Private Sector Engagement(PSE) in Electricity Generation of Bangladesh: Risk, Achievement, and Challenges.

By

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MPPG 10th Batch

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South Asian Institute of Policy and Governance (SIPG)
North South University, Dhaka, Bangladesh

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Dedicated to,

My son,

Tahmid Aynan Tawaf

Hope my Life,

Declaration

I declare that the thesis titled “Private Sector Engagement(PSE) in Electricity Generation of Bangladesh: Risk, Achievement and Challenges” submitted to the South Asian Institute of Policy and Governance (SIPG) of North South University, Bangladesh for the Degree of Master in Public Policy and Governance (MPPG) is an original work of mine. No part of it, in any form, has been copied from other sources without acknowledgment or submitted to any other university or institute for any degree or diploma. Views and expressions of the thesis bear the responsibility of mine with the exclusion of PPG for any errors and omissions to it.

H. M. G. SAROWER

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ABSTRACT

Electricity is widely regarded as a crucial driver of economic development. Bangladesh, an aspirant development nation with a development target of becoming a high-income developing country by 2041, is pursuing a mission to ensure reliable and high-quality electricity for all at a reasonable cost, which is also aligned with the UN Sustainable Development Goals as a global commitment. Inspired by the early global experience of power sector reform and engagement of electricity generation in the private sector during the 90s, Bangladesh also pushed private sector involvement in electricity generation. Insufficient public funds to develop enough electricity generation capacity in order to fulfill current and future demand was the major motivation for employing the private sector. During the period 2006-2008, a severe electrical crisis resulted in retarded economic growth in the developmental transition of Bangladesh. Since 2009, the government has pursued a two-pronged strategy to address current crises and capacity building in order to achieve the country's development goal of being an upper high-income country by 2041. The government approved a proposal to increase generation capacity to 40 GW by 2030 and 60 GW by 2041, as outlined in the 2016 Power System Master Plan. Such massive capacity expansion necessitated a significant amount of capital expenditure, which the state could not afford on its own. As a result, flexible government policies were initiated that provided generous incentives for private investment which established a favorable investment climate for the private sector. Consequently, private investment increasingly replaced government investment, and the country saw a significant rise in the private generation, with the private sector now retaining about half of the total installed generation capacity. Between January 2009 and July 2021, 76 private power plants added 8875 MW to the national grid, helping to alleviate a severe electricity shortage that was impeding economic growth. In addition, access to energy has improved to 99.75 percent, a significant indicator for the SDGs. Despite the considerable capacity additions, the country's demand generation has slowed, resulting in a surplus of energy-producing capacity. Due to a persistent escalation in the fiscal deficit resulting from underutilized private power plants, the single buyer(BPDB) has received a public bailout in the form of budgetary support or subsidy. There is widespread acknowledgment of the necessity of private

investment as an engine for growth, but the ultimate goal of financially sustainable private sector investment in the electricity industry is a grave concern for Bangladesh. This is an exploratory study based on primary data gathered from interviews with seven (7) experts in the fields of energy policy and private power project execution and then a comprehensive examination of policies, acts, and regulations affecting PSE in Bangladesh's electricity generation. The PSE in electricity generation is principally carried out under the Private Power Generation Policy of 1996 (Revised 2004) and the Quick Enhancement of Energy and Electricity Special Provision Act of 2010. The study has found that a wide range of flexibility has been maintained to facilitate PSE in a short amount of time. PSE in practice entails policy implementers using convenient and expedient take from multiple policy sources, which can be referred to as arbitrary practice. Although the Quick Enhancement of Energy and Electricity Special Act of 2010 was enacted for crisis management it is being currently used as an important policy instrument to deal with unsolicited private power projects, despite the Act's negative impact on sectoral governance. In the process of private sector engagement, risk has been disproportionately allocated between the public and private sectors. Weak demand projections, inconsistency in the energy sector (in terms of domestic natural resources exploration), slower industrial growth, and the continued operation of contractually expired RPPs and QRPPs all lead to over-investment or developing generation capacity to meet increased demand, resulting in underutilization and a revenue-to-expense gap (fiscal deficit). Achieving a financially sustainable PSE in the power sector is challenging. Dealing with the Private sector’s reluctance to absorb some market risk government has to take challenge transfer risk to achieve the cost-effective efficient way of PSE.This may proved to be unsustainbale in the long run.

Key Words: Private Sector Engagement(PSE), Policy Risk, Financial Sustainability, Capacity Payment, Capital Expenditure, Overcapacity, Independent Power Plant(IPP), Demand Risk, Subsidy, Arbitrary Practice.

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Abbreviations

ADB-	Asian Development Bank
ADP	Annual Development Program
BREC	Bangladesh Energy Regulatory Commission
BAU	Business-as-Usual
BERC	Bangladesh Energy Regulatory Commission
BOO	Build-Own-Operate-Transfer
BPDB	Bangladesh Power Development Board
BREB	Bangladesh Rural Electrification Board
CAPEX	Capital Expenditure
DESCO	Dhaka Electric Supply Company
DPDC	Dhaka Power Distribution Company
EGCB	Electricity Generation Company of Bangladesh
FDI	FDI Foreign Direct Investment
FSA	Fuel Supply Agreement
GDP	Gross Domestic Product
GoB	Government of Bangladesh
GSA	Gas Sales Agreement
HFO	Heavy Fuel Oil
IA	Implementation Agreement
IEA	International Energy Agency
IPP	Independent Power Producer
LLA	Land Lease Agreement
MoU	Memorandum of Understanding
MPEMR	MPEMR Ministry of Power Energy and Mineral Resources
MW	Megawatt
OECD	Organization for Economic Co-operation and Development

OPEX	Operating Expenditure
O & M –	Operation and Maintenance
OEM	Original Equipment Manufacturer
PGCB	Power Grid Company of Bangladesh
PPA	Power Purchase Agreement
PSMP	Power System Master Plan
PSPGPOB-	Private Sector Power Generation Policy of Bangladesh
RMG	Ready-Made Garments
SDGs	Sustainable Development Goals
SREDA	Sustainable and Renewable Energy Authority
SIPP	Small Independent Power Producers
WZPDCL	WZPDCL West Zone Power Distribution Company
WB	World Bank
USD /$	United States Dollar

Chapter-I

Introduction

1.0 Introduction:

Bangladesh has experienced phenomenal economic development in the last decade, qualifying it to transition from Least Developed Country to developing country status (LDC) (Byron, 2021). The UN Committee for Development Policy (UNCDP) made the recommendation based on its achievement in terms of per capita income, human assets, and economic and environmental vulnerability, which were set as required criteria for eligibility to migrate into developing countries (Jha, 2021). Bangladesh, as an aspirant prosperous nation with enormous economic development potential, has set a strategic development goal of becoming an Upper Middle-Income Country (UMIC) by 2031 and a higher income developed country by 2041, (Al-Amin, 2021). According to Asian Development Bank (2009) in "Guidance Note: Electricity Sector Risk Assessment," the electricity sector is a key player in a country's economic development. The lack of electricity at the household level was linked to low income, traditional energy dependency (biomass), poor health and education service delivery, inefficient natural resource utilization, and pollination, according to the study. It also discovered a link between severe electricity shortages at the industrial level and the disruption of economic activities. Access to reliable, adequate, and affordable electricity service is required to achieve inclusive economic growth.

Power sector of Bangladesh pursues a prudent vision of universal access to quality electricity in a cost-effective and affordable manner((*Power division, n.d*) which is quite in line with sustainable Development Goal -7, “ensure access to affordable, reliable, sustainable and modern energy for all” (*Goal 7 | Department of Economic and Social Affairs, n.d*). Because it supports all aspects of economic growth, electricity is regarded as one of the most influential factors in boosting economic growth. As a result, economic growth and electricity consumption are positively related and can occur concurrently. (Masuduzzaman, 2013). Typically, a higher economic growth engendering greater

expansion of domestic market, engage more private investment and more demand for electricity will be ensured (Arto et al., 2016). There is a two-way causality linkage between GDP growth and consumption of energy, which implies that the two are interrelated and may serve as complements to one another (*The Least Developed Countries Report 2017 - UNCTAD* 2017)The purpose of this study is to examine the role of the PSE in the development of electricity generation capacity in Bangladesh in the context of the rising demand for electricity in light of the country's development strategies.

Economic growth in a developing country is retarded by the electricity crisis (Sullivan. 1990, p.335). Per capita, electricity consumption is a critical development indicator. Despite significant progress in increasing electricity capacity over the year, Bangladesh's annual per capita electricity consumption is relatively low when compared to neighboring countries (Irfan, et al., 2019) and many other East Asian development contenders such as Vietnam, Thailand, and Malaysia significantly lower than developed countries, according to World Bank Electric Power Consumption (KWh per Capita) (World Bank, 2020). According to the “Global Competitiveness Report 2019, published by World Economic Forum, Bangladesh could manage to secure the position of 105 out of 141 countries on the Global Competitiveness Index and 110 in terms of supplying quality electricity (Schwab, 2019).

Providing high-quality electricity and making it easier to get it are critical for creating a favorable, investment-friendly business climate. According to the World Bank's Doing Business report, Bangladesh ranked 168th out of 190 economies on the indicator "Ease of Doing Business" and 176th on the indicator "Getting Electricity." 2020 (World Bank, 2020). According to the “Least Developed Country Report, 2017: Transformational Energy Access” published by United Nations Conference on Trade and Development (UNCTD) reveals that more than fifty percent of the private enterprises in Bangladesh regards lack of consistent access to energy as the major barrier for higher productivity (UNCTAD, 2017). In the 1990s, Bangladesh's power sector was underdeveloped, with low electricity coverage regarded as a major impediment to economic growth and poverty alleviation.

Due to a lack of institutional framework and sectoral weak financial health, the country has been unable to scale up the development of electricity infrastructure (World Bank, 2004).

Electricity investment is capital intensive. The energy industry is widely regarded as one of the most capital-intensive industries, requiring significant capital investment. According to the World Energy Outlook, the International Energy Agency (IEA) in 2011, the investment required to meet the world's growing energy demand will total the US $ 38 trillion (in constant 2010 dollars) (World Economic Forum, 2011). To meet the GDP target, electricity growth must be maintained at 1.5 times GDP (PSPGPB, 1996). Electricity capacity development is a continuous process, and there is always a need for significant capital expenditure to increase capacity. The process of increasing electricity generation capacity necessitates ongoing investment, and the sector must be able to meet not only current demand but also rising future demand (Bridle et al., 2014).Because electricity demand changes over time, there is always a growing need for massive capital expenditure for capacity development. Such huge requirement of capital expenditure put pressure on of economy of developing and transitional countries (Schramm, 1990, p.319). An alternative way of replacing public capital is engaging the private capital. In order to mobilize private capital through the private sector government has to offer attractive investment incentives and good return on investment .

In the past, Bangladesh faced a severe electricity crisis as it transitioned to a more developed economy. Its economy took a major hit when there was an abysmal power shortage from 2006 to 2009. Its electricity supply capacity ranged between 3,800 and 4,200 MW, far below the country's demand of 6000 MW (Shelley, 2010). Ethirajan (2010) According to a BBC news report, Bangladesh has a daily electricity shortfall of 2000 MW or roughly one-third of its total requirement. This crisis has had a negative and multifaceted impact on Bangladesh's social, economic, and political sectors. Frequent load shedding and difficulties in obtaining new connections at the domestic and industrial levels were ubiquitous back then. Foreign Direct Investment has reached a standstill as

the business climate has been exacerbated by an electricity shortage (Abedin, 2015). According to the World Bank's Investment Climate Assessment report on Bangladesh released in October 2008, the electrical crisis was identified as the number one problem by more than 76 percent of investors. Because of the power outage, more than 12% of industrial production capacity was not used. As a result, their GDP contribution was 2% lower than it could have been (Khan & Islam, 2021).

Bangladesh required multibillion-dollar capital investment in the electricity sector to electrify the entire country and ensure reliable quality electricity for all. As a result, the Bangladeshi government has always prioritized increasingly diverse investment sources (Haque, 2020). Recognizing the crisis of electricity shortage and growing needs, and following global trends of engaging the private sector in electricity generation, the Bangladesh government developed the Private Sector Power Generation Policy of Bangladesh 1996-(Revised 2004) to harness private capital in the electricity generation sector in order to develop generation capacity (Dey and Khan, 2006).

In 2009, a newly elected government took the crisis seriously and planned to address it by restructuring and remodeling the entire electricity sector (Rasel, 2013). The government approved a comprehensive Power Sector Master Plan (PSMP 2010), and implementation began in phases based on short, medium, and long-term comprehensive generation, transmission, and distribution capacity development plans (GoB PSMP, 2010).

The government has accelerated the development of electricity generation by enacting laws and innovative policies. The Power Sector Master Plan-2010 has envisioned the requirement of increased generation capacity of 20 GW by 2021 and 34 GW by 2030. The master plan also identified the need for an aggregate investment of approximately BDT 4.8 trillion (US$ 69.5 billion) at a rate of BDT 241 billion (US$ 3.5 billion) per year to meet these targets (Power Division, PSMP, 2010).

In response to the changed fuel situation in 2016, the government of Bangladesh made changes to the planning and strategic goals of the "Power Sector Master Plan -2010."

According to the (Power Sector Master Plan 2016) and (Revisiting PSMP 2016), the government intends to increase generation capacity by 24 GW by 2021, 40 GW by 2030, and 60 GW by 2041 in order to sustain economic growth (Power Division, PSMP 2016).

Historically, the Bangladeshi electricity generation sector had a "natural monopoly" because it was mostly owned and controlled by the government. Prior to 2009, Bangladesh had a total installed generation capacity of 5823 MW, with 774 MW coming from the private sector (IPP, SIPP, and Rental), accounting for 13% of total national capacity (BPDB Annual Report, 2009-10). For a huge shift in generation capacity augmentation such as from 05 GW 2009 to 24 GW at 2021(190% increase), from 24 GW 2021 to 40 GW at 2030 (66% increase) and from 40 GW capacity 2030 to 60 GW at 2041 (50% increase) requires huge capital expenditure which cannot be borne by the government alone because that requirement is beyond state capacity (Mahbub & Jongwanich, 2019).

In developing countries, private investment is the preferred alternative to public investment. As a result of the persistent electricity shortfall over the years and the newly elected government's development push, it then committed to encouraging private sector participation in electricity generation (Likhon, 2020). PSMP 2010) suggests pursuing private sector investment and developing an environment that will facilitate private finance, as well as creating an effective and efficient competitive power market, to make the power sector more effective and efficient. In this regard, the government enacted favorable policies for private investment, resulting in a favorable investment climate by providing a guaranteed return on investment (ADB Project no. 40276-01). Moreover, an additional opportunity for investment is also made available for foreign investors. (PSPGBOB 1996, Revised 2004, p.6).

The government's investment was gradually replaced by private investment, and the country saw a significant increase in private generation. Along with the current installed capacity of Bangladesh's public sector (47 percent), joint-venture (4 percent), and power import (6 percent), the private sector contributed 43 percent of electricity (Haque, 2020).

As a result, the private sector has gradually become a major contributor and an indispensable component in the power generation sector.

By leveraging a combination of public and private initiatives, Bangladesh made significant progress in increasing generation capacity to the point where current electricity demand is no longer difficult to meet. Bangladesh's current generation capacity is 25235 MW (including captive and renewable), but on April 27, 2021, the country could produce a maximum electricity demand of 13,792 MW (Power Division, at a glance, Accessed 26th November 2021). Such a difference between generation capacity and maximum demand eventually implies significant proton of installed capacity is being inefficiently utilized. Simon & Ahmed (2020**)** claimed during 2018-19 Bangladesh currently had a 43% overall power capacity utilization rate which was succumbed to capacity payments to idle plants at Taka 90 bn (US$1.1bn).

From January 2009 to July 2021, a total of 79 private power projects of various capacities have been implemented (Power cell, 2021). The private sector owns approximately half of the total national electricity generation capacity, and the government is required to pay a capacity charge for this unused generation under a two-part tariff policy that provides investment guarantees (PSPGPOB-1996, P. 6). According to the Financial Express news ("Power sector Received", 2020), approximately 52.260 billion BDT has been given to the power sector as a subsidy over the last ten years. At the same time, the government has raised tariffs by 98 percent from 2009 to 2020 ("power-tariff," 2020). The lower level of capacity utilization indicates that the country has significant overcapacity which entails high subsidies for capacity payment. Experiencing over two decades of private sector engagement on electricity generation government policy implementation on electricity generation Private Sector engagement seems costly due to substantial increase in subsidy and progressively increasing tariff which is against the vision of achieving the vision of cost-effective and affordable electricity.

1.1 Background of the Study:

The capacity enhancement of electricity generation is a continuous process, but because the nature of investment is capital intensive, early planning and implementation is required (considering the implementation lead time of different power projects) to meet future demand. An incorrect demand estimation, combined with economic growth that falls short of keeping up with electricity growth, exacerbates the situation. Simon & Ahmed (2020**)** argues Bangladesh already has excess electricity at a utilization rate of 43%, which is lower than the global standard of 54%. A large difference between existing installed capacity and maximum demand demonstrates that Bangladesh's augmented capacity is being developed beyond its needs, resulting in higher tariffs and unaffordable subsidies. There has been a need for private sector engagement (PSE) in the electricity generation sector of developing and transitional economies due to financial constraints or resource constraints, as well as inefficiency developed in the sector as a result of the public sector's long-held monopoly (Adamantiades et el., 1995). As the private sector became a dominant contributor of electricity generation, the gap between BPDB's operating revenue and operating expenses widened year after year, causing the government subsidy to increase significantly (BPDB annual Report, 2021), posing a potential threat to achieving affordable electricity.

The private sector owns nearly half of the total installed generation capacity. Inefficient use of this capacity will result in large capacity payments to the private plant remaining idle. Typically, the cost of electricity generation in the private sector is very high due to a high risk premium (Khan et al., 2012), which when combined with increasing capacity payment raises the overall cost of electricity production. The Bangladesh government pays the capacity payment, and high-cost electricity is sold to consumers at a reduced rate. Subsidies provided by the government are becoming exorbitantly high as a result of inefficient use of private generation capacity, and the economy will eventually be unable to bear the burden for an extended period of time (8th Five-year Plan, P.351-363). As a result, the electricity generation sector may be vulnerable to becoming financially unsustainable, potentially jeopardizing overall energy security. As a result, this particular

policy area of the government must be examined against the backdrop of Bangladesh's ambition to become a developed nation by 2041.

1.2 Research Objective:

This research thus aims to identify the achievement and challenges of private sector engagement in electricity generation of Bangladesh and assess the risk vulnerability of financial sustainability of such initiative.

1.3 Research Question

1. What are the achievements of private sector engagement in the electricity generation of Bangladesh?
2. What are the risks associated with existing policies of PSE in the electricity generation of Bangladesh?
3. What are the challenges to moving forward?

1.4 Scope of the Study:

The study intends to investigate the private sector investment engagement procedure in the area of electricity generation in Bangladesh as guided by relevant public policies in order to determine whether such engagement is causing financial vulnerability in the overall power sector. No case study can be conducted under the assumption of unevenness or irregularity in the process of private sector engagement because every private entity must participate in electricity generation via a common platform of public policy, rules, and regulations. The study will evaluate expert judgment and opinion from a panel of multidisciplinary experts. The methodology explains how to arrive at such judgment and opinion. Bangladesh's strategic development plans will be analyzed in relation to policies, rules, and regulations in order to identify the nature and element of risk that results from them. The relevance of sector-specific plans will be verified in relation to the nation's strategic development plan and global goals (SDG). The scope of the study also includes an examination of existing sectoral and national level plans, public

policies, literature, and strategic papers used for the development of private power generation in Bangladesh.

1.5 Significance of the Study:

The study's approach is to determine whether public policy and practice for attracting private investment in the power generation sector are sources of risk for financial sustainability. Financial sustainability is a prerequisite for any organization's survival. The study also aims to identify the impediments to PSE (private Sector Engagement) that will contribute to the achievement of a financially solvent power sector, in order to achieve the Bangladesh government vision of "universal access to quality electricity in a cost-effective and affordable manner" and the global goal SDG -7 "Affordable Clean Energy for all" while not compromising economic development. This study may provide policymakers with insight into the economic ways of PSE, specifically in electricity generation, as the private sector is an inextricably linked development stakeholder for the government, and both public and private sector contributions are required to achieve the SDGs (Kindornay et el., 2018). Future Researchers might have progressed with further study on a country-specific knowledge of PSE engagement its risk and challenges.

1.6 Limitations of the study:

The study's findings are based on a fairly static political economy. The research has been limited to a microeconomic view of one sector of the country's power system. The study's major findings do not imply any generalized viewpoint on private sector engagement in other sectors of Bangladesh. It cannot be guaranteed that responses for selected expert interviewees who work closely with political leadership will be free of self-censorship. The study period for private sector engagement was limited from 2009 to 2021 when this trend of private generation gained impetus. The research was carried out during the global Pandemic Covid-19. Because of the lockdown or social distancing caused by the pandemic, it was impossible to reach more informants and stakeholders related to private power in Bangladesh.

1.7 Organization of Chapters:

The research will be divided into five (5) comprehensive chapters. The thesis will begin with an introductory Chapter that will provide context and a procedural blueprint for navigating the research, which will include the background of the study, objectives, statement of the problem, formulation of research questions, significance of the study, scope of the study, and study limitation. The second chapter will concentrate on a review of relevant literature, theory selection, and theoretical framework development, as well as variable and indicator identification for the research. Third, consider the research methodology and research design. The fourth chapter is the data presentation and data analysis where the study discusses relevant Acts and rules, policies and framework, national development plans of Bangladesh, and global goals and other related secondary data that are used for private sector involvement in electricity generation along with a discussion of the primary data obtained from expert interviews. Chapter four also deals with data examination, analysis, and presentation. Chapter five will reveal and discuss the research findings, implications, and conclusion.

Table-01: Organization of Chapters:

Chapter-I	Introduction
Chapter II	Review of Literature & Analytical Framework
Chapter-III	Research Methodology
Chapter-IV	Data Analysis & Presentation
Chapter -V	Findings, Implications & Conclusion.

Chapter-II

Literature Review and Theoretical Framework

2.0 Introduction:

A literature review is a survey of journals, books, articles, or other scholarly materials on a given topic that aids a researcher in gaining an overview of relevant knowledge and determining the application of theories and methodologies (Fink, Arlene, 2014). It also allows the researcher to spot any gaps in the previous study. According to (Knopf, Jeffrey W 2006), reading literature can identify work that has previously been done in earlier studies in a related topic, allowing researchers to avoid "reinventing the wheel." The researcher reviewing the literature in this study has a focus on the study's field of study and research questions. As a result, the relevant literature has been divided into two categories. In the first group, we looked at the literature on private sector involvement in power generating in a worldwide setting. The second group covers reviewed literature in the domestic context, such as broad overviews of the Bangladesh power sector and the current private sector scenario.

2.1 Review of Literature on Global Context:

As a result of global pressure to address developing countries' repeated poor performance in the state-owned electricity utility, the World Bank was forced to shift its focus to lending policy guidance and promotion of private sector involvement in the 1980s. The fundamental driving force for this policy push was the need for substantial capital investment due to a lack of energy. The overall macroeconomic situation in South and East Asia has deteriorated further as a result of poor financial performance of electrical utilities, low tariffs, and inadequate revenue collection management (Adamantiades et al., 1995)

Fraser (2005) investigated with the help of world bank assistance in private sector participation and policy transfer and Major Private Investment Deal Captured by Pakistan at a financing sum of $1.6 billion for power generating capacity development of 1292 MW

in Hub Power Project (Hubco), which was named "Deal of the Year" by Euromoney Institutional Investor in 1994, and later selected as the "Deal of the Decade" by Euromoney Institutional Investor in 1999. The country is experiencing a situation where electricity demand is increasing considerably more slowly than predicted, resulting in overcapacity. The Pakistani government has been unable to establish a clear system for prioritizing IPP power installations. As a result of the emergence of private power plants, more than half of operating expenses were borne by IPPs, and the government began to have difficulty meeting its payment obligations. Cost recovery by tariff was far more difficult for political pressure and no provision was left. The government has entangled with long-term contractually IPP projects making the crisis worse.

Mukherjee (2014) wrote a book that detailed about two decades of experience with private engagement in the power sector. The experience of private participation in generation from 1991 to 2002 and after 2003, when the Indian Electricity Act of 2003 was adopted, might be distinguished. Initially, with rampant severe financial crisis scenario India pursued private sector participation in electricity generation as per the Electricity Laws (Amendment) Act of 1991. Initial investment incentives were generous, with case-by-case negotiated tariffs covering fixed and variable costs (capacity and energy payment), a 16 percent return on equity, the public sector bearing foreign currency risk, and the government providing a counter-guarantee for payment obligations, among other things. Early on, the government favored liquid fuel-based power plants since they require less building time, but later on, liquid fuel-based capacity was shown to have a high cost of generating (from high fuel charges). Due to unrecoverable generation costs, lower tariffs, and the distribution utility's poor financial health, huge financial losses occurred, necessitating a government bailout. The backlash was arising as the government was contractually obligated to pay capacity charges and take-or-pay, which occasionally caused IPPs to be more inclined to offtake cheaper base-load power. Following the enactment of the Electricity Act of 2003, a significant shift in government policy toward private power plants occurred when tariffs were determined through a transparent bidding process that provided the best value for money.

Sarangi & Mishra, et al. (2019) conducted an empirical assessment in which the sustainability of the Indian electricity sector was statistically analyzed in economic, environmental, and social dimensions. The study was based on the indicator of sustainable development, so 11 indicators from the economic, environmental, and social dimensions were used and analyzed in 12 Indian states. Average Revenue/ACS, Private Sector Installed generation capacity, 100-AT & C losses, and CPP (Captive Power Plant) net export are identified as economic indicators and statistically analyzed with other social and environmental indicators to trace the trajectory of sustainable sector outcome indices (both individual and composite) for all 12 states of study. The contribution of the private sector to electricity generation is regarded as one of the most important indicators on the economic dimension, which has an impact on the sustainability outcome. In terms of the economic dimension of the sustainability outcome, the study reveals a nonlinear trend with multiple ups and downs.

According to Chung (2017), Indonesia's private electricity generation sector (IPPs) is leading the country to a high-cost electricity future due to overpaid and underutilized electricity generation capacity. Based on empirical data, the study predicts that electricity generation capacity will exceed "Perusahaan Listrik Negara's (PLN)" planned reserve margin. A significant amount of installed capacity will go unused. According to the report, the Indonesian government provides capacity payments to private power plants as an incentive to encourage private sector investment. Persistence in increasing generation capacity by utilizing all available sources will result in an Indonesian electricity reserve margin of 55% in 2019. According to the report, if 40% of the installed capacity remains unused, the government is obligated to pay a significant sum (US$16.2 billion) to the idle power plant. According to the report, countries' obligations to pay capacity charges for underutilized electricity are unavoidable, and this private electricity (IPP) will eventually become an economic burden.

Sullivan (1990) conducts a study that provides historical context and early experience with private sector involvement in power generation in developing countries. The study refers

to private participation in this sector in developing countries in the context of power shortages and their adverse effect on development growth, where the government is unlikely to drain public funds in significant investment requirements for electricity generation. Furthermore, the need for private financing is justified by sectoral inefficiency caused by monopolies and undiversified sources of power.

The introduction of IPP-based private sector engagement in electricity generation in the United Arab Emirates (UAE) was a strategic option in terms of attracting private sector investment and increasing efficiency. The UAE government allows new IPP projects to be built-own-operate (BOO) or build-own-transfer (BOT) with state ownership retained. In this regard, it has only corporatized state-run institutions making claims, but consumer tariff reductions are still dependent on government subsidies (Carvalho, 2008).

Chi Nguyen et al. (2014) proposed a framework for assessing the financial sustainability of the electricity sector. It implies that the power sector is a key driver of economic development and can be regarded as a major GDP contributor sector because electricity is the primary input supply for the industrial, commercial, and residential sectors. In order to function and deliver the expected economic benefits, the electricity sector must always be financially sustainable. The paper identified four conditions that must be met in order to be financially sustainable: the ability to recover costs, the ability to meet current and future demand, the ability to make an adequate investment for continuous demand growth, and the ability to conform to social and environmental norms. The paper also created indicators for each of the conditions and compared them across countries.

In a discussion paper published by the (CAG, New Zealand, 2013), public sector financial sustainability is defined as the financial capacity to meet current obligations, the ability to withstand sudden financial shocks, the ability to maintain and service debt, and a reasonable level of commitment to the citizenry in terms of serving national expectations. The author further argues in this paper that a level of debt that is the result of sectoral poor creditworthiness and continuous degradation, defaulting, and overspending of public money over a long period is truly unacceptable. In the reasoning, the paper also

suggests assessing public sector financial sustainability by identifying the balance between public sector operation income and operating expenses.

2.2 Review of Literatures on Bangladesh Context:

The typical and primary rationale for private involvement is a belief in the private sector's superior management capability over the public sector, but (PSPGPOB 1996) argue that private sector participation in Bangladesh Power sector occurs in an emergency rather than increasing the sector's efficacy, especially when public funds are unavailable.

BPDB is incurring losses as a result of its inability to recover electricity supply costs through cost-reflective tariffs, and such losses necessarily entail government budgetary support to be sustained. As a result, the government is unable to make capital investments for future capacity enhancement because such subsidies or budgetary support amounts are large and increasing (Alam et al., 2004).

Mujeri & Chowdhury (2013) The importance of liquid fuel and quick rental power plants in Bangladesh is illustrated in a discussion paper. According to the study, small IPPs and QRPP/ RPPS were implemented as part of crisis management and contingency planning until the majority of demand could be met by large least-cost public baseload power plants. The paper also suggests that those IPPS could reduce their capital costs even further by only paying for fuel and variable O&M costs rather than capacity payments. Based on the findings of the relevant study, it was suggested that a balance be maintained between capacity enhancement and affordability so that the lowest cost options are fully utilized and the QRPP option is phased out on a regular basis. IPPs are more vulnerable to unforeseen country or project risks than short-term RPPs/ QRPPs. This research also established an average cost for an unserved or undelivered unit of electricity. A weighted average cost of Tk. 26.73 per kWh. A weighted average cost of Tk. 26.73per kWh compared to average generation cost/supply cost of Tk. 4.02 per kWh necessary means the cost of unserved energy is nearly seven times the average supply cost of electricity.

According to Kocaata and Boehler (2018), Bangladesh can achieve the Sustainable Development Goals (SDGs) by leveraging public-private partnerships. According to the findings of the case study, all relevant country actors agreed on the critical importance of

private sector engagement (PSE) in national development priorities in Bangladesh, and in the Bangladeshi context, private sector engagement is predominant in the form of financing, particularly debt financing. Furthermore, development financiers place a premium on the private sector's strategic use of development assistance.
In an overview of ADB's private sector operations, the same point was made emphatically. Accelerating growth through private investment is critical to meeting the Sustainable Development Goals (SDGs) by 2030. (Michael Barrow 2019).

In a study, Khan, Riley, et al. (2012) considered private sector engagement, specifically Independent Power Plants (IPPs) in Bangladesh electricity generation as PPP (Public-Private Partnership), which appears to be inspired by the New Public Management (NPM) principles of competition, incentivization, and fragmentation. This study examines private investment in the power sector in Bangladesh, as well as the context of PPP in developing countries. It goes on to say that, like many other countries, Bangladesh sought to have private companies invest in electricity generation in order to get better value for money, improve performance, and obtain more financing. The study identified the following causes of PPP (Public-Private Partnership) ineffectiveness in Bangladesh: lack of competitive bidding, irregularities and political rent-seeking, unnecessarily lingering decision making, and so on.

Nicholas (2021) pursuing more capacity in accordance with the Power Sector Master Plan in the context of Bangladesh's current demand to supply capacity will result in the construction of far more capacity than is actually required in the future. Even when plants are idle, excess electricity generated by the private sector is subject to "capacity Payment." Overcapacity is expected to persist for the foreseeable future. According to the study, adhering to the current generation capacity addition plan envisioned in the "Revisited PSMP-2016" will trap the country in an extremely high level of overcapacity by 2030. Increased risk of overcapacity will result in financial insolvency as a result of higher subsidies and tariffs. This study also recommended learning from Indonesia's electricity sector, where ambition for too much power capacity and reliance on independent power

plants (IPPs) has necessitated a rapid escalation in government unsustainable subsidies. Haque (2020) has elicited the fact from an appraisal of the Bangladesh power sector that The government of Bangladesh has offered a favorable investment policy, which has facilitated massive investment in power generation, but a national loss is being incurred due to capacity payments for private plants. The government's incentives for attracting private investment are causing financial instability, which must be addressed. According to the study, the government's failure to establish financial sustainability in the power sector will result in high-cost electricity and a slowing of economic growth in the long run. Given the burdened economy as a result of excessive subsidies in the electricity sector, and the Prime Minister of Bangladesh in a ceremony mentioned. "It is not always possible to provide a subsidy..." That is something that everyone should remember." (The Daily Star, 2020)

Pargal, et al. (2017) discussed in a paper about “Economy-wide Impact of Electricity Price Increases in Bangladesh. According to this paper” Adopting an interim solution based on a liquid fuel-based private power revenue shortfall that will eventually be bailed out by government subsidies. Subsidies are likely to be reduced as interim / short-term private power plants phase-out and cost-effective baseload power plants come online. As there was no abetting liquid fuel-based power plant, the cost-to-revenue gap widened, and government budgetary support remained constant. According to the study, the additional revenue saved from the elimination or removal of electricity subsidies or gas price increases can be recycled in the economy The study also suggests the additional revenue saved from elimination or removal of electricity subsidy or money recovered from the retreating subsidized gas price can be recycled in the economy according to analysis net impact on key economic indices of this policy is positive. As subsidy or budgetary support is substantial so the removal of it can still overcome the short-term negative impact.

The Power and Energy Sector Strategy Paper (SSP) published in 2018 recognizes the need to meet the Sustainable Development Goal (SDG) target while also improving the sector's financial viability by lowering costs through optimal fuel mix and improved energy

efficiency. It was also acknowledged that active private sector participation is critical in light of the investment requirement (of 7.5 trillion USD) to obtain better value for money due to public sector financial constraints and a decline in foreign assistance. In the absence of cost-reflecting tariffs, the widening gap between earned revenue and electricity cost entails poor financial health and negative creditworthiness of the single buyer (BPDB), as well as a high-risk premium in private investment, which discourages private investment in the power sector. This challenge will be met by reducing subsidies through increased power tariffs, as well as increasing local private investment by addressing legal and regulatory issues.

Bangladesh's 8th Five-Year Plan also emphasized the two-wing financial strategies for the power sector, which are public funding and public-private partnership (PPP). In keeping with that strategic approach, the government is also concerned with financial sustainability. The national plan also mentioned surplus capacity, its financial implications, rising electricity production costs, and operational deficits in the power sector. Recognizing the liquid fuel-based power plant as the cause of high electricity costs and increased government spending, the government wants to shift to a low-cost generation scenario that is less expensive than HSD and Furnace Oil subsidies in order to achieve financial sustainability.

According to a case study based paper by Shahriar (2017) inferred based on a case study about two independent private power plants (IPP) of Bangladesh that conventional mode (IPP's) of private sector engagement in electricity generation does not fulfill the criteria to be considered as effective Public-Private Partnership (PPP) as the case study suggested instances of successful IPP engagement in Bangladesh has complied only 50% criteria to become an effective PPP. The study also discussed relevant terms of policies for private sector generation.

2.3 Salient Features of the reviewed literatures: The salient features identified by the study summarized and mentioned below,

Table 2.0 : Summary of Literature Review

Authors/ Organization	Major Findings	Context
Literatures on Global Context		
(Adamantiades et al., 1995)	The policy advises in the promotion of reform and private sector involvement in the power sector to address developing countries' consistent poor performance. Increasingly poor financial performance of state electricity utilities in developing countries as a result of low tariffs and poor revenue collection management.	Developing Country
Fraser, (2005)	Due to World Bank-assisted policy transition and the development of an "orderly Framework," Pakistan could have successfully captured significant of private finance in power projects. However, there are too many private plants operating without regard for the least cost. Operating expenses were incurred as a result of IPPs and the government failing to meet payment obligations.	Pakistan
Mukherjee, (2014)	During the first phase of private participation in generation, from 1991 to 2002, India provided generous incentives through case-by-case tariff negotiations. A government bailout was required due to the state electricity board's poor financial performance and the lack of a cost-reflecting tariff, which resulted in financial loss. The Electricity Act of 2003 was a game-changer because it provided the best value for money through competitive bidding tariffs.	India
Sarangi, Mishra, et al. (2019)	Private generation regarded as very important indicators on economic dimension and variably impact with sustainability outcomes.	On 12 Indian states
Chung (2017)	Unrealistically generation capacity development plan, predilection over IPP's entailed overcapacity, subsidy, and financial burden.	Indonesian Power sector
(Carvalho, 2008)	Corporatization of state institutions and government retained ownership in IPP was the basis of private sector engagement electricity generation but the subsidy is required in increasing cost	UAE

Chi Nguyen, et al, (2014)	The power sector can be financially sustainable if four conditions are met: the ability to recover costs, the ability to meet current and future demand, the ability to make an adequate investment for continuous demand growth, and the ability to conform to social and environmental norms.	Global Context
Sullivan(1990)	In the face of a power shortage, a financial crisis, and the need to increase efficiency, developing countries are likely to mobilize private capital in power generation.	Developing country context.
CAG, New Zealand, (2013)	Financial sustainability in the public sector refers to its ability to meet current obligations, withstand sudden financial shocks, maintain and service debt, and assess sustainability by identifying the balance between public sector operation income and operating expenses.	New Zealand
Literatures on Bangladesh Context :		
(PSPGPOB 1996)	The private sector participating in the Bangladesh Power sector takes place in the urgent situation rather than increase the efficacy of the sector especially when public funds are not available.	Bangladesh
(Alam et al., 2004)	BPDB is incurring loss due to inability to recover electricity supply cost and government budgetary support to sustain such subsidy or budgetary support amount is huge and ever-increasing.	Bangladesh
Mujeri, Chowdhury (2013)	Electricity from liquid fuel-based small IPPs and QRPP/ RPPS is costly which is supposed to be an interim measure and gradually to be phased out after least-cost power materialized.	Bangladesh
Kocaata, Boehler (2018)	private sector engagement (PSE) is vital in national development priorities in Bangladesh and in the Bangladeshi context private sector engagement is predominant in the form of financing more particularly debt financing	Bangladesh
Timilsna, Pargal, et al. (2017)	Additional revenue saved from the elimination of electricity subsidies or gas price increases can be recycled in the economy. This analysis shows that the net impact of this policy on key economic indicators is positive and that removing it can still outweigh the short-term negative impact.	Bangladesh

Khan, Riley et al. (2012)	Based on IPP mode Private investment in Bangladesh is actually NPM-inspired, but it is ineffective due to a lack of competitive bidding, irregularities and political rent-seeking, unnecessary decision making, and so on.	Bangladesh
Literatures on Bangladesh Context :		
Nicholas (2020)	Bangladesh has developed overcapacity in electricity generation which is set to continue in the long run and the sector is potentially unsustainable due to capacity payment and increasing subsidy.	Bangladesh
Haque (2020)	The favorable policy is the key to the success of engaging massive investment in electricity generation but the national loss is incurring due to incentive mechanisms for private plants.	Bangladesh

2.4: Research Gap

This study will determine whether there are risks associated with policies that allow for private investment in Bangladesh's electricity generation sector. Conventional studies cover the need, nature, and pros and cons of private sector investment in electricity generation without a thorough examination of government policy's ability to engage the private sector in electricity generation at a low cost in the context of sectoral financial sustainability, particularly in the context of Bangladesh. Simultaneously, this research will identify the genuine achievement of engaging the private sector, which appears to be understated in conventional research. The government requires This research will identify challenges to achieving the goal of the relevant electricity private generation policies in the process of implementation of private investment for executing development plans. Finally, this research would be useful in gaining knowledge about the real policy pictures of Bangladesh's private generation so that future policymakers can make policy adjustments as needed.

2.5.0 Choice of Theory (The Principal-Agent Theory):

The infrastructure required for producing and supply of electricity is very expensive in terms of construction and operation. Goods and services related to electricity are regarded as public because electricity has a nature of non-rivalries and it is non-excludable to the public regardless of its price (Fernando, 2021). The use of public goods or services does not limit or deplete its future availability (Public goods, 2021). According to article 9. to the constitution of Bangladesh "The State shall endeavor to ensure equality of opportunity to all citizens" (Constitution of Bangladesh, art 9) so the government f Bangladesh cannot deny public access to electricity as it is an important human need, basic element of societal existence and a mandatory requirement for economic growth (Constitution of Bangladesh, art.9).

Bangladesh electricity generation sector has exercised inherent monopoly until the adoption of "The Private Sector Power Generation Policy" in 1996 by which the first private power plant came into operation in 1998 (Khulna Power Company Ltd, n.d). Bangladesh assessed continuous requirements of enhancing electricity generation to realize social economic and human development. The state needs to harness the private capital in generation capacity enhancement for attaining economic efficiency in the environment of resources constraints as there was always a competing demand on government resources. A substantial volume of financing required for power generation seems unfeasible to invest by the state alone when the level of external assistance kept declining over the year (PSPGPB-1996)

Considering the electricity sector as a critical public sector in prevailing resource constraints followed global trend "doing more with less" (Brinkerhoff, D. W., & Coston, J. M. 1999) opted for engaging private sector penetration in the public area of electricity.

According to Young (2000), from the middle of the twentieth-century countries all over the world delivered public services by the public institutions as they adopted "strong state model" but (Hood 1991; Stewart and Walsh 1992) argued the role of the government has changed from 1980's onward mode public service changed for greater effectiveness and improved efficiency at the institutional level by advocating small

government but the strong government in the environment of financial and resources restraint (as cited by Osborne, et al.,2005). The principal-agent theory has emerged in 1970. In the exegesis of Pollitt and Talbot (2003), instead of relying on a heavy head of government direct functionality and responsibility of public services has been divested by dismantling large departments into smaller entities and employing them as "agencies" to provide public services. Government tends to monitor and evaluate performance by contractual means. By doing this public service has been shifted to a principal-agent model whereby public servants act no longer a service provider rather operating as contract managers and overseers (as cited by Osborne et al.,2005).

2.6.0 Principal-Agent Theory and its Key Components:

The analytical framework of this study established on principal-agent Theory which is based on a contractually established bilateral relationship between two parties, one is "Principal" and the other is called "agent" who is hired by the Principal to perform a service (decision making and action taking) on behalf of the principal (Principal-agent problem, 2021).

The Principal-Agent Theory may be defined as a model "in which the leader who proposes the contract is called the Principal and the follower (the party who just has to accept or reject the contract) is called the Agent. (Roach, 2016).This model allows both parties (principal and agent) to receive mutual benefits but benefits can be limited for both or any one party in case of Conflict of interest (Act in a way that is contrary to the principal), Disputes over priorities, Changed circumstances, Goal divergence, Moral hazard (Information asymmetry and hidden action) (Ambrosini et at., (2015). This difference in priority between agents and principals is known as the principal-agent problem (Carol M. Kopp, 2021).

Principal-Agent Theory has a few basic assumptions –

I. Information is asymmetric between the parties.
II. Both Principal and Agent is rational utility maximizer, the agent pursues its interests, that may run contrary to those of the principal interest (Waterman and Meier, 1998).

III. Principal absorber of the majority of risk (Risk neutral) and the agent is risk-averse and risk on the agent will generate agency cost. (Martin & Réveillac, 2019)

The basic premise of the theory is that "if both parties to the relationship are utility maximizers, there is good reason to believe that the agent will not always act in the best interests of the principal" (Jensen and Meckling, 1976).

The principal selects employs and engages agent (s) by contractual means to establish a mutual obligation for both parties. An agent employed and engaged by the principal to perform or execute tasks in complex requires investment, specialized skills, other requirements in line with the goal and objectives of the principal. On the other hand, Principals are more likely to pin their focus on outcomes, while agents will have clarity around work, programs, goals, and deadlines. Study assimilates to Principal-Agent Theory through resembling "Government" is acting the "Principal" who engage (Osborne, Stephen & Brown, Kerry. 2005 p. 61) private sector (Agent) in electricity generation in the context of the study.

2.6.1 Contractually formed Principal-Agent Relationship:

A principal will employ, engage or hire an agent to do a specific task which the principal does not do due to time constraints, capacity constraints, capability constraints, act to the strategic priority, lack of will, etc. The relationship of the principal-agent is based on a situation where one party (The principal) poses a relatively superior position to another party (the Agent) (Murray, 2020). The arrangement of the Principal-Agent relationship is based on both parties legally bounded by contract where one party (principal) appoints another party (Agent) (Linder et al., 2015)

This relationship is called "agency," and the "law of agency" provides guidelines to form such a relationship (Chen, 2020). Both the Principal and agent have to act and behave according to the formal terms and conditions described in the contract which is the lifeline of the relationship. A Contract creates an environment for obligation so the agent cannot render its assigned tasks in an improper manner either intentionally or negligently. A formal contract between Principal and agent enables delegation of

authority from a principal to agent (Carol M. Kopp, 2021). It “clearly outlines the duties and responsibilities of both parties”. (Jean Murray, 2020)

2.6.2 Agency Cost:

The typical Success of the Principal-agent relationship is highly dependent on agency problems. According to the principal-agent theory, agency Problem will arise when there is no goal alignment between owner or principal with an agent, and the agent is no longer may operate in line with the best interest of the principal (Eisenhardt, 1989; Jensen & Meckling, 1976 cited by Cowden, B. J., Bendickson, J. S., Bungcayao, J., & Womack, S. (2020)). Agency problem emanates from the conflict of interest between Principal and Agent, Moral hazard and Information asymmetry, Agency problem results in agency cost which too is borne by the principal (Principal-agent problem 2021). Information asymmetry is one party maintains a more and better set of information than another party (Information asymmetry 2021). Agents persistent on their own interest may cause compromise of principal desire, in order to limit the goal or interest divergence principal can establish appropriate incentive mechanism by incurring cost that coast termed as agency costs (Jensen and Mickling, 1976). Thus Agency cost is the Principal’s defraying the expense which is associated with the principal-agent relationship. It also arises from inefficiencies, dissatisfactions, disputes, and disruptions in the process of an agent acting on behalf of the principal. It is difficult to make sure that the employed agent’s act is always aligned with the principal’s goal, so potential divergence in goal causes agency costs. This cost is also known as agency risk (Zeidan and Jakob, 2015).

2.6.3 Moral Hazard (Hidden information and Hidden actions):

If the agent maintains better and more information than the principal and kept it hidden before or during the relationship this may cause risk to the principal. The agent uses the information to maximize its individual gain rather than obtaining the principal’s interests. Such asymmetry in information also creates a possibility of an agent’s hidden action. Due to the range of hidden information and availability of multiple options the agent chooses different instruments to achieve the objectives.

2.6.4 Allocation of Risk and Incentives:

When the employed or hired agent performed its duty assigned by the principal it is the responsibility of a principal to make timely payment for the service rendered contractually. Usually, it cannot constantly monitor the agent's actions. In order to mitigate the risk of shirking the responsibility by the agent, or agent acting opposite to the interest of the principal, the principal offers an incentive mechanism (James, 2021).

The public sector or the Principal is risk-neutral and the private sector or the Agent is risk-averse. Shrestha et al. (2019) argued the government has the ability to control the endogenous risk but taking sole responsibility to manage the entire endogenous risk in the process like to be proved costly though the private sector may be suited for taking some of those risks.

The principle motivation and ultimate goal for the Private sector is profit maximization and it conducts all of its activities regarding profit. The public sector is considered as the private sector's largest customer, conversely, the private sector is considered as the public sector's benefactor. Agent (private sector) will mount all-out effort to secure their interests in terms of the incentives they are offered (The Dallas Morning News, 2019). Designing an effective and efficient incentive mechanism is extremely essential because it is the most essential component for the purpose of the principle-agent relationship.

Prime consideration government or public sector regarding electricity is public service. The government act as "principals" and its all effort and priorities are determined by nations specific goals, objectives, development visions, and public mandates, so the government always wants to ensure that private sector engagement in this regard may be obliged by these public service priorities and desires their appointed agents (private sector) to accomplish them. (Roach, 2016)

2.7.0 Theoretical Framework Using Principal-Agent Theory:

The study concerns the contractually engaging private sector to perform a strategic responsibility of electricity generation on behalf of the government. As a rational utility maximizer private entity acquires and maintains information relating to market, profit,

and business. Electricity is a business commodity for Agent as it can be bought, sold, and traded whereas government maintains and operate by considering electricity as public goods and service. Unlike investing in any other sector, investing in electricity generation is fraught with risk. The Principal-Agent model allows for the allocation of risk between the principal and the agent. Risk should be transferred to the party that is best able to mitigate the risk, and risk should be transferred to the party that prices the risk the lowest (Shahriar, 2017). The asymmetry of information between both parties creates moral hazards, resulting in a divergence of the principal's goal. For the purpose of goal alignment, the principal defrays the "Agency Cost" by providing policy-backed incentives, and the State absorbs the majority of the risk, such as maintaining the increasing trend of electricity demand in accordance with generation capacity enhancement. These investment incentives improve the contractual relationship between principal and agent (s). Thus, the government (Principal) employs/engages the private sector (Agent) to achieve the goals and objectives of increasing generation capacity. According to the PA Theory, the concern of "reducing Agency Loss" may be an important factor in the financial sustainability of the power sector. We can summarize the theoretical ideas in the figure below to answer the research questions and above-mentioned assumptions:

2.7.1 Theoretical Framework based on Principal-Agent Theory:

Study has developed a theoretical framework taking concept from the Principal-Agent model.

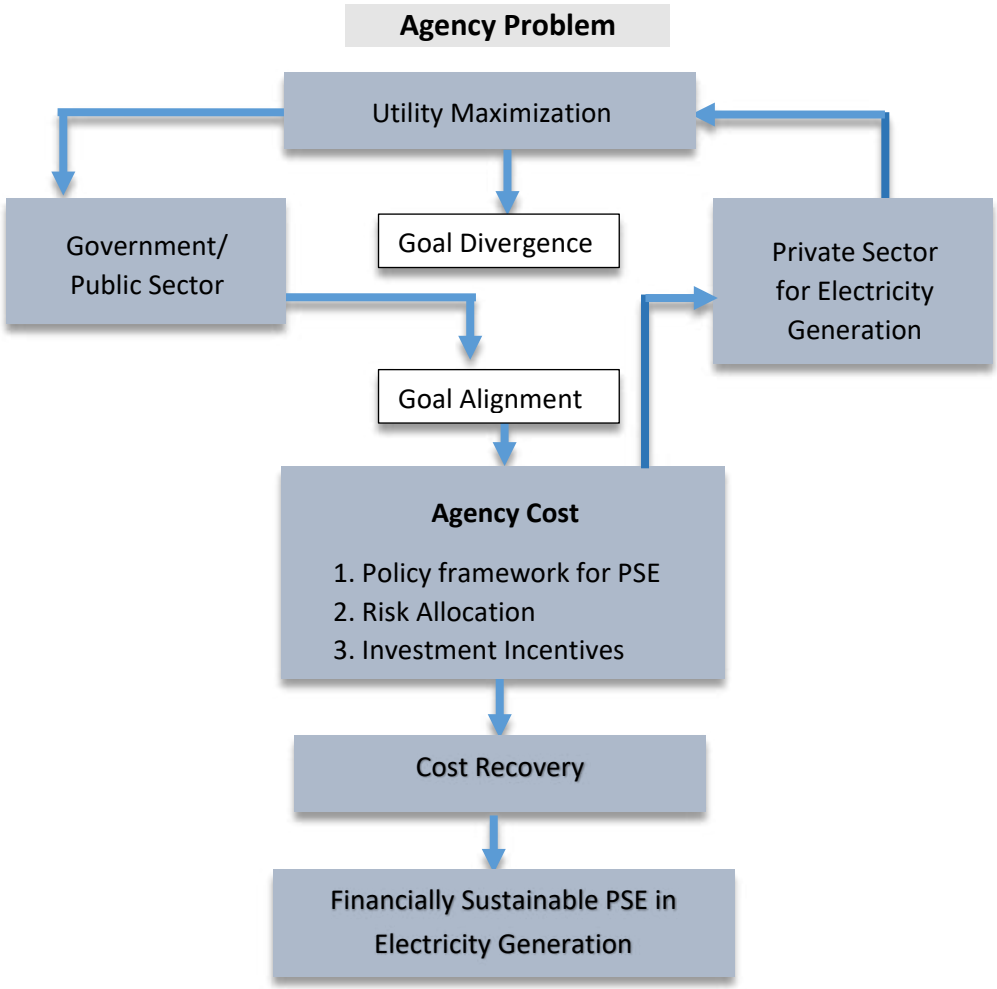

Figure 01: Theoretical Framework

2.8.0 Defining variables and measurable indicators

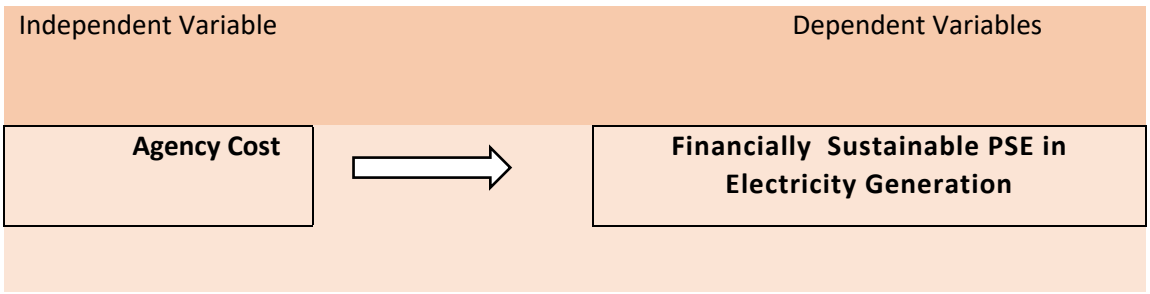

Figure: 2.0 Describing Variables

Indicators of Independent Variable:

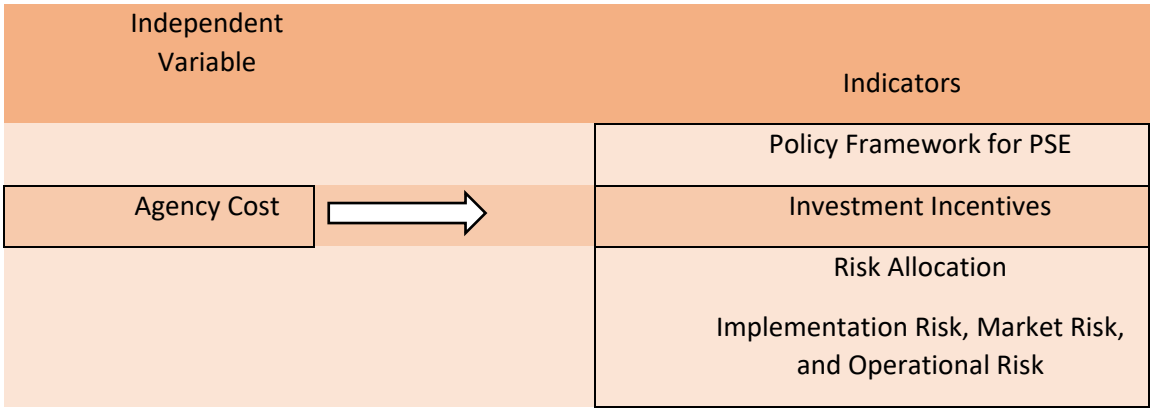

Figure: 3.0: Indicators of Independent Variable

Indicator of Dependent Variable:

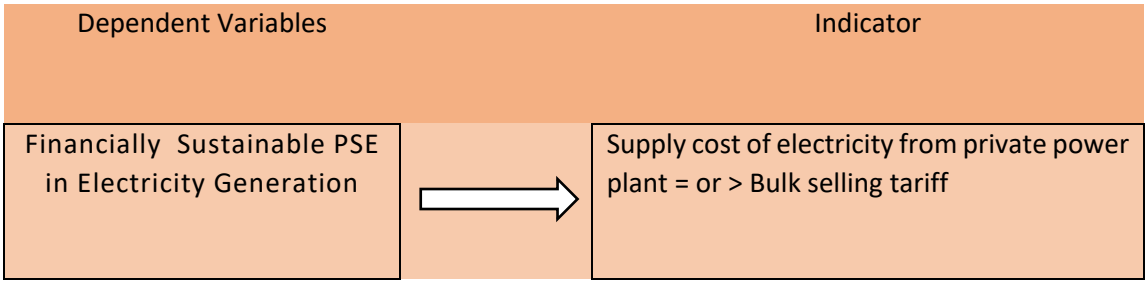

Figure: 4.0: Indicators of Dependent Variable

2.8.1 Describing Independent variables and measurable indicators:

2.8.2 Agency Cost: As a result of rational utility maximization, private investors see electricity as a product or goods to be traded, whereas the government sees it as public goods and services. The private sector's effort to maximize profit or meet the demand for a guaranteed return on investment creates an agency problem that must be resolved by reducing agency costs; otherwise, there will be goal divergence. The goal alignment is enabled by the principal's contractually obligated commitment to defray agency costs.

2.8.3 Financial Sustainability: Financial sustainability in the public sector refers to its ability to meet current obligations, to withstand sudden financial shocks, to maintain and service debt, and to assess sustainability by identifying the imbalance between public sector operation income and operating expenses. The agency's investment in PSE for electricity generation will be recovered. The balance of supply cost of electricity

purchasing for private power plants and bulk selling tariff is an indicator of financial sustainability.

2.9.0 Operationalization of Independent Variables:

Table 3.0: Operationalization of Independent Variables

Independent Variable	Operational definition	Indicator	Collection Method
Agency Cost	Cost bearded by GoB In order to Private companies actions aligned best with Governments interest	Policy Framework for PSE	Secondary Data Analysis and Expert Interview.
		Investment Incentives	
		Implementation Risk and Market Risk	
		Operational Risk	

2.9.1 Operationalization of Independent Variables:

Tabe 4.0**:** Operationalization of Independent Variables

Dependent Variable	Operational definition	Indicator	Collection Method
Financially Sustainable PSE in Electricity Generation	Financial capacity to meet current obligations, ability to withstand sudden financial shock, a cost recovery plus achieve a minimum level of Profitability	Supply cost of electricity from private power plant = or > Bulk selling tariff	Secondary Data Analysis and Expert Interview.

2.10 Summary of the Chapter**:**

The chapter's primary focus is on studying relevant literature to develop idea insight, as well as learning about previous research in the area of PSE in electricity generation. The literature provides a method for selecting appropriate theories and developing the theoretical framework. the theoretical framework was developed on the basis of principal-agent theory and the variables identified as outlined.

Chapter-III

Methodological Overview of the Study

3.0 Research Methodology:

This chapter intends to provide a detailed description of the methodological process that will be used in this research. A research methodology is a methodical approach to problem-solving. It is the science of determining how to conduct research. The procedures used by researchers to describe, explain and predict phenomena are referred to as research methodology (Goundar, 2012). The current study used content analysis, qualitative concurrent synthesis interviews, and a semi-structured –questionnaire with a selected panel of experts. The study focuses on the policies used in PSE for Bangladesh's electricity generation. In a previous context, where the country has inherent resource constraints to develop electricity generation to ensure an adequate and reliable supply of electricity, the government initiates the capture of private investment. During the 2006-2008 electricity crisis, PSE received an enormous impetus. As soon as the private sector became a significant contributor to Bangladesh's electricity generation, its financial sustainability was jeopardized. Thus, the purpose of this research is to assess policy risk vulnerability by acknowledging achievements thus far and to identify challenges in this regard. This Chapter provides a comprehensive overview of qualitative research methodologies, which is essentially followed by a detailed protocol for the study. The procedures for addressing the study objectives and questions in a justifiable manner will be outlined in this chapter. The literature discussed in this chapter includes a brief description of the research design, describing sources and tools, the technique of collecting primary and secondary data, the selection of relevant content and policy documents, instruments for data collection, strategies and approaches to data collection, and methods of data analysis and interpretation.

3.1 Research Design:

Delineating a systematic approach and establishing an action plan to conduct research can be expressed as a research design (Aminuzzaman: 2011). Typically, the research

problem serves as the driving force behind the overall strategy and is a determining factor in the design chosen by the researcher for a study (VEXCO, n.d). Furthermore, research design facilitates the arrangement of conditions for data collection and analysis in such a way that it can combine regency and research purpose with the procedural economy (Selltiz 1965). The research design refers to the overall strategy you choose to integrate the various components of this study in a coherent and logical manner, ensuring that you are effectively addressing the research problem. It serves as the blueprint for data collection, measurement, and analysis. The overall strategy you select to integrate the various components of this study in a coherent and logical manner.

3.2 Research Method:

The study will be qualitative in nature, with the goal of exploring, interpreting, and examining the situation in order to identify the nature and fundamental elements of a phenomenon of private sector participation in electricity generation. Sekayi and Kennedy (2017) proposed that textual consensus of data is the outcome of the qualitative Delphi process and is best suited for any research question that qualitatively oriented and group-based data can answer for the question of the study. Qualitative research methods are typically used to investigate and gain a deeper understanding of a situation's complexities – to paint a complete picture.

Qualitative research examines phenomena or events from the people's point of view (Atya, n.d) It is a method for understanding words, options, and experiences, as well as describing and defining events based on people's personal experiences. In contrast to quantitative studies, qualitative research relies heavily on words, images, and some form of description. We accomplish this by documenting the research problem by observing people, interviewing them, discussing the research problem in a focus group, or testing their interaction in a specific setting. The primary goal of qualitative research is not to generalize, but rather to understand and investigate specific contexts and cases. The research problem and research questions are the primary determinants of research methodology selection.

The study attempts to address a research question of risk involvement likelihood in private sector enjoyment policies and procedures in Bangladesh's electricity generation from a financial sustainability standpoint; however, it is not addressed through integration by numbers or quantitative methods. This study employs open-ended questions to elicit expatriate perspectives, as well as an examination of policy documents and relevant content. The researcher is determined to elicit and extract the relevant field expert's opinion, experience, and actual thoughts about the problem. However, the research is more focused on being "inductive," and attempting to develop an understanding of risk involving in private sector engagement existing policies, practiced procedures in contrast to existing policies, and discussion about achievement and challenges through observation and exploration of expatriates' statements.

Various methods, such as interviews, ethnographic studies, or focus groups, can be used in qualitative research. Phenomenological, ethnographic, grounded theory, historical, case study, and action research are some examples. For this research, the interview method may be advantageous because it allows for greater flexibility, allows for open-ended questions, and allows for the exploration of individual experiences or opinions regarding the researched phenomenon. It is also obvious that interviews can vary in their degree of structure, among other things.

According to Bryman (2008), unstructured and semi-structured questions are more effective for obtaining and acquiring in-depth data from interviewees' opinions and experiences. Exploratory studies, according to Silverman (2000), must be less structured than confirmatory studies. As a result, the questions do not have to be highly structured or standardized; rather, they should be rather open. The semi-structured interview, as described by Pole and Lampard (2002), appeared to be a suitable method for this thesis because its structuring through an interview guide allowed for orientation during the interview.

3.3 Sources of Data:

Both primary and secondary data sources are required for the research. To investigate the private sector's involvement in Bangladesh electricity generation, risk achievement, and challenges, a semi-structured interview, and secondary data (Content) analysis method were used under the auspices of "qualitative research." The researcher selects seven experts and for in-person interviews for primary data collection. Experts to be interviewed were chosen based on their knowledge of the inner workings of private sector engagement and the overall power sector, as well as their expertise, experience, and involvement record in power sector development and policy formulation, formulation, and implementation.

3.4 Secondary Data collection:

Argyrous (2009) pointed out "secondary data are an abundant resource for researchers." He also claims that secondary data has the advantages of saving time and money, as well as providing access to high-quality data. Secondary data were gathered through content analyses of various books, journal articles, newspaper articles, reports, policies, strategic papers, planning documents, laws, circulars, and online content. Secondary data were used to supplement the primary data gathered through semi-structured interviews.

3.5 Content analysis:

What is contained is referred to as content, and content analysis is the examination of what is contained in a message. Broadly speaking, content analysis can be defined as a method in which the content of the message serves as the foundation for drawing inferences and conclusions about the content (Nachmias and Nachmias, 1976).

Furthermore, content analysis exists at the interface of observation and document analysis. It is defined as an observation method in the sense that it "takes the communications that people have produced " rather than asking people to respond to questions (Kerlinger, 1973). As a result, it is also regarded as a non-intrusive or non-reactive method of social research. Content analysis, according to Krippendorff (1980), is a research technique for making replicable and valid inferences from data to their context.

The source documents must be determined first in order to conduct content analysis. Furthermore, the research question on which the study is based, as well as the theoretical background, must be thoroughly defined and explained in order to define the intention of the analysis and to be able to interpret the material (Mayring 2003). According to Mayring (2003), there are three distinct types of content analysis interpretation, summary, which means reducing the data, 'explication,' which means finding additional material, and structuring,' which means filtering important aspects from the data (p.58).

In this study, the researcher felt that structuring' and filtering the relevant content out of the material as a whole and analyzing them according to pre-specified categories was the most appropriate method. Power sector policy documents and data required for this study are mostly available and accessible on respective governmental organization websites, which the researcher obtained accordingly, with additional secondary data collected from respective offices, online books, journals, publications, and relevant newspaper articles.

3.6 Interview Guide:

Before conducting the interview, the researcher extensively examined existing literature and relevant policy documents. Insights gained and inferences drawn from such extensive research were used as motivational input in developing and comprehending the concept of the interview. "Relevant theories and themes are further developed for the development of interview questionnaires." These questionnaires were distributed in accordance with the various themes and categories to facilitate interviews. An interview guideline or checklist will be used as a tool to ensure that all aspects of this research are discussed during the interview (Patton 2002). To conduct a fluent interview, a brief interview guideline and checklist were created.

Because the study was open and semi-structured, it seemed more natural to allow the respondents respond to the questions in their own time, mentioning whatever came to mind. In this method, a series of questionnaires containing the necessary information are used to represent the study's statement to an expert panel while maintaining anonymity.

The researcher serves as a coordinator, gathering and aggregating expert opinions to produce summarized results. A total of seven (7) experts were interviewed in this study. Purposive sampling was used to select experts, which is best suited for making the case information-rich (Patton 2002). Sampling was also said to cover a wide range of expertise, depending on their accessibility. An expatriate's voluntary offers to maintain anonymity and confidentiality were accepted and considered.

Table: 5.0 : List of Interviewees

Type of Respondent and Number	Data Collection Method	Working Area and expertise
Academician-01	In-depth Interview	Academic and Energy Expert
Academician-01	In-depth Interview	Academic and Energy Expert Advisor to Consumer Association of Bangladesh
Engineer-01	In-depth Interview	Former Chairman, BPDB (State-owned Electricity Utility) and, Power Policy Expert
Engineer-01	In-depth Interview	Head of A wing of Power Division, MoPEMR, GOB and Media personality, Power Policy Expert
Civil Servant-01	In-depth Interview	Former Secretary, Power Division, MoPEMR, GOB, and Former Chairman, BERC
Civil Servant-01	In-depth Interview	Former Secretary, Power Division. Public Policy and Development Expert.
Bank Official	In-depth Interview (In-person)	SAVP, Scheduled Private Bank, Power Finance.

3.7 Unit of Analysis:

A unit of analysis is the entity that will have drawn conclusions at the end of the research and can be considered the primary focus of the research (Sheppard, 2020). In qualitative research, the unit of analysis also specifies the portion of the content or in-depth

interview to be used in the development of codes for decision-making and drawing conclusions (Roller & Roller, 2020).

Secondary data is gathered from relevant policy documents for PSE, and primary data is gathered through semi-structured interviews with expert personnel. The research's unit of analysis is country-specific PSE achievement, policy risk, and financially sustainable PSE in Bangladesh's electricity generation, as well as challenges in this regard.

3.8 Validity and Reliability:

A qualitative study based on questionnaires and content analysis is required to validate and ensure reliability. According to Patton (2001), validity and reliability are serious concerns for a researcher when designing a qualitative research study, analyzing the results, and making a quality judgment for the study.

According to Leung (2015), validity in qualitative research refers to the "appropriateness" and "trustworthiness" of research tools, procedures, and data obtained through the procedures. According to the research, reliability in quantitative research refers to the exact replicability, repeatability, and consistency of processes and results. The validity of the qualitative method used in the research was ensured by the fowling criteria.

a) The study's methodology is qualitative, and the researcher operates as an unbiased facilitator in the process of gathering uninfluenced opinions from respondents.

b) Anonymity and confidentiality of the acquired opinion or responses to be maintained by the researcher in order to avail neutrality.

c) The study will proceed with ethical Selection of expert panel from the public and private sectors, professionals, academicians, and individual consultants in order to achieve a diversified perspective on broader purpose.

d) Respondent validation be done cross-checking of initial result with the participant expert responses authenticated.

3.8.1 Reliability:

The study tends to be reliable on the criteria of relatively static political economy, selection of expert panel for interview by keeping heterogeneity and ensuring anonymity and confidentiality, cross verification in contrast to content analysis while drawing inference and fact elicitation.

3.9 Conclusion:

A quick summary of research approaches and methods is provided in this section. Primary data was gathered through one-on-one interviews with energy policy experts, as well as secondary data from pertinent policy papers, literatures, studies, and reports. Data was also gathered from government officials, public websites, publications, and emails, among other sources.

Because of the heterogeneity of the respondents, an interview was used in which the anonymity and confidentiality of the respondents' opinions were maintained, and the data was cross-verified for validity and reliability. This chapter also included a data coding, analysis, and presentation guideline, which was replicated in Chapter 5. Finally, a quick overview of data collection, presentation, and interpretation aided in making this study run smoothly.

Chapter-IV

Data Analysis and Data Presentation

4.0 Introduction:

In Bangladesh, the electricity sector was a trailblazer in attracting private investment in public infrastructure (Uddin, 2015). Policy support was required to facilitate private investor engagement in the public sector (ADB, 2007). As a separate entity, a private company enters a strategic public sector, such as electricity, and has an impact on the entire value chain in the process. This chapter will go over the policies, acts, and laws that are relevant to PSE in Bangladesh's electricity generation. The chapter will extract the key policy points with major takeaways and flaws, which will be analyzed in chapter 05.

4.1 Historical Background of Private Power and Early Global Experience:

The electricity sector of developing countries underwent a paradigm shift in the 1990s. The World Bank and other aid agencies advocated and promoted policy transfer through coercive means by development funds and aid for structural and sectoral reform across developing countries (World Bank, 2013). Induction of market-oriented reform strategy restructuring of the state electricity utility, including the involvement of the private sector, the establishment of an independent regulatory body, and the subsequent establishment of market competitiveness, was being promoted (Foster, et at. 2020). According to Sullivan (1990), electricity is regarded as an essential component for achieving economic growth, but power shortages are looming and have become a crisis in developing countries. He went on to say that inefficiency at the state utility, inept management, political interference, and increased subsidized electricity all contributed to the financial crisis. Developing economies were looking into alternative ways to mobilize private capital and engage the private sector to combat power shortages caused by a lack of financing. Since then, two distinct forms of private power have been adopted across countries: privatization (partially or completely privatizing state utilities) and independent power. The popular rationale for increased private sector involvement can be divided into three broad categories: i) mobilization of private

capital in electricity development, ii) increased sectoral efficiency, and iii) diversification of electricity generation sources (Sullivan, 1990).

4.2.0 Relevant Policy documents, Acts, And Laws:

Bangladesh, as appears to be the case like many struggling developing countries facing power shortages and financial incapacity, chose to involve private investors (PSPGPOB, 1996). The Private Sector Power Generation Policy (PSPGPOB) was passed in 1996, and it was the first step toward IPP-style private power (Day and Khan, 2006). It was Bangladesh's first public-private partnership policy framework. Following that, the government developed and enacted a few more policies concerning power generation that are relevant to PSE. In chronological order, Bangladesh's Policies, Acts, and Laws regarding Private Sector Participation in electricity generation are discussed.

Chronology of Policies, Acts, and Laws in Bangladesh which are related to PSE in the electricity sector of Bangladesh is listed below,

Table 6.0 : Chronology of Policies, Acts, and Laws in Bangladesh

Sl	Relevant Policy / Law
01	Private Sector Power Generation Policy of Bangladesh (PSPGPB)-1996 (Revised 2004)
02	Policy Guideline for Small Power Plant (SPP) 1998 and Revised 2008
03	Bangladesh Energy Regulatory Commission Act 2003
04	Private Sector Infrastructure Guidelines-2004
05	Policy Guideline for Enhancement of Private Participation in Power generation, 2008.
06	The Policy and Strategy for Public-Private Partnership (PPP Policy)-2010
07	Quick Enhancement of Electricity and Energy Supply (Special Provisions) Act, 2010
08	PPP Act-2015

4.2.1: Private Sector Power Generation Policy of Bangladesh-1996(2004)

This policy was formulated to encourage private-sector investment by providing an institutional framework for the evaluation, negotiation, and approval of private-sector power projects, as well as providing investment incentives to attract private investment. The goal of the policy was to attract private investment in the electricity generation sector.

4.2.2 Background:

Bangladesh Power Development Board (BPDB), the state-owned statutory body, was solely responsible for the generation and transmission of power in the country, as well as distribution in urban areas except for greater Dhaka and rural areas; it also acts as a "Single Buyer" by purchasing and selling bulk power, in addition to being the public sector power producer. To catch up with the emerging economy, the country projected a total capacity addition requirement of 3350 MW by 2005 (up from the 1996 available 2200 MW to and 4600 MW by 2005), implying a total investment requirement of Taka 176 billion or US$ 4.4 billion. Governments' difficulty in securing such a large volume from the public sector in an environment of limited domestic resources and declining levels of external assistance. The private sector was the only viable option.

4.2.3: Key Policy Features:

4.2.4 Single Window Operation: The Power Cell under the Ministry of Power Energy and Mineral Resources was tasked with facilitating all stages of private power promotion, development, implementation, commissioning, and operation.

4.2.2 Solicitation of Proposals: Build-own-operate (BOO) basis Independent Power Producers' (IPP) projects will be processed through a competitive bidding process by i) selection of pre-qualified applicants (Process called Request for Qualification, RFQ) and ii) RFP (Request for Proposal) documents will be issued to pre-qualified bidders.

4.2.6 Standardized Security Package documents: Under this policy government will develop standard security package documents such as Implementation Agreement (IA), Power Purchase Agreement (PPA) Fuel Supply Agreement (FSA), and Land Lease Agreement (LLA) for private power projects to level playing field and efficient contract management after selection.

4.2.7 Financing Arrangements:

- To ensure returns on equity and debt servicing private investors will depend on the revenues earned by electricity selling.
- Minimum Twenty (20) percent equity investment was required by the investor
- To facilitate the creation and encouragement of a corporate debt securities market essential for raising local financing for power development projects
- Private Sector Infrastructure Development Fund (PSIDF) might be created to provide the partial capital cost of the project as subordinated debt.

4.2.8 The tariff structure (Two-Part):

(a) Capacity Payment: Payment which will cover debt service, return on equity, fixed operation and maintenance cost, insurance, and other fixed costs.

(b) Energy Payment: which will cover the variable costs of operation and maintenance, including fuel

4.2.9 Fiscal Incentives:

Private investors are immune from corporate income tax for a period of 15 years, as well as receiving exemptions or waivers on due customs duties on imported plant and equipment and replacement parts. Furthermore, provisions were made for the repatriation of equity and profits, the designation of Private Power Generation as an industry, and corporations being eligible for all additional concessions offered to industrial projects, among other things.

4.2.10 Facilities and Incentives for Foreign Incentives:

Foreign investors have been offered tax exemptions on royalties, technical know-how, and technical help fees, capital gains from share transfers, repatriation of invested capital, profits and dividends, savings and retirement benefits, income tax exemption for up to three years, and unlimited work permit issuance.

4.2.11 Major Takeaway:

1. Selection of private companies and tariffs to be determined through a competitive bidding process.
2. Provision for "one window operation" to facilitate and streamline the implementation of private power projects.
3. Generous investment incentives were provided as it was in the early stage of such initiatives.

4.2.12 Bangladesh Energy Regulatory Commission Act, 2003:

The Private Industry Power Generation Policy (PSPGP) of 1996 allows PPP projects in the power sector to be launched. The Asian Development Bank (ADB) funded two IPP projects totaling 450 MW. 360 MW was funded by Meghnaghat and the World Bank. Haripur Power Projects was a pioneer in the field (khan et al, 2012). Over time, a growing number of local and international private investors have expressed interest in investing in Bangladesh's power sector. As a result of this environment, the government was forced to establish an independent and impartial regulatory commission (which was also part of the Washington consensus advocated by the World Bank) to create and maintain a favorable investment climate, ensure transparency in management and operation, determine tariffs, protect consumers' interests, and promote competitiveness. The Basic characteristics of the BERC Act, 2003 are independence, neutrality as regulator and quasi-judicial authority

4.2.13 Key Features of the BERC Act-2003 :

Table 7.0 Key features of the Act relevant to the study	
Functions, powers, and proceedings of BERC	Tariff Determination, ensuring efficiency in energy usage, promoting quality services, safety enhancement in the electricity value chain, issuance of licenses, dispute resolution between the licensees, and between licensees and consumers, etc.
BERC Tariff Policy	Harmonize the tariff with the marginal cost of energy; Persuasion of least-cost electricity, and excellent investment; protection of the interest of the consumers; etc.

4.2.14 Major Takeaway:

- Government acts as a Policy formulator whereas BERC has given autonomy for regulation-making.
- Operate as a Forum for Consumer Complaints and dispute settlement among licenses.
- Government will pin its focus on efficiency, least-cost electricity, excellent service, and an excellent investment in the energy/ electricity sector.

4.2.15 Private Sector Infrastructure Guidelines-2004

The government of Bangladesh has been encouraged by the remarkable success of attracting private investment in the electricity sector to pursue a policy of attracting more private investment in other infrastructure sectors, such as ports, roads, water supply, waste management, and so on boost economic growth. The policy guideline's aim is to establish procedures for identifying private infrastructure projects, as well as to establish guidelines, institutional arrangements, and procedures for procurement. This policy is applicable when the public interest is involved, private investors are required to acquire public facilities, private projects that require government

regulation and investment incentives, as well as income sharing and state assurance for the off-take of products and services resulting from private investments.

4.2.16 Key Takeaway relevant to the study:

- Detailed guidelines for private investment in the public sector.
- Provision for ensuring Competitiveness among the private investor
- Electricity sector is an eligible sector under this guideline where all boxes for applicability are ticked.
- Provision for unsolicited proposal and direct negotiation as required.

4.2.17 Policy Guideline for Small Power Plant (SIPP) in Private Sector-1998 (2008)

Many industries, as well as household consumers, found the current state of acute power shortages, combined with transmission and distribution bottlenecks, intolerable and unacceptable. Furthermore, both governmental and private sector implementation of large-scale power plants necessitated a lengthy gestation time and a significant amount of financial capital. As an immediate remedy to these crises, The Government of Bangladesh (GOB) has decided to allow private sector investors to construct Small Power Plants (SPP) on a BOO basis for their own use and sell excess electricity to other users.

4.2.18 Key Takeaway

- A private investor can build a small power plant and sell it to the chosen specific customer, and the government as well.
- Investment incentives remain the same as Private Power Generation Policy 1996.

4.2.19 Policy Guideline for Enhancement of Private Participation in Power generation, 2008:

Following the creation of the private sector infrastructure policy in 2004, the government of Bangladesh sought to encourage greater private investment in the

power sector by using public-private partnerships (PPPs) to construct new power plants and renovate inefficient and old public power facilities.

4.2.20 Key Takeaway from the policy

- To encourage more private investment in electricity generation, a new power plant will be built, and an existing power plant will be rehabilitated in a public-private partnership.
- Investment incentives to the same as Private Power Generation Policy 1996.
- To develop local private investors and entrepreneurs in the power sector.
- Private power plant to be permitted import fuel under the rules and regulations of the country

4.2.21 Quick Enhancement of Electricity and Energy Supply (Special Provisions) Act, 2010:

In the aftermath of a severe power shortage in 2006-2008, the government implemented immediate contingency planning and crisis management to ensure a reliable supply of energy and electricity. Conventional rules and procurement procedures may take time to implement crisis management measures, and crisis management measures may conflict with or contradict other laws and policies. The Quick Enhancement of Electricity and Energy Supply (Special Provisions) Act, 2010, was enacted as a result.

4.2.22 Description of the Act:

This Act makes particular provisions for facilitating effective and timely action to enhance electricity and energy generation, transmission, transportation, and distribution to ensure an uninterrupted supply of power and energy. When there is a severe shortage of electricity and energy in the country, which would impede economic development, and energy enhancement procedures under existing and applicable other laws are time-consuming, this Act shall be applicable thereafter.

4.2.23 Special Provision or Key Features:

Non tendered negotiated Tariff: A special committee is entrusted the power and authority to interact and negotiate with a single or restricted number of private organizations regarding any purchase, investment plan, or proposal, rather than going through a competitive tendering procedure. Negotiated proposal to be approved in CCGP.

4.2.24 Bar to jurisdiction of Court:

No question shall be raised in the court regarding the validity of any act done or purported to be done, any action taken or any order issued or direction given under this Act.

4.2.25 Protection of action taken in good faith:

Any litigation, prosecution, or other legal procedure brought against a public official who has done or purported to do something in good faith while performing his obligations under this Act is not valid and enforceable.

4.2.26 Key Takeaway

- This act is applicable for crisis management, and the prevailing situation of acute shortage of energy.
- Provision for avoiding competitive tendering process.
- Provision of indemnity for public officials.

4.2.27 The Policy and Strategy for Public-Private Partnership (PPP Policy)-2010

There are a few shortcomings in the PSIG-2004 guideline, such as ambiguity over PPP project commencement, confusing procurement guidelines, and the lack of standardized procedures for PPP project identification, formulation, appraisal, and approval. Furthermore, in order to maintain an annual GDP growth rate of 8%, the government projected a BDT 4.8 trillion investment requirement from 2009 to 2016, with private sector participation vital, particularly in growth-enhancing infrastructure

projects. There are a few shortcomings in the PSIG-2004 guideline, such as ambiguity over PPP project commencement, confusing procurement guidelines, and the lack of standardized procedures for PPP project identification, formulation, appraisal, and approval. Furthermore, in order to maintain an annual GDP growth rate of 8%, the government projected a BDT 4.8 trillion investment requirement from 2009 to 2016, with private sector participation vital, particularly in growth-enhancing infrastructure projects

4.2.28 Key feature

The strategy of engaging more PPP projects was two-pronged i) Attract private investment to build new infrastructure and expand existing ii) Innovation and sustainability of public service delivery.

4.2.29 Applicability of PPP Project: PPP policy can be used for projects that meet at least one of the following requirements:

i. Public sector facing difficulties in implementation of the project is difficult with its financial resources or expertise;
ii. Quality or service level elevated if a project is being PPP pursued rather doing government alone,
iii. Competitiveness among private investors, which allows the government to get the most value for money. Private investment for public service offers sustainable innovation

4.2.30 Incentives for Private Investor:

Fiscal and non-fiscal incentives to the private investors for launching PPP projects in priority sectors. Private investors are eligible for reduced import tax on capital items under PPP projects; and Tax exemption or reduced tax on profit from operating/managing for a specific period. Moreover, special unique incentives can be given by taking prior approval from the government.

4.2.31 Provision for Treatment of Unsolicited Proposal and Direct negotiation:

Private investors were allowed to submit unsolicited proposals under the PPP policy, with arrangements in place for those proposals to be approved. In exceptional, unique, and extraordinary circumstances, the government may agree to allow investors to develop projects through direct negotiation whilst still maintaining the spirit of competition.

4.2.32 Key Takeaway:

- Win-win benefits for all (Citizen, Public, and Private sector)
- PPP's application under this guideline has been clarified, as well as the sectoral scope, which is primarily infrastructure, with a focus on energy and electricity.
- Establishment of procedure for PPP project identification, treatment, appraisal, and approval.
- Institutional framework of PPP project.

4.2.33 Public-Private Partnership(PPP) Act, 2015:

The investment requirement is consistently increasing to develop the public infrastructure and service sector which is essential for the sustainable development of Bangladesh. Enactment of PPP Act. 2015 will prioritize the increased need for investment. Furthermore, the goal of this Act is to create a strong legislative framework that will encourage local and foreign private investors to engage with the government to build public infrastructure assets. Bangladesh will be tied to the global economy in this way.

4.2.34 Goal of Public-Private Partnership(PPP) Act, 2015:

The Act's purpose is to assure rapid, inclusive economic growth, as well as to better meet the demand for improved, high-quality public services in a fiscally sustainable way.

4.2.50 key features of PPP Act 2015 relevant to the Study:

Establishment of PPP Authority:

Under this Act, a PPP board of governance will be established, led by the Honorable Prime Minister, who would also serve as chairperson. The Finance Minister, along with a minister selected by the Honorable Prime Minister and respective Ministers from key PPP projects, would serve as vice-chairperson of the Board.

Major Functions of PPP Authority:

This Act has granted the PPP Authority a broad range of powers and authority to ensure the effective and complete development of the PPP program such as approving and promulgating policies, regulations, guidelines, and directives, decisions on public financial participation, and Investment incentives, Providing opinion and Consent about PPP projects, selection of Private partner, and approval of Selected Bidder, etc.

4.3.0 Institutional Arrangement of PSE in Electricity Generation:

Any private investor interested to join in power generation business and opt for awarded with a power plant project institutional arrangement and procedural methodology provides two distinct ways,

i) Competitive Bidding or Solicited Proposal which is processed under the Private Power Generation Policy-1996 and Public Procurement Rules 2008
ii) Unsolicited Proposal which is treated under Quick Enhancement of Electricity and Energy Supply (Special Provisions) Act 2010.

4.3.1 Treatment of Solicited or Competitive Process:

Private sector engagement in IPP power plant (privately built, owned, and operated power plant) through Competitive bidding process is selected through RFQ (Request for Qualification) and RFP (Request for Proposal) as mentioned in Private Power Generation Policy 1996. RFQ and RFQ documents are being followed by the standard

Documents published Central Procurement Technical Unit(CPTU). CPTU has responsible for standardized procurement documents under PPR -2008.

Stage-01: International Solicitation for Pre-Qualified Applicants:

International Solicitation for the pre-Qualified bidder is sought. Contracting Authority serves notice for International Invitation for Pre-Qualification in their own website, Newspaper, and CPTU website. Interested Applicants purchase Prequalification documents and submit them within the timeline. Generally, a Request for qualification document is issued by the Contracting Authority for shortlisting capable and potential applicants. RFQ documents usually contain detailed information and instructions required to submit an Application.

Stage-02 RFQ submission by Applicants and Shortlisting Pre-Qualified Bidder:

RFQ documents purchased by potential and interested applicants. In order to select pre-qualified Bidders, the following criteria have been satisfied by the tenderer as mentioned in RFQ documents,

Typically Contracting Authority or procuring entity evaluates the submitted RFQ of potential applicants as bellow mentioned criteria**,**

- Applicants Eligibility and General Qualification Criteria: In this criteria applicant's general qualification is tested under the condition mentioned in the documents.
- Financial Qualification Criteria: Applicants' financial qualifications were tested by information from Balance Sheet evidential documents about Total Assets, Total Liabilities, Net Worth, Current Asset, Current Liabilities, Total Revenues, Profits Before Taxes, and Profits After Taxes, Average Annual Turnover, and so on.
- Technical Qualification Criteria: Experience in Contracts of Similar Size and Nature of work.

Based on submitted or furnished documents the contracting authority evaluates the qualified applicant shortlisted based on pass-fail criteria.

Stage-03: RFP issuance to Pre-Qualified Bidder:

RFP refers to the document that contains the detailed information and instructions required to submit a Proposal and is issued by the contracting authority to shortlisted Bidders who are participating in the bidding process for a PPP Project. The contracting Authority (for Private Power Contracting Authority is Bangladesh Power Development Board) issues RFP documents to shortlisted Pre-qualified bidders.

Stage -04: Selection of Successful Bidder: Single Stage Two envelop Method Followed:

- Bidder submits bid on or before date, Bidders have to submit the proposal in Two Envelop where Envelop-I contains qualification evidence for the technical, commercial, and financial eligibility and in Envelope II Bidders submits Tariff proposal with bid security.
- Bidders' technical, commercial, and financial criteria were evaluated in accordance with the verification of qualification demonstrated in the pre-Qualification Document. The bidder who provided evidence of Qualification documents, legal, technical, commercial, and financial criteria from Envelope -1 will be determined to be the responsive bidder.
- Contracting Authority, Bangladesh Power Development Board (BPDB) may seek clarification from the Bidder during evaluation if required.
- On a pre-announced date, the Bangladesh Power Development Board (BPDB) will open the Envelope II tariff proposals of the responsive bidders, evaluate these Envelope II proposals, and rank bidder responsive proposals from lowest offered tariff to highest. The lowest financial bidder who is also the most technically responsive is declared the winner.
- Technically non-responsive bidders are notified by the procurer and their Envelop –II returned unopened.

Step-05: Approval from CCGP:

Procuring Agency pursues the approval stages and seeks approval from the approving authority via the concerned division and ministry. The Cabinet Committee for Government Purchase (CCGP) is the authority that approves new power projects.

Step-06: Letter of Intent (LOI) Issuance to Awarded Bidder: Following CCGP approval, the contracting Authority, the Bangladesh Power Development Board, issues a letter of intent (LOI) to the successful Bidder (the Project Sponsor)

Step 07: SPV (Special Purpose Vehicle) formation and Draft Agreement Initiated by BPDB and Sponsor Company:

For the project's implementation, the Sponsor Company or proposal proponent company will establish a Special Purpose Vehicle (the Company). The company then collaborates with BPDB, on the creation of Power Purchase Agreements (PPA) Implementation Agreements (IA) with PGCB and the government, Fuel Supply Agreements (FSA) with BPC or Gas Supply Agreements (GSA) with Gas Utility, Land Lease Agreements (LLA) with public entities, and so on.

Step-07: Vetting by related Ministry or state entities: Drafted PPA, FSA, GSA, IA, etc. documents are then sent to related ministries/ divisions, such as NBR(IRD), Legislative, environment, etc. All the concerns and comments are accommodated in the Vetted documents.

Stage-08: Final Approval for contract Signing: Contacting Authority then takes permission from the line ministry and concerned division for contract signing. Upon approval, the Signing of the Contract happens.

Step-09 Financial Closure: Sponsor Company then have to make a financial closure within a stipulated timeline and notify to contracting authority.

Step-10: Implementation of Project:

SPV company will implement the project with all contractual guidelines and technical specifications under the given timeline.

Step-11 Commissioning of Project and Operate as BOO basis:

After commissioning, a private company will operate the power plant for a specified period of time to provide electricity to the Bangladesh Power Development Board (BPDB) at specified tariffs (the Tariff Charges).

4.3.2 Treatment of Unsolicited Proposal:

According to Unsolicited procurement guideline 2018 of the PPP project, the definition of the unsolicited proposal is as follows,

“any unilaterally submitted written proposal of a PPP Project submitted by an Original Proponent on its initiative which is not necessary a proposal in response to government request”. At present Private Power plants through unsolicited Proposal is implemented under the Quick Enhancement of Electricity and Energy Supply (Special Provisions) Act 2010. The process is as follows,

Stage-01 Unsolicited Proposal Submission:

The private sector submits an unsolicited proposal for a new power project to the Power Division, which is part of the Ministry of Power, Energy, and Mineral Resources. The proposal includes the project scope as well as a brief description of the Proponent and its previous relevant experience. Power Division then sends this proposal to the Bangladesh Power Development Board (which also serves as the country's single buyer and contracting authority) for initial comments and to justify its congruency with the country's demand-supply scenario. The proposal is then preliminarily reviewed by the BPDB and submitted to the power division for further action, along with an initial opinion or recommendation.

Stage-02: Proposal Examined and Reviewed by Proposal Evaluation Committee:

A proposal evaluation committee has been formed according to the guideline for the Power sector under the Quick Enhancement of Electricity and Energy Supply (Special Provisions) Act 2010. The committee is made up of seven members in total. Three of them were chosen from the BPDB, one from the PGCB, one from Power Cell, one from SREDA, and one from PetroBangla. Upon receipt of such unsolicited proposal, this Committee will examine the Technical, Financial, and proponent's institutional Qualification. accordingly, this committee submits a report to the Proposal Processing Committee (known as Tariff Negotiation Committee) with necessary observations, opinions, and recommendations.

Stage-03: Negotiation or Bargain with Project sponsor by Proposal Processing Committee:

According to Section 5 of the Quick Enhancement of Electricity and Energy Supply (Special Provisions) Act 2010, a Proposal Processing Committee has been formed (1). The government will constitute a processing committee in accordance with technicalities and other matters of the plan. The committee will be made up of experienced experts in the relevant field. This committee reserves the authority to make decisions from the initial stage of the implementation plan to the stage of approval. The Committee has granted authority to communicate, consult, and bargain with any organization concerned with the plan, and to prepare a proposal containing such recommendations as may serve the best of public interests, taking into account the competency, experience, and financial capability of such organization. The Power Division established a proposal processing committee with a total of ten members under this provision. In accordance with the provisions of Special Act 2010, this committee may communicate, negotiate, accept proposals, and visit/inspect the proposed site of a plant, factory, or installation, among other things, in order to make recommendations. Accordingly, the proposal Processing Committee verify the Technical financial institutional qualification as submitted by the Proposal Evaluation

committee report. Then it negotiates with the proponent of Unsolicited Proposal for Tariff.

Stage-04: Tariff Negotiation Strategy:

The Proposal Processing Committee shall accept any Tariff proposed by unsolicited proponents shall be equal to or less than the previously approved tariff for a similar fuel type power project. That does mean tariff to be approved if it is equal or lower in successive approved projects. As the technical financial and institution qualification verified and negotiation of the tariff has been finalized the committee then in principle accepts the proposal and recommends for approval.

Stage-05: Approval Procedure:

The contracting authority, Bangladesh Power Development Board (BPDB) starts the approval procedures through its line ministry and concerned division. Concerning the division of the respective ministry submits the recommended proposal to the Cabinet Committee on Government Purchase in accordance with the procedures relating thereto. The proposal is approved by the Cabinet Committee on Government Purchase (CCGP), the Ministry or Division, and implementing agency shall take appropriate measures to implement it.

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For the project's implementation, the Sponsor Company or proposal proponent company will establish a Special Purpose Vehicle (the Company). The company then collaborates with BPDB, on the creation of Power Purchase Agreements (PPA) Implementation Agreements (IA) with PGCB and the government, Fuel Supply

Agreements (FSA) with BPC or Gas Supply Agreements (GSA) with Gas Utility, Land Lease Agreements (LLA) with public entities, and so on.

Step-07: Vetting by related Ministry or state entities: Drafted PPA, FSA, GSA, IA, etc. documents are then sent to related ministries/ divisions, such as NBR(IRD), Legislative, environment, etc. All the concerns and comments are accommodated in the Vetted documents.

Stage-08: Final Approval for contract Signing: Contacting Authority then takes permission from the line ministry and concerned division for contract signing. Upon approval, the Signing of the Contract happens.

Step-09 Financial Closure: Sponsor Company then have to make a financial closure within a stipulated timeline and notify to contracting authority.

Step-10: Implementation of Project:

SPV company will implement the project with all contractual guidelines and technical specifications under the given timeline.

Step-11 Commissioning of Project and Operate as BOO basis:

After commissioning, a Private company will operate the power plant for a specified period of time to provide electricity to the Bangladesh Power Development Board (BPDB) at specified tariffs (the Tariff Charges).

4.4.0 Power Generation Sector Achievement and contribution of PSE:

During Bangladesh's sixth (2011-15) and seventh (2016-2020) five-year plans, energy and electricity sector development played a catalytic and enabling role in the country's social-economic growth. Bangladesh has continued to pursue the same policy, recognizing the need of guaranteeing a reliable supply of electricity at an affordable price as a significant contributor to social and economic development (8th Bangladesh Five-Year Plan, p.341) by providing primary energy as an input to practically all types of economic activities, the electricity sector makes a substantial contribution to a

country's GDP. As a result, the sector's contribution has increased 19% each year, and its proportion of GDP will be 1.3 percent in 2020, up from 0.95 percent in 2009. The better performance is reflected in the global ranking, with the quality of energy supply as a percentage of output rising from 124 in 2015 to 68 in 2019. Increased electricity generation installed capacity, per capita generation, access to energy, and system loss, among other things, have been used to describe the power sector's success. (Moazzem & Preoty, 2020). Since 2009, a total of 119 new power plants have been built. The total capacity of electricity generation has increased by 445 percent, from 4942 MW to 22031 MW until July 2021. The number of consumers increased from 10 million to 40 million, and the excess to electricity increased from 49 percent to 99.5 percent. Simultaneously, the overall performance of the system is improved, as is system loss and revenue collection. At a glance, the accomplishment is as follows:

Table-8.0 Electricity Sector Achievement at a Glance

Sl No	Subject	Before 2009	July 2021	Achievement Comparison
01	Number of Power plant	27	146	119 No's
02	Grid-Connect Installed Capacity	4942 MW	22031 MW	17062MW
03	Maximum electricity Generation	4130 MW	13792	9662 MW
04	Number of Consumer	10800000	40700000	209900000
05	System Loss	14.33%	8.49%	5.84% Reduction
06	Access to Electricity	47%	99.75 %	52.50
07	**Per capita Generation**	**220 kWh**	**560 kWh**	**340 kWh**

Source: Power Cell Annual Report 2021.

Total Fossil Fuel based power generation capacity is 20512 MW, Power Import: 1160, Hydro-electricity-230 MW, Grid-Connected Solar-129 MW, Captive Generation 2800 MW, Off-Gird Solar, 404 MW, aggregated total Installed Capacity 22031+2800+404=25235 MW

4.4.1 Power source Diversification:

To obtain power from various sources, the government of Bangladesh implemented a power project with diverse power sources. This includes power plants in the public sector, as well as those in the private sector (IPP, SIPP, rental, and captive), as well as joint ventures. In addition, the country entered a new horizon of opportunity in the cross-broader power exchange. The government's power generation capacity from the various sources listed below,

Table -9.0: Power generation capacity of Bangladesh from the various sources

Sl no.	**Public Sector**	**Number of Power Plant**	**Installed Capacity MW**
1	BPDB	38	6013
2	APSCL	5	1444
3	EGCB	3	957
4	NWPGCL	7	1401
5	RPCL	3	182
6	B-R Power Gen	1	149
A)	Sub-Total Public Sector	57	10146
Sl no	Joint Venture	Number of Power Plant	Installed Capacity MW
1	BCPCL	1	1244
B)	Sub-Total Joint Venture Installed Capacity	1	1244 MW
Sl no.	Private Sector	Number of Power Plant	Installed Capacity MW
5	IPP	59	8042
6	SIPP(BPDB)	4	99
7	SIPP(BREB)	9	251
8	Rental 15 year	4	169
9	Rental 3/5 Year	12	920
C)	Sub-total Private sector	88	9481
D)	Power Import	Point	Capacity
	Bheramara HVDC		1000
	Tripura		160
	Sub-Total Import		1160
	The total Installed capacity of Bangladesh (A+B+C+D)	146	22031 MW

Source: Power Cell, MPEMR Annual Report, 2021

4.4.2 The Percentage of ownership of Power Generation capacity of Bangladesh:

Currently, the public sector accounts for 46% of total generation capacity, while private power plants account for 43%, joint ventures account for 6%, and power imports account for 5% (Power Cell Annual Report 2021).

Table 10: Power Generation capacity based on Ownership (%)

Sl No	Plant Ownership	No of Power Plant	Installed Capacity	%	Maximum Available Capacity	%
1	Public	57	10146	46	9740	46
2	JV	1	1244	6	1244	6
3	Private	88	9481	46	9136	43
4	Import		1160	5	1160	5
Total		146	22031		21280	

Source: Power Cell Annual Report 2021

4.4.3 Power Generation Capacity in accordance with the Fuel Type:

The majority of installed power plants use natural gas or liquid fuel as their primary fuel. Natural gas accounted for 52 percent of installed capacity, while liquid fuel accounted for 33 percent. The figure below depicts the installed capacity of power generation by fuel type as of June 2021.

Table 11: Power Generation Capacity in accordance with the Fuel Type

Sl	Fuel Type	Number of Power Plant	Installed Capacity (MW)	%	Maximum Available Capacity	%
1	Natural Gas	65	11450	52	11100	52
2	HFO	60	6004	27	5687	27
3	HSD	10	1290	6	1268	6
4	Coal	3	1768	8	1688	8
5	Hydro	1	230	1	230	1
6	On-Grid Solar	7	129	1	129	1
7	Import		1160	5	1160	5
Total		146			21262	

Source: Power Cell Annual Report 2021

4.4.4 Power Project Contracted versus project Implemented Form January 2009 to July 2021 based on Ownership:

Number of Contracted and number of Implemented Power Plant according to Ownership mentioned below,

Table: 12 Power Project contracted v/s Implemented from 2009-2021(Ownership)

Sl No	Plant Ownership	No of Power Plant	Contracted Installed Capacity (MW)	Implemented Installed Capacity	
				Number of Power plant	Capacity (MW)
1	Public Sector	53	11481	42	7143
2	Joint Venture	4	4975	1	1244
3	Rental Power Plant	20	1653	20	1653
4	IPP power plant	74	11920	56	7022
		151	30029	119	17062

Source: Power Cell

4.4.5 Power Project Contracted versus Implemented Form January 2009 to July 2021 based on fuel type:

Table: 13: Power Project contracted v/s Implemented from 2009-2021(Fuel Type)

Sl	Fuel Type	Number of Power Plant Project	Contracted Installed Capacity (MW)	Implemented Installed Capacity	
				Number of Power plant	Capacity(MW)
1	Natural Gas	45	12474	36	7828
2	HFO	66	6548	61	6000
3	HSD	14	1749	13	1587
4	Coal	9	8615	2	1518
5	Hydro	0	0	0	0
6	Renewables	17	643	7	129
7			1160	119	17062

Source: Power Cell

4.5.0 Current Organizational Structure of Bangladesh Power Sector:

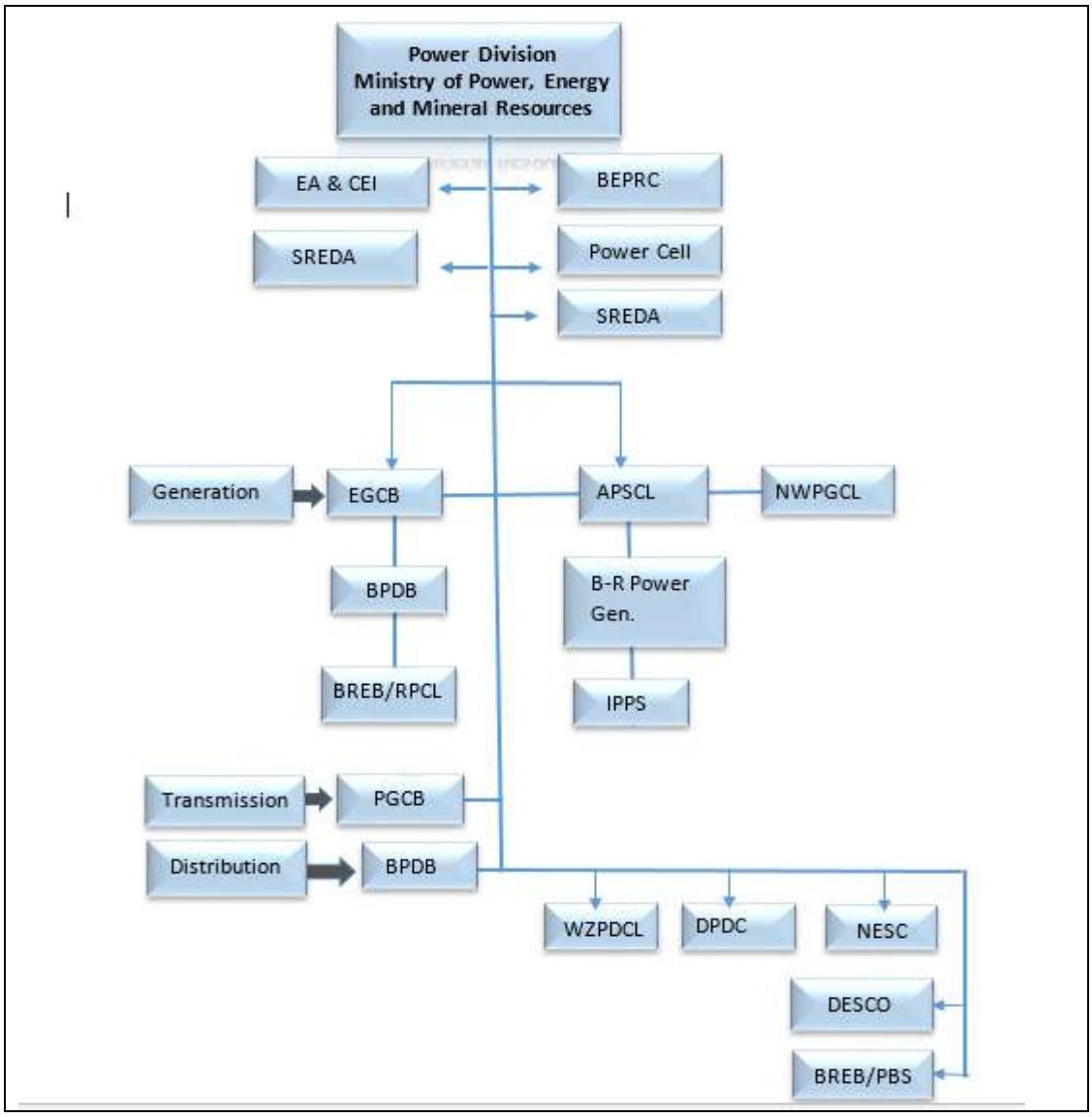

Figure 5.0: Organizational Structure of Power Sector of Bangladesh (Source Power Division)

Table 14: Organizational Structure of Bangladesh Power sector

Apex Body	Power Division, Ministry of Power, Energy & Mineral Resources (MPEMR)
Regulator	Bangladesh Energy Regulatory Commission (BERC)
Approval of HT consumer and licensing to the professional.	Electrical advisor (EA) and Chief Electric Inspector (EA and CEI)
Development of private power	Power Cell
Promotion and Development of Renewable Energy	Sustainable and Renewable Energy Development Authority (SREDA).
Research wing,	Bangladesh Energy and Power Research Council – (BEPRC)
Central Training institute:	Bangladesh Power Management Institute (BPMI)
Generation	I. Bangladesh Power Development Board (BPDB) II. Bangladesh Rural Electrification Board (BREB)/RPCL III. Coal Power Generation Company of Bangladesh Limited(CPGCLB) IV. BR Power Generation company limited V. Ashuganj Power Station Company Ltd. (APSCL) VI. Electricity Generation Company of Bangladesh (EGCB) VII. North-West Power Generation Company Ltd. (NWPGCL) VIII. Independent Power Producers (IPPs)
Transmission	Power Grid Company of Bangladesh Ltd (PGCB)
Distribution	I. Bangladesh Power Development Board (BPDB) II. Dhaka Power Distribution Company (DPDC) III. Dhaka Electric Supply Company Ltd (DESCO) IV. West Zone Power Distribution Company (WZPDC) V. Rural Electrification Board (REB) VI. Northern Electric Supply Company Limited(NESCO)

Source: Power Division, MPEMR, Bangladesh.

4.6.0 Discussion:

The private sector engaged in the public infrastructure development started with PSPGPOB -1996, begins with electricity generation, and expanded to other economic growth-enhancing infrastructure projects. Policies kept evolving on limitations, shortcomings, and changed circumstances. Most relatable policies towards PSE in the infrastructure/ electricity sector have been discussed chronologically. Form the policy points inferences will be drawn in chapter 5.

4.7.0 Analysis of Interviewees perspective:

A theoretical framework and research question were used to develop semi-structured questionnaires, which were then given to the relevant expert.

4.7.1 Policy arrangement and Framework:

In response to a query of the researcher about the institutional framework and policy mechanism for private sector engagement in electricity generation in the context of Bangladesh one key respondent who has been an expert in the field of energy policy has talked through in detail, clarified his perspective and experience, his words stated as follows,

> *Referring to the early history of privatization, During the 90's when the world bank and other international donor agencies started promoting the electricity sector reform and advocating privatization agenda for the developing country all over the world. the Primary consideration for reform strategy was unbundling the state-controlled electricity utilities, breaking vertically integrated system turned into a horizontally integrated, corporatizing the state utility, bringing efficiency through effective competition, or market-based reform, and creating a level playing field for all investors and finally attracting and engaging the private sector. According to the World Bank and other international donor agencies, the monopolistic state-controlled power sector lacks transparency and accountability, which inevitably leads to inefficiency. The transformation and changes brought to the power sector of Bangladesh during that transition were not rationalized. The transformation or reform policy was not carried out in a lawful manner. There were many countries around the world that enacted appropriate laws to materialize those reform policies. Bangladesh did not have*

an energy policy back then but formulated a "Private Power Generation Policy in 1996". If a comprehensive energy policy was formulated then "Electricity Generation, Distribution, Transmission" could be included in a single policy framework and Private sector generation could be part of that.

Being overly critical about the current modality of private sector engagement he mentioned...

Any policy should be supported by adequate Legislation afterward. The timely enactment of Law would have defined the role of BPDB, Power Division, Planning Commission, Cabinet, legislative, and all related stakeholders. Act or Law for policy is required in order to check if there is any policy deviation. When The achievement is not supported by law it shall not be called an achievement at all.

To acquire more knowledge and insights about the policy framework issue the researcher had approached another prominent energy expert of Bangladesh who is also an academic in the relevant field. In his response, he described the context and strategy of Bangladesh regarding private power generation. First and foremost, he started with a little historical perspective of private sector engagement in electricity generation of Bangladesh and mentioned the procedural effectiveness and efficacy of PSE.

According to him...

During the political regime of 2001-2006, the then incumbent government politically selected number of rental private Power plants but the implementation of those projects did not materialize due to serious backlash from various stakeholders. The Backdrop of serious electricity shortage during 2006-2008 the caretaker government awarded a couple of rental power projects. The newly elected government that took over in 2009 initially maintained a strong aversion for private power. From 2010 government left no choice but to pursue liquid-fuel-based rental and quick Rental private power because they can come into operation within the shortest possible time compared to Gas based power plants in the dire of power shortage. World standard security package documents are being currently used and the contractual mechanism is quite sound as compared to international standards. If any contractual manipulation is there that is an absolute governance issue.

Another distinguished interviewee, who has long served as the Head of an important wing under the Ministry of Power, Energy, and Mineral Resources, GoB acknowledged the necessity of enactment law or Act against any policy but, he also argued,

> *It is the uniqueness of the Private Power Generation policy 1996 that the policy is so contained and complete that without any legal framework it has the ability to be effective in the PSE. Since 1996 it has been more than two decades, over 80 private power plant has been implemented under this policy there was no litigation occurred or no case filed in court regarding any issue.*

A former Chairman, BPDB has expressed his opinion regarding the policy arrangement of PSE,

> *The policy had never been a static document rather it is dynamic, it always incorporates reform, changes over time. Battling with a serious power crisis entails the urgent need for electricity supply not only for the crying need of citizens but also to boost the economic activities on a development target. The government had to offer incentive strategies to attract private sectors and some of that incentive strategies might contradict with other policies contemporary public policies or rules or laws which might time consuming to accommodate.*

In his more direct opinion, he further asserted,

> *Policies are less rigid compared to Laws or Acts. One can have enough flexibility while taking decisions under the policy.*

The researcher interviewed a civil servant, who served as secretary, Power Division, Ministry of Power, Energy and Mineral Resources (MPEMR), Government of, involved in critical policy decisions and implementation. His response was,

> *The policy has much more flexibility, I don't see the requirement of Law or Act in this regard as it is working fine in PSE for the power sector.*

From the Interview of experts, the researcher has identified the major convergences and differences of the opinions, mentioned in the table below,

Table 15: Interviewees opinion convergence and difference on policy arrangement of PSE in electricity generation of Bangladesh

Theme	Interviewees Opinion Convergence	Interviewees Opinion Differences
Policy arrangement and Framework	The policy has more flexibility than Law,	Policies are guidelines for implementers, but successive legislation should be in place to regulate policy deviations.
	Exiting PSE involving procedures has effective contract management with Security Package Documents.	PSE policy frameworks are sound as there is no litigation has occurred with any private parties since its adoption in 1996.

4.7.2 Over Estimation of Demand Projection and Implication with Private Power Plants:

In 2005, Power Sector Master Plan (PSMP) was put in place to help develop Bangladesh's power sector which was mostly focused on gas, with the assumption of plentiful gas reserves. A revised PSMP 2010 has been developed considering the changed scenario of gas shortages with coal as the leading primary fuel for the attainment of steady power supply up to the year 2030, taking into account the diversification of fuel supplies. Regarding fuel diversification, the PSMP 2010 intends to achieve a fuel composition ratio of 50% coal (30% local coal and 20% imported coal), 25% natural gas (including LNG), 5% liquid fuel, and 20% nuclear, including renewable and cross-border commerce, hence prioritizing the use of indigenous primary energy sources. According to the study, by 2030, the electricity demand needed to achieve an 8% GDP will be 34,000MW (PSMP 2010, Power Division). Later part of the long-term planning in PSMP 2016 reduced coal's dominance in its planning to 35% of the total energy mix, and the total power generation target for 2041 was set at 60,000 megawatts (Sajid, 2020). The overall demand projection has been elevated even higher level at successive Power System Master plans. As of 2021 government has achieved a target of implementation of 8.03% electricity for coal in contrast to the PSMP 2010

target of 50% and PSMP 2016 target of 35% electricity for coal. The government kept up with the overall generation enhancing target in line with the master plan but coal-based least-cost power plants implementation was not happening rather inclined to liquid fuel power plants.

Demand Projection was made in PSMP 2005 basis on GDP and historical Electricity consumption, GDP per capita method for PSMP 2010, and GDP elasticity method for demand forecasting in PSMP 2016. Successive PSMP shaves been criticized in a number of accounts including weak demand-side analysis, over projection of electricity demand, and thereby creating excess capacity in power generation. Both the power sector and the economy have been confronted with multiple challenges because of weak demand projection in the successive PSMPs (Moazzem, and Preoty 2020).

According to BPDB annual Report 2021, 18392 MW is expected to be added to the national grid from January 2022 to December 2030 while 3990MW capacity is set to be phased out within 2022-2030 as per the retirement plan for the existing power plants. The implementation of power projects for electricity generation capacity enhancement up to 2025 has depicted below,

Table 16: Generation Capacity Addition in the pipeline up to 2025

Ownership wise	2022	2023	2024	2025	Total
Public	775 MW	1292 MW	4458 MW	775 MW	7300 MW
Joint Venture	1320 MW	1320 MW	2520 MW	0	5160 MW
Private	2698 MW	718 MW	1040 MW	0	4456 MW
Import	1496 MW	0	0	0	1496 MW
Total	6269 MW	3330 MW	8018 MW	775 MW	18412 MW

Source: BPDB Annual Report 2021

The researcher has obtained the data about the forecasted demand and maximum installed electricity generation capacity up to 2025 as per the power projects are being implemented. The Year-wise comparison between Installed capacity and forecasted maximum demand is mentioned in the table below,

Table 17: Year-wise comparison between Installed capacity and forecasted maximum demand from 2021 to 2025

Year	2021	2022	2023	2024	2025
Forecasted Maximum Demand (MW)	14500	15800	17100	18500	19900
Maximum Generation Capacity (MW)	22269	26959	30585	34978	35635

Source: Power Cell

This plan has essentially entailed inefficient or underutilization of installed capacity. The overcapacity situation will be even worse if the demand generation growth does not catch up with the installed capacity. Estimated future overcapacity has been calculated in a study conducted by The Institute for Energy Economics and Financial Analysis (IEEFA) by taking into consideration of BPDBs capacity addition and retirement plant for power plants up to 2025. The study has demonstrated a possible scenario where 10% of average electricity annual growth will lead to overall capacity utilization dropping 40% by 2025-26 whereas if annual generation growth is 8 percent, then utilization will keep dropping down to 36.0 percent by 2025-26 and at 7.0 percent electricity growth the utilization will be to 34.0 percent of total installed capacity (Simon & Ahmed, 2020). The illustrated bellow, actual and estimated capacity utilization (in %) has illustrated bellow,

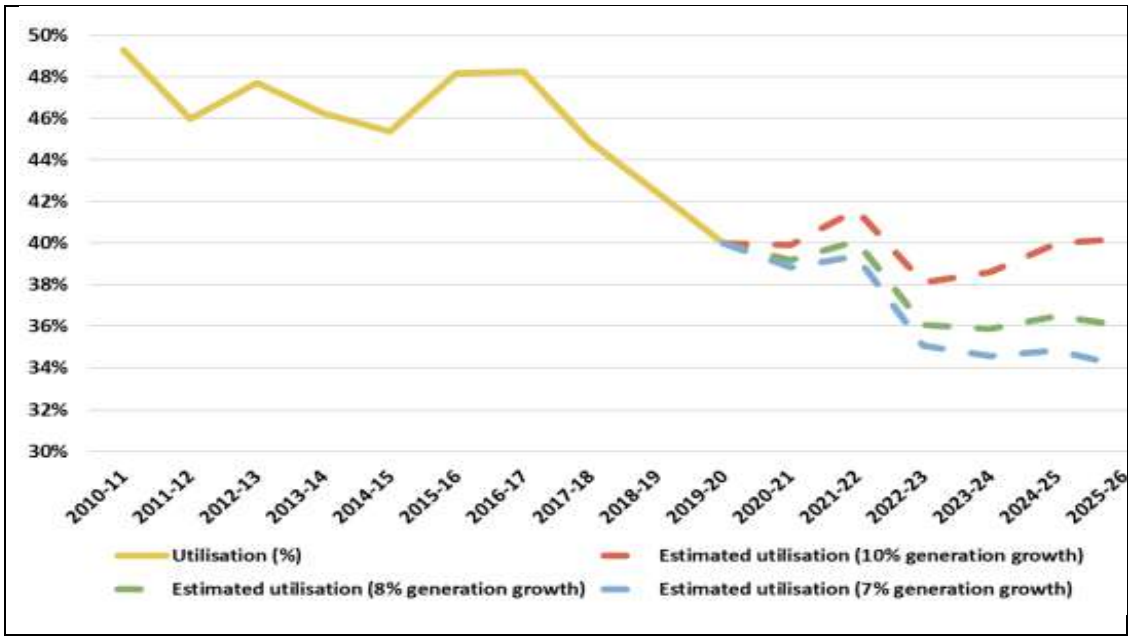

Figure 06: Actual and Estimated Capacity Utilization (%) Source: Extracted from IEEEA (2020).

One of the interviewed expert's perspectives on the methodological aspects of the "demand projection issue" has been described as follows.

> *In Bangladesh, there is no integrated resource planning for electricity demand projections, hence planning is distributive and Ad-hoc. A twenty-year master plan is unattainable and difficult to execute and implement, generation planning will be based on a 10-year and 5-year short-term strategy that will be reviewed on a regular basis. GDP should not be used to anticipate demand because GDP growth is not reflected in Bangladesh's electricity demand. Time has come to decouple demand projections from GDP because GDP figures in Bangladesh are confusing and appear inflated due to a high level of public investment. Despite the fact that the country's GDP has increased dramatically over the last decade, electricity demand has not increased at the same rate.*

In fact, Moazzem and Preoty (2021) demonstrated in a working paper that non-the service sector has the majority of the Contribution to GDP of Bangladesh but the non-service sector consumes less electricity compared to the service sector.

Another key informant and energy expert maintained a strong opinion in response to the researcher's questions about increasing generation capacity based on the projected demand envisioned by the master plan. He underscores a political economy dimension

of demand estimation, as well as the government's persuasion for surplus electricity. He claims that,

> *The government's generation plans are irrationally ambitious and out of step with reality. Electricity demand was forecasted and was aggressively executed without regard for fuel availability. The sector is in crisis because business interests have taken precedence over consumers' interests. There is no consistency between electricity demand and generation capacity. Costs have risen as a result of the continuous increase in generation, transmission, and distribution. Because of generous incentives and government assistance, this sector has become an appealing business and money-making opportunity for private companies in areas where consumer interests are not protected. "Investing in the power sector allows some people to become wealthy quickly and without taking any risks."*

A former civil servant working in the power sector expressed a slightly different viewpoint, saying,

> *Bangladesh Government planning is integrated, but due to resource constraints, concurrent development work in generation transmission and distribution is not taking place.*

4.7.3 Occurrence of Slower Industrial Growth and Consequence on Overcapacity:

According to PSMP 2016, Bangladesh's economy will be primarily dependent on traditional industries such as RMG, Jut, and Lather. New industries are expected to grow gradually (PSMP 2016, p.26) Nayyar and Sharma, (2021) demonstrated Bangladesh was unable to diversify its exports. The most important export sector is readymade garments (RMG). Over the last two decades, the industry has consistently accounted for at least three-quarters of Bangladesh's total exports, increasing its share from 75% in 2000 to 84 percent in 2019.

The following are the comments of one energy expert on industrial grid electricity consumption;

> *If the grid electricity consumption trend of industries is looked at, it can be noticed that the curve might be almost flat. That does necessarily imply that industrial growth is not as expected and that industries are less interested in*

obtaining electricity from the grid, preferring instead to rely on captive generation for their own use.

The following patterns were observed by the researcher in the BPDB's annual reports regarding industrial electricity consumption as a percentage of the country's overall electricity generation:

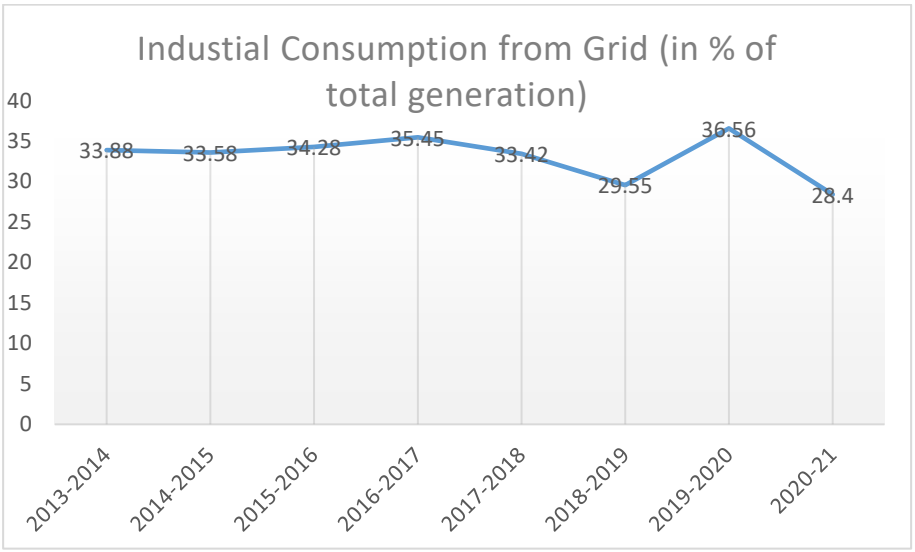

Chart 01: Industrial electricity consumption from grid pattern (% of total generation)

Source: BPDB's annual reports(2013-2021).

To get a viewpoint on "nation's industrial growth and its correlation with electricity consumption," the researcher also spoke to a former civil servant with working experience in the power sector, who shared the same viewpoint as previous interviewees. In response, he said,

The industrial sector appears to be less interested in grid electricity, preferring instead to rely on captive generation. Many industries have introduced energy-saving methods in their manufacturing machinery, which has resulted in decreased consumption and overcapacity.

The following is the opinion expressed by the head of an important wing of the power sector on this issue.

> *Heavy electricity-guzzling industries may not be possible because our development contenders already have cemented a position in an established market, but that a country can be developed without such heavy industrialization.*

The study observed the convergences and differences of opinions, which are listed in the table below, based on the expert interviews.

Table 18: Interviewees opinion convergence and difference on Demand Projection Modeling and Overcapacity Issue

Issue	Interviewees Opinion Convergence	Interviewees Opinion Divergence
Over Estimation of Demand Projection and Private Power Plants.	Reserve margin shall not exceed over 25 %. GDP growth in Bangladesh might not be taken as the basis of demand projection.	A power generation master plan for twenty-year is unrealistic and difficult to execute and implement. Bangladesh should pursue a bottom-up, integrated approach to planning.
	The failure of industrial growth to materialize as planned has been linked to a high share of underutilized power capacity.	Planning is integrated, and due to resource constraints, execution in all aspects is challenging.
	Currently, there is a gap between Installed capacity and actual utilization of capacity. A certain amount of Installed capacity is not producible due to domestic gas and coal shortages.	
	Capacity underutilization has financial implications.	

4.7.4 Excess Reserve Margin:

A high level of service reliability depends on countries reserve margin. Planning Reserve Margin: Planning electricity Reserve margin is the amount of the state capacity that can be available for generation coupled with probabilistic analysis in order to meet the expected demand over the planning horizon A calculated planning reserve is a relative indication of redundancy. Planning reference margins are reserve margin targets based on each area's load, generation capacity, and transmission characteristics. Adding a new power plant has always required extensive planning and construction time. As a result, the projected demand for electricity should have been higher than the actual demand. Electricity demand varies throughout the day and evening, night, during the summer and winter, so capacity must not only meet average demand but also peak hourly demand. When demand is extremely high, the reserve margin indicates the risk of an overloaded system. To ensure reliability and the ability to handle sudden demand increases, the system must maintain a reserve margin of 10-20%. In contrast, very high reserve margins increase the risk of underutilization of available capacity because a significant amount of power plant capacity is idle during normal demand periods (Cheng, 2018). The electricity reserve margin in the current situation of Bangladesh is acceptable at a level of approximately 25% but the reserve margin shall be reduced from 25% in 2020 to the target of 10% by 2030 (PSMP 2016, P. 45).

The research has drawn an inference on surplus electricity generation capacity based on comparing the year-wise installed capacity to maximum demand served which has been mentioned below,

Table 19: Year-wise installed capacity enhancement to maximum demand served

Year	Installed Capacity(MW)	Present Capacity (Derated) MW	Maximum Demand (MW)	Excess Capacity (%)
2004-05	4995	4364	3721	17.28
2005-06	5245	4614	3782	22.00
2006-07	5202	4623	3718	24.34
2007-08	5303	4776	4130	15.64
2008-09	5719	5116	4162	22.92
2009-10	5823	5271	4606	14.44
2010-11	7264	6639	4890	35.77
2011-12	8716	8100	6066	33.53
2012-13	9151	8537	6434	32.69
2013-24	10416	9821	7356	33.51
2014-15	11534	10939	7817	39.94
2015-16	12365	11170	9036	23.62
2016-17	13555	12771	9479	34.73
2017-18	15953	15410	10958	40.63
2018-19	18961	18438	12893	43.01
2019-20	20283	19892	12738	56.16

Source: BPDB Annual Report 2020-21

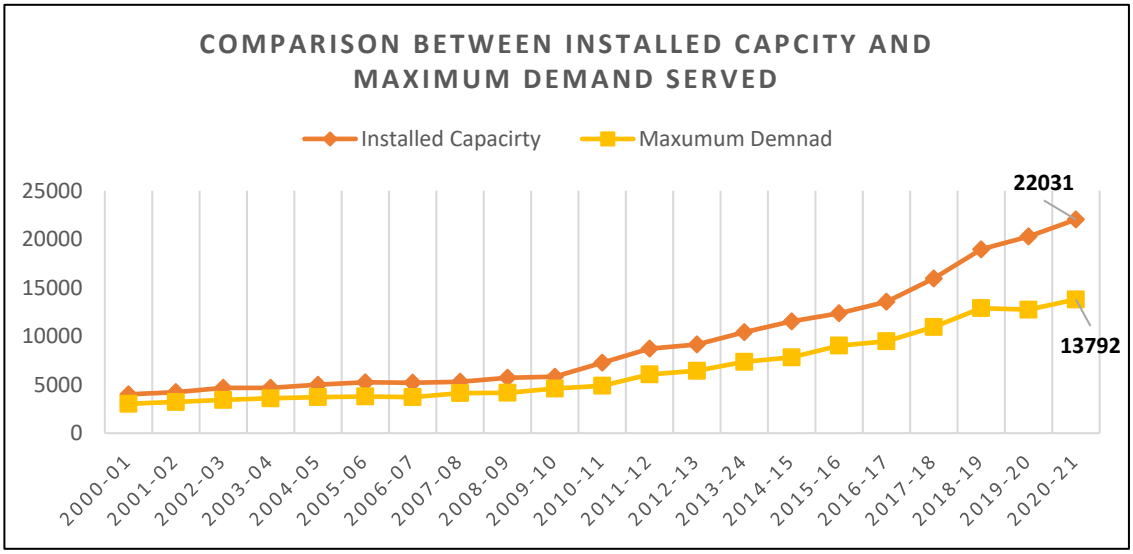

Chart 02: Increasing Gap between the installed capacity to maximum demand

As key informants, another expert has expressed his thoughts on the excessive reserve margin for electricity, which is described below.

> Occasionally *We have reduced capacity in electricity generation due to gas shortages. Furthermore, due to maintenance and forced shutdown, a number of power plants also remain idle. At the same time, we are unable to draw 1000 MW more from the grid due to a transmission bottleneck. We must maintain liquid fuel-based power plants due to fuel risk, but it would be better if not more than 25%. in our country ideal case not sustaining because of fuel constraint, so the reserve margin seems too high.*

The opinion of the former Chairman, BPDB regarding "excess reserve margin and excess generation capacity" is mentioned as follows,

> *A reserve margin of no more than 25% is required. therefore, there must be a balance between private and public sector electricity generation. The surplus capacity of more than 30% indicates that we have overinvested, and our economy is not capable to bear the burden for a long period. The reserve margin appears to be excessively high or overcapacity for a variety of reasons. For example, roughly 3000 MW capacity of rental and quick rental power plants have expired contracts, but they have been in service for a long time with multiple contractual extensions.*

4.7.5 Quick Enhancement of Electricity and Energy Supply (Special Provisions) Act, 2010:

During a crisis, the traditional procurement process was assumed to be time-consuming. International invitation/solicitation RFQ (Request for Pre-Qualification), Shortlisting of Bidder through Prequalification by following evaluation and approval process, RFP issuance, RFP submission in two envelope method, Evaluation, Approval all have a timeline according to Public Procurement Rules (PPR-2008). The Quick Enhancement of Energy and Electricity (Special Provision) Act has assumed that the time-consuming process of conventional procurement might be a hindrance to achieving quick electricity and managing the crisis. The act aided in the early stages of being fruitful. This Act provides authority and power to the Proposal Processing Committee to communicate, consult and bargain with a single or limited number of

organizations about any procurement, investment plan, or proposal regarding power project. This Act allows for tariffs to be negotiated on a case-by-case basis rather than through a competitive bidding process. According to Section 2 of this Act, Act has given supremacy over the Public Procurement Rules (PPR-2008) thus it might promote inefficiency in public procurement and operate against the inherent spirit of spending public money in a transparent, competitive, and accountable manner. As the special law was first enacted in October 2010, this act was enacted for a crisis period but it has extended for the period up to 2026. The Act includes a provision that indemnifies a public official who acts in good faith. Given the concern, providing protection for actions taken in good faith under (section 10) of the law is highly ambiguous, as the Act contains no definition or specification of good faith. No action, prosecution, or other legal procedure shall be brought against any officer or employee for anything is done or purportedly done in good faith while fulfilling his duties under this Act. This left the door open for arbitrary and capricious application by the implementers due to the vagueness, broadness, and ambiguity of this Act. The importance of discretion in decision-making and individual sanctity of implementers has been 'assumed.' taken for granted. In other words, the Act indemnifies or protects officials who are involved in the process of granting contracts without going through the tender procedure.

Reprimanding Quick Enhancement of Electricity and Energy Supply (Special Provisions) Act, 2010 and its extension of several occasions the energy policy expert mentioned,

> *The Special Provision Act of 2010 is only for emergency situations, and BAU situations are expected to be ignored when emergency situations dominate." Giving a fifteen extension in phases does necessarily means the sector has not been able to recover from the crisis. The government granted project after project to private corporations without going through the tendering process, because there was no regulation in place, private companies have now become a bigger influencer in the sector.*

Another energy expert and academic, in a similar vein to the previous interviewee, has expressed his strong opposition to the continuation of this Act, stating,

I have advocated for a long time to immediately discontinue this special Act. It cannot be continuing any longer.

The researcher sought a broader viewpoint from the former Chairman of the BPDB, based on his job experience in the electricity sector. He responded by describing the policy's historical context and current relevance.

Initially, when the government was aggressively pursuing only generation capacity, it increased the complexity of the traditional procurement process and the possibility of conflict with other laws and other rules of business of government entities. Furthermore, unforeseen cases to while on prevailing crisis period and contingency management the probable genuine and justified loss of private investors interests can be addressed through this special act 2010. The background of the law, on the other hand, is no longer valid. It may be terminated immediately.

The researcher shared a few points from the content analysis concerning the Act to another important interviewee and his opinion was sought subsequently. He has maintained his support for the special Act's continuation. He voiced his views on the Special Act of 2010 which has detailed below.,

The legislation exists, but how it is applied is crucial. This Act should be utilized sparingly and only when absolutely necessary. The risk or benefit of the law is depending on how it is applied. It has been used as a part of crisis management.

The former Chairman of the BERC has also endorsed the enactment of the Act and its prolonged period of operation. He stated in his version,

Bidding prices can be manipulated by syndication in the traditional procurement process stipulated by PPR-2008, and there is no option to negotiate with bidders, increasing the likelihood of that situation. A special act was carried out. In response to a suggestion of the Act be repealed, he stated that it falls under the purview of the government. As far as the negotiation and approval process is concerned, this is not in the hands of any individual, but rather of a group of people involved in the negotiation process—when a group of people is involved, there is no chance of corruption. The other process is carried on as usual. Only a few instances of direct negotiation occurred.

Based on expert interviews, the research reveals convergences and differences of opinion based on the research inquiry, which are presented in the table below.

Table 20: Interviewees opinion convergence and difference on the issue of Quick Enhancement Energy and Electricity Special Act 2010

Issue	Interviewees Opinion Convergence	Interviewees Opinion Differences
Quick Enhancement of Electricity and Energy Supply (Special Provisions Act-2010)	This Act may have some applicability for a very short period of time when considered as part of contingency measures, emergency, and crisis management.	Any Act enacted to deal with an emergency situation cannot be in effect over a decade. When there is an emergency, BAU cases are supposed to be ignored, avoided, or neglected.
		The grounds for this Act to run for an extended period of time are no longer relevant because currently there is no scarcity of electricity in Bangladesh.
		The Act is in place, but how it is implemented is crucial. This act was only utilized when absolutely necessary.
		The competitive bidding process has the probability of collusive practice where the bidding price can be manipulated through syndication. The traditional procurement process does not permit negotiation with bidders, whereas this act does.
		The Electricity Sector Officials are granted Moral Courage under the Act. The inconsistent development of the energy sector, compared to the power sector, necessitates the Act's continuation.

4.7.6 Energy sector development lagging behind power sector:

The impact of this disparity in priorities in the two interconnected sectors on allocation is becoming more visible by the day. Due to insufficient allocation in the energy sector, it is not possible to invest in its own gas exploration and extraction. Import reliance, on the other hand, has grown. This is worsening the situation. Excessive reliance on imports has also resulted in a slight shift in the international prices of LNG and other fuel products, resulting in a revenue deficit for the government. The energy sector has been allocated only Tk 14,400 crore in the Eighth Five-Year Plan, which is Tk 3,000 crore less than in the Seventh Five-Year Plan. One-tenth of the electricity sector is allocated to energy sector development in the Eighth Five-Year Plan.

According to Pargal (2017), the annual growth rate of natural gas has increased by 7.5 percent, with the power sector accounting for 54 percent of the total national gas supply. The study further reveals that domestic coal production capacity is stalled and slowing due to environmental, logistical, and financial constraints.

Being a backward linkage yet energy sector development is not concomitant with the power sector. prominent energy expert of Bangladesh who is also an academic has shared his thoughts on the country's energy sector.

> *Domestic fuel resources are critical for energy security, and the government's lack of action on domestic gas and coal exploration is unacceptable. Bangladesh would most likely be reliant on imports for primary energy sources by 2030, and the majority of primary fuel will be used for electricity production. Many countries around the world have no domestic energy resources but have managed to survive. The situation will, however, collapse if the economy does not take over. The current approach for future growth, power growth, will all collapse if the economy falls.*

Another important respondent, former Chairman of the BPDB, conveyed his opinion.

> *Domestic liquid fuel supply capacity has increased. No power plants have been shut down due to a lack of liquid fuel. The private sector has given permission for liquid fuel import and transportation because the government lacked the*

necessary resources. Import infrastructure development activities by the energy sector are lacking in due diligence.

Former Power Secretary denied the energy sector's complete failure to keep up with the power sector he rather stated that

The energy sector has improved significantly, but there is still much to be improved, and improvement has no limitation.

Table 21: Interviewees opinion convergence and difference on the issue of energy Sector development.

Issue	Interviewees Opinion Convergence	Interviewees Opinion Divergence
Energy sector development lagging behind the power sector	In order to deliver primary fuel as an input to electricity generation, energy sector development must occur concurrently with power sector development.	In terms of liquid fuel supply capacity, the energy sector's performance has improved.
	The energy sector's performance in terms of domestic resource exploration and extraction, as well as developing import infrastructure, is unsatisfactory.	

4.7.7 Subsidy and Cost Recovery:

Aside from electricity generation and distribution, the Bangladesh Power Development Board (BPDB) serves as the government's single buyer. It buys power from other public utilities, private power generation companies (independent power producers or IPPs), small power producers (SPPs), and imports power from India. At the same time, it sells bulk electricity distribution utilities at a Bangladesh Energy Regulatory Commission-approved tariff (BERC). The fiscal deficit incurred by the single buyer (BPDB) as a result of the ongoing imbalance between electricity supply costs and bulk selling tariffs to the distribution utility required government budgetary support to be recovered. The government of Bangladesh also provides subsidies for electricity and natural gas

consumption. The consumer receives electricity at a much lower cost than the long-run marginal cost of production (Timilsina, Pargal, et. al. 2018).

The government's budgetary support or subsidy is twofold. Firstly, providing primary fuel at a subsidized cost to reduce the cost of electricity generation; and secondly providing lower tariffs to support domestic and marginal consumers, as well as adjusting the losses incurred by BPDB due to the gap between high purchase and low selling costs of electricity (PWC, 2018). Furthermore, it is not uncommon in many developing countries for producers to incur losses due to inefficiency, and these losses may be covered by the government, which is also a type of subsidy. Tariffs set below cost-recovery rates can result in hidden losses ().

Table 22 : Government / Budgetary support provided to BPDB

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Budgetary Support (Billion BDT)	17.9	29.7	50.0	54.9	47.1	50.4	53.7	56.0	62.4	86.2	86.0	117

Source: The Financial Express (21st November 2021).

The energy expert says about government bailout by providing subsidy to the single buyer BPDB to cover up the loss incurred due to bulk tariff and power purchase for private power plant,

> *Subsidy in developing countries is not unusual. but it brings inefficiency to the sector and reduces accountability.*

Head of an important wing of the power sector of Bangladesh response was as follows,

> *The economic impact of electricity shall be taken into consideration while discussing subsidies.*

Former bureaucrats, in answer to the researcher's query about the power sector's growing fiscal deficit and the government's continued budgetary support to

compensate operating losses, emphasized the development context of Bangladesh through electricity generation. and claims,

> *We prefer the term the government budgetary support as "development support" rather than "subsidy." This subsidy enables poor people to obtain electricity at a lower cost and contributes to economic development.*

One Energy policy expert has criticized the government ambitious plan of increasing unnecessary power capacity, his version is as follows,

> *Without the subsidy, the supply cost of electricity per unit would be more than ten takas. The most important aspect of subsidy is the government's cost recovery initiative by tariff increase for reducing the subsidy. The government is contractually bound to pay capacity payments over the contractual period due to underutilization or to idle power plants. As losses incurred as a result of government inefficiency so cost recovery by tariff hike shall be unjustified to consumers. He claims that as a consumer, why should I pay higher tariffs to recover the cost of excess capacity that you developed for me but is not serving.*

Table 23: Interviewees opinion convergence and difference on the issue of Cost recovery and subsidy

Issue	Interviewees Opinion Convergence	Interviewees Opinion Divergence
Subsidy and Cost Recovery	Currently, the supply cost of electricity from private power plants (government purchase cost plus contribution to maintenance and development fund plus interest on budgetary support) appears unrecoverable without a tariff hike. With the persistent and ever-increasing gap between supply cost to bulk selling tariffs	Subsidies are common in developing countries. However, it causes inefficiency and reduces accountability.
		Electricity contributes to the growth of the economy, ensuring financial stability as well as an economic advantage.

	resulting in a loss, the cost looks to be unrecoverable without tariff escalation. The economy is stressed by a recovery that is depending on financial support.	We like to refer to it as development assistance rather than a subsidy. This subsidy allows low-income people to access power at a lesser cost, contributing to economic growth.

4.7.8 Market Risk and Competitiveness:

Private sector participation in electricity generation is a collaborative venture involving both public and private investors, and like any other public-private venture, it is subject to risk and uncertainty. A typical risk allocation matrix is depicted below.

Table 24: Risk Allocation between Public and Private Sector.

Implementation Risk	Sponsor's Equity	Lenders	Contractors (Turn-Key, O&M)	Public Utility	Government	Insurance
Cost Overruns	v			v	v	
Change Orders	v					
Time Overrun	v		v	v	v	v
Completion	v		v	v	v	
Force Majeure	v		v	v	v	v
Market Risk						
Interest Rate	v				v	v
Forex Availability	v					
Currency Devaluation				v	v	
Electricity Demand				v		
Inflation				v		
Fuel Price				v		
Cost Escalation	v		v			
Operational Risk						
O & M cost Overruns	v	v	v			v
Force Majeure	v	v	v	v	v	v
Performance	v		v			

Source : USAID

According to the risk allocation matrix, the private sector bears the majority of implementation risk, while the public sector bears the majority of market risk. The private sector owns 83% of the liquid fuel-based power plants. The gestation period for a liquid fuel power plant is relatively short. The private sector owns 80% of the peak power plants. The private sector accounts for nearly half of the total generation in the country, but 80 percent of that half is made up of peak load power plants. Liquid fuel-based and peak load power plants have lower implementation costs compared to baseload power plants. Private investors take on less risk in terms of implementation and financing. The government or public sector bears the majority of market risk. Maintaining electricity demand, inflation, currency depreciation, and fuel price volatility in the international market are all priorities.

Payment risk: Typical Payment Structure (Two-Part Tariff) for private power Plants,

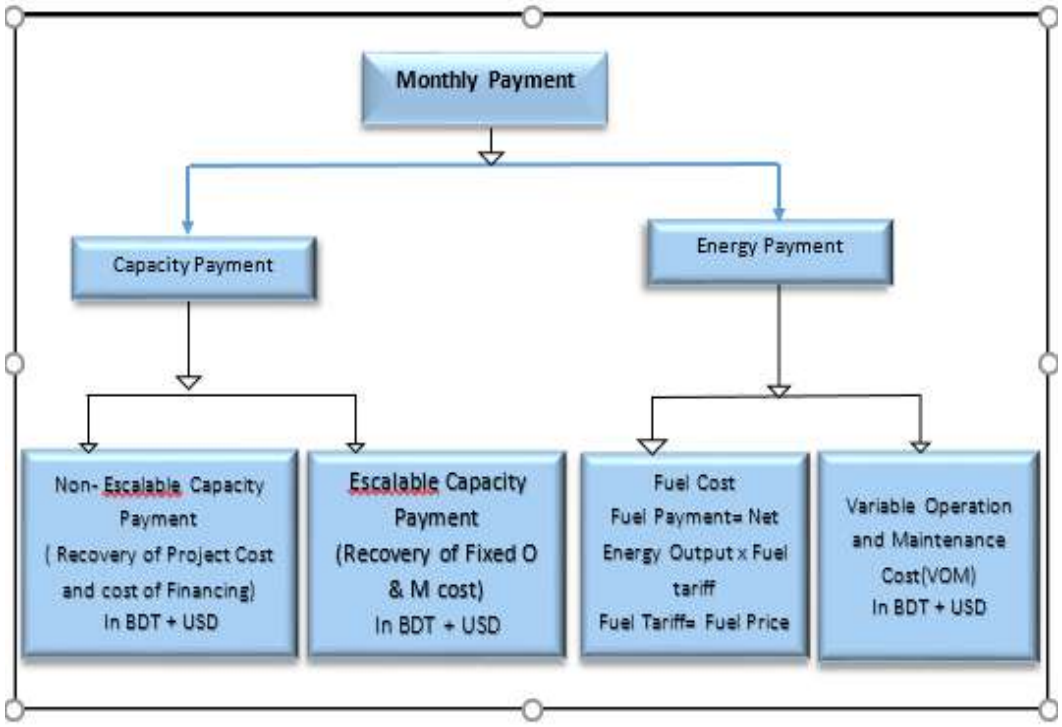

Figure 7.0: Two-Part Payment Structure for Private Power Plant.

Typical Project` cash flow:

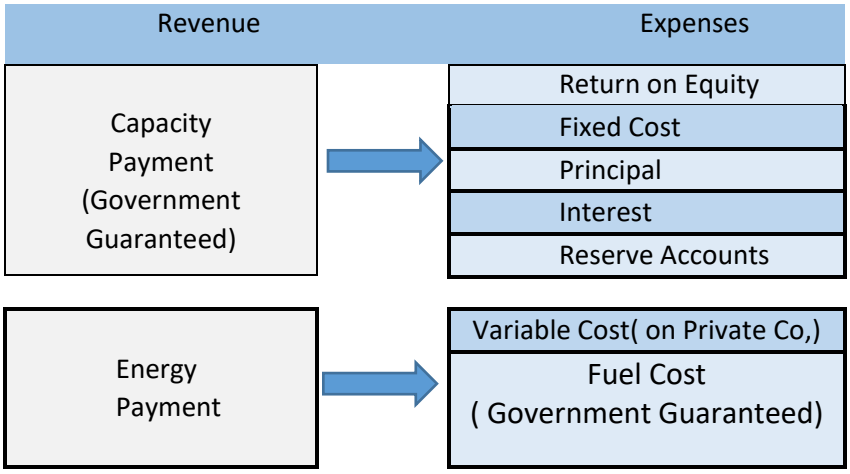

Figure 8.0: Payment Risk is borne by the public sector.

In terms of payment risk, the government bears the majority of the risk. By offering a two-part tariff capacity payment, the company is able to cover its investment costs, return on equity, debt servicing (principal and interest), and so on. Fuel payment, on the other hand, is provided based on the operation of the power plant. The Bangladesh government also allowed private power plants to import liquid fuel with a 9% fuel handling charge. The cost of variable operation and maintenance (VOMP) is the only cost attributed to a private power plant. Even if the power plant is not operational for the entire year, its payment to the financier will be unaffected. However, the government continues to bear the majority of market risk. This implies that risk is distributed disproportionately between the public and private sectors.

Former Chairman BPDB says,

> *The time has come for private investors to participate in market risk as well. In reference to India, where the capacity payment has been eliminated and that tariffs are determined through competitive bidding, with fixed and variable costs merged into the energy payment. Similarly, the "take or pay" strategy is to be abrogated; rather, it's time to adopt the "take and pay" tariff strategy for*

Bangladesh. if there is only one-part tariff (only energy payment) to take and pay, then the private sector should enter this market based on a proper market demand assessment. Currently, private sectors are working to achieve the higher generation capacity target outlined in the Master Plan.

One of the respondents from financing institutions says,

When it comes to financing security, we first consider only capacity payments that can fully cover the total loan amount. It usually serves the purpose. However, it is very unlikely that the off-taker will receive no power at all, and we believe that an additional 10-20% energy payment and capacity payment can cover the loan repayment with a payback period of 8-9 years, which we are willing to finance. When he asked about no capacity payment and tariff will be determined by fixed and variable cost into one part would you finance?? He reiterated that there is currently surplus electricity and that there is no guarantee that the government or offtake will purchase electricity from that power plant, so we are concerned about the company's debt servicing. Only in this case will we finance a captive power plant where there is no risk of demand.

The former bureaucrat who was also a former Chairman of the state regulatory body has provided his opinion in answer to the question of transferring market risk and introducing competitive-based tariffs in all aspects of PSE's electricity generation and operating period.

Yes, we must ensure competitiveness, which will take time. If the market for both demand and supply is left to private power plant owners, tariffs and other factors will be controlled by private parties.

Serving as Head of an important wing of the power sector has referred to the present way of “risk distribution” as a weaker link in the entire value chain of the private and public sectors. He asserted

Because we are gradually tightening on subsequent award-giving, squeezing them, wanting to lower the tariff in successive projects, and why they are still interested in whether the market has the surplus capacity, we need to evaluate if the incentives and security package documents are actually overly generous.

The former civil servant further said,

If you try to achieve competition by transferring market risk to private investors, you will reduce investment appetite, which will have implications for the market and the public sector.

Echoing the previous statement of a former civil servant one energy expert and academic further added," *transferring justified risk to the private sector and ensuring effective competition will have consequences but given market maturity, the time has come to consider doing so".*

Table 25 : Interviewees opinion convergence and difference on Competitiveness in PSE

Issue	Interviewees Opinion Convergence	Interviewees Opinion Divergence
Market Risk and PSE through Competitive Bidding	Competitive bidding yielded the best value for money. The government is assuming the majority of the risk in order to provide an investment appetite. PSE's key feature is an only capacity enhancement (considering that expensive electricity is preferable to no electricity). Private sector contribution in terms of achieving the least cost, generation, and base-load power plant implementation is insignificant.	The market is currently saturated with surplus electricity, financers are unwilling to lend without the provision for capacity payments because then there is no guarantee that government will take electricity from private power plants.
		The sector's top priority is ensuring competitiveness, which will not happen overnight.
		Attempting to increase competition by shifting market risk to private investors diminishes investment appetite, which has negative implications.
		To shift some market risk to the private sector by adopting the competitive bidding-based "No-Electricity, No-Pay" tariffs.

4.7.9 Concluding Remarks:

Semi-structured questionnaires were deployed to interviewees based on relevant literature, policy contents, and secondary data in accordance with the independent and dependent variables and their indicators. All interviewees were given the same variety of questions as in the questionnaires. The data were analyzed in accordance with the problem statement, research question, and theoretical framework. Relevant contents, specifically policy documents, were analyzed to identify policy risks arising from Bangladesh's private sector engagement in electricity generation's policy ambiguity, policy vagueness, and policy broadness. Expert opinions and perspectives are obtained through the analysis of interviews. The researcher carefully observed the given insights, strong reactive opinion, generous comments, facts acceptance and acknowledgment, and individual position of interviewees during the semi-structured interview. The similarities and convergence of responses given to semi-structured questionnaires by interviewed experts aided in obtaining research findings, fact elicitation, and drawing inferences, while differences, discrepancy, and divergence of experts' opinions were carefully analyzed and used for drawing inferences from diverged opinions by reviewing with content analysis.

Chapter-V
Study Findings and Conclusion:

5.0 Introduction:

This chapter sets out the findings of the research in the view of the research question and analytical framework considering statements of the problem. To address the acute electricity deficit, which is a major hindrance to economic progress, the private sector's engagement in electricity generation of Bangladesh has increased significantly, combined with continued government budgetary support in the form of subsidies and increasing consumer tariffs. Consequently, the purpose of this research is to uncover the successes and challenges of the private sector's involvement in electricity generation in Bangladesh, as well as to analyze the policy risk vulnerability from the perspective of financially sustainable PSE in this sector.

Findings and all inferences have been drawn from the content analyses and interviewees' perspectives. Research findings have hinged upon facts elicitation from secondary data analysis and interviewees' perspectives. Interview opinion convergence, common acceptance, acknowledgments, and perspectives have directly attributed to major study findings. Relevant policy arrangements and Secondary data analysis for PSE in electricity generation were used to draw inference by the researcher in case of certitude of occurrence. While interviewing experts in the relevant field, the study has noted disagreements and differences in opinion which was validated by opinion cross-checking, policy implementation in practice, and secondary data analysis.

5.1.1 Study Findings in view of Theoretical Framework:

Independent Variables: Agency Cost:

According to the analytical framework "**Agency Cost"** was identified as an independent variable through which government defrays three basic types of agency cost.

i) Policy Arrangement and Framework,

ii) Investment Incentives and

iii) Risk allocation

5.1.2 Policy Arrangement and Institutional Framework for the present mode of PSE in Electricity Generation in Bangladesh:

The contents analysis and interviewed experts' opinion has revealed the range of policy arrangements along with an institutional framework for the selection process of Private Sector Engagement (PSE) in electricity generation of Bangladesh. The PSE in electricity generation is being done primarily under Private Power Generation Policy -1996 (Revised 2004) and Quick Enhancement of Energy and electricity Special Provision Act 2010.

Private Power Generation Policy -1996 (Revised 2004) necessitates the competitive selection of PSE. The policy allows a Build-Own-Operate (BOO) basis Independent Power Producers (IPPs) projects. Private Investors shall receive an appropriate tariff which is determined through a transparent competitive bidding process. Moreover, the private investors are supposed to receive guaranteed payment through a structured two-part tariff system that covers the fixed cost (capacity payment) and variable cost (energy payment). Moreover, standardized security package documents (PPA, IA, LLA, FSA, GSA, etc.), provision for generous fiscal incentives for engaging private investment, and single-window operation were the salient features of this PSPGPOB 1996. In contrary to the conventional bidding process, the present mode of PSE permits non-competitive engagement (known as "unsolicited proposal") through case-by-case negotiation under the Quick Enhancement of Energy and electricity Special Provision Act 2010. Provision of treating of unsolicited proposals by avoiding completive bidding process allows the private investor to engage their capital quickly and left a window of opportunity for the private sector to exploit the negotiation environment.

5.1.3 Investment incentives for PSE:

5.1.4 Payment Structure:

Private power companies eligible for a two-part tariff consists of capacity payment and energy payment as stipulated by the Power Purchase Agreement (PPA). Private investors received payment guarantees under the following structure:

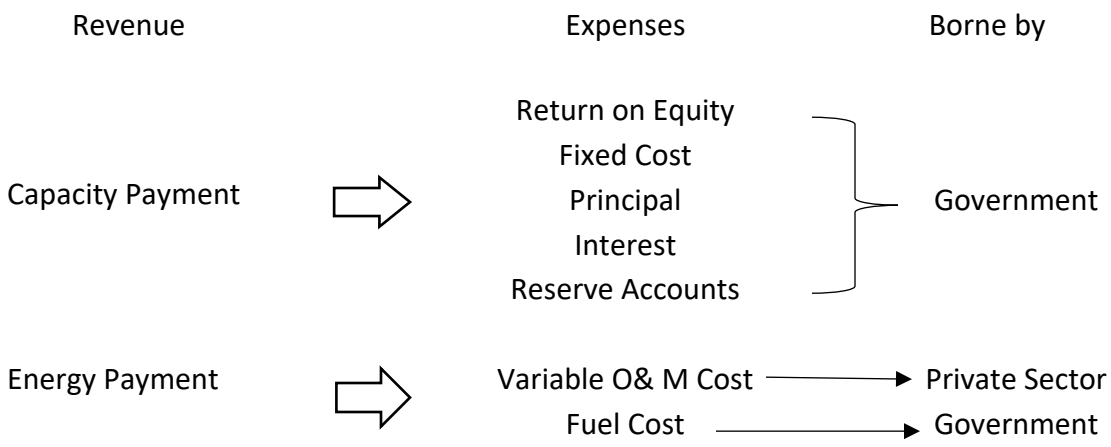

Figure 9.0: Payment Structure for PSE

5.1.5 Fiscal Incentives:

The investor also receives fiscal incentives which are discussed below as mentioned in PSPGPOB 1996 (Revised 2004) by the following Statutory Regulatory Orders (SROs) issued by the National Board of Revenue(NBR) of the Government of Bangladesh.

5.1.6 SRO -05 for Date:02nd January 2020. and SRO -04 for Date:02nd January:

The Government of Bangladesh has on company's income of electricity business, foreign worker's income, interest from foreign loans, on company's payable royalties, technical know-how, and technical assistance fees, capital gains on transfer of shares.

5.1.7 SRO -58 Dated: 11th March 2008:

The Government of Bangladesh has exempted private power companies from paying all Import Duty (ID), Value Added Tax(VAT), Supplementary Duty exempted private power companies from the taxes payable as per Bangladesh Income Tax Ordinance -1985 (SD), and Advance Income Tax (AIT) for the import of Plant Equipment's Temporary Erection Materials and Spares for **Rental and Quick Rental Power Plants**.

5.1.8 SRO -73 Dated: 19th March 1997:

The Government of Bangladesh has also exempted private power companies from paying all Import Duty (ID), Value Added Tax (VAT), Supplementary Duty(SD), and Advance Income Tax (AIT) for the importation of Plant Equipment's Temporary Erection Materials and Spares for establishing **Private Power Generation Station**(IPPS).

5.1.9 Risk Allocation:

5.1.10 Construction Risk:

Construction cost overruns risk is shared by the Sponsor company, Turn-key Contractor, and Public sector. The change order during construction is attributed to the Sponsor Company. Delays/ Time Overrun and Force Majeure risk have a connection to all stakeholders as, Sponsor company, Lender, Turn-key Contractor, Insurance company, and Public sector. Completion of project risk is shared among the Sponsor company, Lender (Credit Risk), Turn-key Contractor, and the Public sector.

5.1.11 Operational Risk:

Operation and Maintenance (O&M) cost overruns risk is shared among sponsor company, Lender, insurance, and O&M operators. Efficient performance risk is assumed by a sponsor company and O&M operators. Power plant Operational risk in BOO basis IPP engagement is mostly attributed to private sectors. Lender risk is not insignificant in construction risk and operational risk, because of the failure in this regard there is a possibility of those investments turned out to be Nonperforming assets (NPA). The public sector assumed the inherent risk of unavailability of the contracted electricity in case of both construction and operational risk.

The majority of private power projects Construction Risk is borne by the private investor or Sponsor Companies. In Bangladesh, almost 80% of a liquid-fuel-based power plant is owned by IPPS, which have a relatively lower gestation period than gas, coal-based power plants. Furthermore, these risk has some proportionate sharing with the public sector as well. Some of the construction risks are transferrable which in part to the Turn-key contractor, Equipment manufacturer, Operation and Maintenance Operator, and Insurance companies.

Private power generation policy-1996 mentioned there will be no sovereign guarantee from the government, private investor to secure its return on investment and debt services from energy sells to BPDB, but as to the two-part tariff of payment structure, private investment has to assume risk only variable operation and Maintenance cost to operate the power plant. another payment is guaranteed by capacity payment and fuel payment (with 9% profit for liquid fuel import & handling) by the government. Fuel risk is 100% attributed to the government.

5.1.12 Market Risk:

The majority of Market risk is attributed to the government. The study has found the public sector is solely responsible for assuming market-related risks such as Currency Devaluation, Electricity demand, inflation, and fuel price risk. Among these risks of Currency Devaluation, inflation, and fuel price risk are directly assumed through tariffs given to private power plants for electricity purchase.

5.1.13 The Risk of Maintaining "Electricity Demand" in Line with Installed Capacity:

The creation of electricity demand in contrast to installed supply capacity has a greater financial implication. Inability to maintain electricity demand to meet the supply capacity leads to underutilization of supply capacity. The public sector incurs a substantial loss on underutilization of installed capacity of private power plants due to the two-part tariff structure which entails relentless capacity payment throughout the plants contacted operational tenure.

The reasons behind the demand risk identified by the study are, over-investment due to weakness in demand projection, Industrial consumption of grid-connected electricity was not being in line with the expectation, Inconsistent performance of the Energy sector in terms of harnessing domestic primary fuel delayed retirement schedule of contractually expired RPPs and QRPPs, etc.

5.1.14 Weakness in Demand Projection:

The Power System Master Plan (PSMP) was formulated in 2005, 2010, and 2016 based on GDP & historical consumption of electricity, GDP per capita, and GDP elasticity method respectively.

The Secondary data and expert opinion have converged on the fact of weak correlation with GDP to electricity demand for Bangladesh. The official GDP growth rate estimation by national and international organizations has a difference from the government's official projections (CPD, World Bank, IMF, and ADB), and electricity demand projections based on GDP seems to have been flawed due to ambiguity and discrepancy among estimated GDP by the different national international organizations Economic activities related to the service sector are the major contributor to the Bangladesh economy which is less energy-intensive. (Moazzem and Preoty, 2021). Weakness in demand projection modeling leads to over-investment in terms of the development of surplus electricity more than countries actual need in both the public and private sector and the financial implication is borne by the public sector only. This weakness in demand projection modeling was also endorsed by the World Bank by revealing that, the projection of demand has been made on the weak benchmark, over-projection on long-term economic growth and per capita income, and lack of methodological rigor (World Bank,2017 cited by Moazzem, 2020).

5.1.15 Energy Sector development is inconsistent with power sector development.

The energy sector receives significantly less allocation of budget to develop domestic primary fuel exploration and capacity development. On depletion scenario of existing natural fossil fuel resources, new indigenous gas and coal harness capacity development did not materialize as per the increasing demand of electricity sector. The import of energy is always subject to supply disruption and price volatility. Furthermore, Energy Import infrastructure development is also not satisfactory. Uncertainty and inconsistency of the energy sector seem to have created an environment for unscrupulous overestimation of demand and to be more reliant on liquid fuel private power plants.

5.1.16 Industrial Growth at a slower pace:

The interviewee’s opinion converges on the fact that one of the critical rationales for developing electricity generation capacity is to meet the requirements of the growing need for electricity in industries. Industrial growth has occurred at a much slower pace than expected.

The study found the grid consumption of electricity by the industrial sector in the last ten years nearly constant. Besides sower industrial growth, industries have developed a reliance on captive generation rather than using grid electricity. Moreover, energy efficiency also contributed to the lower demand for electricity by the industrial sector.

5.1.17 Extension of Contractually expired RPP and QRPPs:

The delayed schedule of retirement for RPP and QRPP due to multiple extensions is another reason for overcapacity.

5.1.18 Dependent Variable: Financially Sustainable PSE

Financially sustainable PSE verified with the logical assessment of Cost Recovery which has been reflected in the Operating expense to operating revenue of BPDB from 2010 to 2020.
Cost recovery has 2 aspects;

1. There should not any deficit between electricity purchase costs from private power plants and bulk tariff for electricity sales to distribution utility,
2. Sectoral Technical Commercial performance,

This study has found that sectoral technical-commercial performance such as reducing distribution system loss, reducing transmission system loss, and increasing collection of revenue, has improved by all indicators. This implies cost recovery has very little implication with sectoral technical and commercial performances. The average supply cost of electricity from IPP, RPP, and Power Import (Per unit Purchase cost+ Contribution Maintenance and Development Fund+ Interest on Budgetary Support) has been always higher than the average per unit bulk electricity selling tariff since 2010. The loss is progressively increasing per year. which essentially results in a higher fiscal deficit. The figure below gives the details,

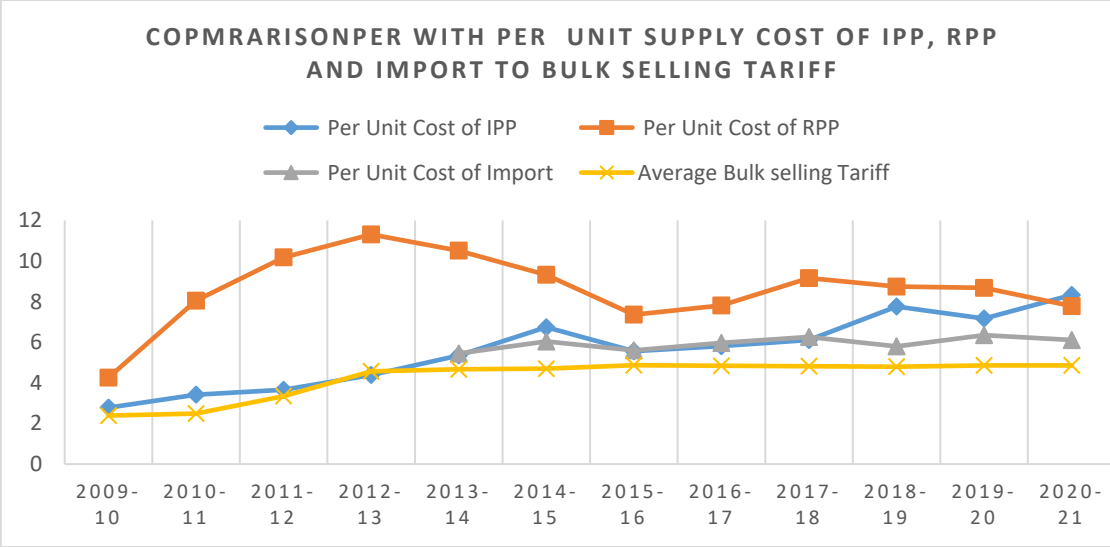

Chart 3.0: Average supply tariff of electricity cost from IPPs, RPPs, and imports.

The progressive gap between BPDB's year wise Operating expense to Operating Revenue

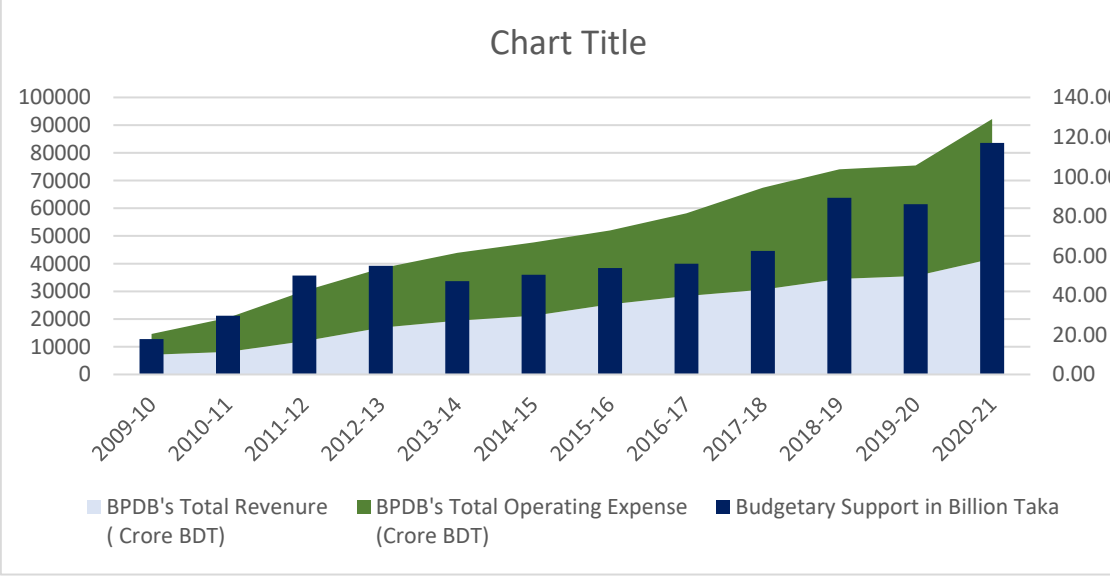

Chart-4.0: Progressive gap between BPDB's operating expense to operating Revenue.

5.1.19 Deficit minimizes by Increasing Tariff and implication:

As the current bulk selling rate does not cost reflecting, the fiscal deficit is being filled by direct budgetary support from the public exchequer in the form of subsidy. To reduce the subsidy increasing tariff is the option. From the PSMP 2016 JICA survey, 10% tariff increase has 0.72% negative impact on Real GDP, 20% increase has 1.45%, and 30% increase has 2.17% negative impact. The Power System Master Plan-2016 has suggested increasing the bulk selling tariff per year at a continuous progression to mitigate the negative impact on the national economy (PSMP 2016, P. 95). Progressively Tariff increase every year is seemingly unfeasible due to domestic resistance in the Bangladeshi political context. Furthermore, tariff increases due to sectoral inefficiency or enhanced idle generation capacity that is not giving service to the consumer are considered to be unjustified.

5.2.0 Findings under the purview of Research Question:

The research has three fundamental questions for the answer to. Findings to answer each research question are discussed as follows,

Research Question 01: What are the contributions of private sector engagement in electricity generation to the sectoral overall achievements of n of Bangladesh?

A total of 119 new power plant with the sum of 17062 MW of capacity has been constructed and come under operation from January 2009 to July 2021. 8875 MW power was added to the national grid by 76 private power plants. As a result, the nation could successfully overcome the serious electricity crisis which was hindering economic growth. Official data shows no indication of load shedding in July 2019-20 (CPD, 2020). Bangladesh has now transformed into a “country of electricity surplus” from a "country of electricity shortage” and there is no load shedding due to generation shortage other than technical outage and maintenance (BBC Bangla, 2019). Moreover, access to electricity has reached 99.75 % in 2021 which was only accounted for 47 % during the year 2009. Sectoral Technical commercial performance has improved in terms of reducing system loss and revenue collection enhancement. Total transmission and distribution system loss has been reduced from 15.73 % (2009) to 11.11 % (2021) and account receivable has been reduced to 2.40 equivalent months (2009) to 1.46

equivalent months (2021). This technical and commercial performance of the power sector in Bangladesh is better than many larger countries in South Asia (Pargal, 2017). Indigenous private sector capacity enhanced as more than 90% of private power plants were implemented and owned by local investors. The investment climate improved and the image of the country has been elevated. Electricity complemented economic growth and contributed to the achievement of the MDG goal. According to SDG Tracker, "Bangladesh's Development Monitor," a set of 39 indicators has been chosen to ensure that Bangladesh accomplishes its Sustainable Development Goals under the guidance of the Prime Minister's Office's SDG Working Committee. Goal 7 of the Sustainable Development Goals (Affordable, reliable, sustainable, and modern energy for all) has two indicators. The primary criterion is to ensure that every person in the country has access to power (SDG Indicator 7.1.1). Because energy access had already reached 99.75 percent by 2021, it appears that 100 percent will be realized by 2030. The second indicator is to increase renewable energy's percentage of total final energy consumption to 10%. (Indicator 7.2.1 of the SDGs) according to the Sustainable Development Goals Tracker. (n.d.) The renewable energy share of total final energy consumption, including on-grid and off-grid is 3.49% which is needed to be looked at to achieve the target of 10%. Moreover, successful Private Sector Engagement in electricity generation has paved the way for engaging private investment in other public infrastructure sector development (such as road, bridge, etc) of Bangladesh. The most significant contribution of PSE is development of domestic private investor as most of the private power plant owns by Bangladeshi private parties. A satisfactory after-contact management is established due to standardized security package documents.

5.2.1 Research Question 02: What are the risks associated with existing policies of PSE in the electricity generation of Bangladesh?

5.2.3 Legal and Regulatory Environment:

Private Sector Power Generation Policy of Bangladesh (PSPGPOB) -1996 (Revised-2004) is the pioneer policy tool of Bangladesh to engage the private sector in strategic public infrastructure. The policy should be followed by the legislation of Act, Rules, or Law, otherwise, there will be

no tools that can regulate any policy deviations. However, this study found that there is no such legislative engagement in place regarding PSPGPOB -1996 (Revised-2004).

5.2.4 PSPGPOB 1996(2004) is Strategically de-coupled with Public Procurement Rules-2008:

Private Sector Power Generation Policy of Bangladesh (PSPGPOB) -1996 has no strategic linkage between PPA-2006 and PPR 2008 because that policy was revised lastly in 2004 way before the enactment of PPA 2006 and later PPR-2008. The procurement guideline in PSPGPOB -1996 (Revised-2004) seems unclear, as it only contains the provision of solicitation of the proposal through competitive bidding by RFQ and RFP. World Bank Country Procurement Assessment Report (2002) of Bangladesh has identified some unsatisfactory features in the Bangladesh Procurement system and one of many the unsatisfactory feature was "Bid Documents are one-sided". It also identified a few causes for delay in approval within public bodies and one of those few causes was poor bidding documents. Bank's suggestion regarding addressing this issue was to establish a Central Procurement Policy Unit under any appropriate ministry which will be responsible for preparing and issuance of Standard Bidding Documents for Public procurement. Bangladesh Government Enacted PPA 2006 and later PPR-2008 for public procurement, Bidding documents were standardized by the Central Procurement Policy Unit (CPTU) of the Government. Thus it seems that in absence of standardized bid documents in PSPGBOB 1996(2004) the present mode of PSE implementation may have resulted in the practice of adopting standard bid documents from CPTU under PPR-2008.

PSE through competitive bidding, the bid documents are supposed to be followed as per PPR-2008, but it has been found that in the case of power generation projects security package documents (PPA, LLA, GSA, FSA, IA, etc.) have standardized and provision for Investment Incentives made available under Private Sector Power Generation Policy of Bangladesh (PSPGPOB) -1996.

5.2.5 BPDB performs single-window operation instead of Power cell:

The Private Sector Power Generation Policy of Bangladesh (PSPGPOB), -1996 (Revised -2004) has provided the responsibility to Power Cell, under Ministry of Power, Energy and Mineral

resources of Bangladesh to facilitate Private Sector engagement in and worked as single-window operation but this study founds IPP Cell under BPDB performs a single-window operation instead of the Power cell, in the ministry.

The aforementioned ambiguity and limitation of PSPGPOB, -1996 (Revised -2004) for PSE seem to have led the implementers for convenient take and cherry-picking from multiple policy sources which may be problematic and create problems for the country in the long run.

5.2.6 Avoidance of Parallel Policy arrangement of PSE in electricity generation (The PPP Act. 2015):

Private Sector Power Generation Policy of Bangladesh (PSPGPOB) -1996 (Revised -2004) has been regarded as the fundamental approach to Private sector investment in public infrastructure but the policy did not directly attribute to the concept of Private Public Partnership (PPP) Initiative. Inspired from the initial success of attracting and effectively engaging the private sector, the Government of Bangladesh has officially adopted Public-Private Partnership (PPP) through successive policy frameworks through addressing shortcomings of previous policy. Policy Guideline for Enhancement of Private Participation in Power generation-2008, which was formulated in 2008 has a strategic linkage with Policy and Strategy of PPP Project 2010- and later with PPP Act. -2015 because it states a “new private power plant to build and old Power plant to be rehabilitated through PPP” (p.1). The Bangladesh Public-Private Partnership Act, 2015 (“PPP Act”) was enacted and gazette on 16 September 2015. The PPP Act was enacted to enable the development of critical public infrastructure and services to promote expanded infrastructure investment, which is critical for long-term economic growth. It also established a solid legislative framework to entice national and international private sector investors to collaborate with the government in the construction and upgrade of critical infrastructure assets.

Content analysis of relevant laws in this study reveals that there is an alternative/parallel policy arrangement with an established set of procurement procedures, rules, and guidelines under the PPP Act 2015 for PSE in electricity generation in Bangladesh. In practice, no electricity

generation project was implemented under the Public-Private Partnership (PPP) Act 2015 due to taking recourse to the earlier policies by the sector.

5.2.7 The issue with Quick Enhancement of Energy and electricity Special Provision Act 2010:

Private Sector Engagement (PSE) for electricity generation of Bangladesh follows PSPGPOB - 1996 (Revised 2004) for competitive bidding selection and Quick Enhancement of Energy and Electricity Special Provision Act 2010 has been used as a special policy instrument for the treatment of unsolicited proposals. Although Quick Enhancement of Energy and Electricity Special Provision Act. 2010, is supposed to be a tool for crisis management it is currently being used as a regular policy instrument for the treatment of unsolicited proposals (avoiding conventional competing bidding procurement process). Since 2010. A total of 46 out of 76 power plant has been awarded under this Special Provisions Act through direct negotiation. Stripping or discontinuing this Act will create an immediate policy void in the power sector because there is no provision for treating the unsolicited proposals in PSPGPB-1996. Moreover, the competitive tendering process as stipulated in PSPGPB-1996 has shortcomings of multiple accounts such as the absence of legislation, unclear procurement guidelines, not linked with PPR-2008, etc. Hence its implementation is subjected to arbitrary practice due to policy ambiguity. This Act just allows bypassing the tendering process for the sake of quick power with no regulation, limit, or guideline of such activity. The Act seems to have significant policy broadness and vagueness. This provision has an omnipresence in both the power sector and the energy sector which is can be termed as policy broadness.

This Act has also put a bar to the jurisdiction of the court as no court can question any act done or purported to be done or any taken action under this Act. It also indemnifies the public officials who have been involved with power project activities in good faith under the Act. However, there is no specification or defining of the term “Good faith” where individual sanctity has been taken for granted. This might be termed as policy vagueness.

The research has found the continued prevalence of this Act which is against the inherent spirit of public procurement (in terms of Transparency, Accountability, Competition, Efficiency). This puts the energy and power sector governance under question when this law indemnifies public

officials where individual sanctity has been taken for granted. Such policy risk has the potential of bad execution even by the public officials who have the best intention to policy implementation. More importantly non Competitive engagement through negotiated tariff bypassing conventional tendering seems to be against the achievement of better value for money, consumer utmost interest.

5.2.8 Research Question 03: What are the challenges to moving forward?

5.2.9 Transferring Market Risk to Private sector and Achieve Competitiveness:

The initiative for PSE in Electricity generation was taken in 1996, it has been more than two decades of experience, the government assumes the majority of the risk, but as the market has achieved enough maturity over time to consider transferring some risk to private entities. Establishment of competitive bidding tariff, based on an only one-part tariff where interties for capacity payment and energy payment is converted into the one-part tariff (No-electricity No-pay basis). So investors join the sector by doing the proper market assessment. In this process, they will assume some of the market risks. ADB's Performance Evaluation Report on "Bangladesh: Meghnaghat Power Project" has recommended that "The government must ensure that the bidding process is transparent and free of political influence (Rao, 2009, p.). The study has further found; in the current scenario of surplus electricity generation capacity, a financier is not likely to finance based on a single part tariff (on a no-electricity no-pay basis) as there is no guarantee government will off-take electricity.

5.3.0 Summary of The Research Findings:

The PSE in electricity generation is being done primarily under Private Power Generation Policy -1996 (Revised 2004) and Quick Enhancement of Energy and electricity Special Provision Act 2010. Private Sector Power Generation Policy of Bangladesh (PSPGPOB) -1996 (Revised-2004) has multiple shortcomings, such as no legislation in place to regulate policy deviation, strategically decoupled with PPR-2008, unclear procurement guidelines, bid documents for RFQ and RFQ are not standardized in PSPGPOB 1996 and no provision for treating unsolicited proposals. The unsolicited proposals are being treated under Quick enhancement of energy and electricity special Act -2010 where the contract is being awarded through direct

negotiation. Quick enhancement of energy and electricity special act -2010 has not any clear procurement guideline, rather it provides legal security for any activity in this regard. An Act that was enacted for crisis management is now used as an important policy tool that occasionally Indulges policy broadness and vagueness. The sanctity of power sector officials has been taken for granted. PSE in practice has convenient and expedient take from multiple policy sources by the policy implementers which can be called arbitrary Practice. Risks are disproportionately shared between the public sector and private sector, where the public sector assumes the majority of the risk. linear regression with GDP growth to electricity demand growth does not seem applicable for Bangladesh. Weak demand projection leads to over-investment or developing generation capacity more need. Uncertainty and inconsistency of the energy sector seem to have created an environment for unscrupulous overestimation of demand and develop additional capacity. Slower Industrial Growth and extended operation of contractually expired RPP and QRPPs is another reason for visible overcapacity. Digression for implementation of the master plan in terms of fuel-based power project implementation but the tenacity to develop capacity. The least-cost base load contribution does not materialize much from private-sector financial sustainability at stake. Transferring market risk bringing competitiveness the PSE process needed to achieve financial sustainability PSE.

5.3.1 Financial Sustainability of PSE is at stake:

A financially sustainable PSE in the power sector is challenging. Dealing with the Private sector's reluctance to absorb some market risk government has to take challenge transfer risk to achieve the cost-effective efficient way of PSE. Demand creation is the biggest challenge in the scenario of surplus electricity.

5.4.0 Scope for the Future Research:

This research is all about the evaluation of policy risk assessment and finding out the achievement and challenges to move forward for PSE in power electricity generation in the context of Bangladesh. The study suggests there is potent scope to study the political economy dimension of private investors in Bangladesh in the electricity business and implications on investment scenario. Moreover, another area of further study has been identified is the

financial quantification of underutilization of installed generation capacity about private power plants. Sector governance can be analyzed in light of policy and practice. Bringing sustainability in long-term public-private partnership (PPP) procurement and efficient contract management in contrast to power sector investment has the potentiality to attract future research.

5.5.0 Conclusion:

Bangladesh, as a profound pursuant of becoming a developed country by 2041, neither can accept any shortage in the electricity supply chain nor can compromise with the state mission to ensure universal access to quality electricity at a cost-effective and affordable cost. Aside from its commendable contribution to resolving the serious electricity crisis, achieving nearly 100 percent access to electricity, and developing domestic private investors, the government provided overly generous investment incentives, raising concerns about the sector's financial viability. Without domestic resources, relying on privately owned liquid fuel-based power plants and aggressively implementing generation capacity enhancement appears to be detrimental to the nation's economy. The majority of market risks, particularly demand risks, are a major source of concern for governments in financially sustainable PSE. Any shortcomings in demand creation will result in the developed capacity being a white elephant. Government policies to engage the private sector in a generation are not without ambiguity and limitations, which could be a core concern for the electricity sector's future development plan. The Quick Enhancement Electricity Special Act of 2010 is a convenient policy tool that may have discouraged policymakers from implementing more effective policies to ensure effective sectoral governance. A two-part tariff structure is typically offered to private power plants that are kept for reserve margins, but a significant amount of private power may not be provided to a two-part tariff structure. When there is enough competition, PSE in any infrastructure sector provides better value for money. Appropriate policy arrangements will be required to prevent possible bad implementation and to check and balance with the political economy.

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ANNEXURE

Annex-I

Interview Checklist:

1. Would you please give background and context of Private Sector Engagement in the power sector of Bangladesh?
2. How do you describe the private sector's contribution to the power sector of Bangladesh?
3. What is the effectiveness and efficacy policy instruments or arrangement currently used by the government for PSE in electricity generation?
4. In your perspective is there any weaker link in the present mode of PSE and policy arrangements?
5. The study contents have found the variety of usage of the Quick Enhancement of Energy and Electricity Special Act-2010 in Bangladesh for PSE. How do you describe the policy?
6. How do you see the country's generation capacity enhancement plan, implementation underutilization of added capacity, and implications? Please be kind enough to provide a detailed insight on overcapacity, and reserve margin.
7. How do you describe the risk allocation between the private and public sectors on the present mode of PSE in electricity generation and please provide a perspective on the implication of risk allocation?
8. How do you describe the performance of the "Energy sector" which is operated under the Ministry of Power Energy and Mineral Resources?
9. How do you see the financial viability of the present mode of PSE in electricity generation of Bangladesh by supportive public policies?