



GLOBAL JOURNAL OF MANAGEMENT AND BUSINESS RESEARCH: A  
ADMINISTRATION AND MANAGEMENT  
Volume 15 Issue 7 Version 1.0 Year 2015  
Type: Double Blind Peer Reviewed International Research Journal  
Publisher: Global Journals Inc. (USA)  
Online ISSN: 2249-4588 & Print ISSN: 0975-5853

## Optimizing Uses of Gas for Industrial Development: A Study on Sylhet, Bangladesh

By Md. Asfaqur Rahman

*Pabna University of Science and Technology, Bangladesh*

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**GJMBR - A Classification :** *JEL Code: M00*



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## I. INTRODUCTION

Industry is manufacturing industry which includes all production, processing and assembling activities as well as repairing and reconditioning of processed goods, and also service industry which includes service oriented activities which involve significant use of equipment or fixed assets (Industrial Policy 1999). Within the industrial sector, gas is playing an increasingly important role in recent years. The gas industry in Bangladesh is much older than the nation itself as an exploration and utilization of natural gas started in the early sixties when this region was part of Pakistan. At present, the country produces 2000 MMCFD gas against a demand of 2500 MMCFD leaving a shortage of around 500 MMCFD. All the gas-dependent sectors in general and power and industrial sectors in particular, are the worst victims of the gas crises. While most of the country areas are experiencing severe gas crisis, Sylhet has to struggle with surplus gas due to a lack of proper

utilization plan. Petrobangla officials claimed the amount of surplus gas in Sylhet region might be 55 MMCFD, and experts believe the amount is even greater than estimated. Many industries like the garment and the fertilizer industries in Dhaka-Chittagong region had to shut down their operations on account of either low gas pressure or a grave shortage of gas. While such a grim situation is prevailing in most of the places, the situation is completely opposite in Sylhet. As many as 17 gas fields out of 25 of the country are located in Sylhet and more than 65% gas is being generated from the area. Another study says that the reserve of recoverable natural gas has been estimated at 12.4 trillion cubic feet. After years of commercial exploitation, a reserve of 9.8 trillion cubic feet is still available. The present demand supply imbalance may give momentary wrong signal but the country has enormous potential to not only overcome these tensions but also become a medium earning vibrant economy if it only can plan and implement its industrialization process with vision and commitments.

## II. OBJECTIVES OF THE STUDY

The core objective of this study is to make an overall analysis, whether Sylhet can meet the demand of the development through gas-based industrialization. The specific objectives are:

- To accelerate the pace of industrial development and to reduce the pressure from other regions where the scope of gas-based industrialization is limited.
- To maximize the use of available resources by taking immediate and effective steps and to introduce new sectors for industrialization in the Sylhet region.
- To find out the opportunities for setting up an EPZ in the Sylhet region to mobilize the growth of RMG sector and other sectors in the Sylhet region.

## III. METHODOLOGY

The present study is conducted to find out the potential sources that can accelerate the industrial development in the Sylhet region. Data were collected mainly on the basis of secondary information. But some primary data used in the study have been collected through personal interview. The secondary data used in the study have been collected mainly from the publications of Petrobangla, Jalalabad Gas

**Author:** Lecturer, Department of Business Administration, Pabna University of Science and Technology, Pabna, Bangladesh.  
e-mails: rupokmgtdu@yahoo.com, asfaq@pust.ac.bd

the study have been collected mainly from the publications of Petrobangla, Jalalabad Gas Transmission and Distribution System Limited (JGTDSL), Sylhet Chamber of Commerce and Industry (SCCI), Energy Bangla, Centre for Policy Dialogue (CPD), Asian Development Bank (ADB), etc. The other fundamental secondary sources which help to complete this research are newspaper and internet sources. Information, data, and case studies are studied and accumulated to provide a reasonable explanation. Both local and national Bengali and English daily newspapers are studied for seeking data and information related to the industrialization process in the Sylhet region. All other data and information on natural resources are also collected, compiled, and analyzed for this research through internet which includes research paper, reports, workshop outputs, and information published on the web sites.

#### IV. BACKGROUND OF THE STUDY

##### a) Industrialization

United Nations Industrial Development Committee states that industrialization is a process through which a growing part of National Income is invested in the manufacturing sector for the production of consumer goods, capital goods and for infrastructural development for the progress and welfare of a nation. 'Industry' is broadly defined to include both manufacturing and service industry. 'Manufacturing industry' includes all production, processing and assembling activities as well as repairing and reconditioning of processed goods. 'Service industry' includes those service oriented activities, which involve significant use of equipment and fixed assets. Thus industrialization deals with the development, improvement, implementation and valuation of integrated systems of people, money, knowledge, information, equipment, energy, materials and/or processes. Industrialization largely depends on the planning and analysis required by the organizations to enhance their position and strategy to create a positive internal condition in the changing market. The principles of industrialization are not only universally applicable across industries, but across all operations in government, commerce, services, or industry.

Industrialization has been recognized as an important factor country's economic growth for last two centuries. Before the Industrial Revolution, people worked with hand tools, manufacturing articles in their own homes or in small shops. In the third quarter of the 18th century steam power was applied to machinery, and people and machines were brought together under one roof in factories, where the manufacturing process could be supervised. In the next hundred years factories grew rapidly in size, in degree of mechanization, and in complexity of operation. The growth, however, was accompanied by much waste and inefficiency. The development of modern technological devices and automation brought us a second industrial revolution and causing changes in the traditional factory system. Bakshi (2005) mentioned in his study that the following backgrounds are highly needed for a poor country like Bangladesh: a) Socio-economic context of a country b) Level of economic development c) International relations with other countries d) Attitude of the commitment of the government in the power e) rate of literacy and level of technical know-how.

##### b) Industry in Bangladesh

Industry and the service sectors require many services like planning, coordination, banking, insurance, transportation and storage, utilities, telecommunication and other infra-structural services. National efficiency and the international competitiveness of a country depend not only on the availability of adequate infra-structural services, but also on an inter-linked 'services infrastructure' of producer services (Azad, 1999). Industry contributed 31.27 percent of GDP in FY2012 of which manufacturing contributed 19.01 percent. The manufacturing sector includes large, medium and small scale manufacturing firms; it generated employment for 12.38 percent of the labour force in 2010 and contributed about 95 percent of export earnings in FY2012. The growth rate of value added of large and medium manufacturing has been 8.31 percent while that of small scale manufacturing has been 6.96 percent during this period. The sector is projected to grow at a higher rate reaching 11.7 percent in FY2015 and accelerating to 14.0 percent in FY2021 when it will contribute 28 percent of GDP.

Projection of Sectoral Growth FY2012- FY2021:

Sector	FY2011	FY2012	FY2013	FY2014	FY2015	FY2021
Agriculture including fisheries	5.0	4.5	4.4	4.3	4.3	4.5
Industry	9.2	9.6	9.9	10.5	11.5	12.0
Of which Manufacturing	9.5	9.8	10.1	10.7	11.7	14.0
Services	6.6	6.8	7.1	7.3	7.8	8.0
GDP	6.7	7.0	7.2	7.6	8.0	10.0

Source: General Economic Division, Planning Commission, Perspective Plan of Bangladesh 2010-2021.

c) *Domestic Demand of Gas*

Considering the sustainable economic development, gas is given top priority in the national agenda. The issue of export of gas has been debated many times. We all are at a common consensus that export or no export, our own domestic need for gas has to be met first. This paper thereby attempts at assessing how much gas we need in the future and how much we have at present with a view to industrialization process in Sylhet.

d) *Resource Estimation*

- i) *Gas Fields:* Even though the exploration history of oil and gas goes back almost a century, exploration density has remained very low. So far only about 75 exploration wells have been drilled, which resulted in the discovery of 25 gas fields of sizes ranging from more than 4 TCF to 25 BCF GIIP.

- ii) *Gas Production:* So far in Bangladesh 25 gas fields have been discovered with the rate of success ratio is 3.1:1 of which two of the gas fields are located in offshore area. Gas is produced from 17 gas fields (79 gas wells). Average daily gas production capacity is about 2000 MMCFD of which International Oil Companies (IOC) produce 1040 MMCFD and State Owned Companies (SOC) produce 960 MMCFD. The demand is increasing day by day. According to the plan of Energy and Mineral Resources Division (EMRD), 995 MMCFD (including 500 MMCFD LNG), 500 MMCFD and 380 MMCFD gas will be added to the national gas grid within the year 2015. After completion of these plans production capacity is expected to increase to about 2353 MMCFD gas by December 2015.

GAS Production Capacity (As of December 2013)						
Unit: Gas in MMCFD, Condensate in BBLD						
Company	Field	Total Wells	No. of Producing Wells	Production Capacity	Production	
					Gas	Condensate
1.BGFCL	TITAS	21	20	503	501	410
	BAKHRABAD	9	6	43	40	14
	HABIGANJ	11	9	225	226	10.2
	NARSHINGDI	2	2	30	28	55.5
	MEGHNA	1	1	11	11	19.8
	Sub Total	44	38	812	806	509.5
2.SGFL	SYLHET	3	2	11	9	67.9
	KAILASHTILA	6	6	80	81	709.8
	RASHIDPUR	7	4	49	47	55.7
	BEANIBAZAR	2	2	14	10	150.5
	Sub Total	18	14	154	146	983.8
3.BAPEX	SALDANADI	3	1	20	15	3.0
	FENCHUGANJ	3	3	40	38	27.3
	SHAHBAZPUR	2	2	30	0	0.00
	SEMUTANG	5	1	12	6	2.0
	SUNDALPUR	1	1	10	6	0.0
	SRIKAIL	2	2	44	42	41.0
	BEGAMGANJ	1	0	20	0	0.0
	Sub Total	17	10	176	107	73.3
SUB TOTAL (1+2+3)		79	62	1142	1059	1566.6
SANTOS	SANGU	9	0	0	0	0.00
CHEVRON	JALALABAD	4	4	230	253	1789.1
	MOULAVIBAZAR	7	6	60	73	11.7
	BIBIYANA	14	14	770	834	3547.0
TULLOW	BANGURA	6	4	100	111	333.0
SUB TOTAL		40	28	1160	1270	5680.7
GRAND TOTAL		119	90	2302	2329	7247.3

Source: Production and Marketing Division, Petrobangla.

- iii) *Gas Reserve:* Despite numerous studies, debates persist on the size of the gas reserve. Some IOCs have made sheer exaggerations of the reserve to substantiate export proposals. According to a

seminar report of the Bangladesh Engineer's Institute, with the existing reserve of gas, Bangladesh can only meet two decades' of

demand. A summary on the opinion of reserves from various sources are appended below:

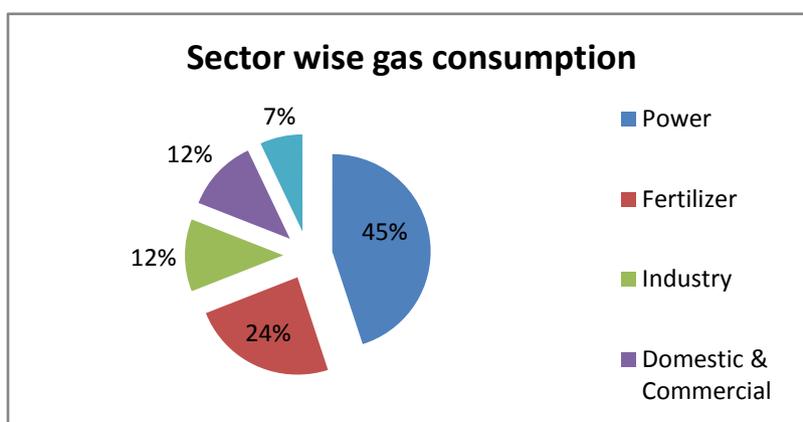
*Table 3:* Gas Reserve Estimation

Sl. No.	Quantity	Authority
1.	15.39 TCF	PETROBANGLA
2.	41.6 TCF	Norwegian petroleum directorate
3.	40 TCF	US Geographical Survey (USGS) 2010

iv *Sector-wise Gas Consumption:* Considering the average rate of consumption of gas in the country of the last 17 years and in line with Vision 2021, to implement the target of producing 11500 MW new electricity by 2015, a projection has been done according to the sector wise annual demand of gas from 2009 to 2015. The projection for the probable demand of gas up to 2015 is shown in the table below:

*Table 4:* Conservative Estimates of Sector-wise Allocation of Gas (In BCF)

Sector	2009-10	2010-11	2011-12	2012-13	2013-14	20014-15
Power	278.2	300.5	324.5	50.5	378.5	415.8
Captive Power	120.9	142.6	164.0	188.6	216.9	238.6
Fertilizer	94.0	94.0	94.0	94.0	94.0	94.0
Industry	133.9	160.7	184.8	214.4	246.5	271.1
Household	88.9	99.5	111.4	124.8	139.8	153.8
CNG	37.2	44.7	51.4	56.5	113.0	124.3
Others	30.0	30.8	31.9	32.7	33.7	37.4
<b>Total</b>	<b>783.1</b>	<b>872.8</b>	<b>962.0</b>	<b>1061.5</b>	<b>1222.4</b>	<b>1335.0</b>



*Figure 1:* Sector wise gas consumption

It is also evident from the figure that the majority of the gas usage is in the energy (45%) and fertilizer (24%). There is an increasing rate of consumption of gas over the last decades in all the sectors, because the dependency on gas as a cheap and reliable source of energy readily available within the country has increased.

v *Customer base Marketing Companies:* Petrobangla markets gas to various customers through its marketing companies. There are now six marketing companies operating in their

respective franchise areas. The companies are Titas Gas T&D Company Ltd. (TGT DCL), Bakhrabad Gas Distribution Company Ltd. (BGDCL), Jalalabad Gas T&D System Ltd. (JGTDSL) and Pashchimanchal Gas Co. Ltd. (PGCL), Karnafuli Gas Distribution Co. Ltd. (KGDCL) and Sundarban Gas Co. Ltd. (SGCL). The number of customers has been added up to July 2014 for these marketing companies are shown in the table below:

*Table 5:* Growth Trajectory of Customers

Year	TGT DCL	BGDCL	JGTDSL	PGCL	KGDCL	TOTAL
2010-11	1563290	190596	149725	59086	369703	2332400
2011-12	1563307	206213	162615	59171	369703	2361009
2012-13	1563331	206293	170826	59218	369703	2369371
2013-14	1722712	318435	192943	96492	472602	2803184
2014-15 (up to July 2014)	1741730	324808	194452	99723	480168	2840881

### e) Industrialization in Sylhet

Sylhet plays an important role in our national economy since it attracts a huge amount of remittances, keeping the nation's foreign exchange reserve healthy. In Sylhet, it is found that loans are mostly given to trade, agricultural purposes and other purposes like housing, consumer uses, etc. Whereas only 8.72% of the loan is given for the industrial development. Sylhet, as a prospective region for industrialization, had been neglected by the government and other local stakeholders. Only the tea industry has been developed in this division, mainly at the hands of multinational companies in the private sector. The Government of Bangladesh (GOB) has developed several Export Processing Zones (EPZ) in Chittagong, Savar (Dhaka), Mongla, Ishwardi, Comilla, Uttara, Karnaphuli (Chittagong) and Adamjee (Dhaka), but the division 'Sylhet' does not seem to have serious consideration.

Although natural gas, the country's most valuable natural resource, is available in this division, a nominal attempt has so far been made since independence to capitalize such resources in the industrialization of the Sylhet with minimum cost and effort. Here only two big public industries were established before independence of the country and only one multinational cement industry has gone under operation since 2006. Industrialization of Sylhet will

obviously increase Bangladesh's output, which will simultaneously increase the employment opportunities in the country. Job creation will enhance the living standards of the people of Sylhet and will help to reduce the rich-poor gap. Both the growth of GDP and the reduction of poverty are of great importance in the context of Bangladesh if it really wants to transform itself from a developing country into a developed one.

A small-scale investigation on the mismatch between local resources and regional development of Sylhet was conducted in 2005 (Ahsan et al., 2005). The study suggested improving five priority areas: awareness, education, facilities, administrative efficiency and planning for the utilization of local funds.

A number of studies have been considered about several alternatives to establish the best option for monetizing gas. A clear picture in respect of Sylhet is the investment size, marketing opportunities, and lack of risk taking mentality of the local investors. As Sylhet is only dealing with the power, fertilizer, tea estate, and the domestic utilization of gas, it is also promising with the industrial, commercial, pharmaceuticals, garments, cement, and ceramic industries. The new industrial policy 2010-2014, approved by the Cabinet in August 2010, also emphasizes on the importance of gas-based industrialization in Sylhet. Here is a list of some of the industries located in this region:

Name of Industry Sector in Sylhet	Number of Industries
Tea Processing	133
Food Processing	115
Textile & Garments	24
Cottage (Cane & Wood Furniture, Saw Mill, Board Mill)	71
Chemical & Medicine	17
Brick & Stone Industry	183
Engineering Sector	28
Others (Rubber, Cigarette Factory, Printing & Packaging, etc)	13
Total	584

Source: ERG Working Paper 2/2010

Natural gas exploration and production is dominated by three state-owned companies, all of which are subsidiaries of Petrobangla. Bangladesh's largest gas production company, Bangladesh Gas Fields Company Ltd. (BGFCL), operates the Sylhet, Kailashtila MSTE, Kailashtia, Rashidpur, and Beanibazar gas fields. From these five fields, BGFCL produces 810 million cubic feet per day (MMCF/D), or roughly half of the country's total natural gas production. The Sylhet Gas Field Company Ltd. (SGFCL) is Bangladesh's second largest production company, producing 162 MMCF/D of natural gas. SGFCL operates the Sylhet, Kailashtila MSTE, Kailashtia, Rashidpur, and Beanibazar gas fields. The third state-owned company involved in natural gas production and exploration is BAPEX, which produces about 58 MMCF/D of natural gas from the Salda and Fenchuganj fields.

## V. FINDINGS

### a) Factors Against Industrial Development in Sylhet

There are a number of factors that foster growth to one region compared to others. Infrastructure, access to energy and natural resources, concentration of entrepreneurship, skilled labor force, urbanizations, public resource allocations, geographical locations are among the factors which enables a region to develop more rapidly than others. There may be many factors adversely affecting the development of industries, the most intimidating factor found in this study is the lack of utilization of local funds in Sylhet. In most of the cases the remittances are mainly utilized for household consumption, purchasing land, purchasing flat and building luxury houses. The percentages of people who are interested to invest their remittance for trading and

enterprise development are only 5% (Hossain, et. al, 2011). The other factors that the local people argued for which industrial development is still lagging behind in Sylhet are as follows:

- Lack of entrepreneurship development
- Lack of cooperation from bank or other financial institutions
- High cost of land
- High interest rate for loan/ advances
- Lack of social, administrative and legal security of investment
- Lack of technological knowledge about industrialization

- Lack of creativity and awareness among capable investors
- Idleness among the local people
- Lack of skilled manpower
- Lengthy bureaucratic procedure for enterprise development
- Lack of adopting regional policy of GOB

A framework has been developed by the authors analyzing the above mentioned factors responsible for neglecting industrialization in Sylhet and suggesting probable solutions regarding utilizing the opportunities for accelerating the industrial development using gas and other resources.

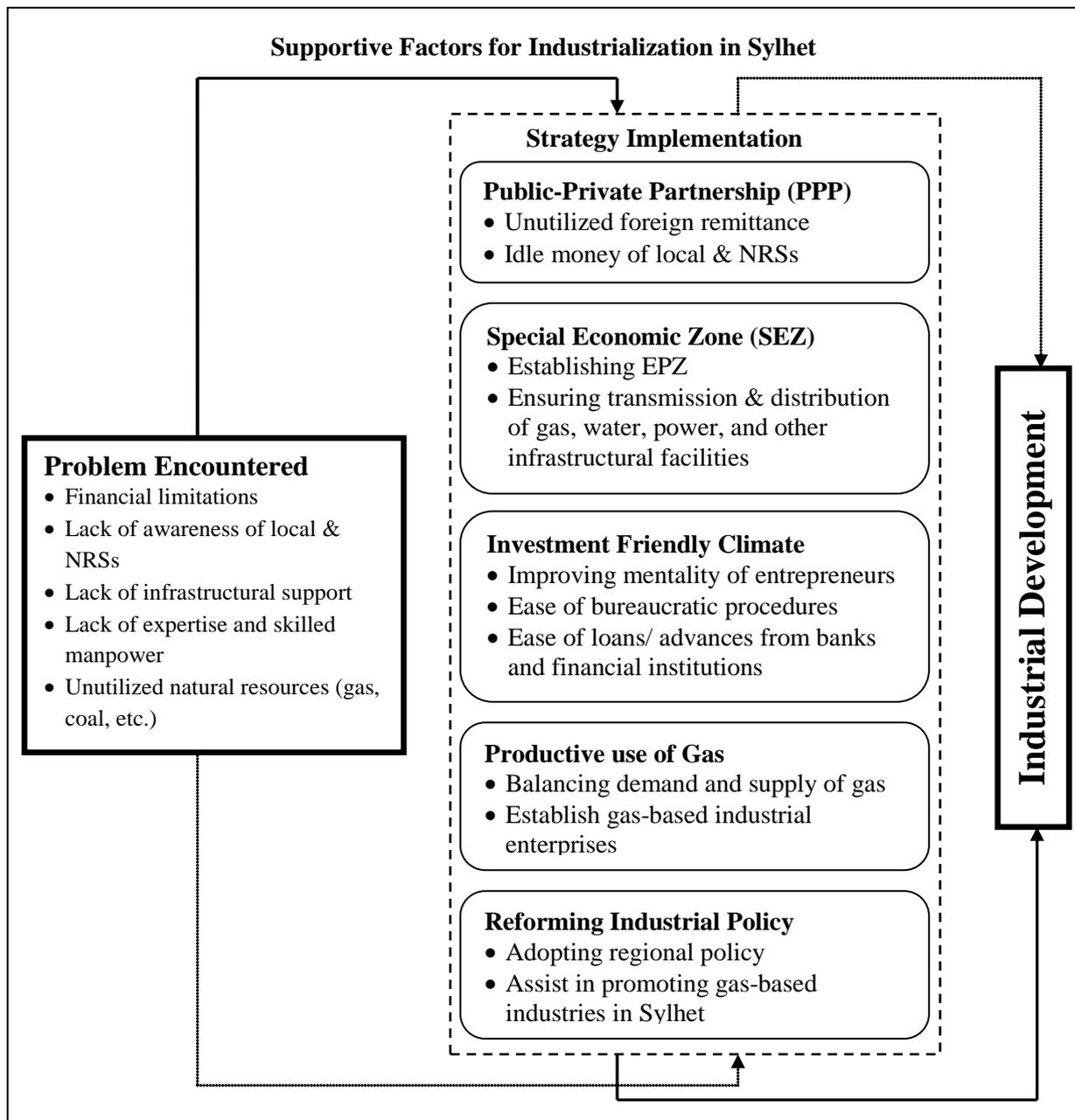


Figure 2: Supportive factors for industrialization in the Sylhet region

b) *Brief description of the significant sectors for gas-based industrialization in Sylhet Division*

i. *Power Sector*

An essential precondition for industrial development is uninterrupted supply of electricity. More than 90% of electricity is generated from natural gas. The power sector is the single largest consumer of gas, accounting for 48% of total gas sales. Under the development of power sector only 11 gas-based power plants have been established in different areas of Sylhet. With the surplus of 16.645 MMCM gas after sales for power generation will smoothen the industrialization process in Sylhet.

ii. *Fertilizer Sector*

The annual requirement of fertilizer is around 30 lakh tonnes against the production of 16-18 lakh tonnes. Bangladesh has to import the rest from different countries to meet the demand. Therefore, to reduce the demand-supply gap Bangladesh Chemical Industries Corporation plans to install a fertilizer plant in the country by 2016 namely Shahjalal Fertilizer Company Ltd in Fenchuganj with the production capacity of 1750 metric ton of urea fertilizer which is also required

Year	2001-2010	2011-2020	2021-2030	2031-2040	2041-2050	Total
<i>Industrial Gas Consumption (Bcf)</i>	822	1684	2861	3788	4368	13522

*Figure : Gas consumption in Industrial Sector*

iv. *Captive Power Sector*

One of the reasons for the growth of this sector is the installation of gas engine driven generators as captive power supply by RMGs, Textile, Ceramics, Pharmaceuticals and other manufacturing plants. Different gas transmission and distribution companies in Sylhet can also do the same. In this process up to January 2012, JGTDSL gave 90 gas connections to encourage the investors to install different gas driven captive power based manufacturing plants.

v. *CNG*

The activities of CNG filling stations in Sylhet division started under JGTDSL at first started in 2004. Under the development activities of JGTDSL, it expanded a total 43 connection to CNG refueling stations in Sylhet division up to January 2011. Many entrepreneurs are now interested to install CNG stations beside the Dhaka-Sylhet by-pass road and at the various important locations under the franchise area of the company. Beside JGTDSL other gas transmission and distribution companies in Sylhet should undertake plan to set up more CNG filling stations all over the Sylhet division as JGTDSL earns on an average tk. 75 crore yearly by selling 75MMCM gas to different CNG filling stations.

approximately 30 MMCFD of gas. To meet this demand JGTDSL rehabilitated 25 km of existing transmission pipeline from Haripur to the Shahjalal Fertilizer Company Ltd in Fenchuganj.

iii. *Industrial Sector*

Although there is tremendous shortage of power and gas supply in Dhaka-Chittagong region, the investors has the tendency to establish industries to utilize more resources such as skilled manpower, international business opportunities, EPZ, etc which may not be available in Sylhet region. But Sylhet division is enriched with electricity, gas, water, sewerage, transportation facilities etc. The availability of raw materials, low cost labor, and interest of local and foreign investors specially the nonresident Sylheties are the main foundation for industrialization in Sylhet. Different gas-based industries such as textiles, leather goods, chemicals and petrochemicals, green jute pulp, paper, rayon products, etc can be facilitated by the different gas transmission and distribution companies in Sylhet region to step-ahead the industrialization process.

vi. *Tea Industry*

At present there are 163 tea estates and 114 tea factories in Bangladesh. Since 139 tea estates out of 163 in Bangladesh belong to the Sylhet division, it is undoubtedly revealed that the tea industry is a productive sector in the region. These tea estates in Sylhet annually produce about 55 million kg of tea. Gas is desperately important to the tea industry as in the majority of cases; the factories are powered by gas-generating sets. Study states that up to January 2011, JGTDSL provided 91 gas connections to different tea estates.

vii. *Garments Industry*

Over 50% to 60% garment units in Dhaka-Chittagong use generators run by diesel as a back-up support for ensuring uninterrupted electricity supply to their factories. Industry owners are spending additional Tk 10.97 billion for buying gas and diesel per year for generating 1,200MW of electricity for their factories. Thus readymade garments owners have been facing 25% production loss due to frequent power cut and shortage in gas supply. In this case Sylhet is the most significant zone to enhance this sector by utilizing the scarce electricity and surplus gas meeting the demand of its own. The government of Bangladesh is willing to

expend public funds for establishing new EPZ in Sylhet for promoting this sector. Different gas transmission and distribution companies in Sylhet should make an agreement to boost this sector by providing gas to the existing textile industries as well as the new industries to be established in the Sylhet region. This step would help the government to release the pressure of decentralizing the garment industries from Dhaka-Chittagong to Sylhet.

#### viii. *Ceramics Industry*

Ceramics is a fast growing and highly prospective industry for its rising export performance. This industry is getting export orders from new countries, like Turkey, India, Argentina and Brazil. But the companies operating in Bangladesh are not enough to meet the demand. Because the leading manufacturers of this item are not taking any plan to expand their capacity or establishing new factories, as they cannot utilize their full capacity due to the gas and power crisis. In this case Sylhet could be the best region for establishing this gas based industry where raw materials, cheap labor and other infrastructural facilities are available. To meet the demand of gas supply, different gas transmission and distribution companies in Sylhet can transmit and distribute gas to the factories to be established in Sylhet region as it needed.

#### ix. *Cement Industry*

As the supply of gas, fuel, power, infrastructure and transportation facilities are available to the cement factories in Sylhet region, the government and the industrialists should focus on the availability of the raw materials and make the factories operable.

#### x. *Domestic/Commercial and Other Sectors*

The use of gas in domestic sector is very low, i.e. at present only 6% but it is increasing at a rate of 12%. The commercial sector accounts for less than 1.5% of the total gas consumption and this has not shown significant growth during the current decade. The seasonal users, mainly the brickfields, consume a small quantity of gas during the brick-manufacturing season. This could be a minor sector for the near future. But the major sectors for gas based industrialization are the paper, pulp, pharmaceuticals, aluminum, methanol, petrochemicals, LNG, GTL etc. The production of methanol and petrochemicals results in new product based on gas as a raw material and fuel. The production of aluminum requires the import of the basic ore and gas is used as an energy source for electricity.

Year	2001-2010	2011-2020	2021-2030	2031-2040	2041-2050	Total
<i>Domestic/ Commercial/ Others Gas Consumption (Bcf)</i>	537	794	1051	1212	1339	4933

Figure : Gas Consumption in Domestic/ Commercial/ Others

## VI. RECOMMENDATIONS

As the purpose of the study was to recommend the opportunities for the proposed gas-based industrialization in Sylhet region but some suggestions are still needed for the betterment of the industrialization process which are briefly stated below:

- The government should announce a special incentive package for the entrepreneurs to set up industries in Sylhet region with available gas.
- The SCCI can formulate flexible industrialization policy for the new investors who want to establish gas based industries in different regions of Sylhet.
- Establishing an EPZ in Sylhet for accelerating the trade over the world and river port over Kushiyara river on the side of SEZ could also be a path for the transportation which could link with Dhaka-Chittagong and India also.
- Removing the bureaucratic bottlenecks that have always been the biggest obstacles that no industrial belt was so far built in the Sylhet region to utilize gas.
- For smooth transmission and distribution of gas in different sectors JGTDSL should concentrate on finding more gas fields.

- As the seven sister states of India are very near from Sylhet, the entrepreneurs or the investors should have an easy access to the seven sisters to export their products.
- Providing supports like investment security, one-stop services, easy access to physical infrastructure, etc. to the non-resident Sylheties to encourage investment.
- In general, the workforce in Sylhet is not experienced enough for the promotion of industrialization, so proper education, training facilities, etc. are needed to develop for fulfilling the purpose.

## VII. CONCLUSION

From the above findings and analysis of this study, we can come to a decision that the industrialization process through gas may create a major impact on the economy of Sylhet region and the country as whole. Industrialization process is not an easy task and thus needs lots of research to implement the activities through proper industrial planning and intervention. The key problem found in this study is the narrow mentality of the local and foreign investors to invest in different sectors although maintenance of

available funds and abundant resources are somewhat challengeable and become unutilized. Now it is the real time for the investors to utilize the opportunities available here to improve the new and neglected sectors to be established based on gas. As Special Economic Zone and JGTDSL were emphasized in this study to carry out the gas-based industrialization process, both of them suggested to take necessary steps to revitalize the power, garment, cement, ceramics and commercial zones because these sectors can utilize the maximum facilities provided by them.

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## ABBREVIATIONS

BGSL	Bangladesh Gas Systems Limited
CMS	Cubic Meters per Second
CNG	Compressed Natural Gas
EPZ	Export Processing Zone
FY	Fiscal Year
GSP	Generalized System of Preferences
GTL	Gas to Liquids
JGTDSL	Jalalabad Gas Transmission and Distribution System Limited
LNG	Liquefied Natural Gas
MMCFD	Million Cubic Feet a Day
MMCM	Million Cubic Meters
MW	Mega Watt
NRS	Non Resident Sylhet
PDB	Power Development Board
PPP	Public Private Partnership
R&D	Research and Development
RMG	Ready Made Garments
RPGCL	Rupantarita Prakritik Gas Company Limited
SCCI	Sylhet Chamber of Commerce and Industry
SEZ	Special Economic Zone

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