ENERGY MARKET IN ASIA-PACIFIC AND CANADA'S POTENTIAL FOR NATURAL GAS EXPORT

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Overview

Asia-Pacific region holds nearly half of the world's population, which has been growing relatively faster than other regions, though has slowed down considerably in recent years. In terms of economic growth, it is also one of the fastest growing regions in the world and is often considered an economic engine for the world. With economic growth comes increasing demand for energy, and as such it has become the most energy hungry region of the world. Although world's total primary energy consumption increased by approximately 22% during the last decade (from 2004 to 2014), Asia Pacific region experienced an increase of over 56% during the same period.

Energy market in Asia-Pacific is highly fragmented and diverse. It has economies which are highly deficient in energy and are almost entirely dependent on import (i.e., Japan) and at the same time has economies which have surplus energy (i.e., Brunei Darussalam, Indonesia). There are plenty of energy movements among economics in the region. There are economies where energy demand and supply evolved rapidly changing the nature and intensity of energy trade. China, for example, despite increased energy production, became energy deficient from energy surplus due to rapid economic growth and development. Malaysia also has narrowed down its energy trade balance considerably.

There are also geographic, demographic, economic and political factors that make Asia-Pacific energy market further complicated. Though some economies have been growing at a much higher rate than the world average, others have been slow. Despite rapid economic growth, a large proportion of population remains below poverty and is deprived of the light of economic growth and development. Along with the variability of economic growth, per capita energy use varies considerably across economies and within economy as well. Over 500 million people in the region have no access to electricity. The overall demand for energy, however, continues to grow in all economies though not at similar rates. China and India are the largest economies and their energy consumption grew at a much faster rate than others.

Another specific characteristic to note for economies in the region is the dominance of national energy companies. In Asia-Pacific, energy sectors in many countries are so regulated that they are almost completely controlled by national companies. For example, the energy sectors of China and India, the largest energy consumers and producers in the region, are highly dominated by national companies.

One can easily observe that the region is becoming increasingly energy deficient and reliant on imported energy. Domestic production has been given considerable attention by several countries but so far production increase could not keep pace with demand growth. Very recently, the demand growth has slowed down substantially, but still remained in an upward trend and the gap between domestic supply and consumption continues to widen.

Canadian energy sector has been actively monitoring the energy market situation in Asia-Pacific region and exploring potential for exporting Canadian energy to this region. Infiltrating Asia-Pacific energy market is considered vital for diversifying Canadian energy exports. Currently, Canada exports its energy products almost exclusively to the US. Asia Pacific Foundation of Canada identifies several reasons for boosting energy trade with Asia-Pacific among which the two most important complimentary factors are: high GDP growth (and as such an increase in energy demand) of the region and increased inflow of investment from rest of the world economies to experience further growth pressure. High GDP growth in the region attracts global players for investment and for increasing recognition of global economic growth. It is expected that the region will host the majority of world's middle class with a sustained increase in energy demand.

Asia Pacific region has become the second largest market for Canadian goods and services after US and is expected to grow even further. Canada has already made (or in the process of implementing) bilateral free trade agreements with several Asian countries, i.e., China, India, Thailand, Hong Kong and Philippines. Canadian energy sector also attracted several Asian investors. In 2013, Asian investment in Canada, dominated by China and Japan, was just under $78 billion. Malaysia is also keen on investing in Canadian energy sector.

The objective of this paper is to examine potential for developing and exporting Canadian natural gas to Asia-Pacific in the light of projected demand and supply of energy in the region as well as in Canada. It is also the intention to see how important role Canadian natural gas production and export can play in economic development of Canada as well as mitigating energy demand in Asia-Pacific region.

Methods

The two aspects of this paper are to analyze demand and supply forecasts for energy in the Asia-Pacific and to examine potential for developing and exporting Canada's natural gas in the region. In both cases, there need to be an analysis of existing and historical situations and to forecast possible conditions in the future. The simplest forecast is a linear time trend, which is not practical for a number of reasons. Traditional forecasting techniques based on time-series data are not appropriate to forecast demand and supply for energy as those are affected by so many factors. In this paper, we examine different factors affecting demand and supply of energy in general in Asia Pacific and natural gas in particular, and analyze the historical and existing situations based on those factors. We also look at the possibility of alteration of those factors and how energy demand and supply can get affected by those changing factors.

Since our ultimate objective is to examine the potential for developing and exporting Canada's natural gas in the region, we first examine the possibility of increasing or sustaining demand for natural gas in the region, second, if there is sustained demand, what potential opportunity Canadian natural gas sector has to contribute to this demand. We would also like to examine how competitive advantage Canadian natural gas sector may have (if any) over other suppliers including Australia.

The entire activities of preparing this paper can be divided into three categories: collection of literature, collection of numerical data, and logical extrapolation of information through analysis of data and literature. For collection of literature, we focused on both soft and hard literature – government publications, reports, newspaper articles and journal articles. Numerical data were gathered broadly from three different sources – (1) government reports and publications including Statistics Canada, (2) industry reports including individual company publications (i.e., BP Statistical Reviews), consortium reports and publications (i.e., Canadian Association of Petroleum Producers, IEA), and private data banks (i.e., Enerdata).

Results

Asia-Pacific region is inherently deficient in energy as it consumes more energy than it produces. With its well over 50% of the world's population, it produces only 31% of world's energy. It imports all three major forms of energy resources – oil, natural gas and coal with oil playing the leading role followed by natural gas. Overall oil production in this region has already surpassed the peak and is unlikely to grow. Natural gas production, on the other hand, continues to increase and recently surpassed oil production. Despite its overall increase in energy production, it has become increasingly reliant on imported energy. Since economic growth is expected to continue, its demand for imported energy is expected to grow despite several mitigation strategies – increasing domestic production of conventional and renewable energy, efficient energy demand management, and controlled growth of economy and population. How fast the energy demand is expected to grow depends on the rate of economic growth and the rate of increase of energy efficiency, which eventually depend on several factors – social, demographic, political, environmental and technological.

Sustained growth of energy demand in Asia-Pacific does not guarantee potential for Canadian energy export in this region. The region is diversifying its energy imports. Energy rich economies from around the world are trying to capture a slice of energy demand from this region. Neighboring Australia (many statistical reports include Australia in Asia-Pacific region, for our analysis, we used only Asian countries) is boosting its LNG production with intention to satisfy a significant portion of energy demand in the region. Because of high energy prices (much higher LNG price for example), the region aggressively seeking efficient energy demand management to mitigate at least part of its growing energy demand. Developing improved technology for energy consumption efficiency and energy production from renewable resources is of high priority. Japan, for example, has recently announced that it is doubling its budget for seeking energy-saving measures.

Conclusion

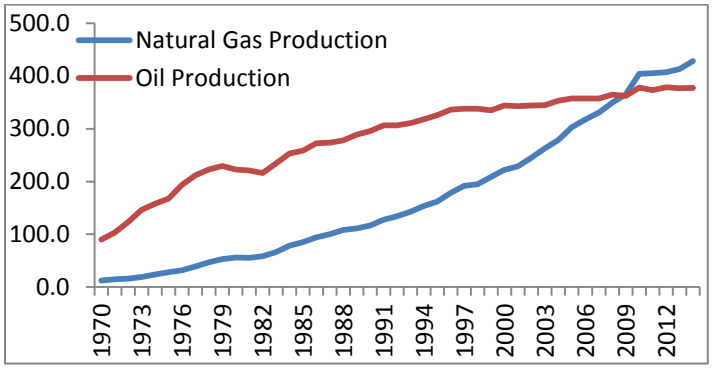
Do all those mean Canada should not try to enter the market? The answer is perhaps no. But Canada has to work hard if it really wants to enter into to the market. As there are already players in the market, it will have a natural disadvantage. However, given US is the only importer of its energy resource, Canada has little option but to aggressively try to enter into Asia-Pacific market. We hope to provide a detailed analysis on this.

Table Production and consumption of energy in major Asia Pacific Economies (million tonnes in 2014)

	Oil		Gas		Coal		Nuclear Consn	Hydro Consn	Renewable Consn
	Prodn.	Consn.	Prodn.	Consn.	Prodn.	Consn.			
China	211.4	520.3	121.0	166.9	1844.6	1962.4	28.6	208.2	53.1
India	41.9	180.7	28.5	45.6	243.5	360.2	7.8	29.6	13.9
Indonesia	41.2	73.9	66.1	34.5	281.7	60.8	- -	3.4	2.2
Japan	- -	196.8	- -	101.2	0.7	126.5	- -	19.8	11.6
Malaysia	30.3	35.2	59.8	36.9	- -	15.9	- -	2.7	0.3
Other	52.2	369.3	152.9	195.0	68.7	205.5	46.1	74.6	6.7
Total	377.3	1376.2	428.3	580.1	2439.2	2731.3	82.5	338.3	87.8
World	4220.6	4211.1	3127.3	3065.5	3933.5	3881.8	574.0	879.0	316.9
% World	8.9	32.7	13.7	18.9	62.0	70.4	14.4	38.5	27.7

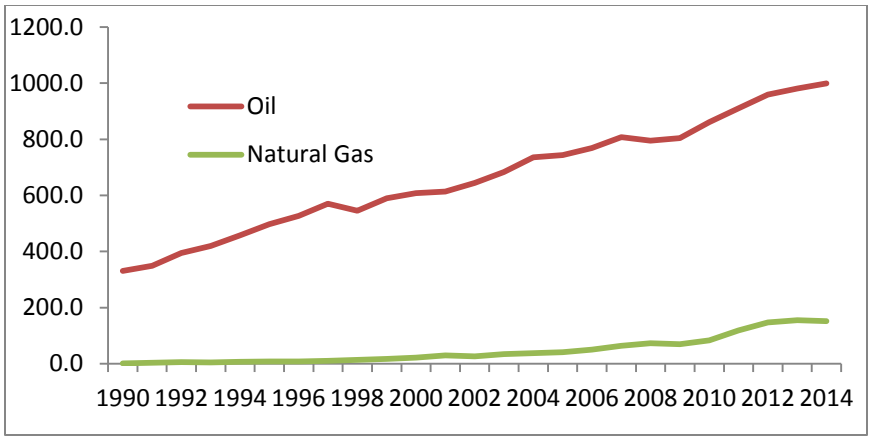
Oil production in Asia Pacific reached its peak and a further increase in oil production is unlikely. Natural gas production, on the other hand, continues to increase and is likely to continue although at a slower pace. The following figure shows historical record of oil and gas production in Asia Pacific region for the past 45 years.

Trends of oil and gas production in Asia Pacific



Although natural gas production has been increasing at a much faster rate and surpassed oil production, the deficiency in natural gas continues to increase and the region is increasingly relying on imports. Both oil and natural gas import have to continue to increase due to increasing demand despite substantial increase in other energy (nuclear, hydro and renewable energy).

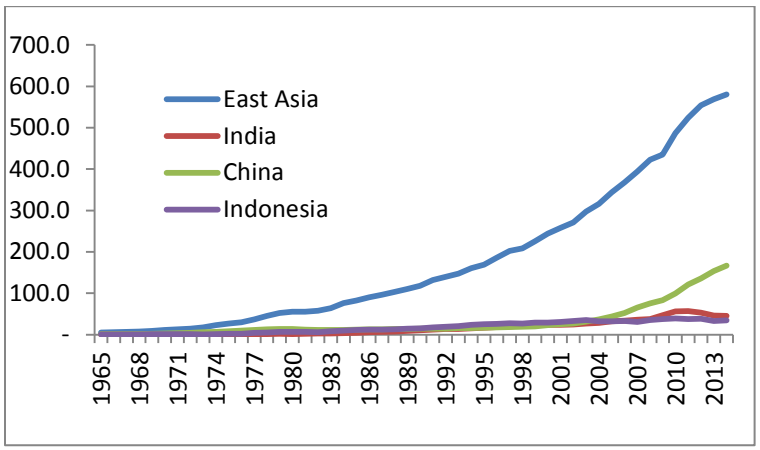
Production and Consumption differential of oil and natural gas in Asia Pacific for the last 25 years



From BP energy outlook,

Million tonnes of oil equivalent	Actual						Forecast				
	1990	1995	2000	2005	2010	2013	2015	2020	2025	2030	2035
Oil Deficit	339.6	514.9	615.8	766.3	890.3	1023.0	1068.9	1220.9	1394.9	1541.3	1656.4
Natural Gas Deficit	3.3	0.8	16.3	30.9	68.2	135.1	159.2	227.3	341.6	396.2	383.9
Coal Deficit	10.0	17.0	24.0	-19.8	-29.6	20.8	81.6	53.6	102.3	156.0	182.8
Total Deficit	352.9	532.7	656.1	777.4	928.9	1178.9	1309.7	1501.8	1838.8	2093.5	2223.1
Oil Import											
Natural Gas import											

Trends in Natural gas consumption in Asia Pacific



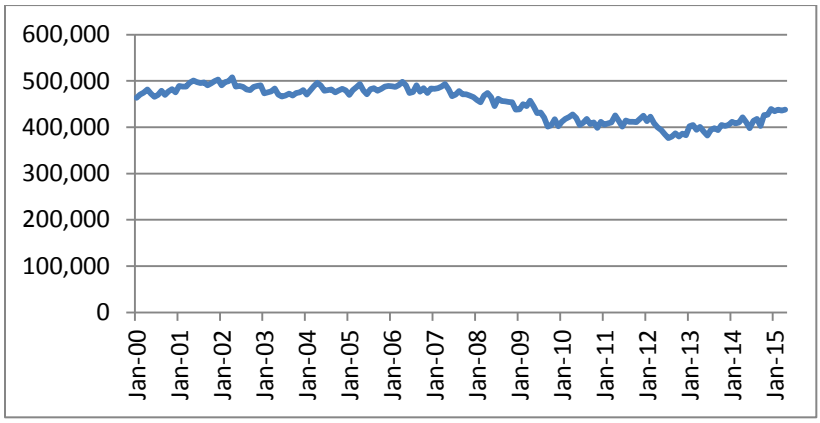
Asia Pacific LNG import by source

Asia Pacific LNG import by source			Billion Cubic Meters			
	2009	2010	2011	2012	2013	2014
US	0.9	1.2	1.3	0.5	0.0	0.3
Brazil				0.1	0.0	0.0

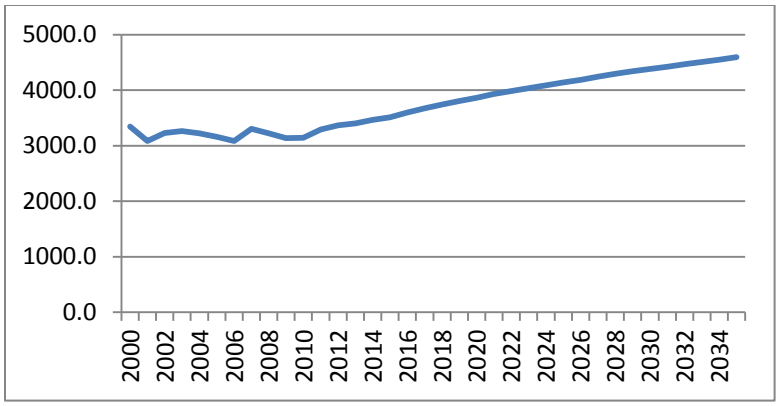
Trinidad &Tobago	1.9	2.3	3.8	1.9	1.6	1.2
Peru		0.2	2.0	1.5	1.7	0.1
Belgium	0.1	0.2	0.3			
Norway		0.2	0.9	0.7	0.7	0.9
Europe			0.2	0.9	0.8	3.8
Russian Federation	6.2	13.3	14.4	14.8	14.2	14.5
Oman	10.1	10.4	10.8	11.2	11.4	10.4
Qatar	29.9	36.3	48.6	66.5	75.0	74.4
United Arab Emirates	6.9	7.6	7.9	7.5	7.4	8.0
Yemen	0.3	3.5	5.4	5.9	8.2	8.3
Algeria	0.2	0.1	0.3	0.9	1.3	2.6
Angola					0.3	0.4
Egypt	1.0	1.9	3.0	3.8	3.0	0.4
Equatorial Guinea	4.2	3.2	4.0	4.5	5.1	4.4
Nigeria	2.3	3.6	7.6	13.1	12.1	13.3
Australia	24.1	25.3	25.6	28.0	30.1	31.6
Brunei	8.8	8.8	9.4	9.1	9.5	8.3
Indonesia	35.6	45.2	28.8	24.7	22.1	21.4
Malaysia	30.6	31.8	32.8	31.8	33.8	33.7
Myanmar	8.3	8.8				
New Guinea						4.7
Korea						0.2
Total	**171.5**	**211.2**	**207.1**	**227.2**	**238.1**	**242.7**

Canadian Natural gas Production and consumption

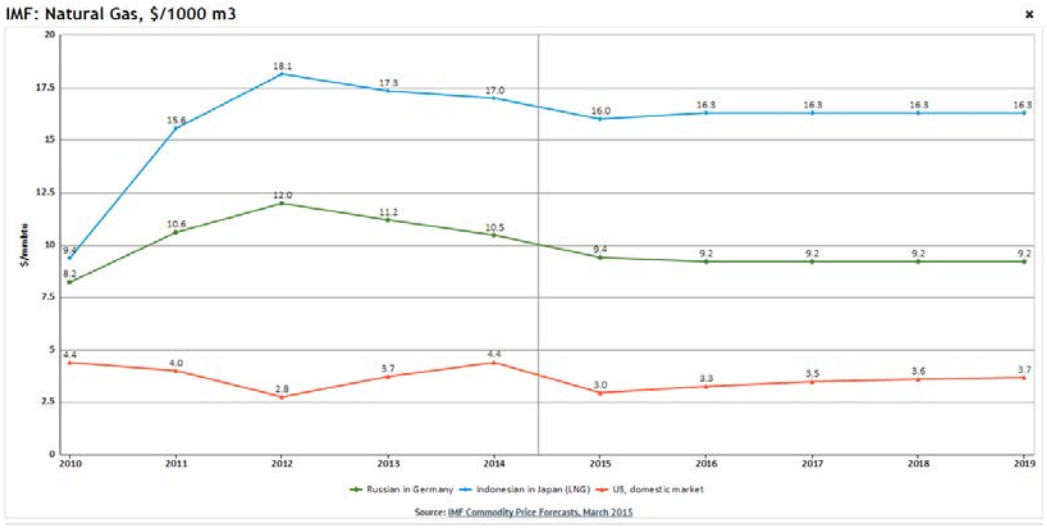
Canadian natural gas production (cubic meters per day)



Natural gas demand



Natural gas price in the world



Natural gas reserve in Canada

First mover advantage

Conclusions

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