TRADE IN ENERGY SERVICES IN BCIM, BIMSTEC+1 AND ASEAN+4 REGIONS-POTENTIALS AND CHALLENGES.

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Abstract:

Contribution of energy services is increasing over the years and playing a major role in world trading system. Service sectors in WTO are generally governed by General Agreement on trade in service which formed in 1995. But in WTO, still GATS are ongoing issue under current Doha agenda for more liberalization in different service sectors specific issue through successive round of negotiation. In this research paper authors try to define different component of energy services through different service trade database namely EBOPS, WTO service list and different CPC version. This research paper projects substantial growth pattern in total trade of energy services and also evaluate change pattern in competitive advantages of energy services among major economics in South and East Asia specially China, India, Japan and Korea. Research paper maps degree of energy service liberalization through Hoekman index method under three sub regional (BCIM, BIMSTEC+1, ASEAN+4) framework to show existence of limitation on Market access and national treatment within this sector. This research paper evaluates commitments level differs among different components of energy services and overall commitment levels under ASEAN+4 is highest among three FTA studies. It is also observed that similarity pattern among different energy service commitment level across regions enhanced economic cooperation and liberalization of energy services. Authors also evaluate potentialities of energy service trade

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among three regional blocks and to identify from which blocks future enhancements may come. In this paper author pointed out major challenges and quantify the main barriers in energy service trade through Services Trade Restrictiveness Index (STRI) score.

Keywords: GATS, Trade in energy services, Hoekman Index, RCA, Service Liberalizations, MA, NT

Introduction:

Energy services are important drivers for economic developments, welfare and infrastructure developments covered under General Agreement on Trade in Services (GATS) of WTO. Processes of different service liberalization particularly energy service limited within some developed and developing countries but still it's an ongoing debate in WTO under Doha round. India and different countries in South and East Asia are taking active part in energy service negotiation processes. But most importantly services like engineering and consulting services which intervene in energy value added chain defined as energy related service rather than energy services. As there had been delayed in liberalization of service trade under WTO (Hoekman, Martin and Matto,2009),South and East Asian countries formed different bilateral and multilateral FTAs for establishing service trade negotiation among themselves for regional community building (Fink Molinuevo etal,2008). The paper undertakes a mapping exercise of among different FTA on energy service trade which is important criteria for regional economic developments. Here author focuses on service sectors potentialities among three major FTAs namely a) BCIM Framework Agreement on Services, b)possible BIMSTEC+1 service agreements c) ASEAN+4 Service Agreement. Though India try to adopt unilateral liberalization processes to enjoy more gain from service trade liberalization but in implementation stage of service negotiation and liberalization processes India faced some big challenges. GATS in WTO are still ongoing agenda under the current Doha round for further multilateral liberalization but its basic framework of negotiation is fully taken into consideration and implemented under the three FTAs among South and East Asian regions.

Objective of study: i) To indentify energy related service being traded among different countries/ regional blocks. ii) To access the extent to which energy service trade has been

liberalized in various countries and regional blocks under study. iii) To estimate country and mode specific energy service facilitation index of the concerned countries and blocks. iv) To understand the potential of energy service trade among these blocks under study. v) To identify various challenges faced in energy service trade.

Literature Review:

L. G. Burange etal (2009) illustrates that the major growth of India particularly in the exports as well as imports of services have occurred chiefly in the post liberalization period i.e. from the year 1991 to the year 2007. Arpita Mukherjee etal (2009) examined India's opportunities and constraints to trade in energy services within the GATS framework. Joachim Monkelbaan (2013), explored 'win-win' outcomes for socioeconomic development based on sustainable energy services. Lambert Botha (2009), discussed within the context of WTO regulation of cross border trade in energy goods and services. It will consider a selected number of aspects within WTO agreements of relevance to the energy sector. Prabir De etal (2007) highlighted the issues surrounding the trade in education services and country specific barriers which influencing movement of students across border. Ingo Borchert etal (2012) described a new initiative to collect comparable information on services trade policies for 103 countries, across a range of service sectors and the relevant modes of service delivery. Wolfmayr, Y (2008) examined a thorough and detailed analysis of the competitiveness of the Austrian different service sectors. Cosimo Beverelli etal (2008), focused on effect of services trade restrictiveness on manufacturing productivity for a broad cross-section of countries at different stages of economic development.

HikariIshido (2011), depicted degree of liberalization of trade in services under four ASEAN+n frameworks. Again HikariIshido (2012), pointed out existence of limitations on market access and/or national treatment by each service sector, study focused that the commitment level differs greatly between sensitive and less sensitive sectors, and that the commitment level under the ASEAN Framework Agreement (AFAS) is the highest among the four FTAs studied. Hikari Ishido (2013) suggested degree of service trade liberalization by APEC members towards achieving free trade area in Asia pacific (FTAAP) and make some comparative analysis.

Methodology:

The following methodologies have been adopted by author to find out opportunities and challenges among different regional agreements on energy services.

a)   Define the scope of energy services and to prepare a list of energy and related services associated with it from different literatures. b) To find out energy service trade potentialities among major economics of the regions by Evaluate individual countries export and import position based on energy services trade over 2009 to 2013 and Finding out of Revealed competitive advantage (RCA) of energy service among major economics and calculate average growth rate (AGR) during 2009 to2013. c) For evaluating commitment pattern and service trade liberalization under three sub regional agreement by Methods of indexing (Hoekman Index) based on commitments level of individual member countries for service trade for liberalization as per commitment table in WTO ,Evaluate similarities pattern in energy services use correlation among different countries of the region based on Hoekman's index value and Perform energy service facilitation among different countries based on commitments level according to mode of service trade. d) To find out energy service potentialities and similarities across region prepare cluster analysis based on different commitment pattern. e) Find out possible challenges and barriers in energy service trade.

Hypothesis: Huge potential exists in energy services among various major regional blocks of South and East Asia.

Scope of study:

This study restricts the scope of energy services to i) defines the energy services and identifies major services associated with energy sector (Section 1) ii) analyzes five years' (2009-13) export, import and total tread trends of the energy services of major economy like India, Japan, China and Korea. Calculate RCA values based on energy services among four countries and find out average growth rate of energy services based on RCA values during 2009 to 2013 (Section 2) iii) Used the Hoekman indexing methods for service trade liberalization based upon different database constructed and evaluate correlation among the participating countries. We also evaluate indexation of commitments by country, mode and aspect wise among different

participating countries (Section 3) iv) perform cluster analysis among energy services based on commitment pattern (Section 4) v) Find out possible challenges in services particularly energy services and quantify barriers in service trade (Section 5).

Database used for Study:

WTO member countries used a list of services (MTN.GNS/W/120) from the United Nations Provisional Central Product Classification (UNCPC) for the purpose of negotiations in service trade. International trade in services is classified as per the fifth edition of the balance of payments manual (BPM5). BPM5 classification of IMF comprises 11 categories of services. These categories are further disaggregated at various levels and this is referred to as the extended balance of payments classification (EBOPS). The paper also used OECD statistics on International Trade in Services.

<u>**Section 1:**</u>

In WTO Services sectoral Classification List W/120 covered mainly 12 service sectors distributed over 150 sub-sectors. However, it does not have a separate comprehensive category for energy services. Important energy services like transport, distribution, construction, consulting, engineering, etc. are covered by the respective horizontal categories, while some energy-related services are listed as separate sub-sectors. For instance, services incidental to mining and services incidental to energy distribution are classified under 'Other Business Services', and pipeline transportation is covered under 'Transport services'. One of the reasons for the poor coverage of energy services in the W/120 is that the UNCPC, from which it is drawn, also does not list energy services as a separate category. It is also important to note that after the Uruguay Round, the coverage of energy services in the UNCPC has undergone changes in line with developments in this sector. Given the evolutionary nature of this sector and its inadequate coverage in the W/120, classification of this sector has been widely debated since the beginning of the Doha Round. The debate largely centered around two issues: (a) whether energy services should be classified as one sector or should different parts of it be classified under relevant sectors (transport, distribution, etc.), and (b) what constitutes a comprehensive coverage of this sector.

Energy services may be traded through Modes 1 (cross-border trade), 3 (foreign commercial presence) and 4 (movement of natural persons). Mode 1 also covers services related to the cross-border transmission of electricity and gas through pipelines and interconnected grids. Mode 3 is of paramount importance since it covers all different forms of foreign commercial presence, such as BOT (build, operate and transfer) and IPP (Independent power producer) .Mode 4 includes the movement of skilled professionals who deliver technical and managerial services, as well as the movement of semi-skilled and unskilled personnel needed, for example, for the construction and upgrading of facilities and grids. Author prepare energy service list (Annexure 1) with help of different service related database EBOPS, W/120 of WTO and different version of CPC etc. Here energy service incorporate different interrelated services energy services like transport, distribution, construction, and consulting, engineering, distribution and transport services along with renewable and non renewable services.

Section 2

Total trade of energy services among major economics of South and East Asia: -

In this paper authors try to evaluate growth of different energy services particularly in export, import and total trade among major economics namely India, china, Japan and Korea between 2009 and 2013. Positive growth in total trade between 2009 and 2013 among different energy services (249, 273,274,277,279,280,283) are observed in Korea but in energy services (249,271,273,274,277 and 279) have positive growth and in 280,281 and 283 have negative growth observe in case of India.

India's trade in energy services:

In this section Paper evaluates the India's total trade of services related to energy sector over 2009 to 2013. From table 2.1 authors observe that India's total service trade value fluctuate in different years across world and in service codes like 273,277,274 and 271 India have positive total trade growth over 2009 to 2013 and 208,281 and 283 it has negative total trade growth during same time period.

China's trade in energy services:

Here paper examines the China's total trade of services relate to energy sector over 2009 to 2013. From table 2.2 it observed that China's total service trade value fluctuate with world in

four energy services only among years 2009 to 2013 and in service codes like 273,274 China have positive total trade growth over 2009 to 2013 and 249 it has negative total trade growth during same time period.

Japan's trade in energy services:

We examined the Japan's total trade of energy services over 2009 to 2013. From table 2.3 the paper observes that Japan's total service trade value fluctuate with world over the years in different energy services except 273. So in 249 Japan has negative total trade growth and 279 it has positive total trade growth over 2009 to 2013.

Korea's trade in energy services:

Paper also examines the Korea's total trade of energy services to world over 2009 to 2013. From table 2.4 it observed that Korea's total service trade value fluctuate in different years. In all service codes 249,273,274,279,280,284 and 277 Korea has positive total growth level over year's 2009 to2013.

Observation based on RCA values of the different energy service among India, Japan, China and Korea:

Average RCA growths of India in different energy services (280,279,274,273,283,249) are comparatively higher than other counties. But in energy services (277 and 271) India have negative RCA growth rate between 2009 and 2013. India has huge competitive advantage in energy service code 283 than that of other countries (Ref table 2.5).

RCA values of Indian energy services have been calculated for the year 2009 and 2013 and average growth rate have been generated for evaluation purposes. Author observed that India have competitive advantage in different energy services based on EBOPS code 280, 274, 277, 273 and 271. India has not competitive advantage in service sector codes like 279,249 and 279. From growth rate value we examined highest growth rate prevailed in service code 283 followed by service code 273. Author observed that China have competitive advantage in different energy related services like 274, 277, 273 and 249. From growth rate value examined highest growth rate prevailed in service code 273 followed by service code 274. Author also observed that Japan

have competitive advantage in different energy related service sector codes like 249, 273 and 279. From growth rate value examined highest growth rate prevailed in service code 273 only. Lastly author observed that Korea have competitive advantage in different energy services like 249, 273 and 280. Korea has not competitive advantage in service sector codes like 274,277 and 279. From growth rate value we examined highest growth rate prevailed in service code 280 only.

Section 3

Hoekman Index

Energy service trade liberalization through indexation method is a new research area, primarily because the trade in energy services has long been considered as non-tradable (which is currently not the case), and also because the modalities of trade in services differs greatly across different sub-sectors (Adlung and Martin, 2005). Authors try to create commitment table under GATS in WTO based on four Modes i.e. from Mode 1 up to Mode 4, and two aspects of liberalization, i.e. market access (MA) and national treatment (NT). In each different categories of energy service sub sector under four modes and two aspects of liberalization make eight "cells", for each of which the existence of limitations is indicated in text of country wise service trade liberalization chart in WTO. Based on such country wise indication manuals authors try to fill in one of the following three indications: (1) "none" (in the case of no limitation), or (2) "unbound" (in the case where there is no legally binding commitment made), or (3) description of the limitation. Hoekman (1995) proposes an indexation method on service sector for measuring the degree of commitments level based on GATS. This method assigns values to each of 8 cells (4 modes and 2 aspects--market access (MA) and national treatment (NT)--), as follows: first assign the value 1 when the sector is fully liberalized; 0.5 when limited but bound; 0 when unbound i.e. government has not committed to liberalize by sub-sector, by mode and by aspect (market access and national treatment), and take the simple average for aggregation; then calculate the average value by services sector and by country. If average value of indexing comes at higher level, the more liberal the country's service trade commitments and low figure indicate low liberal in host country service trade commitment level to other members.

Energy service trade liberalization is more or less same in case of Japan and Korea as its average Hoekman index value higher than China and India. India has not fully liberalized in energy service as its index value is lower among major economics in south and East Asia.

From table 3.1 authors evaluates commitment level among BCIM member countries in energy services. In services like 1A and 1B India has highest commitment than BCIM average commitment. In other services namely 3B, 3E, 4A, 4B and 4C china have highest commitment level than BCIM average commitment. Bangladesh and Myanmar have no commitment level so there value will zero in all energy related service code. If we compare country wise commitment level after incorporating all energy services we observed china has highest commitment level than India. From table 3.2 authors again evaluate commitment level among BIMSTEC+1 member countries in energy services. Among all services in 1A both India and Thailand have highest commitment level, and in 1C India have highest commitment level. But in 1F both Japan and Thailand have highest commitment level. Other services like 3B, 3E and 4Aboth Japan and Thailand have highest commitment level and in 4C Japan has highest commitment level than BIMSTEC+1 average commitment level. Bangladesh, Bhutan, Sri Lanka and Myanmar have no commitment level in energy related service so there value will zero. If we compare country wise commitment level after incorporating all energy services we observed Japan commitment level is highest followed by Thailand and India. From table 3.3 authors evaluate commitment level among ASEAN+4 member countries in energy services. In service code 1A both India, Cambodia, Malaysia, Singapore, Vietnam have highest commitment but in services 1C India and Singapore have highest commitment level and in 1F Cambodia, Malaysia, Vietnam, Thailand, Japan and Korea have highest commitment level. But other services like 3B, 3E and 4ACambodia, Indonesia, Vietnam, Thailand, Japan, China and Korea have highest commitment level and in 4B Cambodia, Japan, China and Korea have highest commitment level. In energy services 4C Cambodia, Japan, China and Korea have highest commitment level and in 11G only Cambodia has highest commitment level than ASEAN+4 average commitment level. Myanmar, Philippines, Brunei have no commitment level in energy related service so there value will zero. If we compare country wise commitment level after incorporating all energy services we observed Cambodia has highest commitment level followed by Korea and Japan.

*Correlation of commitments among the participating countries based on energy service***:**

After calculating the Hoekman index, authors evaluate similarities pattern among member countries of three sub regions by measuring correlation coefficient among them. This has been done by comparing the calculated Hoekman Indices by country and based energy services.

In this paper author examine correlation among BCIM countries. Correlation between India and BCIM is very week but in case of China and BCIM are positive indicating there is some commonality among the participating countries with the energy service commitment pattern. But in case of India and China have negative correlation indicating no similarities in energy service commitment pattern. It is one of the notable and valuable observations from our analysis. This paper evaluates correlation among BIMSTEC+1 member countries. Correlation between India and BIMSTEC+1 is very week but in case of Japan, Thailand and Nepal Vis a vi BIMSTEC+1 are positive indicating there is some commonality among the participating countries with the commitment pattern in energy services. Correlation between India vs. Japan and India vs. Nepal are weekly positive indicating very small similarities in commitment pattern of energy services. Author also examined correlation among ASEAN+4 member countries. Correlation between India and ASEAN+4 is very low but in case of Indonesia, Malaysia, Vietnam, Thailand, Japan, China and Korea Vis a vi ASEAN+4 are positive indicating there is some commonality among the participating countries with the commitment pattern. Correlation between India vs. Japan and India vs. Malaysia and India vs. Singapore are weekly positive indicating similarities in commitment pattern of energy services. Negative correlation in energy services persists among BIMSTEC+1 vs. BCIM, ASEAN+4 vs. BCIM and ASEAN+4 vs. BIMSTRC+1 indicates no commonalities exists in energy service commitment patterns among three major sub regions in South and East Asia.

Hoekman Index by country and different mode:

The Hoekman Index has also been calculated by country, by aspect. Observation based on level of commitments by mode is that while mode 1 and mode 3 exhibit energy service based variation while in mode 2 has deepest commitment and in mode 4 shows least commitment across all countries commitment pattern among energy services. Table 3.4 shows Hoekman index by

different mode among BCIM member countries based on two aspects Market Access (MA) and National Treatment (NT). Similarly Hoekman index by different mode among BIMSTEC+1 and ASEAN+4 member countries based on two aspects Market Access (MA) and National Treatment (NT).

Section 4

Cluster Analysis

In this section author wants to highlight similarities in commitments pattern among individual participating members of BCIM region based on clustering method. The standard k means clustering method has been applied on calculated Hoekman Index value. In BCIM regions two clusters are formed and five energy services attached to first cluster and four energy services attached to second cluster. Cluster 1 consists of energy related service codes 1A, 3B, 3E, 4A and 4B and cluster 2 consists of 1C, 1F, 4C and 11G among BCIM regions. Same methods author used in evaluating similarities in commitments pattern among individual participating members of BIMSTEC+1 region. Here two clusters are formed and seven energy services attached to first cluster and two energy services attached to second cluster. Cluster 1 consists of energy related service codes 1A, 1F,3B, 3E, 4A , 4C and 4B and cluster 2 consists of 1C and 11G among BIMSTEC+1 regions. Author used same principal for calculating similarities in commitments pattern among individual participating members of ASEAN+4 regions. Here also two clusters are formed and five energy services attached to first cluster and four energy services attached to second cluster. Cluster 1 consists of energy related service codes 1A, 1F,3B, 3E and 4A and cluster 2 consists of 1C, 4B, 4C and 11G among ASEAN+4 regions. Table 4.8 gives ANOVA table for judgment of level of significance in clustering.

Section 5

Identify challenges of energy service trade

In mode 1 it is being observed that political unrests are growing among many major players of developed countries which restrict trade with other developing countries particularly in South and East Asia. Therefore, any policy change and economic downturn in these countries will put

negatively challenges on Indian outsourcing sector. Protection of uncompetitive domestic providers (on political grounds) and lack of domestic regulation are preventing India from taking full advantage of liberalization on trade in services particularly energy service trade. In mode 4 Indian professionals have appear for Economic Need Tests (ENTs) and Labour Market Tests (LMTs), to provide services in other countries. But this restriction hampered effective market access for professional qualifier (obtained in India) adversely, affect the ability of Indian professionals to provide services abroad. Service trade restrictiveness index is unique evidence based diagnostic tools, which provide up to date information in service trade barriers among global trade services. It provides useful information to service trade policymaker to find out different reform option, benchmarking them relative to global best practices and compile trade policy for further negotiation of services. In this paper author quantify the main barriers in energy service trade through direct approach method which is used in OECD Services Trade Restrictiveness Index (STRI) database. In conclusion part authors suggested different approaches for enhancing energy services trade among major economics of South and East Asia.

In energy services trade domestic regulations and investments barriers are considered as major challenges. STRI helps to identify different components and measure its weight age for restriction in energy services trade. STRI takes values from 0 to 1, where o indicates completely open and 1 indicates completely closed for negotiation in service trade policy. It provides policy makers and international negotiators with plenty of information used as measurement tool to open up energy service trade and negotiate international energy service trade agreements among different countries. Here authors examined restrictiveness value among four major economies (India, Japan, China and Korea) in terms of energy service trade pillars like architectural, engineering, construction and distribution services. The paper examined that all major countries has put index value in aforesaid service categories less than 1, indicates there is enough scope of further negotiation in energy services to achieve overall economic developments.

Conclusion:

This study focuses on mapping the degree of energy service liberalization and potentials among three major FTAs. The paper tries to investigate causal links between restrictions on trade in services and the actual performances of energy service trade. Clear distinction drawn between actual policy provisions and the noted commitments of individual country in energy related

services. In addition, enforcement of the bound commitments is among different countries of the regions are important issue. However one country tries to deeply commit in different level among energy services components to form an effective FTA but in reality such commitment might not be actually realized (enforced). The indexing exercise in this study revealed commitment level under the different FTAs and evaluate India's position in energy services. Cross-country similarities in energy services are evaluated properly in service sector commitment under each of the FTAs. Authors also analyzed different countries commitment pattern across different modes and observed that Mode 4 (movement of people) is least committed, whereas Mode 2 (consumption abroad) is most committed under all the three FTAs. In short, in energy service trade India has an offensive interest in Mode 1 and Mode 4. India could also commit to liberalize FDI under Mode 3 to some extent. Lastly Authors also observed that all major economics namely India, China, Japan and Korea among three regional agreements have put service trade restrictiveness index value among major components of energy services in low level so that there is enough scope of further negotiation in energy services to bust up service trade within the regions.

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List of tables:

Table 2.1: Total Trade of energy services of India during five consecutive years (2009-13) in $

Reporter	Service Code	Total Trade 2009	Total Trade 2010	Total Trade 2011	Total Trade 2012	Total Trade 2013
India	249	1916000000	1516000000	1970000000	2016713793	2613051888
India	271	3215000000	6673000000	5406000000	7011986487	5627388570
India	273	23238000000	37570000000	46575534763	55493102940	56189416211
India	274	10132000000	18487000000	20651281080	21326056817	19653462527
India	277	8901000000	17356000000	19255326970	19725519760	17804527160
India	279	875000000	1219000000	970455750	1211371526	1277953760
India	280	4996000000	7536000000	3658000000	4165730135	4637919505
India	281	431000000	457000000	346797933	759173795	362083113
India	283	326000000	384000000	259000000	658498348	259696787

EBOPS service categories used for calculation

Table 2.2: Total Trade of energy services of China during five consecutive years (2009-13) in $

Reporter	Service Code	Total Trade 2009	Total Trade 2010	Total Trade 2011	Total Trade 2012	Total Trade 2013
China	249	15330428991	19566527920	18452435521	15864622779	14553308032
China	273	36298604463	42788960770	53763824409	60991130443	45441727063
China	274	32032692690	37863418525	46972543869	53466816521	40535627763
China	277	0	0	0	33447099618	40535627763

EBOPS service categories used for calculation

Table 2.3: Total Trade of energy services of Japan among five consecutive years (2009-13) in $

Reporter	Service Code	Total Value 2009	Total Value 2010	Total Value 2011	Total Value 2012	Total Value 2013
Japan	249	24695936407	18687006870	17362631900	19866014487	17167710000
Japan	271	0	0	0	0	0
Japan	273	43790101156	44274079720	47453073443	53638887600	0
Japan	274	0	0	0	0	0
Japan	277	0	0	0	0	0
Japan	279	14535652559	14048336457	13810069007	15384490309	16001370000
Japan	280	0	0	0	117000	14000
Japan	283	0	0	0	0	0

EBOPS service categories used for calculation

Table2.4: Total Trade of energy services by Korea among five consecutive years (2009-13) in $

Country	Service code	Total trade in 2009	Total trade in 2010	Total trade in 2011	Total trade in 2012	Total trade in 2013
Korea	249	17359100000	14279000000	19273100000	23071800000	25227100000
Korea	271	4253200000	0	0	0	0
Korea	273	24431500000	33970000000	37047600000	42525300000	43028400000
Korea	274	3060800000	3022000000	3317800000	3796100000	3899600000
Korea	277	1389300000	1251000000	1311500000	1559200000	1517500000
Korea	279	1501700000	1553000000	2328500000	2835400000	2756100000
Korea	280	1012200000	1044000000	1444700000	2742000000	3790700000
Korea	283	28400000	6471000000	0	0	0
Korea	284	7752400000	17699000000	20221700000	23417600000	23324100000

EBOPS service categories used for calculation

2.5 Average growth in RCA in Energy Service between 2009 and 2013 among major economics

Service codes	Average RCA growth of India	Average RCA growth of China	Average RCA growth of Japan	Average RCA growth of Korea
280	77.42	NA	NA	5.66
279	100.95	NA	0.33	0.15
274	59.23	32.76	NA	0.65

277	-0.96	NA	NA	0.18
273	129.11	87.02	1.11	2.30
283	706.67	NA	NA	NA
249	46.43	13.75	0.32	0.42
271	-6.99	NA	NA	NA

Table 3.1: Calculation of Hoekman Index based on service sector commitment level relates to Energy Sector among BCIM member countries

Country	1A	1C	1F	3B	3E	4A	4B	4C	11G	Average Hoekman Index
India	0.4688	0.1875	0.0000	0.0625	0.0000	0.0000	0.0000	0.0000	0.0000	0.0799
China	0.0000	0.0000	0.1719	0.4375	0.4375	0.4375	0.4375	0.2500	0.0000	0.2413
Myanmar	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Bangladesh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
BCIM Average	0.1172	0.0469	0.0430	0.1250	0.1094	0.1094	0.1094	0.0625	0.0000	0.0803

Table 3.2: Calculation of Hoekman Index based on service sector commitment level relates to Energy Sector among BIMSTEC+1 member countries

Country	1A	1C	1F	3B	3E	4A	4B	4C	11G	Average Hoekman Index
India	0.4688	0.1875	0.0000	0.0625	0.0000	0.0000	0.0000	0.0000	0.0000	0.0799
Japan	0.0000	0.0000	0.4583	0.5000	0.5000	0.7500	0.7500	0.7500	0.0000	0.4120
Myanmar	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Bangladesh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Thailand	0.3437	0.0000	0.4097	0.6875	0.4375	0.5000	0.0000	0.0000	0.0000	0.2643
Nepal	0.0625	0.0625	0.0278	0.0625	0.0625	0.0625	0.0000	0.0000	0.0000	0.0378
Bhutan	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Sri Lanka	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
BIMSTEC+1	0.1094	0.0313	0.1120	0.1641	0.1250	0.1641	0.0938	0.0938	0.0000	0.0992

Average										

Table 3.3: Calculation of Hoekman Index based on service sector commitment level relates to Energy Sector among ASEAN+4 member countries

Country	1A	1C	1F	3B	3E	4A	4B	4C	11G	Average Hoekman Index
Brunei	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Cambodia	0.7500	0.0000	0.5000	0.5000	0.5000	0.5000	0.7500	0.7500	0.6250	0.5417
Indonesia	0.0937	0.0000	0.0833	0.2500	0.2500	0.0000	0.0000	0.0000	0.0000	0.0752
Malaysia	0.5625	0.0000	0.3056	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0965
Myanmar	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Philippines	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Singapore	0.3438	0.7500	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1215
Vietnam	0.3750	0.7500	0.5556	0.5000	0.5000	0.5000	0.0000	0.0000	0.0000	0.3534
Thailand	0.3437	0.0000	0.4097	0.6875	0.4375	0.5000	0.0000	0.0000	0.0000	0.2643
India	0.4688	0.1875	0.0000	0.0625	0.0000	0.0000	0.0000	0.0000	0.0000	0.0799
Japan	0.0000	0.0000	0.4583	0.5000	0.5000	0.7500	0.7500	0.7500	0.0000	0.4120
China	0.0000	0.0000	0.1719	0.4375	0.4375	0.4375	0.4375	0.2500	0.0000	0.2413
Korea	0.3750	0.5000	0.5486	0.5000	0.4375	0.5000	0.4375	0.4375	0.0000	0.4151
ASEAN+4 Average	0.2548	0.1683	0.2333	0.2644	0.2356	0.2452	0.1827	0.1683	0.0481	0.2001

Table3.4: HI value by different mode among BCIM member countries

Country	Aspect, i.e. Market Access(MA) or National Treatment(NT)	Hoekman Index for mode1	Hoekman Index for mode2	Hoekman Index for mode3	Hoekman Index for mode4
India	MA	0.0032	0.0032	0.0116	0
	NT	0.0032	0.0032	0.0136	0
China	MA	0.0028	0.035	0.0157	0

			0.0028	0.035	0.0286	0
	NT		0.0028	0.035	0.0286	0
Myanmar	MA		0	0	0	0
	NT		0	0	0	0
Bangladesh	MA		0	0	0	0
	NT		0	0	0	0
BCIM	MA		0.006	0.0382	0.0273	0
Average	NT		0.006	0.0382	0.0422	0

Annexure 1: Energy service list**:**

EBOPS	W/120	CPC Provisional Code	Explanatory Note	CPC ver 1.0	CPC ver 2.0
280	1.A.e	Class: 8672 - Engineering services	86721 - Advisory and consultative engineering services and Engineering design services for mechanical and electrical installations	83331/83332/83333/83339/83341	83310/83321
	1.A.f	Class: 8673 - Integrated engineering services	86731 - Integrated engineering services for transportation infrastructure turnkey projects	83312	83329
279	1.C.a	Class: 8510 - Research and experimental development services on natural sciences and engineering	85103 - Research and experimental development services on engineering and technology	81130	81129
274	1.F.c	Class: 8650 - Management consulting services	86505 - Production management consulting services	83115	83115/83116
277	1.F.d	Class: 8660 - Services	86601 - Project management	83190	83190

		related to management consulting	services other than for construction		
273	1.F.e	Class: 8676 - Technical testing and analysis services	86763 - Testing and analysis services of integrated mechanical and electrical systems	83563	83443
			86764 - Technical inspection services	83564/83569	83444/83449
283	1.F.h	Group: 883 - Services incidental to mining	88300 - Services incidental to mining	86210	67990/86211/86219
284	1.F.j	Group: 887 - Services incidental to energy distribution	88700 - Services incidental to energy distribution	86221/86222/86223/86224	86311/86312/86320/86330/86350/86340
	1.F.j	Group: 887 - Services incidental to energy distribution	69110 - Electricity transmission and distribution services	69110	69111
	1.F.j	Group: 887 - Services incidental to energy distribution	69120 - Gas distribution services through mains	69120	69120
	1.F.m	Class: 8675 - Engineering related scientific and technical consulting services	86751 - Geological, geophysical and other scientific prospecting services	83510	83411
283	1.F.i	Class: 8845 - Manufacture of coke, refined petroleum products and nuclear fuel, on a fee or	88450 - Service related to manufacture of coke, refined petroleum products and nuclear fuel, on a fee or contract basis	86350	

		contract basis			
284	1.F.t	Class: 8790 - Other business services	Subclass: 87909 - Other business services n.e.c.(Service incidental to mining and service incidental to energy distribution)	83990/85970/85990	83990/85961/85962
284	1.F.n	8864 - Repair services of electrical machinery and apparatus n.e.c., on a fee or contract basis	88640 - Repair services of electrical machinery and apparatus n.e.c., on a fee or contract basis	87152	87152
249	3.B	Class: 5134 - For long distance pipelines, communication and power lines (cables)	51340 - For long distance pipelines, communication and power lines (cables)	54241/54242	54214/54242
	3.B	Class: 5136 - constructions for mining and manufacturing	51360 - constructions for mining and manufacturing	54260	54261/54262/54269
	3.B	53242 - Construction of Long-distance communication and power lines (cables)	Construction of Long-distance communication and power lines	53242	
271	4.A	Class: 6211 - Commission agents' services	62113 - Sales on a fee or contract basis of fuels, metals, ores, timber, building materials and industrial and technical chemicals	61261/61262/61264/61271/61272/61291/61292/61293/61296	61261/61262/61264/61271/ 61272/61291/61292/61293/ 61231

	4.B	Class: 6227 - Wholesale trade services of intermediate products, other than agricultural; wholesale trade services of waste and scrap and materials for recycling	62271 - Wholesale trade services of solid, liquid and gaseous fuels and related products	61191	61191
	4.C	Class: 6329 - Other specialized retail sales of non-food products	63297 - Retail sales of fuel oil, bottled gas, coal and wood	62191/62291/62391/62491/62591	62191/62291/62391
231	11.G.a	Class: 7131 - Transportation of petroleum and natural gas	71310 - Transportation of petroleum and natural gas	64310	
		Class: 9113 - Administrative services for more efficient operation of business	91132 - Administrative fuel and energy related services	91132	91132