RESEARCH ARTICLE

FDI flow in Energy Sector among BCIM, BIMSTEC+1 and ASEAN+4 sub-regional Alignments

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Abstract

Foreign Direct Investment is the most dynamic component for boosting trade among different sub-regional blocs. It may be considered under Mode 3 of the General Agreement on Trade in Service agreement. This study documents various restrictions under market access and national treatments under mode 3 as committed by different member countries, among three regional trading blocs to improve the energy sector. A large portion of trade is being facilitated through a strong linkage between service trade and Foreign Direct Investment flow among countries or regions. ASEAN countries in South East Asia played an important role in attracting foreign direct investments for the economic development and growth in Energy Sector. Trade barriers, particularly commitment barriers of importing countries, have a strong negative impact on a smooth flow of investments across regions. This research also reviews the purposes of Foreign Direct Investment among regional countries and explores the deepest and strong relationships among regional members to explore a possible strategic relationship for the formation of a Regional Trade Agreement.

Keywords: Foreign Direct Investment; General Agreement on Trade in Service agreement; Association of South East Asia; Centre for Policy Dialogue; ASEAN Free Trade Area

Introduction

South and East Asia have a long history of sub-regional cooperation. Formal economic and cultural cooperation among the countries of the South and East Asian region dates back to early 1960s, when the Association of South East Asia (ASA) was formed in 1961 by the Philippines, Thailand, and the Federation of Malaya (now part of Malaysia), is one of the earliest examples of such alliance in Asia. But South & East Asia have become a critical part of the world trading system since 1978 when China initiated its economic reform. Over the years, East Asia has emerged as the world's fastest-growing economy. Along with Japan, China and the Republic of Korea have emerged as the other two economic forces in East Asia (Aparna etal, 2015). Meanwhile, the South Asian countries took an initiative to develop a sub-regional alliance among them.

ASEAN+4: In 1967, ASA was replaced by the Association of Southeast Asian Nations (ASEAN), established by the governments of Indonesia, Malaysia, the Philippines, Singapore, and Thailand to accelerate economic growth, social progress, and cultural development and to promote peace and security in Southeast Asia. Brunei joined ASEAN in 1984, followed by Vietnam in 1995, Laos and Myanmar in 1997, and Cambodia in 1999. ASEAN Free Trade Area (AFTA) was established in January 1992.

BIMSTEC+1: In 1997, BIST-EC (Bangladesh, India, Sri Lanka, and Thailand– Economic Cooperation) formed in Bangkok. Myanmar was admitted in the later part in 1997 and the organization was renamed BIMST –EC. In 2004, Nepal and Bhutan joined in existing group and the name changed to BIMSTEC (Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation). Its first summit was held in Bangkok in July 2004. BIMSTEC (Bangladesh, Bhutan, India, Myanmar, Nepal, Thailand, and Sri Lanka) was officially formed in 1997 and its secretariat was established in Dhaka in 2014 (Charu Lata Hogg, 2007).

BCIM: In 1999, the Centre for Policy Dialogue (CPD) in Bangladesh, Yunnan Academy of Social Sciences (YASS) in Kunming, China, the Centre for Policy Research (CPR) in India, and the Ministry of Border Trade of Myanmar were the pioneering institutions those agreed to launch the BCIM (Bangladesh China India Myanmar) initiative which was initially called the 'Kunming initiative' (D. S. Rawat etal, 2016) . It is a Track II (non-government) Regional Trade Facilitation Initiative (RTFI) for bettering economic collaboration within this region.

India has attracted FDI in 4 major energy sectors namely, power, non-conventional, petroleum & natural gas, and electrical equipment, among different countries of three sub-regions. India's total outward FDI in electricity and mining is highest for Singapore, followed by Sri Lanka, China, Bangladesh, Myanmar, and Indonesia (Arif Hussain Malik, 2016). India's FDI inflow to the renewable energy sector mainly comes from Malaysia, Philippines, Japan, and Singapore from South East regions. So, the flow of FDI plays an important role in regional intregation , particularly in energy sector.

The Researcher wants to highlight the following objectives namely

1. To analyze Bilateral Investments Treaties (BITS) among India with other countries among these sub-regions.
2. To analyze thev flow of FDI among three major sub-regions.
3. To examine the movement of FDI among India and other sub-regional countries in Energy, particularly Renewable Energy sector.
4. Analysis of the commitment pattern under Mode 3 (which covers the flow of FDI) among member countries of the three sub-regions.
5. Evaluation of Myanmar's importance as a strategic investment hub for strengthening subregional alignment.
6. To evaluate possible ways for strengthening energy cooperation among regional blocks.

A research gap persists in intra-regional FDI movement across all sectors and particularly in the energy sector among the three sub-regions under study. Research work cannot properly analyze the commitment patterns under Mode 3 (which covers the flow of FDI) among different member countries of respective trading blocs covering energy services. Moreover, research work cannot properly highlight FDI flow of India in both renewable and non-renewable energy across three sub-regions. Myanmar considers a strategic entry point for three sub-regions of India, therefore the study considers Myanmar a special interest for building an investment hub for investing in energy products and services which is ignored in the above literature.

The research paper is divided into five major sections. First Section highlights Bilateral Investments Treaties (BITS) among India with other countries in these regions. Second Section analyzes the flow of FDI among three major sub-regional countries in the Electricity Gas , Water and mining and in Renewable Energy sectors. The third Section examines the commitments pattern under Mode 3 (which covers flow of FDI) among different member countries. Section four analyses the importance of Myanmar a strategic hub for future Investments and the last section examines importance of sub-regions for energy cooperation and flow of FDI among members South East Asian regions.

Literatures Review

Energy and its services are a very important factors among different developed and developing countries in South East Asis to maintain economic growth rate in bilateral and multilateral lavel (Muhammad Naveed Jamil **,** 2022**)** . Regional cooperation among different member countries creates favorable situation for an economic development based on suitable energy service policy and framework (Joachim Monkelbaan, 2013). The degree of liberalization will be evaluated based on trade in services among different countries of ASEAN+n framework and among different modes. FTA frame work applied for evaluation of cross-country and sector-wide similarities in the pattern of service sector commitment level made by different country among ASEAN regions. Existence of limitation on Market access (MA) and National Treatment (NT) by each service sector and simultaneously evaluate commitment level producing sensitive and less sensitive service sector among different FTA across different regions also an evaluating parameter for service cooperation (Ishido, 2012). Foreign direct investment is considered to an important tool for economic growth and integration of regional economy with global economy (ADBI, 2014) . As our regional economy belongs to South East Asian region, So FDI movements along these economies are essential to evaluate overall growth within regions. However, in reality, actual FDI inflows among countries vary due to policy implementation, economical and political scenarios among different countries. The impotence of FDI are rapidly increasing among different countries of ASEAN regions in the context of regional integration processes and overall economic development (Stephen Thomsen, 2011). FDI is one of the major internal source of financing for developed and developing countries among South East Asian regions and it enhances future energy demand by incorporating different technology-based innovations and transfers of technology (Burcak Polat, 2018). Laura Diaconu (2014) examined the trends in ASEAN's inward FDI flow and simultiniously identified different factors which must address and examine for maintaining the current flows and future estimation of investments across the region to maintain growth. Different member countries of South East regions take different initiatives to attract direct and indirect portfolio investments from individual and corporate houses among different member countries for overall regional development. Liberalization of economic policy, incorporation of foreign investments promotion board among different member countries in South East Asian region, and incorporating automatic approval routes are key initiatives for attracting FDI across energy sector (Deepti etal, 2015). India has followed different policy initiatives like economic policy reforms, and liberalized its service restriction to attract more FDI. India considers a major investment hub after China and Japan in South East Asian region. India's inward investments mainly come from Mauritius and Singapore; in

service sector and energy sector. The Service sector has increased its importance in world economy as it's innovation, and incorporation of new technology increased its competitiveness that enhances economic power.India's inward investments (R.B. Teli, 2013). According to Karsenty (2000), mode 1 and mode 3 trade dominate the pattern of international service trade, where each category represents approximately 40% of total service trade and Mode 4 trade plays a marginal role and according to the schedules of the GATS. Renewable energy market in SEA considers a strong economic growth potential due to increasing energy demand and environmental issues among ASEAN member countries. Different forecasting techniques are applied for evaluating future energy demand, particularly in renewable energy sectors and how possible future challenges handled across different countries by attracting FDI (IRENA, 2018). General equilibrium model used to evaluate effect of FDI inflow in energy sector particularly in Central Asia. Result revealed that natural gas sector and non-petroleum based industries would be better off in attracting FDI due to its overall production efficiency with innovative technology and overall terms of trade (Michael P. Barry, 2009).

Methodology

To analyze intra-regional inward and outward FDI flows (across all categories) among three sub regions and for evaluating Bilateral Investment Treaties (BITS), among regional members, an existing FDI related database has been used. And to examine the commitment pattern under Mode 3 (which covers flow of FDI), of different member countries of the three sub-regions under study, the Hoekman indexing method has been used. . The Hoekman Index (Mode 3) has been calculated by country and by aspect for evaluation of Market Acess (MA) and National Treatment (NT) (Kallal etal, 2018). If we observe commitment pattern by mode across regional member countries, the author observed that mode 3 exhibits dissimilarity trend in Market Acess (MA) and National Treatment (NT) (kallal , 2017). The researcher also discussed the gravity model and its relevance in FDI movement. Here, author briefly reviews the earlier literatures of gravity models and relate this work to established theoretical contributions in movement of FDI. For analysis of FDI movements, the study has used data for the year 2010-2020.

Findings and Discussions

Bilateral Invesment Treaties (BITS)

Out of the 18 countries in the regions under study, India has entered into Bilateral Investment Treaties (BITS) with 14 countries. Countries not covered under BITS are: Cambodia, Laos, and Brunei. The oldest BIT entered into was with Singapore in 1965. In the energy sector (Dipankar,2006),

India entered into Bilateral Investment Treaties (BITS) with three countries. In 2009, a BIT was signed with Myanmar for duration of 10 years on the energy investment aspect. In 2011, a BIT was signed with Japan on energy-driven technology for 10 years and in 2009 BIT with Korea on power sector for 10-year was signed (Ref Table 1).

Table 1: Bilateral Investments Treaties (BIT) among India with other Countries

Country	Year	Treaty Duration	Energy product & Services	Comment
Bangladesh	2009	10 years	No	In force in social & environmental Investments aspect
Nepal	2011	10 years		Not in force
China	2006	10 years	No	Terminated
Indonesia	2004	10 years	No	Terminated
Malaysia	1997	10 years	No	Terminated
Myanmar	2009	10 years	Yes	In force in social & energy Investments aspect
Philippines	2001	10 years	No	In force
Sri Lanka	1998	10 years	No	In force
Singapore	1965	Renewed in different phases	No	In force
Thailand	2001	10 years		In force
Japan	2011	10 years	Yes (Energy technology)	In force
Vietnam	1999	10 years	No	In force
Korea	2009	10 years	Yes (power)	In force
Bhutan	2006	10 years	No	In force

Source: Invesmentpolicyhub,unctad.org and Ministry of Commerce, Government of India

FDI flow among members of Sub-Regions

The study analyzed FDI stock flow (both inward and outward) among members of three sub-regions (Ref Table 2). The table observes that-
Growth in FDI inflow of Japan has declined 13 percent from year 2012 to 2018. But, growth in FDI outflow of Japan has increased 68 percent from year 2012 to 2018. Growth in FDI inflow of China has increased 130 percent from year 2012 to 2018 and growth in FDI outflow of China has increased 3937 percent from year 2012 to 2018. Growth in FDI inflow of Korea has increased 36 percent from year 2012 to 2018 and growth in FDI outflow of Korea has increased 112 percent from year 2012 to 2018. The Growth in FDI inflow of Indonesia has increased 130 percent from year 2012 to 2018 and growth in FDI outflow of Indonesia has increased 782 percent from year 2012 to 2018. Growth in FDI inflow of Cambodia has increased 130 percent from year 2012 to 2018 and growth in FDI outflow of Cambodia has increased 91 percent from year 2012 to 2018.

Growth in FDI inflow of Singapore has increased 73 percent from year 2012 to 2018 and growth in FDI outflow of Singapore has increased 46 percent from year 2012 to 2018. Growth in FDI inflow of Thailand has increased 35 percent from year 2010 to 2016 and growth in FDI outflow of Thailand has increased 300 percent from year 2012 to 2018. Growth in FDI inflow of India has increased 54 percent from year 2012 to 2018 and growth in FDI outflow of India has increased 48 percent from year 2012 to 2018. Growth in FDI inflow of Sri Lanka has increased 57 percent from year 2012 to 2018 and growth in FDI outflow of Sri Lanka has increased 223 percent from year 2012 to 2018. Growth in FDI inflow of Vietnam has increased 102 percent from year 2012 to 2018 and growth in FDI outflow of Vietnam has increased 346 percent from year 2012 to 2018.

Growth in FDI inflow of the Philippines has increased 148 percent from year 2012 to 2018 and growth in FDI outflow of the Philippines has increased 576 percent from year 2012 to 2018. Growths in FDI inflow among Nepal, Bhutan, Myanmar and Bangladesh have increased 173, 228, 56 and 139 percent respectively from year 2012 to 2018. From the above analysis, it is clear that growth in FDI inflow are highest in Bhutan, Nepal, Bangladesh, Cambodia, China, Philippines and Vietnam among members of three regions. Similarly, growth in FDI outflow is highest for China, Philippines, Vietnam and Thailand among members of the three regions.

Table 2 FDI stock of members among three sub-regions (Millions in USD)

Country	Inward FDI			Outward FDI		
	2012	**2018**	**% Change**	**2012**	**2018**	**%Change**
Japan	214880	186714	-13.11	831076	1400694	68.54
China	587817	1354404	130.41	317244	12809755	3937.82
Korea	135500	184970	36.51	144032	306145	112.55
Cambodia	6162	16656	170.30	340	652	91.76
Indonesia	160735	234961	46.18	6672	58890	782.64
Lao	1888	5639	198.68	12	19	58.33
Malaysia	101620	121621	19.68	96964	126937	30.91
Myanmar	14507	22666	56.24	-	-	-
Philippines	25896	64249	148.10	6710	45377	576.26
Singapore	632760	1096320	73.26	466129	682404	46.40
Thailand	139286	188651	35.44	21369	85636	300.75
India	205580	318502	54.93	96901	144134	48.74
Sri Lanka	6190	9745	57.43	351	1136	223.65
Vietnam	57004	115391	102.43	2234	9978	346.64
Nepal	239	653	173.22	-	-	-
Bhutan	52	171	228.85	-	-	-
Bangladesh	6072	14539	139.44	-	-	-

Source**:** UNCTAD World Investment Report in 2020

FDI flow among ASEAN

Table 3 shows that intra ASEAN FDI flow in the sub-region has declined from 22% in 2010 to 20% in 2016. China's FDI flow in the sub region has declined from 2.02% in 2008 to 0.70% in 2016. India's FDI flow in the sub-region has increased from 3.21% in 2010 to 7.52% in 2016. Japan's FDI flow in the sub-region has increased from 9.14% in 2010 to 11.35% in 2016. Korea's FDI flow in the sub-region has increased from 3.27% in 2010 to 3.79% in 2016. EU's FDI flow in the sub-region has increased from 20.44% in 2010 to 24.83% in 2016.

Table 3: ASEAN: Total FDI Inflows, by Source (USD million)

Country	2010	2012	2014	2015	2016	Share in 2016	Share in 2010
Intra ASEAN	10449	15200	20548	19400	24377	20.68	22.29
China	946	4053	5718	6779	820	0.70	2.02
India	1506	3474	4299	1330	8869	7.52	3.21
Japan	4285	11171	21206	21766	13381	11.35	9.14
Korea	1533	4298	1577	3652	4469	3.79	3.27

Rest of World	16714	25450	36855	32142	34692	29.43	35.65
EU	9445	19018	6543	22256	29269	24.83	20.14

Source: ASEAN Integration Report, 2015

Sector-wise FDI inflow among ASEAN, Japan, China and Korea

The study analyzed FDI inflow among four major economic and ASEAN region in the different key sectors (Ref Table 4). In the mining sector, FDI inflow in 2015-16 among ASEAN region constitute 0.90 percent of total FDI inflows to this region. India's inflows constitute 1.65 percent, Korea's inflows constitute 0.17 percent and Japan's inflows constitute 0.09 percent respectively out of total FDI inflows among individual countries in this sector. In the electricity and gas sector, FDI inflow among ASEAN region constitutes 0.28 percent out of total FDI inflows to this region. India's inflows constitute 3.75 percent; Korea's inflows constitute 0.66 percent respectively out of total FDI inflows by individual country in this sector. In the mining and electricity sectors combined FDI inflow in China constitute 7.72 percent out of total FDI inflows to this country. In Construction sector FDI inflow among ASEAN region constitute 0.25 percent out of total FDI inflows to this region. India's inflows constitute 11.48 percent, Japan's inflows 0.77 percent and China's inflows constitute 2.19 percent respectively out of total FDI inflows by individual country in this sector. But Korea's inflow decreased by 0.43 percent out of total FDI inflows by individual country in this sector. In the manufacturing sector, FDI inflow among ASEAN region constitutes 4.17 percent out of total FDI inflows to this region. India's inflows constitute 23.40 percent, Korea's inflows constitute 51.28 percent, China's inflow constitutes 15.24 percent and Japan's inflows constitute 63.21 percent respectively out of total FDI inflows by individual country in this sector. In transportation sector, FDI inflow among ASEAN region constitute 0.35 percent out of total FDI inflows to this region. India's inflows constitute 3.78 percent, Japan's inflows 8.57 percent and Korea's inflows constitute 4.13 percent respectively out of total FDI inflows by individual member countries in this sector.

Table 4: Sector-wise FDI inflows of ASEAN, Japan, China, and Korea on Energy sector in 2015-16 (USD Millions)

Sector	ASEAN	% of Total	Korea	% of Total	India	% of Total	Japan	% of Total	China	% of Total
Mining and quarrying	1089.6	0.9	13	0.17	596	1.65	15.9	0.09	10440	7.7
Electricity, Gas	345.6	0.28	50	0.66	1364	3.78		0	-	-
Transportation	420.4	0.35	315	4.13	1363	3.78	1520.7	8.57		0
Construction	301.2	0.25	-33	-0.43	4141	11.5	136	0.77	2983.4	2.2
Manufacturing	5072.3	4.17	3909	51.28	8439	23.4	11219.7	63.21	20670.2	15.24
Information and Communication	1408.4	1.16	511	6.7	2638	7.31	966.7	5.45	11932	8.8
Total	121621.1		7623		36068		17749.5		135610	

Source: OECD FDI data, https://en.portal.santandertrade.com, https://dipp.gov.in, RBI database and China's investment report 2016-17.

FDI flow between India and other countries among sub-regions

India has attracted FDI in 4 major energy sectors namely power, non-conventional, petroleum & natural gas and electrical equipment (Ref Table 5). In the power sector India attracted highest FDI USD 10476 millions followed by petroleum and natural gas USD 6675.76 millions, Non Conventional energy USD 4397.94 millions and in electrical instruments USD 4336.72 millions. Though power sector tops the list, Non-Conventional energy has attracted substantial FDI in recent years. 100 per cent FDI is allowed in India under automatic route for renewable power generation and distribution projects.

Table 5: FDI (million US$) attracted by India in the different energy sectors

Sectors	2000-01	2009-10	2017-18	Total
Power	89.42	1271.79	868.8	10476.15
Petroleum & Natural Gas	9.35	265.53	103.02	6675.76
Non-conventional Energy	0	622.52	776.51	4397.94
Electrical Equipment	79.76	728.27	444.88	4336.72

Source: Economic outlook report on SEA, 2018

The non-conventional energy sector of India has received a total FDI equity inflow of US$ 6.01 billion during April 2000 to September 2017 from different countries of the world. However, majority of FDI inflow in renewable energy sector came from Mauritius, USA and Japan to India.

FDI flow among India and BCIM

Thanks to China, India's inward FDI (in values and stocks) from BCM countries increased over years. However, outward FDI flow to BCM shows wide fluctuations. Bangladesh and Myanmar are the major losers .So India's Net investments flows towards BCM regions were negative in values initially i.e in year 2010, 2011, and 2013 but in later periods i.e in year 2014 and 2018 increased slowly (Ref Table 6)

Table 6 India's Net FDI in BCM countries over time

Year	Inward Investments in Values (million US $)	Outward Investments in Values (million US $)	Net Investments in Values(Million US $)
2010	1.55	27.89	-26.34
2011	73.36	114.25	-40.89
2012	148.16	69.05	79.11
2013	121	124.19	-3.19
2014	505	87.63	417.37
2018	461	99.78	361.22

Source: OECD database, RBI, Investmentpolicyhub, World Bank, DIPP.gov.in

FDI flow amonmg India BIMSTEC+1

Inward FDI into India has increased during 2010-2018, which mainly comes from Japan. No other BIMSTEC+1 country had made any significant amount of investments in Indian. However, there was a steady decline in India's investment in BIMSTEC+1 region during this period. Indian investments in Sri Lanka, Thailand, Myanmar and Bangladesh declined in year 2014 and 2018. India's Net Investment flows towards BIMSTEC+1 region were positive in values from 2011 to 2018 except in 2010. Net investments flow reached highest level in year 2014 in BIMSTEC+1 region (Ref Table 7).

Table 7 India's Net FDI in BIMSTEC+1 countries over time

Year	Inward Investments in Values (million US $)	Outward Investments in Values (million US $)	Net Investments in Values(Million US $)
2010	1260.78	1272.1	-11.32
2011	2096.03	589.97	1506.06
2012	1345.91	273.65	1072.26
2013	1795	226.87	1568.13
2014	2019	164.35	1854.65
2018	1818	174.78	1643.22

Source: OECD database, RBI, Investmentpolicyhub, World Bank, DIPP.gov.in

FDI flow among India and ASEAN+4

Thanks to Singapore, Japan and China, India's inward FDI from ASEAN+4 regions has increased substantially during 2010-2018. However, India's investment graph in ASEAN+4 regions shows wide fluctuations during this period. India's outward investments to Singapore is highest followed by Malaysia and Indonesia. India's Net Investments flows towards ASEAN+4 regions were negative in initial period i.e in 2010 then fluctuation observed in later years. Net investments flow reached highest level in year 2018 in ASEAN+4 regions (Ref Table 8).

Table 8 India's Net FDI in ASEAN+4 countries over time

Year	Inward Investments in Values (million US $)	Outward Investments in Values (million US $)	Net Investments in Values(Million US $)
2010	2934.82	4166.86	-1232.04
2011	5695.33	2773.54	2921.79
2012	3321.78	2145.17	1176.61
2013	6520	5144.22	1375.78
2014	7799	6842.5	956.5
2018	14999	5610.5	9388.5

Source: OECD database, RBI, Investmentpolicyhub, World Bank, DIPP.gov.in

FDI flow between India and other sub-regional countries in Electricity. Gas, water and mining

India's outward FDI in different countries of three regions (BCIM, BIMSTEC+1 and ASEAN+4) increased over years in electricity, gas, water and mining sector [4]. India's outward FDI was higher in mining compared to electricity. India's total outward FDI in electricity was USD 258.35 million and in mining USD 8094.318 million over years of 2013 to 2017. So total outward of India's FDI in energy sector has been increased from USD 575.14 million to USD 3096.16 million during 2013-16. However, in 2017 outward FDI of India decreased to USD 1891.42 million (Ref Table 9). In electricity sector, India's outward FDI to Singapore is highest USD 236.16 million followed by Bangladesh USD 13.82 million, Bhutan USD 2.04 million and in Sri Lanka USD 1.70 million over year 2013 to 2017.In 2013 India's total outward FDI was USD 112.36 million and decreased in 2014 USD 18.80 millions. In 2015 outward FDI again increased to USD 109.83 million and again decreased to subsequent years (Ref Table 10). In mining sector, India's outward FDI to Singapore was highest USD 7963.56 million, followed by Sri Lanka USD 68.98 million, China USD 25.95 million, Philippines USD 9.81 million, Myanmar USD 7.01 million, Indonesia USD 5.75 million, Bangladesh USD 5.35 million, Cambodia USD 2.65 million, Laos USD 2.62 million USD 1.38 million, Bhutan USD 1.38 million, Nepal USD 0.95 million, Malaysia USD 0.25 million, Japan USD .09 million, Thailand USD 0.29 million and Vietnam 0.23 million over year 2013 to 2017 (Ref Table 11). India's total outward FDI in both electricity and mining was highest to

Singapore USD 8199.72 million, followed by Sri Lanka USD 70.69 million, China USD 9.82 million, Bangladesh USD 19.17 million, Philippines USD 9.82 million, Myanmar USD 7.01 million, Indonesia USD 5.75 million, Nepal USD 5.55 million, Bhutan USD 3.43 million, Cambodia USD 2.65 million, Laos USD 2.62 million, Malaysia USD 0.25 million, Japan USD 0.11 million, Thailand USD .029 million and Vietnam USD 0.023 million from year 2013 to 2017 (Ref Table 12).

Table 9: India's Outward FDI to in Electricity Gas and Water and Mining in South East Asia (In USD Millions)

Year	Outward FDI from India to SEA (Electricity Gas and Water)	Outward FDI from India to SEA in Mining
2013	112.3655	462.7749
2014	18.8073	1133.2545
2015	109.83687	1528.0439
2016	3.1567	3093.0053
2017	14.1878	1877.2398

Source: OECD service and FDI database

Table 10 : India's Outward FDI in Electricity Gas and Water (In USD Millions)

Year	Sri Lanka	Nepal	Singapore	Bhutan	Japan	Bangladesh	Total
2013	0.45	0.3517	109.5218	2.042	NA	NA	112.3655
2014	0.616	0.1442	16.4861	NA	0.005	1.556	18.8073
2015	0.3285	0.0957	109.41267	NA	NA	NA	109.8369
2016	0.2705	0.0564	0.6049	NA	NA	2.2249	3.1567
2017	0.0432	3.9534	0.135	NA	0.016	10.0402	14.1878
Total	1.7082	4.6014	236.16047	2.042	0.021	13.8211	

Source: OECD service and FDI database

Table 11: India's Outward FDI to SEA in Mining (In USD Millions)

Year	Singapore	Sri Lanka	Myanmar	Indonesia	Nepal	Philippines	Bhutan	Bangladesh	Lao
2013	434.1827	19.4201	2.309	1.8805	0.0334	0.409	0.374	0.4362	0.3424
2014	1108.9776	5.7879	0.5395	0.475	0.2307	8.4025	0.4472	0.2996	1.0913
2015	1496.63	24.4901	0.1688	0.47	0.2057	-	0.4177	0.3825	0.564
2016	3065.6675	12.1942	0.6641	1.2205	0.3479	0.5023	0.024	-	0.5643
2017	1858.1	7.0938	3.325	1.7084	0.1306	0.502	0.126	4.2379	0.06
Total	7963.5578	68.9861	7.0064	5.7544	0.9483	9.8158	1.3889	5.3562	2.622

Year	Malaysia	Cambodia	China	Japan	Vietnam	Thailand	Total
2013	0.0628	0.1	3.224	0.0008	-	-	462.7749
2014	0.0942	-	6.909		-	-	1133.255
2015	0.0628	0.42	4.224	0.0083	-	-	1528.044
2016	0.0275	0.17	11.6		0.023		3093.005
2017	0.0029	1.9663		0.083	-	0.0299	3894.366
	0.2502	2.6563	25.957	0.0921	0.023	0.0299	

Source: OECD service and FDI database

Table 12: India's outward FDI among different member countries of BCM, BIMSTEC+1 and ASEAN+4 in both Electricity Gas and Water and Mining from 2013 to 2017 (In USD Millions)

Country	2013	2014	2015	2016	2017	Total
Singapore	543.7045	1125.4637	1606.043	3066.272	1858.235	8199.718
Sri Lanka	19.8701	6.4039	24.8186	12.4647	7.137	70.6943
Nepal	0.3851	0.3749	0.3014	0.4043	4.084	5.5497
Bhutan	2.416	0.4472	0.4177	0.024	0.126	3.4309
Japan	0.0008	0.005	0.0083	-	0.099	0.1131

Bangladesh	0.4362	1.8556	0.3825	2.2249	14.2781	19.1773
Myanmar	2.309	0.5395	0.1688	0.6641	3.325	7.0064
Indonesia	1.8805	0.475	0.47	1.2205	1.7084	5.7544
Philippines	0.409	8.4025	-	0.5023	0.502	9.8158
Laos	0.3424	1.0913	0.564	0.5643	0.06	2.622
Malaysia	0.0628	0.0942	0.0628	0.0275	0.0029	0.2502
Cambodia	0.1	-	0.42	0.17	1.9663	2.6563
China	3.224	6.909	4.224	11.6	-	25.957
Vietnam	-	-	-	0.023	-	0.023
Thailand	-	-	-	-	0.0299	0.0299

Source: OECD service and FDI database

FDI in the renewable energy sector

From 2009 to 2016, approximately USD 6 billion was invested by different development banks in Southeast Asia on renewable energy-based projects. The World Bank invested USD 1.75 billion, Asian Development Bank invested USD 1.16 billion, Japan Bank for International Cooperation (JBIC) invested 1.06 billion, Japan international cooperation agency (JICA) invested 0.52 USD billion, International financial cooperation invested 0.35 USD billion and EXIM Bank invested 0.18 USD billion for development of renewable based energy projects in South East Asia (Renewable Energy Report, SEA, 2018). Among different countries of SEA, Indonesia received 60 percent of cumulative investments for the developments of geothermal projects (E.M. Remolona etal, 2005). Other ASEAN countries namely Philippines, Thailand, Vietnam and Lao attracted investments for the developments of renewable energy based projects with collaboration of ADB and JBIC (Janaka Wijayasiri etal, 2008). World Bank and JICA started financial support to Myanmar for the developments of power plant on the renewable energy generation and distribution in SEA regions. Annual investments in 2015 on renewable energy sector in the Asian region was nearly ten times higher than it was in 2004, increasing from USD 19 billion to USD 179 billion. China raised its investment in the renewable energy sector from USD 3 billion in 2004 to USD 102.9 billion in 2015 and India has increased its investment in this sector by 22% from 2014 reaching USD 10.2 billion in 2015 (UNCTAD , 2013). Policy maker expect that by the year 2040, almost 49 per cent of the total electricity in India will be generated from renewable energy resources and efficient batteries will be used to store electricity which will further cut the solar energy cost by 66 percent as compared to its current cost (UNCTD and ASEAN, 2017). It is claimed that the use of renewable energy, in place of non-renewable like coal, gas etc. will save India's exchequer US$ 8.43 billion per annum (Zhaoli Wu, 2014).

FDI in renewable energy among ASEAN

Largest recipients of FDI in renewable energy projects in SEA were India (USD 24688 million), China (USD 13555 million) and Indonesia (USD 11930 million) from 2003 to 2016. More than 60% of the total energy related FDI received by the member countries in this region came in form of renewable energy. Renewable energy sector of India received approximately USD 3.2 billion FDI from 2015 to 2018. India attracted FDI in renewable energy of USD 25886 million mainly came from European countries, Non OECD members, China and Singapore. China's FDI USD 13555 million comes from European countries, Non OECD members and Singapore. FDI of Indonesia USD 11930 million comes from Singapore, China, Non OECD members, Malaysia. Philippines's FDI inflow in renewable energy comes from China, Singapore Thailand and other OECD countries [20]. All member countries of ASEAN together received investments of USD 24347 million in renewable energy. Brunei and Singapore are least attractive countries to attract FDI in renewable energy sector, USD 409 million and USD 946 million respectively. The Euro area seems to be the main investor with 28.7% of the total investments in ASEAN regions.

India's inward and outward FDI in renewable energy

India's FDI inflow from SEA countries, in renewable energy sector, mainly comes from Malaysia, the Philippines, Japan and Singapore. Indian companies have tied up with different foreign collaborators like Mudajaya Group Berhad from Malaysia, ORIX Corporation from Japan, Asian Development Bank, AIRRO Singapore Pvt Ltd of Singapore to attract FDI equity inflow. FDI equity inflow in renewable energy is highest from Japan, USD 90.94 millions, followed by Malaysia USD 77.18 million, the Philippines USD 44.69 millions and Singapore USD 41.07 millions (Ref Table 13)

Table 13: India's inward FDI from SEA in renewable energy sector in 2017

Foreign Collaborator	Country	Indian Company	FDI Equity Inflow (US$ millions)
Mudajaya Group Berhad	Malaysia	RKM Powergen Pvt. Ltd.	77.18
ORIX Corporation	Japan	TADAS Wind	53.23

		Energy Pvt. Ltd				Energy Pvt. Ltd.	
Asian Developme nt Bank	Phil ippi nes	Renew Power Ventures Pvt. Ltd.	44.69				
AIRRO Singapore Pte Ltd	Singap ore	Diligent Power Pvt. Ltd.	41.07				
ORIX Corporation	Japan	Lalpur Wind	37.75				

Source: Economic outlook report on SEA, 2017

India's investment in renewable energy is USD 13.7 billion in 2018 to ASEAN regions. Out of India's total investments, USD 4.6 billion were invested in solar power, while USD 4.1 billion invested in wind power projects (Ref Table 14).

Table 14: Outward Investments of India in renewable energy sector over 2009-2018

Year	Investment in USD billion
2009	4.2
2010	9
2011	13.8
2012	8
2013	6.8
2014	8.4
2015	9.9
2018	13.7

Source: https://www.irena.org/financeinvestment (2019)

China is the global leader in terms capacity related to hydropower, solar PV, wind power and solar water heating in renewable energy sector. Several global renewable power plant equipment manufacturing companies mainly from China and Japan have formed Joint Ventures with Indian Companies for establishing manufacturing base in India for manufacture of boilers/turbine, storage device with technological collaboration.

Analysis of commitments under mode 3 among sub-regions

BCIM region

Evaluation of commitment levels of BCIM countries in Mode 3 for energy services (Ref Table 15): Average Hoekman scores under Mode 3 for BCIM region are 0.0273(MA) and 0.0422(NT). The respective scores for India and China are: 0.0116(MA), 0.0136(NT) and 0.0157 (MA), 0.0286 (NT) respectively. China opened up their MA through joint venture mode in different energy services (kallal et.al, 2018) like management consulting services, energy related scientific and technical consulting services, long distance transmission through pipeline and repair services etc. India also opened up their MA through offering 51% FDI in engineering and integrated engineering services, research and experimental development services and long distance transmission through pipeline etc.

Table 15 Commitment pattern of BCIM countries in Mode 3 among energy services

Country	1.A.e	1.A.f	1.C.a	1.F.c	1.F.d	1.F.e	1.F.h	1.F.i	1.F.j
China MA	Unbound	Unbound	Unbound	JV(50%)	Unbound	JV(50%)	Unbound	Unbound	Unbound
NT	Unbound	Unbound	Unbound	FL	Unbound	FL	Unbound	Unbound	Unbound
India MA	51%	FL	51%	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
NT	FL	FL	FL	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
Myanmar MA	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
NT	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
Bangladesh MA	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
NT	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound

1.F.m	1.F.n	1.F.t	3.B	3.E	4.A	4.C	11.G.a
JV(50%)	Unbound	Unbound	JV(50%)	JV(50%)	JV(50%)	Unbound	Unbound
FL	Unbound	Unbound	FL	FL	FL	Unbound	Unbound

Unbound	Unbound	Unbound	51%	Unbound	Unbound	Unbound	Unbound
Unbound	Unbound	Unbound	FL	Unbound	Unbound	Unbound	Unbound
Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound

Source: country wise WTO commitment list

BIMSTEC+1 regions

Evaluation of commitment levels of BIMSTEC+1 country in Mode 3 in energy services (Ref Table 16): It is observed that average Hoekman scores are better than BCIM at 0.1719(MA) and 0.1792(NT). Average Hoekman Index scores of Mode 3 for Japan are 0.6667 (MA), 0.6111(NT), Thailand 0.4444 (both for MA and NT) and Nepal 0.2530(MA), 0.3640(NT). Japan opened its MA in energy related scientific and technical consultancy, services related to management consulting, repair service for long distance pipelines, communication and power lines (cables), wholesale trade services of solid, liquid and gaseous fuels and related products etc. Thailand Opened their MA in different energy services like management consulting services, technical testing and analysis services, service incidental to mining, transmission in long distance pipeline etc. Nepal opened its MA by allowing 51 percent FDI in engineering and integrated engineering services and 66 percent in research and experimental development services, management consulting services, transmission in long distance pipeline, services incidental to mining and repair services.

Table 16 Commitment pattern of BIMSTEC+1 countries in Mode 3 among energy services

Country	1.A.e	1.A.f	1.C.a	1.F.c	1.F.d	1.F.e	1.F.h	1.F.i	1.F.j
Myanmar									
MA	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
NT	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
Bangladesh									
MA	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
NT	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
Japan MA	Unbound	Unbound	Unbound	FL	FL	FL	Unbound	Unbound	Unbound
NT	Unbound	Unbound	Unbound	FL	FL	FL	Unbound	Unbound	Unbound
Thiland MA	FL	Unbound	Unbound	FL	Unbound	FL	FL	Unbound	Unbound
NT	FL	Unbound	Unbound	FL	Unbound	FL	FL	Unbound	Unbound
Nepal MA	51%	51%	51%	51%	51%	Unbound	51%	51%	Unbound
NT	FL	FL	FL	FL	FL	Unbound	FL	FL	Unbound
Bhutan MA	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
NT	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
Sri Lanka MA	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
NT	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
India MA	51%	FL	51%	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
NT	FL	FL	FL	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound

1.F.m	1.F.n	1.F.t	3.B	3.E	4.A	4.C	11.G.a
Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound

Unbound	FL	FL	FL	FL	FL	FL	Unbound
Unbound	FL	FL	FL	FL	FL	FL	Unbound
Unbound	FL	FL	FL	Unbound	FL	Unbound	Unbound
Unbound	FL	FL	FL	Unbound	FL	Unbound	Unbound
Unbound	51%	Unbound	51%	51%	51%	Unbound	Unbound
Unbound	FL	Unbound	FL	FL	FL	Unbound	Unbound
Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
Unbound	Unbound	Unbound	51%	Unbound	Unbound	Unbound	Unbound
Unbound	Unbound	Unbound	FL	Unbound	Unbound	Unbound	Unbound

Source: country wise WTO commitment list

ASEAN+4 region

Evaluation of commitment level of ASEAN+4 countries in Mode 3 in energy services(Ref Table 17): It is observed that average Hoekman Index scores of Mode 3 for Cambodia are 0.6944 (MA), 0.7778 (NT), Korea 0.5278 (MA), 0.7233 (NT), Indonesia 0.5278 (both for MA and NT), Malaysia 0.1667 (MA), 0.3334(NT) and Singapore 0.0834(MA), 0.1112(NT). ASEAN+4 average Hoekman scores are better than BCIM and BIMSTEC+1 at 0.2096(MA) and 0.2438(NT). Korea and Vietnam have fully liberalized their MA in engineering services, research and development services, management consultancy services, technical testing, service incidental to mining, energy related scientific and technical consultancy, repair, transmission through pipeline etc. Indonesia has opened up its MA through joint venture in energy services like management consultancy services, repair services, technical testing, and manufacture of coke, refined petroleum products and nuclear fuel on a fee or contract basis. Malaysia has also opened up its MA by allowing 51% FDI in engineering and integrated engineering services, management consulting services and technical testing. Singapore has fully liberalized its market in research and development services and allowed up to 51 percent FDI in engineering services. Cambodia has fully liberalized most of the energy related services under Mode 3

Table 17 Commitment pattern of ASEAN+4 countries in Mode 3 among energy services

Country	1.A.e	1.A.f	1.C.a	1.F.c	1.F.d	1.F.e	1.F.h	1.F.i	1.F.j
Myanmar									
MA	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
NT	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
Japan MA	Unbound	Unbound	Unbound	FL	FL	FL	Unbound	Unbound	Unbound
NT	Unbound	Unbound	Unbound	FL	FL	FL	Unbound	Unbound	Unbound
Thailand MA	FL	Unbound	Unbound	FL	Unbound	FL	FL	Unbound	Unbound
NT	FL	Unbound	Unbound	FL	Unbound	FL	FL	Unbound	Unbound
India MA	51%	FL	51%	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
NT	FL	FL	FL	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
China MA	Unbound	Unbound	Unbound	JV(50%)	Unbound	JV(50%)	Unbound	Unbound	Unbound
NT	Unbound	Unbound	Unbound	FL	Unbound	FL	Unbound	Unbound	Unbound
Korea MA	FL	Unbound	FL	FL	FL	FL	FL	Unbound	Unbound
NT	FL	Unbound	FL	FL	FL	FL	FL	Unbound	Unbound

Cambodia									
MA	FL	FL	Unbound	FL	FL	FL	FL	Unbound	FL
NT	FL	FL	Unbound	FL	FL	FL	FL	Unbound	FL
Vietnam MA	FL	Unbound	FL	FL	FL	FL	FL	FL	Unbound
NT	FL	Unbound	FL	FL	FL	FL	FL	Unbound	Unbound
Philippines									
MA	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
NT	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
Indonesia									
MA	JV	Unbound	Unbound	Unbound	JV	JV	Unbound	JV	Unbound
NT	JV	Unbound	Unbound	Unbound	JV	JV	Unbound	JV	Unbound
Malaysia MA	51%	51%	Unbound	51%	Unbound	51%	Unbound	51%	Unbound
NT	FL	FL	Unbound	FL	Unbound	FL	Unbound	FL	Unbound
Singapore									
MA	51%	Unbound	FL	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
NT	FL	Unbound	FL	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
Brunei MA	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
NT	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
Laos MA	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
NT	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound

1.F.m	1.F.n	1.F.t	3.B	3.E	4.A	4.C	11.G.a
Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
Unbound	FL	FL	FL	FL	FL	FL	Unbound
Unbound	FL	FL	FL	FL	FL	FL	Unbound
Unbound	FL	FL	FL	Unbound	FL	Unbound	Unbound
Unbound	FL	FL	FL	Unbound	FL	Unbound	Unbound
Unbound	Unbound	Unbound	51%	Unbound	Unbound	Unbound	Unbound
Unbound	Unbound	Unbound	FL	Unbound	Unbound	Unbound	Unbound
JV(50%)	Unbound	Unbound	JV(50%)	JV(50%)	JV(50%)	Unbound	Unbound
FL	Unbound	Unbound	FL	FL	FL	Unbound	Unbound
FL	FL	FL	FL	FL	FL	FL	Unbound
FL	FL	FL	FL	FL	FL	FL	Unbound
FL	Unbound	Unbound	FL	FL	FL	FL	FL
FL	Unbound	Unbound	FL	FL	FL	FL	FL
FL	FL	Unbound	FL	FL	FL	FL	Unbound
FL	FL	Unbound	FL	FL	FL	FL	Unbound
Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
Unbound	JV	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
Unbound	JV	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound

Unbound	Unbound	51%	Unbound	Unbound	Unbound	Unbound	Unbound
Unbound	Unbound	FL	Unbound	Unbound	Unbound	Unbound	Unbound
Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound
Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound	Unbound

Source: country wise WTO commitment list

Strategic investment in Myanmar

For India, Myanmar is the gateway to the East Asia. Myanmar is a member of all the three sub-regional alignments under study. Around 90% of the Indian FDI in Myanmar has been invested in oil and gas sector only. At least 5 Indian public sector undertakings, namely, ONGC Videsh, Oil India Ltd, Indian Oil Corporation, Petronet, and GAIL are engaged at different stages of activities in Myanmar. Leveraging on Myanmar's experience India may try to expanding energy diplomacy in its neighborhood. To identify potential sub-sectors (from list of energy products in annexure 6.1) and suitable geographic locations for investment the study has applied the following three approaches.
- Statistical approach: Analysis of historical trade data
- Analysis of pull factors: Analysis of resources and government policies conducive for investment
- Analysis of push factors: Leverage on the investments already made.

Statistical methods

Here three approaches have been followed
Analysis of RCA values:
An analysis of RCA values on energy sectors have been identified as ideal sectors for investment in Myanmar would be
- 1 sector where Myanmar has the highest RCA values among the energy products: HS 74. They have already archived their competitive edge. Indian investors can take advantage of the LDC status of Myanmar and low labour cost to export these products from Myanmar.
- 2 sectors of Myanmar where RCA values have improved during the years 2010-2013: HS27 and HS74. These are the rising sectors.
- 1 sector where RCA values have declined during our evaluation period though the RCA remained >1: HS71. Here Indian expertise and capital would be welcome to regain their past glory. Investors may target these sectors also.
Based on RCA analysis, the following 3 energy sub sectors may be selected for investment in Myanmar: HS 27, HS71 and HS74 for more sub-regional cooperation.

Sector Potentiality approach

We have also identified a few sectors that have potential to enter into their partner country.
- On the basis of RCA and RCDA values we could identify that HS27, and HS 74 sectors have the potential to enter into Indian market. If India invests in these sectors, the investors can cater to the expanding NE market of India using border huts and trading points. Otherwise China or other investors will exploit that opportunity.
- Similarly for HS73 sector India has the potentiality to enter into Myanmar. If investment is made in Myanmar, the domestic market of Myanmar will absorb the output of these sectors.

Import substitution approach

- 4 sectors are the major import depending sectors in Myanmar. Stake holders of these sectors, namely, HS 27, HS73, HS84, and HS85 would welcome any package (Technology and Capital) that would help to reduce their import dependence.

Pull Factors

Though the government of Myanmar is earnestly trying to attract FDI and integrate with the SEA market to get out of the shadows of long isolation and sanctions by the western developed countries, international rating agencies and multilateral bodies like the World Banks are not yet optimist about Myanmar. The latest report of the World Bank Group is an example.

Table 18: Ease of doing Business in Myanmar and select East and South East Asian countries

Sl no	Country	Ease of doing business score(out of 100)	Ease of doing business rank(190 countries)
1	Malaysia	80.60	15
2	Indonesia	67.96	73
3	Regional Average (East Asia & Pacific)	63.41	-
4	India	67.23	77

| 5 | Lao PDR | 51.26 | 154 |
| 6 | Myanmar | 44.72 | 171 |

Source: World Bank Group, Doing Business ,2019

Myanmar has sought investment –both domestic and foreign in the following sectors:

- Power sector
- Infrastructural development
- Extractive industry(minerals/oil and gas)

Indian firms have exposure in infrastructural development (Sittwe port) and oil and gas sector. The experience of the existing investors may help others to venture into these sectors.

But Myanmar offers huge potential for Indian minerals and mining companies/institutions. The experience of Geological Survey of India would be very useful for making a foothold in the lucrative mining sector. Please refer to annexure 8.1 to assess the huge potential of the mining resources of Myanmar. But unlike this loot of resources, India's approach should be to assist Myanmar in their sustainable long term development of mines for bettering of the nation not just exploitation and appropriation of natural resources.

Large scale reform in the State-owned Economic Enterprises (SEE) is another area where huge opportunities await Indian expertise. There are several state-owned economic enterprises (SEEs) in Myanmar authorized to keep other accounts (OAs), which hold around $9 billion..

Push Factors: *Leverage on investments already made:*
India has invested in two main sectors (i) Oil and Gas–in the form of FDI and (ii) infrastructure.

Oil and gas sector in Myanmar

Myanmar attracts maximum FDI in oil and gas sector, followed by power sector. Around 90% of the Indian FDI in Myanmar has been invested in oil and gas sector only.

With India's vast experience and expertise in oil and gas industry, from exploration to exploitation and from refining to distribution, India may focus more extensively in this highly potential sector. In near future, fund rich State-owned Economic Enterprises (SEEs) are likely to be privatized through Public Private Partnership (PPP) mode. Indian firms may bid for SEEs related to oil and gas.Myanmar needs electricity for development. It is a supply demand gap. And demand for fertilizer is increasing steeply. With India's expertise in the production and generation of gas based fertilizer and electricity the government may consider to utilise discovered natural gas, instead of monetizing it by selling to China, for the production of fertilizer and generation of electricity in Myanmar itself.

Road and port infrastructure

India may take advantage of the road and port infrastructure it has contributed to build in Myanmar. To begin with, two major connectivity projects namely-Kaladan Multi Modal Transit Transport Project [1] and India-Myanmar-Thailand Trilateral Highway project (which is a part of the Asian Highway Network) may be considered for meaningful economic engagement with Myanmar. Another important road- the Stillwell Road (the Ledo Road) which connects Upper Assam with Kunming(China)via Upper Burma, may also play an important role in promoting India's economic ties with Myanmar, China, Lao and other east Asian countries. But immediate investment plan, along that route, may be kept on hold due to poor condition of the road.

Evaluation of sub-regional alignment in FDI flow

A Major problem in the field of service trade and FDI flow are the lack of relevant data for formulating any econometric model. However, many researchers used sectoral service trade and FDI movement data over different years for generating different models, particularly on FDI flows as well as relevant barriers ampong the regional level. Here researcher used baseline gravity equations for evaluating the impact of regional FTA particularly on energy-based services and flow of FDI.

$$FDI_{ij} = \infty + \beta_1 d_{ij} + \beta_2 Y_i + \beta_3 Y_j + \beta_4 YC_i + \beta_5\ YC_j + \beta_6\ FTA_{ji} + \beta_7\ TRI_j + \epsilon_{ij} \text{ ---------(eq no1)}$$

The variables FDI represent outgoing FDI stocks from country i to country j in 2020. The explanatory variables are as follows: dij represents the geographical distance among exporting and importing country, yi is GDP of country i , yj is GDP of country j, yci is GDP per capita of country i, ycj is per capita of country j, FTAij is a dummy variable taking 1 if the two countries i and j are linked through a regional free trade, zero otherwise. The trade restrictiveness variable trij is a measure of the barriers to service trade and FDI in country j.

Formation of gravity equation requires data on bilateral trade value among countries, GDP value of individual country, distance between two countries, populations of different countries etc. Bilateral trade flows have been captured from the UN's COMTRADE database or from the World Bank's Trade data. GDP in current US dollars was gathered from the IMF's International Financial Statistics or the World Bank's World Development Indicators (WDI). For distances data, the geodesic distances between capitals or the largest cities of each country are available from the Centre Etudes Prospective Information's International (CEPII), along with other geographic and trade-related variables[2]. Total import

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[1]http://mdoner.gov.in/infrastructure/kaladan-multi-modal-transit-transport-project-inland visited on 26.12.2018

[2] The CEPII database can be accessed at http://www.cepii.fr/anglaisgraph/bdd/distances.htm visited on 05/07/2021

data covering 712 rows among bilateral trades for the year 2020 have been used for the estimation of FDI in energy service model. All regression models estimators are estimated using Ordinary Least Squares and Fixed effect methods.

Table 19: Results of parameters using Gravity model

Parameters	Base line Gravity Equations
GDP_Parent	1.39 *** (0.05)
GDP_Host	0.81 *** (0.07)
Distance	-0.49 *** (0.12)
Trade barriers H	-0.36 * (0.27)
Regional FTA	0.67 *(0.03)
Constant	-4.69 *** (1.08)
Number of obs	712
F-stats	195.86
Prob > F	0.000
Adjusted R^2	0.6844
Root MSE	1.3476

Source: Result generated from STATA
standard errors in parenthesis *** = 0.01 sign. level ** = 0.05 sign. level * = 0.1 sign. Level

Model is based on OLS regressions method where author distinguish among exporting and importing countries GDP. The GDP coefficients are highly significant at 90 percent level and show that there is a clear home market effect in both the FDI flow (i.e. the parent GDP coefficient is larger than the host country GDP coefficient).
Service trade barriers have a significant negative effect on service exports and FDI flow. Regional FTA formation has positibve coffecient and has increased FDI flow approximately 94 percent level in energy services.

Possibility of regional energy cooperation

Some of the member States among three regions, namely Nepal, Myanmar and Bangladesh etc. still lack in terms of access to electricity. These countries have tried to develop energy infrustructure in the last few years, but there is still a large population among these regions are left without electricity. Very low access and availability of electricity enhance possible potentiality for regional energy cooperation. Main driver for regional energy cooperation includes importing power from other countries, expanding grid connectivity and providing financial support for boosting energy generation and distribution.
Some member countries among these sub-regions have positive synergies in the development of technology based power plant, operation, transmission and balancing the regional grid. The geographically interconnected region should allow rerouting high capacity transmission lines through another country for point-to-point grid connection, essential for

regional energy cooperation. Some renewable energy based countries don't have sufficient storage of hydro and gas plants for grid balancing. There is a scope of possibility of utilization of storage-based hydro-power plants in countries namely Nepal, Bhutan and Myanmar; and gas power plants in countries like Myanmar and Bangladesh for renewable energy integration through regional grid balancing.

Technology transfer on energy sector

Modern IOT based technologies such as smart grid, electric mobility and electricity storage moving from technology-based demonstration phase to commercial implementation in different level, there is scope for energy technology transfer as one of the important driver of regional cooperation. These can enhance for implementation of commercial based projects with inward FDI. One of the greatest technology transfer is observed in the case of Rooppur Nuclear Power Plant which is under construction is in Bangladesh. With collaboration of the Japanese technology and investment and the similar technology was deployed and commissioned successfully in India's Kudankulam Nuclear Power Plant. So along with technology transfer, FDI movement plays an important role for regional cooperation.

Research and development in energy sector and FDI movement

Regional member countries can undertake joint research and development initiatives in new energy technologies, and strengthen investment flow, which could act as an enabler of regional cooperation. There are enough scope of research and development namely clean coal, sustainable hydropower, and renewable energy integration etc. Different research institutions in these regions can collaborate with different financial institutions to enhance technology based research and open up future flow of FDI among these sub-regions.

Regional stability and peace

Regional energy cooperation has geostrategic implications, and often has interlinkages with political stability and peace. In regions where relations between the countries are not cordial,it is difficult to start or sustain energy cooperation. On the other hand, almost all the well- established examples of regional energy cooperation have the underlying factors of regional stability and peace as a enabler and drivers, for energy cooperation. One of the major advantages of regional grouping is that there is no significant political enmity or a history of adverse relations between the member States. The region is peaceful, and free from any major international conflicts. Even within the individual Member States, there is political stability. This aspect serves as a key driver for

energy cooperation, and serves as an opportunity for strengthening the cooperation.

Conclusion

In energy sector India entered into Bilateral Investment Treaties (BITS) with three countries out of 18 countries of the three sub-regions. India received maximum FDI, across all sectors, from Singapore followed by Japan, China and Korea from South East Asian countries. Steady FDI flow has been observed in case of Japan, Singapore and Korea. More than twenty per cent of total FDI inflows into ASEAN regions come from EU countries. Among ASEAN countries Japan considered as single largest investor to India among ASEAN region. India's inward investments in Energy sector is very low (Ninth position in Power sector and fifteenth in Petroleum & Natural Gas sector) among 16 major sectors. India has attracted FDI in 4 major energy sectors namely, power, non-conventional, petroleum & natural gas and electrical equipment, among different countries of three sub-regions. India's investment in the renewable energy was USD 13.7 billion in 2016 among ASEAN regions. India's FDI inflow to renewable energy sector mainly comes from Malaysia, Philippines, Japan and Singapore from SEA countries. Out of India's total investments in renewable energy, USD 4.6 billion was invested in solar power, while USD 4.1 billion invested in wind power projects. India's total outward FDI in both electricity and mining is the highest in Singapore, followed by Sri Lanka, China, Bangladesh, Myanmar, Indonesia etc. Under this study, researcher observed that, India and Myanmar are the only two countries that are members of all three sub-regions under study. The study also suggests that Myanmar as the strategic gateway for Indian business to South East Asia. In this research author has examined aggregate FDI flow under mode 3 in energy services within the gravity model framework. In the model author finds a strong negative effect of barriers to service trade on service exports and FDI. Removing these barriers may increase flow of FDI in future time period through more liberalization of MA and NT. GDP has significant positive effects on FDI flow, and author also identifies a strong linkage among home market as well as partner countries that probably indicates that FDI flows are highly heterogonous in nature.

Cambodia has fully liberalized most of the energy related services under Mode 3 which attracts more FDI. Average Hoekman scorer under mode 3 in ASEAN+4 sub-regions are better than BCIM and BIMSTEC+1 sub-region. Korea and Vietnam have fully liberalized their MA (Market Access) in engineering services, research and development services, management consultancy services, technical testing, service incidental to mining, energy related scientific and technical consultancy, repair, transmission through pipeline etc. So, there are lot of scope for movement of FDI flow. Indonesia has opened up its MA through joint venture in energy related services and scope of FDI namely in management

consultancy services, repair services, technical testing, and manufacture of coke, refined petroleum products and nuclear fuel on a fee or contract basis. Malaysia has also opened up its MA by allowing 51% FDI in engineering and integrated engineering services, management consulting services and technical testing. Singapore has fully liberalized its market in research and development services and allowed up to 51 per cent FDI in engineering services. The research also pointed out that there is a sufficient scope of energy cooperation among regional member countries within the three regional blocs, which enhanced regional integration and economic cooperation in the future.

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