in the region last year and in 2015 by acquiring equity stakes in other ASEAN companies in the region (table 1.9). These companies include the following:

- **Indonesia**: Pharma Healthcare and Sinar Mas
- **Malaysia:** Johor Corporation, CIMB, Gadang Holdings, SapuraKencana, Parkson, Felda Global Ventures, YTL and Top Glove
- **The Philippines:** JG Summit and Xurpas

Table 1.8. The top 20 ASEAN banks have regional footprints and significant assets, 2014
(Millions of dollars)

Bank	Headquarters	Net income	Total assets	Market capitalization	Cash or near cash holding	Selected host country
DBS Group	Singapore	3,194	332,653	38,447	14,733	Indonesia
Oversea-Chinese Banking Corp.	Singapore	3,033	302,881	31,457	19,109	Brunei Darussalam, Indonesia and Malaysia
United Overseas Bank	Singapore	2,565	231,551	29,678	26,484	Indonesia, Malaysia, Philippines, Thailand
Malayan Banking	Malaysia	2,053	182,864	24,405	18,858	Indonesia, Philippines, Singapore, Cambodia
CIMB Group	Malaysia	950	118,280	13,376	10,332	Brunei Darussalam, Cambodia, Indonesia, Myanmar, Singapore, Thailand, Viet Nam
Public Bank	Malaysia	1,381	98,735	20,181	3,220	Cambodia, Lao PDR, Viet Nam
Bangkok Bank	Thailand	1,119	83,862	11,252	1,822	Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Viet Nam
Krung Thai Bank	Thailand	1,022	83,238	9,640	2,269	Lao PDR, Myanmar and Singapore
Siam Commercial Bank	Thailand	1,642	82,033	18,771	1,282	Cambodia, Myanmar, Lao PDR, Singapore and Viet Nam
Kasikorn Bank	Thailand	1,421	72,596	16,653	1,764	Lao PDR, Myanmar and Viet Nam
Bank Mandiri	Indonesia	1,676	68,788	20,227	5,746	Malaysia and Singapore
Bank Rakyat	Indonesia	2,045	64,518	23,121	5,935	Singapore
RHB Capital	Malaysia	623	62,646	5,598	6,185	Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Myanmar, Singapore, Thailand and Viet Nam
Hong Leong Financial Group	Malaysia	526	59,256	5,268	..	Cambodia, Singapore and Viet Nam
Hong Leong Bank	Malaysia	648	53,079	7,735	..	Cambodia, Singapore and Viet Nam
Bank Central Asia	Indonesia	1,391	44,443	26,034	4,710	Singapore
BDO Unibank	Philippines	514	41,655	8,788	6,951	Singapore
AMMB Holdings	Malaysia	557	40,643	6,646	3,771	Indonesia
Metropolitan Bank and Trust	Philippines	453	35,864	5,092	5,594	Singapore
Bank Negara	Indonesia	910	33,514	9,152	2,904	Singapore
Total of the top 20 ASEAN banks	..	27,722	2,093,099	331,522	141,669	..

Source: UNCTAD 2015b, based on data of Bloomberg and company websites.

Note: Based on total assets reported for 2014.

Table 1.9. ASEAN companies are expanding regionally through M&As, 2014 (Millions of dollars)

Ultimate acquiring company	Ultimate acquiring nation	Target company	Target nation	Target industry	Value	Shares acquired
Falcon Energy	Singapore	Maritam Indah Sdn Bhd	Brunei Darussalam	Investors, nec	..	50
Phillip Mfis	Singapore	HwangDBS Commercial Bank PLC	Cambodia	Banks	40	100
Investor Group	Indonesia	Axis Telekom Indonesia PT	Indonesia	Radiotelephone communications	865	100
Solusi Tunas Pratama	Indonesia	XL Axiata Tbk PT-Telecoms Towers (7000)	Indonesia	Radiotelephone communications	459	100
LMIR Trust	Singapore	Lippo Mall Kemang	Indonesia	Operators of nonresidential buildings	306	100
Polaris	Singapore	Trikomsel Oke Tbk PT	Indonesia	Electronic parts and equipment, nec	121	20.78
Kendall Court(Singapore)	Singapore	Intrepid Mines Ltd-Tujuh Bukit Project	Indonesia	Gold ores	80	100
Johor Corp	Malaysia	Wisesa Inspirasi Nusantara PT	Indonesia	Forest nurseries and gathering of forest products	26	20.46
Bowsprit Capital	Singapore	Siloam Hospitals Purwakarta	Indonesia	General medical and surgical hospitals	25	100
ASL Marine Holdings	Singapore	Loh & Loh Construction Indonesia PT - Certain Assets	Indonesia	Ship building and repairing	20	100
Johor Corp	Malaysia	Wisesa Inspirasi Nusantara PT	Indonesia	Forest nurseries and gathering of forest products	17	54.55
Halcyon Agri	Singapore	PT Golden Energi	Indonesia	Fabricated rubber products, nec	7	95
OCK Group	Malaysia	Putra Mulia Telecommunication PT	Indonesia	Employment agencies	7	85
Gadang Holdings	Malaysia	Dewata Bangun Tirta PT	Indonesia	Water supply	5	70
Gadang Holdings	Malaysia	Ikhwan Mega Power PT	Indonesia	Electric services	1	60
Shin Yang Shipping	Malaysia	Pelayaran Baruna Adiprasetya PT	Indonesia	Arrangement of transportation of freight and cargo	..	49
Boustead Singapore	Singapore	Mustika Petrotech Indonesia PT	Indonesia	Oil and gas field services, nec	..	80
Siam Cement	Thailand	Indorisu Printingdo	Indonesia	Corrugated and solid fiber boxes	..	90
SapuraKencana Petroleum	Malaysia	Newfield Malaysia Holdings	Malaysia	Crude petroleum and natural gas	896	100
Global A&T Electronics	Singapore	Panasonic Industrial Devices Semiconductor	Malaysia	Semiconductors and related devices	117	100
Ascott Residence Trust	Singapore	Somerset Ampang (Malaysia) Sdn Bhd	Malaysia	Operators of apartment buildings	53	100
Sasteria (M)	Singapore	TMC Life Sciences Bhd	Malaysia	Offices and clinics of doctors of medicine	32	26.65
Fraser & Neave	Singapore	Yoke Food Industries Sdn Bhd	Malaysia	Canned fruits, vegetables, jams and jellies	17	70
E Power	Singapore	Mperial Power Ltd	Malaysia	Electric services	11	51
Wilmar International	Singapore	Nexsol(M)Sdn Bhd	Malaysia	Petroleum refining	9	100
Declout	Singapore	Verity Solutions Sdn Bhd	Malaysia	Computer facilities management services	1	100
Royalton Capital	Singapore	Jinmei Industrial Sdn Bhd	Malaysia	Converted paper and paperboard products, nec	1	100
HG Metal Manufacturing	Singapore	Jin Heng Li Hardware Sdn Bhd	Malaysia	Metals service centers and offices	1	20.15
Jackspeed Corp	Singapore	Dynasty Culture Sdn Bhd	Malaysia	Fabricated textile products, nec	..	100
ecoWise Holdings	Singapore	Autoways Industries Sdn Bhd	Malaysia	Tires and tubes	..	20
Cogent Holdings	Singapore	JW Cogent Logistics Sdn Bhd	Malaysia	Trucking, except local	..	50
Sinar Mas Group	Indonesia	Sarawak Oil Palms Bhd - Transshipment & Processing	Malaysia	Vegetable oil mills, nec	..	..
ARA Asset Management	Singapore	Allworth Property Management Sdn Bhd	Malaysia	Operators of nonresidential buildings	..	49
Lian Beng Group	Singapore	Grand Millennium Development Sdn Bhd	Malaysia	Real estate	..	49

/...

Table 1.9. ASEAN companies are expanding regionally through M&As, 2014 (Millions of dollars) (concluded)

Ultimate acquiring company	Ultimate acquiring nation	Target company	Target nation	Target industry	Value	Shares acquired
Central Marketing Group	Thailand	HCH Group	Malaysia	Women's and children's clothing	..	100
Quan Min Holdings	Singapore	Q & M Dental Surgery (Bandar Puteri Puchong)	Malaysia	Offices and clinics of dentists	..	20
Singapore	Singapore	Emperador Inc	Philippines	Distilled and blended liquors	391	10.67
JG Summit Holdings	Philippines	Tigerair Philippines	Philippines	Air transportation, scheduled	15	100
Banco De Oro Unibank	Philippines	Citibank Savings Inc	Philippines	Banks	..	99.99
Electricity Generating PCL	Thailand	Masin-AES Pte Ltd	Singapore	Electric services	453	45
Peak Hotels & Resorts Group	Singapore	Silverlink Resorts Ltd	Singapore	Hotels and motels	358	100
DBS Group Holdings	Singapore	Sociéété Générale Private Banking	Singapore	Investment advice	220	100
Felda Global Ventures	Malaysia	Asian Plantations Ltd	Singapore	Cash grains, nec	171	100
Top Glove	Malaysia	Medi-Flex Ltd	Singapore	Plastics products, nec	23	20.23
Investor Group	Indonesia	Navigat Group Pte Ltd	Singapore	Electrical apparatus and equipment	21	6.7
YTL Corp	Malaysia	Sin Heng Chan (Singapore) Pte Ltd	Singapore	Prepared animal feeds, except for dogs and cats	19	100
Mitra Investindo	Indonesia	Goldwater LS Pte Ltd	Singapore	Crude petroleum and natural gas	14	90
Enco Holdings	Malaysia	Kencana Bio Energy Pte Ltd	Singapore	Electric services	5	30
Kobay Technology	Malaysia	Microhandling Asia Pte Ltd	Singapore	Measuring and controlling devices	..	49
Nam Cheong	Malaysia	Marco Polo Offshore (IV) Pte Ltd	Singapore	Deep sea foreign transportation of freight	..	50
Navis Capital Partners	Malaysia	MFS Technology (S) Pte Ltd	Singapore	Printed circuit boards	..	..
Xurpas	Philippines	Altitude Games Pte Ltd	Singapore	Computer facilities management services	..	21.7
Navis Capital Partners	Malaysia	Cladtek Holdings Pte Ltd	Singapore	Oil and gas field services, nec	..	100
Exabytes Network	Malaysia	Usonyx Pte Ltd	Singapore	Computer related services, nec	..	100
Astro Holdings	Malaysia	Asia Sports Ventures Pte Ltd	Singapore	Management consulting services	..	50
Investor Group	Thailand	Hess Thailand Holdings II Ltd	Thailand	Petroleum refining	1,000	100
B Grimm Power	Thailand	Sime Darby Power Co Ltd	Thailand	Electric services	163	100
Loyz Energy	Singapore	Carnarvon Thailand Ltd - Onshore Concessions	Thailand	Crude petroleum and natural gas	65	20
Hotel Royal	Singapore	Panali Co Ltd	Thailand	Hotels and motels	40	100
Catcha Media	Malaysia	One2Car Co Ltd	Thailand	Business services, nec	15	100
Tune Money	Malaysia	Osotspa Insurance PCL	Thailand	Insurance agents, brokers and service	13	49
Hotel Properties	Singapore	Laem Ka Properties Co Ltd	Thailand	Real estate	3	45
TEE International	Singapore	CMC Communications (Thailand) Co Ltd	Thailand	Telephone communications	..	20
Phillip Securities	Singapore	Finansa Life Assurance Co Ltd	Thailand	Life insurance	..	98
Thoroughbred Holdings	Singapore	Thai Tech Steel (2003) Co Ltd	Thailand	Cold-rolled steel sheet, strip and bars	..	70
Furniweb Industrial Products	Malaysia	Furnitech Components (Vietnam) Co Ltd	Viet Nam	Metal household furniture	..	10.44
Triyards Holdings	Singapore	Strategic Marine (V) Co Ltd	Viet Nam	Ship building and repairing	..	100

Source: UNCTAD, UNCTAD M&A Database (accessed 15 July 2015).

Note: Selected cases, on gross basis. nec = not elsewhere classified.

- **Singapore:** LMIR Trust, Polaris, Boustead, Fraser and Neave, E-Power, Wilmar, CapitaLand, Jackspeed Corporation, Jubilee Industries, Tembusu Industries and DBS
- **Thailand:** Siam Cement, Electricity Generating PCL, Bangchak Petroleum, Power Buy and B. Grimm Power

1.3.3. Cross-border M&As

Cross-border M&A sales in ASEAN were down, but purchases made by ASEAN companies rose. MNEs continued to use cross-border M&A as a strategy for participating in and accessing the ASEAN market, establishing quick production or service platforms, and acquiring strategic assets in the region. The use of cross-border M&As tends to be by MNEs from some key source countries and concentrated in ASEAN Member States with more mature M&As environments.

Although the value of cross-border M&As in the region declined by nearly 50%,[26] the number of deals held steady (410 in 2014 compared with 409 in 2013), suggesting that MNEs continue to have interest in using M&As as a channel to operate in the region. The decline in value was due to the drop in the size of deals, including mega deals, those exceeding $500 million (from 17 in 2013 to just 10 in 2014).

Companies from developed and developing economies acquired considerably fewer assets in the region last year (table 1.10). Cross-border M&As by companies from developing economies fell by almost 50%, mainly as a result of the significant dive in the numbers and values of cross-border M&As made by ASEAN companies in particular. In addition, regional cross-border M&A deals by ASEAN companies fell from $20.3 billion in 2013 to just $7.4 billion in 2014, due to the significant decline in M&As made by Thai companies. Regional cross-border M&As made by Thai companies in 2014 stood at $1.6 billion, which significantly contrasted with the $13.1 billion recorded in 2013.

The decline in M&As does not necessarily suggest a loss of appetite by ASEAN companies for making acquisitions in the region. The timing of M&A opportunities, particularly those involving mega deals, of which many were done in 2012-2013, also contributed. The plunge in cross-border M&As also highlights the inherent “lumpiness” in the values of M&A activities and the effect of mega deals on trends in cross-border M&As.

Although cross-border M&A deals by Japanese companies also declined significantly, Japan was nonetheless the largest acquirer of assets in ASEAN, with nearly $4 billion in deals, followed by the United States with $3.1 billion (a 19-fold increase, compared with deals made by American companies in 2013). Deals by Chinese companies rose by 13 times to $2.4 billion in 2014. Indonesian and Korean companies also made significant acquisitions in the region.

Cross-border M&As in the region in all three key economic sectors (i.e. primary, manufacturing and services) declined (table 1.11). However, deals in infrastructure-related industries bucked the trend. Cross-border M&A values in ICT rose significantly from $0.4

Table 1.10. Cross-border M&A sales in ASEAN fell by nearly 50% in 2014 (Millions of dollars)

	2010	2011	2012	2013	2014
World	21,324	34,353	23,043	40,363	21,700
Developed economies	6,232	18,070	10,664	15,989	9,776
Europe	3,163	7,803	6,988	6,766	1,151
European Union	2,622	7,571	6,987	5,566	954
France	318	1,464	1,305	57	42
Germany	613	282	..	52	211
Italy	..	..	123	697	85
Netherlands	4	329	4,812	2,043	..
Sweden	16	5	3	..	220
United Kingdom	1,660	5,228	625	2,108	304
Other developed Europe	541	232	..	1,200	197
Switzerland	319	231	..	1,186	197
North America	888	4,632	567	223	3,114
United States	871	3,399	513	164	3,114
Other developed countries	2,181	5,635	3,109	9,000	5,511
Australia	253	473	555	539	1,303
Japan	1,928	5,162	2,554	8,461	3,896
Developing economies	14,698	16,226	12,233	23,269	11,864
Africa	270	..	263	256	119
Latin America and the Caribbean	40	705	14	724	..
Asia	14,388	15,521	11,955	22,289	11,745
China	1,014	1,150	222	186	2,397
Hong Kong, China	520	939	2,235	1,545	1,074
Korea, Republic of	2,023	1,321	161	142	754
ASEAN	9,348	9,646	8,460	20,339	7,436
Indonesia	1,223	759	936	1,321	1,992
Malaysia	3,699	2,046	383	3,454	1,464
Philippines	1	22	705	108	27
Singapore	3,833	5,890	2,355	2,376	2,336
Thailand	542	928	3,950	13,077	1,617
Viet Nam	50	..	31	2	..

Source: UNCTAD, UNCTAD M&A Database.

Note: gross basis.

billion in 2013 to $3.6 billion in 2014, transportation and storage deals rose by 25% to $1.5 billion and electricity, gas, water and sanitation deals by 4% to $1.1 billion in 2014. Trade, manufacturing and finance witnessed significant declines in cross-border M&A sales.

Most of the significant deals were made in infrastructure-related industry by Chinese and ASEAN companies, indicating the growing use of the M&A strategy to establish a presence in the region. China Mobile acquired a 23% stake in True Corporation (Thailand) for $882 million, Solusi Tunas Pratama (Indonesia) acquired Malaysian-owned Axiata-Telecom Towers in Indonesia for $459 million, Electricity Generating (Thailand) acquired a 45% interest in Masin-AES in Singapore for $453 million, and a Korean company acquired Angat Hydroelectric Power Plant in the Philippines for $441 million.

Japanese companies made significant acquisitions in finance, in particular, in the insurance industry in Indonesia. Sumitomo Mitsui Financial Group acquired a 15.7 % stake in Bank Tabungan Pensiunan Nasional (Indonesia) for $526 million, Nippon Life Insurance acquired a 20% interest in Asuransi Jiwa Sequis Life (Indonesia) for $424 million, and Sumitomo Life Insurance acquired 40% ownership of BNI Life Insurance (Indonesia) for $357 million.

Table 1.11. Cross-border M&A sales in infrastructure-related industries in ASEAN rose in 2014 (Millions of dollars)

	2010	2011	2012	2013	2014
Total	21,324	34,353	23,043	40,363	21,700
Primary	2,515	6,752	4,300	3,448	2,015
Agriculture, forestry and fishing	42	479	254	3	237
Mining and quarrying	2,474	6,273	4,046	3,445	1,778
Manufacturing	5,126	5,539	9,709	14,219	4,105
Food, beverages and tobacco	1,995	1,040	7,445	10,745	1,273
Paper and paper products	22	261	18	11	108
Coke and refined petroleum products	..	..	..	..	1,009
Chemicals and chemical products	1,463	1,214	660	23	275
Pharmaceuticals, medicinal chemical and botanical products	-	122	95	610	182
Rubber and plastics products	448	379	106	164	30
Basic metal and metal products	375	576	78	719	400
Computer, electronic, optical products and electrical equipment	100	1,393	514	87	171
Motor vehicles and other transport equipment	39	166	114	1,267	515
Non-metallic mineral products	316	85	231	64	28
Machinery and equipment	12	112	101	45	85
Services	13,682	22,062	9,034	22,697	15,580
Electricity, gas, water and waste management	157	2,612	632	1,077	1,122
Construction	440	143	71	103	9
Trade	1,659	1,769	930	7,867	326
Accommodation and food service activities	63	414	471	1,925	729
Transportation and storage	731	3,746	296	1,194	1,497
Information and communication	222	725	524	438	3,563
Financial and insurance activities	5,517	6,923	3,547	8,133	3,172
Business activities	1,661	4,260	1,796	1,646	3,921
Education	..	37	16	..	12
Arts, entertainment and recreation	17	78	3	6	1,113
Other service activities	2	32	29	..	25

Source: UNCTAD, UNCTAD M&A Database.

Note: gross basis.

1.4. Policy developments

ASEAN Member States continue to introduce measures in 2014-2015[27] to make investing easier, increase transparency and improve the investment environment. Measures introduced include national investment policy reforms, industrial development policies, incentives and tax reforms, investment facilitation, infrastructure development and institutional support to investors. The ASEAN Member States are also involved with other

investment-related agreements at the bilateral, plurilateral and regional levels, which are at various stages of negotiation and development. Some of the measures introduced or announced in 2014–2015 include those laid out in the following subsections.

1.4.1. Reform and improvement of investment policies

In a number of Member States, the following reforms and improvements in investment policies were made:

- Indonesia enacted Presidential Regulation Number 39 Year 2014, "Lists of Business Fields that are Closed for Investment and Business Fields that are Conditionally Open for Investment", which aims to provide clearer, more transparent and more certain investment policies.
- The Myanmar Investment Commission issued notifications in August 2014 on (i) amended classification of types of economic activities, (ii) economic activities requiring environmental impact assessment and (iii) investment businesses that will be granted or not granted exemption and tax relief.
- The Philippines issued the 10th Foreign Investment Negative List on 29 May 2015 to reflect the changes in its List A (sectors in which foreign ownership is limited by mandate of the constitution and specific laws). The list provides clarity on which professional practices are open to foreigners, subject to reciprocity.
- Singapore amended the Companies Act of 1967 in October 2014 to reduce the regulatory burden on companies, provide for greater business flexibility and improve the corporate governance landscape in the country.
- The Thailand BOI made Announcement No. 2/2557 on 3 December 2014, promoting more high-value industries and eco-friendly production in the country. This announcement became effective for applications submitted from 1 January 2015.
- Viet Nam amended its Investment Law and Enterprise Law; the amendment took effect on 1 July 2015. The new law guarantees the freedom of doing business in Viet Nam except for the clearly defined business lines prohibited by the law.

A number of Member States are updating or improving their investment policies. For instance, Cambodia is drafting a new law on investment to update the law that was adopted in 1994 and amended in 2003. Myanmar is working on merging the Myanmar Citizens Investment Law and the Foreign Investment Law into a single law, as well as updating the century-old Myanmar Companies Act (1914).

Some Member States have also announced efforts to align investment policies with national economic or industrial development policy. They include the following:

- Cambodia is working on its "Industrial Development Policy 2015-2025", which will be launched later in 2015. It has also adopted what are called "Four Key Concrete Measures" to be accomplished by 2018, which target economic areas such as electricity, the transport and logistics system, labour development, and the Sihanoukville SEZ.

- Malaysia launched the 11th Malaysia Plan on 21 May 2015 to chart its latest direction to become a high-income nation by 2020. The plan includes strategies to position Malaysia as a high-tech hub for manufacturing and services activities, and to attract quality investments in high value added industries as well as new growth areas.
- Myanmar's National Comprehensive Development Plan, which consists of four detailed five-year plans from 2011 to 2030, is in the approval process. It will include a long-term 20-year Foreign Direct Investment Promotion Plan.
- The 2011–2016 Philippines' Development Plan, which focuses on industrialization, identified six broad sectors as priorities. In aligning its investment strategy with this industrial plan, a new approach was undertaken through the Investment Priorities Plan starting in 2014. Instead of an annual listing of industries to be granted fiscal incentives, the plan will be effective for three years, to provide investors with predictable policies for investing in new areas identified by the Government.
- In line with Thailand's 11th National Economic and Social Development Plan (2012-2016), the BOI approved a "Seven-Year Investment Strategy" (2015-2021) in November 2014. The strategy focuses on promoting investments that create value and have a positive impact on society and the environment; it became effective for applications submitted starting 1 January 2015.

1.4.2. Investment incentives and tax reforms

ASEAN Member States have also made announcements about the provision of incentives and tax reforms. They include the following:

- Indonesia issued Government Regulation Number 18 Year 2015 (effective since 6 May 2015) to improve tax incentives for investments made in certain business fields or regions. It offers more types of incentives with more relaxed conditions and broader eligibility criteria for business fields and regions.
- Malaysia announced four new incentives in the 2015 budget for investments made in less developed areas, industrial estates, and projects that increase automation in labour-intensive industries, and establishment of principal hubs.
- Thailand's "Seven-Year Investment Strategy" (2015-2021), approved in November 2014, offers fiscal incentives on the basis of the importance of the activities and the merit of the investment (such as whether it enhances competitiveness, promotes decentralization, or encourages industrial area development).

On tax matters, Indonesia, Malaysia and Myanmar updated their tax schemes. Thailand postponed its tax increase and Brunei Darussalam announced a number of agreements on the avoidance of double taxation. These developments are as follows:

- Brunei Darussalam signed the Agreement on the Avoidance of Double Taxation with the Republic of Korea on 9 December 2014. The Tax Information Exchange Agreement between Brunei Darussalam and Canada entered into force on 24 December 2014, and the Brunei Darussalam-United Arab Emirates Avoidance of Double Taxation Agreement came into effect on 1 January 2015.

- Indonesia's Government Regulation Number 18 Year 2015 not only provides an income tax facility for investment made in certain business fields or regions, it also improves the procedure of applying for income tax exemption. Investors can submit applications through a one-stop service centre and results will be provided within 30 working days.
- Malaysia implemented a goods and services tax (GST) on 1 April 2015. Businesses making taxable annual sales of more than RM 500,000 are required to register for GST. The GST rate is fixed at 6%.
- Myanmar promulgated the Law Amending the Income Tax Law, Commercial Tax Law, and Union Tax Law in March 2014. Tax rate structures have been simplified and foreign currency–denominated contracts are no longer subject to 1% stamp duty.
- Thailand postponed the planned increase in the value added tax rate from 7% to 10% in 2014. It had also reduced the corporate income tax from 30% to 23% in 2012 and to 20% in 2013.

1.4.3. Investment facilitation and ease of doing business measures

Member States implemented various initiatives to facilitate investment and to increase the ease of doing business. They include streamlining of investment procedures, increases in institutional support for investors, and establishment of more economic zones and infrastructure development.

Streamlining of processes and requirements

Member States also streamlined investment application processes to make investment easy. These actions included the following:

- Brunei Darussalam amended its Miscellaneous License Act on 1 January 2015, to allow business licenses to be issued immediately by a single authority under the Ministry of Home Affairs, once the business incorporation or registration certificates have been issued by the Ministry of Finance; businesses are given a grace period to fulfil all the requirements.
- Myanmar's new Foreign Investment Rules reduce the number of steps and documents for the business approval process.
- The Philippines unveiled reforms on 14 April 2015, simplifying the process of starting a business to 6 steps and 8 days, from 16 steps and 34 days.

One-start, one-stop centres

Indonesia and Myanmar established one-stop centres to facilitate investment.

- Indonesia revived its Investment One-Stop Service (OSS) Centre on 26 January 2015, making the process faster, simpler, more transparent and convenient. The OSS Centre obtains authority from related technical ministries or agencies to issue licensing and

non-licensing documents for particular sectors. It integrates with 22 ministries and agencies, covering most business fields. Indonesia's investment agency, BKPM, is also assisting regional governments in implementing OSS centres at provincial and district levels, which are targeted to be integrated with the OSS Centre in Jakarta in 2016.

- Myanmar moved its office of the Directorate of Investment and Company Administration from Nay Pyi Taw to Yangon in July 2014, to be closer to its one-stop centre and the business community. One-stop centres have been further extended to branch offices in Monywa, Pathein and Dawei in 2015.

Special economic zones (SEZs)

Myanmar and Thailand announced investment policies relating to SEZs:

- Myanmar promulgated its SEZ Law in January 2014, which decentralizes decision-making to the SEZ committee and allows seven years' income tax exemption – eight years for construction companies in designated areas.
- The Thailand BOI's Announcement No. 4/2557 grants an additional three-year corporate income tax exemption on top of basic incentives for investment projects located in the country's five SEZs. Maximum incentives will be offered to 13 targeted industries, covering 61 business activities, if they locate operations in one of the SEZs.

Other measures and infrastructure development

Some Member States also made announcements or introduced other measures that support investment, which include national infrastructure development plans:

- Brunei Darussalam is preparing a comprehensive National Land Transport Master Plan. Several sector-specific industrial parks that are ready to be utilized by investors have been allocated.
- Indonesia enacted Presidential Regulation Number 30 Year 2015 on 17 March 2015, which covers land procurement for public infrastructure. The Government will take over the responsibility for conducting such procurement.
- The 11th Malaysia Plan, launched on 21 May 2015, announced several major infrastructure projects to boost growth, to be funded by both the private and the public sectors. These projects include additional Mass Rapid Transit (MRT) and Light-Rail Transit (LRT) rail lines.
- Singapore amended its Land Titles Act, effective 15 August 2014, to provide greater clarity, consistency and operational efficiency. For example, the provisions relating to the surrender and reissuance of title to land (whether registered or unregistered, whether subject to mortgage or charge, and whether of the same or different tenure) have been streamlined and simplified to a single process.
- Thailand is restructuring its trade and investment schemes, and enhancing its competitiveness through the development of the financial market and capital market, the intellectual property management system, local infrastructure, and energy security.

- Viet Nam issued a decree on public-private partnerships on 14 February 2015 to regulate the conditions and procedures for implementing infrastructure investment projects in that form.

1.4.4. Regional and bilateral investment agreements

ASEAN Member States are collectively negotiating investment agreements for various ASEAN free trade agreements (FTAs) with Dialogue Partners, including the Regional Comprehensive Economic Partnership.

Individual Member States continue to actively negotiate and implement bilateral and plurilateral FTAs that include investment agreements or chapters. Some Member States have concluded additional bilateral investment treaties (BITs) and investment promotion and protection agreements (IPPAs). The concluded BITs include the following:

- Cambodia-Belarus BIT on 23 April 2014
- Cambodia-Russia BIT on 3 March 2014
- Myanmar-Republic of Korea IPPA, signed on 5 June 2014
- Myanmar-Israel IPPA on 5 October 2014
- Singapore BITs with Burkina Faso and Côte d'Ivoire, signed on 27 August 2014
- EU-Singapore FTA's investment protection chapter, initialled in May 2015
- Viet Nam-South Korea FTA, signed on 5 May 2015
- Viet Nam-Eurasian Custom Union FTA, signed on 29 May 2015

Some Member States are negotiating other bilateral investment instruments with a number of different partner countries. They include the following:

- Trans-Pacific Partnership Agreement, participated in by Brunei Darussalam, Malaysia, Singapore, and Viet Nam
- Separate BITs by Lao PDR with Azerbaijan, Canada, Pakistan, Portugal, Serbia, Turkey, and Ukraine
- Malaysia-European Free Trade Association (EFTA) Economic Partnership Agreement (MEEPA)
- Myanmar-EU Investment Protection Agreement
- Philippines-EFTA
- Philippines-EU FTA
- Philippines-Mexico IPPA
- Singapore-Turkey FTA
- Thailand-India FTA
- Thailand-EU FTA
- Thailand-Canada FTA

1.5. Outlook for 2015-2016

FDI inflows in 2015 are likely to decline marginally or stay at about the same level as in 2014, partly because of global economic fragilities and slower growth in the region. Cross-border M&A sales and FDI flows to the region in the first half of 2015 were down. Those weak numbers do not augur well for the region to record higher annual FDI flows in 2015 to surpass the level achieved in 2014.

The outlook for 2016 is cautiously optimistic, but much depends on the health of the global economy and corporate investment plans as well as the delivery of the AEC in terms of depth and scope. Supporting further investment into the region in 2016 and beyond are the region's strong macroeconomic fundamentals, its economic resilience and the influences of regional integration, as well as the cost competitiveness of the region, the strong cash holdings of ASEAN companies, and the continued regional investment expansion plans of investors.

A number of specific factors are worth highlighting:

- The region's growing number of middle-income consumers and its comparatively higher economic growth as compared with the world average will continue to play important roles in attracting market-seeking FDI and influencing corporate investment plans.
- As the region becomes more integrated, companies are positioning themselves strategically with more expected to expand regionally in post-AEC 2015. The AEC is expected to increase the competitiveness of the region and connectivity between ASEAN Member States, which will help reduce the transaction costs of investment and the cost of doing business in the region across a wide range of industries.
- The growing competitiveness of the region will play a key role in attracting FDI, with MNEs constantly seeking lower-cost locations and opportunities for production networks to increase their efficiency. The rise in production costs in locations outside the region and within ASEAN will encourage efficiency-seeking FDI to and within the region.
- MNEs, both foreign and ASEAN, will continue to exploit complementary locational advantages within the region with respect to building an effective supply chain strategy and achieving production efficiency. This will entail investment and production operations that are based on differences in locational cost structures, factors of production and skill levels that match MNEs' strategy. As MNEs engage in regional division of production for reasons of markets, costs or access to natural resources, they are connecting the Member States through production, investment and inter- and intra-firm linkages – making the region a stronger magnet for attracting FDI from new and existing investors.
- The huge infrastructure plans announced by ASEAN Member States and their commitment to attracting private investment into infrastructure will contribute to the rise in investment in this industry, including in industrial estates development

Box 1.3. Reforming international investment governance

In its *World Investment Report 2015: Reforming International Investment Governance*, UNCTAD presents policy options for meeting the five key challenges in governance:

- *Safeguarding the right to regulate:* Options include clarifying or circumscribing provisions such as most-favoured-nation (MFN) treatment, fair and equitable treatment (FET), and indirect expropriation, and including exceptions.
- *Reforming investment dispute settlement*: Options include (i) reforming the existing mechanism for investor-State dispute settlement (ISDS) while keeping its basic structure, or (ii) replacing existing ISDS arbitration systems, which could include (1) the creation of a standing international investment court, (2) State-State dispute settlement and/or (3) reliance on domestic judicial systems of the host State.
- *Promoting and facilitating investment*: Options include adding inward and outward investment promotion provisions (i.e. host and home country measures), and joint and regional investment promotion provisions, including an ombudsperson for investment facilitation.
- *Ensuring responsible investment*: Options include establishing provisions on investor responsibilities, such as clauses on compliance with domestic laws and on corporate social responsibility.
- *Enhancing the systemic consistency of the international investment agreements (IIA) regime*: Options include improving the coherence of the IIA regime, consolidating and streamlining the IIA network, managing the interaction between IIAs and other bodies of international law, and linking IIA reform to the domestic policy agenda.

Some of the reform options can be combined and tailored to meet several reform objectives. On the whole, policymakers need to find the right balance, meeting reform needs while maintaining the investment protection rationale of IIAs. Countries can use the action menu presented in *WIR 2015* and define their own road maps for IIA reform: they can pick and choose, and adapt and adopt, various reform actions and options to formulate their own reform packages, in line with their national development strategies and specific circumstances.

At the same time, IIA reform is a global challenge; at the global level, there is therefore a need for a holistic approach to reforming the regime in a systematic and comprehensive manner. An effective support structure is important to achieve this. The outcome document of the Third International Conference on Financing for Development has entrusted UNCTAD to play a lead role to facilitate such a global endeavour. It calls upon UNCTAD to continue its work on investment agreements, including meetings and consultations with Member States.

Overall, IIA reform – at all levels – should be guided by the goals of harnessing IIAs for sustainable and inclusive growth, and determining the most effective means to safeguard the right to regulate while providing protection and facilitation of investment. Reform should focus on critical areas, include actions at all levels, take a systematic and sequential approach, ensure inclusiveness and transparency, and make use of multilateral support structures – such as the one provided by UNCTAD.

Source: UNCTAD.

and construction activities. Private participation in infrastructure should not be examined from FDI statistics alone but also from analysis of non-equity approaches to participation by the private sector (chapters 2 and 3).

- The investment environment in the region continues to improve with reforms and favourable investment measures announced or introduced by ASEAN Member States. At the international level, stakeholders show interest in addressing international investment governance issues (box 1.3).
- Recent surveys of companies found that an increasing number of MNEs have favourable perceptions of the region which have translated into investment. Many have investment plans that target the region in the next few years (AmCham-Singapore and US Chamber of Commerce 2014, 2015; EU-ASEAN Business Council 2015; JETRO 2015; KPMG 2015; Economist 2014). Some have already adopted an integrated regional business strategy, and others are planning to do the same in the post-AEC 2015 environment.

1.6. ASEAN: a rapidly growing South–South cooperation partner

ASEAN is both a major recipient and a source of FDI. The region is an important source of and partner in South–South cooperation. Outward FDI flows from the region to the world rose by 19% in 2014, to $80 billion – greater than the outward FDI flows of France and Spain combined, and 2.6 times greater than the outward FDI of the Republic of Korea. Companies from the region are expected to increase their internationalization in 2015 and beyond, including using more M&A strategies – hence strengthening further South-South partnerships.

Outward FDI flows from ASEAN have been growing steadily since 2012, when a significant outflow went to other developing economies, including in the region. The geographical reach of enterprise internationalization differs by Member State. On average, Singaporean and Malaysian companies are more internationalized, with a bigger global footprint than companies from the other Member States. Vietnamese companies continue to invest heavily in neighbouring countries (box 1.4). An increasing number of Indonesian, Philippine and Thai companies are investing regionally because of emerging investment opportunities and the AEC. Companies from Indonesia, Malaysia, the Philippines and Singapore invested abroad actively last year, while FDI from Thailand and Viet Nam declined.

The increasing financial strength of ASEAN MNEs – their strong profitability and cash holdings – are encouraging them to regionalize and internationalize (table 1.12). Emerging investment opportunities abroad are driving them to invest overseas. In some cases, limited markets or saturated growth, or land and labour constraints at home are key drivers (AIR 2013 and AIR 2014).

The top 100 ASEAN companies by market capitalization had combined cash holdings of $228 billion and combined assets of nearly $3 trillion in 2014. Most of them have operations in other ASEAN Member States. Some are subsidiaries of a group of companies, which have extensive regional presence and overseas investment outside the region.

Table 1.12. Top 100 ASEAN companies have strong assets and significant cash holdings, 2014 (Millions of dollars)

Company	Country	Industry	2014			
			Net income	Total assets	Market capitalization	Cash or near cash holding
Singapore Telecommunications	Singapore	Telecommunication	2,901	31,249	46,219	410
DBS Group Holdings	Singapore	Banks	3,194	332,653	38,447	14,733
Overseas-Chinese Banking Corp	Singapore	Banks	3,033	302,881	31,457	19,109
United Overseas Bank	Singapore	Banks	2,565	231,551	29,678	26,484
PTT	Thailand	Oil, gas and consumable fuels	1,718	54,062	28,120	6,199
Bank Central Asia	Indonesia	Banks	1,391	44,443	26,034	4,710
Malayan Banking	Malaysia	Banks	2,053	182,864	24,405	18,858
Bank Rakyat Indonesia	Indonesia	Banks	2,045	64,518	23,121	5,935
Advanced Info Service	Thailand	Telecommunication (wireless)	1,110	3,839	22,675	434
Telekomunikasi Indonesia	Indonesia	Telecommunication	1,235	11,335	22,629	1,424
Tenaga Nasional	Malaysia	Electric utilities	2,000	34,993	22,093	2,565
Avago Technologies	Singapore	Semiconductors	263	10,491	21,936	1,604
Bank Mandiri	Indonesia	Banks	1,676	68,788	20,227	5,746
Public Bank	Malaysia	Banks	1,381	98,735	20,181	3,220
Siam Commercial Bank	Thailand	Banks	1,642	82,033	18,771	1,282
Sime Darby	Malaysia	Industrial conglomerates	1,034	15,871	18,271	..
Axiata Group	Malaysia	Telecommunication (wireless)	718	14,030	17,279	1,457
Kasikornbank	Thailand	Banks	1,421	72,596	16,653	1,'764
Siam Cement	Thailand	Construction materials	1,035	14,154	16,335	579
Wilmar International	Singapore	Food products	1,156	43,558	15,642	3,127
Maxis	Malaysia	Telecommunication (wireless)	525	5,172	14,685	437
SM Investments Corp	Philippines	Industrial conglomerates	640	15,912	14,506	1,546
Philippine Long Distance Tel	Philippines	Telecommunication (wireless)	768	9,752	14,030	596
Digi.Com	Malaysia	Telecommunication (wireless)	621	1,229	13,700	150
PTT Exploration & Production	Thailand	Oil, gas and consumable fuels	662	23,328	13,511	3,947
CIMB Group Holdings Bhd	Malaysia	Banks	950	118,280	13,376	10,332
Thai Beverage	Thailand	Beverages	668	5,226	13,079	68
Petronas Gas	Malaysia	Gas utilities	563	3,787	12,523	182
Petronas Chemicals Group	Malaysia	Chemicals	754	8,129	12,452	2,584
Keppel Corp	Singapore	Industrial conglomerates	1,488	23,820	12,104	4,330
Perusahaan Gas Negara	Indonesia	Gas utilities	723	6,215	11,719	1,216
CP	Thailand	Food and staples retailing	313	9,918	11,601	980
IHH Healthcare	Malaysia	Health care	231	8,179	11,258	704
Bangkok Bank	Thailand	Banks	1,119	83,862	11,252	1,822
SM Prime Holdings	Philippines	Real estate	414	8,691	10,999	788
Ayala Land	Philippines	Real estate	333	8,693	10,689	641
Capitaland	Singapore	Real estate	916	33,301	10,641	2,043
Airports of Thailand	Thailand	Transportation infrastructure	379	4,741	10,525	216
IOI Corp	Malaysia	Food products	1,040	4,777	10,396	..
JG Summit Holdings	Philippines	Industrial conglomerates	411	12,489	10,352	838
Global Logistic Properties	Singapore	Real estate	685	13,947	10,025	1,446
Genting Singapore	Singapore	Hotels, restaurants and leisure	501	9,566	9,870	2,791
Singapore Airlines	Singapore	Airlines	286	17,995	9,786	3,826
Krung Thai Bank	Thailand	Banks	1,022	83,238	9,640	2,269
Ayala Corporation	Philippines	Diversified financial services	419	16,228	9,609	2,030
Genting	Malaysia	Hotels, restaurants and leisure	553	20,932	9,419	4,681
Gudang Garam	Indonesia	Tobacco	453	4,684	9,396	128
MISC	Malaysia	Marine	674	11,876	9,204	1,382
Bank Negara Indonesia	Indonesia	Banks	910	33,514	9,152	2,904
Universal Robina Corp	Philippines	Food products	262	1,734	9,078	224
BDO Unibank	Philippines	Banks	514	41,655	8,788	6,951
Great Eastern Holdings	Singapore	Insurance	694	49,579	8,572	2,457

Table 1.12. Top 100 ASEAN companies have strong assets and significant cash holdings, 2014 (Millions of dollars) (concluded)

Company	Country	Industry	2014			
			Net income	Total assets	Market capitalization	Cash or near cash holding
Bank of the Philippine Islands	Philippines	Banks	406	32,414	8,262	5,598
Bangkok Dusit Med Service	Thailand	Health care	228	2,833	8,096	109
Singapore Tech Engineering	Singapore	Aerospace and defense	420	6,280	8,003	1,104
Sapurakencana Petroleum	Malaysia	Energy equipment and services	343	7,948	7,856	345
Hong Leong Bank	Malaysia	Banks	648	53,079	7,735	..
Semen Indonesia	Indonesia	Construction materials	469	2,761	7,731	397
Intouch Holdings	Thailand	Telecommunication (wireless)	455	1,662	7,672	90
Telekom Malaysia	Malaysia	Telecommunication	254	6,461	7,308	853
Aboitiz Power Corp	Philippines	Independent power producers	376	4,845	7,056	900
City Developments	Singapore	Real estate	608	14,872	7,050	2,817
PTT Global Chemical	Thailand	Chemicals	463	12,299	7,021	469
Dynasty Ceramic	Thailand	Building products	38	158	7,005	6
Total Access Communication	Thailand	Telecommunication (wireless)	330	3,234	6,943	177
Kalbe Farma	Indonesia	Pharmaceuticals	174	1,'000	6,901	153
Kuala Lumpur Kepong	Malaysia	Food products	307	3,928	6,842	395
AMMB Holdings	Malaysia	Banks	557	40,643	6,646	3,771
Genting Malaysia	Malaysia	Hotels, restaurants and leisure	363	5,940	6,591	791
Aboitiz Equity Ventures	Philippines	Industrial conglomerates	414	6,281	6,524	1,129
Manila Electric Company	Philippines	Electric utilities	407	6,014	6,449	1,553
Petrovietnam Gas Joint Stock	Viet Nam	Gas utilities	667	2,516	6,249	1,126
Central Pattana	Thailand	Real estate	225	2,705	6,205	76
Sembcorp Industries	Singapore	Industrial conglomerates	632	12,966	5,994	1,254
Singapore Exchange	Singapore	Finance	254	1,316	5,963	..
Big C Supercenter	Thailand	Food and staples retailing	223	3,123	5,941	347
RHB Capital	Malaysia	Banks	623	62,646	5,598	6,185
Charoen Pokphand	Thailand	Food products	325	12,664	5,472	1,021
Starhub	Singapore	Telecommunication (wireless)	292	1,500	5,412	199
Singapore Press Holdings	Singapore	Media	322	5,326	5,371	355
Capitaland Mall Trust	Singapore	Real estate investment trusts	489	7,442	5,332	853
Siam Makro	Thailand	Food and staples retailing	150	1,327	5,287	139
Hong Leong Financial Group	Malaysia	Banks	526	59,256	5,268	..
International Container Terminal Services	Philippines	Transportation infrastructure	182	3,401	5,235	194
YTL Corp	Malaysia	Multi-utilities	479	19,020	5,231	..
Sembcorp Marine	Singapore	Machinery	442	6,219	5,143	813
Globe Telecom	Philippines	Telecommunication (wireless)	301	4,012	5,133	375
Jollibee Foods Corp	Philippines	Hotels, restaurants and leisure	121	1,210	5,127	170
Alliance Global Group	Philippines	Industrial conglomerates	298	9,156	5,114	1,835
Metropolitan Bank & Trust	Philippines	Banks	453	35,864	5,092	5,594
Charoen Pokphand Indonesia	Indonesia	Food products	147	1,678	4,987	71
Petronas Dagangan	Malaysia	Oil, gas and consumable fuels	153	2,725	4,857	525
PPB Group	Malaysia	Food products	280	5,313	4,842	194
DMCI Holdings	Philippines	Industrial conglomerates	243	3,066	4,659	341
Astro Malaysia Holdings	Malaysia	Media	141	2,121	4,564	372
Vietnam Dairy Products Jsc	Viet Nam	Food products	286	1,205	4,467	71
Golden Agri-Resources	Singapore	Food products	114	14,667	4,458	323
Ascendas Real Estate Investment Trust	Singapore	Real estate investment trusts	383	5,848	4,317	30
SIA Engineering	Singapore	Transportation infrastructure	211	1,357	4,291	44
Comfortdelgro Corp	Singapore	Road and rail	224	3,949	4,199	623
Total			70,553	2,928,468	1,131,906	228,137

Source: UNCTAD 2015b, based on Bloomberg.

Box 1.4. Outflows of FDI from Viet Nam

Licensed Vietnamese investments abroad in 2014 registered by the Ministry of Planning and Investment exceeded $1.78 billion, involving some 109 newly licensed projects worth more than $1 billion and 22 expansion projects.[a] These investments were made in 28 countries and territories; Tanzania, the leading destination, accounted for 34% of Viet Nam's total overseas registered investment capital last year. Cambodia came second with a 31% share, followed by Burundi at 16%. However, in terms of projects, Cambodia was the largest destination, with 23 projects or 21% of all of Viet Nam's overseas investment projects. Singapore came second with 16 projects, followed by Lao PDR (13) and the United States (12). As of the end of 2014, Vietnamese companies had invested about $20 billion, most of it concentrated in the oil and gas industries, followed by the agriculture and forestry, hydroelectric, ICT and finance industries.

Vietnamese companies that announced major investments included Viettel, with a combined $525 million investment in two major telecommunication network projects in Tanzania and Burundi in 2014. An Dong Mia made an $80 million investment in a rubber plantation project in Cambodia. Hoang Anh Gia Lai Group announced plans to jointly operate a luxury hotel with Melia Hotels (Spain) in Myanmar in 2015 and also handed over the completed $36 million Attapeu International Airport to the Government of Lao PDR. It has started operation of the $550 million HAGL Centre in Myanmar. The Bank for the Investment and Development of Vietnam and Viettel received approval from Myanmar in 2015 to operate in that host country. The Vietnam Rubber Group opened a rubber latex processing plant in 2015 in Cambodia.

Source: UNCTAD.

[a] *Viet Nam News*, "International investments top $1.7 billion in 2014", 13 February 2015 (http://vietnamnews.vn/economy/266508/intl-investments-top-17b-in-2014.html).

The strong cash reserves of these 100 top ASEAN companies are more than the combined global FDI made by companies from France, Germany, Italy and the Netherlands in 2014. These cash reserves are also greater than the combined 2014 GDP of Cambodia, Lao PDR and Viet Nam. These companies and their cash reserves are potential sources of investment for other developing economies. They operate in different sectors, in particular in agriculture, extractive, manufacturing, and services industries. Many of these companies aspire to be strong regional or international players in their industries.

In particular, ASEAN engineering, construction and infrastructure companies have contributed to strengthening South–South cooperation through the development of infrastructure in other developing economies (chapter 2 and section 1.3). For instance, Malaysian companies such as UEM, Bina Puri, Gamuda, MTD Construction, HG Power Transmission, Scomi, IJM, Mudajaya, Ho Hup Construction, Ranhill and WCT have been building infrastructure projects in ASEAN and further afield (table 1.13).

Other ASEAN companies have been active in developing and operating infrastructure assets in many developing economies, including those in the region. They include companies in the following Member States:

Table 1.13. Malaysian companies built a variety of infrastructure in developing economies and elsewhere in 2013–2015 (Selected cases)

Company	Types of projects	Location	Contract value ($ million)	Year of completion
	ASEAN Member States			
Trans Resources Corp	Modernization of airport terminal	Brunei Darussalam	98	2014
Bina Puri	Building construction	Brunei Darussalam	4	2014
MTD Construction	Toll road	Indonesia	371	2015
Johawaki	Construction of road and toll road	Indonesia	428	2014
UEM Builders	Toll road	Indonesia	641	2015
Bina Puri	Mini hydropower plant	Indonesia	10	2015
Salcon Engineering	Others	Lao PDR	1	2013
Eastern Soldar Engineering & Construction	Tankage work - construction and commissioning	Singapore	16	2014
Salcon Engineering	Construction of reservior	Thailand	7	2014
Prinsiptek	Building and residential development	Thailand	14	2015
Bina Puri	Building construction	Thailand	25	2014
Salcon Engineering	Water treatment	Viet Nam	22	2013
Gamuda	Transmission line, mechanical and electrical activities	Viet Nam	146	2013
Ireka Engineering & Construction	Hospital builidng	Viet Nam	26	2013
	Other developing economies			
Malaysian Maritime & Dredging	Dredging and bank protection, jetty facilities	Bangladesh	27	2013
HG Power Transmission	Transmission line	Bangladesh	5	2014
HG Power Transmission	Transmission line	Bangladesh	23	2015
Scomi Rail	Monorial system	Brazil	621	2014
Scomi Rail	Monorial system	Brazil	652	2015
MTD	Highway construction	China	429	2014
Mersing Construction & Engineering	Sewage conveyance system	Hong Kong, China	14	2014
Mersing Construction & Engineering	Water system	Hong Kong, China	26	2015
IJM	Road and highway construction - Andhra Pradesh	India	24	2014
Salcon Engineering	Water treatment	India	5	2013
IJM	Road construction - Mahua-Jaipur Section	India	6	2015
IJM	Road construction - Mahua-Jaipur Section	India	9	2014
UEM Builders	Building construction	India	13	2014
UEM Builders	Road works	India	50	2013
Mudajaya	Power plant (Equipment procurement)	India	588	2013
Ho Hup Construction	Road construction	Iraq	20	2015
Ho Hup Construction	Water system project	Iraq	88	2015
Steelworks Engineering	Sectional steel water tank	Kenya	..	2013
Ranhill	Residential development	Libya	143	2013
WCT	Expressway	Oman	..	2015
WCT	Road and building development[a]	Qatar	334	2015
Bina Puri	Water system and pipeline	Saudi Arabia	8	2013
Salcon Engineering	Water supply system	Sri Lanka	18	2015
MTD	Sewage tunnel	United Arab Emirates	19	2013

Source: CIDB Malaysia.

[a] Refers to the year the project was awarded.

- **Indonesia:** Waskita Karya, Wijaya Karya and Semen Indonesia
- **Philippines:** International Container Terminal, San Miguel, Ayala and Manila Water
- **Singapore:** Sembcorp, Keppel Corporation, City Development, CapitaLand and Changi Airports International
- **Thailand:** ITD, EGCO, Ratchaburi, Banpu, Amata, Siam Cement and EGATi
- **Viet Nam:** Viettel, EVN and VLP

ASEAN banks such as CIMB, Maybank, DBS, Bangkok Bank, OUB, DBS and Kasikorn Bank have also played a role in South–South infrastructure development by providing finance for projects based in other developing economies (chapter 2).

The internationalization of ASEAN companies through cross-border M&As has been on a steady rise, with most transactions concentrated in developing Asia. ASEAN companies have also been active in using M&As in their internationalization processes, indicating their growing financial prowess and abilities to acquire strategic assets abroad. Global cross-border M&A purchases by ASEAN companies have been rising consistently since 2009. ASEAN companies acquired more assets abroad than cross-border M&A sales witnessed in the region in 2014. As in 2013, most cross-border M&A purchases by ASEAN companies were made in developing Asian economies (table 1.14).

The infrastructure, finance and hospitality industries were the focus of M&A purchases by ASEAN companies in 2014 (table 1.15). Some of the cross-border M&A deals made by ASEAN companies exceeded $1 billion. These mega deals were dominated by Singapore companies, which made two such deals in Hong Kong (China) that averaged more than $5 billion each. Sovereign wealth funds based in the region and Government-linked companies were also active in cross-border M&As. For instance, Temasek (Singapore) acquired a 25% share in Watson Holdings (Hong Kong, China) for $5.7 billion and three oil blocks in the United Republic of Tanzania for $1.3 billion. Petronas (Malaysia) acquired Talisman Energy-Montney Assets (Canada) for $1.4 billion. GIC (Singapore) acquired an 11% stake in Emperador (Philippines) for $391 million. Malaysia Airports Holdings acquired the final 40% share of Sabiha Gokcen Uluslararasi Havaalani (Turkey) that it did not yet own, for $290 million, and Singapore Telecommunication acquired Adconion Media (United States) for $255 million.

Other private companies from Singapore, Malaysia, Thailand, Indonesia and the Philippines also made significant M&As abroad in various industries (annex table 1.3). OCBC (Singapore) bought 97.8% of Wing Hang Bank (Hong Kong, China) for $4.8 billion. St James Holdings (Singapore) bought Perennial Real Estate Holdings (China) for $2.8 billion; RGE (Indonesia) acquired Sateri Holdings Ltd-Viscose fiber assets (China) for $863 million; and JG Summit Holdings (Philippines) purchased NZ Snack Food Holdings (New Zealand) for $608 million.

ASEAN companies made 35 deals exceeding $250 million in 2014 as compared with only 21 in 2013[28] (annex table 1.3). These numbers provide further evidence of the growing financial strengths of ASEAN companies that support acquisition of assets abroad.

Table 1.14. Cross-border M&A acquisitions by ASEAN companies globally rose by 5% to $43.1 billion in 2014 (Millions of dollars)

Target nation	2010	2011	2012	2013	2014
World	26,117	31,990	31,357	41,112	43,109
Developed economies	9,749	16,249	16,752	6,061	14,800
European Union	2,937	3,962	5,970	1,769	3,385
Germany	95	39	190	..	516
United Kingdom	238	3,446	5,225	1,337	2,230
North America	906	8,807	6,786	2,075	4,186
Canada	609	3,481	5,430	183	1,433
United States	297	5,326	1,356	1,892	2,753
Other developed countries	5,374	3,070	3,787	2,014	7,181
Australia	5,017	2,738	3,033	1,491	3,779
Japan	282	225	724	523	2,599
Developing economies	16,368	15,741	14,604	35,048	28,309
United Republic of Tanzania	..	..	18	..	1,293
Brazil	2,250	..	66	..	1,285
China	1,413	2,386	1,594	10,544	5,299
Hong Kong, China	2,733	3,156	3,402	976	10,934
ASEAN	9,237	9,646	8,460	20,339	7,436
Cambodia	5	..	101	166	40
Indonesia	2,461	2,222	1,493	2,705	2,508
Malaysia	1,300	792	1,402	3,249	1,463
Philippines	45	418	425	94	455
Singapore	5,077	5,803	4,196	7,748	1,594
Thailand	192	362	457	6,232	1,363
Viet Nam	158	49	387	146	12

Source: UNCTAD, UNCTAD M&A Database (accessed 1 July 2015).

Note: gross basis.

Table 1.15. Cross-border M&As by ASEAN companies were concentrated in finance, services, infrastructure and extractive industries in 2014 (Millions of dollars)

Industry	2010	2011	2012	2013	2014
Total	26,117	31,990	31,357	41,112	43,109
Primary	3,238	3,219	7,620	3,327	2,933
Mining and quarrying	3,225	1,888	6,780	3,218	2,818
Manufacturing	4,420	7,404	10,900	8,299	4,058
Food, beverages and tobacco	3,664	533	5,879	7,686	2,578
Manufacture of paper and paper products	142	7	2	88	864
Manufacture of computer, electronic, optical products and electrical equipment	20	461	216	32	339
Services	18,459	21,366	12,836	29,486	36,118
Electricity, gas, water and waste management	323	490	818	271	882
Construction	86	-	28	21	166
Trade	595	633	740	6,144	630
Accommodation and food service activities	620	255	218	37	4,012
Transportation and storage	248	513	272	559	1,870
Information and communication	355	277	1,353	597	1,001
Financial and insurance activities	8,649	16,870	6,257	14,955	14,409
Business activities	3,207	1,981	1,469	2,512	3,827
Public administration and defence; compulsory social security	4,282	344	1,680	4,172	9,274

Source: UNCTAD, UNCTAD M&A Database (accessed 15 July 2015).

Note: gross basis.

1.7. Conclusion

The year 2014 saw a new record level of FDI inflows to ASEAN and witnessed further corporate investment expansions, with many companies keen to establish a stronger regional footprint. The AEC, the broader ASEAN regional connectivity and the growing competitiveness of economies in the region were key influencing factors. Many existing and potential investors look forward to the arrival of the AEC later in the year; many have expressed plans to expand their operations in the region in post-AEC 2015. In addition, given the strong economic fundamentals, resilient economies and growing affluence of consumers in the region, the prospect for ASEAN to attract higher levels of FDI flows in the next few years – surpassing the level of last year – is promising. An integrating ASEAN is increasingly influencing how MNEs invest, plan, network and operate in the region.

A consequence of the growing FDI and corporate expansion is that regional production networks (RPNs) and regional value chains (RVCs) are expected to further intensify as more foreign and ASEAN companies position themselves to operate in different Member States. Companies do so partly because of their corporate strategies, which include gaining access to resources, markets and inputs and increasing operation efficiency by tapping the complementary locational advantages offered in the region. Lower transaction costs contributed by regional integration also play a role. By year end 2015, 96% of all tariff lines in ASEAN will have zero rates for intra-ASEAN imports – supporting further intraregional trade and production networks. Final goods or intermediate products manufactured in one Member State can be exported to another Member State without tariff burdens. Put differently, companies are producing as if they were within a single-country model of operation but across a number of Member States connected through RVCs. Regional corporate expansion is another important source of ASEAN connectivity contributed by intra- and inter-company linkages involving the facilities of MNEs and ASEAN companies located in different parts of the region.

MNEs will continue to expand their presence in the region. The growth of intra-ASEAN investment and the regionalization of more ASEAN companies will remain a key feature of the future investment landscape. ASEAN companies are also taking advantage of investment and business opportunities offered further afield. Outward FDI flows from the region have been increasing steadily since 2012. ASEAN companies are playing an important role in strengthening South–South cooperation as most of their investments are within the region and to other developing economies. Their strong cash reserves and their aspirations to be regional players and to internationalize will continue to drive them to invest abroad, including through greater use of M&A strategies to access markets.

The increase in manufacturing FDI in the CLMV countries and the relocation of labour-intensive operations to these locations, as well as in other Member States, is contributing to regional connectivity. Production from these locations is being supplied to affiliates or customers based in the other ASEAN Member States. This connectivity is contributing

to the development of supporting industries and the regional division of labour. The rise in regional economic activities involving MNEs and ASEAN companies is helping bridge the development divide through investment and production, especially between the CLMV countries and the other Member States.

Notes

1 Aside from ASEAN as a region, they include Japan, the United States, Hong Kong (China), the United Kingdom, China, Luxembourg, the Netherlands, Australia and the Republic of Korea.

2 Covers through the first half of 2015.

3 *Phnom Penh Post*, "Plans to turn Poipet into automotive parts manufacturing hub", 20 June 2015 (http://www.phnompenhpost.com/post-weekend/plans-turn-poipet-automotive-parts-manufacturing-hub).

4 Xinhua, "6th China-built hydropower dam in Cambodia starts operation", 14 August 2014 (http://en.people.cn/n/2014/0814/c90777-8769756.html).

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6 *Investvine*, "Thai, Japanese Firms To Build Car Plants In Myanmar", 7 May 2014 (http://investvine.com/thai-japanese-firms-to-build-car-plants-in-myanmar/).

7 *Investvine*, "Colgate-Palmolive To Open Factory In Myanmar", 25 June 2015 (http://investvine.com/colgate-palmolive-to-open-factory-in-myanmar/).

8 *Bloomberg*, "Coca-Cola to Suzuki Myanmar Factory Rush Spurs Shipping", 27 March 2014 (http://www.bloomberg.com/news/articles/2014-03-27/coca-cola-to-suzuki-myanmar-factory-rush-spurs-shipping).

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10 Consult-Myanmar, "Japan gets 3 out of 9 foreign banking licenses in Myanmar", 9 October 2014 (http://consult-myanmar.com/2014/10/09/japan-gets-3-out-of-9-foreign-banking-licenses-in-myanmar/).

11 Oxford Business, "The Report: Myanmar 2015", 2015.

12 Reuters, "Samsung Electronics to build a $3 billion smartphone plant in Vietnam", 10 November 2014 (http://www.reuters.com/article/2014/11/10/us-samsung-elec-vietnam-idUSKCN0IU03R20141110); Business Korea, "South Korea to invest US$7.3 billion in Vietnam this year", 29 December 2014 (http://businesskorea.co.kr/article/8265/largest-vietnam-investor-south-korea-invest-us73-billion-vietnam-year).

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14 FT.com, "Vietnam opens door to hard money and soft power", 1 March 2015 (http://www.ft.com/intl/cms/s/0/004f7e36-bc0e-11e4-a6d7-00144feab7de.html#axzz3ddlkspYZ).

[15] *Vietnamnet*, "Korean Lotte group expands investment in Vietnam", 4 April 2015 (http://www.vietnambreakingnews.com/2015/04/korean-lotte-group-expands-investment-in-vietnam/).

[16] *Investvine*, "Thailand's Amata invests in Vietnam industrial park", 22 August 2014 (http://investvine.com/thailands-amata-invests-in-vietnam-industrial-park/).

[17] *Wall Street Journal*, "Falling sales threaten Thailand's car-making supremacy in Southeast Asia", 24 March 2015 (http://www.wsj.com/articles/falling-sales-threaten-thailands-car-making-supremacy-in-southeast-asia-1427217924; and *TIR*, "Eco-car projects to spur demand for Thai automotive parts and components", Vol. 25, January 2015.

(http://www.boi.go.th/tir/issue_content.php?issueid=119;page=42).

[18] 'Indonesia pushes Central Java as Asian low-cost manufacturing hub' *Investvine*, 6 August 2014 (http://investvine.com/indonesia-pushes-central-java-as-asian-low-cost-manufacturing-hub/).

[19] Up to the first half of 2015.

[20] http://www.mmtimes.com/index.php/business/technology/14357-newcomer-to-build-500-ooredoo-towers.html

[21] *Investvine*, "Volkswagen to build factory in Indonesia", 10 September 2014 (http://investvine.com/volkswagen-to-open-new-plant-in-indonesia/).

[22] Up to the first half of 2015.

[23] *Bangkok Post*, "Toa expands to Cambodia, Indonesia", 28 April 2015 (http://www.bangkokpost.com/business/news/544331/toa-expands-to-cambodia-indonesia).

[24] http://www.vietnambreakingnews.com/tag/hanoi-commercial-joint-stock-bank/

[25] http://asia.nikkei.com/Business/AC/Vietnam-s-No.-1-dairy-company-eyes-global-rank

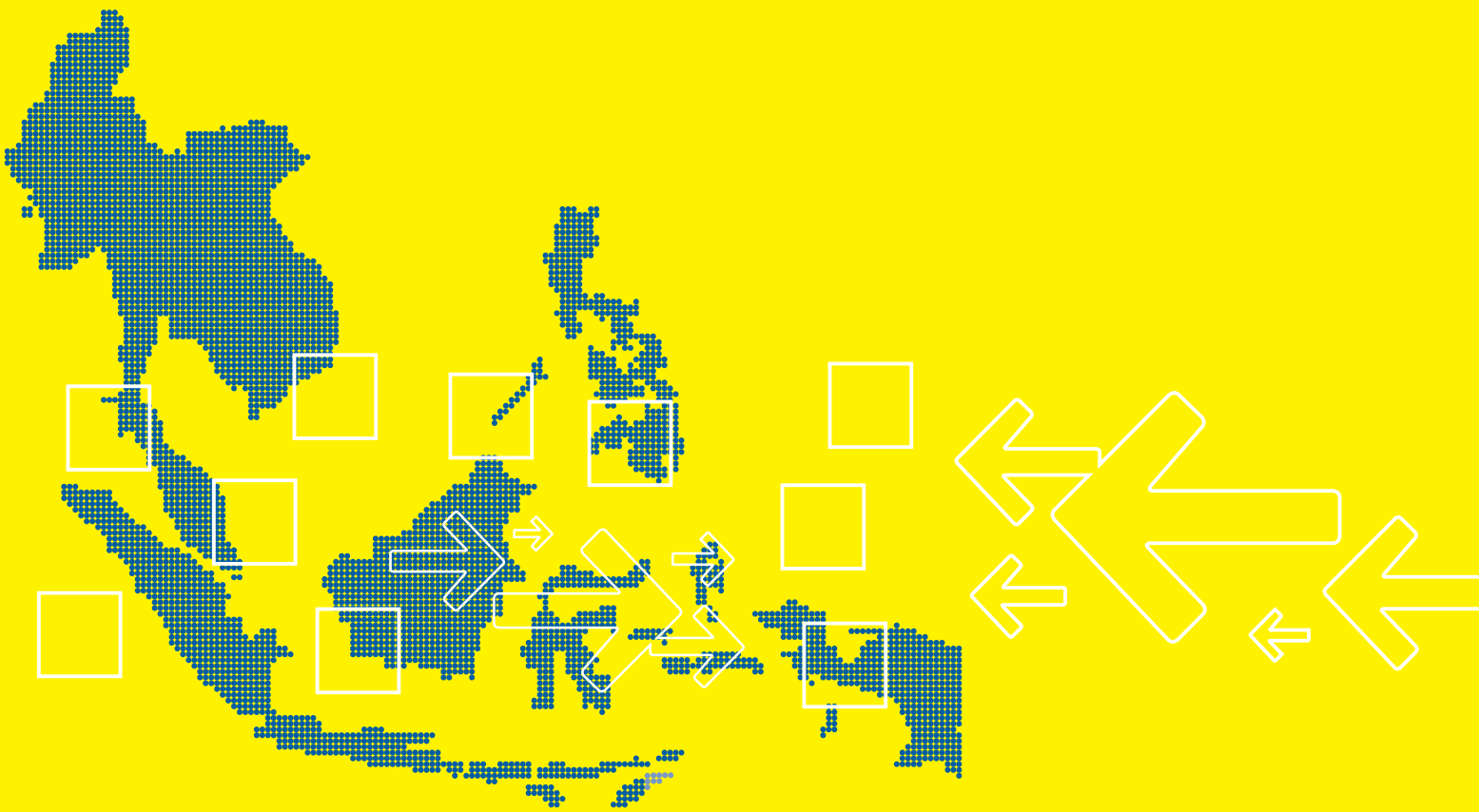
[26] On gross basis.

[27] Covers up to the first half of 2015.

[28] On gross basis.

PART TWO

INFRASTRUCTURE INVESTMENT AND CONNECTIVITY IN ASEAN



CHAPTER 2

INFRASTRUCTURE INVESTMENT AND PRIVATE SECTOR PLAYERS IN ASEAN

2.1. Introduction

The importance of infrastructure to ASEAN Member States cannot be emphasized enough. Member States in the region have been investing in infrastructure with varying degrees of spending and development. However, more infrastructure investment is needed across a wide range of economic, social and environmental sectors if ASEAN Member States are to achieve the objectives of their economic plans, including those related to national and regional connectivity (chapter 4). The private sector, domestic and foreign, has been a significant player in the region's infrastructure development. The roles of banks, other financial institutions and donors of official development assistance (ODA) have also been significant. In various infrastructure sectors, the presence of foreign multinational enterprises (MNEs) is highly visible.

Investing in infrastructure to meet rapid growth in demand has been a challenge for most ASEAN Member States. Some need to invest more to overcome years of under investment, while others need to invest to expand, upgrade or rehabilitate existing facilities. Finding resources, mobilizing and channeling them to suitable projects, including involving different players to deliver the infrastructure needed, are crucial steps. Although the private sector cannot replace the State, it needs to play a larger role to help address the infrastructure gap.

ASEAN Member States have taken steps to liberalize their infrastructure industries, with some sectors more deregulated than others and some Member States more open than others. Some countries have also privatized infrastructure assets, such as those in telecommunication and power generation. There has been an increasing trend of the private sector owning public assets. More pro-private sector policy initiatives, including public-private partnership (PPP) arrangements, have been introduced to encourage private sector participation in the region.

There are many different aspects and types of players in infrastructure development. Contractual arrangements are distinguishing features of the infrastructure industry, and ASEAN is no exception. This report examines investment in three key physical infrastructure sectors, namely power, transport, and information and communication technology, or ICT. Each of these sectors has key features and characteristics that need to be appreciated (*WIR* 2008). The report does not examine corporate governance issues and the complex financing aspects of infrastructure. It is also not in the scope of this report to address the different implications of infrastructure but to recognize that although infrastructure can have less desirable impacts (e.g. land issues and ecosystem concerns), it

can also bring favourable economic, social and environmental consequences. Stakeholders need to address these potential implications in a balanced manner, taking into account the need to protect vulnerable segments of society and the need for development.

This chapter analyses both investment and the different categories of foreign private sector players in infrastructure development in ASEAN. The chapter further highlights the importance of infrastructure to the Member States and the huge scale of future investment needs in the region.

2.2. The importance of infrastructure to ASEAN

Infrastructure plays an important role in the region's economic, social, environmental and connectivity development. It is the backbone of the economy of all the ASEAN Member States and is a key driver for realising the ASEAN Economic Community. Countries in the region continue to develop infrastructure to provide reliable services to households, businesses and industries. They recognize the importance of infrastructure for alleviating poverty and supporting development. Each ASEAN Member State has significant infrastructure development plans; the challenge is to implement these plans in the period earmarked and to attract private sector participation.

The importance of infrastructure for supporting economic growth, increasing competitiveness, improving quality of life and ensuring universal access for all cannot be emphasized enough (*WIR* 2014). Evidence indicates that the provision of adequate infrastructure in services such as electricity, telecommunication and transportation can help boost GDP (box 2.1) and connect each Member State nationally and regionally as well as internationally (through land transport, ports and airports). Greater connectivity of transport infrastructure enhances logistical efficiency and supports the growth of trade, commerce and investment.

The lack of adequate infrastructure has held back the economic development of some Member States, such as Cambodia, Lao PDR, Myanmar and Indonesia. With adequate infrastructure, it is estimated that Indonesia's GDP could grow at a rate between 7% and 9% annually, instead of the current rate of 6% to 6.5%.[1] The overcrowded ports and the poor connectivity between the country's islands have led to high logistics costs of about 24% of GDP, as compared with only 16% in Thailand.[2] If logistics costs could be brought down to 16% of GDP with improvements in marine logistics and national transport infrastructure connectivity, Indonesian businesses, government and households could save about $70 billion to $80 billion a year in logistics costs.

A study found that better infrastructure can have positive impacts on income and poverty levels in the countries in the Greater Mekong Subregion. These countries are likely to experience an increase in GDP between 1.1% and 8.3%, with the highest increases in Cambodia, Lao PDR, Myanmar, Viet Nam and Thailand (Stone et al. 2012). A lack of infrastructure increases economic costs. A study estimated that congestion in metropolitan Manila would lead to some $54 million in economic costs per day, and about $23 million in

the Bulacan, Cavite, Laguna and Rizal areas. This amounts to $27.2 billion per year lost due to congestion, equivalent to 11% of the country's GDP.[3]

In Lao PDR, investment and development in power plants over the years have expanded the supply of electricity to reach more homes. Access to electricity by household has increased from only 16% in 1995 to more than 70% today.[4] Many of the power plants built and owned by foreign investors in Lao PDR export electricity to neighbouring countries. Investment in infrastructure can also generate additional employment in a country. An increase of infrastructure investment equivalent to 1% of GDP could generate an additional 700,000 jobs in Indonesia (McKinsey Global Institute 2013).

Box 2.1. The importance of infrastructure investment: experiences of other regions and countries

If the infrastructure gap in Latin America is addressed so as to reduce the gap to the level in middle-income countries in other regions, it is estimated that economic growth in the region could be raised by two percentage points annually, on average (Calderon and Servén 2010).

Weak infrastructure reduces the productivity of African companies by 40% and the growth of per capita income by 2% (UNCTAD 2014a). High transportation costs are a major impediment to African countries attempting to penetrate global markets competitively and inhibit African countries from trading with each other (African Development Bank (AfDB) 2010; Naudé and Matthee 2007). A study estimated that if the road connections between the Central African Republic and the Democratic Republic of the Congo were upgraded, regional trade could increase by $10 billion to $30 billion per year (Buys et al. 2006).

A study assessing the impact of mobile telephony on economic growth involving 96 developed and developing economies found that (i) for a given level of total mobile penetration, a 10% substitution from 2G to 3G penetration increases GDP per capita growth by 0.15 percentage points; (ii) a doubling of mobile data use leads to an increase in the GDP per capita growth rate of 0.5 percentage points; and (iii) a 10% increase in mobile penetration increases Total Factor Productivity in the long run by 4.2 percentage points (Deloitte LLP 2012).

Another study suggests that an increase in infrastructure investment equivalent to 1% of GDP would generate an additional 3.4 million direct and indirect jobs in India and 1.3 million in Brazil (McKinsey Global Institute 2013).

2.2.1. Electricity

Infrastructure development in electricity has helped expand utilities' capacity to serve more households and industries. It has also intensified grid connectivity between different parts of countries and among Member States, including remote areas and industrial estates where national electricity grids formerly could not reach. For instance, both grid connections and power trade arrangements between ASEAN Member States are increasing (chapter 4). More than 90% of the electricity generated at the Nam Theun 2 hydropower plant in Lao PDR is exported to Thailand, and this plant alone is expected to expand the electricity-generating capacity of the country by

150% and bring in $2 billion in export revenue for the government throughout the 25-year concession period.[5] This revenue may be used for other development needs, including in social sectors. The power sector is an important export revenue source for Lao PDR. About 85% of power generation in the country is exported to neighbouring countries. By 2020, the power sector alone is expected to contribute some 16% to the country's GDP.[6]

The construction of the Mong Duong II coal-fired thermal plant in Viet Nam involved 6,000 construction jobs and is expected to be completed in 2015; it will serve more than 2 million households. The Song Hau I power plant in Viet Nam, also to be completed in 2015, will ease power shortages in the southern part of the country. The Burgos wind farm in the Philippines, completed in 2014, is expected to serve more than 2 million households and offset 200,000 tonnes of carbon dioxide emissions per year. An undersea cable in Indonesia will help bring electricity from resource-rich Sumatra to electricity-hungry Java. Without investment in more power plants, grid connections and transmission lines, many areas of countries in the region would remain dark and would face challenges in bringing industrial parks to rural areas. To this end, investment in electricity infrastructure ensures reliability of power supply, supports rural development and alleviates poverty by bringing investment and employment to rural areas.

ASEAN Member States, as a group, had an electrification rate of at least 78.5%[7] in 2012 (table 2.1). By 2020, the region is expected to achieve nearly 90% electrification, with six Member States achieving universal access. However, the provision of reliable and affordable electricity is uneven. By 2030, the region will have or be near to achieving universal access for all, if the current plans of four Member States are fulfilled. To reach this universal access target, countries in the region need to continue to invest to expand installed capacity and to improve transmission and distribution infrastructure, including the interconnection of countries through regional power grids. Equally important are maintaining and upgrading electricity infrastructure.

Table 2.1. More people are gaining accessed to electricity in ASEAN, with universal access a common feature by 2030
Electrification Rate (% of population)

	2012	2020	2030[b]
ASEAN	**78.5**	**88.1**	**97.0**
Brunei Darussalam	100	100	100
Cambodia	34	54	70
Indonesia	76	97	100
Lao PDR	78	90	100
Malaysia	100	100	100
Myanmar	32	47	100
Philippines	70	90[a]	100
Singapore	100	100	100
Thailand	99	100	100
Viet Nam	96	100	100

Sources: UNCTAD, based on *World Energy Outlook 2014*, national and other sources.

[a] Based on 2017 indicative rate.

[b] Except for Lao PDR the numbers are based on national plans.

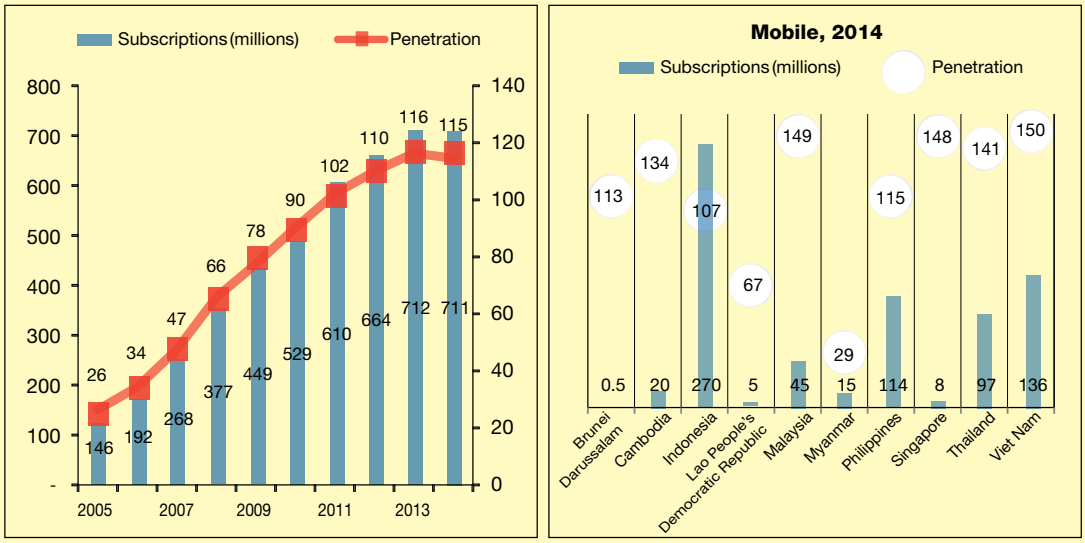
2.2.2. Telecommunication

The telecommunication penetration rates in some ASEAN Member States are among the highest in the developing countries, and the industry has attracted significant interest and participation from the private sector, which has contributed to the rapid growth of the industry in the region (box 2.2).

Box 2.2. Rapid growth of ICT in ASEAN

The telecommunications sector in ASEAN grew rapidly in the last decade, particularly in access to mobile voice and data networks. The number of mobile subscriptions increased almost five times between 2005 and 2014 (box figure 2.2.1, left). Except for Lao PDR and Myanmar, all the Member States now have more mobile phone subscriptions than people (box figure 2.2.1, right).

Box figure 2.2.1. Increasing ASEAN mobile subscriptions



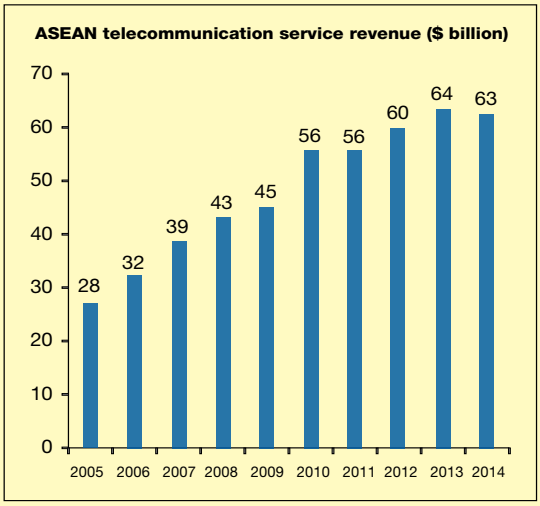
Source: UNCTAD, based on information adapted from regulatory authorities and operator reports.

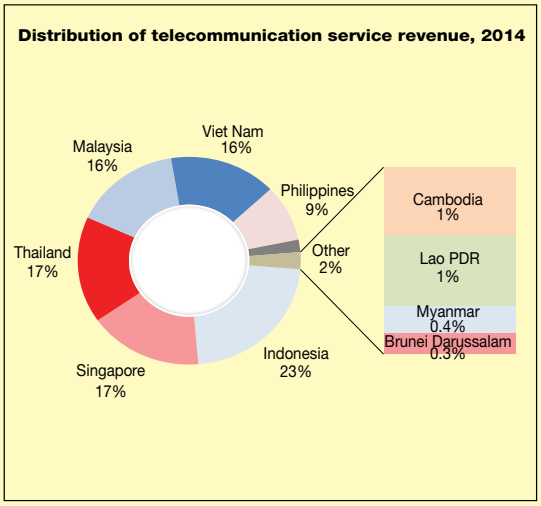
Today, mobile broadband far exceeds fixed broadband in subscriptions: in 2014, mobile broadband penetration in ASEAN reached 43% of the population compared with only 3% for wired broadband. Telecommunication service revenues have increased in parallel with the growth in access. The ASEAN telecommunication service market was estimated to be worth $64 billion in 2014, more than double what it was a decade previously (box figure 2.2.2, left). Indonesia is the region's largest market while Singapore, Thailand, Malaysia and Viet Nam have similar market sizes at 16%–17% of the region's total (box figure 2.2.2, right).

Data traffic is growing rapidly throughout the region, coupled with the increase in smartphone ownership. Monthly mobile data traffic per smartphone in ASEAN and Oceania was 1.2 GB in 2014 and is forecast to more than triple to 4 GB by 2020 (Ericsson 2015). In order to accommodate this growth in data use, international Internet bandwidth is increasing (box figure 2.2.3). Some ASEAN operators are forging partnerships with large content providers to store their data locally (e.g. caching) in order to increase performance and reduce demand for international bandwidth. Neutral Internet Exchange Points, by which domestic and regional traffic could be freely exchanged, would reduce demand for international bandwidth. However, for the most part, they have not been as successful in ASEAN as other regions. One reason is that incumbent operators want to protect their international transit business (Internet Society 2015).

Box 2.2. Rapid growth of ICT in ASEAN (concluded)

Box figure 2.2.2. Rising ASEAN telecommunication service revenue

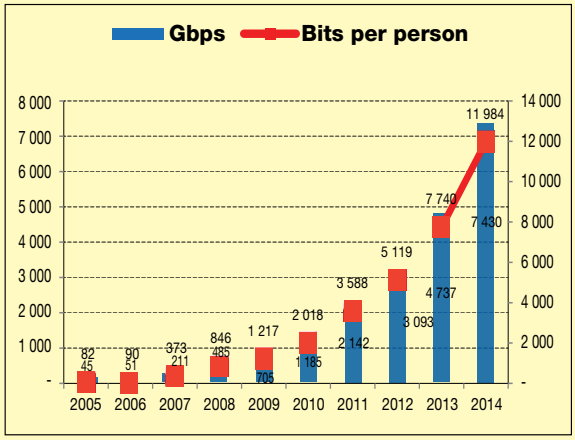


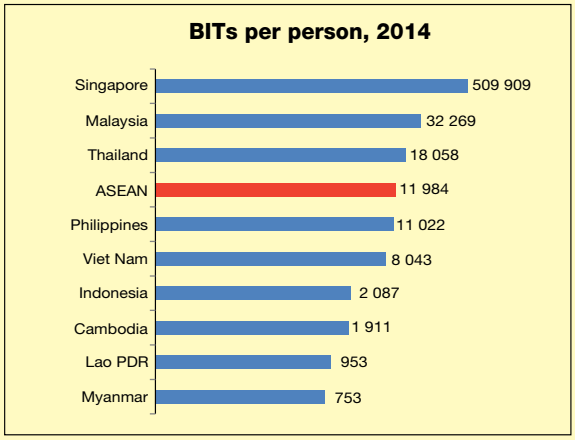


Source: UNCTAD, based on information adapted from operator reports and Infocomm Development Authority of Singapore.

Note: Converted to dollars at annual average exchange rates.

Box figure 2.2.3. Growing international Internet bandwidth in ASEAN





Source: UNCTAD, based on information adapted from regulatory authorities.

Investment in telecommunication infrastructure has enabled more efficient telephony services and increased the degree of penetration, with more people able to use telecommunication service even in remote areas. This development has contributed to national and global connectivity, enhancing communication and ICT connections, and bringing remote areas into the modern information age.

Many people are benefitting from improvements in the telecommunication infrastructure in the CLMV countries (Cambodia, Lao PDR, Myanmar and Viet Nam) as well as in the

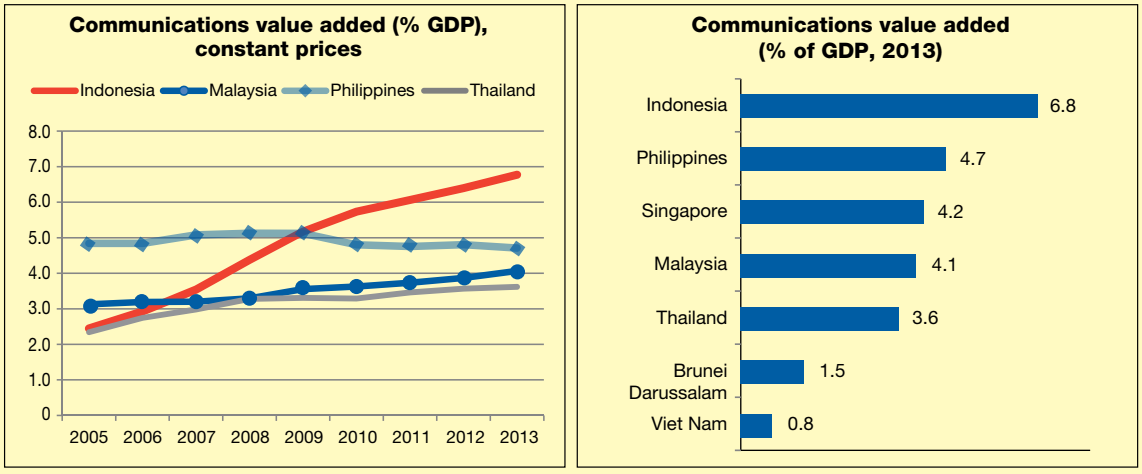
other ASEAN Member States. In the Philippines, the liberalization of the telecommunication sector and regulatory reforms have contributed to the entry of new players, which has resulted in rapid growth of the network, increase in foreign investment, access to technology, improvement in ICT efficiency and the emergence of new services. The Government's efforts to reach the underserved and unserved areas have made good progress. In 2014, 111% of the population are mobile phone users and 37% used the Internet, compared with only 89% and 25%, respectively in 2010.[8]

The improvement of the ICT infrastructure has important economic implications for the Member States (box 2.3). It has helped expand connectivity and access to technology, which was once limited to those who could buy equipment and facilities at exorbitant prices.

Box 2.3. The importance of ICT

The rise in telecommunication access has seen a corresponding increase in the size of the communications sector in most ASEAN Member States for which data are available. The value added of the telecommunication sector has grown over the last decade in ASEAN, although its contribution to overall GDP has varied (box figure 2.3.1, left). In Indonesia, the communication sector has outpaced GDP growth and its contribution has risen to 6.8% of the economy in 2013, the highest in ASEAN (box figure 2.3.1, right). This is a 4.2 percentage point increase since 2005. The contribution in the Philippines was 0.1 percentage point lower in 2013 than it was in 2005, even though communications value added has grown 90% over that period in constant prices. In terms of its direct economic impact, growth in the communications sector contributed between 3% and 14% of GDP growth in 2013, among countries for which data are available.

Box figure 2.3.1. Rising communications value added in ASEAN



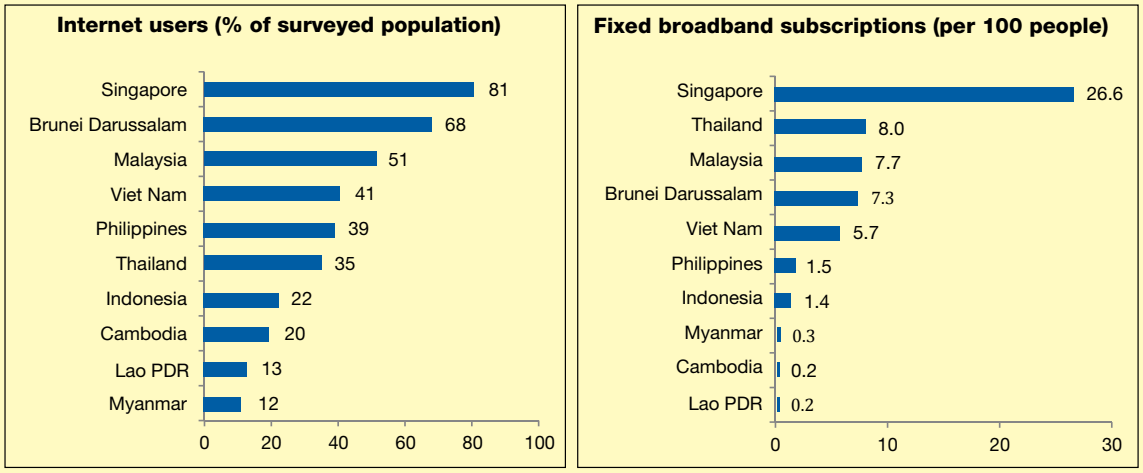
Source: UNCTAD, based on information adapted from national statistics agencies.
Note: Communications refers to telecommunication and posts. Data for Viet Nam refer to Information and communication, which includes telecommunication, broadcasting, publishing and computer and information services.

The impacts of telecommunication are wider than its direct contribution. Telecommunication infrastructure is essential for enabling the service economy, supporting e-commerce and driving the software industry. Broadband access, in particular, is a critical general-purpose technology

Box 2.3. The importance of ICT (continued)

essential for growth and competitiveness. A number of studies have attempted to measure the link between broadband access and economic growth. Though the methodologies differ, they generally find that increases in fixed broadband access contribute to an increase in GDP. However the evidence is mixed, particularly where penetration levels have not reached a particular threshold (e.g., fixed broadband greater than 10%). In many ASEAN Member States, fixed broadband penetration is considerably below this level (box figure 2.3.2, right) and Internet users make up less than half the population (box figure 2.3.2, left). This points to the need to increase Internet and fixed broadband penetration in order for the Internet economy to have greater economic impact.

Box figure 2.3.2. Mixed evidence of Internet users and fixed broadband penetration, 2014

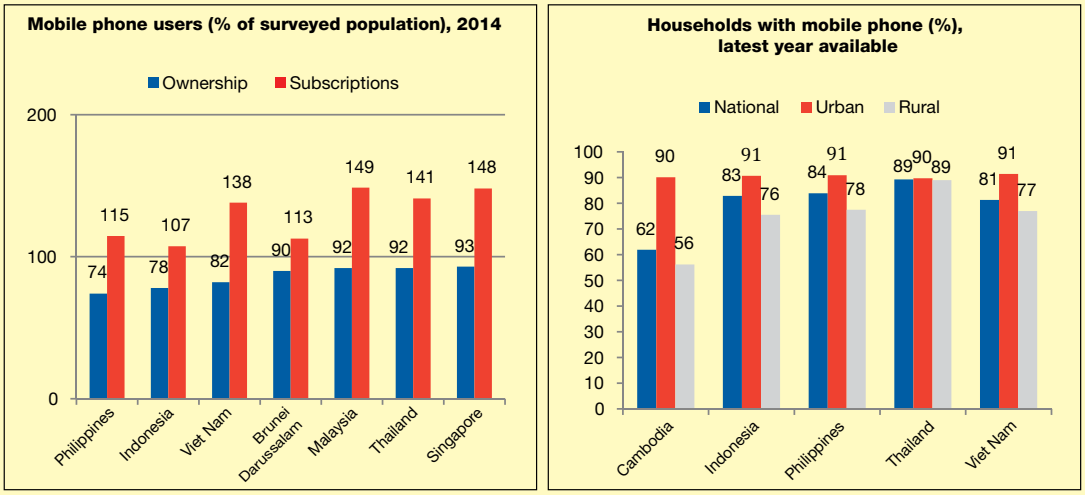


Even basic voice coverage and access are incomplete in some Member States. For example, the percentage of the population that owns a mobile phone is a more telling statistic than the subscription penetration figures, which are distorted by multiple SIM cards and machine-to-machine subscriptions (box figure 2.3.3, left). Though coverage of 2G mobile networks is relatively high in ASEAN, it is still incomplete in a number of Member States, leaving 60 million people without access to a signal, mainly in rural areas. As a result, there is a gap between urban and rural mobile penetration (box figure 2.3.3, right). This could be alleviated through well-designed universal service programs.

Improvements in the telecommunication infrastructure in Myanmar contributed to lowering service costs and have brought down the cost of a SIM card from $2,000 to just $1.50 in five years.[9] Similarly, in Lao PDR, the cost of using a mobile phone has come down significantly, from $9.20 for three minutes in 2000 to $0.24 in 2014. With the rapid development in Myanmar's communication network, mobile phone penetration in the country is expected to rise from a low base of 4% in early 2012 to 75% before the end of 2016.[10]

Box 2.3. The importance of ICT (concluded)

Box figure 2.3.3. Demand-side mobile access indicators are more telling statistics



Source: UNCTAD, based on information adapted from Pew, DHS and national telecommunication regulatory authorities and statistical offices.

Note: In the left chart, data for the Philippines, Indonesia, Viet Nam, Malaysia and Thailand refer to users 18 and older. Data for Brunei Darussalam refers to users aged 15 and older; data for Singapore refer to users age (7 years and older) in 2013.

2.2.3. Transport

Bridges

The construction of bridges in the region has connected lands that are otherwise separated by seas and rivers, and eased the movement of people and goods between areas that once were difficult or time consuming to reach. Evidence indicates that bridge connections have helped such areas expand commercial activities, tourism, and investment and increase local economic growth. Bridges have not only enhanced national linkages but also facilitated regional connectivity. The construction and operation of the First and Second Penang Bridge in Malaysia physically connected Penang Island with the mainland peninsula, significantly reducing the travel time and increasing logistical efficiency. Brunei Darussalam is building one of the longest bridges (30 km) in that country, to connect Muara with Temburong, which is at present physically separated from the rest of the country.[11] The construction of the 5.4 km Suramadu Bridge connected the second largest Indonesian city, Surabaya, to the Madura Islands. Travel time across the strait has been significantly reduced as compared with ferry crossings. With the involvement of foreign and local contractors, Viet Nam is building its longest sea bridge, linking the northern city of Haiphong to the port of Lach Huyen. Many bridges have been built to link areas within countries and to link neighbouring countries. Many more are being built or are in the planning stage in various ASEAN Member States.

Roads

National road connections also support smooth movement of goods and people, including bringing produce from farms to markets and industrial goods from ports to factories – and vice versa. Good road connections and networks can reduce logistical costs, thereby increasing the competitiveness of businesses and that of a country as a whole.

Completion of missing road links and upgrading of national roads is important for transportation efficiency. The completed Cambodia National Road No. 41, laid by Chinese contractors, connects Cambodia National Roads No. 3 and No. 4, which enhances the national road network and improves connectivity. These roads also provide an important channel to the southern coastal cities and ports. Cambodia is also building the 174 km National Road No. 58, which will link Samrong City with Poipet City in 2018 – making the country better connected.

The construction of the $2.9 billion Jakarta Integrated Tunnel, involving Bouygues (France), consists of two tunnels that will carry traffic and flood water on separate levels, which will help address Jakarta's traffic congestion and flood problem.[12] The Indonesian Government is planning to construct the 2,700 km Trans-Sumatra toll road in 2015, which is estimated to cost $23 billion.[13] The toll road will be the main highway on Sumatra that connects Banda Aceh in the north to Bandar Lampung in the south through 24 sections stretching across 10 provinces.

In Malaysia, seven new highways are being built in 2015 at an estimated cost of $6.19 billion, to connect areas and to increase road network efficiency. The projects include the Serdang–Kinrara–Putrajaya Highway, the Duta–Ulu Kelang Expressway extension, the Sungai Besi–Ulu Kelang Elevated Expressway, the Damansara–Shah Alam Expressway, the Kinrara–Damansara Expressway, the Kuala Lumpur Outer Ring Road and the West Coast Expressway from Banting to Taiping.[14] The construction of Malaysia's West Coast Expressway when completed in 2019 will cut travel times between Taiping and Banting considerably.[15]

Rail

The plan to develop a number of high-speed rail links nationally and between ASEAN Member States (Singapore-Kunming Rail Link) is expected to generate significant impacts along the route aside from employment opportunities from such projects (chapter 4). An important aspect of rail development is its ability to connect cities and enable transportation of goods and people. It plays a crucial role in moving minerals and natural resources from mines to ports, refineries and markets. Like road transport, it contributes to the development of trade and exports, including support for downstream logistical businesses.

The urban transport system in various major cities in ASEAN has helped move massive numbers of people rapidly in and across the cities on a daily basis. Such urban rail network systems have increased the efficiency of capital cities and help reduce the number of vehicles in congested cities. While some ASEAN Member

States are building their capital's mass rail transport networks, others are expanding their intracity rail systems and intercity rail networks. The MRT system in Jakarta is expected to commence operation in 2018. Kuala Lumpur's MRT system is being expanded with more lines and an extended network. Singapore is also expanding its MRT networks, from 178 km of line to 360 km by 2030. Thailand continues to expand Bangkok's MRT and BTS infrastructure to cope with growing demand and urbanisation. The Hanoi Metro project started in 2015, and the Ho Chi Minh City Metro network is expected to begin in 2020.

Airports and seaports

Without air and seaports, a country is disconnected from a region and from the world. The provision of airports and ports is significant for connectivity, trade and commerce, and for supporting the growth of tourism. ***The development and upgrading of airports in the region have contributed to the rapid growth of low-cost budget airlines and related businesses*** (box 2.4, chapter 4). ***The latter in turn play a key role in supporting the growth of tourism in the region and in generating employment.***

Box 2.4. More airports are being developed or upgraded in ASEAN

ASEAN countries are investing in new airports and upgrading existing ones to cope with rising demand and increasing capacity. The private sector is playing a role in airports development through PPP arrangements and concessions, and as engineering, procurement and construction (EPC) contractors (chapter 3). More private sector participation is being solicited. Over the next five years, at least $33 billion will be needed in the region to spend on building and expanding airports.

For instance, Indonesia will need $15 billion to construct and develop airports through to 2019. A third terminal at the Soekarno Hatta airport in Jakarta is expected in 2015. Some $1.7 billion is needed to build a third runway and a passenger terminal. In Malaysia, KLIA 2, a new terminal with a value of $800 million, intended for low-cost budget airlines, opened in 2014. The Government has continued to invest and upgrade airports in the country. In 2014, $310 million was allocated for upgrading of airports and $217 million for enhancing capacity in KLIA.

The Government of Myanmar expects the new Hanthawaddy International Airport to be operational by the end of 2019. This airport, which will be privately operated, will be the premier gateway for entry into the country with the capacity initially to handle 12 million passengers per year. The cost of the airport will be about $1.5 billion. The Philippines is planning to upgrade 49 airports over the next five years, at an estimated cost of $2.5 billion. Most of the upgrades will be done through PPPs. The Philippine Government is also planning to construct a new Manila Airport at an estimated cost of about $10 billion. The airport will be financed through PPP and funding support from Japan. It is expected to operate in 2025 and accommodate 55 million passengers per year.[16]

The expansion of Singapore's Changi Airport is under way. A fourth terminal is to be completed by 2017 at a cost of at least $2.2 billion. Terminal 1 will be expanded to handle more passengers – from 17 million to 24 million people per year – and the new Terminal 4 will add capacity for another 16 million passengers a year. Singapore is also planning to build Terminal 5.

Box 2.4. More airports are being developed or upgraded in ASEAN (concluded)

The Thai Government has allocated $1.9 billion for the second phase of the expansion work on Bangkok's Suvarnabhumi airport. About $589 million will be spent on construction of a new runway, $340 million for road works and $900 million for the construction of a new terminal complex. A second terminal at the Don Muang airport, for budget airlines, will open in 2015. A new international terminal at Phuket Airport in the southern part of Thailand is expected to open in 2016, at a cost of over $300 million, including further redevelopment works scheduled for completion by 2017.

Viet Nam is also seeking domestic and foreign investors to participate in airports development and upgrading through PPPs. Projects include the development of the Long Thanh airport to alleviate traffic congestion at Ho Chi Minh City's Tan Son Nhat Airport. In 2013, the Civil Aviation Administration of Viet Nam committed more than $8.1 billion to aviation infrastructure projects, of which Long Thanh airport would account for $7.2 billion. Viet Nam is also building new and smaller regional airports. For example, a groundbreaking ceremony was held in early 2015 for an airport in the south-central resort town of Phan Thiet. The airport is expected to become operational in 2018.

Other Member States, such as Brunei Darussalam, are also expanding and upgrading their international airports (section 3.2.3).

Source: CAPA Centre for Aviation.

The $4 billion expansion of the Tanjung Priok seaport in Indonesia, when complete in 2023, will triple the port's annual shipping capacity and ease congestion (Jones 2014). The port handles more than 50% of the country's imports and exports. The construction of an $18.5 million port terminal in Bataan (Philippines), when complete in 2016, will increase the port capacity by a minimum of 3 million tonnes of cargo annually; a joint venture of Nectar Group (United Kingdom) and Seasia Logistics (Philippines) is doing the work.[17] The modernization and upgrading of the $422 million Davao Sasa Port[18] to be financed through PPP is expected to handle 1.2 million 20-foot equivalent units (TEUs) annually. The port is also expected to serve as a transshipment hub for BIMP-EAGA and will support the establishment of the ASEAN Roll-On/Roll-Off (RORO) shipping network and short sea shipping route.[19]

Malaysia is planning to expand Port Klang to further boost movement of goods through it. Expansions have nearly doubled capacity in the Northport (from 2.9 million to 5.6 million TEUs) and in the Westport (from 7.5 million to 14 million TEUs).[20] The $3.8 billion investment by the Port Authority of Thailand to expand the Chabang Port to ease congestion will expand capacity by 240% from 5.6 million TEUs to 18.8 million by 2020. The port currently handles half of the imports and exports of Thailand.[21]

2.2.4. Other infrastructure

ASEAN Member States have developed many special economic zones, including industrial, science and technology parks that generate significant economic, technological and social impacts. The benefits of these parks to an economy would not materialize if not for the

provision of a reliable supply of electricity, water, telecommunication and road networks. A 2015 UNIDO study estimated that there are more than 1,000 economic zones in ASEAN (893 industrial parks, 84 special economic zones, 2 eco-industrial parks, 25 technology parks, and 1 innovation district), and the numbers of such zones are increasing in the region.

These zones have help attracted many MNEs and house many factories that have created jobs. For instance, the Batamindo Industrial Park in Batam Island (Indonesia), developed by Sembcorp (Singapore), has attracted more than 70 manufacturing MNEs and generated at least 60,000 jobs, economically transforming the island.[22]

Viet Nam has 212 industrial parks in operation. At the end of 2014, its economic zones and industrial parks had attracted more than 5,500 FDI projects with a registered capital of $85.5 billion, of which 59% had been disbursed.[23] The import-export turnover associated with enterprises operating in these zones and parks amounted to $73.4 billion in 2014. Together, these enterprises created some 2.4 million jobs in the country.

Lao PDR is expected to have established 15 SEZs by the end of 2015, and another 10 more by 2020. Most of these zones will be developed in border areas and remote parts of the country, to promote development in rural areas. Indonesia is planning to build 8 SEZs and 14 new industrial estates between 2015 and 2019. One industrial park there is being developed by China Minsheng Investment Company. The project is expected to be completed in 2020 at an estimated cost of $5 billion.[24] Myanmar has 19 industrial estates and is developing 7 more as well as 3 SEZs in the country. Thailand plans to develop 12 SEZs along its borders (namely, with Cambodia, Lao PDR, Myanmar and Malaysia). Brunei Darussalam has established sector-specific industrial parks that are ready to be used. They include the Rimba Digital Junction (an industrial park for high-tech industries), the Bukit Panggal Industrial Park (to house export-oriented energy-intensive manufacturing industries) and the Brunei BioInnovation Corridor (an international halal-themed industry park).

Other infrastructure, such as dams, has also played an important role in economic and social development in the region. The construction of dams for hydropower plants has not only helped increase electricity generation capacity and cultivate renewable energy, but also has prevented floods and supported the irrigation of nearby agricultural areas, providing livelihoods for farmers. For instance, in Viet Nam the dams at the Ban Ve hydroelectric power plant and the Dai Ninh hydroelectric plant help prevent flooding in the surrounding areas as well as supply water for irrigation in agriculture.

2.3. Infrastructure investment needs

Infrastructure investment needs in ASEAN are huge, estimated to be about $110 billion per year through to 2025. It is possible to meet this need from resources held mainly by the private sector. Various studies have estimated the region's infrastructure investment needs, which range from about $60 billion to $150 billion

per year for different future periods and coverage of ASEAN Member States (table 2.2 and box 2.5).[25] UNCTAD has estimated that the region would need at least $110 billion in annual investment in power, transport, telecommunication, and water and sanitation for the next decade. This estimate excludes investment needs for cross-border regional connectivity projects.

The power sector and transport infrastructure dominate annual investment needs. They together will account for the lion's share of the future needs, as they have in the past. This is also consistent with estimates of other studies (ADB-ADBI 2009, Goldman Sachs 2013, Bhattacharyay et al. 2012). Investment needs in water and sanitation remain low but more needs to be done to expand the provision of quality infrastructure service in this area, and to ensure universal access.

Table 2.2. Annual infrastructure investment needs in ASEAN are huge, 2015–2025

	ADB-ADBI (2009)	McKinsey Global Institute (2013)	KPMG (2014a)	Bhattacharyay et al. (2012)	Goldman Sachs (2013)	**UNCTAD estimate**
Estimated annual investment needs (Billions of dollars)	60	133	146	100	69	110
Sectors covered	Power, transport, telecom-munication, WSS	Power, transport, telecom-munication, WSS	..	Power, transport, telecom-munication, WSS	Power, transport	Power, transport, telecom-munication, WSS
Period covered	2010–2020	2013–2030	mainly 2013–2030	2010–2030	2013–2030	2015–2025
Countries covered	All except Brunei Darussalam, Singapore	All ASEAN Member States	All except Brunei Darussalam, Singapore	All except Brunei Darussalam, Singapore	Only Indonesia, Malaysia, Philippines and Thailand	All ASEAN Member States

Source: UNCTAD 2015b.

Note: WSS = water supply and sanitation

The infrastructure development plans of ASEAN Member States also differ in terms of magnitude and sectors. Infrastructure quality and coverage in ASEAN differ markedly between the Member States. Some already possess good-quality infrastructure from significant investment made in the past, including investments in maintenance and upgrades. Others have under invested in infrastructure and need to do more to ensure the provision of adequate-quality infrastructure assets to support economic growth and meet rapidly growing demand.

Additional resources are available to be tapped to finance infrastructure development in the region (table 2.3). Although public finances are central and fundamental, the scale of investment required means that the private sector, including MNEs, must play a pivotal role. A number of key challenges and policy options can be considered for mobilization and channeling of resources to infrastructure investment (*WIR* 2014). The role of MDBs and ODAs remains important, and they need to continue to support infrastructure development in the region to help ASEAN Member States become better connected.

Box 2.5. ASEAN needs at least $110 billion annually in infrastructure investment through to 2025

The $110 billion estimate of infrastructure investment needs provides an indication of magnitude. It is estimated as follows:

- Electricity (generation, transmission, distribution) = $ 38 billion
- Transport (road, rail, ports and airports) = $ 55 billion
- Telecommunication (ICT) = $ 9.2 billion
- Water and sanitation = $ 7.8 billion

The estimate for electricity is based on IEA 2014, which provides estimates of investment needs in electricity for the region between 2014 and 2025. The estimates, based on new policies, cover generation, transmission and distribution.

The estimate for transport is based on two calculations: the median of investment needs of $42 billion calculated by Bhattacharyay (2013) and the estimates based on percentage share of GDP for transport indicated in Bhattacharyay et al. (2012). It excludes Brunei Darussalam and Singapore. GDP figures at current prices for 2013-2020 from the World Economic Outlook database were applied. The annual average for the period was projected to cover 2021-2025.

Future telecommunication investment in ASEAN will be driven by the expansion of mobile broadband networks, upgrades of wired access and national and international backbones to fibre optic, and increases in network capacity. The estimate for ICT is at about the level spent in the previous decade. It is based on the average cost needed to expand mobile and wired broadband service, including associated backbone transmission investments based on historical investment data for each country. It is assumed that in the next decade more emphasis will be needed on development and upgrading of infrastructure to support mobile and data technology. The estimates cover 2015 through to 2025 and build on the assumption that mobile broadband penetration will reach the existing rate of 2G population coverage. Two reasons that investment will not increase are the trend by operators to outsource more network deployment and the savings achieved from infrastructure sharing, particularly for existing mobile antenna towers.

The annual investment needs for water supply and sanitation (WSS) are based on the percentage share of GDP for WSS of Bhattacharyay et al. (2012). The estimate excludes Brunei Darussalam and Singapore. GDP figures at current prices for 2013-2020 from the World Economic Outlook database were applied. The annual average for the period was projected to cover 2021-2025.

Source: UNCTAD.

In addition to the list in table 2.3, other private sector funds can be considered. They include potential facilities for infrastructure projects from foreign banks and international development financial institutions such as the Asian Development Bank (ADB) and the World Bank. In addition, a number of specialized funds can be tapped for infrastructure investment in the region. They include, for example, the China-ASEAN Investment Cooperation Fund with a potential size of $10 billion, the ASEAN Infrastructure Fund managed by the ADB and the soon to be established Asian Infrastructure Investment Bank. Commercial banks, mainly foreign entities, are further important sources. In 2014, they provided about $8 billion in financing facilities to infrastructure projects in ASEAN.

Table 2.3. At least $10 trillion in available resources can be tapped for infrastructure investment in ASEAN, 2015

Type of resources	Year	Amount ($ billions)	Source
ASEAN Bond Markets	2015	1,081	Asian Development Bank Bond Monitoring. Based on second-quarter 2015 bond markets data of Indonesia ($125 billion), Malaysia ($285 billion), Philippines ($103 billion), Singapore ($241 billion), Thailand ($284 billion) and Viet Nam ($43 billion).
ASEAN Stock Exchanges	2015	2,002	World Federation of Exchanges. Based on stock exchange market capitalization in August 2015 of Indonesia ($334 billion), Malaysia ($363 billion), Philippines ($243 billion), Singapore ($639 billion), Thailand ($373 billion) and Viet Nam ($50 billion).
ASEAN Infrastructure Companies (Total assets)	2014	1,567	Orbis. Covers construction, real estate, utilities and telecommunication companies. Based on 3,319 infrastructure companies with reported financial data; of which 3,030 domestic infrastructure companies with combined total assets of $1.45 trillion and 289 foreign construction companies operating in ASEAN with $117 billion. Information for some companies was based on 2012 data (latest year for which data are available).
ASEAN Banks (Total assets)	2014	4,619	Orbis. Based on 477 banks with reported $4,619 billion total assets, with operations in ASEAN, of which 338 are domestic and 139 foreign owned. Domestic banks collectively held $4 trillion, and foreign bank subsidiaries owned $619 billion in total assets. Information for some companies was based on 2012 data (latest year for which data are available).
ASEAN Insurance Companies (Total assets)	2014	504	Orbis. Based on data for 278 domestically owned insurance companies and 118 foreign-owned companies operating in ASEAN. Total assets of domestic insurance companies were $340 billion, and foreign-owned subsidiaries held $164 billion. Information for some companies was based on 2012 data (latest year for which data are available).
ASEAN Pension Funds (Total assets)	2014	38	Orbis. Based on data for 222 pension fund companies with reported financial data, of which 176 domestic companies held total assets of $31 billion and 36 foreign ones operating in ASEAN held $7 billion. Information for some companies was based on 2012 data (latest year for which data are available).
Memorandum:			
Gross domestic saving	2014	820	World Bank. Exclude data on Myanmar.
Foreign-exchange reserves	2014/2015	750	IMF: Data for Indonesia, Malaysia, Philippines, Singapore and Thailand reported in August 2015. World Bank: Data for Brunei Darussalam, Cambodia, Lao PDR, Myanmar and Viet Nam based on 2014 data and for Myanmar on 2012 data.
Sovereign wealth fund	2014	620	Sovereign Wealth Fund Institute: Based on December 2014 data for Brunei Investment Agency (Brunei Darussalam), Government Investment Unit (Indonesia), Khazanah Nasional (Malaysia), GIC Private Limited (Singapore), Temasek (Singapore) and Vietnam`s State Capital Investment Corporation (Viet Nam).

Source: UNCTAD 2015b.

The region is expected to invest more in the next decade in light of the strong commitments of Member States to increase the quality of their infrastructure, the announcement of huge infrastructure investment plans and the growing demand for more infrastructure.

The future infrastructure investment needs of ASEAN far exceed available public resources. This large gap needs to be filled. The public sector alone cannot deliver the infrastructure to

meet the growing needs. It is imperative that the private sector play a greater role, including through effective PPPs.

2.4. Foreign private participation in infrastructure in ASEAN

Private participation in infrastructure development in the region is rising, with most private involvement occurring in the transport, telecommunication and power sectors. MNEs from within ASEAN and outside the region are active in the last two and in some transport infrastructure, such as urban rail networks and port terminals.

Many players are involved in infrastructure developments in ASEAN. Domestic investors and foreign MNEs continue to contribute to infrastructure development across sectors (chapter 3). The State has traditionally been the main developer, owner and provider of infrastructure services in the region. However, this role of the State is declining. Private sector participation as investors and owners of infrastructure assets in the region is growing.

Countries in the region have been investing in gross fixed capital formation (GFCF), which has grown much faster than the rate of GDP. But more investment in GFCF, in particular in infrastructure, is needed to support economic development. Some Member States invest more in GFCF than others. In Member States such as Lao PDR and Indonesia, GFCF accounted for about 32% and 30% of GDP between 2005 and 2013, while in Cambodia and the Philippines it accounted for only 18% and 19%, respectively.

The share of private investment in GFCF for more developed ASEAN Member States (i.e. Indonesia, Malaysia, Thailand, Singapore[26]) rose between 2000–2004 and 2010–2014, while the Philippines remains stable at about 87% (table 2.4). These statistics highlight

Table 2.4. Rising pivate investment in GFCF in some ASEAN Member States
(Annual average 2000–2004, 2005–2009, 2010–2014 at constant price; Millions of dollars)

	Brunei Darussalam	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Viet Nam
2000–2004 (annual average)										
GFCF ($ million)	944	758	131,560	..	28,757	3,892	15,866	29,936	16,233	20,220
Public investment share (%)	..	36	13	..	56	43	13	24	31	29
Private investment share (%)	..	64	87	..	44	57	87	76	69	71
2005–2009 (annual average)										
GFCF ($ million)	1,413	1,217	180,598	..	38,475	5,480	19,795	44,193	25,825	32,108
Public investment share (%)	..	33	11	..	46	43	13	16	26	29
Private investment share (%)	..	67	89	..	54	57	87	84	74	71
2010–2014 (annual average)										
GFCF ($ million)	1,975	1,820	251,255	..	61,610	10,014	30,492	72,452	33,366	33,519
Public investment share (%)	..	44	9	..	41	45	14	18	22	33
Private investment share (%)	..	56	91	..	59	55	86	82	78	67

Source: IMF, WEO Database.

the growing importance of private investment across the region in economic development, including in infrastructure. They also suggest that the CLMV countries would need to encourage greater private sector participation in economic development and to release public resources to use in areas where it would be more challenging to attract private investment (e.g. in social sectors such as water, sanitation and education).

The form of MNE involvement in infrastructure operations varies significantly by sector, in part reflecting the policies of host countries in the region, the openness of the sectors, investment opportunities and the risk-return relationship perceived by investors. The private sector has been participating in infrastructure development in the region through a number of modalities. They include foreign direct investment (FDI) (greenfield), mergers and acquisitions (M&As), privatization participation, non-equity modalities (concessions), and partnership or consortium arrangements. Some modalities are more significant than others for private sector participation. The privatization of public infrastructure and the maturity of the M&A environment, including opportunities to acquire assets in a host country, can influence private sector participation. Firms' experience, skill sets and ability to win contracts are additional influences. MNEs from developed and developing countries, including from ASEAN, are participating in infrastructure development in the region through contractual arrangements, whether as engineering, procurement and construction (EPC) contractors or subcontractors. They also invest, build, operate and manage infrastructure assets.

The choice of modalities would also depend on company, host country and infrastructure sectors. In some Member States and in some sectors such as road construction, the domestic private sector are active players. In others, foreign companies have a significant presence; an example is in electricity generation in Lao PDR and Myanmar, which is also supported by those countries' policy and investment opportunities. However, in large and complex infrastructure projects, foreign companies' participation is high because of the skills, experience and access to finance that they bring.

ASEAN Member States are using PPPs to attract private participation in infrastructure development. Member States such as Indonesia, Lao PDR, Myanmar, the Philippines and Viet Nam have all implemented and announced PPP projects. Concession arrangements such as build-operate-transfer (BOT), build-operate-own (BOO) and build-transfer-operate (BTO), turnkey and – in some cases – guarantees of revenue streams through long-term power purchase agreements or toll collection concessions have attracted private sector participation.

FDI is an important form of MNE involvement in telecommunication and in power generation in the region because of the liberalization of those industries over the years. In some Member States such as Singapore, power generation assets have been privatized and foreign MNEs are now owners of these assets. Senoko Power, once owned by the Government, is now owned by Lion Power, which is controlled by a consortium led by Marubeni (Japan) and including GDF Suez (France), Kansai Electric Power (Japan), Kyushu

Electric Power (Japan) and Japan Bank for International Cooperation. The Huaneng Group (China) now owns Tuas Power and YTL Power International (Malaysia) owns Power Seraya in Singapore. The lion's share of electricity generation in Singapore is supplied from power plants owned by foreign MNEs. In telecommunication, foreign players dominate in some Member States.

2.4.1. FDI in infrastructure

The growing FDI in infrastructure is dominated by investments in transportation and storage, and in ICT, and in real estate (table 2.5). The World Bank data on private participation in infrastructure (PPI), which are on a project basis also indicate the dominance of private participation in these infrastructure sectors and in electricity (table 2.6). On average, PPI in four ASEAN Member States – Indonesia, Lao PDR, Thailand and Viet Nam – has been increasing since the 1990s.[27]

Except for the decline in 2012–2013, FDI in real estate[28] has been on a rising trend, while FDI in construction has recovered from the significant plunge in 2011–2012, to nearly reach the peak of 2008. FDI in these activities remains at a high level (figure 2.1).

FDI in infrastructure accounted for about 12-15% of total FDI inflows into the region in 2012 and 2014 (if real estate activities are included), with differences between ASEAN Member States. Indonesia, Thailand and Viet Nam saw a rise in FDI in infrastructure investments in 2014. FDI in transportation and storage, information and communication, and real estate rose in Indonesia, while in Thailand FDI in information and communication rose. Viet Nam witnessed an increase in FDI in construction and real estate.

Figure 2.1. **Rising FDI flows in real estate and recovery in construction in ASEAN**
(Millions of dollars)

Source: ASEAN Secretariat, ASEAN FDI Database (accessed 1 July 2015).

Table 2.5. **Transportation, information and communication, and real estate dominate infrastructure FDI in ASEAN** (Millions of dollars)

	Brunei Darussalam	Indonesia	Malaysia	Myanmar	Philippines	Singapore	Thailand	Viet Nam	Total
2012									
Electricity, gas, steam and air conditioning supply	..	199.1	21.2	..	(23.2)	..	(26.6)	49.8	220.3
Water supply; sewerage, waste management and remediation activities	..	85.3	(13.8)	233.2	(1.8)	..	(56.6)	0.3	246.6
Construction	38.3	(76.2)	57.0	..	8.8	127.4	(170.2)	177.1	162.1
Transportation and storage	4.3	997.8	(167.5)	..	(9.6)	2,158.6	39.8	116.3	3,139.6
Information and communication	..	2,025.8	18.4	..	19.6		(225.8)	213.4	2,051.4
Real estate activities	..	830.6	182.0	..	163.5	7,741.6	1,014.6	1,013.4	10,945.8
Total of the selected infrastructure sectors (if including real estate)	85.1	7,294.3	12.8	233.2	151.1	12,313.6	135.8	2,127.0	16,765.9
Total FDI	864.8	19,137.9	9,400.0	1,354.2	2,797.0	60,980.3	10,699.2	8,368.0	115,452.8
2013									
Electricity, gas, steam and air conditioning supply	..	208.8	98.1	..	(27.4)	..	41.4	835.9	1,156.8
Water supply; sewerage, waste management and remediation activities	0.1	89.5	(8.1)	31.6	461.4	..	6.7	21.0	602.2
Construction	(41.9)	148.9	280.1	..	1.7	316.3	33.0	86.9	825.0
Transportation and storage	1.3	624.8	256.1	405.6	21.3	1,387.7	87.2	18.4	2,802.5
Information and communication	(0.7)	1,268.5	752.8	..	5.2	..	145.6	24.9	2,196.5
Real estate activities	..	834.8	1,020.0	44.5	70.5	5,813.2	1,647.2	391.3	9,821.5
Total of the selected infrastructure sectors (if including real estate)	(82.3)	5,515.6	3,778.3	918.9	995.0	9,221.2	2,275.1	2,365.7	17,404.5
Total FDI	725.5	18,443.8	12,297.4	2,621.0	3,859.8	56,138.3	12,999.8	8,900.0	117,687.1
2014									
Electricity, gas, steam and air conditioning supply	..	184.1	(11.0)	2.2	(58.4)	..	(262.0)	96.3	(48.9)
Water supply; sewerage, waste management and remediation activities	(0.1)	78.9	(1.2)	..	(24.0)	..	6.7	26.7	86.9
Construction	22.5	101.8	265.2	..	6.1	88.6	84.1	457.3	1,047.8
Transportation and storage	4.5	739.7	203.5	413.3	90.2	1,034.4	52.2	74.5	2,612.3
Information and communication	(2.4)	1,726.0	(31.5)	..	13.2	..	809.3	32.0	2,546.6
Real estate activities	..	1,371.7	839.3	29.3	153.8	5,150.7	1,273.4	1,194.2	10,031.3
Total of the selected infrastructure sectors (if including real estate)	49.1	7,032.7	1,689.0	860.4	207.9	7,396.7	2,653.9	2,567.8	16,276.1
Total FDI	568.2	22,276.3	10,714.0	946.2	6,200.5	72,098.3	11,537.9	9,200.1	136,181.4

Source: ASEAN Secretariat, ASEAN FDI Database (accessed 1 August 2015).

[a] Includes industrial estates, speical economic zones, free trade zones and commercial properties.

Table 2.6. **Private participation in infrastructure is uneven in ASEAN, 1991–2014** (Millions of dollars)

	Indonesia					Malaysia					Philippines					Thailand				
	Energy	Telecom	Transport	WSS	Total	Energy	Telecom	Transport	WSS	Total	Energy	Telecom	Transport	WSS	Total	Energy	Telecom	Transport	WSS	Total
1991	..	..	11	..	11	..	..	..	..	..	379	54	..	..	433	..	252	16	..	268
1992	137	..	115	..	252	1,350	..	160	284	1,794	160	54	..	..	214	..	1,854	48	..	1,902
1993	..	250	352	..	602	1,330	..	814	2,558	4,702	1,879	54	..	..	1,933	171	2,460	..	..	2,631
1994	596	1,249	27	..	1,872	3,182	748	2,011	790	6,731	1,243	735	..	..	1,978	504	160	..	..	664
1995	2,470	1,804	503	200	4,977	1,200	1,012	1,889	10	4,111	2,329	593	300	..	3,222	1,385	370	1,700	160	3,615
1996	3,204	3,694	..	..	6,898	..	1,033	2,948	..	3,981	1,614	1,192	514	..	3,320	2,389	1,013	150	..	3,552
1997	2,725	1,511	..	123	4,359	215	673	2,182	..	3,070	1,673	2,401	1,127	7,566	12,767	2,141	644	..	61	2,846
1998	330	579	..	632	1,541	..	175	592	..	767	1,260	547	..	..	1,807	574	331	27	..	932
1999	125	1,260	1,028	..	2,413	195	296	314	..	805	182	626	78	2	888	190	377	64	66	697
2000	..	642	..	..	642	..	276	1,080	3,965	5,321	1,764	384	5	..	2,153	859	511	..	9	1,379
2001	..	1,421	..	37	1,458	1,765	419	684	..	2,868	672	1,157	909	..	2,738	890	1,672	455	240	3,257
2002	188	1,322	..	..	1,510	12	475	..	16	503	126	706	30	..	862	..	1,198	..	..	1,198
2003	829	940	..	..	1,769	2,050	438	1,570	..	4,058	454	767	..	..	1,221	1,336	664	45	34	2,079
2004	158	895	159	8	1,220	1,210	1,204	342	2,521	5,277	322	930	..	..	1,252	0	613	439	..	1,052
2005	32	1,538	..		1,570	1,600	483	587	..	2,670	99	672	..	..	771	1,609	945	..	242	2,796
2006	662	1,476	372	20	2,530	203	487	531	..	1,221	646	619	215	504	1,984	197	1,130	..	19	1,346
2007	423	3,517	1,140	..	5,080	..	595	423	..	1,018	2,083	1,526	..	..	3,609	..	1,031	..	..	1,031
2008	2,885	2,876	..	..	5,761	..	882	425	..	1,307	1,820	1,209	315	..	3,344	2,341	406	..	..	2,747
2009	..	2,976	220	..	3,196	182	778	..	..	960	4,605	1,198	96	27	5,926	..	539	..	..	539
2010	2,300	1,846	..	..	4,146	34	947	253	..	1,234	2,149	1,385	343	..	3,877	745	420	..	..	1,165
2011	366	2,012	..	..	2,378	24	845	..	..	869	993	1,104	370	..	2,467	1,646	597	..	..	2,243
2012	288	2,664	1,989	15	4,956	2,175	929	381	..	3,485	736	1,620	50	178	2,584	1,581	1,169	..	..	2,750
2013	1,931	1,772	..	140	3,843	1,283	925	..	..	2,208	1,265	735	45	..	2,045	1,703	1,706	..	..	3,409
2014	1,651	..	..	..	1,651	..	..	..	..	..	..	..	..	..	..	934	..	..	..	934
Total	21,300	36,244	5,916	1,175	64,635	18,010	13,620	17,186	10,144	58,960	28,453	20,268	4,397	8,277	61,395	21,195	20,062	2,944	831	45,032

Table 2.6. **Private participation in infrastructure is uneven in ASEAN, 1991–2014** (Millions of dollars) (concluded)

	Cambodia					Lao PDR					Myanmar					Viet Nam				
Year	Energy	Telecom	Transport	WSS	Total	Energy	Telecom	Transport	WSS	Total	Energy	Telecom	Transport	WSS	Total	Energy	Telecom	Transport	WSS	Total
1991	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1992	..	13	..	..	13	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1993	..	18	..	..	18	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1994	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	10	..	10
1995	..	2	120	..	122	..	..	..	..	..	394	..	..	..	394	..	256	..	..	256
1996	..	8	..	..	8	536	92	..	..	628	..	..	50	..	50	205	..	15	..	220
1997	127	78	..	..	205	..	..	..	..	..	325	..	..	..	325	110	..	70	..	180
1998	..	14	..	..	14	..	1	..	..	1	..	..	..	..	..	..	..	..	39	39
1999	16	1	..	..	17	..	7	..	..	7	..	..	..	..	..	40	..	..	..	40
2000	..	2	..	..	2	..	5	2	..	7	..	..	..	..	..	..	130	..	20	150
2001	28	12	65	..	105	..	12	..	..	12	..	..	..	..	..	87	..	..	154	241
2002	4	28	7	..	39	..	20	..	..	20	..	..	..	..	..	1,780	..	20		1,800
2003	..	17	..	..	17	..	6	..	..	6	..	..	..	..	..	412	230	..	7	649
2004	25	8	53	..	86	..	34	..	..	34	..	..	..	..	..	..	70	..	..	70
2005	25	69	..	..	94	1,250	10	..	..	1,260	..	..	..	..	..	93	..	..	92	185
2006	..	3	40	..	43	1,070	10	..	..	1,080	556	..	..	..	556	..	682	133	..	815
2007	655	166	..	..	821	..	..	..	..	..	..	..	..	..	..	367	645	267	..	1,279
2008	47	37	..	..	84	870	..	..	..	870	..	..	..	..	..	170	..	365	..	535
2009	..	390	..	..	390	..	125	2	..	127	..	..	..	..	..	349	267	200	..	816
2010	1,864	18	..	..	1,882	3,860	..	..	..	3,860	..	..	..	..	..	943	..	155	..	1,098
2011	..	4	..	..	4	452	..	..	..	452	..	..	..	..	..	2,770	..	..	..	2,770
2012	..	7	..	..	7	501	..	..	..	501	..	..	..	..	..	169	..	..	..	169
2013	..	..	..	..	..	..	..	..	..	..	170	..	..	..	170	..	..	276	..	276
2014	..	..	..	..	..	1,043	..	..	..	1,043	..	..	..	..	..	..	..	..	..	..
Total	2,791	895	285	..	3,971	9,582	322	4	..	9,908	1,445	..	50	..	1,495	7,495	2,280	1,511	312	11,598

Source: World Bank, PPI Database.

Note: Data for 2014 cover up to first half of the year. WSS = water supply and sanitation.

2.4.2. M&As in infrastructure

Cross-border M&As in infrastructure in ASEAN are also on the rise (table 2.7). Some 18% of the M&A deals in the region in 2010-2014 related to infrastructure activities. Cross-border infrastructure M&As rose significantly, from $2.8 billion in 2013 to $6.2 billion in 2014, and involved more ASEAN Member States including, to a small extent, Cambodia and Viet Nam. This development indicates the increasing opportunities for foreign investors to use M&A strategies in the region.

Most of the cross-border infrastructure M&As are in information and communication, transportation and storage, and energy (power) as well as in water services and sanitation. Foreign and ASEAN companies are active acquirers of infrastructure-related assets (table 2.8). Among MNEs from developed countries, Japanese companies dominated. Among the developing economies, China, Hong Kong (China), the Republic of Korea and some ASEAN Member States were active buyers in 2013–2014. Companies based in Indonesia, Malaysia, Singapore and Thailand made notable infrastructure-related acquisitions. They include companies such as E-Power (Singapore), Enco Holdings (Malaysia), Electricity Generating PCL (Thailand), B. Grimm Power (Thailand) in the electricity sector; Gadang Holdings (Malaysia) and Salcon (Malaysia) in water and sanitation; Ortus Holdings (Singapore) in transportation; and Axiata (Malaysia), Solusi Tunas Pratama (Indonesia) and TEE International (Singapore) in telecommunication.

Table 2.7. Infrastructure M&A activity in ASEAN is on the rise

	Deals (number)					
	2010	2011	2012	2013	2014	2010–2014, annual average
Total	**547**	**584**	**502**	**409**	**410**	**490**
of which:						
Electricity, gas, water and waste management	14	17	19	9	12	14
Construction	14	12	14	15	9	13
Transportation and storage	31	27	18	25	24	25
Information and communication	33	48	25	30	48	37
Subtotal of selected infrastructure-related sectors	92	104	76	79	93	89

	Value ($ million)					
	2010	2011	2012	2013	2014	2010–2014, annual average
Total	**21,324**	**34,353**	**23,043**	**40,363**	**21,700**	**28,157**
of which:						
Electricity, gas, water and waste management	157	2,612	632	1,077	1,122	1,120
Construction	440	143	71	103	9	153
Transportation and storage	731	3,746	296	1,194	1,497	1,493
Information and communication	222	725	524	438	3,563	1,095
Subtotal of selected infrastructure-related sectors	1,550	7,226	1,523	2,813	6,192	3,861

Source: UNCTAD, UNCTAD M&As Database.

Note: gross basis.

Table 2.8. Asian companies are active in infrastructure M&A activity in ASEAN (Selected cases), 2013–2014

Year	Target company	Target nation	Target industry	Ultimate acquiring company	Ultimate acquiring nation	Value ($ million)	Share acquired (%)
Electricity							
2013	Gunkul PowerGen	Thailand	Cogeneration	Chubu Electric Power	Japan	..	49
2013	Powertude	Malaysia	Cogeneration	Renotex Group	Seychelles	..	51
2014	MH Bio-Energy Group	Cambodia	Cogeneration	Undisclosed Acquiror	unspecified	26	80
2013	Global Business Power	Philippines	Electric services	ORIX Corp	Japan	165	20
2013	PT Cikaengan Tirta Energi	Indonesia	Electric services	Nippon Koei	Japan	..	90
2013	GMR Energy	Singapore	Electric services	First Pacific	Hong Kong, China	482	70
2014	Angat Hydroelectric Power Plant	Philippines	Electric services	Korea Water Resources Corp	Korea, Republic of	441	100
2014	Mperial Power	Malaysia	Electric services	E Power	Singapore	11	51
2014	Andaman Power & Utility	Thailand	Electric services	All Asia Asset Capital	Hong Kong, China	..	4.5
2014	Kencana Bio Energy	Singapore	Electric services	Enco Holdings	Malaysia	5	30
2014	Masin-AES	Singapore	Electric services	Electricity Generating PCL	Thailand	453	45
2014	Myanmar Power	Myanmar	Electric services	Mitsui & Co	Japan	..	44
2014	Ikhwan Mega Power	Indonesia	Electric services	Gadang Holdings	Malaysia	1	60
2014	Sime Darby Power Co Ltd	Thailand	Electric services	B Grimm Power	Thailand	163	100
2014	Siam Solar Power	Thailand	Electric services	Toyo Thai Corp	Thailand	..	5
2013	Grama Bazita	Indonesia	Electrical work	Endress+Hauser Consult	Switzerland	..	100
2014	Cofely DC	Singapore	Electrical work	Suez	France	..	100
Water and Sanitation							
2013	Maynilad Water Services	Philippines	Water and sanitation	Marubeni Corp	Japan	400	20
2014	Dewata Bangun Tirta	Indonesia	Water and sanitation	Gadang Holdings	Malaysia	5	70
2014	Pam Lyonnaise Jaya	Indonesia	Water and sanitation	Jardine Matheson Holdings	Hong Kong, China	..	19
2013	Saigon Water Infrastructure Corp	Viet Nam	Water and sanitation	Manila Water	Philippines	15	31.47
2013	United Envirotech	Singapore	Water and sanitation	KKR & Co LP	United States	40	11.18
2014	Sound Global	Singapore	Water and sanitation	Beijing Sanghua Envi Tech Dvlp	China	13	1.55
2013	Salcon Darco Environmental	Singapore	Water and sanitation	Salcon	Malaysia	20	40
2014	Pan Pacific Corp	Viet Nam	Water and sanitation	TAEL	Malaysia	12	20
Transportation							
2013	Vietnam Kumho Asiana Plaza Saigon	Viet Nam	Highway and street construction	Asiana Airlines	Korea, Republic of	67	50
2014	Bien Hoa Vung Tau Expressway Devp	Viet Nam	Highway and street construction	Undisclosed Acquiror	unspecified	..	10
2014	Rach Mieu Bridge BOT	Viet Nam	Bridge and highway construction	Undisclosed Acquiror	unspecified	2	25
2014	UFIS Airport Solutions	Singapore	Airports and airport terminal services	Amadeus IT Holding	Spain	..	100
2013	Jakarta Monorail	Indonesia	Local and suburban transit	Ortus Holdings	Singapore	..	90

Table 2.8. Asian companies are active in infrastructure M&A activity in ASEAN (Selected cases), 2013–2014 (condluded)

Year	Target company	Target nation	Target industry	Ultimate acquiring company	Ultimate acquiring nation	Value ($ million)	Share acquired (%)
2014	Klik Eat Indonesia	Indonesia	Local and suburban transit	Yume No Machi Souzou Linkai	Japan	..	36.4
Telecommunication							
2013	Infratech Indonesia	Indonesia	Radiotelephone communication	Babel Investment	United Kingdom	..	70
2013	Latelz	Cambodia	Radiotelephone communication	Axiata Group	Malaysia	155	100
2013	Hutchison CP Telecommunications	Indonesia	Radiotelephone communication	Investor Group	Indonesia	..	35
2013	Sotelco	Cambodia	Radiotelephone communication	Huot Vanthan	Cambodia	..	90
2014	YuuZoo Corp	Singapore	Radiotelephone communication	Contel Corp	China	26	100
2014	True Corp	Thailand	Radiotelephone communication	China Mobile Communication Corp.	China	882	23.36
2014	Axis Telekom Indonesia	Indonesia	Radiotelephone communication	Investor Group	Indonesia	865	100
2014	XL Axiata - Telecoms Towers	Indonesia	Radiotelephone communication	Solusi Tunas Pratama	Indonesia	459	100
2014	CMC Communications	Singapore	Radiotelephone communication	TEE International	Singapore	..	20
2013	Digital Port Asia	Thailand	Telephone communication	NTT	Japan	..	74
2013	Kang JSC	Viet Nam	Telephone communication	Mox Telecom	Germany	..	65
2013	Nera Telecommunications	Singapore	Telephone communication	Northstar Equity Partners	Indonesia	5	3.32
2014	Propel Network	Malaysia	Telephone communication	KYOCERA Corp	Japan	..	50
2014	CMC Communications	Thailand	Telephone communication	TEE International	Singapore	..	20
2013	Solusi Tunas Pratama	Indonesia	Communication services	Cahaya Anugerah Nusantara	Hong Kong, China	29	7.46

Source: UNCTAD, UNCTAD M&A Database.

Japanese MNEs such as Chubu Electric Power, Orix, Nippon Koei and Mitsui acquired electricity-related companies in ASEAN. Yume No Machi Souzou Linkai acquired companies in transportation; and NTT and Kyocera acquired companies in telecommunication. European MNEs such as Babel (United Kingdom) and Mox Telecom (Germany) also made acquisitions in telecommunication.

The infrastructure development in ASEAN Member States evolved differently. MNEs' participation in infrastructure development in the region is dominated by greenfield activities, in particular through non-equity modalities (NEMs) (*WIR* 2011).

2.4.3. Participation through NEMs

Concessionary arrangements and contracts, a form of NEM, continue to dominate in infrastructure sectors. They are key features of MNEs' participation in infrastructure development in ASEAN. Participation through NEMs is significant and overwhelmed FDI numbers, which have consistently under reported MNEs' participation in infrastructure development. Much of the under-reporting arises from the data collection methodology, which does not capture non-equity forms of participation such as concessions and contracts (box 2.6).

Infrastructure MNEs may decide to serve an ASEAN host market through FDI or M&As or through NEMs. Through NEMs, MNEs participate in infrastructure development by providing trade in services and construction services. In assessing the role of MNEs in infrastructure in ASEAN, it is therefore important to reflect on the different forms of MNEs' participation.

Box 2.6. FDI statistics do not capture the full extent of investments in infrastructure

When it comes to investment in infrastructure, users of FDI statistics are often puzzled by the numbers reported. They read about billions of dollars spent on infrastructure development yet see little evidence of it in the FDI statistics of many countries.

This anomaly arises because of a number of methodological and definitional issues in relation to reporting on infrastructure investment. A significant amount of infrastructure activities occur on a contractual basis; they are not captured through FDI accounting. Services provided in development of infrastructure are captured under trade in services and not in FDI. In addition, investments in infrastructure are also dispersed in other foreign investments (through bilateral and multilateral loans of governments, including ODA grants), a small amount of foreign portfolio investment (bonds and individual investments through specialized investment funds), commercial loans, private domestic investments and PPP arrangements.

Accounting for FDI in infrastructure is made more difficult because there is no single industrial classification for infrastructure. The data must be culled from different industrial classifications in ISIC Rev4. Infrastructure such as railroads and harbours developed by a mining company appears as an investment in mining rather than in an infrastructure classification such as transportation. There is also the factor of errors and omissions in data compilation, especially related to construction based on EPC contracts associated with infrastructure, including many types of investment in real estate development (e.g. industrial estates, commercial, retail, recreational, free trade zones).

Source: Richards (2015).

The use of a consortium model is also a common strategy among MNEs, particularly for huge and complex projects. Such joint efforts help pool resources, finance and skills to manage and build large projects. It is also a model that could improve the chances of winning concessions in some countries. Consortium-based projects include the partnership of AES (United States), Posco Power (Republic of Korea) and China Investment Corporation for the Mong Duong II independent power producer (IPP) project in Viet Nam. Another is the consortium of Électricité de France International, EGCO (Electricity-Generating Public Company; Thailand), Italian-Thai Development (Thailand) and the Government of Lao PDR for the Nam Theun 2 hydropower project in Lao PDR. The consortium arrangement is also common with megaprojects such as the construction of mass transit systems and in ICT projects in ASEAN.

2.5. Infrastructure players

Infrastructure players in ASEAN differ in behaviour, background and aspiration. They can be categorized as the public and private sectors, the local and foreign private sectors, developed and developing countries, and ODA donors and various types of financiers, including companies participating in different segments of infrastructure value chains. For instance, the public sector invests in infrastructure for general public benefits and national economic interests, while the private sector invests to generate a return and increase shareholders' wealth. The different categories of players have different perceptions of the economic values of projects, different risk-return attitudes, different skill sets, different motivations, and different commitments to the development of public and welfare infrastructure-related services.

Technological development, environmental awareness and the use of integrated business models by MNEs are also broadening the categories of players. The increasing use of green and renewable technology has provided opportunities for new players to enter the power industry in generating electricity. Solution or equipment providers have entered at higher points in the value chain of the infrastructure industry rather than remaining confined to simply manufacturing and providing equipment to other players higher up in the chain. Gunkul Engineering (Thailand), a supplier of electrical equipment for power transmission and distribution, is moving into power generation and is making the production of renewable energy its core business. It has power generation activities in Myanmar. The company expects revenues from its power-generating business to surpass those from sales of equipment by 2018.[29] Similarly, Sarawak Cable (Malaysia) not only manufactures and provides electrical equipment to power plants and transmission line developers but has also invested in power generation in Indonesia.

Government policy towards promoting the generation of electricity from renewable energy sources such as solar power has also provided opportunities for new players to enter the electricity market in ASEAN. Companies such as GE and Alstom not only produce equipment and machinery for power-generating or EPC companies but also are involved in the electricity generation segment of the value chain themselves. Natural resource

extractive companies such as Bukit Asam (Indonesia), Petronas (Malaysia), PTT (Thailand) and Pertamina (Indonesia) are also involved with downstream electricity generation.

Given the huge future investment needs, limited public budgets and significant national infrastructure plans of ASEAN Member States, the private sector is encouraged to play a greater role in infrastructure development through direct investment, concessionary arrangements and PPPs.

2.5.1. Public versus private sector

In many ASEAN Member States, the public sector continues to account for the lion's share of infrastructure spending, albeit with declining contributions over time. In Indonesia, the public sector accounted for about two-thirds and the private sector one-third of infrastructure spending. In some infrastructure sectors such as telecommunication and electricity generation, the private sector role has become more dominant and the public sector role smaller.

In social areas such as education, water supply and health care, the public sector continues to be the main player, with private participation limited by low prospects for obtaining attractive economic returns. In contrast, private participation in telecommunication has been overwhelming because of the opportunities for obtaining attractive returns on investment.

2.5.2. Infrastructure players: developed versus developing economies

MNEs from both developed and developing economies participate in infrastructure development in ASEAN (table 2.9)*.* ***The former continues to play an important role in the region and the latter has become more visible.*** Traditionally, MNEs from developed countries have dominated the infrastructure landscape across the region. They faced few challenges. In more recent times, with the emergence of new players from Asia and ASEAN, that landscape has changed.

Backed by their ownership advantages, knowledge, brand names and financial capacity, MNEs from developed countries were the partners of choice for building infrastructure in the region in the past. Over time, infrastructure companies from developing economies such as the Republic of Korea and Hong Kong (China) have participated in infrastructure projects in the region. In more recent times, new sources of players from within the region and China became notable contributors.

The number of actors operating or investing in the region's infrastructure industry is now more diversified than in the past. However, infrastructure-related MNEs continue to invest and some have expanded their presence across the region. Examples from developed countries include J-Power (Japan), AES (United States), Sumitomo (Japan), GDF Suez (France), Siemens (Germany), ABB (Switzerland), APR Energy (United States)**,** Mitsui (Japan), GE (United States) and Marubeni (Japan) (table 2.10).

Table 2.9. **MNEs from both developed and developing economies participate in ASEAN infrastructure development** (Selected cases)

MNEs	Key Projects
Developed economies	
Japan	
Power and electricity	
Sumitomo Corporation	EPC contract to build a 1,000 MW ultra-supercritical coal-fired power plant in Manjung, Malaysia
Mitsubishi Corporation	Delivery of two 600 MW supercritical steam turbines and generators for the upcoming Vinh Tan 4 thermal power project in Binh Thuan Province of Viet Nam
Itochu Corporation and Kyushu Electric Power Company	Construction works on the $1.6 billion geothermal power plant in Sarulla, North Sumatra Province, Indonesia
Toshiba	As part of a consortium, contract to deliver two 600 MW supercritical steam turbines and generators for the upcoming Vinh Tan 4 thermal power project in Binh Thuan Province of Viet Nam
Electric Power Development Company	Developing a gas turbine–based power project in Ayutthaya in Thailand
Marubeni	Several power, transport and plant projects in Myanmar, Thailand, Indonesia and the Philippines
Transport	
Sumitomo Mitsui Construction	Constructing Viet Nam's longest sea bridge, linking Haiphong City to Lach Huyen Port
Mitsui Company Limited	Operating the first container terminal at Kalibaru Port in North Jakarta, Indonesia
Tokyu Corporation	Constructing three elevated stations in Phase I of Jakarta's north–south MRT corridor project
Obayashi Corporation and Shimizu Corporation	Constructing a 5.9 km underground tunnel and implementing two underground construction packages for Jakarta's north–south MRT corridor project
Takenaka Corporation	Developing Terminal 3 of the Ninoy Aquino International Airport in the Philippines
Telecommunication	
NTT Docomo, Softbank and KDDI	Involved in telecommunication infrastructure in the region
United States	
Power and electricity	
Ormat International	Construction works on the $1.6 billion geothermal power plant in Sarulla, North Sumatra Province, Indonesia
APR Energy	Developing a 100 MW power generation plant in Myanmar
AES Corporation	Developing the 630 MW Masinloc power plant in the Philippines
GE	Developing a wind grid in Viet Nam
Xylem	Contract to supply customized pumps for the 1,285 MW Xayaburi dam project
ACO Investment Group	Developing two 150 MW solar energy plants worth $480 million in Myanmar
SunEdison	Developing solar energy plants in Malaysia
Open Systems International	Providing energy management equipment, supervisory control and a data acquisition/energy management system at load dispatch centres across Viet Nam
Transport	
GE	Contract to supply 40 engines for Boeing 787 Dreamliners owned by Vietnam Airlines
Boeing Corporation	Contract to supply 80 Boeing 737 jets from Singapore-based BOC Aviation Limited
European Union	
Power and electricity	
Alstom (France)	Supplying the turbine and generator for a 27 MW power plant in Iloilo Province, the Philippines; contracts worth 422.98 billion dong with the National Power Transmission Corporation to supply power equipment and materials for the 500 kV My Tho and 220 kV Vinh Tan substations in southern Viet Nam; supplying three-phase shunt reactors for the Hongsa power plant in Lao PDR

Table 2.9. **MNEs from both developed and developing economies participate in ASEAN infrastructure development** (Selected cases) (continued)

MNEs	Key Projects
Prysmian Power Link SRL (Italy)	Connecting Phu Quoc Island, Viet Nam, to the national grid on an EPC basis
Conergy AG (Germany)	Commissioned the first phase (13 MW) of a 22 MW solar photovoltaic project on a turnkey basis in the San Carlos Economic Zone of San Carlos City, the Philippines
Statkraft Norfund Power Invest AS (Norway)	Developing several greenfield power projects in the Philippines
Transport	
Alstom Transport (France)	Developing various MRT projects in Bangkok and Singapore
Invensys Rail (United Kingdom)	Providing the signalling systems for all three stages of Singpaore's Downtown Line
Damen (Netherlands)	Investing in Vietnamese shipping yards
A.P. Moeller-Maersk (Denmark)	Deployed a jack-up rig in Malaysia
Fraport AG (Germany)	Developing Terminal 3 of Manila's Ninoy Aquino International Airport in the Philippines
Vinci Group (France)	Holds stakes in key airports of Cambodia
Wright Bus (North Ireland) and Volvo Bus Corporation (Sweden)	Supplying 415 double-decker buses to Singapore by 2017
TUV Rheinland Group (Germany)	Involved in the Jakarta monorail system project
Scania (Sweden)	Delivering 360 city buses to Malaysia's State-owned Syarikat Prasarana Negara Berhad
Telecommunication	
Telenor (Norway)	Providing telecommunication services in Myanmar
Developing economies	
China	
Power and electricity	
China Southern Grid International	Constructing the Nam Tha 1 hydropower dam in Bokeo Province in Lao PDR
China Huadian Corporation	Constructing a 338 MW hydropower dam in Mondol Seima district in Cambodia; developing the $630 million Phase I of the biggest power plant in Bali, Indonesia
China National Heavy Machinery Corporation	Developing the Phnom Penh–Sihanoukville transmission line and East Phnom Penh–Neakleung–Svay Rieng transmission line in Cambodia
China Datang Corporation	Developing the 120 MW Atai hydropower plant, along with its transmission line, in Cambodia
Hydrolancang International Company	Constructing the 530 MW Hlawga power plant in Myanmar
Hanergy Group Holding Limited	Developing a 1,400 MW hydropower plant along the Thanlwin River in Myanmar
Southern Power Grid Company Limited and China Power International Holdings Limited	EPC contract for the $2 billion, 1,200 MW Vinh Tan 1 coal-fired power plant in Viet Nam
Yingli Energy	Setting up a 5 MW ground-mounted solar photovoltaic project in Thailand
Guangdong No. 3 Water Conservancy	Constructing three hydropower dams on the Nam Ma River in Houaphanh Province in Lao PDR
Transport	
China Railway Group	Constructing a railway link, a steel plant, and a seaport in Cambodia; developing Line 2A of the Hanoi Metro
Guangxi Beibu International Port Group	Expanding the Kuantan Port in Pahang in Malaysia
Changchun Bombardier Railway Vehicles	Supplying 73 units of C951 three-car trains for the driverless Downtown Line of Singapore's MRT
CSR Qingdao Sifang	Contract to supply 91 four-car driverless train sets for the Thomson Line and the Eastern Region Line of the Singapore MRT
China Merchants Group	Developing the Tanjung Sauh Port, Batam Island, in Indonesia
Changchun Railway Vehicles and China Communications Construction Company	Involved in Indonesia's first monorail system in Jakarta
China CAMC Engineering Company Limited	Expanding the Luang Prabang International Airport in Lao PDR
CNR Group's Dalian Locomotive & Rolling Stock Company	Supplying trains for the PhP 3.77 billion Metro Rail Transit Line 3 capacity expansion project

Table 2.9. **MNEs from both developed and developing economies participate in ASEAN infrastructure development** (Selected cases) (concluded)

MNEs	Key Projects
China Harbour Engineering Company Limited	Undertaking Phase I of the Samalaju Port project in Sarawak, Malaysia
Shanghai Tunnel Engineering Company	Constructing 7 km twin tunnels from Woodlands to the Mandai depot on the Thomson Line in Singapore; contract for the Shenton Way station and associated tunnels
China National Petroleum Corporation	Constructing a deep-sea port on Madae Island, in Rakhine State, Myanmar
China Railway No. 5 Engineering Group Company Limited	Building the Fourth Friendship Bridge on the Mekong River across the Lao PDR and Thailand border
Yunnan Sunny Road and Bridge Company Limited	Constructing Road No. 13 North in Lao PDR
Telecommunication	
Huawei and ZTE	Providing telecommunication services in various ASEAN Member States
China Telecom Global Limited; China Telecommunications Corporation; China Mobile International	Developing the 8,900 km Southeast Asia–Japan Cable system linking Brunei Darussalam, mainland China, Hong Kong (China), Japan, Singapore and the Philippines
Republic of Korea	
Power and Electricity	
BKB Company Limited	Developing a 500 MW power plant at Thaketa in Myanmar
Korean Electric Power Corporation	Building two greenfield 100 MW power plants inside the Naga Power Plant Complex in the city of Naga in southern Cebu
Hyundai Engineering Company	Constructing a 47 MW hydropower plant in Indonesia
Daelim Industrial Company	EPC contract to build a 1,000 MW, ultra-supercritical, coal-fired power plant in Manjung, Malaysia; EPC contractor for Phase I of the PhP 13 billion 210 MW coal-fired power plant in Maasim, Sarangani in the Philippines
Doosan Heavy Industries and Construction	Delivering two 600 MW supercritical steam turbines and generators for the upcoming Vinh Tan 4 thermal power project in Binh Thuan Province of Viet Nam; contractor for the 1,200 MW Nghi Son 2 thermal power plant in the northern province of Thanh Hoa
SK Engineering and Construction and Korea Western Power	Developing the 410 MW Sapien-Senamnoi hydroelectric project in Thailand; developing an electricity transmission line connecting the 410 MW Xe Pian Xe Namnoy hydropower plant in Lao PDR to a substation in Ubon Ratchathani, Thailand
South Korea Electric Power Corporation	Developing the 1,200 MW Nghi Son 2 thermal power plant in Viet Nam
KTC Cable	Developing the Kampong Cham–Kampong Thom–Siem Reap line and a substation at Kampong Thom
Transport	
Lotte Engineering and Construction	Constructing the first section of the 140km Da Nang–Quang Ngai Expressway in Viet Nam
Samsung C&T Corporation	Developing the third phase of Singapore's LNG terminal located in Jurong Island; building the Caldecott station on Singapore's MRT
Daelim Industrial Company Limited	Developing an 8.5 km elevated rail system in Hanoi; contract for the Outram Park station and associated tunnels in Singapore; constructing the Sungai Brunei Bridge in Brunei Darussalam
Daewoo Engineering and Construction Company Limited	Undertaking various MRT projects in Singapore
Water supply and sanitation	
Korea Water Resources Corporation	Developing drinking water treatment projects in Bali, Gresik and Semarang in Indonesia; undertaking flood prevention project in Thailand

Source: UNCTAD, based on Southeast Asia Infrastructure Research.

Table 2.10. Marubeni: Participation in infrastructure development across ASEAN (Selected cases)

Subsidiary/plant	Location	Activities	Sector
Eastern Power and Electric Company	Thailand	IPP in Bang Po	Electricity
Marubeni Asian Power	Singapore	Marketing and development of power projects in the Asia Pacific region	Electricity
Cirebon Electric Power	Indonesia	IPP in Cirebon	Electricity
Jawa Power	Indonesia	IPP in Paiton	Electricity
Matlamat Cakera Canggih	Indonesia	Marketing, development, contracting and project execution of power projects in Indonesia	Electricity
San Roque Power Corporation	Philippines	Hydro IPP in Luzon	Electricity
Senoko Energy	Singapore	IPP in Singapore	Electricity
TeaM Energy Corporation	Philippines	Holding company for the Ilijan, Pagbilao and Sual power plants in the Philippines	Electricity
Maynilad Water Services	Philippines	Providing water and wastewater services to the 17 municipalities in the West Zone of Metro Manila and its vicinities	Water and sanitation
Eastern Sea Laem Chabang Terminal	Thailand	Container terminal operation	Port
Megalopolis Manunggal Industrial Development	Indonesia	Development, sale and management of MM 2100 industrial town	Industrial infrastructure

Source: UNCTAD, based on information from Marubeni's website.
Note: IPP = independent power producer.

Developing economies' infrastructure companies such as those from Hong Kong (China) and the Republic of Korea expanded their operations in ASEAN by winning concessions and through a complex structure of investment ownership (box 2.7). The emergence and growing presence of Chinese infrastructure companies in the region has also contributed to the significance of developing economies' MNEs in ASEAN's infrastructure development.

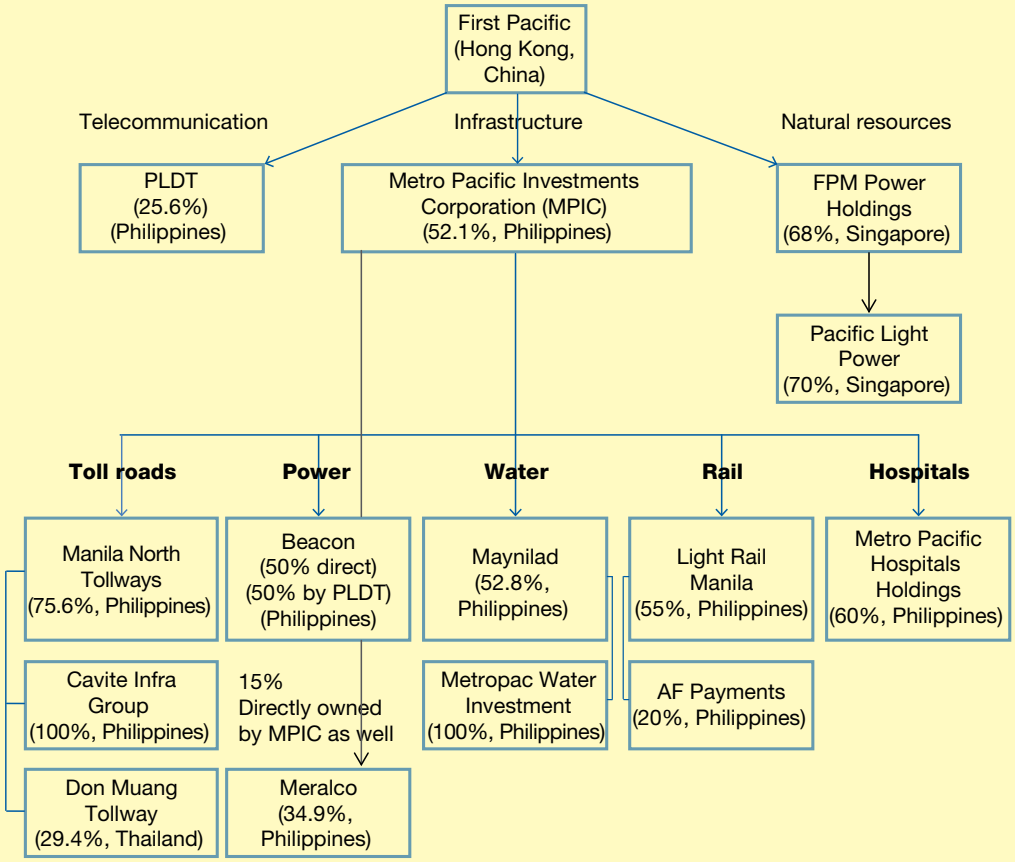
Box 2.7. Infrastructure participation by a complex MNE group in ASEAN

First Pacific, headquartered in Hong Kong (China), is a conglomerate with significant investment operations in various industries in ASEAN. In infrastructure, it has extensive operations in roads, power, water, hospitals, rail and telecommunication. Through a complex group and affiliates relationship, First Pacific has a strong interest in infrastructure activities in ASEAN Member States (box figure 2.7.1).

All these subsidiaries, incorporated in the Philippines and Singapore, are major investors in infrastructure assets in their own right. They invest in and expand infrastructure assets locally and in some cases overseas. Through a subsidiary, for example, Metro Pacific Investments (Philippines) has toll road operations in Thailand on the Don Muang Tollway; it has power business in Singapore through FPM Power and Meralco.

Box 2.7. Infrastructure participation by a complex MNE group in ASEAN (concluded)

Box figure 2.7.1. Complex involvement of First Pacific in infrastructure activities in ASEAN



Source: UNCTAD and ASEAN Secretariat, based on company's information and MPIC (http://www.mpic.com.ph/investments/).

2.5.2.1. Prominence of Chinese MNEs

Chinese infrastructure-related companies are rapidly becoming more prominent in the infrastructure development landscape in ASEAN. They have participated in building infrastructure across all sectors in the region. These players are not only operating as contractors but also are investing in and owning infrastructure.

Chinese companies have become notable players in building infrastructure in ASEAN in a very short period of time. Some have an extensive regional presence built by establishing subsidiaries. Although most of these companies are State-owned enterprises, Chinese private companies such as Huawei also participate. In 2014, 62 Chinese companies were among the top 250 international contractors in terms of international revenues, and a majority of these companies have built infrastructure projects or are expanding their operations in ASEAN (table 2.11).

Table 2.11. Major Chinese international contractors have a presence in ASEAN

Company	Selected ASEAN Member State locations of contracts	ASEAN location of selected subsidiaries
China Communications Construction Group	Cambodia, Indonesia, Malaysia, Myanmar, Philippines, Singapore, Viet Nam	Indonesia, Philippines, Singapore,
Sinohydro Group	Brunei Darussalam, Indonesia, Lao PDR, Malaysia, Singapore, Thailand, Viet Nam	..
China State Construction Engineering Corporation	Indonesia, Malaysia, Philippines, Singapore,Thailand, Viet Nam	Indonesia, Philippines, Singapore, Thailand, Viet Nam
China National Machinery Industry Corp	Cambodia, Indonesia, Lao PDR, Malaysia, Lao PDR, Philippines, Thailand, Viet Nam	Malaysia
China Railway Group	A number of ASEAN Member States	Singapore, Thailand
CITIC Construction	Indonesia, Philippines, Thailand, Viet Nam	Cambodia, Singapore
China Metallurgical Group	A number of ASEAN Member States	..
China Railway Construction Corporation Limited	A number of ASEAN Member States	..
Sepcoiii Electric Power Construction	Indonesia, Philippines, Singapore, Viet Nam	..
China Gezhouba Group Company	Cambodia, Indonesia, Lao PDR, Myanmar, Thailand	Malaysia, Singapore, Thailand
SEPCO Electric Power Construction	Indonesia	Indonesia
China Civil Engineering Construction	Cambodia, Malaysia, Singapore, Thailand, Viet Nam	Indonesia, Singapore
Shanghai Electric Group	Indonesia, Malaysia, Philippines, Viet Nam	Indonesia, Malaysia, Philippines, Singapore, Thailand, Viet Nam
China General Technology	Indonesia, Myanmar, Viet Nam	Myanmar
China National Chemical Engineering Group	Indonesia, Malaysia, Viet Nam	Indonesia, Malaysia, Philippines, Singapore,Thailand, Viet Nam
China International Water & Electric Corp	Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Thailand, Viet Nam	..
CGC Overseas Construction Group	Indonesia	Indonesia
Sinopec Engineering (Group)	Indonesia, Malaysia, Myanmar, Singapore, Thailand, Viet Nam	Singapore
Dongfang Electric Corp.	Indonesia, Malaysia, Viet Nam	..
Qingjian Group	Philippines, Singapore, Thailand, Viet Nam	Singapore
Shanghai Construction Group	Cambodia, Indonesia, Lao PDR, Malaysia, Philippines, Singapore, Thailand, Viet Nam	Indonesia, Malaysia, Philippines, Singapore, Thailand, Viet Nam
China Geo-Engineering	Cambodia, Lao PDR	Lao PDR
China Jiangsu International Econ and Technical	Singapore	..
Beijing Construction Engeering Group	Malaysia, Philippines, Singapore, Thailand, Viet Nam	Malaysia, Philippines, Singapore, Thailand, Viet Nam
China Dalian International Economic and Technical Corp.	Malaysia, Singapore	..
Anhui Construction Engineering Group	Lao PDR, Thailand, Viet Nam	Thailand
China Aluminum International Engineering	Malaysia, Viet Nam	..
China Yunan Construcution Engineering Group	Cambodia, Lao PDR, Malaysia, Myanmar, Thailand, Viet Nam	Cambodia, Lao PDR, Thailand
Zhongding International Engineering	Indonesia, Malaysia, Thailand	..
Sinosteel Equipment and Engineering Co	Indonesia, Malaysia, Thailand, Viet Nam	Singapore
China Huanqiu Contracting & Engineering	Indonesia, Singapore	Indonesia, Singapore
Jiangsu Zhongxin Construcution	Singapore, Viet Nam	..
Weihai International Economic & Technical Cooperative	Malaysia, Singapore	..
International Co. of Yanjian Group	Malaysia	..
China National Complete Plant Import & Export Corp	Indonesia, Myanmar, Viet Nam	Viet Nam

Source: UNCTAD 2015b, based on companies' information, Orbis and Engineering News-Record.

Many Chinese companies are involved with power projects in ASEAN either as EPC contractors or as subcontractors (NEMs). These companies include Sinohydro Corporation, Three Gorges Corporation, Huaneng Group, Gezhouba Corporation, Guodian Corporation, State Grid Corporation, Datang Corporation and China Southern Power Grid. In some ASEAN Member States, such as in the CLMV countries, Chinese companies are the largest investors and contractors of infrastructure projects.

While Chinese companies' participation in infrastructure development in ASEAN is significant and increasing (box 2.8), the FDI numbers under report the situation as many Chinese companies operate through NEMs. Chinese companies have helped build many recent significant projects across the region, including hydropower plants and dams in Lao PDR; roads, bridges and hydropower plants in Myanmar; ports and land transport infrastructure in Cambodia; industrial estates, bridges and rail lines in Indonesia; power plants in the Philippines; urban rail networks in Viet Nam; and high-speed rail projects in some ASEAN Member States.

Box 2.8. Chinese companies are increasingly a significant force in ASEAN's infrastructure landscape

More than $50 billion – or an annual average of $10 billion – in infrastructure projects in five ASEAN Member States[a] with expected completion dates between 2013 and 2017 are associated with Chinese companies. In perspective, this is about 17% of the region's annual infrastructure investment needs in 2015 (if based on $60 billion per year).

Chinese companies are building a 400 km rail line, a steel plant and a seaport in Cambodia, to be completed by 2017. These projects are estimated to be worth a combined $11.2 billion. The China Railway Group is developing the railway line, while Sinomach's subsidiary China Ocean Engineering Construction is involved with building the port component. Another Sinomach subsidiary (China Perfect Machinery Industry) and Cambodian Petrochemical are jointly building a $2.3 billion oil refinery, to be completed by 2015. With financing facilities provided by the Chinese EXIM Bank, China National Heavy Machinery Company is involved in building the Tatay River hydropower dam, which is expected to cost $540 million, and China Huadian Corporation is building the Lower Stung Russei Chrum hydropower station, which is estimated to cost $580 million. Cambodia plans to build 10 dams between 2010 and 2019, and 6 involve financing from Chinese banks. Chinese companies are also building other infrastructure such as power plants, electricity transmission lines and bridges.

In Indonesia, many Chinese companies are involved in the construction of power plants, ports, road and rail infrastructure through various projects that started in 2012–2013. Chinese investors are developing a China–Indonesia Industrial Investment and Cooperation Zone and other railway projects in the country. Sinopec is building an oil storage terminal in the Batam Free Trade Zone that is estimated to cost about $850 million. China Power Investment and Anhui Conch Cement are involved with a $17 billion hydropower project in North Kalimantan that is to be completed by 2021. Other Chinese companies such as China Railway Group, China Honggiao Group and China Communications Construction Group are involved with transport, power and communication projects in Indonesia. Sinohydro is involved in dam construction; Gezhauba

Box 2.8. Chinese companies are increasingly a significant force in ASEAN's infrastructure landscape (concluded)

Group and China Power International are building coal and hydropower plants; and Shanghai Construction and China Harbour Engineering are building toll roads in the host country. In recent years, other companies such as China Huadian, Dongfang Electric and Sinohydro have built coal-fired power stations and hydropower plants.

Chinese companies are involved with hydropower, roads and railway projects in Lao PDR. These companies include Sinohydro Group. China and the Lao government are jointly developing a 420 km railway linking the country with Kunming in Yunnan Province. China Three Gorges Corporation and China International Water and Electric Corporation are involved in the Nam Ngiep 1 Hydropower project, which is to be completed by 2019 at an estimated cost of $868 million. China National Electric Engineering Company is building the Laos Hongsa coal-fired power plant, estimated to cost some $1.68 billion. Four of 10 special economic zones (SEZs) in the country were built with Chinese investment or financing:

(i) The Boten Beautiful Land SEZ, built by Yunnan Hai Cheng Industrial Group with an investment amount of $500 million
(ii) The Saysetha Development Zone, a joint venture between a Chinese company, the Lao government and a local Laotian investor involving $128 million
(iii) The Golden Triangle SEZ, through a joint venture of $86.6 million between a Chinese company and the Lao government. In August 2013, a group of Chinese companies opened a complex worth $80 million in this SEZ.
(iv) The Thatluang Lake SEZ, by a Chinese developer, involving $1.6 billion

In Myanmar, Chinese companies have been involved with various infrastructure projects such as railways, ports, dams, oil and gas pipelines, hydropower projects and mining. For instance, China National Petroleum Corporation participated in the construction of the Sino-Burma oil and gas pipeline, Sinohydro in the Hatgyi dam in Karen State and China Power Investment in Chibwenge hydropower plant in Kachin State. Other Chinese companies such as China Non-ferrous Metal Mining Group, Datang Corporation, Huaneng Group, China Three Gorges Corporation, Wanbao Mining Company, Norinco and China Railway Engineering are present in Myanmar.

Chinese companies have been involved with various large-scale infrastructure projects in Malaysia for some time. In recent years, companies such as China Communications and Construction Company and China Harbour Engineering, together with local partners, have constructed the Penang Second Bridge, which was opened in March 2014 at an estimated cost of $1.5 billion. Beijing Urban Construction Group, together with local partners, is involved in various road and tunnel projects in Penang that are estimated to cost some $2.6 billion. China Three Gorges Corporation and Sinohydro continue to participate in various hydropower projects, while companies such as Shougang Group and Prosperity Minerals are involved with steel plant projects. Other companies, such as ZTE and Huawei, have been involved with the development of telecommunication infrastructure in Malaysia. A Chinese company, Guangxi Beibu Gulf International Port Group, is building infrastructure projects, including an industrial park and an expansion of the port in Kuantan State.

Source: ASEAN Investment Report 2014.
Note: [a] Cambodia, Indonesia, Lao PDR, Malaysia and Myanmar.

A consortium of Indonesian companies, together with China Road and Bridge Corporation (CRBC) and China Harbour Engineering, constructed the 5.4 km, $445 million Suramadu Bridge connecting Surabaya with Madura. CRBC is also involved in the construction of the Cao Lanh Bridge in southern Viet Nam, which is to be completed by 2017. The company also contributed to building the 95 km Cambodia National Road No. 41, which opened in 2015. The Shanghai Construction Group was the main contractor for the construction of Cambodia's National Road No. 58.[30] The China Railway Eryuan Engineering Group is helping to develop a high-speed train line linking Lao PDR to the border town with China. The line will be part of the SKRL and is expected to be completed by 2021.[31]

In 2015, China expressed interest in investing and providing finance for infrastructure projects in Indonesia. Some $63 billion has been announced in relation to Indonesia's huge infrastructure plans for 2015–2019 (table 2.12).

Table 2.12. Potential Chinese investment and financing in Indonesia (Billions of dollars)

Financing[a]	19.8
Electricity	15.3
Industrial estates	10.4
Railways	6.6
Smelting	6.4
Seaports	2.0
Others	2.9

Source: "Indonesia banks on $63 billion from China", Wall Street Journal, 1 April 2015 (http://www.wsj.com/articles/indonesia-banks-on-63-billion-from-china-1427896422).

[a] Credit facility for companies involved in multiple sectors.

2.5.2.2. Increasing participation of ASEAN companies

The numbers of ASEAN companies involved in infrastructure development are increasing, and they are also investing outside the region in other developing countries, strengthening South–South cooperation.

In addition to winning contracts, infrastructure-related companies from Indonesia, Malaysia, the Philippines, Singapore, Thailand and Viet Nam have established subsidiaries in other ASEAN Member States (table 2.13). Some have more intraregional presence than others. In particular, more Malaysian and Singaporean companies are participating in infrastructure projects in the region, with increasing involvement by Thai companies. Infrastructure companies from Indonesia and Viet Nam are increasingly more visible in intraregional infrastructure activities, albeit fewer in their numbers.

ASEAN companies are also owners of infrastructure assets in other ASEAN Member States. In electricity, these companies include EGCO (Thailand), Ratchaburi (Thailand), YTL (Malaysia), Genting (Malaysia), EVN (Viet Nam) and VLP (Viet Nam) (box 2.9). In airports: Malaysia Airports Holding, Muhibbah Engineering (Malaysia), Yongnam Holdings (Singapore). In ports: PSA (Singapore) and International Container Terminal Services (Philippines). In industrial estates: Amata (Thailand) and ITD (Thailand). And in telecommunication: SingTel (Singapore) and Axiata (Malaysia).

Some ASEAN companies supply materials and resources to operate or construct infrastructure assets. These companies include Siam Cement (Thailand), Banpu (Thailand) and Semen Indonesia (Indonesia) (chapter 3).

Table 2.13. Increasing regional presence from some infrastructure-related companies from ASEAN, 2014

Name of company	Home country	Industry	Market capitalization ($ million)	Total revenues ($ million)	ASEAN locations of selected subsidiaries or contract operations
Adhi Karya	Indonesia	Construction, engineering	249	698	Singapore
Axiata Group	Malaysia	Telecommunication	12,583	5,398	Cambodia, Singapore
Ayala Land	Philippines	Real estate	10,898	2,011	Malaysia
Bangkok Dusit Medical Services	Thailand	Hospitals	8,347	1,720	Cambodia, Singapore
Banpu	Thailand	Mining, electricity	1,607	3,098	Indonesia, Singapore, Thailand
Bukit Asam	Indonesia	Mining, electricity	948	1,053	Other ASEAN Member States
CapitaLand	Singapore	Real estate	8,438	3,376	Malaysia, Viet Nam
City Developments	Singapore	Real estate	5,275	3,118	Indonesia, Malaysia, Myanmar, Philippines, Thailand, Viet Nam
EGAT	Thailand	Electricity	..	16,508	Lao PDR and Myanmar
EGCO	Thailand	Electricity	..	78	Indonesia, Lao PDR, Philippines and Thailand
Enco Holdings	Malaysia	Engineering	..	..	Indonesia and Thailand
First Philippine Holdings Corporation	Philippines	Conglomerate	2,260	874	Indonesia, Singapore, Thailand
Gamuda	Malaysia	Infrastructure	2,675	775	Viet Nam
Genting Berhad	Malaysia	Conglomerate	6,912	5,486	Indonesia, Myanmar, Philippines, Singapore, Thailand
Gunkul	Thailand	Electricity	660	91	Singapore
IHH Healthcare	Malaysia	Hospitals	11,457	2,175	Indonesia, Singapore
International Container Terminal	Philippines	Harbour facilities	3,945	1,119	Indonesia
Intouch Holdings	Thailand	Telecommunication	6,893	315	Cambodia, Singapore
Italian-Thai Development	Thailand	Infrastructure	1,231	1,477	Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Viet Nam
Keppel Corporation	Singapore	Conglomerate[a]	9,190	10,086	Indonesia, Malaysia, Myanmar, Philippines, Thailand, Viet Nam
KPJ Healthcare	Malaysia	Hospitals	1,056	766	Indonesia, Singapore, Thailand
Malaysia Airports	Malaysia	Airports	2,252	991	Manages airports in Cambodia and outside ASEAN
Manila Water	Philippines	Water	918	367	Singapore, Viet Nam
Maxis	Malaysia	Telecommunication	11,985	2,429	Indonesia, Singapore
Metro Pacific Investments Corp.	Philippines	Road construction	2,997	932	Indonesia, Thailand, Viet Nam
Muhibbha	Malaysia	Infrastructure, engineering	..	..	Cambodia, Philippines, Singapore
Nusa Konstruksi Enjiniring Tbk	Indonesia	Construction, engineering	27	165	Malaysia
Philippine Long Distance Telephone	Philippines	Telecommunication	12,006	3,832	Malaysia
Port of Singapore Authority	Singapore	Ports	..	2,877	Indonesia, Thailand and Viet Nam
PTT	Thailand	Oil and gas	20,174	86,545	Cambodia, Indonesia, Malaysia, Myanmar, Philippines, Thailand, Viet Nam
Ratchaburi Electricity Generating Holding	Thailand	Electricity	2,135	1,702	Cambodia, Lao PDR, Singapore
Salcon	Singapore	Engineering	106	77	Singapore, Viet Nam

Table 2.13. Increasing regional presence from some infrastructure-related companies from ASEAN, 2014 (concluded)

Name of company	Home country	Industry	Market capitalization ($ million)	Total revenues ($ million)	ASEAN locations of selected subsidiaries or contract operations
San Miguel	Philippines	Conglomerate[a]	2,328	17,569	Malaysia, Singapore, Thailand, Viet Nam
Sembcorp Industries	Singapore	Conglomerate[a]	4,432	8,317	Indonesia, Malaysia, Philippines, Viet Nam
Semen Indonesia	Indonesia	Building materials	4,243	2,182	Viet Nam
Siam Cement	Thailand	Building materials	1,384	14,945	Cambodia, Indonesia, Malaysia, Philippines, Lao PDR, Singapore, Viet Nam
Singapore Telecommunication	Singapore	Telecommunication	42,060	12,618	Indonesia, Philippines, Malaysia, Philippines, Thailand
Supalai PCL	Thailand	Real estate	882	566	Philippines, Singapore
Telekom Malaysia	Malaysia	Telecommunication	6,097	3,256	Indonesia, Singapore
Telekomunikasi Indonesia	Indonesia	Telecommunication	20,081	7,307	Singapore
Tenaga Nasional	Malaysia	Electricity	16,103	13,760	Cambodia, Indonesia, Lao PDR, Thailand, Viet Nam
Total Access Communication	Thailand	Telecommunication	4,445	2,752	Malaysia, Singapore
Truba Alam Manunggal Engineering	Indonesia	Construction, engineering	57	105	Singapore
United Envirotech	Singapore	Engineering	1,224	267	Malaysia
UPP Holdings	Singapore	Electricity	89	88	Malaysia
Viettel	Viet Nam	Telecommunication	..	..	Cambodia, Lao PDR
YTL	Malaysia	Utilities	4,043	6,245	Cambodia, Indonesia, Singapore, Thailand

Source: UNCTAD 2015b, based on companies' information and Orbis.
Note: real estate includes commercial and industrial estates.
[a] Includes various infrastructure.

Box 2.9. The internationalization of ASEAN power companies

Electricity-Generating Public Company (EGCO), headquartered in Thailand, is involved in generation and sales of electricity in Thailand as well as abroad. The group operated 23 power plants in 2014, with total equity contracted capacity of 3,767 MW in five countries in the Asia Pacific region. Most of the plants are in Thailand, with the group increasingly expanding in Indonesia, Lao PDR and the Philippines. Most of EGCO's overseas operations in electricity generation and sales are concentrated in ASEAN. The company plans to invest some $1.5 billion in expansion of capacity in Indonesia and the Philippines, and is studying the potential to expand three overseas power projects (namely, the San Buenaventura and Masinloc coal-fired power plants in the Philippines, and the Star Energy geothermal power station in Indonesia). EGCO plans to co-invest with local business partners to expand the existing power plants and acquire commercial operating assets in Lao PDR, the Philippines and Indonesia, where it already has a strong presence. It also looks for new opportunities to invest in other countries such as Myanmar.

Ratchaburi Electricity Generating Holding (Ratchaburi), based in Thailand, also operates overseas through a number of subsidiaries and affiliates. The company aims to be a leading integrated energy company in Asia Pacific, where it currently has significant operations in ASEAN countries. It has a presence in Cambodia, Lao PDR and Singapore. It plans to have more generating businesses in neighbouring countries (Cambodia, Myanmar and Viet Nam), including in other ASEAN countries and in the Asia-Pacific region.

Box 2.9. The internationalization of ASEAN power companies (concluded)

Italian-Thai Development (Thailand) is a construction and infrastructure company with activities ranging from ports and rail construction to industrial park development in Thailand, and in other countries in Asia and Africa. It has construction subsidiaries in Malaysia, Myanmar, and the Philippines. In Indonesia, ITD has a subsidiary operating in coal digestion services and in Lao PDR it has one operating in the construction of hydropower plants.

YTL Power International (Malaysia) has overseas activities in a number of countries. In the utilities business, it owns and operates power plants in Indonesia, Malaysia and Singapore. The company is also involved with operations and maintenance (O&M) activities in many other countries, including in Indonesia.

Viet-Lao Power Joint Stock Company (Viet Nam) is involved with eight hydropower plants in Lao PDR and has established three subsidiaries in the host country. It is currently building the Xekaman 1 hydropower plant, which will export 80% of the electricity it generates to Viet Nam.

Tenaga (Malaysia) also has activities in power projects in some ASEAN Member States (see box 2.10)

Source: UNCTAD 2015b, based on companies' annual reports and corporate information.

ASEAN infrastructure companies are contributing to South–South cooperation and connectivity with other regions. Aside from participating in infrastructure projects in the region, ASEAN companies have contributed to infrastructure development in other developing countries. For instance, some Indonesian and Malaysian companies have constructed infrastructure in a wide range of sectors and in different countries between 2011 and 2015 (table 2.14; box 2.10).

Box 2.10. Tenaga Nasional: Expanding internationally based on horizontal strategy

Tenaga Nasional (Malaysia) aspires to be a regional champion and has a presence in nine countries outside Malaysia.[a] It has power plant activities in Asia and the Middle East. In ASEAN, it has a presence in Indonesia, Myanmar and Viet Nam. It also has a presence in other developing countries such as in Sri Lanka, Turkey, Kuwait, the United Arab Emirates and Saudi Arabia. The company has representative offices in Jakarta and Hanoi.

In 2014, Tenaga signed an investment agreement with KLS Energy Lanka (Sri Lanka) for a joint development of a 35 MW hybrid wind and solar project in Jaffna, Sri Lanka. The project is expected to be completed in 2016. The EPC contract was awarded to China Machinery Engineering Corporation in 2014.

In 2014, Tenaga was awarded a seven-year O&M contract for the open-cycle gas turbine Plant–1 at the Sabiya power generation and distillation plant, in Kuwait, in partnership with Kharafi National (Kuwait).

Source: Tenaga Nasional, company websites and annual reports.

[a] Tenaga Nasional, Annual Report 2014, p. 28 (http://www.tnb.com.my/tnb/application/uploads/annualreports/b6e32400d256d64b390a4510bf5be66e.pdf)

Table 2.14. Infrastructure-related MNEs from Indonesia and Malaysia are internationalizing: selected projects completed in 2011–2015

Company	Home country	Project	Sector	Location	Year of completion	Value ($ million)
Waskita Karya	Indonesia	Road infrastructure	Transportation	Saudi Arabia	2013	..
		Educational building	Education	Saudi Arabia	2012	..
		Road and bridges	Transportation	Timor Leste	2013	..
Wijaya Karya	Indonesia	Road infrastructure	Transportation	Papua New Guinea	2011	..
		Road infrastructure	Transportation	Brunei Darussalam	2012	..
		Road and bridges	Transportation	Timor Leste	2012	..
Hutama Karya	Indonesia	Power plant	Electricity	Timor Leste	2011	..
Pembagunan Perumahan	Indonesia	Road infrastructure	Transportation	Timor Leste	2013	..
Muhibbah Engineering	Malaysia	Section of airport	Transportation	Qatar	2012	370
Eversendai Corp	Malaysia	Airport	Transportation	Qatar	2012	97
Mudajaya	Malaysia	Power plant (equipment)	Electricity	India	2013	588
Sunway Construction	Malaysia	Highway	Transportation	India	2012	117
IJM Construction	Malaysia	Highway	Transportation	India	2012	67
		Road	Transportation	India	2012	201
		Road	Transportation	India	2014	9
		Road	Transportation	India	2015	6
UEM Builders	Malaysia	Road	Transportation	India	2012	78
		Highway	Transportation	Indonesia	2015	641
MTD Construction	Malaysia	Sewer	Water and sanitation	United Arab Emirates	2013	19
		Highway	Transportation	Indonesia	2015	371
WCT Engineering	Malaysia	Highway	Transportation	China	2014	429
		Highway	Transportation	Oman	2015	..
		Airfield paving - road	Transportation	Qatar	2012	74
Gamuda	Malaysia	Bridges	Transportation	Bahrain	2011	627
		Sewerage treatment	Water and sanitation	Viet Nam	2012	390
Bina Puri	Malaysia	Water pipe	Water and sanitation	Saudi Arabia	2013	6
		Power plant	Electricity	Indonesia	2015	10
Zelan	Malaysia	Power plant	Electricity	Indonesia	2012	486
HG Power Transmission	Malaysia	Power transmission lines	Electricity	Papua New Guinea	2012	1
		Power transmission lines	Electricity	Bangladesh	2012	9
		Power transmission lines	Electricity	Bangladesh	2014	5
		Power transmission lines	Electricity	Indonesia	2012	20
		Power transmission lines	Electricity	Bangladesh	2015	23
Scomi	Malaysia	Monorail system	Railway	India	2011	607
		Monorail system	Railway	Brazil	2014	621
Ho Hup Construction	Malaysia	Road	Transportation	Iraq	2015	20
		Water treatment system	Water and sanitation	Iraq	2015	87
Puncak Niaga	Malaysia	Water treatment system	Water and sanitation	China	2011	5
Trans Resources	Malaysia	Sewer and water works	Water and sanitation	Australia	2011	13
		Airport	Transportation	Brunei Darussalam	2014	98
Ranhill Water	Malaysia	Water treatment system	Water and sanitation	China	2011	77
		Wastewater plant	Water and sanitation	China	2011	19
Salcon Engineering	Malaysia	Water transmission	Water and sanitation	Viet Nam	2013	22
		Water treatment system	Water and sanitation	India	2013	5
		Water treatment system	Water and sanitation	Thailand	2014	7
		Water treatment system	Water and sanitation	Sri Lanka	2015	18

Source: UNCTAD 2015b, based on information of CIDB (Malaysia).

2.5.3. Infrastructure financiers and other players

The various categories of infrastructure financiers all play an important role in providing or arranging finance for infrastructure development in ASEAN. They include ODA donors, MDBs, specialized infrastructure funds, private equity investors, commercial banks and Sovereign wealth funds. A significant part of financing for infrastructure projects in the region comes from these sources.

Multilateral development banks (MDBs) such as the World Bank and Asian Development Bank have been contributing to infrastructure development in the region. The contribution includes concessionary loans and technical assistance grants. For instance, the Asian Development Bank, the World Bank and the Thai government provided a loan for the improvement of the 900 km R10 road route linking Viet Nam to Dawei in Myanmar.[32] The European Investment Bank, Asian Development Bank and Agence Française de Développement provided a loan facility to build Line 3 of the metro in Hanoi.[33] Other infrastructure projects in ASEAN have also benefitted from receiving loans from MDBs and other financial institutions in 2014 (table 2.15).

ODA from a number of donor countries such as Japan, the Republic of Korea, the United States and the European Union have also contributed to infrastructure development in some ASEAN Member States. For instance, Japan is providing ODA grants and lower-interest loans to a number of ASEAN Member States for infrastructure development projects (table 2.16). The Japan International Cooperation Agency is providing a loan to finance the construction of Line 1 of the underground transport system in Ho Chi Minh City, Viet Nam. Segments of Line 1 of the metro in Jakarta and the construction of the Bangkok BTS also received ODA loans from Japan.

The Asian Infrastructure Investment Bank is expected to start operation later in 2015. With an authorized capital base of $100 billion, it will provide an important source of financing

Table 2.15. MDBs and international development financial institutions support infrastructure projects in ASEAN, 2014

Project	Country	Debt ($ million)	IDFI involvement ($ million)	Remarks
Sarulla geothermal	Indonesia	1,170	822	JBIC loan: $492 million ADB loan: $330 million
Rautau Dedap geothermal	Indonesia	50	50	ADB loan
DSLNG LNG project	Indonesia	1,526	1,526	JBIC loan: $763 million Kexim: $382 million and $190 million cover Nexui cover: $191 million
Indonesia infrastructure finance	Indonesia	..	250	IFC loan
Rajamandala electric power	Indonesia	110	66	JBIC loan
Nam Ngiep I power plant	Lao PDR	643	250	JBIC: $200 million ADB: $50 million
San Gabriel power plant	Philippines	265	265	Kfw-IPEX loan with a Hermes cover

Source: Thomson Reuters, published in Project Finance International, 14 January 2015, http://www.pfie.com/Journals/2015/01/13/y/k/v/PFILeagueTables2014.pdf.

Note: IDFI = International development finance institution, selected cases.

Table 2.16. Japanese ODA has supported infrastructure activities in CLMV countries, 2013–2015

Project name	Sector	Subsector	Date of approval	Amount approved (¥ million)	Main portion (applied to reduced interest rate)	
					Interest rate (%)	Repayment period (years)
Cambodia						
National Road No. 5 Improvement Project (Thlea Ma'am–Battambang and Sri Sophorn–Poipet Sections) (I)	Transportation	Road	3/30/2015	19,208	0.01	40
Phnom Penh City Transmission and Distribution System Expansion Project (Phase 2) (I)	Electricity	Electricity	3/30/2015	3,816	0.01	40
National Road No. 5 Improvement Project (Prek Kdam–Thlea Ma'am Section) (I)	Transportation	Road	7/10/2014	1,699	0.01	40
Phnom Penh City Transmission and Distribution System Expansion Project	Electricity	Electricity	7/10/2014	6,480	0.01	40
Southwest Phnom Penh Irrigation and Drainage Rehabilitation and Improvement Project	Water and sanitation	Irrigation and flood control	7/10/2014	5,606	0.01	40
National Road No. 5 Improvement Project (Battambang–Sri Sophorn Section)	Transportation	Road	5/16/2013	8,852	0.01	40
Lao PDR						
Vientiane International Airport Terminal Expansion Project	Transportation	Airports	1/10/2014	9,017	0.7	30
Nam Ngum 1 Hydropower Station Extension Project	Electric power	Power plants	6/21/2013	5,545	0.55	40
Myanmar						
Communication Network Improvement Project	Telecommunication	Telecommunication	3/26/2015	10,500	0.01	40
National Power Transmission Network Development Project Phase I	Electric power	Transmission lines and distribution systems	3/26/2015	24,678	0.01	40
Greater Yangon Water Supply Improvement Project	Water and sanitation	Water supply, sewerage and sanitation	9/5/2014	23,683	0.01	40
Irrigation Development Project in Western Bago Region	Irrigation and flood control	Irrigation and flood control	9/5/2014	14,870	0.01	40
Infrastructure Development Project in Thilawa Area Phase II	Transportation	Roads	9/5/2014	4,613	0.01	40
Yangon–Mandalay Railway Improvement Project Phase I (I)	Transportation	Railways	9/5/2014	20,000	0.01	40
Infrastructure Development Project in Thilawa Area Phase I	Others	Others	6/7/2013	20,000	0.01	40
Regional Development Project for Poverty Reduction Phase I	Others	Urban/rural community infrastructure	6/7/2013	17,000	0.01	40
Urgent Rehabilitation and Upgrade Project Phase I	Electric power	Other electric power	6/7/2013	14,052	0.01	40
Viet Nam						
O Mon Thermal Power Plant Unit No. 2 Construction Project (II)	Electric power and gas	Power plants	3/22/2013	6,221	1.4	30
Second Transport Sector Loan for National Road Network Improvement	Transportation	Bridges	3/22/2013	24,771	1.4	30

Source: JICA.

Table 2.17. **Financial institutions, commercial banks and lenders finance power infrastructure projects in ASEAN (selected cases)**
(Millions of dollars)

Asset	Close date	Location	Value	Lenders/Banks	Sponsors
Burgos Wind Farm	Nov 2014	Philippines	Debt: 315	Eksport Kredit Fonden (Denmark) guaranteed a part of the dollar loan component. Foreign banks provided loans, which participated by Australia and New Zealand Banking Group (ANZ), DZ Bank AG, ING Bank NV, Maybank (Malaysia) and Norddeutsche Landesbank Gironzentrale. Local lenders include BDO Unibank, Land Bank of the Philippines, Philippine National Bank, and Security Bank Corporation.	EDC (Philippines)
GED & Mitsui Gas Power Plant	Nov 2014	Thailand	Debt: 1,808	Mitsubishi UFJ Financial ($226.0), Bangkok Bank ($226.0 m), Siam Commercial Bank ($226.0 m), Kasikornbank (226.0), Mizuho Financial ($226.0 m), CIMB ($226.0), LH Financial ($226.0)	Mitsui (Japan) Gulf Energy Development (1,680) owned by Gulf JP (Japan)
Nam Ngiep 1 Hydropower Plant	Aug 2014	Lao PDR	Debt: 746.5	Japan Bank for International Cooperation ($106.6), Sumitomo Mitsui Financial ($106.6), Bangkok Bank ($106.6), Siam Commercial Bank ($106.6), Mizuho Financial ($106.6), Mitsubishi UFJ Financial ($106.6), Export Import Bank of Thailand ($106.6)	KPIC Netherlands (KPN), a wholly-owned subsidiary of Kansai Electric (Japan, 45%), EGAT International (30%), subsidiary of Electricity Generating Authority of Thailand, and Lao Holding State Enterprise (LHSE, 25%), a wholly-owned subsidiary of the Government of Lao PDR.
EVN Vinh Tan 4 Power Plant	Jul 2014	Viet Nam	Debt: 338.2	Japan Bank for International Cooperation and Bank of Tokyo-Mitsubishi UFJ (BTMU)	Electricity of Viet Nam
Banten IPP	Dec 2013	Indonesia	Debt: 730	Malaysia Exim Bank ($200), commercial banks ($504) which include Citibank and other Malaysian banks such as CIMB, Maybank, RHB	Genting Power Holdings (Malaysia)
Senoko Energy	June 2013	Singapore	Debt: 2081.2	Commercial banks include Japanese banks: Mizuho, BTMU, Sumitomo Mitsui Banking Corporation (SMBC); and Singaporean banks: DBS, OCBC	Lion Power - owned by a consortium comprising Marubeni Corporation (Japan), GDF Suez (France), Kansai Electric Power (Japan), Kyushu Electric Power (Japan) and Japan Bank for International Cooperation)
Nong Saeng, Saraburi Power Plant	November 2011	Thailand	Debt: 1184	Japan Bank for International Cooperation (JBIC) ($ 270), ADB ($170), Mizuho ($100) and $104 (bath tranches) from Thai Banks: Siam Commercial Bank and Kasikorn Bank	Gulf JP UT - 90% owned by Electric Power Development (Japan)
U-Thai, Ayuthaya Power Plant	October 2012	Thailand	Debt: 1247	JBIC ($284), ADB ($184 m), BTMU ($100) and $568 (bath tranches) from BTMU, SMBC and Thai banks: Bangkok Bank, Kasikorn Bank, Land and Houses Bank, Siam Commercial Bank	Gulf JP UT - 90% owned by Electric Power Development (Japan)

Source: UNCTAD 2015b, based on information of Bloomberg New Energy Finance and Project Finance International.

for regional infrastructure development. Japan has also announced plans to expand financing for infrastructure projects in Asia with $110 billion for the next five years.[34] Other regional financial facilities include the ASEAN–China Infrastructure Funds and the ASEAN Infrastructure Fund, which have financed various projects in ASEAN Member States (AIR 2014).

Commercial financial institutions have been playing a key role in providing infrastructure project financing in the region (table 2.17). In 2014 alone, the various mandated lead arrangers and banks were responsible for raising at least $8.7 billion of financing facilities for infrastructure projects in ASEAN (annex table 2.1). ASEAN banks are also involved in providing finance for infrastructure projects undertaken within the region. For instance, Malaysian banks such as Maybank, Exim Bank, CIMB and RHB Bank are participating in $730 million of project financing in favour of PT Lestari Banten Energi, the project company for the design, engineering, construction and operation of the 660 MW coal-fired IPP in Banten, West Java, Indonesia.[35] Similarly, many Thai banks, such as Bangkok Bank, Siam Commercial Bank, Kasikornbank and Krung Thai Bank, have also been involved in infrastructure project financing in power projects in neighbouring countries. Singapore banks such as DBS, UOB and OCBC are also active financiers of infrastructure projects in the region. Specialized infrastructure funds have been involved in financing projects in the region. A number of these funds are based in Singapore (table 2.18).

Table 2.18. Selected infrastructure funds are targeting the Asia and Pacific region

Manager location	Infrastructure fund	Stage	Target sectors	Size ($ million)
Singapore	Equis Direct Investment Fund	Fundraising, investment	Energy, telecommunication	300
Singapore	Equis Asia Fund II	Fundraising	Transport, energy, telecommunication, environment	1,000
Singapore	Mizuho AsiaInfra Capital Pte. Ltd.	Fundraising, investment	Transport, energy, environment	125
United Kingdom	Macquarie Asia Infrastructure Fund LP	Fundraising	Transport, energy, telecommunication, environment	..
Australia	Macquarie International Infrastructure Fund (MIIF)	Fully invested	Transport, energy, telecommunication	..
Singapore	Challenger Emerging Market Infrastructure Fund (EMIF)	Investment	Transport, energy	238
United States	J.P. Morgan Asian Infrastructure & Related Resources Opportunity Fund I	Investment	Transport, energy, social infrastructure, environment	857
Australia	The Infrastructure Fund (TIF)	Fundraising, investment	Transport, energy, social infrastructure, environment	..
Australia	CFS Australian Clean Energy Infrastructure Fund	Fundraising	Energy	..
Singapore	Equis Asia Fund I	Investment	Energy	647
Bahrain	Islamic Development Bank Infrastructure Fund II	Fundraising	Transport, energy, telecommunication, social infrastructure, environment	..
United States	IFC Global Infrastructure Fund, LP	Investment	Transport, energy, telecommunication, social infrastructure, environment	1,200
United Kingdom	Actis Energy 3	Investment	Energy	1,150
Singapore	South East Asia Strategic Assets Fund (SEASAF)	Investment	Transport, energy, telecommunication, environment	147
Singapore	Armstrong S.E. Asia Clean Energy Fund	Investment	Energy, environment	164
Australia	AMP Capital Asian Giants Infra Fund	Investment	Transport, energy, telecommunication, environment	161

Source: InfraPPP Database.

2.5.4. Sovereign wealth funds

Sovereign wealth funds (SWFs) are another source of finance for infrastructure projects. In the ASEAN region, these funds include Khazanah (Malaysia) and Temasek (Singapore), which have directly or indirectly participated in infrastructure activities. In most cases, they invest in infrastructure assets at home and abroad through companies they owned or through government-linked companies. Their purpose in investing is to generate a stream of revenues from acceptable projects.

Khazanah had a $32 billion net portfolio worth as of 31 December 2014. It participated in infrastructure projects both in the ASEAN region through UEM and Plus Expressways International. The latter is building the 116 km Cikampek-Palimen Expressway in West Java (Indonesia). Through the Opus Group that it owned, Khazanah is contributing to infrastructure development in Indonesia and outside ASEAN. Khazanah also own Malaysia Airports Holding, which has contracts to operate and manage airports in Cambodia and outside the region. In addition, through a number of Malaysian government-linked companies that it owned, Khazanah is also indirectly contributing to infrastructure development in a number of sectors and in many other ASEAN Member States (table 2.19).

Table 2.19. Khazanah's contribution to infrastructure development in ASEAN through GLCs that it owns (selected cases)

Company	Industry	Host country
CIMB	Banking (CIMB provides loans to infrastructure projects including in other neighbouring countries)	Brunei Darussalam, Cambodia, Indonesia, Singapore Thailand, Viet Nam
IHH	Hospitals	Brunei Darussalam, Singapore, Viet Nam
UEM	Infrastructure/engineering	Brunei Darussalam, Indonesia
Axiata	Telecommunications	Cambodia, Indonesia, Singapore
Plus Expressways	Road infrastructure	Indonesia
Tenaga	Electricity	Indonesia

Source: Khazanah, Malaysia.

Temasek is involved in investment in selected infrastructure sectors both at home and abroad, in particular in telecommunication, ports, power and engineering activities through some of the Singapore GLCs. It had a net portfolio value of $195 billion as of 31 March 2015. In telecommunication in ASEAN, it has a stake in Intouch, based in Thailand, through MediaCorp. Through Singapore Technologies Telemedia, it has an indirect interest in Sky Cable (Philippines), U Mobile (Malaysia) and Asia Mobile Holdings, which owns a stake in Lao Telecommunications.

In power generation, Sembcorp is involved in power projects in ASEAN and non-ASEAN countries. For instance, Sembcorp co-owns the 746 MW Phu My 3 combined-cycle gas turbine power plant in Viet Nam. Temasek is also involved in ports development, operation and management in a number of countries through the Port of Authority of Singapore (PSA), a major government-linked company. In engineering and construction, Keppel Corporation and ST Engineering provide Temasek a platform for contributing to infrastructure development in other countries.

2.6. Conclusion

Evidence indicates that with better infrastructure, higher economic and industrial growth can be attained, more logistical efficiency can be achieved and significant economic cost savings can be made. Infrastructure development has increased household and industry access to electricity, brought industrial estates to rural areas, facilitated connectivity through road, rail and bridge links, provided ICT connection and led to the emergence of infrastructure-enabled downstream businesses (e-commerce and business process outsourcing activities) in ASEAN. Improved infrastructure can contribute to increasing the competitiveness of the region and attracting FDI.

Given the importance of infrastructure, ASEAN Member States are investing in upgrading and building new national infrastructure in electricity, transport and ICT. Some have to invest more than others because of years of under-investment and because of rapid growth in demand from population, urbanization and rapid industrial development. Member States have also announced significant plans to improve national infrastructure services.

With growing demand, the region's infrastructure investment need is huge. However, it is possible that this need can be met with potential additional resources. The region will require about $110 billion annually in investment in power, transport, ICT, and water and sanitation. Aside from other resources outside ASEAN, there are some $10 trillion worth of assets in companies and institutions associated with the region that can be tapped. The challenge is to mobilize and channel these additional sources of funding to infrastructure in the region. A number of approaches to mobilizing and channeling investment to infrastructure were suggested in the *World Investment Report 2014*, approaches which could be considered or adapted in ASEAN.

The actors operating or investing in the region's infrastructure industry are now more diversified than in the past. They differ in behaviour, background and aspiration, and can be categorized as the public and private sectors, the local and foreign private sectors, developed and developing countries, and ODA donors and various types of financiers, including companies participating in different segments of infrastructure value chains. ASEAN companies and the foreign private sector have been playing roles in infrastructure development in the region. They have been participating through various modalities, which include FDI, privatization, NEMs, cross-border M&As, and partnership or consortium arrangements. They operate as contractors, suppliers and subcontractors.

Infrastructure investors and contractors from some Asian economies are prominent in ASEAN. Some European and American engineering and equipment manufacturers also have a strong presence. Chinese investors and contractors have become increasingly more visible in the region in a relatively short period of time. They will continue to be active players in the region because of emerging opportunities, the internationalization drive of Chinese firms, strategies to grow revenue streams from winning overseas contracts and encouragement from home government measures.

Infrastructure-related companies from ASEAN are also increasingly owning and building infrastructure in other Member States. The various categories of infrastructure financiers can play an important role in providing or arranging finance for infrastructure development in ASEAN. They include ODA donors, MDBs, specialized infrastructure funds, private equity investors, commercial banks and sovereign wealth funds. A significant part of financing for infrastructure projects in the region comes from these sources.

The private sector in all categories needs to play a greater role in infrastructure development in the region over the next decade if the infrastructure plans of the ASEAN Member States are to be realized. States cannot do it alone and the private sector cannot replace the States in infrastructure development. There is a need for a closer public-private partnership, including involving other stakeholders to deliver infrastructure.

The form of MNE involvement in infrastructure operations varies significantly by sector, in part reflecting the policies of host countries in the region, the openness of the sectors, investment opportunities and the risk-return relationship perceived by investors. Some modalities are more significant than others. Firms' experience, skill sets and ability to win contracts are key influences.

Participation through NEMs, which is a key feature of the region's infrastructure industry, means that MNEs' participation in infrastructure development is under reported. Much of the under-reporting arises from data collection methodology, which does not capture non-equity forms of participation such as concessions and management contracts. Any analysis of private sector participation in infrastructure needs to look at not just FDI numbers but also NEM activities, where a significant share of private sector activities are concentrated.

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CHAPTER 3

INFRASTRUCTURE VALUE CHAINS AND MOTIVATIONS OF MNES IN ASEAN

3.1. Introduction

Infrastructure value chains in ASEAN are complex and involve a network of players. In segments of a number of chains, MNEs contribute specific technology and skill sets that support the delivery of infrastructure. Among other roles, MNEs participate as equipment and material suppliers; solution providers; engineering, procurement and construction (EPC) companies; subcontractors; owners or sponsors; as well as project financiers.

MNEs' motives for investing in infrastructure in ASEAN vary. Winning infrastructure contracts is an important consideration that can influence the establishment of a subsidiary or representative office in a host country or in a region. Most motives are related to market and strategic considerations. Some MNEs invest in infrastructure to support their core business; for instance, shipping companies develop port terminals or telecommunication service providers establish information and communication technology (ICT) infrastructure in order to achieve overall operation efficiency. Some upstream MNEs invest in downstream infrastructure to establish an integrated business – for example, from mining to power generation. Others invest to diversify into or across infrastructure chains or segments to generate revenues, reduce risk or increase corporate valuation. Some pursue a horizontal expansion strategy, investing overseas in order to maximize returns from exploiting their proprietary advantage, knowledge or skill sets (e.g. airport companies invest in or build airports infrastructure abroad).

This chapter examines the interconnection of infrastructure value chain players in ASEAN and demonstrates that in most segments MNEs play an important role in delivering infrastructure. The chapter also analyses key drivers and motivations that influence MNEs to invest or participate in infrastructure development in the region.

3.2. Infrastructure value chains in ASEAN

In general, the value chain of infrastructure industries ranges from design, construction and development to operation and management (O&M) (figures 3.1 and 3.2). Different companies may be involved at each stage. In some cases, the same company may be involved across a number of segments from development to O&M, which reflects such companies' integrated business strategy, diversified skills and ability to win multiple contracts. Another set of companies might be involved at the construction or development stages. Some companies may provide only equipment or solutions to EPC contractors in the value chain (box 3.1).

Box 3.1. Equipment and solution providers are present in ASEAN

Some equipment manufacturers and service providers associated with infrastructure development in ASEAN also have an extensive presence in the region. They have established manufacturing and service operations in multiple ASEAN Member States to better serve clients or to achieve production efficiencies (box table 3.1.1).

Box table 3.1.1. Participation of equipment manufacturers and service providers

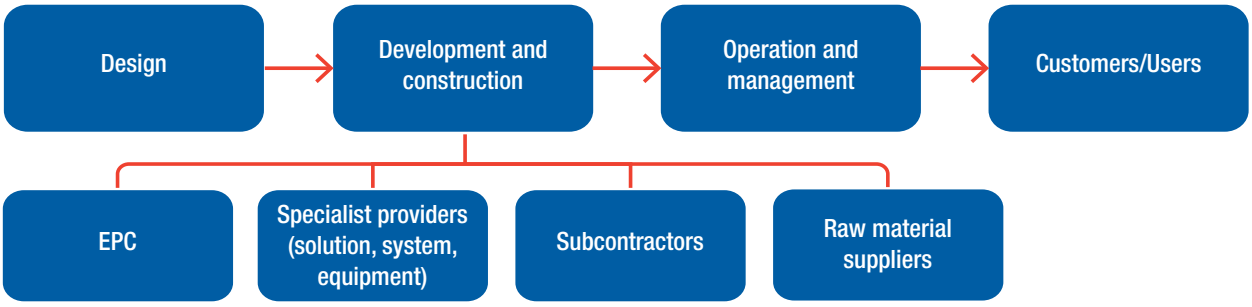
Company	Nationality	Sector	Presence (selected locations)
Volvo Construction Equipment	Sweden	Construction	Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, Viet Nam
Liu Gong Machinery Company Limited	China	Construction	Dealers in Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, Viet Nam
Komatsu	Japan	Construction	Distributors in Brunei Darussalam, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, Viet Nam
Sandvik	Sweden	Construction	Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Philippines, Singapore, Thailand, Viet Nam
Sany Heavy Industry Company	China	Construction	Sales and service networks in Brunei Darussalam, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Thailand, Viet Nam
Shantui Construction Machinery Company Limited	China	Construction	Myanmar, Indonesia, Singapore
Daewoo Engineering	Korea, Republic of	Construction/ engineering	Presence across ASEAN
JCB	United Kingdom	Construction	Brunei Darussalam, Cambodia, Indonesia, Malaysia, Myanmar, Philippines, Singapore, Thailand, Viet Nam
Liebherr	Germany	Construction	Indonesia, Malaysia, Singapore, Thailand
Caterpillar	United States	Construction	Dealers in Brunei Darussalam, Cambodia, Indonesia, Malaysia, Singapore, Thailand, Viet Nam
XCMG	China	Construction	Dealers in Brunei, Cambodia, Indonesia, Lao PDR, Myanmar, Malaysia, Philippines, Singapore, Thailand, Viet Nam
CNH Industrial	Switzerland	Construction	Presence across ASEAN
Zoom lion	China	Construction	Subsidiaries in Singapore and Viet Nam. Representative offices in Cambodia, Thailand, Malaysia
Siemens	Germany	Electrical equiptment	Cambodia, Indonesia, Malaysia, Myanmar, Philippines, Singapore, Thailand, Viet Nam
Schneider Electric	France	Electrical equiptment	Brunei Darussalam, Cambodia, Indonesia, Malaysia, Myanmar, Philippines, Singapore, Thailand, Viet Nam
Mitsubishi Heavy Industry	Japan	Electrical equipment	Cambodia, Indonesia, Lao PDR, Malaysia, Philippines, Singapore, Thailand, Viet Nam
Kirloskar Brothers Limited	India	Electrical equipment	Cambodia, Lao PDR, Singapore, Thailand, Viet Nam
Doosan Heavy Industries and Construction	Korea, Republic of	Energy	Indonesia, Philippines, Thailand, Viet Nam
Wärtsilä	Finland	Energy	Indonesia, Malaysia, Philippines, Singapore, Viet Nam
China National Machinery Import and Export Corporation	China	Energy	Indonesia, Malaysia, Viet Nam
IHC Merwede	Netherlands	Maritime equiptment	Regional office in Singapore
Trina Solar	China	Solar	Regional office in Singapore
AEG Power Solutions	Germany	Solar	Malaysia, Singapore, Thailand
Yingli Solar	China	Solar	Regional office in Singapore
Ericsson	Sweden	Telecom-munication	Brunei Darussalam, Cambodia, Indonesia, Malaysia, Myanmar, Philippines, Singapore, Thailand, Viet Nam
Alcatel-Lucent	France	Telecom-munication	Brunei Darussalam, Cambodia, Indonesia, Malaysia, Philippines, Singapore, Thailand, Viet Nam
Huawei	China	Telecom-munication	Indonesia, Malaysia, Philippines, Thailand

Source: Southeast Asia Infrastructure Research.

Each infrastructure sector has its own specific features and interconnections of different players, involving both local and foreign-owned entities. In some countries and sectors, key value chain segments are dominated by MNEs (e.g. EPC contractors, equipment suppliers, solution providers).

The interconnection of players in different parts of value chains is important for infrastructure development. Companies operating in the extractive industries, such as gas and coal mining, play a key role in providing the necessary fuels for power plants to generate electricity. Technology and equipment suppliers manufacture turbine engines, wind power generators and solar panels to capture energy sources for conversion into electricity. Engineering companies and project contractors assist investors and owners in building power plants, dams and wind farms for electricity generation. In telecommunication and transport (e.g. urban rail and airports), MNEs are involved across different segments of the value chains from engineering design, construction, and development to O&M. Various categories of financiers play a crucial role in contributing or helping to raise the necessary finance for undertaking infrastructure projects (chapter 2). It is important to understand who plays what role in which segments of the value chain and how they are connected to add value to bring infrastructure projects to fruition, and to continuing operation.

Figure 3.1. **Infrastructure value chains involve a number of key segments**
(Simplified representation)



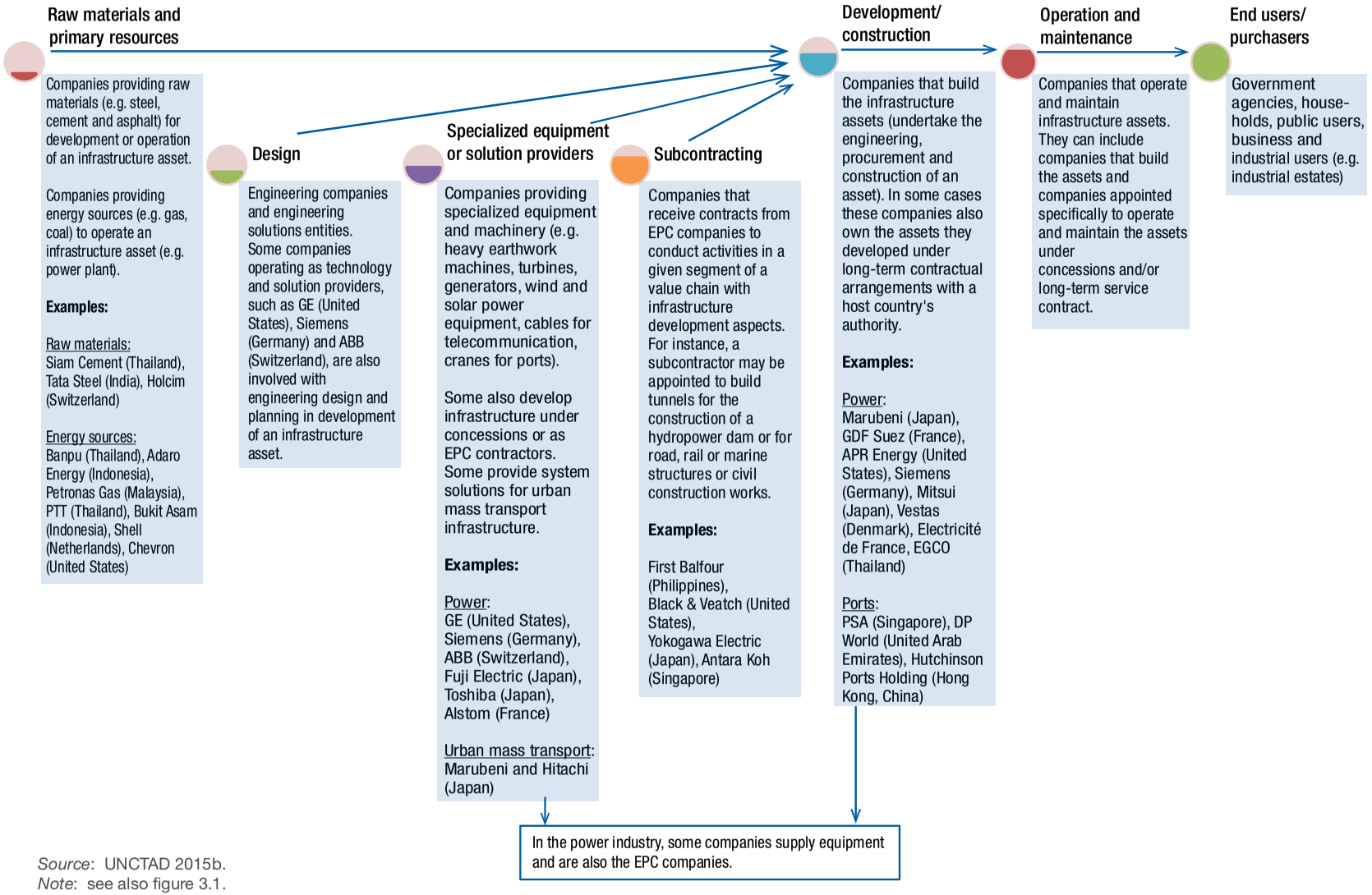
Source: UNCTAD 2015b.

3.2.1. Electricity value chains

In electricity infrastructure development across ASEAN, MNEs frequently operate as EPC contractors of power plants, transmission lines and power stations. Some also invest in and own power plants. These MNEs come from both developed and developing countries (box 3.2).

The rapid rise in electricity demand, the regional power grid programme and the commitment by Member States in the region to invest in and upgrade the electricity infrastructure make power investment an attractive target for many electricity infrastructure-related MNEs (chapter 2). Strong industrial development, rising per capita income, large and rapidly

Figure 3.2. **Players in different segments of an infrastructure value chain are interconnected (a simplified illustration)**



Source: UNCTAD 2015b.
Note: see also figure 3.1.

Box 3.2. Foreign power players in electricity generation are in ASEAN (selected cases)

Cambodia

Cambodia invites foreign players to participate in power generation. As a result, there has been an increasing number of foreign independent power producers (IPPs) in the country. They operate under power purchase agreements (PPAs). Electricity transmission and distribution is controlled by the country's electricity agency. Foreign companies involved in the country's electricity industry are dominated by Chinese players, which include State Grid Corporation of China, Sinohydro Corporation, China Southern Power Grid, China Hydropower Corporation, Huadian, China National Heavy Machinery Corporation. Non-Chinese players include Pestech International (Malaysia), EVN (Viet Nam) and Korean MNEs.

Indonesia

Indonesia is encouraging the private sector to play a greater role in the development of the country's electricity infrastructure, including through public-private partnerships (PPPs) and concessionary arrangements. An increasing number of MNEs are investing in power generation in Indonesia. These companies include Solar Guys International (Australia), Daewoo Engineering and Construction (Republic of Korea), Genting (Malaysia), Itochu (Japan), Kyushu Electric Power (Japan), Tenaga (Malaysia), Sinohydro (China), Kansai Electric Power (Japan) and Tata Power (India).

Lao PDR

Lao PDR has a very significant hydropower potential of about 26 GW but only 3 GW of capacity have been built. Exporting electricity to neighbouring countries such as Cambodia, Thailand and Viet Nam is one of the key features of the industry. Electricity sales to neighbouring countries account for a significant share of the country's total export revenues. MNEs played an important role in the development of the electricity industry, in particular in power generation through hydropower. Investors from Thailand and China dominate in power plant investment. Some of the MNEs involved in the construction of power plants and operation of power concessions include EDF (France), Velcan Energy (France), EGCO (Electricity Generating Company, Thailand), Banpu (Thailand), Glow Energy-GDF Suez (France), SK Engineering and Construction (Republic of Korea), Korean Western Power (Republic of Korea), Sinohydro Corporation (China), Vietnam-Lao Power (VLP) (Viet Nam), Hoang Anh Gia Lai Group (Viet Nam), ITD (Thailand) and PTTi (Thailand).

Myanmar

Myanmar needs to invest more in power generation to increase capacity and to meet growing demand, including upgrading existing old facilities. More foreign investors have been investing in the country's infrastructure in recent years. MNEs from China are major players in the country's power generation sector. They include Sinohydro, Datang United Hydropower, China Southern Power, Gezhouba, China Heavy Machinery Corporation, Yunnan Machinery Export Import, and Huadian. Other MNEs such as EGATi (Thailand), Toyo-Thai Corporation (Thailand) and Sumitomo Corporation (Japan) also have a presence in the country.

Philippines

The Philippines government has actively privatized power plants, which has led to the emergence of local and foreign IPPs. To help the country cope with growing demand, private sector

Box 3.2. Foreign power players in electricity generation are in ASEAN (concluded)

participation in IPPs is strongly encouraged. About 82% of the country's installed capacity in 2014 was contributed by private sector IPPs,[a] which are dominated by large local players such as San Miguel, Aboitiz, the Lopez group and Global Power Corporation. Foreign players such as AES (United States), EGCO (Thailand), KEPCO (Republic of Korea), LG (Republic of Korea), Mitsubishi Corporation (Japan), Tokyo Electric (Japan), Marubeni (Japan), Kyushu Electric (Japan) and TeaM Energy (Japan) have been participating in power generation in the country, either as owners or EPC contractors of projects.

Singapore

Since 1995, Singapore has been liberalizing the electricity industry through various processes. The liberalization and privatization of power assets has encouraged the local and foreign private sector to participate in the electricity industry as IPPs, in wholesale distribution for contestable markets and in retailing of electricity. About 80% of the total licensed generation capacity in 2014 was associated with foreign-owned power plants. Through privatization, Senoko Power is now owned by Lion Power Holding, a consortium consisting of Marubeni (Japan), GDF Suez (France), Kansai Electric Power (Japan), Kyushu Electric Power (Japan) and the Japan Bank for International Cooperation. Tuas Power is owned and operated by Huaneng Power International (China) and Power Seraya by YTL Power International (Malaysia). PacificLight, a company owned by FPM Power Holdings and Petronas Power (Malaysia), participated in power generation. The former in turn is owned by First Pacific (Hong Kong, China) and Meralco (Philippines). Upstream companies such as Shell Eastern Petroleum and ExxonMobil Asia Pacific are also involved in power generation. Foreign players are involved in O&M activities; for example, Alstom (France) is a turnkey contractor of the Keppel Merlimau Cogen 800 MW expansion plant.

Thailand

Electricity demand in Thailand has grown rapidly and the importation of electricity from neighbouring countries is a common feature of the Thai electricity supply scenario. The Thai government has signed PPAs with Cambodia, Lao PDR, Malaysia and Myanmar to supplement electricity supply. The country has privatized electricity generation and has been encouraging private sector participation in power generation through IPPs and PPAs. Key local players in power generation include the Electricity Generating Authority of Thailand (EGAT), EGCO, Ratchaburi Electricity Generating Holding, Banpu and other local players. Some of these companies also operate in neighbouring countries to export electricity back to Thailand to serve the local market. Foreign MNEs such as J-Power (Japan), GDF Suez (France), SPC Power Corporation (Philippines), China Light and Power (Hong Kong, China), Mitsubishi (Japan), Tokyo Electric Power (Japan) and Marubeni (Japan) have investment in power generation in Thailand.

Viet Nam

More foreign companies are investing in Viet Nam's power industry. These companies include the China Southern Power Grid, EGAT (Thailand), Toyo Ink Group, Sembcorp Utilities (Singapore), PHI Group (United States), Tata Power (India), Sumitomo (Japan) and Doosan Heavy Industries and Construction (Republic of Korea).

Source: UNCTAD 2015b.

[a] See "About PIPPA", Philippine Independent Power Producers Association (http://pippaonline.org/about).

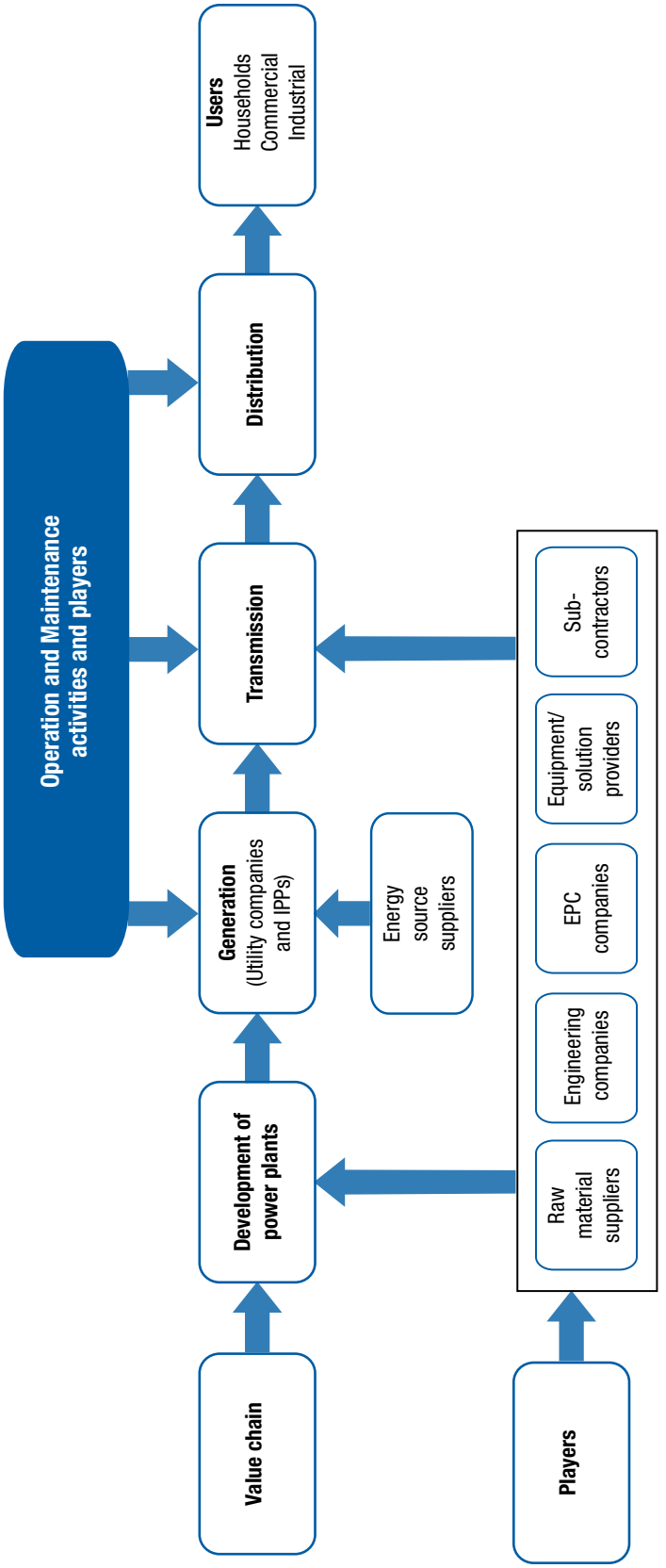
growing populations (including urbanization) also make the region an attractive place to invest. Such factors will continue to drive the growth in electricity investment by the private sector, including MNEs, in the region for the foreseeable future. For instance, in Myanmar, 10 power plants were completed in 2013 and 2014, and 7 more are due for completion by 2016. The government has plans to develop another 87 power plants to meet future demand, and most of these plants are to be built by foreign investors.[1] The Philippines announced plans to establish 23 new coal-fired power plants by 2020, while Indonesia plans to build 35 power plants between 2015 and 2019. The rising demand for more power plants to be built in the region also means more opportunities for power MNEs to participate in the infrastructure development through contracts.

The role of MNEs in the electricity industry can be appreciated by understanding the different types of players, what they do in each value chain segment and how they are connected, in particular in power plant development and electricity generation (figure 3.3). For instance, in the development of the $440 million, 300 MW Dai Ninh hydroelectric power plant in Viet Nam, Japanese, German and Vietnamese companies played major roles. A consortium of Toshiba and Nissho Iwai provided the design, manufacturing, installation and commissioning of the equipment at the plant. A joint venture of Nippon Koei and Electric Power Development Corporation was the project consultant. Sumitomo and Japan AE Power were the main substation contractors. Siemens and Vietnamese Power Construction Company No. 2 were the subcontractors. Siemens was awarded the contract to provide the design, manufacturing and construction of the substations and their accompanying telecommunication systems. It provided the 500kV/220kV equipment from Germany, the control and protection systems from Indonesia and the telecommunication systems from Singapore.[2] In another example, in 2015, Toshiba (Japan) won a contract to provide turbines and generators to the EPC Chinese company (Zhejiang Orient Engineering) for the construction of the Upper Yeywa hydropower plant in Myanmar, which is owned and being developed by Myanmar Electric Power Enterprise.

(a) Raw materials and energy source suppliers

MNEs operating in this segment include those supplying raw materials (cement and steel) to build power plants. Such companies include Holcim (Switzerland) and Siam Cement (Thailand). MNEs and local companies also supply fuel as a source for electricity, usually on a long-term contract basis. MNEs operating in pertinent extractive industries include Adaro Energy (Indonesia), Pertamina (Indonesia), Petronas (Malaysia), PTT (Thailand), Banpu (Thailand), and Bukit Assam (Indonesia), all of which supply energy sources such as gas and coal to power plants. The Malampaya deepwater gas-to-power project in the Philippines involves Shell Philippines Exploration, Chevron, and the Government of the Philippines, which supplies natural gas to three power plants in Batangas, Philippines. Holcim's subsidiary in the Philippines supplied ready-mix concrete for the construction of the Phividec coal thermal power plant in Northern Mindanao.

Figure 3.3. The electricity value chain can be complex and involves a portfolio of players



Source: UNCTAD 2015b.

In addition, some extractive companies are also involved in downstream activities (power generation) (box 3.3). Integrating different segments of value chains is a natural business model for some resource-based MNEs. Upstream companies such as Shell Eastern Petroleum and Exxon Mobil Asia Pacific are involved in power generation in Singapore, producing electricity primarily for their own use.

Box 3.3. MNEs in the extractive industry are involved with power generation in ASEAN (selected cases)

Banpu (Thailand), a coal producer, has significant coal mining operations in Indonesia. The company is diversifying into power generation. For instance, in Thailand, it has a 50% share in BLCP Power Limited, a 1,434 MW coal-fired power plant in Map Ta Phut Industrial Estate in Rayong Province. It has recently become involved in another electricity-generating project in the Hongsa power plant in Lao PDR with Ratchaburi Electricity Generating Holding and Lao Holding State Enterprise (LHSE), a State-owned enterprise of Lao PDR. The Hongsa power plant is expected to commence commercial operations in 2015. The company is also building a new power plant in China that will commence operation in 2017. Banpu's long-term corporate strategy is to explore and enter into new energy possibilities in bio-energy, wind power and solar energy.[a]

Pertamina (Indonesia), a State-owned oil and gas company, is involved in a gas-fired IPP together with Marubeni (Japan). The project will involve value chain segments from upstream gas exploration and production to mid-stream transmission and storage, and downstream power generation.[b]

Petronas (Malaysia), through its subsidiary Petronas Power, operates in the power business to maximize value chain benefits by integrating with the group's liquefied natural gas supply business. It undertakes investment in power generation activities at home and abroad. Together with First Pacific (Hong Kong, China) and Meralco (Philippines), it jointly owns FPM Power Holdings, which in turn owns PacificLight (Singapore), which is involved in the generation and retailing of electricity. Petronas continues to expand in the power sector and is constructing, at an estimated cost of about $1 billion, a gas-fired power plant with a generation capacity of 1,200 MW in Pengerang, Southern Johor, Malaysia. The plant, which is expected to be complete by 2016, contracted Technip (France) to provide the engineering design and support.[c]

PTT (Thailand) invests abroad through its subsidiaries PTT International and PTT Green Energy to explore alternative energy and to secure energy sources. At home, it provides energy sources such as gas to gas-fired power plants owned by local and foreign IPPs. Through PTT International, the group has invested in power plants overseas. For instance, it holds a 25% stake in Xayaburi Power and a 40% stake in Nam Lik-1 Power. Both assets are in Lao PDR.

Adaro Energy (Indonesia), a coal mining company, is diversifying into power generation as part of its coal value chain. About 75% of the coal production is destined for overseas customers, primarily in Asia, and a majority of them operate in the utilities business. Adaro Energy is involved in the coal supply chain from pit to port to power generation. The activities include mining, barging, shiploading, dredging, port services, marketing and power production. The company is involved in a $4 billion, 2x1,000 MW coal-fired steam power plant in Central Java, Indonesia,

Box 3.3. MNEs in extractive industry are involved with power generation in ASEAN (selected cases) (concluded)

with a consortium comprising its subsidiary Adaro Power, Electric Power Development (Japan) and Itochu Corporation (Japan). The plant will start commercial operation in 2016 with Adaro Energy supplying majority of the coal requirements. In addition, the company together with Korea Electric Power Corp. (KEPCO) established Tanjung Power (Indonesia) in August 2013 to develop, build and operate a 2x100 MW coal-fired power plant in South Kalimantan. The power plant will use approximately 1 million tonnes of coal per year, the majority of which will be supplied by Adaro Energy. The company has also entered into a joint venture with China Shenhua Overseas Development and Investment to operate a coal-fired power plant in Indonesia.

Bukit Asam (Indonesia), a State-owned company in coal mining, is increasingly involved in power generation with coal supplied from its mines. Some of the power plants are built with foreign MNEs such as the $1.6 billion, 2x620 MW Banko Tengah plant in Indonesia in partnership with China Huadian. The construction of the plant will begin in 2016 and commercial operation in 2019. In addition, the $2.4 billion, 800–1,200 MW Peranap power plant in Indonesia, operated in partnership with PLN (Indonesia) and TNB (Malaysia), will use coal from Bukit Asam's source and will commence operation in 2020.

Source: UNCTAD 2015b, based on information from companies' websites and annual reports.

[a] "Coal: Banpu powers up", *The Asia Miner*, 9 March 2015 (http://www.asiaminer.com/news/latest-news/6598-coal-banpu-powers-up.html#.VVNkeU103Cw).

[b] "Execution of Memorandum of Understanding with PT. Pertamina", *Marubeni News Release*, 20 February 2014 (http://www.marubeni.com/news/2014/release/00010.html)

[c] "Petronas-Pengerang gas-fired power plant, Johor, Malaysia", World Construction Network, 27 May 2013 (http://www.worldconstructionnetwork.com/projects/petronas-pengerang-gas-fired-power-plant-johor-malaysia/)

(b) Sponsors and owners of power plants

MNEs play an increasingly important role in the development of power plants in the region as sponsors, owners or as independent power producers (IPPs) (table 3.1). They own and operate power plants through various forms of long-term concessions (e.g. build-operate-transfer, build-operate-own) in the host country. In most cases, MNEs that own power plants sell the electricity generated to national electricity authorities under some form of power purchase agreements (PPAs), to industrial customers, or as exports to a third or home country.

In the CLMV countries (Cambodia, Lao PDR, Myanmar, Viet Nam), foreign companies dominated the construction and development of power plants. For instance, in Lao PDR this segment is dominated by investors from Thailand and China (table 3.2).

In the power sector, some MNEs have a significant presence in the region. Electric Power Development (J-Power), headquartered in Japan, has invested abroad in 38 power plants. As of 2015, half of these power assets are in ASEAN (table 3.3). It has 15 IPP projects in operation in Thailand with an additional one that is to commence operation in 2015. It has

Table 3.1. Foreign and regional MNEs build electricity infrastructure in ASEAN, 2012–2014 (Selected projects and economies)

Project	Sector	Location	Financial closure (Year)	Sponsor			Value ($ million)	Installed capacity (MW)	Technology	Type of PPI	PPA arrangement
				Name	Equity stake	Nationality					
Bina Puri Desa Patteneteng	Electricity Generation	Indonesia	2012	Bina Puri	80	Malaysia	10	4	Hydro	BOT	Yes
SGI-Mitabu Solar Plant Phase I	Electricity Generation	Indonesia	2012	Mitabu Australia Solar Guys International	.. ..	Australia Australia	104	50	Solar, PV	BOO	Yes
Komipo Wampu	Electricity Generation	Indonesia	2012	Daewoo E & C Korea Midland Power Corp.	.. ..	Republic of Korea	174	45	Hydro	BOT	Yes
Cilacap Power Plant Phase II	Electricity Generation	Indonesia	2013	PT Sumber Energi Sakti Prima	51	Indonesia	900	660	Coal	BOT	Yes
Banten Coal-Fired Power Plant	Electricity Generation	Indonesia	2013	Genting Group	95	Malaysia	1,000	660	Coal	BOT	Yes
Krueng Isep Hydropower Project	Electricity Generation	Indonesia	2013	PT Senagan Energi	100	Malaysia	31	10	Hydro	BOO	..
Sarulla Geothermal Project	Electricity Generation	Indonesia	2014	Itochu Corp Kyushu Electric Power Ormat Turbines PT Medco Energi International	25 25 12.75 37.25	Japan Japan Isreal Indonesia	1,541	330	Geothermal	BOO	Yes
Rajamandala Hydro Power Plant	Electricity Generation	Indonesia	2014	Kansai Electric Power	100	Japan	111	47	Hydro	BOT	Yes
Sinohydro Nam Khan II and III	Electricity Generation	Lao PDR	2012	Sinohydro	85	China	430	173	Hydro	BOT	Yes
Hag Nam Kong II	Electricity Generation	Lao PDR	2012	Hoang Anh Gia Lai Group	100	Viet Nam	71	66	Hydro	BOT	Yes
Xe-Pain Xe-Namnoy	Electricity Generation	Lao PDR	2014	Korea Western Power Ratchaburi Electricity Generating Holding	25 25	Republic of Korea Thailand	1,043	410	Hydro	BOT	..
Cypark Pajam Solar Biogas Plant	Electricity Generation	Malaysia	2012	SK Corp. Cypark Resources LG Electronic	26	Republic of Korea Malaysia Republic of Korea	17	7	Solar, PV, Biogas	BOO	Yes
Kuala Lumpur Airport Solar Plants	Electricity Generation	Malaysia	2013	SunEdison	100	United States	41	15	Solar, PV	BOO	Yes
ASEA Aklan Biomass Plant	Electricity Generation	Philippines	2012	ASEA One Power LG Group	.. ..	Philippines Republic of Korea	12	12	Biomass	BOO	Yes
Ahlone Power Plant	Electricity Generation	Myanmar	2013	Toyo-Thai Corporation	100	Thailand	170	121	Gas	BOO	Yes
Gulf Utai Power Plant	Electricity Generation	Thailand	2012	J-Power	90	Japan	1,280	1,600	Gas	BOO	Yes
Surin Solar PV I, II and III	Electricity Generation	Thailand	2013	SPC Power Corp.	100	Philippines	48	22	Solar, PV	BOO	Yes
SPC Lopburi PV Plant	Electricity Generation	Thailand	2013	China Light & Power Mitsubishi EGCO	33 33 33	Hong Kong, China Japan Thailand	15	4	Solar, PV	BOO	..
Khanon 4 CCGT	Electricity Generation	Thailand	2014	Mitsubishi Tokyo Electric Power	50 50	Japan Japan	822	930	Gas	BOO	Yes

Source: World Bank, PPI Database.

Note: PPI = Private participation in infrastructure; PPA = Power purchase agreement; BOO = build, own, operate; BOT = build, operate, transfer; PV = photovoltaic.

Table 3.2. MNEs play an important role in the development and ownership of power plants in the CLMV countries, selected projects, 2010-2015

Name	MW	COD	Off-taker	Finance	Ownership at COD
			Lao PDR		
Nam Theun 2	1,080	2010	95% EGAT (Thailand)	26 international private banks and international financial institutions	EDF (France) 35%; EGCO (Thailand) 25%; LHSE (Lao PDR) 25%; Italian-Thai Development (Thailand) 15%
XPXN	400	2013	EGAT (Thailand)	Thai and international banks	Korean-led consortium; LHSE (Lao PDR)
Xekaman 3	250	2012	EVN (Viet Nam)	Vietnam Investment and Development Bank, Vietnam Commercial Bank	Viet-Lao Power (VLP-Viet Nam); Electricité du Laos (EdL) 15%
Nam Ngiep 2	280	2013	EdL (Lao PDR)	China BFI	CWE (China) 90%; EdL 10%
Nam Ou	1,100	2012	EdL (Lao PDR)	China BFI	Sinohydro (China), EdL
Xayaburi	1,285	2012	EGAT (Thailand)	Thai banks	PTTi; CH. Kanchang (Thailand); EdL
Nam Ngum 5	120	2012	EdL (Lao PDR)	China Exim Bank	Sinohydro (China) 85%; EdL 15%
Nam Ngum 2	615	2011	> 95% EGAT (Thailand)	Thai banks	Ch. Kanchang (Thailand) 28.5%; Ratchaburi (Thailand) 25%; EdL 25%; Bangkok Expressway (Thailand) 12.5%; others 9%
Nam Lik 1-2	100	2010	EdL (Lao PDR)	China Development Bank	CWE (China) 90%; EdL 10%
Under Development					
Xayaburi	1,285	..	EGAT (Thailand)	Thai banks	CH. Kanchang (Thailand); LHSE (Lao PDR)
Nam Ou	1,100	..	EdL/EGAT	China BFI	Under Negotiations (formerly Japanese led)
Nam Thuen 1	520	..	EdL (Lao PDR)	China BFI	Sinohydro (China); LHSE (Lao PDR)
Xekaman 1	468	..	EVN (Viet Nam)	Vietnam Development Bank	Viet-Lao Power 70%; EdL 30%
Nam Ngiep 3	460	..	EVN (Viet Nam)	Negotiation	VLP (Viet Nam) 85%; LHSE (Lao PDR) 15%
XPXN	400	..	EGAT (Thailand)	Thai and international banks	Korean-led consortium; LHSE
THPC Expansion	280	..	EGAT (Thailand)	International banks	EdL 60%; GMS Power 40%
Nam Ngiep 2	280	..	EGAT (Thailand)	China Development Bank	CWE (China) 90%; EdL 10%
Nam Ngiep 1	262	..	EGAT (Thailand)	ADB,Thai and international banks	Kansai Electric Power (Japan); EGATi (Thailand); LHSE (Lao PDR)
Nam Khan 2&3	173	..	EdL (Lao PDR)	China ExIm	Sinohydro (China) 85%; EdL 15%
Nam Tha 1	170	..	EdL (Lao PDR)	China BFI	China Southern Grid International; EdL
Nam Phay	140	..	EdL (Lao PDR)	Negotiation	Norinco International Corp. (China) 85%; EdL 15%
Nam Kong 2	66	..	EdL (Lao PDR)	BIDV (Viet Nam)	Hoang Anh Gia Lai Group (Viet Nam) 100%
Nam Lik 1	65	..	EGAT (Thailand)	Negotiation	Gamuda (Malaysia), EGCO (Thailand), LHSE (Lao PDR)
			Cambodia		
Kirirom 3	18	2013	..	..	China State Grid
Kam Chay	194	2011	..	..	Sinohydro (China)
Projects Planned or Under Development					
Russei Chrum Krom	246	2015	..	..	China Huadian
Stung Tatay	120	2015	..	..	China National Heavy Machinery Corporation
Stung Atay	12	2015	..	..	China Electric Power Technology Import & Export Corporation
Kirirom 1	338	2015	..	..	China Electric Power Technology Import & Export Corporation
Stung Treng	980	2020	..	..	..
Sambor	2,600	2020	..	..	China Southern Power
Lower Se San 2	400	2020	..	..	Royal Group
Lower Sre Pok 2	222	2020	..	..	EVN (Viet Nam)
Stung Battamburg 1	24	2020	..	..	Korean Company
Stung Sen	40	2020	..	..	Korean Company
			Myanmar		
Yeywa	790		Domestic sale	China Exim Bank, CITIC (China)	MEPE/HPGE; CITIC (China); Sinohydro (China); CHMC, CGGC, Siemens, Malcolm Dunstan, Colenco, HTCT

Table 3.2. MNEs play an important role in the development and ownership of power plants in the CLMV countries, selected projects, 2010-2015 (concluded)

Name	MW	COD	Off-taker	Finance	Ownership at COD
Upper Paungluang	140		Domestic sale	China Exim Bank	MEPE; Colenco, Malcolm Dunstan, Yunnan Machinery ExIm (China)
Shweli I	600		50% exported to China; 50% for domestic sale	China Exim Bank	Yunnan Machinery Exim (China); Datang United Hydropower (China); China Southern Power Corp.
Dapeyin I & II[a]	408		90% to China; 10% for domestic sale	China Exim Bank	MEPE, Datang United Hydropower (China)
Lower Paungluang[a]	280		Domestic sale	China Exim Bank	MEPE, Yunnan Machinery Exim (China), Sinohydro (China)
Planned/Under Development					
TaSang	7,110		..	Thai and Chinese banks	EGATi (Thailand); China Three Gorges (China)
Wei Gyi	4,540		EGATi (Thailand)	Thai Banks	EGATi (Thailand)
Kunlong	2,400			..	Goldwater Resources; Hanergy Holding
7 Dams Project: Chibwe, Kaunglanphu, Laiza, Lakin, Myitsone, Pashe, Phizaw.	13,360		China Power Investment; China Gezhouba; Sinohydro	China BFI	Asia World Company, MEPE
Hat Gyi	1,200		EGATi (Thailand); Sinohydro (China)	Thai and Chinese banks	EGATi, Sinohydro, MEPE
Viet Nam					
Se San 3A	108	2007	..	20% Russia; 50% Vietnamese banks; 30% EVN/EVN	
Song Ba Ha	220	2009	..	JBIC/EVN	
Se San 4	255	2010	..	JBIC/EVN	
Son La	2,400	2010–2012	..	70% Vietnamese banks; 30% EVN	
Dak Mi 4	192	2012	..	Vietnamese banks/EVN	

Source: "Regional Hydropower: Developments and Challenges", a presentation by DFDL: Legal and Tax at American Chamber of Commerce-Singapore, 16 May 2014, Singapore (http://www.dfdl.com/images/stories/160514_AmCham_Singapore_final_short_version_2.pdf).

Note: COD = commercial operation date, MW = megawatt.

[a] Operational.

three power plant projects in operation in the Philippines and one in Viet Nam. Another project is under construction in Indonesia.

GDF Suez (France) is a major utility company with extensive international operations. In ASEAN, it has operations in Indonesia, Singapore and Thailand. It has many subsidiaries, such as Tractebel Engineering, operating in the region. In electric generation and cogeneration, it operates through its subsidiary Glow Group in Thailand. The IPP business in Thailand generates and sells electricity primarily to the Electricity Generating Authority of Thailand (EGAT), and supports 30 industrial customers, mainly based in the Map Ta Phut industrial zone. It is also strongly involved in the development of thermal, geothermal and renewable energy in Indonesia, where it is the largest IPP through a consortium that owns Paiton Energy. The other partners in this venture comprise Mitsui & Co (Japan), Tokyo Electric Power (Japan) and Batu Hitam Perkasa (Indonesia). GDF Suez also manages the plant's operations through its majority-owned subsidiary in PT Ipmomi. In 2012, GDF Suez, together with Sumitomo Corporation (Japan), Marubeni (Japan) and Supreme Energy

Table 3.3. J-Power has growing electricity generation operations in ASEAN, 2015

Projects	Type	Output capacity (MW)	Ownership share (%)	Owned capacity (MW)	Power purchaser	Validity of purchase agreement
Thailand						
Roi-Et	Biomass (Chaff)	10	24.7	2	EGAT	to 2024
Rayong	CCGT	112	20	22	EGAT, companies in the industrial park	to 2024
Gulf Cogeneration	CCGT	110	49	54	EGAT, companies in the industrial park	to 2019
Samutprakarn	CCGT	117	49	57	EGAT, companies in the industrial park	to 2020
Nong Khae	CCGT	120	49	59	EGAT, companies in the industrial park	to 2021
Yala	Biomass (Rubber Wood Waste)	20	49	10	EGAT	to 2031
Kaeng Khoi 2	CCGT	1,468	49	719	EGAT	to 2033
SPPs,[a] seven	CCGT	790	86.6	684	EGAT, companies in the industrial park	to 2038
Nong Seang	CCGT	1,600	90	1,440	EGAT	to 2039
U-Thai (under construction)	CCGT	1,600	90	1,440	EGAT	25-year PPA
Philippines						
CBK (3 projects)	Hydroelectric	728	50	364	National Power Corporation	to 2026
Viet Nam						
Nhon Trach 2	CCGT	750	5	38	Vietnam Electricity	to 2021
Indonesia						
Central Java (under construction)	Coal	2,000	34	680	PT Perusahaan Listrik Negara	25-year PPA from commercial operation

Source: UNCTAD and ASEAN Secretariat, based on information from J-Power company website.

Note: CCGT (combined-cycle gas turbines), PPA = power purchase agreement, SPP = small power producer. EGAT (Electricity Generating Authority of Thailand) is a State-owned electric power utility company of Thailand. PT Perusahaan Listrik Negara is a State-owned electric power utility company of Indonesia.

[a] Consists of seven SPP projects (KP1, KP2, TLC, NNK, NLL, CRN, NK2). J-Power holds a 67.5% stake in the NLL plant and a 90% stake in the other six.

(Indonesia), signed a 30-year PPA with PLN (Indonesia) for three geothermal projects in Sumatra, Indonesia.

Velcan Energy (France) develops, finances, builds and operates hydropower concessions in emerging markets including in Lao PDR and Indonesia. It has two concessions under development in Lao PDR, the 52 MW Nam Phouan and the 41 MW Nam Ang, each with a concession period of 30 years, which includes construction. In Indonesia, Velcan has projects at various stages of commercial negotiations. Given the market potential for electricity, Velcan has been actively prospecting in Indonesia.

AES (United States)[3] operates in 18 countries involving plants with 35 GW of generating capacity. In ASEAN, it has subsidiaries in the Philippines and Viet Nam. Through expanding its investment, AES Philippines has increased the generation capacity at the Masinloc power plant from 50% to 74% and is increasing net production by 62% within two years. The plant started commercial operation in 2008 with a gross installed capacity of 630 MW; AES owned a 51% equity interest. A recent power project of AES in Viet Nam is the $1.95 billion

Mong Duong 2 coal-fired power plant, which is the largest private sector power project in the host country. The 1,240 MW plant started commercial operation in the first half of 2015. It was built under a build-operate-transfer agreement and a 25-year PPA with Electricity of Vietnam and a 25-year coal supply agreement with a State-owned enterprise (Vinacomin). AES has a 51% equity interest in the power plant, Posco Power Corp. (Republic of Korea) has a 30% interest and China Investment Corporation a 19% interest.

In addition, many ASEAN MNEs or power utility companies own power plants in other ASEAN Member States (chapter 2). These companies include EGCO (Thailand), EVN (Viet Nam), Genting (Malaysia), ITD (Thailand), Hoang Anh Gia Lai Group (Viet Nam), Prestech International (Malaysia), Ratchaburi Electricity Generating Holding (Thailand), Vietnam-Lao Power (VLP, Viet Nam) and YTL (Malaysia). Furthermore, many power plants in the region owned by national utility companies were built by MNEs (box 3.4).

Box 3.4. Tenaga's power plants are built by MNEs from developed and developing countries

Tenaga (Malaysia) is one of the largest utility companies in the region. It operates in generation, transmission and distribution of electricity. It has increasingly invested in and operated in power generation projects abroad. In Malaysia, it owns many power plants, which have been built with the participation of MNEs. For instance in 2014, Tenaga had nine power plant projects in Malaysia at varying stages of completion, with most involving foreign EPC companies (box table 3.4.1).

Box table 3.4.1. Tenaga power plants in Malaysia are constructed by MNEs, 2014

Name of project	Installed capacity (MW)	EPC	Nationality	Commercial operation date	Stage of completion in 2014
Prai Combined-Cycle Gas Turbine	1,071	Samsung Engineering & Construction	Korea, Republic of	January 2016	79.9%
Manjung Coal-Fired Power Plant Project (Manjung 4)	1,010	Consortium: • Alstom • China National Machinery Import and Export Corporation • CMC Machipex	 France China China	2015	99.5% in August
Fast Track 3A Coal-Fired Power Plant (Manjung 5)	1,000	Consortium: • Sumitomo • Daelim	 Japan Korea, Republic of	October 2017	18.8% in August
Combined-Cycle Generating Plant Redevelopment Project	384.7	Sinohydro	China	September 2015	63.8% in August
Ulu Jelai Hydroelectric Project (2 x 186 MW)	372	Consortium: • Tindakan Mewah • Salini Costruttori SpA	 Malaysia Italy	December 2015 and March 2016	63.4% in August
Hulu Terengganu Hydroelectric Project 2x125 MW Puah and 2x7.5 MW Tembat	265	• Loh & Loh • Sinohydro	Malaysia China	September 2015 and December 2015 for the Puah units; March 2016 and April 2016 for the Tembat units	84.3% in August

Source: UNCTAD and ASEAN Secretariat, based on information from Tenaga Nasional company website and Annual Report 2014.

(c) EPC companies

Some MNEs help to build power plants in ASEAN as EPC entities, sometimes in cooperation with other players (table 3.4). They provide key engineering service, procurement of equipment and construction of power plants either entirely by themselves or through engaging subcontractors to carry out specific or specialized engineering work. In some cases it is difficult to distinguish between a sponsor or owner and EPC companies, as the latter also often own a stake in the power plant they built and are also involved in supplying equipment.

Some EPC MNEs in ASEAN power plant projects include Sharp (Japan) for the construction of a 52 MW solar power plant in Thailand, Vestas Wind Systems (Denmark) for the Burgos wind farm in the Philippines, the Siemens–Marubeni consortium for Chana combined power plant-2 in Thailand, Doosan Heavy Industries and Construction (Republic of Korea) for the Mong Duong 2 coal-fired thermal plant and Vinh Tan 4 thermal power plant in Viet Nam, and Sumitomo (Japan) for the various EPC power plant projects across ASEAN (box 3.5).

Other EPC contractors of power plants include the Alstom (France)–Marubeni (Japan) consortium, which in 2015 won the contract to build a new 600 MW lignite-fired power facility in Mae Moh, Thailand, for EGAT (Thailand).[4] Alstom will provide technological expertise and equipment such as the boiler, steam turbine and generator, while Marubeni will provide the rest of the equipment needed as well as civil and installation works. In addition, Conergy (Germany) is building an 8 MW solar power plant in Sa Kaeo, Thailand for B. Grimm Power (Thailand).

Doosan Heavy Industries and Construction (Republic of Korea) is an EPC contractor offering a wide range of services ranging from the manufacturing of boilers, power generation systems and desalination facilities to the construction of power plants. It has a presence in ASEAN through two subsidiaries in Viet Nam and sales offices in Indonesia, the Philippines and Thailand. It has won major power plant projects in Viet Nam as an EPC company and equipment supplier, making it a significant integrated power solution provider in that country (table 3.5).

(d) Subcontractors to EPC companies

Although many subcontractors are local companies, some are foreign MNEs engaged by EPC principals to perform specialized tasks. For instance, Black and Veatch (United States) was a subcontractor for the Siemens-Marubeni EPC consortium for the Chana combined power plant-2 in Thailand; Toyo Engineering (Japan) for the Mitsui & Co (Japan) EPC contract for the gas-fired cogeneration plants in Thailand; and Yokogawa (Japan) for the Doosan Heavy Industries and Construction (Republic of Korea) EPC contract for the Mong Dong-2 coal-fired thermal plant in Viet Nam.

GDF Suez's subsidiary Tractebel Engineering, based in ASEAN, provides engineering services for and technical advice on hydropower, renewable and thermal projects to clients in ASEAN. It has recently opened a branch in the Philippines. It provided engineering

Table 3.4. MNEs participate in electricity infrastructure value chains in ASEAN, selected projects

Project	Country	Location	Expected date of operation	Total capacity (MW)	Value ($)	Owners/ sponsors	Arrangement	EPC	Selected subcontractors	Remarks
Chana Combined Power Plant-2	Thailand	Songkhla	2014	800	435 million	EGAT	Turnkey	Siemens-Marubeni Consortium	Black & Veatch (for BoP equpment)	Siemens and Marubeni also supplied equipment. Fuel for the plant supplied from the offshore Thailand-Malaysia joint development.
A Luoi Hydroelectric Power Plant	Viet Nam	Thua Thien Hue Province	2012	170	202 million	Central Hydropower JSC	..	..	Cavico Corp for Tunnel	Involves construction of transmission lines and power stations
Ban Ve Hydroelectric Power Plant	Viet Nam	Nghe An Province	2010	320	390 million	Électricité de Vietnam	..	Song Da Corp	Cavico Corp	Involves construction of transmission lines and power stations
Burgos Wind Farm	Philippines	Ilocos Norte Province	2014	150	450 million	EDC Burgos Wind Power Corp	20 years fit-in-tariff	Vestas Wind Systems (Denmark)	First Balfour	Vestas also given O&M contract; First Balfour also acts as EPC for tranmission line development.
Gas Fired Cogeneration (120 MW x 9 projects; 130 MW x 3 projects)	Thailand	Industrial estates	2017–2019	1,470	2.4 billion	GED & Mitsui (Japan)	BOO	Mitsui	Toyo Engineering Corporation	..
Mong Duong-2 Coal-fired Thermal Plant	Viet Nam	Quang Ninh Province	2014	1,240	2.1 billion	AES (51%), Posco Energy (30%), China Investment Corp (19%)	BOT (25 years)	Doosan Heavy Industries and Construction (Republic of Korea)	Yokogawa Electric (Japan)	Doosan also supplied equipment. Vincomin supplied coal under a 25-year agreement. Financing came from 12 foreign banks, which included BNP Paribas, Crédit Agricole, HSBC, ING, Natixis.
Nam Theun 2 Hydropower Project	Lao PDR	Khammuan Province	2010	1,070	1.3 billion	NTPC, which is owned by Électricité de France International (France, 35%), EGCO (Thailand, 25%), Italian-Thai Development (Thailand, 15%), Government of Lao PDR, 25%	BOOT (31 years)	EDF (main developer)	AECOM (United States) for constructing transmission lines; three subcontracts to Japanese firms, one to ITD (Thailand) and another subcontract to a consortium of European and Canadian firms[a]	Also involves construction of transmission line across the Lao-Thai border. Four multilateral development banks (including that World Bank and Asian Development Bank) provided financing support along with development agencies of developed countries. Majority of the electricity from this plant is exported to Thailand.
Vinh Tan 4 Thermal Power Plant	Viet Nam	Binh Thuan	2018	1,200	1.5 billion	Vietnam Electricity Group (EVN)	..	Doosan Heavy Industries and Construction (Republic of Korea)	..	Company also supplies equipment for plant construction.
Banten IPP	Indonesia	Banten, West Java	2017	660	1 billion	Genting (Malaysia)	BOT (25 years)	Harbin (China)	..	25-year power purchase agreement with PLN. Lestari Banten Energi (95% owned by Genting) is the appointed operator.

Source: UNCTAD.

Note: BOO = build, own, operate; BOOT = build, own, operate, transfer; BOT = build, operate, transfer.

[a] http://www.oecd.org/dac/evaluation/dcdndep/44539854.pdf

Box 3.5. Sumitomo Corporation (Japan): An active EPC player in power industry in ASEAN

Sumitomo has extensive operations in ASEAN in different infrastructure sectors. It has built power plants in Indonesia, Malaysia, the Philippines and Viet Nam and has subsidiaries across the region. It plans to further expand its regional footprint, including in EPC activities.

In Indonesia, Sumitomo is the EPC contractor for the Kamojang geothermal power station (35 MW capacity) owned by Pertamina Geothermal Energy (Indonesia).[a] By 2014, Sumitomo Corporation had been involved with 11 EPC geothermal power construction projects in Indonesia, including some for which it was awarded contracts by Pertamina last year.[b] These projects account for about 50% of current and anticipated geothermal power generation in the country. Sumitomo has also built geothermal power stations in the Philippines.

The company is constructing a gas-fired power plant next to the Thilawa Special Economic Zone in Myanmar. The plant will start operation in 2016.[c] The company is also constructing a number of coal-fired thermal power stations and other power plants in Viet Nam. It is building the Pha Lai 2 coal-fired power station on an EPC turnkey basis. It is operating the Phu My 2-2 gas-fired combined-cycle power plant jointly with EDF (France) and Tokyo Electric Power Company (Japan) in an ongoing IPP project. And it recently won an EPC contract to construct the Duyen Hai 3 coal-fired thermal power station expansion project, to be completed by 2018.[d]

Source: UNCTAD and ASEAN Secretariat, based on information from Sumitomo Corporation company website and annual reports.

[a] Sumitomo Corporation, "Sumitomo Corporation Signs Deal with PT. Pertamina Geothermal Energy for Construction of the Fifth Unit of the Kamojang Geothermal Plant", news release, 7 October 2013 (http://www.sumitomocorp.co.jp/english/news/detail/id=27206).

[b] Sumitomo Corporation, "Contract Awarded by PT Pertamina Geothermal Energy for Construction of Units 5 and 6 at Lahendong Geothermal Power Station in Indonesia", news release, 12 December 2014 (http://www.sumitomocorp.co.jp/english/news/detail/id=28151).

[c] Sumitomo Corporation, "Contract Awarded for Construction of Units 1 and 2 of gas-fired power generation plant that will provide electricity to Myanmar's Thilawa SEZ", news release, 6 March 2016 (http://www.sumitomocorp.co.jp/english/news/detail/id=28411).

[d] Sumitomo Corporation, "Order Received for Construction of Duyen Hai 3 Extension Coal-fired Power Plant (1 x 688 MW) from Vietnamese State-run Power Company", news release, 26 November 2014 (http://www.sumitomocorp.co.jp/english/news/detail/id=28132).

Table 3.5. Doosan Heavy industries and construction: recent significant power projects in Viet Nam

Power plant	Total capacity (MW)	Contract award date	Estimated completion date	Scope of operation
Mong Duong 2	1,200	Dec 2010	2014	EPC
Mong Doung 1	1,080	Dec 2011	..	Supply of main equipment
Vinh Tan 4	1,200	Dec 2013	2018	EPC and supply of equipment
Nighi Son	1,300	Dec 2014	..	EPC and supply of equipment
Song Hau 1	1,200	April 2015	2019	EPC in power generation facilities and supply of equipment (e.g. boilers and turbines)

Source: UNCTAD, based on information from company's website.

Note: All plants are coal fired. EPC = engineering, procurement and construction.

services to the 120 MW SPR combined-cycle gas turbine projects in Thailand, the 410 MW Xepian Xe Namnoy and the 65 MW Nam Lik 1 hydropower projects in Lao PDR, the 90 MW First Gen Avion project in the Philippines and the 600 MW Vinh Tan 4 project in Viet Nam as well as for the strengthening of the West Kalimantan power grid in Indonesia.

Mitsui Engineering and Shipbuilding (Japan) has been awarded a subcontract for civil construction work for a recent Sumitomo EPC power plant project in Viet Nam, and Black and Veatch (United States) will be responsible for technical coordination work.

(e) Technology, equipment and other solution providers are active players in the region

Many MNEs operating in this segment of the value chain are expanding their presence in ASEAN because of their investment and contractual activities in power plant development. Many developed-country MNEs operate in this segment of the value chain. They provide dedicated equipment such as turbines and generators to EPC companies to build power plants or transformers. Other MNEs in this segment are solution or technology providers to power plant projects to support the power generation system.

For instance, Fuji Electric (Japan) supplied steam turbines and generators to Sumitomo's various recent EPC power plant projects in Indonesia. Mitsubishi Hitachi Power Systems (Japan) has been awarded a contract to supply key components (turbines and power generators) and Taihei Dengyo Kaisha (Japan) a contract to provide other equipment for the construction of Sumitomo's EPC gas-fired power plants in Myanmar in 2016. Toshiba Corporation (Japan) has been contracted to provide key equipment such as the steam turbine and generator, and Babcock and Wilcox (United States) the boiler for Sumitomo's EPC power plant project in Viet Nam, which is to be completed by 2018.

Aside from being an EPC contractor and holding equity stakes in IPP projects in Viet Nam, Sumitomo is also a supplier of equipment, such as to the A Vuong and Buon Kuop hydroelectric power plants (see box 3.5). ABB (Switzerland) provided high-voltage power transformers to EGAT in 2014 to support the transmission links from two hydropower plants in Lao PDR.

ABB (Switzerland) won a contract to supply an integrated electrical and control solution to a Slovakia EPC company, Istroenergo Group, for the construction of the 97 MW San Gabriel Avion open-cycle, gas-fired power plant in the Philippines, which is to start commissioning in 2015.[5] ABB won a contract to provide an automation system for the supercritical power plant in Banten Serang, Indonesia, which is being built by the EPC contractor, Harbin Power Engineering (China).[6] The plant is expected to start operation in 2016. ABB is also to provide system design, engineering, installation assistance, commissioning support and training. The plant is owned by PT Lestari Banten Energi (Indonesia), which in turn is owned by Genting (Malaysia).

GE, which has manufacturing operations in ASEAN, is also a major supplier of power equipment to plants across the region. For example, it manufactured and supplied about 100 gas engines to Navigat (Indonesia), which have been installed in power plants in Indonesia and Thailand, which together generated 330 MW of electricity. It has also supplied four 9F gas turbines to two power stations of EGAT (Thailand). For renewable energy power plants (solar and wind), GE has manufactured and supplied turbines to many projects in the region, which include 62 wind turbines for the construction of the Bac Lien wind farm in Viet Nam.

Northwind Power Development Corporation (Denmark) supplied wind turbine generators for the construction of the North Luzon wind power plant in the Philippines. Gamesa (Spain) was awarded a contract in 2015 to supply 25 turbines for wind farms in Nakhon Ratchasima (Thailand), which are to be developed by PowerChina ZhongNan (China).[7] Gamesa has a footprint in the Philippines and Viet Nam, where it has supplied equipment to power plants. Fuji Electric (Japan) won a contract in 2015 to supply geothermal steam turbines and generators to PT Pertamina Geothermal Energy (Indonesia) for Units 5 and 6 at the Lahendong geothermal area.

(f) Integrated power plant contractors

Some MNEs, such as Siemens (Germany), are involved in all or most of the electricity value chains in ASEAN. Siemens, through its various subsidiaries, has won several contracts in ASEAN to build power plants, which include EPC operations, supply of equipment and long-term maintenance activities. For instance, it is constructing a 414 MW combined-cycle gas-fired power plant in Batangas City, the Philippines, with equipment supplied from within the Siemens group. It will also operate the power plant for the owner, First Gen Corporation (Philippines).[8] In Thailand, it has been awarded contracts to supply 18 industrial gas turbines, which include providing technical assistance to install the turbines and the long-term maintenance work. Together with Samsung C&T (Republic of Korea), Siemens is building a 800 MW combined-cycle gas turbine power plant in Singapore for Pacific Light Power. As with other similar past projects (e.g. cogeneration combined cycle power plant for PowerSeraya), Siemens will also supply equipment and commissioning of the power plant.

(g) Manufacturing MNEs producing electricity for own use

As part of their strategy to reduce costs and improve competitiveness, some manufacturing MNEs are building power plants to generate electricity for their own consumption at their manufacturing plants in ASEAN. For instance, Asahi Glass (Japan) announced that it will be investing $400 million to build and own a 250 MW coal-fired plant at its Indonesian subsidiary PT Asahimas Chemical, in Banten. The move is being made to significantly reduce power costs, a major expense of the business. The power plant is scheduled to begin operation in 2017.[9]

3.2.2. Telecommunication value chains

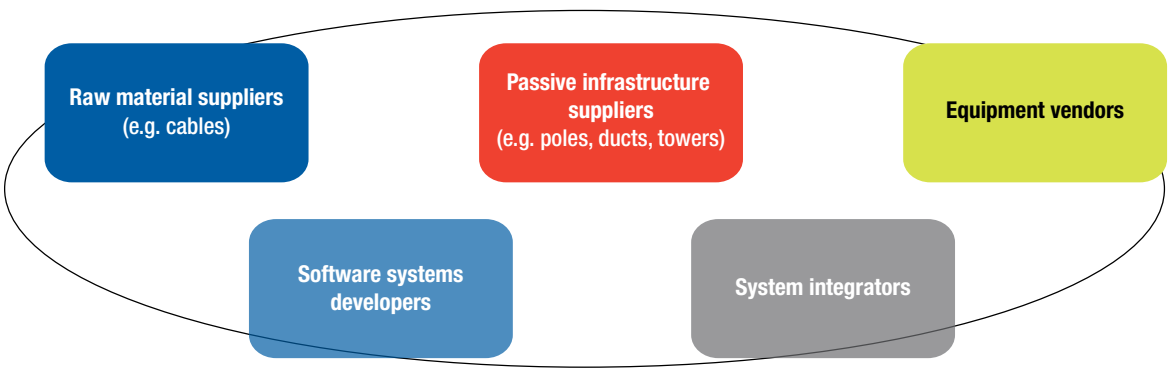
Telecommunication infrastructure consists of backbone transmission networks, switches, access networks such as base stations for wireless networks and supporting software systems. Backbones employ fibre-optic cable or wireless (microwave, point to point, and satellite) transmission systems. Access systems include wireless base stations or coaxial cable or copper to homes and businesses. Civil works are necessary as well, from digging trenches to raising towers and poles.

The telecommunication value chain can be broadly segmented into the provision and construction of infrastructure, the operation of telecommunication services and the provision of value added services. Of particular importance are the inputs used for investment in telecommunication infrastructure (figure 3.4).

Operators are at the centre of the telecommunication sector value chain. They make the decisions regarding infrastructure investment, users subscribe to their services, and third parties use their networks to provide add-on applications. Therefore, the starting point for an analysis of ASEAN's telecommunication segmentation is the operators themselves, particularly retail operators that have facility-based licenses.

The ASEAN telecommunication service market has two salient features. One is a relatively high level of privatization. Almost 60% of telecommunication operators are private or partly private entities (table 3.6). The second is foreign involvement. All ASEAN members except for Brunei Darussalam have at least one foreign strategic investor in their telecommunication sector. These strategic investors come from both within and outside ASEAN. Axiata (Malaysia) and Singtel have three investments each in ASEAN telecommunication operators. Vietnam's Viettel has two investments. Investors from outside the region include Ooredoo (Qatar), which has two investments through Asia Mobile Holdings (AMH), a joint venture with Singapore Technologies Telemedia, and two direct investments (in Indonesia

Figure 3.4. **Telecommunication infrastructure involves different inputs from different players**



Source: UNCTAD and ASEAN Secretariat.

Table 3.6. Main facilities-based telecommunication operations in ASEAN involve strategic investors

Country	Operator	Private (%)	Publicly listed	Strategic investor (country)[a]	Share (%)
Cambodia	CamGSM	100	..	..	..
	Metfone	[b]	..	Viettel (Viet Nam)	100
	Smart	100	..	Axiata (Malaysia)	88
	Telecom Cambodia	0	..	..	..
Indonesia	Indosat	86	✓	Ooredoo (Qatar)	65
	Telkom	47	✓	..	..
	Telkomsel	[c]		Singtel (Singapore)	35
	XL	100	✓	Axiata (Malaysia)	67
Lao PDR	ETL	0	..	..	..
	LTC	49	..	Asia Mobile Holdings (Singapore)	24
	Unitel	[b]	..	Viettel (Viet Nam)	51
Malaysia	Celcom	100		..	..
	DiGi	100	✓	Telenor (Norway)	49
	Maxis	100	✓	..	..
	TM	71	✓	..	..
Myanmar	MPT	0		..	..
	Ooredoo	100		Ooredoo (Qatar)	100
	Telenor	100		Telenor (Norway)	100
Philippines	Globe	100	✓	Singtel (Singapore)	47
	PLDT	100	✓	NTT (Japan)	26
Singapore	M1	100	✓	Axiata (Malaysia)	28
	SingTel	49	✓	..	
	StarHub	100	✓	Ooredoo (Qatar)	14
Thailand	AIS	100	✓	Singtel (Singapore)	23
	CAT	0		..	..
	DTAC	100	✓	Telenor (Norway)	43
	Jasmine	100	✓	..	..
	TOT	0		..	..
	TRUE	100	✓	China Mobile	18
Viet Nam	VNPT	0	..	..	..
	VinaPhone	0	..	..	..
	Mobifone	0	..	..	..
	Viettel	0	..	..	..
TOTAL	**37**	**22**	**15**		**17**

Source: UNCTAD and ASEAN Secretariat.
Note: MPT = Myanma Post and Telecommunication.
[a] Informatoin as of September 2015.
[b] Investment by foreign strategic operators that are government owned.
[c] 65% held by Telkom Indonesia, which is 47% private.

and Myanmar). Telenor (Norway) is active in three Member States (Malaysia, Myanmar and Thailand). Hutchison Whampoa (Hong Kong, China) has relatively small cellular operations in Indonesia and Viet Nam.

Although telecommunication operators account for the bulk of capital expenditure throughout the region, others are investing, too. Wholesalers are providing backbone transmission, the public sector is investing in government backbones and services, and private sector firms are deploying in-house networks.

(a) Raw materials suppliers

Although many ASEAN Member States host some degree of telecommunication equipment manufacturing, these manufacturers generally make components that are integrated into products by other companies. Some of these products, such as fibre-optic cable, might be used by local operators.[10] Fibre-optic cable requires inputs such as copper and aluminium, which typically need to be imported. Some fibre manufacturers are joint ventures with foreign partners. For example, OPCOM (Malaysia) is 30% owned by Sweden's Ericsson, and Sucaco (Indonesia) is 12% owned by Furukawa (Japan), which provides technical assistance to the company.

(b) Passive infrastructure

Passive infrastructure consists of conduits for transmission equipment such as ducts and towers for cables and towers for wireless antennas. The main costs for the development of this infrastructure are often not for the physical elements but rather for land acquisition, taxes, rent and civil works. Principal operators can outsource the construction work for their own passive infrastructure. In some cases, they may choose to lease it or sell it to independent operators and then rent it back. In some countries, towers are operated independently and operators lease space to place their antennas. Some operators may have subsidiaries to carry out these activities for financial reasons (e.g., the construction costs are borne by the subsidiary and therefore are not treated as capital expenditures by the operator which instead incurs operating costs to lease the facilities). Public entities such as road ministries, railway companies, electric utilities and local governments may also own passive infrastructure and lease it to operators. Singapore provides an example of a single passive infrastructure that is shared among different operators (box 3.6).

Private companies are involved in passive infrastructure, particularly for towers (table 3.7). Ideally, this reduces duplication and promotes infrastructure sharing by allowing for independent ownership and leasing to multiple operators on each tower. In Indonesia, operators have been selling their towers to independent operators and leasing them back. Telkom, the country's largest operator, divested 49% of its tower subsidiary to Indonesia's second largest target operator, Tower Bersama Infrastructure (TBI), in exchange for 6% equity, valuing each tower at $226,000. The country's third largest mobile operator, XL, sold some 3,500 towers to PT Solusi Tunas Pratama for $460 million and leased them back for a period of 10 years. The sale is somewhat surprising considering that XL's joint venture partner, Axiata (Malaysia) has a tower subsidiary with some 14,000 towers in Malaysia and Cambodia, as well as in Bangladesh and Sri Lanka, and 12,000 km of fibre in Pakistan.

Myanmar is a particularly interesting tower market. It has been estimated that some 17,000 telecommunication towers will be needed over the next few years to achieve 70% mobile coverage.[11] Digicel (Ireland) built more than 1,000 towers in Myanmar.[12] It established a 75% joint venture in Myanmar in 2013 for the tower business and is leasing the towers to one of the licensed operators. Windsor (Singapore) is building 500 towers to lease to Ooredoo's (Qatar) subsidiary in Myanmar. The Myanmar firm Pan Asia Majestic Eagle Limited recently

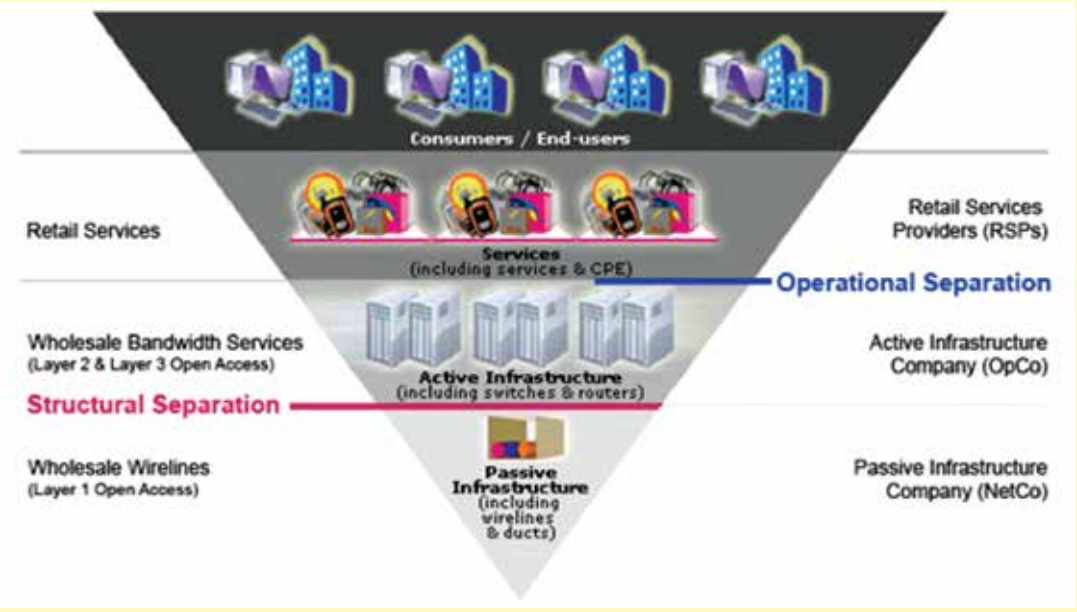
Box 3.6. Infrastructure sharing in Singapore

Another way of looking at segmentation in the telecommunication sector is the example of Singapore's Next-Generation Nationwide Broadband Network (Next Gen NBN), an open-access network funded with a government subsidy of up to S$1 billion. The Government designed Next Gen NBN in order to realize its vision of making the country an information and communications hub and to create new economic opportunities (box figure 3.6.1). The model called for creating an open-access fibre backbone and network in order to rationalize investment. Under the model, one company was selected to construct the fibre backbone and a second to develop the wholesale transmission network. Service providers utilize the network and pay regulated wholesale prices. The backbone company, NetLink Trust (formerly known as OpenNet) was selected in September 2008 and awarded a grant of up to S$750 million for the fibre backbone rollout. It owns all the fibre-optic cables and offers wholesale dark-fibre services to others on a nondiscriminatory basis. To facilitate deployment, NetLink Trust made use of relevant existing passive infrastructure, such as ducts, manholes and exchanges.

Nucleus Connect, a wholly owned subsidiary of operator StarHub, was selected as the operating company in April 2009 to develop and operate the wholesale transmission network. It began commercial operations on 31 August 2010.

The results have been impressive. By June 2015, there were 812,000 fibre subscriptions in Singapore. It ranked sixth in the world in fibre penetration in 2014.[a] According to the International Telecommunications Union (ITU), Singapore has the cheapest fixed broadband prices in ASEAN, the second cheapest in the Asia-Pacific region and the third cheapest in the world.[b]

Box figure 3.6.1. Singapore infrastructure-sharing model for Next Gen NBN



Source: Infocomm Development Authority of Singapore.

[a] http://www.ftthcouncil.eu/documents/PressReleases/2015/PR2015_FTTH_Subscribers.pdf

[b] http://www.itu.int/en/ITU-D/Statistics/Pages/publications/mis2014.aspx

Table 3.7. Tower ownership in ASEAN differs between Member States, 2015

Country	Number of towers	Owned by operators	Owned by tower companies
Indonesia	66,690	30,010	36,680
Malaysia	20,000	13,300	6,700
Myanmar	7,238	2,200	5,038
Thailand	55,000		
Viet Nam	55,000	45,000	10,000

Source: UNCTAD and ASEAN Secretariat, based on information adapted from TowerXchange Research (http://www.towerxchange.com/towerxchanges-analysis-of-the-independent-tower-market-in-asia/).

received $85 million in financing from a consortium of banks to deploy over 1,250 telecommunication towers for Ooredoo Myanmar.[13] Apollo Towers (United States) is deploying 700 towers to lease to Telenor Myanmar.[14]

(c) Equipment vendors

The most expensive segment is that for specialized equipment used to deploy telecommunication networks. The equipment market for this key telecommunication infrastructure is highly concentrated, with only about half a dozen global players: Huawei and ZTE (China), Ericsson (Sweden), Nokia Siemens Networks[15] (Finland) and Alcatel-Lucent (France) (table 3.8).[16] These vendors provide 2G/3G/4G wireless equipment as well as fibre-optic transmission equipment. They often provide an end-to-end solution for network deployment. Equipment selection is based on a variety of factors including technical solution, price and payment options. Data on the value of equipment awards is not available, often due to contractual arrangements. Ericsson's sales to ASEAN have averaged €15 billion since 2012.

Some equipment vendors are also active in constructing regional and international fibre-optic backbones linking ASEAN countries to each other and to global networks. Operator consortiums fund these networks (chapter 2).

Operators are generally not dependent on a single vendor. Although there may be costs in changing suppliers, the new vendor generally tries to minimize those costs. In addition, over time, innovations have made equipment more interoperable. Operators may select different vendors for separate components of their network, such as backbone transmission and mobile access networks, or for different generations of mobile telephony. M1 (Singapore) provides an example: it has worked with no fewer than four equipment

Table 3.8. Top telecommunication network equipment manufacturers are from Europe and China, 2014

Vendor	Headquarters	Revenue ($ billion)	Asia-Pacific sales, 2014			Contracts awarded in ASEAN (2013-2015)		
			$ billion	%	Scope	3G	4G	Backbone
Alcatel-Lucent	France	17	1.7	10	Excluding China	..	1	4
Ericsson	Sweden	33	2.3	7	SE Asia and Oceania	2	2	..
Huawei[a]	China	34	5.1	15	Excluding China	3	1	..
Nokia	Finland	17	4.4	26	Excluding China	4	1	..
ZTE[a]	China	9	1.4	15	Asia excluding China	..	3	1

Source: UNCTAD and ASEAN Secretariat, based on information adapted from company annual reports.

[a] Revenues for Huawei exclude "consumer business" and those for ZTE "handset terminals". Asia-Pacific revenue share refers to total revenues for those two companies.

vendors for different parts of its networks (table 3.9). Foreign strategic investors active in ASEAN also sign contracts with specific vendors for equipment to be used across their networks. By pooling their requirements in different markets, they can achieve economies of scale and obtain lower prices for equipment. For example, NEC (Japan) signed an agreement to supply routers and optical communication equipment to 13 telecommunication subsidiaries of Telenor (Norway) around the world, including those in Malaysia, Myanmar and Thailand.[19]

Table 3.9. Singapore M1 network deployments involve mainly European vendors, 2013

Network component	Vendor	Description
Microwave backbone	Ericsson	Expansion
900 MHz 3G network	Nokia	New network
All IP (Internet protocol) network	Nokia	Convert core infrastructure to IP
Small cell	Alcatel-Lucent	Enhance indoor radio coverage
3G network expansion	Huawei	Expand 2.1 GHz network
4G small cell	Alcatel-Lucent	Trial

Source: UNCTAD and ASEAN Secretariat, based on information adapted from M1 Limited data.

As networks transform to Internet protocol (IP), specialized Internet hardware companies are selling more equipment to telecommunication operators. Cisco (United States), which specializes in Internet router and switching equipment, has larger revenues than any of the global telecommunication equipment vendors. It is active in the region, supplying equipment to governments, private businesses, the academic sector and telecommunication operators. Examples include a private network for a consortium of ASEAN operators,[20] equipment for deployment of Wi-Fi hotspots for Indonesia's Telkom[21] and videoconferencing equipment in Viet Nam.[22]

(d) Software systems

Telecommunication networks are major users of software applications, such as for supporting network monitoring, performance, billing and operations support. This software is sometimes bundled with equipment and other times purchased separately, particularly for specialized applications. Although operators sometimes purchase from local software developers, global developers are usually the recipients of larger contracts. Software vendors sometimes join with local partners who have knowledge of local markets.

Examples include the following:

- In Malaysia, local company NSS MSC Sdn Bhd provided an encrypted SMS package for mobile operator Celcom.[23]
- Amdocs (United States) has won contracts for its applications from several operators in the region. It has a particular niche in mobile money. It was awarded a three-year contract to integrate Singtel (Singapore) billing and customer support systems for retail, enterprise and government users into a single platform.[24] In the Philippines, it was awarded a seven-year managed services engagement with responsibility for Globe's business support systems.[25] Amdocs has provided billing systems for True in Thailand,[26] VNPT in Viet Nam[27] and XL in Indonesia.[28]
- Dialogic (United States) teamed with Khine Thit Sar Co Ltd, a Myanmar telecommunication integrator and reseller, to provide intelligent call control software to Myanma Posts and Telecommunications.[29]

(e) System integration

Systems integrators are involved in activities such as linking equipment and software from different vendors, managing civil works and representing global companies in local markets. They tend to be domestic companies that are familiar with the local telecommunication industry and have connections with the different operators in the market. For example, Intex Telecom Systems[30] represents a number of major equipment vendors in the Philippines. It was one of Nokia Siemens Networks' first partners and also represents Huawei (China), Ericsson (Sweden), Alcatel (France) and ZTE (China). Another example is Ntegrator (Singapore), which operates throughout a number of ASEAN Member States (Cambodia, Malaysia, Myanmar, Singapore, Thailand and Viet Nam), designing, installing and implementing wired and wireless networks as well as providing project management, maintenance and support.[31]

3.2.3. Transport value chains

The transport infrastructure value chain is also complex. In ports, for instance, it involves engineering design, construction, development, equipment and material supply, and road and rail construction both in and linking to the port. In road infrastructure, a similar sequence of value chain segments exists.

(a) Ports

Port operators such as the Port of Singapore Authority, Hutchinson Port Holdings (Hong Kong, China) and DP World (United Arab Emirates) invest abroad to expand their core business in ports development and operation. Some international shipping companies also invest in and operate port terminals to support their shipping logistics businesses (table 3.10). Maersk (Denmark) has a 30% interest in Port of Tanjung Pelepas (Malaysia) through its port operating arm, APM Terminal. Other companies, such as Marubeni (Japan), have port interests in Thailand, although port operation and shipping are not their core businesses.

Other port MNEs and shipping companies are also partnering with local companies to build and operate port terminals in the region. Mitsui & Co. (Japan), Nippon Yusen Kabushiki Kaisha (Japan), PSA International (Singapore) and PT Pelabuhan Indonesia II (Indonesia) are building a $300 million container terminal at the Tanjung Priok Port in Jakarta.[32] In 2015, Mitsui O.S.K. Lines partnered with a local company (SahaThai Terminal) in Thailand to build a new barge terminal operation in Bangkok, which is expected to open in 2016. In Viet Nam, three Japanese MNEs (Mitsui O.S.K. Lines, Nippon Yusen KK, and Itochu Corporation) together with a local company (Vietnam National Shipping Lines) are building a $349 million container terminal in northern Viet Nam, to be completed in 2015.[33] The operation of Tan Cang-Cai Mep International Container Terminal I in Viet Nam is jointly owned by Hanjin (Republic of Korea), Mitsui O.S.K. Lines (Japan), Wan Hai (Taiwan Province of China), Saigon Newport (Viet Nam) and Vietnam National Shipping Lines.

Table 3.10. Major port and shipping MNEs are investing in ports in ASEAN (Selected cases)

Company	Activity	Headquarters	Selected subsidiary/affiliate	Selected host country	Remarks
DP World	Port investment and operator	United Arab Emirates	PT Terminal Petikemas, Surabaya	Indonesia	Owns 49% share of subsidiary; 51% owned by Pelabuhan Indonesia III (a State-owned company)
			Asian Terminal Inc.	Philippines	Has a stake in the affiliate
			Laem Chabang International Terminal	Thailand	Owns 34.5% share of the affiliate
			Saigon Premier Container Terminal	Viet Nam	Owns 80% of subsidiary; 20% owned by Tan Thuan Industrial Promotion Company (a State-owned company)
Hutchinson Ports Holding	Port investor, developer and operator in 26 countries	Hong Kong, China	Jakarta International Container Terminal	Indonesia	..
			Koja Terminal	Indonesia	..
			Port Klang	Malaysia	..
			Myanmar International Terminals Thilawa	Myanmar	..
			Hutchinson Laemchabang Terminal	Thailand	
			Thai Laemchabang Terminal	Thailand	..
			Saigon International Terminals	Viet Nam	..
SSA Marine	Port investor and operator	United States	Cai Lan International Container Terminal	Viet Nam	
			SP-SSA International Terminal, Cai Mep	Viet Nam	..
International Container Terminal Services, Inc.	Invest, develop, manage and operate container ports and terminals	Philippines	New Muara Container Terminal Services	Brunei Darussalam	..
			PT Makassar Terminal Services, South Sulawesi	Indonesia	
			PT Pbm Olah Jasa Andal, Jakarta	Indonesia	..
APM Terminals	Shipping and port terminal operations in 38 countries	Netherlands	Tanjung Pelepas	Malaysia	Has a 30% stake in the affiliate
			Laem Chabang	Thailand	..
			Cai Mep	Viet Nam	..
China Ocean Shipping (Cosco)	Shipping and logistics services	China	Cosco Corporation (Singapore)	Singapore	..
Evergreen Marine	Main business in shipping logistics	Taiwan Province of China	..	Malaysia Thailand	Owns container terminals in ASEAN Member States, such as in Malaysia and Thailand
Hanjin	Main business in shipping logistics	Republic of Korea	..	Viet Nam	Owns terminals in ASEAN Member States, such as in Viet Nam

Source: UNCTAD 2015b, based on information from companies' websites.

Aside from investors, other players also contribute to ports development by designing or building them. For instance, Mitsui Engineering and Shipbuilding (Japan) is providing 29 cranes estimated at $126 million in Port Klang (Malaysia). Indonesian Port Corporation, a State-owned operator, is expanding the port at Tanjung Priok, Jakarta. PT PP (Persero) (Indonesia) is the main contractor for the expansion project. Royal HaskoningDHV (Netherlands) won the contract to be the lead consultant, supervising the construction of the expansion of a section of the port with local subconsultant Atrya Swascipta Rekayasa.[34] The contract covers reclamation, revetments, an access bridge, a container yard and wharf structures. Van Oord (Netherlands) is to provide expertise to deepen the harbour, which includes reclaiming land.[35] Mitsui & Co. (Japan) won the contract to build, finance and operate the first container terminal.

Companies such as Antara Koh (Singapore) provided subcontracting services involving specialist tasks to other main contractors in port and other transport infrastructure projects in ASEAN. For instance, for a local company, it supplied and installed piles for container and general cargo docks at Ahlone International Port Terminal (1) in Yangon, Myanmar in 2014.

(b) Airports

Foreign and local companies in ASEAN also play an important role in airport development in the region. The construction of the $1 billion Changi Airport Terminal 4 in Singapore, to be completed in 2017, involves a portfolio of players. A consortium led by SAA Architects (Singapore) and including Benoy (United Kingdom), AECOM (United States) and Beca Carter Hollings & Ferner (SEA) (New Zealand) is responsible for the architecture and design work.[36] Local company CSC Holdings was awarded the contract to provide foundation works for the construction of the airport terminal building, ancillary buildings and other infrastructure, while Takenaka Corporation (Japan) is responsible for the construction work. Yongnam (Singapore) won a subcontract for structural steel work. The airport is owned by the Changi Airport Group.

Indonesia is building the $485 million Terminal 3 at the Soekarno Hatta International Airport (Jakarta).[37] The new terminal is part of an ongoing $1.24 billion airport expansion plan by operator Angkasa Pura II, which is a State-owned company. Many companies are involved in the building work. The terminal is being built by a consortium led by Wijaya Karya (Indonesia), and including Waskita Karya (Indonesia), Pembangunan Perumahan (Indonesia), Hyundai Engineering (Republic of Korea), Jaya Teknik Indonesia and Indulexco. Incheon Airport (Republic of Korea) and Jaya CM (Indonesia) are acting as project management consultants. Other airport specialists and other Korean companies based in Jakarta are involved with the project. Woodhead (Australia) is the lead architect and designer of the Terminal 3 complex.

Other ASEAN Member States have also expanded or upgraded their key airports, work which involved foreign and local companies. The $900 million Noi Bai International Airport Terminal 2 in Viet Nam, funded through Japanese official development assistance (ODA),

was opened in December 2014. The terminal was built by a group of companies that included Taisei Corporation (Japan) and local company Vinaconex (Viet Nam). Japan Airport Consultants provided supervision on the construction activities. Expansion of the Wattay International Airport in Lao PDR, estimated to cost $37.7 million, involved a number of companies. China CAMC Engineering Company was a main contractor, and Nippon Koei (Japan) won a consulting contract. In addition, a new cargo terminal, completed in 2011, was built by Lao-Japan Airport Terminal Building Service. Azusa Sekkei (Japan) designed the terminal and the Bank of Japan provided the $830 million financing facilities. Brunei Darussalam is modernizing and expanding its international airport using a consortium led by Changi Airport Consultants Contractors (Singapore) and AECOM (United States).[38] Trans Resources Corporation (Malaysia) and Swee Private Limited (Singapore) were subcontracted by the consortium to carry out the construction works.

(c) Rail

For urban mass rapid transportation systems, a portfolio of local and foreign companies with different skill sets work together to deliver the infrastructure. They include companies contracted for engineering design, rail network construction, station development, civil construction works, tunneling contraction, and production of equipment and system solutions including train sets. The rail value chain and the interconnection of players can be illustrated by the following cases.

Daelim Industrial (Republic of Korea) is building the $84 million, 8.5 km elevated section Line 3 of Hanoi's metro, to be completed in late 2016.[39] The line is expected to transport 200,000 people daily.[40] In 2014, a consortium of Shimizu (Japan) and Maeda Corp. (Japan) won the contract to build the 2.6 km underground section of Line 1 of Ho Chi Minh City's metro.[41] Hitachi (Japan) is to provide 17 three-car train sets, signalling, telecommunication, power supplies, platform screen doors, automated fare collection and depot facilities for the city's Line 1 metro network.[42]

In Indonesia, a consortium led by Mitsui (Japan), which includes Toyo Engineering (Japan), Kobe Steel (Japan) and local firm PT Inti Karya Persada Tehnik (IKPT) is to build a segment of Line 1 of the Jakarta metro.[43] Toyo Engineering is the project manager and will supply overhead electrification and substations, track work, escalators and lifts. Kobe Steel is responsible for systems integration, as well as supplying signalling, telecommunication, automatic fare collection and platform screen door equipment. IKPT is to undertake local installation and supply subcomponents. Sumitomo Corp (Japan) and Nippon Sharyo (Japan) will provide 16 six-car train sets for the Line 1 network. The metro will have the capacity to carry 173,000 people daily. Construction of Line 1 involved a consortium of Shimizu (Japan), Obayashi (Japan), Wijaya Karya (Indonesia) and Jaya Konstruksi (Indonesia) to construct two underground civil works packages. A consortium of Sumitomo Mitsui Construction Company (Japan) and PT Hutama Karya (Indonesia) will undertake another.[44] Sumitomo (Japan) and Nippon Sharyo (Japan) have established a railway engineering firm in Indonesia with a local partner.[45] Sumitomo was awarded a ¥13 billion contract in 2015

to supply MRT Jakarta (Indonesia) with 96 subway cars (as equipment supplier) for the North–South Line of the Jakarta Mass Rapid Transit system.

In Thailand, the 23 km Purple Line of the Bangkok Mass Transit System (BTS) is expected to begin operation in 2016. Construction of the line is being developed by Bangkok Metro Public Company under a 30-year PPP contract. CH Karnchang (Thailand), main contractor of the line, awarded Marubeni (Japan) and Toshiba (Japan) a contract to provide rolling stock and power, signalling, control, telecommunication and other railway systems for the line, along with 10 years of maintenance.[46] East Japan Railway's J-TREC is to provide 21 three-car metro train sets.

Local and foreign companies are involved in the construction of the northern extension of the BTS Skytrain Sukhumvit Line from Mo Chit to Ku Kot. These companies include Italian-Thai Development (Thailand) for civil works on the 12 km Mo Chit–Saphan Mai section. A joint venture of Unique Engineering & Construction (Thailand), Sinohydro (China) and China Harbour Engineering will construct the 7.5 km Saphan Mai–Ku Kot section.[47] Other contractors associated with the extension of this BTS line include a joint venture of Sino-Thai Engineering & Construction (Thailand) and AS Associate Engineering (Thailand). Construction of the 16-station extension is scheduled to be completed in 2020.

In Singapore, an urban rail project, Downtown Line Stage 1, was completed in 2013 with the participation of a number of companies on different construction and development activities.[48] Examples of the players include Taisei Corporation (Japan), which designed and constructed the line. Shimizu Corporation (Japan) constructed the tunnel between Promenade station and Marina Bay. Cross Street station was built by a joint venture of Soletanche Bachy (France), Koh Brothers (Singapore) and Samsung Engineering and Construction (Japan). The former two won the contract to carry out civil works for the project and were involved with the construction of the Bugis station and associated tunnels. The Chinatown station was built by Gammon Construction (Hong Kong, China). CPG Corporation (Singapore) was a subcontractor of the Soletanche Bachy and Koh Brothers joint venture for engineering, construction and management services for the tunnel construction near Bugis station. Alstom (France) installed the tracks and supplied the design and related equipment for the DTL Stage 1 project. Bombardier Transportation (Canada) and its subsidiary in Singapore supplied 73 three-car train sets. Westinghouse Brake and Signal Holdings (United Kingdom) supplied and installed the signalling system and platform screen doors. The communication systems were supplied by Singapore Technologies Electronics. Otis Elevator Company (United States) supplied, installed and commissioned 108 lifts. Constructions Industrielles de la Méditerranée (France) designed, manufactured and commissioned 299 escalators.

Downtown Line Stage 2 in Singapore, at an estimated $644.5 million, is due to be completed in 2015. The project also involved a portfolio of companies.[49] Some of these companies and their specific activities include Invensys Rail (United Kingdom) for comprehensive signalling and communication for the project, track laying by Alstom (France), design and construction work by a joint venture of GS Engineering and Construction (Republic of

Korea) and Hock Seng Infrastructure (Singapore). Tunneling works involved a number of companies, including SK E&C (Republic of Korea) and McConnell Dowel (Australia) for the design and construction of two tunnels and Shanghai Tunnel Engineering (China) for construction of a tunnel. A design and construction contract was awarded to SsangTong Engineering & Construction (Republic of Korea), which subcontracted the work to Mott Macdonald (United Kingdom).

(d) Bridges and roads

Various types of companies, foreign and local, are involved at different stages of road and bridge development. They include companies providing services for technical design, materials, construction, subcontracting, tunneling, equipment manufacturers and suppliers, and technology or solution system providers.

In bridge development, a subsidiary of LafargeHolcim (Switzerland) supplied cement for the construction of the $150 million, 705 m Phu My Bridge in Viet Nam. The bridge was constructed by a consortium consisting of Bilfinger Berger (Germany) and Baulderstone Hornibrook (Australia). Chau Thai Concrete Corporation 620 (Viet Nam) developed the bridge viaducts as a subcontractor. Freyssinet, a subsidiary of the Vinci Group (France), installed the cable stays, prestress and heavy lifts as a specialist subcontractor. The design of the main bridge was by Arcadis (France). Cardno (Australia) developed the approach structures. Cardno and Leonhardt, and Andrä und Partner (Germany) designed the temporary work and provided construction engineering services for the main bridge.[50] Societé Générale (France) provided financial facilities for the project with export credit loans from Germany, France and Australia. Subcontractors such as Antara Koh (Singapore) constructed the foundation for the Neak Loeung Bridge across the Mekong River in Cambodia in 2013 for the main contractor, Sumitomo Mitsui Construction (Japan). In 2011, Antara Koh undertook the foundation works for the construction of the Nhat Tan Bridge and a 3.9 km bridge section over the Red River in Hanoi for Sumitomo Mitsui Construction (Japan).

While the construction of roads is often dominated by local companies, foreign companies are significant players as solution or system providers. For instance, a consortium of Japanese companies comprising Toshiba Corporation, Hitachi and Itochu is to provide a $39 million intelligent transport system for part of Viet Nam's North-South Expressway. The system will include electronic toll collection, traffic control and equipment monitoring systems. Vix Technology (Australia) is developing a cashless payment system for the Kuala Lumpur-Klang Valley multimodal transport system.[51]

The Secondary National Roads Development project in the Philippines, which is due to be completed in 2016, involves different players in different stages of the road construction. Tetra Tech (United States) and Gauff Engenierre (Germany) are involved in the project design, while Katahira Engineers International (Japan) is responsible for the management and construction supervision of the project, Qingjian (China) is responsible for construction work under Contract Package 2, and Hanjin (Republic of Korea) together with Yakal (Philippines) is undertaking construction work under Contract Package 4.

The completed Marina Coastal Expressway in Singapore involved main contractors and subcontractors. The former includes a consortium of Mott MacDonald (United Kingdom), Samsung (Republic of Korea) and Ssangyong (Republic of Korea), in which each brought specific skill sets that contributed to the completion of the project.

The $40 million Vietnam–Lao PDR 2E highway was a priority project for the two countries. The highway was developed by a consortium consisting of Lao Transport Engineering Consult (LTEC), Transport Engineering Design Inc. (TEDI-Viet Nam), and Lao Cooperation. It involved eight bridges. LTEC and TEDI-Vietnam provided supervision and consultancy services, while Lao Cooperation Company carried out construction on 30 km of the highway. Road Company No. 18 (Viet Nam) constructed the remaining 38.2 km stretch. The Government of Viet Nam provided a 15-year soft loan facility for the project.

The construction of the $1.4 billion Da Nang–Quang Ngai Expressway in Viet Nam is expected to be completed in 2017.[52] The project involves a joint venture of Korean companies (Korea Expressway Corporation and Dohwa Engineering), which are to provide integrated project review and monitoring consulting services. A consortium of Japanese companies (Nippon Koei, Nippon Engineering Consultants and Chodai) and Thai Engineering Consultants won the contract to design and provide consulting services. A Japanese consultant based in Viet Nam (Fukken & Minami Consultant) is a subcontractor in the project. Two local Vietnamese companies will manage and implement the construction of the project (Civil Engineering Construction Corporation No. 4 and Thang Long Construction Corporation).

3.2.4. ICT-enabled value chains: e-commerce

The value chain of ICT, in particular telecommunication infrastructure, extends to downstream business operations such as e-commerce. Without ICT infrastructure, e-commerce would not exist in the way it does today. Yet, e-commerce is increasingly an important platform for trade, commerce and business development in the region, which is an important channel for promoting entrepreneurship and SMEs.

From the perspective of a small enterprise, engaging in business-to-business (B2B) e-commerce may be a requirement for participating in national or global value chains. Meanwhile, business-to-consumer (B2C) e-commerce may allow smaller firms to access new clients domestically and abroad. E-commerce currently accounts for less than 1% of the total retail sales in ASEAN (AT Kearney 2015), but this share is expected to grow.

High-quality and affordable access to ICT infrastructure and services are essential for enterprises and consumers to engage in e-commerce. At the most basic level, people need to be able to communicate by mobile phones. It is increasingly important for the Internet to be accessible and for data services to be provided in both urban and rural areas. Most Internet traffic now comes from mobile devices. High-speed, broadband connectivity is required to seize the full opportunities from e-commerce, including leveraging cloud solutions for the purchase of digital products that need high-quality broadband service.

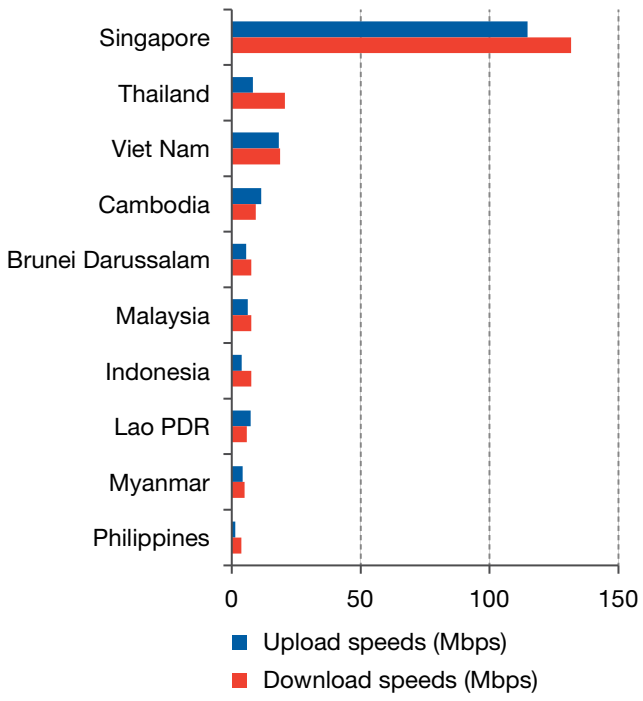
More and more goods and services are delivered over ICT networks. Such digital delivery can happen in several ways: instant and permanent download to the user's computer, limited download (for example, a rental product such as a video that expires after a certain time), streaming download or cloud storage (upload and download). The digital delivery process is affected by the quality of a buyer's Internet connection (UNCTAD 2013a). Whereas small digital products (for example, a song or a book) require a relatively slow download speed, videos require faster speeds. Low latency – that is, more direct routing over the network – is also critical for products such as videos.

The network speed situation in ASEAN varies. According to data compiled by the Ookla Net Index, average download speeds in July 2015 ranged from 3.7 Mbps in the Philippines to 131.6 Mbps in Singapore – the highest in the world (figure 3.5).

Singapore has the highest penetration of Internet access – 40 times more users than in Myanmar (table 3.11). More than half of all Internet users in Singapore already buy online, as compared with less than 10% in Indonesia and Thailand.

The proportion of enterprises that access the Internet is influenced by their size, with larger firms tending to have higher levels of use. For example, in Thailand, 20% of large enterprises placed orders online in 2012 but only 2% of micro enterprises. In Indonesia, the corresponding figures for 2014 were 54% for large enterprises and 4% for micro ones.[53]

Figure 3.5. **Singapore has the highest broadband speeds for households in ASEAN, July 2015** (Mbps)



Source: Ookla Net Index (http://www.netindex.com/download/allcountries/) (accessed 20 July 2015).

On the part of a seller, a web presence for accepting orders is necessary. About 110,000 e-commerce sites in the world generated non-negligible revenue in 2014.[54] Given that e-commerce sites require security software, a useful proxy for the quality of e-commerce infrastructure is the number of so-called secure servers that use encryption technology for Internet transactions. There are considerable differences between countries. In 2014, there were over 930 secure data servers per million inhabitants in high-income economies compared with one server per million inhabitants in the least developed countries. Such diversity is visible also in ASEAN,

Table 3.11. Uneven e-commerce readiness in ASEAN, 2014 (selected indicators)

Country	Share of individuals using the Internet (%)	Secure servers per million inhabitants	Rank in UNCTAD B2C e-commerce index	Share of Internet users buying online (%)[a]
Singapore	81.0	822.3	26	52
Malaysia	67.5	87.7	45	24
Brunei Darussalam	64.5	148.9	..	38
Viet Nam	48.3	11.9	90	..
Philippines	37.0	10.8	..	..
Thailand	34.9	23.5	70	7
Indonesia	17.1	6.3	88	10
Lao PDR	14.3	2.0	106	..
Cambodia	9.0	3.0	92	..
Myanmar	2.1	0.5	..	..

Sources: ITU, World Bank and UNCTAD.
[a] Data refer to 2014 for Indonesia, 2013 for Brunei Darussalam and Thailand, 2012 for Singapore and 2011 for Malaysia.

with only 0.5 secure servers per million people in Myanmar and more than 800 per million people in Singapore (table 3.11).

A 2013 UNCTAD study conducted in collaboration with the ASEAN Secretariat made several recommendations on how to better leverage cyber laws to contribute to the development of the ASEAN Economic Community (UNCTAD 2013b). The recommendations include commissioning an updated road map to help Member States develop and harmonize domestic e-commerce laws; strengthening information-sharing exchanges of best practices; building capacity; promoting a greater awareness of e-commerce legislation among users; strengthening cross-border harmonization on jurisdictional issues, conflict resolution and cooperation, including in cybercrime, consumer protection and e-signatures; and implementing a multiyear project on e-commerce and law reform.

E-commerce readiness among ASEAN economies varies considerably, but there are promising developments in most countries (UNCTAD 2015a). In the Philippines, growing exports of various ICT-enabled services are a good example of B2B e-commerce. In Cambodia, local retailers, such as Little Fashion and Shop168.com, allow customers to browse and order products online. They use private delivery services in Phnom Penh and receive cash on delivery. In Viet Nam, some companies are now specializing in addressing the delivery and payment function of e-commerce. A well-known example is Giao Hang Nhanh. In 2012, its first year of business, it delivered more than 60,000 orders; in 2013, it served more than 800 online merchants and handled over $70,000 of transactions per week.[55]

There is generally little information on cross-border trade and investment related to e-commerce in the ASEAN region. None of the top 10 Internet retailer companies in Asia are from an ASEAN Member State. The top five largest e-commerce sites were Zalora, Lazada, Reebonz, iBuyGroup (all of which are based in Singapore) and Groupon (United

States).[56] Several of them are active in multiple ASEAN Member States. Both Zalora and Lazada are partly owned by Rocket Internet (Germany).

3.3. Drivers and motivations of MNEs' infrastructure investment

In infrastructure activities, MNEs derive their competitive advantages from a variety of sources and invest mostly to access markets and increase revenue bases. In some cases, infrastructure-related companies invest in different segments of a value chain as part of their integrated business models by moving into upstream or downstream operations, or to support forward or backward vertical integration of core business functions. Non-infrastructure companies and financiers invest in infrastructure to diversify and hold a portfolio of assets, with varying degrees of risk-return arrangements.

Drivers and motivations can be categorized as "push" and "pull" factors (AIR 2013). The former relate to factors driving MNEs to invest abroad while the latter relate to locational and regional factors that lead MNEs to operate in the region.

The drivers and motivations of investment in infrastructure differ by companies and industries. Drivers include opportunities to exploit firm ownership advantages, corporate aspirations and other home country factors that drive infrastructure-related MNEs to venture overseas. Motives can be subdivided into four main types: market-seeking, resource-seeking, efficiency-seeking and strategic asset–seeking. For instance, MNEs investing in power generation activities in a host country with a view to selling to local buyers or exporting to neighbouring countries can be classified as having a "market-oriented motive". This is the case for Thai power companies, which have built power plants in Lao PDR to export electricity back to Thailand (e.g. EGAT International, EGCO and Ratchaburi Electricity Generating Holding). However, motives can also be mixed. Some of the companies in this group chose to invest in Lao PDR because they could gain access to ample hydropower resources (resource-seeking motive) and they are likely to regard the move as a more efficient strategy to secure energy supplies to serve the growing Thai market (strategic asset–seeking motive). Such power investment by Thai companies can also be motivated by efficiency-seeking motives in that it also helps to save the cost of power project construction and generation at home, both of which can be relatively higher.[57]

Infrastructure companies need to possess certain ownership advantages to invest abroad (table 3.12). These might include, for instance, engineering skills, technological superiority, or management skills in managing, constructing and operating complex projects. Possession of international brand names, a proven record of successful projects, and global networks and alliances (including strong financial resources) are also important advantages. Companies invest abroad to exploit their core skills or infrastructure business operations. For instance, the Port of Singapore Authority, DP World (United Arab Emirates) and Hutchinson Ports Holdings (Hong Kong, China) invest abroad in a horizontal overseas investment strategy to exploit core business skills in port investment and operation. The latter two MNEs have significant port operations in ASEAN. Malaysia Airports Holdings, exploiting its airport operations abroad, has managed two airports in Cambodia. It now has

Table 3.12. Infrastructure FDI is influenced by different drivers and motivations

Sources	Key factors	Specific elements
Firm ownership advantages	Proprietary advantage and knowledge	Possess technological capabilities and engineering skills, including a proven record in handling and managing huge, complex infrastructure projects. Building, managing and operating infrastructure assets is the core business.
	Brand names and global networks and reputation	Some infrastructure companies have reputations or brand names that have helped them secure infrastructure projects in ASEAN Member States. Increasingly infrastructure MNEs and construction companies from developing countries are emerging in the region because of their cost advantage and technological capabilities. Chinese companies are able to win contracts in ASEAN Member States partly because of their cost advantage.
	Financial capacity and access to financial facilities	Some infrastructure MNEs have access to the huge financial resources of the parent company and hence are able to invest in or operate projects that require large capital outlays. Some have easier access to finance that supports the undertaking of international infrastructure projects.
	Business models, strategy and alliances • Integrated business model such as linking upstream to downstream operations • Business networks and alliances to form consortiums, including through joint venture arrangements to take on large, complex projects, help pool expertise and resources, and spread out risks	Some MNEs invest abroad because they are pursuing an integrated business strategy. These MNEs move up the value chain from construction of assets for others to ownership and operation of assets in the host country. Some invest in infrastructure in host countries to support their core business operations. Strategic alliances and partnerships with other major infrastructure players under a consortium arrangement can also encourage overseas ventures. Oil and gas exploration and production, and coal mining companies invest in power generation plants. Shipping companies operate terminal ports in foreign countries.
Internationalization drive	To expand revenue bases and access new markets; sometimes to strengthen market share; to pursue aspirations to be among key global or regional market players. The need to be close to customers or have a significant presence by setting up subsidiaries or representative offices in host countries with rapidly growing infrastructure industries; also helps in securing contracts	With limited or saturated markets at home, many infrastructure companies in Malaysia and Singapore invest abroad or secure infrastructure contracts mainly in other developing countries. Korean, Japanese and European companies also invest abroad, in the face of saturated markets at home and encouraged by opportunities from internationalization. Equipment suppliers, solution providers, and engineering and construction companies set up operations in host countries. Many Japanese, Korean, Chinese, European and American construction and infrastructure-related companies have established a presence in ASEAN Member States.
Changing external environment	Technological change, providing new opportunity to technology suppliers to move up the value chain	Technology suppliers integrate power production such as in wind or solar power.

Table 3.12. Infrastructure FDI are influenced by different drivers and motivations (concluded)

Sources	Key factors	Specific elements
Home country factors	Limited or saturated market, making it difficult to support growth	Limited opportunities to grow and expand revenues
	Government policy supporting or encouraging going abroad	Examples include Singapore's enterprise internationalization policy and the Chinese and Thai governments' outward FDI policies.
	Support from home country banks and financial institutions in providing loans for investment in infrastructure projects	Exim banks providing support Commercial banks providing syndicated loans for infrastructure projects
	Competition at home	Drive home-based MNEs to diversify markets and increase growth from emerging markets
Host country measures	Market size and market attraction	Rapid economic growth, urbanization, and rising per capita and population growth indicate potential for strong growth in demand in infrastructure services. High-growth market attracts investment because of potential returns.
	Liberalization, deregulation and privatization	Sectors that were once closed for foreign investments are now open, with majority or wholly owned foreign ownership allowed in some cases. Industry liberalization opens up investment opportunities to MNEs. Privatization of power and telecommunication assets in some ASEAN Member States has led to the rise in the number of private players (e.g. IPPs in electricity, telecommunication operators). Some ASEAN Member States such as Singapore have privatized electricity generation assets, which provides opportunities for foreign MNEs to participate in power generation in the host country.
	PPP programme, concessions and huge infrastructure plans	Such programmes have attracted private participation in infrastructure in ASEAN.
	Bilateral and regional infrastructure cooperation programmes	Power purchase agreements between countries enable exports of electricity generated in one country to a neighbouring country.
Regional factors	Regional initiatives such as the ASEAN Economic Community and the ASEAN Connectivity programme	Regional initiatives or projects such as the ASEAN Power Grids, PPAs, Trans-ASEAN Gas Pipelines, SKRL, open skies initiative, and the proposed roll-on roll-off shipping programme (chapter 4).

Source: UNCTAD 2015b.

operations in India, Turkey and Qatar. Similarly, Changi Airports International (Singapore) is involved in development of and investment in airports in a number of countries including Brazil, the Russian Federation and India through joint partnerships with other companies.

Corporate strategy and aspirations can also be important forces driving infrastructure companies to venture abroad. Some infrastructure-related MNEs have internationalized to expand their market reach, global footprint and revenue bases through various approaches and for different reasons. They internationalize to grow and to be a major or larger player in their industry. These MNEs include Alstom (France), Axiata (Malaysia), GDF Suez (France), GE (United States), Hitachi (Japan), Huawei (China), ITD (Thailand), Singapore

Telecommunication, Telenor (Norway), and many other Malaysian, Singaporean and Thai infrastructure MNEs.

Some infrastructure-related companies invest abroad to pursue corporate development or expansion strategies (horizontal, vertical and diversification) (table 3.13). For instance, equipment suppliers or solution providers become owners of infrastructure assets in the power generation and telecommunication industries. Shipping companies invest abroad in port terminals to support their shipping businesses, and EPC companies may not only construct infrastructure assets abroad but also own and operate them.

Companies such as Keppel Corporation (Singapore) acquired and operate ports in Guangdong Province, China, to provide integrated logistics solutions for industrial clients based in and around that province. Maersk (Denmark), a shipping company, invests in port terminals in ASEAN countries to support its international shipping operations. Similarly, Hanjin Shipping (Republic of Korea), Mitsui O.S.K Lines (Japan) and Wanhai Lines (Taiwan Province of China) invested in and are operating Tan Cang Cai Mep International Terminal in Viet Nam in a joint venture with Saigon New Port to support their shipping businesses. Banpu (Thailand), a mining company, invests in and operates power plants at home and abroad.

Some MNEs invest abroad as a diversification strategy to bolster revenue streams from different business activities, such as sovereign wealth funds (SWFs) and commercial banks taking a stake in infrastructure projects located outside their home countries. There are also MNEs that invest in infrastructure projects as a result of emerging opportunities. For example, Toyo Ink (Malaysia), a chemical manufacturing company producing solvents and water-based ink, is building a power plant in Viet Nam. However, such cases are few.

Changes in the environment external to a company, such as the emergence of new technologies and climate change concerns, can provide an impetus for companies to venture abroad to take advantage of new opportunities. Renewable technology for power generation (e.g. wind, wave and solar) provides opportunities for a new set of power generation companies to invest in and operate abroad using new technology. The technological development in mobile phone and data service has provided opportunities for companies to get involved in telecommunication infrastructure and services in overseas countries.

In some cases, infrastructure MNEs invest abroad because of limited opportunities to grow at home and increasing competition in home markets (e.g. engineering and construction companies in Malaysia and Singapore). The support of home governments can play an important role in encouraging MNEs to invest abroad and in the region, for example, through international cooperation programmes (e.g. ODA) and provision of financing facilities. The encouragement provided by home governments (e.g. in China and Singapore) has helped companies from these countries venture abroad (AIR 2014, Wenbin and Wilkes 2011, UNCTAD 2007, Wee 2007). More and more countries are adopting outward FDI policies or measures to encourage their national companies, including infrastructure and construction

Table 3.13. Power, ports and telecommunication infrastructure companies with overseas expansion strategies, selected factors and cases

Strategy	Horizontal strategy	Vertical strategy	Diversification strategy	Opportunistic drive
Primary reason	Owners of infrastructure assets expand abroad to replicate their core infrastructure operation or exploit core skills.	Companies invest and operate in upstream or downstream or backward or forward integration to support integrated business models.	Companies in unrelated business areas invest in infrastructure activities abroad to diversify revenue sources from their core business operations (portfolio diversification).	Companies undertake infrastructure investment or projects to take advantage of opportunities in overseas locations where they have won contracts.
		Examples of industry		
Transport: ports	Ports operation is the core business. Companies invest abroad in container terminals for geographical expansion and diversification reasons.	Maritime shipping is the main business. Companies invest abroad in container terminals to support their shipping operations. Companies operate or invest in ports to support integrated logistics businesses for industrial customers.	Financial asset management is the main business. Companies invest in container terminals for valuation and revenue generation.	EPC companies and concession opportunities
Examples of port and related companies	• Port of Singapore Authority (Singapore) • Dubai Port World (United Arab Emirates) • Hutchinson Ports Holding (Hong Kong, China) • SSA Marine (United States) • International Container Terminal Services, Inc. (Philippines)	• APM (Denmark) • Cosco (China) • APL (Singapore)[a] • Evergreen (Taiwan Province of China) • Hanjin (Republic of Korea) E.g. Keppel Corp. (Singapore) invests in river ports in Guangdong Province, China. Hanjin Shipping (Republic of Korea), Mitsui O.S.K Lines (Japan) and Wanhai Lines (Taiwan Province of China) invest in Tan Cang Cai Mep International Terminal in Viet Nam with Saigon New Port.	• SWFs (Khazanah – Malaysia; Temasek – Singapore) • Corporate infrastructure funds (Macquarie Infrastructure Fund, Morgan Stanley Infrastructure Fund) • Commercial banks • Other financiers	
Transport: airports	Airport operation is the core business. Companies invest abroad in airport development and management for geographical expansion and diversification reasons.	Airline or courier service is the main business. Companies invest in airports or airport-related infrastructure (air cargo/freight hub) to support their airline or courier operations.	Financial asset management is the main business. Companies invest in airports for valuation and revenue generation.	EPC and concession opportunities
Examples of airport and related companies	• Malaysia Airports Holding (Malaysia) • Changi Airports International (Singapore) • Vinci (France) • Incheon (Republic of Korea) • Yongnam (Singapore)	• DHL • FedEx • Bangkok Airways • Emirates Airline	• SWF (Khazanah – Malaysia; Temasek – Singapore) • Infrastructure funds • Financial institutions	• Eversendai (Malaysia) • Muhibbah Engineering (Malaysia)
Utilities: power	Power generation is the core business. Companies invest abroad in power generation for geographical expansion and diversification reasons.	Oil, gas and coal production is the main business. Companies invest abroad in power generation to support their business integration models (from upstream to downstream activities). Some technology or equipment suppliers invest abroad to integrate different segments of the value chains from supplying equipment to power generation activities.	Financial asset management is the main business. Companies invest in power generation for valuation and revenue generation.	EPC and concession opportunities Companies win contracts or receive investment approval to develop and/or operate and manage infrastructure assets in a host country (e.g. Toyo Ink (Malaysia) is building a power plant in Viet Nam).

Table 3.13. Power, ports and telecommunication infrastructure companies with overseas expansion strategies, selected factors and cases (concluded)

Strategy	Horizontal strategy	Vertical strategy	Diversification strategy	Opportunistic drive
Examples of power and related companies	• EGCO (Thailand) • GDF Suez (France) • Electricité de France • Ratchaburi Electricity Generating Holding (Thailand)	• Banpu (Thailand) • Petronas (Malaysia) • Adaro Energy (Indonesia) • BP (United Kingdom) • GE (United States) • Alstom (France)	SWFs; commercial banks and infrastructure funds	• Contractors: Marubeni (Japan), ABB (Switzerland), Alstom (France), Zelan (Malaysia)
Telecom-munication	Telecommunication is the core business. Companies invest abroad in telecommunication infrastructure to exploit core skills and for geographical expansion reasons.	Providing telecommunication (e.g. mobile and data) services is the main business. Companies invest abroad as part of their business integration strategies and to expand their market bases.	Financial asset management is the main business. Companies invest in telecommunication for valuation and revenue generation.	EPC and concession opportunities
Examples of telecom-munication and related companies	• Axiata (Malaysia) • China Mobile (China) • SingTel (Singapore) • Huawei (China) • Ooredoo (Qatar) • Telenor (Norway)	• Axiata (Malaysia) • China Mobile (China) • SingTel (Singapore) • Huawei (China) • Ooredoo (Qatar) • Telenor (Norway)	SWFs; commercial banks and infrastructure funds	

Sources: UNCTAD 2015b and Rodrigue and Notteboom (2009).
Note: a A subsidiary of Neptune Orient Lines.

entities, to internationalize or regionalize (examples include Malaysia, Singapore, Thailand and Viet Nam).

State-owned banks, exim (export-import) banks and commercial financial institutions of a home country have played a role in supporting infrastructure companies in undertaking projects overseas (chapter 2). Chinese, Malaysian, Thai and Japanese banks, for instance, have provided financing facilities and long-term loans to their national companies that are involved with overseas infrastructure activities in the region. The China-ASEAN Investment Cooperation Fund has supported infrastructure activities involving Chinese MNEs (AIR 2014).

ASEAN infrastructure-related companies have internationalized or regionalized for a combination of "push" and "pull" factors (AIR 2013). Some do so to take advantage of opportunities in the rapidly integrating region or farther abroad. Some have been compelled to go abroad because of limiting factors in the home countries such as saturated markets and limited opportunities for growth.

Significant potential in a host country market attracts infrastructure investment. Potential draws include, among others, a rapidly growing economy, a large population and a commitment to huge national infrastructure investment plans. Countries in the ASEAN region possess many of these locational determinants (KPMG 2014b, PwC 2014).

Privatization of infrastructure assets and active promotion of private participation through PPP programmes in infrastructure have played a role in attracting investment involving MNEs. Similarly, PPAs between countries influence investment decisions in power generation projects such as that between Thailand and Lao PDR.

3.4. Conclusion

In general, the value chain of infrastructure industries ranges from design, construction and development to operation and management (O&M). The infrastructure value chain in ASEAN is complex and involves a portfolio of players. In each of the infrastructure sectors (power, transport and ICT) examined, different players bring specific skill sets to support the delivery of infrastructure. In most cases, these players work in close partnership or consortia involving many other subcontractors from raw material suppliers, engineering design companies and equipment suppliers to solution providers and specialized service contractors. In some Member States and infrastructure sectors, key value chain segments are dominated by MNEs (e.g. EPC contractors, equipment suppliers, solution providers). MNEs from developed and developing economies, including from ASEAN, are investing, building, operating, financing and managing infrastructure assets in the region.

Different companies may be involved at different stages of the value chain. In some cases, the same company may be involved across a number of segments from development to O&M, which reflects such companies' integrated business strategy, diversified skills and ability to win multiple contracts. Another set of companies might be involved at the construction or development stages. Some companies may provide only equipment or solutions to EPC contractors in the value chain. Each infrastructure sector has its own specific features and interconnections of different players, involving both local and foreign-owned entities. It is important to understand who plays what role in the infrastructure value chain so that projects can be packaged to target stakeholders.

MNEs' motives for investing in infrastructure in ASEAN vary. Winning infrastructure contracts is an important consideration. Most motives are related to market and strategic considerations. Some MNEs invest in infrastructure to support their core business in order to achieve overall operation efficiency. Upstream MNEs may invest in downstream infrastructure to establish an integrated business. Others invest to diversify into or across infrastructure chains or segments to generate revenues, reduce risk or increase corporate valuation. Some pursue a horizontal expansion strategy, investing overseas in order to maximize returns from exploiting their proprietary advantage, knowledge or skill sets. While most of these reasons can be associated with "push" factors, other reasons such as "pull" factors can also influence an MNE's participation. Rapid population growth, strong demand, urbanization, an affluent society and the commitment of ASEAN Member States to improving infrastructure have also encouraged regional and foreign companies to participate in infrastructure development.

Notes

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CHAPTER 4

INFRASTRUCTURE AND ECONOMIC CONNECTIVITY IN ASEAN

4.1. Introduction

ASEAN Member States are increasingly interconnected through physical, institutional and economic links. The implementation of regional programmes such as those in the Master Plan on ASEAN Connectivity and Declaration on the AEC Blueprint strengthens regional linkages. Sectoral programmes under the AEC pillar are also contributing to regional connectivity through investment, trade, production, services and infrastructure development.

Regional connectivity is shaped by development that is taking place at three levels: nationally, subregionally and regionally. It is also taking shape in three interrelated sectors or clusters of industries: infrastructure, infrastructure-enabled industry and infrastructure services, which have implications for attracting investment. These three levels are not just closely related but also mutually connected. In each of these levels, the private sector – both foreign and local – is involved. Also contributing to regional connectivity is the rapid growth in intraregional investment and regional value chains (RVCs). This growth, which is expected to continue, involves different players (e.g. B2B, intra- and inter-firm linkages) operating in different Member States (AIR 2014). The AEC, when fully implemented, will provide another impetus in influencing regionally oriented corporate strategies and encouraging foreign and ASEAN companies to expand their regional footprints (chapter 1).

Although much attention has been given in recent years to institutional arrangements related to regional connectivity, these arrangements alone will not bring about the connectivity desired to achieve regional integration. The role of the private sector is highly important. There is evidence that foreign and local private sector actors are already playing a role, but they need to participate more to help realize an environment that more strongly supports regional connectivity.

The landscape of ASEAN physical connectivity is expected to be considerably more densely drawn by 2030 than it is today. For example, the electrification rate is expected to reach nearly 100%, providing universal access to all in the region by 2030. The growth rate of ICT penetration is expected to rise significantly, providing modern connections to more homes and industries, and thus supporting development of more competitive downstream infrastructure-led businesses. In transport, the SKRL – which involves several ASEAN Member States – is expected to significantly reduce travel time from Kunming (China) to Singapore, and generate benefits along the route. With the completion of the last missing national roads in the AHN in 2015, ASEAN Member States are now physically interconnected by 23 designated national highway networks with a total length of 38,400 kilometers (km)

of road routes. Air transportation is expected to grow rapidly as a consequence of the increasingly affluent society, greater ASEAN connectivity, and growing regional cooperation to realize a single ASEAN aviation market. The total seat capacity of ASEAN airlines saw double-digit growth in 2009–2013, and the share of low-cost carriers in the region rose significantly, from 13.2% in 2003 to 57% in 2014.

Evidence indicates that physical and regional economic connectivity generate benefits to ASEAN Member States. Greater connectivity in ASEAN will have an important impact on the region's competitiveness and support more intraregional economic activities. Goods and people can be moved more cost-efficiently across the region, and more industrial areas as well as households can access electricity and stronger ICT connections. Regional value chain activities by ASEAN companies and MNEs will grow more intensely – further strengthening regional connectivity.

This chapter examines regional connectivity in the context of physical infrastructure, investment and business-to-business (B2B) activity. Owing to space and scope constraints, institutional and people-to-people aspects of ASEAN connectivity are not analyzed, although their contributions to strengthening regional connectivity are equally important. It highlights how the region is *currently* physically connected through power, transport and ICT infrastructure and economically connected through investment, production, trade, and inter- and intra-firm linkages.

4.2. ASEAN connectivity

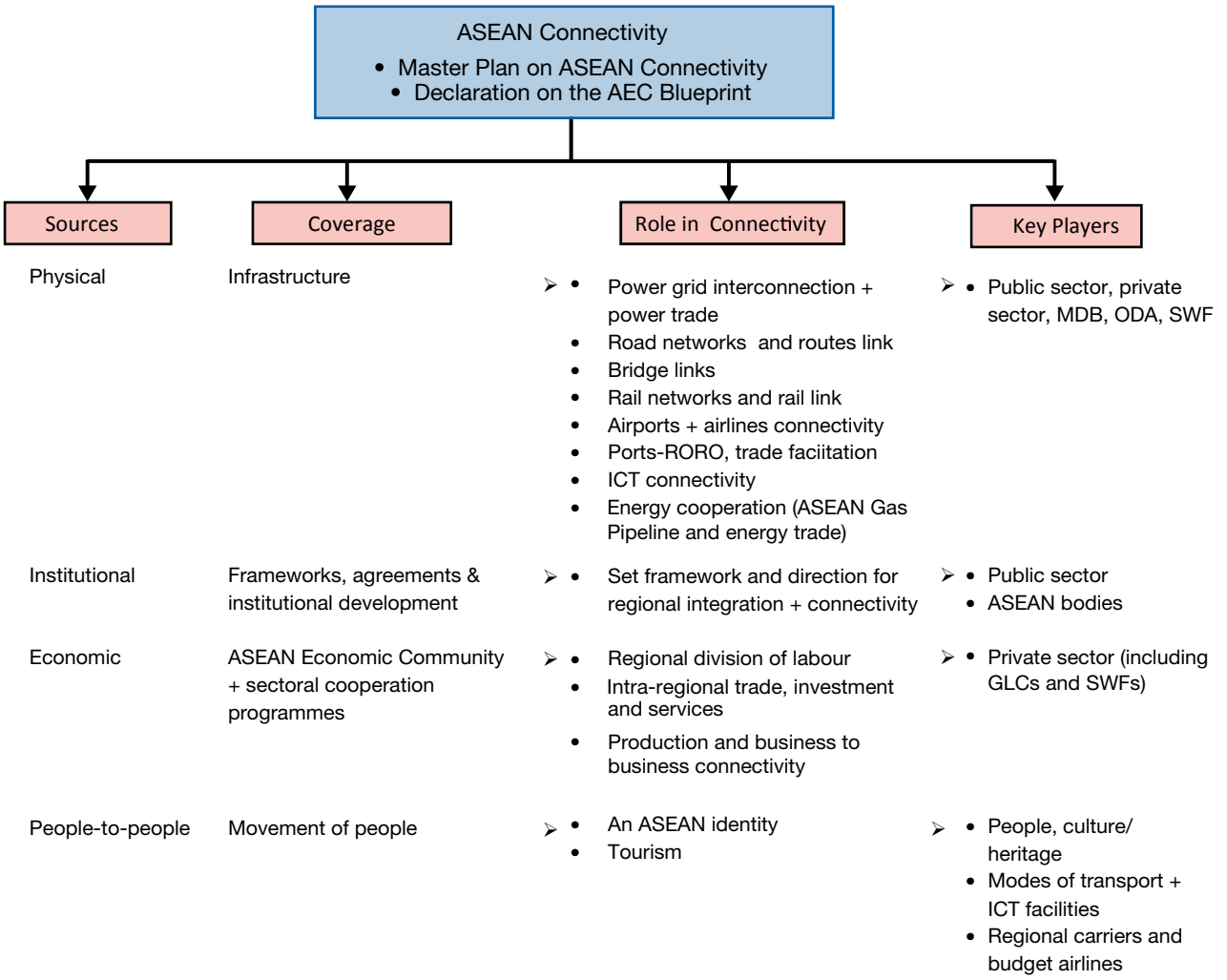
Two key sources of regional mandates provide the guiding principles for regional infrastructure and economic connectivity. They are the Master Plan on ASEAN Connectivity and the Declaration on the ASEAN Economic Community Blueprint (figure 4.1). The former covers connectivity in a broader context including physical aspects such as infrastructure, which expand the opportunities for MNEs to participate. The latter covers connectivity in the economic context such as through investment, trade, production and services, which have implications for MNEs' strategies.

In addition to infrastructure, institutional development in ASEAN is also central for regional connectivity. Much progress has been made in the area of the ASEAN Trade in Goods Agreement (ATIGA), the ASEAN Comprehensive Investment Agreement (ACIA), the ASEAN Framework Agreement on Services (AFAS), customs development (AIR 2014), and regional cooperation in transport, energy and ICT, which are all part of the AEC Blueprint.

4.2.1. Infrastructure connectivity

ASEAN Member States are increasingly interconnected through infrastructure development undertaken at the national, subregional and regional levels. Various major regional infrastructure projects have been identified and prioritized (table 4.1); some have been completed while others have yet to be implemented. Some subregional infrastructure projects, such as those related to the Brunei Darussalam–Indonesia–Malaysia–

Figure 4.1. **ASEAN Member States are connecting through four key sources of linkages**



Source: UNCTAD 2015b.
Note: GLC = government-linked company, ICT = information and communication technology, MDBs = multilateral development banks, ODA = official development assistance, RORO = roll-on/roll-off, SWF = sovereign wealth fund.

Philippine East ASEAN Growth Area (BIMP-EAGA), the Indonesia–Malaysia–Thailand Growth Triangle (IMT-GT) and the Greater Mekong Subregion (GMS), are also contributing to regional connectivity (annex tables 4.1 and 4.2). These projects include infrastructure development in power, transport and ICT.

ASEAN Member States are cooperating as well as individually implementing infrastructure projects that have significant national and regional connectivity aspects. Regional connectivity cannot be achieved without the development or upgrading of national infrastructure. When a national road or rail network within a Member State is completed and connected, it provides a strong foundation to realize regional connectivity by linking it to networks in other Member States. One implication of these developments is that by

Table 4.1. Regional infrastructure projects are connecting ASEAN Member States
(Selected cases)

Title of project	Sector	Objectives	Status/remarks
Construction of the AHN (completion of missing links and upgrade of transit transport routes in Lao PDR and Myanmar)	Road	The main objective of the AHN is to establish an efficient, integrated, safe and environmentally sustainable regional land transport corridor linking all ASEAN Member States and beyond. ASEAN Member States have been developing and upgrading various sections of the AHN as integral components of their national programmes.	Some ASEAN Member States face the challenges of poor-quality roads and incomplete road networks. Lao PDR and Myanmar have constructed the last missing links of the AHN. They and the other Member States are upgrading "below Class III" roads[a] in segments of the AHN. As of 2015, all the missing links in the AHN have been eliminated. However, efforts are under way to upgrade some routes in some Member States.
Singapore–Kunming Rail Link (SKRL)	Rail	The main objective of the SKRL is to provide a complementary mode of land transportation. It also aims to provide a more efficient and economical mode for cross-border cargo transportation in the region and beyond. The participating ASEAN Member States are to complete the SKRL missing links.	Some Member States are starting to upgrade their national rail networks and build high-speed rail lines. For instance, Malaysia and Singapore are making advances in their discussion to jointly build high-speed rail lines linking the two cities. Thailand has announced plans to start building high-speed rail lines running from north to south in the country.
ASEAN Broadband Corridor	ICT	The project aims to address different definitions of broadband speeds and promote greater broadband penetration and affordability as well as universal access in the region.	From 2013, the project covers the implementation of regional and national strategies to enhance penetration, affordability and universal access to broadband Internet service.
Melaka–Pekanbaru Power Interconnection	Power	This project supports investment in strategic transmission assets that connect countries, to optimize power networks by reducing the overall need for reserve capacity, improving system reliability, removing transmission bottlenecks and transmitting cheaper power from one area to another. Malaysia and Indonesia plan to exchange peaking capacity and spinning reserve to accommodate differences in their peak hours and load curves.	The project involves construction of a 500 kV high-voltage direct current (HVDC) power transmission line between Melaka (Malaysia) and Pekanbaru (Indonesia). It also includes the construction of a 600 MV ±250 kilovolt (kV) HVDC transmission line from Sumatra to Peninsula Malaysia as well as converter stations and other transmission facilities.
West Kalimantan–Sarawak Power Interconnection	Power	This project supports investment in strategic transmission assets that connect international boundaries, to optimize power networks by reducing the overall need for reserve capacity, improving system reliability, removing transmission bottlenecks and transmitting cheaper power from one area to another.	Sarawak (Malaysia) exports additional electricity to West Kalimantan (Indonesia), generating income for Sarawak Energy. West Kalimantan will benefit from the improved quality and reliability of power supply. The project will help diversify the energy generation portfolio by retiring old and inefficient oil-based power plants and reducing carbon dioxide emissions in Borneo.
ASEAN Roll-On/Roll-Off (RORO) Shipping Network and Short Sea Shipping	Port	The aim is to establish RORO routes in ASEAN to link mainland and archipelagic regions to provide a seamless intermodal transport system.	The RORO shipping network could reduce transport costs, and expand business activities and commerce, as well as improve local government revenues. The RORO is one of the prioritized connectivity projects.

Source: UNCTAD and ASEAN Secretariat.

[a] Under the AHN, Class III roads are two lanes (narrow) with double bituminous pavement. They can be used only when funding for construction and/or land for the road is limited. The type of pavement should be upgraded to asphalt concrete or cement concrete. Class III is also regarded as the minimum desirable standard. Upgrading of any road sections that are less than Class III to comply with the Class III standard should be encouraged.

Note: AHN = ASEAN Highway Network, RORO = roll-on/roll-off.

2030 the regional connectivity landscape will be one that is more interconnected in power, transport and ICT than it is today.

In addition to the regional projects covered in table 4.1, ASEAN is also increasingly interconnected through the development of the Trans-ASEAN Gas Pipeline (TAGP), which aims to develop a regional gas grid by 2020 to make it possible to transport gas across borders (ASEAN Secretariat 2012a). The TAGP has expanded to cover from piped gas to liquefied natural gas (LNG) as the options for gas supply in the region. Thirteen gas pipeline interconnection projects connecting six Member States bilaterally, with a total length of approximately 3,673 km, have been successfully commissioned as of 2015. Four LNG regasification terminals with throughput capacity of 17.8 million tonnes per year are now also operational. At least one more regasification terminal will be operational by 2020, and several more are in the planning, construction and capacity expansion stages.

4.2.1.1. Electricity

Power purchase and exchange agreements in ASEAN are increasing, which is contributing to regional connectivity. This increase highlights the growth of trade in electricity among ASEAN Member States. Countries with a surplus can export electricity more cost-effectively to other Member States with supply shortages.

ASEAN Member States have signed long-term bilateral power purchase agreements (PPAs) for export/import or exchange of electricity, involving different Member States (table 4.2).

Table 4.2. Increasing PPAs among ASEAN Member States, 2015 (Selected bilateral cases)

	Brunei Darussalam	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Viet Nam
Brunei Darussalam					X					
Cambodia				X					X	X
Indonesia					X					
Lao PDR		X							X	X
Malaysia	X		X				X		X	
Myanmar									X	
Philippines					X					
Singapore										
Thailand		X		X	X	X				
Viet Nam		X								

Source: UNCTAD 2015b and media sources.
Note: Each bilateral PPA between two ASEAN Member States can involve a number of PPAs with different power plants' companies in the producing country and a public utility company in the buying country.

These PPAs contribute to regional power connectivity. Some power plants, as in Lao PDR, are built and produce power to supply primarily to neighbouring countries, such as Thailand. A Member State may sign multiple PPAs with a power-exporting Member State covering several purchase arrangements with different power plants owned by different power-producing companies based in the latter. Many of the power plants involved in cross-country PPAs are associated with MNEs as owners, co-owners or contractors (chapters 2 and 3). Another important aspect of PPAs is that they increase production and market linkages in power supply in the region, hence contributing to strengthening the infrastructure connectivity between Member States.

ASEAN Member States are connecting through the ASEAN Power Grid (APG) system (box 4.1). The 16 power grid interconnection projects earmarked for the APG system will

Box 4.1. Power interconnection between ASEAN Member States, selected cases

Some ASEAN Member States have already established grid interconnections. Some are currently developing interconnections of transmission lines for power trade while others are already exporting or importing power. The list below provides selected cases of existing and ongoing power grid interconnection projects in the region.

Malaysia–Thailand Power Interconnection (existing)

Malaysia's national grid system is interconnected to Thailand's transmission system through an HVDC interconnection with a transmission capacity of 300 megawatts (MW) and a 132 kV HVAC overhead line with a maximum transmission capacity of 90 MW.

The Khlong Ngae (Thailand)–Gurun (Malaysia) 110 km transmission system connects the 230 kV AC network of Thailand with the 275 kV AC network of Malaysia, which started commercial operation in 2001. Siemens built the transmission infrastructure as a turnkey project, complete with the HVDC system design and network integration, delivery of the converter stations, AC switch gear, and the interconnecting 300 kV DC overhead line.

Malaysia–Singapore Power Interconnection (existing)

Malaysia's power grid is also connected to Singapore's transmission system by two 230 kV submarine cables with a firm transmission capacity of 200 MW.[a]

Malaysia–Indonesia Power Interconnection (ongoing)

Melaka (Malaysia) and Pekanbaru (Indonesia) are jointly developing a grid interconnection. This will involve construction of a 600 MW joint electricity network between Melaka and Pekanbaru. The interconnection is expected to cost $500 million. PLN, the Indonesian utility agency, will cover $300 million and Malaysia's TNB will bear $200 million.

West Kalimantan–Sarawak Power Interconnection (ongoing)

This project aims to connect the electricity grids in West Kalimantan (Indonesia) and Sarawak (Malaysia). The latter will export additional electricity to the former. The project is estimated to cost about $120 million, with $41 million to be covered by Malaysia. PLN (Indonesia) will build an 83 km, 275 kV transmission line from the Bengkayang substation to the border with Sarawak (Malaysia) while SESCO (Sarawak, Malaysia) will build a 42 km, 275 kV transmission line from the Mambong substation to the border with West Kalimantan (Indonesia).

further link the ASEAN Member States. Although the electricity transmission infrastructure is dominated by national utility agencies, the private sector is also involved — largely as a contractor in the development of this segment of the electricity value chain.

A primary objective of the ASEAN Power Grid is to achieve long-term security, availability and reliability of electricity supply through an integrated system. Existing power grid interconnections in the region (tables 4.3 and 4.4) connect several ASEAN Member States and involve 3,489 megawatts (MW). As of May 2015, a number of power grids are being developed to connect Lao PDR with Thailand, with Viet Nam, and with Cambodia; and Malaysia with Indonesia, with Brunei Darussalam and with Thailand, which will provide an additional 5,072 MW of cross-border power supply in the region.

A number of additional regional power grid interconnections can be expected by 2020 (Ibrahim 2014). They will include the interconnections between Sarawak (Malaysia) and Brunei Darussalam by 2018, between Lao PDR and Cambodia in 2017, between Malaysia and Sumatra (Indonesia) and the Philippines in 2020. Three more power grid projects — between Thailand and Malaysia, Thailand and Lao PDR, and Lao PDR and Viet Nam — are expected before 2020. In addition, the Lao PDR–Thailand–Malaysia–Singapore Power

Box 4.1. Power interconnection between ASEAN Member States (concluded)

Lao PDR–Viet Nam Power Transmission Interconnection (ongoing)

This project, with an estimated cost of $218 million, consists of two parts to be implemented between 2014 and 2018: (i) construction of a 59 km, 500 kV transmission line and a 230 kV/500 kV substation in Hatxan (Lao PDR); and (ii) construction of a 94 km, 500 kV transmission line and expansion of the existing 220/500 kV Pleiku substation in Viet Nam. The grid interconnection will involve transmission of 3,157 gigawatt-hours per year of electricity from eight small hydropower plants (with a total of 1,013 MW capacity) in southern Lao PDR, to be developed by independent power producers.

Thailand–Lao PDR 500 kV Substation Transmission Facility (ongoing)

The project, with an estimated cost of $106 million, covers a 500 kV line from Udon Thani (Thailand) to Nabong (Lao PDR). It aims to transfer power to Thailand from several hydropower projects in the Central-1 area of Lao PDR. These hydropower projects include Nam Ngum 2, Nam Theun 1 and Nam Ngiep 1, with a total installed capacity of over 1,500 MW, largely for export to Thailand.

Thailand–Lao PDR–Viet Nam Interconnection (ongoing)

This project, estimated to cost $278 million, will interconnect Thailand and Viet Nam via Lao PDR, and cover the Lao PDR–Viet Nam section. It will introduce a step change in the development of the regional power market and lead to reduced reserve requirements, lower costs and enhanced confidence in the regional power market.

A number of potential GMS power projects with connectivity prospects involving some ASEAN Member States have been identified (Asian Development Bank 2013b).

Sources: Asian Development Bank (2013a and 2013b), ASEAN Secretariat (2012b) and Tenaga (2014).

[a] Tenaga Nasional, Annual Report 2014.

Table 4.3. **More power grids interconnection to connect ASEAN**
(Capacity status as of May 2015 in MW)

	Existing	Ongoing	Future	Total
Northern System	2,659	3,942	15,774–18,924	22,375–25,525
9. Thailand–Lao PDR	2,111	3,352	1,865	7,328
10. Lao PDR–Viet Nam	248	290	..	538
11. Thailand–Myanmar	..	..	11,709–14,859	11,709–14,859
12. Viet Nam–Cambodia	200	..	..	200
13. Lao PDR–Cambodia	..	300	..	300
14. Thailand–Cambodia	100	..	2,200	2,300
Southern System	450	600	1,800	2,850
1. P. Malaysia–Singapore	450	..	600	1,050
4. P. Malaysia–Sumatra (Indonesia)	..	600	..	600
5. Batam (Indonesia)–Singapore	..	..	600	600
16. Singapore–Sumatra (Indonesia)	..	..	600	600
Eastern System	..	430	600	1,030
6. Sarawak (Malaysia)–West Kalimantan (Indonesia)	..	230	..	230
7. Philippines–Sabah (Malaysia)	..	..	500	500
8. Sarawak (Malaysia)–Sabah (Malaysia)–Brunei Darussalam	..	200	100	300
15. E.Sabah (Malaysia)–E. Kalimantan (Indonesia)	..	..	..	..
Northern-Southern System	380	100	300	780
2. Thailand–Peninsula Malaysia	380	100	300	780
Southern–Eastern System	..	..	3,200	3,200
3. Sarawak (Malaysia)–Peninsula Malaysia	..	..	3,200	3,200
Total	**3,489**	**5,072**	**21,674 - 24,824**	**30,235 - 33,385**

Source: HAPUA.

Note: numbers in the first column of the table relate to specific projects inidcated in table 4.4.

Integration Project aims to involve cross-border power trade of up to 100 MW from Lao PDR to Singapore through Malaysia and Thailand, using the existing grid interconnections. This pilot project has been positioned as a pathfinder on the road toward realizing the APG.

Although the volume of regional power trade is small, it has significant potential for further growth. By 2026, some 19,576 MW of cross-border power purchases and 3,000 MW of electricity exchange is expected to occur through cross-border interconnections in the region (Ibrahim 2014). When completed, the 16 currently earmarked grid interconnections will account for at least 10% of the total installed capacity in the region. As the region becomes more grid connected in the future, the volume of electricity trade and number of power plants are expected to grow.

Table 4.4. ASEAN grid interconnection projects are linking Member States (as of May 2015)

	Projects	Earliest commercial operation date
1	Peninsula Malaysia–Singapore (New)	Post 2020
2	Thailand–Peninsula Malaysia	
	• Sadao–Bukit Keteri	Existing
	• Khlong Ngae–Gurun	Existing
	• Su Ngai Kolok–Rantau Panjang	TBC
	• Khlong Ngae–Gurun (2nd Phase, 300MW)	TBC
3	Sarawak–Peninsula Malaysia	2025
4	Peninsula Malaysia–Sumatra (Indonesia) [a]	2020
5	Batam (Indonesia)–Singapore	2020
6	Sarawak (Malaysia)–West Kalimantan (Indonesia)	2015
7	Philippines–Sabah (Malaysia)	2020
8	Sarawak-Sabah–Brunei Darussalam	
	• Sarawak–Sabah	2020
	• Sabah–Brunei Darussalam	Not Selected
	• Sarawak–Brunei Darussalam	2018
9	Thailand–Lao PDR	
	• Roi Et 2–Nam Theun 2	Existing
	• Sakon Nakhon 2–Thakhek–Then Hinboun (Exp.)	Existing
	• Mae Moh 3–Nan-Hong Sa	2015
	• Udon Thani 3–Nabong (converted to 500KV)	2019
	• Ubon Ratchathani 3–Pakse–Xe Pian Xe Namnoy	2019
	• Khon Kaen 4–Loei 2–Xayaburi	2019
	• Nakhon Phanom–Thakhek	2015
	• Thailand–Lao PDR (New)	2019-2023
10	Lao PDR–Viet Nam	2016-TBC
11	Thailand–Myanmar	2018-2026
12	Viet Nam–Cambodia (New)	TBC
13	Lao PDR–Cambodia *	2017
14	Thailand–Cambodia (New)	Post 2020
15	East Sabah–East Kalimantan	Post 2020
16	Singapore–Sumatra	Post 2020

Source: HAPUA.

Note: TBC = to be confirmed

[a] Priority projects

4.2.1.2. Transport

The changing landscape of road networks in ASEAN from 1992 to 2015 highlights the growing regional transport connectivity. ASEAN Member States are connecting through the AHN, a regional arrangement agreed since 1999. A number of missing road routes which hampered AHN connectivity were reported in 2012 (ASEAN Secretariat 2012b). In 2015, all had been completed. These formerly missing links connect the ASEAN Member States from the CLMV countries (Cambodia, Lao PDR, Myanmar and Viet Nam) to Singapore. With strengthened regional cooperation in customs, including in technical standards, goods and people should move more cost-effectively in ASEAN than they have been able to do in the past. The road connectivity landscape in the region, in particular in the CLMV countries, has evolved rapidly since the 1990s (figure 4.2). However, more road transport networks have been planned for development and upgrading by Member States.

The AHN involves 38,400 km of roads. Some stretches of the national road networks such as in Lao PDR and Myanmar are being upgraded, and more roads are to be improved. The private sector, including MNEs, is expected to continue to play an important role in the development of road infrastructure as contractors and concession holders (chapters 2 and 3).

With no more missing links, the priority of recent AHN development work has been to upgrade the routes that are less than

Class III on the transit transport routes in Indonesia, Lao PDR and Myanmar. By 2020, all designated national routes are to be upgraded to at least Class I or primary road standards, and low-traffic-volume non-arterial routes to at least Class II standards. The total length of roads that are less than Class III has been reduced by 46.2%, from 5,311 km in 2010 to 2,454 km in 2015.

Land transport infrastructure implemented and planned at the BIMP-EAGA and GMS levels will also help strengthen regional connectivity (table 4.5; ADB-ADBI 2009, ADB 2015). For instance, when completed, the project to deepen the connectivity of the GMS Southern Economic Corridor and upgrade a road section in Cambodia connecting Battambang and Siem Reap will strengthen connectivity between Cambodia, Thailand and Viet Nam. Other planned projects that will help strengthen ASEAN's connectivity include the following:

- The proposed $0.5 million construction of the Poipet (Cambodia)–Klong Loeuk (Thailand) Railway Bridge.
- The $150 million road development from Luang Namtha Province (Lao PDR) to the Lao PDR–Myanmar Friendship Bridge.
- The Fifth Lao–Thai International Friendship Bridge across the Mekong River, which facilitates the transport of goods and people from northern Thailand through central Lao PDR and central Viet Nam by the NR8 land route.
- The $100 million East–West Economic Corridor Eindu–Kawkareik Road Improvement, which is part of the AHN.
- The $60 million Mae Sot (Thailand)–Myawaddy (Myanmar) border crossing and infrastructure improvements that include 16.9 km of four-lane divided highway (13.3 km in Thailand and 3.6 km in Myanmar), a 100 meter bridge across the Moei River at the border, and associated border-crossing facilities.
- The $30 million Friendship Bridge over the Mekong River at Xiengkok (Lao PDR) and Kainglap (Myanmar).
- The $2 billion Bang Yai–Kanchanaburi Intercity Motorway, which is an important component of Thailand's National Highway Development Plan and part of the Laem Chabang–Bangkok (Thailand)–Dawei (Myanmar) Corridor.
- Viet Nam plans to improve the 900 km Southern Economic Corridor, R10 route, linking Dawei in Myanmar to southern Viet Nam. The route will facilitate transportation of goods in the subregion and is expected to support social, tourism and cultural exchanges among the constituent countries.[1]

Existing bridge links between ASEAN Member States such as those between Thailand and Lao PDR; Thailand and Myanmar; Lao PDR and Myanmar; Malaysia and Singapore; and Brunei Darussalam and Malaysia have helped establish connectivity and increase transportation development, including tourism.

The SKRL will further strengthen rail connectivity between major cities in ASEAN. The SKRL, with rail running from Kunming (China) to Singapore, involves seven ASEAN Member States. The SKRL is a prioritized project of the ASEAN transport cooperation effort

Figure 4.2. **Greater road network connectivity in selected ASEAN Member States, 1992, 2005 and 2015**

GMS infrastructure improvements: Road transport network 1992

GMS infrastructure improvements: Road transport network 2005

GMS infrastructure improvements: Road transport network (2015 Committed)

Source: ADB.

Table 4.5. Transport infrastructure projects in the GMS also contribute to connectivity

Selected investment projects	Country coverage	Sector	Cost estimate ($ million)	Cost to country
Poipet–Aranyaprathet New Road with Cross-Border Facilities	Cambodia, Thailand	Road	..	Cambodia
Mekong River Bridge at Xiengkok (Lao PDR)–Kainglap (Myanmar) along the ASEAN–India Highway	Lao PDR, Myanmar	Bridge	23	Lao PDR
Mekong Bridge at Paksan–Bungkane (with Thailand)	Lao PDR, Thailand	Bridge	..	Lao PDR
Selamphao Bridge at the end of NR14A between Lao PDR and Cambodia	Cambodia, Lao PDR	Bridge	30	Lao PDR
Mekong River Bridge at Xiengkok (Lao PDR)–Kainglap (Myanmar) along the ASEAN–India Highway	Lao PDR, Myanmar	Bridge	16	Myanmar
Mae Sot–Myawaddy Border Crossing and Infrastructure Improvements	Myanmar, Thailand	Other infrastructure	30	Myanmar
Aranyaprathet–Poipet New Road with Border-Crossing Facilities	Cambodia, Thailand	Road	..	Thailand
Mekong Bridge at Bungkane–Paksan	Lao PDR, Thailand	Bridge	..	Thailand

Source: ADB 2013b.

and under the Master Plan on ASEAN Connectivity. When completed, it will connect the capital cities of Cambodia, Lao PDR, Myanmar, Thailand and Viet Nam. The SKRL "Eastern Line" will run through Thailand, Cambodia, and Viet Nam, and a "Western Line" will run through Thailand and Myanmar. There are missing links or links that need to be rehabilitated in six Member States: Cambodia, Lao PDR, Malaysia, Myanmar, Thailand and Viet Nam. Some SKRL-related projects in selected ASEAN Member States are at various stages of development (table 4.6).

The Kuala Lumpur–Singapore high-speed rail link discussion between the governments of Malaysia and Singapore has made significant progress. However, the exact date for commence of the construction of the link has yet to be agreed. Thailand and Lao PDR have announced plans to construct their parts of the SKRL segments.

Intercountry rail projects developed or to be developed at the subregional level will further connect ASEAN Member States. A number of rail projects have the potential to connect the CLMV countries under the GMS programme. For instance, the railway project from Batdoeung (Cambodia) to Lock Ninh (Viet Nam), estimated to cost $1.1 billion, will connect the two countries (ADB 2013b). Similarly, the 145 km Ho Chi Minh–Loc Ninh rail link, estimated to cost $900 million, will help deepen the rail network links between Viet Nam and Cambodia. When complete, the planned high-speed rail networks in a number of ASEAN Member States will considerably change the rail transport infrastructure landscape in the region (table 4.7).

ASEAN Member States are building, expanding and upgrading airports, which will also strengthen connectivity through air travel and tourism (chapter 2). The

Table 4.6. The SKRL will further connect ASEAN Member States

Country	Missing sections, route and spur lines	Rail length		Feasibility study status	Construction status	Planned completion year
		Existing length of section	New construction			
Cambodia	Poipet (Thailand border)–Sisophon	..	28	Completed	Ongoing	2016
Cambodia	Phnom Penh–Tra Peang Sre (Cambodia/Viet Nam border) (Cambodia/Viet Nam border)	32	255	Completed	Seeking funding	2025
Viet Nam	Loc Ninh (Cambodia/Viet Nam border)–Ho Chi Minh City	20	129	Completed	Seeking funding	2025
Thailand	Aranyaprathet–Klongluk	..	6	Completed	Completed	2015
Lao PDR	Vientiane–Thakhek*	..	330	Ongoing	Date of commencement to be determined	Beyond 2025
Lao PDR	Thakhek–Mu Gia (Viet Nam border)*	..	136	Ongoing	Date of commencement to be determined	Beyond 2025
Viet Nam	Mu Gia (Lao PDR border)–Tan Ap[a]	..	53	Pre-Feasibility Study completed	Date of commencement to be determined	Beyond 2025
Viet Nam	Tan Ap–VungAng[a]	6	66	Ongoing	Date of commencement to be determined	Beyond 2025

Source: ASEAN Secretariat and SKRL Fact Sheet Summary cited in ASEAN Secretariat (2012b).
[a] spur line.

numbers of airlines using or benefiting from these airports have also risen. The numbers of ASEAN-based airlines including budget carriers have grown. The numbers of planes of many low-cost carriers in the region have increased rapidly in recent years. Lion Air operating from Indonesia alone is expected to saw its fleet size rise from 91 in January 2013 to 105 in January 2015, Air Asia's operation from Malaysia only is projected to see its fleet increase from 64 in January 2013 to 76 in January 2015, and Malindo Air based in Malaysia is projected to have a new fleet of 10 aircrafts by January 2015 (Sobie 2014). In addition, the numbers of seats offered by domestic and international airlines in the region have also increased significantly, from 33.6 million in 2005 to 188 million in 2014.

These airports and local airlines are contributing to regional connectivity through the provision of affordable transportation, movement of people and tourism. The numbers of intra-ASEAN visitor arrivals have risen from 34.8 million in 2010 to more than 45.2 million in 2014.[2] ASEAN cooperation in establishing an ASEAN Single Aviation Market will further accentuate regional air travel connectivity (box 4.2).

Table 4.7. Many high-speed rail networks in ASEAN expected by 2022

Country	Length (km)	Stations (no.)	Cost ($ billion)	Expected opening
Indonesia	144	6	6.17	2020
Indonesia	685	9	21.4	2022
Philippines	84	3	3.00	..
Thailand	745	13	7.04	2021
Thailand	221	5	2.22	2022
Thailand	615	..	..	..
Thailand	982	..	..	..
Viet Nam	1,630	..	..	2020
Malaysia–Singapore	400	..	2.44	2020
Lao PDR–Viet Nam	220	11	5.00	2017
Total	**5'726**	**47+**	**47.27+**	**..**

Source : Southeast Asia Infrastructure Research.

Box 4.2. ASEAN Single Aviation Market will increase air travel connectivity

ASEAN Member States are implementing an open skies policy in 2015 as part of the formal ASEAN Single Aviation Market (ASAM). The following related agreements have been signed: the ASEAN Multilateral Agreement on Air Services, the ASEAN Multilateral Agreement on the Full Liberalization of Air Freight Services and the ASEAN Multilateral Agreement on the Full Liberalization of Passenger Air Services along with their respective protocols.

These agreements provide the competitive space for greater expansion and opportunities for air travel within the ASEAN region, in terms of more destinations, increased capacities and lower fares. The open skies agreements and related protocols have entered into force and been operationalized. These agreements contributed to the development of low-cost carrier operations, which now account for more than half of all airline capacity in the region. Several intra-ASEAN international routes are now the busiest in the world. The enhanced air connectivity has contributed to the development of tourism within the region. In 2014, ASEAN recorded a new high for visitor arrivals into the region – more than 105 million, a 2.8% increase from 2013.

The ASAM is one of the key pillars supporting the establishment of the AEC by facilitating free, efficient, safe and secure movement of people and goods within and potentially beyond ASEAN. The ASAM includes economic initiatives related to ownership and control, charters, tariffs, competition law, consumer protection, airport user charges, dispute resolution and dialogue partners. ASEAN Member States also put effort into the liberalization of air transport ancillary services, which will put in place the system and process for economic liberalization and regulatory convergence in support of the ASAM.

In addition to economic components, the ASAM also covers technical components, including aviation safety, aviation security and air traffic management. Within Aviation Safety, ASAM initiatives achieved significant progress in developing the ASEAN Aviation Regulatory Monitoring System, the ASEAN Foreign Operator Safety Assessment, and the Mutual Recognition Arrangement on Certificates, Approvals and Licences of Civil Aviation. Under the ASAM, the following measures have been completed: (1) the ASEAN Regional Contingency Plan; (2) the Capacity-Building Framework on Air Traffic Management; and (3) identification of key regional initiatives and required enabling technologies.

Source: ASEAN Secretariat.

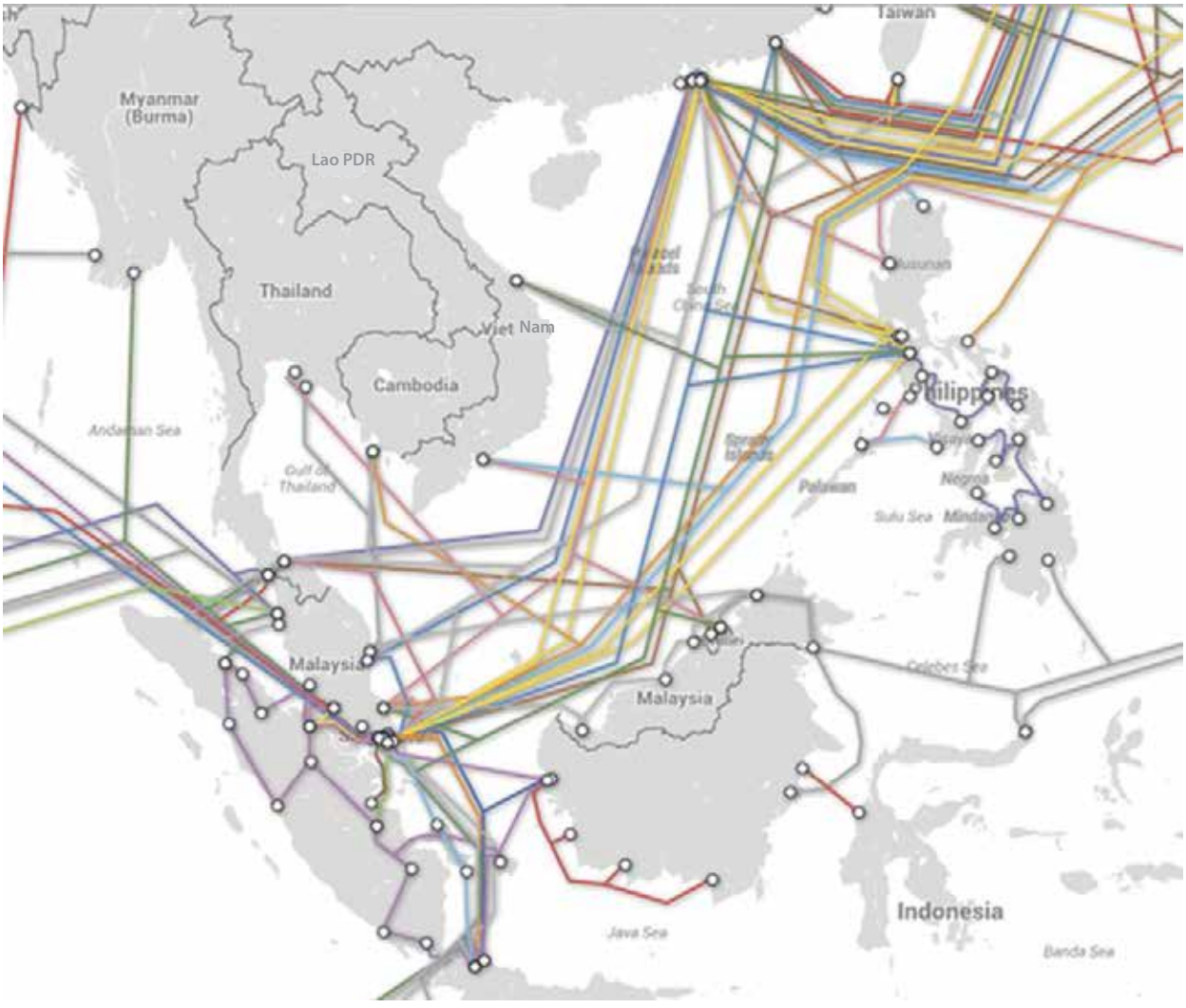
4.2.1.3. ICT

Regional cooperation on ICT, such as the ASEAN Broadband Corridor and inter-country projects, is contributing to reducing the digital divide and increasing ICT connectivity in the region. Some of the ICT equipment vendors in ASEAN are active in constructing regional and international backbones that link Member States to each other and to global networks. Operator consortiums fund these networks. For example, Huawei is building an undersea fibre cable to link Malaysia, Cambodia and Thailand.[3] The SEA-ME-WE 5 submarine fibre-optic cable running from Singapore to France, being constructed by Alcatel-Lucent, will traverse Indonesia, Malaysia, Myanmar, Singapore and Thailand.[4] NEC is building an Asia-Pacific gateway, connecting Singapore, Malaysia, Thailand and Viet Nam.

Regional interconnectivity has increased, and today ASEAN is criss-crossed by numerous submarine cable systems (figure 4.3). They interconnect ASEAN nations as well as other countries within the Asia-Pacific region and on to global fibre-optic backbones.

All ASEAN Member States that border another have a transborder link (table 4.8). Most also have at least one submarine cable in common with one or several ASEAN Member States. However, participating in the same undersea cable network does not necessarily mean there is end-to-end connectivity between all the countries involved, as additional transmission gear must be installed between any two countries. Thailand and Viet Nam are the most connected, with terrestrial telecommunication connections to all their bordering neighbours and on one or more undersea cable networks with the other countries.

Figure 4.3. **ASEAN Member States are also interconnected through undersea fiber-optic cable networks, 2015**



Source: http://www.submarinecablemap.com/#/.

Table 4.8. Inter-ASEAN telecommunications connectivity involves all Member States

	Brunei Darussalam	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Viet Nam
Brunei Darussalam			UF		TF+UF		UF	UF	UF	UF
Cambodia				TF	UF		UF	UF	TF	TF
Indonesia	UF				T+UF	UF	UF	UF	UF	UF
Lao PDR		TF				T			TF	TF
Malaysia	UF	UF	T+UF				UF	TF+UF	TF+UF	UF
Myanmar	UF		UF		UF		UF	UF	T	UF
Philippines	UF	UF	UF		UF	UF		UF	UF	UF
Singapore	UF	UF	UF		TF+UF	UF	UF		UF	UF
Thailand	UF	TF	UF	TF	TF	TF	UF	UF		UF
Viet Nam	UF	TF	UF	TF	UF	UF	UF	UF	UF	

Source: UNCTAD.
Note: TF = Terrestrial fiber. UF = Undersea fiber. T = Terrestrial, non-fiber. Undersea fiber connections refer to being on the same submarine cable network and may not include direct country-to-country telecommunications traffic capability.

A number of existing ICT infrastructure networks already connect or are connecting some ASEAN Member States. They include the following:

- The $36 million, 1,100 km submarine cable network connecting Thailand, Indonesia and Singapore, which provides customers with enhanced transmission of broadband traffic.
- The 147 km, repeaterless submarine telecommunications cable system between Dumai (Indonesia) and Melaka (Malaysia).
- The 400 km, intra-Asia regional submarine cable system between Batam (Indonesia), Dumai (Indonesia) and Melaka (Malaysia).
- The 1,300 km Jakabare Cable System, involving Java–Kalimantan–Batam–Singapore, which provides high bandwidth between these cities and between Jakarta and Singapore.
- The $430 million, 7,200 km intra-Asia submarine cable system involving the Philippines, Malaysia and Singapore and connecting to other Asian economies such as Japan and Hong Kong (China). This cable network also provides high-capacity communications, connecting the Greater Mekong Subregion with the other Asian economies (chapter 3).

ICT infrastructure helps connect people and businesses through communication facilities and access to information, by Internet links and by fixed and wireless telephone lines. ICT

infrastructure development in the region is not only connecting ASEAN Member States but is also connecting the infrastructure to ICT-enabled downstream businesses. The development of good-quality ICT infrastructure is central to the provision and the existence of ICT-enabled services such as e-commerce, which is a growing platform for trade, business and entrepreneurship development in the region.

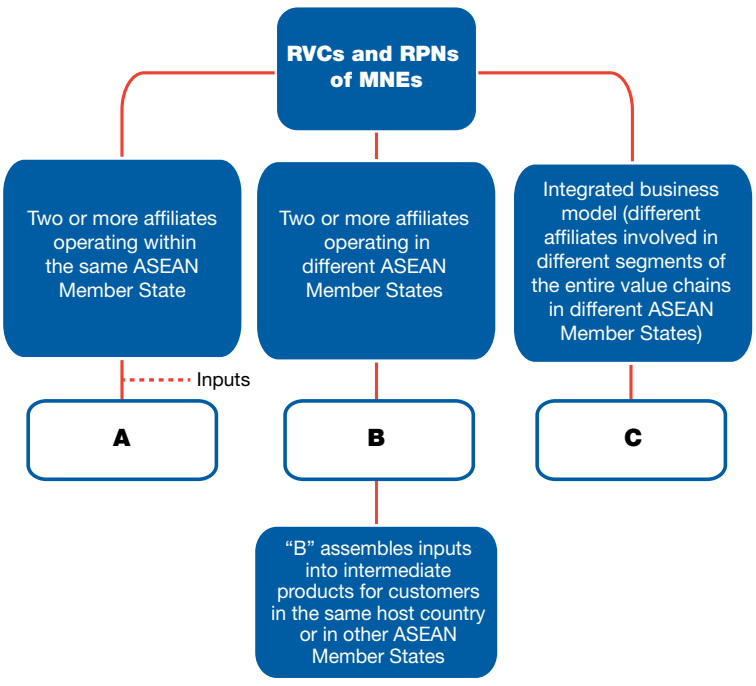
4.2.2. Regional economic connectivity

The region is also interconnected through investment, production, trade and services involving inter- and intra-firm operations by foreign and local companies based in different ASEAN Member States. More ASEAN companies are also investing in the region for various economic and strategic reasons, including regional integration influences (AIR 2013, AIR 2014). The rise in intra-ASEAN investment and ASEAN MNE regionalization is strengthening regional connectivity. Although some ASEAN firms are contributing to regional connectivity by having a presence in another ASEAN Member State, others are helping the region connect by producing inputs, intermediate products or final products as contract manufacturers or suppliers to other MNEs operating in the region.

Foreign companies' investment and operations in ASEAN also contribute to regional connectivity. Some of these companies have multiple plants or operations in different ASEAN Member States, with operations interconnected across different locations. Many of these companies are involved with RVCs and RPNs (AIR 2014). These companies are tapping different locational advantages in the region to achieve production efficiency or to access certain strategic inputs (land, labour or raw materials) that match their corporate strategies. Through them, ASEAN as a region becomes more interconnected because of intraregional trade and production activities involving inter- and intra-firm arrangements (figures 4.4 and 4.5). In other words, RVCs and RPNs are important sources of ASEAN economic connectivity.

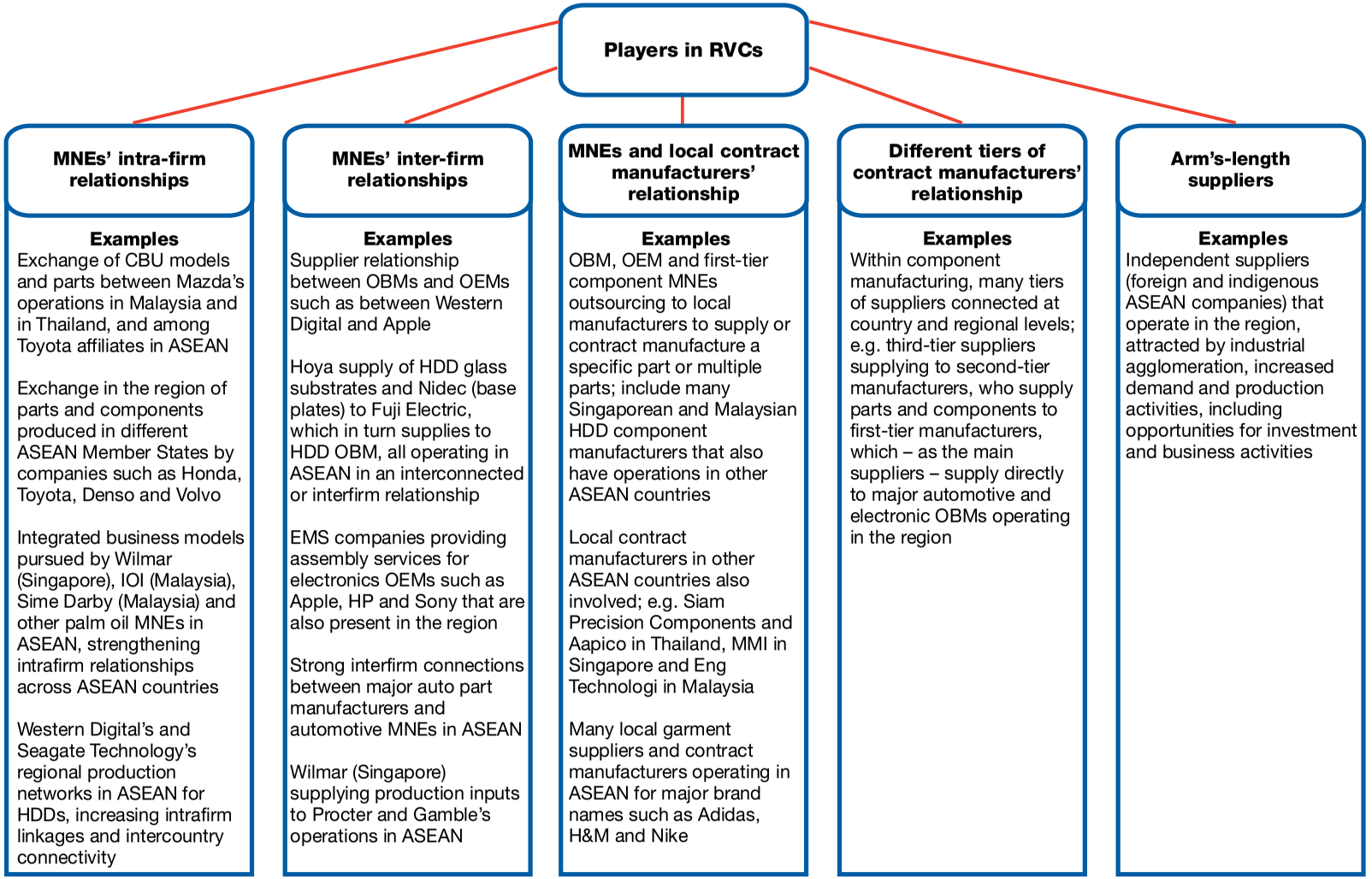
Although regional integration in ASEAN plays a role in providing an environment conducive for RVC activities, the increasing ability of MNEs to slice, distribute

Figure 4.4. MNEs' RVCs and RPNs connect ASEAN



Source: Adapted from AIR 2014.

Figure 4.5. **RVCs connect companies and countries in the region**



Source: AIR 2014.
Note: CBU = completely built-up, HDD = hard disk drive, OBM = original brand manufacturer, OEM = original equipment manufacturer

and coordinate different value chain segments and functions to be performed by different players or firms contributes to regional connectivity (box 4.3, *WIR* 2013). Table 4.9 provides selected sources of economic connectivity associated with or contributed by activities of ASEAN and foreign MNEs in the region.

Institutional development in economic areas is another key source for regional connectivity. The various economic programmes under the AEC – such as the ATIGA, the ACIA, the AFAS, the single window and customs cooperation – are contributing to a more conducive environment for investment, trade, production and services in the region (figure 4.6, table 4.10). The realization of the AEC late in 2015 is an important development that will have a significant impact in strengthening regional economic connectivity well into the future.

Table 4.9. Private sector plays a key role in economic connectivity in ASEAN
(Selected cases)

Mode	Selected aspects or sources of connectivity	Cases/examples
Production	• Multiple plants and RVCs involving different ASEAN Member States • Business linkages (intra-firm and inter-firm linkages) • RPN strategy of companies to achieve production efficiency, engendered by regional division of labour and locational complementarity	• HDD production involving Western Digital and Seagate Technology intrafirm and interfirm connectivity in various ASEAN Member States (AIR 2014) • Electronics: RVCs involving different MNEs, contract manufacturers and local firms in ASEAN • Automotive: Toyota, Volvo, Mazda and Denso, Valeo and Robert Bosch auto-part production networks in ASEAN involving multiple plants or a network of suppliers across the region • Agriculture: Wilmar, Sime Darby and IOI operating in different palm oil value chains from plantation to processing and mechandising in different ASEAN Member States
Investment	• Investment contributing to regional expansion and strengthening of regional foothold by MNEs • Rise of intra-ASEAN investment and enterprise regionalization • Increase in intra-ASEAN cross-border M&As	• GE's extensive investment in different Member States for different business operations • First-, second- and third-tier Japanese automotive companies' investment across ASEAN • Retail: AEON (Japan), Parkson (Malaysia), Lotte (Republic of Korea) and Central (Thailand), with multiple operations across ASEAN • Intra-ASEAN investment by firms from Indonesia, Malaysia, the Philippines, Singapore, Thailand and Viet Nam • Intraregional cross-border M&As by ASEAN firms in ASEAN
Non-equity modalities	Contractual arrangements – EPC consultants, solution providers, equipment suppliers in infrastructure development and contract manufacturers in manufacturing industry	• ASEAN companies undertaking concessionary projects in other ASEAN countries (e.g. infrastructure) and as contract manufacturers • ASEAN and foreign companies participating in infrastructure development nationally that has regional connectivity contributions such as interconnection of transmission grids, intercountry bridge links, road and rail construction that are part of the AHN and SKRL
Trade	Intraregional trade activities including sourcing of parts and components and in services	• Companies (local and foreign) producing in one country and supplying parts and components to other ASEAN Member States (e.g. intermediate goods) • Final goods traded regionally • Intraregional trade in commodities (coal, gas, electricity, oil and palm oil)

Source: UNCTAD 2015b.
Note: AHN = ASEAN Highway Network, EPC = engineering, procurement and construction.

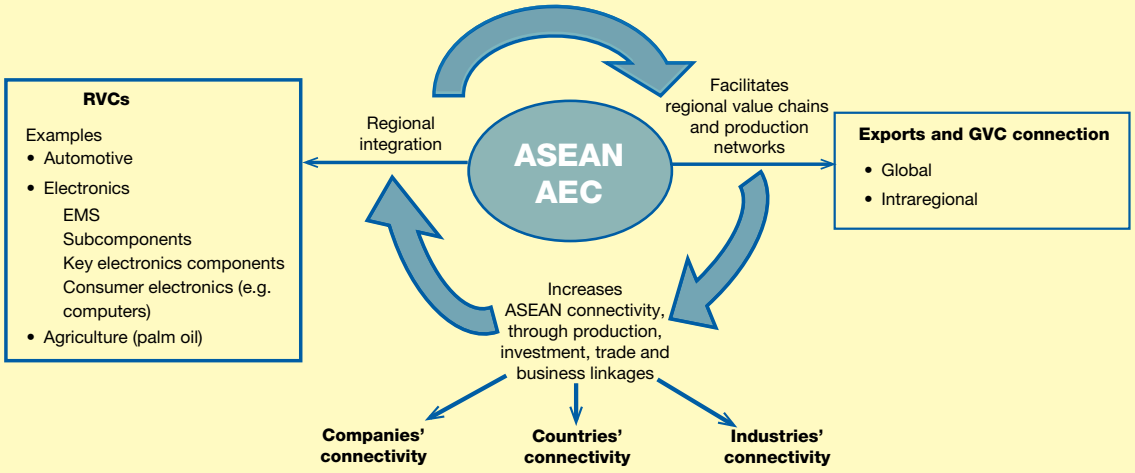
Box 4.3. RVCs and RPNs contribute to regional connectivity in ASEAN

RVCs in ASEAN are growing. Foreign and local companies operating in the region have increased their sourcing of inputs from the region to use in producing or assembling components or final products in the value chains they are associated with (AIR 2014). Intra-ASEAN manufacturing value added inputs in ASEAN exports rose more than eight-fold between 1990 and 2011, from $100 billion to $855 billion. Intra-ASEAN trade in intermediate inputs used in ASEAN exports is expected to grow more, aided by growth or expansion of operations by MNEs in the region in 2013–2015 (chapter 1 and AIR 2014).

RVCs in ASEAN are spreading, involving more companies, more countries and a wider range of products that help connect the region. The expanding operations of MNEs in the region and the increasing capacity of local firms in producing inputs used in subsequent stages of the value chains in ASEAN play roles in this growth. Regional integration is also contributing to this trend in RVCs, which are connecting ASEAN countries through foreign direct investment (FDI), non-equity modalities, trade in intermediate inputs and finished goods, and arm's-length transactions.

RVCs strengthen regional connectivity through production, investment, trade and business linkages (box figure 4.3.1). They also help connect countries, companies and industries in the region.

Box figure 4.3.1. Regional integration, RVCs and ASEAN's connectivity



Source: AIR 2014.

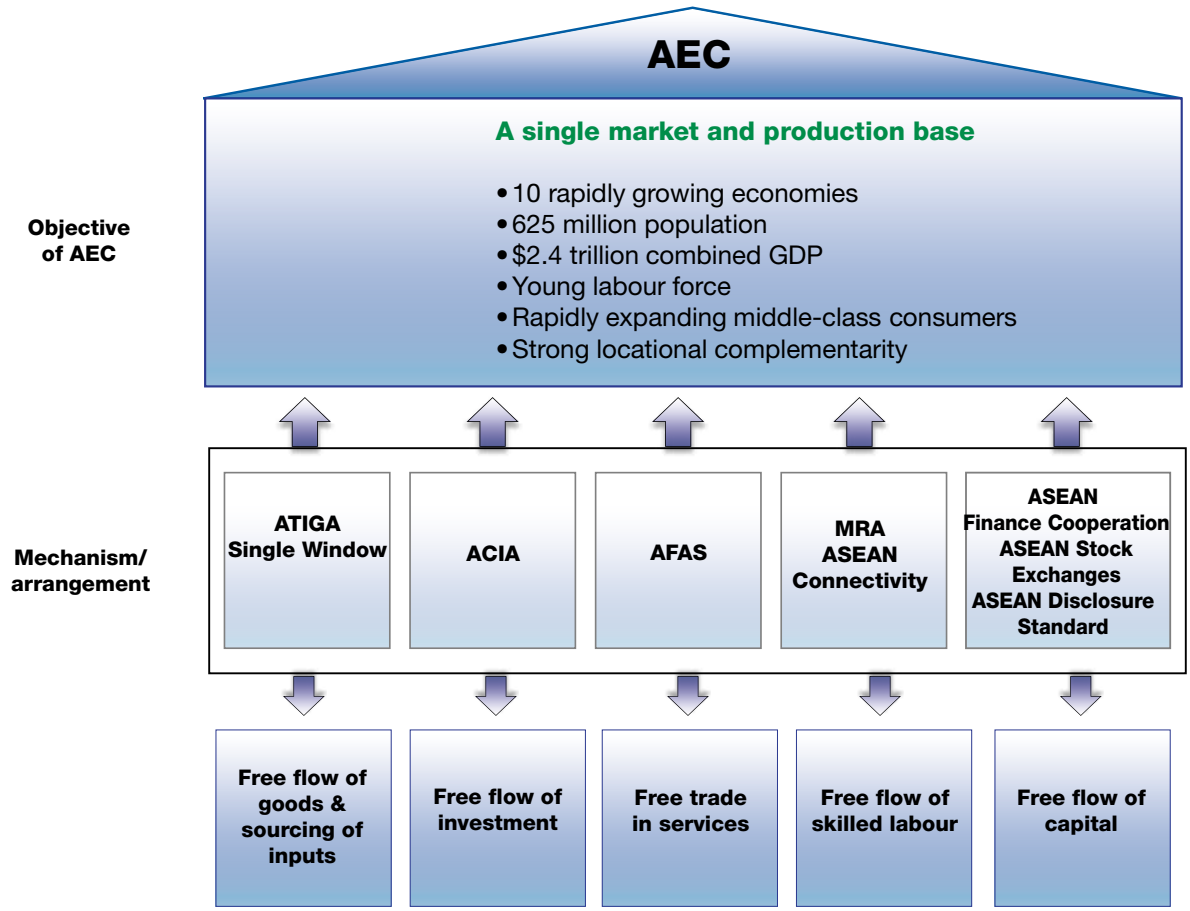
RVCs involve the multifaceted interconnection of many companies operating in different ASEAN countries (in-country and regionally), which encompass intra- and inter-firm relationships, including extensive webs of supplier connections and contractual arrangements. RVCs and the connectivity of firms and ASEAN countries take place across different industries. In the electronics and automotive industries, different players produce different components and parts in different ASEAN Member States for a lead firm, which also has different business operations (e.g. manufacturing, assembly, regional administrative functions including marketing, and sourcing activities) in the region.

Box 4.3. RVCs and RPNs contribute to regional connectivity in ASEAN (concluded)

RVCs in ASEAN also take place at a number of different levels: sub-component and component manufacturing, assembly and post-assembly. At each stage, major companies operate on an RPN basis with multiple plants in a host country and connect in subsequent stages of the value chains with affiliates or other suppliers or customers operating in different ASEAN Member States. For parts and components that they do not produce or that they produce in insufficient quantity, these companies source directly or through contract manufacturing from their suppliers in the region. RVCs also occur through the interconnection of business functions of different affiliates operating in ASEAN countries. Intra-firm RVC business connections within an MNE group can include research and development, manufacturing of key components, assembly, sourcing of other intermediate inputs, testing, regional administrative and logistics operations, and marketing and distribution functions based in different ASEAN Member States.

Source: AIR 2014.

Figure 4.6. **AEC: A key source for regional economic connectivity**



Source: AIR 2014 and UNCTAD 2014b.
Note: ACIA = ASEAN Comprehensive Investment Agreement; AFAS = ASEAN Framework Agreement on Services; ATIGA = ASEAN Trade in Goods Agreement; MRA = Mutual Recognition Arrangement

Table 4.10. Regional measures/agreements can affect production and the RVC landscape

Regional initiatives	Measures/mechanism	Selected effects on RVCs
ASEAN Comprehensive Investment Agreement (ACIA)	• Removes investment impediments and opens up industries for investment • Provides investment promotion and protection • Enhances regional investment cooperation and facilitation • Increases transparency and provision of investment information	• Improves regional investment environment through collective and individual actions in liberalization, facilitation and promotion of ASEAN as an investment region • Increases the competitiveness of ASEAN for FDI and intra-ASEAN investment • Supports investment networks in ASEAN, which can lead to increase in RPN and RVC activities, including multi-plant operations regionally • Supports contract manufacturing and related investment by first-, second- and third-tier component manufacturers
ASEAN Trade in Goods Agreement (ATIGA)	• 96% of the 99,434 total tariff lines in ASEAN will have zero tariff for intra-ASEAN imports by 31 December 2015. • However, 99.2% of the total tariff lines of the six major ASEAN economies (Brunei Darussalam, Indonesia, Malaysia, the Philippines, Singapore, Thailand) are already at a 0% rate.	• Lowers transaction costs • Zero tariff = goods move across the region as if within a single country • Facilitates regional sourcing of final products and intermediate goods; increases production efficiency • Facilitates intra- and inter-firm trade within the region, hence increasing regional connectivity • Supports contract manufacturing by ASEAN and non-ASEAN firms across the region because of the ease of movement of goods regionally and the lower cost
Customs and Trade Facilitation	• ASEAN single window	• Facilitates easier, smoother and more efficient flow of goods and customs clearance • Reduces lead time from factory to customers • Streamlines customs procedures and processes, hence reducing the cost of physically moving goods regionally
Industrial Cooperation	• AICO[a] • SME cooperation	• Supports RPNs through exchange of parts and components by automotive, electronics and other companies • Improves both regional cooperation in SME development and capacity for national SMEs to be regional players, thereby supporting industry in the region
ASEAN Connectivity	• Connecting ASEAN through physical infrastructure, people and institutions	• Increases connectivity in ASEAN, which helps lower further the transaction costs of doing business • Facilitates investment in power and cross-border energy trade – increasing the reliability of power and other energy supply • Lowers the cost of transporting and delivering goods and services across ASEAN and to the world • Increases efficiency of travel within the region and to other international hubs • Easier access to skills and professionals in the region
ASEAN Framework Agreement on Services (AFAS)	• Mutual recognition of standards • Services liberalization packages on WTO-plus principle	• Facilitates movement of skills and professionals in the region • Investment opportunities in the services sector
Strengthening external relations	• ASEAN-China FTA • ASEAN-India FTA • ASEAN-Japan CEP • RCEP • Others	• Expands market reach for companies operating in ASEAN to other partner markets and resources • Increases opportunity for RVCs to link with operations in partner countries

Source: Based on AIR 2013 and UNCTAD 2014b.

Note: AICO = ASEAN Industrial Cooperation; RCEP = Regional Comprehensive Economic Partnership; RVCs = regional value chains; RPNs = regional production networks; SME = small- and medium-size enterprise

[a] No new AICO applications from 1 January 2013 because most ATIGA tariffs are already at a 0% rate, so there is no AICO tariff benefit to be gained.

4.2.3. Subregional connectivity

Subregional economic and infrastructure cooperation among constituent members or contiguous areas is also connecting ASEAN Member States. These subregional arrangements include the BIMP-EAGA, the IMT-GT and the GMS (table 4.11).

Economic activities and subregional infrastructure projects completed or being developed in these subregions contribute to regional connectivity. Development in these subregions would make it easier to realize broader regional economic and infrastructure connectivity. Annex tables 4.1 and 4.2 highlight some of the identified priority infrastructure projects involving ASEAN Member States under the BIMP-EAGA and GMS. Most of the projects are in transport infrastructure. As of 30 June 2015 there were 41 high-priority investment projects in transport, electricity and economic zones listed in the GMS Regional Investment Framework 2013-2022 (RIF). These projects worth $16.3 billion at various stages of implementation and consideration are directly associated with the five ASEAN Member States in the GMS (ADB 2015).

Table 4.11. Subregional arrangements contribute to regional connectivity
(Selected cases)

Subregion	Members	Areas of cooperation (selected coverage)
East ASEAN Growth Area (BIMP-EAGA), formally launched in 1994	The entire sultanate of Brunei Darussalam; the provinces in Kalimantan, Sulawesi, Maluku and Papua in eastern Indonesia; the states of Sabah and Sarawak and the federal territory of Labuan in Malaysia; and Mindanao and Palawan in the Philippines	Aims to increase economic cooperation and connectivity among members of the subregion and outside the subregion. Areas of cooperation include trade, tourism, investments and infrastructure development. The role of the private sector is important.
Indonesia–Malaysia–Thailand Growth Triangle (IMT-GT) established in 1993	14 provinces in southern Thailand: Krabi, Nakhon Si Thammarat, Narathiwat, Pattani, Phattalung, Satun, Songkhla, Trang, Yala, Chumphon, Ranong, Surat Thani, Phang Nga, and Phuket 8 northern states of Peninsular Malaysia: Kedah, Kelantan, Melaka, Negeri Sembilan, Penang, Perak, Perlis, and Selangor 10 provinces of Sumatra, Indonesia: Aceh, Bangka-Belitung, Bengkulu, Jambi, Lampung, North Sumatra, Riau, Riau Islands, South Sumatra, and West Sumatra	Aims to accelerate economic cooperation and integration among the members. The private sector has been playing and is expected to continue to play a role in this process. Areas of cooperation include trade, investment, infrastructure, tourism and agriculture.
Greater Mekong Subregion (GMS) formed in 1992	Cambodia, the People's Republic of China (Yunnan Province and Guangxi Zhuang Autonomous Region), Lao PDR, Myanmar, Thailand, and Viet Nam	Aims to strengthen cooperation and connectivity of Member States. Subregional projects cover transport, energy, telecommunications, environment, human resource development, tourism, trade, private sector investment and agriculture. ADB has provided support since 1992.

Source: Based on information of these subregions and ADB.

4.2.4. Extraregional sources of connectivity

Some ASEAN Member States are also undertaking projects with non-ASEAN neighbouring countries (e.g. China and India), which can contribute to improving infrastructure and connectivity between the ASEAN Member States. For instance, the $370 million proposed project to improve the Upper Mekong River Navigation Channel from China and Myanmar to Houayxay (Lao PDR) will increase connectivity among the ASEAN Member States as well as with China.[5] The 500 kilovolt (kV) interconnection between the People's Republic of China, Lao PDR and Thailand, estimated to cost $600–800 million, will have an impact on power connectivity between the ASEAN Member States and with China.

4.3. Impacts of regional connectivity

Regional connectivity in ASEAN has a direct impact on lowering transaction costs and on increasing competitiveness and economic activities including generating an enhanced environment for investment, trade and production in the region. It facilitates easier movement of people and goods, reduces travel time, enables reliable access to interconnected grid-based electricity and generates spillover benefits for downstream businesses (table 4.12). Furthermore, ICT connectivity reduces the regional digital divide and supports the growth of ICT-enabled downstream business activities (e.g. e-commerce). With regional connectivity, the environment for RVC and RPN operations will become even more conducive and in turn RVCs/RPNs will further strengthen ASEAN's integration.

4.3.1. Electricity connectivity impact

Resource endowments in the region are uneven. Some ASEAN Member States have significant fuel resources available for electricity generation, while others face challenges in securing fuel sources for power electricity generation plants. Regional power exchange or trade and grid interconnections provide solutions to increase regional cooperation to overcome power challenges. Such regional cooperation increases not just grid connectivity but also trade and resource connection among ASEAN Member States. Regional power infrastructure development can benefit participating countries in terms of total investment cost reductions, improve the stability of electricity supply and move towards decarbonization (access to renewable energy). For some Member States, it helps to generate revenue from electricity trade, which can be used to support national infrastructure development.

Increasing power trade benefits power-producing as well as power-importing Member States. Those with ample energy sources (e.g. hydropower, geothermal, coal) can produce electricity more cost-effectively, while those with limited energy sources to generate electricity can gain from importing. Subject to location, distance and peak time, Member States can benefit from power exchange or power trade. The region can also achieve optimal use of energy resources, fuel diversification and energy security.

For instance, more hydropower plants are being built in Lao PDR to supply electricity to Thailand and other neighbouring countries (box 4.4). A Trans-Borneo Power Grid transmission link project currently being developed would bring hydropower from Sarawak

Table 4.12. Contribution from infrastructure connectivity in ASEAN involves various sectors (Selected cases)

Infrastructure	Institutional arrangements	Selected objectives	Impact on selected sectors/ areas	Cases/examples
Electricity	• PPAs • ASEAN Power Grid	• Energy security and reliability • Power markets development • Power grid interconnection • Lower-cost electricity through export/import • Power plant development based on energy source allocation	• Power exchange or trade between neighbouring energy-surplus and energy-deficient countries. Encourage investment in power plants in fuel source–rich Member States. • Contiguous and remote areas can be developed. More industrial estates and commerce can be established. • Economic and industrial plans can be supported. • Increase supply of electricity to more homes and more factories. • Rural development can be achieved, including employment generation and opportunities for women. • Improved quality of life and living standard.	• Electricity generated in the Hongsa power plant in Lao PDR transmitted to Thailand. • Some 90% of electricity from the Xe Pian Xe Namnoy hydropower plant exported to Thailand. • Sarawak (Malaysia)-West Kalimantan (Indonesia) power grid connection benefitting the two countries in terms of access, cheaper cost, electricity trade and improved environment. • Malaysia–Thailand grid inter-connection for power exchange.
Transport (Road, Rail, Airports and Ports)	• AHN • SKRL • Airports connectivity • RORO (ports)	• Ease of movement of goods and people • Support trade and exports • Regional transport connectivity and link with outside the region • Upgrading and modernization of transport infrastructure services • Development of transport missing link (road and rail)	• Lowering of logistic and transaction costs for agriculture, manufacturing and services industries. • Support the tourism industry and hospitality businesses, and promote cultures of the region (people-to-people connectivity). • Enable downstream logistic businesses to exist. • Increases competitiveness of industries in attracting FDI. • Reduce traveling time within country and regionally through intercountry transport networks. • Airport links, supporting feeder hubs, international connections and rise of budget airlines. • Bridge links, connecting islands and contiguous areas separated by seas and rivers, which have an effect on border trade and tourism.	• SKRL and national high-speed rail development in Malaysia to Singapore and in Thailand. • Airport upgrades and new airports development in ASEAN Member States • Completion of missing roads under the AHN arrangement. • Linking of national highways and road networks with neighbouring countries such as the road connection of Thailand with Malaysia, Malaysia with Singapore, Lao PDR with Thailand and the Trans-Borneo highway. • The improvement of the road from Pontianak, West Kalimantan (Indonesia) to the Sarawak (Malaysia) border shortens the route by 100 km and reduces travel time and cost. • Singapore–Malaysia bridge causeway link, Thailand–Lao PDR bridge link, Thailand–Myanmar bridge link and Malaysia–Brunei Darussalam Friendship Bridge connection.
ICT	ASEAN Broadband Corridor	• ICT access and bridging digital divide	• Support ICT-enabled business (e-commerce, BPO, ICT service providers)	• ASEAN's average broadband subscriptions per 100 inhabitants grew from 5.1 in 2010 to 8.5 in 2014.

Source: UNCTAD 2015b.

Note: AHN = ASEAN Highway Network, BPO = business process outsourcing, ICT = information and communication technology, PPA = power purchase agreement, RORO = roll-on/roll-off, SKRL = Singapore-Kunming Rail Link.

(Malaysia) to West Kalimantan (Indonesia). The project will help Sarawak Energy, a State-owned entity, sell excess electricity generated from the hydropower plant and would help West Kalimantan to secure a more cost-competitive power supply. Under a power exchange agreement signed between Perusahaan Listrik Negara (Indonesia) and Sarawak, the former would be able to obtain electricity for West Kalimantan at $0.18 per kilowatt-hour in lieu of its fuel-generated electricity at $0.25 per kilowatt-hour. The power exchange between the two countries will also contribute to reducing carbon dioxide emissions by 400,000 tonnes a year by 2020.[6]

Tenaga (Malaysia) signed an agreement with Indonesian state-owned utility company PLN and coal miner Bukit Asam (Indonesia) in 2012 to build a coal-fired power plant in Sumatera, Indonesia.[7] The agreement also covers the construction of a 275 kV interconnection line from Melaka, Malaysia to Sumatra, Indonesia. The power plants will have a combined capacity of 1,200 MW. The interconnection project for a 600 MW HVDC link will span across the Straits of Melaka connecting Teluk Gong in Melaka, Malaysia and Perawang, Riau. The

Box 4.4. Regional power trade projects increase power connectivity and access to cheaper electricity in ASEAN

Power trade projects among ASEAN Member States are increasing and will further enhance regional connectivity. This is achieved with provision of affordable grid-based electricity from an exporting country to an import recipient. Lao PDR and Viet Nam are exporting electricity to a number of neighbouring countries with grid interconnection. More grid connectivity projects are being planned. They will include the following main components:

Component 1

Development of a cross-border 115 kV transmission line linking Ban Hat (Lao PDR) and Stung Treng (Cambodia), to facilitate import of lower-cost electricity from Lao PDR to displace higher-cost diesel-fueled generation sources in Cambodia.

Component 2

Development of a cross-border 115 kV transmission line linking Tan Bien (Viet Nam) and Kampong Cham (Cambodia) for bilateral power exchanges, beginning with imports of lower-cost electricity from Viet Nam to displace diesel-fueled generation in Cambodia, and leading over the long term to the transfer of surplus hydropower from Cambodia to Viet Nam.

Component 3

Development of the Xeset 1 to Saravan segment of the proposed 115 kV transmission link that will eventually interconnect electricity grids from (western) Thailand through (southern) Lao PDR to (southern) Cambodia.

Component 4

Development (feasibility, design, building, commissioning) of a modern Load Dispatch Center for Lao PDR to facilitate regional power trade and development of grid-to-grid interconnections and to enhance the security of a future integrated GMS power grid.

Source: World Bank, "GMS Power Trade (Lao PDR) Project" (http://www.worldbank.org/projects/P105331/gms-power-trade-laos-project?lang=en).

commercial operation date for the various power plant projects will range from 2018 to 2019.

The construction of a transmission line from the Viet Nam border to major substations in Cambodia provided a reliable and affordable supply of electricity, which made possible the development of a special economic zone in Kampot province (Cambodia). The economic zone in turn attracted some 40 businesses and generated 10,000 jobs for the local community.[8]

Regional power trade can potentially provide cost-saving solutions to meet ASEAN's growing electricity demand (box 4.5). A study estimated that under the assumptions of a 20% and 50% regional power trade situation, the total cost to meet the growing electricity

Box 4.5. Benefits and feasibility of ASEAN power grid interconnectivity

The APG and subregional power cooperation such as is occurring at the GMS level are key levers for regional power grid interconnectivity among the ASEAN Member States. Both have been making steady progress, in the form of bilateral interconnection projects with long-term PPAs. This is perceived as the first stage towards the fully functioning regional grid for multilateral trading of power (Li and Chang 2015).

A fully functioning regional grid can generate many benefits for participating ASEAN Member States. Through such interconnection, the development of cheaper renewable energy resources, which exist in abundance in the region, could be further developed, especially hydropower in the GMS. In addition, the interconnected grids can take advantage of the varying timing of peak and non-peak hours in different countries and thus save a large portion of the investment in expensive peak power generation capacities. The Economic Research Institute for ASEAN and East Asia (ERIA) (2013) estimated some $11 billion net savings in the cost of electricity generation for all ASEAN Member States and two Southwest China provinces as well as Northeast India in a 20-year period, despite the high initial costs of investment in interconnecting transmission lines.

However, the high upfront cost of new transmission lines for cross-border interconnection and the uncertainty of future demand for imports and exports of electricity through these transmission lines complicate the financial decisions to invest. The financial feasibility of each proposed cross-border transmission line needs to be carefully studied. One study identified that the power grid interconnection among Lao PDR, Malaysia, Singapore, Thailand, and Viet Nam is financially feasible and should be prioritized (ERIA 2014). This finding coincides with the initiative by the governments of Lao PDR, Thailand, Malaysia, and Singapore to develop interconnection and demonstrate a multilateral framework for cross-border trade in electricity.

Further institutional issues still hinder the realization of a fully interconnected power grid in the region. These are mainly concerned with (i) regional coordination of infrastructure development plans and rules for data and information communication, (ii) wheeling charges (transmission tariffs) for multilateral cross-border power trade with proper unbundling and coordinated review criteria in each participating Member State, and (iii) harmonization of technical standards, including operation and connection standards (Li 2015).

Source: ERIA.

demand in ASEAN during 2010–2030 could decline by 3% and 3.9%, or equivalent cost savings of $21 billion and $29 billion in 20 years if compared with the "no regional power trade" scenario (Chang and Li 2012).

Another study of power interconnection projects among the ASEAN Member States indicates that significant benefits can be expected from several transmission interconnections (Thailand–Lao PDR, Viet Nam–Lao PDR–Thailand, and Lao PDR–Thailand–Malaysia–Singapore) in relation to the estimated cost of the transmission lines (table 4.13). Grid connections between Thailand and Cambodia and between Malaysia and Indonesia are also expected to generate benefits for the constituent members. In addition, the eventual interconnection of the 16 earmarked ASEAN power grids and power exchange is expected to generate a net saving of $788 million and a reduction in installed capacity by 2,013 MW in the region (Ibrahim 2014).

Table 4.13. Interconnection grids and their priority in ASEAN

Selected cases	Possible cumulative cost benefit range ($ million)	Estimated cost of transmission line ($ million)	Order of priority
Thailand–Cambodia	4,560–5,470	162–1,009	Second priority
Thailand–Lao PDR	19,282–20,604	728–1,957	First priority
Thailand–Myanmar	(4,607)–(2,766)	2,244–3,956	Need careful assessment
Myanmar–Thailand–Malaysia–Singapore	(1,118)–3,064	2,384–6,272	Need careful assessment
Viet Nam–Lao PDR–Thailand	21,604–23,715	922–2,885	First priority
Malaysia–Indonesia	3,968–4,087	1,790–1,901	Second priority
Lao PDR–Thailand–Malaysia–Singapore	23,217–26,557	868–4,273	First priority

Source: Kutani and Li (2014).

4.3.2. Transport connectivity impact

Transport infrastructure connectivity also contributes to lower transaction costs in moving goods and people, including significantly reducing travel time and supporting intraregional trade.[9] Bridge links across seas and rivers make travel more easy, reduce transit time and cost including contribute to border trade, and increase tourism. Such bridge links include the causeway link between Malaysia and Singapore, and the various inter-country bridges that provided the link such as between Thailand and Lao PDR, Thailand and Myanmar, Lao PDR and Myanmar as well as between Cambodia and Viet Nam. Aside from lower logistical costs, these bridge linkages reduce travel time and provide faster movement of goods and people, which can enhance trade, business and tourism.

Infrastructure projects undertaken in the GMS have generated economic benefits to the constituent members. Road improvements in Champasak Province (Lao PDR) were estimated to have increased the number of tourists by 128% between 1998 and 2004 (the early years when the road was improved) because of travel conditions and connectivity

with neighbouring countries (ADB 2008). The opening of the second Mekong International Bridge in December 2006 led to an 8% increase in tourism in the first two months of 2007 alone. The increase in interconnected roads has meant an increase in regional tours, which is true of Lao PDR, Thailand and Viet Nam (Rattanatay 2007). The improvement in the GMS subregional transport network generated an estimated 45% decline in land transport costs and a 25% drop in the cost of imports (ADB 2009).

The Phnom Penh (Cambodia) to Ho Chi Minh City (Viet Nam) highway project reduced travel times to schools and markets by about 40% (Phyrum et al. 2007). The development of the Densavanh to Khanthabouly road, between the Lao PDR and Viet Nam borders, reduced travel time from approximately 12 hours to 2.5–3 hours (Rattanatay 2007). The improvement of the road from Pontianak (West Kalimantan, Indonesia) to the Sarawak (Malaysia) border is expected to shorten the route by 100 km, in addition to saving vehicle operating costs and time (annex table 4.2). The opening of the Pandaruan Bridge (Malaysia–Brunei Darussalam Friendship Bridge) in 2013 helped improve connectivity between the two countries and significantly save traveling time by replacing ferry crossings – which used to require commuters to spend up to 2 hours to cross the 60 m wide river as compared with the few minutes it takes now. The construction of the Kuala Lurah border-crossing facility, when completed, will significantly reduce travel time for road users and improve connectivity in the subregion involving Brunei Darussalam and Sabah (Malaysia) and Sarawak (Malaysia) (annex table 4.2). The 3,200 km India–Myanmar–Thailand Trilateral Highway project, which is expected to open in November 2015, is projected to cut travel time from 3 hours to 45 minutes for the first 26.5 km of the highway.[10]

The SKRL will connect the capital cities of Cambodia, Lao PDR, Myanmar, Viet Nam and Thailand, and connect to Kuala Lumpur and Singapore. The 330 km Kuala Lumpur–Singapore high-speed rail link when completed will form part of the SKRL. Travel time between the two cities will drop to 90 minutes instead of the current 6 hours. The rail link between the countries is projected to have a significant impact on several industries, including tourism and logistics.

The AHN serves as the skeleton of land transport for the region, connecting capitals, seaports and airports. It also provides vital support in facilitating investment and tourism development in the region. The AHN enhances transport connectivity not only in and between the ASEAN Member States but also with neighbouring countries and beyond, as it is also connected to the Asian Highway Network. The AHN provides important support for intra- and inter-regional trade with more efficient and greater accessibility for goods and services. It also helps reduce transportation and trade costs, establish linkages with regional and global supply chains, and facilitate greater regional integration.

4.3.3. ICT Impact

There is evidence to support the benefits of improvement of ICT infrastructure, which significantly lower cost and access to ICT facilities by a broader range of users, such as in the case of the CLMV countries (chapter 2).

4.3.4. Spillover benefits

There are other spillover effects from infrastructure connectivity. Two distinctive business categories would benefit from regional infrastructure improvement. Downstream businesses that rely directly on the provision of quality infrastructure such as logistic companies, e-commerce and tourism fall in one category. Another category is businesses, factories and industrial estates in remote areas. Given that electricity can be supplied to remote areas or industrial estates in another Member State, more factories in these poor areas can be lighted and established because of the certainty of power supply. These industrial estates in turn help attract more factories, create employment, generate exports, induce rural development, alleviate poverty and facilitate gender equality.

Infrastructure development and connectivity increases the attractiveness of the investment environment in ASEAN. Cost savings and increased competitiveness will be key features arising from regional connectivity. At the level it is now, regional connectivity has influenced investment, trade and production activities in the region. However, a physically more connected region will bring about a stronger, economically connected ASEAN, which in turn will increase the attractiveness of the region in attracting FDI, promote trade and support additional RVC/RPN activities.

4.4. MNEs' role in regional connectivity

The private sector, including MNEs, plays an important role in regional connectivity through investing, building and managing infrastructure. Furthermore, MNEs involved in intraregional production activities, provision of services and intraregional trade are another important catalyst for ASEAN connectivity.

The role of the private sector in regional connectivity has not been well documented as compared with that of institutional development. The private sector makes physical and economic connectivity possible through investment and business operations, which are facilitated by regional institutional development and setting.

ASEAN and foreign MNEs participate in infrastructure development across the region (chapters 2 and 3). Some participate as concession holders and engineering, procurement and construction (EPC) contractors, delivering infrastructure and connecting it at national, subregional and regional levels. Some provide finance to enable the implementation and completion of infrastructure projects that have a regional connectivity element, while some invest as owners of infrastructure assets.

MNEs from within and outside the region are helping ASEAN get interconnected. For instance, Korean companies such as SK Engineering and Construction and Korea Western Power constructed transmission lines linking Lao PDR and Thailand for supply of electricity.[11] ASEAN and foreign companies such as Vinci (France), Yongnam (Singapore) and Muhibbah Engineering (Malaysia) are investing and managing a number of airports in the region,

which connect travel to and from other ASEAN Member States.[12] Japan`s Sumitomo Mitsui Construction and China Railway No. 5 Engineering Group have built bridges that link ASEAN Member States,[13] and China Railway Construction Corporation and Malaysia's Giant Consolidated helped in rail connectivity.[14]

Power infrastructure connectivity

MNEs have been involved in the construction and ownership of power plants that supplied electricity from one Member State to other Member States (chapter 2). Some of these MNEs also built power stations and transmission lines connecting to power plants. These companies include China National Electric Engineering Company, Obayashi (Japan), EGAT (Thailand), Tenaga (Malaysia), Banpu (Thailand) and Siemens (Germany). Companies such as Sarawak Energy (Malaysia), Sarawak Cable (Malaysia), Siemens (Germany) and AECOM (United States) have played a role in the construction of transmission lines and power connectivity in the region (box 4.6).

There is significant potential for private sector participation in transmission line projects in ASEAN (table 4.14). The region has a network of at least 3.1 million km of transmission and distribution lines in 2011. It is estimated that the region would need some 250,000 km of additional transmission lines and a further 4.0 million km of distribution lines to connect end-users between 2011 and 2035 (IEA 2013). Table 4.15 shows the role of MNEs in energy connectivity projects.

Table 4.14. The private sector can play important roles in power connectivity in GMS (Planned projects)

Country	Connectivity	Private participation
Cambodia	Several cross-border interconnections are planned, mainly at low voltage. A 230 kV line to Lao PDR may be constructed.	This is significant for both large-scale and small-scale generation.
Lao PDR	Many cross-border interconnections are planned, mainly for export of power to Thailand and Viet Nam.	The private sector is very strong in generation and potentially will enter transmission.
Myanmar	Very large investments are likely to be needed to transmit power to China and Myanmar. These pose great challenges of sustainability.	Considerable private finance is the only conceivable basis for expansion on the scale envisaged.
Thailand	Strong connections are with Lao PDR and several cross-border connections planned with Cambodia and Myanmar.	The most recent power development plan appears to eschew private finance, except for small and very small power producers.
Viet Nam	Several lines to China may be substantially strengthened; greater connectivity to Cambodia is likely.	Private finance was successful in the early 2000s but then dried up. Reforms have been made to the public-private partnership regime.

Source: Asian Development Bank (2013a).

Box 4.6. Companies help ASEAN Member States connected through power projects (Selected cases)

Sarawak Energy (Malaysia) is a State-owned energy company. It is involved with electrical power generation, transmission and distribution. It transfers energy from its power plants in the Sarawak region to other regions in Malaysia. In late 2013, the company signed on for a 500 kV transmission line project with Toshiba Transmission and Distribution System (Japan) and China Xian Electric Engineering, to build a high-voltage transmission line over 500 km from Similajau in Bintulu to Tondong in Kuching (Sarawak, Malaysia).[a]

Sarawak Cable (Malaysia), 16.5% owned by Sarawak Energy (Malaysia), is constructing transmission lines between Sarawak (Malaysia) and West Kalimantan (Indonesia) to deliver 230 MW of renewable energy. The transmission line goes through the state grid, which is owned by Sarawak Energy.[b] Sarawak Cable has also constructed a 275 kV underground high-voltage cable, which exports electricity from Malaysia to Indonesia. In addition, Sarawak Cable owns 78% of PT Inpola Mitra Elektrindo (Indonesia), which is developing a 10 MW power plant in Indonesia, due to be completed at the end of 2015.[c]

Siemens Energy (Germany) has constructed and has ongoing power projects in ASEAN, including the First NatGas Power in the Philippines, Block 2 of the Chana combined-cycle power plant in Thailand (jointly with Marubeni), the Pengerang cogeneration plant in Malaysia, the PLP combined-cycle power plant in Singapore and the Nhon Trach 2 combined-cycle power plant in Viet Nam.[d] Aside from building power plants, Siemens Energy has also played a role in developing power connectivity projects in the region. Completed transmission projects undertaken by the company as a lead contractor include the 300 MW Thailand–Malaysia HVDC interconnection system, which involved construction of the Khlong Ngae converter station at the Thai border and the Gurun converter station at the Malaysia border, which were then linked with an overhead transmission line of 110 km carrying 300 kV of electricity.[e]

AECOM (United States) is a technical and management support services MNE that operates in the transportation and energy industries. It has completed hydropower projects in ASEAN, such as the Mrica hydropower project in Indonesia and the Buon Kuop hydropower plant in Viet Nam. The company is currently involved with the construction of a power line interconnectivity project associated with the Nam Theun II hydropower plant in Lao PDR, which is 40% owned by Electricité de France, 25% by Lao Holding State Enterprise and 35% by EGAT (Thailand). AECOM is to construct a 115 kV, 70 km line from Nam Theun II to Pakse and a 500 kV, 170 km line from the power station to Savannakhet and across the Mekong River to Thailand.

Source: UNCTAD 2015b.

[a] http://www.sarawakenergy.com.my/index.php/news-events-top/latest-news-events/latest-media-release/513-sarawak-energy-inks-deal-with-toshiba-ttda-china-xian-electric-for-500kv-transmission-backbone

[b] http://www.theborneopost.com/2015/03/19/electricity-to-be-exported-to-kalimantan-by-year-end/

[c] http://www.thestar.com.my/Business/Business-News/2015/02/16/Sarawak-Cable-getting-better-power-deal-in-Sumatra/?style=biz

[d] http://www.energy.siemens.com/hq/en/sustainable-energy/

[e] http://www2.egat.co.th/hvdc/INTRODUCTION.HTML

Table 4.15. The private sector contributes to power interconnection between ASEAN Member States (Selected cases)

Project	Location	Owner	EPC	Transmission Capacity (MW)	Remarks and Source
Hongsa	Xayaboury in Lao PDR near Thailand	LHSE (Lao PDR) 20% Banpu (Thailand) 40% Ratchburi (Thailand) 40%	Chinese consortium led by China National Electric Engineering Company.	1878	In June 2015, unit 1 started to supply 500 kV through a transmission line to EGAT's grid in Thailand. The commercial operation dates of units 2 and 3 are expected to occur in November 2015 and March 2016. First Northeast Electric Power Engineering (NEPC) is the subcontractor. ABB (Switzerland) is providing the technology/system solution. The cost of the project is $3.7 billion. A transmission line has been constructed to supply energy to Thailand.
Xekaman 1	Vientiane and Xiangkouang	Viet-Laos Power Joint Stock Company and Laos Electricity Corporation	CK Power (Thailand)	322	The plant was built at a cost of $441 million. With the Xekaman Xansay hydropower station, the combined output will be 1.2 billion kWh per year. About 20% of the output will be for the local market and the remaining 80% for export to Viet Nam. Andritz (Austria) won a contract in 2013 to deliver the electromechanical equipment.
Nam Ngiep 1	Bolikhamxay	PIC Netherlands (45%), a subsidiary of Kansai Electric Power, EGAT International (30%), and Lao Holding State Enterprise (25%)	Obayashi (Japan)	290	Some 1,620 GWh of electricity is projected to be generated annually. To export the power, two transmission lines will need to be constructed. The 125 km 115 kV transmission line will be constructed by EDL (Electricité du Laos) and Japan's Obayashi won the civil engineering contract.
Sepian-Xenamnoy	Attapeu and Champasak	LLHSE 24% SK Engineering & Construction (Republic of Korea) 26% Korea Western Power (Republic of Korea) 25% Ratchaburi Electric Generating Holding Public Company (Thailand) 25%	SK Engineering and Construction (Republic of Korea)	410	Some 90% of the electricity generated by the plant will be sold to EGAT (Thailand), with the remaining 10% sold to EDL (Lao PDR). Power will be exported through a 230 kV transmission line to the Pakse Substation, and from there a 500 kV Transmission Line to the Thai-Lao PDR borders. KOWEPCO (Republic of Korea) was awarded a 27-year operations and maintenance contract. Tractebel Engineering (France) was given the owner's engineering contract. TEAM GROUP (Thailand) completed the environmental impact assessment. ATT Consultants (Thailand) designed the transmission system which will eventually export electricity to Thailand. The pre-feasibility and feasibility study was done by Afconsult (Switzerland).
Nam Theun 2		Electricité de France (40%) Lao Holding State Enterprise (25%) Electricity Generating Public Company Limited (35%)	AECOM (United States)	1070	The majority of the electricity is exported to Thailand, earning the Lao PDR government average revenue of $80 million per year over the 25 years of the concession period. The commercial operation date of the plant was 2010.
Khlong Ngae-Gurun		EGAT (Thailand)	Siemens AG (Germany) was the main contractor.	300	The Thailand–Malaysia HVDC interconnection is a 110 km, 300 kV DC overhead transmission line. Teshmont Consultants (Canada) was a subcontractor.
Xayaburi Hydro-power Project		EGAT (Thailand)	Ch. Karnchang (Thailand)	175	About 95% of the electricity generated by the plant will be exported to Thailand through a planned 200 km transmission line from the plant to Loei Province. Pöyry's Energy Business Group (Finland) was the engineer for the construction of the dam and plant. The other subcontractors included Afconsult (Switzerland), Whessoe Engineers (United Kingdom).
Sapien-Senamnoi		Lao PDR Government	SK Engineering & Construction (Republic of Korea) and Korea Western Power (Republic of Korea)	410	The power generated at the site will be transmitted to Thailand and power stations in Lao PDR. The project is expected to cost $1 billion.

Source: UNCTAD 2015b, based on industry and media information.

Land transport infrastructure connectivity

MNEs are playing an important role in developing bridges that link ASEAN Member States. Some are contributing to regional connectivity through building roads and rail links. Many MNEs have built and are building infrastructure that connect the region. Alstom (France) is involved in construction of tunnels in the mountainous areas of Viet Nam to connect rail lines that will be part of the SKRL network. Companies such as the China Railway Construction, Marubeni (Japan), Toshiba (Japan) and Japan Transport Engineering Company are involved with transport infrastructure projects that contributed to regional connectivity (table 4.16). Other companies such as Sumitomo Corporation (Japan) and Italian-Thai Development (Thailand) have constructed bridges that helped connect ASEAN Member States.

In addition, the region is further connected through the activities of other MNEs that rely on the provision of infrastructure. These MNEs include those that operate in businesses such as logistics, business process outsourcing, e-commerce, industrial estates and tourism activities. Without quality infrastructure services, these MNEs will be less likely to invest and operate in a country or region. The existence of quality infrastructure also encourages other MNEs to expand their activities that span across the region with multiple plants in multiple locations.

Table 4.16. Transport infrastructure is also important for regional connectivity
(Selected projects)

Infrastructure	Connecting countries	Companies (Contractors)	Remarks
Neak Loeung Bridge	Cambodia and Viet Nam	Sumitomo Mitsui Construction (Japan)	Construction of the bridge started in 2011 and is expected to be completed in 2015 at an estimated cost of $130 million.
Second Thai–Lao Friendship Bridge	Savannakhet (Lao PDR) and Mukdahan (Thailand)	Sumitomo Corporation (Japan)	Completed in 2006 at an estimated cost of $70 million.
Third Thai–Lao Friendship Bridge	Thahhek (Lao PDR) and Nakhon Phanom (Thailand)	Italian-Thai Development (Thailand)	Completed in 2011 at an estimated cost of $57 million.
Fourth Thai–Lao Friendship Bridge	Thailand and Lao PDR	China Railway No.5 Engineering Group and Krung Thon Engineering (Thailand)	The two companies jointly constructed the bridge, which was completed in 2013. The budget of the bridge was estimated at about $44.8 million.
Lao–Myanmar Friendship Bridge	Luang Namtha (Lao PDR) and Xienglap, Thakilek (Myanmar)	China Harzone Industry Corporation supplied steel trusses for the construction of the bridge.	The bridge links Lao PDR's National Road No.17E and Myanmar's National Road No. 4, and connects Xiengkok river port in the Long district in Lao PDR with Xienglap, Thakilek district (Myanmar). The bridge was opened in May 2015.
Kuala Lumpur to Singapore High-Speed Rail Link	Malaysia to Singapore	A number of companies have been reported to have expressed interest in undertaking the project: • China Railway Construction Corporation	The project is in the bidding process.

Table 4.16. Transport infrastructure is also important for regional connectivity (Selected projects) (concluded)

Infrastructure	Connecting countries	Companies (Contractors)	Remarks
		• East Japan Railway Company (JR East) • Alstom (France) • Siemens AG (Germany)	
Thai Railway Construction (eventually part of the SKRL)	Thailand	China Railway Construction Corporation	Expected to start in 2015.
Thai–Lao–China rail freight link	Thailand, Lao PDR and Cambodia	Giant Consolidated (Malaysia)	The rail link is estimated to cost $7.2 billion. Construction of the project will be undertaken with Chinese supervision.
900 km double railway line in Thailand	Eventually part of the SKRL	Siemens (Germany)	..
Thailand to Viet Nam Railway (through Lao PDR)	Thailand to Viet Nam	Giant Consolidated Ltd (Malaysia)	Rich Banco Berhad (New Zealand) provided a loan to Giant Consolidated Limited (Malaysia) to fund the construction of rail running across Lao PDR from the Thai to the Vietnamese border.

Sources: UNCTAD 2015b, based on industry reports and media.

Economic connectivity

Regional and foreign MNEs are contributing to growing RVCs and RPNs, which are connecting ASEAN Member States (AIR 2014). These MNEs include those operating in the automotive industry as vehicle manufacturers, and parts and components producers (box 4.7). Many automotive parts and components manufacturers operate in different ASEAN Member States, and they supply components to automotive manufacturers or to first- and second-tier parts and components producers in the region.

In electronics, MNEs such as Western Digital and Seagate Technology have multiple plants in different ASEAN Member States, producing different key parts and components of hard disk drives (HDDs). They also assemble components supplied by other suppliers operating in the region (together with parts that they produce) into intermediate products to supply to computer companies such as Apple, HP, Lenovo, Samsung, Toshiba and Acer (AIR 2014). Many of the latter group of companies also have multiple plants in ASEAN. Many HDD and other electronic component manufacturers and suppliers operate in different ASEAN Member States.

The relationship between equipment brand owners (e.g. Western Digital, Seagate Technology, Apple and Sony) and the networks of electronic component manufacturers in ASEAN increases regional economic connectivity.

In agriculture, such as in palm oil cultivation and related merchandise development, regional companies are operating in plantations, refineries and production in different ASEAN Member States. These companies include IOI (Malaysia), Wilmar (Singapore), Sime Darby (Malaysia) and Golden Agri (Indonesia). They have also established business linkages with contract farmers in host countries such as Indonesia and Malaysia (AIR 2014).

Some of these companies in turn provide raw materials and intermediate products to food and non-good consumer MNEs operating in different segments of the palm oil value chain. These companies, such as P&G (United States), Unilever (Netherlands/United Kingdom), Cargill (United States) and Nestlé (Switzerland) also have operations in different ASEAN Member States.

Box 4.7. RVC and RPN players in ASEAN

The number of RVC/RPN players in ASEAN is increasing. They include both foreign and ASEAN MNEs. These players in automotive and electronic industries in the region include the following:

Major automotive manufacturers

BMW, Daihatsu, Ford, GM, Hino, Honda, Hyundai, Isuzu, Land Rover, Mazda, Mitsubishi, Nissan, Renault, Suzuki, Toyota and Volvo.

Selected auto part and component manufacturers

AAPICO Hitech, Aisin Ai, Aisin Seiki, Amkor Technology, BASF, Calsonic Kansei, Continental, Cummins, Denso, Delphi Automotive Systems, EDS Manufacturing, Faurecia, Furukawa, GKN, Heraeus Materials, Hitachi Automotive Systems, Jatim Autocomp, Johnson Controls, JTEKT, Kayaba, KDS, Lear, Murata Electronics, Nichicon, Nok Corporation, NSK, ON Semiconductor, Robert Bosch, Sanko Gosei Technology, Sanko Kiki, SCG Industries, Showa Manufacturing, Sumitomo Electric Industries, Tokai Rika, TRW, Usui International Corporation, Valeo, Yazaki and ZF Friedrichshafen.

Selected HDD part and component manufacturers in different ASEAN Member States: Malaysia: Dufu, Eng Technologi, Epson Precision, Fuji Electric, Hiroshige, Iomega, JCY, LKT Tech, MATC, Min Aik, MMI Precision, Notion, ShinEtsu, Syquest Technology, Totoku, VTec. Philippines: CAM Mechatronics, Eng Tecknologi, Hoya, Miyoshi Precision, Nidec, Nitkoshi, TDK. Singapore: Amtek Tech, Beyonics Technology, MMI Industries, Nidec, Norelco, Patec, Showa Denko. Thailand: Cal-Comp, Fujikura Electronics, Furukawa, Hoya Hutchinson Tech, Kuroda, Microsemi, Miyoshi Precision, Minebea, Nidec, Nitto Denko, Nok Precision, NHK Spring, NMB, Shin-Ei Precision, Shin-Etsu Magnetics, TDK. Viet Nam: Armstrong, Hoya.

Other electronic MNEs, including electronic manufacturing services firms, in ASEAN: Benchmark Electronics, Celestica, Compal Electronics, Di-Nikko Engineering, Delta Electronics, Dell, Electrolux, HP, Hitachi, Hon Hai Precision Industry, Intel, Jabil, LG, Plexus, National Semiconductor, New Kinpo Group, Nikon, Nokia, Panasonic, Sanmina, Sanyo, SIIX, Sony, Sumitronics, Texas Instruments, and UMC Electronics.

Source: AIR 2014.

4.5. Regional – subregional connectivity projects

Various priority projects related to regional physical connectivity and infrastructure are highlighted in the Master Plan on ASEAN Connectivity (ASEAN Secretariat 2012a). These projects include infrastructure developments in power grid interconnection, road and rail transportation networks, and ICT. There are also priority projects in trade facilitation (e.g. the national single window, mutual recognition arrangements), travel facilitation (e.g. easing visa requirements) and elimination of scheduled investment impediments. These regional projects are at various stages of implementation. When fully implemented, they will strengthen regional connectivity.

At the GMS subregional level, 57 priority infrastructure investment projects as of 30 June 2015 related to transport, electricity and ICT, which are to be implemented between 2014 and 2018 (Annex table 4.1, ADB 2015). These projects, which aim to connect and develop the GMS constituent members, are estimated to cost $30 billion during the five-year programme, and a significant proportion of the finance is to come from MDBs, ODA and private sector participation. The projects cover construction of new infrastructure and upgrading of existing assets in transport (i.e. road, bridge, rail and port link), electricity and ICT connectivity. The list of projects and their huge cost illustrates the important role of MDBs to these projects with connectivity implications in the GMS area.

Planned infrastructure connectivity projects, including upgrading of existing facilities in the BIMP-EAGA, are dominated by land transport improvement and connectivity activities (annex table 4.2). Other projects to strengthen this subregion include commerce, tourism and investment.

4.6. Conclusion

ASEAN Member States are increasingly interconnected through national, subregional and regional infrastructure development. The region is also interconnected through production, investment and trade activities carried out by MNEs and ASEAN companies operating in different Member States. The implementation of regional programmes such as those highlighted in the Master Plan on ASEAN Connectivity and the Declaration on the AEC Blueprint will further strengthen regional linkages.

In addition to the development of national and subregional infrastructure connections, ASEAN Member States are also connecting through a number of major regional infrastructure programmes. The APG and the TAGP are contributing to energy security in the region. Some electricity grids are already interconnected, some are being developed, and more are expected to be completed by 2026. The increase in PPAs together with existing and ongoing grid connection is further linking the ASEAN Member States. In gas supply infrastructure, significant developments have also been made. Gas can now be moved to demand centres both through pipelines and through a network of gas terminal facilities for LNG.

The AHN is also contributing to regional connectivity. In 2015, all remaining missing roads that had held back regional connectivity were built; Member States continue to upgrade the quality of their national roads as part of their commitment in the AHN, which comprises 38,400 km of ASEAN highways. In rail, some Member States are planning to construct high-speed rail lines and some are already developing their sections of the SKRL. The latter will involve some 6,890 km of lines running through several ASEAN Member States. Bridge links and the various intercountry friendship bridges in the region are also connecting some Member States and contiguous areas otherwise separated by rivers and seas.

For facilitating short shipping routes and the transport of goods within the region, an RORO initiative has been introduced in ASEAN ports; the initial run of ASEAN RORO service is expected to be launched by 2017. ASEAN Member States are expanding and upgrading airports to cope with greater demand for air travel, and to support tourism and the growth of regional airlines, with rapidly increasing numbers of planes serving the region. These airport investments play an important role in facilitating the movement of people and the downstream operation of budget airlines and related logistic businesses. The ASEAN Open Skies Agreements have entered into force and been operationalized, and will significantly change the region's air transport landscape.

In ICT, ASEAN Member States are cooperating in laying an increasing number of criss-crossing undersea cable systems and installing broadband connections.

In moving forward, more cross-border regional infrastructure connectivity work still needs to be done. The overall investment needs for regional physical connectivity projects are huge. Given that public financing is limited, funding for some of these connectivity projects will need to come from multiple stakeholders (public sector, private sector, multilateral development banks [MDBs] and official development assistance). The private sector, both ASEAN and foreign companies, has been involved in investing, building, operating and financing infrastructure development that helps connect the ASEAN Member States. However, the private sector would need to play a greater role to help deliver future infrastructure projects with regional connectivity elements.

Physical connectivity has an important implication for improving logistic efficiency, supporting tourism, lowering transaction costs, and increasing access to regional energy supply, including providing cost-saving solutions to meet ASEAN's growing electricity demand and gas energy needs. Regional electricity trade and exchanges have helped some ASEAN Member States establish industrial estates and bring electricity to remote areas that otherwise would face significant development challenges. A more physically connected ASEAN will increase further the competitiveness of the region and improve the region's FDI environment. It also generates spillover benefits for downstream infrastructure-enabled business development such as in logistics, business process outsourcing and e-commerce, all of which have implications for business-to-business and regional connectivity.

In regional economic connectivity, increasing intra-regional investment, contract manufacturer linkages, and intra- and inter-firm operations by foreign and local companies

based in ASEAN are further strengthening regional integration. Regional expansion by MNEs and further growth in intra-ASEAN investment is expected to continue with the imminent realization of the AEC, as these firms position themselves as regional players in the industries they serve – and through them, in a greater connected ASEAN.

The future landscape of ASEAN connectivity will be more densely connected in physical and economic contexts in the next decade. In both contexts and at different levels, the private sector – both foreign and local companies – will play an important role in the region's connectivity.

Notes

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9 A study indicated that if the necessary infrastructure investment is made in upgrading and improving the Asian Highway Network, intraregional trade in 18 of the 32 member countries would increase by 35% or about $89.5 billion a year (Parpiev and Sodikov 2008).

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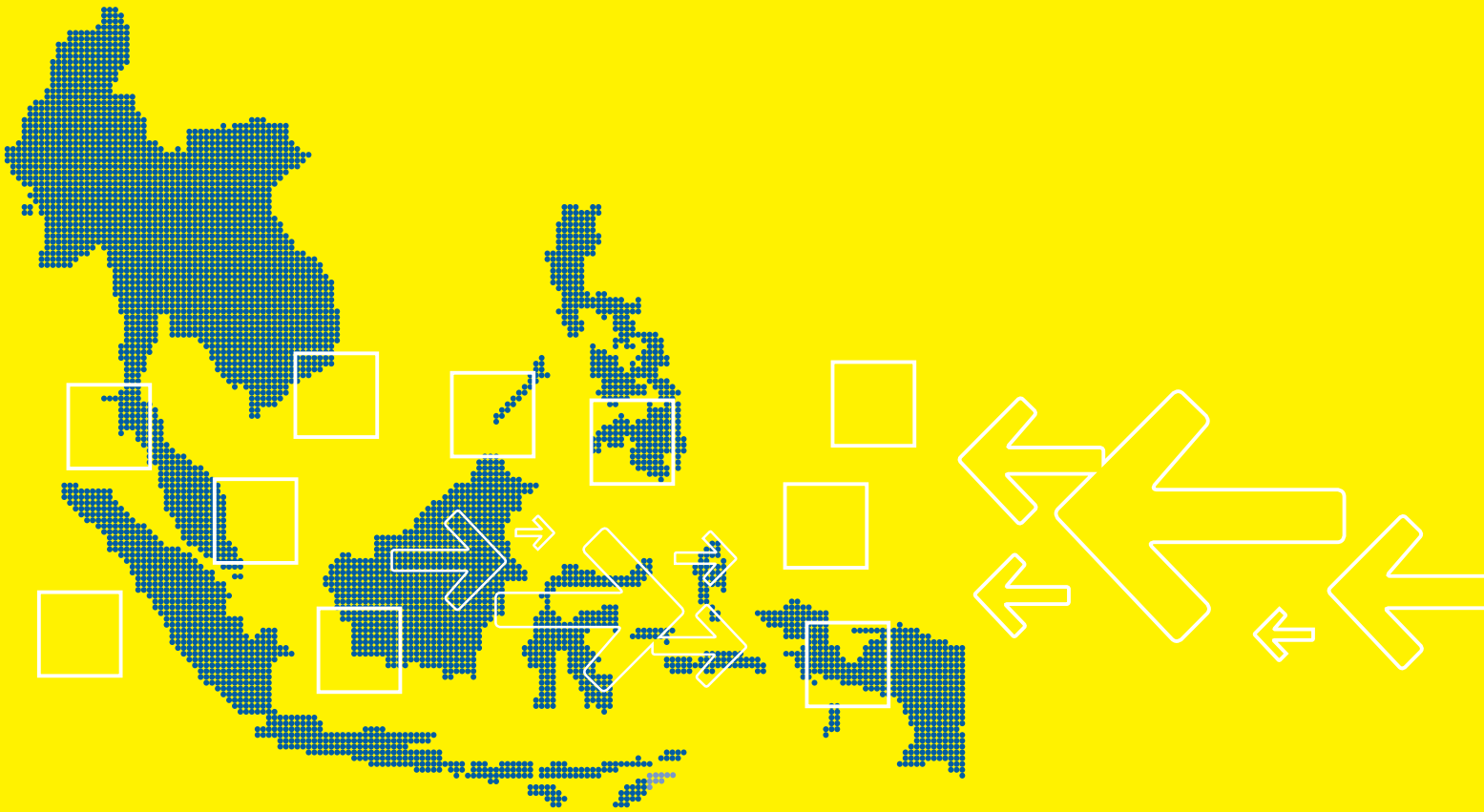

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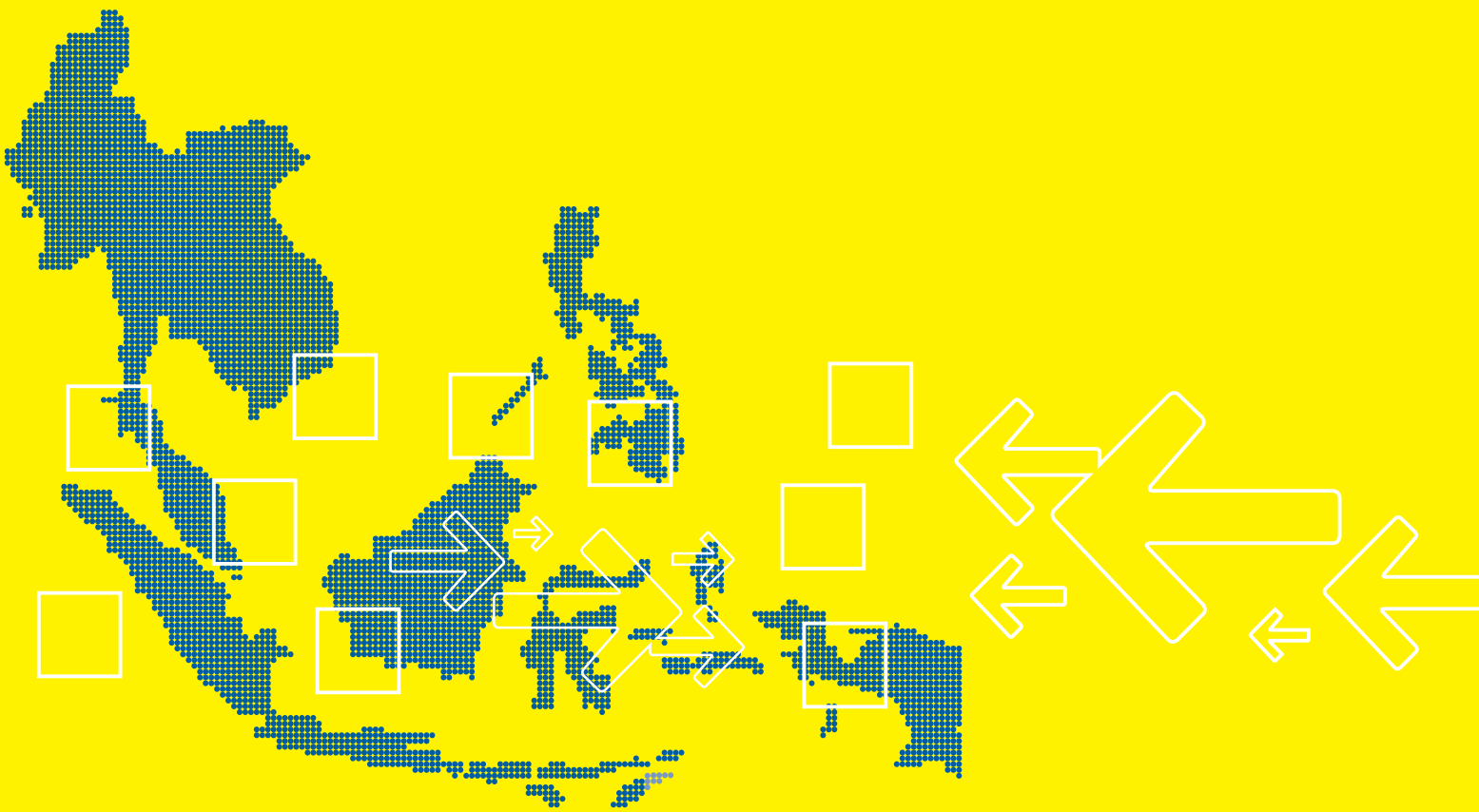
ANNEXES



Annex table 1.1. **FDI flows into ASEAN, 2000–2014** (Millions of dollars)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Brunei Darussalam	550	526	1036	3298	206	289	434	260	330	371	625	1208	865	725	568
Cambodia	149	149	145	84	131	381	483	867	815	539	783	892	1,557	1,275	1,727
Indonesia	-4,550	-2,979	145	-596	1,895	8,336	4,914	6,928	9,318	4,877	13,771	19,242	19,138	18,444	22,276
Lao PDR	34	24	25	20	17	28	187	324	228	319	333	467	294	427	913
Malaysia	3,788	,554	3,203	2,473	4,624	4,064	6,072	8,538	7,248	1,405	9,156	12,001	9,400	12,297	10,714
Myanmar	208	192	191	291	251	236	428	715	976	963	2,249	2,058	1,354	2,621	946
Philippines	2,240	195	1,542	491	688	1,854	2,921	2,916	1,544	1,963	1,298	1,816	2,797	3,860	6,201
Singapore	14,752	17,302	8,262	16,532	24,103	17,299	36,613	46,338	11,115	25,036	55,035	46,774	60,980	56,138	72,098
Thailand	3,350	5,061	3,335	5,235	5,862	8,048	9,460	11,330	8,539	4,853	9,112	3,861	10,699	13,000	11,538
Viet Nam	1,289	1,300	1,200	1,450	1,610	1,954	2,400	6,700	9,579	7,600	8,000	7,519	8,368	8,900	9,200
Total	21,809	22,326	19,085	29,278	39,386	42,489	63,912	84,917	49,693	47,927	100,360	95,838	115,453	117,687	136,181

Source: ASEAN Secretariat, ASEAN FDI Database (accessed 1 July 2015).

Annex table 1.2. **FDI flows to ASEAN, by industry and selected economies/regions, 2013–2014** (Millions of dollars)

2013	Japan	United States	European Union	Emerging Markets of East Asia					India	Australia	ASEAN	Total FDI in ASEAN
				Korea, Republic of	Hong Kong (China)	Taiwan Province of China	China	Sub-total				
Agriculture, forestry, and fishing	62.2	55.5	472.6	37.0	1.4	1.0	88.2	127.7	4.6	3.1	1,599.3	2,346.0
Mining and quarrying	(661.3)	982.1	1,582.0	25.4	57.8	.9	558.1	642.3	(1.6)	67.1	479.3	8,042.2
Manufacturing	12,453.5	269.4	3,561.3	2,153.0	1,635.9	536.8	1,575.8	5901.6	116.3	620.0	5,807.2	33,342.1
Electricity, gas, steam and air conditioning supply	211.1	25.1	227.9	166.3	35.1	22.9	87.1	311.5	.1	4.9	248.1	1,156.8
Water supply; sewerage and waste management	420.3	5.3	101.5	4.2	16.5	.6	.7	22.0	0.0	.1	25.1	602.2
Construction	40.9	16.4	159.2	68.9	466.7	5.0	21.3	561.9	(1.4)	145.1	(19.6)	825.0
Wholesale and retail trade; repair of motor vehicles and cycles	1,946.7	279.8	5,661.1	598.6	(545.3)	93.4	1,424.2	1571.0	247.8	65.2	655.0	13,946.6
Transportation and storage	301.1	163.5	(906.7)	(115.2)	10.9	150.8	(145.1)	(98.5)	24.8	105.0	271.1	2,802.5
Accomodation and food service activities	32.9	107.4	20.1	35.1	(124.7)	3.4	15.8	(70.4)	.6	3.5	114.5	260.4
Information and communication	102.1	2.2	378.4	2.2	(10.1)	.6	(1.8)	(9.1)	(0.0)	12.9	389.0	2,196.5
Financial and Insurance activities	5,340.0	(262.8)	6,300.4	297.6	2,231.1	327.2	239.9	3,095.8	323.9	2,095.1	2,935.4	28,263.7
Real estate activities	388.2	300.6	701.4	78.7	703.5	34.8	1,574.5	2,391.4	1.0	(9.6)	4,804.0	9,821.5
Professional, scientific and technical activities	123.9	227.1	22.3	38.9	7.1	5.5	9.7	61.3	(1.2)	4.6	76.2	711.8
Administrative and support service activities	60.1	53.7	65.5	1.4	0.0	.6	2.6	4.7	0.0	(4.2)	104.5	294.9
Education	13.3	.6	.3	9.6	1.7	1.3	5.2	17.8	(5.2)	.4	14.4	66.5
Human health and social work activities	53.1	27.9	1.7	7.4	1.2	4.0	3.9	16.5	0.0	9.6	15.5	127.7
Arts, entertainment and recreation	11.1	1.0	12.1	4.2	14.9	.6	2.2	21.9	.3	.1	(.2)	218.8
Other services	830.7	2,649.6	3,598.5	225.4	516.5	105.6	523.4	1,370.8	185.9	273.5	589.4	9,010.3
Others												3,225.0
Memorandum:												
Lao's data											104.6	426.7
Data suppressed for confidential reason	36.0	8.8	296.2	13.5	210.0	54.9	792.6	6.4	434.8	92.9	1,186.8	
Total	**21,766.1**	**4,913.3**	**22,255.7**	**3,652.4**	**5,230.2**	**1,349.9**	**6,778.5**	**15,946.5**	**1,330.7**	**3,489.2**	**19,399.6**	**117,687.1**

Annex table 1.2. FDI flows to ASEAN, by industry and selected economies/regions, 2013–2014 (Millions of dollars) (concluded)

2014	Japan	United States	European Union	Emerging Markets of East Asia					India	Australia	ASEAN	Total FDI in ASEAN
				Korea, Republic of	Hong Kong (China)	Taiwan Province of China	China	Sub-total				
Agriculture, forestry, and fishing	77.7	(27.1)	332.6	33.8	19.3	3.1	51.5	107.7	4.7	10.1	3,928.9	4,492.6
Mining and quarrying	388.7	(1,273.9)	2,301.3	16.5	(80.6)	2.5	1,120.0	1,058.5	(.1)	137.4	1,213.4	7,295.1
Manufacturing	6,799.4	(822.4)	4,204.4	2,570.3	1,408.6	718.4	313.8	5,011.0	26.1	(216.5)	6,585.9	22,215.4
Electricity, gas, steam and air conditioning supply	18.7	.9	243.6	35.5	(18.0)	4.9	387.5	409.9	.2	.7	(53.9)	460.4
Water supply; sewerage and waste management	4.4	1.3	84.6	10.1	1.0	3.4	2.5	17.0	.1	.2	8.9	98.2
Construction	131.8	15.2	100.4	294.6	134.5	23.5	169.6	622.2	(5.0)	16.4	182.8	1,187.9
Wholesale and retail trade; repair of motor vehicles and cycles	1,992.9	6,219.1	1,372.0	333.8	154.8	(33.7)	1,853.3	2,308.2	75.3	295.2	1,071.7	17,055.2
Transportation and storage	326.2	(17.3)	495.0	5.1	12.7	10.7	57.9	86.4	110.1	306.2	418.4	2,612.8
Accomodation and food service activities	23.9	(57.2)	25.9	105.9	59.9	13.9	22.4	202.0	1.2	1.4	(35.8)	158.0
Information and communication	94.0	28.5	491.4	(6.4)	1,001.7	1.7	(5.6)	991.4	(5.2)	(137.1)	435.7	2546.9
Financial and Insurance activities	1,843.7	5,243.8	13,900.7	405.8	5,096.5	1,712.2	1,908.9	9,123.3	261.7	2,442.5	3,485.0	43,052.2
Real estate activities	457.8	322.2	540.1	423.5	1,042.7	93.2	2,000.7	3,560.1	3.7	140.2	4,567.5	10,040.0
Professional, scientific and technical activities	10.2	338.6	244.6	46.2	(25.5)	6.7	21.6	49.0	1.3	(23.6)	124.7	1,048.3
Administrative and support service activities	34.8	41.7	(13.6)	7.2	7.1	1.5	.4	16.2	.1	.4	65.8	216.7
Education	4.1	.5	3.0	11.6	4.8	1.8	.7	19.0	(8.2)	.2	8.8	61.6
Human health and social work activities	22.0	10.6	10.8	64.3	24.5	9.9	4.0	102.8	.3	8.2	39.9	210.5
Arts, entertainment and recreation	(2.9)	(.3)	(9.8)	(12.3)	(5.3)	(2.0)	(.8)	(20.4)	(.1)	(.2)	(5.1)	(47.4)
Other services	998.5	1,839.4	4,736.4	109.6	162.6	115.8	849.0	1237.1	(56.3)	2,694.4	1,572.6	19,311.3
Others												4,165.3
Memorandum:												
Data suppressed for confidential reason	155.2	1,178.5	205.2	13.5	503.6	126.5	111.9	755.6	409.7	27.3	762.3	
Total	**13,381.1**	**13,042.3**	**29,268.5**	**4,468.9**	**9,504.9**	**2,814.1**	**8,869.4**	**25,657.3**	**,819.5**	**5,703.4**	**24,377.4**	**136,181.3**

Source: ASEAN Secretariat, ASEAN FDI Database (accessed 1 July 2015).

Note: Data for cross tabulation for 2013 do not include Myanmar and 2014 do not include Philippine's data.

Annex table 1.3. **ASEAN companies continued to make cross-border mega deals exceeding $250 million in 2013–2014** (Millions of dollars)

Year	Ultimate acquiring company	Ultimate acquiring nation	Target company	Target nation	Target industry	Value	Shares acquired
2013	Investor Group	Thailand	Ping An Insurance	China	Life insurance	9,386	15.6
2013	Thai Beverage	Thailand	Fraser & Neave	Singapore	Bottled and canned soft drinks	6,896	62
2013	CP ALL PCL	Thailand	Siam Makro	Thailand	Grocery stores	4,220	64.4
2013	SapuraKencana Petroleum	Malaysia	SeaDrill Ltd - Asian Tender Rigs Division	Malaysia	Drilling oil and gas wells	2,913	100
2013	CP ALL	Thailand	Siam Makro	Thailand	Grocery stores	1,912	31.7
2013	Indonesia Republic	Indonesia	ConocoPhillips Algeria	Algeria	Crude petroleum and natural gas	1,753	100
2013	Singapore	Singapore	Grand Wailea Resort Hotel (Hawaii)	United States	Hotels and motels	1,502	100
2013	Investor Group	Malaysia	Spire Healthcare Ltd - Hospitals	United Kingdom	General medical and surgical hospitals	1,111	100
2013	Gallant Venture	Singapore	PT Indomobil Sukses Internasional	Indonesia	Motor vehicles and passenger car bodies	809	52.4
2013	Fortune REIT	Singapore	Tin Shui Wai Development	Hong Kong, China	Operators of nonresidential buildings	754	100
2013	CT Corp	Indonesia	Carrefour Indonesia	Indonesia	Grocery stores	673	60
2013	Gallant Venture	Singapore	PT Indomobil Sukses Internasional	Indonesia	Motor vehicles and passenger car bodies	449	29.6
2013	Lippo Group	Singapore	US Bank Tower (Los Angeles, CA)	United States	Operators of nonresidential buildings	368	100
2013	International Sport Capital	Indonesia	FC Internazionale Milano	Italy	Professional sports clubs and promoters	338	70
2013	Indofood CBP Sukses Makmur	Indonesia	China Minzhong Food Corp	China	Frozen fruits, fruit juices and vegetables	320	55.5
2013	Singapore Telecommunications	Singapore	Bharti Telecom	India	Telephone and telegraph apparatus	303	3.6
2013	Investor Group	Indonesia	Silverlink Resorts	Singapore	Hotels and motels	300	100
2013	Singapore	Singapore	Matahari Putra Prima	Indonesia	Department stores	296	26.1
2013	Tuan Sing Holdings	Singapore	Robinson Point	Mauritius	Investment offices, nec	272	100
2013	Wilmar International	Singapore	Cosumar	Morocco	Cane sugar, except refining	270	27.5
2013	Malaysia	Malaysia	Acibadem Saglik ve Hayat Sigorta	Turkey	Accidental and health insurance	252	90
2014	Singapore	Singapore	AS Watson Holdings	Hong Kong, China	Retail stores, nec	5,672	25
2014	Overseas-Chinese Banking Corp	Singapore	Wing Hang Bank	Hong Kong, China	Banks	4,847	97.8
2014	St James Holdings	Singapore	Perennial Real Estate Holdings	China	Land and real estate	2,782	100
2014	Frasers Centrepoint	Singapore	Australand Property	Australia	Land and real estate	2,406	98.4
2014	NutriAsia	Philippines	Del Monte Foods	United States	Dog, cat and pet food	1,675	100
2014	Petronas	Malaysia	Talisman Energy Inc-Montney Assets	Canada	Crude petroleum and natural gas	1,433	100
2014	Singapore	Singapore	Blocks (3), Tanzania	United Republic of Tanzania	Crude petroleum and natural gas	1,293	20
2014	Global Logistic Properties	Singapore	BR Properties - Portfolio of Logistic Assets	Brazil	General warehousing and storage	1,178	100
2014	Rainbow Light	Singapore	Nippon Paint	Japan	Paints, varnishes, lacquer products	1,012	18.7
2014	Investor Group	Thailand	Hess Thailand Holdings II	Thailand	Petroleum refining	1,000	100
2014	SapuraKencana Petroleum	Malaysia	Newfield Malaysia Holdings	Malaysia	Crude petroleum and natural gas	896	100

Annex table 1.3. **ASEAN companies continued to make cross-border mega deals exceeding $250 million in 2013–2014** (Millions of dollars) (concluded)

Year	Ultimate acquiring company	Ultimate acquiring nation	Target company	Target nation	Target industry	Value	Shares acquired
2014	Investor Group	Indonesia	Axis Telekom Indonesia	Indonesia	Radiotelephone communications	865	100
2014	RGE	Indonesia	Sateri Holdings Ltd - Viscose fiber assets	China	Cellulosic manmade fibers	863	100
2014	Alliance Global Group	Philippines	Whyte & Mackay	United Kingdom	Wines, brandy and brandy spirits	725	100
2014	Investor Group	Singapore	Beijing Xiaoju Technology	China	Prepackaged software	700	..
2014	Investor Group	Singapore	Pactera Technology International	China	Computer facilities management services	658	100
2014	JG Summit Holdings	Philippines	NZ Snack Food Holdings	New Zealand	Cookies and crackers	608	100
2014	Rainbow Light Ltd	Singapore	Nippon Paint	Japan	Paints, varnishes, lacquer products	591	14.8
2014	Solusi Tunas Pratama	Indonesia	XL Axiata Tbk PT - Telecoms Towers (7000)	Indonesia	Radiotelephone communications	459	100
2014	Electricity Generating	Thailand	Masin-AES	Singapore	Electric services	453	45
2014	Singapore	Singapore	Emperador	Philippines	Distilled and blended liquors	391	10.7
2014	Malaysia	Malaysia	Istanbul Sabiha Gokcen Uluslararasi Havalimani Yatirim Yapim ve Isletme AS	Turkey	Airports and airport terminal services	388	40
2014	Peak Hotels & Resorts Group	Singapore	Silverlink Resorts	Singapore	Hotels and motels	358	100
2014	Global Logistic Properties	Singapore	Tokyo 2 Logistic Tokutei Mokuteki Kaisha - GLP Tokyo II	Japan	Operators of nonresidential buildings	353	100
2014	Singapore	Singapore	Ronesans Gayrimenkul Yatirim	Turkey	Real estate investment trusts	317	21.4
2014	LMIR Trust	Singapore	Lippo Mall Kemang	Indonesia	Operators of nonresidential buildings	306	100
2014	Investor Group	Indonesia	AmanResorts International	Singapore	Hotels and motels	300	100
2014	IREIT Global	Singapore	Deutsche Telekom AG - Office Buildings Portfolio (5)	Germany	Operators of nonresidential buildings	299	100
2014	Malaysia	Malaysia	Intudigital	United Kingdom	Operators of nonresidential buildings	294	80
2014	Malaysia	Malaysia	Sabiha Gokcen Uluslararasi Havaalani	Turkey	Airports and airport terminal services	290	40
2014	Singapore	Singapore	Mid City Place Investments	United Kingdom	Real estate investment trusts	285	50
2014	Hong Leong Group	Singapore	226 West Fifty-Second Street LLC - Novotel New York Times Square	United States	Hotels and motels	274	100
2014	Hong Leong Group	Singapore	Novotel New York Times Square, New York, New York	United States	Hotels and motels	274	100
2014	Investor Group	Singapore	Seven Energy International	United Kingdom	Oil and gas field exploration services	255	26
2014	Singapore Telecommunications	Singapore	Adconion Media	United States	Information retrieval services	255	100

Source: UNCTAD, UNCTAD M&As Database (accessed 15 July 2015).

Annex table 2.1. **Many banks and financial institutions provide loan facilities for infrastructure projects in ASEAN, 2014 (selected cases)** (Millions of dollars)

Banks/ Finance Institution	Project/ Company	Location	Amount
Mitsubishi UFJ Financial (Japan)	Sarulla Geothermal	Indonesia	54.7
	Nam Ngiep 1 Power	Lao PDR	23.9
	Trans Thai-Malaysia	Malaysia	47.1
	Donggi Senoro LNG PT	Indonesia	175.5
	Singapore LNG	Singapore	172.0
	Gulf Electric	Thailand	560.8
ANZ (Australia)	Burgos Wind Power Plant	Philippines	37.5
SMBC (Japan)	Sarulla Geothermal	Indonesia	54.7
	Nam Ngiep 1 Power	Lao PDR	23.9
	PT Bajradaya Sentranusa	Indonesia	26.2
	Petrofac FPSO 003 Pte	Thailand	9.3
	Petrofac MOPU 005 Pte	Malaysia	35.7
	Bowin Clean Energy	Thailand	35.1
	Donggi Senoro LNG PT	Indonesia	175.5
	Houay Ho Power	Lao PDR	84.0
	Pan Asia Majestic Eagle	Myanmar	17.0
NAB (Australia)	Sarulla Geothermal,Sumatra	Indonesia	54.7
KDB (Republic of Korea)	PT Bajradaya Sentranusa	Indonesia	26.2
	PAU Fertilizer Plant	Indonesia	103.8
Mizuho Financial (Japan)	Sarulla Geothermal	Indonesia	54.7
	Nam Ngiep 1 Power	Lao PDR	23.9
	Energy Equity Epic [Sengkang]	Indonesia	41.7
	Bang Poo SPP	Thailand	134.5
	PT Rajamandala Electric Power	Indonesia	110.0
	Trans Thai-Malaysia	Malaysia	47.1
	Bowin Clean Energy	Thailand	35.1
	Donggi Senoro LNG PT	Indonesia	128.0
	Singapore LNG	Singapore	172.0
	Gulf Electric PCL	Thailand	166.7
HSBC (United Kingdom)	Batutua Tembaga Raya PT	Indonesia	41.3
	MEASAT 3b Satellite	Malaysia	28.2
	Trans Thai-Malaysia	Malaysia	47.1
	Petrofac FPSO 003 Pte	Thailand	9.3
	Petrofac MOPU 005 Pte	Malaysia	35.7
OCBC (Singapore)	Well Harvest Winning Alumina	Indonesia	190.0
	MEASAT 3b Satellite	Malaysia	28.2
	PAU Fertilizer Plant	Indonesia	103.8
	Pan Asia Majestic Eagle	Myanmar	17.0
	Singapore LNG	Singapore	172.0
DBS (Singapore)	Well Harvest Winning Alumina	Indonesia	190.0
	Pan Asia Majestic Eagle	Myanmar	17.0
	Singapore LNG	Singapore	172.0
	Everet LNG	Singapore	53.6
UOB (Singapore)	PAU Fertilizer Plant	Indonesia	103.8
BNP Paribas (France)	Batutua Tembaga Raya PT	Indonesia	41.3
ING (Netherlands)	Sarulla Geothermal	Indonesia	54.7
	Pan Asia Majestic Eagle	Myanmar	17.0
	Burgos Wind Power Plant	Philippines	37.5
SG (France)	Sarulla Geothermal	Indonesia	54.7
	Batutua Tembaga Raya PT	Indonesia	41.3
	PT Bajradaya Sentranusa	Indonesia	26.2
	Petrofac FPSO 003 Pte	Thailand	9.3
	Petrofac MOPU 005 Pte	Malaysia	35.7

Annex table 2.1. **Many banks and financial institutions provide loan facilities for infrastructure projects in ASEAN, 2014 (selected cases)** (Millions of dollars) (concluded)

Banks/ Finance Institution	Project/ Company	Location	Amount
Banco De Oro Unibank (Philippines)	Pagbilao Power Plant	Philippines	253.3
	GMR-Megawide Cebu Airport	Philippines	521.0
	Burgos Wind Power Plant	Philippines	33.5
Kasikornbank (Thailand)	Nam Ngiep 1 Power	Lao PDR	107.7
	Serm Sang Palang Ngan	Thailand	83.5
	Lopburi Solar	Thailand	8.7
	Gulf Electric PCL	Thailand	394.1
Bangkok Bank (Thailand)	Nam Ngiep 1 Power	Lao PDR	107.7
	Bang Poo SPP	Thailand	134.5
	Bowin Clean Energy	Thailand	35.1
	Gulf Electric PCL	Thailand	261.7
Siam Commercial Bank (Thailand)	Nam Ngiep 1 Power	Lao PDR	107.7
	Gulf Electric PCL	Thailand	394.1
Standard Chartered (United Kingdom)	Energy Equity Epic	Indonesia	41.7
	MEASAT 3b Satellite	Malaysia	28.2
	Pan Asia Majestic Eagle	Myanmar	17.0
Citibank (United States)	Singapore LNG	Singapore	172.0
KfW IPEX-Bank (Germany)	First NatGas Power	Philippines	265.0
DZ Bank (New Zealand)	Burgos Wind Power Plant	Philippines	37.5
Bank of Philippine Islands	Pagbilao Power Plant	Philippines	253.3
	SaCaSol	Philippines	11.5
LH Financial (Thailand)	Gulf Electric PCL	Thailand	261.7
Natixis (France)	Energy Equity Epic	Indonesia	41.7
	MEASAT 3b Satellite	Malaysia	28.2
	PT Bajradaya Sentranusa	Indonesia	26.2
	Petrofac FPSO 003 Pte	Thailand	9.3
	Petrofac MOPU 005 Pte	Malaysia	35.7
Metropolitan Bank & Trust (Philippines)	Pagbilao Power Plant	Philippines	253.3
CIMB (Malaysia)	Gulf Electric PCL	Thailand	166.7
Maybank (Malaysia)	MEASAT 3b Satellite	Malaysia	28.2
	PT Bajradaya Sentranusa	Indonesia	26.2
	Burgos Wind Power Plant	Philippines	37.5
	Trans Thai-Malaysia	Malaysia	47.1
NongHyup Financial (Republic of Korea)	Donggi Senoro LNG PT	Indonesia	47.5
Korea Exchange Bank (Republic of Korea)	Donggi Senoro LNG PT	Indonesia	47.5
TMB Bank (Thailand)	Lopburi Solar	Thailand	8.7
	Bowin Clean Energy	Thailand	35.1
RHB (Malaysia)	MEASAT 3b Satellite	Malaysia	28.2
Saigon-Hanoi Bank (Viet Nam)	San Hydropower	Viet Nam	23.0
Indonesia Infrastructure Finance (Indonesia)	PT Bajradaya Sentranusa	Indonesia	17.9
Land Bank of the Philippines	Burgos Wind Power Plant	Philippines	33.5
Philippine National Bank	Burgos Wind Power Plant	Philippines	33.5
Security Bank & Trust (Philippines)	Burgos Wind Power Plant	Philippines	33.5
Total loans by banks and financial institutions for infrastructure projects in ASEAN in 2014			**8,697.0**

Source: Thomson Reuters, based on Project Finance International.

Annex table 4.1. Infrastructure connectivity: selected subregional (GMS) projects in ASEAN

Country	Sector	Name of project	Description	Subsector	Cost estimates ($ million)	Justification/additional information
Cambodia	Transport	Sihanoukville Port Access Road Improvements	The project will improve the final 9.5 kilometers (km) (approximately) of NR4 leading to the port of Sihanoukville. This may be included in the Sihanoukville Port Special Economic Zone Project financed by the Japan International Cooperation Agency.	Road	40.0	Greater Mekong Subregion project. Regional Investment Implementation Plan (2014-2018)
Cambodia	Transport	Deepening Connectivity of GMS Southern Economic Corridor	The major objectives of the project are to upgrade a connecting road section in Cambodia from Battambang to Siem Reap, and to improve the cross-border facility (CBF) at Pailin. The project will rehabilitate a 75 km road section between Battambang and Siem Reap, creating a stronger link between Pailin and Siem Reap to meet transport demand. It will also rehabilitate the existing small CBF in Pailin, bringing it up to the standard of the Greater Mekong Subregion (GMS) Cross-Border Transport Agreement (CBTA). The project will deepen subregional connectivity in the Southern Economic Corridor among Cambodia, Thailand, and Viet Nam. The design will be completed in 2015 with the feasibility study final report.	Road	120.0	Greater Mekong Subregion project. Regional Investment Implementation Plan (2014-2018)
Cambodia	Transport	Phnom Penh–Sihanoukville Highway Corridor Improvements	The proposed 209 km expressway project will follow a new alignment between routes NR4 and NR3, starting along NR4, and in general following a corridor to the west of NR4. The preliminary scope of the project is a build-operate-transfer model with a 50-year concession period. When completed, the highway will be the first controlled-access in Cambodia, and provide a high-capacity road link to the port of Sihanoukville and to the GMS Southern Coastal Corridor.	Road	1'000.0	Greater Mekong Subregion project. Regional Investment Implementation Plan (2014-2018). A feasibility study is being undertaken by an international developer.
Cambodia	Transport	Link Road between NR5 and NR6 near Kampong Tralach north of Phnom Penh	The proposed link will facilitate traffic movement between the major highways north of Phnom Penh, and reduce traffic congestion within Phnom Penh.	Road	65.0	Greater Mekong Subregion project. Regional Investment Implementation Plan (2014-2018)
Cambodia	Transport	Construction of Poipet (Cambodia)–Klong Loeuk (Thailand) Railway Bridge	The proposed bridge will replace an existing unserviceable rail bridge at the Poipet–Aranyaprathet border-crossing point between Cambodia and Thailand.	Rail	0.5	Greater Mekong Subregion project. Regional Investment Implementation Plan (2014-2018). A ground breaking ceremony for the construction of the bridge took place in mid-2014.
Lao PDR	Transport	Vang Tao Border-Crossing Point	The facilities are located at the Lao PDR–Thailand border-crossing points at Vang Tao and Chong Mek, on NR16. The existing border-crossing facilities do not meet the implementation requirements of the GMS CBTA.	Other Infras-tructure	15.0	Greater Mekong Subregion project. Regional Investment Implementation Plan (2014-2018). Now under construction.
Lao PDR	Transport	Upgrading NR13N and N13S (Portion through Vang Vieng–Vientiane–Thabok); ASEAN Highway AH11 (NR13S)	NR13N connects Vientiane to the country's northern provinces, and NR13S connects Vientiane to the southern provinces. Present and projected traffic demand requires the road to be expanded to 4 lanes. The Government is considering using a public–private partnership (PPP) approach for implementing the project.	Road	280.0	Greater Mekong Subregion project. Regional Investment Implementation Plan (2014-2018). Possible PPP investment, with World Bank support. The World is providing support for the feasibility study and detailed design.

Annex table 4.1. Infrastructure connectivity: selected subregional (GMS) projects in ASEAN (continued)

Country Coverage	Sector	Name of Project	Description	Subsector	Cost estimates ($ million)	Justification/additional information
Lao PDR	Transport	Mekong Bridge at Bungkan–Paksan	This will be the Fifth Lao–Thai International Friendship Bridge across the Mekong River, between Muong Paksan, Bolikhamxay Province (Lao PDR side), and Amphoe Muong, Chang Wat, and Bungkane (Thailand side). This bridge will facilitate the road transport of goods and passengers from northeastern Thailand through central Lao PDR and central Viet Nam via NR8. Thailand is considering providing assistance for a feasibility study and detailed design of the project.	Bridge	To be deter-mined	Greater Mekong Subregion project. Regional Investment Implementation Plan (2014-2018).
Lao PDR	Transport	Thanaleng Border-Crossing Infrastructure Improvement	The Thanaleng border-crossing operates in a very restrictive and inefficient manner to both passenger and freight traffic. Daily freight traffic exceeds 300 trucks; and passenger car and bus traffic reportedly exceeds 1,000 vehicles per day. There is a need not only to separate freight traffic from passenger traffic, but also to significantly improve and upgrade the road and other infrastructure at this location.	Other Infras-tructure	25.0	Greater Mekong Subregion project. Regional Investment Implementation Plan (2014-2018). Financing support is needed.
Lao PDR	Transport	Muong Ngeune–Chomphet–Luang Prabang	This tourism corridor extends from Chiang Rai–Chiang Mai–Luang Prabang (Chiang Thong)–Vientiane. The section from Muong Ngeune–Chomphet–Luang Prabang is part of this initiative. If a good road is in place, it will promote trade, investment, and tourism.	Road	90.0	Greater Mekong Subregion project. Regional Investment Implementation Plan (2014-2018). The Government of the Lao PDR has requested financing support from Thailand's NEDA.
Lao PDR	Transport	Upgrading of NR8 East–West Transport Route; ASEAN Highway AH15 (Van Lao–Nan Phao)	NR8 branches off from NR13S at Ban Lao, passing through the districts of Kamkeuth and Laksao before reaching the Lao PDR–Viet Nam border-crossing point at Namphao–Cau Treo; and from there, it connects to Cua Lo Seaport, in Vinh, Viet Nam. The road does not meet ASEAN standards. This portion of the road is included in the ASEAN Master Plan for Connectivity for upgrading.	Road	80.0	Greater Mekong Subregion project. Regional Investment Implementation Plan (2014-2018). Financing support is needed.
Lao PDR	Transport	Xiengkok River Port	Under the Quadrilateral Agreement onthe Commercial Navigation on Upper Mekong–Langcang River (People's Republic of China [PRC]–Lao PDR–Myanmar–Thailand), Xiengkok Port (Lao PDR) will be a checkpoint for downstream river traffic from the PRC to Chiang Saen Port, in Thailand. This port needs to be constructed to meet growing trade activities and passenger traffic; and should be equipped with necessary handling equipment, immigration and customs offices, and warehouses.	Port Infras-tructure	15.0	Greater Mekong Subregion project. Regional Investment Implementation Plan (2014-2018).
Lao PDR	Transport	Ban Mom River Port	Under the Quadrilateral Agreement on the Commercial Navigation on Upper Mekong–Langcang River (PRC–Lao PDR–Myanmar–Thailand), Ban Mom Port will be a checkpoint for upstream river traffic from Chiang Saen Port, in Thailand, to the PRC. This port needs to be constructed to meet growing trade activities and passenger traffic; and should be equipped with necessary handling equipment, immigration and customs offices, and warehouses.	Port Infras-tructure	12.0	Greater Mekong Subregion project. Regional Investment Implementation Plan (2014-2018).
Lao PDR	Transport	Lalay Border-Crossing Point (NR15)	The facilities are located at the Lao PDR–Viet Nam border-crossing points on NR15 in Salavan Province. The existing border-crossing facilities do not meet the implementation requirements of the GMS CBTA.	Other Infras-tructure	4.0	Greater Mekong Subregion project. Regional Investment Implementation Plan (2014-2018).

Annex table 4.1. Infrastructure connectivity: selected subregional (GMS) projects in ASEAN (continued)

Country Coverage	Sector	Name of Project	Description	Subsector	Cost estimates ($ million)	Justification/additional information
Lao PDR	Transport	Nam Phao Border-Crossing Point (NR8)	The facilities are located at the Lao PDR–Viet Nam border-crossing points on NR8 in Bolikhamxay Province. The existing border-crossing facilities do not meet the implementation requirements of the GMS CBTA.	Other Infras-tructure	8.0	Greater Mekong Subregion project. Regional Investment Implementation Plan (2014-2018).
Lao PDR	Transport	Na Phao Border-Crossing Point (NR12)	The facilities are located at the Lao PDR–Viet Nam border-crossing points on NR12 in Khammouane Province. After the Third International Friendship Bridge opens for transit traffic through the Lao PDR, Thailand, and Viet Nam, traffic will increase. The existing border-crossing facilities do not meet the implementation requirements of the GMS CBTA.	Other Infras-tructure	10.0	Greater Mekong Subregion project. Regional Investment Implementation Plan (2014-2018).
Lao PDR	Transport	Luang Namtha–Xiengkok–Lao–Myanmar Friendship Bridge (NR17)	NR17 is located in Luang Namtha Province, in the Lao PDR. This road starts from Muong Luang Namtha, the capital city of Luang Namtha Province; passes through Muang Sing and Muang Long; and then connects with the Lao–Myanmar Friendship Bridge. This road is the portion of the ASEAN–India corridor that passes through Myanmar, northern Lao PDR, and Ha Noi; and then runs down to Ho Chi Minh City and Cambodia. The cost of the construction of the Lao–Myanmar Friendship Bridge is to be shared equally by the Lao PDR and Myanmar.	Road	150.0	Greater Mekong Subregion project. Regional Investment Implementation Plan (2014-2018).
Lao PDR	Transport	Vientiane–Boten Railway	Under the Sino–Lao Cooperation Scheme, theproject is underfinal technical design review. The train speed was reduced from high speed to about 200 km/h. Financial negotiation is also underway.	Rail	7'200.0	Greater Mekong Subregion project. Regional Investment Implementation Plan (2014-2018). Discussions with the People's Republic of China on financing support are ongoing.
Myanmar	Transport	East–West Economic Corridor Eindu–Kawkareik Road Improvement	The project focuses on a key route that is not only for the GMS, but also for the Trilateral Highway and the ASEAN and Asian highways. It is on the principal section of the National Highway, and must be upgraded to ASEAN Class II standard.	Road	100.0	Greater Mekong Subregion project. Regional Investment Implementation Plan (2014-2018). Feasibility study and detailed design are ongoing. ADB loan in the 2015 program is in the pipeline.
Myanmar	Transport	Mae Sot–Myawaddy Border Crossing and Infrastructure Improvements (with Thailand)	The Government of Thailand is studying a new road bypass and bridge to the north of the existing border crossing, at Mae Sot (Thailand)–Myawaddy (Myanmar), located in congested centers of the two border cities. This new crossing will be dedicated to cross-border freight traffic. The bypass will link with a newly envisioned special trade zone on the Myanmar side. The project will include about 16.9 km of a new four-lane divided highway (13.3 km in Thailand; 3.6 km in Myanmar), a 100 meter-long bridge across the Moei River at the border, and associated border-crossing facilities. The estimated total cost is about $60 million (B1,750 million) for the combined sections in both countries.	Other Infras-tructure	30.0	Greater Mekong Subregion project. Regional Investment Implementation Plan (2014-2018). Feasibility study is under preparation.

Annex table 4.1. Infrastructure connectivity: selected subregional (GMS) projects in ASEAN (continued)

Country Coverage	Sector	Name of Project	Description	Subsector	Cost estimates ($ million)	Justification/additional information
Myanmar	Transport	Improvement of Inland Ports	The project involves the construction of four inland ports on the Ayeyarwaddy River (Bhamo, Mandalay, Pokokku, and Magway) and two inland ports on the Chindwin River (Monywa and Kalewa). The project aims to improve the transportation and handling of domestic and international cargo and containers.	Port Infras-tructure	60.0	Greater Mekong Subregion project. Regional Investment Implementation Plan (2014-2018). A feasibility study will be carried out. This will include river behavior, for year-round operations.
Myanmar	Transport	Lao PDR–Myanmar Friendship Bridge over the Mekong River at Xiengkok–Kainglap	The governments of the Lao PDR and Myanmar have agreed to jointly finance (50% each) the construction of the International Friendship Bridge across the Mekong River at Xiengkok (Lao PDR side) and Kainglap (Myanmar side).	Bridge	30.0	Greater Mekong Subregion project. Regional Investment Implementation Plan (2014-2018).
Thailand	Transport	Bang Yai–Kanchanaburi Intercity Motorway (part of the Laem Chabang–Bangkok–Dawei [Myanmar] Corridor)	The proposed expressway is an important component of Thaland's National Highway Development Plan. Detailed design has been completed. Implementation by public–private participation is being considered.	Road	2'000.0	Greater Mekong Subregion project. Regional Investment Implementation Plan (2014-2018).
Thailand	Transport	Tak–Mae Sot Highway Improvement	The project will improve highway capacity and resolve the bottleneck on the East–West Economic Corridor (EWEC) in Thailand. It will upgrade the existing road from two to four lanes; total length is 90 km.	Road	90.0	Greater Mekong Subregion project. Regional Investment Implementation Plan (2014-2018). Budget allocated in fiscal year (FY) 2015.
Thailand	Transport	Lomsak–Phetchabun Highway Improvement	The project will improve highway capacity and resolve the bottleneck on the EWEC in Thailand. It will upgrade the existing road from two to four lanes; total length is 120 km.	Road	120.0	Greater Mekong Subregion project. Regional Investment Implementation Plan (2014-2018). Budget allocated in FY 2015.
Thailand	Transport	Kalasin–Nakrai–Kamcha I Highway Improvement	The project will improve highway capacity and resolve the bottleneck on the EWEC in Thailand. It will upgrade the existing road from two to four lanes; total length is 140 km.	Road	140.0	Greater Mekong Subregion project. Regional Investment Implementation Plan (2014-2018). Budget allocated in FY2015.
Thailand	Transport	Chiang Rai–Chiang Khong Highway Improvement	The project will improve highway capacity and resolve the bottleneck on the North–South Economic Corridor inThailand. It will upgrade the existing road from two to four lanes; total length is 80 km.	Road	80.0	Greater Mekong Subregion project. Regional Investment Implementation Plan (2014-2018). Budget allocated in FY2016.
Thailand	Transport	Mae Sot–Myawaddy Border Crossing and Infrastructure Improvements (Thailand part)	The Thailand government is studying a new road bypass and bridge to the north of the existing border crossing, located in the congested centers of two border cities, Mae Sot and Myawaddy. This new crossing will be dedicated to cross-border freight traffic, and avoid the congested urban areas of the two cities. The bypass will link with a newly envisioned special trade zone on the Myanmar side. The project will consist of 17–20 km of new four-lane divided highway (14–17 km in Thailand; 3.6 km in Myanmar), a bridge across the Moei River at the border, and associated border-crossing facilities. The estimated total cost is about $60 million (B1,750 million) for the combined sections in both countries.	Road	To be deter-mined	Greater Mekong Subregion project. Regional Investment Implementation Plan (2014-2018). Detailed design will be completed by the end of 2014.

Annex table 4.1. Infrastructure connectivity: selected subregional (GMS) projects in ASEAN (continued)

Country Coverage	Sector	Name of Project	Description	Subsector	Cost estimates ($ million)	Justification/additional information
Thailand	Transport	Tha Laem Chabang Port Development, Phase 3 - Feasibility Study	According to throughput forecasting, the total containers accommodated in Basin I and Basin II will exceed 10 million twenty-foot equivalent units (TEUs) per year by 2018, while the maximum capacities of Basin I and Basin II are approximately 11 million TEUs per year. Given their capacities, the development of Basin III will be necessary. The Laem Chabang Port (LCP) will develop the main infrastructure, such as dredging, land reclamation, breakwater, etc. The objective of the project is to accommodate the increasing throughput and strengthen the LCP's role as a gateway port to the GMS.	Port Infras-tructure	5.0	Greater Mekong Subregion project. Port container thoughput projections indicate that the existing Phase I and II facilities will soon reach capacity. The proposed feasibility study will present technical and other options for expanding the port.
Thailand	Transport	Single Rail Transfer Operator Development of Laem Chabang Port	Approximately 88% of transport from LCP to the hinterland is via the road system, while 9.5% is by rail and 2.5% by waterway. The project will develop the infrastructure and necessary facilities to serve the discharging and loading containers transported by rail to the port area. The project will largely help facilitate rail transfer in the future, in response to the completion of the single rail transfer double-track construction. It will increase the handling capacity of rail transport at the LCP from the current 500,000 TEUs per year to 1–2 million TEUs per year. To enhance the logistics network system in the country, the government is focusing on shifting LCP-linked transport of containerized cargo from road to rail and waterway.	Rail	90.0	Greater Mekong Subregion project. The project aims to increase the proportion of container traffic moved by rail from 9% of port throughput to 20% of port throughput, in line with the government's policy to reduce logistics costs.
Viet Nam	Transport	GMS Ben Luc–Long Thanh Expressway (Stage 2)	The project will construct a 57.1km expressway between Ben Luc and Long Thanh, south of Ho Chi Minh City. This is a section of the GMS Southern Economic Corridor.	Road	623.0	Greater Mekong Subregion project. Stage 1 is under construction.
Viet Nam	Transport	GMS Ha Noi–Lang Son Expressway	The project will construct a 156.6 km expressway between Ha Noi and Huu Nghi, in Lang Son Province, on the border with Guangxi Zhuang Autonomous Region in the PRC.	Road	1'400.0	Greater Mekong Subregion project. Financing from ADB and the Export-Import Bank of China is being considered.
Viet Nam	Transport	Second GMS Southern Coastal Corridor	The project will construct the missing sections of the GMS road corridor in the southern coastal region of Viet Nam.	Road	373.0	Greater Mekong Subregion project. Regional Investment Implementation Plan (2014-2018). The feasibility study is complete. ADB financing is under consideration.
Viet Nam	Transport	Second GMS Northern Transport Network Improvement (Luang Prabang–Thanh Hoa) (additional financing)	The project will upgrade Vietnamese National Highway 217 from Do Len to Na Meo border gate (in Thanh Hoa Province); and the Lao PDR's national highways 6, 6A, and 6B.	Road	145.0	Greater Mekong Subregion project. Regional Investment Implementation Plan (2014-2018). ADB financing in 2015 is proposed.

Annex table 4.1. Infrastructure connectivity: selected subregional (GMS) projects in ASEAN (continued)

Country Coverage	Sector	Name of Project	Description	Subsector	Cost estimates ($ million)	Justification/additional information
Viet Nam	Transport	National Highway 14D Improvement	The project will improve the highway section (72 km) from Thanh My to the border with the Lao PDR in Quang Nam Province. National Highway 14D is a part of the minimum distance route for freight transportation among Bangkok, Pakse (Lao PDR), and Da Nang (Viet Nam).	Road	130.0	Greater Mekong Subregion project. Regional Investment Implementation Plan (2014-2018). ADB financing in 2016–2017 is being considered.
Viet Nam	Transport	Northern East–West Corridor: Son La–Dien Bien–Tay Trang Border Gate (Viet Nam and the Lao PDR) section, to connect with Luang Namtha (Lao PDR) to the Friendship Bridge (Lao PDR–Myanmar) at Xiengkok–Kainglap	This is the shortest route to connect northern Lao PDR, and the northeast of Myanmar, through the northwest of Viet Nam to the Hai Phong international gateway port.	Other Infras-tructure	To be deter-mined	Greater Mekong Subregion project. Regional Investment Implementation Plan (2014-2018). The concept paper is under preparation. The Luang Namtha (Lao PDR) to the Friendship Bridge (Lao PDR–Myanmar) at Xiengkok–Kainglap section is listed in the GMS Regional Investment Framework.
Lao PDR, Viet Nam	Energy	Lao PDR–Viet Nam Power Transmission Interconnection (Hatxan–Pleiku)	This project will (i) construct a 59- kilometer 500 kilovolt (kV) transmission line and a 230 kV/500 kV substation in Hatxan (Lao PDR); and (ii) construct a 94-kilometer 500 kV transmission line and expand the existing 220 kV/500kV Pleiku Substation, in Viet Nam. The project will enable the transmission of 3,157 gigawatt-hours/year of electricity to be produced by eight small hydropower plants (with a total capacity of 1,013 MW) in southern Lao PDR, which will be developed by independent power producers.	Electricity trans-mission and distribution	218.0	Greater Mekong Subregion project. Regional Investment Implementation Plan (2014-2018).
Lao PDR	Energy	Nabong 500 kV Substation Transmission Facility	The project aims to construct a 500 kV line from Udon Thani (Thailand) to Nabong (Lao PDR), to transfer power from several hydropower projects in the Central-1 area of the Lao PDR to Thailand. These include the Nam Ngum 2, Nam Theun 1, and Nam Ngiep 1 hydropower projects, which have a total installed capacity of over 1,500 MW, largely for export to Thailand.	Electricity trans-mission and distribution	106.0	Greater Mekong Subregion project. Regional Investment Implementation Plan (2014-2018).
China, Lao PDR, Thailand	Energy	PRC–Lao PDR–Thailand 600 HVDC Interconnection	The project aims to supply electricity to Thailand from China. Preliminary studies have been undertaken, such as a joint feasibility study to assess the project's technical and economic viability, a study on ownership models and on the principles of benefit sharing, and a study on technical alternatives. It also the conduct of project preparation; detailed engineering; construction of the transmission line, including substations; and possibly the distribution of components.	Electricity trans-mission and distribution	600.0–800.0	Greater Mekong Subregion project. Regional Investment Implementation Plan (2014-2018).
Lao PDR, Thailand, Viet Nam	Energy	Reinvestigation of Thailand–Lao PDR–Viet Nam Interconnection	The project will involve reconsidering an interconnection between Thailand and Viet Nam via the Lao PDR, and the Lao PDR–Viet Nam section. It will introduce a step change in the development of the regional power market; and lead to reduced reserve requirements, lower costs, and enhanced confidence in the regional power market.	Electricity trans-mission and distribution	278.0	Greater Mekong Subregion project. Regional Investment Implementation Plan (2014-2018).

Annex table 4.1. Infrastructure connectivity: selected subregional (GMS) projects in ASEAN (continued)

Country Coverage	Sector	Name of Project	Description	Subsector	Cost estimates ($ million)	Justification/additional Information
China/Lao PDR	Information and communi-cation Technology	Time-Division Long-Term Evolution Demonstration Network in Lao PDR	In June 2011, at the Greater Mekong Subregion (GMS) Information and Communication Technology (ICT) Ministerial Meeting, the Ministry of Industry and Information Technology of China and the Ministry of Posts and Telecommunications of Lao PDR signed the Memorandum of Understanding on Continuing with Demonstration Projects of Applicable Communication Technologies in Rural Areas. Private sector in China and the Lao PDR preliminarily intended to cooperate with each other in building a time-division long-term evolution demonstration network in Vientiane, in the Lao PDR, to provide high-speed mobile data services for promoting communications development in rural areas and reducing the digital gap.	ICT infras-tructure	5.0	Greater Mekong Subregion project. Regional Investment Implementation Plan (2014-2018).
China/Viet Nam	Cross-border Economic Zones (CBEZ)	Joint China–Viet Nam Cross-Border Economic Zones (CBEZs)	The project will cover three cross-border economic zones (CBEZs) located at China–Viet Nam borders as follows: (i) Pingxiang (Guangxi Zhuang Autonomous Region, China); and Dong Dang (Lang Son Province, Viet Nam), (ii) Dongxing (Guangxi Zhuang Autonomous Region, China) and Mong Cai (Quang Ninh Province, Viet Nam), and (iii) Longbang–Baise (Guangxi Zhuang Autonomous Region, China) and Tra Linh (Cao Bang Province, Viet Nam). The components of the CBEZs are as follows: (i) Pingxiang–Dong Dang. The planned area is 17 square kilometers (km2), with the China and Viet Nam each allocating 8.5 km2. The China section will be constructed based on the Guangxi Pingxiang Comprehensive Bonded Zone, which was approved by the State Council. The CBEZ is a pilot cross-border cooperation zone under the framework of ASEAN-China Free Trade Agreement. It is also an important economic zone situated in a node city of the Greater Mekong Subregion economic corridor, which will contribute to the transformation of a transportation corridor into an economic corridor and serve economic development along the corridor.	Other omfras-tructure	150.0	Greater Mekong Subregion project. Regional Investment Implementation Plan (2014-2018).

Annex table 4.1. Infrastructure connectivity: selected subregional (GMS) projects in ASEAN (concluded)

Country Coverage	Sector	Name of Project	Description	Subsector	Cost estimates ($ million)	Justification/additional information
			The proposed project is intended to support the second phase of infrastructure construction of China section. (ii) Dongxing–Mong Cai. This CBEZ is located at the China–Viet Nam border, to be connected by the Second International Bridge of Beilun River, which is about to be constructed. The planned China section includes 971.85 hectares, and Viet Nam plans to allocate an area as large as that of China section for this zone. This CBEZ will be built as an experimental zone to deepen the China–Viet Nam cooperation, and is a priority project of the Dongxing National Experimental Zone of Development and Opening-Up. The CBEZ is also an important economic zone situated in a node city of the GMS economic corridor that will contribute to the transformation of a transportation corridor into an economic corridor and serve the economic development along the corridor. The proposed project is intended to support the infrastructure construction of the China section.			
Cambodia	Cross-border Economic Zones (CBEZ)	Construction of Phnom Penh New Port Special Economic Zone	The project will be the first package of development in the Phnom Penh New Port Special Economic Zone (SEZ). It will involve an area of 143 hectares, in which 106 hectares (ha) are for long-term lease to manufacturers, 3.0 ha for apartments and shops, 2.7 ha for a logistic center, and the remaining area for service facilities. The pilot package is intended to induce further SEZ development (more than 600 ha) to attract private sector investments.		60.0	

Source: ADB, Greater Mekong Subregion Regional Investment Framework Implementation Plan (2014-2018) (http://www.adb.org/documents/gms-regional-investment-framework-implementation-plan-2014-2018).

Annex table 4.2. BIMP-EAGA: Enhanced connectivity (selected infrastructure projects), 2012–2016

Goals/projects	Objectives and strategies	Sector	Specific activities and impacts
Component 1: Development of priority infrastructure projects focusing on priority EAGA economic corridors			
West Borneo Economic Corridor			
Pontianak Port (West Kalimantan, Indonesia) to Kuching Port (Sarawak, Malaysia)	The objective of developing this sub-corridor is to improve connectivity between Indonesia and Malaysia via the West Borneo Economic Corridor, which is expected to generate increased economic activity between West Kalimantan and Sarawak.	Transport - Port	Pontianak to Entikong Transport Link The two subprojects of the Link are: (i) Tayan–Serawak Road Rehabilitation, and (ii) Entikong Border Crossing Facility. Tayan–Serawak Road. The improvement of the road from Pontianak to the Sarawak border shortens the route by 100 kilometer (km), in addition to substantial savings in vehicle operating costs and time.
Bandar Seri Begawan–Kota Kinabalu (Sabah, Malaysia) subcorridor [along the road through Limbang (Sarawak), Temburong (Brunei Darussalam) and Lawas (Sarawak) before reaching the State of Sabah near Sitipang]	The improvements along this route aims to facilitate travel which is currently complex, involving travel by road with two ferry crossings, four border crossings, and then eight controls at checkpoints (total travel time takes 4 and a half hours or up to 10 hours on weekend, school holidays, and festivities). The improvements involve constructing a new border crossing facility at Kuala Lurah that is compatible with the new border post-facility at Tedungan, Malaysia; and the construction of the Pandaruan Bridge to replace the two ferry crossings.	Transport and bridges	Kuala Lurah Border Crossing Facility The construction of the Kuala Lurah Border Crossing Facility will replace old facilities to make it compatible with the border facility at Tedungan. The new facility will provide significant time savings for road users, and improve connectivity in the subregion. Pandaruan Bridge • The Pandaruan Bridge will improve connectivity between Brunei Darussalam and Malaysia via the Trans Borneo Highway. The project involves the construction of a 60-meter bridge to replace the ferry over Pandaruan River.
Greater Sulu Sulawesi Corridor			
Palawan (Philippines)–Sabah (Malaysia) Subcorridor	The objective of this subcorridor is to develop the capacity of Palawan ports to accommodate greater trade and passenger flow which are currently limited, and to develop a connection with Kudat in Sabah in the case of Brooke's Point port. Kudat has the potential to become the gateway from southwestern Philippines with tourism being a driving force.	Transport - Ports	Palawan Ports Development Program The objective of the project is to improve the ports in order to increase their capacity to handle BIMP-EAGA traffic in the future, and potentially to develop a connection with Kudat in Sabah, Malaysia. The project involves rehabilitation and improvement of two ports, namely, Brooke's Point and Puerto Princesa. Brooke's Point is the second largest port in Palawan, while Puerto Princesa serves as the main port. Both ports serve as links to Sabah, Malaysia. • Brooke's Point Port. The rehabilitation of the port will involve repair of (i) RC Pier and Roll-on Roll-of (RoRo) Ramp; (ii) the Philippine Ports Authority (PPA) building; and (iii) RC Pier Approach. It includes four additional subprojects, namely: (i) relocation of existing breakwater, (ii) repair of passenger terminal building, (iii) expansion of TMO building; and (iv) widening of causeway and pier approach. • Expansion of Puerto Princesa Port. This project will involve the construction of a new 228-meter berth, warehouses, and passenger terminal. Puerto Princesa Port is being planned to serve as an alternative to Brooke's Point Port. Currently, Puerto Princesa Port is experiencing increasing passenger traffic volumes.

Annex table 4.2. BIMP-EAGA: Enhanced connectivity (selected infrastructure projects), 2012–2016 (continued)

Goals/projects	Objectives and strategies	Sector	Specific activities and impacts
Zamboanga Peninsula (Mindanao, Philippines)–Sabah (Malaysia) Subcorridor	Both Zamboanga and Davao provide connectivity in the Greater Sulu Sulawesi Sea, while Tawi-Tawi facilitates connectivity along the Zamboanga–Sabah subcorridor of BIMP-EAGA. Ports located in these provinces are key factors in maritime connectivity in the BIMP-EAGA subregion. Ports improvement in Zamboanga and Davao will be needed to address serious deficiencies in infrastructure and facilities that are hindering growth in traffic potential of the subcorridor.	Port	Zamboanga Port Expansion (Philippines) — a component of Mindanao Ports Program I The improvement of the port will first involve repaving the container marshalling area, and fixing the drainage system which has been damaged resulting in both surface and underground flooding. Second, a new ramp will also be constructed in the ferry basin, consisting of a standard fixed concrete ramp, and the ISPS container barrier will be replaced with a fence to address congestion. Last, the shoal will be removed to allow deeper drafted vessels to berth directly alongside the quay. The project is scheduled for 2011–2015. Davao Port Expansion (Phase 1) Phase 1 will involve constructing 113 meters of the 270-meter container berth. It will construct a new RoRo ramp and passenger terminal and associated works in order that the next component of the new quay extension can be constructed and that passenger and freight activities can be segregated.
Zamboanga Peninsula–Sabah Subcorridor through the island provinces in the Autonomous Region in Muslim Mindanao (ARMM)	Economic development of the island provinces in ARMM relies on improved connectivity with, on one side Zamboanga, and, on the other side, Sabah. This requires infrastructure improvements and rehabilitations at Jolo, Bongao, and Sitangkai since these serve as major local hubs for the region. The improvements will provide more reliable and frequent shipping services along the subcorridor.	Port	Zamboanga Port Expansion (Philippines) — a component of Mindanao Ports Program I The project includes the expansion of the back-up area and new berthing facilities after land reclamation for Bongao Port. For Sitangkai Port, the project will improve the berth space to accommodate larger cargo vessels; and provide a segregated stair handling for small wooden hulled vessels, a new passenger terminal, and a reconstructed causeway.
Davao–General Santos (Mindanao, Philippines)–North Sulawesi (Indonesia) Subcorridor	The objective of further developing this subcorridor is to establish proper synergy between Davao and General Santos, on one hand, and Manado and Bitung, on the other hand, for both shipping and air services. Developing connectivity among these four points will improve the movement of goods and people along the subcorridor.	Port	Davao Port Expansion (Phase 2) (Philippines)—a component of Mindanao Ports Program II The project involves the (i) widening of RC wharf and installation of Quay Crane Rail; (ii) concrete paving of new back-up area; (iii) rehabilitating the passenger terminal building, allied facilities, and RoRo ramp; and (iv) expanding the north end of the port. General Santos Port (Makar Wharf) (Philippine)—a
		Port	component of Mindanao Ports Program II The project involves (i) port expansion and reclamation with open storage (3.4 hectares), (ii) construction of a warehouse, (iii) installation of Quay Crane Rail, and (iv) construction of passenger terminal building. Projects are included in the approved Medium-Term Public Investment Program of PPA as new proposed projects. Glan Port Expansion Project—a component of Mindanao Ports Program II The project involves construction of a RoRo facility.
		Port	Manado-Bitung Link Enhancement The project is located in North Sulawesi and is composed of two subprojects: (i) Manado Port Expansion, and (ii) Manado–Bitung Toll Road. • The Manado Port Expansion involves the development of southern berth, central piers, and northern pier. • The Manado–Bitung Toll Road involves the construction of a toll road between Manado and Bitung to improve synergy and economic growth.

Annex table 4.2. BIMP-EAGA: Enhanced connectivity (selected infrastructure projects), 2012–2016 (continued)

Goals/projects	Objectives and strategies	Sector	Specific activities and impacts
		Port and Road	Davao–General Santos Toll Road Rehabilitation This project involves improvements and expansion of the ring road in General Santos to support the ports and bring the road up to international standard.
		Road	Rehabilitation of the Davao–Digos road segment will include conversion of the roads to four-lanes while the Digos–General Santos City road segment will include construction of climbing lanes at the three locations between Davao and General Santos City.
Other Priority Infrastructure Projects			
		Road	Tanjung Selor Border Road (East Kalimantan, Indonesia) The project involves the construction of about 191 km of roads from Tanjung Selor to the Malaysian border.
Component 2: Improvement of Air, Sea and Land Transport Linkages			
	This component aims to strengthen transport links for a number of important routes through more effective implementation and expansion of connectivity measures. The second component also aims to promote integrated sea linkages through better linkages between hub and feeder systems; and address the present lack of guidelines in the operations of non-conventional-sized ships (NCSSs). Another objective of the component is to strengthen air linkages, including outside the BIMP-EAGA subregion.		
Component 3: Power Interconnection and development of renewable energy			
Development of the Sarawak Subcorridor	One of the major economic development initiatives that has been launched in this segment is the Sarawak Corridor of Renewable Energy (SCORE) project[1] located in the central region of Sarawak covering 57% of the state or 70,700 square kilometers. This major 20- to 30-year development scheme is built around energy-intensive industry investments to provide a triggering effect, and form the early anchor for an advanced base of industrial development.	Electricity	Trans Borneo Power Grid: Sarawak–West Kalimantan Power Interconnection The project involves construction of a 275 kilo-volt (kV) transmission line that will allow low-cost electricity generated by hydropower plants in Sarawak to be exported to West Kalimantan, where the entire power generation is based on oil. The power generation capacity in Sarawak is expected to be more than doubled by 2013 as new hydropower plants [3,500 megawatts (MW)] are commissioned. The Term Sheet for Power Exchange Agreement (PEA) to enable the export of bulk electricity from Sarawak to West Kalimantan was signed on 18 July 2011 between Sarawak Energy Berhad (SEB) and the Indonesian power utility PT PLN PESERO (PLN).

Annex table 4.2. BIMP-EAGA: Enhanced connectivity (selected infrastructure projects), 2012–2016 (concluded)

Goals/projects	Objectives and strategies	Sector	Specific activities and impacts
Component 4: Improvements in ICT facilities and services			
	As a means to narrow the digital divide, information communication technology (ICT) literacy of the people in the subregion will be promoted, especially those in the rural areas.	ICT	ICT Rural Outreach Program (iROP) The ICT rural outreach program (iROP) caters to the rural community aimed at improving the ICT literacy of the people, especially those in the rural areas. It includes the setting up of an ICT community center, undertaking human capacity ICT literacy and entrepreneur development, and establishing a portal for local products to be marketed regionally. iROP also provides employment opportunities in the rural areas and serves as a portal for marketing local products and services, which will contribute to the economic growth of BIMP-EAGA. The project is led by the private sector, the Infocom Federation Brunei (IFB). A similar project will be introduced by EA Trilink of the Philippines. • The pilot project of iROP has been implemented successfully in Bangar Mukim of Temburong District. The first phase of the project includes the setting up of a one-stop community center for training of candidate users, to be followed by a second phase which will involve the development of the iROP framework content.
	ICT connectivity in BIMP-EAGA needs to be developed further to enhance the subregion's attraction as an investment hub. Enhanced ICT connectivity can also positively impact on other priority subsectors, including supply chain development and ecotourism.	ICT	BIMP-EAGA Rink (BIMP-EAGA Submarine Cable) The project will link all BIMP-EAGA member countries using a Hybrid Communications Platform either through sub-sea cable, satellite, or terrestrial systems. The project, which is estimated to cost $150 million, has a potential high impact to support the various priority initiatives under the BIMP-EAGA, specifically ecotourism, and can also potentially contribute to the planned establishment of the ASEAN Broadband Corridor under the Master Plan of ASEAN Connectivity. The implementation of this project can address the digital divide and can positively influence telecommunication tariffs to make BIMP-EAGA a more conducive and competitive region for food basket chain link and ecotourism.

Source: BIMP-EAGA Implementation Blueprint, March 2012 (http://bimp-eaga.org/Documents/ef4b1b8e-7291-40a5-9a0a-2d0250543801.pdf)

[1] The project was officially launched in February 2008 in Bintulu by the Prime Minister of Malaysia. SCORE is basically a private-sector-driven project with an estimated cost of RM334 billion.

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