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IMPACT OF THE GLOBAL FINANCIAL CRISIS ON INVESTMENTS IN SOUTH ASIA'S ELECTRIC POWER INFRASTRUCTURE

INDIA ✦ PAKISTAN ✦ BANGLADESH





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FINAL REPORT

FOR INDIA, PAKISTAN, AND BANGLADESH

The Impact of the Global Financial Crisis on Investments in the Electric Power Sector

The Experience of India, Pakistan, and Bangladesh

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Co-Editors

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INTRODUCTION

PAKISTAN

Preface

This activity has been carried out under the World Bank's Infrastructure Recovery and Assets (INFRA) Platform. The INFRA Platform has been developed to bridge infrastructure financing, project preparation and capacity gaps resulting from the global financial crisis. The Platform includes a rapid diagnostic tool to identify at-risk infrastructure projects and to develop a medium-term strategy for their financing. Under INFRA, ESMAP is carrying out diagnostic assessments of the power sector covering 20 developing countries. This report is part of this project.

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The India report was prepared by CRISIL Risk & Infrastructure Solutions Limited, Mumbai, India.

The Pakistan report was prepared by IGI Finex Securities, Karachi, Pakistan.

The Bangladesh report was prepared by AT Capital Partners Ltd., Dhaka, Bangladesh.

LIST OF ABBREVIATIONS

ABT	Availability Based Tariff
ADB	Asian Development Bank
ADR	American Depository Receipts
AEDB	Alternative Energy Development Board
AEL	Adani Enterprises Limited
APGENCO	Andhra Pradesh Generation Corporation Limited
ASR	Average scale rate
AT&C	Aggregate Technical and Commercial
ATC	Asian Tiger Capital Partners
bcf/d	Billion Cubic Feet Per Day
BERC	Bangladesh Energy Regulatory Commission
BHEL	Bharat Heavy Electricals Limited
BOO	Build-Own-Operate
BOP	Balance of Plants
BPDB	Bangladesh Power Development Board
BRPD	Bangladesh Regulation and Policy Department of Bangladesh Bank
BSE	Bombay Stock Exchange
CAGR	Compound Annual Growth Rate
CAPEX	Capital Expenditure
CASAREM	Central Asia South Asia Regional Electricity Market
CDM	Clean Development Mechanism
CDS	Credit Default Swap
CEA	Central Electricity Authority
CEO	Chief Executive Officer
CER	Certified Emission Reductions
CERC	Central Electricity Regulatory Commission
CPPA	Central Power Purchasing Authority
CRIS	CRISIL Risk & Infrastructure Solutions Limited
CRR	Cash Reserve Ratio

CSEB	Chhattisgarh State Electricity Board
CVD	Countervailing Duty
CWIP	Capital Work in Progress
DESA	Dhaka Electric Supply Authority
DHBVN	Dakshin Haryana Bijili Vitran Nigam
DISCO	Distribution Companies
DPDC	Dhaka Power Distribution Company
DRHP	Draft Red Herring Prospectus
DSE	Dhaka Stock Exchange
DSM	Demand Side Management
DVC	Damodar Valley Corporation
E&P	Exploration and Production
EA	Electricity Act
ECA	Export Credit Agency
ECB	External Commercial Borrowings
ECGC	Export Credit Guarantee Corporation
ECNEC	Executive Committee of the National Economic Council
ECR	Export Credit Refinancing
EPC	Engineering, Procurement, and Construction
EPS	Electric Power Survey
ESMAP	Energy Sector Management Assistance Program
EXIM	Export Import
FATA	Federally Administered Tribal Areas
FCCB	Foreign Currency Convertible Bonds
FCNR	Foreign Currency Non Resident
FDI	Foreign Direct Investment
FESCO	Faisalabad Electric Supply Company
FI	Financial Institution
FII	Foreign Institutional Investors
FOIR	Forum of Indian Regulators
FRBM	Fiscal Responsibility and Budget Management
FRDL	Fiscal Responsibility and Debt Limitation

FSA	Fuel Supply Agreement
FY	Financial Year
FYP	Five Year Plan
GDP	Gross Domestic Product
GENCO	Generation Companies
GEPCO	Gujranwala Electric Supply Company
GERC	Gujarat Electricity Regulatory Commission
GETCO	Gujarat Energy Transmission Corporation Limited
GFA	Gross Fixed Assets
GFC	Global Financial Crisis of 2008
GHG	Greenhouse Gases
GoB	Government of Bangladesh
GoI	Government of India
GoP	Government of Pakistan
GSA	Gas Supply Agreement
GSDP	Gross State Domestic Product
GSECL	Gujarat State Electricity Corporation Limited
GUVNL	Gujarat Urja Vikas Nigam Limited
GW	Giga Watts
HESCO	Hyderabad Electric Supply Company
HRD	Human Resources Development
HRT	Head Race Tunnel
HT	High Tension
HUBCO	Hub Power Company
HVDC	High Voltage Direct Current
IA	Implementation Agreement
IBI	Islamic Banking Institution
IBPS	Indiabulls Power Services
IBREL	Indiabulls Real Estate
ICSID	International Center for Settlement of Investment Disputes
IDA	International Development Association
IDB	Islamic Development Bank

IDCOL	Infrastructure Development Company Limited
IDF	Infrastructure Development Fund
IDFC	Infrastructure Development Finance Corporation
IEA	International Energy Agency
IESCO	Islamabad Electric Supply Company
IFC	International Finance Corporation
IFI	International Finance Institution
IIFCL	India Infrastructure Finance Company Limited
IIP	Index of Industrial Production
IPFF	Investment Promotion and Financing Facility
IPI	Iran-Pakistan-India
IPO	Initial Public Offering
IPP	Independent Power Producer
IPTC	Independent Private Transmission Company
IREDA	Indian Renewable Energy Development Agency
IRR	Internal Rate of Return
JNNURM	Jawaharlal Nehru National Urban Renewal Mission
JSW	Jindal South West
KAPCO	Kot Addu Power Company
KESC	Karachi Electric Supply Company
KSEB	Karnataka State Electricity Board
KV	Kilo Volt
kWh	Kilo Watt Hour
L&T	Larsen and Toubro
LAF	Liquidity Adjustment Facility
LESCO	Lahore Electric Supply Company
LIBOR	London Inter Bank Offered Rate
LIC	Life Insurance Corporation
LNG	Liquefied natural gas
LP	Limited Partners
LT	Low Tension
mb/d	Millions of Barrels Per Day

MCX	Multi Commodity Exchange
MEPCO	Multan Electric Supply Company
MIGA	Multilateral Investment Guarantee Agency
MOE&F	Ministry of Environment & Forests
MoP	Ministry of Power
MOU	Memorandum of Understanding
MPGENCO	Madhya Pradesh Generation Corporation
MPPGCL	Madhya Pradesh Power Generation Company Limited
MSEDCL	Maharashtra State Electricity Distribution Company Limited
MSME	Micro, Small and Medium Enterprises
MTOE	Million Tons of Oil Equivalent
MVA	Mega Volt Amperes
MW	Mega Watt
MYT	Multi Year Tariff
NBFC	Non Banking Financial Company
NCDEX	National Commodity & Derivatives Exchange Limited
NEEPCO	North Eastern Electric Power Corporation
NEPRA	National Electricity Power Regulatory Authority
NFA	Net Fixed Assets
NHB	National Housing Bank
NHPC	National Hydroelectric Power Corporation
NLC	Neyveli Lignite Corporation
NLDC	National Load Dispatch Centre
NPCIL	Nuclear Power Corporation of India Limited
NRB	Non-Resident Bangladeshi
NTDC	National Transmission and Dispatch Company
NVVN	NTPC Vidyut Vyapar Nigam Limited
O&M	Operations and Management
OMC	Oil Marketing Companies
ONGC	Oil and Natural Gas Corporation
PE	Private Equity
PEPCO	Pakistan Electric Power Company

PESCO	Peshawar Electric Supply Company
PFC	Power Finance Corporation
PGCB	Power Grid Company of Bangladesh
PGCIL	Power Grid Corporation of India Limited
PIPE	Private Investment in Public Equity
PKR	Pakistan Rupee
PLR	Prime Lending Rate
POL	Petroleum, Oil and Lubricants
PPA	Power Purchase Agreement
PPI	Private Participation in Infrastructure
PPIAF	Public Private Infrastructure Advisory Facility (World Bank)
PPIB	Private Power and Infrastructure Board
PPP	Public-Private Partnership
PRG	Partial Risk Guarantee
PSE	Public Sector Enterprise
PSEC	Public Sector Energy Company
PSMP	Power System Master Plan
PV	Photo Voltaic
QESCO	Quetta Electric Supply Company
QIP	Qualified Institutional Placement
RBI	Reserve Bank of India
RE	Renewable Energy
REC	Rural Electrification Corporation
REIT	Real Estate Investment Trust
RFO	Residual Fuel Oil
RFP	Request for Proposal
RFQ	Request for Qualification
RGGVY	Rajiv Gandhi Grameen Vidyutikaran Yojana
RI	Reliability Index
RLDC	Regional Load Dispatch Centre
RPP	Rental Power Plant
RPTL	Reliance Power Transmission Limited

RRVUNL	Rajasthan Rajya Vidyut Utpadan Nigam Limited
SBLC	Standby Letter of Credit
SCADA	Supervisory Control and Data Acquisition
SEB	State Electricity Board
SEBI	Securities and Exchange Board of India
SEC	(Bangladesh) Securities and Exchange Commission
SERC	State Electricity Regulatory Commission
SIDBI	Small Industries Development Bank of India
SIP	Small Investment Program
SIV	Structured Investment Vehicles
SJVNL	Satluj Jal Vidyut Nigam Limited
SLDC	State Load Dispatch Centre
SLR	Statutory Liquidity Ratio
SPP	Small Power Project
SPV	Special Purpose Vehicle
STPP	Super Thermal Power Plant
T&D	Transmission and Distribution
TAPI	Turkmenistan-Afghanistan-Pakistan-India
TCEB	Thar Coal Energy Board
TCF	Trillion cubic feet
TCP	Trading Corporation of Pakistan
TFC	Term Finance Certificate
TOD	Time of Day
TOE	Tons of Oil Equivalent
TPP	Thermal Power Plant
TPS	Thermal Power Station
TUF	Technology Upgradation Fund
TWH	Tera Watt Hour
UGVCL	Uttar Gujarat Vij Company Limited
UMPP	Ultra Mega Power Project
UNCITRAL	United Nations Commission on International Trade Law
UPRVUNL	Uttar Pradesh Rajya Vidyut Utpadan Nigam Limited

USAID	United States Agency for International Development
USD	United States Dollar
WAPDA	(Pakistan) Water and Power Development Authority
WPI	Wholesale Price Index
WZPDC	West Zone Power Distribution Company

IMPACT OF THE GLOBAL FINANCIAL CRISIS ON INVESTMENTS IN SOUTH ASIA'S ELECTRIC POWER INFRASTRUCTURE

Executive Summary

Background and Context

The South Asia Region (SAR) has been experiencing rapid economic growth since the 1990s with concomitant increase in the demand for electricity. Electricity supply has not been able to match up to this growing demand, resulting in significant electricity shortages in the three large South Asian countries (Bangladesh, India, and Pakistan), which is retarding their growth. Therefore, these countries have developed ambitious plans to augment electricity supply. The Global Financial Crisis (the *Crisis*) became acute from September 2008 following the collapse of Lehman Brothers. It has had a widespread impact across the world through inducing recessionary conditions including falling demand, freezing financial markets, and loss of confidence. Many sectors have been affected, particularly those in which large investments are planned, and this includes the electricity sector in SAR. The *Crisis* hit South Asia at a time when it had barely recovered from the after-effects of the global energy price spikes and the food crisis.

While all three countries are affected by the financial crisis, there has been a differential impact based on individual country circumstances which prevailed in late 2008. Pakistan was vulnerable because a difficult political and social environment had prevented the adoption of adequate policy measures to adjust to the earlier terms of trade shock. Additionally, the reliance on external funding had been relatively large. Bangladesh, on the other hand, had mostly been insulated from the first round effects of the financial crisis owing partly to sound macroeconomic management, but also because of its limited integration with world financial markets. In India, the financial crisis has not had a substantial impact on account of a number of factors: a fundamentally strong macro economy, pro-active monetary policy management, prudent foreign debt management, substantial foreign exchange reserve cover, high savings rate, and a healthy financial sector. However, India's plans to more than double its investments in infrastructure under its 11th and 12th Five Year Plans, and to draw heavily on private debt and equity capital to finance these investments at a time when the global financial markets are just beginning to come out of the *Crisis*, will need careful monitoring and management.

The World Bank designed the Infrastructure Recovery and Assets (INFRA) Platform in Spring 2009 as its infrastructure response to the global financial crisis. The INFRA Platform was launched to support counter-cyclical spending on infrastructure and protecting existing assets and priority projects of the client countries with the intention of providing the foundation for rapid recovery and job creation, and to promote long-term growth. As part of the INFRA effort, Energy Sector Management Assistance Program (ESMAP) has funded diagnostic vulnerability assessments focused on the power sector in 20 developing countries covering the period up to 2015. This study is a part

of this effort and studies the impact of the global financial crisis on investments in South Asia's electric power infrastructure and specifically covers India, Pakistan, and Bangladesh.

The specific impacts of the *Crisis* on investments in the electric power infrastructures of India, Pakistan, and Bangladesh are given below.

Impact of the *Crisis* on India

- ***The impact of the global financial crisis on India's power sector has been marginally adverse in the short term.*** No major medium-term and long-term impact is likely.

- India's power sector resilience in the face of the global financial crisis is attributed to its strong domestic demand fundamentals which have been driving its growth; increasingly conducive enabling environment since the enactment of the Electricity Act (2003); broadening of the domestic private power developer base over the years; greater dependence on domestic sources of debt funding; existence of strong sector-focused financing entities; timely intervention by the government in the form of fiscal stimulus packages to revive demand; appropriate monetary policy measures by the central bank to address liquidity problems; and existence of government-owned central sector entities with strong balance sheets and robust cash flows.

- ***The strong fundamentals of the Indian economy provided room for cushioning the impact of the Crisis through stimulus packages*** in December 2008 and January 2009. These fiscal stimulus packages, together amounting to about 3% of GDP, included additional public spending, particularly capital expenditure, government guaranteed funds for infrastructure spending, cuts in indirect taxes, expanded guarantee cover for credit to micro and small enterprises, and additional support to exporters. These stimulus packages came on top of an already announced expanded safety-net for rural poor, a farm loan waiver package, and salary increases for government staff, all of which too stimulated demand[1].

- The central bank's timely interventions played a crucial role in restricting the impact of reduced liquidity on debt disbursements to a relatively short period of three to four months after September 2008.

- The measures taken by the government and the central bank to boost economic growth helped in restoring confidence and were instrumental in bringing down the cost of credit to pre-*Crisis* levels. This ensured continued economic growth during the *Crisis* period. After

[1] Subbarao, Duvvuri. 2009. *Impact of the Global Financial Crisis on India: Collateral Damage and Response.* Speech delivered at the Symposium on "The Global Economic Crisis and Challenges for the Asian Economy in a Changing World" organized by the Institute for International Monetary Affairs, Tokyo on February 18, 2009

growing at close to 9% per year for four years, the Indian economy slowed down to 6.7% in 2008-09[2], but recovered to 7.4% in 2009-10.

Public Sector Investments

- ***Availability of debt to central public sector power entities*** - which are focused on generation and transmission, owned substantially by the central government, and have strong financial profiles - ***did not pose any material challenges.*** These entities finance their investments on recourse basis, i.e., on the strength of their balance sheets. Such entities continued to borrow at competitive rates (i.e., in terms of spreads over the benchmark rates), either through the bank credit route or the bond finance route. However, their cost of borrowing went up by about 75-100 basis points in tandem with the increase in the prime lending rates of banks in the immediate aftermath of the *Crisis*.

- None of the entities in the central sector, which have robust cash flows and strong internal resource generation, had any difficulty in financing the equity component of their planned investments. Thus, the implementation of projects and capital expenditure by central public sector power entities continued unabated and in some cases even exceeded the targeted levels during the *Crisis* period. It is also understood that during the *Crisis* period, most central sector entities received extremely competitive quotes from their equipment suppliers/contractors, presumably due to tougher market conditions experienced by such suppliers/contractors in the private sector/ overseas markets.

- ***Even state sector entities*** - which are focused across different segments in the value chain, i.e. generation, transmission and distribution; owned by state governments in India; and known for their relatively weaker financial profile - ***did not face many challenges in securing debt financing.*** This was primarily on account of the continued availability of credit from sector-focused financing entities and even commercial banks, which preferred public sector entities over private sector projects to extend credit during the *Crisis* period. It needs to be noted that like central sector entities, these state government entities also finance their investments on the strength of their balance sheets and implicit support from the state governments. As was the case with the central sector entities, cost of bank credit did increase for state sector entities by about 75-100 basis points in the immediate aftermath of the *Crisis*. State sector entities, which rely on state government grants for financing equity investments, did not face any difficulty in securing such funding during the *Crisis* period. Consequently, capital expenditure by state-level entities continued to show robust growth during the *Crisis* period.

[2] The manufacturing sector, which bore the brunt of slowdown and had grown 3.8% in 2008-09, bounced back and posted 10.8% growth in 2009-10.

Private Sector Investments

- ***The impact of the global financial crisis was most strongly felt on private sector investments***. The private sector's preferred mode of financing is limited/ non-recourse project-financing. The impact on private sector investments, which are largely generation-focused, differed according to the stage of implementation of the project: (1) projects which had achieved financial closure before the onset of the *Crisis*; (2) projects which were at advanced stages of development and were seeking financial closure during the *Crisis* period; and (3) projects which were at an early stage of development.

- ***For projects which had achieved financial closure***, i.e., had tied up their debt and equity before the onset of the *Crisis*, availability of debt in terms of disbursements was not materially impacted. However, the cost of debt funds went up by about 75-100 basis points in tandem with the increase in prime lending rates of the banks in the immediate aftermath of the *Crisis*. By and large, there are no known cases of delays in debt disbursals due to delays in equity flows by identified equity investors. Most projects belonging to this category are scheduled to be commissioned during the 11th Five Year Plan (FYP) ending March 2012 or during the early part of the 12th FYP commencing April 2012. Thus, timelines of commissioning of capacity during the 11th FYP and early part of 12th FYP is unlikely to be adversely impacted due to the global financial crisis.

- ***Projects in advanced stages of development***, i.e., those projects which were seeking financial closure, certainly experienced an impact on their timeline for achieving financial closure. Many such projects had sought foreign debt as one of the sources of debt finance. However, foreign debt availability nearly dried up with the onset of the *Crisis*. It was ***total risk aversion on the part of the foreign banks*** that led to a considerable drop in external commercial borrowings accessed by the power sector during the *Crisis* period. Many such projects had to place greater than planned reliance on domestic debt funding to meet their debt requirements. It is understood that during the *Crisis* period, due diligence of projects by domestic lenders took a relatively longer time (than during the pre- *Crisis* period) and therefore lengthened the timeframe for achieving financial closure by about six months. Domestic lenders are understood to have laid greater emphasis on tie-up of equity financing before approving debt for projects.

- ***Equity financing was the hardest hit among the sources of finance for private investors in the power sector***. Many developers faced difficulties in arranging equity for financing projects. Equity markets, which were already declining even prior to the onset of the *Crisis*, registered even sharper declines and plans for raising cheap equity at higher valuations through the equity market had to be deferred. While private equity (PE) investors welcomed the decline in capital market valuations as it aligned their valuation expectations with those of strategic investors who were seeking private equity funding, the transactions took longer to conclude with the tightening process rigor and threshold expectations of PE

funds. As a result, PE transactions too saw a perceptible drop during the *Crisis* period. The *Crisis* period also saw deferment of plans or exits by many small or relatively new entrants in the power sector, who were leveraging their allocated captive coal blocks or state-allotted hydro project licenses to make a foray into power generation. Those that remained, rushed to established and bigger strategic investors to tie up equity finance for their projects.

- During the *Crisis* period, most established and bigger developers refocused their attention on relatively advanced stage projects. PE funds too showed distinct preference for operating, under-construction and advanced development stage projects in their project portfolios.

- Generation projects awarded through tariff-based competitive bidding, which had envisaged foreign currency debt, increased their reliance on more expensive rupee debt. This effectively reduced the returns to the equity investors. Some projects, which eventually achieved financial closure post-March 2009 (when the effect of the *Crisis* started to wear off), have been exploring the possibility of refinancing the un-drawn portion of rupee debt by arranging foreign debt through the External Commercial Borrowing (ECB) route.

- Most projects belonging to this category are scheduled to be commissioned during the tail end of the 11th FYP or during the early part of the 12th FYP. Overall, projects in this category, while delayed in terms of achievement of financial closure, are unlikely to see any material adverse impact on their timelines of commissioning of generation capacity. This is primarily because of the mitigation strategies adopted by many of the established developers in terms of arranging short-term financing to commence construction, pending achievement of financial closure, and their superior project management capabilities which should enable timely achievement of commissioning as stipulated under the power purchase agreement or even achievement of early commissioning in some cases.

- ***For projects in the early stages of development***, i.e., projects which were at the bidding stage or projects which were in the process of securing key development stage inputs such as land and environmental clearances, the impact was felt in terms of lengthening of the development period (which culminates in the achievement of financial closure). The *Crisis* period did witness postponement of bid submission deadlines for competitively-bid generation projects. The number of bidders who finally submitted bids also got adversely impacted when compared to the response levels in the pre- *Crisis* period. The tariffs quoted for some of the projects were also relatively higher when compared to those witnessed during the pre- *Crisis* period. While it is difficult to isolate the impact of the *Crisis* on tariffs, an increase in debt funding costs and higher desired equity returns in the light of heightened risk perception, had a role in pushing up the quoted tariffs.

- Most projects belonging to this category are scheduled to be commissioned during the later part of the 12th FYP. Given the significantly bigger pipeline of such projects in the private sector, aggregating to about 95,000 MW, some delays as highlighted above are unlikely to materially affect timelines for commissioning of capacity over the later half of the 12th FYP.

- It is pertinent to note that during the *Crisis* period, tariff regulations for the period 2009-14, announced by the central regulator (CERC), did take note of such changes in the financing costs and increased the allowed equity return for cost-plus generation and transmission projects from 14% to 15.5% (16% in the case of commissioning of projects before the period indicated in the regulations).

- While relatively higher generation tariffs (either through the competitive bidding route or cost-plus route) may make such projects relatively easier to finance and therefore less likely to face any financing-related implementation delays, the same may potentially have an adverse impact on the finances of already weaker distribution entities. This will bring distribution side reforms into sharper focus.

- During the *Crisis* period, investments in renewable energy projects became relatively unattractive due to low price of certified emissions reductions (CERs) in the market. This led to reduced interest in such projects during the *Crisis* period. Due to the relatively shorter gestation period, the impact in terms of lower capacity addition was experienced during the year following the *Crisis*.

- Overall, the *Crisis* period saw a drop in the number of and quantum of financial closures. The cost of debt funding at the approval stage did go up by 75-100 basis points in the immediate aftermath of the *Crisis* in keeping with the prevailing interest rate scenario in the country. While the rigor of the approval process certainly intensified during the *Crisis* period, the other terms of debt financing such as interest rate reset periods, loan covenants, and lenders' security, are not known to have altered as a result of the *Crisis*.

- The *Crisis* did have some beneficial indirect impacts on the power sector:

    - It triggered weeding out of speculative developers with relatively short-term outlook on the sector;

    - It encouraged refocusing of development efforts on fundamentally stronger projects at relatively advanced stages of development, by strategic and PE investors;

    - It discouraged speculative behavior in bidding and brought tariffs to realistic levels;

    - It underscored the importance of entities with stronger balance sheets;

    - It highlighted the need for broadening and strengthening domestic sources of debt funding; and

    - It brought into focus the centrality of distribution side reforms and the need to accelerate measures such as open access implementation, for power market development.

Impact of the *Crisis* on Pakistan

- Pakistan was vulnerable to the *Crisis* because a difficult political and social environment had prevented the adoption of adequate policy measures to adjust to the earlier global energy price spikes and the food crisis.

- Pakistan was strongly affected by the *Crisis* as the current account imbalance and fiscal deficit increased, inflation surged and growth slowed (from 7.3% per annum during 2004-07, economic growth slowed to 5.8% in 2008 and slid down further in 2009). The foreign exchange reserves of the State Bank of Pakistan dropped to US$3.3 billion (about three weeks of imports) by mid-October 2008; the nominal exchange rate depreciated precipitously to PKR 84/US$; and the the average inflation rate rose to about 25% by the end of November 2008. In response to these developments, Standard & Poor's downgraded Pakistan's rating to CCC in early November 2008 posing serious threat to external financing of projects.

- The Government of Pakistan (GoP) underwent a stabilization effort beginning with the induction of an IMF Stand-By Arrangement (SBA) in November 2008 worth about USD 11 billion which supported the country's foreign exchange reserves. The resulting economic recovery, however, continues to count on foreign inflows from multilaterals including IMF, 'Friends of Pakistan', and US assistance, for budgetary support and to keep the country solvent. The GoP has also been actively soliciting budget and energy import support from China and the Gulf States.

Public and Private Sector Investments

- The current power deficit in Pakistan is estimated at 4000 MW - 5000 MW[3]. To tide over the significant electricity shortages in the country, the Government of Pakistan planned to add 4,225 MW of generating capacity in 2009 against which the achievement was 151 MW.

- There were many reasons for the failure of the 2009 capacity addition plan:

    - Independent Power Projects (IPPs) were delayed due to global financial crisis, security and terrorism related issues:

        - For example, following competitive bidding by 9 companies for new IPP projects under Private Power and Infrastructure Board's (PPIB) Fast Track process (Package A), Cavalier Energy's 470 MW LPG fueled IPP project at Port Qasim, Karachi was 'agreed in principle' by Bid Evaluation Committee of PPIB in August 2008. Tariff was approved by NEPRA on 9 October 2008 and as of 6 December 2008, Cavalier IPP project was at stage 16 (notice for submission of Performance Guarantee and processing fee) out of 21 stages

[3] Government of Pakistan (Ministry of Finance). *Pakistan Economic Survey 2007-08*

in PPIB's Fast Track process. It was reported in January 2009 that the project would not materialize because foreign investors were unwilling to provide financing due to recent increases in Pakistan's country risk premium.

- One of the wind energy projects, ZORLU Energi, commissioned Phase I of its project (6MW) in April 2009, which represented a substantial delay from initially planned commissioning date. The company is facing ongoing difficulty in financing Phase 2 of the Project.

- In November 2005, Eden Enterprises Malaysia and its partners successfully bid for the USD 1.1 billion, 655MW Suki Kinari run-of-the-river hydro power project located in the Khyber Pakhtunkhwa (formerly called the North West Frontier Province). The feasibility study for the project was completed in September 2007 and petition for tariff determination was filed in July 2008. However, the project has failed to achieve financial closure due to litigation issues and investors' unwillingness to commit financing in the wake of the *Crisis*.

- Pakistan has resorted to Rental Power Plants (RPPs) as a quick-fix solution to the crippling energy crisis. The aim was to acquire 2,250 MW of RPP capacity by end-2009. However, none of the RPPs were commissioned. Rather old RPPs (GE and Alstom Rental Plants) could not get gas resulting in loss of 286 MW capacity[4]. RPPs have been delayed due to persistent controversy in the media and financial constraints [originally, the mobilization advance paid to RPP sponsors by the Government of Pakistan was 7% along with a confirmed Standby Letter of Credit (SBLC); however, because of the financial crunch, it was difficult to open confirmed SBLC due to high confirmation charges; therefore, government allowed 14% mobilization advance and government guarantee in lieu of SBLC[5]]. This process delayed many RPPs including Pakistan Power Resources 110 MW RPP.

- As of March 2010, the banking sector has PKR 370 billion (USD 4.35 billion) in exposure to the power sector with the major component (PKR 240 billion) consisting of circular debt and related Public Sector Energy Company (PSEC) financing inclusive of PEPCO Term Finance Certificates (TFCs). In addition, approximately PKR 100 billion is in fixed investment and PKR 30 billion is in working capital finance. With this level of exposure of the banking sector to power (15% of total portfolio), the lending limits to power sector have been exceeded and there is no further room to provide credit to the sector until the circular debt issue is resolved. In the current environment, local banks have also shied away from

[4] Government of Pakistan (Ministry of Water and Power)

[5] Another reason given by Government of Pakistan for this change was the unwillingness of banks to provide debt financing to the RPPs on account of liquidity problems in the financial markets, the problem of circular debt, and the high exposure of banks to the power sector [see Government of Pakistan response to ADB Report on Rental Power Projects (http://www.pepco.gov.pk/GOP_Response_to_ADB_Report_29-01-10.pdf)]

financing power projects because of higher risk perception. The asset mix of the banking sector is shifting from risky loans portfolio to short-term government paper.

- Gas shortage for GENCOs / KAPCO / Rentals – forcing them to use expensive Residual Fuel Oil (RFO) - leading to greater fuel imports and loss of generation capacity. The financial crisis and circular debt problem also played a part as the RFO based plants did not receive regular payments impacting their availability.

- The strong impact of the *Crisis* on Pakistan was reflected in higher risk aversion of commercial lenders. The higher risk aversion was manifested in spike in Credit Default Swap (CDS) spreads and higher risk-free rate in domestic money markets. In sovereign markets, CDS spreads on Pakistan's outstanding Government debt rose by over 3,000 basis points in 2008 due to market volatility and fears over the country's financial stability. Local benchmark rates such as the 6 month KIBOR more than doubled to 15.7% in 2008. Higher interest rate increases the cost of capital. During the project development phase, these costs become a part of the project outlay, and any hike in interest rates over and above the originally projected becomes construction cost overrun.

- In order to address the power shortfall over the medium-term, the Government of Pakistan (GoP) has come out with a "Vision 2020 Program" to add around 20,000 MW into the system by 2020 at an estimated cost of over $32 billion. The government envisages a 55%-45% Public-Private mix for financing these projects in which GoP intends to provide $17 billion using borrowing and budgetary funds while an estimated $15 billion is expected to be raised by the private sector.

- In the past two decades, Pakistan has managed to attract USD 8.9 billion of private investment in 38 power projects. Going forward, the Government faces an uphill challenge to attract about twice the financing from the private sector over the next decade compared to what was raised in the past two decades. The 2008 global credit crunch has further exacerbated this situation, by reducing the risk appetite of sponsors and commercial lenders resulting in higher overall project costs and shorter debt tenors.

- Multilateral institutions increased their funding for power projects to help Pakistan in the face of limited liquidity available from international investors. Additional funding began to be provided by development banks such as the IBRD, the Asian Development Bank, and the International Finance Corporation (IFC).

- Export credit for both public and private sector projects is an important element of financing power projects. The demand for export credit in the region has shown steady growth, due in large part to the funding requirements of capital-intensive projects. The importance of ECAs has further increased due to reduced appetite on the part of commercial lenders for uncovered term financing in the period following the *Crisis*. The involvement of ECAs is also necessary for crowding-in commercial bank financing for power projects in emerging markets as they provide guarantees to funding banks covering political and commercial risk.

Impact of the *Crisis* on Bangladesh

- The Bangladesh economy proved to be very resilient to the fallout from the global financial crisis with GDP growth in Financial Year (FY) 2009 declining only to 5.9% from 6.2% in FY 2008. GDP growth is expected to be 5.5% in FY 2010.

- Two important factors are responsible for such low volatility in Bangladesh growth rate:

    - Resilience of Bangladeshi exports, partly due to "Walmart effect" where demand for lower cost items increases during recessionary conditions in importing countries; and

    - Strong inflow of remittances.

- The overall impact of the global financial crisis has been subdued in Bangladesh also because there has been no major private investment in the power sector since 2002. And arguably, if there had been private sector investments, these would have borne the brunt of the *Crisis*.

Public and Private Sector Investments

- Power sector allocation in the government's Annual Development Plan of Bangladesh increased in the wake of the global financial crisis. In FY 2010, the power sector allocation went up to $442 million from $386 million in FY 2009 (an increase of over 14% in nominal terms). For FY 2011 the announced allocation is $880 million.

- Multilateral financial institutions have tried to increase the allocation of resources to Bangladesh. A recent initiative has been additional funding support to the Infrastructure Promotion and Financing Facility (IPFF) of $257 million approved in May 2010 by the World Bank. This initiative is expected to increase infrastructure supply in the power sector – renewable energy and energy savings – as well as other sectors.

- Infrastructure Development Company Limited (IDCOL) provides long-term senior and subordinate debt financing to viable privately-owned and operated infrastructure projects in Bangladesh. Recent developments include Government contribution of an additional $350 million in local currency to IDCOL for project financing. The Asian Development Bank (ADB) is currently conducting due diligence prior to making $165 million in funding available to IDCOL; this amount could be increased to $500 million. In addition, the ADB recently made a direct infusion of $50 million into IDCOL without the requirement of a Ministry of Finance repayment guarantee.

- Local commercial banks provide loans with a maximum tenor of 5-7 years and generally require equity of 25 % - 35% of total project cost. Loan amounts are typically of small size with limits imposed by Bangladesh Bank on single party exposure. Syndications and club financing are the favored means to increase pooled finance, but it has been estimated that projects in excess of $70-100 million would be difficult to finance locally (largest syndication to date is $57 million) especially in the current market environment. Overall, there are limitations in domestic sources of finance not only in terms of quantum, but also in terms of cost of finance and tenor.

- The *Crisis* has impacted (generic impact) access to foreign bank lending in a number of significant ways. Syndication markets have dried up and many banks have retreated to their home markets or exited the market altogether. The banks that remain in the market have significantly less appetite for risk than they had in the pre- *Crisis* period. This low risk appetite is manifested in the following:

    - Experienced, credit-worthy sponsors: Lenders are focusing, in particular, on the long-term ability of sponsors to provide necessary funding, credit support, and technical expertise.

    - Strong commercial structure: Projects with a contracted, credit-worthy revenue stream are being favored over those that are exposed to merchant risk or rely on non-investment grade off-takers.

    - Government support: For those projects in which the government acts as a counterparty, strong support evidenced through guarantees is crucial to attract lender attention.

    - Stricter financing terms in the form of shorter tenors, increased interest rates (one lender estimated that margins on debt would be well above 400 basis points over LIBOR), and stronger covenants in terms of lower debt-equity ratio.

- Prior to the *Crisis*, it is likely that a larger number of international lenders to Independent Power Projects (IPPs) in Bangladesh would have been willing to lend on the basis of a mix between comprehensive[6] and political-only cover. However, post-*Crisis*, it appears that very few would be willing to lend without comprehensive cover.

- Equity funding: There are two listed private power generation companies in Bangladesh – Summit Power and the recently listed Khulna Power Company. While the power sector, including transmission and distribution companies, was trading at around 19x price-earnings (P-E) ratio, Summit Power was trading at 79x P-E ratio and Khulna Power at 62x P-E ratio in mid-2010. High investor demand and attractive valuations suggest the latent potential of equity funding of power projects in Bangladesh even in the current market environment.

- While international bond markets are a source of financing for major infrastructure projects such as IPPs, high levels of perceived political and commercial risk and the lack of a government bond benchmark are likely to make the international bond markets inaccessible to a Bangladesh-based IPP currently.

- Obtaining senior debt with tenors greater than 15 years will be a challenging task in the current environment and will require risk mitigating instruments and mechanisms. In this regard, there would be a need for support from multilateral/ bilateral financial institutions in

[6] Comprehensive coverage refers to a guarantee or an insurance policy from an Export Credit Agency (ECA) that covers default by a borrower due to instances related to either political or commercial risk.

the form of credit enhancements. Thus, in projects costing over $70-100 million, one or more multilateral lending agencies (such as the World Bank, IFC, ADB, CDC and JEXIM) would have to be involved both through providing direct financing and through risk mitigating instruments like Partial Risk Guarantees backstopping payment obligations of less credit-worthy offtakers like BPDB. This would be in addition to a Government of Bangladesh Guarantee to the commercial lender.

- One of the key lessons about the impact of the *Crisis* on developing economies is the need to have a balance between international and local financing for energy projects. Bangladesh enjoys an annual savings surplus (Gross National Saving - Gross National Investment) of around 5% of GDP or $ 4.5 billion. A key challenge in addressing Bangladesh's electricity crisis is to channel this domestic private sector capital into infrastructure financing. Insurance and pension reforms and development of corporate bond market are both medium-term strategies for channeling long-term domestic savings into infrastructure investments.

- Overall, the impact of the global financial crisis on Bangladesh power sector can be summarized as below:

    - There are limitations in domestic sources of finance not only in terms of quantum, but also cost of finance and tenor.

    - Larger IPPs will require international finance and support from multilaterals.

    - The Power Purchase Agreement (PPA) will require tariff adjustment for domestic currency depreciation, inflation, and fuel price increase.

    - Foreign sponsors and financiers will need a government guarantee of the PPA, backed with a Partial Risk Guarantee from multilaterals.

    - This increases the contingent liabilities of the government and makes the project 'risk-free' for the private sector. But, this may be necessary for Bangladesh to be able to attract IPPs in the current environment.

    - Increased funding through budgetary support/ IDCOL and IPFF financing would be required to make up for shortfall in commercial financing.

Conclusion: Role of multilateral institutions in the changed economic environment

Box 1 gives a snapshot of the role of multilateral institutions in the changed economic environment.

Box 1: Role of multilateral institutions in the changed economic environment

The importance of multilateral financing has increased because of the global financial crisis. One, multilaterals increase the quantum of available finances for investment in the power sector. Two, they provide risk-mitigating instruments (like Partial Risk Guarantee). And three, their presence in a deal can provide other financiers (both debt and equity) with the needed confidence to invest in the country and sector.

World Bank Response to the Global Financial Crisis

The World Bank designed the Infrastructure Recovery and Assets (INFRA) Platform as its infrastructure response to the *Crisis*. INFRA Platform:

- Supports counter-cyclical spending on infrastructure to:
    - Provide the foundation for rapid recovery and job creation; and
    - Develop a robust base for economic growth.
- Brings priority focus on infrastructure investments and maintenance; and
- Provides a platform for Multilateral Development Banks and International Financial Institutions to work together to leverage finance.

In FY 2009 the World Bank Group provided $21.6 billion of countercyclical financing for infrastructure sectors – 30% higher than in FY 2008 (IBRD/IDA: $18.3 billion, above the INFRA target of $15 billion/year, and leveraged an additional $30.3 billion; IFC's lending and equity commitments totaled $3.2 billion, leveraging $22.1 billion dollars from other sources; MIGA provided $108 million in guarantees).

A study commissioned for this report to examine financing of power sector projects in India, Pakistan, and Bangladesh in the aftermath of the global financial crisis found that multilaterals can help through the following specific measures:

- Payment guarantees for government utility payments (credit risk of the revenue providers/ offtakers is clearly a much greater perceived risk in Bangladesh than in India or Pakistan);
- Greater involvement of World Bank Group in structuring project documentation, providing consulting services and market information to companies both prior to and after the investment has been made;
- Pre-financing of sponsors' equity commitments during the construction phase;
- Support for sector reforms and greater transparency.

CHAPTER 1: INTRODUCTION

INTRODUCTION

The three large South Asian countries (India, Pakistan, and Bangladesh), which are the focus of this report, have drawn up large power capacity addition plans to provide for the rapidly increasing electricity demand in the region. The Global Financial Crisis (the *Crisis*), which became acute from September 2008 with the collapse of Lehman Brothers, has had a widespread impact across the world and across sectors through inducing recessionary conditions including falling demand, freezing financial markets, and loss of confidence. The purpose of this report is to assess whether the ambitious plans of these countries were adversely affected by the Global Financial Crisis, and where relevant, to be able to plan better for such future shocks. The report is structured as follows: it starts with the Executive Summary. After this introductory chapter (Chapter 1), there are detailed country chapters (Chapter 2 - 4) which, *inter-alia*, map the different sources of financing available to the power sectors in the three target countries and discuss how these sources were affected by the *Crisis* (if at all). An important aspect of this assessment has been the attempt to ring-fence the impact of the *Crisis* per se on power sector projects, as distinct from other policy, implementation, and institutional capacity constraints that already exist.

The three large South Asian countries on the whole have been quite resilient to the *Crisis*. The decline in the growth rate of South Asia during the *Crisis* has been the least among all regions[1]. Financial systems proved to be robust with limited exposure to overseas subprime markets. Remittances, exports of goods and services such as in the IT and garment sectors, and foreign direct investments kept up during the *Crisis*. At the same time, policy response in most countries and global rebound played a key role in boosting confidence and accelerating recovery. The region grew at a healthy 7% in 2010 and is expected to grow at 8% in 2011. India's growth is expected to rise to 9% in 2011 and Bangladesh's 6.4%.

Strong and timely policy interventions were a key to building confidence and recovery. In India, monetary policy was eased and interest rates were sharply lowered during the *Crisis*, so that liquidity problems would be overcome and the cost of credit would come down to pre-*Crisis* levels in a short span of time. The relatively strong fundamentals of the Indian economy also provided room for cushioning the impact of the *Crisis* through fiscal stimulus packages in December 2008 and January 2009. These fiscal stimulus packages, together amounting to about 3% of GDP, included *inter-alia*, additional public spending, particularly capital expenditure, and government guaranteed funds for infrastructure spending. These stimulus packages came on top of an already announced expanded safety-net for rural poor,

[1] Regional GDP growth declined by nearly 3 percentage points—from a peak of 8.9% in 2007 to 6.3% in 2009 (Source: World Bank. 2010. *World Bank South Asia Economic Update 2010: Moving Up, Looking East*)

a farm loan waiver package, and salary increases for government staff, all of which too stimulated demand[2].

Pakistan was vulnerable to the *Crisis* because a difficult political and social environment had prevented the adoption of adequate policy measures to adjust to the earlier global energy price spikes and the food crisis[3]. The Government of Pakistan (GoP) underwent a stabilization effort beginning with the induction of an IMF Stand-By Arrangement (SBA) in November 2008 worth about $11 billion which supported the country's foreign exchange reserves. The resulting economic recovery, however, continues to count on foreign inflows from multilaterals including IMF, 'Friends of Pakistan', and US assistance, for budgetary support and to keep the country solvent. Bangladesh, which was mostly insulated from the first round effects of the *Crisis*, however, was able to take strong fiscal action, following the set of stimulus measures which had already been enacted in response to food and fuel price spikes and a devastating cyclone in 2007.

1. Financing Challenges in the South Asian Power Sector

In the Report of Expert Committee on Integrated Energy Policy (Government of India, Planning Commission), projections of total energy requirement with GDP growth rate of 8% and 9% have been made. Assuming GDP-electricity elasticity of around 1.0, electricity generation in India would be required to grow at 8 to 9% per annum. In keeping with the target set by the National Electricity Policy (2005) to raise per capita power availability from 704 kWh in 2007-08 to 1,000 kWh per annum by 2012, a capacity addition target of 78,700 MW has been set for the Eleventh Five Year Plan (2007-2012).

India's ambitious capacity addition plans across the electricity value chain call for huge investments. The Indian Planning Commission's Working Group on Power for the Eleventh Five Year Plan (2007-12) had assessed a total fund requirement for generation, transmission, distribution, rehabilitation and maintenance, etc. of Rs.10,595 billion (over $210 billion[4]). Assuming a debt equity ratio of 65:35, the debt requirement has been assessed at Rs.6,933 billion (about $139 billion) and equity at Rs.3,662 billion (about $73 billion). After assessing the funds requirement and available financial resources, the Group estimated a total funding

[2] Subbarao, Duvvuri. 2009. *Impact of the Global Financial Crisis on India: Collateral Damage and Response.* Speech delivered at the Symposium on "The Global Economic Crisis and Challenges for the Asian Economy in a Changing World" organized by the Institute for International Monetary Affairs, Tokyo on February 18, 2009

[3] The text for this report was researched and prepared before the devastating floods of Summer 2010 in Pakistan

[4] An exchange rate of $1 = Rs. 50 has been assumed.

gap of Rs.4,216 billion (close to 40% of the fund requirement, which adds up to over $84 billion till 2012).

Taking this forward for the period 2010 to 2015, we have estimated ***the debt funding gap*** to be $121 billion, which is 48% of the total debt funding requirement in the sector.

For Pakistan, the capacity addition target for the next decade (2010-20) is 20,000 MW at a cost of over $32 billion, of which the bulk (over $28 billion) would be required in the period 2010-15. In addition, investment in transmission and distribution is estimated at $ 3 billion and $ 7.8 billion respectively over the next decade. The likely funding gap could be as high as 50% after accounting for increased multilateral assistance and budgetary allocation to the power sector (budgetary allocation in FY11 was $1.5 billion).

Bangladesh projects a funding requirement of $11.5 billion in electricity generation, transmission and distribution till 2015. The likely funding gap may be over 60% as there is limited private sector activity and the fiscal resource envelope for the sector may only add up to around $2.5 billion over the period 2010-15.

So, it can be reasonably assumed that the ***funding requirement*** in the power sector would be over $350 billion by 2015 in the three large countries of South Asia. The ***funding gap*** till 2015 is likely to be about $150 billion for the three countries.

2. Main Sources of Finance for the Power Sector and the Impact of the Crisis on each of them

The main sources of finance for the power sector in the South Asia region have been government budget, multilaterals, specialized institutions, commercial bank finance, foreign bank finance, equity finance, and private participation in energy projects including project finance.

Overall, it can be said that the impact of the *Crisis* was positive for the three South Asian countries in terms of budgetary support to the power sector. The importance of multilateral financing increased because of the *Crisis*. One, multilaterals increased the quantum of available finances for investment in the sector. Two, they were prepared to provide risk-mitigating instruments (like Partial Risk Guarantee). And three, their presence in a deal provided other financiers (both debt and equity) with the needed confidence to invest in the country and sector.

The impact of the *Crisis* on commercial bank finance was manifested in higher interest costs in the immediate aftermath of the *Crisis* in India. For Pakistan, exposure of banking sector to power stands at 15% of total portfolio which implies that banks have fully utilized their credit limits and there is no further room to provide credit to the power sector until the

'circular debt' issue is resolved. For Bangladesh, there are limitations in domestic sources of finance not only in terms of quantum, but also in terms of cost of finance and tenor.

There has been relatively little foreign borrowing for power projects financed to date in India. Substantially all of the funding has been provided by domestic banks. Most of the funding for projects in Bangladesh is either provided by local financial institutions or the multilateral and bilateral agencies. After 2002, funding to the power projects in Pakistan has been dominated by local banking sector. So, while the *Crisis* did have a pronounced impact on foreign bank finance in terms of availability and cost of credit, this did not have a significant impact on the largest countries of South Asia.

In India, with falling equity markets, equity-raising was not attractive and there was reduction in Initial Public Offerings (IPOs) during the *Crisis* period. There are two listed private power generation companies in Bangladesh – Summit Power and the recently listed Khulna Power Company. Their attractive valuations based on high investor demand suggest the latent potential of equity funding of power projects in Bangladesh even in the current market environment.

The impact of the *Crisis* on private participation in the power sector in India was centered around the latter part of 2008 and early 2009, when there was some increase in interest rates and higher risk perception. Evidence shows that the *Crisis* delayed actual bidding, fund-raising, and financial closure of some mega projects. For example, Power Finance Corporation (PFC), the nodal agency for Ultra Mega Power Projects (UMPPs, see Box 1) in India, had repeatedly deferred the request-for-proposal bid (price bid) submission for the Tilaiya UMPP project (now awarded to Reliance Power) to December 29, 2008 fearing that the prospective bidders may not be able to raise funds for the 4,000 MW project (total expected investment: $4 billion; with a debt equity ratio of 70:30 for most power projects, raising large amounts of debt and equity capital would have been difficult in the tight credit market). However, proactive measures by the government and the central bank led to rapid recovery and there was explosive growth of power sector projects achieving financial closure during 2009-10 as the impact of the *Crisis* wore off. There was no significant private sector activity in the power sectors of both Bangladesh and Pakistan around the *Crisis* period to have been significantly impacted by it.

Box 1: What are India's Ultra Mega Power Projects?

In India, Ultra Mega Power Projects (UMPPs) are very large-sized thermal power projects each of about 4,000 MW capacity being developed on a Build-Own-Operate basis and involve a capital outlay of about $4 billion. They are being developed without any guarantees as opposed to the power policy in the mid-1990s when guarantees were extensively used. This is a recent initiative of the Government of India and involves creation of shell companies for coal-based UMPPs with most pre-implementation clearances (including land-acquisition and environmental clearance) and then opening these companies for tariff-based competitive bidding by private parties. This initiative is designed to reduce project development risks and improve investor confidence. UMPPs are expected to use supercritical technology to achieve higher levels of fuel efficiency resulting in fuel saving and lower green-house gas emissions. UMPPs are based either on pithead (captive blocks) or imported coal (coastal blocks). Initially, nine locations for UMPPs have been identified:

- Coastal sites: Mundra in Gujarat, Krishnapatnam in Andhra Pradesh, Tadri in Karnataka, Girye in Maharashtra, and Cheyyur in Tamilnadu.
- Pithead sites: Sasan in Madhya Pradesh, Tilaiya in Jharkhand, Sundergarh in Orissa, and Akaltara in Chhattisgarh.

Four UMPPs have been competitively awarded to date (see table below).

Table 1: Ultra Mega Power Projects that have been awarded

Project	Capacity (MW)	Sponsor	Location	Fuel	Offtaker(s)	Tariff (Rs./ kWh)	Status
Mundra UMPP	4,000	Tata Power	Gujarat	Imported Coal	Multiple states	2.26	Under construction
Sasan UMPP	4,000	Reliance Power	Madhya Pradesh	Pit-head Captive coal	Multiple states	1.20	Under construction
Krishnapatnam UMPP	4,000	Reliance Power	Andhra Pradesh	Imported Coal	Multiple states	2.33	Financial Close due
Tilaya UMPP	4,000	Reliance Power	Jharkhand	Captive coal	Multiple States	1.77	Financial Close due

Source: Project Finance International (www.pfie.com)

3. The Way Forward

3. 1 India

India's buoyant economy and large deficits in generation capacity and network infrastructure will drive future growth in the power sector. Capacity additions and efficiency improvement plans offer tremendous opportunities for investments across the value chain in the sector. The Electricity Act (2003) and subsequent policy and regulatory developments have created the right environment for attracting such massive investments. Given the country's large coal reserves, coal will continue to remain the preferred fuel for power generation. India is adopting more efficient generation and network technologies, laying emphasis on renewable sources of generation capacity, and encouraging efficiency in end-use of electricity to reduce the carbon intensity of its economic growth while enhancing the sustainability of its development.

Recent developments such as the selection of private developers for setting up generation projects through competitive bidding (including developers for UMPPs); ongoing development and construction of generation projects; prospects of the country achieving record capacity addition during the Eleventh Five Year Plan period; initial interest shown by private sector in transmission projects; evolution of new business models for private participation in distribution; and the increasing level of trading activity have brought a sense of optimism in the sector.

However, the sector still has to tackle some important issues such as tariff rationalization; transparent administration of subsidies; enhancing efficiency and commercial viability of distribution entities; enhancing efficacy of open access; and removing impediments to ensure speedy implementation of generation projects. But, progress is being made and further reforms at both central and state level would address many of these concerns and thereby enable continued growth in investments in the sector.

3.2 Pakistan

The current power deficit in Pakistan is estimated at 4000 MW - 5000 MW[5] and as per government estimates, energy demand in the country is expected to increase by 8.8% per annum beyond 2010. In order to address the power shortfall over the medium-term, the Government of Pakistan (GoP) has announced the "Vision 2020 Program" to add around

[5] Government of Pakistan (Ministry of Finance). *Pakistan Economic Survey 2007-08*

20,000 MW into the system by 2020 at an estimated cost of over $32 billion. The government envisages a 55%-45% public-private mix for financing these projects whereby Government of Pakistan intends to provide $17 billion using borrowing and budgetary funds while an estimated $15 billion is expected to be raised by the private sector. In addition, investment in transmission and distribution is estimated at $3 billion and $7.8 billion respectively over the next decade.

In the past two decades, Pakistan has managed to attract $8.9 billion of private investment in 38 power projects. Going forward, the Government faces an uphill challenge to attract about twice the financing from the private sector over the next decade compared to what was raised in the past two decades. The 2008 *Crisis* has further exacerbated this situation, by reducing the risk appetite of sponsors and commercial lenders resulting in higher overall project costs and shorter debt tenors. The likely funding gap could be as high as 50% even after accounting for increased multilateral assistance and budgetary allocation to the power sector (budgetary allocation in FY11 was $1.5 billion).

Investment constraints in Pakistan relate to unprecedented macroeconomic and sector risks, which have been compounded by limited policy reform, unilateral actions taken by the government, and investor concerns regarding the validity of sovereign guarantees and contract enforcement.

The primary power sector constraint is related to under-recoveries together with an exceedingly high power generation cost. The fuel mix inclination towards fuel oils has resulted in a dependence on costly imports and commodity price risk being passed on indiscriminately to the Power Purchasing Authority (PPA). The PPA has been unable to pay arrears to power producers (for whom fuel cost is a pass-through). Meanwhile rising payables connected with high power generation costs has led to balance sheet deterioration and loss of credit worthiness across the entire energy chain through the problem of circular debt. Consequently, power plants are unable to function at optimal capacity due to the inability to pay for the fuel. Rehabilitation and aging concerns of power plants have also been amplified due to lack of liquidity.

The Pakistan story needs to improve in a holistic way through: (i) enabling financial recovery and financial viability of power sector entities; (ii) promoting affordability of power through a lower cost expansion program focused on domestic resources – coal and hydel; (iii) regulatory streamlining to improve efficiency of decision making, policy formulation, and private sector participation; (iv) autonomy and accountability of public sector entities throughout the energy chain; and (v) enhanced regional co-operation for energy trade as a means of diversifying energy supply and thereby increasing energy security.

3.3 Bangladesh

While Bangladesh remained more resilient to the Global Financial Crisis than most other economies, the power crisis remains the single biggest constraint to increasing growth. Over 50% of Bangladesh's population does not have access to electricity, while supply to the rest of the population is unreliable at best. It has been estimated that Bangladesh currently faces an energy deficit of around 2000 MW, which has resulted in poor quantity and quality of electricity supply, manifested in frequent load-shedding and voltage fluctuations. Load-shedding increases costs of production, disrupts manufacturing schedules, and ability to compete in export markets. Production costs also increase because of the impact of energy uncertainty on business confidence and investment spending. The GDP growth loss resulting from inadequate electricity supply has been estimated to be in excess of 0.5% and potentially greater.

The Government of Bangladesh has recently committed to an aggressive plan to nearly triple the electricity generation capacity by 2015 at a cost of $11.5 billion. A significant part of this required investment would have to come from the private sector. However, important constraints to financing of power projects will have to be addressed, especially in the current market environment. There are issues related to high cost, limited tenors, stringent covenants, and regulatory limits (single borrower for domestic banks and country exposure for foreign banks) all of which limit bank debt (both domestic and foreign) as a source of finance for power projects. The international loan syndication market has dried up and many banks have retreated to their home markets or exited the project finance market altogether. However, even prior to the credit crisis, there were limited syndication opportunities for privately financed power projects in Bangladesh due to perceptions of political risk by international lenders. Project structures must also be watertight, with international private lenders indicating that they will consider only those projects where contracts with state-owned entities are directly guaranteed by the government and that benefit from strong multilateral or Export Credit Agency (ECA) involvement.

However, there are encouraging signs. The recent success of energy equity issues suggests latent demand in the domestic capital markets. The multilaterals including the World Bank[6] and ADB are also providing funding support. This would not only add to the pool of available resources but also catalyze commercial lending through guarantee instruments.

Bangladesh has a history of attracting international private capital in its power sector. The Haripur and Meghnaghat Independent Power Projects (IPPs) were ground-breaking, privately-sponsored projects that began operations at the beginning of this decade. Together

[6] The most recent initiative has been additional funding support to Infrastructure Promotion and Financing Facility (IPFF) of $257 million approved in May 2010 by the World Bank.

these two projects make up 14% of the country's current installed generation capacity. The experience of undertaking these projects has benefited the country's IPP program as the government already has a series of model project agreements that meet international standards. To re-establish the confidence of foreign sponsors and international commercial lenders for setting up power projects in Bangladesh, there is a need to focus efforts on successfully closing one or two projects while following transparency in the award process to generate the positive momentum required to achieve the government's larger goals in augmenting power supply.

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CHAPTER 2: INDIA

1. INTRODUCTION

1.1 Background to the assignment

India stands fifth in the world in terms of electricity generation capacity, which has reached nearly 159 GW as on 31st March 2010. However, it still faces substantial energy and peak deficits. Further, the National Electricity Policy, 2005, has set a target to raise per capita electricity availability from 704 kWh in FY[1] 2007-08 to 1000 kWh per annum by the end of FY 2011-12. In view of this, a capacity addition target of 78,700 MW has been set for the Eleventh Five-Year Plan[2] (11th FYP). In pursuance of this objective, the Ministry of Power has rolled out various initiatives like the Ultra Mega Power Projects (UMPPs) initiative. However, only about 28% of the target for capacity addition during the 11th Plan has been attained in the first three years of the Plan (22,301 MW of capacity has been commissioned by March 2010). While the gap in implementation can be ascribed to multiple factors, one of these factors -- availability of adequate financing, particularly during the global financial crisis – constitutes the scope of this Assignment.

The 2008-09 global financial crisis posed several challenges to the country through the contagion effects of the global financial markets. While on the financial side, the credit, money, equity and foreign exchange markets were impacted, on the trade side, there was a slump in exports owing to reduced demand in India's main overseas markets. The GDP and industrial growth were also impacted. Yet, the financial crisis did not have a substantial impact on India on account of a number of factors: a fundamentally strong macro-economy including prudent foreign debt management, substantial foreign exchange reserve cover, high savings rate, solid financial sector health, and proactive monetary policy management. The Government and Reserve Bank of India (RBI) undertook various fiscal and monetary measures to counter the impact of the global financial crisis. The country has witnessed a fast recovery in industrial and GDP growth from the second quarter of FY 2009-10.

Against this economic background, the assignment, commissioned by the World Bank (the Bank) under the Energy Sector Management Assistance Program (ESMAP)[3], intends to bring out the impact of the global financial crisis on investments in India's electric power infrastructure. CRISIL Risk and Infrastructure Solutions Limited ('CRIS'), a subsidiary of CRISIL Limited, India's leading Ratings, Research, Risk and Policy advisory company, has been mandated as consultants ('the Consultant') for the said assignment ('the assignment'). The detailed scope of work and the assignment limitations are placed at Annex 1.

[1] The Indian Financial Year (FY) starts on 1st April and ends on 31st March.

[2] Eleventh Five Year Plan period started on 1st April 2007 and ends on 31st March 2012.

[3] ESMAP is a global technical assistance program which helps build consensus and provides policy advice on sustainable energy development to governments of developing countries and economies in transition. ESMAP also contributes to the transfer of technology and knowledge in energy sector management and the delivery of modern energy services to the poor.

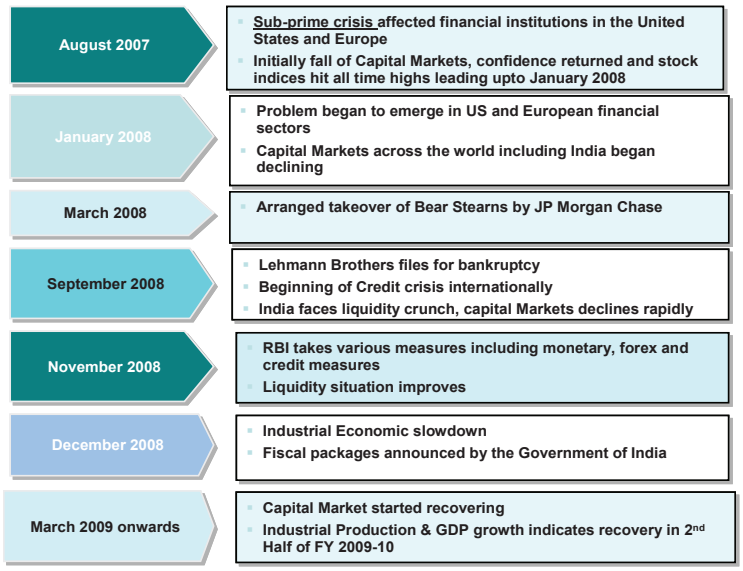
1.2 Objectives of the assignment

As per the Consultant's mandate, the primary objective of the assignment is to estimate the short- to medium-term funding gap in the power sector (electricity generation – both fossil fuel and renewable energy-based, transmission and distribution) either resulting from the 2008 financial crisis or predating the crisis. The findings from the study will shape the Bank's power sector support strategy in the country by mapping the different sources of financing available to the power sector, the effect of the financial crisis (if at all) on these sources, and the role that the Bank's relatively scarce resources can play to leverage private capital into the sector while also mitigating the risks from increasing dependence on global and domestic private investment. An important aspect of this study would be to focus on the impact of the financial crisis on power sector projects, as distinct from other policy, implementation and institutional capacity constraints that may already exist.

1.3 Focus Period for analysing the impact of Global Financial Crisis

Turbulence in the USA started with the sub-prime crisis around August 2007 and was further aggravated by the collapse of Lehman Brothers in the middle of September 2008, leading to a crisis of confidence in the financial markets. With the credit crisis in the international markets, the liquidity crunch was felt by the banking sector in India beginning September 2008. As the liquidity situation worsened, RBI started injecting liquidity into the system through its expansionary monetary policy and other measures aimed at forex liquidity and credit measures for industries. The liquidity situation started to improve from November 2008. However, events in the international markets and slowdown in the growth of the Indian economy led to risk averseness extending up to February 2009. This chronology of events leading up to the crisis and beyond is shown in Figure 1.

Figure 1: Chronology of events leading up to the crisis and beyond



Source: CRIS

Taking the above chronology of events into account, the period from September 2008 to March 2009 has been considered as the global financial crisis period in the context of the debt market for

the purpose of the present assignment. In the case of the equity markets, the assignment focuses on a longer period, i.e., from January 2008 till March 2009, as the equity markets were impacted during this period with the impact accelerating from September 2008.

1.4 About the India report

The India report is organized as follows:

Section 1: This section provides an introduction to the assignment and covers the background and objectives of the assignment.

Section 2: It gives the sectoral context of the electric power infrastructure sector and details out the evolution of India's power sector, including the key changes that have taken place over the last several decades; its regulatory and policy framework; institutional framework; and ownership structure of the electric power infrastructure sector including key players in various segments. It also covers the present status and key issues faced by each of the segments, i.e., electricity generation, transmission and distribution.

Section 3: It covers the analysis of the global financial crisis and its overall impact on India. It covers the impact on foreign investment flows and foreign exchange, capital markets, credit, trade, industrial growth and GDP growth. Further, it details out the measures taken by the Reserve Bank of India as well as the Government of India. The section is intended to give an overall perspective of the key changes happening at the economy level so as to establish a connect with the happenings in the electric power infrastructure sector.

Section 4: This is the main section, which covers the impact of the global financial crisis on investments in India's electric power infrastructure. The impact is covered under different segments of the sector. The analysis first covers the impact on funding sources, which is expected to be felt by all the segments of the sector. In addition to this, for each of the specific segments and select stakeholders, a separate analysis of impact has been carried out. This includes the impact on electric power generation (conventional sources), renewable energy generation, transmission, and distribution. The section ends with the synthesis of impacts and conclusion.

2. SECTORAL CONTEXT OF ELECTRIC POWER SECTOR IN INDIA

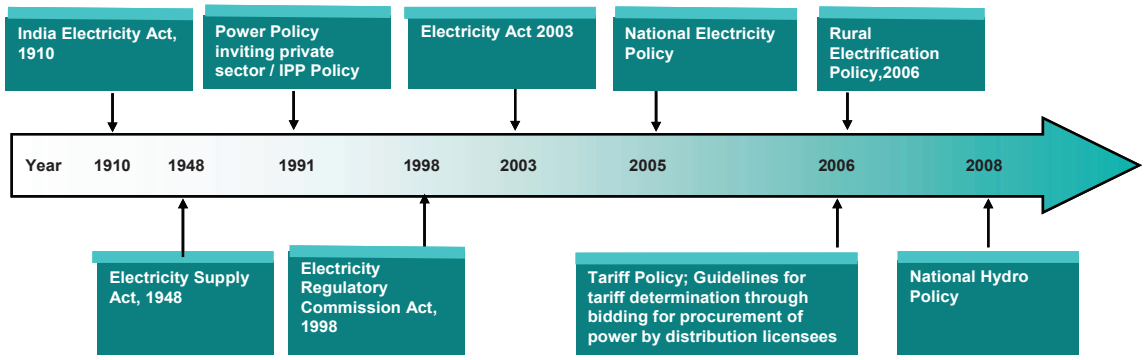
2.1 Evolution of India's Electric Power Infrastructure Sector

The Indian power sector has witnessed a rapid change over the last few years. The country's power sector is characterized by a massive demand-supply gap, dominant presence of state-owned utilities, un-electrified rural areas, delays in capacity addition, problems in securing fuel linkages, inefficiencies especially in network segments, a need for tariff rationalisation to address cross-subsidies, and weak financial health of state-level utilities. Aggressive capacity addition plans, growing role of private sector players, investments in rural electrification, measures to improve efficiency and customer orientation, and growing maturity of independent regulatory institutions are all set to change the face of the sector. These, coupled with market development measures like the formulation of competitive bidding guidelines; the government's initiative on Ultra Mega Power Projects (UMPP); structural measures to allow trading of power, rising quantum of traded power and the emergence of power exchanges; introduction of open access in transmission and distribution; all these have put the sector at the forefront of India's continuing reform agenda.

Post-independence, till about the end of the 20th century, the onus of developing the electricity sector rested on the state governments, more specifically the respective State Electricity Boards. Over a period of time, the performance of these Boards across India deteriorated due to the low tariffs charged by them in comparison with the cost of supply; high transmission and distribution losses; inefficient systems and process for revenue collection; commercial losses; etc. However, developments over the last decade or so, specifically after the enactment of the Electricity Act (2003) have led to the creation of significant investment interest among the private sector investors.

The figure below shows the timeline of key policy, legislative and regulatory developments in India's power sector.

Figure 2: Evolution of India's Electric Power Infrastructure



Source: CRIS

Some of the significant developments are highlighted below:

- In 1998, the Electricity Regulatory Commission Act was enacted. It led to the creation of the Central Electricity Regulatory Commission (CERC) and allowed state governments to create State Electricity Regulatory Commissions. Besides protecting consumer interest, these regulatory commissions brought in a check on the performance of utilities and provided an open forum for involving the public in tariff determination, framing of regulations, etc.

- In June 2003, a new self-contained comprehensive legislation, the Electricity Act 2003 (EA 2003), was introduced. The enactment of EA 2003 paved the way to undertake comprehensive market reforms in the electricity sector. Some of the key changes that marked the sector after the enactment of EA 2003 are given below:

  i. The sector has been significantly opened up through mandatory unbundling, and the creation of independent regulatory commissions.

  ii. EA 2003 provided for the introduction of open access (non-discriminatory access for the use of transmission and distribution system); multi-year tariff approvals (for certainty in tariff); extension of Availability-Based Tariff (bringing about more responsibility and accountability in power generation and consumption through a scheme of incentives and disincentives) within the state; compulsory metering; and declaration of electricity theft as a criminal offence.

  iii. To promote competition, it de-licensed generation, permitted power trading with license, and created a framework for market development.

- Competitive Bidding Guidelines – Competitive procurement of electricity by the distribution licensees is intended to reduce the overall cost of procurement of power and facilitate the development of power markets[4].

- Ultra Mega Power Projects (UMPP) – The Government of India has proposed the development of thirteen UMPPs of about 4,000 MW capacity each under Case-II of the competitive bidding guidelines of procurement of power by distribution licensees. These plants have been/will be awarded to developers on a BOO (Build-Own-Operate) basis and will be coal-based and will use highly efficient super-critical technology. Being large in size (4,000 MW capacity), the projects will meet the power needs of a number of states through the transmission of power on both regional and national basis. Four such projects have already been awarded.

[4] For procurement of power by distribution utilities under tariff-based competitive bidding (wherein the bid criteria is levelized tariff), as per the competitive bidding guidelines, the Ministry of Power has suggested two options known as Case I and Case II. In Case I, bidders are expected to offer capacity at the pre-identified delivery point from any of their existing / planned power projects. In Case II, the bid is for development of project of particular capacity at a pre-identified site and then supply of electricity to the state utility with state utility taking responsibility of land acquisition, clearances , fuel linkage, etc.

A detailed note on evolution of India's electric power infrastructure has been placed at Annex 2.

2.2 Regulatory & Policy Framework

EA 2003 and consequent regulations have resulted in major structural reforms across the power value chain. The key changes that EA 2003 has effected in the industry are shown in the table below.

Table 1: Key Changes emanating from the EA 2003

Area	Key Policy / Regulatory Parameters
Generation	▪ Does not require any licensing or state govt. approval for setting up the plant leading to much faster implementation[5]. ▪ Freedom to construct, operate and maintain Captive Power Plant. ▪ The tariffs for sale only to regulated utilities are under the jurisdiction of appropriate regulators. The tariffs for captives and open access entitled customers can be set based on mutual negotiation.
Transmission	▪ All transmission entities have to provide non-discriminatory open access to all market participants. ▪ Transmission licensees are barred from participating in trading activities and vice versa, thus ensuring non-discriminatory treatment in an open access scenario.
Distribution	▪ All future power procurement by distribution licensees shall be executed on the basis of competitive tariff-based bidding. ▪ Parallel networks have been allowed to be set up. ▪ Regulated utilities have been allowed to purchase from a generator/trader of their choice. ▪ Consumers with more than 1 MW load are allowed open access. ▪ The retail tariffs are to be rationalized in a phased manner with transparent subsidy payment.
Trading	▪ Trading has been made a licensed activity. ▪ Power exchanges have been created.

The most significant reform initiative under EA 2003 is the move towards a multi-buyer, multi-seller system as opposed to the traditional structure, which permits only a single buyer to purchase power from generators.

There are no foreign direct investment restrictions on this sector; projects can be planned across the value chain with 100% equity participation from foreign private investors.

[5] It may be noted that, in the case of hydroelectric projects, for capital expenditure exceeding certain limits, concurrence from CEA is needed. The capital expenditure limit is (i) Rs 2500 crore (1 crore = 10 million), provided that (a) the scheme is included in the National Electricity Plan as notified by CEA and confirms to the capacity and type; (b) the site for the generating station has been allocated through the transparent bidding process in accordance with the guidelines issued by the Central Government; (ii) Rs 500 crore for any other scheme not covered in (a) and (b) above.

The National Electricity Policy was notified in 2005 with the objective of providing access to electricity to all households over the next five years and meeting the power demand fully by 2012.

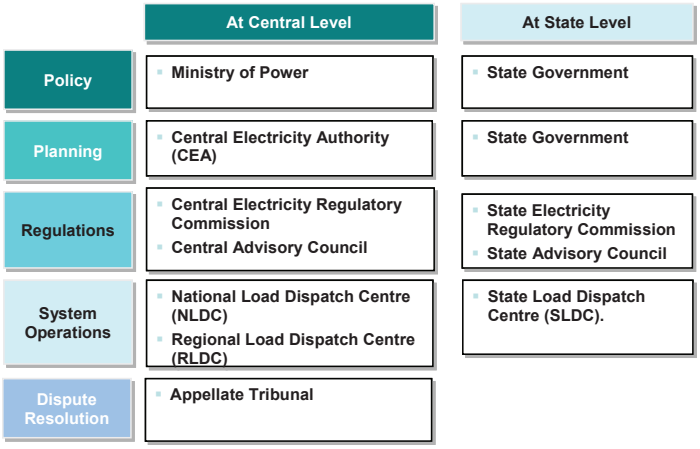
The Tariff Policy, 2006 provides guidelines to regulators for fixing tariffs for generation, transmission and distribution. Among other things, it has made it mandatory for distribution licensees to procure power through competitive bidding except in cases where a state-owned company has been identified as the developer. Further, to improve the competitiveness of industrial and commercial tariffs, it suggests bringing down the cross-subsidy progressively at a linear rate, to a maximum of 20% of its opening level by FY 2010-11.

A summary of the key regulations and policies in the Indian electricity sector is given in Annex 3.

2.3 Institutional Framework

Electricity is a concurrent subject in India, i.e., it is under the jurisdiction of both the central (federal) and state (provincial) governments. This means that both the governments have powers to legislate on the subject. Figure 3 below depicts the institutional structure at the central and the state levels. At the central level, while the Ministry of Power is responsible for the policy-related aspects of the sector, the overall sector planning has been entrusted to the Central Electricity Authority (CEA). The regulatory aspects of the sector involving more than one state are addressed by the Central Electricity Regulatory Commission. State Electricity Regulatory Commissions (SERC) take care of the same at the state level. In line with the philosophy of a national grid, the National Load Dispatch Centre (NLDC) and the Regional Load Dispatch Centres (RLDC) are envisaged as system operators at the national and regional networks, with each state housing a State Load Dispatch Centre (SLDC).

Figure 3: Institutional Structure of India's Electric Power Infrastructure



Source: CRIS Analysis

2.4 Ownership Structure in India's Electric Power Infrastructure Sector

Currently, the power sector in India is dominated by government-owned and operated utilities. The state and Central Government-owned utilities account for 50% and 32% of the total electricity generation capacity respectively, while the private sector accounts for about 18%.

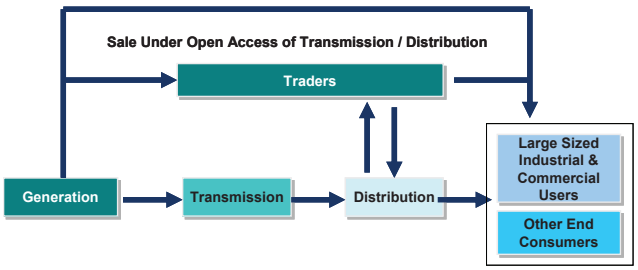
India has robust electricity-generating companies like NTPC and NHPC which are substantially owned by the Government of India and which focus on thermal and hydel power generation respectively. These entities are known to have strong balance sheets and they resort to balance-sheet financing (as opposed to limited/non-recourse project finance preferred by the private sector) as their preferred mode of financing.

The generation segment of the sector has witnessed the maximum interest from private sector players. Private player interest is largely dominated by Indian companies. A few multinational players like CLP and AES figure in the market, but their generation capacity is limited. Since the enactment of EA 2003 and consequent relative ease in obtaining financing, private sector interest has continued to grow. India has, over the years, built a good private developer base. Not only do private sector companies in power/ infrastructure sectors continue to show interest, but companies in other sectors including core and non-core sectors have also displayed interest in investing in the power sector.

The bulk of the transmission and distribution utilities are owned and operated by government-owned entities. At the central level, Power Grid Corporation of India Limited (PGCIL), substantially owned by the Government of India, focuses on inter-state and inter-regional transmission. PGCIL too is known for its strong financial profile and its ability to finance investments, leveraging its strong balance sheet. State government-owned transmission and distribution entities dominate the state level transmission and distribution segments. These entities do not enjoy the financial strength of PGCIL. The private sector has a relatively small presence in distribution and is making an entry into transmission. Opportunities for private players in the form of joint ventures or Independent Power Transmission Companies (IPTCs) are emerging in the electricity transmission segment. Similarly, distribution franchising offers investment opportunities for the private sector in the electricity distribution segment. Most of the traded power is through PTC or NVVN, though there are over 20 private sector licensed traders in the country.

The following chart outlines the flow of electricity in the industry.

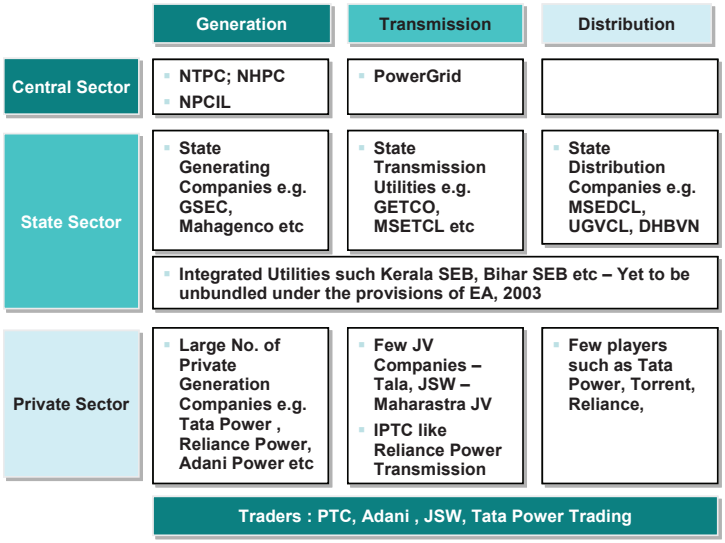
Figure 4: Flow of electricity



Source: CRIS

The following chart depicts various players in India's electricity sector.

Figure 5: Key Players in the Electric Power Infrastructure Sector



Source: CRIS Analysis

Going forward, for India to achieve its targeted annual GDP growth of 8-9%, adequate electricity supply will be crucial. According to the 17th EPS[6], it is expected that energy requirement and peak electricity demand in India will increase at a CAGR of 7% and 7.2% respectively over the next 15 years. The target to increase the per capita consumption of electricity in India from the current level of 704 kWh/year to 1,000 kWh/year by March 2012, will also require investment in new electricity generation capacity.

Irrespective of the expected growth in demand for electricity in the coming years, significant capacity additions need to be made even to bridge the current demand-supply gap. The 17th EPS, which was published in March 2007, has further raised the earlier estimates and projected that the peak electricity demand in FY 2016-17 will grow to almost double the peak electricity demand recorded in FY 2005-06. The peak demand is expected to be 218,209 MW in FY 2016-17 compared to 97,269 MW in FY 2005-06.

[6] Electric Power Survey by Central Electricity Authority (CEA) forecasts state-wise demand of electricity for the purpose of overall planning by the Ministry of Power, Govt. of India

2.5 Present Status of Electric Power Infrastructure

2.5.1 Electricity Generation

Growth of the power sector infrastructure in India since 1947 has been noteworthy, making India the third largest producer of electricity in Asia and the fifth largest in the world. Generating capacity has grown 117 times from 1.36 GW in 1947 to over 159 GW as on 31st March, 2010. Notwithstanding this significant achievement, India is still suffering from energy deficit.

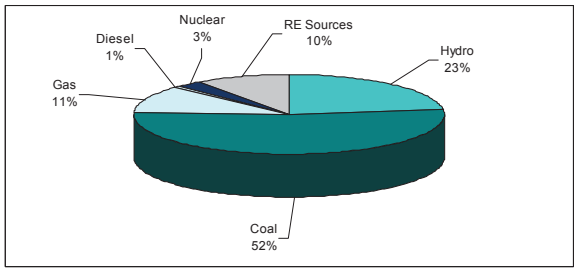
The present installed generation capacity in the country stands at about 159 GW[7]. Electricity Generation stood at about 746 TWh in FY 2009-10. Table 2 and Figure 6 below present the sector-wise and fuel-wise break up of the installed generation capacity. As is evident close to 64% of total installed capacity is from thermal sources - predominantly coal, hydro contributes 23% to the total installed capacity and the country garners the balance 13% from nuclear and renewable energy (RE) sources.

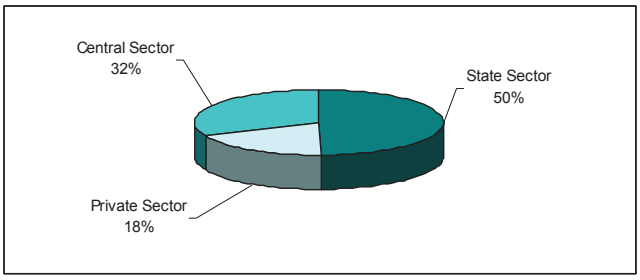
Table 2 : Details of Installed Capacity (as on 31st March, 2010)

In MW	Hydro	Coal	Gas	Diesel	Nuclear	RE Sources	Total MW
State	27,065	44,977	4,046	603	-	2,701	79,392
Private	1,233	8,056	6,306	596	-	12,820	29,011
Central	8,565	31,165	6,702	-	4,560	-	50,993
Total	**36,863**	**84,198**	**17,054**	**1,199**	**4,560**	**15,521**	**159,395**

Source: Central Electricity Authority

Figure 6: Fuel-Wise & Sector-wise Installed Capacity (as on 31st March, 2010)



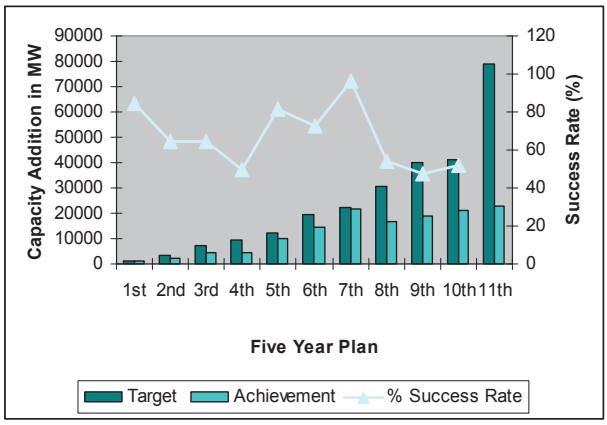


Source: Central Electricity Authority

The actual generation capacity addition has been low compared to the planned capacity addition in the past. The generation projects face issues due to delay in the acquisition of land, lack of adequate equipment manufacturing capacity in the country, difficulties in obtaining long-term fuel supply, difficulties in getting adequate water supply, delays in getting clearances and permits such as environmental and forest clearance, etc. Figure 7 below shows the planned versus actual capacity additions achieved during various Plan periods.

[7] as on 31st March 2010 (Source: CEA)

Figure 7: Target vs Actual Capacity Addition during Plan Periods



Note: Achievement during the 11th Plan refers to the period 2007-10.
Source: Central Electricity Authority

2.5.2 Demand-Supply Position

There is a severe energy deficit in the country. The following table summarizes the demand-supply situation in the country over the last five years.

Table 3: Trend in Demand-Supply Position

	Peak Demand (MW)	Peak Met (MW)	Peak Deficit / Surplus (%)	Energy Requirement (MU)	Energy Available (MU)	Energy Deficit / Surplus (%)
2005-06	93,255	81,792	-12.3%	631,757	578,819	-8.4%
2006-07	100,715	86,818	-13.8%	690,587	624,495	-9.6%
2007-08	108,866	90,793	-16.6%	739,345	666,007	-9.9%
2008-09	109,809	96,685	-12.0%	774,324	689,021	-11.0%
2009-10	118,472	102,725	-13.3%	830,300	746,493	-10.1%

Source: Central Electricity Authority

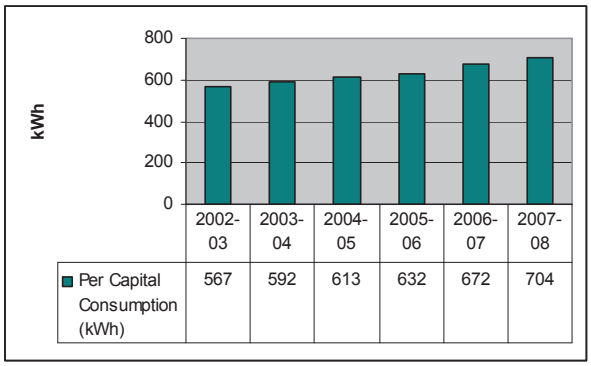
Thus presently the country faces about 13.3% of peak power shortage and about 10.1% energy deficit. Due to growing demand and slow pace of capacity addition, the energy deficit has persisted over the years.

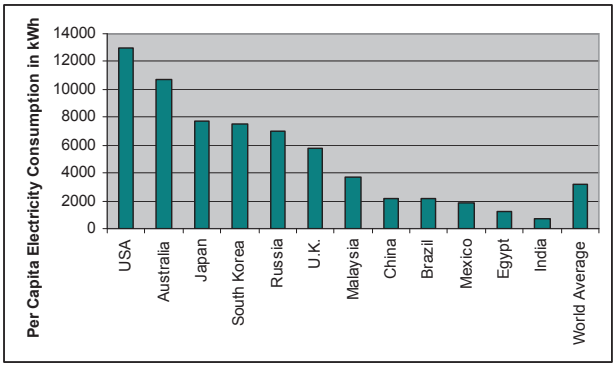
2.5.3 Consumption

According to the Eleventh Five-Year Plan document, India is the world's fifth largest energy consumer, accounting for 3.45% of global energy consumption. However, the per capita consumption of electricity of 704 kWh in India is quite low as compared to the global average of 3,240 kWh. The per capita electricity consumption of major developed nations and other major emerging economies is given below.

About 83.9% of the villages in India have been electrified as on 31 March, 2010. The National Electricity Policy envisages 'Power for all by 2012' and per capita availability of power to increase to over 1,000 kWh by FY 2011-12.

Figure 8: Trend of per capita electricity consumption in India





Source: Central Electricity Authority

2.5.4 Renewable Energy Generation

Over the last few years, there has been an increased focus on the exploitation of renewable energy sources in the light of environmental conservation and India's energy security needs. Although for a considerable time, generation from renewables has remained costlier than that from conventional power projects, it is gradually becoming competitive. Investments in renewables have been promoted through numerous policy incentives, which include:

- Preferential Tariffs
- Mandatory Purchase Obligations
- Accelerated Depreciation
- Incentive for Grid-Connected Power (Solar PV, Solar Thermal, Wind)

The following table outlines the potential and actual exploited potential for renewable energy sources.

Table 4: Renewable Energy Sources – Potential and Actual

Renewable Energy Resource	Estimated Potential	Installed Capacity (As on March 31, 2010) in Grid Connected application
Wind Power	45,195 MW	11,807 MW
Bio-Mass	16,881 MW	866 MW
Small Hydro	15,000 MW	2,735 MW
Co-generation Baggase	5,000 MW	1,334MW
Solar Energy	50 MW/ sq km for Solar PV, 140 Million sq m Collector Area for Solar Thermal	10 MW
Waste to Energy	2,700 MW	65 MW

Source: Ministry of New and Renewable Energy

2.5.5 Transmission

Currently, India has a transmission and distribution network of 6.78 million circuit kilometres which is the third largest in the world. In India, the power transmission and distribution (T&D) system is a three-tier structure, comprising distribution networks, state grids and regional grids. The distribution networks are owned by distribution licensees and the state grids are primarily owned and operated by the respective state transmission utilities. In order to facilitate the transmission of power among the neighbouring states, state grids are interconnected to form regional grids.

Most of the inter-state transmission links are owned and operated by Power Grid Corporation of India Limited (PGCIL). PGCIL also owns and operates many inter-regional transmission lines (forming a part of the national grid), in order to primarily facilitate the transfer of power from a surplus region to a deficit region. The regional grids are being gradually integrated to form a national grid, enabling interregional transmission of power and thereby facilitating optimal utilization of the national generating capacity. The geographical distribution of the primary sources of power generation in the country is uneven. Hydro potential is based mainly in the northern and north-eastern states and coal is primarily located in the eastern part of the country. The development of a strong national grid has become a necessity to ensure optimal supply of power to all.

Transmission capacity in India, above the 220 kV level, has reached nearly 200,000 circuit kilometers (ckm). Transformer capacities at 400 kV level and at 220 kV level at the end of February 2010 were 95,710 MVA and 127,416 MVA respectively. The length of the HVDC lines at the end of February 2010 was 7,447 ckm. Inter-regional transmission capacity as on 31st March 2009 was 20,750 MW. Despite recent capacity additions, sourcing of power by deficit regions continues to pose problems. While generation surpluses are available in the eastern region, the western region faces a high power deficit. However, there are no significant flows of electricity between regions owing to the non-availability of transmission capacity. The table below provides details of existing and planned inter-regional transmission capacity.

Table 5: Existing and Planned Inter-Regional Transmission Capacity

Region	Capacity in MW as on March'09	Addition in 11th Five Year Plan (Balance)	Total Target Capacity in MW at the end of 11TH Five Year Plan
EAST-NORTH	6,330	5,800	12,130
EAST-WEST	2,990	3,500	6,490
WEST- NORTH	4,220	0	4,220
EAST-SOUTH	3,630	0	3,630
WEST-SOUTH	1,720	1,000	2,720
EAST- NORTH EAST	1,260	1,600	2,860
NORTH EAST –NORTH	0	6,000	6,000
Various 132kV inter-regional links	600	0	600
Total	**20,750**	**17,900**	**38,650**

Source: 11th Five Year Plan

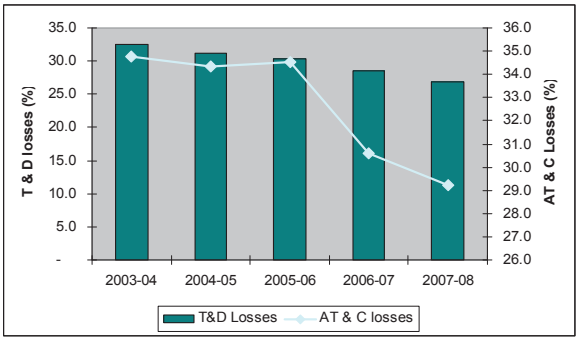
The Ministry of Power (MoP) has envisaged the establishment of an integrated national power grid in the country by the year 2012. The program envisages addition of over 60,000 ckm of transmission network in a phased manner by 2012. The integrated grid shall evacuate additional 100,000 MW and

carry 60% of the power generated in the country. The existing inter-regional transmission capacity connects the northern, eastern, north-eastern and western regions in a synchronous mode and the southern region asynchronously. The inter-regional power transmission capacity is expected to be further augmented to 38,650 MW by 2012.

2.5.6 Distribution

Power distribution is a critical link between power generation, power transmission, and end users of power. Improvement of commercial viability and operational performance of distribution segment has been in focus. Significant improvements have been made in the distribution sector so far. However, it continues to be the weakest link in the electricity value chain with high transmission and distribution (T&D) losses. The aggregate technical and commercial (AT&C)[8] losses stood at 29% and range from 15.7% to 46.7% for different states as per the latest PFC report on the performance of state power utilities. The primary reasons for high AT&C losses relate to obsolete infrastructure and unaccounted-for usage of electricity at the last mile.

Figure 9: Trend in Energy Losses

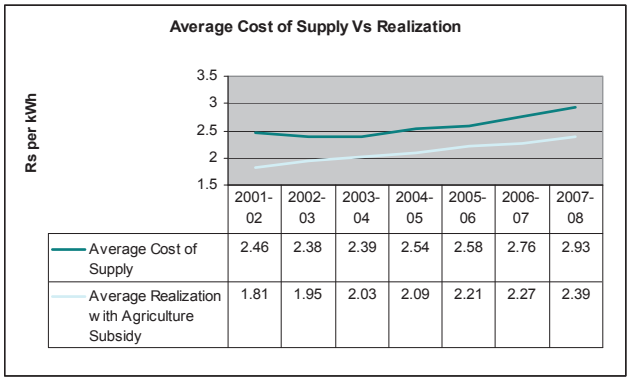


Source: Central Electricity Authority, Power Finance Corporation Annual Report on Performance of State Power Utilities 2007-08

The retail consumer tariffs are not reflective of the cost of service. Industrial tariff is still high and agricultural tariff (accounting for about 25 percent of consumption) is well below the cost of service, as are the residential/domestic tariffs. The number of hours and quality of supply, particularly in rural areas, is low and there is planned and unplanned load shedding in various consuming areas. Even states that are more advanced than others in terms of electricity reforms continue to report significant un-metered electricity supply. This is an important area for the sector to work upon, as lack of operational improvements by distribution utilities and their inability to reduce AT&C losses, raise a question mark on the credit-worthiness and commercial viability of the sector. The charts below provide the average cost of supply vs. realisation for distribution utilities and revenue gap experienced by them.

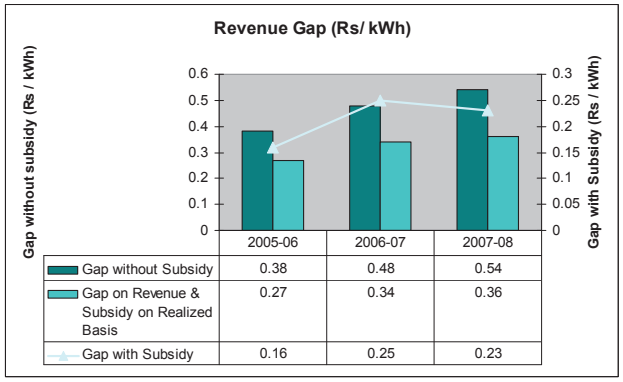
[8] AT & C loss is the difference between energy input units into the system and the units for which the payment is collected. This term was introduced to capture losses on account of non-realization of payments. The formula for AT & C loss calculation is: AT & C loss = (Energy Input – Energy Realized) * 100/ Energy Input; where Energy Realized = Energy Billed * Collection Efficiency and Collection Efficiency = (Amount Realized / Amount Billed)*100

Figure 10: Average Cost of Supply Vs. Realization



	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
Average Cost of Supply	2.46	2.38	2.39	2.54	2.58	2.76	2.93
Average Realization with Agriculture Subsidy	1.81	1.95	2.03	2.09	2.21	2.27	2.39

Figure 11: Revenue Gap of Utilities

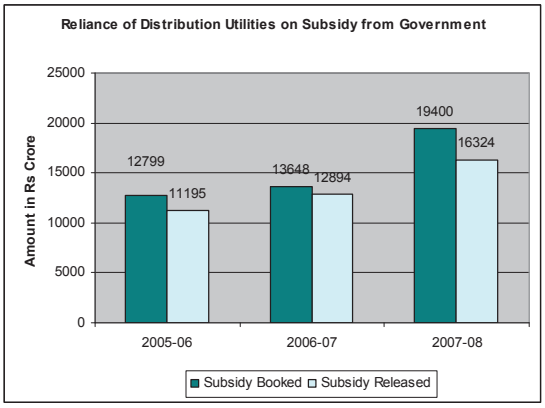


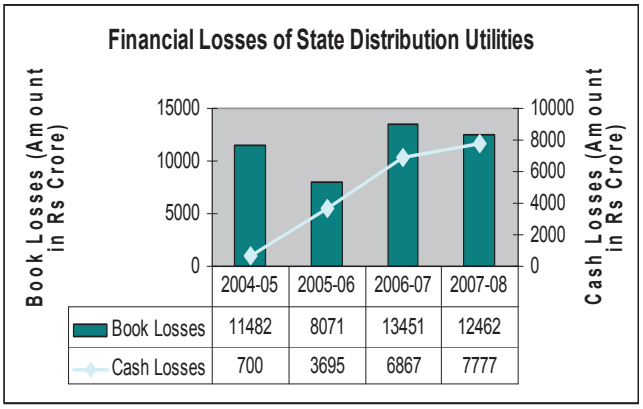
	2005-06	2006-07	2007-08
Gap without Subsidy	0.38	0.48	0.54
Gap on Revenue & Subsidy on Realized Basis	0.27	0.34	0.36
Gap with Subsidy	0.16	0.25	0.23

Source: Power Finance Corporation Annual Report on Performance of State Power Utilities 2007-08

While some states have rolled back free power to agriculture, others continue to offer low-priced or free power to the agriculture sector, resulting in heavy financial losses for the state distribution utilities. The distribution utilities continue to rely on government subsidies. According to the latest report on the performance of state power utilities compiled by the Power Finance Corporation, the total book losses of all the state power utilities in the country remain substantial at Rs. 12,462 crore in FY 2007-08. The charts below give details of the dependence of state distribution utilities on state government subsidies, and book/cash losses incurred by them. The book losses include revenue and subsidy on accrual basis whereas cash losses include revenue and subsidy on realized basis.

Figure 12: Trend of Subsidy by Government and Financial Losses of State Distribution Utilities





	2004-05	2005-06	2006-07	2007-08
Book Losses	11482	8071	13451	12462
Cash Losses	700	3695	6867	7777

Source: Power Finance Corporation Annual Report on Performance of State Power Utilities 2007-08

As a result of high AT&C losses and historically weak financial health of distribution utilities, investments in the distribution sector have been relatively low and growth and maintenance of distribution systems in India has been poor.

Thus, enhancing the financial health of distribution entities is a key priority for India's power sector if the desired quantum and pace of investments in the sector is to be sustained.

2.6 Implementation of open access at transmission and distribution level

While introduction of competitive bidding for procurement of power by distribution entities has created competition for the market in the power sector, implementation of open access at transmission and distribution levels holds the key to the development of dynamic competition in the power market which would allow the end consumers to choose their supplier. EA 2003 provides for the introduction of open access regulation by the regulatory commissions. CERC and various SERCs have introduced regulations to facilitate open access, but their ground-level implementation continues to remain woefully short of expectations. This is primarily on account of the cascading effect of transmission and distribution wire charges; impact of cross-subsidy surcharge and additional charges; and an absence of truly independent functioning of state load dispatch centres. Not only is open access relevant for the introduction of competition, but it is also critical to attract investments in generation as it signals access to viable and attractive markets and decides the value of generation investments. It is only through the increased scale and pace of generation investments that the country can attain reasonable balance of demand and supply and look forward to the onset of healthy competition in the sector.

2.7 Financing challenges in Electric Power Infrastructure

India's ambitious capacity addition plans across the electricity value chain calls for massive investments. The private sector is already playing an important role in capacity addition program in generation. It is expected that private sector interest in transmission investments will grow in the coming years. With models for private participation in distribution gradually evolving, the private sector could play an important role in the distribution segment too. Limited or non-recourse project-finance is the preferred mode of financing by the private sector. Unlocking constraints in securing such financing holds the key to achieving the desired scale of private sector investments in the sector. Some of the key constraints relating to project finance for the power sector include:

- Challenges faced by larger projects in attaining financial closure (especially the ultra mega power projects);
- Shorter than desired tenor of debt relative to the length of power purchase agreements/contract periods, leading to higher cost of service delivery;
- Interest rate risk exposure;
- Constraints on the banking system (which has been the mainstay for financing independent power projects) arising from the group and sector exposure norms and ALM issues;
- Limited role played by insurance companies and pension funds, relative to their potential to finance infrastructure sectors;
- Relatively small role of bond financing in financing of power projects;
- Limited interest by international developers; and
- Difficulties faced in raising equity especially during difficult market conditions such as those witnessed during the global financial crisis.

2.8 Realizable Pipeline and Debt Funding Gap

A detailed analysis of realizable pipeline of projects and the availability of debt funding over the period FY 2010-11 to FY 2014-15, indicates that the sector is expected to face a substantial debt

funding gap amounting to about Rs. 543,700 crore (about US$ 121 billion), which constitutes about 48% of the total debt funding requirement. The estimated debt funding gap for FY 2010-11 to FY 2014-15 is given in the table below.

Table 6: Estimated Debt Funding Gap

Amount in Rs Crore	2010-11	2011-12	2012-13	2013-14	2014-15	Total
Total Availability of Debt for power sector	70,849	90,065	110,041	143,019	186,324	600,298
Debt Requirement for power sector	158,375	199,239	269,724	277,508	239,116	1,143,962
Gap between Estimated Availability of Debt and Requirement of Debt	(87,526)	(109,175)	(159,682)	(134,489)	(52,793)	(543,665)

Source: CRIS Analysis

The detailed approach, methodology, and assumptions for arriving at the above funding gap is at Annex 4 of this Report.

2.9 Outlook

India's buoyant economy and large deficits in generation capacity and network infrastructure will drive future growth in the power sector. Capacity additions and efficiency improvement plans offer tremendous opportunities for investments across the value chain in the sector. The Electricity Act 2003 and subsequent policy and regulatory developments have created the right environment for attracting such massive investments. Given the country's large coal reserves, coal will continue to remain the preferred fuel for power generation. India is certainly adopting more efficient generation and network technologies, laying adequate emphasis on renewable sources of energy, and encouraging efficiency in end-use of electricity to reduce the carbon intensity of its economic growth while enhancing the sustainability of its development.

Recent developments such as the selection of private developers for setting up generation projects through competitive bidding (including developers for UMPPs); ongoing development and construction of generation projects; prospects of the country achieving record capacity addition during the Eleventh Five Year Plan period; initial interest shown by private sector in transmission projects; evolution of new business models for private participation in distribution; and the increasing level of trading activity have brought a sense of optimism in the sector.

However, the sector has to still tackle some important issues such as tariff rationalisation; transparent administration of subsidies; enhancing efficiency and commercial viability of distribution entities; enhancing efficacy of open access; and removing impediments to ensure speedy implementation of generation projects. But progress is being made and further reforms at both central and state level would address many of the above concerns and thereby enable continued growth in sustainable investments in the sector.

3. GLOBAL FINANCIAL CRISIS AND ITS OVERALL IMPACT ON INDIA

This section details the overall impact of the global financial crisis on the Indian economy and highlights the measures taken by the central government and the central bank (Reserve Bank of India, RBI) to mitigate the impact of the crisis on the Indian economy.

The sub-prime crisis that surfaced around August 2007 affected financial institutions including investment banks, private equity, and hedge funds in the United States and Europe. The collapse of Lehman Brothers in the middle of September 2008 further aggravated the situation leading to a crisis of confidence in the financial markets. The associated uncertainty had a cascading effect and culminated in a full-blown financial crisis that impeded the prospects of an early recovery in the international markets.

3.1 Impact of the Global Financial Crisis on India

The impact of the global financial crisis on India can be broadly summarized as below.

3.1.1 Foreign Investment Flows

Post the fall of Lehman Brothers in September 2008, Foreign Institutional Investors (FIIs) started unwinding their investments in a significant manner. FII investment, which was about US $ 20 billion in FY 2007-08, turned negative US $ 15 billion in FY 2008-09. Foreign Direct Investment, which had shown significant growth in recent years, remained almost at the same level as in FY 2007-08, due to the impressive growth achieved in H1 of FY 2008-09.

Despite the substantial liberalization measures by RBI, external commercial borrowings (ECBs) reduced to some extent during the second half of FY 2008-09 and the first half of FY 2009-10.

The reversal of capital flows, caused by the global de-leveraging process put pressure on the forex market. This resulted in the rapid depreciation of the Indian Rupee after September 2008, in line with the movement of the dollar against other currencies during this period.

3.1.2 Capital Markets

The stock market started declining from January 2008, and till September 2008, just prior to Lehmann filing for bankruptcy, Bombay Stock Exchange (BSE) Index lost 33% of its peak January 2008 value. However, post-September 2008, the Bombay Stock Exchange (BSE) index went down by a further 40%, following a sharp decline in stock markets across the world, shift in international investors' preferences, and resultant withdrawal of portfolio investments. The capital market has however started recovering since March 2009.

The years prior to the crisis had been particularly good for the primary capital market. However, during FY 2008-09, resources mobilized through the primary market came down substantially.

3.1.3 Credit

As the external (foreign) sources of credit for companies were drying up in the wake of the global financial crisis, there was a sharp increase in domestic credit during April–October 2008. The increase seems to be due to the substitution effect. However, towards the later part of FY 2008-09, credit growth declined due to a slowdown in the economy in general and the industrial sector in particular. On a full year basis, bank credit growth fell from 22.3% in FY 2007-08 to about 17.5% during FY 2008-09.

3.1.4 Trade

The adverse effect of the global financial crisis was also felt on exports on account of a fall in global demand as well as drying up of international financing and trade credit. Growth in export was robust till August 2008. However, in September 2008, export growth witnessed a dip and turned negative in October 2008. The beginning of FY 2009-10 saw acceleration in the fall of exports with a further deepening of the global recession. While the export growth rate was (-) 22.3% in April–November 2009, it became positive at 18.2% in the month of November 2009.

Import growth was also affected by the global recession though with a slight lag. It declined from October 2008 and was negative for the period up to December 2009.

3.1.5 Industrial growth

Industrial growth, especially manufacturing, was adversely affected by the global financial crisis. On a quarter-to-quarter basis, there were sharp reductions in growth in Q2, Q3 and Q4 of FY 2008-09. Growth declined to about 1% in the second quarter of FY 2008-09.

3.1.6 GDP growth

The global financial crisis and the consequent economic recession in developed economies have contributed to the economic slowdown in India. Economic growth decelerated in FY 2008-09 to 6.7%, representing a decline of 2.1 percentage points from the average growth of 8.8% in the previous five years, i.e., FY 2003-04 to FY 2007-08.

Due to various measures taken by RBI and the Government, monetary as well as fiscal, over a span of a year, the economy posted a remarkable recovery, not only in terms of overall growth but more importantly in terms of its broad-based character. In the second quarter of 2009-10, the economy grew by 7.9% (advance estimates by Central Statistical Organization).

3.2 India's Response to the Global Financial Crisis

3.2.1 Measures by Reserve Bank of India (RBI)

The outflow of foreign exchange, as a fall-out of the *Crisis*, led to a tightening of liquidity in the domestic market. This, coupled with the virtual freezing of international credit, required RBI to change its monetary stance in the second half of FY 2008-09. RBI responded by facilitating

monetary expansion through a decrease in CRR[9], repo[10] and reverse repo rates[11], and the statutory liquidity ratio (SLR)[12]. The repo rate was reduced by 400 basis points in five tranches from 9% in August 2008 to 5% in March 2009. The reverse repo rate was lowered by 250 basis points in three tranches, from 6% in November 2008 to 3.5% in March 2009. The repo and reverse repo rates were subsequently reduced by 25 basis points each, from April 2009 onwards. SLR was lowered by 100 basis points with effect from November 2008 and CRR was lowered by 400 basis points in four tranches from 9% in August 2008 to 5% in January 2009.

In addition to the above, following measures, aimed at managing forex liquidity, were also taken:

- upward adjustment of the interest rate ceilings on the foreign currency non-resident (banks) [FCNR(B)] and non-resident (external) rupee account [NR(E)RA] deposits;
- substantial relaxation in the external commercial borrowings (ECB) regime;
- allowing the NBFCs and HFCs access to foreign borrowing; and
- allowing corporates to buy back foreign currency convertible bonds (FCCBs) to take advantage of the discount in the prevailing depressed global markets.

The RBI also instituted a rupee-dollar swap facility for banks with overseas branches to give them comfort in managing their short-term funding requirements. To provide support to the construction sector, developers were permitted to raise ECBs for integrated township projects.

The above monetary measures were supplemented with sector-specific credit measures for export, housing, micro and small enterprises, and infrastructure.

3.2.2 Fiscal measures

Over the last few years, both the central and state governments were making efforts to contain fiscal deficit as per the roadmap in the Fiscal Responsibility and Budget Management (FRBM) Act. This was relaxed to deal with the *Crisis* and two fiscal stimulus packages were announced in December 2008 and January 2009. These fiscal stimulus packages together amounted to about 3% of the GDP and included additional public spending, particularly capital expenditure, government-guaranteed funds for infrastructure spending, cuts in indirect taxes, expanded guarantee cover for credit to micro and small enterprises, and additional support to exporters.

[9] CRR refers to the liquid cash that banks have to maintain with Reserve Bank of India as a certain percentage of their demand and time liabilities.

[10] Repo (Repurchase) rate is the rate at which the RBI lends shot-term money to the banks.

[11] Reverse Repo rate is the rate at which banks park their short-term excess liquidity with the RBI.

[12] SLR is the amount which a bank has to maintain in the form of cash, gold or approved securities. The quantum is specified as some percentage of the total demand and time liabilities of a bank. This percentage is fixed by RBI.

3.3 India's resilience and bounce-back

India's resilience in dealing with the global financial crisis and its relatively quicker bounce-back are attributed to many factors: a fundamentally strong macro-economy including prudent foreign debt management, substantial foreign exchange reserve cover, high savings rate, solid financial sector health, and proactive monetary policy management. Some of these are structural reasons whereas others relate to swift measures taken by the Government of India and the Reserve Bank of India.

RBI's prudent regulation of India's banking sector ensured that India's banking sector was relatively unaffected by the sub-prime crisis as well as the asset price bubbles which developed in the domestic economy. Similarly, RBI's effective and timely use of monetary policy instruments in terms of changes in CRR, SLR, Repo and Reverse Repo rates, ensured that liquidity problems did not last long and the cost of credit also came down to pre-*Crisis* levels in a relatively short span of time.

In temporarily departing from the stipulated path of fiscal deficit reduction under FRBM, the Government showed its commitment to a long-term growth vision for the country. Bold stimulus measures taken by the Government ensured that the country continued its economic growth, even when many of the developed countries were registering negative growth. Specific measures taken by the GoI also ensured that segments of the economy, most affected by the *Crisis*, received the necessary support to mitigate the impact. India's large rural economy is also believed to have helped the country mitigate the impact. Many of the Government actions during this period played a crucial role in restoring people's confidence and improving investment sentiment relatively quickly. Overall, emphasis on increased government spending in asset creation also augured well for the infrastructure sectors and ensured continued implementation of the infrastructure investment agenda.

Detailed analysis of overall impact of the global financial crisis on India is at Annex 5.

4. IMPACT OF GLOBAL FINANCIAL CRISIS ON INVESTMENTS IN INDIAN ELECTRIC POWER INFRASTRUCTURE

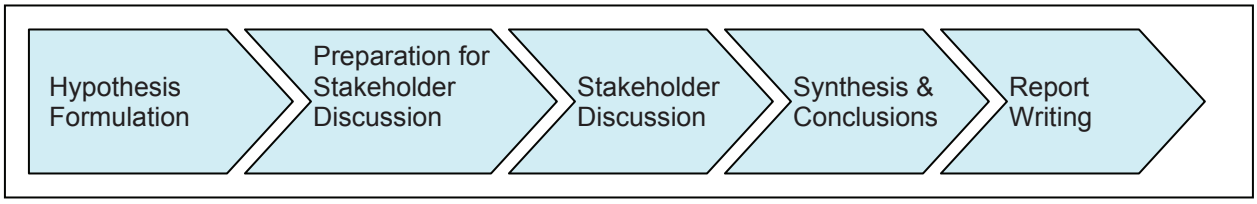
This section presents the impact of the global financial crisis on various players in the Indian power sector. Drawing on the analysis of data available in the public domain, hypotheses developed through such analysis and validation of hypotheses undertaken through stakeholder discussions, this chapter details the impact of the *Crisis* on various players across the value chain. The chapter also synthesises the outcome of the analysis and stakeholder discussions to draw meaningful conclusions.

The focus of the analysis is to analyze the impact of global financial crisis on investments in the electric power infrastructure. In the first sub-section, the overall approach has been described. This is followed by analysis of impact of global financial crisis on financing including debt and equity financing and impact on generation, transmission and distribution segments of the electric power infrastructure. The last sub-section provides synthesis and key conclusions.

4.1 Approach Adopted for Analysis of Impact of the Global Financial Crisis

The overall approach was to prepare a comprehensive list of hypotheses and then to test these hypotheses during stakeholder discussions to draw meaningful conclusions. The preparation of the initial hypotheses was the outcome of interplay between data collection, analysis and internal brainstorming by the consultant. Discussions were subsequently held with select stakeholders in the form of focused interactions based on a structured questionnaires prepared with the aim of testing the hypotheses. The outcomes of analysis, hypotheses formulation, and stakeholder discussions have been synthesized to draw meaningful conclusions about the impact of the global financial crisis on India's electric power infrastructure. Figure 13 below describes the overall approach to the assignment.

Figure 13: Overall Approach



The most critical element in the entire approach was to isolate the impact of the financial crisis on the investments in the power sector from the one created by other factors (i.e. pre-existing challenges in India's power sector). To isolate the impact of the financial crisis, the following approach was adopted:

- At the time of designing the questionnaire, it was ensured that the key hypotheses that were being tested were given due emphasis.

- Substantial amount of data on various aspects of investments in the power sector were collected and analyzed prior to stakeholder interactions. The data and background information served as a quick check in case of a mismatch between the perception of the stakeholder and the facts gathered and helped in terms of probing the issue deeper.
- Further, as stakeholder discussions moved forward, the questionnaires were sharpened to bring more focus on the hypotheses that were emerging as impacts of global financial crisis.
- After completion of stakeholder discussions, various responses were put together and synthesized to arrive at initial conclusions, which were debated internally within the consultant team to finalize the report.

To be able to conduct discussions in a focused way and test the initial hypotheses formulated, a stakeholder-wise questionnaire was prepared separately for conventional/renewable generation, transmission, distribution, lenders, private equity players and policy makers. In line with the scope of work, a detailed list of stakeholders was finalized. These stakeholders included:

- Relevant Government ministries and representative state governments;
- Central government and state government owned power sector entities;
- Financial institutions involved in energy financing and select commercial banks, as well as other private lenders;
- Private equity investors; and
- Private developers and sponsors in the generation, renewables, transmission, and distribution segments.

Post completion of stakeholder discussions, various responses were put together and synthesized to gain a clear understanding of the responses. Where there was a difference in response received from various stakeholders, these points of differences were analyzed by conducting some quick reality checks from market sources or by collecting additional data/information. Synthesis of results in the manner described helped the consultant in drawing draft conclusions.

Once the draft conclusions were drawn, a final round of discussion was held with select stakeholders. The agenda of discussion at this stage was to present the draft conclusions / key findings to select players and get their reactions on the same. The World Bank team also participated in this final round of select stakeholder discussions.

4.2 Analysis of the Impact of the Global Financial Crisis

4.2.1 Impact on funding sources

In this section, an analysis of the impact of the global financial crisis on financing of the power sector has been carried out. It is divided into the impact on debt financing and impact on equity financing. While the debt financing analyzes the impact on sources such as domestic bank credit, power sector focused financiers, and external commercial borrowings in terms of availability of funding, cost of debt and other aspects, the equity financing analyzes impact on raising resources through capital markets and private equity.

4.2.1.1 Impact on debt sources

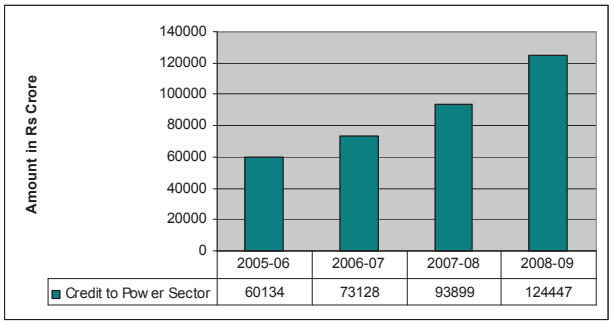
As mentioned above, on the debt side, the major sources of funding are domestic bank credit, funding by power sector focused financial institutions and external commercial borrowings. Further on the debt side, two indicators of availability of funds -- disbursements and debt approvals need to be segregated while analysing the impact. Disbursement is release of funds against the approved debt financing as per the milestones such as physical progress of the project, equity investment by the developers, etc. and is an indicator which immediately reflects the liquidity available to the financiers. The debt approvals are a lead indicator, as post debt financing approval and subject to achievement of milestones as per loan agreement, disbursements are expected to take place. Thus, subsequent analysis covers disbursements and approvals separately.

- **Credit disbursement was not an issue for the power sector at an aggregate level**

Credit disbursement was not an issue for the power sector at an aggregate level during the *Crisis* period. Bank credit to the power sector has continued to grow at the same pace as in the previous years; therefore, no significant change was noticed during the *Crisis* period. As can be seen in Figure 14 below, credit outstanding to the sector was about Rs 1,24,447 crore as on 31st March, 2009 as against credit outstanding of Rs. 93,899 crore as on 31st March, 2008. This increase in credit is in line with the growth witnessed in the power sector over the last few years. Credit to the power sector increased at the rate of 33% in FY 2008-09 as compared to 26% in the FY 2007-08.

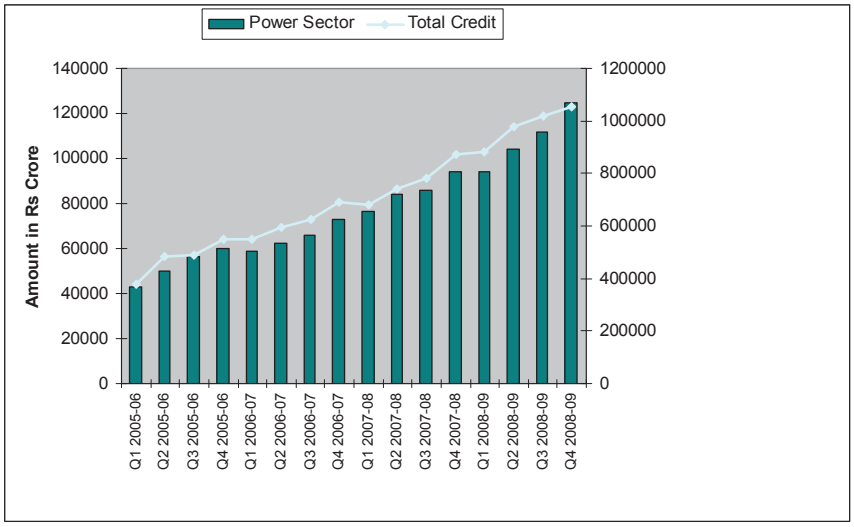
Further, quarter on quarter credit outstanding for the FY 2008-09 as shown in the Figure 15 below indicates that there was no noticeable change in credit to the power sector during the *Crisis* period, with credit to the power sector growing at a rate of 8% and 11% during the Q3 and Q4 of FY 2008-09 as compared to 11% in the Q2 of FY 2008-09.

Figure 14: Bank Credit to Power Sector



Source: Reserve Bank of India

Figure 15: Trend in Total Credit by the Banking Sector and Credit to the Power Sector



Source: Reserve Bank of India

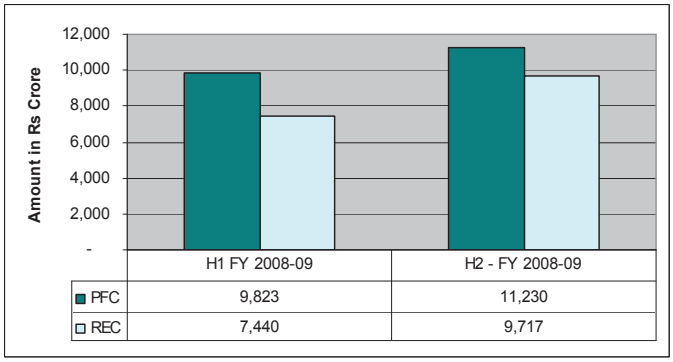
In addition to the above, an analysis of the disbursements by the Power Finance Corporation (PFC) and the Rural Electrification Corporation (REC), which are major lenders to the electric power infrastructure in general and to the state owned utilities in particular, confirms that there was no change in the availability of credit for the projects that have achieved financial closure. In terms of disbursements prior to *Crisis* (H1 of FY 2008-09) and post-crisis (H2 of FY 2008-09), the disbursement pattern of these entities as reflected in the Table 7, does not show any change.

Table 7: Disbursements by PFC, REC

Disbursement (Amount in Rs. Crore)	2005-06	2006-07	2007-08	2008-09
PFC	11,541	14,055	16,207	21,052
REC, excluding RGGVY	8,007	10,086	12,297	16,484

Source: Annual Reports of PFC , REC

Figure 16: Half yearly disbursement by PFC & REC for FY 2008-09



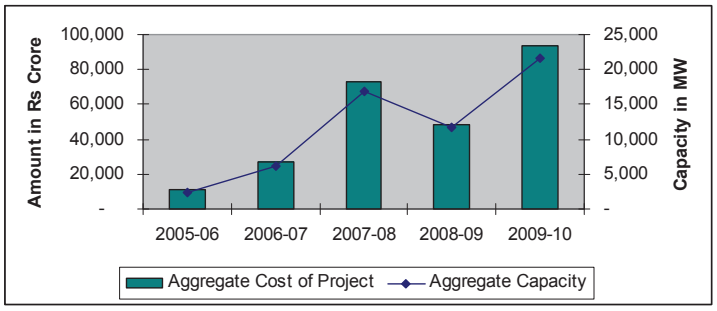
Source: PFC, REC websites

During discussions with the stakeholders, it was also confirmed that the projects, that have achieved financial closure, have not seen any impact in terms of disbursements during the *Crisis* period. It needs to be further noted that was there was no change (tightening) with regard to disbursement conditions by the banking sector as well as players such as PFC and REC.

- **There was a dip in the number and capacity of generation projects that achieved financial closure during the global financial crisis and achievement of financial closure took longer time**

While disbursement of debt funds for the projects that had achieved financial closure did not get adversely impacted, the projects that were in the funding stage seem to have been impacted by the global financial crisis. An analysis of the trend of financial closures, as presented in Figure 17 below, indicates that the aggregate capacity as well as aggregate project cost that achieved financial closure during the FY 2008-09 were lower compared to the previous year. However, in FY 2009-10, there was an increase in financing approvals including private sector projects. In fact, in a short span of time after April 2009, a large number of projects achieved financial closure.

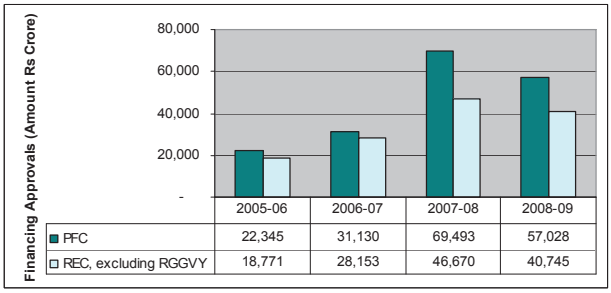
Figure 17: Trend in Financial Closure of Generation Projects from FY 2005-06 to FY 2009-10

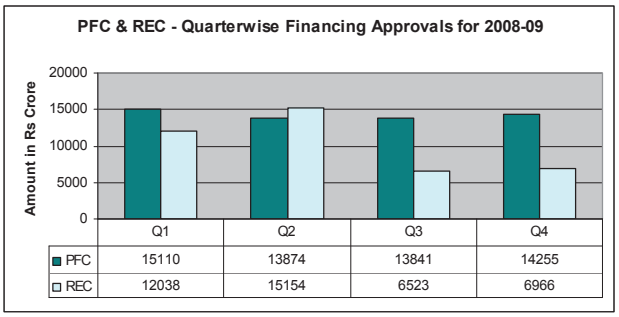


Source: CRIS Analysis

The trend in financing approvals by power sector focused financiers such as PFC and REC does indicate a reduction during FY 2008-09 compared to the previous year. In fact quarter-wise financing approval data show reduction during the last two quarters of FY 2008-09 in case of REC, though on an annual basis the reduction was less compared to the one observed for PFC.

Figure 18: Trend in Financing Approvals for Power Sector focused financiers





Source: PFC, REC Annual Reports, Investor Presentations

While during the discussions with stakeholders in the government sector i.e., government-owned utilities, it was indicated that they were not impacted by the global financial crisis, consultations with private sector developers have indicated that they had faced funding problems starting from September 08 to November 08 (the period when banks faced liquidity issues) and for a few months beyond that as uncertainty prevailed.

An analysis of government-owned utilities such as NTPC and PGCIL indicates that these entities did not face any difficulty in raising debt during the global financial crisis period. During FY 2008-09, NTPC has tied up loans of Rs.1,157 crore. Further, they have entered into a loan agreement with the State Bank of India for Rs. 8,500 crore for part-funding of debt requirement in respect of capital expenditure for the next three years. In addition, loan amounting to Rs. 3,550 crore were tied up with other banks to fulfil the debt requirement for the next three years. NTPC also raised bonds amounting to Rs.1,900 crore from the domestic market for financing capital expenditure and refinancing existing loans.

Similarly, Power Grid Corporation of India Limited (PGCIL) was able to raise bonds totaling Rs 3,697 crore during the FY 2008-09, compared to Rs 2,769 crore in FY 2007-08. It may be noted that these companies have significant cash reserves, strong balance sheets and cash flows. In case of state government owned utilities, despite their weaker financial profile, lenders (domestic banks/sector focused financing institutions) continued extending credit during the *Crisis* period. This was primarily due to the perceived implicit backing by the state government in case of default / non-payment, past track record in dealing with these utilities, and appreciation of the sectoral issues.

Some of the discussions with developers have indicated that the private sector projects took longer to achieve financial closure during the global financial crisis period. It is understood that such delays were of about six month duration. No industry-wide statistics have been reported in this respect. However, an analysis of various reports in the media does support such a hypothesis with respect to delay in the achievement of financial closure due to the global financial crisis. Some such reported cases are given below:

(a) In March 2009 it was reported that the energy unit of GMR Infrastructure Ltd was finding it difficult to complete on-time the raising of funds for six power projects due to a liquidity crunch and was facing stricter due diligence by banks and financial institutions. GMR Energy Ltd. needed as much as Rs. 29,000 crore of funding for its projects, which were at various stages of development. In fact, GMR Energy chairman was also quoted in the report as follows: "…In the backdrop of the liquidity crunch and slowdown in the economy, we will now need to increase efforts in convincing the bankers and financial institutions. Creditors are undertaking stricter and lengthier due diligence process with microscopic analysis on the viability of each of the projects"[13].

(b) Sterlite Energy, which bagged the Rs. 10,000 crore Talwandi Sabo thermal power project on September 1, 2008, was expecting to complete the project's financial closure within 12 months of the date of award of the project but it could not do so and ascribed it to the impact of the global downturn. "Because of the global financial crisis, bankers were reluctant in signing the agreement for

[13] March 4, 2009. Source: Mint

funds and suppliers were also not ready... These factors led to the non-completion of financial closure within a year….the company had concluded the Engineering, Procurement and Construction (EPC) contract at the site and is in the process of ordering the necessary equipments for setting up the plant. The work is going on at the site and we are committed to completing the project within the scheduled time," said Talwandi Sabo Power Limited CEO[14].

(c) Reliance Power managed to achieve financial closure of Sasan UMPP in April 2009, but much later compared to October 2008 when it was originally expected to happen. This was for one of India's largest coal-based power projects, the 4,000 MW ultra-mega power project at Sasan, Madhya Pradesh. The Sasan project was in the market to raise resources for two years and faced constraints in raising foreign funding. With the global financial crisis, it was forced to raise a rupee loan instead of foreign currency loan as planned earlier. The financial closure was achieved after India Infrastructure Finance Company Ltd. (IIFCL) and its overseas subsidiary agreed to lend around Rs. 2,500 crore. The loan is to be repaid when the company secures dollar-denominated loans from overseas banks. The lender was IIFCL's overseas subsidiary IIFCL Plc, which was formed to leverage the foreign exchange reserves of the country to fund Indian projects[15].

Also, an analysis of the generation projects that achieved financial closure in FY 2009-10 reveals that around 10 projects, aggregating about 15,000 MW capacity, achieved financial closure during the short time period of April to July 2009, post the global financial crisis. This clearly indicates that the projects would have faced delay in achieving financial closure in the previous year (i.e. FY 2008-09) and with the improvement in the capital markets and the economic upturn, the lenders would have gained confidence to lend to the projects.

While the ability of power projects to achieve financial closure would certainly depend upon the progress achieved in respect to land acquisition, access to water, tie-up of fuel, and promoter's track record, these issues could not have suddenly been accentuated in FY 2008-09 compared to the pre-*Crisis* period. The sudden drop in financial closures during 2008-09, despite a healthy pipeline of projects awaiting financing approvals, cannot be attributed to the above factors alone. The *Crisis* certainly contributed to the slowing down of financial approvals during FY 2008-09. There was another reason for the delayed financial closure -- the ability to bring in requisite equity for the project was under greater scrutiny during the global financial crisis. This was pointed out by various banks and financial institutions during stakeholder consultations.

- **There was an increase in the cost of debt during the *Crisis* period**

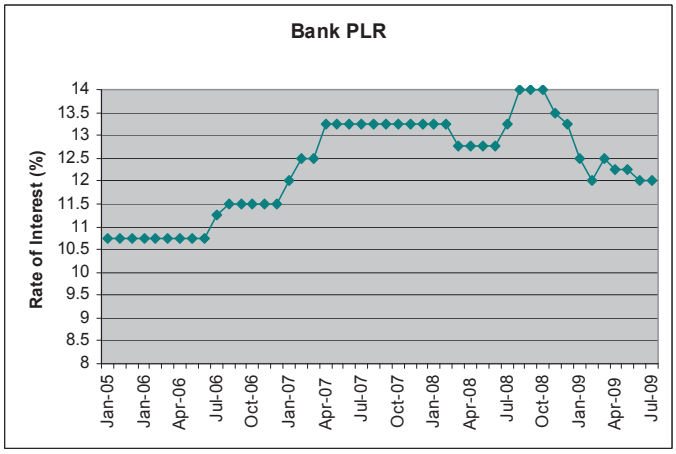
The debt funding cost showed a definite increase during the *Crisis* period. Banks link their interest rates for the debt funding extended to infrastructure projects to their respective Prime Lending Rates (PLRs). The lending rates are often expressed as spread above or below the PLRs (depending upon the credit-worthiness of the project in the case of project finance/ borrowing entity in the case of balance sheet finance). While there is no publicly available project-specific data with respect to

[14] September 24, 2009. Source: infraline.com

[15] April 4, 2009. Source: infraline.com

lending rates for the electric power infrastructure projects,[16] an analysis of the PLRs of the five major banks shows that the benchmark PLR which was around 13.25% per annum during August 2007 to August 2008, increased to 14% per annum in August 2008 and remained the same till November 2008, when the RBI announced various measures to inject liquidity in the system. Post these actions by RBI, bank PLRs showed a declining trend and came down to 12% per annum in July 2009. Thus, during the *Crisis* period, there was about 75-100 basis point increase in the PLR. The change in the PLR by five major banks may be seen in Figure 19 below.

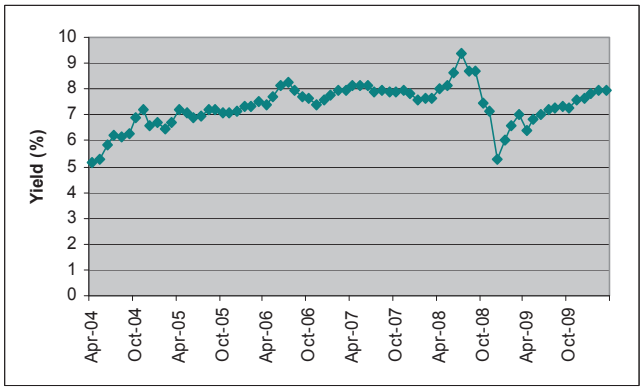
Figure 19: Prime Lending Rate (PLR) of Five Major Banks



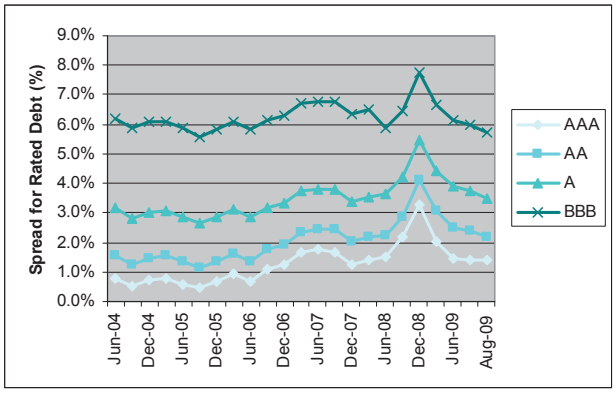
Source: RBI Annual Reports

Besides the PLR of the banks, the increase in cost of debt is also evident from the trend of yields in government securities "10-year bonds" after October 2008, and also the trend of the spreads (over yield on 10-year government securities) for various rated debt instruments, especially during the period from August 2008 to December 2008.

Figure 20: Trend in yields of Government securities "10-year bond" and Spread for rated debt



Source: Reserve Bank of India

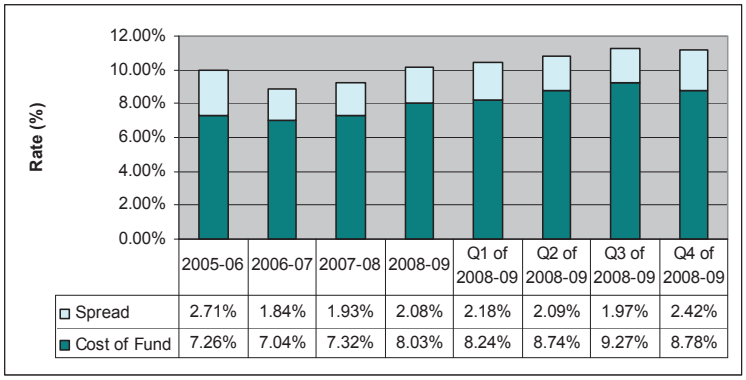


Source: CRISIL Research

[16] During discussions with the private developers, it was pointed out that the rate of interest for the generation projects financed on project-finance basis has normally been in the range of 10.5% p.a. to 11.5% p.a. in the pre-*Crisis* period, but during the global financial crisis period, it increased to 11.0% p.a. to 12.5% p.a.

In addition to the above, during various stakeholder discussions with the utilities, it was found that many of them borrowed mostly from Power Finance Corporation (PFC) and they had witnessed an increase in the interest cost during the period. Since, PFC is a lender to the electric power infrastructure sector only, a quarterly analysis of the cost of credit extended by PFC also gives an indication of the impact on the cost of debt for the sector. It can be seen from Figure 21 below that overall there was 86 basis points (bp) increase in the cost of credit from PFC in FY 2008-09 compared to FY 2007-08. In Q3 and Q4 of FY 2008-09, the increase was around 195 basis points vis-a-vis FY 2007-08.

Figure 21: Spread and Cost of Funds for PFC



	2005-06	2006-07	2007-08	2008-09	Q1 of 2008-09	Q2 of 2008-09	Q3 of 2008-09	Q4 of 2008-09
Spread	2.71%	1.84%	1.93%	2.08%	2.18%	2.09%	1.97%	2.42%
Cost of Fund	7.26%	7.04%	7.32%	8.03%	8.24%	8.74%	9.27%	8.78%

Source: PFC investor presentations

During the *Crisis* period, entities such as NTPC and PGCIL continued to get financing at competitive rates compared to other players. However, because of overall increase in the interest rates, they have witnessed an increase in the cost of borrowings.

While the cost of debt went up during the *Crisis* period, there are no known changes in other aspects of debt financing such as in the interest rate reset period, conditions for disbursement, and nature of security sought.

- **For projects in general and generation segment in particular, there was no change in the debt- equity ratio; preferred mix was 75:25 or 70:30 with only few projects financed on 80:20 basis**

In order to understand the impact of the global financial crisis in financing terms, an analysis of the funding mix in terms of debt and equity was carried out. Data on funding of 60 thermal projects aggregating about 58 GW was collected for this purpose. These projects achieved financial closure between FY 2005-06 and FY 2009-10.

It can be seen from Table 8 below that the number of projects that have achieved financial closure with the debt-equity ratio of 80:20 are fewer. In fact, over a period of time, the 75:25 debt-equity ratio has emerged as the preferred debt-equity ratio followed by 70:30.

Table 8: Trend in Debt-Equity Ratio of Projects that achieved Financial Closure – No. of Projects

Debt Equity Ratio	2005-06	2006-07	2007-08	2008-09	2009-10	Total
70:30	1	4	8	1	5	**19**
75:25	-	3	8	7	11	**29**
80:20	3	3	2	2	2	**12**
Total	**4**	**10**	**18**	**10**	**18**	**60**

Source: CRIS Analysis

Table 9: Trend in Debt-Equity Ratio of Projects that achieved Financial Closure – Capacity in MW

Debt Equity Ratio	2005-06	2006-07	2007-08	2008-09	2009-10	Total
70:30	1,500	3,180	7,950	366	6,890	**19,886**
75:25	-	1,160	7,655	8,490	13,936	**31,241**
80:20	800	1,800	1,192	2,800	900	**7,492**
Total	**2,300**	**6,140**	**16,797**	**11,656**	**21,726**	**58,619**

Source: CRIS Analysis

- **External Commercial Borrowings (ECB) decreased due to various factors including risk averseness in the international markets as well as lack of developers' appetite to bear foreign exchange risk**

External commercial borrowings (ECB)[17] were naturally the most affected source of debt funds as the international financial markets witnessed turmoil in the banking sector and were going through difficult times. While there was some slowdown in the growth of ECBs raised by the power sector during FY 2007-08, compared to the previous years, the first half (H1) of FY 2008-09 has seen ECBs of US $ 0.5 billion, which was almost equal to the ECBs raised during the entire previous year. However, with the onset of the global financial crisis, there was a sharp reduction in ECBs during the second half (H2) of FY 2008-09. The amount raised during the second half of FY 2008-09 was only US $ 0.1 billion compared to US $ 0.5 billion in the first half of FY 2008-09 (see Table 10 below). The trend reversed immediately in the following year. Post-financial crisis period, in the first half of FY 2009-10, the borrowings increased to US $ 0.8 billion and in the second half of FY 2009-10 (till February 2010), the ECBs increased to US $ 1.5 billion. This clearly demonstrates the impact of the global financial crisis on ECBs.

Table 10: ECBs raised by the power sector during FY 2005-06 to FY 2009-10

Amount in Bn US$	FY 05-06	FY 06-07	FY 07-08	FY 08-09		FY 09-10	
				H1	H2	H1	H2 - till Feb
Power Sector	1.1	1.6	0.6	0.5	0.1	0.8	1.5

[17] The term 'ECB' encompasses commercial bank loans, buyer's credit, securitized instruments such as floating rate notes and fixed rate bonds, credit from private sector window of multilateral financial institutions like IFC, ADB, AFIC, CDC, etc.

Source: Reserve Bank of India

This reduction in ECBs during the *Crisis* period is despite the fact that:

(a) In September 2008, the ECB policy was further liberalized by the government wherein the borrowers in the infrastructure sector were allowed to raise up to US $ 500 million per year, a significant increase from the previous limit of US $ 100 million, under the Approval Route.[18] The 'all-in-cost' ceiling (over six-months LIBOR) in respect of ECBs was increased to 450 basis points from the earlier ceiling of 350 basis points for loans with an average maturity of more than seven years.

(b) In October 2008, the 'all-in-cost' ceiling (over six-months LIBOR) was further relaxed and revised to 500 basis points for loans with an average maturity of more than five years.

(c) In January 2009, the 'all-in-cost' ceilings on such borrowings was removed under the approval route of RBI. Also, NBFCs, dealing exclusively with infrastructure financing, were permitted to access ECB from multilateral or bilateral financial institutions, under the approval route of RBI. This 'all-in-cost' ceiling was restored in December 2009.

The global liquidity crunch forced companies implementing major projects to significantly rework their plans to achieve financial closure on time. Reliance Power Ltd.'s ultra-mega power project in Sasan was reported as one of the examples of how the Indian electric power infrastructure sector was impacted by the risk averseness of international lenders. Though it had permission to raise $2 billion via ECBs, it opted for a rupee loan of Rs. 10,000 crore from domestic lenders as global funding sources dried up. Reliance Power struck an agreement with domestic institutions to repay without penalty the rupee loans, when it raised cheaper overseas borrowings. A $600-million loan from IIFCL (UK) was aimed at completing the Rs. 14,550-crore debt financing for the project. The project achieved financial closure in April 2009 instead of October 2008 as was originally scheduled[19].

On the borrower side, one of the reasons for lower appetite was the rise in the foreign exchange rate. US $ /Rupee exchange rate increased steadily from Rs. 42.92 per US $ prior to August 2008 to Rs. 48.61 per US $ at the end of October 2008 and went to Rs. 51.50 per US $ in March 2009. This meant higher forward premia/hedging cost and/or possible difficulties in servicing the foreign debt as revenue streams are denominated in Indian rupees.

[18] Reserve Bank of India (RBI) has allowed certain categories of borrowers, recognized lenders, funds with pre-defined maturity, quantum, interest cost and end-use to access External Commercial Borrowings without any prior approval from the RBI. Such a route is called Automatic Approval Route. Other transactions of ECBs which do not fall under the Automatic Route require prior approval of RBI. Such a route is referred to as Approval Route.

[19] Source: infraline.com

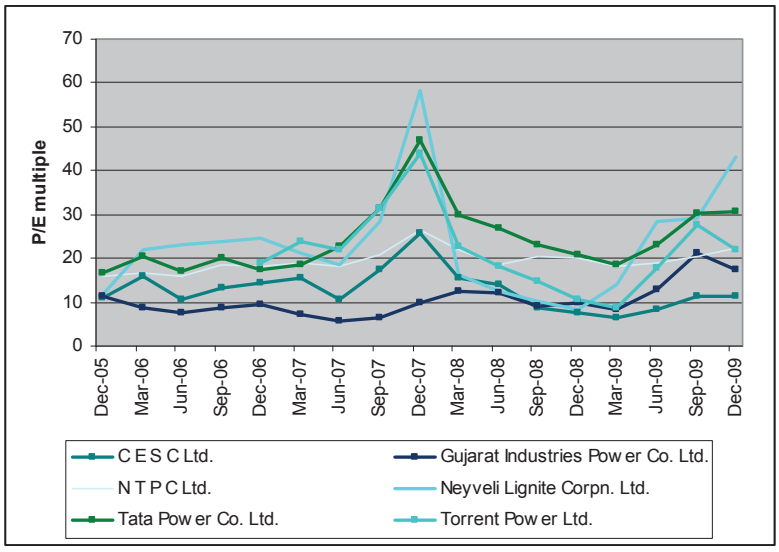
4.2.1.2 Impact on Equity Sources

The analysis of impact on equity sources covers most commonly accessed sources of equity in the power sector in India besides internal accruals, viz., Initial Public Offerings (IPOs) through the capital markets and investment by private equity investors (PE). The analysis covers both the availability and the valuation-related aspects of these equity sources. An analysis of the key hypotheses on the equity sources is presented in the following sections.

- **Raising equity from the capital market became much more difficult due to a drop in valuation and the risk averseness of investors. Some of the developers deferred their plans for capital market offerings and had to evaluate other options such as Qualified Institutional Placements (QIP)**

As discussed in the section on the impact of the global financial crisis on India, the equity markets in the country were affected the most. In tandem with the overall equity markets, electric power infrastructure companies also saw their stock prices spiralling down during the global financial crisis period. As compared to the debt markets, the equity markets witnessed the impact over a longer period of time. The price earning multiples ("P/E multiples") of major electric power infrastructure companies which reached the highest level in December 2007, witnessed a rapid drop between March 2008 and September 2008. As can be seen from figure 22 below, the drop in valuation continued till March 2009 and only post March 2009, the P/E multiples of these companies started increasing.

Figure 22: P/E multiples of select listed electric power infrastructure companies in India



Source: Prowess database

Raising equity from the market became difficult and there was a reduction in the Initial Public Offerings (IPOs) during the global financial crisis period. In fact, in September 2008, it was reported that nearly a dozen Indian companies dropped or deferred offerings as the local stock market fell by more than 35 percent. In the power sector, after the Reliance Power IPO in February 2008, there was no IPO till August 2009 when Adani Power raised funds from the market. The only exception

was KSK Energy, which raised over Rs. 842 crore in July 2008, but its IPO was oversubscribed only to the extent of 1.5 times the amount offered to the investors. The table below gives a list of power companies which raised equity through the capital market route in recent years.

Table 11: Equity Raised in Recent Years by Power Sector Companies through Capital Markets

Company Name	Final Issue Date	Portfolio Size (Capacity in MW) as per Draft Prospectus	Financial Year	Final Issue Price (Rs/ Share)	Total Funds Raised Through IPO (Amount in Rs. Crore)
Jaiprakash Hydro	Apr 14 2005	300	2005-06	32	576
GVK	Feb 27 2006	900	2005-06	310	257
Gammon Infrastructure	Apr 3 2008	120	2008-09	167	276
GMR Infra	Aug 21 2006	948	2006-07	210	801
Lanco	Nov 27 2006	5,094	2006-07	240	1,067
KSK	July 14 2008	9,137	2008-09	232	803
Reliance Power	Feb 11 2008	28,200	2008-09	450	11,700
Adani	Aug 20 2009	6,600	2009-10	100	3,017
NHPC Limited	Aug 12 2009	12,929	2009-10	36	6,039
Indiabulls Power	Oct 30 2009	5,462	2009-10	45	1,529
JSW Energy	Jan 4 2010	11,390	2009-10	100	2,700
NTPC Limited	Feb 5 2010	44,574	2009-10	201	8,287

Source: SEBI Website, CRIS Analysis

None of the major electric power infrastructure players were able to raise equity through IPO during the global crisis period, though many of the players had plans to raise equity through this route. These players had to defer their plans or raise funds through Qualified Institutional Placements (QIPs). These plans for raising equity through the capital market were driven by the encouraging response received by the Reliance Power IPO just prior to the global financial crisis. Some of the examples, where players had plans for the IPO but had to resort to alternative means, are discussed in the following paragraphs.

(a) The Adani group initiated plans to come up with a mega initial public offering (IPO) in April 2008. The company filed a draft prospectus with SEBI (country's capital market regulator) in May 2008 for raising Rs. 5,630 crore through IPO to finance its six proposed thermal power projects in Gujarat, Maharashtra, and Rajasthan totalling 9,900 MW at an estimated investment of Rs. 43,139 crore. The company received approval from SEBI, but had to let the permission lapse on account of market conditions. In view of this, Adani Power had to rope in a few strategic investors by offering an equity stake to Adani Enterprises (AEL), 3i Power Investment A1, Grow Power Trust and Ventura Power. Subsequently, after a gap of one year, Adani Power Limited -- an Adani Enterprises company -- filed its draft red herring prospectus (DRHP) with SEBI in April 2009. This time the company had scaled down the size of its offering and the fund-raising was planned for 6,600-MW, instead of 9,900 MW that was projected in its earlier offer document. The public issue of Adani

Power finally closed in August 2009. Adani's was the largest IPO to hit the market in the 18 months ending in August 2009.

(b) Indiabulls, part of the Indiabulls real estate and financial services group, had plans to raise funds through an IPO in August 2008. The company brought in private equity players such as LN Mittal and the hedge fund Farallon Capital that invested Rs. 1,580 crore for a 28.6% stake in Indiabulls Power Services (IBPS). In February 2008, the company had plans for development of power projects with an aggregate capacity of over 10,000 MW. However, due to capital market conditions, it deferred the plan for IPO and raised funds through qualified institutional placement (QIP) in April 2009. The QIP was by Indiabulls Real Estate (IBREL) and the amount raised was Rs. 2,656 crore. The proceeds were to fund its power project, i.e., a 1,320-megawatt project planned in Amaravati in Maharashtra. The company subsequently filed a draft red herring prospectus in July 2009 with plans to develop 5,462 MW from five thermal plants under various stages of implementation and raised about Rs. 1,529 crore through capital market in October 2009.

(c) JSW Energy was planning to raise about Rs. 4,000 crore through an IPO in FY 2008-09. However, it had to defer its IPO. Subsequently, the company was looking at various options for raising equity. It was reported that JSW Energy was planning to raise funds for capital expenditure through private placement of 5% stake (over US $ 500 million) to a US-based PE firm. Subsequently, post-improvement in the capital market scenario, the company raised Rs. 2,700-crore through an IPO in January 2010.

(d) State-owned hydro-power generator NHPC Ltd. had planned to launch an initial public offering (IPO) worth about US$ 700 million in late October 2008. It also had the regulator's approval in place. However, in the month of September 2008, it deferred plans for an IPO because of the turbulent market conditions. The company finally raised Rs. 6,039 crore through an IPO in August 2009, once the IPO market revived.

Thus, there were many instances wherein project developers, who were planning to raise equity through IPOs, had to defer their plans. These developers had to resort to alternatives such as QIPs, private equity and other such means. Discussions with stakeholders highlighted the fact that equity was the most affected source of funds.

- **Many of the private equity players that were attracted by India's economic growth have found it tough to raise funds. Existing private equity players were adopting a "wait-and-watch" approach**

Driven by India's economic growth, many Private Equity (PE) firms and hedge funds had planned their entry into the country. With the changed market outlook due to the global financial crisis, these players subsequently decided to exit. It was reported that during the period September 2008 to September 2009, four overseas private equity firms and 25-30 hedge and sovereign funds closed their India operations.

These players that exited from the country during the global financial crisis included players such as the UK-based Candover Investments Plc, the listed arm of European PE fund Candover; Babcock and Brown India Pvt. Ltd; UK-based PE fund Englefield Capital, and FirstRand Bank Ltd.

Candover exited India in September 2009 after it failed to raise a fund in India. Further, due to the global financial crisis, its UK parent's asset value reduced and it defaulted on its commitment of $1.47 billion to its own fund, leading to a shutdown of its operations outside the UK. Babcock and Brown India closed as its Australian parent went into liquidation in August 2009. There were cases of exits, consolidations and defaults in commitments or investments in India by foreign Limited Partners (LPs) – investors in private equity firms.

As can be seen from Table 12 below, only around 105 investors were active in the PE space during the calender year 2009, as compared to around 216 active investors in the PE space during the calender year 2008.

Table 12: Trend in Number of Active Investors in the PE Segment

	Year 2006	Year 2007	Year 2008	Year 2009**
Number of investors active each year	155	214	216	105

*** Till September, 2009*

Source: Mint newspaper, October 28, 2009

Private equity players looking to raise funds found it difficult to do so. LPs were evaluating track records, returns, and horizon commitments of General Partners (GPs) – private equity managers – more diligently than in the pre-*Crisis* period.

During some of the stakeholder discussions, it was mentioned that many PE funds were told by their investors to work with their existing portfolio of companies and stop making new investments. The firms that had already raised funds were adopting a "wait and watch" attitude as there was uncertainty with respect to the duration of the impact and time taken for economic recovery. There were also pressures on some of the funds to exit from the investment. However, there were few such opportunities as the capital markets were down.

- **Private Equity Investments in the Electric Power Infrastructure Sector reduced considerably. The number of deals as well as the average deal size declined.**

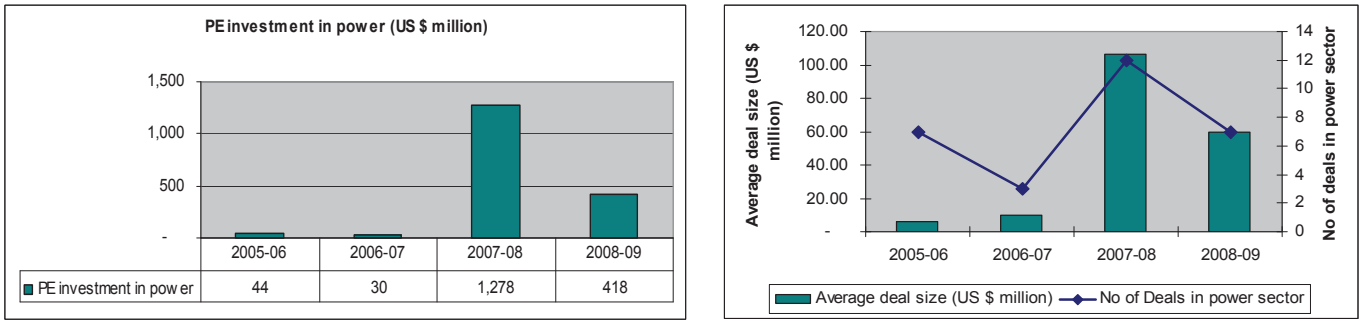
The private equity deals were driven by the business opportunity offered by the demand-supply gap in India's deficient power sector. In fact, of the total deals in infrastructure, the power sector was the second highest (first being telecom). During January 2004 to August 2008, the country's infrastructure witnessed Rs. 37,187 crore worth of PE investments in unlisted companies. Of this, the telecom sector accounted for the maximum share at 67.65%, followed by the power sector at 13.74% (Rs. 5,108 crore). In the power sector, while there were very few deals during FY 2004-05 and FY 2005-06, in FY 2007-08 the sector recorded the highest ever PE deals.

In addition to PE deals in unlisted companies, during the pre-*Crisis* period, around Rs. 6,036 crore was invested in PIPE[20] deals from January 2004 to August 2008, representing about 17% of the total PE investments. The PIPE deals involved an investment of private equity when a listed entity divested a part of its stake through qualified institutional placements (QIPs).

[20] Private Investment in Public Entities (PIPE) is investment by private equity investors in publicly listed companies.

During the global financial crisis, the investment by PE firms came down. As shown in the figures below, FY 2007-08 saw the highest number of deals and investment to the tune of about US $ 1,278 million. The investment declined to about US $ 418 million in FY 2008-09. The impact of the global financial crisis on the private equity players was one of the reasons for reduced investment, the other being unrealistic valuation expectations of the entities seeking PE investments.

Figure 23: Trend of Private Equity Investment in Electric Power Infrastructure



Source: vccircle.com, CRIS analysis

The number of deals, which had shot up during FY 2007-08, dropped in FY 2008-09 to about half compared to the previous year. Further, the average deal size reduced from US $ 106 million in FY 2007-08 to US $ 60 million in FY 2008-09. It may be noted that during FY 2007-08, there were three large-sized deals, of which two were in the range of US $ 400 million and the third was of US $ 190 million size. Against this, there was only one comparable deal of US $ 125 million size in FY 2008-09.

- **Due to the impact on capital market valuations, the valuation expectations of PE investors and developers started aligning.**

As mentioned earlier, due to the global financial crisis, the valuation of the listed entities came down. This had an impact on the private equity deals that were in the market.

The crash in the stock market had made it difficult for PE investors to exit at reasonable prices. Further, with the primary market badly affected, PE investors had to consider alternatives to listing as an exit option. Many PE investors started extending their investment horizon or tried to find other investors at the right price. The investors turned more selective and the terms became more rational in terms of risk/reward dynamics.

Discussions with the some of the stakeholders revealed that prior to the global financial crisis, valuation expectations of the power sector developers were posing a challenge to close the deal. These valuation expectations were driven by the valuations that Reliance Power was able to get in its IPO. The equity was valued at about Rs. 3.6 crore per MW. The IPO was one of the largest in the country and investors other than the promoters had over-subscribed the issue 73 times. This also resulted in upward re-rating (the P/E multiples of power sector entities are given in Figure 22) of all the listed power sector companies. With the market valuations sliding down during the global financial crisis, the developers found it difficult to raise funds from the market; their valuation

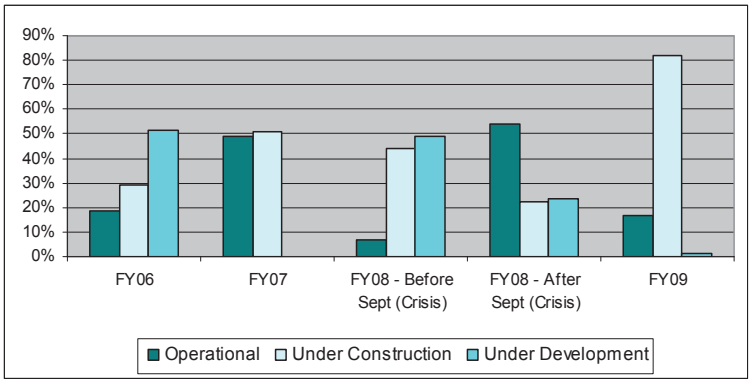
expectations also started falling. With the improvement in the scenario and alignment in valuation expectations, FY 2009-10 saw a pick-up in the PE investments with the closure of about 14 deals worth US $ 820 million in the initial few months.

- **Private Equity Players started preferring companies'/developers' real portfolios, started focusing on operational and under construction projects**

Encouraged by the high valuations received by Reliance Power which essentially had projects in the development and construction stages in its portfolio, other developers with projects in the initial stages of development started contemplating an IPO and private equity investment.

In view of this, an analysis of the deals that were successfully concluded in the electric power infrastructure sector has been carried out. The analysis clearly demonstrates that the private equity players have started focusing on real portfolios, i.e., sector players with project portfolios that had higher capacity under operation or under construction stage. It can be seen from Figure 24 below that post-September 2008, there was a clear preference for projects under operations and relatively lower preference for projects in the development stage.

Figure 24: Analysis of Stage of Implementation of Electric Power Infrastructure companies with PE Investment



Source: vccircle.com, CRIS analysis

4.2.2 Impact on Electric Power Generation Segment

This section analyzes the impact on generation sector projects. This impact is captured through an assessment of the 11th Five-Year Plan capacity additions. The focus is on assessing the impact, if any, on the country's plan for capacity addition and understanding how the global financial crisis has impacted developers in terms of their project development.

- **There was no noticeable impact of global financial crisis on the planned generation capacity addition in the 11th Five Year Plan**

As stated earlier, 78,577 MW capacity addition has been planned during the 11th Five-Year Plan period (April 2007 to March 2012). However, the capacity additional achieved till date is only 21,221

MW. Recently, there was a mid-term review of the generation capacity addition plans outlined in the 11th Plan and the same was revised to 62,374 MW. Of the total 16,212 MW capacity getting delayed, about 10,890 MW capacity was in thermal generation and about 5,322 MW in the hydro-generation segment. About 11,072 MW capacity addition delayed related to central sector projects and the balance 5,140 MW capacity addition delay related to state sector projects.

In order to understand whether any of the project implementation delays were attributable to the global financial crisis, an analysis of various project monitoring reports by CEA as well as the mid-term appraisal undertaken by the Ministry of Power, was carried out. According to the analysis, some of the major reasons, which contributed to the delay in the commissioning of projects during the 11th Plan are as follows:

- Delay in placement of orders – mainly Civil Works & Balance of Plants (BOPs);
- Contractual disputes between project developers and contractors and their sub-vendors/sub-contractors;
- Problems of land acquisition;
- Issues with respect to environment and forest clearance, geological issues in the case of hydros;
- Shortage of skilled manpower for erection and commissioning; and
- Inadequate deployment of construction machinery.

Given the construction period of about three-four years for most (thermal) projects, the majority of the projects scheduled for commissioning during the 11th Five-Year Plan, would have already achieved financial closure/ approvals for the loans prior to the onset of the global crisis in FY 2008-09. As discussed earlier in the section on the impact on credit disbursements, these projects have not been impacted by the global financial crisis. The above analysis of project commissioning delays supports the conclusions drawn from an analysis of disbursements during the global financial crisis.

- **Power procurement plans of the distribution utilities were impacted as there was limited interest by the developers. Further, the generation tariffs quoted by developers were higher during the *Crisis* period.**

The power procurement plans of distribution utilities were impacted due to the global financial crisis. Further, the generation projects, which were under bidding, witnessed limited interest from the developers. There are many examples of bid processes which support this observation, e.g., bid process for Ultra Mega Power Project (UMPP) at Tilaiya in the state of Jharkhand ("Tilaiya UMPP") and power procurements by distribution utilities in the states of Gujarat, Uttar Pradesh and Punjab that were going through the process of power procurement during the global financial crisis period.

The Tilaiya UMPP (4,000 MW power project) was offered to developers via the tariff-based bidding route. The project was a part of the Government's UMPP scheme under which it proposes to set up 13 UMPPs to increase India's power capacity by more than 50,000 MW by the end of 2017, in order to bridge the growing electricity demand-supply gap in the country.

Due to concerns of the private developers about achievement of financial closure during the *Crisis* period, the submission of the financial bid was deferred twice. The financial bid which was originally

expected to be submitted in November 2008, was deferred to December 1, 2008, and subsequently to December 29, 2008.

Further, many of the bidders chose not to submit technical / financial bids. While nine companies were qualified for submission of the financial bid for Tilaiya UMPP, four companies, including India's largest private sector electricity generator, Tata Power, and infrastructure major, Larsen & Toubro Ltd, chose not to bid for the project. Similarly, Essar Power, part of the telecom-to-oil Essar group, and Citra Thermal Power and Infrastructure Ltd. did not bid. Lanco Infratech withdrew its bid subsequently. Excluding Lanco Infratech, only four players -- Reliance Power, NTPC Ltd. (the country's largest power producer), Jindal Steel and Power Ltd., and Sterlite Industries -- finally submitted price bids.

The main reason for such a poor response was reported to be the global financial crisis/liquidity crunch and concerns about raising funds/achieving financial closure for such a large-sized power project with an estimated project cost in the range of Rs. 16,000 crore to Rs. 18,000 crore. In his reaction to submission of bids by only five players, the then Minister of State for Power said that "If everything would have been normal (referring to the current financial turmoil), we could have more bidders..."[21]

Power procurement by utilities in the state of Gujarat was negatively impacted by the global financial crisis. Gujarat Urja Vikas Nigam Ltd (GUVNL), the apex electricity company of the state, which had seen an encouraging response in the previous bidding round, received a lukewarm response to its offer for supply of 2,000 MW power under competitive bidding. It may be noted that Gujarat utilities are some of the best performing utilities in the country. Of the 19 selected power companies (which included Reliance Power, Torrent Power, KSK Energy, PTC India, Sanghi Group, JSW Energy and Essar Power among others), only four (Adani, Essar, Reliance Power and PTC India) aggregating 1,900 MW capacity submitted their technical and financial bids to supply power to GUVNL on a long-term basis. The date for submission of bids was 15 November 2008. The bidding process coincided with the onset of the global financial crisis. Due to the uncertainty associated with the global financial crisis, the tariffs quoted by the bidders were high compared to the earlier bidding round. This led to a rejection of all the bids by GUVNL.

Similarly, the global financial crisis also affected the bidding for the 1,980-MW thermal power plant at Bara in the Allahabad district of Uttar Pradesh. The date of the submission of financial bids was extended several times. Initially, the bid was expected to be submitted on November 30, 2008, but subsequently, it was extended to December 15, 2008 and then to January 5, 2009. The main reason for the extension of the bid submission was reportedly lack of interest by the bidders and the likelihood of bidders quoting a higher price for supplying electricity.

In case of bidding by utilities in the state of Punjab, Lanco Infratech was the only bidder in the competitive bidding process for the development of a 1,320 MW coal-based power plant at Rajpura. The Rs 7,000-crore project was to be executed on a build, own and operate model for the Punjab State Electricity Board under the tariff- based competitive bidding guidelines laid down by the

[21] December 30, 2008. Source: infraline.com

Ministry of Power, wherein a special purpose vehicle needs to be created by the power procuring utility. This SPV should have all the necessary clearances including fuel linkage.

While there were around five players in the fray in the earlier stages, including generation players such as Reliance Power, Tata Power, Essar and Sterlite, the final bid/price bid was submitted by only Lanco Infratech. The price bid submission happened in the month of November 2008. Since the project received only a single bid, it was rejected by the state electricity regulatory commission and the utility went for a re-bid. The revised Request for Qualification (RFQ) and Request for Proposal (RFP) documents were floated on June 10, 2009 with the due date of submission being August 31, 2009. In response to the revised bid, which was floated after the global financial crisis, as many as eight power companies (including Reliance Power, L&T Power, Welspun Urja India, Essar Power, Dalmia Cement (Bharat), GMR Energy , JSW Energy and Adani Power) submitted technical and price bids for setting up the thermal plant. This clearly shows that the same project witnessed different levels of developer interest during the global financial crisis period and in the subsequent period.

As mentioned in the earlier paragraph, the bids for the supply of power under tariff-based competitive bidding in the case of GUVNL were at much higher levels compared to the earlier bids. GUVNL, in its earlier power procurement during FY 2006-07, received bids at the levelized tariff range of Rs. 2.25 per kWh to Rs. 2.89 per kWh. Similarly, procurement by other utilities (utilities in the states of Maharashtra, Haryana and Madhya Pradesh) during the period FY 2007-08 received bids at levelized tariffs ranging from Rs. 2.64 per kWh to Rs. 2.94 per kWh. However, the levelized tariff quoted during November 2008 was in the range of Rs. 3.25 per kWh to Rs 3.50 per kWh. While some increase may be attributed to the increase in fuel cost and some changes in the bid evaluation parameters, the main reason seems to be the uncertainty associated with the global financial crisis and its consequent impact on the cost of financing.

There were no other bids for power procurement under Case I.[22] The bids by the utilities in the states of Punjab and Uttar Pradesh, discussed in the above paragraphs, were under Case II. The only Case I bids that were invited subsequent to the Gujarat bid, were by the states of Maharashtra and Karnataka in the beginning of FY 2009-10. These bid invitations received bids in the similar range of levelized tariff as witnessed by the utilities in the state of Gujarat. After the global financial crisis period, the Case I bids received by utilities in the state of Gujarat in FY 2009-10 were in the range of Rs. 2.35 per kWh to Rs 3.18 per kWh. These were on the lower side compared to Rs. 3.25 per kWh to Rs 3.50 per kWh, received during the *Crisis* period.

[22] For procurement of power by distribution utilities under tariff- based competitive bidding (wherein the bid criteria is the levelized tariff), the Ministry of Power has suggested two options, known as Case I and Case II. In Case I, bidders are expected to offer capacity at the pre-identified delivery point from any of their existing / planned power projects. In Case II, the bid is for development of a project of a particular capacity at a pre-identified site and then for supply of electricity to the state distribution utility, with the state utility taking responsibility of land acquisition, various clearances, fuel linkage, etc.

- **Either due to funding constraints and/or lenders' risk averseness, developers, who were looking at large portfolio of projects, started focusing on implementing projects which were in more mature stages of development**

While the projects that normally achieve financial closure are those that are in advanced stages in terms of parameters such as fuel supplies, stage of clearances, and availability of land and water, during the global financial crisis period, there was an added concern with respect to the ability of the promoters to bring in equity. Several discussions with banks/financial institutions and private equity players have brought this out.

With the sources such as capital markets drying up and the sourcing of private equity becoming difficult, many of the private developers had to re-prioritize projects based on the level of preparedness of their project in terms of the parameters mentioned earlier. The generation of internal accruals, used as one of the means of financing equity in projects, got impacted due to the economic slowdown. Such an impact was more pronounced for new developers from other sectors (such as real estate, financial services, and steel) of the economy. Though the period of *Crisis* and slowdown was relatively short, it did impact the pipeline of projects that were in the early development stages and had not yet reached the funding stage. The impact on the project development pipeline and eventual commissioning of such projects is likely to be visible with a lag.

An analysis of media reports points out that re-prioritization of projects was in fact happening.

(a) Adani Power Limited which had earlier indicated 9,990 MW portfolio of projects, subsequently went for an IPO for 6,660 MW projects only.

(b) JSW projects at various places, excluding those in Maharashtra, Rajasthan and Karnataka, were delayed by one year, as the group had put on hold its expansion plans due to the global financial crisis. The company had plans for 2000 MW projects in Chhatisgarh and Orissa and other projects in West Bengal and Jharkhand. JSW Energy was planning to raise about Rs. 4,000 crore through an initial public offer in 2008, but the IPO was delayed due to the global financial crisis[23].

- **Smaller and/ or non-core players either deferred their development plans or started looking for strategic partners or completely exited the generation segment**

Driven by the opportunity presented by the power sector, many of the smaller and non-core power players had planned to enter the power generation segment. Many of such developers were looking to leverage their captive coal block allocations or hydel project licenses. However, the level of effort and resources required for development of a power project, i.e., for land acquisition, environmental clearances and financial closure, were found to be too challenging by these players. Many of them started losing patience with protracted clearances and approvals. Meanwhile, with the global financial crisis setting in, banks and financial institutions preferred lending to known promoters with prior power sector experience and took longer in executing the due diligence process. Some of these

[23] Source: Infraline. Date: May 11, 2009

players also started facing problems in mustering equity investments. Due to the declining trend in the capital markets, many of them faced difficulties as equity financing was raised against the pledge of listed stocks, which declined in value. Sectoral issues together with the global financial crisis led many of these players to either defer their development plans or induct another strategic investor as a partner or plan their exit from the project. Many such strategic partner inductions or promoter exits were initiated during the global financial crisis. However, these seem to have materialized post-improvement in the economic scenario and capital market valuations. Here are some examples mentioned in public media:

(a) Emco energy's sale of equity to GMR Energy: In July 2009, Emco Limited sold its stake in its power generation subsidiary Emco Energy which was developing a 520 MW project. Reportedly, Emco Energy was looking for strategic players to meet the gap in equity and subsequently found more value in selling the entire project. The official reason cited was that the sale would allow it to focus on larger power generation projects instead of the small plants the subsidiary was pursuing. (Source: Power Line Magazine, November 2009)

(b) In August 2009, Dhariwal Infrastructure sold 51% stake to CESC Limited. The group was involved in various activities other than power generation and was developing a 600 MW power project in the state of Maharashtra. CESC's strategy was to progressively acquire 100% stake in Dhariwal Infrastructure. (Source: Power Line Magazine, November 2009)

(c) In March 2010, Gayatri Projects was discussing with a couple of power utilities as strategic investors to dilute its 49 percent stake in its 1,320 MW power project. Gayatri Energy Ventures, a wholly-owned unit of Gayatri Projects, a diversified infrastructure player, was entering the power sector for setting up of a power plant near Krishnapatnam in southern India. The company had got environmental clearance, tied up coal for the project, and was in possession of 1,400 acres of land for the project. (Source: infraline.com, March 19, 2010).

(d) In February 2010, it was reported that the construction company Patel Engineering had planned to dilute as much as 40 percent of equity in its power subsidiary, Patel Energy Resources. It was looking at investors like Power Trading Corporation, Power Finance Corporation and other financial players and funds. The company is developing a 1,320-MW power plant at Nagapattinam in Tamil Nadu and is also building a 90-MW hydro power plant in Arunachal Pradesh. Both projects were trying to achieve financial closure. Patel Energy was floated around two years earlier, after Patel Engineering decided to venture into the power sector. (Source: Infraline.com, March 10, 2010)

(e) In February 2010, it was reported that four-month-long negotiations between GVK Infrastructure and Dainik Bhaskar Power (DB Power) to buy the latter's power plant have fallen through. Sources close to the developments said GVK had been evaluating a Chhattisgarh-based 1,200 MW power project that is being developed by DB Power, which has plans to set up 5,000 MW of power capacity. DB Power is promoted by the Bhaskar Group, which is a known player in the newspaper industry.

4.2.3 Impact on Renewable Energy Based Power Generation

This sub-section analyses the impact of the global financial crisis on renewable energy-based generation projects. It may be noted that these projects would also face financing issues as discussed

in the previous section. However, the focus of this section is on assessing the impact on project developers and project development at an aggregate level.

- **Renewable Energy Projects under implementation were not impacted; however, the pipeline of projects under early stages of development was impacted.**

The capacity addition in the renewable energy sector was not impacted during FY 2008-09. The capacity addition was much higher during FY 2008-09 compared to the previous year. However, as shown in Table 13, capacity additions came down in FY 2009-10. The major reduction in capacity addition was witnessed by wind power projects.

Table 13: Trends in Renewable Energy Capacity Addition (in MW)

Capacity Addition in MW	FY 2005-06	FY 2006-07	FY 2007-08	FY 2008-09	FY 2009-10
Wind Power	1,112	1,716	1,574	2,398	1,565
Biomass	57	94	165	98	162
Small Hydro Power	55	157	140	384	306
Cogeneration	83	141	59	329	285
Waste to Energy	21	2	17	19	6
Solar power	-	-	-	2	8
Total RE (MW)	**1,327**	**2,111**	**1,955**	**3,230**	**2,332**

Source: Ministry of New and Renewable Energy

The projects scheduled for commissioning during FY 2008-09 were in the construction stage and the funds for such projects had already been tied-up. The disbursements, as mentioned earlier, did not get adversely impacted during the global financial crisis. It is therefore unlikely that such Renewable Energy (RE) projects would have been adversely impacted. Thus, the RE capacity addition during FY 2008-09 did not witness any reduction. An analysis of the Indian Renewable Energy Development Agency Limited (IREDA) data, a Non-Banking Financial Company (NBFC) focused on financing energy generation from renewable sources, relating to financing approvals and disbursements, also supports the above conclusion. The trend in financing approvals and disbursements by IREDA is given in the table below.

Table 14: Trend in Financing Approvals and Disbursements by IREDA

Amount in Rs Crore	2005-06	2006-07	2007-08	2008-09
Approvals	506	589	826	1,490
Disbursements	303	411	554	771

Source: IREDA Annual Report, 2008-09

However, it seems that renewable energy projects that were in the development stage, were impacted. Renewable projects, particularly wind power projects, have short implementation periods. Accordingly, the impact of shelving or delays in RE projects in their early development stage, is likely to be felt in lower project commissioning, within a subsequent period of one to two years.

The investment in wind projects is driven by the fact that these projects are allowed faster depreciation rates and hence they are used for tax savings by corporate sector entities. As the

corporate sector, in general, witnessed a reduction in their earnings, there was less incentive for corporate sector entities to invest in the wind projects to save taxes.

The reduction in the growth of biomass-based capacity was mainly due to other sectoral issues such as volatility in fuel prices, concerns with respect to quality, and disruption in supply of fuel. With the increase in prices of crude oil, various industries had started utilizing the biomass-based resources in their boiler applications. With increased demand, shortages were experienced by the biomass generators resulting in price increase. Increase in raw material prices impacted biomass players as the feed-in tariffs are fixed on per kWh basis and hence the fuel price risk is borne by the biomass generators. This reduced the attractiveness of the biomass generation projects during the *Crisis* period.

- **CDM revenues came down, thereby lowering the attractiveness of projects.**

Renewable energy projects are eligible for Certified Emission Reductions (CERs) under the Clean Development Mechanism (CDM). Under the Kyoto protocol, industrialized countries have committed to achieving certain reduction in emissions of Greenhouse Gases (GHG) and if they fail to do so, then under the Clean Development Mechanism (CDM), they have the flexibility to offset the difference between actual emissions versus committed levels by purchasing CERs generated in developing countries. As many of the European countries have emissions beyond their commitment levels, they have been major contributor to CER demand.

CER trading takes place in various exchanges including the Chicago Climate Exchange, the European Climate Exchange, Nord Pool, PowerNext and the European Energy Exchange. In India, the National Commodity and Derivative Exchange (NCDEX) and the Multi-Commodity Exchange (MCX) are two exchanges on which CERs are traded. This trading of CERs provides developers of any GHG emission reducing project an opportunity to sell credits and earn additional revenue. The pricing of CERs is driven by the demand-supply conditions. The revenue from these CERs have been one of the attractions for the RE developers.

During the financial crisis, due to the reduction in production from GHG-generating industries, the demand for CERs in the European countries came down. As may be seen in the table below, Germany's carbon emission deficit reduced by almost 50%, i.e., from about 79.3 million tonne CO_2 equivalent in 2008 to 40 million tonne CO_2 equivalent in 2009. Similarly, there was a sharp reduction in deficit from UK from 48.8 million tonne CO_2 equivalent in 2008 to 15.6 million tonne CO_2 equivalent in 2009. Countries such as Spain and Italy, which had a deficit during 2008, had a surplus during the year 2009.

Table 15: Surplus / Deficit of carbon emissions by European Countries in Year 2008 and 2009

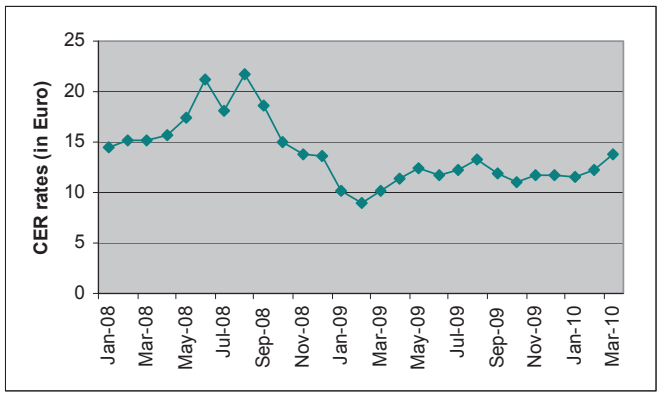
Surplus / Deficit (in million tonne CO_2 equivalent)	2008	2009
Austria	-0.2	4.5
Belgium	1.3	10.7
Czech Rep.	2.5	4.6
Denmark	-2.6	-1.6
Estonia	-1.8	1.4

Surplus / Deficit (in million tonne CO_2 equivalent)	2008	2009
Finland	0.8	2.7
France	4.4	17.4
Germany	-79.3	-40
Greece	-6.7	-0.5
Hungary	-3.7	0.9
Ireland	-0.4	2.8
Italy	-17.5	18.1
Latvia	0.4	0.8
Lithuania	1.2	1.4
Luxembourg	0.4	0.3
Netherlands	0.8	2.8
Poland	-3.9	6.1
Romania	8.4	21.2
Spain	-12.9	13.6
Sweden	1	3.5
UK	-48.8	-15.6

Source: Bloomberg, CRIS Analysis

This change in the deficit/surplus scenario of carbon emissions substantially impacted the CER rates which were as high as 21.7 Euros in August 2008 and reduced to 9 Euros in February 2009, due to the global financial crisis and ambiguity on carbon credits' status post-2012 (see Figure 25 below). Since then, CER rates have increased to reach 13.8 Euros in March 2010. Since the ambiguity with respect to carbon credit status post-2012 remains, the reduction in CER rates can be substantially attributed to the global financial crisis.

Figure 25: Trend in CER Rates



Source: Bloomberg, CRIS Analysis

A quick analysis of the impact of reduction of CER rates from 21 Euros to 9 Euros on the equity IRR for a typical project reveals that the equity returns come down by 4% - 4.15%. This reduced the attractiveness of renewable energy projects during the *Crisis* period.

4.2.4 Impact on Electricity Transmission

This sub-section covers the analysis of the impact of the global financial crisis on the transmission segment. It may be noted that electricity transmission is dominated by the government sector and the projects are funded on balance-sheet finance basis.

- **There was no reduction in capital investments by transmission utilities**

While PGCIL is responsible for overall planning of regional grid / transmission systems, the state transmission utilities are entrusted with the responsibility of providing state transmission networks. The transmission sector is dominated by the government except in select cases of private sector participation. Such cases include Reliance Power Transmission, which is undertaking the Western Region System Strengthening project; Power Link Transmission, which is a joint venture between Tata Power and PGCIL for implementing the transmission system associated with the Tala Hydro-Electric Project in Bhutan and Tata Power, which has a legacy transmission network[24] in the Mumbai region in the state of Maharashtra.

In order to understand the impact of the global financial crisis on the capital expenditure (CAPEX) of the transmission sector, an analysis of capital expenditure by PGCIL as well as select state transmission utilities, was carried out. Analysis of the Gross Fixed Assets, Net Fixed Assets as well as capital-work-in -progress as on 31st March of the respective years, indicates that the capital expenditure by PGCIL in 2008-09 continued to grow at about the same pace as in the past. Further, capital expenditure incurred by PGCIL during FY 2008-09 was about Rs. 8,095 crores, compared to Rs. 6,656 crore incurred in FY 2007-08. This represented a growth of about 22% on a year-on-year basis.

Table 16: Key indicators for Capital Expenditure of PGCIL

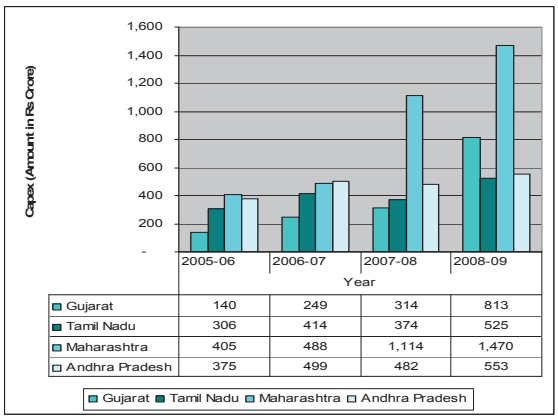
Amount in Rs Crore	2005-06	2006-07	2007-08	2008-09
Gross Fixed Assets (GFA)	24,888	29,014	35,417	40,319
% growth in GFA	13%	17%	22%	14%
Net Fixed Assets (NFA)	18,516	21,816	27,355	31,128
% growth in NFA	14%	18%	25%	14%
Capital-work-in-progress (CWIP)	6,400	9,440	8,758	13,286
% growth in CWIP	27%	48%	-7%	52%

Source: PGCIL Annual Report for FY 2008-09

Similarly, analysis of data from the select state transmission utilities including Gujarat, Tamil Nadu, Maharastra and Andhra Pradesh reveal that capital investment by these utilities continued at a healthy pace during the *Crisis* period. The state transmission utilities that have been analyzed were short-listed on the basis of their size, length of transmission network, and the generation capacity addition plans.

[24] Tata Power has a license to distribute power in the Mumbai region.

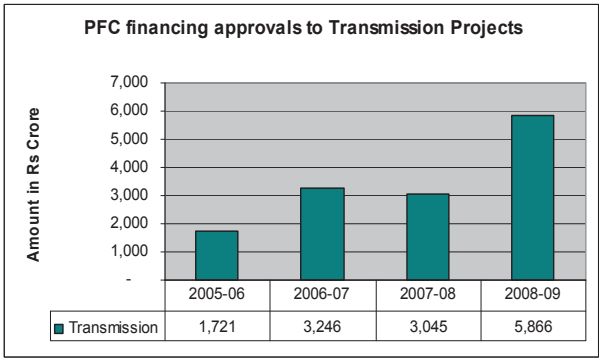
Figure 26: Trend in Capital Expenditure by select State Transmission Utilities



Source: Tariff orders of state transmission utilities

Further, an analysis of the financing approvals of the transmission projects by Power Finance Corporation (PFC) also shows continuation in the investment momentum. As shown in the figure below, while there was some dip in the approvals in 2007-08, it picked up in FY 2008-09.

Figure 27: Trend of PFC debt approvals to the transmission sector



Source: PFC annual reports

The first private sector project in transmission by Reliance Power Transmission Limited (RPTL) achieved financial closure for its Western Region System Strengthening project during the global financial crisis period. In fact, the project, which is funded with a debt to equity ratio of 70:30, witnessed an oversubscription on the debt portion. Against a requirement of Rs. 970 crore, the project received financing approvals for Rs. 1,200 crore. The project reportedly achieved financial closure in 70 days from the execution of the project agreements.

- **EPC contractors'/ equipment suppliers' order book positions continued to remain healthy during the global financial crisis**

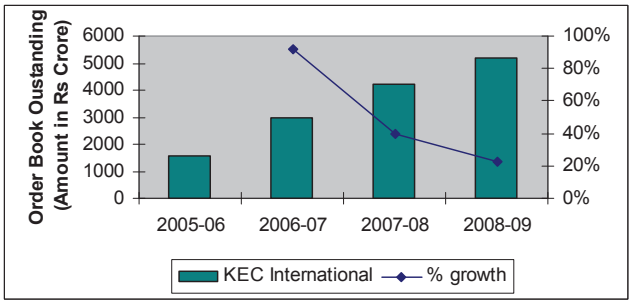
EPC contractors' / equipment suppliers' order book is a lead indicator of the impact on capital expenditure in the subsequent periods. An analysis of the listed players, such as KEC International

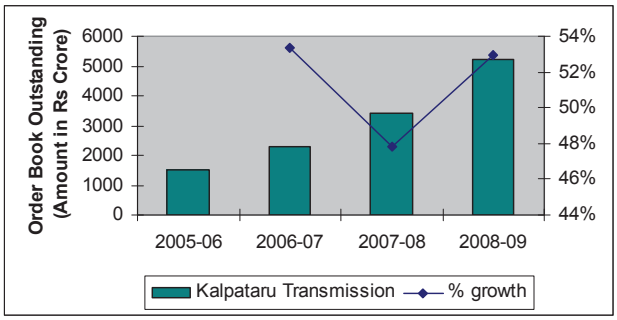
and Kalpataru Transmission, reveals that though their order books continued to remain healthy, KEC International's order book growth rate came down during the FY 2008-09. However, Kalpataru Transmission's order book has grown at a higher rate compared to that in FY 2007-08.

It is also understood that bids for equipment supply and construction, received by the central sector entities, were lower than their internal budget estimates. While no quantitative data on this is available in the public domain, bids are stated to be lower by 15-20% than the internal budget estimates. The prime reason for this could be relatively lower opportunities in the private sector market and international markets, leading to greater competition for the central sector business.

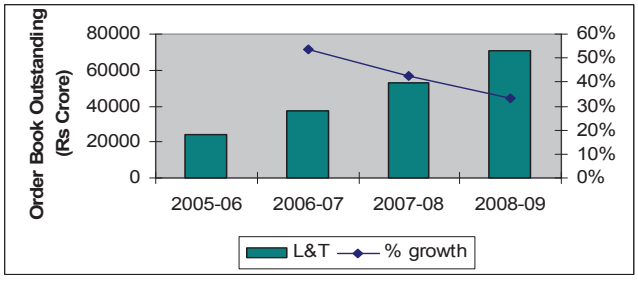
In the case of other players such as L&T, which is active in the generation, transmission and distribution segments, their order books witnessed lower growth compared to the earlier years but continued to remain at healthy levels. Emco Limited, which is active in both the transmission and the distribution segments, had witnessed growth at a higher rate. Thus, overall no major adverse impacts were experienced by the transmission sector EPC contractors/ equipment suppliers. The order book position of these key players for the last few years is given in the figure below.

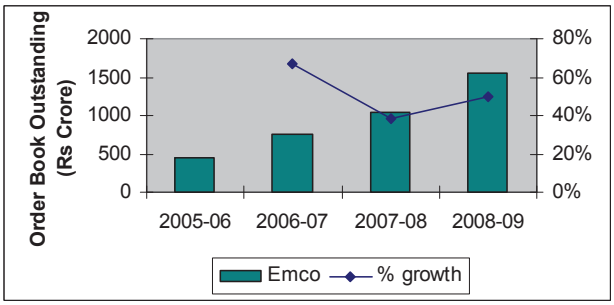
Figure 28: Order Book Outstanding for EPC Contractors / Equipments Suppliers - Transmission





Source: Annual Reports of KEC International and Kalpataru Transmission





Source: Annual Reports of L & T and Emco Limited

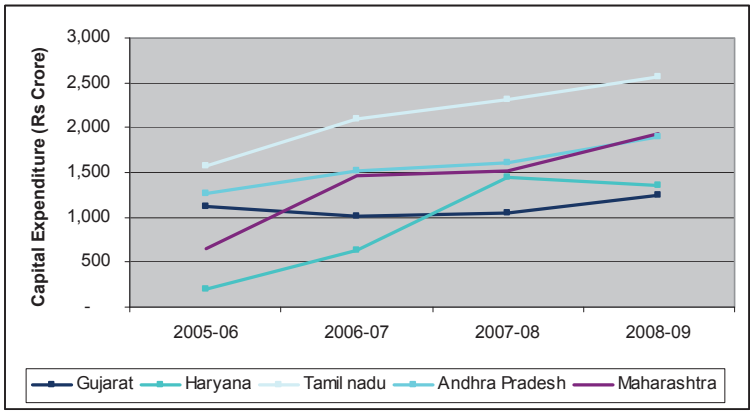
4.2.5 Impact on Electricity Distribution

This sub-section covers the analysis of the impact of the global financial crisis on the distribution segment. It may be noted that electricity distribution is dominated by the government sector and the projects are funded on balance sheet finance basis. Such projects receive government grants for financing the equity component of capital expenditure and subsidy for implementation of government-directed retail tariffs.

- **There was no reduction in capital investments by distribution utilities**

An analysis of select state distribution utilities including Gujarat, Haryana, Tamil Nadu, Maharastra and Andhra Pradesh reveals that the capital investments by these utilities continued to grow at a healthy pace during the *Crisis* period except the utility in Haryana, where it more or less remained at the same level (see Figure 29). The state distribution utilities that have been analyzed were short-listed on the basis of size, network length, and generation capacity addition plans.

Figure 29: Trend of Capital Investment by Select Distribution Utilities

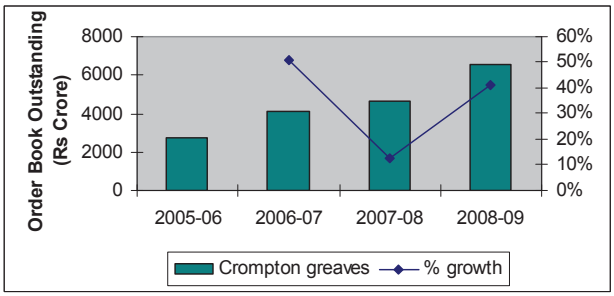


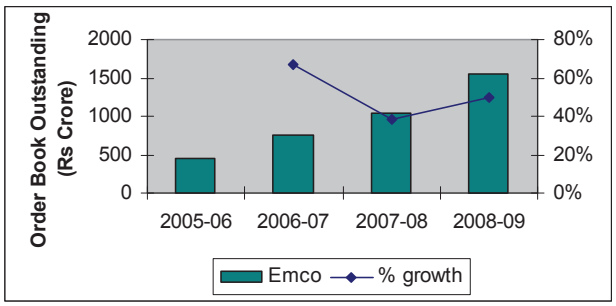
Source: Annual Reports of respective state distribution utilities

- **EPC contractors' / equipment suppliers' order book position remained healthy and growth continued even during the global financial crisis.**

As mentioned earlier, EPC contractors' / equipment suppliers' order book is a lead indicator of the impact on capital expenditure in the subsequent periods. The order book position and year-on-year growth of the same is given in the figure below. It can be seen that Emco Limited's order book, which is exposed to both the transmission and the distribution segments, had witnessed growth at a higher rate compared to the previous year and continued to remain healthy. Other players such as Crompton Greaves, which is in the distribution segment, also witnessed growth in its order book at a higher rate compared to the earlier year. Thus, on overall basis, no major adverse impact was witnessed by the distribution segment EPC contractors / equipment suppliers.

Figure 30: Order Book Outstanding for EPC Contractors / Equipments Suppliers – Distribution



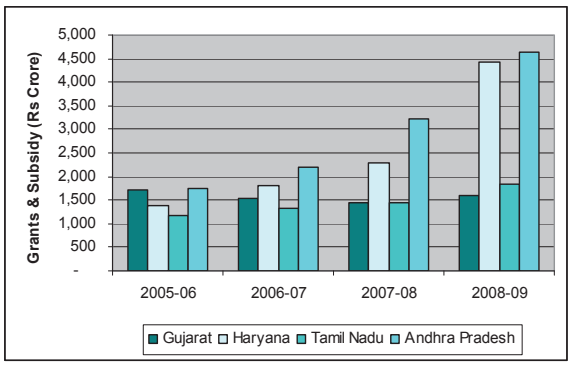


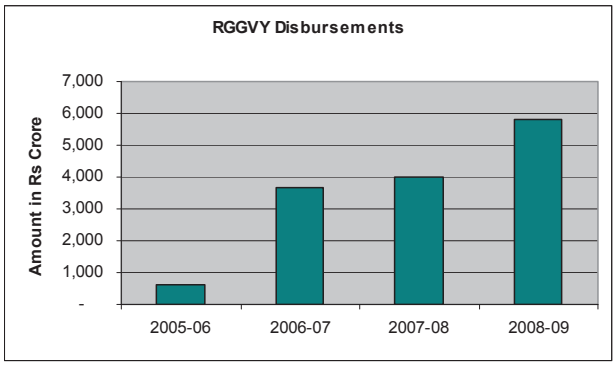
Source: Annual Reports of Crompton Greaves and Emco Limited

- **There was no reduction in allocation by centre / states in terms of grants / subsidies**

Analysis of select states in terms of grants /subsidies over a period of time indicates that there was no reduction in grants / subsidies. In fact, some of the states such as Haryana and Andhra Pradesh have seen a high increase in grants / subsidies. Further, Rajiv Gandhi Gramin Vidhyutikaran Yojana (RGGVY), which is aimed at the rural distribution sector in the country, has also seen disbursement growth, from Rs.4,007 crore in FY 2007-08 to Rs. 5,794 crore in FY 2008-09, which amounts to year-on-year growth of about 44%.

Figure 31: Trend in Grants / Subsidy for select states and Disbursements under RGGVY

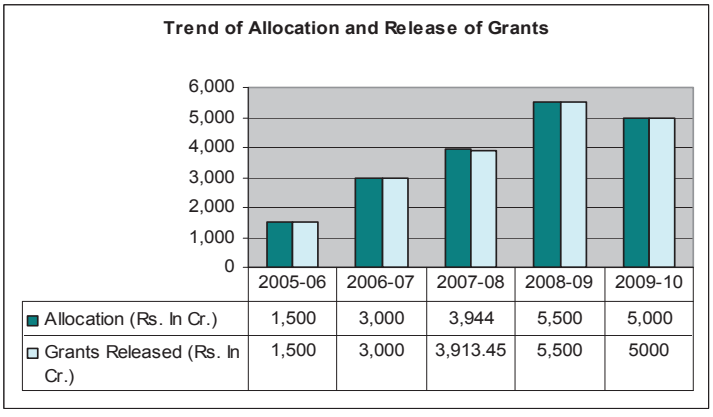




Source: Annual Reports of State Distribution Companies , REC Annual Reports

Overall also, there was no reduction in grant allocation by the central government under various schemes started in the 10th and the 11th Five Year Plans. The same continued at a higher level during FY 2008-09. Further, there was no difference in terms of the amount of grants allocated and the amounts actually released.

Figure 32: Grant Allocation from Central Govt. for Schemes under 10th & 11th Five Year Plans



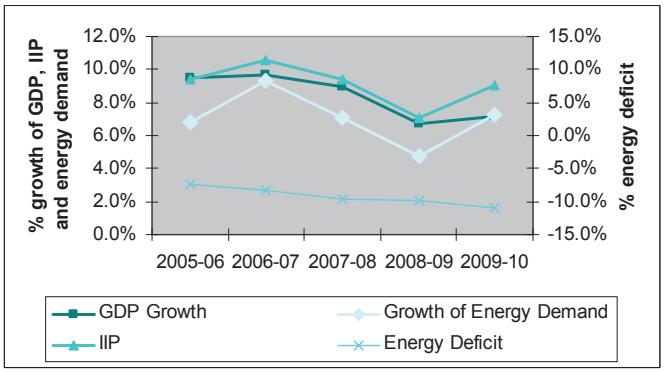
	2005-06	2006-07	2007-08	2008-09	2009-10
Allocation (Rs. In Cr.)	1,500	3,000	3,944	5,500	5,000
Grants Released (Rs. In Cr.)	1,500	3,000	3,913.45	5,500	5000

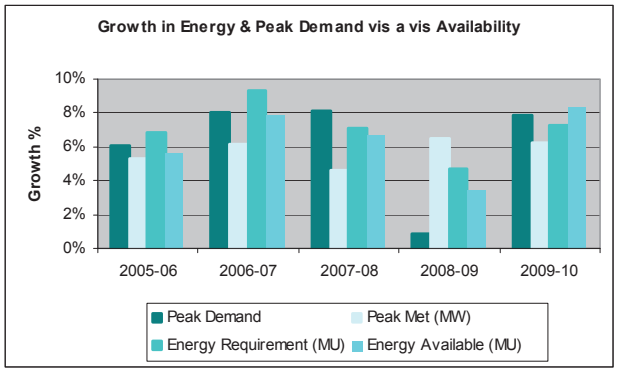
Source: infraline.com

- **Energy demand did not reduce, however in tandem with industrial slow-down, demand growth decelerated**

The growth of energy demand moved in tandem with the growth in GDP as well as IIP. While in absolute terms, energy demand did not fall, energy demand showed a lower growth compared to the previous years. It needs to be kept in mind that for a country with a high energy deficit of 11% - 12% and regular load shedding, the reduction in demand is likely to result in utilities increasing their supply hours. However, the slowing down of energy demand in India did not affect the energy deficit as growth in energy availability also came down.

Figure 33: Trend in energy growth



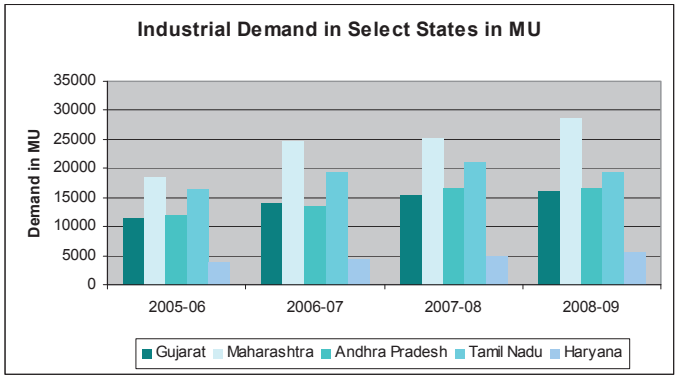


Source: Central Electricity Authority

At the state level, the trend in energy demand from industrial consumers is not clear. While states like Gujarat and Andhra Pradesh showed lower industrial demand growth in FY 2008-09 as compared to FY 2007-08, in states such as Maharashtra and Haryana, industrial demand continued to increase at a higher rate in FY 2008-09 compared to FY 2007-08. Only Tamil Nadu experienced negative growth in industrial demand, i.e., reduction in industrial demand in absolute terms (see Figure 34 below).

The reduction in industrial energy demand or its growth rate is expected to bring down the energy deficits. However, due to interplay with other factors such as addition to generation capacity, no clear trend is apparent in terms of slowdown in industrial demand and consequent reduction in energy deficit for the analyzed states. While the impact of the reduction of industrial demand growth is visible through a lower energy deficit in the state of Gujarat, in the case of Andhra Pradesh, during FY 2008-09, the energy deficit rose despite lower growth in industrial energy demand as there was no fresh capacity addition during FY 2008-09. Tamil Nadu, which has registered only a marginal increase of 92 MW capacity during FY 2008-09, also faced higher energy deficit compared to FY 2007-08. Haryana continued to show higher growth in industrial demand. The likely reason for this anomaly could be that the demand is driven by the service sector that had not witnessed a slowdown during the initial two quarters beginning April 2008. However, the state added 600 MW during the year and accordingly, there was a reduction in the energy deficit.

Figure 34: Trend in Industrial Demand in Select States



Source: Tariff Orders of Select States

4.3 Synthesis and Conclusion

The impact of the global financial crisis on India's power sector has been marginally adverse in the short term. No major medium-term and long-term impact is likely.

Indian power sector's resilience in the face of the global financial crisis is attributed to its strong demand fundamentals which have been driving its growth; increasingly conducive enabling environment since the enactment of EA 2003; broadening of domestic private developer base over the years; greater dependence on domestic sources of debt funding; existence of strong sector-focused financing entities; timely intervention by the government in the form of fiscal stimulus packages to revive demand; appropriate monetary policy measures by the central bank to address liquidity problems; and existence of government-owned central sector entities with strong balance sheets and robust cash flows.

In analyzing the impact of the global financial crisis, it is important that the impacts created by the pre-existing challenges in the sector, such as impediments in speedy implementation of generation projects and poor financial condition of distribution entities, are isolated from those created by the *Crisis*.

The following paragraphs summarize the specific impacts of the global financial crisis on investments in India's electric power infrastructure.

The central bank's timely interventions played a crucial role in restricting the impact of reduced liquidity on debt disbursements to a relatively short period of three to four months after September 2008.

The measures taken by the Central Government to boost economic growth helped in restoring confidence and were instrumental in bringing down the cost of credit to pre-*Crisis* levels. These measures also ensured continued economic growth during the *Crisis* period.

Availability of debt to central sector entities, which are focused on generation and transmission, are owned substantially by the central government, and have strong financial profiles, did not face any material challenges. These entities finance their investments on recourse basis, i.e., on the strength of

their balance sheets. Such entities continued to borrow at competitive rates (i.e., in terms of spreads over the benchmark rates), either through the bank credit route or the bond finance route. However, their cost of bank loans went up by about 75-100 basis points in the immediate aftermath of the *Crisis* in tandem with the increase in the prime lending rates of banks.

None of the entities in the central sector, who have robust cash flows and strong internal generation, had any difficulty in financing the equity component of their planned investments. Thus, the implementation of projects and capital expenditure by central sector entities continued unabated and in some cases even exceeded the targeted levels during the *Crisis* period. It is also understood that during the *Crisis* period, most central sector entities received extremely competitive quotes from their equipment suppliers/contractors, presumably due to tougher market conditions experienced by such suppliers/contractors in the private sector/overseas markets.

Even state sector entities -- which are focused across different segments in the value chain, i.e. generation, transmission and distribution; owned by state governments; and are known for their relatively weaker financial profile -- did not face any challenges in securing debt financing. This was primarily on account of the continued availability of credit from sector-focused financing entities and even commercial banks, which preferred public sector entities over private sector projects to extend credit during the *Crisis* period. It needs to be noted that like central sector entities, these entities too finance their investments on the strength of their balance sheets and implicit support from the state government. As was the case with the central sector entities, bank credit's cost did increase for state sector entities by about 75-100 basis points. State sector entities, which rely on state government grants for financing equity investments, did not face any difficulty in securing such funding during the *Crisis* period. Consequently, capital expenditure by state-level entities continued to show robust growth during the *Crisis* period.

The impact of the global financial crisis was most strongly felt in the area of private sector investments. The private sector's preferred mode of financing is limited/non-recourse project-financing. The impact on private sector investments, which are largely generation-focused, differed according to the stage of implementation of the project: (1) projects which had achieved financial closure before the onset of the *Crisis*; (2) projects which were at advanced stages of development and were seeking financial closure during the *Crisis* period; and (3) projects which were at an early stage of development.

For projects which had achieved financial closure, i.e., had tied debt and equity before the onset of the *Crisis*, availability of debt in terms of disbursements did not get materially impacted. However, the cost of debt funds went up by about 75-100 basis points in the immediate aftermath of the *Crisis* in tandem with the increase in prime lending rates of the banks. By and large, there are no known cases of delays in debt disbursals due to delays in equity flows by identified equity investors. Most projects belonging to this category are scheduled to be commissioned during the 11th Five-Year Plan ending March 2012 or during the early part of the 12th Five-Year Plan (FYP) commencing April 2012. Thus, timelines for commissioning of capacity during the 11th FYP and early part of 12th FYP are unlikely to witness any adverse impact due to the global financial crisis.

Projects in the advanced stages of development, i.e., those projects which were seeking financial closure, certainly experienced an impact on their timeline for achieving financial closure. Many such projects had sought to finance projects using foreign debt as one of the sources of debt finance.

However, foreign debt availability nearly dried up with the onset of the *Crisis*. It is believed that it was total risk aversion on the part of the foreign banks that led to a considerable drop in external commercial borrowings by the power sector during the *Crisis* period. Many such projects had to place greater than planned reliance on domestic debt funding to meet their debt requirements. It is understood that during the *Crisis* period, due diligence of projects by domestic lenders took relatively longer (than during the pre-*Crisis* period) and therefore lengthened the timeframe for achieving financial closure by about six months. Domestic lenders are understood to have laid greater emphasis on tie-up of equity financing before approving debt for projects.

Equity financing was the hardest hit among the sources of finance. Many developers faced difficulties in arranging equity for financing projects. Capital markets, which were already declining even prior to the onset of the *Crisis*, registered even sharper declines and plans for raising cheap equity at higher valuations through the capital market route had to be deferred. While private equity investors welcomed the decline in capital market valuations as it aligned their valuation expectations with those of strategic investors who were seeking private equity funding, the transactions took longer to conclude with the tightening process rigor and threshold expectations of investment committees in PE funds. As a result, PE transactions too saw a perceptible drop during the *Crisis* period. The *Crisis* period also witnessed deferment of plans or exits by many small or relatively new entrants in the power sector, who were leveraging their allocated captive coal blocks or state-allotted hydro project licenses to make a foray into power generation. Those that remained rushed to established and bigger strategic investors to tie up equity finance for their projects.

During the *Crisis* period, most established and bigger developers refocused their attention on relatively advanced stage projects. PE funds too showed distinct preference for project portfolios with a preponderance of operating, under-construction and advanced development stage projects.

Overall, the *Crisis* period saw a drop in the number of and quantum of financial closures. The cost of debt funding at the approval stage did go up by 75-100 basis points in keeping with the prevailing interest rate scenario in the country. However, it needs to be noted that it is the cost of debt at the disbursal stage, which impacts the economics of the project and not the one at the approval stage. While the rigor of the approval process certainly intensified during the *Crisis* period, the other terms of debt financing such as interest rate reset periods, loan covenants, and lenders' security, are not known to have altered as a result of the *Crisis*.

For generation projects awarded through tariff-based competitive bidding, which had envisaged foreign currency debt, increased reliance on more expensive rupee debt has effectively reduced the returns to the equity investors. Some of the projects, which eventually achieved financial closure post-March 2009, have been exploring the possibility of refinancing the un-drawn portion of rupee debt by arranging foreign debt through the ECB route.

Most projects belonging to this category are scheduled to be commissioned during the early part of the 12th FYP commencing April 2012. Overall, projects in this category, while delayed in terms of achievement of financial closure, are unlikely to see any material adverse impact on their timelines of commissioning of generation capacity. This is primarily because of the mitigation strategies adopted by many of the established developers in terms of arranging short-term financing to commence construction, pending achievement of financial closure, and their superior project management

capabilities which should enable timely achievement of commissioning as stipulated under the power purchase agreement or even achievement of early commissioning in some cases.

For projects in the early stages of development, i.e., projects which were at the bidding stage or projects which were in the process of securing key development stage inputs such as land and environmental clearances, the impact was felt in terms of lengthening of the development period (which culminates in the achievement of financial closure) timeframe. The *Crisis* period did witness postponement of bid submission deadlines for competitively-bid generation projects. The number of bidders who finally submitted bids also got adversely impacted when compared to the response levels during the pre-*Crisis* period. The tariffs quoted for some of the projects were also relatively higher when compared to those witnessed during the pre-*Crisis* period. While it is difficult to isolate the impact of the *Crisis* on tariffs, certainly an increase in debt funding costs and higher equity returns in the light of heightened risk perception, had a role in pushing up the quoted tariffs.

Most projects belonging to this category are scheduled to be commissioned during the later part of the 12th FYP commencing April 2012. Given the significantly bigger pipeline of such projects in the private sector, aggregating to about 95,000 MW, some delays as highlighted above are unlikely to materially affect timelines for commissioning of capacity over the latter half of the 12th FYP.

It is pertinent to note that during the *Crisis* period, tariff regulations for the period 2009-14, announced by the central regulator (CERC), did take note of such changes in the financing costs and increased the allowed equity return for cost-plus generation and transmission projects from 14% to 15.5% (16% in the case of commissioning of projects before the period indicated in the regulations).

While relatively higher generation tariffs (either through the competitive bidding route or cost-plus route) may make such projects relatively easier to finance and therefore less likely to face any financing-related implementation delays, the same may potentially have an adverse impact on the finances of already weaker distribution entities. This will bring distribution side reforms into sharper focus.

During the *Crisis* period, investments in renewable energy projects became relatively unattractive due to the reduction in rates of certified emissions reduction (CERs) in the market. This led to reduced interest in such projects during the *Crisis* period. Due to the relatively shorter gestation period, the impact in terms of lower capacity addition was experienced during the year following the *Crisis*.

The *Crisis* did have some beneficial indirect impacts on the sector:

- Triggered weeding out of speculative developers with relatively short-term outlook on the sector;
- Encouraged refocusing of development efforts on fundamentally stronger projects at relatively advanced stages of development, by strategic and PE investors;
- Discouraged speculative behaviour in bidding and brought tariffs to realistic levels;
- Underscored the importance of entities with stronger balance sheets;
- Highlighted the need for broadening and strengthening domestic sources of debt funding; and
- Brought into focus the centrality of distribution side reforms and the need to accelerate measures such as open access implementation, for power market development.

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5. ANNEXES

5.1 Annex 1: Scope of Work for the Assignment

5.1.1 Scope of Work

The Consultant's scope of work for the assignment is as follows:

(a) Gather data showing amount and source of funding actually accessed by a representative sample of power sector entities (both fossil-fuel and renewable energy-based, with minimum energy sector investment of $10 million and/or minimum capacity of 10 MW) in 2006, 2007, 2008 and 2009. The sources of funding are government budget (for power sector state-owned enterprises); bonds; stock market; sponsor equity; trade finance (export credit); commercial bank finance; development bank (including World Bank) finance; project finance; etc.

(b) Prepare projections/prospects for funding energy project pipeline (including green/clean energy components of the project pipeline) in the period 2010 to 2015. The energy project pipeline will include the full range of power projects that the government intends to develop either in the public or the private sector. In addition to Greenfield projects, major rehabilitation/ modernization projects would also be covered by the assessment, where possible.

(c) Analyze the data, describe the changes in the composition of funding from that traditionally observed, and identify causes for the changes in the pattern of funding. This would include an analysis of the Indian debt market so that its capabilities are well-understood.

(d) Asses whether or not there was a visible impact of the financial crisis on the power sector, and why. This would cover aspects relating to changes in availability (including government resource envelope, bond and equity financing, bank lending, private equity funding, external commercial borrowing) and cost (interest rate) and other terms of financing including time to closure; higher offered tariffs for competitively bid projects; changes in commercial and industrial consumption at the distribution level; project delays; relative riskiness of power sector entities, etc. This will also explicitly address the relative composition of funding for the generation, transmission and distribution sub-sectors in the electricity sector and analyze whether substitution of funding has been observed over time which could be attributed to a shortfall in generation funding. Has there been a noticeable "flight to quality" and if so, where does the market see quality in the power sector, i.e., which types of projects are receiving the biggest surge in funding.

(e) Estimate the funding gap in the period 2010-2015.

(f) Recommend funding sources (total amount as well as for specific projects) to address the identified funding gap in the power sector. In this regard, the consultant firm will assess the prospects of funding from private sources/PPPs and various non-traditional options including mobilizing resources from the Indian diaspora (in the form, for example, of non-resident Indian bonds.)

(g) Even in the face of the global financial crisis, some Indian states have seen major power sector investments. The consultant will assess the factors responsible for this.

(h) The consultant firm should explore the possibility of attracting funds from regional private sector players (which would mitigate the drying up of international credit markets and could subsequently attract the attention of other foreign investors who do not want to be first movers).

(i) The assessment will be undertaken based on information collected through a specifically designed questionnaire, available secondary sources of information, and in-depth discussion with select stakeholders.

5.1.2 Assignment Limitations

While the assignment has been carried out in line with the scope of work outlined in the previous section of this Report, it is important to note the following limitations/constraints faced while executing the assignment.

(a) While the scope of work mentions analysis of source of funds actually accessed by power sector entities in terms of bonds, stock market, sponsor equity, trade finance (export credit), commercial bank finance, development bank (including World Bank) finance, etc., such detailed information is not available in the public domain. Further, project or scheme-wise funding is only available in terms of break-up into debt and equity, and in some cases in terms of the amount of external commercial borrowings accessed by power sector entities. In view of this, an analysis of the changing pattern of the mix of debt funding sources could not be undertaken.

(b) While some information is available in the public domain with respect to major rehabilitation/modernization projects, the details are not sufficient to analyze the impact of the global financial crisis on renovation and modernization programs. Hence the same has not been covered in the report.

(c) An estimate of the funding gap for the period 2010-2015 has been carried out for debt funding only.

(d) As regards the analysis of differences in the impact on investments across different states, the following points need to be noted:

- State government owned entities i.e. utilities in generation, transmission and distribution, finance their investments on balance sheet finance basis. They primarily rely on Power Finance Corporation (PFC), Rural Electrification Corporation (REC) and in some cases on commercial banks for debt financing. In terms of availability of debt and therefore accomplishment of investment plans, states have not shown any differentiated performance.
- In terms of projects developed by the private sector, which had achieved financial closure prior to the onset of the *Crisis*, there has not been any adverse impact on their commissioning timeline due to non-availability of financing. Hence, there is no differentiated impact seen across various states in respect of such projects.
- As regards projects which were in the process of seeking financial closure, again the impact as analyzed in the report is primarily driven by the difficulties in raising equity or by longer time taken for achieving financial closure. None of these are known to have been influenced by relative attractiveness of power purchaser state(s) and/or the state where the proposed project is located.

- Only for projects in their early stage of development, say projects under competitive bidding, relative bid response levels or relative competitiveness of tariffs quoted by the developers could be influenced by the relative attractiveness of the power purchaser state(s). However, available data on this aspect does not enable us to draw objective and definitive conclusions. Therefore impact analysis presented in this report does not highlight relative difference in the impact on investments experienced by different states.

5.2 Annex 2: Evolution of India's Electric Power Infrastructure

For much of the history of post-Independence India, the electricity sector has been an entrenched symbol of the nation's state-led economic development approach. Publicly owned, and operated and managed by state employees, the sector was conceived and run as an instrument of development policy. Beginning in 1991, however, these basic assumptions began to be challenged. Sector-reform efforts have been as much about contesting this mindset as about undertaking changes in ownership, investment, and management practices.

There have been four overlapping but distinct periods of electricity sector policy approaches: (1) Pre - 1991; (2) The 1991 independent power producer (IPP) policy and its aftermath; (3) The World Bank-led restructuring policy, which began to be implemented around 1993 in Orissa; and (4) Enactment of the Electricity Act, 2003, when the restructuring model was scaled up through national legislation and state-level reforms.

The Indian Electricity Act, 1910, created the basic framework for electric supply in India. The Electricity (Supply) Act, 1948 mandated the creation of vertically integrated utilities, i.e., the State Electricity Boards (SEB). At that time, it was felt that supply of electricity, which till then was limited to big cities, must be extended to cover the rest of the country and that it was the Government's responsibility to implement it. Accordingly, the onus of developing the electricity sector rested on the state governments and through them with the respective State Electricity Boards.

Over a period of time, the performance of SEBs across India deteriorated due to (i) low tariffs as compared to the cost of supply; (ii) high transmission and distribution losses; (iii) inefficient systems and process for revenue collection; (iv) irregular payment of cash subsidy from governments leading to cash shortfall, and (v) spiralling interest expenses on account of continuing shortfall in revenues to meet expenses.

A power policy was announced by the Government of India (GoI) in 1991 inviting private sector participation in the Indian electricity sector. The key features of the policy were (i) norms for operational parameters of electricity generation plants; (ii) norms for determination of tariffs on Cost Plus basis; and (iii) concept of a two-part tariff, i.e., separate capacity charges (linked to the availability of electricity generation capacity) and energy charges (linked to actual generation of electricity).

In 1998, the Electricity Regulatory Commissions Act was enacted to segregate the roles pertaining to (i) regulation; and (ii) policy matters relating to the electricity sector. It created the Central Electricity Regulatory Commission (CERC) and allowed state governments to create State Electricity Regulatory Commissions.

Even after these measures were implemented, the performance of the electricity sector remained dismal. The losses of all the SEBs in India increased from USD 681 million in FY 1992-93 to

around USD 3,772 million in FY 1999-2000[25]. This deteriorating health of the off-takers, i.e., the SEBs, discouraged private sector participation in the electricity generation sector. Lack of private sector investments coupled with inadequate state government funding hampered the growth of capacity in the electricity generation sector. The total addition in installed electricity generation capacity from 1992 to 2002 was around 35,500 MW, which was half of the target and the capacity addition by IPPs was just 6,778 MW from 1993-94 to 2001-02.[26]

Thus, a need was felt to introduce a comprehensive legislation which would address key concerns such as (i) determination of tariffs on the basis of economic criteria; (ii) timely payment of subsidy in cash from governments; (iii) adequate tariffs to recover cost; (iv) simplification of procedure for curbing commercial losses; (v) creation of an alternative to the single buyer, i.e., State Electricity Board, by permitting sale to third parties; (vi) trading of electricity to manage regional demand/supply mismatch; (vii) introduction of competition; and (viii) promotion of efficient operations in order to make the electricity sector financially viable and self-sustaining.

Against this backdrop, a new self-contained comprehensive legislation, the Electricity Act, 2003 (EA 2003) was introduced. All previous legislations were summarily repealed by EA 2003. EA 2003 preserves the core features of previous laws, other than those relating to the mandatory existence of SEBs and the responsibilities of the state governments and SEBs with respect to regulating licensees. EA 2003 is progressive, in the sense that it rationalizes the provisions in the existing laws to create a competitive environment and a level playing field for all participants irrespective of ownership. Further, it obviates the need for individual states to enact their own legislation and has provisions to address emerging concepts such as power trading and open access. Some of the key features of the sector before and after the implementation of EA 2003 are given below.

Pre - EA 2003:

- Vertically integrated, non-corporate, self-regulating utilities owned by state governments which performed all functions of generation, procurement, transmission and sale of electricity.
- Limited private sector involvement in generation post-1991; sale of electricity by generators under long-term PPAs, bilaterally negotiated with single offtakers; limited flexibility and overdependence on contractual integrity.
- Sector inefficient and lacking in commercial focus.
- Extension of electricity across India.
- Significant losses incurred by utilities progressively and state governments unable to sustain the level of subsidies required to sustain their financial health.
- Need for significant investment which was financially not viable, leading to forced low capita consumption and significant gap between demand and supply.

[25] Source: Power Finance Corporation Report on Performance of State Utilities

[26] Source: Central Electricity Authority

Post - EA 2003:

- Sector has significantly opened up through mandatory unbundling, segregation of the distribution and procurement functions, introduction of availability-based tariff regime, and introduction of electricity trading as a licensed activity.
- The regulatory regime is evolving further to introduce open access and multi-year tariff approvals; extend Availability-Based Tariff ('ABT') within the state; introduce compulsory metering; and declare electricity theft as a criminal offence.
- Procurement of power by distribution entities is through tariff based competitive bidding.

5.3 Annex 3: Summary of Key Regulations and Policies Governing the Sector

Introduction

The power sector in India has for long been guided by the Indian Electricity Act of 1910, the Electricity Supply Act of 1948 and various rules laid down under these laws. While the SEBs have contributed to accelerated growth in the sector, their performance has called for significant improvement/ reforms. To provide a uniform approach for the reforms and necessary impetus for sound and sustainable commercial growth in the sector, the Government of India enacted the Electricity Act 2003 (EA 2003), which paved the way for accelerated reforms, growth in the sector, and introduction of competition and efficiency in various functions. With the enactment of the Electricity Act 2003 and establishment of regulatory frameworks, both at the Central and the state levels, the electricity business environment has changed significantly. The spirit of the new Electricity Act is to introduce competition in all spheres of activities in the power sector and hence provide all power sector players, including distribution companies, an opportunity to enter the market or expand their existing market base.

As per the provisions of the EA 2003, the regulatory structure has also been realigned. Two levels of regulatory powers have been created: at the Central level and at the state level with clear demarcation of the roles and jurisdiction of both in line with the fact that electricity is a concurrent subject shared by the Centre and the states. At the central level, the Ministry of Power is responsible for the policy-related aspects of the sector; the overall sector planning has been entrusted to the Central Electricity Authority (CEA). Currently, there are no separate roles of policy and planning at the state level; both are under the state government. Further, the regulatory aspects of the sector involving multiple states are looked after by the Central Electricity Regulatory Commission; State Electricity Regulatory Commissions take care of the same at the state level.

Based on the provisions of the Act, several policy initiatives have been notified by both the Central and state governments. The National Electricity Policy, notified by the Central Government in February 2005, had among its objectives to make power available to all households in a period of five years. It also gave guidelines for commercial turnaround of utilities and protection of consumer interest. The National Tariff Policy was also notified by the Central Government in January 2006 with the aim of ensuring financial viability of the sector and attracting investments as well as to promoting transparency, consistency and predictability in the regulatory approaches across jurisdictions. Other key initiatives at the Central level include the Rural Electrification Policy, which intends to give a further thrust to the electrification of villages and reach the goal of providing access to electricity to all households in a fixed timeframe.

The State Electricity Regulatory Commissions, in turn, have also issued their own policies and directives in compliance with the provisions of EA 2003 and other policy initiatives mentioned above such as Open Access regulations, introduction of intra-state availability-based tariffs, and multi-year tariff frameworks.

The key features of each of the above policy measures initiated by the Centre as well as the states are discussed below.

Key Provisions of Electricity Act, 2003

There has been a fundamental reconsideration of the way the power sector is regulated in recent years post the enactment of EA 2003. Some of the new paradigms for the implementation of EA 2003 are detailed below.

New paradigm	▪ Regulator to be the licenser, license enforcer, tariff setter, dispute resolver ▪ Distribution companies to be responsible for conduct of business in fair, reasonable, and efficient manner ▪ Work processes, systems and costs to be subject to regulator's scrutiny and public viewing ▪ Bulk consumers to have choice of supplier
New obligations	▪ Forward estimates of demand, cost, investment plans ─ higher degree of process automation to compile engineering, billing and financial data ▪ Requirement of public disclosures ─ credible and transparent documentation of revenue and expenses ▪ Clear accountability to meet service standards through practice documentation and process measurements ▪ Credible cost structure of allocating expenses under different supply voltages for pricing decisions

Apart from the above, specific regulations in EA, 2003 have brought about significant changes in the power sector at the consumer level, i.e., at the distribution of electricity end. These are discussed below.

- The distribution licensee has a mandatory duty to supply electricity on request to any consumer in a time-bound manner upon payment of applicable tariff. Distribution licensee is empowered to recover charges/ expenses and demand security deposit for providing his services. Ombudsman should be established in each state for consumers' grievance redressal.
- SERCs may allow parallel distribution by permitting more than one company to supply electricity through separate independent distribution systems. However, the parallel distribution licensee has to comply with the additional requirements prescribed by the Government of India (GoI) regarding capital adequacy, creditworthiness, code of conduct, etc.
- SERCs may permit a consumer/class to receive supply of electricity from anyone other than the distribution licensee in his area of supply by open access.
- EA 2003 has provided open access to all consumers who want to wheel power from their own captive power plant. EA 2003 grants the distribution licensee the right to trade electricity without a separate trading license.
- EA 2003 allows the distribution licensee to sub-contract part functions of its operation/area of supply by way of franchise. However, the obligation to supply and other responsibilities would still be with the licensee.

- The distribution licensee can recover cross-subsidy charge from open access users (other than captive users) to meet the existing cross-subsidy at the required levels in his area of supply. The cross-subsidy surcharge is to be determined by the respective SERC and EA 2003 envisages gradual elimination of the surcharge over a period of time.
- The distribution licensee can also recover an additional surcharge from the open access users to meet any stranded cost it would have to incur due to the migration of load. The Forum of Indian Regulators (FOIR) has recommended that no additional surcharge should be applicable, in the present energy-deficit scenario, as neither generation nor network infrastructure would get stranded due to migration of load. However, as and where, situations of stranded generation or network assets do arise, these are expected to be dealt with by the respective commissions on a case-to-case basis.
- The distribution licensee would have to adhere to the electricity supply code and the standard of performance regulation issued by the respective SERCs (GERC has already come out with these regulations whereby the company would have to adhere to the parameters laid down in terms of safety standards, quality and reliability of supply, timely handling of services related to new connections, timely remedy of supply interruptions, method of charging the consumers, and payment of interest on security deposits, etc.).
- The distribution licensee has to get the tariff for purchase of power from a generation company, retail sale of electricity, and wheeling of electricity approved by the SERC. However, in the case of purchase of power through a competitive bidding process (as approved by GoI), the approval of SERC is not required.
- The state government is entitled to provide subsidy to any consumer category provided that it pays the subsidy in advance in a manner specified by the SERC.
- The retail tariffs are to be rationalized in a phased manner with transparent subsidy payment by the government in cash to the licensees.
- Thrust to complete rural electrification and provide for management of rural distribution by panchayats, cooperative societies, non-government organizations, franchisees etc.
- Metering of all electricity supplied has been made mandatory. The distribution licensee is empowered to disconnect supply for non-payment of dues. Stringent provisions for controlling theft of electricity have been made.

National Electricity Policy

The salient features of the National Electricity Policy are described below.

- A time-bound programme should be drawn up by the State Electricity Regulatory Commissions (SERC) for segregation of technical and commercial losses through energy audits not later than March 2007. An action plan for the reduction of the losses with adequate investments and suitable improvements in governance should be drawn up.
- Standards for reliability and quality of supply as well as for loss levels shall also be specified by the SERCs from time to time, so as to bring these in line with international practices by 2012.
- The Act mandates distribution licensees to supply electricity through a correct meter within a stipulated period. The Authority should develop regulations as required under Section 55 of the Act within three months of the notification of the policy.
- The Act requires all consumers to be metered within two years from the notification of the policy. The SERCs may obtain their metering plans from the distribution licensees, approve these, and monitor the same.

- The SERCs should encourage the use of pre-paid meters. In the first instance, Time of Day (TOD) meters for large consumers with a minimum load of one MVA are also to be encouraged. The SERCs should also put in place independent third-party meter testing arrangements.
- Modern information technology systems may be implemented by the utilities on a priority basis, after considering cost and benefits, to facilitate creation of network information and customer data base which will help in the management of load, improvement of quality, detection of theft and tampering, customer information and prompt and correct billing and collection.
- Special emphasis should be placed by distribution licensees on consumer indexing and mapping in a time-bound manner.
- High Voltage Distribution System is an effective method for reduction of technical losses, prevention of theft, improved voltage profile and better consumer service. It should be promoted to reduce the LT/HT ratio, keeping in view techno-economic considerations.
- A time-bound programme for the implementation of SCADA and a data management system should be obtained from distribution licensees and approved by the SERCs keeping in view techno-economic considerations. Efforts should be made by the utilities to install substation automation equipment in a phased manner.
- The states and distribution utilities should ensure the effective implementation of anti-theft provisions under EA 2003 and may set up special courts as envisaged in EA 2003.
- The state governments would prepare a Five-Year Plan with annual milestones to bring down the AT&C losses expeditiously. Community participation, effective enforcement, incentives for entities as well as staff and consumers, and technological upgradation should form part of campaign efforts for reducing these losses.
- Reliability Index (RI) of supply of power to consumers should be indicated by the distribution licensee. A road map for declaration of RI for all cities and towns up to the District Headquarter towns as also for rural areas, should be drawn up by SERCs. The data of RI should be compiled and published by CEA.
- Commission should regulate utilities based on pre-determined indices of quality of power supply.

Rural Electrification Policy

The salient features of the Rural Electrification Policy are given below.

- The Rural Electrification Policy aims at provision of access to electricity to all households by 2009; quality and reliable power supply at reasonable rates; and minimum lifeline consumption of one unit per household per day as a merit good by 2012.
- As per the policy, the appropriate commission would lay down guidelines for this purpose for various types of projects (for different fuels, technology and size) receiving subsidy as opposed to tariff determination on a case-to-case basis.
- The policy suggests both grid extension and off-grid solutions for the purpose of electrification and has suggested a follow-up with special enabling dispensation to be put in place for standalone systems of up to 1 MW which are based on cost effective proven technology and use locally available resource such as biomass.
- For the purpose of management, the RE policy suggests the deployment of franchisees in order to ensure revenue sustainability and improve services to the consumers.

- The RE policy gives state governments six months to prepare and notify a Rural Electrification Plan to achieve the goal of providing access to electricity to all households.

Key Provisions of the National Tariff Policy

The salient features of the National Tariff Policy are given below.

- All future requirement of power should be procured competitively by distribution licensees, except in cases of expansion of existing projects or where a state-controlled/owned company has been identified as a developer and where regulators will need to resort to tariff determination based on norms provided that expansion of generating capacity by private developers for this purpose would be restricted to one time addition of not more than 50% of the existing capacity. Even for the public sector projects, tariff of all new generation and transmission projects should be decided on the basis of competitive bidding after a period of five years or when the Regulatory Commission is satisfied that the situation is ripe to introduce such competition.
- The MYT framework is to be adopted for all tariffs to be determined from April 1, 2006.
- Regulatory assets must be created only as an exception; recovery should be time-bound and within a period not exceeding three years at the most and preferably within the control period, carrying cost of Regulatory Asset should be allowed to the utilities and in business as usual conditions, the opening balances of uncovered gap must be covered through transition financing arrangement or capital restructuring.
- Tariffs for consumers below the poverty line who consume below a specified level should be supported through cross-subsidy; however, tariff for such consumers will be at least 50% of the average cost of supply.
- SERC would notify a roadmap within six months with the target that by the end of 2010-2011, tariffs are within ± 20 % of the average cost of supply.
- PPAs with the generating companies would need to be suitably assigned to successor distribution companies.
- The cross-subsidy surcharge should be brought down progressively and, as far as possible, at a linear rate to a maximum of 20% of its opening level by the year 2010-11.
- Metering of supply to agricultural/rural consumers can be achieved in a consumer-friendly way and in an effective manner by the management of local distribution in rural areas through commercial arrangements with franchisees with the involvement of panchayat institutions, user associations, cooperative societies, etc.

5.4 Annex 4: Realizable Pipeline and Funding Gap

This annex establishes the demand for funds and available supply of funds to arrive at the funding gap in the India's power sector over the next five years, i.e., FY 2010-11 to FY 20014-15. The demand for funds is based on: (a) analysis of the realizable pipeline of generation projects based on planned capacity additions and physical on-ground progress of various projects, and (b) funding requirements across other elements of the value chain, based on certain benchmarks of the capital costs. Estimation of the supply of funds is premised on certain assumptions detailed in the Annex. The following paragraphs present the underlying assumptions and analysis.

5.4.1 Realizable Pipeline & Funding Requirement

5.4.1.1 Approach to Projection of Realizable Pipeline

In order to arrive at the realizable project pipeline, a detailed exercise has been undertaken to estimate the likely generation capacity additions in the Indian power sector during the period FY 2010-11 to FY 2014-15. The approach is to assess the likely generation capacity additions at a project level, which is based on: (a) the CEA's project monitoring report and medium-term appraisal of capacity addition undertaken by the Ministry of Power,[27] and (b) CRISIL Infrastructure Advisory's own internal database of major power projects being developed by private players.

To estimate the capacity additions during the 11th Five-Year Plan (Plan), a recent report, dated 30th April 2010, by the CEA called "Feasible capacity additions during the 11th Five-Year Plan" was used as a starting point. This report estimates that power generation projects totalling 62,374MW are likely to be commissioned during the 11th Plan. Inputs on most projects that are likely to be commissioned during FY 2010-11 and FY 2011-12, are captured in this report. Expected commissioning dates of some of these projects have been revised, based on specific project-level information available and/or the past track record of project implementation.

Further, CRISIL Infrastructure Advisory has maintained its own database ("IPP List") of projects being developed by private players, based on its work with various developers as well as announced plans of large developers in India. This database contains information on over 100 projects being developed by most large private players in the Indian power sector and totalling to a generation capacity of over 95,000 MW. As private participation in power generation has only recently picked up, most of these projects are expected to be commissioned only in the 12th Plan period. Thus, this database has been used as a basis to estimate the likely capacity additions during the period FY 2012-13 to FY 2014-15. The overall estimation of capacity additions by central sector entities such as NTPC, NPCIL and NHPC as also state-level generating companies, has been made for the 12th

[27] It contains comprehensive project-level information on plants expected to come online during the 11th Five-Year Plan (ending March 2012) and information on projects under consideration for the 12th Five-Year Plan (beginning April 2012).

Plan based on their announced plans and past track record of project development and implementation.

To the project-level capacity addition estimates provided by the above two databases, projections of renewable capacity additions during the period FY 2010-11 to FY 2014-15 have been added to arrive at an overall year-wise generation capacity addition estimation.

5.4.1.2 Assessment of Planned Projects / Capital Addition

The CEA report "Feasible capacity additions during the 11th Plan," dated 30th April, 2010 estimates that about 118 projects (including 30 hydro projects, 84 thermal projects and 4 nuclear projects) shall come online during the 11th Plan adding 62,374 MW to the total installed capacity (see Table 17).

Table 17: Estimated Capacity Addition (revised) during the 11TH Five-Year Plan

Total Capacity Addition (MW)	Hydro	Coal	Lignite	Gas/LNG	Nuclear	Total
Central Sector	2,922	13,430	750	740	3,380	21,222
State Sector	2,854	14,735	450	3,316	0	21,355
Private Sector	2,461	13,725	1,080	2,531	0	19,797
All India	8,237	41,890	2,280	6,587	3,380	62,374

Source: Central Electricity Authority

Out of the revised capacity addition of 62,374 MW planned during the 11th Five Year Plan, about 22,301 MW capacity has already been added in the period FY 2007-08 to FY 2009-10. Of the balance, CRISIL Infrastructure Advisory estimates that about 32,342 MW is likely to be commissioned between FY 2010-11 and FY 2011-12, and the remaining will spill over to the 12th Plan.

CRISIL Infrastructure Advisory's assessment of its internal database of announced private sector projects suggests that although over 95,000 MW of projects have been announced by various private developers, only projects of about 22,111 MW capacity seem to be in a position to get commissioned between FY 2010-11 and FY 2014-15 over and above the projects considered in the Central Electricity Authority (CEA) estimates. Of these, projects adding 5,030 MW capacity (over and above those considered in the CEA list) shall come online between FY 2010-11 and FY 2011-12 and the remaining 17,082 MW capacity will be commissioned during the period FY 2012-13 to FY 2014-15.

It is unlikely that the 95,000 MW IPP list of projects will be realised entirely as many of these projects are still in an early stage of development. The realizable capacity additions for FY 2012-13 to FY 2014-15 of the 12th Plan assume that 33% of the above projects would actually come online. Thus, the overall capacity additions during the period FY 2010-11 to FY 2014-15 are projected below in the Table 18.

Since no aggregated information is available with respect to renewable energy projects in the pipeline, it is assumed that renewable projects will add capacity equivalent to about 10% of the capacity added from thermal, hydro and nuclear-based projects.

Table 18: Sector-wise Overall Capacity Addition for the period: FY 2010-11 to FY 2014-15

Capacity Addition in MW	2010-11	2011-12	2012-13	2013-14	2014-15
Central Sector	6,217	6,855	8,230	5,800	7,122
State Sector	4,590	5,733	4,200	5,560	5,355
Private Sector	7,501	10,213	14,030	17,474	12,253
All India	**18,308**	**22,801**	**26,460**	**28,834**	**24,730**

Source: CRIS Analysis

The fuel-wise break-up of overall capacity addition is presented in the Table 19 below:

Table 19: Fuel-wise Overall Capacity Addition for FY 2010-11 to FY 2014-15

Capacity Addition in MW	2010-11	2011-12	2012-13	2013-14	2014-15
Coal	11,348	14,565	20,602	21,022	20,730
Gas	2,115	1,101	0	1,718	124
Hydro	1,548	3,562	3,453	3,472	1,629
Nuclear	1,633	1,500	0	0	0
Renewables	1,664	2,073	2,405	2,621	2,248
Total	**18,308**	**22,801**	**26,460**	**28,834**	**24,730**

Source: CRIS Analysis

Clearly, the private sector is going to emerge as a key player, especially during the 12th Plan period. If the current aggressive investment plans of the private sector are maintained, then even after taking into account the probability of certain projects being delayed or shelved, the 12th Plan period should see more than half of the capacity addition coming from the private sector. Over the years, the state generation utilities would have declining contribution in generation capacity addition as they would be required to participate in competitive bidding exercises to sell power from their new plants/expansion projects post-January 2011 (subject to the state regulator's decision) unlike currently when they are selling to distribution companies in the respective states through negotiated cost-plus PPAs.

It may be noted that the above is based on project-level assessment of only those projects that are currently announced and on assumptions found to be appropriate for the current market dynamics. Thus, one finds that the capacity additions peak around FY 2012-13 and FY 2013-14. As the power sector matures, changes in the regulatory environment, policy initiatives by the Government, the fuel supply situation, and the overall dynamism in the market shall have a significant impact on the actual capacity additions that materialize in the coming years, especially in the 12th Plan.

5.4.2 Estimation of Funding Requirement

In order to arrive at the capital funding requirement, the following assumptions for capital cost have been made:

- Coal-based generation projects: Rs. 5 crore per MW (typical range is Rs. 4.50 crore per MW to Rs. 5.50 crore per MW)

- Gas-based generation projects: Rs. 3.75 crore per MW (typical range is Rs. 3.25 crore per MW to Rs. 4.25 crore per MW)
- Hydro-projects: Rs. 8 crore per MW (Typical range is Rs. 6 crore per MW to 10 crore per MW)
- For nuclear projects, there is no clear range of capital cost. However, based on a recently closed deal of Nuclear Power Corporation, Rs. 7 crore per MW is assumed.

An aggregated project pipeline of transmission, distribution and renewable energy projects at the country level for the period FY 2010-11 to FY 2014-15, is not available. Hence, information available in the Eleventh Five-Year Plan and initial estimates of the Twelfth Five-Year Plan, which are in the form of aggregate capital investment requirement for transmission, distribution and renewable projects, are used to estimate the funding requirement. According to the 11th Five-Year Plan and initial estimates of the 12th Five-Year Plan, the aggregate capital investment in transmission and distribution is as mentioned below in Table 20:

Table 20: Capital Investment Plan for Transmission & Distribution during 11th & 12th Five Year Plan

Amount in Rs Crore	11th Five Year Plan	12th Five Year Plan
Transmission	140,000	240,000
Distribution	309,077	400,060

Source: CEA Website

Since the capital investment in transmission and distribution depends to a large extent, on the amount of energy to be wheeled through the network, the amount of capital investment in these segments is linked to capital investment in generation projects/generation capacity addition. The generation capacity addition/generation capital investment requirement according to our estimate is different from the capital expenditures planned in the 11th and 12th Five Year Plans. Also, no year-wise break-up of the capital expenditure in the transmission and distribution segments is available. As a result, various assumptions have been made to arrive at year-on-year revised capital investment requirement in the transmission and distribution segments. For the estimation of capital investment, it is assumed that the capital investment required in transmission and distribution per unit capital investment in generation shall remain at the same level as assumed in the Five-Year plans, i.e.,

(i) During the 11th Five-Year Plan, for every Rs.1 crore investment in generation, about Rs.0.24 crore investment would be required in transmission and Rs.0.52 crore in distribution.

(ii) During the 12th Five-Year Plan, for every Rs.1 crore investment in generation, about Rs.0.52 crore investment would be required in transmission and Rs.0.81 crore in distribution.

Based on these assumptions, the total capital investment in the electricity sector is estimated as given in Table 21 below:

Table 21: Capital Investment Requirement in India's Power Sector for FY 2010-11 to FY 2014-15

Amount in Rs Crore	2010-11	2011-12	2012-13	2013-14	2014-15
Coal	56,740	72,825	103,008	105,112	103,649
Gas	7,932	4,129	-	6,443	464
Hydro	12,384	28,496	27,621	27,777	13,029
Nuclear	11,428	10,500	-	-	-
Renewable	9,986	12,437	14,432	15,727	13,489
Transmission	23,297	30,375	70,321	75,167	63,326
Distribution	51,434	67,059	117,219	125,298	105,560
Total Investment in Power Sector	**173,201**	**225,821**	**332,601**	**355,523**	**299,518**

Source: CRIS Analysis

Project incurs capital expenditure during its entire construction period leading up to the stage of commissioning. With this scenario in mind, assumptions have been made with respect to capital expenditure phasing over different years based on the project construction period, and typical phasing of the capital expenditure as relevant for different value chain segments.

The capital requirement from the various sources of finance, i.e., equity and debt, has been estimated, based on the debt-equity ratios of the projects that have achieved financial closure or on the typical funding pattern by utilities in case of transmission and distribution. In the case of the thermal power projects, a debt: equity ratio of 75:25 has been assumed for the private sector projects and 70:30 for the central sector and state sector projects. A debt-equity ratio of 70:30 has been assumed for funding hydro-generation as well as renewable energy projects, based on historical patterns of funding. Similarly, for transmission projects, a debt-equity ratio of 70:30 has been assumed. This is due to the fact that most transmission capital investments are likely to be made by government-owned utilities under the cost-plus regime, wherein the regulator typically allows normative interest and Return on Equity assuming a 70:30 debt-equity ratio. The typical funding pattern of distribution capital expenditure varies, however. Based on the average debt-equity mix of all the distribution utilities in the country, a debt-equity ratio of 60:40 has been assumed.

Considering the above debt-equity mix assumptions and the capital expenditure phasing, the year-wise debt requirement for the power sector for the period FY 2010-11 to FY 2014-15 is given in Table 22.

Table 22: Debt Requirement for Power Sector in FY 2010-11 to FY 2014-15

Requirement of Debt in Rs. Crore	2010-11	2011-12	2012-13	2013-14	2014-15
Coal	61,712	70,855	77,775	84,159	71,515
Gas	2,934	1,916	2,420	1,420	336
Hydro	14,784	14,341	10,833	7,933	4,560
Nuclear	877	420	-	-	-
Renewables	7,848	9,404	10,556	10,226	9,820
Transmission	18,785	35,244	50,921	48,473	47,325
Distribution	51,434	67,059	117,219	125,298	105,560
Total Requirement of Debt	**158,375**	**199,239**	**269,724**	**277,508**	**239,116**

Source: CRIS Analysis

5.4.3 Estimation of Supply of Funds

The estimation of the supply of funds and accordingly the funding gap applies to the debt component alone and not to equity/government grants, consumer contribution, etc. Under the debt component, the typical sources of funds are domestic bank credit, funding from non-banking finance companies, investment by insurance and pension companies, and external commercial borrowings. The approach adopted for estimation of supply of funds from each of these sources is given below.

(i) Domestic Bank Credit

The power sector has accessed around Rs. 30,548 crore as credit from domestic banks during FY 2008-09. Domestic bank credit extended to the power sector has been growing at about 33% p.a. for the last two years. Despite slowdown during FY 2008-09, the pace of growth has been maintained. In view of this, we have assumed a growth rate of around 33% p.a., for the purpose of forecasting supply of funds from this source.

(ii) Non-Banking Finance Companies (NBFCs)/Pension and Insurance Companies

There are limitations with respect to data availability on the funds lent by these entities to the power sector projects. However, the Planning Commission's report on Projections of Investment in Infrastructure during the Eleventh Plan dated 14th August, 2008 does provide an estimation of funds available from these entities to the infrastructure sectors. The same is given below in Table 23.

Table 23: Debt Availability for Infrastructure sectors during the 11th Five Year Plan

Amount in Rs Crore	2007-08	2008-09	2009-10	2010-11	2011-12
Domestic Bank Credit	49,848	63,207	80,147	101,626	128,862
Non-Banking Finance Companies	23,852	31,485	41,560	54,859	72,415
Pension / Insurance Companies	9,077	9,984	10,983	12,081	13,289
External Commercial Borrowings	19,593	21,768	24,184	26,868	29,851

Source: Planning Commission. 2008. Projections of Investment in Infrastructure during the Eleventh Plan

As per the above mentioned report, the power sector accounts for about 32% of the total investment requirement for infrastructure sector. It is assumed that the power sector would be able to access around 32% of the funds available for infrastructure.

(iii) External Commercial Borrowings (ECBs)

The quantum of ECBs accessed by the power sector has not shown any consistent pattern as it is dependent on a number of variables including overall cost of these funds vis-à-vis domestic sources, restrictions imposed by the Reserve Bank of India, international economic and banking scenario, etc. Prior to FY 2007-08, the funding through ECBs was around Rs.7,100 crore, which subsequently fell to Rs.2,801 crore in the next year. FY 2009-10 again showed an increase due to the lower cost of such funds and return of confidence due to the revival of the Indian economy. Funding from ECBs stood at Rs.10,617 crore during FY 2009-10. Overall, ECBs accessed by the power sector over the last five years have grown at 20% p.a. For the forecast of funds from this source, we have assumed FY 2009-10 as the base year and escalated it in subsequent years at a rate of 20%.

(iv) Multilateral Agencies

Multilateral agencies such as World Bank has been lending to the power sector. During the 11th FYP, World Bank has approved around US $ 2.3 billion. The full amount is expected to be disbursed in the next two years.

Based on the above, the estimated funds available for the power sector are as given below in Table 24.

Table 24: Estimation of Availability of Debt for Power Sector for FY 2010-11 to FY 2014-15

Amount in Rs Crore	2010-11	2011-12	2012-13	2013-14	2014-15
Domestic Bank Credit	30,855	41,037	54,579	72,590	96,545
Non-Banking Finance Companies	18,094	24,135	32,193	42,941	57,277
Pension / Insurance Companies	3,985	4,429	4,923	5,472	6,082
External Commercial Borrowings	12,741	15,289	18,347	22,016	26,419
Multilaterals – World Bank	5,175	5,175			
Total Availability of Debt	**70,849**	**90,065**	**110,041**	**143,019**	**186,324**

Source: CRIS Analysis

It may be noted that the estimation of availability of debt from the domestic bank credit do not take into account any constraints due to exposure norms and ALM issues. These entities are increasingly constrained by prudential exposure (group, entity and sector) limits, and possible asset-liability mismatches (especially for smaller banks). Large projects such as UMPPs and large developers have faced these problems in the recent past. These challenges could limit ability of domestic banks to lend to power projects.

5.4.4 Estimation of Debt Funding Gap

A detailed analysis of realizable pipeline of projects and the availability of debt funding over the period FY 2010-11 to FY 2014-15, indicates that the sector is expected to face a substantial debt funding gap amounting to about Rs. 543,700 crore (~ US$ 121 billion), which constitutes about 48% of the total debt funding requirement..

Table 25: Estimated Debt Funding Gap

Amount in Rs Crore	2010-11	2011-12	2012-13	2013-14	2014-15	Total
Total Availability of Debt for power sector	70,849	90,065	110,041	143,019	186,324	600,298
Debt Requirement for power sector	158,375	199,239	269,724	277,508	239,116	1,143,962
Gap between Estimated Availability of Debt and Requirement of Debt	(87,526)	(109,175)	(159,682)	(134,489)	(52,793)	(543,665)

Source: CRIS Analysis

Except sector-focused financial institutions such as Power Finance Corporation (PFC) and Rural Electrification Corporation (REC), other sources of funding, i.e., commercial banks, larger NBFCs like Infrastructure Development Finance Corporation (IDFC), and infrastructure-focused financing

entities like Indian Infrastructure Finance Corporation Limited (IIFCL) do not earmark funding for the power sector specifically. Hence, identification of availability of funds for the power sector alone, with a good degree of accuracy, is difficult.

Since the capacity addition, post the 12th Five Year Plan i.e. after FY 2016-17 has not been planned, the debt funding gap above shows a reduction towards the end of the forecast period.

5.4.5 Measures for addressing gap in debt funding

The above analysis of the debt funding gap clearly highlights one of the key challenges facing the implementation of massive investment plans in India's power sector. As discussed in the previous sections, the country needs to address several financing constraints, especially those relating to the availability of debt funding. While some of the measures would focus on removing constraints on existing financing entities, the key lies in bringing in additionality of sources of debt funding. In this context, many suggestions have been made by industry participants and are currently under debate. These include:

- Removing debt exposure to SPVs with established cash flows while computing group exposure for banks;
- Allowing higher exposure norms for sector-focused financial entities such as PFC, REC and IIFCL, with requisite contingent support;
- Allowing ECBs to refinance rupee debt;
- Encouraging use of take-out financing, with entities like IIFCL/LIC playing the role of take-out financial institutions;
- Tapping resources of insurance companies, pension funds, sovereign and multilateral funds by creating a fund focused on investing in bonds offered by infrastructure projects which have entered the operations phase;
- Refinancing bank finance for operational infrastructure projects through issuance of capital market bonds.

5.5 Annex 5 - Global financial crisis and its overall impact on India

The following paragraphs discuss the impact of the global financial crisis on some of the important aspects of the Indian economy such as foreign investment flows and foreign exchange, capital market, credit, trade, industrial growth, and Gross Domestic Product (GDP), and also describe the responses of the Government of India and the Reserve Bank of India to the *Crisis*.

5.5.1 Impact of Global Financial Crisis on India

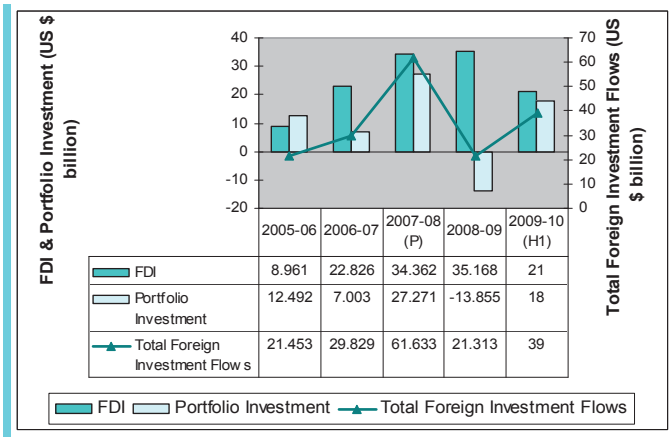
5.5.1.1 Foreign Investment Flows & Foreign Exchange

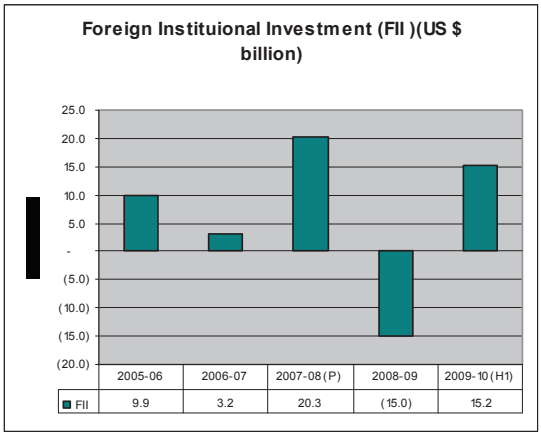
While the rapid growth of economy from FY 2005-06 to FY 2007-08 made India an attractive destination for the foreign capital flows, the net capital flow increased by 9.2% in FY 2007-08. Foreign portfolio investment added to the buoyancy in the Indian capital markets. Indian corporates also became aggressive in terms of acquisitions overseas, which increased outbound direct investment flows.

After the fall of Lehman Brothers in September 2008, Foreign Institutional Investors (FIIs) started unwinding their investments in a big way. FII investment, which was about US $ 20 billion in FY 2007-08, turned (-) $ 15 billion in FY 2008-09. Since FIIs formed a major part of portfolio investment, they followed a similar pattern. Portfolio investment reduced from US $ 27 billion in FY 2007-08 to (-) $ 13 billion in FY 2008-09. The downturn did not last long. Driven by the revival in growth prospects of the Indian economy and improvement in global investors' sentiment, FII investment in the capital market became positive again to the extent of US$ 15 billion in April-September 2009.

Foreign Direct Investment, which has shown significant growth in recent years, remained almost at the same level as in FY 2007-08, due to impressive growth in H1 of FY 2008-09. FDI however remained subdued in Q3 of FY 2008-09 in the wake of the global financial crisis, though it started to recover in Q4 of 2008-09. In terms of sectors, only metallurgical industries and petroleum and natural gas saw a reduction in FDI; other sectors witnessed an increase in absolute terms. Subsequently, due to better growth performance of the Indian economy and global recovery driven by Asian economies such as China and India, FDI was marginally higher at US $15.2 billion in H1 of 2009-10 (advance estimates). The trend in foreign investment flows in India is shown in the following table.

Figure 35 Trend in Foreign Investment Flows to India





Source: Reserve Bank of India

Despite substantial liberalization measures by RBI, external commercial borrowings (ECBs) reduced to some extent during the second half of FY 2008-09 and the first half of FY 2009-10. However, in the second half of FY 2009-10, the ECB flows reached their historical levels. This was attributed to better growth performance of the Indian economy and the global recovery driven by Asian economies including China and India.

Table 26: Trend in External Commercial Borrowings

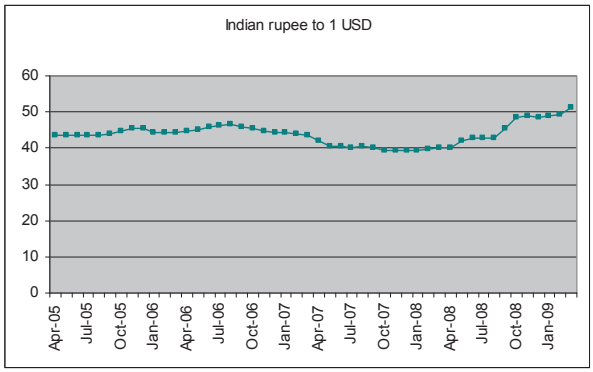
Amount in Bn US$	FY 05-06	FY 06-07	FY 07-08	FY 08-09		FY 09-10	
				H1	H2	H1	H2 - till Feb. 10
Total	18.0	17.9	20.0	10.6	9.5	7.3	10.0

Source: Reserve Bank of India

Remittances are another source of inward foreign capital flows that in the past have helped to balance India's large trade account deficit and keep the current account deficit at a reasonable level. The remittances from overseas Indians started showing the impact of the global crisis during the third quarter of FY2008–2009 when, on a year-on-year basis, they declined by 0.5%. The impact became more evident in the fourth quarter of FY2008–09 when the inflow of remittances declined by more than 29% as compared to the same period in the previous year.

The reversal of capital flows, caused by the global de-leveraging process put pressure on the forex market. This resulted in the rapid depreciation of the rupee after September 2008, in line with the movement of the dollar against other currencies during this period. With signs of recovery and return of FII flows after March 2009, the rupee has again been strengthening against US dollar (see Figure 36).

Figure 36: Trend in Rupee to US $ Exchange Rate



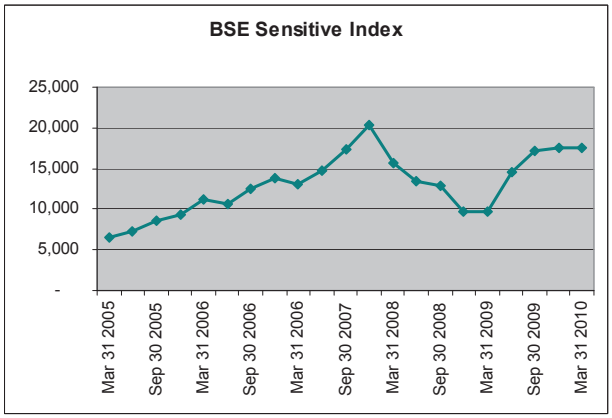
Source: Reserve Bank of India

5.5.1.2 Capital Markets

While the stock market started declining from January 2008, till September 2008, just prior to Lehman filing for bankruptcy, Bombay Stock Index lost 33% of its peak in January 2008 value. However, post-September 2008, the Bombay Stock Index went down by a further 40%, following a sharp decline in stock markets across the world, shift in international investors' preference, and resultant withdrawal of portfolio investments as explained previously. The movement in equity prices in India's capital market was in line with the trends in the major international equity markets.

Initially, the downward movement was due to uncertainty about US sub-prime mortgage and credit market exposure, and concerns about domestic inflation and depreciating rupee. Post-September 2008, the capital market was impacted by the outflow of funds from domestic capital markets by FIIs, volatility in the international markets, and slowdown of economic activities. The capital market has however started recovering since March 2009. There is again a revival of interest from FIIs in emerging markets including India. The changes which occurred in the BSE Sensitive Index during the period FY 2005-06 to FY 2009-10 is shown in the figure below.

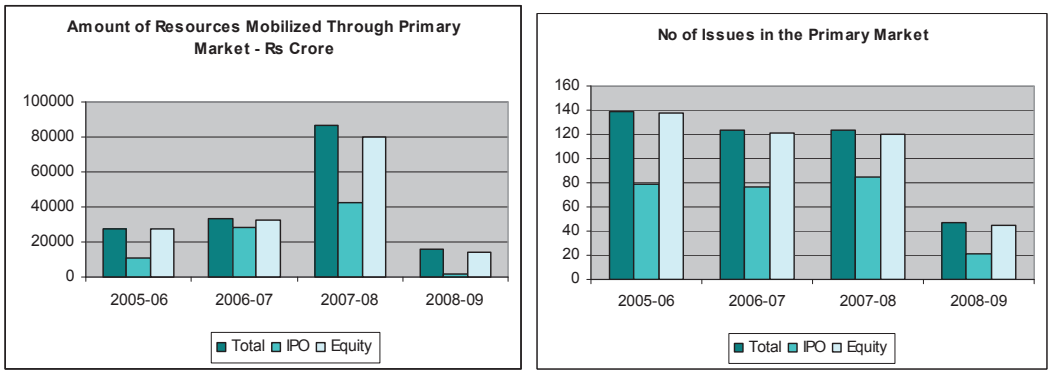
Figure 37: Trend in BSE Sensitive Index



Source: Bombay Stock Exchange

Conditions in the equity market were not conducive for raising fresh equity after February 2008. This was initially due to the unwillingness of companies to accept lower listing prices, but as the market weakened, appetite for fresh issuance also declined. The years prior to the *Crisis* had been particularly good for the primary capital market. However, during FY 2008-09, resources mobilized through the primary market came down. As shown in Figure 38 below, both the amount of resources mobilized through the primary market as well as the number of issues plummeted sharply. The monthly data on the equity raised from the primary market during FY 2008-09, showed that there was hardly any activity in that period except a few issues. However, with the improvement in the capital market and the economic scenario, the primary market had some equity issuances including large issuances by government entities.

Figure 38: Trend in Resources Mobilized Through Primary Market

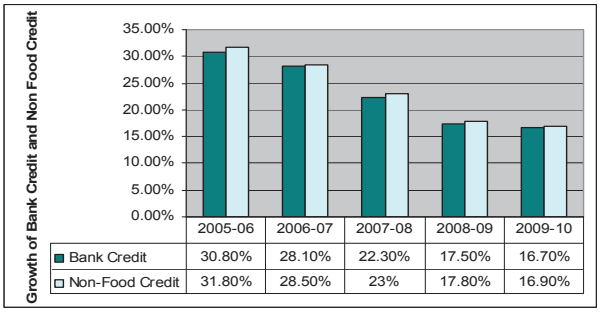


Source: Securities and Exchange Board of India

5.5.1.3 Credit

As the external (foreign) sources of credit for companies were drying up in the wake of the global financial crisis, there was a sharp increase in domestic credit during April–October 2008. The increase seems to be due to the substitution effect explained in the subsequent paragraph. However, towards the later part of FY 2008-09, credit growth declined due to a slowdown in the economy in general and the industrial sector in particular. On a full year basis, bank credit growth fell from 22.3% in FY 2007-08 to about 17.5% during FY 2008-09. The credit growth in FY 2009-10 continued at a lower level compared to the previous years; however, the non-banking domestic sources of funds and ECBs (which had dried up in the immediate aftermath of the global financial crisis) became accessible.

Figure 39: Trend in Total Bank Credit & Non Food Credit



	2005-06	2006-07	2007-08	2008-09	2009-10
Bank Credit	30.80%	28.10%	22.30%	17.50%	16.70%
Non-Food Credit	31.80%	28.50%	23%	17.80%	16.90%

Source: Reserve Bank of India

Due to the impact of the collapse of Lehmann Brothers, the international inter-bank market froze, impacting trade credit. These trade credits tend to be rolled over and the extinction of the possibility of roll-over created problems for most of the emerging markets. Since short-term trade credit in India was comparatively lower at US $ 1.9 billion during the *Crisis* period, financing of short-term trade did not pose much of a problem. However, net outflows during the second half of FY 2008-09 and the first half of FY 2009-10 suggest some challenges in rolling over maturing trade credit. Various measures by the Government and RBI have helped ease trade financing.

However, during the *Crisis* period, these credits were substituted by domestic lines of credit and the purchase of foreign currency in the market, which led to a surge in credit. In search of substitute financing, corporates withdrew their investments from the domestic money market mutual funds, putting redemption pressure on the mutual funds and down the line, on non- banking financial companies (NBFC), where the mutual funds had invested a significant portion of their funds.

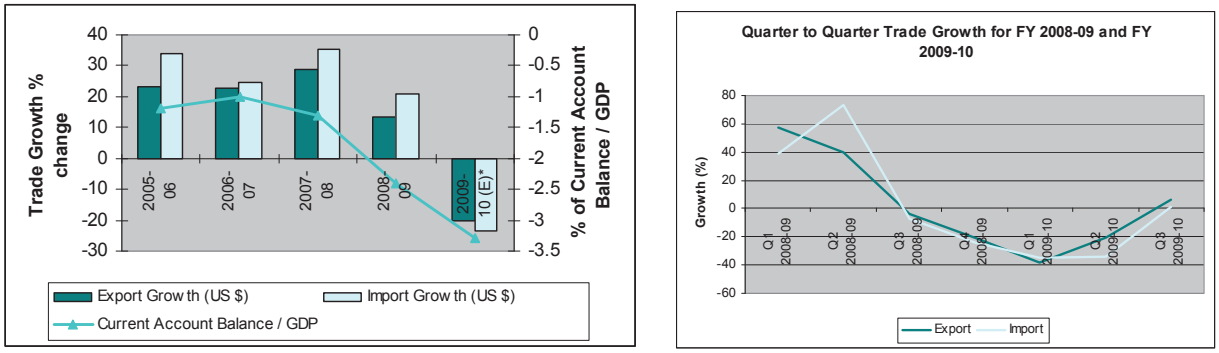
5.5.1.4 Trade

The adverse effect of the global financial crisis was also felt on exports on account of a fall in global demand, the drying up of international financing and trade credit. Growth in export was robust till August 2008. However, in September 2008, export growth witnessed a dip and turned negative in October 2008. Handicrafts, primary products, gems and jewellery exports registered negative growth. The US, European Union and the Middle East, which account for 75% of India's goods and services trade, went into downturn. The beginning of FY 2009-10 saw acceleration in the fall of exports with a further deepening of global recession. While the export growth rate was -22.3% in April–November 2009, it became positive 18.2% in the month of November 2009. Overall, the export sector faced a *Crisis* for a period of around 13 months, starting from October 2008 to October 2009 (except for December 2008). During this period, the growth was negative. It was only in the month of November 2009 that it became positive.

Import growth was also affected by the global recession though with a slight lag. It declined from October 2008 and was negative for the period up to December 2009. While growth of imports of POL was high during the first half of 2008-09 due to high prices, it moderated in the second half of FY 2008-09. In the post-recession period, non-POL and non-POL+ non-bullion import growth rates were very low.

During FY 2009-10, import growth was negative -23.6%, accompanied by a decline of both POL and non-POL imports at -29.8% and -20.7% respectively. Non-POL non-bullion imports declined by 22.4% due to a slowdown in industrial activity and exports. Gold and silver imports registered negative growth due to the continuous rise in gold prices. Import growth became positive in December 2009 partly due to the positive growth of POL products with a pick-up in oil prices and industrial demand, and partly due to the growth of non-POL items.

Figure 40: Trend in Trade Growth



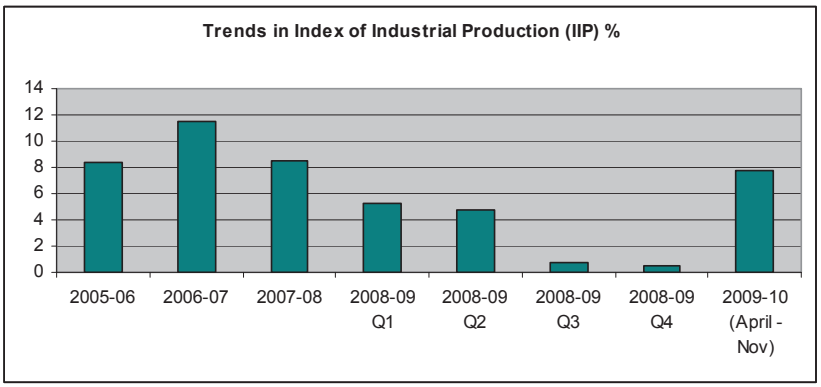
Source: Economic Survey 2008-09, 2009-10

5.5.1.5 Industrial growth

The growth in the production sector, especially manufacturing, was adversely affected by the global financial crisis. On a quarter-to-quarter basis, there were sharp reductions in growth in Q2, Q3 and Q4 of FY 2008-09. Growth fell to around 1% in Q2 of FY 2008-09. Shrinkage of demand for exports sharply dented the performance of industries with a high export orientation.

The global economy, led by the Asian economies, especially China and India, has shown signs of recovery in FY 2009-10. In India, the recovery in FY 2009-10 was due to various monetary and fiscal measures taken by RBI and the Government (discussed in the subsequent section). According to advance estimates by the Central Statistical Organization, the index of industrial production grew at 7.7% in April to November of FY 2009-10, which is significantly higher than 0.6% during the second half of FY 2008-09. The manufacturing sector has grown at the rate of 8.9% during April to November of FY 2009-10. The trend in the Index of Industrial Production (IIP) is shown in the figure below.

Figure 41: Trend in Index of Industrial Production



Source: Reserve Bank of India; FY 2009-10 - Advance Estimates by Central Statistical Organization

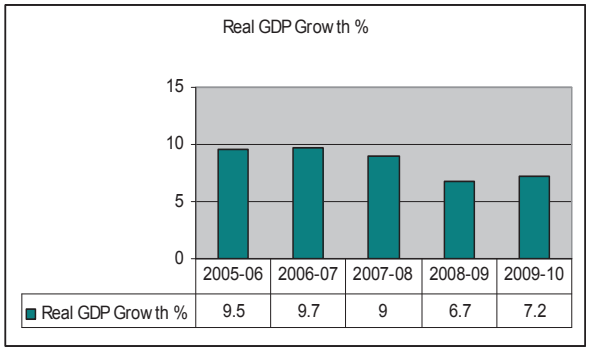
The downward movement was initially driven by high commodity prices till the second half of FY 2008-09. However, in the second half, industrial slowdown was driven by resource constraints faced

by the industry (other than bank credit which had substituted other sources of finance) as it became increasingly difficult to raise resources from (a) external sources (ECBs as well as ADR/ GDRs); (b) capital markets through the equity route; and (c) trade credit. The downward trend continued for almost eight quarters (beginning with the first quarter of FY 2007-08 and continued through to the last quarter of FY 2008-09), but then reversed and reached a level of 7.7% during April-November of FY 2009-10. The recovery was broad-based with almost all the major components of IIP witnessing a reversal.

5.5.1.6 GDP growth

The global financial crisis and the consequent economic recession in developed economies has contributed to the economic slowdown in India. This is clearly visible from the trend of GDP growth as shown in Figure 42. Economic growth decelerated in FY 2008-09 to 6.7%, representing a decline of 2.1 percentage points from the average growth of 8.8% in the previous five years, i.e., FY 2003-04 to FY 2007-08. The growth which was 7.8% and 7.7% for the first two quarters respectively came down to 5.8% in both the subsequent quarters. The deceleration of growth of FY 2008-09 was spread across all sectors. Due to various factors discussed in previous paragraphs, the industry sector was the worst affected due to the global financial crisis. Due to various measures taken by RBI and the Government, monetary as well as fiscal, over a span of a year, the economy posted a remarkable recovery, not only in terms of overall growth but more importantly in terms of its broad-based character. In the second quarter of 2009-10, the economy grew by 7.9% (advance estimates by Central Statistical Organization).

Figure 42: Trend in Real GDP Growth Rate (%)



Source: Reserve Bank of India, 2009-10 Advance Estimates

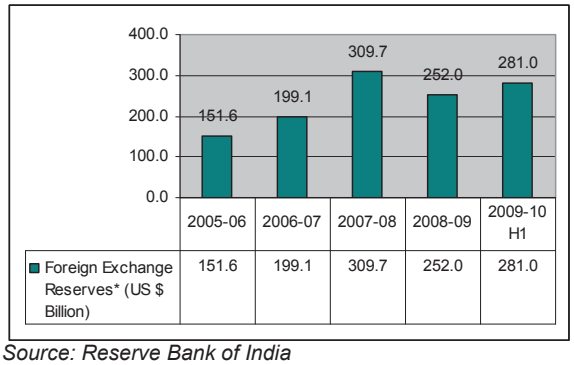
5.5.2 India's Response to the Global Financial Crisis

5.5.2.1 Measures by Reserve Bank of India (RBI)

Before the onset of the global financial crisis, the main concern of the policy makers was excessive capital inflows, which increased from 3.1% of GDP in FY 2005-06 to 9.3% in FY 2007-08. While this had resulted in an increase in foreign exchange reserves from US $ 151.6 billion at the end of March 2006 to $ 309.7 billion at the end of March 2008, it also contributed to monetary expansion. The Wholesale Price Index (WPI) reached a trough of 3.1% in October 2007, a month before global

commodity price inflation zoomed to a double digit from a low single digit, driven by the increase in oil and commodity prices. The WPI peaked to 12.8% in August 2008. There was deceleration in money supply during the first half of FY 2008-09. The trend in foreign exchange reserves as well as inflation is given in the Figure 43 and Figure 44 below.

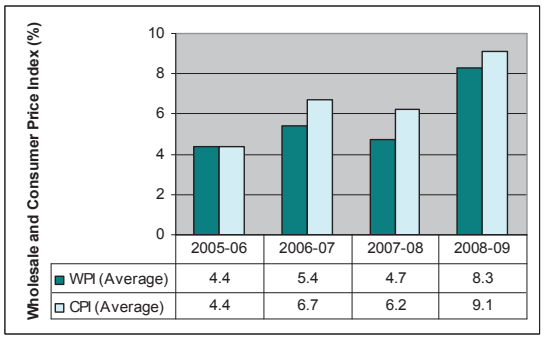
Figure 43: Trend in Foreign Exchange Reserves



	2005-06	2006-07	2007-08	2008-09	2009-10 H1
Foreign Exchange Reserves* (US $ Billion)	151.6	199.1	309.7	252.0	281.0

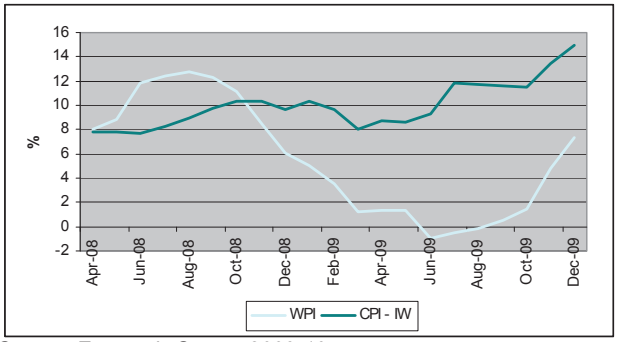
Source: Reserve Bank of India

Figure 44: Trend in Inflation



	2005-06	2006-07	2007-08	2008-09
WPI (Average)	4.4	5.4	4.7	8.3
CPI (Average)	4.4	6.7	6.2	9.1

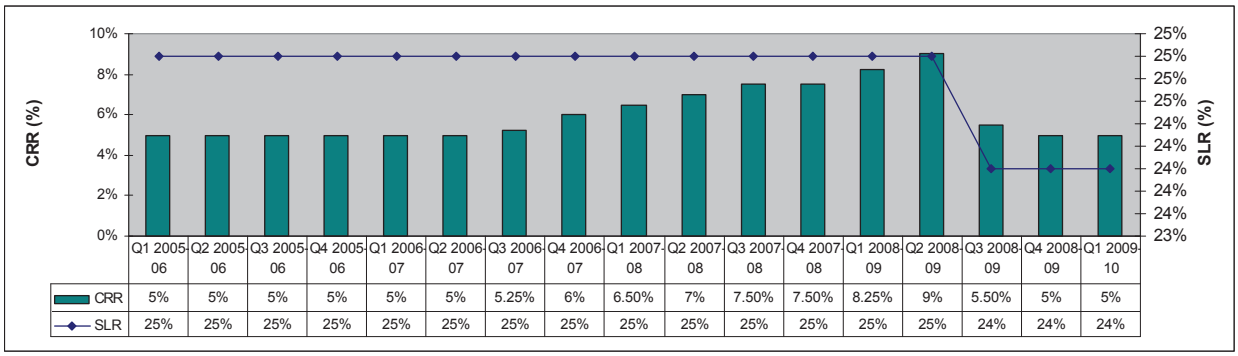
Source: Reserve Bank of India



Source: Economic Survey 2009-10

In the above scenario, the policy stance of RBI during the first half of FY 2008-09, pre-September 2008, was towards controlling monetary expansion and inflationary expectations. The repo rate was increased by 125 basis points in three tranches from 7.75% at the beginning of FY 2008-09 to 9.0% with effect from end-August 2008. The reverse repo rate was left unchanged at 6%. The cash reserve ratio (CRR) was increased by 150 basis points in six tranches from 7.5% at the beginning of April 2008 to 9% with effect from end-August 2008. While the trends in CRR and SLR are given in the Figure 45, the trend in repo and reverse repo rate is given in Figure 46 below.

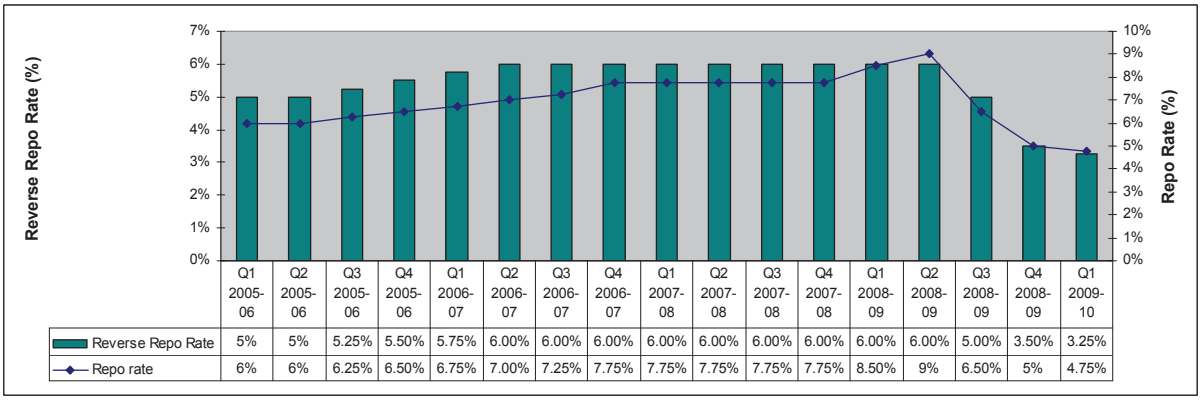
Figure 45: Trend in CRR and SLR



	Q1 2005-06	Q2 2005-06	Q3 2005-06	Q4 2005-06	Q1 2006-07	Q2 2006-07	Q3 2006-07	Q4 2006-07	Q1 2007-08	Q2 2007-08	Q3 2007-08	Q4 2007-08	Q1 2008-09	Q2 2008-09	Q3 2008-09	Q4 2008-09	Q1 2009-10
CRR	5%	5%	5%	5%	5%	5%	5.25%	6%	6.50%	7%	7.50%	7.50%	8.25%	9%	5.50%	5%	5%
SLR	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	24%	24%	24%

Source: Reserve Bank of India

Figure 46: Trend in Repo and Reverse Repo Rates



	Q1 2005-06	Q2 2005-06	Q3 2005-06	Q4 2005-06	Q1 2006-07	Q2 2006-07	Q3 2006-07	Q4 2006-07	Q1 2007-08	Q2 2007-08	Q3 2007-08	Q4 2007-08	Q1 2008-09	Q2 2008-09	Q3 2008-09	Q4 2008-09	Q1 2009-10
Reverse Repo Rate	5%	5%	5.25%	5.50%	5.75%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	5.00%	3.50%	3.25%
Repo rate	6%	6%	6.25%	6.50%	6.75%	7.00%	7.25%	7.75%	7.75%	7.75%	7.75%	7.75%	8.50%	9%	6.50%	5%	4.75%

Source: Reserve Bank of India

The outflow of foreign exchange, as a fall-out of the *Crisis*, led to a tightening of liquidity in the domestic market. This, coupled with the virtual freezing of international credit, required RBI to change its monetary stance in the second half of FY 2008-09. RBI responded by facilitating monetary expansion through a decrease in CRR, repo and reverse repo rates, and the statutory liquidity ratio (SLR). The repo rate was reduced by 400 basis points in five tranches from 9% in August 2008 to 5% in March 2009. The reverse repo rate was lowered by 250 basis points in three tranches, from 6% in November 2008 to 3.5% in March 2009. The repo and reverse repo rates were subsequently reduced by 25 basis points each, from April 2009 onwards. SLR was lowered by 100 basis points with effect from November 2008 and CRR was lowered by 400 basis points in four tranches from 9% in August 2008 to 5% in January 2009.

In addition to the above, following measures which were aimed at managing forex liquidity were also taken:

- upward adjustment of the interest rate ceilings on the foreign currency non-resident (banks) [FCNR(B)] and non-resident (external) rupee account [NR(E)RA] deposits,
- substantially relaxing the external commercial borrowings (ECB) regime,

- allowing the NBFCs and HFCs access to foreign borrowing, and
- allowing corporates to buy back foreign currency convertible bonds (FCCBs) to take advantage of the discount in the prevailing depressed global markets.

The Reserve Bank also instituted a rupee-dollar swap facility for banks with overseas branches to give them comfort in managing their short-term funding requirements. To provide support to the construction sector, developers were permitted to raise ECBs for integrated township projects.

The above monetary measures were supplemented with sector-specific credit measures for export, housing, micro and small enterprises, and infrastructure.

5.5.2.2 Fiscal Measures

Over the last few years, both the central and state governments were making efforts to contain fiscal deficit as per the roadmap in the Fiscal Responsibility and Budget Management (FRBM) Act. This was relaxed to deal with the *Crisis* and two fiscal stimulus packages were announced in December 2008 and January 2009. These fiscal stimulus packages together amounted to about 3% of the GDP and included additional public spending, particularly capital expenditure, government-guaranteed funds for infrastructure spending, cuts in indirect taxes, expanded guarantee cover for credit to micro and small enterprises, and additional support to exporters. These fiscal stimuli were over and above payout of a part of arrears to government employees following the Sixth Pay Commission Report and debt relief package to alleviate the debt burden of distressed farmers.

Detailed measures undertaken by RBI and the Government are given below:

A. Measures by RBI from September 2008 to Jan 2009

Rupee Liquidity
- Repo rate under LAF (liquidity adjustment facility) reduced from 9.0 percent to 5.5 percent
- Reverse Repo rate under LAF reduced from 6.0 percent to 4.0 percent
- Cash Reserve Ratio reduced from 9.0 percent to 5.0 percent
- Statutory Liquidity Ratio reduced from 25 percent to 24 percent, with exceptional reductions for specified conditions
- Repo facility for Rs. 60,000 crore under LAF to banks for lending to Mutual Funds and NBFCs
- Scheme to advance Rs. 25,000 crore to financial institutions under Agricultural Debt Waiver and Debt Relief Schemes

Forex Liquidity
- Interest rate ceiling on FCNR(B) and NR(E)RA term deposits increased
- ECB up to $500 million permitted for rupee/foreign currency expenditure for permissible end use under automatic route
- Systemically important non-deposit taking NBFCs and housing finance companies registered with NHB, permitted to raise short-term currency borrowings under the approval route
- Buy back/pre-payment of foreign currency convertible bonds permitted

- Swap facility for Indian banks with overseas branches to give them comfort in managing their short-term funding requirements

Credit Delivery

- Extension of the period of pre-shipment rupee export credit (at concessional rates) from 180 days to 270 days
- Eligible limit of the ECR facility for banks enhanced to 50 percent of the outstanding export credit eligible for refinance
- Advance allocation of Rs. 3,000 crore to SIDBI and NHB against estimated shortfall in priority sector lending by banks
- Provisioning requirement for all types of standard assets reduced to 0.4 percent
- SPV for providing liquidity support to NBFCs to the tune of Rs. 25,000 crore

B. Measures by Government of India on 7 December 2008

- Government to seek authorization of additional plan expenditure up to Rs. 20,000 crore in the current year. Total spending programme in the balance four months of 2008-09 expected to be Rs. 300,000 crore
- Across the board cut of four percentage points in the ad valorem cenvat rate (except for petroleum products)
- Measures to support exports like interest subvention of two percent for pre/post shipment export credit; additional allocation of Rs. 350 crore for export incentive scheme; service tax refund on foreign agent commission; and government back-up guarantee to ECGC
- Refinance facility of Rs. 4,000 crore to National Housing Bank and of Rs. 7,000 crore to SIDBI for lending to MSME sector
- Additional allocation of Rs. 1,400 crore to clear the entire backlog under the Technology Upgradation Fund (TUF) scheme (for textile sector)
- Higher quantum of road projects announced
- Authorization of IIFCL to raise Rs. 10,000 crore through tax-free bonds by 31 March 2009
- Reprioritizing of budgeted expenditure by key government departments
- Government departments allowed to replace vehicles
- Export duty on iron ore fines eliminated and that on lumps reduced to five percent

Measures by Government of India on 2 January 2009

- Guarantee cover under Credit Guarantee scheme increased from 50 percent to 85 percent for credit up to Rs. 5 lakh
- State governments permitted to raise additional market borrowing of 0.5 percent of their GSDP, i.e., Rs. 30,000 crore for capital expenditure
- IIFCL enabled to access Rs. 30,000 crore through tax-free bonds (to fund highway and port projects)
- To support exporters – DEPB rates restored to pre- November 2008 levels
- EXIM bank received a Rs. 500 crore line of credit from RBI for lending to exporters
- Exemptions from CVD and basic customs duty withdrawn
- One-time assistance under JNNURM to states for purchase of buses for urban transport system

5.6 Annex 6: Analysis of projects planned for commissioning during 11th Five Year Plan

Sl. No.	Sector/Project	Benefits (MW)	Reasons for delay
	Central Sector		
1	Barh STPP-I, NTPC, Bihar	U-1, 660	Contractual issues (dispute between Power Machines, Russia and NTPC)
		U-2, 660	
		U-3, 660	
2	Barh STPP-II, NTPC, Bihar	U-1, 660	Delay in placement of main plant order. Order was placed in 03/08.
3	Nabi Nagar TPP, 3x350, JV of NTPC and Railways	U-1, 250	Zero date not yet finalized
		U-2, 250	Land for the project to be acquired
		U-3, 250	
4	Bokaro TPS A Exp. DVC, Jharkhand	U-1, 500	Underground CW channel to be dismantled for start of work for boiler foundations.
5	Mouda TPP, NTPC, Maharashtra	U-2, 500	Delay in placement of order for main plant. Order was placed in 11/08.
6	Tuticorin JV, NLC, TN	U-1, 500	Delay in placement of orders for main plant. Order was placed in 01/09.
		U-2, 500	
7	Tripura Gas, ONGC, Tripura	Module-1, 375	Orders for main plant civil works and logistics to be placed by BHEL. Forest clearance from MOE&F for erection of transmission lines is awaited. Widening of roads for transportation of heavy equipment to be done.
		Module-2, 375	
	Sub total	**6140**	
	State Sector		
8	Kakatia TPP Ext. APGENCO, AP	U-1,500	Delay in placement of orders for main plant. Order was placed in 10/08.
9	Korba West St. III, CSEB, Chhattisgarh	U-5, 500	Delay in placement of orders for main plant. Order was placed in 04/08.
10	Marwa TPP, CSEB, Chhattisgarh	U-1, 500	Delay in placement of orders for main plant. Order was placed in 03/08.
		U-2, 500	
11	Sikka TPP Ext., GSECL, Gujarat	U-3, 250	Construction work held up in want of conditional environmental clearance by MOE&F. Orders for BoPs are yet to be finalized.
		U-4, 250	
12	Malwa TPP, MPGENCO, MP	U-1, 500	Delay in placement of orders for main plant. Order was placed in 12/08. Orders for BoPs to be finalized.
		U-2, 500	
13	Satpura TPP Ext. MPPGCL, MP	U-2, 250	Delay in placement of orders for main plant. Coal linkage not available. Civil works yet to commence. Orders for BoPs to be placed.
14	Kalisindh TPS, RRVUNL, Raj.	U-1,500	Delay in placement of orders for main plant. Order was placed in 07/08. Orders for BoPs to be finalized.
15	Anpara D, UPRVUNL, UP	U-2, 500	Agency for civil works to be finalized.
	Sub total	**4750**	
	Total 11th Plan	**10890**	

Sl. No.	Sector/Project	Benefits (MW)	Reasons for delay
	Central Sector		
1	Parbati St.-II NHPC, HP. 4x200= 800 MW	800	Delay in revised forest clearance.
			Slow progress of HRT due to poor geology.
			Slide in Power House area in Feb 07.
2	Rampur SJVNL, HP. 6 x 68.67= 412 MW	412	Slow progress of HRT due to poor geology.
3	Loharinagpala NTPC, Uttarakhand 4x150= 600 MW	600	Work suspended due to environmental concerns.
			Delay in forest clearance for approach road to Helgu Adit.
4	Tapovan Vishnugad NTPC, Uttarakhand 4x130= 520 MW	520	Civil works of HRT due to delay in procurement/deployment of Tunnel Boring Machine by Civil Contractor.
			Poor rock strata encountered in power house.
5	Subansiri Lower NHPC, Arunachal Pradesh 8x250= 2000 MW	2000	Frequent stoppage of work by locals on Ar. Pradesh side.
			Signing of MOU with state Govt.
6	Kameng NEEPCO, Arunachal Pradesh 4x150= 600 MW	600	Adverse geology resulting in slow progress jn HRT. Also flash flood on 28.10.2008 caused major damage to some of the works.
	Sub-Total (CS):	**4932**	
	State Sector		
7	Uhl-III, HPJWNL, HP 3x33.3= 100 MW	100	Cancellation of contract for HRT & Neri Khad works due to slow progress.
			Fresh award placed in October 2008.
			Poor geology in HRT.
8	Lower Jurala APGENCO, A.P. 6x40= 240 MW	120	Order for E&M works was placed on Chinese Firm CMEC (L1) in Jan. 2008 who did not sign the agreement due to exchange fluctuation.
			Fresh order was placed on M/s Alsthom India Ltd. with commissioning of 3 units by December, 2011 and balance 3 units in 12tth plan.
9	Sawara Kuddu PVC, H.P. 3x36.67= 110 MW	110	Initial delay due to MOE&F clearance, clearance obtained on 17.05.2007.
			Delay in award of Civil & E&M package. Civil package of HRT was awarded in June 2007 and E&M package awarded in Feb. 09.
10	Pallivasal KSEB, Kerala 3x20= 60 MW	60	Delay in land acquisition.
			Slow progress of civil works.
	Sub-Total (SS):	**390**	
	Total (delayed):	**5322**	

Source: Infraline

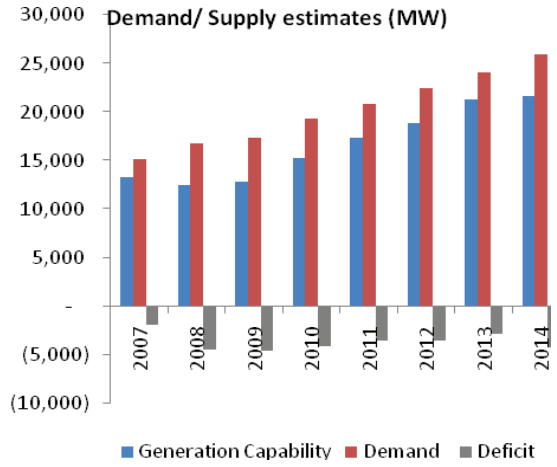
CHAPTER 3: PAKISTAN

1.0 POWER SECTOR OVERVIEW

Pakistan's energy constraints have become more pronounced in the past 5 years, as energy supplies have failed to meet the demand emanating from a 5- year annualized 4.4% growth of the economy. During 2005-2009 while the demand for electricity grew by an average of 5.1%, supplies lagged behind, increasing by only 1.7%. The resultant demand-supply mismatch has affected millions of domestic consumers, industries, and the economy. According to estimates, the energy crisis cumulatively clipped nearly 2 percentage points from annual GDP growth during FY 2010[1]. According to recent figures made available by PEPCO, power deficit has varied between 1,400 – 4,500 MW during August 2010. Going forward, inaction at this juncture would lead to a widening power deficit, severely constraining the economic growth of Pakistan.

According to Government of Pakistan (GoP) estimates, energy demand in the country is expected to increase by 8.8% per annum beyond 2010. If energy consumption increases at the estimated rate, Pakistan's total energy requirements by 2030 will reach 361 Million Tons Oil Equivalent (MTOE) compared to 62.5 MTOE in FY 2008-09[2]. According to GoP estimates, the overall demand for power will reach 36,000 MW by 2015 and a staggering 114,000 MW by 2030[3]. To address the demand gap, Government has focused its efforts on the following set of parallel steps (i) fast track additions to capacity through mainly oil-based rental plants, and expedited processing of independent power projects (IPPs) in the pipeline; (ii) developing a portfolio of new IPPs through competitive bidding for new capacity additions; and (iii) for the longer-term, a diversified program focused on domestic energy resources (mainly hydro and coal)[4], efficiency improvements and conservation, and electricity imports where feasible.

Figure 1: Power Demand and Supply Estimates (MW)



[1] Economic Survey 2009-2010
[2] GoP, HDIP
[3] First Energy Summit, April 2010
[4] Hydel power potential has been estimated at 45,000 MW by WAPDA while according to PPIB the Thar lignite deposits are estimated at 175 billion tonnes, having a potential to generate 100,000 MW.

1.1 Demand has outpaced Supply

Total power generation during the 2005-09 period has increased at a CAGR of 1.7% (hydel generation has increased by 2%; however, compared to FY06 the overall hydel generation has in fact slipped by 3.4%). Hydel generation has been cyclical in nature with peak generation during July-Sept (~6,580MW) and lowest during Jan–Feb (3,930MW)[5]. WAPDA and KESC both are generating below their FY 2005 capabilities, showing declines of 3.2% and 2.9% respectively. Similarly electricity generation from nuclear sources has decreased by 12.8% in the past 5-year period. As a consequence, the overall supplies of the country have remained nearly stagnant at a time when demand has surged.

Table 1: Power Supply (GWh)

		2004-05	2005-06	2006-07	2007-08	2008-09	ACGR
Hydel (WAPDA)		25,671	30,862	31,953	28,707	27,784	2.00%
Thermal	WAPDA	22,189	22,508	21,597	20,427	19,521	-3.15%
	KESC	9,304	9,130	8,169	8,219	8,262	-2.93%
	IPPs	25,669	28,645	34,206	35,231	34,431	7.62%
Thermal-Total		57,162	60,283	63,972	63,877	62,214	2.14%
Nuclear: KANNUP		322	143	189	424	475	10.22%
CHASNUPP		2,473	2,341	2,099	2,653	1,142	-17.56%
Nuclear- Total		2,795	2,484	2,288	3,077	1,618	-12.78%
Total Generation		85,629	93,628	98,213	95,661	91,616	1.70%
Imported		109	146	171	199	227	20.13%
Total Electricity Supply		85,738	93,774	98,384	95,860	91,843	1.73%

Source: Energy Yearbook 2009

1.2 Installed capacity high, but generation remains low

As of June 2009, Pakistan's installed generation capacity stood at 20,306 MW. Some power plants have been commissioned since then and the total installed capacity has inched up approximately to 20,550 MW. Generation, however, still lags with only about 14,000MW being produced on average, implying average utilization levels of 69%. Recent flooding and the subsequent closure of certain plants have trimmed this number further. On August 13, 2010 total generation stood at 12,753 MW compared to total demand of 15,456 MW[6]. Low capacity utilization has been a problem area and efforts are being made to enhance it. However, technical/structural/litigation issues constrain the ability to generate any further electricity from the current installed capacity.

[5] NEPRA – State of Industry Report 2009
[6] PEPCO – Daily updates

Table 2: Installed Capacity (MW)

	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
THERMAL	12,567	12,595	12,595	12,745	13,046	13,370
HYDEL	6,493	6,493	6,493	6,474	6,474	6,474
NUCLEAR	462	462	462	462	462	462
Total Installed Capacity	**19,522**	**19,550**	**19,550**	**19,681**	**19,982**	**20,306**

The power sector continues to be plagued by high transmission and distribution losses. Despite efforts by the GoP to reduce this spillage, the losses remain as high as 36% in some cases. Lack of required investments in the transmission/distribution system has been the single most important reason behind these system losses. The distribution network continues to be characterized by overloaded conductors, transformers and feeders. In addition, collection indiscipline has been another problem area, driving up overall losses of distribution companies.

Table 3: Distribution Losses (in percent)

Company	2005-06	2006-07	2007-08
PESCO	34.6	35.21	36.06
IESCO	13.27	12.17	10.29
GEPCO	10.15	11.63	11.14
LESCO	13.17	12.71	12.85
FESCO	11.07	11.07	11.19
MEPCO	20.52	19.28	18.49
HESCO	39.16	36.95	35.86
QESCO	20.67	21.56	21.01
KESC	34.42	34.24	34.11

Source: Distribution Companies/ KESC

1.3 GoP plans 20,000 MW additional power by 2020

The GoP expects the installed power generation capacity to increase from 20,550 MW in 2009-10 to 24,295 MW in 2010-11[7]. This increment in capacity has been envisaged to come from, among others, 420 MW of rental plants, 1,241 MW of IPPs, 298 MW of hydropower, 44 MW of wind power, and 116 MW from KESC. The target for total electricity generation has been set at 126,355 GWh for 2010-11 implying an increase of 7% (year-on-year). The power generation capacity is expected to increase by 20,000 MW by 2020 as per Vision 2020 program of the Prime Minister. The 20,000 MW addition by 2020 program envisages 6,000 MW through hydro, 6,000 MW through coal, 5,000 MW from gas, 1,000 MW through Naptha and the remaining 2,000 MW from alternative energy resources. This magnitude of capacity addition would entail huge investment and GoP's ability to make such investments would ultimately determine the success of these plans.

1.4 Fuel mix skewed to thermals

The current generation capacity remains skewed towards thermal with a 65.8% share, followed by hydel with 31.9%. Nuclear energy capacity constitutes only 2.3% of total electricity generation

[7] Annual Plan 2010-11

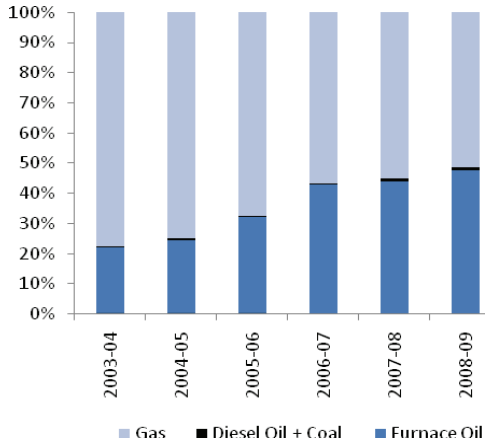
capacity. Pakistan's dependence on thermal energy has continued as its share in the capacity mix has inched up from 64.4% in FY04 to 65.8% by the end of June 2009. No new additions have been made to hydel capacity during recent times.

Table 4: Fuel Consumption for Thermal Power Generation (TOE)

Fuel	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
Coal	82,765	80,481	66,812	73,551	72,568	50,341
Furnace Oil	2,608,548	3,308,574	4,076,897	6,521,503	6,741,614	7,210,211
Diesel Oil	63,272	55,899	32,176	45,125	168,449	173,947
Gas	9,463,538	10,305,897	8,694,561	8,640,101	8,492,919	7,830,065
Total	**12,218,123**	**13,750,851**	**12,870,446**	**15,280,281**	**15,475,550**	**15,264,564**

Source: Energy Yearbook 2009

Figure 2: Fuel Mix



As shown in the figure above, dependence on Furnace oil for power generation has increased significantly over the last couple of years. Gas production has increased by a mere 2.1% in the past five year period[8]. The consequent low availability of gas has not only exacerbated the overall power deficit, but has led to higher cost oil being used as the primary source for power generation. The ratio of oil/gas in the generation mix which stood at 24:74 back in FY 2005 has increased to 47:52 in FY 2009. Higher share of oil in the overall generation mix has invariably resulted in higher costs per kWh. Increased dependence on oil came at a time when oil prices reached their record peaks. High reliance on oil, lack of commensurate increase in tariffs till 2007, coupled with collection indiscipline led to high level of intercorporate debt stock. Consequently, the changing profile of the power generation fuel mix has had huge implication for the current crisis being faced by Pakistan's energy sector. Increased reliance on FO has exposed the sector to oil price volatility. Recent increase in tariffs, in turn, has had the unintended effect of higher receivables and consequently bloating of the intercorporate debt stock.

[8] Energy Yearbook 2009

1.5 RPPs face road blocks

Rental Power Plants have been put across by the Government as a quick-fix solution to the crippling energy crisis. At present 19 projects are in the pipeline with around 2,734 MW capacity. For 2010, 6 RPPs are scheduled to be brought online during the August-December time frame, adding 928 MW to the national grid[9]. The details of these 6 projects may be seen in the table below.

Table 5: Rental Power Plants processed by PPIB

Sr. No.	Project	Location	Capacity (MW)	Expected COD
1	Karkey Rental Project	KTPS Grid Station, Karachi	231.8	31-Aug-10
2	Reshma Power Rental Project	Near Manga-Raiwind Road, LESCO	201.3	30-Sep-10
3	Sialkot Rental Power Project	Near Eminabad Grid Station, GEPCO	65	30-Sep-10
4	Ruba Energy Rental Project	Near Batapur Grid, LESCO	155.55	30-Sep-10
5	Tapal Rental Power Project	Kamoki, Gujranwala, GEPCO	70	30-Sep-10
6	Walters Power Rental Project	Jamshoro, Sindh	205	31-Oct-10
Total (MW)			928.65	

The Rental Power Plants, however, have drawn a lot of flak for having a weak structural and legal framework, in addition to being one of the most expensive options for producing electricity in Pakistan. The table below shows a comparison of the costs associated with producing additional electricity using various options[10].

Table 6: Power Generation - Cost comparison of various options

No.	Options	Incremental Capital Cost ($/kW)	Total Cost (Cents/kWh)
1.	Use of Existing Stalled IPP Capacity (Comparator)	Sunk cost	12.07
2.	Introduction of CFL	28	0.37
3.	New IPP Capacity (Gas)	862	7.06
4.	New IPP Capacity (RFO)	1,388	17.31
5.	RPPs (Gas)	1,020	8.90
6.	RPPs (RFO)	1,466	19.46

Note: Generation costs based on a Power Factor of 60 %.

Source: Asian Development Bank. 2010. *Islamic Republic of Pakistan: Rental Power Review*

Pakistan's earlier experience with the RPPs has not been ideal. Two RPPs, which had been commissioned in 2007 having a total installed capacity of 286 MW, stand virtually idle due to lack of

[9] PPIB

[10] Asian Development Bank. 2010. *Islamic Republic of Pakistan: Rental Power Review*

gas availability. Amongst the RPPs that are under consideration, 12 are based on RFO while 2 are planned to be run on gas. According to a study conducted by the ADB, once all the RPPs come online, a near 35.5% hike in tariff would be necessary in FY 2011 to equate tariffs with costs as RPPs are an expensive source of power, compared to a 25% tariff hike in a scenario where there are no RPPs commissioned.

1.6 Government continues with its RPP program

Nonetheless, the Government has continued to follow its policy of inducting RPPs as it feels that there are no other quick-fix solutions for the demand-supply mismatch. On the financing side, while the GoP claims that the local banks have the appetite to fund such projects, our discussions within the banking circles reveal a clear aversion against the RPPs. Amongst the foremost reasons for the lack of interest in RPP financing are: 1) lack of transparency; 2) state/condition of these plants; and 3) sponsor weakness.

1.7 Major Power Sector players

NEPRA: The National Electric Power Regulatory Authority was established in 1997 to streamline the tariff determination system. NEPRA is responsible for the issuance of licenses for generation, transmission and distribution of electric power. It also has the mandate to approve investment and power acquisition programs of the utility companies.

PEPCO: Since October 2007, WAPDA has been bifurcated into two distinct entities i.e. WAPDA and PEPCO. WAPDA is responsible for water and hydropower development whereas PEPCO is vested with the responsibility of thermal power generation, transmission, distribution and billing. PEPCO is also responsible for the management of the affairs of corporatized Distribution Companies (DISCOs), four Generation Companies (GENCOs) and a National Transmission and Dispatch Company (NTDC).

PPIB: Private Power and Infrastructure Board (PPIB) was setup to act as a single-window facilitator to the private investors. PPIB is responsible for providing support to the power purchaser and fuel supplier while negotiating the Power Purchase Agreement (PPA), Fuel Supply Agreement (FSA)/Gas Supply Agreement (GSA), and other related agreements.

AEDB: Alternative Energy Development Board (AEDB) was established by Government of Pakistan in 2003 to act as a central agency for development, promotion and facilitation of renewable energy technologies in Pakistan. The Board has been tasked to ensure that 5% of total national power generation capacity be based on renewable energy by the year 2030.

WAPDA is the Water and Power Development Authority (WAPDA) established in the 1950s to manage the water and power sector with its role reduced to hydro projects recently.

NTDC is the National Transmission and Dispatch Company (NTDC) founded in 2005, by transferring WAPDA's transmission assets to it and reporting line to PEPCO.

CPPA: or the Central Power Purchasing Authority (CPPA) has been formed as a part of NTDC to undertake purchase of electricity and make payments to the parties involved. It would manage the finances (including subsidies) of these parties.

TCEB: Thar Coal Energy Board (TCEB) is the recently established authority meant to coordinate between federal and provincial platforms and has overlapping functions with the Sind Coal Authority.

2.0 FINANCING THE POWER SECTOR CAPACITY EXPANSION PLAN

2.1 Investment Requirement for the Vision 2020 program

The investment in Pakistan power sector has been weighed down by a host of risk factors spanning from political/regulatory issues to commercial risks. However, despite the investment barriers, the government is keen to attract significant private capital into its power sector, which is facing a huge demand-supply gap. In order to meet the shortfall, the Government has come up with a Vision 2020 Program to add about 20,000 MW of capacity into the system at an estimated cost of $32.5 billion. For the projects planned in the next 10 years (2010-2020), the average annual investment requirement amounts to $ 3.2 billion per year. The government envisages a 55%-45% Public-Private financing mix in which GoP intends to provide $ 17 billion using borrowing and budgetary funds while an estimated $ 15 billion is expected to be raised by the private sector. In addition, the investment in transmission & distribution is estimated at $3 billion and $7.8 billion till 2020 respectively.

The break-up of the total planned capacity addition of 20,000 MW as per stage of project development is as follows: under construction: one project (Neelum-Jhelum, 960MW); advanced stage of project development: 4,200 MW; feasibility study (either on-going or being commenced): 8,820 MW; concept stage: all gas-fired generation projects (except Guddu rehab).

Capacity Addition - Vision 2020 Power Program

The year-wise details of the capacity addition plan are presented below. If implementation follows the plan, Pakistan will be able to nearly double its electricity generation capacity at a cost of about $32.5 billion by 2020.

Table 7: Planned capacity additions under the Vision 2020 power program (MW)

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*		
	2010-11	*2011-12*	*2012-13*	*2013-14*	*2014-15*	*2015-16*	*2016-17*	*2017-18*	*2018-19*	*2019-20*	*Total*	*Share(%)*
WAPDA Hydel	0	0	0	0	2,040	969	0	1,080	0	0	4,089	22%
IPPs Hydel	0	0	0	0	0	0	840	0	0	0	840	4%
Total Hydel	**0**	**0**	**0**	**0**	**2,040**	**969**	**840**	**1,080**	**0**	**0**	**4,929**	**26%**
Indigenous Coal	0	0	0	0	3,500	0	0	0	0	0	3,500	19%
Imported Coal	0	0	0	0	1,200	1,200	0	0	0	0	2,400	13%
Total Coal	**0**	**0**	**0**	**0**	**4,700**	**1,200**	**0**	**0**	**0**	**0**	**5,900**	**31%**
Genco Rehab	0	800	200	0	0	0	0	0	0	0	1,000	5%
Indigenous Gas	0	0	1,200	1,200	600	0	0	0	0	0	3,000	16%
Imported Gas	0	0	1,000	1,000	0	0	0	0	0	0	2,000	11%
Naphta	0	0	0	500	500	0	0	0	0	0	1,000	5%
Total Gas + Naphta	**0**	**0**	**2,200**	**2,700**	**1,100**	**0**	**0**	**0**	**0**	**0**	**6,000**	**32%**
Renewables	0	600	350	500	550	0	0	0	0	0	2,000	11%
Grand Total	**0**	**600**	**2,550**	**3,200**	**8,390**	**2,169**	**840**	**1,080**	**0**	**0**	**18,829**	**100%**
Cumulative Total	**0**	**600**	**3,150**	**6,350**	**14,740**	**16,909**	**17,749**	**18,829**	**18,829**	**18,829**		

Indicative Financing Plan – Vision 2020 Program

The total value of the power projects in the pipeline with expected commercial operation dates between 2010 and 2020 is about $32.5 billion. The break-up of the projects including investment requirements are:

HYDEL

- WAPDA hydel capacity addition of 4,089 MW at an total estimated project cost of $ 8.3 billion
- IPP hydel capacity addition of 840 MW (Suki-Kinari) at total estimated project cost of $ 1.2 billion

COAL

- Indigenous coal capacity addition of 3,500 MW with total investment requirement of $ 6.5 billion
- Imported coal based capacity addition of 2,400 MW with a total investment of $ 4.5 billion.

GAS

- Indigenous gas based capacity addition of 3000 MW, imported gas based capacity addition of 2000 MW and Naphtha based capacity addition of 1000 MW with a total funding requirement of $ 8.1 billion.

RENEWABLE

- Renewables based capacity addition of 2,000 MW with an investment of $ 3.9 billion.

Gross Financing Needs: The table below shows the aggregate financing needs for these power projects expected to be commissioned over the period 2010-20.

Table 8: Gross Financing Needs

	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	Total	Share (%)
Foreign Currency Cost	1,681	4,734	5,222	4,588	3,594	1,082	466	357	21,725	67%
Local Currency Cost	587	1,293	1,564	1,619	1,393	732	525	578	8,290	25%
Total Capital Cost	**2,268**	**6,027**	**6,786**	**6,207**	**4,987**	**1,814**	**991**	**935**	**30,015**	92%
Interest During Construction	58	273	504	644	693	188	89	79	2,528	8%
Total Project Costs	**2,326**	**6,299**	**7,290**	**6,851**	**5,680**	**2,003**	**1,080**	**1,014**	**32,544**	100%
Financing Plan										
Self-Financing/Equity	708	1,932	2,330	2,355	2,188	836	468	453	11,270	35%
Foreign Borrowing	1,294	3,539	4,012	3,647	2,907	1,003	525	467	17,395	53%
Local Borrowing	325	828	948	849	585	163	88	93	3,878	12%
	2,326	**6,299**	**7,290**	**6,851**	**5,680**	**2,003**	**1,080**	**1,014**	**32,544**	100%

The discussion below integrates physical plans with financial plans at the level of individual projects.

Hydel Projects

Table 9: Physical and Financial Plan – Hydel Projects

Project Name	MW	Project ($ Mn)	Disbursed	Remaining	Start	End	USD Cost	Const. Period	Foreign Loan	Rate: LIBOR Plus	Local Loan	Rate: Kibor Plus	Equity
Tarbela IV Extension	960	700		700	1-Jul-11	30-Jun-15	100%	4.0	50.0%	2.5%	10%	1%	40%
Dasu – Stage I	1080	2,181		2,181	1-Jul-10	30-Jun-15	53%	5.0	50.0%	2.5%	10%	1%	40%
Dasu – Stage II	1080	1,725		1,725	1-Jul-15	30-Jun-18	53%	3.0	50.0%	2.5%	10%	1%	40%
Neelum Jhelum	969	1,629	183	1,446	1-Jul-09	30-Jun-16	50%	7.0	50.0%	2.5%	0%	1%	50%
Suki Kinari	840	1,008		1,008	1-Jul-11	30-Jun-17	100%	6.0	75.0%	3.5%	0%	2%	25%

The financing requirement for the above mentioned WAPDA-hydel projects (except Suki Kinari) is estimated at $8.3 billion. An indicative financing plan is shown in the table below.

- WAPDA would need to invest $3.8 billion in the next 10 years for the hydel projects. The source of funding would be mainly allocations from the budget and self-financing from retained earnings.
- Financing from foreign lenders amounting to $3.9 billion will have to be raised. The sources of financing will include multilateral donors, bilateral sources and ECAs. In our opinion, ECAs can contribute 20-25% of the foreign finance component to the projects.
- Finally, $ 0.6 billion or 7% of total financing costs can be raised from local borrowing in the form of debt and loans from commercial banks.

Table 10: Financing Plan – Hydel Projects

	Financing Plan	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	Total	Share (%)
HYDROPOWER											
1	Public Sector Hydel Projects										
	Foreign Currency Cost	338	541	562	593	612	455	350	357	3,809	46%
	Local Currency Cost	334	385	436	506	568	652	525	578	3,984	48%
	Capital Cost	672	926	997	1,099	1,180	1,107	875	935	7,792	94%
	Interest During Construction	11	37	68	102	138	52	46	79	533	6%
	Project Cost	**683**	**962**	**1,065**	**1,201**	**1,318**	**1,160**	**921**	**1,014**	**8,325**	100%
	Financing Plan										
	Self-Financing/Equity	301	432	496	577	650	524	396	453	3,830	46%
	Foreign Borrowing	336	463	499	550	590	554	438	467	3,896	47%
	Local Borrowing	46	67	70	74	78	82	88	93	599	7%
	Total	**683**	**962**	**1,065**	**1,201**	**1,318**	**1,160**	**921**	**1,014**	**8,325**	100%

Coal Projects

Table 11: Physical and Financing Plan - Coal Projects

Name of Project	MW	Capital Cost	Start	Completion	USD Cost	Construction Period	Foreign Loan		Local Loan		Equity
		mn	*Date*	*Date*	*%*	*Yrs*	*Share, %*	*LIBOR +*	*Share, %*	*KIBOR +*	
Thar Block I (for ICB)	1000	1,500	1-Jul-11	30-Jun-15	80%	4.0	60.0%	3.5%	10%	2.0%	30%
Thar Block II (Sind-Engro)	1200	1,800	1-Jul-11	30-Jun-15	80%	4.0	60.0%	3.5%	10%	2.0%	30%
Thar Block V (UCG Project)	1000	1,500	1-Jul-11	30-Jun-15	80%	4.0	60.0%	3.5%	10%	2.0%	30%
Thar Block VI (Oracle)	300	450	1-Jul-11	30-Jun-15	80%	4.0	60.0%	3.5%	10%	2.0%	30%
AES Imported Coal	1200	1,800	1-Jul-11	30-Jun-15	90%	4.0	60.0%	3.5%	15%	2.0%	25%
Imported Coal	1200	1,800	1-Jul-12	30-Jun-16	90%	4.0	60.0%	3.5%	15%	2.0%	25%

The financing requirement for the above mentioned planned coal projects is estimated at $11.02 billion. An indicative financing plan to meet the steep investment needs is shown in the table below.

- GoP and sponsors would need to invest equity of 36% of total project cost or $3.85 billion.
- Financing from foreign lenders amounting to $6 billion will have to be raised. The sources of financing will include multilateral donors, bilateral sources, and ECAs. In our opinion, ECAs can contribute 20-25% of the foreign finance component of the projects.
- Finally, $1.2 billion or 11% of total needed financing would have to be raised from local borrowing in the form of debt and loans from commercial banks.

Table 12: Financing Plan – Coal Projects

	Financing Plan – Coal	FY11	FY12	FY13	FY14	FY15	Total	Share (%)
1	*Indigenous Coal (Thar)*							
	Foreign Currency Cost	1,095	1,114	1,136	1,158	0	4,502	69%
	Local Currency Cost	318	349	384	422	0	1,474	23%
	Total Capital Cost	1,413	1,463	1,520	1,581	0	5,976	91%
	Interest During Construction	34	103	175	249	0	560	9%
	Total Project Costs	**1,447**	**1,566**	**1,694**	**1,830**	**0**	**6,537**	100%
	Financing Plan							
	Self-Financing/Equity	458	542	630	723	0	2,353	36%
	Foreign Borrowing	848	878	912	949	0	3,586	55%
	Local Borrowing	141	146	152	158	0	598	9%
	Total	**1,447**	**1,566**	**1,694**	**1,830**	**0**	**6,537**	100%
2	*Imported Coal*							
	Foreign Currency Cost	422	859	876	894	457	3,508	78%
	Local Currency Cost	55	120	132	145	80	531	12%
	Total Capital Cost	477	979	1,008	1,039	537	4,039	90%
	Interest During Construction	13	54	109	166	99	440	10%
	Total Project Costs	**490**	**1,032**	**1,117**	**1,204**	**636**	**4,479**	100%
	Financing Plan							
	Self-Financing/Equity	132	298	361	425	233	1,450	32%
	Foreign Borowing	286	587	605	623	322	2,423	54%
	Local Borrowing	72	147	151	156	81	606	14%
	Total	**490**	**1,032**	**1,117**	**1,204**	**636**	**4,479**	100%

Gas Projects

Table 13: Physical and Financial Plan - Gas Projects

Project	MW	Project Cost ($mn)	Start	End	USD Cost	Const. Period	Foreign Loan	Rate: LIBOR Plus	Local Loan	Rate: Kibor Plus	Equity
Guddu Rehabilitation	800	800	1-Jul-10	30-Jun-12	100%	2.0	60.0%	3.5%	10%	2.0%	30%
Jamshoro Rehabilitation	200	600	1-Jul-11	30-Jun-13	100%	2.0	60.0%	3.5%	10%	2.0%	30%
On Naphta	500	450	1-Jul-11	30-Jun-14	80%	3.0	60.0%	3.5%	20%	2.0%	20%
On Naphta	500	450	1-Jul-12	30-Jun-15	80%	3.0	60.0%	3.5%	20%	2.0%	20%
CCGT on indigenous gas	600	540	1-Jul-10	30-Jun-13	80%	3.0	60.0%	3.5%	20%	2.0%	20%
CCGT on indigenous gas	600	540	1-Jul-10	30-Jun-13	80%	3.0	60.0%	3.5%	20%	2.0%	20%
CCGT on indigenous gas	600	540	1-Jul-11	30-Jun-14	80%	3.0	60.0%	3.5%	20%	2.0%	20%
CCGT on Indigenous gas	600	540	1-Jul-11	30-Jun-14	80%	3.0	60.0%	3.5%	20%	2.0%	20%
CCGT on indigenous gas	600	540	1-Jul-12	30-Jun-15	80%	3.0	60.0%	3.5%	20%	2.0%	20%
LNG Based Power Park	1000	900	1-Jul-10	30-Jun-13	80%	3.0	60.0%	3.5%	20%	2.0%	20%
LNG Based Power Park	1000	900	1-Jul-11	30-Jun-14	80%	3.0	60.0%	3.5%	20%	2.0%	20%

The financing requirement for the above mentioned planned gas projects is estimated at $8.1 billion. An indicative financing plan to meet the investment needs is shown in the table below.

- GoP and sponsors would need to invest equity of 27% of total project cost or $2.3 billion.
- Financing from foreign lenders amounting to $4.5 billion or 55% of project cost will have to be raised. The sources of financing will include multilateral donors, bilateral sources and ECAs. In our opinion, ECAs can contribute 20-25% of the foreign finance component of the projects.
- Finally, $1.3 billion or 18% of total needed financing would have to be raised from local borrowing in the form of debt and loans from commercial banks.

Table 14: Financing Plan - Gas Projects

	GAS PROJECTS – Financing Plan	FY11	FY12	FY13	FY14	FY15	Total	Share (%)
1	*Indigenous*							
	Foreign Currency Cost	701	1,455	1,336	727	291	4,510	76%
	Local Currency Cost	79	211	319	246	106	961	16%
	Total Capital Cost	780	1,666	1,655	973	398	5,472	93%
	Interest During Construction	22	90	147	124	60	443	7%
	Total Project Costs	**802**	**1,756**	**1,802**	**1,097**	**458**	**5,914**	100%
	Financing Plan							
	Self-Financing/Equity	218	496	510	319	139	1,683	28%
	Foreign Borowing	468	999	993	584	239	3,283	56%
	Local Borrowing	115	260	299	195	80	949	16%
	Total	**802**	**1,756**	**1,802**	**1,097**	**458**	**5,914**	100%
2	*Imported LNG*							
	Foreign Currency Cost	245	500	509	260	0	1,513	70%
	Local Currency Cost	66	145	160	88	0	459	21%
	Total Capital Cost	311	646	668	347	0	1,972	91%
	Interest During Construction	10	40	81	52	0	183	9%
	Total Project Costs	**320**	**686**	**750**	**400**	**0**	**2,155**	100%
	Financing Plan							
	Self-Financing/Equity	72	169	215	122	0	578	27%
	Foreign Borowing	186	387	401	208	0	1,183	55%
	Local Borrowing	62	129	134	69	0	394	18%
	Total	**320**	**686**	**750**	**400**	**0**	**2,155**	100%

Renewable Energy

The financing requirement for the planned renewable energy projects is estimated at $3.9 billion. An indicative financing plan to meet the investment needs is shown in the table below.

Table 15: Financing Plan – Renewable Energy Projects

Financing Plan – RENEWABLES	FY11	FY12	FY13	FY14	FY15	Total	Share (%)
Foreign Currency Cost	398	616	576	778	415	2,783	71%
Local Currency Cost	107	179	181	263	151	882	23%
Total Capital Cost	506	795	757	1,041	567	3,665	94%
Interest During Construction	16	57	41	63	52	229	6%
Total Project Costs	**522**	**852**	**797**	**1,104**	**619**	**3,894**	100%
Financing Plan							
Self-Financing/Equity	117	216	192	271	165	962	25%
Foreign Borowing	303	477	454	625	340	2,199	56%
Local Borrowing	101	159	151	208	113	733	19%
Total	**522**	**852**	**797**	**1,104**	**619**	**3,894**	100%

Government is also trying some non-conventional options to augment power supply. Among these options are:

- Electricity imports from Central Asia under the Central Asia South Asia Regional Electricity Market (CASAREM) initiative, in which Pakistan is playing a leading role.
- Additional gas through LNG imports (one such project is promoted by 4Gas, a company held by Carlyle Group), while the government continues to make efforts towards realization of gas import options through Iran-Pakistan-India (IPI) gas pipeline and Turkmenistan-Afghanistan-Pakistan-India (TAPI) gas pipeline.

2.2 Financing of Investment Requirements through Private Participation

Public investment in infrastructure in Pakistan has declined as a percent of GDP since the early 1990s. Since demand for infrastructure is growing and there is limited fiscal space for public sector-led infrastructure investment, there is considerable infrastructure (including electricity) deficit in the country. Pakistan, like India, embarked on private sector participation for bridging the infrastructure deficit in the country, besides improving the efficiency of service delivery. The table below shows the extent of private participation in infrastructure (PPI) (both for energy and all infrastructure projects) in Pakistan. As the table shows, energy sector accounts for about three quarters of PPI by number of projects and a third by investment in Pakistan.

Table 16: Private Participation in Infrastructure in Pakistan

	Number of Projects	Investments*
Energy	34	8
Total	47	22

***Investments refer to investment commitments and are in current $ billion
Source: World Bank and PPIAF, PPI Project Database. (http://ppi.worldbank.org)

Pakistan has a history of successfully tapping into the private sector through the IPP program in the thermal segment. About a third of the installed power generation capacity in Pakistan is in the private sector. However, now bulk of the generation is planned from hydro and coal based plants which have previously seen little participation from the private sector.

In the past two decades, Pakistan has managed to attract $ 8.9 billion of private investment in 38 power projects (while these numbers do not exactly match those in Table 16, they are similar; variance may be due to different definitions and sources). Trend analysis of private participation reveals that the flow of capital was concentrated in two periods: 1994-1997 and 2005-2008. The first phase of private participation in the power sector was totally supported by foreign sources including multilateral donors and ECAs with limited local participation. Investment in the second phase (2005-2008) has been largely dominated by funds from the local banking sector.

Going forward, the Government faces an uphill challenge to generate around twice the financing in the next decade from the private sector compared to what was raised in the past two decades. The 2008 *Crisis* has further exacerbated this situation, by reducing the risk appetite of sponsors and commercial lenders resulting in higher overall project costs and shorter debt tenors.

History of Private Participation in the Power Sector of Pakistan

- **Project Financing in the 1990s**

Private participation in Pakistan's power sector started in 1994 following the roll-out of the "Private Power Policy". Under the 1994 policy, 15 power plants with a total capacity of 2,911 MW were procured by PPIB (accounting for an investment of $5.3 billion, a quarter of which was financed with foreign capital) and developed by the private sector as IPPs. The table below shows the power projects procured under the 1994 policy (and earlier).

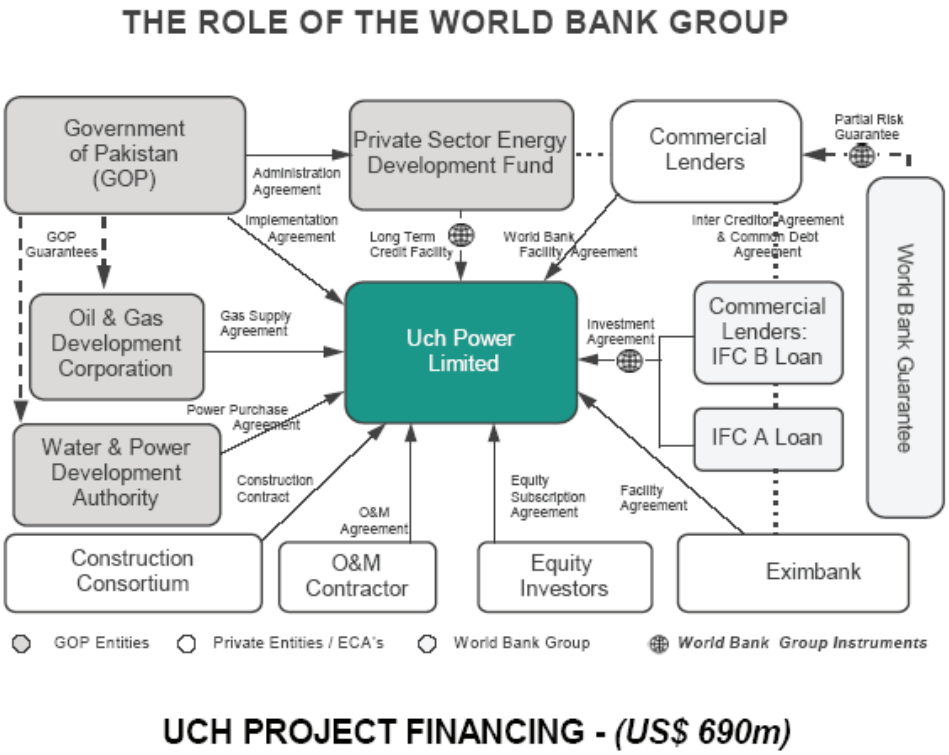
Table 17: Private Power Projects under the 1994 Policy (and earlier)

Project	Capacity (MW)	Policy	Fuel	Term of Project (Yrs)
Kohinoor Energy Ltd	131	1994	RFO *	22
AES Lalpir Limited	362	1994	RFO	30
AES PakGen (Pvt) Limited	365	1994	RFO	30
SEPCOL	117	1994	RFO	30
Habibullah Coastal	140	1994	Gas	30
Rousch Power Ltd	412	1994	RFO	30
Saba Power Company	125	1994	RFO	30
Fauji Kabirwala	157	1994	Gas	30
Japan Power Generation	135	1994	RFO	30
Uch Power Project	586	1994	Gas	30
Liberty Power Project	235	1994	Gas	25
Altern Energy	14	1994	Gas	30
Davis Energen	10	1994	Gas	25
Northern Electric	6	1994	Coal	30
Power Generation System	116	1994	RFO	22
Kot Addu Power Company	1,638	pre-1994	Gas/RFO/HSD	25
HUB Power Company (HUBCO)	1,292	pre-1994	RFO	31
Total MW	5,841			

Note: Kot Addu Power Company and HUB Company pre-date the 1994 policy

The main private sponsors in these projects were AES, Coastal Power, El Paso, Siemens, Tenkasa Inc., Midlands Electricity, and Fauji Foundation. The International Finance Corporation (IFC), the Asian Development Bank (ADB), World Bank, and ECAs supported several of the IPP projects. An example of the World Bank Group support to power projects may be seen in the figure below.

Figure 3: Financing Structure – UCH Power under 1994 policy



The details about two private power projects may be seen in Box 1 and 2.

Box 1. Privatization of Kot Addu Power Company (KAPCO)

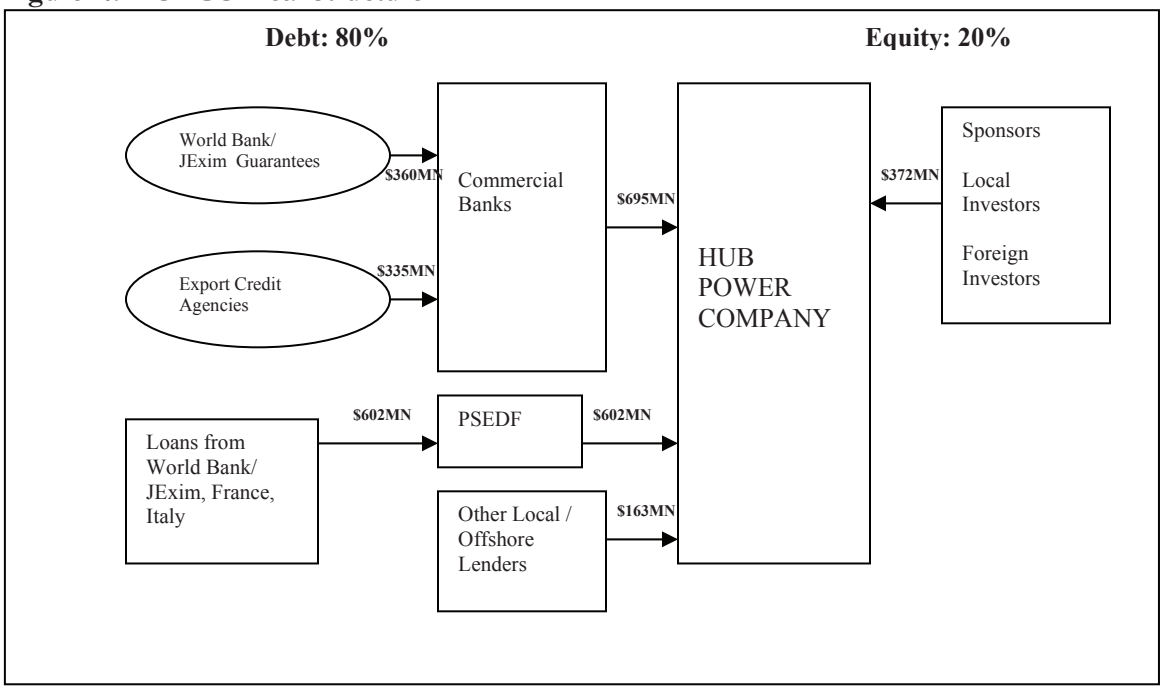
Initially KAPCO was a public-sector power project. Through its strategic sale by the Privatization Commission, it was converted into an IPP. Kot Adu was among the most important privatizations during the 1990s.

The government decided to sell 26% stake in it at a price of $215 million. Subsequently 10% shares were sold for $76 million and the government realized only $291 million from the sale of 36% share. The most interesting feature this privatization was that the government handed over the management of the project to minority shareholders.

Box 2: Hub Power Company (HUBCO) - A Landmark Deal

The Hub Power Company is the first power project to be financed by the private sector in South Asia. Financial closure of the project took place in January 1995. It was a Build-Own-Operate (BOO) project and the contract period was 31 years. The World Bank provided a Partial Risk Guarantee (PRG) for $240 million in 1995. The project was commissioned in 1997. It was a model for the formulation of private power projects in Pakistan which has since generated substantial interest from international investors. The deal structure of Hub Power Company may be seen in the figure below.

Figure 4: HUBCO Deal Structure



The Hub Power Company is listed on Karachi, Lahore, Islamabad and Luxembourg Stock Exchanges, has the largest market capitalization among private companies in Pakistan, and has over 17,000 Pakistani and international shareholders

HUBCO is expanding even in the midst of the Global Financial Crisis of 2008. The 225 MW gross and 213 MW net expansion project at Narowal is expected to be commissioned by end-September 2010, after a 6-month delay to the initial COD of March 2010. The project with a debt-equity ratio of 70:30 would operate on Residual Fuel Oil (RFO) as the primary source for power generation.

HUBCO has recently also acquired a 75% stake in Laraib Energy, an 84 MW hydel power plant. The acquisition signals HUBCO's desire to diversify its feedstock amid high RFO prices. Laraib Energy is the country's first hydro IPP facility and has achieved financial closure in December 2009. The project was registered as a Clean Development Mechanism (CDM) project by the CDM executive board under the United Nations Framework Convention on Climate Change in January 2009.

Source: Adapted from Asian Development Bank. 2008. *Pakistan: Private Sector Assessment* and Project Finance International website (www.pfie.com)

Private activity during this period mainly focused on generation ('Greenfield' Build-Own-Operate projects) with IPPs accounting for most of the investment flows. The policy was initially successful and a number of private power projects were quickly set up. For incentivizing the private sector, Pakistan opted for bulk (benchmark) tariffs rather than competitive bidding. Although this was successful in luring private investors, the process had flaws. It allowed for inefficiencies by approving projects which were too small or not least cost and there were allegations of corruption.

Due to the rapid commissioning of capacity, maximum demand fell from 84% of capacity in 1994 to 64% in 1998. Demand growth slowed further as the Pakistani economy suffered the effects of the Asian financial crisis and the economic sanctions placed on the country after its 1998 nuclear tests. The Water and Power Development Authority faced difficulties in meeting its payments to the IPPs, as the cost of purchasing power from the IPPs reached 50% of WAPDA's operating costs.

In 1997, the GoP in trying to avoid the difficult decision to raise tariffs and given WAPDA's weak financial health decided to re-negotiate contracts to its own advantage. Furthermore, the IPPs became a focus of investigations for corruption and finally in 1998, the Government (through PPIB) issued notice of intent to terminate seven IPPs on grounds of corruption, and notice of intent to terminate two IPPs on technical grounds. This represented approximately two-thirds of the total capacity owned by IPPs in the country at the time.

Hub Power the largest foreign investment project ($ 1.62 billion) was also accused of corruption by GoP. After a prolonged legal battle, the dispute was resolved in 2000 with a decrease in the tariff paid by WAPDA from US cents 6.6/kWh to US cents 5.6/kWh. This lowered the internal rate of return on the project from 18% at the time of financial close to 12%.

Available data on roughly half of the IPPs which renegotiated their tariffs reveals that the average decrease in the levelized tariff was about 10%, ranging from 7-8% to as much as 16%. In exchange for these tariff concessions, the term of their power purchase agreements was extended from around 20 years to 30 years.

Following the renegotiations, the environment became highly politicized, reducing investor confidence and discouraging fresh foreign investment. In 1998, GoP introduced a revised power sector policy based on international competitive bidding but the stigma on government's ability to honor contracts was a severe blow and post-1998 till date no sizeable foreign investment has come into the Pakistan power generation sector.

Revisiting the IPP Program of the 1990s

(Adapted from Lessons from the Independent Private Power Experience in Pakistan)

a) The World Bank stated in 2005 that there is a strong consensus that private investment is not a substitute for reform, and that significant private investment in generation should not take place pending reforms, which at a minimum should address efficiency and tariff policies.

b) The failure of the Government of Pakistan to pursue needed policy reforms and structural changes undermined the program.

c) The Bank concluded that the scale of the programs was too big for Pakistan's state of development and governance capacity. The difficulties with the projects can largely be attributed to their size. Unless Pakistan had developed a track record of GoP contractual performance and successful implementation of power projects, the Government should have concentrated its efforts on modest-sized, and as a consequence, more easily financed projects.

- **Project Financing (2003-2008)**

During the 5 year period (2003-2008), 12 power projects achieved financial closure. All the projects (except Engro Power) were financed by consortia of local commercial banks. The total addition to the system capacity was 2,225 MW accounting for an investment of nearly $ 2 billion. The projects during this period were relatively small in size (less than 250MW) and were sponsored by local investors. The overwhelming interest of local sponsors in setting up power plants was based on attractive risk-return dynamics of the power sector including guaranteed tax-free 15% return on equity in dollar terms, low upfront investment requirement (20%), and local commercial banks' willingness and ability to finance power projects.

Post 9/11 event, Pakistan experienced excessive foreign exchange inflows through sharp rise in remittances. These unprecedented foreign exchange inflows had implications for the banking sector in terms of excess liquidity on the balance sheets. The loan to deposit ratio of commercial banks, a widely used indicator of liquidity, averaged 57% during 2000-2004. This provided banks the leverage to finance the power projects with local funding without multilateral or ECA support.

Table 18: Projects under the 2002 Policy

Financial Closure Year	Project Name	Project Status	Type Of PPI	Segment	Total Investment
2006	Alstom Power	Operational	Greenfield project	Electricity generation	32.1
2006	Orient Power	Construction	Greenfield project	Electricity generation	170
2007	Atlas Power	Construction	Greenfield project	Electricity generation	150
2007	Attock Gen	Construction	Greenfield project	Electricity generation	148.6
2007	Foundation Power	Construction	Greenfield project	Electricity generation	200
2007	Saif Power roject	Construction	Greenfield project	Electricity generation	200
2007	Sapphire Power	Construction	Greenfield project	Electricity generation	185
2008	Almoiz Bagasse-fired	Operational	Greenfield project	Electricity generation	7.5
2008	Engro Power	Construction	Greenfield project	Electricity generation	205
2008	Halmore Bhikki Power	Construction	Greenfield project	Electricity generation	231
2008	Nishat Chunian Power	Construction	Greenfield project	Electricity generation	235
2008	Nishat Power	Construction	Greenfield project	Electricity generation	204
Total					1,968

The reasons of the dearth of foreign interest during 2003-08 period were multifarious: unprecedented macroeconomic and sector risks that emerged during this period were compounded by limited policy reform, unilateral actions by the government, and concerns regarding the validity of sovereign guarantees and contract enforcement.

Box 3: Key Differences - Power Policy 2002 vs 1994

- Governing law is now Pakistan law instead of English law whereas arbitration is under UNCITRAL (United Nations Commission on International Trade Law) Rules instead of ICSID (International Center for Settlement of Investment Disputes) / ICC Rules.
- The payment /performance obligations of fuel supplier by GoP withdrawn.
- Lenders' rights to assign and transfer have been substantially weakened. Lenders' ability to sell and transfer the project in enforcement of their security is now subject to GoP approval.
- Transfers by initial shareholder to another initial shareholder or to the affiliates of initial shareholder during six year lock-in period have been made more restrictive.
- Force majeure provisions have been revised and in some cases specific events have been curtailed, amended or abridged (e.g., water event, lapse of consent, availability of fuel, political events occurring outside Pakistan).
- Provisions related to the payment of special compensation in the case of a force majeure event have entirely been deleted.
- Provisions in relation to the consequences of a Change in Law requiring a material modification or capital addition or damage to the Complex arising from a Pakistan Political Force Majeure Event (Restoration) have been moved from IA to PPA.
- Indemnification provisions have been deleted including defense of claims and double jeopardy provisions. The Company cannot challenge fines imposed by the GoP.
- Cure periods are curtailed for Company Events of Default whereas in case of GoP Events of Default, cure periods are now more generous (grace period for a payment default by power purchaser has been extended from 5 to 30 days).
- Delay in obtaining Consents does not result in extension of Required COD and Company has no termination rights in respect of prolonged delays in obtaining Consents.
- The cap of $ 100,000 for additional security to meet unusual security requirements has been removed.
- The Commissioning Tests have been restricted to 10.
- Required Annual Availability of the Project has been significantly increased.

Source: www.pakboi.gov.pk, IGI Research

3.0 IMPACT OF THE 2008 GLOBAL FINANCIAL CRISIS ON INVESTMENTS IN PAKISTAN'S POWER SECTOR

Just prior to the Global Financial Crisis of 2008, Pakistan was suffering from escalating food and non-food inflation, worsening external and internal imbalances, water and power supply constraints, and the War on Terror. Dwindling foreign exchange reserves resulted in a balance of payment crisis and unprecedented currency depreciation against the US dollar. Additionally, low foreign direct investment, sluggish export receipts and flight of capital due to deteriorating law and order situation exacerbated the problem.

Pakistan was strongly affected by the *Crisis* as the current account imbalance and fiscal deficit increased, inflation surged and growth slowed (after growing at 7.3% during 2004-07, economic

growth slowed to 5.8% in 2008). The foreign exchange reserves of the State Bank of Pakistan dropped to $3.3 billion (about three weeks of imports) by mid-October 2008; the nominal exchange rate depreciated precipitously to PKR 84/US$; and the the average inflation rate rose to about 25% by the end of November 2008. In response to these developments, Standard & Poor's downgraded Pakistan's rating to CCC in early November 2008 posing serious threat to external financing of projects. The difficult economic circumstances of FY 2008 carried over into FY 2009 (growth slowed down to only 2.0% in FY 2009, ending June 2009), and revealed how years of seemingly sustainable growth can unravel in a single year because of structural problems in the face of exogenous shocks and delayed policy response to such shocks.

The GoP underwent an IMF Stand-By Arrangement (SBA) effort in 2008 which supported the country's foreign exchange reserves. Policy makers implemented an aggressive aggregate demand compression strategy via tightening of macroeconomic policies. Important reforms promoted by the IMF include phasing out of fuel subsidies and the phased withdrawal of electricity subsidies[11]. Pakistan's progress remains on track for the first year of the IMF program. The exchange rate has remained broadly stable and the international reserves position has strengthened significantly.

The economic recovery, however, continues to count on foreign inflows from multilaterals including IMF, 'Friends of Pakistan', and US assistance, for budgetary support and to keep the country solvent. The Government of Pakistan has also been actively soliciting budget and energy import support from China, the Gulf States, and the World Bank[12].

Some specific impacts of the Crisis

In common with most countries, ***energy demand*** in Pakistan declined (-3.4% growth in petroleum products, -2.5% growth in gas, and -26.5% growth in coal in July 2008 to March 2009 period) or at most remained stagnant (+0.7% growth in electricity) during FY 2008-09 because of the *Crisis*. By way of comparison, electricity consumption increased by 6.1% per annum over the period 1999-2000 to 2007-08. The important large scale manufacturing sector recorded a (-) 7.7% growth in the year and concomitantly there was a decline in energy demand in the sector. Poor power supply has been singled out as the most important reason for the negative growth recorded by the large scale manufacturing sector[13].

Indicators of higher risk aversion of commercial lenders because of the *Crisis* are spike in Credit Default Swap (CDS) spreads and higher risk-free rate in domestic money markets. In sovereign markets, CDS spreads, indicative of investors' risk appetite, on Pakistan's outstanding Government debt, rose by over 3,000 basis points on account of market volatility and fears over the country's financial stability. During 2008 alone, local benchmark rates such as the 6 month KIBOR more than doubled to 15.7%. Higher interest rate increases the cost of capital. During the project development

[11] ***Electricity subsidies*** have stayed very high at 44% of total subsidies in FY 2009 and remain a significant budgetary burden. The government has since phased in a power tariff increase of 24% in FY 2010 to reduce these subsidies, but the tariff is expected to reach cost recovery levels only in the first quarter of FY 2011.

[12] National Electric Power Regulatory Authority. 2009. *State of Industry Report 2009*

[13] Government of Pakistan (Ministry of Finance). *Pakistan Economic Survey 2008-09*

phase, these costs become a part of the project outlay, and any hike in interest rates over and above the originally projected becomes construction cost overrun.

Fig 5. 6-Month KIBOR

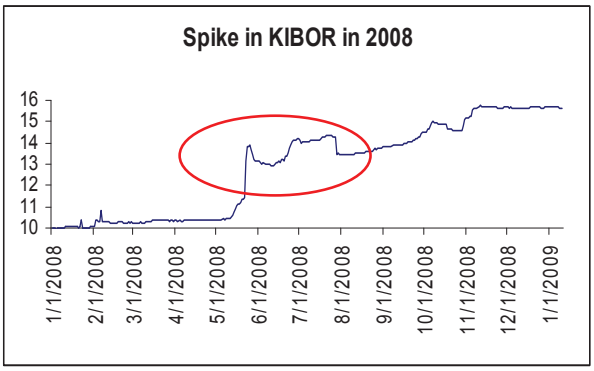
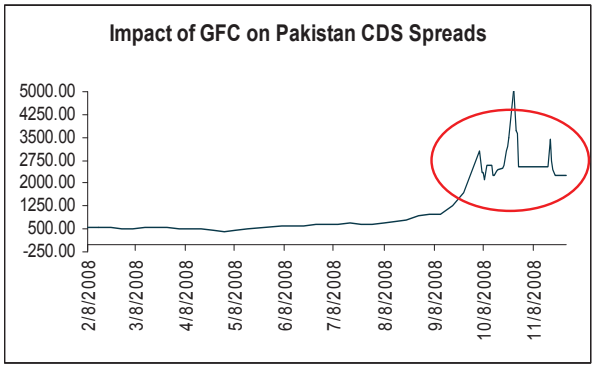


Fig 6. CDS Spreads



To be able to fund the huge financing requirements in the power sector in this environment, the government needs to take-on a more active role in terms of providing comfort to the private sector. In terms of financing avenues, non-conventional sources like Islamic financial institutions, and capital markets (bond and equity) need to play a pivotal role in future power financing. Public Private Partnerships (PPPs) is an investment mechanism characterized by risk and reward sharing between the public and private sectors and needs to be developed further.

3.1 Supply side response

To tide over the significant electricity shortages in the country, the Government of Pakistan planned to add 4,225 MW of generating capacity in 2009. Table 19 below shows the components of the plan as well as the achievement.

Table 19: 2009 Plan for Mitigating the Power Crisis and Achievement

	Plan (MW)	Achievement (MW)
Induction of IPPs	1675	437
Induction of Rental Power Plants	2250	(-) 286*
Rehabilitation of GENCOs	300	0
Total	**4225**	**151**

* None of the Rental Power Plants (RPPs) were commissioned. Rather old RPPs (GE and Alstom Rental Plants) could not get gas resulting in loss of 286 MW[14].

There were many reasons for the failure of the 2009 capacity addition plan:

- IPPs were delayed due to global financial meltdown, security and terrorism related issues:
  - For example, following competitive bidding by 9 companies for new IPP projects under Private Power and Infrastructure Board's (PPIB) Fast Track process (Package A), Cavalier Energy's 470 MW LPG fueled IPP project at Port Qasim, Karachi was 'agreed in principle' by Bid Evaluation Committee of PPIB in August 2008. Tariff was approved by NEPRA on 9 October 2008 and as of 6 December 2008, Cavalier IPP project was at stage 16 (notice for

[14] Government of Pakistan (Ministry of Water and Power)

submission of Performance Guarantee and processing fee) out of 21 stages in PPIB's Package A. It was reported in January 2009 that the project would not materialize because foreign investors were unwilling to provide financing due to recent increases in Pakistan's country risk premium.

- One of the wind energy projects, ZORLU Energi, commissioned Phase I of its project (6 MW) in April 2009, which represented a substantial delay from initially planned commissioning date. The company is facing ongoing difficulty in financing Phase 2 of the Project.
- In November 2005, Eden Enterprises Malaysia and its partners successfully bid for the $1.1 billion, 655MW Suki Kinari run-of-the-river hydro power project located in the Khyber Pakhtunkhua. The feasibility study for the project was completed in September 2007 and petition for tariff determination was filed in July 2008. However, the project has failed to achieve financial closure due to litigation issues and investors' unwillingness to commit financing in the wake of the financial crisis.

- GENCOs' upgrading program was delayed due to security related issues (GE upgrading of Guddu Units GT 9,10 & CC 6 still held up);
- RPP Program was delayed due to persistent controversy in media and financial constraints [originally, the mobilization advance paid to RPP sponsors by the Government of Pakistan was 7% along with a confirmed Standby Letter of Credit (SBLC); however, because of the financial crunch, it was difficult to open confirmed SBLC due to high confirmation charges; therefore, government allowed 14% mobilization advance and government guarantee in lieu of SBLC[15]. This process delayed many RPPs including Pakistan Power Resources 110 MW RPP]. Third party audit of RPPs was ordered in late August 2009, which took 5 months, derailing the whole Program. No RPP has been commissioned to date while the aim was to acquire 2,250 MW of RPP capacity by end-2009;
- Local banks shied away because of higher risk perception. The asset mix of the banking sector shifted from risky loans portfolio to short-term government paper.
- Gas shortage for GENCOs / KAPCO / Rentals – forcing them to use expensive RFO - leading to greater fuel imports and loss of generation capacity. The financial crisis and circular debt problem also played a part as the RFO based plants did not receive regular payments impacting their availability.

From the above, it is apparent that the *Crisis* did play a part in the non-achievement of targets set for generation capacity addition in 2009.

However, it is also true that the direct impact of the global financial crisis on the financing of Pakistan's electricity sector (supply side) was subdued. The domestic financial sector of the economy is still in its developing stages with limited linkages with global markets and no exposure to mortgages or derivates as in developed markets. As a result, domestic financial institutions have been relatively insulated against the contagion in international financial markets.

[15] Another reason given by Government of Pakistan for this change was the unwillingness of banks to provide debt financing to the RPPs on account of liquidity problems in the financial markets, the problem of circular debt, and the high exposure of banks to the power sector [see Government of Pakistan response to ADB Report on Rental Power Projects (http://www.pepco.gov.pk/GOP_Response_to_ADB_Report_29-01-10.pdf)]

Let us take a detailed look at all major sources of funding to assess the impact of the Global Financial Crisis on investments in Pakistan power sector.

3.2 Multilateral Institutions

The multilateral institutions have increased their funding for power projects to help Pakistan cope up with the difficult times. With limited liquidity available from the international banks, additional funding began to be provided by developments banks such as Asian Development Bank and the International Finance Corporation (IFC). For example, the delayed $ 215 million New Bong Escape hydropower project (Laraib Energy), developed by Hub Power Co, has been resurrected with $ 161 million debt funding being sourced largely from the international agencies, the Asian Development Bank, the Islamic Development Bank, the IFC and Proparco. A small portion of the funding has also been provided by domestic banks Habib Bank and National Bank of Pakistan.

The Asian Development Bank and the European Investment Bank are providing a total of $ 660 million funding to Pakistan as part of a $ 2.2 billion program to support its renewable energy sector. ADB has committed $ 510 million while EIB is providing Euro 100 million ($ 150 million). The program is backed by technical assistance from ADB, World Bank and development agencies, USAID and Germany's GTZ[16].

The table below provides a snapshot of multilateral assistance to power projects in Pakistan (till 2008).

Table 20: Multilateral Assistance to Power Projects

Project Name	Agency	Type Of Support	Amount Of Support	Year Of Support
Hub Power Company	IBRD	Guarantee	240	1995
Hub Power Company	IBRD	Loan	258	1995
AES Lal Pir (Pakistan) Ltd.	IFC	Equity	9.5	1995
AES Lal Pir (Pakistan) Ltd.	IFC	Loan	40	1995
AES Pak Gen (Pakistan) Ltd.	IFC	Equity	9.5	1996
AES Pak Gen (Pakistan) Ltd.	IFC	Loan	18	1996
AES Pak Gen (Pakistan) Ltd.	IFC	Syndication	50	1996
Gul Ahmed Energy Ltd.	IFC	Equity	4.1	1996
Gul Ahmed Energy Ltd.	IFC	Loan	24.3	1996
Gul Ahmed Energy Ltd.	IFC	Syndication	35	1996
Kohinoor Energy Ltd.	IFC	Equity	6.3	1995
Kohinoor Energy Ltd.	IFC	Loan	25	1995
Kohinoor Energy Ltd.	IFC	Syndication	36.6	1995
Raiwind Diesel Power Plant	IBRD	Loan	35	1996

[16] Project Finance International website (www.pfie.com). Nov 2009

Project Name	Agency	Type Of Support	Amount Of Support	Year Of Support
Tapal Energy Limited	MIGA	Guarantee	2	1997
Tapal Energy Limited	MIGA	Guarantee	8	1998
Fauji Kabirwala Power Company Ltd.	MIGA	Guarantee	16.1	1997
Rousch Independent Power Co. Ltd	IBRD	Loan	100	1995
Uch Power Ltd.	IBRD	Guarantee	75	1996
Uch Power Ltd.	IBRD	Loan	10	1996
Uch Power Ltd.	IFC	Loan	40	1996
Uch Power Ltd.	IFC	Risk management	16	1996
Uch Power Ltd.	IFC	Syndication	75	1996
Saba Power Company Ltd.	MIGA	Guarantee	5	1997
Karachi Electric Supply Company	IFC	Loan	125	2007
Foundation Power Company Daharki	ADB	Equity	2.75	2007
Foundation Power Company Daharki	ADB	Loan	44	2007
Engro Power Project	IFC	Equity	3	2008
Engro Power Project	IFC	Loan	66	2008

3.3 Public Sector Financing

The traditional source of financing the power sector has been the government budget or government-sponsored borrowing. In the past 6 years (FY05-FY10), the government has allocated PKR 377 billion for the power sector which included foreign aid component of PKR 95 billion. Utilization rates have been below 100% in many years, particularly for foreign aided projects.

According to the annual plan FY10, a total of $ 2 billion (including foreign aid of $ 300 million) was allocated for the power sector which included budgetary allocations for corporations and self financed projects. However, against the budgeted amount, the actual utilization was $ 1.4 billion (foreign aid of $ 200 million), amounting to a utilization rate of 70%. In the recent budget FY11, an allocation of $ 1.5 billion has been kept for the power sector, which is 25% less than the FY10 budgeted amount but inline with the actual utilized amount in the previous fiscal year.

The major projects that are being funded through public sector allocations in FY11 include:

Table 21: Public Sector Assistance to Power Projects (in billion PKR)

Project Name	Total Expenditure till June 2010	Allocation for FY11	Total Project Cost
Neelum Jhelum Hydropower Project	13.8	14.7	84.5
Diamer Basha Dam	0	15	89.5
747 MW Guddu Steam Power Project	13.1	20	44.75
425 MW Combined Cycle Nandipur	7.6	7	22.33
525 MW Combined Cycle Power Plant at Chicho Ki Malian	5.43	11.7	18.05
Transmission Arrangements for Power Dispersal of Ghazi Barotha,	13.2	.45	14.13
DISCOS*	75.8	16.5	130.2
**LESCO,GEPCO,MEPCO,FESCO, IESCO,PESCO, HESCO Distribution & Transmission projects*			

3.4 Commercial Banks

Pakistan's banking sector serves around 6 million borrowers and 25 million depositors, implying a penetration rate of 3.6% and 15% respectively. Almost 81% of banking assets are in private hands. The present foreign stake comes to 47% of total paid-up capital of all Financial Institutions (FIs) regulated by SBP.

The Pakistani banking sector presently consists of a total of 40 banks accounting for assets of $75 billion with the top ten banks accounting for 73% of the total assets. As of March 2010, local commercial banks had total advances of $37 billion out of a total asset base of $75 billion. The banking sector has PKR 370 billion ($ 4.35 billion) in exposure to the energy sector including financing of circular debt and related Public Sector Energy Company (PSEC) financing inclusive of PEPCO Term Finance Certificates (TFCs). Alongside the circular debt, the power sector had also tapped financing for projects under the 2002 power policy: about PKR 100 billion ($ 1.2 billion) is in fixed investments, and PKR 30 billion ($ 0.35 billion) is in working capital finance, while the bulk, i.e., PKR 240 billion remains under PSECs and circular debt[17].

Analysis of project financing in the past 5 years reveals that majority of the power projects were supported by the consortium of local banks. Going forward, the financing has been secured for another 2000 MW for upcoming IPPs with commissioning dates till 2011 from local commercial banks. Based on this surge in reliance on local banks to finance power projects, the lending limits to power sector has been exceeded (exposure of banking sector to power stands at 15% of total portfolio which implies that banks have fully utilized their credit limits) and there is no further room to provide credit to the sector until the circular debt issue is resolved.

According to Fitch Ratings, "Pakistan's banking sector has remained remarkably strong and resilient, despite facing pressures emanating from weakening macroeconomic environment since late 2007." Overall, Pakistan's banking sector has been largely cushioned from the banking crisis in developed markets due to minimal exposure. The liquidity in domestic markets is tight but not due to Global Financial Crisis but because of heavy government borrowing from the banking sector and thus 'crowding out' of the private sector.

Overall, key issues and challenges in financing Pakistan's power sector by commercial banks are:

- Industry structural issues
- Circular debt and fuel supply risk
- Pressure for directed lending from the government to finance the power sector circular debt.
- Sponsor capabilities / execution risk

Deteriorating financial capacity of power sector: Power sector's persistent operational inefficiencies, high cost of operations, and tariffs not covering the full cost of service, amongst other factors, have eroded the operating margins, profitability, and cash flows of state utilities. WAPDA's financial capacity is suspect and late payment to power producers is quite common. These problems

[17] FoDP, Energy Task Force Report June 2010

have resulted in the sector's weak self-financing, debt service and liquidity capabilities resulting in delayed payments to lenders.

In March and September 2009, the GoP issued two TFCs amounting to PKR 80 billion and PKR 85 billion respectively at interest rates of 6 months KIBOR + 175-200 basis points. The interest and principal repayments on these loans have been delayed by around 90 days and banks do not have confidence in the GoP timely repayment capacity.

The financial capacity of the power sector can partly be ameliorated through improved management and operating efficiency of power projects and tariff adjustments.

Fuel Supply Issues: IPPs sign long term Fuel Supply Agreement (FSA) with Oil Marketing Companies (OMCs) before the commencement of commercial production. However, due to liquidity constraints arising from long-due inter-corporate circular debt (see Box 4), OMCs are faced with the risk of default on the foreign oil import payments on letter of credit (LC) which could result in fuel shortage for IPPs.

Possible resolution can occur through increasing the use of domestic fuel resources like coal, eliminating mispricing of gas, and encouraging alternative energy (e.g., sugar cogen) and hydel projects.

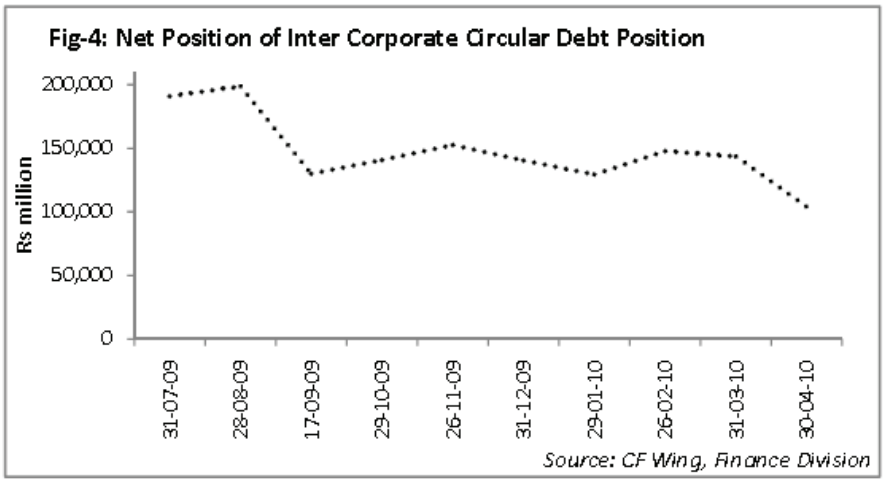
Box 4: Circular Debt Problem and Steps for its Resolution

The circular debt problem plaguing the power sector stems from a disparity between costs and energy tariffs. The inability to increase the consumers' energy tariff prior to fiscal year 2007-08 even though generation cost kept increasing gave rise to substantial cost-tariff differential. This situation was further complicated by the international oil price spike during the first half of 2008, a major input in the generation of electricity. As the subsidy element (difference between cost and tariff) grew, large amounts of circular debt were created whereby power producing companies were unable to receive payments from distribution companies; in-turn the power producers could not make payments to the fuel suppliers. Currently, the government is regularly revising the power tariffs in line with international oil prices to recover the cost of power.

The position of inter-corporate circular debt over time is shown in the figure below. Other steps taken for resolving the circular debt problem are:

- Assumption of PKR 301 billion debt by Power Holding Company will be completed soon. Markup payments of loan are being made regularly (PKR 40 billion paid).
- Power tariff differential claim (subsidy) paid to power sector companies (PKR 95 billion).
- Government has picked up entire past liability of FATA of PKR 85 billion.
- Government has picked up PEPCO's receivables on account of FATA's current dues (PKR 16.7 billion).
- Office of Government Adjuster has been activated to improve recoveries from provinces.
- PEPCO is being persuaded to proactively recover the dues from defaulting private consumers.
- Power tariff is being reviewed regularly to recover the cost of power.
- Measures are being taken to restructure the sector in order to improve its efficiency.

Figure 7: Position of inter corporate circular debt over time



Source: Adapted from Economic Survey 2010

Banks Portfolio Limits: Bank exposure to power including both Advances and TFC investments amounts to $4.35 billion or 15% of total advances. Out of this total exposure, $1.55 billion is provided for project and working capital financing while the circular debt exposure amounts to $ 2.8 billion. Besides reaching the lending limits to lend to the power sector, banks have limited capacity to take power sector risk. In addition, banks do not have the resources to meet the scale and tenor of financing required by the sector.

In this context, the dependence on bank finance could be eased by encouraging growth of domestic capital markets and increased access to external financing (ECA and multilaterals).

Sponsor Capabilities: Local sponsors have limited sector capabilities and weak project management skills leading to cost overruns, delays and technical issues. Possible resolution relates to facilitation and incentives for foreign participation, while taking care that the GoP does not go overboard with incentives as with the 1994 Private Power Policy.

3.5 Corporate Debt Market

The size of corporate debt market in Pakistan is estimated at PKR 200 billion or less than 1% of the total domestic debt market. The listed TFCs amounts to around PKR 125 billion while privately placed and Sukuk issues are estimated at PKR 70 billion. Till now, no effort has been made to raise long term debt or infrastructure bonds. As per estimates, the insurance sector has over PKR 300 billion in investments in low yield Government securities. A part of this investment could be substituted by 10-15 year power bonds in Pakistan.

3.6 Export Credit Agencies (ECA)

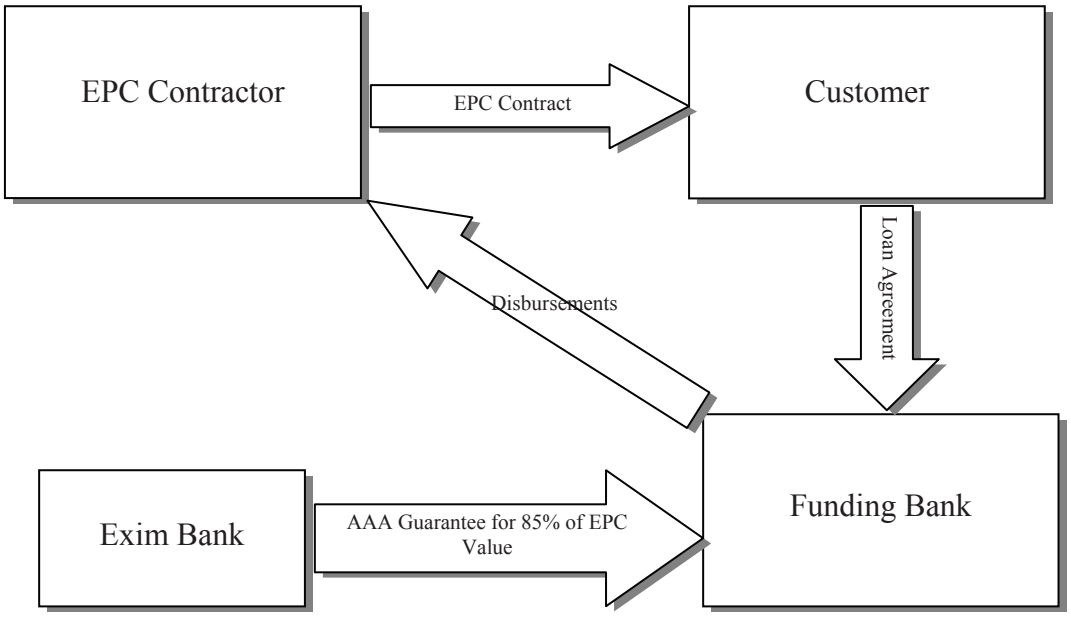
Export credit, for both public and private sector projects, is an important source for financing power projects. The demand for export credit in the region has shown steady growth, due in large part to the funding requirements of capital-intensive projects. The importance of ECAs has further increased due to reduced appetite on the part of commercial lenders for uncovered term financing in the period following the financial crisis.

Export credit is typically provided by ECAs either:

- Directly, as a loan, with repayment terms generally from two to ten years, subject to the OECD Arrangement.
- Indirectly, as insurance or a guarantee provided by an ECA to support a commercial loan.

The involvement of ECAs is necessary to allow commercial banks to finance power projects in emerging markets. ECAs often provide guarantees to funding banks covering 90% political risk and 85% commercial risk with cover going up to 100% in some cases. The banks assume residual risk in the range of 5-15%. The typical ECA financing structure is shown in the figure below.

Fig. 8. Typical ECA Financing Structure[18]



3.7 Local Islamic Banks

According to estimates, total shariah compliant assets worldwide have grown to about $ 700 billion – with annual growth exceeding 10% during the past decade - and are projected to grow to $ 1.6 trillion by 2015. Islamic Financial Institutions (IFIs), while not directly impacted by the

[18] Ahmad, Nomi. *Export credit agency financing of Wärtsilä power plants*

repercussions of the global financial crisis, did experience some effect transmitted through indirect channels. According to an estimate by Standard & Poor's, around 20% of all financing by IFIs is backed by real estate, and a large number of commercial banks are vulnerable to the correction in the real estate market seen during the last two years. Secondly, given the lack of liquidity in Islamic Financial Markets, IFIs have generally resorted to placing funds in the equity market, which has exposed them to the risk of severe correction in stock markets around the world, as seen during the course of the financial crisis.

In Pakistan, since its launch in 2002, Islamic banking has grown progressively. The asset base of the Islamic Banking Institutions (IBIs) on average has grown at around 59% per annum since 2005. The growth in the deposit base and the ongoing expansion in outreach, based on the number of branches, are also impressive. As a proportion of the overall banking industry, the combined share of Islamic banks, Islamic branches of conventional banks, and Islamic windows is 5.2% in deposits, and 5.1% in assets, as of June 2009.

As of March 2010, the local Islamic banking industry had a total asset base of $ 4.4 billion while the total financing stood at $ 1.8 billion. Hence, with the industry still in a nascent stage of development, it does not have the capacity to take an active role in financing power projects.

3.8 Foreign Direct Investment

After growing at an average rate of 61% per annum for four years, Pakistan's FDI declined by 31% in 2008-09. The situation further deteriorated in 2009-10 owing to a combination of internal factors like energy crises and difficult law & order situation along with external factors related to global economic slowdown. Foreign firms' ability to invest has been severely hurt due to falling profitability, higher uncertainty and risk aversion, and reduced availability of finance.

Pakistan has failed to attract substantial foreign direct investment in the power sector which has only contributed 1-4% to the total FDI into Pakistan. In the past decade, the total FDI into power sector has been $ 894 million which translates to a meager $ ~90 million per annum. The key reasons for the lack of FDI in power sector include: i) Policy and regulatory bottlenecks which influence the financial viability of projects; ii) Political risk continues to remain a major hurdle for investment in infrastructure sectors; iii) Macroeconomic crises leading to significant currency depreciation have raised concerns about macroeconomic stability in Pakistan; iv) Bureaucratic delays stretch the project development process and often frustrate investors' sentiments; and v) Sector specific issues like circular debt problem, weak financial condition of the public utilities (WAPDA) which is the primary off-taker of the power generated in the country, and risks to guaranteed availability of fuel supply.

The table below shows sector-wise FDI inflows into Pakistan since the beginning of the millennium. It is apparent that Pakistan has been able to attract only a small amount of FDI in the power sector.

Table 22: Sector Wise FDI Inflows ($ million)

Sector	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	Jul-Apr'10
Oil & Gas	80.7	268.2	186.8	202.4	193.8	312.7	545.1	634.8	775	604.7
Financial Business	-34.9	3.6	207.4	242.1	269.4	329.2	930.3	1,864.90	707.4	133
Textiles	4.6	18.5	26.1	35.4	39.3	47	59.4	30.1	36.9	20.9
Trade	13.2	34.2	39.1	35.6	52.1	118	172.1	175.9	166.6	78
Construction	12.5	12.8	17.6	32	42.7	89.5	157.1	89	93.4	86.3
Power	39.9	36.4	32.8	-14.2	73.4	320.6	193.4	70.3	130.6	10.9
Chemical	20.3	10.6	86.1	15.3	51	62.9	46.1	79.3	74.3	79.1
Transport	45.2	21.4	87.4	8.8	10.6	18.4	30.2	74.2	93.2	104.2
Communication (IT&Telecom)	NA	12.8	24.3	221.9	517.6	1,937.70	1,898.70	1,626.80	879.1	222.2
Others	140.9	66.2	90.4	170.1	274	285	1,107.20	764.5	763.4	433.6
Total	**322.4**	**484.7**	**798**	**949.4**	**1,523.90**	**3,521.00**	**5,139.60**	**5,409.80**	**3,719.90**	**1,772.90**
Privatization Proceeds	-	127.4	176	198.8	363	1,540.30	266.4	133.2	0	0
FDI Excluding Pvt. Proceeds	**322.4**	**357.3**	**622**	**750.6**	**1160.9**	**1980.7**	**4873.2**	**5,276.60**	**3,719.90**	**1,772.90**

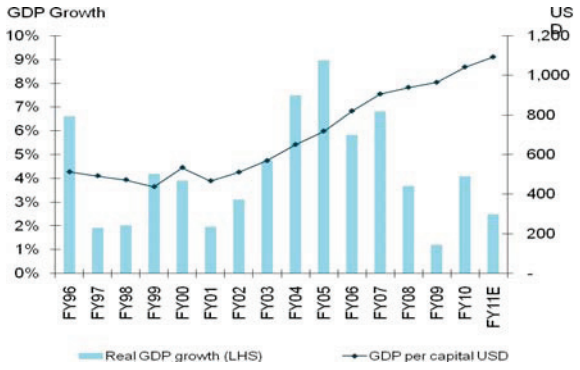
4.0 POWER SECTOR INVESTMENT CHALLENGES: MACRO STABILITY AND SECTOR RISK

4.1 Less Developed Economies and Capacity Deficits

Pakistan like many less developed economies has witnessed a capital deficit for much of its history, manifested in broad electrical power sector demand gap, availability of electricity to 75% of the population, and electricity demand expected to reach over 40,000 MW by FY 2020[19]. Projected annual capacity additions have never been achieved in recent times, with the problem being accentuated since the onset of the Global Financial Crisis, with mounting pressures at the macro and sector level. The fuel mix is highly skewed towards fuel oils, resulting in high average cost of power generation, while stagnant power tariffs pre-2007 have led to unsustainable subsidization of the power sector by the GoP. Under recoveries and lack of collection discipline has fueled the circular debt and liquidity crunch in the sector, compounding the macro and sector risks. As electricity demand boomed in 2002-2007, Pakistan began to see severe electricity shortages, with the supply situation expected to deteriorate as we move into FY11 and FY12. The current power deficit in Pakistan is estimated at 4000 MW - 5000 MW[20]. Power supply constraints have resulted in an estimated loss of productivity amounting to 2% of GDP.[21]

[19] World Bank. 2009. *Least Cost Development Program for Pakistan Power Sector.*
[20] Government of Pakistan (Ministry of Finance). *Pakistan Economic Survey 2007-08*
[21] Government of Pakistan (Ministry of Finance). *Pakistan Economic Survey 2010* (pg 183)

Fig 9. Pakistan GDP and GDP per capita



4.2 Beleaguered Supply Matrix

This necessitates rapid and continuous addition to the supply matrix; however, efforts have been fragmented and often delayed. Current capacity sits at just above 20,000 MW, with a targeted addition of about 20,000 MW by CY 2020. The quick-fix to power woes attempted by the government in the form of Rental Power Plant program has become an expensive initiative. While the aim was to acquire 2,250 MW of RPP capacity by end-2009, there has been no increase in capacity in 2009 from RPPs. Given the recent results in terms of capacity addition, we do not expect that the projected level of about 20,000 MW of new capacity addition by CY 2020 will materialize. Our conservative outlook is based on a number of investment constraints which we would like to split into Macroeconomic risks and Sector specific risks.

Macroeconomic Issues

4.3 Economic Recovery is Fragile

Global growth is expected to be subdued as residual effects of the Global Financial Crisis dominate economic events. While the region is expected to post GDP growth in the range of 7-7.5% (led by India), the outlook for countries like Pakistan and Sri Lanka, which are faced with large internal and external imbalances and conflict related challenges, is not sanguine. These countries were compelled to impose demand compression tactics and are likely to present very modest growth trends in the near future. While Sri Lanka's conflict related concerns appear to have come to an end, Pakistan remains at the heart of the US War on Terror on its border with Afghanistan, is suffering from an internal insurgency in its resource rich North-Western region, while relations with India remain on edge. Consequently, we expect the country's growth trajectory to remain in the 3.5-4% range, and in this economic and political climate the two great challenges ahead remain the risk of large fiscal and external imbalances.

4.4 Economic vulnerability is the primary hurdle

Fiscal management remains hampered by low fiscal resource mobilization, constrained global liquidity flows, security related spending, energy chain debt pressures, and debt servicing. The impact on external imbalances and the exchange rate is directly related to and could result in symbiotic exacerbation of the fiscal position.

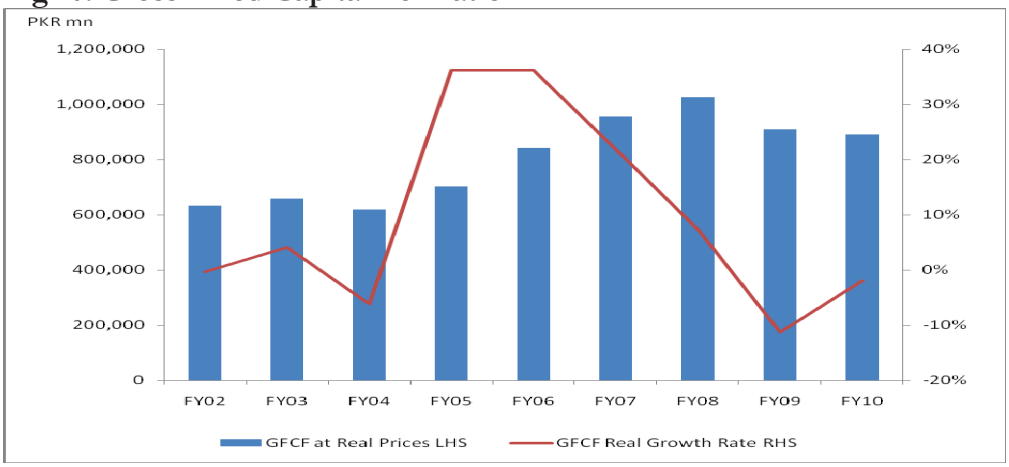
Domestic variables such as power supply constraints have already made their presence felt on the GDP radar - estimates suggest that power shortages have resulted in an output loss amounting to 2% of GDP. Water shortages could similarly constrain output through its impact on agricultural output. Couple these with exogenous events such as natural disasters (earthquake of CY 05 or monsoon related floods of CY 10) or the global inflation boom of CY07/08, the Pakistan economy's vulnerability could deteriorate to worrying levels. According to news reports, crop damage associated with the floods could reach $ 1 billion in FY 2011.

Since the onset of the *Crisis,* Pakistan's vulnerability ratios have hit rock bottom and then broadly rebounded. This reflects Pakistan's particular situation - a less developed economy heavily exposed to exogenous factors such as global commodity inflation spiral and external inflows to balance the twin deficits. With the mild recovery in the global economy in FY 2009 and induction into the IMF program, Pakistan's situation began to improve. Foreign exchange reserves reached a record $16.8 billion in FY 2010, inflation halved to 11.7% from 21% earlier, and the current account deficit shrunk to 2% of GDP. The impact on the exchange rate was positive too - volatility reduced substantially in FY 2008 while YoY depreciation slid to 6% from 43% since FY 2007. Foreign investor perceptions also improved - CDS spreads recovered by over 4600 basis points (bps) to the 475 bps range while eurobond spreads on the 10 year note recovered from the 1700 bps range to around 600 bps recently. However, the recovery remains dependent on significant financial support and bridge financing from multilaterals including the IMF's SBA worth $ 11 billion valid till October 2010.

4.5. Domestic liquidity remains tight and Cost of Borrowing remains high

Pakistan's Fixed Capital Formation and Investment to GDP ratio have decreased in recent times (see figure below); Real GFCF has shrunk by a 3 year compound rate of 2.3% and dropped to just 16% of GDP in FY 2010. Savings do not look much better at 14% or so of GDP and are unlikely to improve in the current economic climate. Investment growth is highly correlated with expansionary monetary policy with a 18 month – 2 year lag; consequently, we expect investment to remain in the range of 15% of GDP until a rebound in M2 growth is evident.

Fig 10. Gross Fixed Capital Formation



M2 growth has decelerated to an average 11% in the last 2 years from a 6 year average of 17.4% during FY 2002-08. Meanwhile benchmark market rates such as 6M KIBOR and 6M T-bills have also bounded up over 1000 bps in the last 6 fiscal years. The sharp decline in asset creation is directly related to higher borrowing costs and also evident in consumption patterns. Private sector spending was rising at an average 8% during FY 2004-2006 in real terms; however, this has slipped to an average 4.2% between FY 2008 and FY 2010.

Our outlook for M2 growth remains moderate in the medium term as the economy stabilizes under demand compression policies initiated by the Pakistani monetary authorities. As the banking system's asset creation gains momentum in tandem with demand recovery and increase in government spending, liquidity is likely to get tighter with a consequent impact on market interest rates. This is against a diminishing resource base or accumulated foreign exchange earnings and reserves from exports, FDI (FDI has declined significantly since the pre-*Crisis* period), remittances, and external financing from loans and aid.

The obvious vulnerabilities associated with the above situation are likely to keep policy makers on a tightening route. Infact, monetary authorities have already taken a u-turn in the easing cycle as of July 2010. Consequently cost of borrowing is expected to remain high. In line with the developments of the last 3 years. investment spending has been shrinking consistently and until we see fiscal and inflation risk diminish, it is unlikely to grow.

4.6 Private Sector Credit Slump

Although demand compression tactics employed by policymakers have been at the heart of the liquidity slump, several other factors have also contributed to sluggish private sector credit:

- Limited demand from private sector requiring no major supply/capacity addition;
- Completion of capacity expansions in most sectors - fertilizer, cement, autos between 2005-2008;
- Limited borrower capacity and sponsor strength due to the global and local financial crisis of FY 2008;

- Sector specific risks leading to over exposure of banks' asset books to certain sectors (textiles, power);
- Tightening of credit controls and checks limiting expansion of consumer lending;
- Heightened interest rate, credit, liquidity, and market risk since FY 2008 leading banks to channel resources towards risk free instruments such as government securities rather than advances.

4.7 Contingent Liabilities must be controlled

For foreign investors across the development and commercial universe, our findings confirm that the most significant macro-risk would be the capacity to meet foreign currency obligations. Net foreign asset accumulation is one proxy to estimate the country's capacity to service the incremental increase in debt and another would be the economy's contingent liability position. We have seen Pakistan's issuance of contingent liabilities almost double in FY09 from FY07 against a challenging Net Foreign Asset position (see table below). While IMF funds and external financing has provided a cushion in FY09/10, moving forward we could see Net Foreign Assets decline in the next 1-3 years.

In this scenario, an increase in external power project financing will not only be challenging but if achieved will put upward pressure on the country's contingent liabilities. Overheating on the externally financed projects will further diminish the value of Sovereign Guarantees. The tables below show respectively fresh issuance of contingent liabilities and total stock of guarantees.

Table 23: Issuance of Contingent Liabilities

Fiscal Year	Issuance (PKR billion)	As %of GDP
FY07	140.7	1.6
FY08	138.8	1.4
FY09	276.3	2.2
FY10*	177.9	1.2
* July2009 - April 2010		

Source: Budget Wing & EF Wing, MoF

Table 24: Guarantees Outstanding as of April 30, 2010 (PKR billion)

Outstanding Guarantees extended to PSEs (total)	642.1
-Domestic Currency	330.7
-Foreign Currency	311.3

Box 5: Background on Contingent Liabilities

The Government issues guarantees for public sector borrowers with relatively weak credit worthiness. In some cases, such as in the case of Trading Corporation of Pakistan (TCP), where the government has 100% ownership, any creditor to the entity has full recourse to the government. The government may also issue guarantees as part of a cost reduction strategy, by taking on risks it is best able to mitigate or absorb.

Table 25: Main types of Contingent Liabilities

Type of Contingent Liability	Examples of Contingent Liability
Explicit Contingent Liabilities: These are specific government obligations defined by a contract or a law. The government is legally mandated to settle such obligations when they become due**.**	• Guarantees for borrowing obligations of provincial governments and public or private entities. • Umbrella guarantees for various loans (SME loans, agriculture loans) • Guarantees for exchange rate risks • Guarantees for private investments • State insurance schemes
Implicit Contingent Liabilities: These represent a moral obligation or expected burden on the government not in the legal sense, but based on public expectations and political pressures.	• Defaults of provincial governments and public or private entities on non-guaranteed debt and other obligations. • Liability clean-up in entities being privatized • Bank failures
	• Disaster and relief financing

However, there are also costs associated with the provision of government guarantees. Hence, such off-balance sheet transactions cannot be overlooked in order to gain a holistic view of a country's fiscal position. Reported debt levels of a sovereign may be understated owing to the non-inclusion of guarantees, explicit or implicit, which may materialize in future.

In the case of Pakistan, the contingent liabilities include, for instance, explicit and implicit guarantees issued to Public Sector Enterprises (PSEs) and unfunded losses of state owned entities such as Pakistan Steel Mill, PIA, WAPDA, PEPCO, Railways, etc. The Fiscal Responsibility and Debt Limitation (FRDL) Act 2005 stipulates that the issuance of guarantees, including those for Rupee lending, bonds, rates of return, output purchase agreements, and all other claims and commitments that may be prescribed from time to time as well as renewal of existing guarantees, should not exceed 2% of the estimated gross domestic product in any financial year. Since 2005-06, there has been a steady increase in the issuance of contingent liabilities but the threshold of 2% has only been breached in 2008-09 by 0.2 percentage points. An institution-wise breakdown of government guarantees in domestic and foreign currencies indicates that WAPDA/PEPCO have been the biggest beneficiary of this provision.

WAPDA was issued guarantees amounting to PKR 218.5 billion and a rollover of $125 million in FY09. In FY10, PKR 112.3 billion has been awarded till April 2010 in respect of public guarantees to PEPCO/ WAPDA in addition to $ 248 million of foreign currency guarantees. The outstanding contingent liabilities as of April 30, 2010 stood at PKR 642.1 billion. This includes the stock of explicit debt guarantees in both domestic and foreign currencies that appear in the account books of PSEs. The rupee guarantees account for 52% of the total stock. Such a high magnitude of public guarantees may lead to distortions in the domestic yield curve and have fiscal consequences.

Source: Adapted from the Pakistan Economic Survey, 2010

Table 26: Institution-wise Issuance of Government Guarantees in Domestic Currency

(PKR billion)

S. No.	Organization	FY07	FY08	FY09	FY10*
1	PIA	18.1	4	25	6.8
2	HBFC	9.8			
3	AWT	6.5			
4	WAPDA	29	54.9	218.5	112.3
5	NLC	1			
6	CAA	4			
7	PARCO	19			
8	PSM	7.8			10
9	KESC	3			3
10	KSEW		3.4		
11	PSO		42		
12	Shell		11		
13	National Industrial Parks Dev. & Mgmt Co.		2		
14	Pak Textile City Limited		0.3		1
15	PAF Shahbaz Air HQ			1	6
16	NIT			20	
17	TIP				1.1
	Total	98.3	117.6	264.5	140.1
	As percent of GDP	1.1	1.1	2.1	1
	Memo:				
	GDP (mp)	8,673	10,243	12,739	14,668

* July 2009-April 2010

Source: Budget Wing, MoF

In addition to these explicit contingent liabilities, the records of which are being maintained at the Ministry of Finance, there is a need to quantify various implicit guarantees embedded in many government contracts that represent a potentially significant charge on future budgets. Ideally, the government should restrain from issuing new guarantees in bulk and instead, advise the PSEs to explore alternative sources of funding, i.e., issuing Real Estate Investment Trust (REIT) units, securitization, etc, to improve their solvency.

Sector-specific issues

4.8 Inefficient fuel-mix leads to high power generation costs

Pakistan's fuel mix remains heavily skewed towards fuel oil and gas at over 77% of total consumption, leading to high power generation costs. High power generation costs exacerbates under recoveries for the DISCOs, leads to balance sheet deterioration of the power purchaser (WAPDA) and ultimately leads to a persistent liquidity crunch for the power producers. At the macro level, this strains fiscal resources due to rising subsidy commitments and compounds fiscal risk particularly if sovereign guarantees are used.

4.9 Local resources are under-utilized

Pakistan is quite well endowed with energy resources (see table below). About 937 million barrels of oil have been discovered, of which 354 million barrels remain unexploited. The coal reserves are estimated at 185 billion tonnes, nearly all located in the Thar Desert in Sindh province. Coal remains one of the most under-utilized resource at less than 1% of overall power generation being coal-based in FY 2008. Although there are concerns that the coal is of relatively low quality, with low heating value, high moisture and ash content, we believe efforts should be made to harness the capacity at hand. There was substantial interest from China and East European investors in Thar Coal in the last decade; however, several projects fell through on account of pricing disagreements and policy inconsistencies.

Notably, Pakistan also has a hydropower potential of about 45,000 MW, of which only about 6,450 MW has been developed[22].

Table 27: Power resource position in Pakistan

Resource	Potential	Known Reserves	Installed	Net Available
Oil mn bbls	22000	937	583	354
Gas TCF	282	54	22	32
Hydro	45000	20000	6450	Renewable
Coal bnMT	185	185	Nil	200
Wind (MW)	110000	20000	50	Renewable
Solar	Unlimited	20000	Nil	Renewable

4.10 Without gas security, outlook for power sector could be dire

An estimated 54 trillion cubic feet (TCF) of gas reserves have been discovered to date, with about 32 TCF remaining unexploited. In 2008, domestic gas production was about 1.3 TCF. Gas demand is likely to outstrip supplies by FY12. Gas shortages have already been felt across the country since CY 2008 and a gas curtailment program has been initiated to divert more gas towards the power sector in FY10. Given the current outlook, with over 6000 MW of power to be gas fired by 2020, Pakistan's demand for gas could more than triple to the 4 TCF range.[23]

Given the immediate term constraints, Pakistan's government has taken some steps towards gas security such as finalizing a long term liquefied natural gas (LNG) import project, and efforts

[22] World Bank. 2009. *Least Cost Development Program for Pakistan Power Sector*

[23] Ali, Akhtar. *Pakistan's Energy Development: The Road Ahead* (Pg 7). Royal Book Company

towards gas import through Iran-Pakistan-India (IPI) pipeline and Turkmenistan-Afghanistan-Pakistan-India (TAPI) pipeline to meet the increasing gas demand[24] (see table below).

Table 28: Comparative data on imported gas pipeline projects, TAPI and IPI

Route	TAPI Turkmenistan, Afghanistan, Pakistan, India	IPI Iran, Pakistan, Inidia
Sub-route	Pakistan, India	
Gas Supplier	Turkmenistan	Iran
Pipeline Length (km)	1700	2670
Capacity (bcf/yr)	1155	1155
Project Cost (Billion $)	7.6	7.5
Financing	ADB	Self financed by participates
Support	USA	Russia
Opposition	Russia	USA
Gas Supply Risk	High	Low
City junctions	Daulatabad (Source), Herat, Kandahar, Quetta, Multan, New Delhi.	Asaluyeh (Bonne), Bandar Abbas, Iran shahr, Karachi/Sui, Multan, New Delhi

Source: Compiled by author; Source: various newspapers (DAWN, The News)

4.11 Circular debt problem

The National Electricity Power Regulatory Authority (NEPRA) determines generation, transmission, distribution, and retail/wholesale tariffs. NEPRA is responsible for computing an average scale rate (ASR) which is different for every DISCO based on its cost conditions. The GoP then announces the Notified Tariff with an implied ASR and the difference between the two rates is computed to be the unit subsidy.

At present it is estimated that the GoP may be subsidizing power to the extent of 22% of total cost[25]. The total tariff associated subsidies for power paid by the government in FY 2010 exceeded PKR 110 billion. Recipients included WAPDA for inter-disco differential payments, KESC for tariff differential, and the PHC (Power Holding Company) for TFC interest payments on Circular Debt. At the current rate, circular debt accumulation has no chance of shrinking with concomitant impact on liquidity and investments across the entire energy chain.

If 20,000 MW of power generation capacity has triggered Gross Circular Debt of over PKR 500 billion or 4% of GDP, an additional 20,000 MW of power combined with the malaise of under recoveries could magnify the Circular Debt burden to unprecedented levels (above PKR 1 trillion). This will result in a major financial crisis for Pakistan and a balance of payments nightmare. The GoP must avoid the possibility of such an event by:

[24] Business Recorder. April 19, 2010. *Pakistan asked to focus on Energy Import Sources: World Bank supports IPI for the first time*

[25] Ali, Akhtar. *Pakistan's Energy Development: The Road Ahead* (Pg 80). Royal Book Company

i) Eliminating all subsidies to the sector;
ii) Retiring the remaining Circular Debt;
iii) Building up Foreign Reserves to meet incremental increases in foreign currency obligations.

However, these measures are not easy to implement. For example, eliminating subsidies in the sector would mean that tariffs would have to be increased. The box below presents a discussion on the subject.

Box 6: Can tariffs be rationalized further?

The government is making efforts to increase the tariff levels to improve the liquidity in the system and thereby help resolve the circular debt issue that is being faced by the Pakistan power sector. In line with this, the government had planned a tariff increase of 26% (compounded) in FY 2010 and raised tariffs by 6% in October 2009, 12% in January 2010 and 6% again with effect from July 2010. Additionally, monthly adjustments are being implemented to recover the fuel costs called the Fuel Adjustment Charge which is passed on to consumers. As a result, tariffs have been effectively increased by about 80% since February 2008. As a consequence of these measures, the financial position of the power sector has improved significantly; the sector's financial deficits are currently about 8% of sector revenues compared to 40% in FY09.

As stated earlier, one of the options for improving the liquidity of the Pakistan electricity sector is to raise electricity tariffs further and remove subsidies altogether. However, this is a difficult decision. According to our findings and talks with stakeholders, further increases in tariff across the board will do little to improve collection discipline and recoveries - particularly in a slow growth high inflation environment like Pakistan, the call to increase tariffs further may eventually backfire. Industrial tariff hikes are likely to be opposed on account of global competitiveness while implementation of agricultural tariff hike is beset with political problems and administrative gaps.

However, this is not to say that nothing can be done to improve tariff management. The GoP should provide more equity in power tariffs associated with local efficiencies and cost differences. We agree that GoP is unable to finance the large gap between generation cost and recoveries and this can be passed on to targeted consumers via i) decentralization of the power distribution chain; ii) increased rates for high end and commercial consumers; iii) wheeling charges with preferential rates for consumers willing to invest in power generation; iv) premium quality uninterrupted power for those who can afford; and v) time of day rates.

However, we believe that ultimate value in tariff management will be derived by changing the fuel mix in power generation to domestic sources (coal, hydel, and to some extent, natural gas). If Pakistan remains dependent on imported thermal fuel oils for its generation, it will be continue to face high power generation costs with concomitant negative impact on liquidity and investment.

4.12 Compliance and enforcement of contracts and legal structure

Our talks with legal experts in the power sector reveal that Pakistan has developed a very accommodating legal and contractual structure for power sector lenders and investors. Therefore, the real constraints hark back to the experience of the IPP program in the late 1990s. In July 1998, the GoP issued 7 Notices of Intent to terminate private power capacity contracted under the 1994 Policy. The notice was presented on the grounds of corruption and technical issues; however, these were perceived by developers as a means to coerce them into giving up the GoP concessions on the tariffs agreed earlier.

Broadly speaking, this was viewed as the government reneging on its contracts due to the cashflow constraints faced by WAPDA and shortage of foreign exchange in the country. One on one negotiations with WAPDA and high level government representatives resulted in some IPPs agreeing to reduce tariffs. The disputes between the GoP and developers stretched to HUBCO, which was accused of corruption and later sought international arbitration, but was prevented from doing so by the GoP in the local courts. These developments raised political sensitivity about investing in the power sector, eroding investor confidence further[26].

Eventually the World Bank stepped in to avert another crisis in Pakistan by orchestrating the Orderly Framework for IPP Negotiations in late 1998. Under this framework, the GoP agreed to:

i) Honor existing contractual agreements;
ii) Protect IPP personnel and their families;
iii) Clarify income, tax, and foreign exchange conversion issues related to IPP contracts; and
iv) Settle through due process any tax or foreign exchange issues.

The GoP committed to basic principles of law enforcement and negotiation, agreeing that contracts would be the starting point for all negotiations which would be by mutual consent. It appeared Pakistan took on more than it could handle in terms of foreign currency obligations to lenders and investors to the projects. Resultantly, power sector reforms were not properly initiated and implemented and consequently disputes arose between the GoP and developers. Therefore, capacity to properly manage IPP contracts and settle disputes was required and must be built now for attracting private investment into the power sector.

4.13 Corporatization of the sector

One way in which the power sector in Pakistan may be improved is through corporatization of the entities. Encouraging corporatization of the power sector is crucial to improve the sector's financial health and ultimately reduce the GoP's liabilities related to it.

As the GoP has issued several government guarantees to back investments, its own credit worthiness has deteriorated at the macro level. At the micro level, public entities in the energy chain have witnessed the negative impact of country risk, subsidy mismanagement, T&D losses, and under recoveries on their finances. Consequently the pool of lenders and investors we consulted indicated that Pakistan should ideally move away from Government Guarantees and towards the complete corporatization of the power sector. In this scenario, entities in the power and energy chain would strive to raise financing for rehabilitation, development, and capacity addition on their own strength. This could be achieved by: i) restructuring of their balance sheets; ii) revaluation of their assets; and iii) reduction of their accumulated losses and receivables related to circular debt.

[26] Fraser, Julia M. *Lessons from the Independent Private Power Experience in Pakistan.* Washington DC: The World Bank.

4.14 Devise and implement sustainable sector development

The financing gap in the Pakistan electricity sector is large because of a combination of macroeconomic risks and sector specific issues. According to our findings, the primary power sector constraint is related to under recoveries accentuated by exceedingly high power generation costs. The fuel mix inclination towards fuel oils has also resulted in a dependence on costly imports and commodity price risk being passed on indiscriminately to the Power Purchasing Authority (PPA). The PPA under the wing of WAPDA has been unable to pay arrears to power producers (for whom fuel cost is a pass-through). Meanwhile rising payables connected with power generation cost has led to balance sheet deterioration and loss of credit worthiness across the entire energy chain. Consequently, power plants have been unable to function at optimal capacity. Rehabilitation and aging concerns have also not been adequately addressed due to lack of liquidity.

Therefore, the Pakistan story needs to improve in a holistic way through: (i) enabling financial recovery and financial viability of power sector entities; (ii) promoting affordability of power through a lower cost expansion program focused on domestic resources – coal and hydel; (iii) regulatory streamlining to improve efficiency of decision making, policy formulation, and private sector participation; (iv) autonomy and accountability of public sector entities throughout the energy chain; and (v) enhanced regional co-operation for energy trade as a means of diversifying energy supply and thereby increasing energy security.

4.15 Recent Announcements

Since FY08 the government is taking steps to close the financing gap. In this context, the government has:

(i) committed to restrict subsidies to the power sector in FY10 to PKR 55 billion;

(ii) to cease all operating subsidies from the subsequent fiscal year;

(iii) amended the legislation to automatically (on a monthly basis) pass through to the end-consumers any changes in fuel prices through the fuel adjustment charge;

(iv) made other quarterly tariff adjustments to cover changes in non-fuel costs;

(v) agreed to allocate more gas to the power sector via a curtailment plan from fertilizer industry, thereby diminishing the need to run the oil-based power plants;

(vi) taken on itself the burden of public policy-induced liabilities that were earlier vested with the power companies – by assuming debts and other liabilities that the power sector companies had incurred during FY 2005-09 to finance their operations; and

(vii) implemented a 26% compounded increase in electricity tariffs in FY 2010.

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CHAPTER 4: BANGLADESH

1. BACKGROUND - POWER SECTOR IN BANGLADESH

The total generation capacity in Bangladesh is 5,376 MW with 3,331 MW in public sector and 2,045 MW (38% of total) in private sector. While about half of the total capacity is being provided by the public sector Bangladesh Power Development Board (BPDB), IPPs account for a quarter of total capacity (constituted mainly by Haripur and Megnaghat projects with installed capacity of 810 MW) (see Table 1). No major private sector participation in capacity addition has occurred since 2002, other than through the provision of short-term rentals and expensive diesel or heavy fuel oil (HFO)-fired IPPs. Bangladesh remains one of the most energy starved countries in the world – its per capita electricity consumption is 220 kWh per year (compared to 704 kWh per year in India and 11,000 kWh per year in the US) and the gap between demand and supply is increasing, which is estimated to be 2,000 MW currently. Many places in both urban and rural areas face load shedding almost every other hour. A household electrification rate of about 32% (in 2005) has been achieved[1], but only one in five rural households has a connection and service quality is poor. It has been estimated that power outages cost about $1 billion a year and reduce overall GDP growth by about 0.5%[2] in the country.

Table 1: Power generation capacity in Bangladesh

	Installed Capacity (MW)		Derated Capacity (MW)	
Public Sector				
Bangladesh Power Development Board	2,785	47%	2,470	46%
Ashuganj Power Station Company LTD.	724	12%	606	11%
Electricity Generation Company of Bangladesh	315	5%	255	5%
Subtotal	**3,824**	**65%**	**3,331**	**62%**
Private Sector				
IPPs	1,330	22%	1,271	24%
Small IPPs (Bangladesh Power Development Board)	99	2%	99	2%
Small IPPs (Rural Electrification Board)	226	4%	226	4%
15 Year Rental	168	3%	168	3%
3 Year Rental	281	5%	281	5%
Subtotal	**2,104**	**35%**	**2,045**	**38%**
Total	**5,928**	**100%**	**5,376**	**100%**

Source: BPDB Annual Report 2009

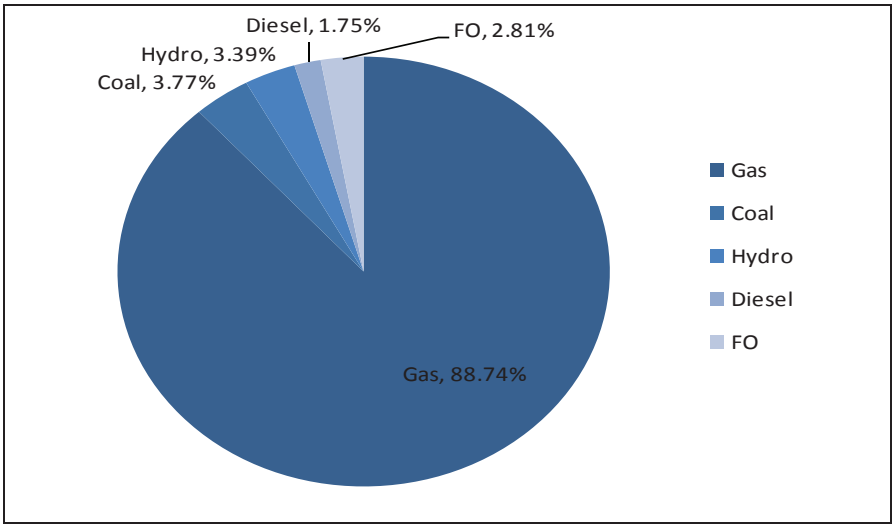
More than 88% of generation capacity is fueled with gas (see Figure 1). Although Bangladesh is rich in natural gas reserves (proven reserves are estimated at 13 trillion cubic feet), energy diversification

[1] Asian Development Bank. 2009. *Energy Outlook for Asia and the Pacific*

[2] USAID. *Impact and Benefits of Power Trading in the South Asia Growth Quadrangle.* (http://www.sari-energy.org/successdocs/ImpactBenefitsSAGQ.pdf)

is critical for power sector development in Bangladesh. The necessity of energy diversification is recognized by the government, which forecasts that currently proven gas reserves would be sufficient to satisfy the market only until 2011, or at most, 2018. However, the government has not defined a clear direction for energy diversification yet[3].

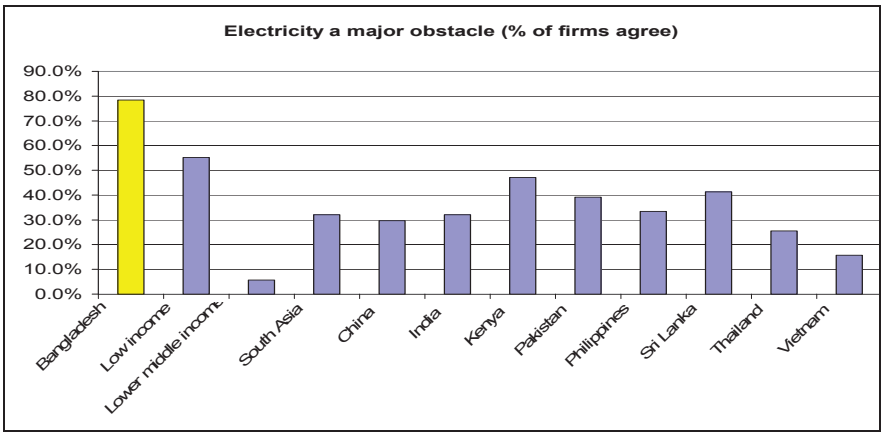
Figure 1: Generation capacity, by Fuel (July 09 – Feb 10)



Source: BPDB Annual Report 2009

In addition, there are concerns about the poor quantity and quality of electricity supply. Nearly 80% of Bangladeshi firms view poor electricity supply as a major obstacle (see Figure 2) to their business prospects. This is the highest among comparator countries.

Figure 2: Bangladesh – Electricity as a major obstacle to business prospects



Source: World Bank Doing Business Survey

[3] Asian Development Bank. 2009. *Energy Outlook for Asia and the Pacific*

Recent Developments

The Government of Bangladesh (GoB) has awarded 5 rental projects with a total capacity of 345 MW out of 8 rental projects that were tendered in 2009. Among the three rejected rental projects, two have been re-tendered as IPPs while the other is likely to be re-tendered soon. In March 2010, the Executive Committee of the National Economic Council (ECNEC) approved government plans to install 10 furnace oil-based peaking power plants with a total capacity of 830 MW. The installation of 830 MW peaking power plants to address the energy crisis, is expected to be completed by December 2011 at a cost of BDT 72 billion ($1 billion), to be borne entirely by the government.

In 2010, the Government of Bangladesh (GoB) has invited tenders for 8 projects to be implemented with private sector participation (see Table 2).

Table 2: Recently Floated Power Sector Tender Details

Power Plant	Type	Capacity	Fuel	Fuel Supplier	Contract Period	Tenders Floated	Last Date of Submission	Expected Award Date
Meghnaghat 2	IPP	300-450	Dual Fuel (Gas / HFO)	n/a	22	Jan 21, 2010	April 15, 2010	Sep, 2010
Bibiyana 2nd Unit	IPP	450	Gas	JTDCL	22	March 1, 2010	May 2, 2010	Nov, 2010
Bhola 2nd Unit	IPP	225	Gas	BAPEX	22	March 1, 2010	May 2, 2010	Nov, 2010
Syedpur	IPP	100	Furnace Oil	BPC	15	March 1, 2010	May 2, 2010	Nov, 2010
Katakhali	IPP	50	Furnace Oil	BPC	15	March 1, 2010	May 2, 2010	Nov, 2010
Jangalia, Comilla	IPP	50	Dual Fuel (Gas / HFO)	n/a	15	March 28, 2010	May 27, 2010	n/a
Khulna	IPP	100	HFO	BPC	15	March 28, 2010	May 27, 2010	n/a
Chapainababganj	IPP	100	HFO	BPC	15	March 28, 2010	May 27, 2010	n/a

[JGTDCL: Jalalabad Gas Transmission and Distribution Company Ltd., BAPEX: Bangladesh Petroleum Exploration Company Ltd., BPC: Bangladesh Petroleum Corporation]
Source: AT Captital Research

Also, in early 2010 Dhaka signed a deal with India to import up to 500 MW power by late 2012. India would supply the power through a linkage to its grid in West Bengal. The government has invited tenders from international firms to build the necessary infrastructure for importing this 500 MW of electricity.

Renewable Energy

According to the Renewable Energy Policy (2008), the Government of Bangladesh (GoB) plans to produce 5% of total generation from renewable sources of energy by 2015 (or 450 MW) and 10% of total generation from renewable sources by 2020 (or 1600 MW), which the government defines to include hydro power. Hydro power usage is currently limited in scope but further potential exists. With wind power, the GoB is seeking to produce 200 MW by 2013 (as against the current 2 MW).

Current solar power capacity, in the form of solar home systems, is between 15 MW – 20 MW. Infrastructure Development Company Limited (IDCOL) is currently being supported by ADB in a major solar power initiative. The GoB is planning to install 200,000 solar home systems in households that are not connected to the electricity grid. The GoB is aiming at a solar capacity of at least 80 – 100 MW by 2013.

Table 3: Select List of Planned Renewable Energy Projects

Fuel	Location	Capacity (MW)
Solar	Sharisabari, Jamalpur	2-4
Solar	Regional Training Centre, Rajshahi	1-2
Solar	Rajabarihat, Godhagari, Rajshahi	2-4
Wind	Anowara, Chittagong (off-shore)	100

Source: GoB, Power Division

Transmission

Power transmission is a state monopoly in Bangladesh, with the public sector Power Grid Company of Bangladesh (PGCB) being the only company responsible for power transmission. The company was established in 1996 during the restructuring of the power sector with the objective of commercializing the sector and to increase efficiency and accountability. Pursuant to a Government of Bangladesh decision to transfer transmission assets to PGCB from the Bangladesh Power Development Board (BPDB) and Dhaka Power Distribution Company (DPDC), former Dhaka Electric Supply Authority (DESA), PGCB has taken over all transmission assets.

During 2007-2008, around 1061 km of transmission lines (230 KV and 132 KV) were constructed, accounting for 13% of the total transmission line length. Substation capacity of 1800 MVA was added in 2007 and 2008 which is 11% of total sub-station capacity. The second East-West interconnector, with a capacity to transfer 1000 MW of power, was completed in 2008 which is expected to remove the existing power divide between the eastern and western parts of the country.

Distribution

Power distribution is solely controlled by government entities. Currently the state owned companies operating in electricity distribution include the BPDB, DPDC, DESA, and West Zone Power Distribution Company (WZPDC). DPDC and DESA cover the Dhaka city and its adjoining areas, and WZPDC covers the West Zone of the country. BPDB, which was the sole distributor before the formation of the other companies, distributes electricity in those areas that are not covered by the other companies.

High system losses are a challenge for the power sector. However, the situation is improving; presently these losses are 20% compared to 28.5% in 2001. The main reason for high system losses

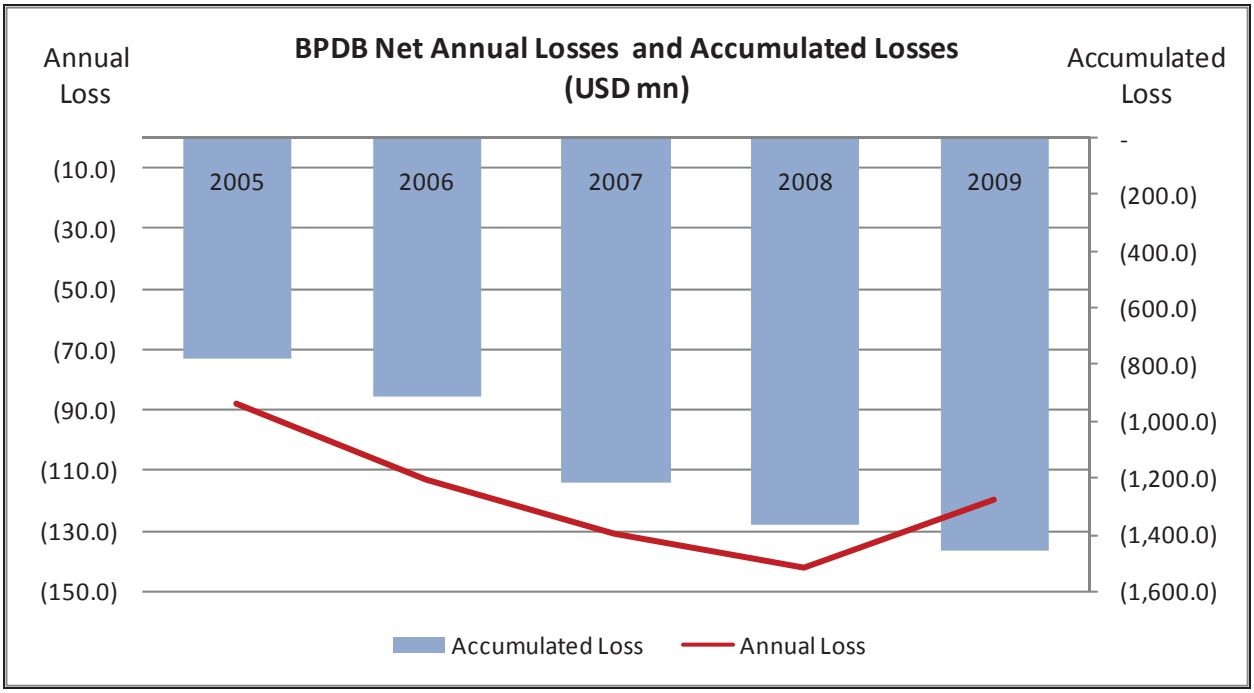
is the inefficient transmission and distribution system of state owned companies. A reduction of 1% system loss could save an estimated 45 MW of power.

In 2007 and 2008, a total of 14,654 km new distribution lines (33KV and below) were constructed by the power utilities and 1,053,044 new consumers were connected to the grid.

Financial Condition of the Power Sector

Bangladesh Power Development Board has roughly half the country's installed capacity and is also the main off taker from IPPs. BPDB has sustained losses every year for the last 5 years with losses averaging $120 million per annum - accumulated losses stood at $1.5 billion in June 2009 (see Figure 3). Losses are largely due to subsidized end user electricity tariffs and inefficiency in the electricity supply chain.

Figure 3: BPDB Net Annual Losses and Accumulated Losses



Source: BPDB Annual Report 2009

GoB Subsidies in the Electricity Generation Sector

Prior to FY 2009/10, the GoB did not (technically) provide subsidies to the government owned electricity generation, transmission, and distribution companies. However in FY 2009/10, with the move towards short term generation solutions through rental power projects and the significant differential between the bid tariffs and the consumer tariff, for the first time, the GoB has estimated the likely direct electricity subsidies for the year. These are estimated to be BDT 12 billion ($174

million) to the BPDB with BDT 2 billion ($29 million) already paid, and BDT 70-80 million ($1.1 million) to be paid to the Rural Electricity Board.

Private participation in electricity projects

Mainly because of the lack of transparency in tendering and the poor financial condition of the sector, no major Private Participation in Power Projects has occurred since 2002. Table 4 below presents private participation in energy projects, both by number of projects and total investments.

Table 4: Private participation in energy projects, year-wise

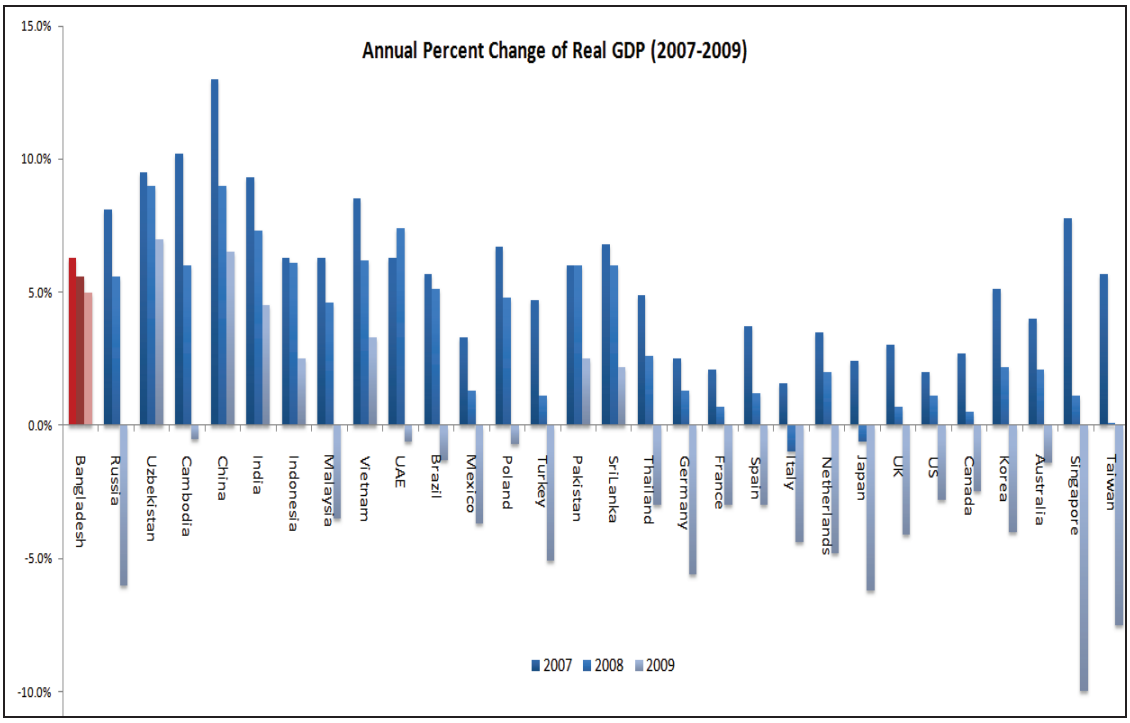
Year	Number of Projects	Total Investment ($ million)
1990	0	0
1991	0	0
1992	0	0
1993	0	0
1994	0	0
1995	0	0
1996	0	0
1997	1	314
1998	2	225
1999	1	16
2000	1	19
2001	2	483
2002	0	0
2003	0	0
2004	0	0
2005	0	0
2006	2	18
2007	0	0
2008	1	31
Total	**10**	**1,105**

Source: World Bank and PPIAF. Private Participation in Infrastructure Database (ppi.worldbank.org)

2. THE IMPACT OF THE GLOBAL FINANCIAL CRISIS ON BANGLADESH

The Bangladesh economy proved to be one of the most resilient in the world to the fallout from the global financial crisis with GDP growth in FY 2008/9 only declining to 5.9% from 6.2% in FY 2007/8. GDP growth is expected to be 5.5 in FY10.

Figure 4: Global Financial Crisis: Bangladesh GDP growth declines, but less than others



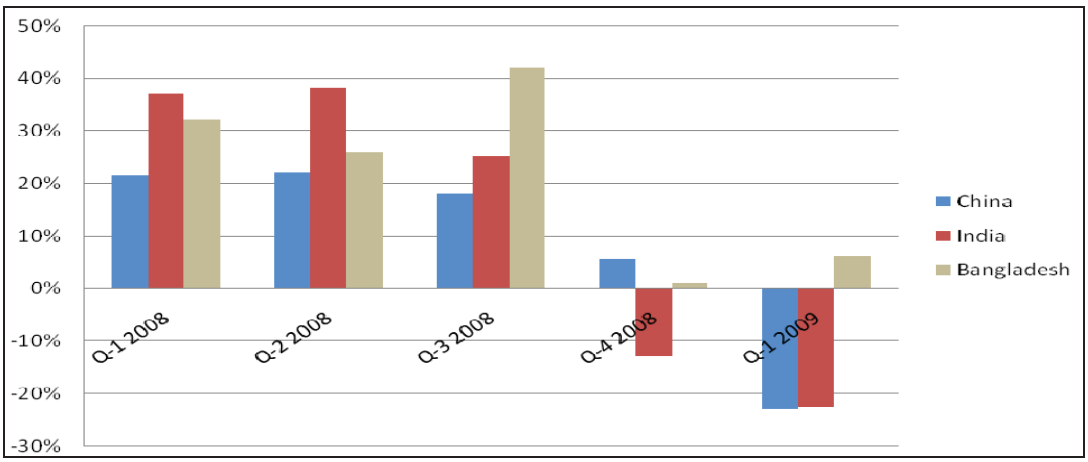
Source: IMF. 2009. *World Economic Outlook Report*

At least two factors may be responsible for such low volatility in Bangladesh growth rate:

- Resilience of Bangladeshi exports (see Figure 5).
- Strong inflow of remittances.

The figure below shows that Bangladesh exports have been the first to see a turnaround (compared to China and India) since the global financial crisis.

Figure 5: Relative Export Performance



Source: Policy Research Institute. *Macro Economic Challenges in FY09-10.* Bangladesh

This was driven by the so called "Walmart Effect" whereby Bangladesh's low cost exports saw increased demand from recession-hit US consumers via increased value-driven purchases at stores such as Walmart. Increased price sensitivity also saw more manufacturers shift from production bases with higher manufacturing costs to Bangladesh. The table below shows that Bangladesh enjoys the cheapest garment wages compared to major garment exporters across the world.

Table 5: Apparel Manufacturing Labor Costs in 2008 - Core Asian Import Supplier Base (in $ per hour, including social charges)

Countries	Labor Cost	Labor Cost	Labor Cost	Labor Cost
	US$/Hour	US$/Hour	US$/Hour	US$/Hour
		Bgldesh=100	Indonesia=100	India=100
Bangladesh	0.22	100	50	43
Cambodia	0.33	150	75	65
Pakistan	0.37	168	84	73
Vietnam	0.38	173	86	75
Sri Lanka	0.43	195	98	84
Indonesia	0.44	200	100	86
India	0.51	232	116	100
China III (Inland)	0.55-0.80	305	152	131
China II (Coastal 2)	0.86-0.94	409	205	176
China I (Coastal 1)	1.08	491	245	212
Philippines	1.07	486	243	210
Malaysia	1.18	536	268	231
Thailand	1.29-1.36	600	300	259

Source: Jassin – O'Rourke Group, LLC @EmergingTextiles.com (1998-2008)

Remittance growth also remained surprisingly robust as Bangladeshi workers, among the lowest paid in their respective job segments, held their jobs and perhaps even benefitted from the cost-cutting seen during the financial crisis. Remittance flows increased by 22.5% in FY 2008/9 making Bangladesh probably the best performer globally (see Figure 6 below).

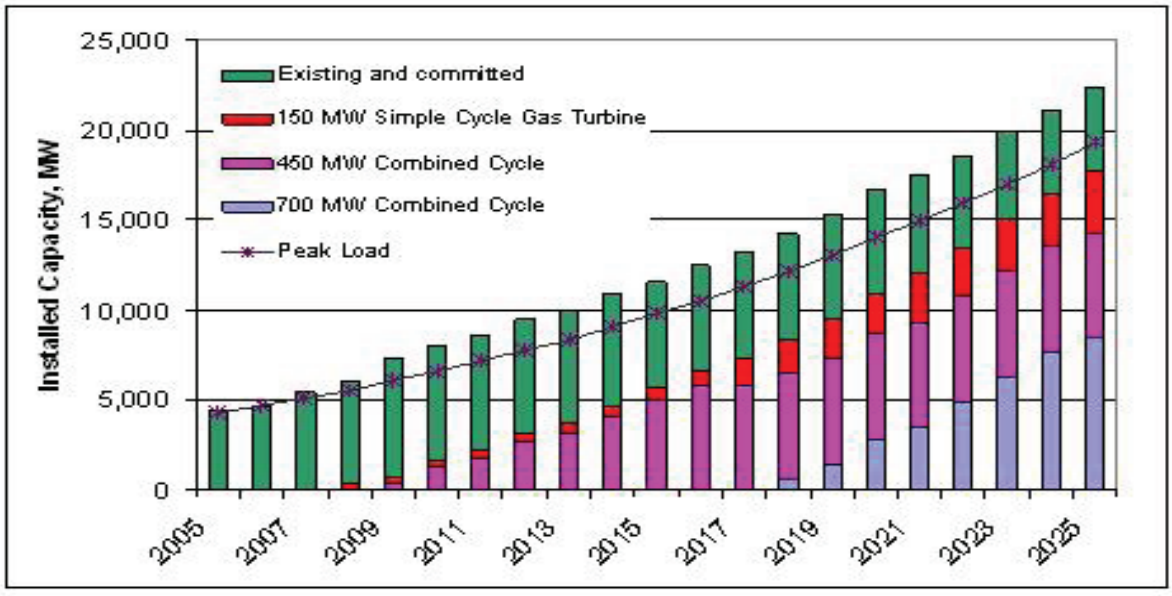
Figure 6: Inward Remittance in Bangladesh

Source: AT Capital Research/Policy Research Institute

3. FINANCING CHALLENGES IN ENERGY SECTOR

In the face of the persistently growing demand gap, the GoB developed a Power System Master Plan (PSMP) in 2005. The PSMP estimated that Bangladesh will need over 22,000 MW of capacity by 2025 (see Figure 7).

Figure 7 : Power System Master Plan - 2005 (Base Case)



Source: GoB, Power Division

In February 2010, the GoB released a revised plan to add 9,426 MW by 2015. The year-wise details of the capacity addition plan are in Appendix 2. If the capacity addition plans materialize, Bangladesh would have a power surplus by 2012.

Table 6: New Generation Plan up to 2015

Year (Jan-Dec)	Jun-10	2010	2011	2012	2013	2014	2015
Max.Demand as per PSMP (12 % Growth from 2013)	6066	6608	7148	7732	8659	9699	10862
Max.Demand considering DSM	5566	5808	6298	6832	7709	8699	9812
Generation addition	-	792	920	2269	1675	1170	2600
Capacity Retired	-	48	-	-	448	378	-
Installed Capacity	5719	6723	7643	9912	11139	11931	14531
Dependable Capacity (without fuel constraints)	4289	5109	5889	7731	8800	9545	11625
Max. Demand-Supply Gap (without fuel constraints)	1277	699	413	-899	-1091	-846	-1813
Dependable Capacity (with gas crisis)	3789	4409	5385	7231	8300	9045	11125
Max. Demand-Supply Gap (with gas crisis)	1777	1399	913	-399	-591	-346	-1313

Source: GoB, Power Division

In February 2010, the GoB also released a revised plan for the Power Grid Company of Bangladesh. The new projects are:

- Power evacuation for two Mega Coal Projects in Chittagong and Khulna
- Power evacuation for Bibiyana 2x450 MW Power Plant
- Power evacuation for Bhola 150 MW and 225 MW Power Plant
- Power evacuation from Sylhet area
- Power evacuation from other planned power plants
- Sub-station capacity enhancement
- First Cross Border Inter connection with India

Investment requirements till 2015

The estimated total investment requirement is $9 billion for generation, $1 billion for transmission, and $1.5 billion for distribution, for a total investment requirement of around $ 11.5 billion.

Table 7: Estimated Financing Requirement for Generation, Transmission and Distribution till 2015

Description	Total Investment (USD mn)	Equity (USD mn)	Debt (USD mn)
New Initiative 920 MW Public Sector Peaking Plant	1000	400 (40%)	600 (60%)
Combined Cycle and Peaking Plants in Private Sector: 3175 MW (IPP)	3800	950 (25%)	2850 (75%)
Solar and Wind Projects: 110 MW (IPP)	200	50 (25%)	150 (75%)
2600 MW Coal PPP	4000	1000 (25%)	3000 (75%)
Total Generation	**9000**	**2400**	**6600**
Transmission	1000		
Distribution	1500		
Total Investment	**11500**		

Source: GoB, Power Division

Main Sources of Finance

The main sources of finance for the power sector have been:

A. Government Budget

B. Multilaterals

C. Other important sources of institutional finance

D. Commercial Bank Finance

E. Foreign bank finance

F. Equity financing

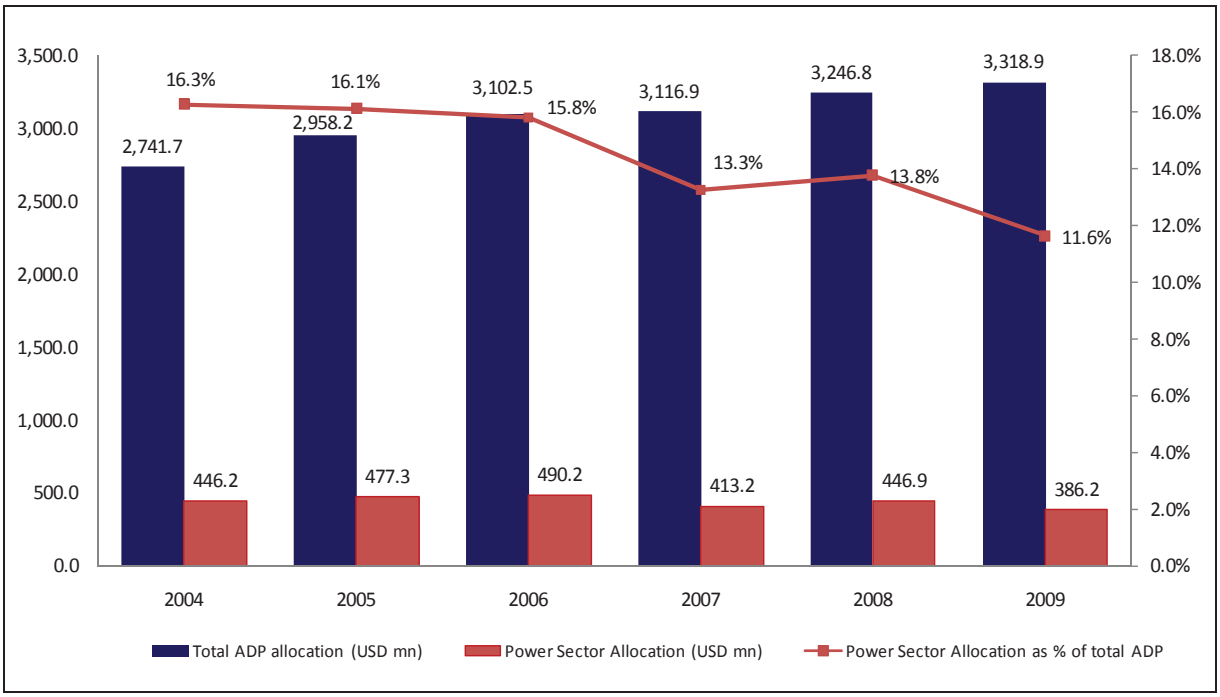
G. Private Participation in the Electricity Sector

A. Government Budget

Annually the GoB, as part of its Annual Development Plan (ADP), allocates total government spending for capital expenditure across various sectors including the Power sector, which includes Generation, Transmission and Distribution. Historically, ADP has grown year on year at an average of around 5% from 2005 to 2009, with implementation averaging 86%. Power sector allocations have averaged 14% in the same period (though they have declined from a peak of 16.3% in 2004 to

11.6% in 2009), with implementation averaging 88%, although it may be noted that this has fallen steadily from 96% in 2005, to 83% in 2009.

Figure 8: Annual Development Plan and Power Sector Allocation



Source: GoB, Ministry of Finance

The total GoB allocation to Power sector in FY09-10 is about $442 million. Thus, GoB financing by itself will be inadequate given the total investment needed for the power generation sector. Therefore, there is a need for increased participation by multilateral agencies and the private sector.

B. Multilateral Sources of Finance

Listed below are the main sources of multilateral finance for the power sector in Bangladesh. Details of each source can be found in Annexure 1 of this report.

- International Development Association (IDA)
- International Finance Corporation (IFC)
- Asian Development Bank (ADB)
- Overseas Private Investment Corporation (OPIC)
- Export Credit Agencies (ECAs)
- The Islamic Development Bank (IDB)

C. Other Important Sources of Institutional Finance

Infrastructure Development Company Limited (IDCOL)

Under its major program, IDCOL provides long-term senior and subordinate debt financing to viable privately-owned and operated infrastructure projects in Bangladesh. It participates, as a lender, in limited recourse project finance based primarily on the satisfactory evaluation of all aspects of the projects. As a lender to large and medium infrastructure projects, IDCOL is a complementary source of funds and, within the framework of an appropriate financing plan, is able to provide loans covering up to 40% of the cost of a project.

The developer is expected to make an equity investment that is appropriate to the project considering the risks associated with its implementation and operation. However, at a minimum, that investment must be 20% of the total project cost. Banks and other financial institutions (public and private) often cooperate with IDCOL in drawing up the overall financing package for major projects and participate in syndications with loans and other services.

Recent developments have been: the Government has contributed an additional $350 million in local currency to IDCOL for project financing, and the Asian Development Bank (ADB) is currently conducting due diligence prior to making $165 million in funding available to IDCOL; this amount could be increased to $ 500 million. In addition, the ADB made a direct infusion of $50 million into IDCOL without the requirement of a Ministry of Finance repayment guarantee.

IDCOL provided financing in the Meghnaghat 450 MW Power Project. The IDCOL facility, the largest loan ever made by a Bangladesh financial institution, was in two tranches: a 16-year $20 million senior facility and a 23-year $60 million subordinated facility.

Investment Promotion and Financing Facility (IPFF)

Bangladesh Bank is set to resume its re-financing facility under its IPFF Project. The World Bank approved additional financing for the project on 4 May 2010, providing $ 257 million to Bangladesh. The additional financing for the Project will enable Bangladesh to continue to build on the positive impacts made through implementation of the ongoing IPFF project in the areas of: (i) expansion of long term financing for infrastructure sectors in Bangladesh; (ii) demonstration of the economic and business case for Public-Private Partnerships (PPPs) in infrastructure; and (iii) capacity building of government agencies and stakeholders on PPPs, towards building a national PPP pipeline and framework. The operation will support Bangladesh Bank, the implementing agency, to expand the scope of funding for PPP ventures in a wide range of infrastructure sectors, scaling up the current successful experience in the power sector. The operation is expected to increase additional financing of infrastructure by over $400 million, leveraging about 100% private resources. It is expected to increase infrastructure supply in the power sector – renewable energy and energy savings – as well as other sectors. The increased provision of infrastructure will create (or help maintain) jobs during the economic slowdown, and remove bottlenecks in economic growth caused by existing infrastructure shortages.

The World Bank has been supporting the IPFF since 2006 and has disbursed $47.5 million in interest-free loans. The IPFF Project has already financed seven fully operational small power plants, which added 178 MW of electricity capacity to the national grid to overcome the country's persistent power shortages. The power plants that the facility has financed include the Doreen Power Plant in Tangail (22MW), Feni (22mMW), Mohipal of Feni (11MW), Narsingdi (22MW), Malancho power plants in Dhaka Export Processing Zone-DEPZ (35MW) and Chittagong Export Processing Zone-CEPZ (44MW), and Regent Barabkunda power plant in Chittagong (22MW).

D. Local Banks

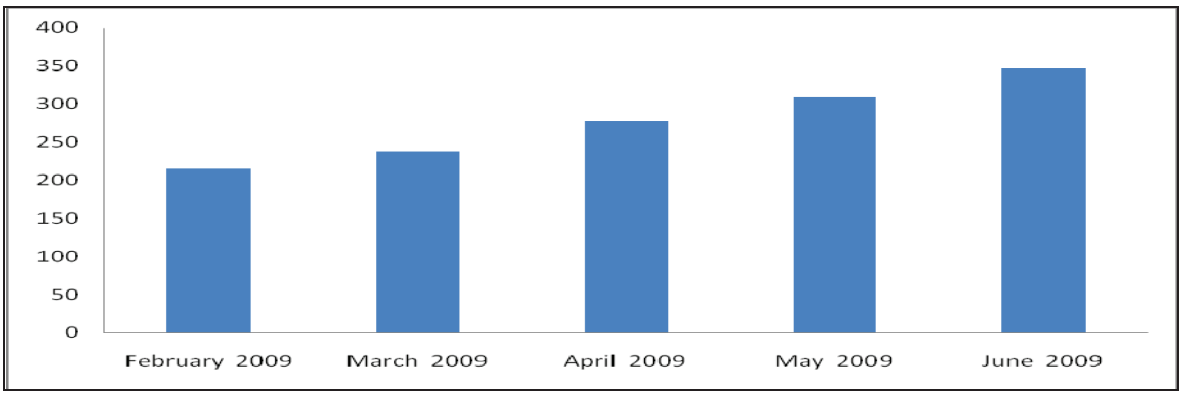
Local commercial banks are largely limited to making loans with a maximum tenor of 5-7 years and generally require equity of 25 % - 35% of total project cost. Loan amounts are typically small with limits imposed by Bangladesh Bank on single party exposure. Syndications and club financing are the favoured means to increase pooled finance, but it has been estimated that projects in excess of $70 – 100 million are difficult to finance locally (largest syndication to date has been $57 million). As such, local banks are unlikely to provide significant amounts of long-term financing for large projects. Inexperience with large scale new infrastructure projects requiring consortium lending - on a non-recourse basis - pose difficulties which local banks are unlikely to overcome in the short-term. Currently, interest rates are high and stand at about 12.5% (base rates of around 8% + margin of 4.5%). Importantly, beyond supply side issues, demand side factors - the impact on investor returns of competitively bid projects, suggest that sponsors have an advantage in opting for international finance sources at lower interest cost and longer tenors.

Total Asset and Investment Composition of Local Commercial Banks

With 48 commercial banks currently in operation, the banking industry has command over 75% of national savings in the form of deposits. As of end-December 2008, banks in Bangladesh made $28.3 billion in advances to the economy out of total assets of $47.8 billion. Banks invested $1.5 billion (about 5% of the total advances) in infrastructure generally, with $202 million to the energy sector.

Due to low level of investment in infrastructure, growth in industry has stagnated. On the other hand, due to the lack of alternative savings avenues in the economy, the deposits in the banks have been growing steadily. Increased deposit growth coupled with the lack of investment appetite has caused month on month increases in liquidity – reported to have reached around $5.0 billion across the sector by June 2009 (see figure below).

Figure 9: Excess Liquidity in the Banking System (in BDT bn)



Source: Bangladesh Bank, GOB

It can be argued that the recent stagnation in financing by banks to the private industrial sectors is due to low credit demand from the private sector itself, which in turn is blamed on lack or inadequacy of infrastructure, particularly the availability of energy (electricity and gas). This strengthens the case for increased participation by banks in infrastructure projects. Participation of commercial banks in infrastructure is very low compared to the neighboring countries (e.g., India where the commercial bank lending growth to infrastructure has been estimated at 50%). There are a number of reasons for this:

- The maturity mismatch between asset and liability is the key constraint to commercial bank lending on a large scale. Infrastructure assets are typically long-term while the source of finance available to the banking sector (deposits) is short-term.
- The exposure limit and prudential norms may prevent banks from infrastructure investment.
- Commercial banks may not have the risk appetite for large-scale infrastructure investment.
- The absence of risk mitigation mechanism in the system is another major handicap.

We focus on some of the key constraints to infrastructure financing by local commercial banks.

Single Borrower Exposure Limits: Current Bangladesh Bank regulations stipulate Single Borrower Exposure Limits whereby a Bank can effectively lend up to 15% of Total Capital (Tier 1 and Tier 2) to a single borrower. While there is scope to relax the rules for Power Project financing, often the commercial bank's internal exposure limits are lower than the caps set by Bangladesh Bank[4].

[4] Excerpts from Bangladesh Bank Policy on Single Borrower Exposure Limits - Banking Regulation and Policy Department (BRPD) Circular No. 02 dated February 19, 2007 and BRPD Circular No. 16 dated November 16, 2005): (a) The total outstanding financing facilities by a bank to any single person or enterprise or organization of a group shall not at any point of time exceed 35% of the bank's total capital subject to the condition that the maximum outstanding against fund based financing facilities (funded facilities) do not exceed 15% of the total capital. In this case, total capital shall mean the capital held by banks as per sectioin-13 of the Bank Company Act, 1991; (b) Non-funded credit facilities, e.g. letter of credit, guarantee etc. can be provided to a single large borrower. But under no circumstances, the total amount of the funded and non-funded credit facilities shall exceed 35% of a bank's total capital.

Table 8: Illustrative lending capacity as per local bank Single Borrower Exposure limits

Bank	Paid up Capital in BDT mn	Paid up Capital in USD mn	Total Capital in BDT mn	Total Capital in USD mn	Exposure Limit in BDT mn	Exposure Limit in USD mn
					15%	
A. State Owned Banks						
1. Agrani Bank Limited.	2484.2	35.8	8,578	123.8	1286.8	18.6
2. Janata Bank Limited.	2,593.9	37.4	9,062.4	130.8	1359.4	19.6
3. Rupali Bank Limited.	1250.0	18.0	-7225.0	-104.3	-1083.8	-15.6
4. Sonali Bank Limited.	9000.0	129.9	24,418	352.3	3662.7	52.9
B. Private Banks						
a) Excld. Islamic Banks						
1. AB Bank Ltd.	2564.0	37.0	6722.5	97.0	1008.4	14.6
2. National Bank Ltd.	2847.0	41.1	6131.3	88.5	919.7	13.3
3. City Bank Ltd.	1571.0	22.7	4217.5	60.9	632.6	9.1
4. International Finance Investment and Commerce Bank Ltd.	1744.0	25.2	3200.7	46.2	480.1	6.9
5. Pubali Bank Ltd.	3822.0	55.2	7546.8	108.9	1132.0	16.3
6. Uttara Bank Ltd.	1597.0	23.0	3688.8	53.2	553.3	8.0
7. Eastern Bank Ltd.	2496.0	36.0	4732.8	68.3	709.9	10.2
8. National Credit and Commerce Bank	2285.0	33.0	4055.3	58.5	608.3	8.8
9. Prime Bank Ltd.	3555.0	51.3	6708.2	96.8	1006.2	14.5
10. Southeast Bank Ltd.	3423.0	49.4	7357.3	106.2	1103.6	15.9
11. Dhaka Bank Ltd.	2128.0	30.7	3999.5	57.7	599.9	8.7
12. Dutch Bangla Bank Ltd.	1500.0	21.6	3220.6	46.5	483.1	7.0
13. Mercantile Bank Ltd.	2158.0	31.1	3617.3	52.2	542.6	7.8
14. Standard Bank Ltd.	2644.0	38.2	3426.0	49.4	513.9	7.4
15. One Bank Ltd.	1558.0	22.5	2314.9	33.4	347.2	5.0
16. Bangladesh Commerce Bank Ltd.	920.0	13.3	1020.0	14.7	153.0	2.2
17. Mutual Trust Bank Ltd.	1766.0	25.5	2483.1	35.8	372.5	5.4
18. Premier Bank Ltd.	2242.0	32.4	3116.1	45.0	467.4	6.7
19. Bank Asia Ltd.	2145.0	31.0	3333.0	48.1	499.9	7.2
20. Trust Bank Ltd.	1848.0	26.7	3119.7	45.0	467.9	6.8
21. Jamuna Bank Ltd.	1622.0	23.4	2160.7	31.2	324.1	4.7
22. BRAC Bank Ltd. (EPL)	2059.0	29.7	4937.5	71.2	740.6	10.7
b) Islamic Banks						
1. Islami Bank Bangladesh Ltd.	6178.0	89.1	14060.5	202.9	2109.1	30.4
2. ICB Islamic Bank Ltd.	6647.0	95.9	-2929.9	-42.3	-439.5	-6.3
3. Al-Arafah Islami Bank Ltd.	1799.0	26.0	2705.7	39.0	405.9	5.9
4. Social Islami Bank Ltd.	2691.73	38.8	1867.4	26.9	280.1	4.0
5. EXIM Bank Ltd.	3374.0	48.7	4989.2	72.0	748.4	10.8
6. First Security Islami Bank Ltd.	2300.0	33.2	2538.6	36.6	380.8	5.5
7. Shahjalal Islami Bank Ltd.	2740.0	39.5	3605.4	52.0	540.8	7.8
Total	**89,551.8**	**1,292.2**	**152,780.1**	**2,204.6**	**24,440.2**	**352.7**

Source: AT Capital Research

While the table above suggests that in theory a syndication of all the local banks could provide a total of $350 million to a single sponsor, the following limitations should be noted:

- This is the maximum that could be provided to a single sponsor, i.e., if a sponsor uses this total capacity on financing a project, he will not be able to avail further financing for future projects.
- Many bidders for power projects are conglomerates active in a number of sectors and would have used up some amount of their counterparty credit limit in other ventures.
- Banks may set a lower cap on single counterparty exposure in line with their own internal exposure limits compared to the regulatory cap imposed by Bangladesh Bank. The largest local syndication has been $57.1 million for Summit Power.
- It is unlikely that 34 banks will participate in syndication. It may be noted that the largest syndication in terms of participating banks was 22 banks in the case of Warid Telecom, with syndications averaging 13 participants in the selected syndications below (see Table 9).

- However, both the expansion of IPFF and potential revisions to the Bangladesh Bank Regulatory Guidelines might potentially offset some of the above factors and increase the amount of domestic bank financing capacity for power projects in Bangladesh.

Table 9: Large Loan Syndications in Bangladesh

Borrower	Amount in USD mn	Year	Tenor (years)	Rate	Lead Arranger	Total Participants	Participants
TM International (Aktel)	44.0	n/a	6	n/a	n/a	n/a	n/a
Warid Telecom	43.3	2006	6	n/a	IIDFC	22	n/a
Shung Shing Power	41.0		6	n/a	n/a	n/a	n/a
Orascom Bangladesh (Banglalink)	35.0	2007	5	n/a	n/a	n/a	n/a
Pacific Bangladesh Telecom (Citycell)	31.0	n/a	5.8	n/a	n/a	n/a	n/a
Banglalion Communications Limited	29.0	2010	n/a	n/a	AB Bank	13	Mercantile Bank Limited, United Commercial Bank Limited, Standard Bank Limited,Bangladesh Commerce Bank Limited, Agrani Bank Limited, Janata Bank Limited, Sonali Bank Limited, Bank Asia Limited, IFIC Bank Limited, Social Islami Bank Ltd and SABINCO.
Grameen Phone	29.0	2007	5	n/a	Standard Chartered	16	Agrani Bank, Bank Asia, Citibank NA, IFIC Bank, Jamuna Bank, National Bank, Pubali Bank, SABINCO, Sonali Bank, Standard Bank, Trust Bank, The City Bank, United Commercial Bank and Uttara Bank.
Nasir Glassware	24.5	2009	5	11.5%-12%	Citibank	5	Agrani, Eastern, Janata and Shahjalal Islami bank
City Sugar Industries Ltd	23.7	2004	n/a	n/a	HSBC	9	IFIC Bank, Pubali Bank, One Bank, Southeast Bank, BRAC Bank, HSBC, Uttara Finance and Investments Ltd, IDLC (Industrial Development Leasing Company of Bangladesh Ltd) and United Leasing Company Ltd
Buro Bangladesh	21.6	2009	n/a	n/a	Citibank	13	Agrani Bank, Dutch-Bangla Bank, Eastern Bank, Janata Bank, Mutual Trust Bank, Prime Bank, Pubali Bank, Sonali Bank, Southeast Bank, Standard Bank, The City Bank and United Commercial Bank.
Summit Power Limited	18.0	2007	7	13%	Standard Chartered	11	UCBL, Premier Bank, Mutual Trust, National Bank, Brac Bank, NCC Bank, One Bank, IFIC, Sabinco, State Bank of India
Barakatullah Electro Dynamics Limited	18.0	2008	n/a	n/a	IDCOL		
Ranks Telecom Limited	14.6	2007	n/a	n/a	IIDFC	11	National Bank Limited, Uttara Bank Limited, United Commercial Bank Limited, EXIM Bank Limited, Saudi-Bangladesh Industrial and Agricultural Investment Company Limited, Standard Bank Limited, Agrani Bank, Premier Bank Limited, Mercantile Bank Limited and First Security Bank Limited.
Nasir Glass Industries	14.4	2003.0	6	n/a	Prime Bank	14	n/a

Source: AT Capital Research

Impact of High Cost of Finance and Short Tenor of Loans from Local Banks on Tariffs and Investor Equity Returns

Local Commercial banks have typically limited themselves to making loans with a maximum tenor of 5-7 years and may require equity of up to 35%. The short tenor of debt financing is a common problem in many emerging markets, but especially so in Bangladesh, given the absence of a developed capital market including liquid corporate bond market and a swap market. Beyond supply-side considerations, a key demand-side consideration is the viability of competitive bids offered by sponsors. Viability of offered tariffs is driven by the sponsors' ability to keep costs down – cost of finance is a component of this.

We have detailed below an illustrative analysis comparing the impact on tariffs and Internal Rate of Return (IRR) of various financing scenarios for a 400 MW Gas Power Plant with assumed total project cost of $340 million:

1. Project Financing including International debt financing
   a. Equity 30% of total project cost
   b. Debt 70% as follows:
      i. Debt
         1. 35% of total project cost at 6.5% with 15 year tenure
         2. 35% of total project cost at 7% with 15 year tenure
2. Project Financing including Local debt financing
   a. Equity 30% of total project cost
   b. Debt 70% as follows:
      i. IPFF - 8% of total project cost at 6% with 10 year tenure
      ii. Other debt - 62% of total project cost at 12.5 % with 6 year tenure

Figure 10: Indicative Offered Tariffs and Equity IRR under alternative financing scenarios

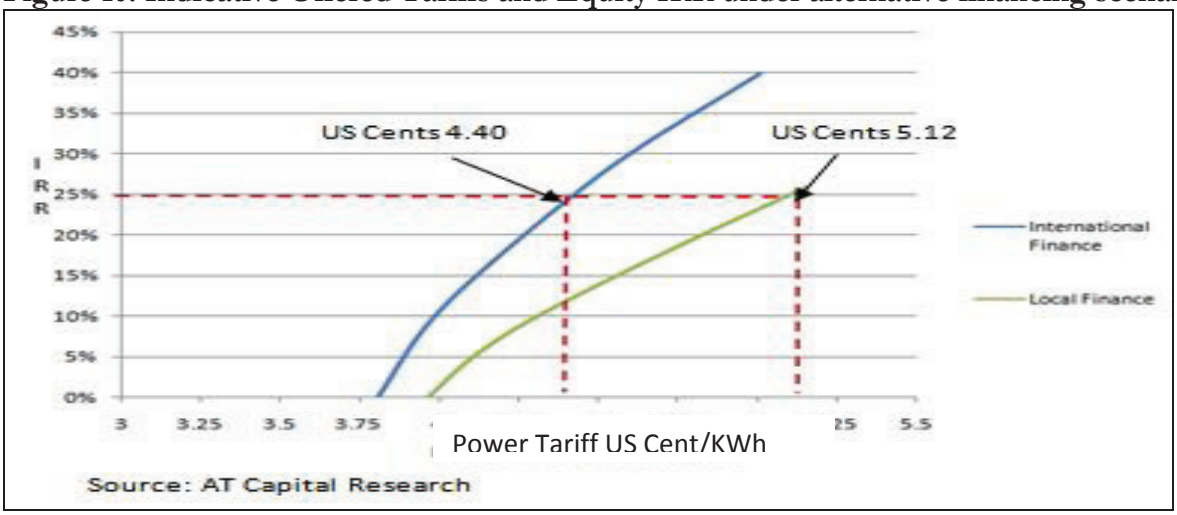


Figure 10 shows the impact on the tariffs for bidding companies, differentiating the comparative advantage of operators who can access international finance over those who have to depend only on local finance. For example, assuming a minimum benchmark IRR of 25%, those with an internationally financed package could bid at US 4.40 cents per kWh, while projects that depend only on local finance could bid at 5.12 cents per kWh - a 16.4% difference, which may prove decisive in actual bidding. With government willing to shoulder foreign exchange risk in internationally financed projects, foreign financing may make for higher returns.

Other Considerations

In our discussions with financiers, the following factors were highlighted by majority of participants with respect to the approval of loans to infrastructure providers:

- Sponsor Track Record: Respondents highlighted concerns about the track record of sponsors. It was noted that given the relative immaturity of the domestic power generation industry, it was often the case that sponsors had either no or relatively little experience in the industry. This issue came up repeatedly for Small Power Project (SPP) and Rental Power Plant (RPP) awards, due to the relaxed criteria for participation.

- Lack of consistency in the tendering process: Concerns were raised by respondents over the consistency and objectivity of the tendering process. This increased political and regulatory risks for projects for both lenders and potential investors.

Both concerns mean that lenders either do not lend to projects or limit their participation, which increases the dependence of sponsors on sources of finance other than domestic banks.

E. Foreign bank finance

Domestic sources of debt finance are too scarce to finance larger IPP projects, with limitations on tenor and higher interest costs. Large IPPs such as Haripur and Megnhaghat have both been financed with foreign loans provided by international banks. In the case of Haripur, $60.9 million was provided by commercial banks at financial closing. In Meghnaghat, commercial bank debt was $20 million at financial closing. One should note that as was the case for these two projects, it is critical that Government Guarantees backed by partial risk guarantees provided by IFIs are in place for enabling international financing of power projects. Also, commercial lenders will require appropriate security on the project cash flows, the corporate entity and its assets.

Here we discuss the generic impact of the *Crisis* on foreign bank finance as Bangladesh has not been active in this market for quite some time. The financial crisis has impacted access to foreign bank lending in a number of significant ways. Syndication markets have dried up and many banks have retreated to their home markets or exited the market altogether. The banks that remain in the market have significantly less appetite for risk than they did pre-*Crisis*. This low risk appetite is manifested in the following:

- **Experienced, credit-worthy sponsors:** Lenders are focusing, in particular, on the long-term ability of sponsors to provide necessary funding, credit support, and technical expertise.

- **Strong commercial structure:** Projects with a contracted, credit-worthy revenue stream are being favored over those that are exposed to merchant risk or rely on non-investment grade off-takers.

- **Government support:** For those projects in which the government acts as a counterparty, strong support evidenced through guarantees is crucial to attract lender attention.
- **Stricter financing terms**
    - ***Tenors*** have shortened post-crisis, and most lenders expected that tenors on uncovered loans would not exceed 8 years, political risk-covered loans could extend for up to 10-12 years, and tenors in the 12-15 year range would only be possible with strong multilateral or Export Credit Agency (ECA) support in the form of credit enhancing guarantees. We could compare these tenors to the Haripur project, which was able to achieve 14 years on a loan tranche backed by a Partial Risk Guarantee (PRG) from the International Development Association (IDA), and the Meghnaghat IPP which was able to achieve tenors of 15 and 10 years on two respective tranches, the first of which was backed by a PRG from ADB and the second of which was a syndicated loan from the ADB. The 14-15 year tenors achieved on the PRG covered tranches for Haripur and Meghnaghat are much longer than the 10-12 year tenors estimated for political risk-covered tranches in today's market. The ADB's syndicated loan did not provide commercial lenders with any guarantees and therefore may be best compared to an uncovered loan, which in the current market is only estimated to be able to achieve a tenor of 8 years. These albeit somewhat rough comparisons show that tenors have likely shortened for projects in Bangladesh.
    - Lenders were unanimous in their agreement that the ***interest rate*** on loans has increased significantly in the wake of the financial crisis, although most lenders were hesitant to provide an estimate on pricing without being able to reference any recent comparative transactions and without being given specific transaction details. One lender estimated that margins on debt would be well above 400 basis points over LIBOR. This is much higher than the pricing for the Haripur and Meghnaghat projects, where the PRG backed tranches achieved pricing of 200 basis points over LIBOR and the ADB syndicated loan for the Meghnaghat project was priced at 350 basis points over LIBOR. But, the interest rates have softened lately. Bank profitability has also been recovering, which should also help both the amount and pricing of international debt financing.
    - ***Stronger covenants*** are also being included in financing agreements, pushing more of the risk onto project sponsors. This was manifested in lower leverage. For financing in the current market environment, it has been felt that a 70/30 debt-equity ratio was the most realistic leverage target, although a small minority thought a project may be able to achieve 75/25. The Haripur IPP, which was the first major IPP in Bangladesh, had a debt-equity ratio of 63/37 (and this includes a subordinated sponsor loan in the debt total), while the Meghnaghat IPP was able to achieve a debt-equity ratio of 73/27.

Bangladesh has received favorable Sovereign Rating

- In April 2010, Standard and Poor announced the first-ever Sovereign Credit Rating for Bangladesh, assigning it a BB- rating with a stable outlook on both its foreign and local currency bond ratings (see Table 10).
- Bangladesh was also assigned its first sovereign rating by Moody's Investors Service of Ba3, the same as the Philippines and Vietnam.

The Bangladesh sovereign ratings would improve the prospects of raising finances abroad by Bangladeshi companies and the government.

Table 10: Bangladesh Sovereign Ratings

Country	Sovereign local currency ratings (LT/Outlook/ST)	Sovereign foreign currency ratings (LT/Outlook/ST)	Transfer and convertibility assessment
Bangladesh	**BB-/Stable/B**	**BB-/Stable/B**	**BB-**
Pakistan	B-/Stable/C	B-/Stable/C	B-
India	BBB-/Stable/A-3	BBB-/Stable/A-3	BBB+
Sri Lanka	B+/Positive/B	B/Positive/B	B+
Indonesia	BB+/Positive/B	BB/Positive/B	BBB-

Source: Moody's and S&P

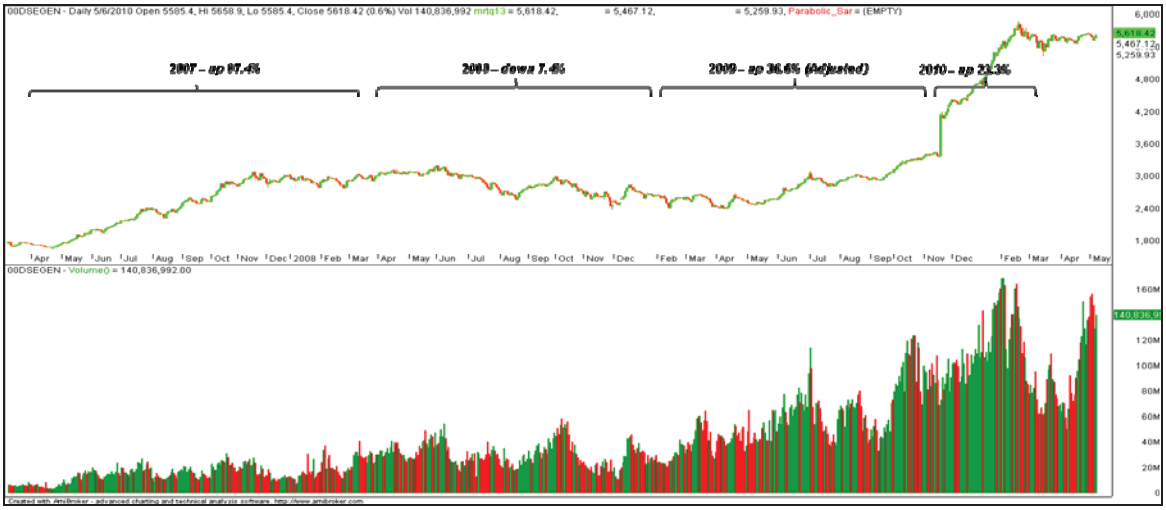
F. Equity financing

There is limited history of large scale funding from capital markets for power projects in Bangladesh. There are only two listed private power generation companies in Bangladesh – Summit Power and the recently listed Khulna Power Company. While the power sector, including transmission and distribution companies, trades at around 19x price earnings (PE) ratio, Summit Power trades at 79.1x PE ratio and Khulna Power at 61.5x PE ratio. Attractive valuations based on high investor demand suggest the latent potential of equity funding of power projects in Bangladesh.

The Bangladesh Capital Market remains at a relatively nascent stage in terms of offering a diversified range of financing products. There is a small, illiquid and poorly functioning corporate bond market, providing limited debt finance. The large majority of listed securities are equities. The stock market is well positioned to enable raising equity capital at attractive valuations for listed operators. For Greenfield projects sponsored by non-listed sponsors, there are precedents of Greenfield IPOs raising capital at par value. Relatively high trading valuations of listed energy operators from an exit perspective provide additional upside, beyond project economics, for operators and investors alike, making equity funding of power projects in Bangladesh attractive.

The main bourse of Bangladesh, the Dhaka Stock Exchange (DSE), has seen significant growth over the last three years – in particular, the market rose by 87.4% in 2007; in 2008 the market was down 7.4%, but still outperformed other markets following the sharp correction in global and emerging market equities. In 2009, the market was up 36.6% (after removing the Grameen Phone IPO, which alone added 21.2% to market capitalization). Market turnover has been rising, currently averaging around $150 million per day.

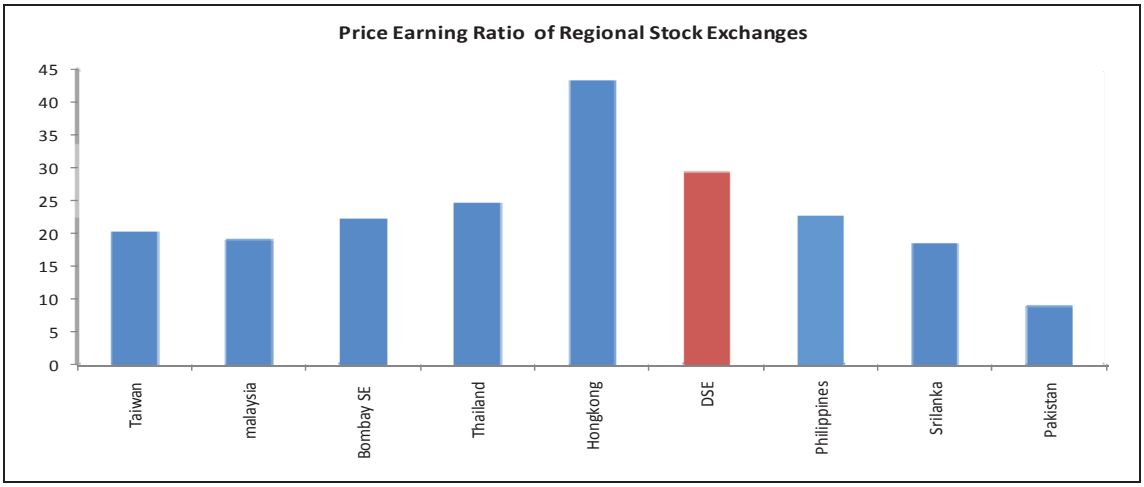
Figure 11: Performance of Dhaka Stock Exchange



Source: AT Capital

PE multiples currently average 27.2x in Bangladesh, placing it at the upper end compared to other Asian markets (see Figure 12).

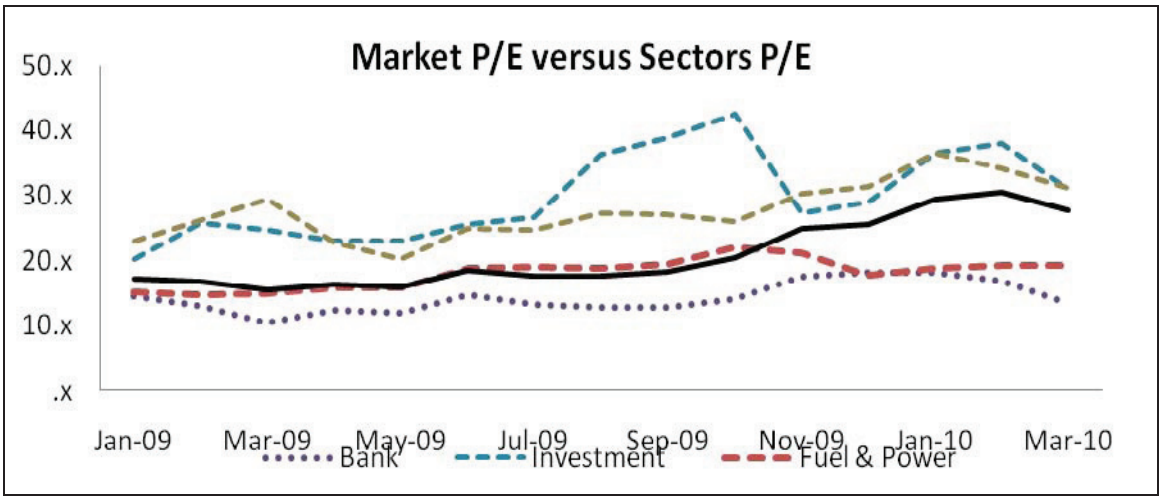
Figure 12: Price Earning Ratio of Regional Stock Exchanges



Source: AT Capital Research

The power and energy sector is currently trading at an average PE ratio of 19.1x. We note, however, that the sector also includes three oil and petroleum distribution companies, one power generation, two power distribution and transmission companies, one natural gas distribution and transmission, two industrial gas companies and one welding electrodes manufacturer.

Figure 13: Market PE Versus Sector PE in Bangladesh



Source: AT Capital Research

The only listed power generation companies, as already stated, are Summit Power, with a total of 215 MW of power generation capacity, and Khulna Power Company, with 110 MW power generation capacity.

Summit Power came to market in Nov 2005, when it listed through an IPO with market cap of $33.7 million (PE ratio of 9.1x). Summit Power is now a $388 million company and is trading at 79.1x PE. Summit Power's share price performance over the last 2 years is shown in Figure 14 below.

Figure 14: Stock Performance of Summit Power Limited

Source: AT Capital Research

Khulna Power, a subsidiary of Summit Industrial and Mercantile Corporation[5] and jointly owned by United, was recently listed through a direct listing (i.e., an offloading of shares rather than a capital raising) when 25% of its shares were offloaded. The direct listing valuation by market cap was $187.4 million which represented a PE of 98.1x. Its current market cap is $620.96 million, with effective PE ratio of 61.5x.

We have detailed below listed power company comparables in the region, showing that Summit and Khulna Power Company Limited are trading at a considerable premium to most of their Asian counterparts.

Table 11: Power Company Comparables in the Region as on May 11, 2010

Company	Capacity (MW)	Country	M. Cap (mn)	EV (mn)	EPS	EV/Revenue	EV/EBITDA	P/E
KPCL	110	BD	42,803.3	42,102.2	3.3	6.7x	48.0x	61.5x
Summit Power	215	BD	37,209.2	40,024.1	16.9	11.1x	44.2x	79.1x
Tata Power	2,785	India	322,886.7	352,972.4	36.7	6.0x	25.2x	37.1x
Torrent Power	1,648	India	142,254.7	168,372.8	10.0	3.9x	20.4x	30.2x
HUB Power Company	1,292	Pakistan	40,326.8	55,961.2	3.3	0.7x	7.4x	10.7x
Japan Power Generation LTD	n/a	Pakistan	418.2	5,737.0	(3.8)	1.6x	13.5x	n/m
Kohinoor Energy LTD	124	Pakistan	5,337.9	4,673.9	5.3	0.6x	3.8x	5.9x
KAPCO	1,600	Pakistan	39,611.4	45,313.3	6.4	0.7x	n/a	7.0x
National Thermal Power Corporation	30,644	India	1,667,645.2	1,850,607.2	9.9	4.4x	13.5x	20.3x
Reliance Infrastructure	941	India	227,185.1	297,996.8	50.6	2.7x	19.9x	19.9x
Reliance Power	33,480	India	356,044.6	355,900.4	1.04	106.3x	138.7x	143.0x
Calcutta Electric Supply Corporation	975	India	47,975.4	59,446.2	32.8	1.9x	7.6x	11.7x
Vallibel Power Erathna Plc	10	Srilanka	4,109.1	4,116.1	0.4	11.3x	11.6x	13.4x
Vidullanka Plc	11	Srilanka	1,226.5	1,378.1	1.9	6.0x	11.4x	17.9x
The Electricity Generating Public Company	4,252	Thailand	41,722.4	44,319.7	15.1	2.8x	3.8x	5.3x
Glow Energy Public Company Limited	1,860	Thailand	54,866.0	82,285.6	2.8	2.4x	10.2x	13.1x
Banpu Public Limited Company	1,434	Thailand	163,592.2	175,048.8	52.4	3.0x	7.4x	11.5x
Tenaga Nasional Berhard	12,233	Malaysia	34,548.2	49,320.6	0.2	1.8x	9.5x	32.3x
Tanjong Public Limited Company	3,951	Malaysia	7,258.6	11,715.1	1.15	3.2x	8.2x	15.7x
Datang International Power Power Generation	25,097	China	96,007.0	203,235.5	0.065	5.5x	22.4x	126.2x
China Power International Development	8,320	China	9,402.4	8,560.8	(0.1)	0.9x	11.1x	n/m
Huadian Power International Corporation	22,335	China	30,045.2	87,835.3	0.4	2.9x	28.7x	11.7x
The Tokyo Electric Power Company	62,825	Japan	3,328,624.0	11,007,997.0	(62.5)	1.9x	16.7x	n/m
Chubu Electric Power	32,626	Japan	1,794,620.9	1,797,271.7	(0.0)	0.8x	3.6x	n/m
The Kansai Electric Power Co. Inc.	33,865	Japan	2,019,483.2	5,098,886.2	(9.3)	1.8x	163.1x	n/m
Source: Annual Reports, NSE India, KSE Pakistan, Colombo Sri lanka Yahoo Finance, Google Finance			**High**			11.3x	28.7x	37.1x
All figures in local currency (BDT,Rupee,Ringit, Remnibi, Yen & Baht)			**Average**			4.1x	12.8x	17.4x
Outliers marked in red - not included in average calculations			**Low**			0.7x	3.6x	5.3x

Bangladesh Specific Considerations for an IPO

Greenfield Rules

In Bangladesh there is scope for new power Special Purpose Vehicles (SPVs) to come to market as Greenfield IPOs. While there are no extensive precedents of this happening, this was the case in the Lafarge Surma IPO where the company raised $57.1 million. Given the lack of an operating track record and history, the pricing of such an IPO would fall under the Fixed Price regime, where the Securities and Exchange Commission (SEC) would set the price. The new book building rules where the market effectively sets pricing, would not apply to a Greenfield IPO, given lack of a minimum

[5] Summit Industrial and Mercantile Corporation is the holding company, which holds 67% of Summit Power and 49% of Khulna Power.

operating history. As was the case in Lafarge IPO, one would expect capital to be raised at par value.

Pricing of IPOs of Companies with Operating Histories

Pricing has historically been an issue for Bangladeshi companies, with the SEC dictating the pricing of issues – previously premia to the face value of shares or net asset value (NAV) were suppressed, regardless of appropriate valuation. However, there have been two recent issues, the Grameen Phone IPO and the Marico IPO, where valuations were around 17x PE and 9x PE, respectively. These are clear precedents that the SEC is moving away from their previous valuation methodology. Recently, new Bookbuilding Rules have been introduced, which will allow the market to determine appropriate pricing under the watch of the SEC.

Liquidity for IPOs

Another key uncertainty for large IPOs has been the extent to which the market could absorb large issues. The Grameen Phone IPO, the largest issue in Bangladesh thus far, has an issue size of $160 million, accounting for 10% of the company. Earlier to this, the largest issue was around $25 million. The Grameen Phone IPO was 4 times oversubscribed, a clear indication of the depth of the market and its ability to absorb larger IPOs.

Sponsors Lock-in Rules for IPOs

In Bangladesh, the SEC rules currently stipulate that sponsors have a three year lock-in period from the date of consent from the SEC. All investors in the company upon application to the SEC are regarded as sponsors. Private placement investors, who come in after the submission of the application are locked in for 1 year from the date of consent of the IPO issued by the SEC.

Direct Listing

From an exit perspective, there is a Direct Listing Regime. Direct Listing is effectively a means to directly sell shares into the market, rather than capital raising and related lock-in guidelines under the IPO rules. Direct listings had been developed for off-loading shares in State Owned Enterprises, with only a handful of private companies taking this route to allow exit for shareholders. Key features of the Direct Listing rules are:

- The pricing is set by the market, rather than the SEC – a mechanism similar to bookbuilding.
- The minimum paid up capital of the company must be BDT 500 million (about $7.25 million).

One should note that the SEC announced that Direct Listing would not be available to non-government companies. However, there have been precedents subsequent to the SEC announcement of waivers being granted to Ocean Container Ports and Khulna Power Company.

Domestic Infrastructure Funds

There are currently no commercial domestic infrastructure funds. A PPP program announced in the 2009/10 Budget included a proposed government facility of Tk 2100 Crore ($310 million), which has yet to come into operation. Additionally the Energy Ministry has proposed setting up a fund focused on financing power generation and exploration projects.

Although some local currency financing can play a role in supporting energy generation, international funding sources will likely remain the major source of funding, at least for the larger projects. Power projects up to around $70-100 million can broadly be financed with domestic sources of finance. However, for projects exceeding this, a significant proportion of the financing will likely have to be sourced internationally, with IDCOL, IPFF and international banks with local offices providing offshore finance (i.e. HSBC, Standard Chartered, Citi NA) being the only substantial providers of foreign currency debt in Bangladesh.

We cover private participation in infrastructure as a separate section.

4. PRIVATE PARTICIPATION IN THE ELECTRICITY SECTOR

It is clear that the GoB alone with its limited resources and implementation capability will not be able to meet the financing challenge and will therefore increasingly require private sector participation. The GoB took initial steps in the late 1990s embarking on major policy reform and restructuring aimed primarily at enhancing private sector capital flows to the power sector. The power sector reform program of GoB included the following:

- Unbundling of the power sector: Separation of power generation, transmission and distribution functions;
- Corporatization and commercialization of emerging power sector entities;
- Creation of regulatory agency in the form of Bangladesh Energy Regulatory Commission (BERC);
- Encouragement for private sector participation and PPPs in power sector;
- Financial restructuring and recovery plan for the sector introduced;
- Efforts to introduce cost reflective tariff for financial viability of the utilities and efficient use of electricity;
- Development of demand side management (DSM) including energy efficiency measures to conserve energy;

- Development of alternative/renewable energy resources; and

- Capacity building and human resource development (HRD) for the sector entities and corporate bodies.

As part of this reform, the GoB came up with the Private Sector Power Generation Policy. It was announced in October 1996 and revised in November 2004. The Policy has elements that are attractive to global and national power developers, as exemplified by the following measures:

- Model Implementation Agreement (IA), Power Purchase Agreement (PPA), and Fuel Supply Agreement (FSA) have been prepared for private power projects to eliminate the need for protracted negotiations between GoB and Sponsors.

- The Power Purchase Agreement (if executed by Government Agencies) will be guaranteed by the GoB for performance obligations of the concerned utilities.

- In case the fuel is to be supplied by a public sector organization, the performance of the fuel supplier will be guaranteed by the GoB under the terms of Fuel Supply Agreement. The rationale for this was twofold: first, it was assumed that the credit of a state-owned entity would need to be backstopped by the government; second, there was awareness that the natural gas supply in the country was constrained and therefore an agreement with a government entity governing the supply of natural gas would require a firm government guarantee. Should the fuel be imported, as in the case of coal or heavy fuel oil, then the fuel supplier would need to be creditworthy.

- A mechanism shall be provided for the adjustments of certain tariff components to variations in Taka/ Dollar exchange rate, fuel price and inflation rate.

- The private power companies shall be exempt from corporate income tax for a period of 15 years.

- Facilities for repatriation of invested capital, profits and dividends shall be provided; and, Taka, would be convertible for international payments on current account.

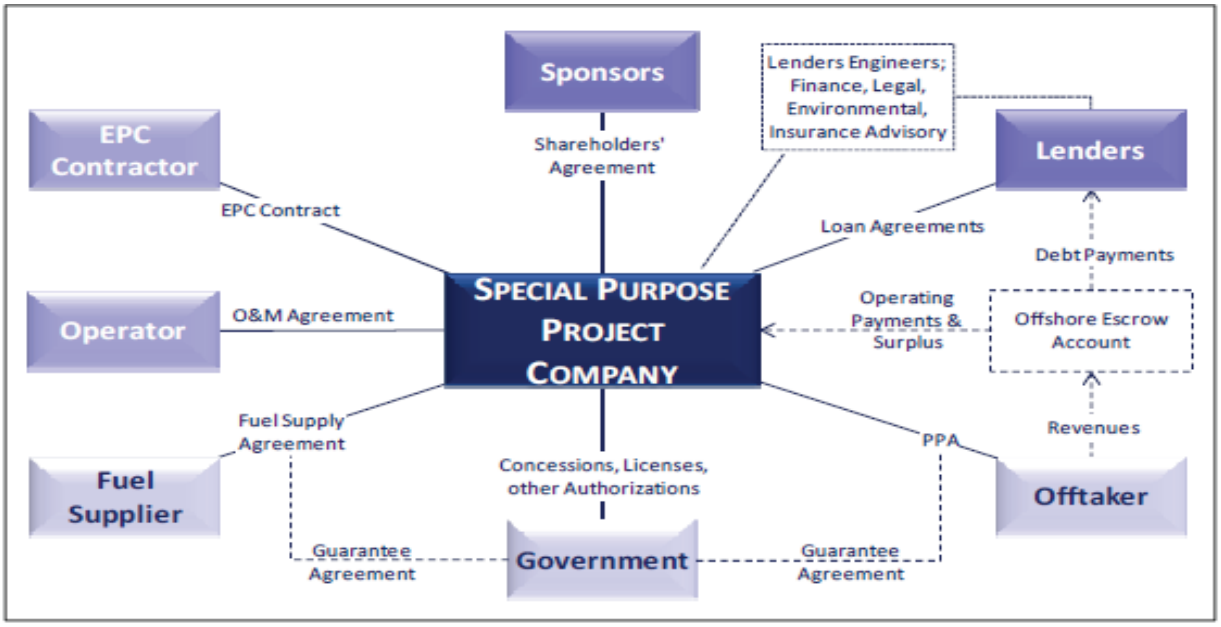
These elements together can be branded as "Fundamental Security Package", which contributed towards foreign investment particularly in large IPP Projects. This policy, which is consistent with international best practices for IPPs, led to a number of successful IPPs in Bangladesh and is a testament to effectiveness of the Policy in attracting private capital.

Project Financing in Bangladesh

Project financing is akin to non-recourse financing in which the lenders to a project are repaid from the cash flows generated from that project with limited or no recourse to the corporate balance sheet of the project's sponsors. Sponsors generally establish a special purpose vehicle, commonly known as the project company, and all agreements and contracts for the project are made with this entity. Lender security and collateral is focused on the project company's accounts, assets and contracts. In the case of default, at least post-completion, lenders have no recourse to the sponsors' corporate balance sheet; they only have recourse to the project company. Since lenders' only source of debt repayment is the project's cash flows, close attention is paid to the underlying economic fundamentals of the project while key risks are mitigated via a tight contractual structure.

The figure below provides a simplified illustration of the typical contractual structure of a private power project and helps to show why risk allocation is the key to project financing.

Figure 15: Project Finance Contractual Structure



Source: Taylor DeJongh. 2009. *Assessing the Impact of Recent Credit Constraints on Energy Sector Investment Requirements in Bangladesh*, a study commissioned by the World Bank

Up until the late nineties, power projects in Bangladesh were undertaken only via the public sector with major financing from donor agencies. Since then, IPPs have started making contributions. While the public sector implemented mostly large projects, the IPPs were both large projects (Meghnaghat and Haripur) and smaller projects under the Small Power Projects (SPP) and Rental Power Plant (RPP) Schemes.

Bangladesh successfully commissioned its first IPPs during 1998 - 2002. These gas-fired projects, most notably Haripur (360 MW) and Meghnaghat–I (450 MW), were modern, combined-cycle power plants developed with project financing arranged by a private company (AES) including funding from the Asian Development Bank (ADB), World Bank/IFC, and other international finance institutions (IFIs). At the time that Meghnaghat-I achieved financial closure in early 2002, Bangladesh was recognized as a world leader in attracting private capital to alleviate acute power shortages.

IPP financing in Bangladesh will need to make use of multiple sources of financing including international commercial banks, multilateral lenders (World Bank, International Finance Corporation, Islamic Development Bank, etc.), bilateral agencies (e.g. FMO, DEG), and Export Credit Agencies (ECAs). The participation of multilateral lenders and ECAs along with international commercial banks would be a requirement for successful IPP financing in Bangladesh. The involvement of multilaterals and ECAs is critical. First, these institutions are an important source of lending capacity in emerging markets such as Bangladesh. Second, these institutions can provide private sector lenders with important credit enhancements such as political risk insurance that are critical to catalyzing private sector lending in emerging markets. Bilateral agencies are also a potential source of financing, although their involvement is not viewed as critical due to lower perceived capacity.

While international bond markets are a source of financing for major infrastructure projects such as IPPs, high levels of perceived political risk and the lack of a government bond benchmark are likely to make the international bond markets inaccessible to a Bangladesh-based IPP currently. This will clearly change over time as Bangladesh launches a sovereign bond and becomes better known in the international capital markets. But on a 1-3 year time horizon, local IPPs may not be able to secure bond financing. If larger international developers with substantial balance sheets, good credit ratings, and a history of accessing international fixed income markets commit to Bangladesh power projects, then they will be able to potentially access international bond markets.

Risk Mitigation: The majority of the risks associated with large IPP Projects are mitigated by the Project's contractual structure, including GOB guarantee, and various risk mitigation instruments provided by Multilateral Agencies (like PRG) that will likely be part of the security package. There will, however, remain certain risks which will be borne ultimately by the Project company.

One of the important risks is the Foreign Exchange Risk. This risk is typically created by mismatch between revenues received in local currency and debt service in foreign currency. This occurs in power projects as there is foreign currency-denominated debt to achieve longer repayment terms and lower interest cost. In order to attract private foreign capital in power sector, this risk is also taken over by the government.

Bangladesh Government Guarantees: The current proposed drafts of the Implementation Agreement, Power Purchase Agreement, and Gas Supply Agreement for the Bibyana project include government guarantees. Lenders unanimously agree that a government guarantee of the PPA would be required. Lenders recognized that Bangladesh has a good track record with its existing IPPs and noted that while payments are sometimes late, there have been no instances of default. The lenders closely following the market recognized that BPDB had begun to implement reforms and that its

fiscal situation was improving; however they still felt that it was running deficits and government guarantees of the off-take contract would be required.

History of Project Financing in Bangladesh

There are limited precedents for the financing of large IPP projects in Bangladesh. The most recent projects are Haripur in 2001 and Meghnagat in 2002. Both projects had sponsor equity, large IFI loans, and commercial banking components. They are both indicative of the likely financing structure that would be used for the proposed Bibyana project.

Haripur Power Project

The 360 MW Haripur IPP was initially developed by AES, which won the 22-year concession. Operations began in 2001. According to the terms of the PPA, BPDB is the sole off-taker and the initial levelized tariff was US$0.0277/kWh.

The initial financing of Haripur was closed with a 63/37 debt-equity ratio and a partial risk guarantee (PRG) from the International Development Association on the commercial loan tranche to mitigate the risks associated with the PPA with BPDB. Pricing on all tranches was 200 basis points over LIBOR with 150 basis points upfront fees for the guaranteed tranche.

In 2003, AES sold its Bangladesh IPP assets, including Haripur, to CDC Globeleq. Globeleq resold the assets in 2007 to Pendekar Energy, a joint venture between Tanjong Energy and Aljomaih. In 2007, Haripur was refinanced with a US$36 million term loan guaranteed by Dutch development agency, FMO.

Table 12: Financial Structure of Haripur Power Project

Equity:	$ mn		
Base sponsor equity	31.0	45.6%	17%
Subordinated sponsor loan	37.0	54.4%	20%
	68.0	100.0%	37%
Debt:			
Commercial debt*	60.9	53.0%	33%
IFC direct loan	40.0	34.8%	22%
IFC syndicated loan	14.0	12.2%	8%
	114.9	100.0%	63%
Total	182.9		100%
Key features:	* guaranteed with IDA's $ 60.9mn PRG; GOB Indemnity Agreement with IDA; US Libor rate + 2%; 15 yr financing		

Source: AT Capital Research

Meghnaghat Power Plant

The 450 MW Meghnaghat IPP, located close to Dhaka, was developed by AES Corporation, using gas supplied via a 30 km pipeline by a subsidiary of Petrobangla, Titus Gas Transmission and Distribution. Meghnaghat was awarded a 22-year concession in 1999 and was one of the first projects to be developed under the Private Sector Generation Policy. The project's debt-equity ratio was 73/27 and the financing included A and B loans from the Asian Development Bank, a commercial loan tranche covered by a PRG from ADB, as well as a junior and a senior loan from IDCOL. Pricing on the PRG-backed loan tranche was 200 basis points over LIBOR, while the B loan was priced at 350 basis points over LIBOR.

In 2003, AES sold its Bangladesh IPP assets, including Meghnaghat, to CDC Globeleq. Globeleq subsequently sold Meghnaghat to Pendekar Energy in the same transaction in which the Haripur plant was sold.

Table 13: Financial Structure of Megnaghat Power Project

Megnaghat			
Equity:	$ mn		
Base sponsor equity	80.0	100.0%	26.7%
	80.0	100.0%	26.7%
Debt:			
ADB Loan	50.0	22.7%	16.7%
Commercial Banks* (ADB PRG)	70.0	31.8%	23.3%
Commercial Banks (ADB scheme)	20.0	9.1%	6.7%
IDCOL	80.0	36.4%	26.7%
	220.0	100.0%	73.3%
Total	300.0		100.0%
Key features:	* guaranteed with $70 million political risk ADB PRG scheme; GOB counter guarantee from GOB to ADB. GOB Guarantees under project agreements. 16 yr loan period with 3 yr grace. ADB - LIBOR + spread determined by Interest Rate Committee. IDCOL loan via IDA - Infastructure Development Fund		

Source: AT Capital Research

Some key features of Haripur and Megnaghat Poject Financing:

- Commercial Bank financing required a Partial Risk Guarantee provided by IFIs.
- Partial Risk Guarantee was backed with an Indemnity Agreement provided by the Government of Bangladesh.
- IFIs have limitations on their participation in projects.
- IFIs lent broadly in line with commercial terms.
- IFIs have to be comfortable with the bid process and in particular the transparency of the process. The World Bank, for example, requires that professional independent transaction advisers (legal, financial, technical) be appointed to provide oversight in the bidding process.
- IDCOL has a facility to provide debt financing.

Project Financing of Power Projects during 2002 - 2009

During the period 2002 to 2009, no large IPPs were developed. Power generation capacity was added through smaller IPPs, SPPs and RPPs. As detailed below, the projects were financed locally, although IPFF funding was used in some projects.

Table 14: Project Financing of Power Projects during 2002-2009

Name of the Project	Contract Period (Yrs)	Capacity (MW)	Type	Total Investment (USD mn)	Debt (%)	Equity (%)	Lead Arranger	Other Participants	Syndicated Term Loan (mn) BDT	Other Financing
IPPs										
Khulna Power Company Ltd. (KPCL)	15	110.0	IPP	103.0	n/a	n/a				
NEPC, Haripur	15	110.0	IPP	124.3	n/a	n/a				
Baghabari, Westmont GT	15	90.0	IPP	n/a	n/a	n/a				
Rural Power Company Ltd (RPCL),Mymensingh	15	140.0	IPP	n/a	n/a	n/a				
2nd Baghabari, Westmont GT	15	40.0	IPP	n/a	n/a	n/a				
Rural Power Company Ltd (RPCL),Mymensingh	15	70.0	IPP	n/a	n/a	n/a				
Malancha (35 & 44MW)	15	79.0	IPP	45.7	70.0%	30.0%	IDCOL	Mercantile Bank, MTBL, SCBL, SBL, UBL, IFIC & SABINCO		IPFF
Summit Power Ltd, Dhaka, Narsingdi, comilla (44.75,35.3,24.5)	15	104.6	IPP	79.6	67.0%	33.0%				
SPPs										
Asian Entech Power Company (22,22,22&11MW)		77.0	SPP	55.0	n/a	n/a				
Summit Purbanchol & Uttaranchal Power Co. Ltd (33*33 & 11 MW)	15	110.0	SPP	69.3	80.0%	20.0%	IIDFC	IDCOL, Bank Asia, NCC, Pubali, UCBL, Agrani Bank, Mercantile Bank, Brac Bank, Sonali Bank, Standard Bank, SABINCO, Janata Bank, Prime Bank, MTBL, BIFC, Rupali Bank, Premier Bank, FISBL, BIFC, SABINCO & Uttara Finance	3,955.0	
Hobiganj, Energypac-Confidence power venture ltd		11.0	IPP	7.1	70.0%	30.0%				
Feni, Doreen		22.0	SPP	n/a	n/a	n/a		NCC Bank		
Mohipal (Feni), Doreen		11.0	SPP	n/a	n/a	n/a	Dhaka Bank	IIDFC	330.0	IPFF provide BDT 180mn in the loan
Barabkunda, Regent Power		22.0	SPP	18.6	70.0%	30.0%	Eastern Bank	IDLC, Uttara Finance & Investment, Bangladesh Commerce Bank, Trust Bank, State Bank of India	775.0	IPFF provide additional BDT 620mn beyond the syndicated loan
Rentals										
BEDL, Fenchuganj	15	51.0	RPP	26.2	70.0%	30.0%	IDCOL	Brac Bank, AB, Trust, Mutual Trust, Bank Asia, City, IIDFC and Janata Bank	1,280.0	
Precision Energy Ltd, Ashuganj		55.0	RPP	19.7	65.0%	35.0%				
VERL, Bhola	3	34.5	RPP	17.1	80.0%	20.0%	AB Bank	IDCOL, Bangladesh Commerce Bank, Mutual Trust, National Bank Limited, Pubali Bank Limited & Uttara Bank	1,156.0	
Energis Power Corp, Sikalbaha, Chittagong	n/a	55.0	RPP	38.0	65.0%	35.0%	Agrani Bank	Sonali, Janata, SouthEast, Bangladesh Commerce Bank, Premier Bank	1,560.0	
Energy prima-hosaf		50.0	RPP	21.4	76.7%	23.3%				
Khulna Rental, Agrreko power	3	40.0	RPP	n/a	n/a	n/a				
Shajibazar	3	50.0	RPP	n/a	n/a	n/a				
Kumargaon, Energy Prima	3	50.0	RPP	n/a	n/a	n/a				
Fenchuganj	15	50.0	RPP	n/a	n/a	n/a				
Bogra, Energy Prima	15	20.0	RPP	n/a	n/a	n/a		NCC Bank		
Shajibazar	15	86.0								

Source: AT Capital Research

General Features:

- The provision of debt for these projects have been through syndications/club financing
- Equity components ranged between 20% and 35%
- Participants in large syndications average 13 banks
- Tenure tends to be 5 to 7 years
- Interest rates tend to be between 12% and 14% (i.e. base of around 8% + margin)
- All loans have been denominated in local currency (Bangladesh taka)
- There were no GoB Guarantees or Multilateral Partial Risk Guarantees

Indicative Project Finance Structure for Large IPPs

We have detailed below an indicative funding structure for a 400 MW Gas Fired Plant, with total project cost of $420 million.

We assume that equity finances 30% of project cost. Based on the experience so far, it appears that it should not be difficult to mobilize the required equity either abroad or locally. One would potentially expect interest from both multinational and investment houses for equity investments. Given the large number of well capitalized investment funds specializing in Asian infrastructure investments, it may be possible to mobilize adequate amounts of foreign equity for well structured limited recourse infrastructure projects.

On debt financing, obtaining senior debt with tenors greater than 15 years will be a challenging task and will require risk mitigating mechanisms. There would be a need for support by bilateral/ multilateral financial institutions. Thus, in projects costing over $70-100 million, one or several multilateral lending agencies (the World Bank, IFC, ADB, CDC and JEXIM) would have to be involved.

Table 15: Indicative Financial Structure for 400 MW Gas Fired Project

	$ mn			Interest Rate	Tenure
Equity:					
Sponsor	126.0	100.0%	30%		
	126.0	100.0%	30%		
Debt:					
IPFF	21.0	7.1%	5%	GOB (4%) + 5%	10 years
IDA through GOB and banks	21.0	7.1%	5%	GOB (4%) + 5%	15 years
Commercial debt	84.0	28.6%	20%	US Libor + 4%	15 years
IFI direct loan	84.0	28.6%	20%	US Libor + 4%	15 years
IDCOL	84.0	28.6%	20%	US Libor + 4%	15 years
	294.0	100.0%	70%		
Total	420.0		100%		

Source: AT Capital Research

Assumptions:

- Base sponsor equity component of 30% of total project cost.
- Funding provision of 5% of total project cost from the IPFF. We have assumed the GoB would likely lend to local banks at a rate of around 4% and a prudent margin for local banks of 5%, in line with current market pricing. We have assumed tenure of 10 years.
- We would expect that the World Bank is prepared to fill any funding gap by providing the GoB a facility through the IDA, after it is satisfied that all other funding sources have been exhausted. We have assumed that 5% of the project cost could be funded through this. The IDA mechanism is to provide the GOB with an interest free loan (for up to 40 years) after which the GoB would disburse through local banks. We have assumed GoB would likely lend to local banks at a rate of around 4% and a prudent margin for local banks of 5%, in line with current market pricing. We have assumed tenure of 15 years.
- IFC will lend up to a maximum of 25% of the total project cost, per their maximum lending rules. We have discussed with them and they are positively inclined to lend to the project. The IFC have indicated they will lend in line with commercial rates. We have included an IFC component of 20% of total project cost.
- Following discussions with IDCOL, they have indicated that they have funds available to provide up to a $100+ million loan – we have however factored 20% of total project cost, to be prudent. IDCOL have indicated that they will lend in line with commercial rates.
- Following discussion with key commercial lenders based in Bangladesh, all have indicated that they would lend to the project. It is likely they will provide offshore financing rather than local financing. We believe a reasonable assumption is that they will provide facilities of around 20% of project cost. They have indicated that the interest rate for loans would not likely exceed Libor + 4%. This, however, is not a commitment. They will require a GoB guarantee backed by a Multilateral Partial Risk Guarantee. We have assumed tenure of 15 years.

Summing up - Financing

- There are limitations in domestic sources of finance not only in terms of quantum, but also cost of finance and tenor
- Larger IPPs will require International Finance and support from Multilaterals
- The PPA would have to provide for tariff adjustment for domestic currency depreciation, inflation, and fuel price increase
- Sponsors and foreign financiers will need a government guarantee of the PPA, backed with a Partial Risk Guarantee from Multilaterals
- This increases the contingent liabilities of the government and makes the project 'risk-free' for the private sector
- But, this may be necessary in the current environment.

5. NEXT STEPS

More financing support from GoB and Multilaterals

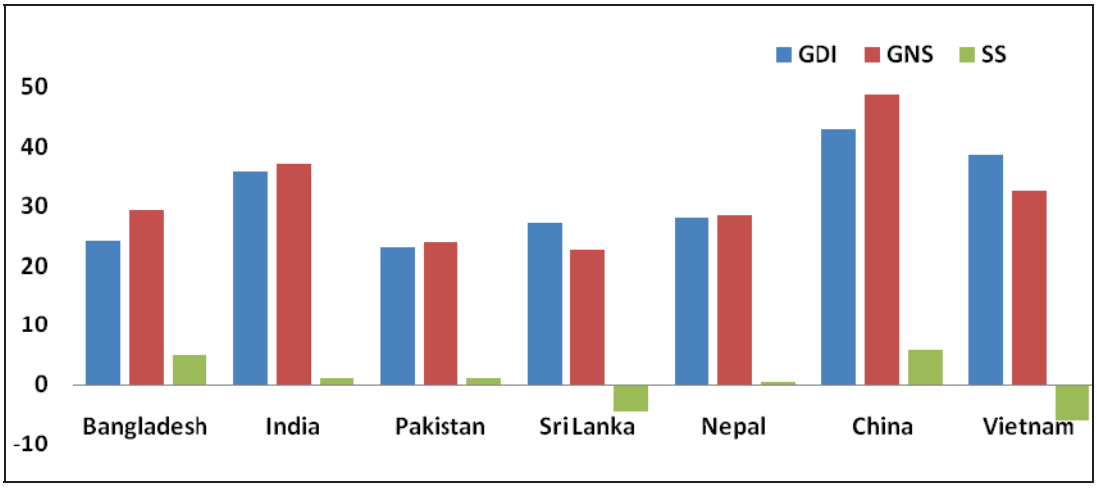
Given the significant funding needs for the GoB power plan, funding gap, and the need to catalyze international commercial bank lending, more multilateral and ECA funding is required. Partial Risk Guarantee from IDA/ World Bank for covering risk of the private sector supplying power to less credit-worthy public sector off-takers (BPDB) will be required. Increased funding through budgetary support/ IDCOL and IPFF financing would also be required to make up for shortfall in commercial financing.

A Strategy to Increase Domestic Infrastructure Financing Capacity

Over medium to long term, channel excess savings into infrastructure investment

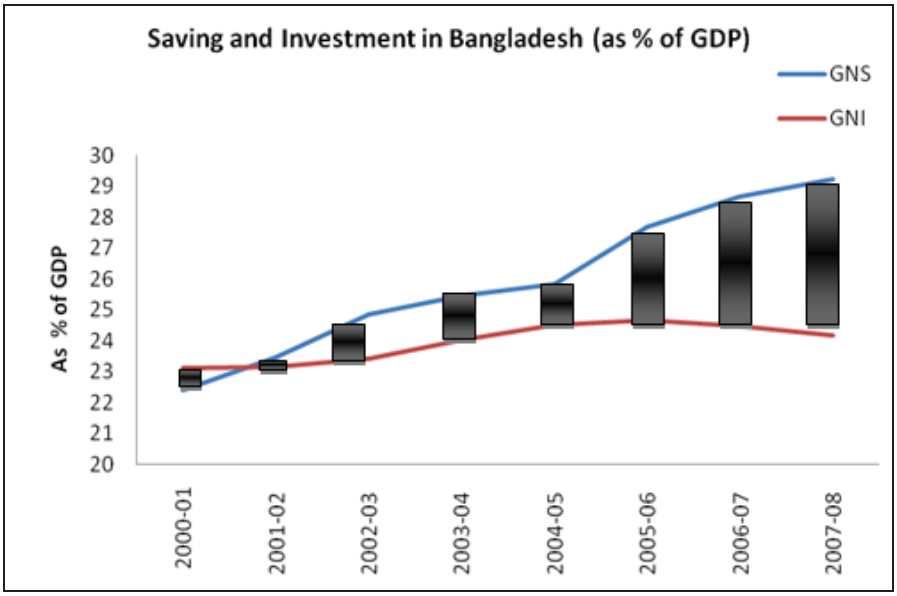
One of the key lessons from the impact of the Global Financial Crisis on developing economies is the need to have a balance between international and local financing for energy projects. As we have highlighted in the section on project financing for IPPs, while the maximum estimate for the Bangladesh banking sector's debt capacity is $350 million for a single sponsor, in practice, the actual amount available to single sponsors would be smaller. In the context of the overall energy financing needs of $11.5 billion, it remains extremely small. However, Bangladesh enjoys an annual savings surplus (Gross National Saving - Gross National Investment) of around 5% of GDP or $4.5 billion. A key challenge in addressing Bangladesh's energy crisis is how to channel this domestic private sector capital into infrastructure financing.

Figure 16: Regional Investment and Savings Scenario ($ bn)



Source: Asian Development Bank

Figure 17: Savings and Investment in Bangladesh



Source: Ministry of Finance, GOB

A growing number of developing countries have developed their securities markets and long-term savings institutions, allowing them to tap domestic markets for infrastructure finance. India, Malaysia, and a number of other countries in Asia have made some noteworthy progress in this area, and we believe some lessons are relevant to Bangladesh.

If Bangladesh is to finance the tremendous infrastructure needs required to maintain GDP growth, it will also have to develop the institutions necessary to channel domestic savings into infrastructure investment. This would also require appropriate regulatory, institutional and policy reforms in the capital markets. However, there are significant challenges as a World Bank (2006) report[6] noted:

"(The) limited recourse characteristic, and the scale and complexity of an infrastructure project makes financing a tough challenge, which is further compounded by *two factors. First, a combination of high capital costs and low operating costs implies that initial financing costs are a very large proportion of the total costs. Second, infrastructure project financing calls for a complex and varied mix of financial and contractual arrangements amongst multiple parties including the project sponsors, commercial banks, domestic and international financial institutions (FIs), and government agencies."*

[6] World Bank. 2006. *Financing Infrastructure: Addressing Constraints and Challenges (INDIA)*

While a detailed analysis of a strategy for infrastructure financing is beyond the scope of this section, we believe that the following reforms (in addition to what has been mentioned in sections 3 and 4) could be part of the solution:

- **Insurance and pension reforms to direct long-term savings to infrastructure investments:** Given that insurance and pension funds are long term funds, they can be deployed for infrastructure assets, which are also long term. In order to encourage participation of these financial institutions in infrastructure financing, reforms are needed in their investment policies and regulatory guidelines.

- **Corporate Bond Market:** Underdeveloped debt markets are yet another key constraint to infrastructure financing, given that most infrastructure projects begin to generate profits in 10-15 years and require longer term debt. The virtual non-existence of Bangladesh's corporate bond market is due partly to the lack of depth in the government bond market and the absence of a yield curve for government bonds which could serve as a benchmark for corporate bonds. Beyond that, corporate debt markets are constrained by a lack of liquidity and well functioning secondary trading; almost no market makers; inadequate credit information; poor and lengthy enforcement laws relating to default proceedings; and the absence of long term investors.

- **Securitization:** An expansion of securitization of infrastructure revenue stream could free up additional financing for further investment in the power sector. Given the handful of securitizations to date and limited experience of banks in this area, a careful assessment needs to be made as to how best to expand this market.

- **Diaspora Infrastructure Bond:** An instrument to channel Non-Resident Bangladeshi (NRB) capital to help solve the infrastructure crisis needs to be developed. This would need focused marketing and appropriate incentives/commissions to financial institutions in key NRB markets in the US, UK, Europe, and the Middle East.

- **Infrastructure Development Funds (IDFs):** These can play an important role by investing in securities (debt and equity) issued by a pool of infrastructure projects. Governments in both developed and emerging market economies have supported the development of infrastructure financing through such funds. Such funds can issue bonds to private investors, guaranteed by the government, to raise core capital. The government can also contribute directly through seed money.

- **Put Options/Exit Strategies:** Financial investors have a well defined investment horizon and usually divest in a pre-determined time frame. They usually prefer to determine the terms of the exit on an upfront basis. The best route for financial investors to exit from an infrastructure project is to sell their stake to the sponsors, through a 'put option', which involves an upfront agreement between the financial investor and sponsor, including agreement on the minimum price at which the financial investor could sell the equity stake to the sponsor at a future date. However, in Bangladesh, it is not clear that the regulations allow

such agreements to be reached upfront between financial investors and sponsors of an unlisted company.

- **Fiscal Incentives:** More tax incentives can be provided to encourage investors to channel funds towards infrastructure.

6. CONCLUSION

The overall impact of the Global Financial Crisis has been subdued in Bangladesh because there has been no major private investment in the power sector since 2002. However, as Bangladesh plans to implement an ambitious generation addition plan, the continued retrenchment of global project finance means that the market to raise debt and equity remains extremely competitive. Lenders are lending with shorter tenors and higher cost of finance and have stricter criteria in terms of project structure and government and IFI guarantees.

While Bangladesh has surplus savings, channelizing them into infrastructure investment would be possible only over the medium- to long-term. High impact steps are needed in the short-term. In a survey of international power sponsors who would potentially be interested in Bangladesh conducted in December 2009, it was noted that the most significant issue raised by survey participants was one not directly related to the *Crisis*. It related to the credibility of the IPP process in Bangladesh. Many participants felt frustrated by the lack of success from recent activity in the sector. There was a general sense that without a stronger commitment to the process on the part of government it would be difficult to attract the caliber of sponsors and EPC contractors required to execute projects successfully. The answer, in the market's eyes, was not to overreach, but instead to focus efforts on successfully closing one or two projects to generate the positive momentum required to achieve the GoB's larger objectives. While conducting the transaction, there is a need for transparency in selecting the winning bidder. This is especially important for project financing – international commercial financiers will look for credible project sponsors and tender process.

The recent GoB Energy Roadshows held in London, Singapore and New York in December 2009 and January 2010 underline its commitment both to market energy opportunities in Bangladesh, reduce misinformation and also learn about, and in the future address and allay, concerns potential foreign players may have about participating in the energy sector. It is hoped that over the course of the next 6-9 months, one of the major power projects, either Bibiyana-2 or Meghnagat-2, will be awarded to a successful bidder. This would give great comfort to international energy players to seriously consider Bangladesh as an investment destination.

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Annexes

Annexure 1: Multilateral and Bilateral Sources of Finance and Credit Enhancements

International Development Association (IDA)

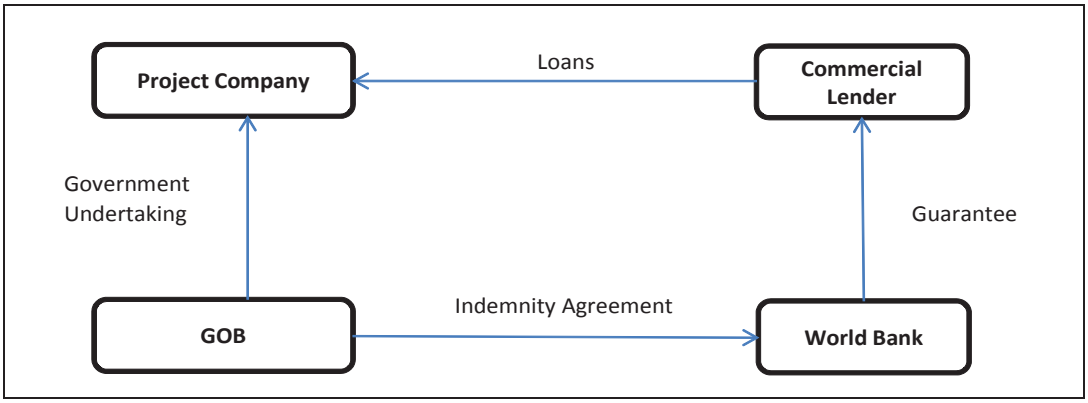
The IDA is the part of the World Bank that provides credit on concessional terms. IDA credits have no interest charge and repayments are stretched over 35 to 40 years, including a 10-year grace period. Credit is provided on a sovereign guarantee basis to the recipient government. The World Bank has indicated that the IDA will consider acting as a lender of last resort should there be financing shortfalls pre-closing. The funding is normally done through the GoB, with the GoB making equity or quasi-equity financing (e.g., preference shares).

IDA offers Partial Risk Guarantees (PRGs) that can support loan guarantees to private-sector projects in countries eligible for concessional lending from the IDA. It is a credit enhancement and may make the project bankable. PRGs can cover a range of risks relating to government performance including: Changes in law; Failure to meet contractual payment obligations; Obstruction of an arbitration process; Expropriation and nationalization; Foreign currency availability and convertibility; and Non-payment of a termination amount or an arbitration award following a covered default failure to issue licenses, approvals, and consents in a timely manner.

PRGs can provide guarantees in local currency to help the borrower issue local currency bonds or borrow long-term local currency loans from local financial institutions where local currency commercial creditors including foreign banks, are willing to take commercial project risks but are deterred by uncertainty in the political and/or regulatory environment.

The mechanism by which the PRG provides comfort to lenders along with a GoB guarantee is as follows:

Figure 1: Mechanism of Partial Risk Guarantee



Source: AT Capital Research

IDA's charges for its PRG include a Standby Fee of 0.20% per year, and a Guarantee Fee of 0.75% per year. IDA requires the signing of an Indemnity Agreement with the host member country.

A partial risk guarantee was provided by the IDA to support the $60+ million loan provided by commercial banks for the Haripur 360 MW Power Project. The involvement of the World Bank helps to mitigate political risk to the project given the significant leverage it has through future country lending. Government action under ongoing projects is evaluated by the Bank in determining whether to provide new loans or guarantees for future projects in a country.

Multilateral Investment Guarantee Agency (MIGA)

MIGA is part of the World Bank group and offers political risk insurance to international investors. Investors may choose any combination of the four types of coverage offered by MIGA. Equity investments can be covered up to 90 percent, and debt up to 95 percent. Coverage is for up to 15 years (possibly 20 if justified by the nature of the project). MIGA may insure up to $200 million, and if necessary more can be arranged through syndication of insurance. MIGA prices its guarantee premia based on a calculation of both country and project risk. Rates for the Small Investment Program (SIP) guarantee range between 0.45% and 1.75% per year.

MIGA provides the following types of risk mitigation:

- Transfer Restriction – protects investors against losses arising from the inability to convert local currency (capital, interest, principal, profits, royalties, etc.) into foreign exchange for transfer outside the country. Devaluation risk is not covered.
- Expropriation – protects investors against loss of investment as a result of acts by the host government that may reduce or eliminate ownership of, rights to, or control of the insured investment.
- Breach of Contract - protects investors against losses arising from the host government's breach or repudiation of a contract.
- War and Civil Disturbance - protects investors (and lenders) against losses arising from the damage to, or destruction or disappearance of, tangible assets caused by politically-motivated acts of war or civil disturbance in the host country; includes terrorism, revolution, and sabotage.

International Finance Corporation (IFC)

The IFC, the private-sector arm of the World Bank and a pioneer in project finance and IPP financing, provides loans/equity to private-sector firms on a project finance basis. Lending criteria is similar to commercial lenders, and the IFC requires majority private-sector ownership/operation of a project. IFC support is limited to 25% of total debt and equity of a project.

IFC parameters are the following:

- $1 million - $100 million+ range, loans/equity limited to 25% of the project cost

- Loans both direct ("A Loans"), and syndicated ("B Loans")
- Commercial interest rates, 12-15 year repayment terms
- Upfront flat fee 1%, commitment fee 1% on undisbursed balance

The IFC participated in the Haripur 360 MW project with a $40 million loan.

Asian Development Bank (ADB)

The ADB provides support to both public and private sectors in the form of loans, guarantees, equity, technical assistance, and co-financing with private-sector lenders. The co-financing is similar to IFC's "B" loan and commercial banks get "umbrella" protection from ADB's preferred creditor status. ADB has a Private Sector Group which supports build-own-operate, build-own-transfer, and other privately-sponsored projects.

ADB parameters include the following:

- Loans and equity to privately-sponsored projects up to 25% of project costs or $75 million; maximum of 10% equity share in a project
- 15 year loan terms with fixed or floating rates based on a market spread over the LIBOR; 1- 3 year grace
- Front-end fee of 1 to 1.5%; commitment fee of 0.5 to 0.75%
- Projects must have host-government support

The ADB played a key role in the 450 MW Meghnaghat Power Project providing a $50 million direct loan and importantly a partial risk guarantee supporting commercial bank loans for $20 million.

The ADB guarantee facility is available only for ADB-financed projects:

- Partial Credit Guarantee (PCG) provides comprehensive cover for a specified portion of the commercial debt provided by co-financiers; covers principal and/or interest for maturities that would be difficult to obtain from commercial lenders.
- PCGs are designed to cover not only hard currency debt, but also local currency debt, including domestic bond issues or long-term loans from local financial institutions.
- PCG cannot be issued on a stand-alone basis and is provided only for projects where ADB has direct participation. Guarantee fees of 0.40% with host government indemnity agreement; without indemnity, fees are market determined.
- ADB Political Risk Guarantees are designed to facilitate commercial co-financing by covering specifically defined sovereign or political risks:
    - Currency inconvertibility and/or non-transferability
    - Confiscation, expropriation, nationalization, or deprivation of project assets
    - Political violence

- Breach of contract
- Other forms of coverage approved by ADB's Board of Directors
- The Political Risk Guarantee cannot be issued on a stand-alone basis and is provided only for projects where ADB has direct participation.

ADB can issue a Political Risk Guarantee without a counter-guarantee from the host government for a maximum amount of $150 million or 50% of the project cost, whichever is lower.

Overseas Private Investment Corporation (OPIC)

OPIC is an independent US government agency whose mission is to mobilize and facilitate the participation of US private capital in projects and foreign direct investment. OPIC assists US companies by providing financing (from large structured finance to small business loans), political risk insurance, and investment funds.

OPIC parameters include the following:

- Direct loans/loan guarantees provide 5-15 years funding to ventures with US ownership (usually 25% minimum)
- Financing on project finance or corporate finance basis
- Must generate cash flows to repay the loan
- Interest rates based on US Treasury rates
- OPIC adds its guarantee fee, 2.5-5% per year, depending upon commercial and political risk.

OPIC provides political risk insurance coverage that is similar to that of MIGA:

- Currency inconvertibility – investors' inability to convert local currency earnings into US dollars; transfer funds out of the country
- Political violence – war, civil disturbance, etc.
- Expropriation – nationalization/confiscation, official interference

Export Credit Agencies (ECAs)

ECAs are agencies of national governments created to provide financing for foreign buyers to purchase *their* countries' goods and services. ECAs provide financing to foreign buyers in the form of direct loans, loan guarantees, and export credit insurance. Most industrialized countries and many emerging markets have ECAs. ECA financing is governed by the *OECD Consensus* for medium-and long-term credits and *Berne Union Guidelines* for short- and medium-term credit insurance.

ECA parameters include the following:

- Maximum repayment terms 10-12 years (12 years for power plants)
- Maximum financing amount is 85% of the export value

- Interest rates for guarantees/insurance based on spread over commercial banks cost of funds (i.e. LIBOR + ½% typical for larger projects); Commercial Indicative Reference Rate used for direct loans; Insurance premia charged for guarantees/insurance by the ECAs based on OECD arrangement.

Comprehensive coverage refers to a guarantee or an insurance policy from an ECA that covers default by a borrower due to instances related to either political or commercial risk. Lenders in Bangladesh appeared willing to lend with a mix of comprehensive and political-only cover and there was one lender willing to entertain lending on the basis of political-only cover. Lenders with less familiarity with the Bangladesh market, however, required comprehensive cover in order to lend to an IPP in Bangladesh. Prior to the credit crisis, it is likely that a larger number of lenders would have been willing to lend at least on the basis of a mix between comprehensive and political-only cover. However, it now appears that very few would be willing to lend without comprehensive cover.

The Islamic Development Bank (IDB)

The IDB utilizes various Shariah-compliant financing instruments to support development projects in its member countries. Through these instruments, the IDB finances a variety of projects in the agricultural, industrial, agro-industrial and infrastructural sectors. It provides loan financing, leasing of assets, instalment sale, equity participation, and profit sharing.

Annexure 2: Power Project Plan (2010-2015)

Table 1: Year-wise Power Project Plan (2010 – 2015)

Year	Capacity Addition
2010	792
2011	920
2012	2,269
2013	1,675
2014	1,170
2015	2,600
Total	**9,426**

Note: Capacity addition in MW

Source: GoB Power Division

Table 2: Projects in 2010

Power Plants	Capacity (MW)	Fuel	Expected Operation Date
Government Setor			
Shikalbaha 150MW picking power plant (Bangladesh Power Development Board)	150	Gas/Oil	May,2010
Siddhirgonj 2x120MW picking power plant (Electricity Generation Company of Bangladesh)	120	Gas	May,2010 (2nd unit)
Fenchuganj 90MW CCPP (Bangladesh Power Development Board)	90	Gas	July,2010
Private Sector			
Ashugonj (3- year rental)	62	Gas	April, 2010
Fenchugonj (3 -year rental)	50	Gas	June, 2010
Bogra (3 -year rental)	20	Gas	n/a
Veramara, New (Rental)	100	Diesel	June,2010
Thakurgao, New (Rental)	50	Diesel	June,2010
Noapara, Jassor, New (Rental)	100	HFO	November,2010
Barisal, New, (Rental)	50	HFO	December,2010
Total Under Construction	**792**		

Source: GoB Power Division

Table 3: Projects in 2011

Power Plants	Capacity (MW)	Fuel	Expected Operation Date
Government Setor (PDB)			
Faridpur picking power plant	50	HFO	July,2011
Dohazari, Chittagong picking power plant	100	HFO	July,2011
Baghabari picking power plant	50	HFO	July,2011
Hathajari, Chittagong picking power plant	100	HFO	July,2011
Daudkandi, Comilla picking power plant	50	HFO	July,2011
Katakhali, Rajshahi picking power plant	50	HFO	September, 2011
Bera, Pabna picking power plant	70	HFO	September, 2011
Gopalgonj picking power plant	100	HFO	September, 2011
Shantahar, Nogaon picking power plant	50	HFO	September, 2011
Sylet 150MW CCPP	150	Gas	December, 2011
Chandpur 150MW CCPP	150	Gas	December, 2011
Total	**920**		

Table 4: Projects in 2012

Power Plants	Capacity (MW)	Fuel	Expected Operation Date
Government Setor			
Ghorasal, Picking (Bangladesh Power Development Board)	200-300	Gas/Diesel	June , 2012
Khulna 150MW GT (North West Power Generation Company)	150	Gas/Oil	June , 2012
Sirajgonj 150MW GT (North West Power Generation Company)	150	Gas/Oil	June , 2012
Kaptai Solar (PDB)	5	Solar	June , 2012
Private Sector			
Katakhali , Rajshahi Picking Power Plant, IPP (Bangladesh Power Development Board)	50	HFO	April, 2012
Syedpur Picking Power Plant, IPP (Bangladesh Power Development Board)	100	HFO	April, 2012
Jamalpur Picking Power Plant, IPP (Bangladesh Power Development Board)	100	HFO	May, 2012
Chapainobabgonj IPP (Bangladesh Power Development Board)	100	HFO	May, 2012
Comilla Picking Power Plant, IPPP (Bangladesh Power Development Board)	50	Gas/HFO	May, 2012
Khulna Picking Power Plant, IPPP (Bangladesh Power Development Board)	100	HFO	May, 2012
Wind Power, IPP (Bangladesh Power Development Board)	100	Wind	June, 2012
Solar, IPP (Bangladesh Power Development Board)	9	Solar	January , 2012
Tangail 20MW IPP (Rural Electrification Board)	20	HFO	June, 2012
Chandpur 15MW IPP (Rural Electrification Board)	15	HFO	June, 2012
Bhola 150-225MW CCPP (2nd unit)SC (GT)	100	Gas	June, 2012
Keranigonj 150-225MW CCPP SC (GT)	100	Gas/HFO	July , 2012
Modongonj 150-225MW CCPP SC (GT)	100	Gas/HFO	July , 2012
Bibiana 300-450MW (Ist Unit) CCPP, SC (GT)	200	Gas	August, 2012
Bibiana 300-450MW (2nd Unit) CCPP, SC (GT)	200	Gas	October , 2012
Meghnaghat 300-450MW (2nd Unit) CCPP, SC (GT)	200	Gas/HFO	November , 2012
Mixed Sector			
Mymensingh Picking Power Plant (Bangladesh Power Development Board & Rural Power Company LTD.)	150	Gas/HFO	June, 2012
Gazipur (Rural Power Company LTD.)	50	Gas/HFO	June, 2012
Raujan, Chittagong (Rural Power Company LTD.)	20	Gas/HFO	June, 2012
Total	**2269**		

Source: GoB Power Division

Table 5: Projects in 2013

Power Plants	Capacity (MW)	Fuel	Expected Operation Date
Government Setor			
Siddhirgonj 2x150 GT (Electricity Generation Company of Bangladesh)	300	Gas	June , 2013
Bhola 150MW CCPP (Bangladesh Power Development Board)	150	Gas	June , 2013
Boropukuria 125MW (3 Unit) (Bangladesh Power Development Board)	125	Coal	June , 2013
Ashugonj 150MW CCPP (Ashuganj Power Station Company LTD.)	150	Gas	June , 2013
Private Sector			
Savar Picking Power Plant	100	Gas/HFO	January , 2013
Kaliakaer Picking Power Plant	100	Gas/HFO	January , 2013
Bibiana 300-450MW CCPP (ST)	100	Gas	August , 2013
Sirajgonj 350-450MW CCPP	300	Gas	June, 2013
Bhola 150-225MW CCPP (ST)	50	Gas	June, 2013
Keranigonj 150-225MW CCPP (ST)	50	Gas/HFO	July , 2013
Modongonj 150-225MW CCPP (ST)	50	Gas/HFO	July , 2013
Bibiana 300-450MW (2nd Unit) (ST)	100	Gas	October, 2013
Meghnaghat 300-450MW (2nd Unit) (ST)	100	Gas/HFO	October, 2013
Total	**1675**		

Source: GoB Power Division

Table 6: Projects in 2014

Power Plants	Capacity (MW)	Fuel	Expected Operation Date
Government Setor			
Haripur 360MW CCPP (Electricity Generation Company of Bangladesh)	360	Gas	June , 2014
Veramara 360MW CCPP (North West Power Generation Company)	360	Gas	June , 2014
Siddhirgonj 450MW CCPP (Electricity Generation Company of Bangladesh)	450	Gas	June , 2014
Total	**1170**		

Source: GoB Power Division

Table 7: Projects in 2015

Power Plants	Capacity (MW)	Fuel	Expected Operation Date
PPP/IPP			
Chittagong, PPP (Joint venture) /IPP	1300	Coal	March , 2015
Khulna South, PPP (Joint venture)/ IPP	1300	Coal	March , 2015
Total	**2600**		

Source: GoB Power Division

This activity has been carried under the World Bank's Infrastructure Recovery and Assets (INFRA) Platform. The INFRA Platform has been developed to bridge infrastructure financing, project preparation and capacity gaps resulting from the global financial crisis. The Platform comprises a rapid diagnostic tool to identify at-risk infrastructure projects and to develop a medium-term strategy for their financing. Under INFRA, ESMAP is carrying out diagnostic assessments for the power sector covering 20 developing countries. This report is part of this project.