STUDY ON IMPLICATIONS OF THE INADEQUATE ELECTRICITY AND GAS SUPPLY IN THE RMG INDUSTRY IN CHITTAGONG EPZ

By
Maumita Chowdhury
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The thesis titled **Study on Implications of the Inadequate Electricity and Gas Supply in the RMG Industry in Chittagong EPZ** submitted by **Maumita Chowdhury**, Student No. 1009082108F, Session- October 2009, has been accepted as satisfactory in partial fulfillment of the requirement for the degree of Master in Advanced Engineering Management on July 15, 2014.

BOARD OF EXAMINERS

1. Dr. Nikhil Ranjan Dhar — Chairman
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   BUET, Dhaka

2. Dr. A. K. M. Masud — Member
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   Department of Industrial & Production Engineering
   BUET, Dhaka.

3. Dr. Md. Shamim Akhter — Member
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   Department of ME
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   Rajshahi

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It is hereby declared that this thesis or any part of it has not been submitted elsewhere for the award of any degree or diploma.

Maumita Chowdhury

This work is dedicated
to my loving

Father

&
Mother

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ABSTRACT

The readymade garments (RMG) industry occupies a unique position in the Bangladesh economy. It is the largest exporting industry in Bangladesh, which experienced phenomenal growth during the last 20 years. By taking advantage of an insulated market under the provision of Multi Fiber Agreement (MFA) of GATT, it attained a high profile in terms of foreign exchange earnings, exports, industrialization and contribution to GDP within a short span of time. The industry plays a key role in employment generation and in the provision of income to the poor. Nearly two million workers are directly and more than ten million inhabitants are indirectly associated with the industry. Over the past twenty years, the number of manufacturing units has grown from 180 to over 4000. The sector has also played a significant role in the socio-economic development of the country. Garments industry is the largest export industry for our country and it contributes75% of total export. The industry is associated with its strength, weakness, threat and opportunity. In 2005-06 the industry faced a great instability due to the protest of the worker. After that under the state of emergency the sector enjoyed a stable growth and finally reaches at the matured stage. During recent period, the RMG sector has been facing with huge trouble particularly loss of production and cost of production is increasing extensively with insufficient supply of gas and electricity. Many of the garments factories are considerably relying on alternative power source as generators. But these steps are only creating losses and increasing cost. In this study an attempt has been made to estimate of loss and increase in cost due to inadequate electricity and gas supply in RMG. Questionnaire has been circulated among the selected RMG industries and relevant data were collected to identify the impact of shortage of power supply under different circumstances which supplements the survey evidence to attain the objectives of the study.

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Introduction

1.1 History and Growth of RMG Industries

In the 1950s, labors in the Western World became highly organized; forming trade unions. This and other changes provided workers greater rights including higher pay; which resulted in higher cost of production. Retailers started searching for places where the cost of production was cheaper. Developing economies like Hong Kong, Taiwan and South Korea presented themselves as good destinations for relocations because they had open economic policies and had non-unionized and highly disciplined labor force that could produce high quality products at much cheaper costs [1].

In order to control the level of imported RMG products from developing countries into developed countries, Multi Fiber Agreement (MFA) was made in 1974. The MFA agreement imposed an export rate 6 percent increase every year from a developing country to a developed country. It also allowed developed countries to impose quotas on countries that exported at a higher rate than the bilateral agreements. In the face of such restrictions, producers started searching for countries that were outside the umbrella of quotas and had cheap labor [2]. This is when Bangladesh started receiving investment in the RMG sector. In the early 1980s, some Bangladeshis received free training from Korean Daewoo Company. After these workers came back to Bangladesh, many of them broke ties with the factory they were working for and started their own factories.

1.2 An Overview of Bangladesh Garments Industry

The RMG industry is the only multi-billion-dollar manufacturing and export industry in Bangladesh. Whereas the industry contributed only 0.001 per cent to the country's total export earnings in 1976, its share increased to about 75 per cent of those

earnings in 2005 [3,4]. Bangladesh exported garments worth the equivalent of $6.9 billion in 2005,which was about 2.5 per cent of the global total value ($276 billion) of garment exports. The country's RMG industry grew by more than 15 per cent per annum on average during the last 15 years. The foreign exchange earnings and employment generation of the RMG sector have been increasing at double-digit rates from year to year. Some important issues related to the RMG industry of Bangladesh are shown in Table1.1

Table 1.1 Important issues related to the Bangladesh ready-made garment industry

Year	**Issue**
1977-1980	Early Period of Growth
1982-1985	Boom Days
1985	Imposition of quota restriction1
990	Knitwear sector developed significantly
1993	Child labor issue and its solution
2003	Withdrawal of Canadian quota restriction
2005	Phase out of quota restriction
2006	Riots and strike by garments labor
2007-2008	Stable growth

Currently, there are more than 4,000 RMG firms in Bangladesh. More than 95 per cent of those firms are locally owned with the exception of a few foreign firms located in export processing zones. The RMG firms are located mainly in three main cities: the capital city Dhaka, the port city Chittagong and the industrial city Narayangonj. Bangladesh RMG firms vary in size. Based on Bangladesh Garment Manufacturers and Exporters Association (BGMEA) data, found that in 1997 more than 75 per cent of the firms employed a maximum of 400 employees each. Garment companies in Bangladesh form formal or informal groups. The grouping helps to share manufacturing activities, to diversify risks; horizontal as well as vertical coordination can be easily found in such group activities. Ready-made garments manufactured in Bangladesh are divided mainly into two broad categories: woven and knit products. Shirts, T-shirts and trousers are the main woven products and undergarments, socks, stockings, T-shirts, sweaters and other casual and soft garments are the main knit products. Woven garment products still dominate the garment export earnings of the country. The share of knit garment products has been increasing since the early 1990s; such products currently account for more than 40 per cent of the country's total RMG export earnings [5,6]. Although various types of

garments are manufactured in the country, only a few categories, such as shirts, T-shirts, trousers, jackets and sweaters, constitute the major production-share [7]. Economies of scale for large-scale production and export-quota holdings in the corresponding categories are the principal reasons for such a narrow product concentration. Foreign buyers are concerned about the different compliance of law. So, they were bothered about the child labor issue of Bangladesh. But later on this problem is salut and now garments are restricted to employ child labor. In 2005 the quota facilities for Bangladesh was withdrawn. Everybody thought it would be a great shock for garments industry. But in reality Bangladesh has faced this challenge with great courage. The fact is that the export of garments product has increased after the withdrawn of this quota. And the last two years were really good time for garment industry. The political situati**o**n was stable under the country's state of emergency and this boost the growth of the industry [8].

1.3 Growth of RMG in Bangladesh

The 100 percent export-oriented readymade garments (RMG) industry of Bangladesh has witnessed remarkable growth since its inception in the late 1970s. Paradoxically, this flagship industry of Bangladeshi private entrepreneurial talent took roots through the first export consignment of shirts from Bangladesh made by the state-trading agency, the Trading Corporation of Bangladesh (TCB), in the mid-1970s under countertrade arrangements and the destination was some East European countries. Subsequently, however, private entrepreneurs entered the industry and phenomenal growth took place in RMG exports from Bangladesh. Export of RMG increased from US $40000 in 1978-79 to US $6.4 billion in 2004-05. The industry has also provided employment to nearly 2 million workers, most of them women drawn from the rural areas [9].

Explosive growth of RMG exports is of course not unique to Bangladesh. The annual compound growth rate of RMG export industries in Indonesia (31.2%), Mauritius (23.8%), and Dominican Republic (21.1%) compares favorably with that of Bangladesh (81.3%) over the 1980-87 periods. However, while initial conditions were favorable for export growth in the countries noted above, this was far from true in the case of Bangladesh. This makes research into the factors responsible for the observed striking

growth of RMG exports from Bangladesh a compelling case study in economic development [11].

Academics and researches have generally attributed the remarkable growth of RMG exports from Bangladesh to favorable external conditions, notably the Multi-Fiber Arrangement (MFA) bilateral quota system imposed by developed apparel countries, and low wages in Bangladesh [3]. The role played by supportive government policy has also been noted in these studies. However, the role played by the RMG entrepreneurs in the dynamic growth of this industry has been largely overlooked [11]. Thus, Khan and Hossain (1989) refuse to accept that the Bangladesh entrepreneurs had made any contribution to the rapid growth of RMG exports from Bangladesh. This apparent disbelief in the dynamics and creativity of Bangladeshi RMG entrepreneurs seems to have sprung from the more general notion, widely held by many scholars during the 1970s and 1980s, that Bangladesh lacks entrepreneurial resources .

While inappropriate government policy can spell disaster for an industry, by the same logic, sound economic policy of the government can stimulate industrial growth. Hence, a second objective of this paper is to analyze the role of supportive government policies in promoting the growth of the RMG industry in Bangladesh. In addition to policies which are supportive, deliberately weak or minimum government regulation of an industry in the form of non-implementation or weak implementation of existing government laws and regulations may spur growth of that particular industry, even through it would clearly reduce social welfare and hence can be construed as misgovernance [12]. There is an unanimity of opinion among scholars that the changing structure of the global apparel industry has been uniquely fashioned by the MFA Quota system used by developed importing countries which restricted export supplies of garments to these markets from established supplying countries and thereby paved the way for the emergence of new garments exporting countries. This migration of the export-oriented garment industry from established suppliers to new suppliers was, as one would expect, directed by the existence of low wages in the new exporting countries. An important feature of the quota-restrained apparel market, which economic theory teaches us to expect, has been the emergence of quota premium or quota rent where the quota is binding. This quota rent clearly is an addition to normal profit that would occur in an unrestrained

market. This paper investigates the importance of the MFA Quota system as a contribuory factor to the rise of the RMG industry in Bangladesh. More importantly, an attempt is made to assess the extent to which quota rents enabled the RMG enterprises to absorb the higher cost of doing business resulting from misgovernance, a luxury which was not available to other industries.

Since May 2006, the RMG industry of Bangladesh has been beset with very serious labor unrest problems which has resulted in large-scale damaging of garment factories by the workers and has at times appeared to threaten the very existence of this industry [13, 14].

The major bone of contention between the RMG factory owners and the workers has been the allegedly low level of wages paid in this industry, particularly wages paid to unskilled workers, together with other issues like late payment of wages, lack of security of workers resulting from absence of a formal contract between the worker and the employer, nonpayment of maternity and other benefits to female workers, etc. These issues, which form part of what is commonly known as 'compliance with social standards', have also posed problems for Bangladesh's RMG industry on the external front for the past few years during which time foreign buyers of Bangladesh's garments have insisted on strict social compliance on the part of RMG enterprises in Bangladesh as a pre-condition for their importation from this country [16].

The fourth and final objective of this paper is to determine whether weak or lack of social compliance of Bangladesh's RMG industry at present, to the extent that it is true, can be traced back to the government's lenient and perhaps 'indulgent' attitude towards the country's overwhelmingly important foreign exchange earning industry during its formative years, in the form of lack of monitoring and regulation and strict enforcement of the country's laws pertaining to social standards. If found to be true, this can be construed as misgovernance because the government, perhaps unwittingly, would in this case have encouraged the RMG industry to move along a path of long-run unsustainable growth, the lack of sustainability originating from a disgruntled workforce and dissatisfied importers, not to speak of exploitation of labor, particularly women workers who dominate this

industry. The garment sector is one of the most important components of Bangladesh's economy [18].

- Garment exports were an estimated $5.8 billion USD out of total merchandise exports $7.8 billion USD in 2004, making them the nation's largest source of exports.
- Garment sector exports accounted for 9.5% of GDP in FY 2003/4.
- The garment sector is an important source of employment generation and currently provides employment for over 2 million people or approximately 3% of the labor force.
- As 90% of the workforce in the garment manufacturing sector is female, the garment sector is particularly important for women's employment.
- The garment sector is a key provider of employment and income to the urban poor.
- The sector is concentrated in Dhaka and Chittagong, where approximately 90% of the factories are located.

1.4 Contribution of the RMG Sector to the Bangladesh Economy

Ready Made Garments (RMG) is the largest export sector of Bangladesh and thus one of the major drivers of country's economy. It has seen tremendous growth over the last three decades and dominated the industrial sector of the country since the early 1980s as shown in Fig.1.1. In the FY 2009-10 RMG export was 13% of the GDP and total export was 17% of the GDP while in 1991-92 RMG export was 4% of GDP and total export was 6% of GDP. It has by now become a colossal industry, earning the lion's share of the country's foreign exchange and providing the largest formal employment to the women of the country [19]. At present Bangladesh exports RMG to around 90 countries in the world with EU, USA and Canada being the major importer which is shown in Fig.1.2.

Garments Industry occupies a unique position in the Bangladesh economy. It is the largest exporting industry in Bangladesh, which experienced phenomenal growth

during last two decades. The industry plays a key role in employment generation and in the provision of income to the poor. Nearly two million workers one directly and more than ten million inhabitants are indirectly associated with the industry. The sector has also played a significant role in the socio-economic development of the country. In such a context, the trend and growth of garments export and its contribution to total exports and GDP has been examined and Table 1.2 shows the position.

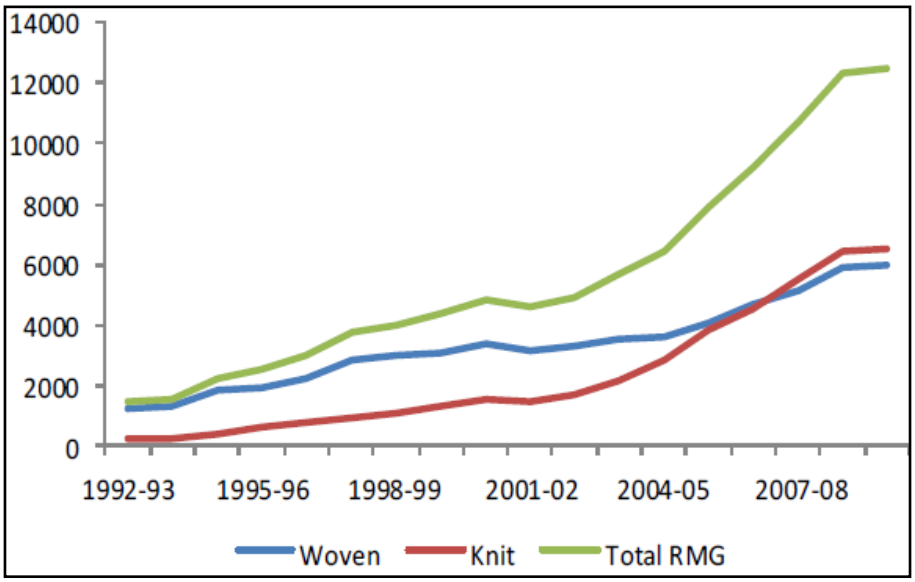

Fig.1.1 Export figures in Million USD [18]

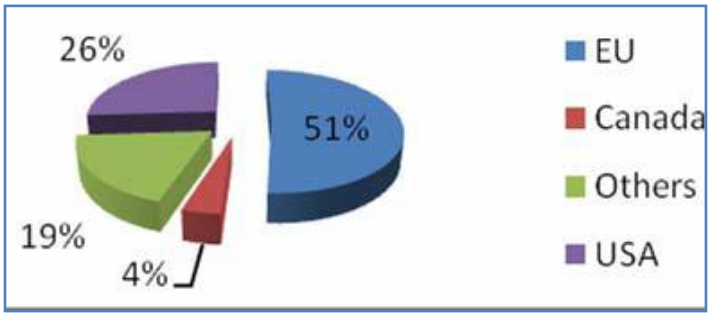

Fig.1.2 Major export destination [18]

Table 1.2: Growth and trend of garments exports, and contribution to GDP [20]

(Amounts in Million USD)

Year	Garment Export (Min USD)	Total Export (Min USD)	Share to Total Export in %	Share to GDP in %
1984-85	116 -	934 -	12.42 -	-
1989-90	624 (40)	1924 (16)	32.43 (21)	-
1994-95	2228 (29)	3473 (13)	64.15 (15)	5.87 -
1999-00	4349 (14)	5752 (11)	75.61 (3)	9.23 (9)
2004-05	6418 (8)	8655 (9)	74.15 (-1)	10.63 (3)
2005-06	7901 (23)	10526 (22)	75.06 (1)	12.64 (2)

Source: Economic Review of Bangladesh, BGMEA

Table 1.3: RMG Exports And It's Share in Total Export of Bangladesh [16]			
Year	Export of RMG (In Million Us$)	Total Export of Bangladesh (In Million Us$)	% of RMG's to Total Export
1983-84	31.57	811.00	3.89
1984-85	116.2	934.43	12.44
1985-86	131.48	819.21	16.05
1986-87	298.67	1076.61	27.74
1987-88	433.92	1231.2	35.24
1988-89	471.09	1291.56	36.47
1989-90	624.16	1923.70	32.45
1990-91	866.82	1717.55	50.47
1991-92	1182.57	1993.90	59.31
1992-93	1445.02	2382.89	60.64
1993-94	1555.79	2533.90	61.40
1994-95	2228.35	3472.56	64.17
1995-96	2547.13	3882.42	65.61
1996-97	3001.25	4418.28	67.93
1997-98	3781.94	5161.20	73.28
1998-99	4019.98	5312.86	75.67
1999-00	4349.41	5752.20	75.61
2000-01	4859.83	6467.30	75.14
2001-02	4583.75	5986.09	76.57
2002-03	4912.09	6548.44	75.01
2003-04	5686.09	7602.99	74.79
2004-05	6417.67	8654.52	74.15
2005-06	7900.80	10526.16	75.06
2006-07	9211.23	12177.86	75.64
2007-08	10699.80	14110.80	75.83
2008-09	12347.77	15565.19	79.33
2009-10	12496.72	16204.65	77.12
2010-11 (July-Sep)	3971.52	5029.05	78.97

It is revealed from the Table 1.3 that the value of garment exports, share of garments export to total exports and contribution to GDP have been increased significantly during the period from 1984-85 to 2005-06. The total garments export in 2005-06 is more than 68 times compared to garments exports in 1984-85 whereas total country's export for the same period has increased by 11 times. In terms of GDP, contribution of garments export is significant; it reaches 12.64 percent of GDP in 2005-06 which was only 5.87 percent in 1989-90. It is a clear indication of the contribution to the overall economy. It also plays a pivotal role to promote the development of linkage small scale industries. For

instance, manufacturing of intermediate product such as dyeing, printing, zippers, labels has began to take a foothold on limited scale and is expected to grow significantly. Moreover it has helped the business of basling, insurance, shipping, hotel, tourism and transportation. The sector also has created jobs for about two million people of which 70 percent are women who mostly come from rural areas. The sector opened up employment opportunities for many more individuals through direct and indirect economic activities, which eventually helps the country's social development, woman empowerment and poverty alleviation. In such a way the economy of Bangladesh is getting favorably contribution from this industry.

1.5 Factors Promoting Growth in Bangladesh RMG

Factors which promoted growth of RMG sector in Bangladesh can be categorized into two groups (i) domestic and (ii) external.

Domestic Factors

- **Cheap labor:** RMG is a labor-intensive sector. Bangladesh is an over-populated country burdened with unemployment problem. The private entrepreneurs in the late 1970s and early 1980s got an opportunity to use cheap labor to flourish this sector over-night. At present, about 3.5 million people are working in this sector. About 80% of them are women. They got a chance to change their fate by working in the garment factories which helped boom the sector.
- **Low production cost:** As labor cost is very low, RMG factories in Bangladesh can produce quality garment at lower cost which has attracted the foreign buyers. International companies like Wal-Mart, JC Penney, H&M, Zara, Tesco, Carrefour, Gap, Metro, Marks & Spencer, Kohl's, Levi Strauss and Tommy Hilfiger all import in bulk from Bangladesh. The total export from the sector has doubled from $6.4 billion in FY 04-05 to $12.5 billion in FY09- 10. The comparative advantage of low production cost also attracted foreign direct investment. As a result, both backward and forward linkage industry flourished in Bangladesh. Currently, the backward industry is able to meet up to 85% of the demand for the raw materials, which significantly contributed to the country's growth of apparel and knitwear exports.

- **Local Demand:** Clothing is a basic need. Bangladesh is one of the most densely populated countries in the world. Every year Bangladesh needs a huge quantity of garment for its local need. Culturally people of Bangladesh like to wear new clothson the eve of various festivals like Eid, Puja, Pohela Baishak etc. Beforeemergence of RMG industry, people of Bangladesh had to depend on the tailors for their domestic need of clothing. Though tailoring still exists, ready-made garment business is very prolific in Bangladesh.
- **Government Support:** The apparel industry received support from the government, which included measures like duty drawback facilities, tax holidays, cash assistance, income tax rebate, creation of export processing zones, zero tariff on machinery inputs, rebate on freight and power rate, bonded warehouse facilities, provision of import under back-to-back letters of credit, loans at confessional rate, export development fund, etc.
- **Back to Back Letter of Credit:** Back to Back Letter of Credit is one of the important factors in the initial and continuing success of this sector. It considerably eases the financing requirement of garment business for the local entrepreneurs. The entrepreneurs are able complete the complicated process of manufacturing and export with very little of their own funds for working capital. Even if the turnover isTk. 50 million and the profit is only 5% the returns are still decent since the funds are borrowed largely from the banks. Therefore the rate of return does not need to be high. In the absence of back to back L/C, it would have been very difficult for the new entrepreneurs to raise funds from local financial institutions to import fabrics and accessories.
- **Private entrepreneurship**: The export- oriented RMG sector started its journey entirely with private initiatives. The journey was not smooth. The entrepreneurs faced tremendous constraints in terms of power and gas supply. Political instability, frequent hartals (strikes), poor port facility, and labor unrest created longer lead time, which became another barrier in competing with neighboring nations. Amidst all the constraints, the RMG entrepreneurs lived up to the buyers' expectations of reduced price margin, improved compliance standards, and quality assurance. There were also significant investments in backward integration.

External Factors

- **Quota facility:** The key factor behind the growth was the quota system under the Multi-Fiber Arrangement (MFA). The General System of Preferences (GSP) facilities and Rules of Origin offered by the developed nations also helped Bangladesh to accelerate its export. In 25 short, MFA provided market protection for Bangladesh, whereas GSP facilities offered preferential treatment and market access opportunities in developed economies.
- **Supply Side Factors:** On the supply side, several factors can be mentioned that have contributed to the growth of Bangladesh as an apparel exporter. First as the wages of the East Asian Countries rose and quota restrictions limited shipments from these countries to particularly the US markets, apparel firms from those countries established production operations in other countries with cheaper labor and with few or no quota restrictions. In the second half of 1970s, business houses from the Republic of Korea, Daewoo in particular, ventured into Bangladesh to transfer the technology of production and to provide marketing channels. The number of garment exports business from this arrangement remained small but awareness as regard the prospects developed within the garment industry. In 1978,fewer than a dozen companies were in operation. The number grew to 80 just in three years. Since then, the growth of the industry has been fabulous. The Korean investment provided the garment industry the decisive advantage without which a much longer time would have been taken by the Bangladesh garment industry to attain its present status.

1.6 Obstructions in the Growth of RMG Sector

Market Diversification: There are several weaknesses the RMG industry of Bangladesh suffers from. This industry is highly vulnerable because it is almost completely dependent on the mercy of two large markets, namely, EU (48%) and US (46%) markets. More than 94% of its apparels are shipped to these two markets. As a separate market Canada is also a cherished destination for Bangladesh apparels. However, volume is very small, around 3% of the total apparel export. The rest 3% are exported to more than 40 small markets. If for some reason, the consumers in these two markets

cannot or do not buy Bangladesh garments large enough quantity, the industry which is the largest employer is likely to collapse, and in turn Bangladesh economy will be in jeopardy. The industry leaders individually and also through BGMEA collectively with the support of EPB and Government are trying to diversify markets. There are many potential markets, the larger are India, China and Japan. Beside ASEAN countries, European countries other than the members of EU, SAARC countries, Russia, Australia and Latin America have good potential [21].

Recently, under a bi-lateral agreement India has allowed Bangladesh to export to India 46 specific items duty-free. Many people believe that this is a modest beginning of getting free access to the very large market. Several years ago Bangladesh was granted limited duty-free access for a few selected items to Japanese market. The business leaders believe that Japanese market offers higher prospect than India or China although initial hope was dashed by the negative impact of Tsunami. But after recovery from Tsunami disaster, apparel export to Japan has increased and this increase is likely to continue. Bangladesh has already exported to China. China imports from Bangladesh because its labor cost has gone up. It is cheaper for China to source cheaper apparel from Bangladesh where cost is lower. But because of language and other barriers export is growing very slowly. Anyhow, Bangladesh cannot afford not to diversify its market, but it must look for new markets without looking for replacement of US and EU markets.

Product Diversification: Another weakness of this industry is the lack of product diversification. Bangladesh has specialized in exporting mostly inexpensive apparels. Its export basket should contain diversified products. It needs to try to export products for high end markets in addition to products for low end markets. It is reported that industry leaders have taken some steps to penetrate into high end markets of US, EU and several other markets It is to be noted that the innovative, enthusiastic and farsighted entrepreneurs of Bangladesh have started increasing their investment in pharmaceuticals, leather products, light engineering, power generating equipment, small ocean going shipbuilding, and similar non-traditional exports. So export basket is getting bigger with overall product diversification.

RMG and Backward Linkages: The phenomenal growth in the readymade garment (RMG) sector in the last decade created many new factories and employment opportunities. Having enjoyed more than 70% of total investments in the manufacturing sector during the first half of the 1990s, RMG and knitwear now account for about 4,825 factories and a workforce of 3.1 m -80% of which are women. This sector now employs over 50% of the industrial workforce and accounts for 79% of the total export earnings of the country (Table 1.4). The growing trend in the textile and the garments sector means that Bangladesh is perfectly positioned to appeal to foreign investors [23].

Table 1.4 Size of Bangladesh Textile Industry [18]

Sub-sector	No. of unites	Installed machine capacity	Production capacity (m)	Manpower
Textile spinning	341	7.20 ml. spld 0.18 ml. rotor	1600 kg	400000
Textile weaving	400	25,000 SL/SLL	1600 mtr	80000
Specialized textile and power loom	1065	23,000 SL/SLL	400 mtr	43000
Handloom (GF/F)	148342	498,000 handloom	837 mtr	1020000
Knitting, knit dyeing (GF):				
(a) Export-oriented	800	12,000 knit/Dy/M	3600 mtr	300000
(b) Local market	2000	5,000 knit/M	500 mtr	24000
Dyeing and finishing (FF):				
(a) Semi-mechanized	180	-	120 mtr	10000
(b) Mechanized	130	-	1600 mtr	23000
Export oriented RMG	4500	-	475 doz	2000,000

Inadequate Electricity and Gas Supply: Bangladesh is undergoing a severe energy crisis and more alarmingly it is looking for alternative suitable sources for power generation but still to select or decide the right one when the country is just about to finish its gas reserve in near future. According to Petrobangla almost 85 percent of the power generation plant here is gas based which is quite unusual for any country. In Bangladesh most of the industries especially the textile industries do not take power from the grid rather they produce their own power by most cases gas generator. This power is called captive power. If we calculate hypothetically we come with a data that Bangladesh has a supply of captive power for at least 2700 MW.

As power cuts have turned frequent too many times, and as gas pressure dipped, machines remain silent for hours in factories. Boilers sitting idle with its workers. In the last one and a half months, about 100 chartered planes left Dhaka airport with shipments. And each airfreight means loss for the exporters as they have to foot the bills from their

pocket. Every kilogram of goods put on a plane costs $4.30, and the worst part is that the buyer would not pay for it. They would not even refund the shipment cost factored in the free on board (FOB). To minimise their costs, exporters are now first shipping their goods to Singapore or Dubai and airlifting them from those business hubs. This minimises the loss in airfreight.

To make things worse, Bangladesh's productivity in the apparel sector has not improved, and remains at a much lower level compared to other competitors like China. Against Bangladesh's productivity of 35 percent, China's is about 80 percent, and major Southeast Asian countries' are in the 70 percent range.

Right now, the country is reeling under power and gas crises, and no end is in view within the next few years. Different gas-fired power plants having around 800 megawatt power generation capacity has remained idle due to the gas crisis. This is intensifying the over-all power load shedding which tends to hover between 1,200 MW and 1,500 MW daily, which is one third of the country's power demand.

1.7 Current Status of Power Supply in Bangladesh

To confront and overcome prevailing and emerging energy crisis, the worst ever in the history of Bangladesh Government has announced mega plan to add new generation of 9426 MW by 2015. Government has planned increasing natural gas production by another 2400MMCFD by that time. The present effective power generation is about 5000MW against a demand of 7000MW.The gas production capacity is 2000MMCFD against a demand of 2500MMCFD. This means that in 5 years power generation will increase by 200% of what has been achieved in over 40 years and gas production will increase 100%. By any extent of imagination is a highly ambitious plan. According to many an unrealistic dream, Energy advisors press meet produced some important figures as can be seen Table 1.5.

This table indicates that in 2011 summer there should be minimum power supply short fall and in 2013 there would be reasonable surplus. Our policy maker relies on this type of information produced off and on by the power system management. According to

BPDB (Bangladesh Power Distribution Board) Total Generation Report, power distributed at 30 January, 2012 in Evening Peak 4916 MW against the total demand 7000MW.

Table 1.5 Estimated Demand [MW per Day] Supply

Year	2010	2011	2012	2013	2014	2015	2016
Maximum demand	6454	6765	7518	8349	9268	10283	11405
New generation public sector	255	851	838	1040	1270	450	1500
New generation private sector	520	1343	1319	1134	1053	1900	1300
Power import	-	-	-	500	-	-	-
Capacity retried	-	58	83	161	1292	128	1033
Generation capacity	5936	8042	10116	12629	13660	15882	17649
NET	5499	7720	9711	12124	13114	15247	16543
Dependable capacity	4331	5954	7575	9578	10491	12197	13554
Max. supply shortage in summer	2123	520	57	1229	1223	1914	2149

The annual trend of power consumption in Bangladesh indicate that at the last part of winter starting from late January power loads start growing with the commencement of irrigation season. Irrigation load usually adds about 1500MW to power demand.

BGMEA, the apparel exporters' forum, has submitted a plan to the prime minister to set up a number of small-scale area-based power plants in a bid to add 1000-megawatt (MW) more electricity to national grid for ensuring uninterrupted power supply to garments factories, insiders in the industry have said. Some 406MW of electricity is supplied by the government to the sector but the RMG manufacturers have demanded 720MW. Still there will be 35 per cent shortage of electricity in the sector. However, as the electricity shortage is a national problem, the RMG units have been depended on 'captive-power', incurring BDT 20 billion additional cost. Worried about the increased price of oil, "This situation has led to 35 per cent hike in production cost". A total of 20,010 million liters of diesel are needed in the industry per year.

The frequency of power and gas outages is threatening citizen welfare and development prospects. The annual loss to production and income from power outages could well exceed 0.5% of GDP per year. The availability of domestic primary fuel supply is getting so scarce that it is forcing severe measures like shutting down fertilizer factories, rationing gas supplies for household and transport uses, and keeping idle installed power

units. Every 1% of GDP growth is estimated to lead to a growth of 1.4% in electricity demand in a typical developing country. For a 5-6% typical annual economic growth rate, this would imply a need for close to 7-8% growth in electricity supply. Rural electrification ratio expanded rapidly since the early 1990s, growing from 10 percent in 1994 to 37% in 2008.

Yet, this is still amongst the lowest in developing world. In the rural economy, low power connectivity is a serious constraint to non-farm sector growth. Against this demand pattern, unfortunately no substantial low-cost and reliable power generation capacity has been added since 2002. Due to the severity of the power crisis, the Government has been forced to enter into contractual agreements for high-cost, temporary solutions, such as rental power and small IPPs, on an emergency basis, much of it diesel or liquid-fuel based. This has imposed tremendous fiscal pressure, as budgetary transfers are routinely made to the power sector in order to enable it to stay current on payments to power suppliers. The Government is aware that precious resources are being diverted to cover operating losses of the utility that arise from purchasing short-term high cost power which is not sustainable for the financial health of the sector in the long run. Therefore, the longer term strategy embedded in the Sixth Five Year Plan power sector plan is to use budgetary allocations to promote low-cost, sustainable expansion of power generation, transmission, and distribution capacity.

Also, there has been no new capacity addition to fuel sources for power generation. With a power sector that is almost totally dependent on natural-gas fired generation (89.22% of power comes from gas-fired generators), the country is confronting a simultaneous shortage of natural gas and electricity. Other fuels for generating low-cost, base-load energy, such as coal, liquid fuel, or a renewable resource like hydropower, are not readily available, and any policies put in place to access them are likely to have a 3-5 year lead time. Gas supply is dwindling, and the absence of obvious choices for alternative fuels implies that there are no readily identifiable and immediately available options for alternative, new generation sources to meet its base-load power requirements.

Demand-Supply Gap for Electricity: One of the aspects to the demand for electricity in Bangladesh is the rise in the intensity of electricity use with the pace of

economic development. In 1980, electricity demand was 30 Gigawatt (GW) per 1000 crore taka of GDP, which increased into 80 GW in 2002. Based on current income elasticity, with an average economic growth of 6 percent the capacity for electricity generation would need to double every six years.

In view of the low base, it is hardly surprising that the demand for electricity is increasing rapidly with the improvement of living standard, increase of agricultural production, development of industries as well as overall development of the country. Due to the failure in the last few years to increase electricity generation capacity proportionately to the demand, a serious supply shortage has emerged. Presently, the shortage is estimated between 1500-1800 Megawatts (Table 1.6)

Table 1.6 Present Power Generation Capacity in Bangladesh (FY10)

Installed Capacity	5823 MW
Generation Capacity	5271 MW
Available Generation	4000-4600 MW
Highest Generation	4606 MW
Electricity Demand (Peak Demand)	6000 MW
Access to Electricity	47%
Per capita electricity Generation 220 KWh	220 KWh
Per capita electricity Consumption	170 KWh

Especially, a huge shortage exists during the evening peak demand. Additionally, due to the crisis of gas supply and lack of necessary maintenance and rehabilitation of old power plants, it is not possible to utilize the total installed capacity. Consequently, the shortage of electricity reaches 1800 Megawatts during the peak demand (5800 MW) of summer causing huge load-shedding.

Use of Different Types of Energy: Natural Gas is used as primary energy in most of the existing power plants (Table 1.7). Some 89 percent of total electricity is produced from gas-based power plants. Besides gas, a small amount of electricity is produced using diesel, furnace oil and coal. In addition, almost 2.5 percent of total electricity is produced from Karnaphuli Hydro Power Plant. Due to the increase in the use

of gas in fertilizer, industries, factories and other sectors it is not possible to supply adequate quantity of gas for electricity generation. The shortage of gas is therefore a serious constraint on the supply of electricity. The diversification of primary energy sources away from gas to other alternatives including hydro, coal, oil, solar and nuclear energies is essential for Bangladesh's power and energy security.

Table 1.7 Primary Energy Use in Power Generation

Primary Energy Type	Percentage of Use
Furnace Oil	3.00
Diesel	1.77
Hydro	2.49
Coal	3.52
Gas	89.22

Although the installed capacity for generation of electricity in the country is 2908 megawatt, the actual production does not exceed 2160 megawatt as against the peak demand of 2200 megawatt. The average level of system loss is still as high as 33.3%. The demand for power will increase by 300 MW annually and an investment of about Tk 110 billion up to the turn of the century will be needed to meet it.

Current status of gas sector: Bangladesh is not only suffering from power generation crisis. It has serious crisis of primary fuel too. Government in desperate situation tries load management. Urea fertilizer factories are kept shut down to divert gas supply to power plants. Industries suffer from lack of quality gas supply all over the gas franchise area. PDB blames Petrobangla for failure of required gas supply which restricts power generation. Natural Gas Value Chain of Bangladesh is in total mess with a very little hope of improvement over the next two remaining years of the present government term. Though Petrobangla in a much hyped Media briefing talked of high sounding success story of adding over 500MMCFD + new gas over the last three years yet the ground picture is very different. No new gas field has been discovered over the period. There are very little success stories in exploration by IOCs and BAPEX. Daily gas

production capacity increased during present government from Jan. 09 to Dec.10: 284 MMCFD only.

1.8 Impact of Inadequate Electricity and Gas Supply in RMG

If we study the major difficulties of Ready Made Garments (RMG) industries, we can surely find how difficult it has become for them to run their industry in all shifts to meet the export commitments. Many potential buyers are aware of the diabolic energy supply situation in Bangladesh and are actively considering alternate source of supply from China, Shrilanka and other countries. Similar situation if not worse is prevailing in Knitwear, ceramics and other small and medium industries. All these happened due to unbalanced and unimaginative growth of industries in fuel constraint regions and lack of far sight and poor management of energy sector.

Prevailing diesel and power crises in the country are forcing readymade garment (RMG) manufacturers to keep their factories idle sometimes for five hours of a ten-hour working day. The garment industry today faces a catastrophic fall and if the government does not address the problems immediately Bangladesh might lose its market to competitors like India and China. BGMEA suggests that the government improves the power situation urgently or provides them with diesel under special arrangement so they can maintain usual production rate. If diesel price is raised they want to be provided with diesel at a subsidized price. Normally production goes on for 10 hours a day in garment factories, but now about five hours are being lost daily due to load shedding.

Many of the garment factory owners resorted to generators, but the recent crisis of diesel has worsened their woes. They usually collect diesel in containers or drums. But with the backdrop of fuel crisis, the government put a bar on carrying diesel in containers, which is like 'adding insult to injury'.

Besides, 90 percent of the generators used in garment factories are diesel run and only about five percent is run by gas. So, in the face of diesel and power crises, garment factory owners are being forced to ship their product by air to make up for lost time in a bid to maintain deadlines. Airfreight charges cost me about Tk. 4 crore in just a month

The transportation facilities of rail and water are still not sufficient enough to ensure supply of liquid fuel to all power plant developers in time. Government must stop giving any new permission for liquid fuel based power plants. Government had to pay billions of dollars already for liquid fuel import. PDB had to pay through its nose the higher price of power. Both PDB and BPC will be bankrupt if this trend continues over long term.

Bangladesh must realize that if it fails to explore and start exploit its own substantial coal resource urgently the black gold may remain underground forever. Government must start mining of coal by open pit method from Phulabri and remaining portion of Barapukuria within this year and start construction of at least 1500-2000MW mine mouth power plants. By end of 2014, much of the power crisis situation will be taken care of.

Natural gas use must be gradually restricted to industrial use only. Natural gas for domestic and commercial use must be phased out. For this category of consumers LPG use must be encouraged. No more Fertilizer plant should be set up until major gas reserve is discovered. Gas use for different categories may be restricted according the following after 2020 (Table 1.8). Use of Natural gas must be capped at 4000MMCFD.

Table 1.8 Power production due to different sources

Source	Power (MW)	Percentage
Natural Gas	7500	50
Coal	6000	40
Import	1000	6.7
Renewable	500	3.3
Total	15,000	100

LNG price from long term contract now is not less than US$ 14/Mbtu. It is higher in spot market. The price may shoot higher as Japan has decided to shut down all its nuclear plant in phases. Bangladesh initiative for LNG import will soon have to be abandoned. Bangladesh must endeavor to generate about 500MW-1000 MW power from hydro, solar, wind, bio fuel and municipal waste by 2015. This will require national movement and creation of required incentives by the government. Feed in tariff may be an incentive. Bangladesh may target to import about 1000MW power from regional grid by year 2020.

Many ready-made garment factories may face closure due to high fuel costs. The production cost of the exportable apparel items will go up by at least 15 per cent due to the fuel price adjustment. Around 2,800 garment factories in the country have to pay additional tens of millions of US dollars as transportation cost of consignments and use of diesel-run generators due to insufficient supply of electricity.

Petrobangla wants to raise gas prices by 5.24% to Taka 84 ($1.01)/Mcf for power plants; by 9.71% to Taka 80/Mcf for fertilizer factories; and by 32.60% to Taka 220/Mcf for industrial users. For captive power plants, the proposed hike is 102.94% to Taka 240/Mcf. Petrobangla also wants to raise gas tariff by 30.55% to Taka 350/Mcf for commercial consumers; by 20.55% to Taka 200/Mcf for tea estates and by 39.10% to Taka 905.92/Mcf for CNG filling stations. Petrobangla, however, did not propose any price hike for residential users. This is the second time the government is increasing the prices of gas after coming to power three years ago. In 2009, gas prices went up on an average by 11.11 percent. Recently after a mass hearing on the proposed price, Petrobangla asked the distribution companies to reoffer the prices. But it is almost obvious that gas price is increasing; only it is to be seen at what extent it is increasing.

Currently it has become a great matter of concern for the garments industries of Bangladesh that the production costs of their exportable apparel items will go up by at least 15 percent due to the latest fuel price adjustment. To compensate for this, it is expected that the government should keep the petroleum prices at their previous rates at least for industrial uses to minimize the production cost.

The garment manufacturing units are largely dependent on petroleum products due to erratic gas and power supplies to their units. The government has increased the domestic fuel prices by 33 to 37% with effect from July 1 to adjust the prices with those in the international market. The new price of diesel and kerosene is Tk 55 a liter, which is about 37.5 % or Tk 15 more than their earlier price of Tk 40.

Petrol is now Tk 87/liter, up by 34% or Tk 22 from its previous price of Tk 65. The price of octane now is Tk 90/liter, which is 34% or Tk 23 more than its previous price of Tk 67. A cylinder of liquid petroleum gas (LPG) is now Tk 1,000, up from Tk 600,

while a liter of furnace oil is now Tk 30, up from Tk 20. The apparel factory owners will have to count an additional cost of Tk 50 crore a month due to this price hike.

The fuel price hike came into effect at a time when the prices of other essential commodities have increased significantly. So, the workers in the sector will also have to bear additional household costs for buying the essentials that may see further price spiral which is an important aspect. Against this backdrop, there may be labor unrest again leading to production hamper at the garment factories which is a matter of fear.

There is another limitation of some RMG industries that they are not getting gas and power in Savar, Ashulia, Gazipur and Narayanganj areas to run their plants properly. According to a government estimate, 35.7 lakh metric tons of petroleum products were used in Bangladesh in fiscal year. During the fiscal year 2006-07, 65% or 22 lakh metric tons of which was diesel. Sixty percent of the diesel was used for transports, 32% for agriculture, and the rest was used for other purposes.

Investment in the garment sector, the motor of the country's export trade, can be held back by shortage of gas supply in Bangladesh. Bangladesh is till date regarded as a lucrative place for investment, due to the availability of gas and cheap workforce. Bangladesh has a huge potential for grabbing larger share in global apparel market, if provided gas supply in industrial units remains unhindered.

Gas supply constraint also restricts power generation significantly. It is often reported that the peak national daily power demand is about 5000-5200MW. The total effective capacity of national production is about 3800 MW. Many of the generation plants have outlived their normal economic life and are being run through cannibalizing. These fuel inefficient plants very often go out of production compounding miseries. So, even consistent generation of 3800MW is not achieved. Consequently massive nationwide load shedding is having devastating adverse impact on everything and especially in RMG sector.

1.9 Strategic Policies for Manufacturing Exports

In order to get the maximum leverage out of manufacturing sector and its competitiveness in the global marketplace, the Sixth Plan would focus on four strategic

approaches. Bangladesh experienced double digit export growth over the past two decades. Yet this superior performance masks the fact that the surge was limited to one product group-readymade garments – aided not least by the MFA regime. With over two million jobs and 77% of export earnings from the RMG sector, too much of the nation's fortune is riding on this one sector. Export concentration in readymade garments makes the economy, jobs and income, extremely vulnerable to external shocks arising from changes in global demand for RMG. The government's focus on export diversification as a cornerstone of its export policy will continue and intensify during the Sixth Plan period.

Export concentration is not a new phenomenon for Bangladesh. For many decades prior to the emergence of RMG exports, jute and jute goods dominated the export sector making up 70 percent of exports until 1981. The shift into manufactured exports materialized for the Bangladesh economy thanks largely due to an external event – the multi-fiber arrangement (MFA) of 1974 – that offered a lifeline for the emergence and rapid expansion of the RMG industry. By 1990, RMG exports had overtaken Bangladesh's traditional exports and, by the close of the 1990s, export concentration emerged afresh, with RMG exports reaching a share of 77 percent. While Bangladesh's export growth for the last decade and a half could be characterized as robust, a sudden decline in demand for Bangladeshi RMG would send shock waves throughout the economy. Such a prospect can be avoided through the creation of a diversified export basket. Herein lies the rationale for an effective strategy for export diversification.

But in the context of the Sixth Plan, the strategy of export diversification will not be limited to product diversification in the export basket. Rather, the strategy will embrace many different facets, each of which addresses the vulnerability aspect of export concentration, as summarized below:

- **Product** diversification - introducing range of new products in the export basket.
- **Geographical diversification -** widening the range of destination markets for exports.

- **Quality diversification -** upgrading the value of existing products, i.e. moving up market from low end to high end products (described as moving up the value chain).
- **Goods-to-services diversification -** seeking opportunities to expand non-merchandise exports.
- **Intermediate goods diversification -** product diversification need not imply adding only final consumer goods in the export basket as is popularly understood in Bangladesh.

There are global opportunities for plugging into the supply chain of export powerhouses Like China, something that East Asian economies have done successfully. That requires Bangladesh to diversify its manufacturing base into backward linkage industries producing

A wide range of intermediate goods for exports within the globalized production chain. Finally, it is critical that the trade policy regime is geared to ensure export competitiveness in general while facilitating emergence and expansion of new export products. Bangladesh's labor cost advantage remains strong though productivity is a question mark. Yet this advantage, properly harnessed, could yield surprising rewards within the current scheme of globalized production and supply chains, provided the trade regime is right. The success of RMG is clear evidence of this phenomenon.

If export diversification is to be the cornerstone of an export strategy, at least three aspects of the trade policy regime will deserve close attention during the Sixth Plan:

- Ensuring export competitiveness in general – by addressing border barriers (e.g. tariffs) and beyond-the border constraints (e.g. trade infrastructure, energy and telecommunications, regulations, finance).
- Reducing anti-export bias of the trade regime – several researches provided ample evidence of anti-export bias of the current import, tariff and subsidy regime that favors import-substituting production over exports. The duty-drawback scheme to provide world priced inputs for export production has proved inadequate. Eliminating or reducing the built-in anti-export bias that

still remain will be key to switching the incentive regime in favor of exports.

- Reducing anti-diversification bias – because of the stellar success of RMG exports, trade policy and incentive regime have a clear focus on this sector which is provided a free trade channel plus logistic support (duty free import of inputs, bonded warehousing facilities, back-to-back LC, rapid custom clearance). While such a policy is appropriate for making RMG exports competitive on a global scale, attention needs to be focused on similar policy environment for emerging and potential exports without which they face formidable barriers in the context of a high-tariff and restrictive import regime in Bangladesh. This particular feature of anti-diversification bias could be unique to Bangladesh and will be addressed during the Sixth Plan.

The philosophy of the current government is for Bangladesh to attain middle income status by 2021. It is felt that the industrial sector has to fuel the much needed dynamism that is required to attain the challenge of earning middle income status. In line with this belief the government has identified three pivotal aspects of the industrial sector of Bangladesh that has to be further developed and improved. These three pivotal areas are

- promotion of domestic content in output,
- wherever practicable substitution of imports and
- sustainable development and husbandry of export oriented industries.

Moreover the government aims to create a more investor friendly atmosphere for both local and foreign investors to fuel industrial growth. Moreover the government aims to improve access of khas land for industrial usage and more efforts will be directed at setting up EPZ and SPEZ .In order to unleash the large scale industrial sector the government is taking an integrated approach i.e. there will be increased concentration in improving the infrastructural needs of industrialization and improvement in the financial sector. The government realizes that in order to extract the true potential of the labor and improve total factor productivity the labor force has to be trained further both vocationally and academically and hence various government agencies will work very closely to the

industrial sector in order to improve the skill gap. In order to improve Bangladeshi goods the government would support the sector by aiding and encouraging them to carry out .Research so that the goods produce could be of high value and unique and thus greater value exports. Finally it is the firm belief of the government that the private sector would be the leader of industrial development and there the government aims to aid this sector by various policy measures including industrial policy.

The Ready-Made Garments (RMG) industry contributes to the Bangladesh economy in a distinctive manner. The last 20 years witnessed unparalleled growth in this sector, which is also the largest exporting industry in Bangladesh. It has attained a high profile in terms of foreign exchange earnings, exports, industrialization and contribution to GDP within a short span of time. The industry plays a significant role in terms of employment generation. Nearly three million workers are directly and more than ten million inhabitants are indirectly associated with the industry. In addition to its economic contribution, the expansion of RMG industry has caused noticeable changes by bringing more than 2.5 million women into the workforce. RMG's growing contribution to GDP is remarkable; it has reached 13 percent of GDP in 2010 compared to about 3 percent in 1991. It also plays a pivotal role to promote the development of other key sectors of the economy like banking, insurance, shipping, courier services, hotel, tourism, road transportation, railway container services, etc.

Table 1.9 Growth of the RMG sector

Year	Export Volume ('000 dozen)	Export Value (US$ million)	Share in Total Exports (%)
1990-91	30,566.60	866.8	30,566.60
1995-96	72,005.00	2,547.10	65.6
1999-2000	111,905.80	4,349.40	75.6
2001-02	140,444.60	4,583.80	76.6
2002-03	152,013.00	4,912.09	75.1
2003-04	182,080.00	5685.76	74.8
2003-04	212,390.00	6424.27	74.8
2005-06	273,840.00	7899.59	75.1
2006-07	332,620.00	9211.31	75.6
2007-08	389,030.00	10699.8	75.8
2008-09	460,510.00	12348.2	79.5

Since the inception of the trade liberalization program in the early 1990's, the RMG sector has grown by leaps and bounds (Table 1.9). From a miniscule share of about 4 percent in total exports in the early 1980s, garments now constitute more than 80 percent of total exports from Bangladesh, raking in nearly $12.5 billion of foreign exchange, out of total export earnings of $15.5 billion in 2008-09. Net domestic value addition–hitherto a weak point, on account of the heavy dependence of the sector on imported fabrics, yarn and accessories–has risen substantially, so much so that nearly 60 percent of the required inputs are now domestically sourced, as compared to a mere 36 percent in 1991-92.

One of the key advantages of the RMG industry is its cheap labor force, which provides a competitive edge over its competitors. The sector has created employment opportunities for about three million people of which 80 percent are women who mostly come from rural areas. Notwithstanding the fact that this sector's emergence and expansion is the direct outcome of the global MFA regime, there is no denying that it has had a stellar impact on overall economic growth, income generation and poverty reduction in Bangladesh

Since the late 70s government initiative such as special bonded warehouse schemes, duty drawback systems and export policy reforms (mid eighties) all helped the RMG sector to operate in almost a free trade environment .Currently, there are nearly 5,000 RMG firms in Bangladesh. More than 95 per cent of those firms are locally owned with the exception of a few foreign firms located in export processing zones. The RMG firms are located mainly in three main cities: the capital city Dhaka, the port city Chittagong and the industrial city Narayanganj. Garment companies in Bangladesh form formal or informal groups. The grouping helps to share manufacturing activities, and to diversify risks; horizontal as well as vertical coordination can be easily found in such group activities.

Readymade garments manufactured in Bangladesh are divided mainly into two broad categories: woven and knit products. Shirts, and trousers are the main woven products and undergarments, socks, stockings, T-shirts, sweaters and other casual and soft garments are the main knit products. Woven garment products still dominate the garment export earnings of the country. The share of knit garment products has been increasing

since the early 1990s; and now accounts for just over 50% of the country's total RMG export earnings. Although various 85 types of garments are manufactured in the country, only a few categories, such as shirts, T shirts, trousers, jackets and sweaters, constitute the major production-share. The United States was the main export destination for Bangladeshi RMG products in the early 1990s followed by the European Union, but the European Union has surpassed the United States over time. These two destinations generate more than 90 per cent of the total RMG export earnings of Bangladesh (Table 1.10).

Table 1.10 Bangladesh RMG Exports to EU and US (in million USD)

Year	**EU**	**US**
2007	6036.2	3191.2
2008	6480.2	3537.5
2009	6998.7	3519.7
2010	7783.7*	4076.3*

It is important to note that the RMG sector helped create jobs in complementary industries or services, such as accessories, packaging, toiletries (demanded by newly employed female RMG workers), courier, finance, transport and telecommunications services, etc. BGMEA claims that the RMG sector creates as many jobs in these complementary enterprises as there are in RMG units themselves. Although RMG operates in a free trade enclave environment, its growth is clearly based on Bangladesh's comparative advantage in a labor- and non-skill intensive activity – one that has been sustained by trade and exchange liberalization in addition to the quota regime offered under the MFA.

While the export-quota system cushioned the Bangladesh RMG industry, enabling it to remain competitive as a prominent garment supplier in international markets until 2004, the phase-out of the system was expected by many analysts to threaten the very survival of this industry. That apprehension was proved wrong as RMG exports continued to grow after 2005 putting Bangladesh securely on the world map as a leading exporter of garments. Yet there are challenges. Backward and forward linkage expansion, meeting

compliance standards, product/market diversification and upgrades are some important strategies for the industry to improve competitiveness and seize global opportunities.

Thanks to domestic investments in textiles, the consumption-production gap of yarn decreased over time, although actual consumption increased every year. The fabric-manufacturing capacity of the country also increased over time. Such a trend indicates that the linkage expansion process of the Bangladesh RMG industry, started in the early 1990s, has not lost momentum. Still, many garment manufacturers in Bangladesh are prefer using imported raw materials instead of using local raw materials owing to price and quality differences. The price of RMG inputs supplied by local sources is relatively high. Bangladesh is just a price taker in sourcing RMG inputs from external sources, whereas competitor countries such as India and China have a certain level of influence on RMG input pricing, as they themselves are prominent textile suppliers in the world market.

In addition to speedy supply, the social dimensions of the RMG industry are getting more attention from consumers, social workers, welfare organizations and brand name international buyers. Currently, many international buyers demand compliance with their "code of conduct" before placing any garment import order. Although Bangladesh was able to solve the problem of child labor very successfully in the mid-1990s, the country's performance in improving the factory working environment is not yet satisfactory. Informal recruitment, low literacy levels, wage discrimination, irregular payment and short contracts of service are very common practices in the RMG factories in Bangladesh. It is true that the country still enjoys some comparative advantage in manufacturing garment products based on low labor costs.

However, such advantages cannot be sustained forever nor can they be expected from a humanitarian perspective. Rented factory premises, narrow staircases, low roofs, closed environments, absence of lunch rooms, unavailability of clean drinking water and no separate toilets or common rooms for female workers, low wages etc are other concerns in the garment factories of Bangladesh.

The product and market composition of garments from Bangladesh requires special attention to ensure the long-term sustainability of the Bangladesh RMG industry as a prominent supplier in the global market. The export-quota system diverted the attention

of some international garment suppliers from quantitative expansion to qualitative improvement of exportable garment products. China and other competitor countries took that opportunity, but Bangladesh failed to do likewise. The country stands far behind in the race to upgrade products compared with its rivals. Bangladesh is still focused on manufacturing lower-end products, although recently the country has emerged slowly from being a lower-end producer towards becoming a middle/high-end producer, from being a simple male-wear producer to become a producer of fashionable female wear. Strengthening the process of upgrading products is very important for the Bangladesh RMG industry if it is to enhance its competitiveness and continue to augment foreign exchange earnings. Medium-term Goals for the RMG Sector

- Diversify export destination.
- Improve supply of both skilled and unskilled workers.
- Improve the availability of more skilled people in the managerial levels
- Further product diversification
- Vertical integration, developing brand name
- Improve competitive edge through higher productivity, investment in R&D
- Produce more high value goods

Strategies under the SFYP

- Have both Bilateral and Multilateral agreements with various countries
- BGMEA and BKMEA will have to invest more in their training facilities to increase and improve on both coverage and training curriculum.
- Improve capacity of owners of RMG by providing training on how to move up the value chain.
- Public infrastructure (such as electricity and roads etc) would have to improve to ensure that RMG factories are operating at full capacity.
- Political stability along with other features pertinent to the enabling environment has to be improved in order to attract more FDI and make the business environment more conducive for business.
- Greater use of IT in order to quicken the pace at which business is conducted both with local and international counterparts.

Chapter-2

Objectives and Methodology

2.1 Objectives of the Present Work

The following specific objectives and areas of scope have been identified for the study:

a. To identify the current status of electricity and gas supply in the RMG sector of Bangladesh.
b. To identify the links of power supply (electricity and gas) and production in the RMG sector in the context of Bangladesh
c. Implications of inadequate power supply on RMG Business
    i) Meeting deadline of RMG exports and power supply
    ii) Lead time, quality and power supply
    iii) Alternative sources of power supply and their implications
    iv) Overall effect to the growth of this sector

2.2 Outline of the Methodology

i) The selection of RMGs will follow the proportional representation of knitwear, woven and sweater production units; proportional representation of RMG units of different sizes i.e. large, small and medium will be categorized based on the level of production/power consumption; proportional representation of geographical locations of RMG units; representation of complaint and non-compliant RMG units.

ii) A set of questionnaire is developed for the selected RMG enterprises. Once the questionnaire is prepared, a sample pretest will be conducted in a RMG firm. The questionnaire will be revised based on the pretest if required.

iii) Relevant cases will be collected to identify the impact of shortage of power supply under different circumstances which will supplement the survey evidence to attain the objectives of the study.

iv) The collected, cleaned, and entered data will be analyzed.

Chapter-3

Data Analysis and Results

Chittagong Export Processing Zone (CEPZ), also known as Chittagong EPZ, is the first and one of the eight export processing zones in Bangladesh located at South Halishahar in Chittagong. There are 500 industries in Chittahong EPZ. But due to restrictions of time, capacity, sufficient manpower and financial support, it was impossible for us to cover a good percentage of garment industries for necessary data and calculation. Then we tried to estimate an approximate value of the above tasks for all the industries (about 500) using the relevant data and calculations of the four industries. The industries which were visited for collecting required data to achieve solutions for the above tasks are:

- Regency Garments Ltd
- Youngone Garments
- Univogue Garments Co. Ltd.
- Pacific Jeans Ltd.

3.1 Required Queries and Information Collected from Industries

The necessary list of questionnaire or queries, the data of which we collected from the above RMG industries consist the following:

- Total production and use of power
- Total number of lines, floors and workers in different sections.
- Targeted output for each section.
- Requirements of electricity and gas supply by studying electricity bills.
- Supply status of electricity and gas supply (both in peak and off-peak hours)
- Alternative source of power to meet the inadequate supply
- Type and cost of alternative source of power

- Data regarding generators like relevant specifications, capacity, running time, expected life etc.
- Total and per unit fuel cost of generator and per unit cost of power supply while using generator
- Maintenance information of the alternate power source (generator).
- No. of workers and their wages involved in operating and maintenance work of alternate power source.
- Time and duration of power failure in garments industries over a specific period o
- Worker wages and allowances for different sections and category.
- No. of workers and other employees involved and present during overtime work.
- Necessary data (like wages and allowances) related to overtime of workers due to power failure.

3.2 Working Steps

- In order to complete our assigned job we have followed the following working sequence step by step:
- Visiting different sections of RMG and understanding and analyzing their working technique or method.
- Gaining a brief idea about the working method of other sections of RMG like cutting and finishing.
- Studying and identifying with the layout and operations of lines of sewing section.
- Data collection, analysis and standardization for time study of sewing and finishing sections.
- Comparative analysis between “time study” and “worker’s production or efficiency rate study”.
- Data collection for “worker’s production or efficiency rate study”.
- Data analysis and standardization.
- Plotting graphs of worker’s production or efficiency rate using collected data.

- Estimating basic time, standard time and production capacity of various operations in lines of sewing and finishing sections.
- Data collection for power failure over a particular period of time in the above stated industries.
- Calculating production losses due to power failure in different sections of RMG in different industries.
- Data collection and calculation of production losses in knitting section due to power failure.
- Accumulating data regarding requirements and cost of power supply, cost of alternate power source etc. (stated in queries above) from all the industries.
- Data collection regarding worker wages and overtime.
- Calculating losses (in cost) due to using alternate power supply in various industries.
- Estimation of total loss (in cost) because of production losses in individual sections due to inadequate electricity and gas supply. Worker wages, product price, maintenance expenses, overtime allowance-all these variables are included and considered in calculating the total loss in cost.
- Preparing bar charts showing losses both in units and cost of all sections of RMG using appropriate data.
- Estimating production losses in units and cost due to inadequate electricity and gas supply of the overall RMG sector of Bangladesh using the calculations of the losses in garments industries.
- Discussing and analyzing the most important and principal aspects of our study regarding the loss due to inadequate electricity and gas supply in RMG sector of our country.

3.3 Different Criteria of Production Losses

It is well-known that sufficient power supply are among the main preconditions for the efficient production of industry sector and thus for promoting exports. The RMG, which is the main export of Bangladesh, heavily depended on modern infrastructure and

adequate power supply in their process of production. However the RMG have been facing with huge trouble particularly loss of production and cost of production is increasing extensively with insufficient supply of gas and electricity during recent period. Many garments factories are now considerably relying on alternative power supply as generators. However, the diesel-run generators are expensive to the RMG producers though the government has been supporting the sector by providing subsidies on diesel. Power supply through generators are not also working as perfect substitute of electricity and gas supply, and have been causing depletion of the garments machineries. Moreover, the removal of subsidies by the government in near future would worsen the situation further.

As stated above, garments industries are facing loss of production in a huge extent due to unwanted power failure or inadequate electricity and gas supply and there are various criteria of these production losses. All the production losses can initially be placed in two categories (i) Direct losses and (ii) Indirect losses.

Direct losses are the visible losses due to insufficient power supply which can easily be detected and which are directly responsible for increasing the cost of production in a large extent. Such losses can be calculated in product unit and can also be converted in cost or price. Some of the direct losses are:

Due to inadequate power supply, sometimes the industries lag behind in achieving their desired output or target. Although there can be alternate power supply in almost all the RMG industries in our country, but it is not necessary that the alternate source which can be gas or diesel generator can continue the operation of all the machines in all the sections of the industry. So, if one section or few machines are facilitated with the supply of alternate power, other remains idle waiting for the regular power supply. Again it is also a matter of significance that the alternate supply takes some time to start the supply of power and by this time the machines and workers stay idle. Generator defect, maintenance activities, fuel problems, technical faults etc. are also important reasons behind the delay or improper service of the generator. Because of all these reasons, the industries often fail to achieve their goal of desired output and bear a wholesome amount of loss.

Because of frequent power failure, most of the industries use temporary power supply source such as gas generator or diesel generator. The frequencies of using these sources vary from one industry to another. In some industries, gas generator is the main source of power supply which serves almost the whole industry with or without a parallel power supply line from the government controlled PDB. Whether in some industries the PDB provided supply line is the main power supply with mainly diesel generator used during power failure. Mainly, large composite industries use one or more gas generators for the whole or some sections of the industry which are their own power supply source as their first priority. But medium and small industries specially the RMG industries generally use PDB power supply and then diesel generator during scarcity of PDB supply.

But in whatever ways the industries use the alternate power supply, they have to bear a cost and this excessive cost can easily be converted into the loss of the industries because if there were adequate power supply, there would not be any need of these costs. Cost for buying, set-up, maintenance, fuel, repair, depreciation of generators can be regarded as a kind of loss due to power failure or inadequate power supply in RMG industries.

As mentioned before, because of many unavoidable reasons, many times workers and machines remain idle may be in the peak hour of their work. As the wages of the workers are predefined in a daily or monthly basis, they have to be paid their specific wages whether they work for the full working time or not. They have to be paid for the non-productive time also which they could not work because of inadequate electricity and gas supply because they are not responsible for this break. But the industry has to suffer in the long run and bear some losses as they are paying the worker for the time which did not bring them any output or product.

If the industry cannot fulfill their desired target in the usual working hour, they have to arrange overtime for their workers to finish the target before the deadline of the buyer. Losses due to overtime can be classified into two major criteria like (i) losses due to excess power supply and (ii) losses due to extra labor expenses.

Overtimes are mainly done at night as the day is the regular working time (usually from 8 A.M to 5 P.M) in almost all the industries. Obviously power supply is also

needed in overtime like the whole day whether it is the PDB supply line or the generators or both. According to the rules of PDB, hours after 5 P.M. are decided as "Peak Hours" which means that during these hours per unit cost of power supply is more than the "Off-peak Hours" (before 5 P.M.). Again, generators' running costs during load-shedding are also included with the above cost. All these excess costs are a source or reason for losses.

Again, for overtime, the workers have to be provided with almost double of their hourly wages along with some allowances for food which vary from one industry to another. This can also be accounted for as a source of loss for the industry.

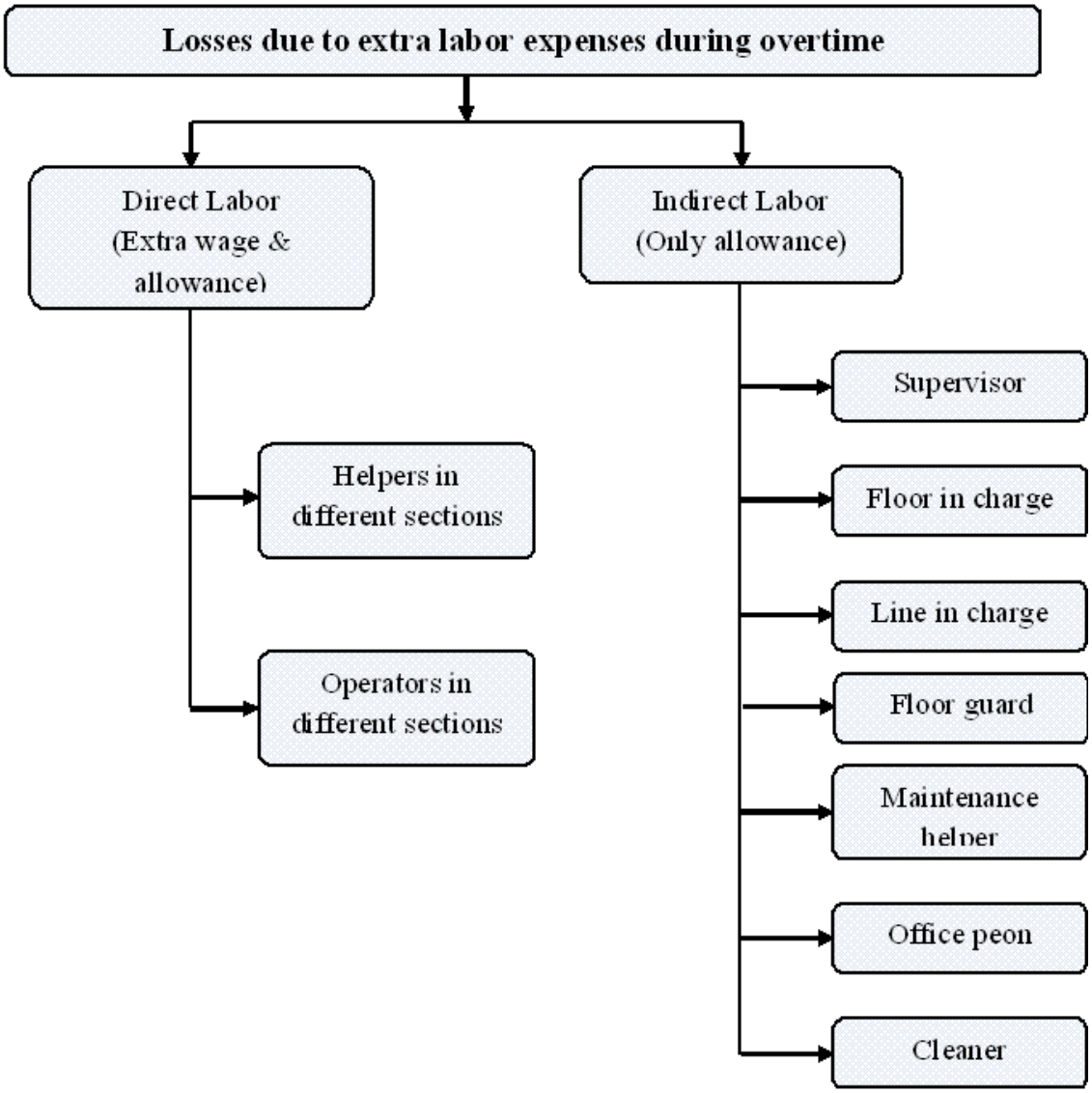

Fig.3.1 Losses due to extra labor expenses during overtime

It is necessary to mention that, during overtime, not only the workers which include operators and helpers have to stay and work, but also many other staffs and employees have to work during overtime. But as the wages of these employees are fixed in a monthly basis, they are not given extra wages but they are provided with a better amount of allowance than the workers. So, the loss of wages and allowances due to overtime are distributed between the following labors (including workers and employees) as can be shown in Fig.3.1.

Indirect losses include the unnoticed losses due to inadequate power supply which cannot be easily detected, estimated or calculated in numerical numbers or calculations but these losses are really significant as they have a great influence in the overall financial or economic conditions of the industry in the long run. Indirect losses may not be calculated in an instance as long as it occurs, but it can cost the industry in a large extent if these types of losses are not checked as soon as possible. Many industries just ignore them and continue in the ever running old process, but they should understand that consciousness and improvement plans for these in losses can gain them a huge profit in future.

There are different reasons behind unwanted interruption of concentration of the workers and power failure is one of the most prominent among them. Sudden power loss or load-shedding can easily break the concentration and attention of the workers as they face unexpected disruption in their smooth way of working. Mostly these types of breaks are welcomed by them as a great opportunity to relax or gossip. Most of the workers cannot or do not start working immediately as the power appears or the generator starts. The reason is that most of them get busy in gossiping, roaming around, relaxing or even sleeping and as a result work starts at delay even after the power returns which can be stated as the “Lead Time”. These idle or non-productive times are causing great losses as unit of products which can be produced in these times are not being produced and price of these products straightly converts into a loss for the industry.

Inadequate electricity and gas supply can interrupt the smooth work flow of an operation, of a line, of a section and also of an overall industry. It is known that, in RMG, all the operations, all the processes, all the lines and even all the sections are inter-linked with each other. It has a continuous flow of working. So, it is necessary to have proper

connection, interaction and understanding between all lines and sections. Any discontinuity, mismatch or interruption in one area can easily affect the work flow of other areas. Due to power interruption if some machines or any working floor remains idle or out of order, then some running machines will not get the materials from the idle machines for further works. On the other hand, some other running machines will be unable to forward their finished materials for further works in the idle machines. As a result, 'Bottlenecking' will occur in places as some workers will have lots of works to do while others will be out of work. The same thing can be said about different sections of RMG. Besides bottlenecking, unorganized work flow, workers' discontinuity, delays, mismanagements, decreased quality etc. can occur due to disturbance in work flow due to power failure.

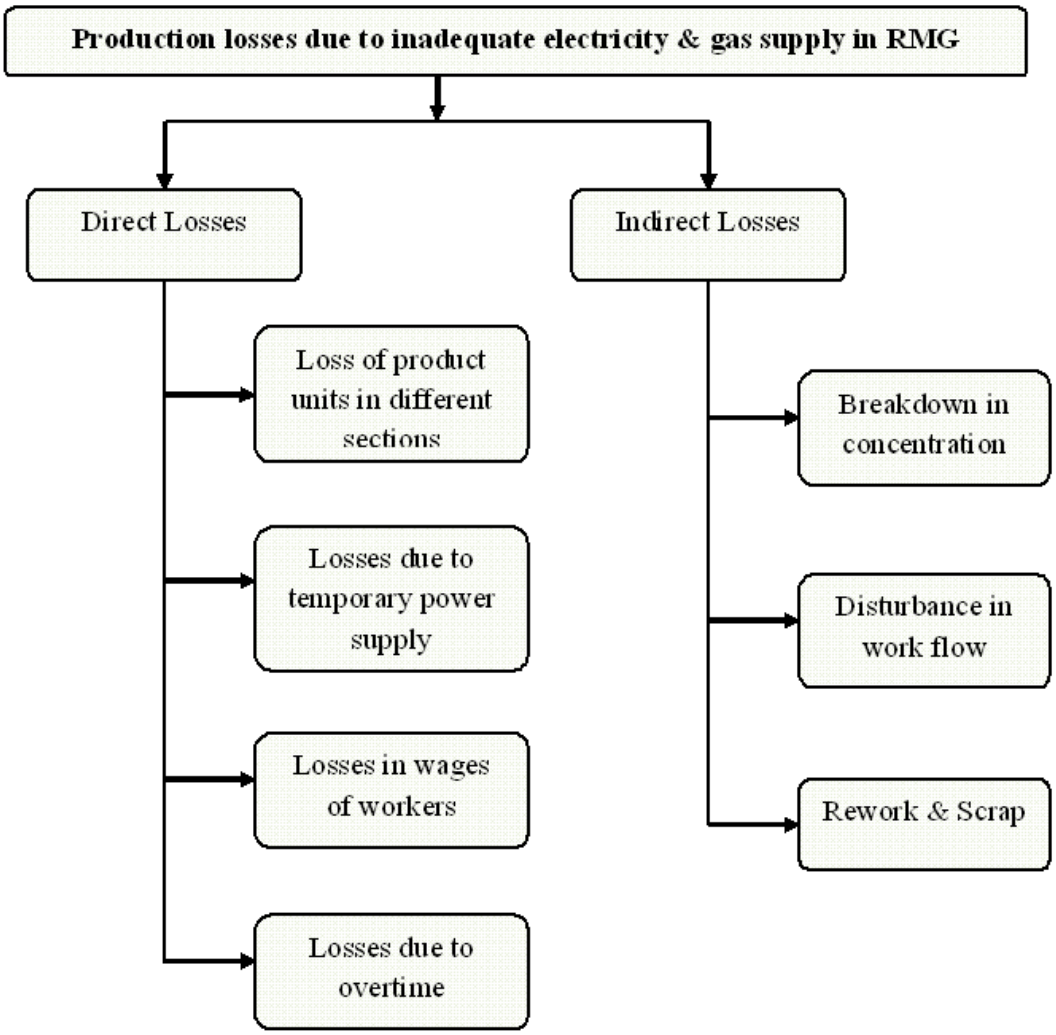

Fig.3.2 Production losses due to inadequate electricity & gas supply in RMG

Inadequate power supply is an important reason behind rework and scrap which are internal failures of the industries. As the costs of them are borne by the industry itself, it is obviously regarded as a loss. Breakdown of concentration of the workers, old-model machines, non-capability of certain machines to operate smoothly in less power, unwanted interruption in the middle of a certain time consuming process etc. are the main reasons of rework and scrap due to power failure. Fig.3.2 shows the various production losses.

Chapter-4

Production Loss of Various Garments

Regency Garments is renowned all over the world for its Sourcing, Manufacturing and exporting of garments and made-ups. Ever since its inception, the company has sought to meet the needs & requirements of the global market. We have all core facilities integrated to assure in-time deliveries. Regency Yarns, Regency Sourcing Intl & Regency Garments serves as professionally managed group together with a commitment to quality & customer satisfaction that has enabled it to carve a niche for itself in the competitive market scenario of today. Regency with its meticulous care and high-quality easy-care fabrications, manage to be on the edge of the newest technology without compromising comfort and value

Regency, a cogent name in manufacturing and export market of the Knitwear Capital of India, Tirupur, caters to the cross section of the quality conscious medium and small-sized global clientele has appeared on the horizon of apparel industry over a decade back. The entrepreneurial visionary promoters of Regency were instrumental in laying sound foundations for the organization in terms of:

- Excellence in production and services,
- Dynamism in its attitude towards state-of-the-art technology and modern management,
- A committed work force worthy of delivering quality product on schedule under the guidance of professionally competent executives in ergonomically healthy environment and interactive milieu.

The mission of this garment are:

- To recognize our customer needs & to develop products those are suitable for the ever-changing consumer requirements.
- To pursue continuous & Consistent growth for mutual betterment with trust and ethical practices focusing on a long term prosperous business relationship.
- To ensure a good organizational culture & climate.
- To deliver the product with quality & commitment as required by customers.

4.1 Production Losses in Different Sections

Time study is very much essential tool for work measurement and it can be done by the calculation of standard minute value (SMV). In this work, SMV was calculated based on individual task by time studies on several production lines and in case of variety products. For the calculation of SMV, allowance (for machine, personal & bundle) factor was added with the basic time whereas basic time was determined by multiplying worker's performance rating with the cycle time. Cycle time means total time taken to do all tasks to complete one operation, i.e. time from peak up part of first piece to next peak up of the next piece. Average cycle time was counted after measuring time for five repetitive operations with a stop watch by standing side of every worker during different periods of a day. The measurement was avoided if found any abnormal time in the process. The procedure was repeated for all operations in a production line and cycle time was measured accordingly.

The processing time exists simply because the process requires tasks and motion. The working method and the numbers of work components are closely related to the net processing time. The time study begins by measuring the number of time required to "lift, sew and place" something. It then proceeds to make improvements based on time values, and ends by defining the differences in the time values caused by the individual differences of the workers. The purposes of processing time are as follows:

- To understand the production capacity of the factory and to draw up plans for an appropriate target of output, suitable range of divided labor and optimum production (scheduling, personnel planning or equipment planning).

- To investigate the level of the individual skill
- To provide benchmarks for improvements
- For use as a standard of evaluating the operations
- To draw up plans and make estimates for a change of products or for the construction of a new or additional factor
- To obtain an evaluation standard for receiving, planning, using the time study as basis of the cost estimation and control
- For use as the basis for determining the unit cost of manufacturing and the wage rate
- For use as the basis for introducing a production control system

The standard time is the time required to complete one unit of work according to the predetermined operation method by a worker with an average skill under the predetermined working condition.

The three factors given here are the working condition, operation method and the worker's skill. Of these factors, the worker's skill in particular has a great influence on the processing time. The individual differences in skill, results in differences in the processing time. If it is possible to mathematically understand the individual differences as a unified level value. The standard time setting may be used for the following purposes:

- To improve the accuracy of the planning (target)
- To assign worker in an appropriate manner
- To understand the teaching skill of the individual workers
- To set the direction of efforts aimed at improving skills

Standard Time = Time Measure × Worker Rating × (1 + Allowance Rate)

The standard allowance rate is very difficult to determine. It is indicated unconditionally as a certain number, since it may change due to the effect various factors. Consequently each factory should determine the allowance rate after thoroughly study and investigation. The standard allowance rate is normally used in sewing is 12% to 18% (outside multiplication method). Fluctuating factor in the allowance rate are as follows:

- Work details
- Number of process allotted to the workers
- Specifications (design, material)
- Initial process, intermediate process, final process
- Degree of skill of the worker
- Size of the lot
- Type of model

4.2 Aspects of Formulating the Overall Production or Efficiency

At first, the applied procedure for calculating the standard time of each process was Time Study. For applying the time study, firstly we selected a particular line of sewing section in which a single type of garment was being produced. Then ten consecutive data representing the needed time for each and every process were recorded. For example, back-tack is a process needed in making a round neck T- shirt. So, we recorded the time needed for finishing a single back-tack operation and in this way we collected total ten individual data. Thus data were collected for every operation of a line in making a round neck T- shirt. Then the average time for every operation was calculated considering an allowance of 30% (confirmed by the industry) and unbundling time of two seconds in average. From these calculations process and line capacity along with the efficiency of the workers can be established comparing standard and actual outputs.

But if we take a closer view about the overall "Time Study" procedure described above, some deficiencies can be identified. Average of only ten consecutive data cannot perfectly represent the needed time of a particular process. This is because all the ten data are taken one after the other in a particular time without any time interval. But it is not at all necessary that a particular worker doing a specific operation will take almost similar time for each job/product.

After observing and also taking necessary data, we obtained the proof of the above statement that the efficiency of the worker changes with time showing a variation in different times of a day. The reasons behind that can be unwanted power failure, lack of concentration, machine defect, maintenance problem, rework and scrap, bottle-necking, health and safety issues, lack of infrastructures etc and many more.

So, the more efficient and intelligent technique to calculate the standard output of the worker for an operation is to observe him/her for a whole day. So, we collected data of the needed time for a single operation in every ten or fifteen minutes time intervals. After every ten or fifteen minutes, five observations were recorded for a specific worker which continued the whole day. Finally the average of the whole collected observations was calculated and standard time for a process was obtained considering allowance as mentioned above. It is done in the same manner for all the operations in a line for producing a specific type of garment. The following comprehensive process can be used easily to identify the advantages comparing with the **Time Study** process like:

- As in this process the working capacity of a worker for his/her defined job is recorded for the whole day, the calculated standard time will be much more accurate and precise.
- If the data of observing time and process time are plotted in a graph, a curve can be gained showing the variation of the working capacity of the worker in the whole day.
- From the graph mentioned in the previous point, some different times can be marked in which the efficiency of various type of workers slows down, rises, achieve peaks or falls down.
- As the particular times of low efficiency can be detected in this procedure, it will be much easier to analyze the reasons behind this low efficiency.
- By analyzing the reasons, the administration of the industry can take necessary initiatives to improve the efficiency in the particular times when the efficiency is alarmingly low.
- The types of workers can be categorized according to their working capacity following the graph mentioned before.
- As power failure is a common phenomenon in the RMG sector of our country, if power failure occurs in times when the worker efficiency is high, the production loss will be more than other times. These losses can be counted by this procedure.

Fig.4.1 to Fig.4.18 shows the variation of production in different section of different products. Table 4.1 to Table 4.6 shows the production in different section of different product due to inadequate supply of electricity.

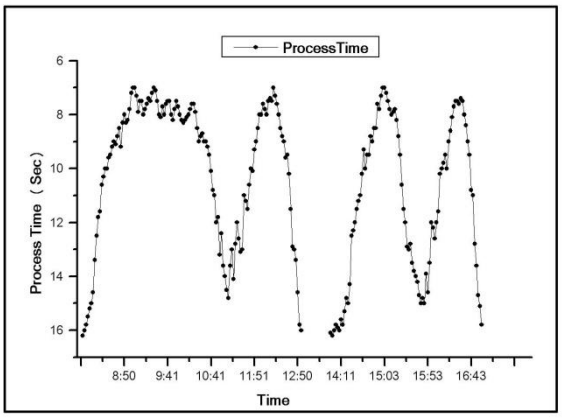

Fig.4.1 Production rate of Back & Front Attach

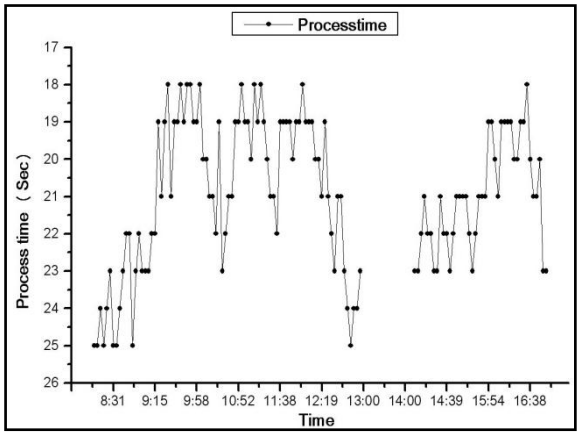

Fig.4.2 Production rate of Shoulder Joint

Fig 4.1 shows process time fluctuation from 07.30 to 17.00 for back and front attach section. It shows that the process time drops from 16 sec to 07 sec at the 1st one hour and becomes steady for next 1.5 hour and rises to 15 sec before first half break. After lunch break the process time decreases and performance becomes highest in an hour. There is a drop in efficiency after that & process time increases before the end of working hour.

Fig 4.2 shows the Process time for Shoulder joint over different time of working hour, the efficiency (low processing time) peaks up in first 45 minutes and becomes steady before the lunch break . There is sudden drop in delivery/ performance before lunch break (high processing time) which picks up to some extent after lunch break. The processing time is more or less same after lunch break & sudden efficiency drop before end of working hour.

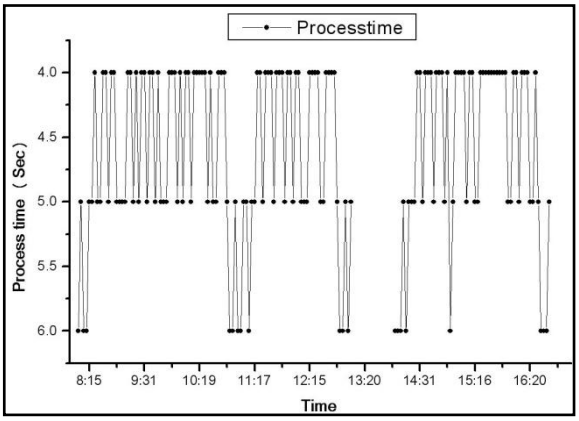

Fig.4.3 Production rate of Rib Tack

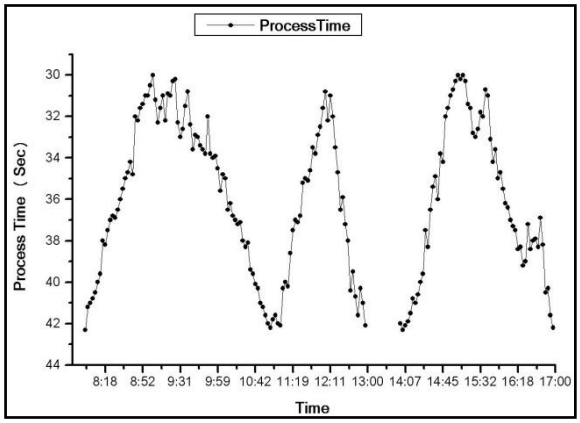

Fig.4.4 Production rate of Rib Attach

Fig 4.3 and Fig.4.4 show the Process time of Rib Tack and Rib Attach. The production becomes high at the first 45 mins than becomes less fluctuating for an hour & keeps dropping before the first break (11.00). After the first break production goes up (less

process time) and reaches its peak (31sec/pc). Half an hour before lunch break the production rate drops to minimum. After lunch break it again picks up to 30 sec/PC in one and half an hour which gradually drops before the end of the day.

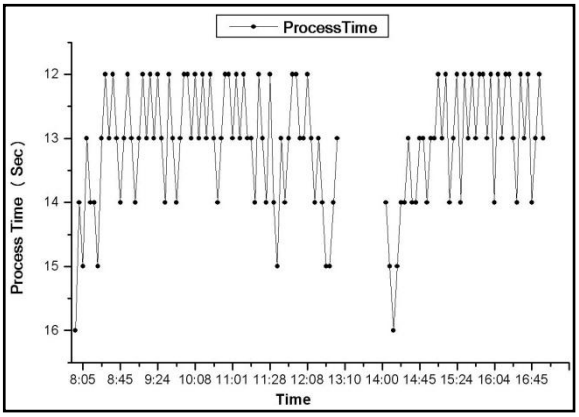

Fig.4.5 Production rate of Back Tack

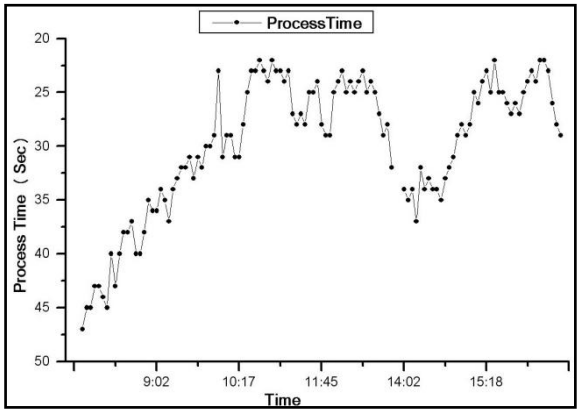

Fig.4.6 Production rate of Back Top Seam

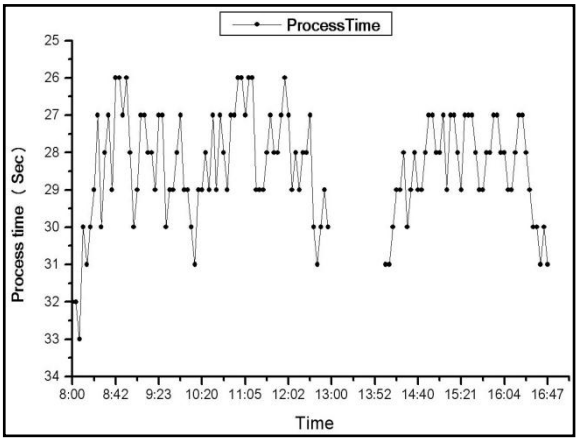

Fig.4.7 Production rate for Neck Top Seam

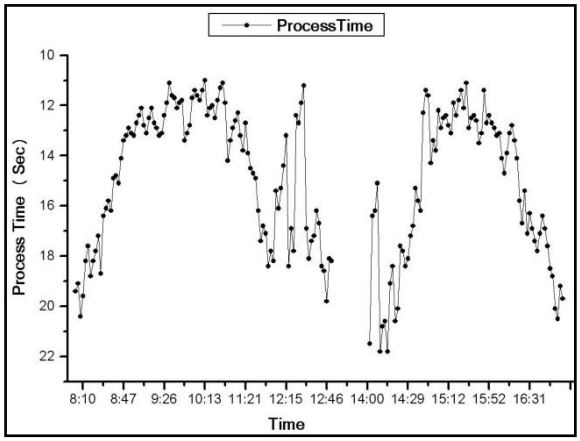

Fig.4.8 Production rate for Level Joint

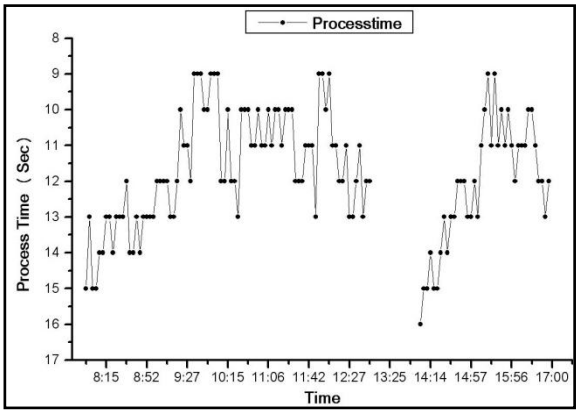

Fig.4.9 Production rate of Shoulder Scissoring

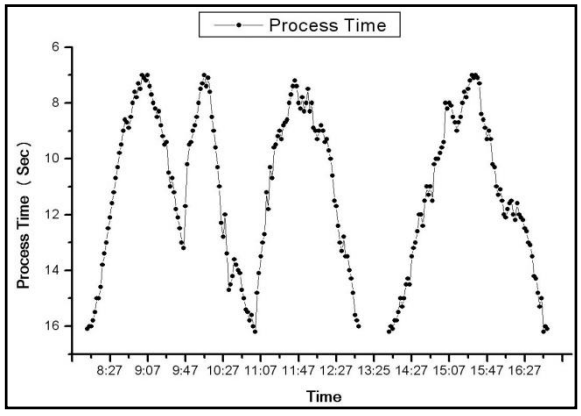

Fig.4.10 Production rate of Sleeve Attach

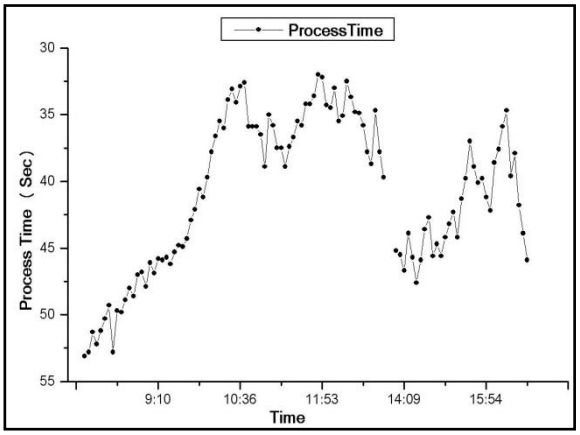

Fig.4.11 Production rate of Sleeve Tack

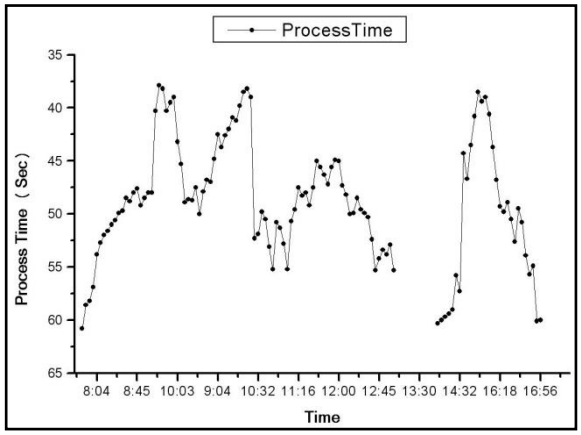

Fig.4.12 Production rate of Sleeve Joint

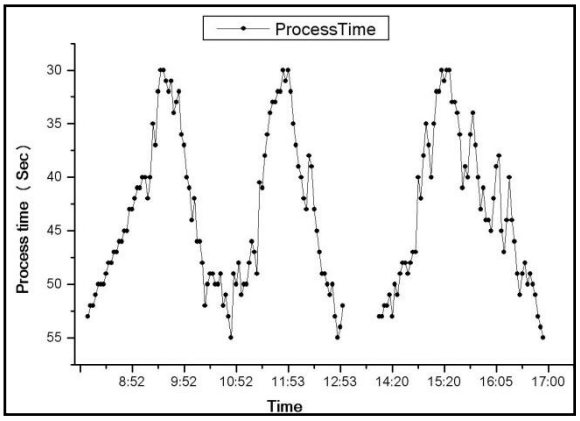

Fig.4.13 Production rate of Armor Top Seam

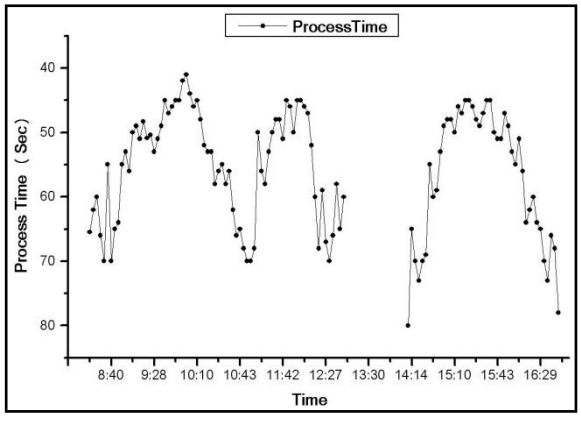

Fig.4.14 Production rate of Side Joint

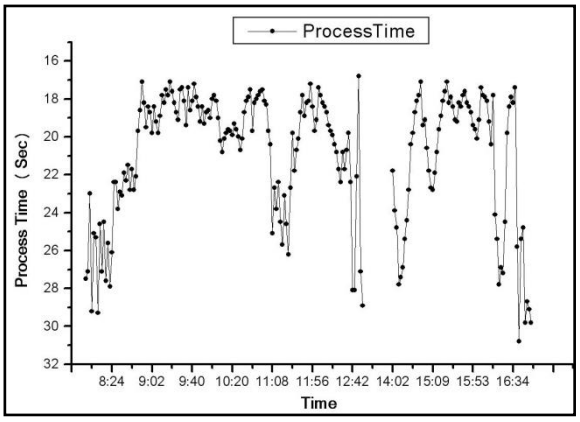

Fig.4.15 Production rate of Sleeve Hem

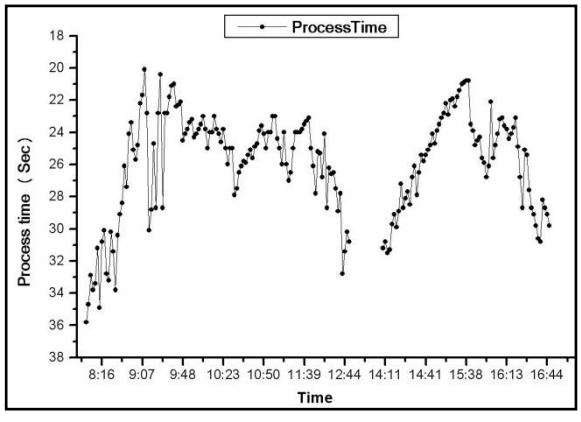

Fig.4.16 Production rate of Body Back

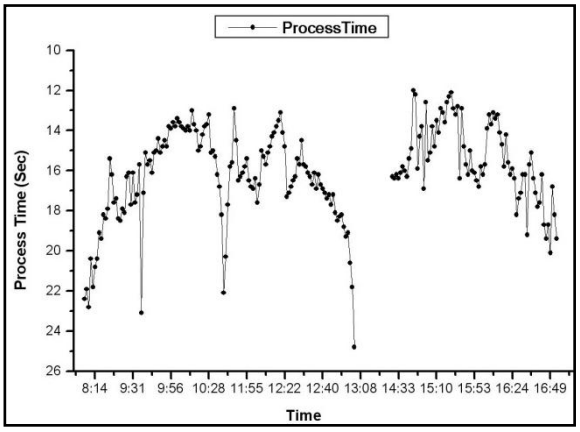

Fig.4.17 Production rate of Body Hem

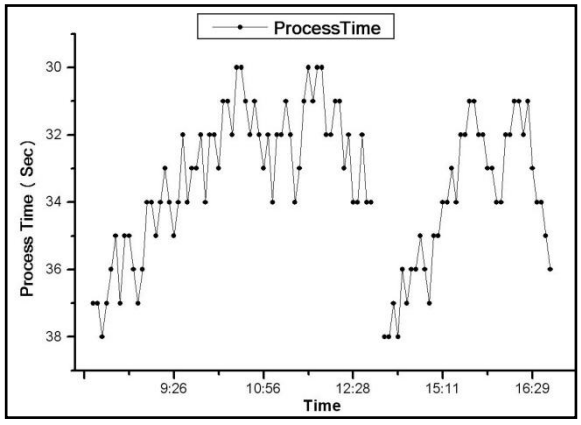

Fig.4.18 Production rate of Thread Cutting

Similar result can be seen in Fig.4.5 to Fig.4.18. From Fig. 4.1 to Fig 4.18, it is seen that the production rate fluctuation is almost same throughout the day. The production rate rises consistently for the first one hour and becomes steady for half an hour and seems dropping before around 10.00. Production again picks up after first break and drops before lunch break. After lunch break it again rises to maximum and drops again before end of the day.

Table 4.1 Production losses in different sections due to power failure in a day

Sections	Targeted Output	Production Losses
Cutting Section	3,125 Pcs/hr	3,386 Pcs
Sewing Section	3270 Pcs/hr	3,811 Pcs
Finishing Section	3,300 Pcs / hr	3,622 Pcs

Table 4.2 Losses for wages and allowances in different sections due to power failure per day on average

Sections	Total time taken to start the production after the power failure occurred at the PDB lines	Losses for wages (Tk)	Losses for allowance (Tk)	Total losses (Tk)
Cutting section	3,900 sec	4,387.5	1,495	5882.5
Sewing section	4,201 sec	39,760.8	12,675	52,435.9
Finishing section	3,569 sec	6,205.1	1,870	8,075.1
Electricity cost for overtime period	4,020 sec			5,410.92
			Total:	71,804.4

Table 4.3	Production losses in different sections due to power failure for 40 days on average		
Sections	Targeted output	Total time taken to start the production after the power failure occurred at the PDB lines	Production losses
Cutting section	66.67 Pcs/min	3hr 54min	15,600Pcs
Sewing section	62.5 Pcs/min	3hr 54min	14,625Pcs
Finishing section	66.67 Pcs/min	3hr 54min	15,600Pcs

Table 4.4	Losses for wages and allowances in different sections due to power failure for 40 days on average			
Sections	Total time taken to start the production after the power failure occurred at the PDB lines	Losses for wages (Tk)	Losses for allowance (Tk)	Total losses (Tk)
Cutting section	3hr 54min	6,972	1,430	8,402
Sewing section	1hr 10min	58,511.70	10,600	69,111.7
Finishing section	1 hr	11,495.22	1,940	13,435.2
Maintenance section	1hr 7min	830.4	70	900.4
Electricity cost for overtime period				8,792.75
			Total:	100,642

Table 4.5	Production losses in different sections per day on average		
Sections	Targeted output	Total time taken to start the production after the power failure occurred at the PDB lines	Production losses
Cutting section	1,000 Pcs/hr	77 min	1,284Pcs
Sewing section	600 Pcs/hr	77 min	770Pcs
Finishing section	750 Pcs/hr	77 min	963Pcs

Table 4.6	Losses for wages and allowances in different sections due to power failure in a day on average			
Sections	Total time taken to start the production after the power failure occurred at the PDB lines	Losses for wages (Tk)	Losses for allowance (Tk)	Total losses (Tk)
Cutting section	77 min	1,379.5	462	1,841.5
Sewing section	77 min	14,437.2	4,236	18,673.2
Finishing section	77 min	2,063.73	612	2,680.73
Maintenance section	77 min	96	42	138
Electricity cost for overtime period				1,295.53
			Total:	24,628.96

Conclusions

The aim of BGMEA is to encourage manufacturing of quality products to compete the competitive World Market through enhancing production of RMG sector. It is committed to protect the interest of its members; helps and influences the Government to formulate pro-growth policies for the sector; and encourages its members constantly to attain development of skill and efficiency of workers and management personnel. BGMEA keeps regular contacts with labor organizations for harmonious worker-management relations and committed to implement all legitimate rights and privileges of garment workers. Very importantly, BGMEA maintains liaison with local and global trade bodies and UN agencies, and bridges interactions between the local exporters and international buyers by arranging fairs in Bangladesh and participates with its members in international fairs in USA, Europe, Russia, Japan and other countries.

It is well-known that sufficient power supply are among the main preconditions for the efficient production of industry sector and thus for promoting exports. The RMG, which is the main export of Bangladesh, heavily depended on modern infrastructure and adequate power supply in their process of production. However, the RMG have been facing with huge trouble particularly loss of production and cost of production is increasing extensively with insufficient supply of gas and electricity during recent period. Many garments factories are now considerably relying on alternative power supply as generators. However, the diesel-run generators are expansive to the RMG producers though the government has been supporting the sector by providing subsidies on diesel. Power supply through generators are not also working as perfect substitute of electricity and gas supply, and have been causing depletion of the garments machineries. Moreover, the removal of subsidies by the government in near future would worsen the situation further.

The overall production loss in the whole RMG sector (estimated for 3500 RMG industries) is accounted individually for different sections. The amount of loss for the overall cutting, sewing and finishing section of RMG sector is consecutively 21.102 million, 19.045 million and 20.015 million pieces during a time period of approximately 40 days. Besides the losses in units, the losses are also accounted in cost for different criteria like losses due to transfer work (combination of wages and allowance rate), electricity cost for overtime period, un-utilizations of generator and losses due to alternative power supply. Total losses estimated regarding the above criteria for all the sections of RMG sector is 1,849.4 million tk. in the observation period of approximately forty days. This gigantic amount is certainly not ignorable and with the removal of these extra expenses or losses, the RMG sector can expand their earnings in a great extent.

If the production loss in the three industries is compared, we can discover that, relatively smaller industries like Sunshine knitwear and DSL garments that use diesel generators are facing severe problems due to power failure because of overtime, maintenance and recent hike in price of diesel. Although previous calculations showed higher loss for Padma Polycotton using gas generator, but it must be mentioned that Padma Polycotton is a large industry having much more floors and lines than Sunshine and DSL with a higher production capacity. It is necessary to mention that, not all the RMG industries are using the PDB power supply as the main power source and gas/diesel generators as an alternate but some established industries (confining 15% of the whole RMG sector) use full time generators (especially gas generators) without any PDB supply lines. So, it can be said that they have no production loss due to power failure as they are facilitated with nonstop power supply, but they still have to bear losses due to gas generator as continuous power supply and un-utilization of generator's capacity. Such an industry named Chaity Composite Ltd. bears losses of 150,048 tk. and 291,008.64 tk. for the above two criteria consecutively.

On the way to protect the interests of its members and to continue with the expansion of RMG production and exports growth, BGMEA has raised its concern in regard to the inadequate supply of gas and electricity to the RMG industry of the country. It is now urgently felt by the BGMEA members that a study should be conducted to

identify the implications of the inadequate power supply to the RMG sector and take necessary actions in response to the observations and findings of the study.

Finally, it can be stated that it is high time the problem of inadequate electricity and gas supply should be solved. All the RMG industries along with the help of BGMEA should come forward and contribute collectively to find a suitable and effective solution of this crisis to prolong the tremendous growth of the RMG sector in Bangladesh.

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APPENDIX

Power failure data for **Cutting Section** (**01-07-2008 – 10-07-2008**):

Date	Time	Total time for power failure at PDB lines	Time taken to start production after the power failure at PDB lines
01-07-08	10:53 – 10:53	8 sec	13 sec
05-07-08	11:51 – 11:58	6 min 19 sec	7 min 08 sec
	12:35 – 12:42	6 min 21 sec	7 min 10 sec
06-07-08	11:42 – 12:24	41 min 15 sec	43 min 2 sec
07-07-08	14:02 – 14:05	2 min 16 sec	3 min 12 sec
08-07-08	12:11 – 12:14	3 min 10 sec	4 min 15 sec

Power failure data for **Sewing Section** (**01-07-2008 – 10-07-2008**)

Date	Time	Total time for power failure at PDB lines	Time taken to start production after the power failure at PDB lines
01-07-08	10:53 – 10:53	8 sec	22 sec
05-07-08	11:51 – 11:58	6 min 19 sec	8 min 30 sec
	12:35 – 12:42	6 min 21 sec	7 min 32 sec
06-07-08	11:42 – 12:24	41 min 15 sec	44 min 4 sec
07-07-08	14:02 – 14:05	2 min 16 sec	4 min 8 sec
08-07-08	12:11 – 12:14	3 min 10 sec	5 min 25 sec

Power failure data for **Finishing Section** (**01-07-2008 – 10-07-2008**)

Date	Time	Total time for power failure at PDB lines	Time taken to start production after the power failure at PDB lines
01-07-08	10:53 – 10:53	8 sec	12 sec
05-07-08	11:51 – 11:58	6 min 19 sec	7 min 22 sec
	12:35 – 12:42	6 min 21 sec	7 min 8 sec
06-07-08	11:42 – 12:24	41 min 15 sec	43 min 32 sec
07-07-08	14:02 – 14:05	2 min 16 sec	3 min 17 sec
08-07-08	12:11 – 12:14	3 min 10 sec	4 min 22 sec

Power failure data for **Knitting Section** (**01-07-2008 – 10-07-2008**):

Date	**Time**	**Total time for power failure at PDB lines**	**Time taken to start generator power supply after the power failure at PDB lines**
01-07-08	10:53 – 10:53	8 sec	8 sec
05-07-08	11:51 – 11:58	6 min 19 sec	6 min 19 sec
	12:35 – 12:42	6 min 21 sec	6 min 21 sec
06-07-08	11:42 – 12:24	41 min 15 sec	16 min 12 sec
07-07-08	14:02 – 14:05	2 min 16 sec	2 min 16 sec
08-07-08	12:11 – 12:14	3 min 10 sec	3 min 10 sec

Table: **Power failure data for the month of June (**01-06-2008 – 30-06-2008)

Date	**Generator On Time**	**Generator Off Time**	**Off-Peak**	**Peak**	**Current (Am)**	**Voltage (V)**	**Power (kW)**	**Electricity Bill (Tk)**
01-06-08	8:38 AM	9:44A M	1hr 6min		1022	400	327	1129.5
	6:45 PM	7:58 PM		1hr 13min	812		260	2128.93
02-06-08	9:02 AM	9:28 AM	26min		875	400	280	762
	12:17 PM	1:16 PM	59min		1164		373	1171.22
03-06-08	9:07 AM	9:34 AM	27min		1219	400	390	551
	10:21 AM	11:28 AM	1hr 7min		1168		374	1311.37
	12:22 PM	1:15 PM	53min		1241		397	1101.15
	4:35 PM	5:32 PM	35min	32min	1144		366	1316.7
	7:03 PM	7:37 PM		34min	1128		361	1376.74
04-06-08	10:12 AM	11:17 AM	1hr 5min		1178	400	376	1279
	12:17 PM	1:20 PM	1hr 3min		1177		377	1302.16
	3:32 PM	4:32 PM	1hr		1147		367	1152.38
	7:00 PM	8:00 PM		1hr	1058		338	2274.74
05-	9:45 AM	9:55 AM	10min		840	400	269	140.78

06-08	3:05 PM	4:10 PM	1hr 5min		1121		359	1221.2
	7:13 PM	8:08 PM		55min	1158		370	2282.6
	8:24 PM	8:31 PM		7min	981		314	246.54
06-06-08	4:43 PM	4:51 PM	8min		1039	400	332	139
	7:30 PM	8:33 PM		1hr 3min	981		314	2218.88
07-06-08	8:03 PM	9:04 PM	1hr 1min		1205	400	386	1232.24
08-06-08	10:02 AM	12:20 PM	2hr 18min		922	400	295	1204.2
09-06-08	11:04 AM	12:06 PM	1hr 2min		1172	400	375	1216.75
	4:05 PM	5:07 PM	55min	7min	1059		339	266.17
	7:10 PM	8:21 PM		1hr 11min	1039		332	2644
	11:15 PM	12:15 AM	1hr		883		282	885.48
10-06-08	11:12 AM	11:30 AM	18min		1222	400	391	368.32
	2:12 PM	2:50 PM	38min		964		308	612.5
	9:00 PM	9:53 PM	53min		1017		325	901.44

Date	**Generator On Time**	**Generator Off Time**	**Off-Peak**	**Peak**	**Current (Am)**	**Voltage (V)**	**Power (kW)**	**Electricity Bill (Tk)**
11-06-08	9:20 Am	10:28 Am	1hr 08min		1025	400	328	1167.25
	12:50 Pm	1:58 Pm	1hr 08min		1129		361	1284.7
	5:02Pm	6:03 Pm		1hr 01min	1115		357	2442.65
12-06-08	9:16Am	9:24Am	8min		1111	400	355	148.63
	10:12Am	11:07 Am	55min		1215		389	1119.67
	5:58Pm	7:17Pm		1hr 19min	1066		341	3021.66

13-06-08	3:38 Pm	4:34 Pm	56min		1105	400	353	1035.53
14-06-08	10:55Am	12:04Pm	1hr 09min		1156	400	370	1336
	2:20 Pm	3:10 Pm	50min		1110		355	928.92
	5:10 Pm	6:14 Pm		1hr 04min	1091		349	2505.36
	11:13Pm	12:17Am	1hr 04min		797		255	854
16-06-08	8:49 Am	9:47 Am	58min		1071	400	343	1041.12
	10:44 Am	11:52 Am	1hr 08min		1081		346	1231.3
	4:30 Pm	5:40 Pm	30min	40min	1108		354	1588.28
	6:58 Pm	7:59 Pm		1hr	1027		328	2244.23
17-06-08	7:32 Pm	8:38 Pm		1hr 06min	973	400	311	2302.33
18-06-08	7:15Pm	8:20 Pm		1hr 05min	930	400	297	2165.38
20-06-08	9:40Pm	10:30Pm		50min	1142	400	365	2047
21-06-08	2:40Pm	3:44Pm	1hr 04min		1095	400	350	1172.27
22-06-08	9:32Am	12:22 Pm	2hr 50min		930	400	297	2642.31
	2:10 Pm	3:52 Pm	1hr 42min		949		304	1622.75
23-06-08	11:04 Am	12:05 Pm	1hr		1225	400	392	1251.4
	1:02 Pm	2:10 Pm	1hr 08min		311		100	355.87

	4:05 Pm	5:05 Pm	55min	5min	1143		366	205.26
	7:07 Pm	8:11 Pm		1hr 04min	1185		379	2720.72
	10:07 Pm	10:37 Pm		30min	762		244	821
24-06-08	10:20 Am	10:28 Am	8min		1159	400	371	155.33
	12:24 Pm	1:25 Pm	1hr		1189		380	1213
	3:33 Pm	4:28 Pm	55min		1200		384	1105.28
	6:28 Pm	7:33 Pm		1hr 05min	1085		347	2529.92
	11:10 Pm	12:00 Pm	50min		308		98	256.43

Date	**Generator On Time**	**Generator Off Time**	**Off-Peak**	**Peak**	**Current (Am)**	**Voltage (V)**	**Power (kW)**	**Electricity Bill (Tk)**
25-06-08	10:02 AM	11:23 AM	1hr 21min		1178	400	377	2012.43
	12:15 PM	1:17 PM	1hr 02min		1138		364	1181
	4:17 PM	5:17 PM	43min	17min	1162		372	709.34
	7:05 PM	8:20PM		1hr 15min	1082		346	2910.73
26-06-08	8:57 AM	9:11 AM	14min		1011	400	323	236.65
	11:02 AM	12:08 PM	1hr 06min		1164		372	1284.88
	1:06 PM	2:07 PM	1hr		920		294	938.55
	4:07 PM	5:07 PM	43min	7min	1138		364	285.8
	7:17 PM	8:18 PM		1hr	1143		366	2504.23
27-06-08	10:53 AM	11:58 AM	1hr 05min		1109	400	355	1207.6
	7:10 PM	8:11 PM		1hr	950		304	2080
28-06-08	9:12 AM	9:26 AM	14min		1121	400	359	263
	11:15 AM	12:20 PM	1hr 05min		1138		364	1238.2
	4:18 PM	5:15 PM	42min	15min	1180		377	634.3

	6:16 PM	7:16 PM		1hr	1186		379	2550.67
29-06-08	9:42 AM	12:30 PM	2hr 48min		862	400	276	2426.6
	7:30 PM	8:20 PM		50min	143		46	258
30-06-08	10:11 AM	11:18AM	1hr 07min		1180	400	377	1321.88
	5:08P	5:37 PM		29min	1095		350	1138.5

Table: **Power failure data for the month of June (**01-06-2008 – 30-06-2008)

Date	**Generator On Time**	**Generator Off Time**	**Off- Peak**	**Peak**	**Power (kW)**	**Electricity Bill (Tk)**
01-06-08	11:04AM	12:04 PM	1hr		150	471
02-06-08	11:00 AM	12:00 AM	1hr		150	471
09-06-08	04:00 PM	04:30 PM	30min		150	235.5
10-06-08	08:00 PM	08:30 PM		30min	150	504.75
14-06-08	03:00 PM	04:00 PM	1hr		150	471
	08:00 PM	09:00 PM		1hr		1009.5
15-06-08	07:00 PM	08:00 PM		1hr	150	1009.5
16-06-08	04:00 PM	04:40 PM	1hr		150	471
23-06-08	07:00 PM	08:00 PM		1hr	150	1009.5
24-06-08	11:50 AM	12:50 PM	1hr		150	471
26-06-08	11:00 AM	12:00 AM	1hr		150	471

QUESTIONNAIRES FOR ELECTRICITY & GAS SUPPLY IN RMG

Name of the Garment		Location	
Address		Year Established	
	Tel:	Fax:	
Type of product:			

Organization / Management				
Capital Involvement	Fixed capital			
	Machinery			
	Land			
	Building			
	Workers wages			
	Others			
Source of Finance (both for fixed and working capital)	☐ Own capital	☐ Bank loan	☐ Both	☐ Others
Number of Employees	☐ Full time #		☐ Part time #	

Electricity Requirements									
Year	2005	2006	2007	2008	2009	2010	2011	2012	2013
Hourly									
Daily									
Monthly									
Yearly									

Gas Requirements									
Year	2005	2006	2007	2008	2009	2010	2011	2012	2013
Hourly									

Daily									
Monthly									
Yearly									

Power Source				
National Power Grid				
Generator	☐ Diesel	☐ Petrol	☐ Gas	☐ Others

Year	2009		2010		2011		2012	
	Requirement	Supply	Req	Supply	Req	Supply	Req	Supply
Hourly								
Daily								
Monthly								

Product Details			
Type of product			
Material Supplier	☐ Sweater ☐ T Shirt ☐ Knitwear ☐ Pant ☐ woolen wear		
Do you face quality problems due to power cut?		What kind of quality problems do you face?	
☐ Yes	☐ No		☐
			☐
			☐
			☐

	Power Source Details

Type of Generator	Power Generation Capacity	Capital Cost	Types of Fuel	Revenue for Fuel	Cost of Maintenance	Manpower involved	Cost regarding Manpower	Remarks

Type	Load shedding Frequency
Hourly	
Monthly	
Yearly	

Product Output					
Production Rate	☐ Hourly	☐ Daily	☐ Weekly	☐ Monthly	☐ Order-based
	#	#	#	#	#
Defect Rate	%	Rework Rate	%	☐ In-house	☐ Outsource
Source of Defect	☐ Man	☐ Machine	☐ Process	☐ Raw Material	☐ Other

Manpower activity during power cut	•
	•
	•
	•
	•
	•

Effect on Manpower			
Do you require outsourcing?		Rate of out-sourcing with respect to production	
		☐ %	☐
☐ Yes	☐ No		

Product Output					
Production Volume	☐ Hourly	☐ Daily	☐ Weekly	☐ Monthly	☐ Order-based
	#	#	#	#	#
Total revenue for electricity(Tk.)					
Total revenue for electricity(Tk.)					
Cost of electricity per unit product					
Cost of Gas per unit product					
Effect on Business					
Does the load shedding have any effect on dead line?				☐ Yes	☐ No
Do you miss dead line of shipment due to insufficient power supply?				☐ Yes	☐ No