



## Supply Chain Insider

Volume 12, Issue 01, 101-133. 10-10-24

Article Received: 20-08-2024

Accepted: 15-09-2024

Available Online: 10-10-2024

ISSN: 2617-7420 (Print), 2617-7420 (Online)

DOI: 10.5281/zenodo.13865148

supplychaininsider.org

# How To Reduce Energy Crisis of RMG Industry In Bangladesh: Overcome Utilizing Proper Supply Chain Management

Tawshik Islam, Azwad Abrar

Mashtura Mim, Sadia Noshin

### Abstract:

Energy crisis in RMG industry caused a major change that has an impact on the supply chain. The main energy crisis sources of RMG industry are poor infrastructure, delay in accomplishment of power plants, huge population, over consumption, natural disasters, unexplored renewable energy sources. That's why our RMG industry is losing its competitiveness to other countries as well as the cost of production increased. The GOB (Government of Bangladesh) is taking necessary steps to reduce energy crisis in RMG industry. Upgrading energy efficiency, exalt renewable energy, investing for new power plants are some good initiatives of GOB (Government of Bangladesh).

### Keywords:

GOB, SWOT ANALYSIS, SYMMETRY, HVAC, CONTINGENCY

## Introduction:

Bangladesh's Ready-Made Garment (RMG) industry, the spine of its economy, has been embrace with a severe energy crisis in recent years. This crisis has emerged as a outrageous challenge, threatening the industry's growth, competitiveness, and overall performance to the nation's GDP. The RMG sector notable for its export-oriented prowess and labor-intensive operations is heavily reliant on a stable and uninterrupted power supply. Electricity and gas are evidential for the industry's production processes from fabric dyeing and finishing to stitching and packaging. However, the country's ample energy infrastructure, coupled with rising energy demands, has led to frequent power outages and gas shortages, significantly impacting the RMG sector's productivity and efficiency.

This introduction sets the stage for a deep investigation of the multifaceted challenges posed by the energy crisis to the RMG industry. It will delve into the particular impacts of power outages and gas shortages, the financial freight on RMG manufacturers, and the potential consequences for the broader economy. The RMG industry's success has traditionally relied on a combination of low-cost labor and a stable energy supply. However, the escalating energy crisis has wasted this competitive advantage, threatening the industry's sustainability and the livelihoods of millions.

Key factors contributing to the energy crisis:

**1.Unreliable electricity supply:** Frequent power outages and load shedding have overturn production schedules, leading to decreased output and order cancellations.

**2.Gas shortages:** The RMG sector is heavily reliant on gas for dyeing, washing, and other processes. Insufficient gas supply has crocked operations and compromised product quality.

**3.Rising energy costs:** The rising price of fuel for power generation and transportation has significantly elevated production costs, reducing profit margins.

**4.Exchange rate volatility:** Fluctuations in the exchange rate have further enhance the crisis, affecting the industry's competitiveness in the global market.

The sequences of this energy crisis are far-reaching, impacting not only the RMG sector but also the broader Bangladeshi economy. Job losses, reduced exports, and a decline in foreign exchange earnings are some of the potential repercussions.

Addressing this crisis requires a multi-faceted approach, including:

**1.Diversification of energy sources:** Searching alternative energy options such as solar, wind also hydro power can decrease dependence on fossil fuels.

**2.Infrastructure development:** Conferring in power generation and transmission infrastructure is crucial to ensuring a stable energy supply.

**3. Energy efficiency:** flourishing energy-efficient practices within the RMG industry can help mitigate the impact of the crisis.

**4. Government support:** Giving targeted support to the RMG sector, such as subsidies or tax breaks, can help businesses cope with the challenges.

## Literature Review:

The RMG industry is the main column of Bangladesh's economy, contributing significantly to GDP and employment. However, the industry's growth and sustainability are increasingly vov by the country's chronic energy crisis. This literature review investigates existing research on the energy crisis's impact on the RMG sector, identifying key challenges, proposed solutions, and research gaps.

### # Key Challenges:

#### 1. Energy Supply and Demand Imbalance:

Some studies highlight the widening gap between energy supply and demand in Bangladesh, particularly in the RMG sector. The reliance on natural gas, which is consume rapidly, has exacerbated the crisis. The intermittent power supply and load shedding have severely influenced production schedules and quality.

#### 2. Economic Impact:

Research premise that the energy crisis has led to increased production costs due to the use of expensive diesel generators.

This has carious the RMG sector's competitive advantage in the global market- Decreased export earnings and job losses have been reported as consequences of the energy crisis.

#### 3. Environmental Concerns:

The mass use of diesel generators has contributed to air pollution and greenhouse gas emissions. Studies emphasize the need for sustainable energy solutions to mitigate environmental impacts.

#### 4. Government Policies and Interventions:

Existing literature points to the government's efforts to trace the energy crisis through various initiatives, such as power plant construction and energy efficiency programs. However, the effectiveness of these policies in alleviating the RMG sector's problems has been questioned.

#### 5. Role of Renewable Energy:

Research suggests that renewable energy sources, as solar and wind power, offer hopeful solutions to the energy crisis. Studies have find out the potential of rooftop solar installations in RMG factories to reduce reliance on the grid.

## **6. Dependency on Natural Gas:**

The RMG industry is heavily trustful on natural gas for its operations, particularly for power generation and industrial processes. The depleting natural gas reserves have led to frequent gas shortages and load shedding, disrupting production and increasing costs.

## **7. Increased Production Costs:**

The energy crisis has evolved in higher production costs for RMG manufacturers due to the increased reliance on diesel generators during power outages. This has eroded the industry's competitive advantage in the global market.

### **#Impact on RMG Industry:**

**1. Threat to Export Competitiveness:** High energy costs and unreliable power sources make Bangladesh less attractive to global buyers compared to competitors.

**2. Job Losses:** The crisis may guidance to factory closures and job losses, affecting millions of workers.

**3. Supply Chain Disruptions:** Unpredictable power supply can shatter the entire supply chain and impacting both domestic and international businesses.

### **#Proposed Solutions:**

**1. Energy Efficiency:** Studies accent the importance of energy-efficient technological tools and practices in RMG sector to reduce consumption.

**2. Renewable Energy:** Conferring in renewable energy powers like solar and power of wind is seen as a long-term solution to mitigate the energy crisis.

**3. Government Policies:** Researchers patron for supportive government policies, including subsidies for renewable energy, tax incentives for energy-efficient investments, and improved power infrastructure.

**4. Diversification:** Exploring alternative energy sources like biomass and hydropower is suggested to decrease dependence on natural gas.

### **# Research Gaps:**

**1. Quantitative Impact Assessment:** As there are qualitative studies on the energy crisis's impact, quantitative assessments of its economic and social costs are limited.

**2. Comparative Analysis:** Comparative studies with other energy-intensive industries can give valuable insights into best practices.

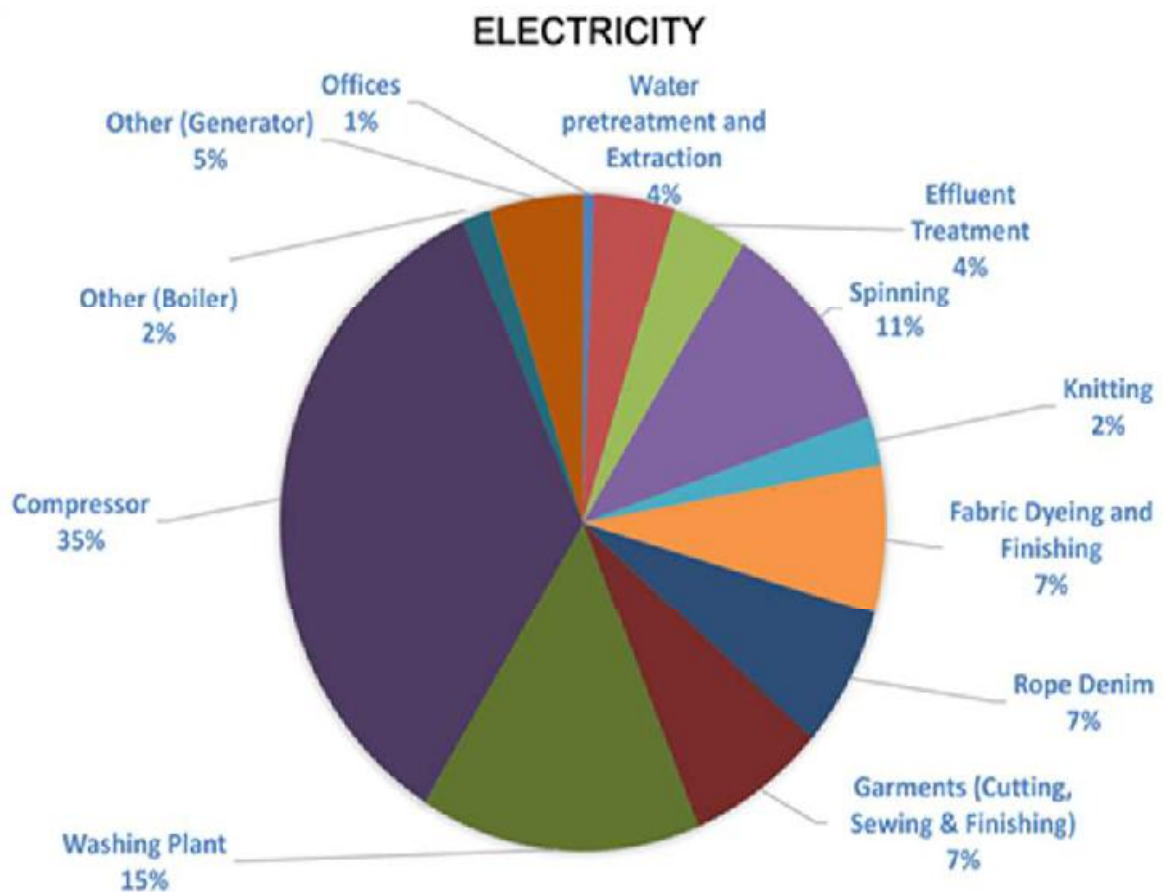
**3. Policy Effectiveness:** Appraise the effectiveness of existing government policies and interventions is crucial for informed decision-making.

### **#Potential Research Directions:**

1. Lead a comprehensive cost-benefit analysis of different energy efficiency and renewable energy options for the RMG industry.

2. Make a demo to assess the impact of energy price fluctuations in the RMG export competitiveness.
3. Identify the potential of public-private partnerships in addressing the energy crisis.
4. Find out the role of the technology transfer in upgrading energy efficiency and renewable energy adoption in RMG sector.

**Electricity usage in RMG industry of Bangladesh:**

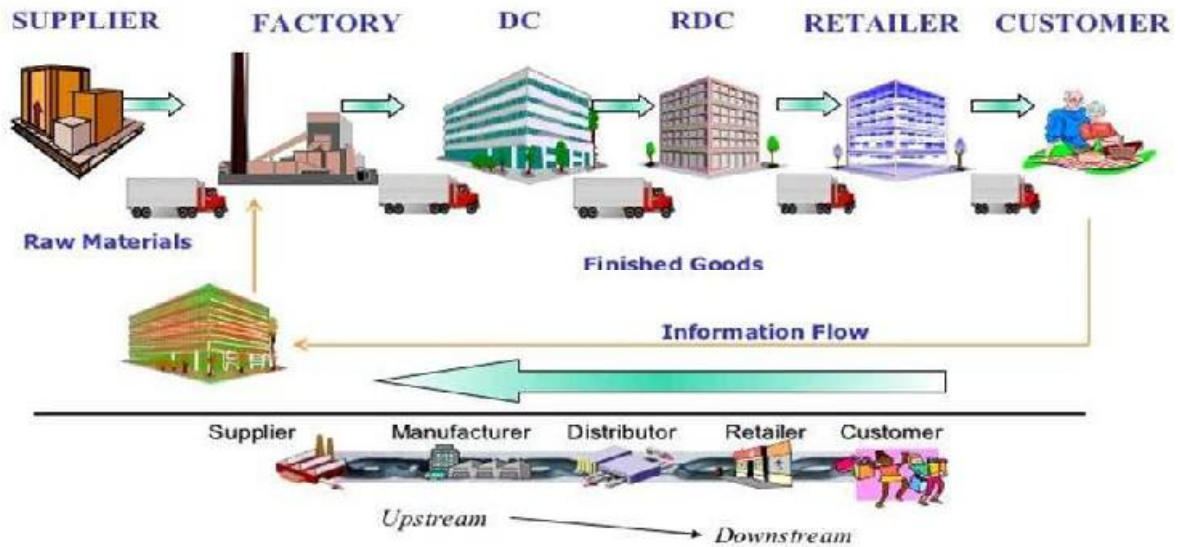


**How supply chain works in RMG Industry:**

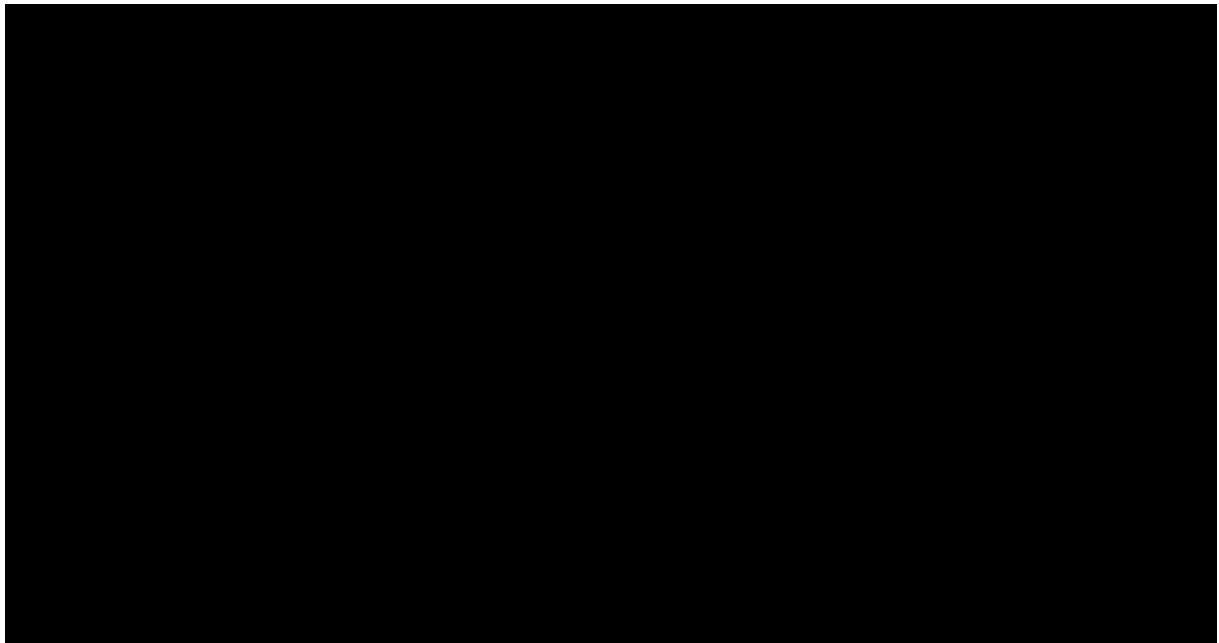
## Supply Chain Insider

Volume 12, Issue 01, 201. 10-10-23 ISSN: 2617-7420 (Print), 2617-7420 (Online)

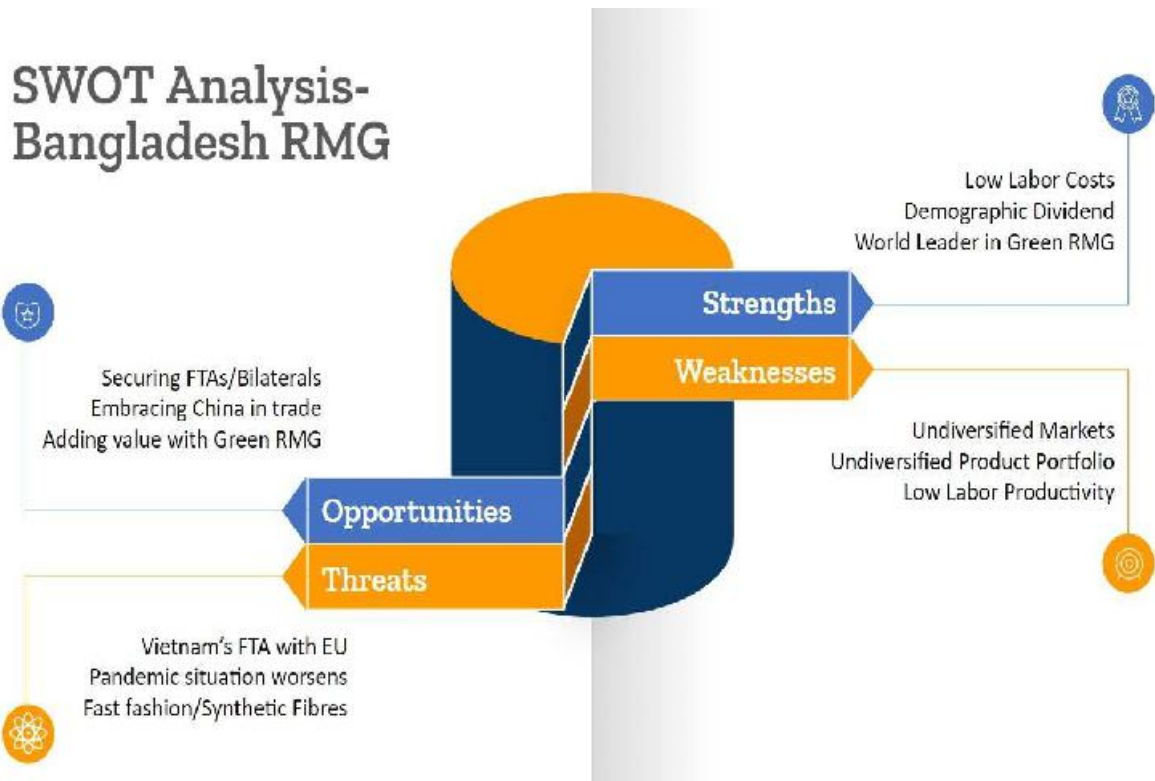
supplychaininsider.org Page 5



Supply chain cycle for RMG Industry:



**SWOT analysis of RMG industry:**



**Data table and calculation:**

**TABLE 1: Number of the factories by different size of workers**

RMG Factories With Workers	Number of the Factories	Per cent of the Factories	LEED Certified Factories Number	% of the LEED Factories
Less than 650 workers	19	26.5	5	16.7
>650 then <1650 workers	17	24.3	4	26.7
More than of 1650 workers	33	48.1	15	44.6

Total num	69	100	24	33.8
-----------	----	-----	----	------

**Weighted Point Average of the Cost of Capital (WACC)**

=( % of Debt Share\*% of cost and Debt + (1-% of debt- share)

\*(% of the expected return on the equity)---(1)

% of the expected return on the equity= [(1+ Real Growth Rate )\*(1+ Inflation Rate – 1] \* 100 - - - -  
 - - (2)

**TABLE 2: Calculated values of the WACC under different investment arrangements**

Weighted Average Capital Cost	Investment Arrangement
WACC of (30% debt)	12.24%
WACC of (50% debt)	12.17%
WACC of ( 70% debt)	12.11%
WACC of (30% debt)	10.72%
WACC of (50% debt)	9.67%
WACC of (70% debt)	8.61%
WACC of (0% debt)	12.31%



**TABLE 3: Used Parameters for the computing NPV and payback time**

Parameters or Conditions	Units
The Initial of Capital Investment	0.77 million USD/1 MW Solar System of Installation
Flat Electricity Charge (for the large industries from March 2024)	BDT 09.73/Kwh
Electricity Price growth	7.5% per annum
Exchange Rate	106 BDT/USD
Average energy yield	1280 (KWh/KW)
Initiation Rate	5.87%
Regular Operating Cost	0.27% of initial capital cost per year

$$\text{NPV} = \frac{-\text{capital investment} + \text{Total net cash inflow in system lifespan}}{(1 + \text{nominal discount})^T} \quad (3)$$

$$\text{Pay-back time (PBT)} = \frac{\text{Pay-backtime (PBT)}}{\text{Net cash inflow in the system lifespan}} \quad (4)$$

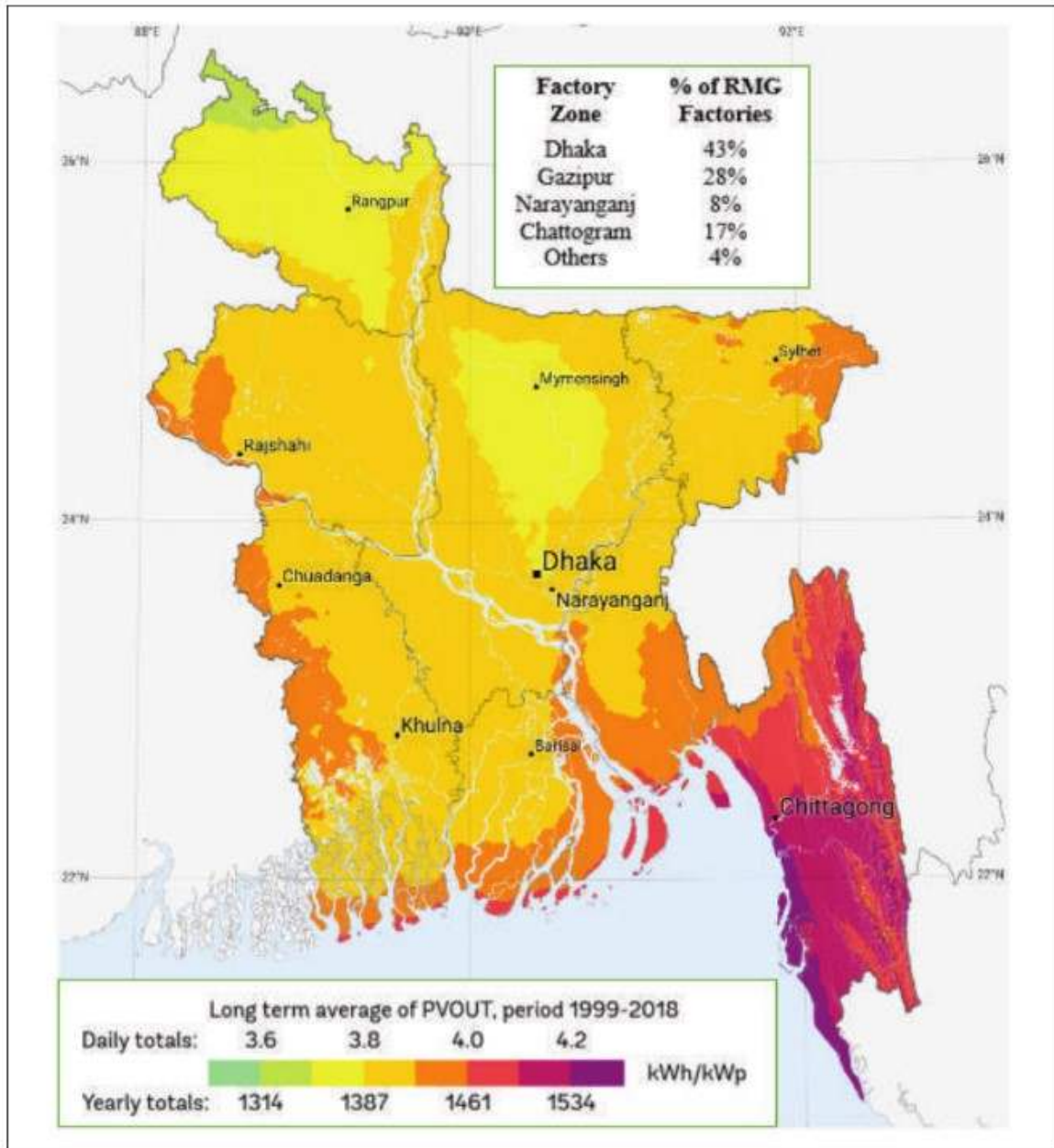
**TABLE 4: Electricity consumption of per factory (per month)**

Factory Sample	Electricity Use of Per Month (in MWh)
LEED Certified type RMGs	325.38
Non- LEED RMGs	207.41
Knit-wear	324.16
Woven	165.12
Mixed of	269.45
Less than 650 (workers)	55.61
>650 and <1650 (workers)	152.88
More than 1650 (workers)	414.72
Total Usage	247.91

**TABLE5: The Estimated electricity of generation (in GWh) demand by Bangladesh’s RMG industry**

Size of Workers % of the RMG	Factories (%)	Number of the RMG Factories	Average Electricity Demand (in MWh)	The Total Electricity Demand in RMG Industry (in GWh) per month	The Total Electricity Demand in RMG industry (in GWh) per annum
Less than 650(workers)	40.01%	1082.1	55.64	60.21	722.57
Greater than 650 but less or equal to 1,650 (workers)	30.00%	812.3	152.89	124.3	1487.3
More than 1650(workers)	30.00%	811	4144.76	336.3	4040.2
Total of	100%	2705	-	521.1	6249

**The Solar irradiation and PV power potential map of Bangladesh:**



Source: Authors' Compilation using the World Bank's PV Power Potential Map in Bangladesh.

**TABLE 6: Chart of the key stakeholders to run RMG sector's RE transition**

## Supply Chain Insider

Volume 12, Issue 01, 201. 10-10-23 ISSN: 2617-7420 (Print), 2617-7420 (Online)

supplychaininsider.org Page 13

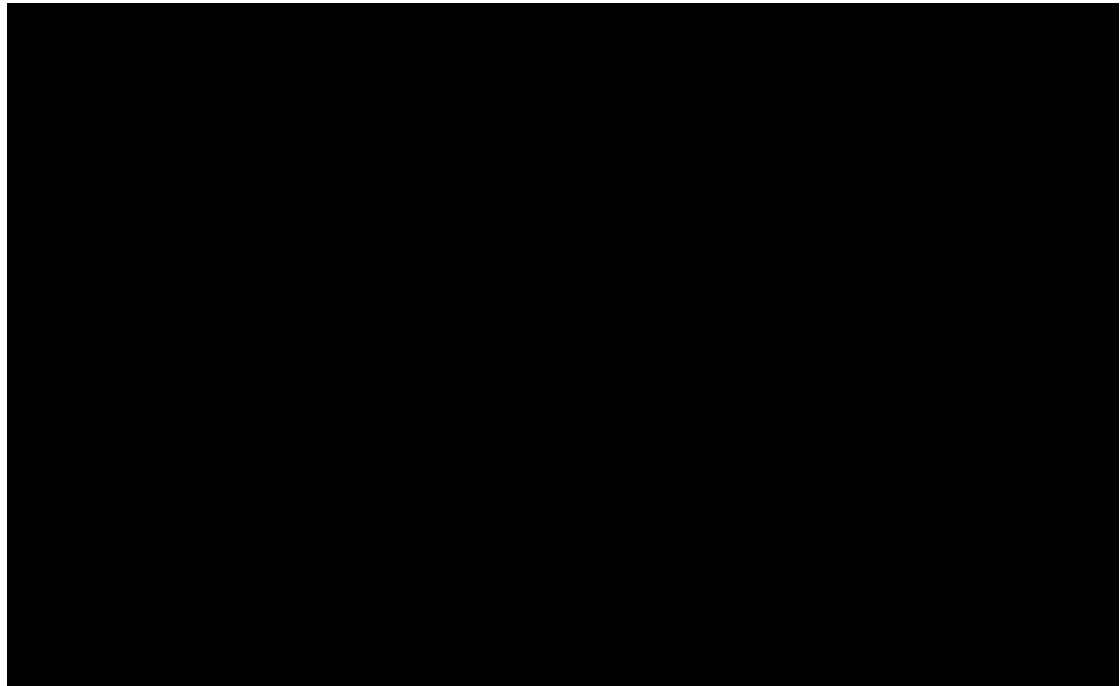
Private Sector Actors	Public Sector Actors
Private Sector/Associations Linked to Garments Industry	Financing and Project Execution
Bangladesh Garment Manufacturers and Exporters Association (BGMEA) Bangladesh Knitwear Manufacturers and Exporters Association (BKMEA) Bangladesh Garments Accessories & Packaging Manufacturers & Exporters Association (BGAPMEA) Bangladesh Textile Mills Association (BTMA)	Implementation, Monitoring and Evaluation Division (IMED), Ministry of Planning Ministry of Finance Sustainable Finance Division (SFD), Bangladesh Bank National Board of Revenue (NBR) Bangladesh Tariff Commission (BTC) Bangladesh Power Development Board (PDB) Sustainable and Renewable Energy Development Authority (SREDA) Bangladesh Export Processing Zones Authority (BEPZA)
Development Partners	Trade and Business Promotion and Negotiation
High Commissions/Embassies Buyers Group World Bank European Union (EU) International Labour Organization (ILO) etc.	Ministry of Foreign Affairs Ministry of Commerce Export Promotion Bureau Ministry of Industries Ministry of Environment, Forest and Climate Change Ministry of Labour and Employment

## Collaboration ideas or methodology for RMG industry that can help to reduce energy crisis:

### 1. Technology adoption fellowship & Government Intervention:

Technology adoption refers to the process of adopting and integrating new technologies into existing systems. When the river starts running dry, start looking for water elsewhere. This is what the global RMG industry has been doing lately. Government understands the significance of this sector and has implemented crucial interventions to support its growth and sustainability.

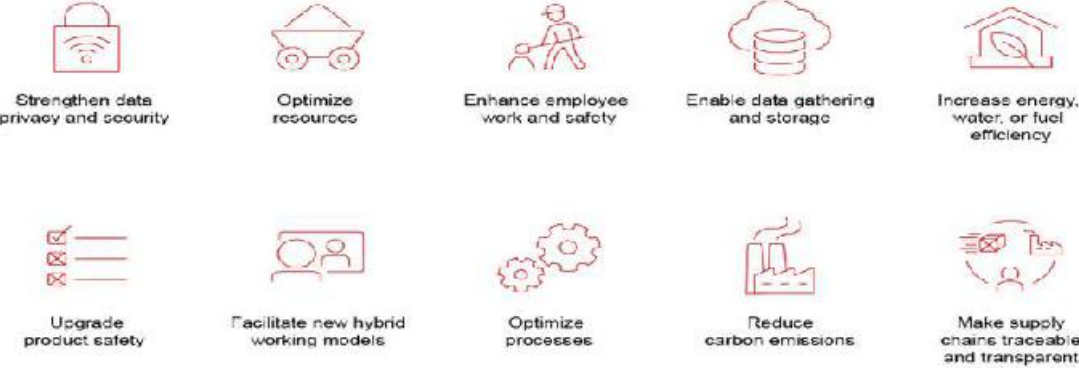
- (a) **Robotics & Automation:** There is a widespread use of the Automation and robotics in the production of garments including Fabric Inspection, Grading, Pattern Making, Pressing and Material Handling and Radio Frequency Identification (RFID). RFID technology allows real time tracking and helps in reducing losses, inventory management, monitoring of garments, improving overall Supply Chain efficiency.



- (b) **Internet of Things in Supply Chain Management:** IoT involves of an entire ecosystem of various tools and services that must come together to deliver a complete solution. IoT helps in better understanding of Customer’s needs and requirements optimize product assortment and customize recommendations to improve designs, pattern and shape. It enables monitoring of production process, real-time inventory tracking and optimization of logistics. IoT sensors can identify bottlenecks, improve inventory management and enhance overall Supply Chain visibility.



(c) **Sustainability Technologies & Digital Platforms:** Sustainability must be achieved by technology. These include reducing energy and water usage, Material efficiency, Emission reduction, Waste Management systems and eco-friendly materials. For example adopting dyeing processes which minimize water expense and implementing recycling systems for fabric waste which can contribute to sustainable practices. Virtual marketplace can be a gateway for local small and medium enterprises (SEMs) to go global.



(d) **Infrastructure Development:** Government focused on improving infrastructure such as roads, ports, power supply and Reduce logistics costs as well as improve efficiency. Congestion and

# Supply Chain Insider



delays are pervasive problems across the logistics system, from roads to sea-ports and land ports. Alternative nodes and links across the transport system is must to rise redundancy and resilience.



## **2. Forecast and Symmetry Energy Demand:**

Forecasting and demand analysis can be used to analyze historical and current data for regional primary and national energy production in RMG industry of Bangladesh. Also data preparing, measuring, coverage and accuracy are same important.

### **How we can symmetry energy Demand in RMG Industry:**

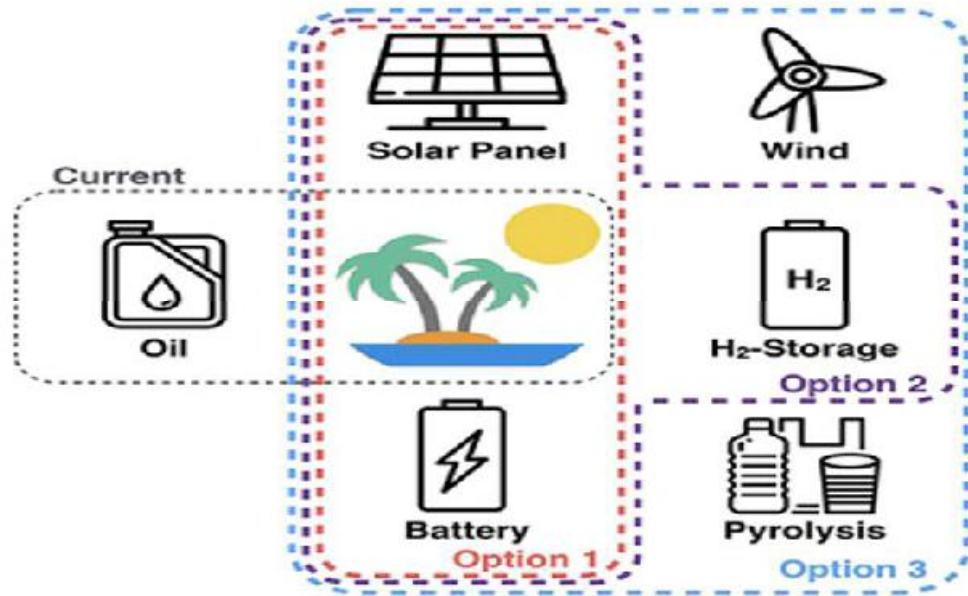
- (a) **Install Energy Efficiency light:** It takes less power than traditional lights also it reduces energy costs. Improve working conditions in RMG industry. RMG stakeholders who use energy efficient lights can develop their brand value by exhibit their commitment to sustainability.



- (b) **Upgrade HVAC system:** Older HVAC (Heating, Ventilation and Air Conditioning) systems are main responsible for high bills. So, upgrading it reduces energy cost. Upgrading HVAC system can assist to ensure that the Sales of Goods is protected from damage.



- (c) **Diversify Energy Sources:** By diversifying energy resources RMG stakeholders can reduce their dependency on fossil-fuels and upgrade energy indemnity. RMG stakeholders can decrease their greenhouse gas emissions and also help to extinguish climate change. Improving energy efficiency by diversify energy sources is also an advantage of RMG stakeholders.



- (d) **Invest in Renewable Energy Sources:** Renewable Energies (Solar, Wind and Biomass) helps to decrease costs and energy consumption. Solar panels can be placed on industry roofs. Wind turbines can be placed on open spaces. Biomass can be derived from wood, agriculture waste, food waste etc.



(e) **Create a Control App:** Control app can help to control energy loss in RMG industry by giving us real time information on energy usage and help us to identify in which areas energy is being wasted so that stakeholders can take necessary steps. Also this app can alert us when energy consumption goes beyond a certain threshold.



### 3. Sharing of Knowledge and Talent Upliftment :

Sharing knowledge and uplifting talent in the RMG industry is particularly important due to its complex and dynamics nature.

#### **How we can uplift Talent and Sharing of knowledge in RMG Industry:**

(a)**Industry Collaboration:** Encourage collaboration among RMG industry stakeholders such as manufacturers, suppliers, retailers and industry associations. Foster partnerships and platforms that facilitate the sharing of best practices, industry trend and innovative solutions. This can include collaborative forums, conferences and knowledge sharing initiatives.



(b)**Training and capacity Building:** Comprehensive training and capacity-building programs for individuals involved in supply chain management within the RMG industry. These

programs can cover topics such as Production Planning, Inventory Management, Quality control, Sustainability Practices and compliance.

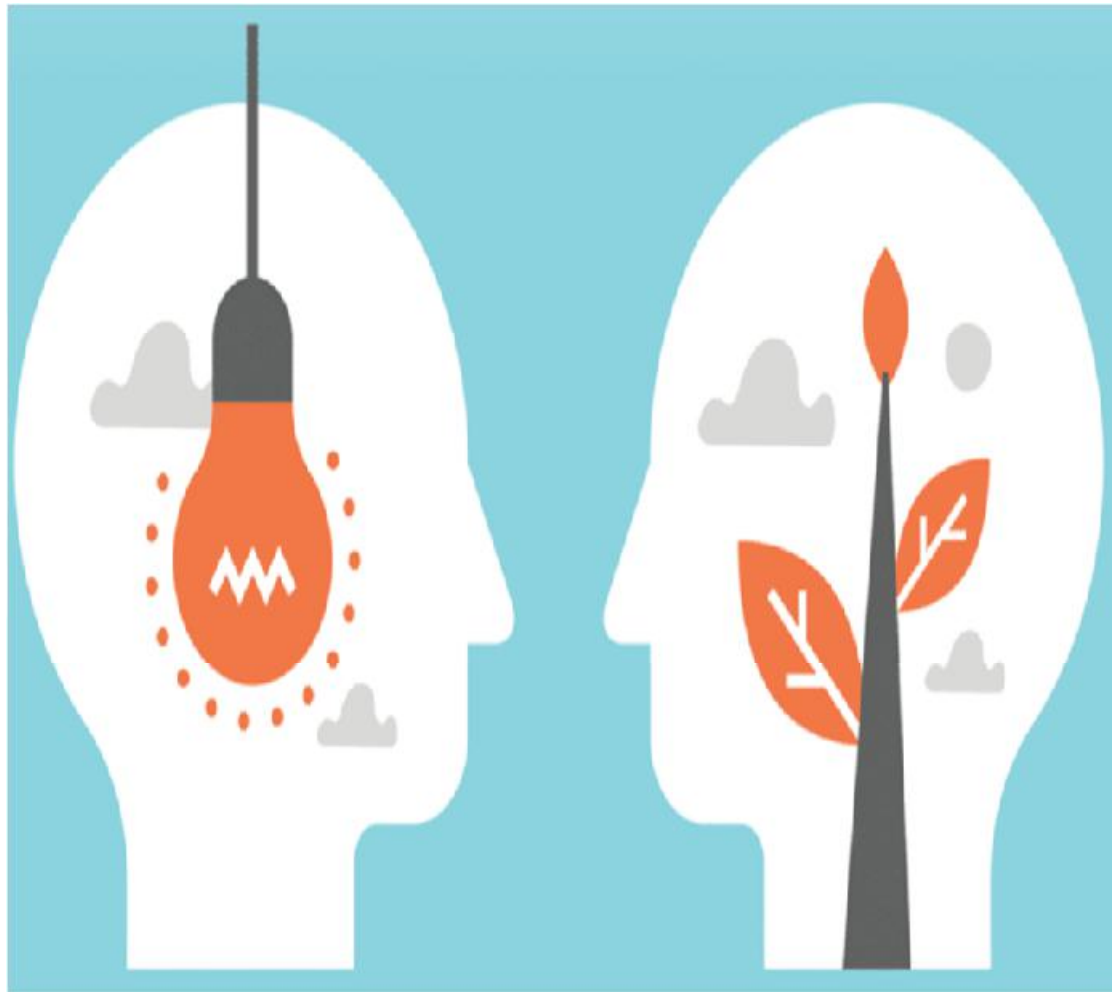
# CAPACITY BUILDING



**(c) Collaborative Audits and Assessments:** Facilitate collaborative audits and assessments that involve multiple stakeholders, including manufactures, brands and industry association. This allows for the sharing of insights and best practices related to social compliance, labor rights and environmental sustainability.



**(d)Mentorship and knowledge Transfer:** Establish mentorship programs that pair experienced professionals in Supply Chain Management with Young talent in the RMG industry. These mentorship relationships provide guidance, advice and opportunities for knowledge transfer.



#### **4. Improve Training method and Develop skills:**

RMG is one of the leading sector of Bangladesh. Due to energy supply crisis the sector faltering gradually. This problem can be solved by improving training method and developing skills of the workers. We can develop such a supply chain where all RMG factories have unique collaboration opportunities among supply chain stakeholders (BGMEA, BKMEA, BTMA). Improving training method and developing skills of workers can play an vital role to develop such a supply chain which promotes less energy loss and ensure reliable supply of power generation and transportation.

##### **(a) Proper Training of Workers:**

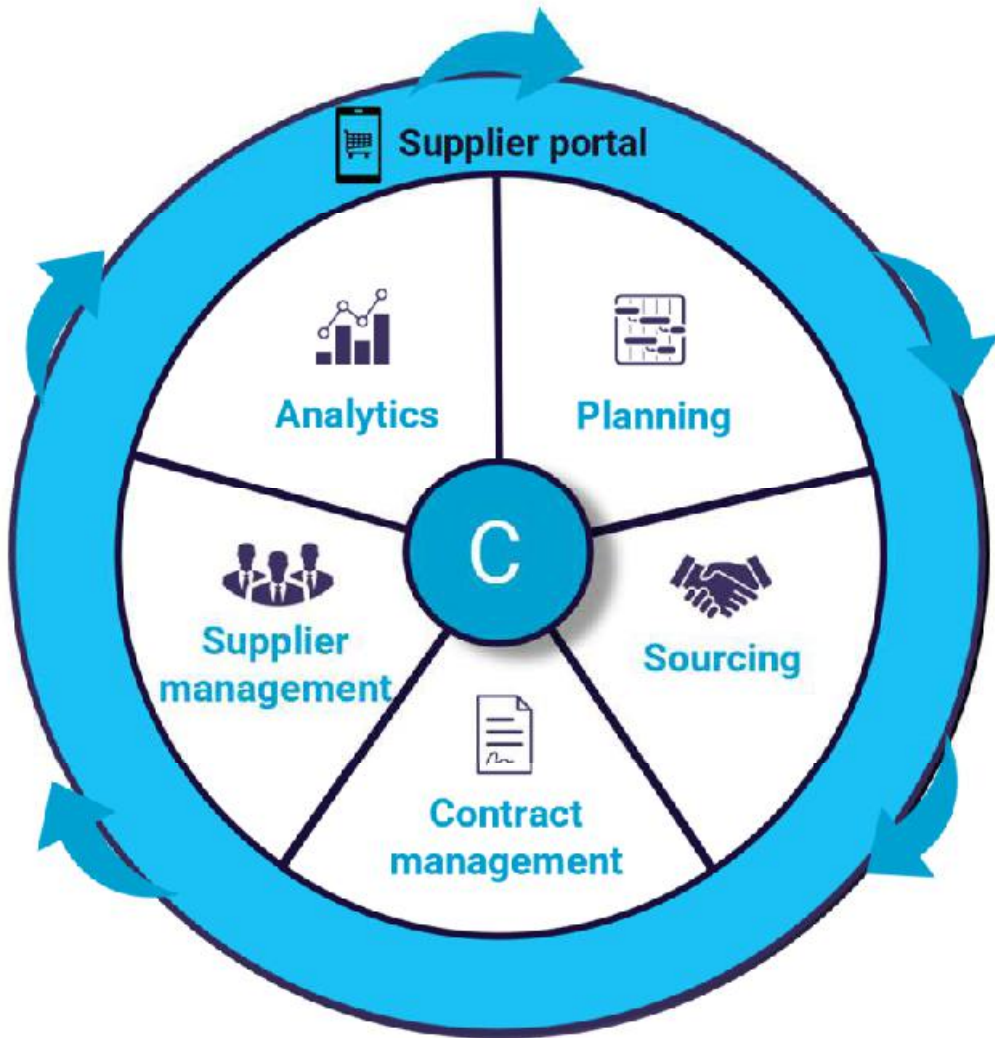
A huge number of workers are engaged in RMG sector in various factories. Most of the illiterate workers employed in garments are unskilled and so their products often become lower quality. So, the worker should train properly. A central authority should arrangement training and skill development program for all factories worker and provide them same training, same raw material, same power supply system to reduce energy loss and get high productivity.



**(b)proper planning and sourcing should be done:**

Training center, Trainer, Training duration, number of trainee at a time should be planned properly by BGMEA or GOB and it should sourcing properly.





#### 5. Develop a Contingency Plan:

Contingency plan is a backup strategy for a team. It provides step-by-step instructions to generate an effective plan. Also, it gives manufacturers a proactive plan of action which can be urgently implemented once a crisis occurs.

**Purpose of Contingency Planning in RMG Industry:** To provide the framework for a coequal approach of RMG to work in urgent situation and to backing a timely response with optimal use of attainable resources and logistic strength. Also ensure that the overall response must be feasible and coordinated.

**How to Implement Contingency Plan in RMG Industry:** These are 5 steps by which we can implement a contingency plan.

- (a) **Make a list of the risks and weight risks based on the severity and likelihood:** Before resolve a risk, first we need to identify it. Make sure our plans are aligned with the scope and magnitude of the risk. We hold a brainstorming assembly with relevant stakeholders to search and discuss potential risks. Then we work with our stakeholders to identify the potential result of each risk. Assess each risk based on the severity of the impact if the risk were to occur and the likelihood of the risk occurring. Then it's up to me and my stakeholders to decide which risks are most significance to notice.

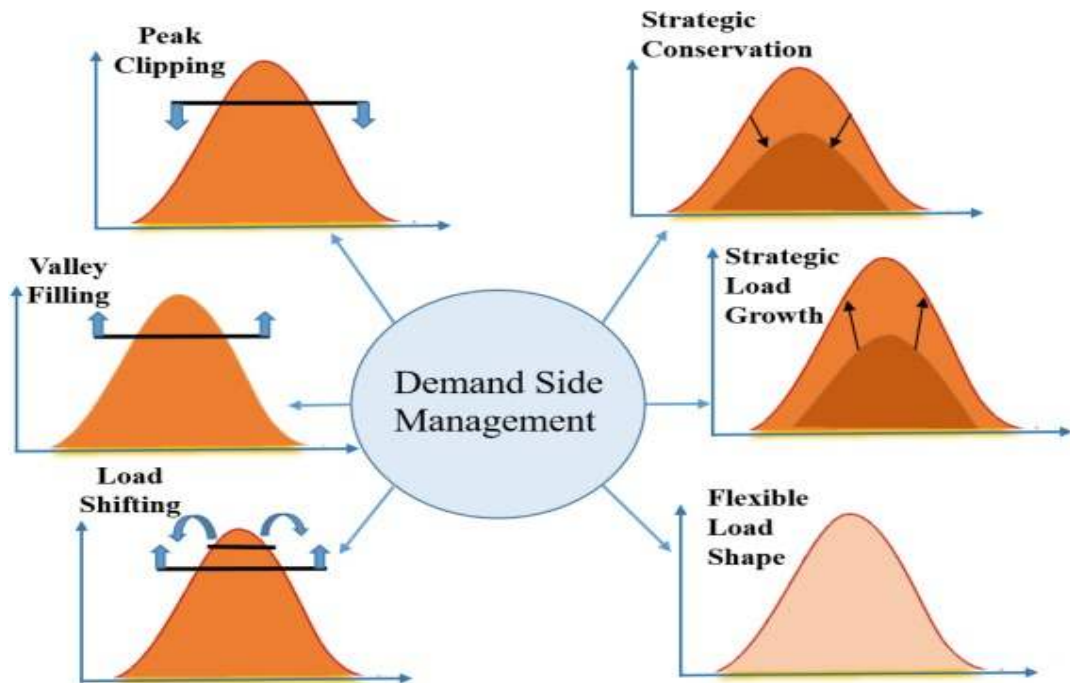


		LIKELIHOOD			
		VERY LIKELY	POSSIBLE	UNLIKELY	
SEVERITY	MAJOR INJURY	3	9	6	3
	MINOR INJURY	2	6	4	2
	TRIVIAL	1	3	2	1

- (b) **Shifting production to off-peak hours:** We can reduce the energy consumption rate in RMG industry by producing sales of goods during the hours when need for electricity is lower than that of peak time. We can save energy by this plan and use the saving energy for other works. Also night production help to lessen the peak load from electricity and free up more for others because electricity demand is lower at night.



- (c) **Accomplishing demand side management measures:** To decrease the peak demand for electricity demand side management measures can be used. It can be done by preparing of data, initial forecasting about energy crisis, practical work and refine a final forecast. Also, it can be done by decreasing the use of electricity during peak hours by management.



- (d) **Providing financial Impetus for energy efficiency:** The GOB can provide financial impetus to stakeholders so that they can raise their energy efficiency of RMG industry. These also help to encourage stakeholders to take up more energy-efficient practices.



- (e) **Build-up and improve inventory:** By upgrading inventory RMG stakeholders and manufactures can lessen the impact of an energy crisis on their activities. Also, they will have a lot of goods that they can sell out even they are incapable to produce as much during an energy crisis.



#### Discussion:

The energy crisis has arisen as a formidable challenge for Bangladesh's Ready-Made Garment (RMG) sector, a cornerstone of its economy. This sector which is the country's main foreign exchange earner has been grappling with the consequences of unreliable electricity and gas supply, leading to significant production breakdown and economic losses.

#### #The Impact of Energy Crisis on RMG Industry:

**Production Disruptions:** Frequent power outages and gas shortages have led to staving in the production process. This results in delayed orders, reduced output and ultimately loss of revenue for the industry.

**Increased Production Costs:** To overcome power cuts, many factories depend on generators which significantly increases production costs. This reduces profit margins and makes Bangladeshi products less competitive in the global market.

**Damage to Machinery:** Frequent power fluctuations can harm expensive machinery leading to additional costs for repairs and replacements.

**Loss of Orders:** Consistent production lags and quality issues due to power fluctuations can lead to loss of orders from international buyers, affecting the industry's reputation.

**Job Losses:** If the crisis remains, it might lead to job losses in the RMG sectors, impacting the livelihoods of millions of workers.

### **#Causes of the Energy Crisis:**

**Rising Demand:** The fast economic growth of Bangladesh has led to a knob in energy demand, outpacing supply.

**Gas Reserves Depletion:** The country's natural gas sources are decreasing, leading to a shortage of this crucial energy resource.

**Inefficient Power Generation:** The power generation and distribution infrastructure is not enough, resulting in losses and power outages.

**Global Energy Price Rise:** The rising cost of fuel for power generation has put additional pressure on the energy sector.

### **#Potential Solutions:**

**Diversification of Energy Sources:** Investing in renewable energies like solar, wind, hydro power can assist decrease dependence on fossil fuels

**Improving Energy Efficiency:** Accomplishing energy-saving technologies in industries and households can help conserve energy.

**Infrastructure Development:** Upgrading the power generation and distribution infrastructure is crucial for ensuring feasible power supply.

**Gas Exploration:** Look for new gas fields and increasing gas production can help alleviate the shortage.

**Government Support:** The government needs to provide stimulus for investment in energy sector and create conducive environment for the industry.

The energy crisis poses a significant menace to the RMG industry which is vital for Bangladesh's economy. Addressing this issue needs concerted efforts from the government, industry stakeholders, and the general public.

### **Conclusion:**

At the end, the proposed supply chain may work efficiently to reduce energy crisis in RMG industry if RMG stakeholders and GOB can execute our plans properly. Execution is the main thing to reduce loss in supply chain. We believe that our proposal might be helpful for the RMG industry of our country.

## References:

1. Donaghey, J., & Reinecke, J. (2018). When industrial democracy meets corporate social responsibility—A comparison of the Bangladesh accord and alliance as responses to the Rana Plaza disaster. *British Journal of Industrial Relations*, 56(1), 14-42.
2. Export Promotion Bureau (2023). Export Data. [http://epb.gov.bd/site/view/epb\\_export\\_data/](http://epb.gov.bd/site/view/epb_export_data/)
3. Farhana, K., Kadirgama, K., Mahamude, A. S. F., & Mica, M. (2022). Energy consumption, environmental impact, and implementation of renewable energy resources in global textile industries: an overview towards circularity and sustainability. *Materials Circular Economy*, 4(1), 15.
4. General Economics Division, Bangladesh Planning Commission. (2020). 8th year plan: July 2020
5. George, G. (2021). Technology transfer in Bangladesh to accelerate energy transition. South Asia Democratic Forum (SADF). [https://d4sa-repository.ub.uni-heidelberg.de/4546/1/77\\_Focus-77.pdf](https://d4sa-repository.ub.uni-heidelberg.de/4546/1/77_Focus-77.pdf)
6. Government of Bangladesh. (2021). Mujib Climate Prosperity Plan Decade 2030. [https://mujibplan.com/wp-content/uploads/2021/12/Mujib-Climate-Prosperity-Plan\\_ao-21Dec2021\\_small.pdf](https://mujibplan.com/wp-content/uploads/2021/12/Mujib-Climate-Prosperity-Plan_ao-21Dec2021_small.pdf)
7. Green Climate Fund. (2023). Climate Funds Update 2023. <https://www.greenclimate.fund/countries/bangladesh#documents>
8. Infrastructure Development Company Limited. (2021). Power sector analysis: Mujib climate prosperity plan decade 2030. [https://mujibplan.com/wp-content/uploads/2022/03/MCPP\\_Power-Sector\\_MAR.pdf](https://mujibplan.com/wp-content/uploads/2022/03/MCPP_Power-Sector_MAR.pdf)
9. International Renewable Energy Agency. (2023). Renewable-energy-statistics-2023.
10. Kabir, M. A., Farjana, F., Choudhury, R., Kayes, A. I., Ali, M. S., & Farrok, O. (2023). Net-metering and feed-in-tariff policies for the optimum billing scheme for future industrial PV systems in Bangladesh. *Alexandria Engineering Journal*, 63, 157-174.
11. Khatun, F., Kamal, M., Kabir, F.A., Nawrin, N., Hoque, M.S. (2023). Securing Green Transition of the Textile and RMG Sector. Centre for Policy Dialogue (CPD).

- 12.Kikuchi, T., Yanagida, K., & Vo, H. (2018). The effects of mega-regional trade agreements on Vietnam. *Journal of Asian Economics*, 55, 4-19.
- 13.Ministry of Energy and Mineral Resources. (2004). Private sector power generation policy of Bangladesh. <https://policy.asiapacificenergy.org/sites/default/files/PSEPGPB.pdf>
- 14.Ministry of Power, Energy and Mineral Resources of Government.(2008).Renewable energy policy of Bangladesh. [https://policy.thinkbluedata.com/sites/default/files/REP\\_English.pdf](https://policy.thinkbluedata.com/sites/default/files/REP_English.pdf)
- 15.Rahman, M. M., & Strutt, A. (2022). Costs of LDC graduation on market access: Evidence from emerging Bangladesh. *Economic Systems Research*, 1-22.
- 16.Rahman, M., & Bari, E. (2018). Pathways to Bangladesh’s sustainable LDC graduation: Prospects, challenges and strategies. In Rahman, M., & Bari, E. (Eds.), *Bangladesh’s graduation from the least developed countries group* (pp. 109-152). Routledge.
- 17.Razzaque, M. A., Akib, H., & Rahman, J. (2020). Bangladesh’s Graduation from the Group of LDCs: Potential Implications and Issues for the Private Sector. In Razzaque, M. A. (Eds.),
- 18.Navigating new waters: Unleashing Bangladesh’s export potential for smooth LDC graduation. Sustainable and Renewable Energy Development Authority and Power Division & Ministry of Power, Energy and Mineral Resources of Government of the People’s Republic of Bangladesh (2015).
- 19.Energy Efficiency and Conservation Master Plan up to 2030. [https://policy.asiapacificenergy.org/sites/default/files/EEC\\_Master\\_Plan\\_SREDA\\_2.pdf](https://policy.asiapacificenergy.org/sites/default/files/EEC_Master_Plan_SREDA_2.pdf)
20. Bangladesh Power Development Board (2023). Tariff Rate. <https://www.bpdb.gov.bd/site/page/c413c44f-9611-4320-82da-b298fe69157e/%E0%A6%9F%E0%A7%8D%E0%A6%AF%E0%A6%BE%E0%A6%B0%E0%A6%BF%E0%A6%AB%E0%A6%B0%E0%A7%87%E0%A6%9>



21. Islam, M. R. (2013). Workers Attitudes toward the Sustainable Human Resource Development in the Readymade Garments Industry of Bangladesh: An Empirical Analysis. *Global Journal of Management and Business Studies*, 3(9), 991-998.
22. Islam, M. S., & Liang, G. Q. (2012). Supply chain management on apparel order process: A case study in Bangladesh garment industry. *Asian Journal of Business and Management Sciences*, 2(8), 60-72.
23. Paul, S. Sustainability Strategy Evaluation in RMG Industry in Bangladesh Using Bayesian Belief Network. *Management*, 9, 10.
24. Alam, M. N., Alias, R. B., & Azim, M. T. (2018). Social Compliance Factors (SCF) Affecting Employee Productivity (EP): An Empirical Study on RMG Industry in Bangladesh. *Pacific Business Review International*, 10(8), 87-9624
25. Ali, M., Rahman, S. M., & Frederico, G. F. (2021). Capability components of supply chain resilience for readymade garments (RMG) sector in Bangladesh during COVID-19. *Modern Supply Chain Research and Applications*.
26. Khan, M. A. I. (2011). Labor unrest in the RMG sector of Bangladesh: A public-private cooperation perspective. A thesis paper in Master in Public Policy and Governance Program. Dhaka: Department of General and Continuing Education, North South University.
27. Hossain, M. U., & Roy, I. (2016). Supply chain management for sustainable RMG growth in Bangladesh. *International Journal of Science and Research*, 5(4), 1242-1248.
28. Akter, K. M., & Banik, S. (2018). Factors Affecting the Quality of Working Life: An Enquiry into the RMG Industry of Bangladesh. *Journal of Human Resource Management*, 6(1), 26-36.