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# The Causes and Impacts of Power Sector Circular Debt in Pakistan

## March 2013

COMMISSIONED BY PLANNING COMMISSION  
OF PAKISTAN

FUNDED BY THE UNITED STATES AGENCY FOR  
INTERNATIONAL DEVELOPMENT (USAID)

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### **DISCLAIMER**

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# FOREWORD

Power sector inefficiencies have cost this country significantly in direct budget costs in the last five years. In addition, growth has been slowed down by at least 2% per annum i.e., 10% lost growth in the last five years. Yet the problem is far from behind us.

The restructuring and reform of the power sector has been held up for over two decades leading the costs to accelerate in recent years. The important question that arises is “Why are we incapable of addressing such a big problem.” The problem requires careful study and research which can only happen if time and resources are devoted to the problem. With enough independent expertise and research for developing a body of knowledge on the required reform, a process of reform must be developed in Pakistan. There have been major shortcomings at all levels of the reform spectrum which are split into three main areas:

- At the policy level there is complete disarray between all entities involved. The Ministry of Water & Power, which is the main policy maker of the sector has no roadmap set out for itself and is more reactive than proactive to power sector reforms which of course is coupled by a lack of political will to help improve the system.
- At the regulatory level there is an authoritarian attitude towards all entities involved. The regulator has failed to address or acknowledge problems of the power sector and is working in isolation.
- At the entities level there is a complete breakdown of governance. Though they are being micromanaged by both the policy makers and the regulator, the entities themselves have no aspirations of moving ahead reforms and are happy to maintain *status quo*.

For the reform process to move forward there needs to be a concerted effort from all involved. Roles should be clearly identified and roadmap is set so that there is no ambiguity on the ultimate objective. The roadmap must be designed in conjunction with the Framework for Economic Growth (FEG) so that there is cohesion with all economic

goals. There has to be an element of sustainability and accountability in the whole process. The FEG was based on extensive research and consultation and approved by the National Economic Commission in 2011, has emphasized that if we want to achieve high growth the emphasis in the coming period must be on the “software” (economic reform, management and productivity improvements) rather than the “hardware” (brick and mortar investments) of growth. The FEG argues for mainstreaming reform especially that of public sector management, regulatory improvements, and more competitive markets for innovation and entrepreneurship.

This report, which USAID has prepared in collaboration with the Planning Commission of Pakistan, is an attempt to identify the root causes of the current circular debt and what steps need to be taken to not only reduce the debt but also continue with the reform process moving ahead. In my view it is an urgent requirement and should be widely discussed to see how this process can be made an urgent priority. It informs the readers of the underlying causes and the way forward.

- Lack of creating a decentralized system of governance is at the heart of the problem. Efficient power sector reform cannot be pursued with this centralized system that is run by a ministry.
- Decentralized and independent entities must be run on corporate lines with corporate management without government or ministerial interference.
- Technology is part of the solution as it allows for improved monitoring, measurement and payments.
- The decentralized system needs an able, competent, independent and empowered regulator who is responsible and accountable for the efficiency of the system and not just tariffs.
- The tariff system must be reviewed continuously to ensure that due costs be passed on to consumers, elimination of cross subsidies, timely fuel price adjustments and artificial loss provisions.
- The question of uniform tariffs should be done away with through careful planning and research.
- Subsidy if any should be targeted to the poor only and not as currently available to all.

- With these improvements the system can be made solvent over a period of time. Then investments will start flowing in not only for increase of capacity but also for more efficiency including a better fuel mix.

We have tried to identify the problem and find steps to its resolution. I complement our teams at USAID and the Planning Commission on a worthy study that does indeed delineate a road map to tackle the circular debt issue.

But this is only one beginning. Unless this report is taken seriously and a reform process built, we will continue to see this problem stretched out.

Dr. Nadeem Ul Haque  
Deputy Chairman  
Planning Commission  
Government of Pakistan

# FOREWORD

I am pleased to present the *Circular Debt Report*, which the Planning Commission of Pakistan has commissioned and the United States Agency for International Development (USAID) has funded. The report is based on an independent analysis. The challenges analyzed in this report are not insurmountable. I am hopeful that the Government of Pakistan and other stakeholders will find the report informative and that even more important, they will use it to address the critical issues that have led to deterioration of the power sector. The circular debt issue did not arise over night, it has existed for a long time and our findings take into consideration the stock of circular debt accumulated since 2006. Although there are several factors contributing to this crippling circular debt, improvements in energy sector governance, enabled by strong political support, could resolve the problem and make the sector self-sustainable.

Addressing the accumulation of circular debt will increase the financial resources needed for the proper functioning of the energy sector. We firmly believe that, with improved and expanded power delivery, increased economic growth and improved socio-political stability will follow.

Allow me to congratulate and thank the various experts and officials from the Government of Pakistan who contributed to the data collection and analysis for this comprehensive report. We at USAID remain committed to supporting the government and people of Pakistan in resolving the critical issues in the energy sector.

Jonathan Conly  
Mission Director  
USAID / PAKISTAN, ISLAMABAD

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# ACRONYMS

AJK	Azad Jammu & Kashmir
AMR	Automated Meter Reading
APR	Annual Performance Review
BOD	Board of Directors
CCI	Council of Common Interest
CEO	Chief Executive Officer
CNG	Compressed Natural Gas
CPPA	Central Power Purchasing Agency
DISCO	Distribution Company
ENERCON	National Energy Conservation Centre
FATA	Federally Administered Tribal Areas
FESCO	Faisalabad Electric Supply Company
FO	Fuel Oil/Furnace Oil
FPA	Fuel Price Adjustment
FY	Fiscal Year
GDP	Gross Domestic Product
GENCO	Public Sector Thermal Generating Company
GEPCO	Gujranwala Electric Power Company
GOP	Government of Pakistan
GST	General Sales Tax
GWh	Gigawatt Hour
HESCO	Hyderabad Electric Supply Company
IESCO	Islamabad Electric Supply Company
IPP	Independent Power Producer
KESC	Karachi Electric Supply Company
KPK	Province of Khyber Pakhtunkhwa
LESCO	Lahore Electric Supply Company
LPS	Late Payment Surcharges
LT	Low Tension
MEPCO	Multan Electric Power Company
MOF	Ministry of Finance

MWP	Ministry of Water and Power
NA	Not Available
NAB	National Accountability Bureau
NEPRA	National Electric Power Regulatory Authority
NTDC	National Transmission and Dispatch Company
PAC	Public Accounts Committee
PAEC	Pakistan Atomic Energy Commission
PDP	USAID Power Distribution Program
PEPCO	Pakistan Electric Power Company
PESCO	Peshawar Electric Supply Company
PPA	Power Purchase Agreement
QESCO	Quetta Electric Supply Company
Rs	Pakistani Rupee
SEPCO	Sukkur Electric Power Company
T&D	Transmission and Distribution
TDS	Tariff Differential Subsidy
TESCO	Tribal Areas Electric Supply Company
TOU	Time of Use
WAPDA	Water and Power Development Authority

# EXECUTIVE SUMMARY

This report addresses the circular debt issue in relation to the Pakistan power sector. Circular debt is the amount of cash shortfall within the Central Power Purchasing Agency (CPPA) that it cannot pay to power supply companies. This shortfall is the result of (a) the difference between the actual cost of providing electricity in relation to revenues realized by the power distribution companies (DISCOs) from sales to customers plus subsidies<sup>1</sup>; and (b) insufficient payments by the DISCOs to CPPA out of realized revenue as they give priority to their own cash flow needs. This revenue shortfall cascades through the entire energy supply chain, from electricity generators to fuel suppliers, refiners, and producers; resulting in a shortage of fuel supply to the public sector thermal generating companies (GENCOs), a reduction in power generated by Independent Power Producers (IPPs), and an increase in load shedding.

Circular debt at the end of Fiscal Year (FY) 2011 was estimated to be Rs537 billion. At the end of FY 2012 it was estimated to be Rs872 billion<sup>2</sup> representing approximately 4% of the national nominal Gross Domestic Product (GDP). Circular debt, if continued unabated, will increasingly constrain the availability of electricity and slow down economic growth.

The primary causes of circular debt include:

- Poor governance
- Delays in tariff determination by an inadequately empowered regulator compounded by interference and delay in notification by the Government of Pakistan (GOP)
- A fuel price methodology that delays infusion of cash to the power sector
- Poor revenue collection by the DISCOs
- Delayed and incomplete payment by the Ministry of Finance (MOF) on Tariff Differential Subsidy (TDS) and Karachi Electric Supply Company (KESCO) contract payments
- Prolonged stays on fuel price adjustments (FPAs) granted by the courts
- Transmission and distribution (T&D) losses and theft.

The federal government retains the authority for approving customer tariffs, but is influenced by a legacy system that supported a single postage stamp rate for all consumers in each category across all DISCOs. The GOP is not implementing the differential tariffs determined by the regulator for each DISCO, which often overshadows commercial decision-making. This results in conditions that contribute to circular debt, including a reluctance to pass on

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<sup>1</sup>This implies that Receivables = Payables to CPPA = circular debt in energy sector. This is somewhat an oversimplification as a small portion of receivables may be net payables to non-energy suppliers. This refinement is not done here to avoid confusion in addressing the circular debt issue.

<sup>2</sup> Data collected by EPP from PEPCO & DISCO Performance Statistics Reports and Chief Engineer's Office and by PDP from NEPRA and MWP. Figure does not include amounts for circular debt that could not be verified at the time this report was prepared.

the full cost of electricity to customers; uniform tariffs do not take into consideration the actual cost of service. Establishment of a TDS that is often not paid on time or in full and is allocated primarily on the basis of “just-in-time” response to the power sector, overstaffing and compromised decision making at the DISCOs, and the subsidies provided to tubewell customers often result in lengthy disputes over payment between the DISCOs and provincial governments.

The federal government also has been lax in passing appropriate legislation to curb electricity thefts, promote energy conservation, increase commercial transparency, strengthen regulatory entities, and promote an open and competitive energy market. The government also appoints the Board of Directors (BOD) of the DISCOs; political and bureaucratic influences continue to limit the BOD's independence and technical and management competency. At the corporate level, the Boards' authority and efficacy in monitoring and enforcing the performance of DISCO management is limited or nonexistent.

The National Electric Power Regulatory Authority's (NEPRA) role also needs to be revisited and its operations improved. The annual determination of tariffs for the DISCOs and subsequent adjustments for fuel cost are lengthy and ineffective, resulting in revenue shortfalls and cash flow problems and obscuring the true cost of electricity to consumers. NEPRA also needs to improve its enforcement powers over the DISCOs with regard to cases of consumer overbilling and requires additional authority to move ahead with implementation.

There also are several secondary causes to circular debt, including:

- The need to improve the thermal efficiency of the GENCOs and for NEPRA to set tariffs based on actual vs. estimated heat rates
- Inadequate budgeting of the TDS, which delays payment and increases financing costs
- Unfavorable generation mix of the GENCOs, due largely to the GOP's fuel allocation policy that diverts natural gas to other non-economic uses
- Non-commercial/non-professional approach to load shedding; non-improvement in tariff terms and conditions; impact of court decisions that have delayed payments to the DISCOs
- Late payment surcharges (LPS) paid by CPPA to the IPPs resulting from the inability of the DISCOs to fully pay CPPA; the GOP's neglect in promoting demand-side management, energy efficiency and renewable energy resources
- The need to settle payment arrears (both disputed and undisputed) in a comprehensive manner; and the need for expanded authority of CPPA to collect payments from the DISCOs through formal and enforceable power purchase agreements (PPAs).

A summary of the components of circular debt is given in Table 1.<sup>3</sup>

**Table 1: Circular Debt Growth from 2006 to 2012 – Billions Rs.**

Growth in Circular Debt (Impact of Primary Causes)								
Primary Causes		2006	2007	2008	2009	2010	2011	2012
Stock of Debt - Beginning of the Year	<b>1</b>	84.07	111.26	144.99	161.21	235.65	365.66	537.53
<b>NON-COLLECTION</b>								
<b>DISCOs Receivables From:</b>								
Federal Government		0.22	0.35	0.08	0.15	1.79	1.57	0.19
FATA		10.87	6.36	9.43	10.24	(78.34)	4.30	13.42
Provincial Governments		2.25	0.75	5.09	7.17	16.72	36.07	15.84
AJK Government		0.54	0.27	0.46	1.18	2.00	5.50	6.05
Agri-Tubewells		0.42	1.28	1.07	3.01	3.46	(3.68)	(3.12)
Private Consumers		9.08	7.96	9.64	19.88	25.59	39.29	54.55
<b>Sub-Total</b>		<b>23.38</b>	<b>16.97</b>	<b>25.77</b>	<b>41.63</b>	<b>(28.78)</b>	<b>83.05</b>	<b>86.92</b>
CPPA Receivables from KESC		3.81	16.76	26.74	(11.87)	4.04	(1.79)	13.78
<b>Total Non-Collections<sup>1</sup></b>	<b>2</b>	<b>27.19</b>	<b>33.73</b>	<b>52.51</b>	<b>29.76</b>	<b>(24.74)</b>	<b>81.26</b>	<b>100.69</b>
<b>TARIFF &amp; SUBSIDY ISSUES</b>								
Tariff Determination & Notification Delay <sup>2</sup>		N/A	N/A	N/A	N/A	N/A	N/A	72.19
Fuel Price Adjustments <sup>3</sup>		N/A	N/A	N/A	N/A	N/A	20.10	33.19
Difference Between DISCOs TDS claims Vs. Actual Disbursed <sup>4</sup>		N/A	N/A	(36.29)	39.66	134.84	48.68	106.02
Difference between DISCOs NEPRA Allowed Vs. Actual T&D Losses <sup>5</sup>		N/A	N/A	N/A	5.02	19.91	21.84	22.78
<b>Sub-Total Tariff &amp; Subsidy Issues</b>	<b>3</b>	<b>N/A</b>	<b>N/A</b>	<b>(36.29)</b>	<b>44.68</b>	<b>154.75</b>	<b>90.62</b>	<b>234.18</b>
<b>Total Circular Debt (As of Year End)</b>	<b>4 = 1+2+3</b>	<b>111.26</b>	<b>144.99</b>	<b>161.21</b>	<b>235.65</b>	<b>365.66</b>	<b>537.53</b>	<b>872.41</b>

Source<sup>1</sup>: PEPCO DISCOs Performance Statistics Reports FY 2005-2012

Source<sup>2</sup>: USAID PDP Analysis based on data from NEPRA's DISCO tariff determination 2012 (Data only available for the year shown)

Source<sup>3</sup>: Data from MoWP - Tariff Cell (Data only available for the 2 years shown)

Source<sup>4</sup>: Chief Engineer's Office - MWP

Source<sup>5</sup>: USAID PDP Analysis

## RECOMMENDATIONS

The primary tasks before the GOP are to remove the current overhang of circular debt on the power sector, and to prevent its recurrence. The current level of debt prevents sector entities from obtaining funding to support improvement in management and system operations and from attracting investment needed to support sector expansion and improved services. Sector reform is needed to prevent its recurrence. To resolve these problems, the GOP needs to achieve two tasks:

(1) Remove the circular debt from the books of energy sector entities (DISCOs, CPPA) and take responsibility for the mismanagement of the power sector reform process. Move the circular debt amount to the government's debt, reallocate in consumers tariff or place a tax on the consumer to recovery over time.

<sup>3</sup> The figures in the table do not include amounts for circular debt that could not be verified at the time this report was prepared.

(2) Undertake specific policies and programs to improve the governance and performance of energy sector entities to decrease costs, increase cash flow, and ensure operational/financial integrity of the sector.

Recommendations to achieve this goal include:

## **ROLE OF GOVERNMENT**

- The GOP needs to redefine its role in the power sector to one as a policy builder on a national energy level and work through the BODs and allow international best practices for improved corporate governance for each of its owned entities, with a goal to allow corporatization for proven financially sound entities.
- The GOP needs to support a more competitive market structure and assist NEPRA to be independent and strengthen the professional and technical requirements for members and staff; and develop a comprehensive capacity building and training effort initiated.
- Tariff and subsidy disputes between the provincial governments and CPPA and the DISCOs, need to be resolved, either by negotiation or arbitration.
- Legislation declaring electricity theft a punishable crime with penalties ranging from fines to imprisonment needs to be implemented with specialized courts established for the purpose.
- The selection criteria and methodology for appointment of DISCOs' BODs needs to be improved. Members of the BODs need to have high professional and technical capabilities; be independent of political influence; have full authority for decision-making at the DISCO; and receive training to effectively monitor performance and enforce accountability of DISCO management and staff. Changes to Articles of Association of the DISCO to improve director's term of office and maintain institutional knowledge with proper rotation and replacement.
- Eliminate the uniform tariff and gradually move toward the regulator's differential tariffs based on true costs. The regulator to enhance tariffs with targeted performance-based tariff to all DISCOs and remove to current cross subsidy between the efficient and inefficient DISCOs.
- Improve the fuel allocation policy in the short-term to allocate fuel to the highest value uses (e.g., assign a high priority to power sector in the allocation of natural gas), and in the long term eliminate fuel allocation so that fuel use is based on competitive market forces.
- Formulate policies and plans to promote hydro power and other domestic sources of energy that will assist in balancing the electricity supply portfolio.
- Implement a strong program of energy conservation and demand-side management.

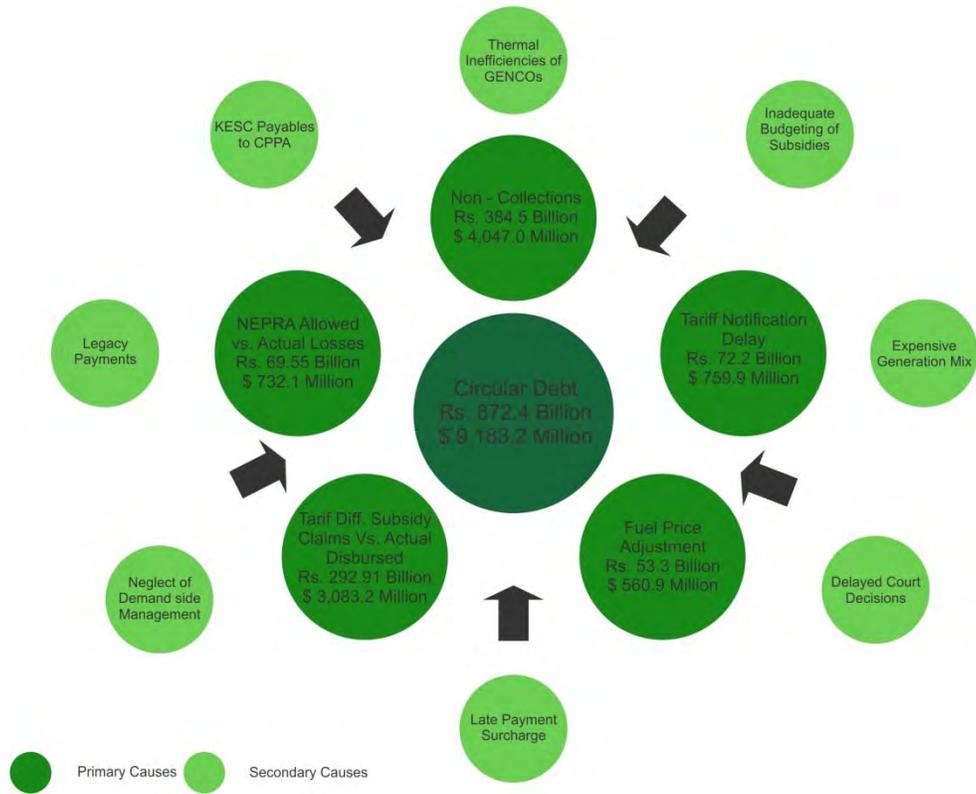
## REGULATORY LEVEL

- The system of annual tariff determination for all companies (DISCOs, National Transmission and Dispatch Company (NTDC), and GENCOs)), needs to be reformed. NEPRA should institute a system of multi-year tariffs, which will allow time to focus on other regulatory functions.
- There is a considerable time delay in determination and implementation of the fuel adjustment charge. NEPRA should adopt a system of prospective fuel prices in tariff determination and make corrective adjustments on a timelier basis.
- Aggressively monitor the performance of power companies to enforce compliance with their license conditions.
- Tariff structure and the conditions of supply (terms and conditions of tariff) need to be revised in light of the present market practices.

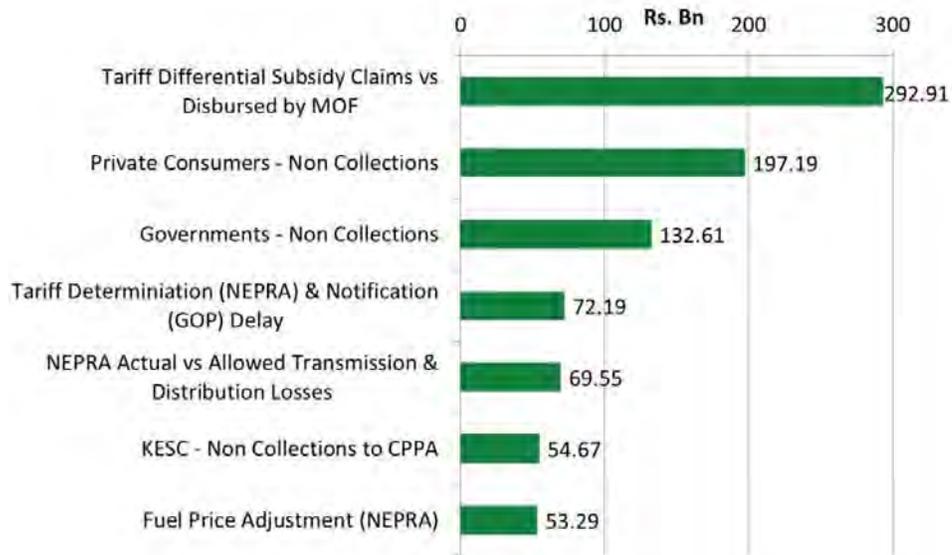
## CORPORATE LEVEL

- The DISCOs do not operate on a commercial basis and are unduly subject to political influence. The DISCOs should be corporatized and the process managed by a reputable international consulting firm.
- Institute a system of fuel testing and prevention of fuel theft for each GENCO.
- Implement a comprehensive energy loss reduction program at each DISCO focusing on reducing technical losses to permissible technical operating limits depending on available investment, and reducing non-technical losses, initially to NEPRA's given targets.
- Design and implement programs focused on energy efficiency and demand-side management.
- Enforce electricity supply contracts, disconnecting defaulting customers without discrimination.
- Implement a comprehensive revenue collection and theft prevention program at each DISCO, with elements including, but not limited to: replacing electromechanical meters with modern metering technology and digital automated meter reading systems (AMR) systems; and reform business processes to improve management control and customer service.
- Introduction of empowerment and accountability, reward and reprimand at all levels.
- Time of Use (TOU) tariff be aggressively pursued with clear marked difference between the peak and off-peak rates based on the nature of use. Peak and off-peaks be defined on the basis of optimal usage in addition to the system peak hours.

**Figure 1: Stock of Circular Debt as of June 2012**



**Figure 2: Causes of Circular Debt**



# 1. INTRODUCTION

## 1.1. CIRCULAR DEBT AND CONTEXT OF THE PROBLEM

This report addresses the circular debt issue in relation to the Pakistan power sector. The term “circular debt” is used somewhat differently by various entities in Pakistan.<sup>4</sup> In essence, the term “circular debt” is understood to be the amount of cash shortfall within the CPPA, which it cannot pay to power supply companies. This short fall is the result of (a) the difference between the actual cost of providing electricity and the revenue realized by the DISCOs from sales to customers, plus subsidies;<sup>5</sup> and (b) insufficient payments by DISCOs to CPPA out of the revenue realized since they give priority to their own cash flow needs. According to estimates, the circular debt at the end of FY 2012 was Rs872.41<sup>6</sup> billion, representing approximately 4% of the national nominal GDP.

The DISCOs’ inability to make full payments to the CPPA results in cash flow problems, which cascade through the energy supply chain. The result is a shortage of fuel supply to generating companies, a diminished power generation capacity and limited investment to maintain the entire system. Reduced capacity to generate and supply power coupled with previously existing supply/demand gaps and frequent breakdowns in the infrastructure have resulted in extensive load shedding across the country.

During the summer months of FY 2012, urban areas were subjected to – on average – eight hours of load shedding per day while some rural areas exceeded 16 hours per day. The prolonged power cuts and load shedding resulted in country-wide civil disturbances.

Load shedding has adversely affected the economy and disrupted social life in the country. It is estimated that in 2008, load shedding in the industrial sector cost the country over Rs210 billion, over \$1 billion from export earnings and a potential displacement of 400,000 workers.<sup>7</sup>The adverse impact of load shedding is much higher if the impact on the agriculture and services sectors is included.

## 1.2. CAUSES OF CIRCULAR DEBT

Deficiencies of governance at the government, corporate, and sector level are at the heart of the circular debt issue. At the government level, these can be attributed to political interference, short- sighted and defective policies (or lack thereof), under-budgeting of TDS, and non-settlement of intra- and inter-government issues. The government has also failed to pass legislation to curb theft and promote energy conservation as well as protect diligent functionaries. At the corporate level, poor governance and the ineffectiveness of the DISCO BODs in guiding and monitoring company performance is a major problem. In addition, continuation of legacy management with almost no professional approach and having no

<sup>4</sup>State Bank of Pakistan Annual report 2010-2011, Pakistan Economic Survey 2011-12, NEPRA,State of Industry Report – 2011.

<sup>5</sup>This implies that Receivables = Payables to CPPA = circular debt in energy sector. This is somewhat of an oversimplification as a small portion of receivables may be net payables to non-energy suppliers. This refinement is not done here to avoid confusion in addressing the circular debt issue.

<sup>6</sup> Data collected by EPP from PEPCO & DISCO Performance Statistics Reports and Chief Engineer’s Office and by PDP from NEPRA and MWEP. Figure does not include amounts for circular debt that could not be verified at the time this report was prepared.

<sup>7</sup> “State of the Economy: Emerging from the Crisis,” Panel of Economists, Beacon House National University, Lahore. 2009.

benchmark performance indices established adds to the problem. At the sector level, NEPRA performance under the NEPRA Act of 1997 leaves much to be desired.

These issues are further discussed in the succeeding chapter. Table 2, Figure 3 and Figure 4 give an overview of the circular debt and the primary contributing factors.

**Table 2: Growth in Circular Debt - Impact from Primary Causes<sup>8</sup>**

Growth in Circular Debt (Impact of Primary Causes)								
Primary Causes		2006	2007	2008	2009	2010	2011	2012
<b>Stock of Debt - Beginning of the Year</b>	<b>1</b>	84.07	111.26	144.99	161.21	235.65	365.66	537.53
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<b>Sub-Total Tariff &amp; Subsidy Issues</b>	<b>3</b>	<b>N/A</b>	<b>N/A</b>	<b>(36.29)</b>	<b>44.68</b>	<b>154.75</b>	<b>90.62</b>	<b>234.18</b>
<b>Total Circular Debt (As of Year End)</b>	<b>4 = 1+2+3</b>	<b>111.26</b>	<b>144.99</b>	<b>161.21</b>	<b>235.65</b>	<b>365.66</b>	<b>537.53</b>	<b>872.41</b>

Source<sup>1</sup>: PEPCO DISCOs Performance Statistics Reports FY 2005-2012

Source<sup>2</sup>: USAID PDP Analysis based on data from NEPRA's DISCO tariff determination 2012 (Data only available for the year shown)

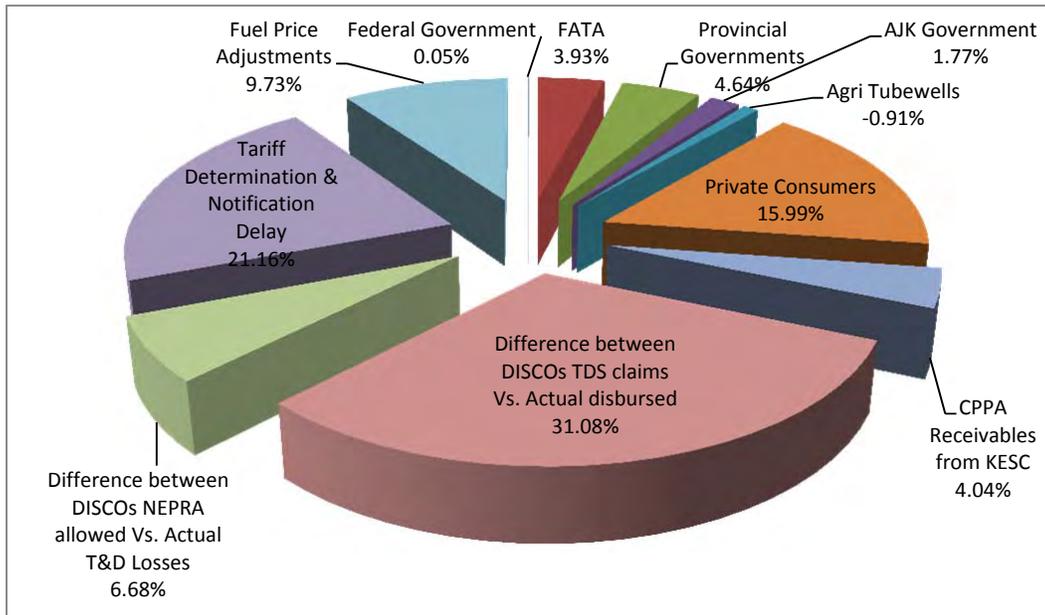
Source<sup>3</sup>: Data from MoWP - Tariff Cell (Data only available for the 2 years shown)

Source<sup>4</sup>: Chief Engineer's Office - MWP

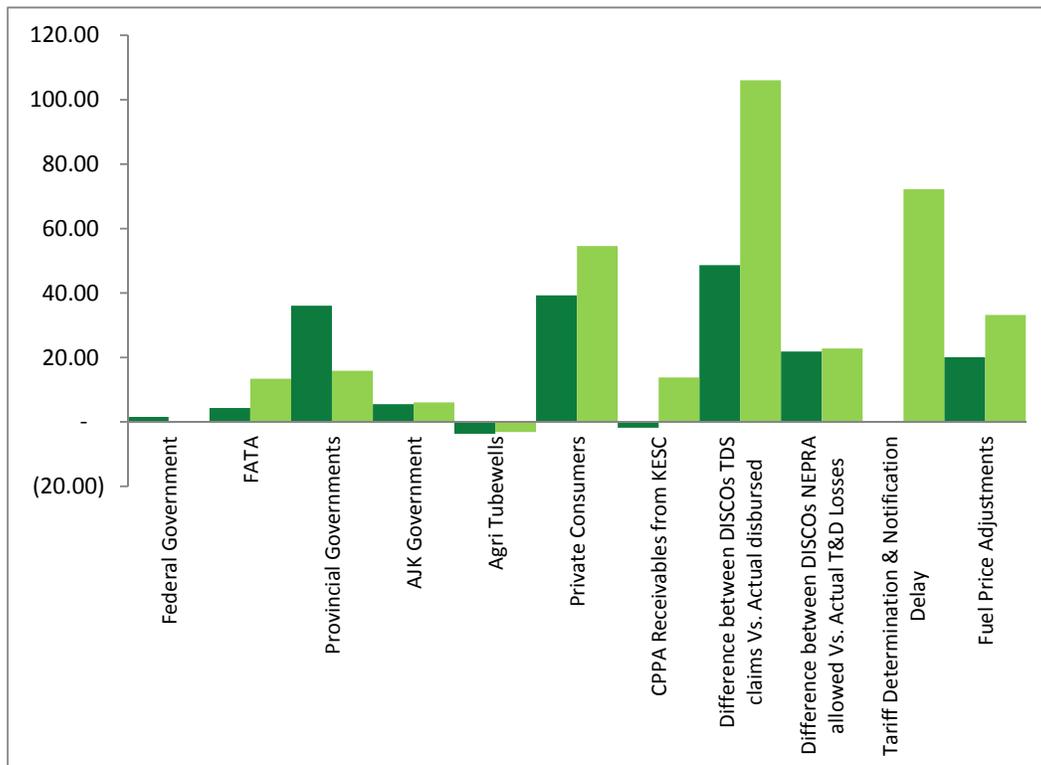
Source<sup>5</sup>: USAID PDP Analysis

<sup>8</sup> Figures in the Table do not include amounts for circular debt that could not be verified at the time this report was prepared.

**Figure 3: Share of Increase in Circular Debt for FY 2011-12**



**Figure 4: Circular Debt Components Comparison FY 2010-11 & FY 2011-12**



Source: See Source for Table 1 above.

## 2. PRIMARY CAUSES OF CIRCULAR DEBT

Although there are many contributing factors to circular debt, there are five primary drivers. These include poor sector governance; delays in tariff determination and notification; delays in FPA notification; poor revenue recovery from government and private consumers; and excessive T&D losses. This chapter addresses each of the primary causes, noting where failures have occurred and what actions can be taken to address the issues.

### 2.1. GOVERNANCE

Poor governance is at the heart of the issue of circular debt. Governance needs to improve at all levels, i.e. government, corporate, and regulatory.

#### 2.1.1. GOVERNANCE AT THE FEDERAL AND PROVINCIAL GOVERNMENT LEVEL

The federal government is both the majority owner as well as a large customer of the power sector. As owner, it retains the prerogative of ultimate decision-making regarding customer tariffs. Unfortunately, as a political entity, the government is influenced by both political and socio-economic considerations. These often overshadow commercial decision-making, and result in a reluctance to pass on the full cost of electricity to customers. Other political and external factors typically result in interference in DISCO operation, including overstaffing, compromise of merit-based staff performance, lack of transparency in procurement, uneconomic investments, etc.

At the provincial level, governments generally are not proactive in the resolution of issues such as the reconciliation of electricity bills, payment of tubewell subsidies arrears, arrears of provincial departments, and arrears due to court orders. In addition, the failure to accept responsibility for the problems stemming from the allocation of power shortages to different provinces continues. If, for example, the issue of bill reconciliation with the Sindh government, the gap created by the Balochistan governments' lack of responsibility for payment of tubewell subsidies, the arrears of Rs19.79 billion<sup>9</sup> in the Province of Khyber Pakhtunkhwa (KPK), and the tariff rate issue for Azad Jammu & Kashmir (AJK) were resolved, a significant portion of circular debt could be substantially reduced.

The federal government has the responsibility to develop the legal framework for the sector, for example, with respect to electricity theft and overall sector governance. However, it has not been adequately attended to comprehensive legislation needed to improve governance and reduce electricity and fuel theft. For example, a legal remedy is needed to protect DISCOs from revenue loss due to the courts' stay orders, preventing them from enforcing supply agreements when they disconnect defaulting customers or in cases where a consumer is caught stealing electricity.

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<sup>9</sup> Source: PEPCO DISCOs Performance Statistics Reports 2012.

The government also is responsible for appointing power companies' BODs, providing them with policy guidelines, and monitoring their performance. However, political and bureaucratic influences continue to hamper the government's performance in this regard. This results in reduced competence and lack of independence of Board members and poor management and operational performance of the DISCOs. Likewise the government embarked on the process of appointment of professional Chief Executive Officers (CEOs) of the DISCO about a year back. However, in spite the fact that the entire process has since been completed, except for Peshawar Electric Supply Company (PESCO), no other company has a CEO appointed through the selection process.

A key function of the federal government is the formation and implementation of national energy policy. In this regard, the GOP needs to develop a comprehensive policy for effective governance of the power sector, including reducing the number of GOP entities involved in the sector, which often have overlapping or ill-defined authority and often lack the capacity to effectively perform their designated functions. For example, a lack of political consensus on hydropower development and generation planning has led to increased dependence on imported fuel or furnace oil and, as a result, an unbalanced power generation mix that has necessitated customer subsidies. As subsidies are not allocated appropriately, benefits extend to those beyond the targeted customer sector. The financial, accounting, and data systems related to the Ministry of Water and Power (MWP) and MOF subsidies are not well-managed and require significant improvement.

Moreover, the government-provided fuel subsidy has led to the direct government allocation of fuel among consuming sectors of the economy, thus further distorting energy markets and contributing to shortages of fuel to generate power and to the circular debt problem. Allocations are mainly based on political considerations rather than on economic benefits. In the short term, the GOP needs to allocate fuel to the various sectors of the economy based on the highest value to the economy. In the long term, fuel prices need to more accurately reflect market prices and to be allocated throughout the economy based on competitive market principles. In addition, GOP support for development of domestic energy sources, such as hydro and other renewable energy resources and natural gas, would help to reduce dependence on imported fuel.

Federal and provincial governments are responsible for NEPRA appointments. Yet by amending or misinterpreting the NEPRA Act's appointment provisions, unqualified persons have been appointed to NEPRA. The GOP also needs to augment NEPRA's authority to move from the present single buyer model for the power sector to a multiple buyer/seller model. In addition, reform initiatives such as privatization of the DISCOs need to be accelerated and completed in a timely manner. In brief, the GOP's failure to create and maintain an enabling environment for the efficient operation of companies and the effective regulation of the sector has led to many of the problems impacting circular debt.

### **2.1.2. INADEQUATE CORPORATE GOVERNANCE**

Governance at the company level leaves much to be desired. For the most part, the DISCOs' BODs do not have sufficient authority or capacity to demand accountability of management and staff and are ineffective in managing DISCO performance. Politically-driven appointments of CEOs and top management continue to prolong and enhance self-

interest groups in maintaining the status quo. The USAID Power Distribution Program (PDP) has recommended many areas for improving corporate governance which have been made through USAID-supported programs, but these have yet to be properly implemented.<sup>10</sup> Similarly, USAID has provided strategic recommendations for GENCOs in addressing critical problems such as fuel theft, fuel adulterations, and poor corporate management and performance. These have been incorporated in comprehensive business plans, and await implementation.

Customer Service rules are not enforced and do not adequately reward good customer performance or discourage poor performance. At times, companies have deliberately over-billed customers, yet were able to escape meaningful punishment. It has been alleged that power and fuel thefts are often conducted with employee collusion. The result is a culture that ignores theft on the part of some workers and poor performance on the part of others and does not reward those who try to perform their functions honestly and with high professional ethics. A Customer Service manual and other performance documents prescribed by NEPRA set out parameters of service. However, none of the DISCOs adhere to such parameters, nor does NEPRA seem to have the will to do so.

### **2.1.3. GOVERNANCE BY NEPRA**

NEPRA was established in 1997, and is legally responsible for the regulation of Pakistan's power sector. It is legally an independent, quasi-judicial authority and, since its inception, has formulated licensing rules, performance standards, grid codes, eligibility criteria, power procurement regulation, procedures for tariff determinations, and other standards and codes.

NEPRA has succeeded in improving operation of the power sector as compared to the time when the sector was bureaucratically controlled. However, much still needs to be corrected, particularly in relation to tariff-setting. The procedure for tariff determination is lengthy, resulting in tariffs that are non-compensating by the time they are put in force. Similarly, NEPRA's administration of fuel price adjustment charges is ex post facto with a significant time delay, thereby failing to cover the rising fuel costs for the power producers resulting in a distorted price signal to customers.

NEPRA members are nominated by the provinces and appointed by the federal government. While professional standing of appointees is one of the qualifications for appointment, nominations are driven by various personal and political considerations. Consequently, NEPRA is subject to pressure from political and executive quarters in the performance of its functions and generally lacks the professional competency needed to effectively perform its regulatory functions. Moreover, NEPRA's inability to move beyond the single buyer model in which CPPA is the sole purchaser of power from the power producers and sole seller to the DISCOs needs to be strengthened. This lack of ability inhibits movement towards a competitive power market where power producers and customers are empowered to make direct arrangements to buy and sell electricity on a competitive basis.

The regulator is short of qualified technical staff and has to increasingly depend on contract and seconded government staff, which often creates a conflict of interest. A review of the numbers and composition of its staff and subsequent realignment to ensure that staffing

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<sup>10</sup> USAID Power Distribution Program: DISCO Operational Audit Reports and Performance Improvement Action Plans issued in 2010.

matches the needed capability should be done. In addition, the perks and benefits structure for the staff at NEPRA also needs to be reviewed. NEPRA could not retain the professionals it has had as they eventually moved on, having been offered better packages elsewhere in the country.

NEPRA also lacks effectiveness in enforcing accountability of the DISCOs, particularly with respect to reducing T&D loss levels, and meeting performance standards and license conditions as set out through the investments allowed through the tariff petitions filed and performance targets set. In addition, the public does not clearly understand the regulator's role and rationale, resulting in consumers' confusion and unrealistic expectations.

## **2.2. DELAYS IN TARIFF DETERMINATION AND NOTIFICATIONS**

Delays in tariff determination and notification contributed Rs72.19 billion<sup>11</sup> to the circular debt for FY 2012. Tariff determinations for all nine DISCOs were delayed for nine months and it took an additional month for the notification to be published. Consumer tariffs in 2011-12 were largely based on 2010-11 tariff values whereas the actual fuel cost for 2012 was 52% higher than the previous year. Without new tariff values from NEPRA and the GOP, the DISCOs had no chance to receive the necessary cash required to meet their monthly wholesale power cost.

Once NEPRA determines the tariff, the GOP reviews it and officially notifies a tariff after modifications as deemed appropriate. Although NEPRA has reduced the time it takes to determine tariffs, the determination procedure still takes many months. In addition, tariff-setting lacks independence, as the GOP notification process often results in a delay and/or reduction in the tariff due to political considerations.

## **2.3. FUEL PRICE ADJUSTMENTS**

Delays in NEPRA's application of the FPA mechanism contributed Rs33.19 billion<sup>12</sup> to the circular debt in 2012.<sup>13</sup>The FPA is a mechanism through which monthly variations in fuel costs, as compared with the reference amount determined in the NEPRA tariff, are passed on to the end user. The FPA mechanism adds to circular debt during periods of rising fuel costs by delaying this adjustment value by two to six months. This creates a cash shortage for the power producers for energy already delivered.

The current FPA method is to bill consumers after the fact using historical cost and an annual reference amount as opposed to using projected fuel consumption and cost. This leads to fuel adjustments that swing radically each month and creates consumer unrest. The current method does not include a process for looking ahead as global fuel price conditions change or the country's fuel mix ratios differ from the reference values.

## **2.4. POOR REVENUE COLLECTION**

Poor revenue collection contributed Rs86.9 billion to the circular debt in 2012. Five of the DISCOs had good collection rates while the other four (Hyderabad Electric Supply Company

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<sup>11</sup> PDP Analysis based on NEPRA determination of DISCOs' tariffs 2012.

<sup>12</sup> Source: PDP Analysis based on data from Tariff Cell -Ministry of Water & Power.

<sup>13</sup>Note: The delay in charging of FPA has been calculated as the difference between what should have been charged to consumers as FPA vs. what is actually charged.

– HESCO, Sukkur Electric Power Company – SEPCO, Peshawar Electric Supply Company – PESCO, and Quetta Electric Supply Company – QESCO) contributed Rs72.14 billion or 83% of the total uncollected amount. Poor revenue collection is due to a number of factors, as described below.

### 2.4.1. POOR COLLECTION FROM PRIVATE CONSUMERS

Non-payment of electricity dues by private consumers is one of the largest contributors to circular debt. The problem is not uniform across the country as some DISCOs have good track records while others display poor collection efficiency. Of the Rs197 billion<sup>14</sup> receivables from private consumers at the end of FY 2012, 73% is attributable to PESCO (including Tribal Areas Electric Supply Company (TESCO)), HESCO (including SEPCO), and QESCO. The position of each company is shown in Table 3.

**Table 3: Private Receivables – Million Rs.<sup>15</sup>**

DISCOs	2008-09	2009-10	2010-11	2011-12	% Share
PESCO*	26,809	32,902	41,282	51,360	26%
HESCO	18,856	25,454	33,344	44,237	22%
QESCO	4,297	5,238	24,780	48,193	24%
LESCO	10,957	15,968	17,081	23,080	12%
GEPCO	3,585	5,322	5,631	5,912	3%
FESCO	3,719	5,676	5,866	7,068	4%
IESCO	2,287	2,286	2,762	2,703	1%
MEPCO	7,252	10,505	11,900	14,638	7%
<b>All DISCOs</b>	<b>77,762</b>	<b>103,351</b>	<b>142,646</b>	<b>197,191</b>	<b>100%</b>

\* PESCO Includes TESCO and HESCO Includes SEPCO

In terms of annual performance in the collection of revenue, the overall efficiency was 87%<sup>16</sup> in FY 2012. The financial impact of not recovering the remaining 13% is estimated to be around Rs86 billion, or equal to 41 days of furnace oil costs for thermal power plants.<sup>17</sup> Again, PESCO, HESCO, SEPCO, and QESCO had the worst collection efficiency, as shown in Table 4.

<sup>14</sup> Source: PEPCO DISCOs Performance Statistics Reports 2012.

<sup>15</sup> Source: PEPCO DISCOs Performance Statistics Reports 2008 – 2012.

<sup>16</sup> This figure includes Rs 7.0 billion released by the Ministry of Finance as a subsidy for FATA.

<sup>17</sup> This has been calculated taking Rs70, 000 as furnace oil price per metric ton and factoring in the total requirement of these plants as 30,000 metric ton per day.

**Table 4: DISCO Wise Revenue Collection Efficiency**

DISCOs	2007-08	2008-09	2009-10	2010-11	2011-12
PESCO*	71%	67%	227%	78%	68%
HESCO	77%	68%	60%	59%	60%
QESCO	86%	80%	76%	41%	36%
LESCO	98%	96%	93%	98%	96%
GEPCO	98%	95%	96%	99%	98%
FESCO	99%	97%	97%	100%	98%
IESCO	98%	97%	96%	93%	96%
MEPCO	97%	96%	94%	98%	97%
<b>All DISCOs</b>	<b>89%</b>	<b>92%</b>	<b>106%</b>	<b>89%</b>	<b>87%</b>

\* PESCO Includes TESCO and HESCO Includes SEPCO

Source: PEPCO DISCOs Performance Statistics Reports FY 2008-2012

The main factors contributing to the increase in receivables include the DISCOs' lack of accountability, political interference, failure to disconnect defaulting customers, lack of modern technology for metering and revenue collection, and fear of reprisal from protesting customers upon disconnection or replacement of meters. Moreover, the high tariff (particularly with reference to the consumers' ability to pay) is, in some cases, encouraging collusion among consumers.

#### **2.4.2. INSUFFICIENT PAYMENT BY PROVINCIAL GOVERNMENTS AND AZAD JAMMU & KASHMIR GOVERNMENT**

DISCOs supply electricity to various provincial government departments, schools, hospitals, police stations, water and sewerage facilities, and offices, some of which are perpetual defaulters. Reasons for inadequate payment vary from region to region and department to department but, typically, defaulters attempt to justify non-payments on the following grounds:

- Non-reconciliation of billing between the DISCO and the concerned government department
- Shortage of funds due to insufficient budget allocations to concerned departments.

Despite the fact that DISCOs have a prescribed procedure for bill correction and reconciliation, government departments tend not to follow these procedures and thereby delay payments. Over the last few years, provincial and federal governments have been unable to reconcile the figures for electricity bills due from provincial governments. DISCO receivables from the provincial governments and AJK were Rs100.48 billion<sup>18</sup> as of June 30, 2012, accounting for 11.5% of the total circular debt at the end of FY 2012.

<sup>18</sup> PEPCO DISCOs Performance Statistics Reports 2012.

**Table 5: DISCOs Receivables from Provinces & AJK – Millions Rs**

Province	2005	2006	2007	2008	2009	2010	2011	2012
Punjab	(481)	(9)	(381)	162	(7)	3,263	5,371	5,842
KPK	239	398	652	254	601	1,144	19,427	19,792
Balochistan	538	119	146	709	1,064	2,419	4,662	52,696
Sindh	341	2,382	3,224	7,603	14,241	25,790	39,230	6,200
AJ&K	(50)	485	756	1,216	2,391	4,393	9,888	15,953
<b>Total</b>	<b>587</b>	<b>3,375</b>	<b>4,397</b>	<b>9,944</b>	<b>18,290</b>	<b>37,009</b>	<b>78,578</b>	<b>100,483</b>

Source: PEPCO DISCOs Performance Statistics Report (FY 2005- FY 2012)

### **2.4.3. INSUFFICIENT PAYMENT BY FEDERAL GOVERNMENT, FATA & AGRITUBEWELLS**

Receivables from the federal government represent unpaid bills of federal government departments, government-owned corporations, and autonomous bodies, as well as subsidies for Federally Administered Tribal Areas (FATA) consumers and Balochistan tube well consumers. Federal government receivables on these accounts stand at Rs30.1 billion as at June 30, 2012.<sup>19</sup>

FATA is one of the least developed part of Pakistan, with limited industrial and commercial activity, and high unemployment. Its location on the Afghan border makes it important, especially in relation to the war on terror. Collection of billed electricity in FATA has historically been a challenge due to the extreme poverty and palatable attitude of the government towards the tribal areas.

### **2.5. INSUFFICIENT PAYMENT OF TARIFF DIFFERENTIAL SUBSIDY BY THE MINISTRY OF FINANCE**

The TDS reflects the government’s policy of applying a uniform tariff across all the DISCOs. The GOP’s annual budgeted line item for this subsidy totaled Rs50 billion<sup>20</sup> for FY 2012, while the DISCOs claims for the same period amount to Rs156 billion.<sup>21</sup> The outstanding balance of the TDS to be paid by the MOF was Rs106.02 billion<sup>22</sup> at the end of 2012, which adds to the circular debt.

NEPRA determines the electricity tariffs based on the revenue requirement of each DISCO to meet all costs and to earn a suitable profit. There is significant difference in the tariffs for each category of customer and across the various DISCOs. The government has the power to notify either the differential tariff determined by NEPRA or a modified (lesser) tariff, with the government assuming payment of the difference. This is known as the TDS. The underlying concept is that the DISCO must ultimately receive revenue as allowed by NEPRA, either from the customers or with the support of a state subsidy. Since the government has adopted a policy of uniform tariff across the country (generally the minimum rate for each category of customer applied for by any of the nine DISCOs), the TDS owed by

<sup>19</sup>PEPCO DISCOs Performance Statistics Reports 2012. (Receivables = Federal Govt + FATA + agricultural tube wells (GOP share))

<sup>20</sup>Ministry of Water & Power, Chief Engineer’s Office.

<sup>21</sup>Ibid.

<sup>22</sup> Ibid.

the GOP on an annual basis is substantial. In addition, the government, historically, has not provided the required TDS in a timely manner.

The MOF is responsible for paying the TDS to CPPA on behalf of the DISCOs. CPPA, then credits the DISCOs' accounts against the amount they owe to CPPA. The MOF has provided an amount of Rs1.290 trillion<sup>23</sup> to cover the TDS from 2006-07 through 2011-12 to CPPA. This amount includes a loan of Rs312 billion<sup>24</sup> that was made to the DISCOs to cover their costs, which has been made a part of Pakistan's national debt. This loan was obtained by the DISCOs to pay their power purchase cost to CPPA, as the government did not fully provide the required amount of subsidy to the DISCOs for the prior years. The adjustment of this amount (i.e. Rs312 billion) against the subsidy claims of the DISCOs has yet to be made. Therefore, CPPA has not yet provided the details of how the total amount of the Rs1.29 trillion payment has been credited to the accounts of the DISCOs. This is mainly held up due to a lack of information on how the amount of this TDS is to be adjusted for the Rs312 billion loan, which has now been picked up by the GOP.

The MOF has recently decided to have the subsidy claims of the DISCOs verified through a chartered accountant firm, which will further delay resolution of this issue. The MOF has submitted a request to USAID to arrange the services of a chartered accountant firm for this purpose. Once this task is completed, the CPPA will have a clear picture of the adjustments to each DISCO's account resulting from the Rs1.29 trillion TDS provided by the MOF. To avoid this type of discrepancy in the future, the MOF should be responsible for monitoring the amount of TDS that has accumulated for each DISCO and report its findings to the GOP on an annual basis.

The concept of a uniform tariff regime needs to be objectively revisited. Because of legal constraints, no consumer can be charged at a higher rate than that determined by NEPRA. Therefore, for each consumer category, the GOP arrives at a uniform tariff based on the lowest tariff determined by NEPRA for any DISCO. This results in a subsidy based on political considerations rather than on need. A more targeted subsidy aimed at low-income consumers and applied to a base level of consumption needs to be established. This would target the subsidy to where it is needed most and would likely reduce the total amount of the subsidy, as those with higher income or higher consumption levels would be excluded. As a first step, the four top performing DISCOs (i.e. IESCO, FESCO, GEPCO, and LESCO) should be allowed to explore corporate privatization to remove them from the uniform tariff base. Once achieved, this would significantly reduce the circular debt.

## **2.6. IMPACT OF HIGH TRANSMISSION AND DISTRIBUTION LOSSES**

DISCO T&D losses for FY 2012 contributed Rs22.78 billion<sup>25</sup> to the circular debt. NEPRA determines distribution margins based on targeted T&D losses set for each DISCO. However, many DISCOs fail to achieve these targets as shown in Table 7. In Pakistan, approximately 50% of aggregate distribution losses<sup>26</sup> reported by DISCOs are non-technical,

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<sup>23</sup>Ministry of Finance.

<sup>24</sup>Ibid.

<sup>25</sup>PDP Analysis of T&D losses based on data from PEPCO DISCOs Performance Statistics Reports 2012.

<sup>26</sup> This is an aggregation that based on PDP operational audit reports technical loss assessments of all DISCOs.

with such underlying reasons as administrative problems, billing, theft, and pilferage of energy. Excess losses result in less than NEPRA-determined revenues for the DISCOs, as less energy is provided to end-use customers. This results in an increase in circular debt, as presented in Figure 3.

PDP evaluated the DISCOs' T&D losses through operational audits completed in 2010. PDP-assessed technical losses among the DISCOs ranged between 8% and 15%, identifying a potential opportunity for performance improvement through investments in network upgrades, installation of state-of-the-art metering systems such as AMRs, low tension (LT) capacitors, and other technical measures. Reducing average T&D losses for all the DISCOs by 1% in FY 2011 would have resulted in savings of over Rs7 billion<sup>27</sup> in power purchase costs, and would have provided enough power to serve an additional 2.6 million residential consumers, and reduced load shedding by 110 MW.

Ideally, if Lahore Electric Supply Company (LESCO), Gujranwala Electric Power Company (GEPCO), Faisalabad Electric Supply Company (FESCO), and Islamabad Electric Supply Company (IESCO) keep their losses below 10% while Multan Electric Power Company (MEPCO), PESCO, HESCO (including SEPCO), and QESCO bring down their T&D losses to 15%, DISCOs revenue would increase by approximately Rs50 billion from the following DISCOs as shown in the table 6 below:

**Figure 6: Increases in DISCO Revenue**

Billion Rs.	LESCO	GEPCO	FESCO	MEPCO	PESCO	HESCO	QESCO	TOTAL
	5	1	1	5	20	15	3	50

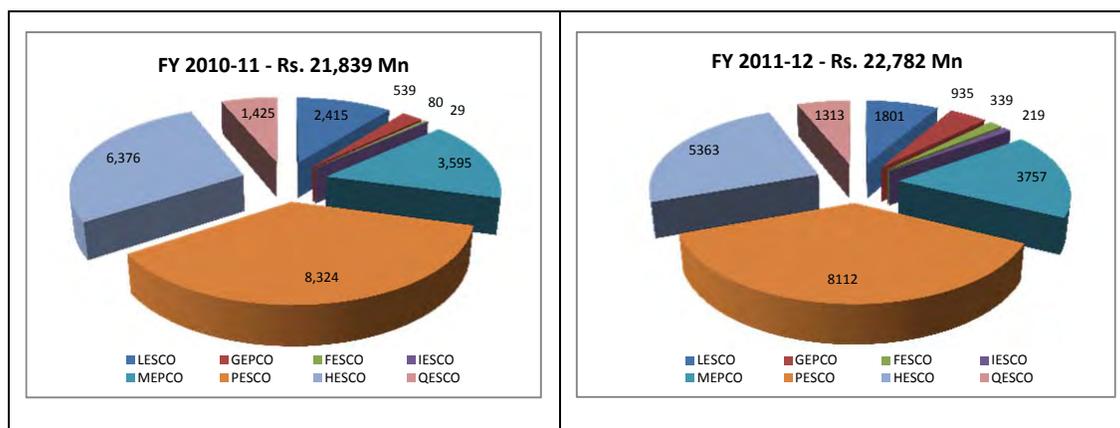
This reduction in losses can release 784<sup>28</sup> MW of power generating capacity with a value of Rs75 billion (which is equivalent to investing in the same amount of new generation capacity), as well as aid in the reduction of load shedding. Even if they had complied with NEPRA's FY 2012 targets for T&D losses, DISCOs revenues would have improved by approximately Rs22 billion. In the long-term, T&D losses need to be brought into alignment with international standards of about 7% of total generation. Doing so would reduce system losses by about 10.3 billion kilowatt-hours and save about Rs75.3 billion. In addition to this, the losses are unrealistically reduced through parking of units or overbilling. This results in creation of unrecoverable receivable's or billing disputes and results in eventually lowering of average sale rate.

<sup>27</sup>Calculation of Savings due to 1% loss reduction:

MkWh Received	MkWh Billed	Actual Loss	% Actual Loss	% Target Loss	MkWh Saved	Av. Sale Rate Rs/kWh	Savings Million Rs
82,319	66,213	16,106	19.6%	18.6%	1,011	7.28	7,359

<sup>28</sup> Ibid.

**Figure 5: Excess T&D Losses Contribute to Circular Debt – Million Rs<sup>29</sup>**



**Table 7: T&D Energy Losses<sup>30</sup>**

Serial	DISCOs		2009	2010	2011	2012
1	LESCO	Actual	13.3%	13.8%	13.3%	13.5%
		NEPRA Allowed	12.3%	12.0%	12.0%	12.0%
2	GEPCO	Actual	11.0%	11.0%	12.0%	11.2%
		NEPRA Allowed	10.7%	11.0%	10.5%	10.5%
3	FESCO	Actual	10.7%	10.8%	11.2%	10.9%
		NEPRA Allowed	9.0%	11.0%	10.8%	10.8%
4	IESCO	Actual	10.8%	9.8%	9.8%	9.5%
		NEPRA Allowed	11.0%	10.0%	9.5%	9.5%
5	MEPCO	Actual	18.4%	19.0%	18.3%	17.9%
		NEPRA Allowed	17.5%	15.0%	15.0%	15.0%
6	PESCO	Actual	35.2%	34.7%	35.2%	35.1%
		NEPRA Allowed	33.2%	28.0%	28.0%	28.0%
7	HESCO	Actual	35.1%	34.8%	33.8%	33.4%
		NEPRA Allowed	34.0%	28.0%	28.0%	24.8%
8	QESCO	Actual	20.1%	20.7%	20.8%	20.9%
		NEPRA Allowed	20.2%	18.0%	18.0%	18.0%
	Average	Actual	19.4%	19.6%	19.6%	19.4%
		NEPRA Allowed	18.4%	16.4%	16.4%	16.0%

The NTDC also failed in keeping its transmission losses for the 500/220 kV transmission network within NEPRA-approved limits, as indicated in Table 8. Had the high transmission losses been restricted to the regulatory target, the accumulation of circular debt in FY 2009, FY 2010, and FY 2011 could have been reduced by Rs11 billion and over 40 MW capacity released, reducing load shedding by this amount.<sup>31</sup>

<sup>29</sup> Source: PDP analysis based on data supplied by MWP. Note: PESCO includes TESCO and HESCO includes SEPCO.

<sup>30</sup> Source: Actual: PEPCO Power Distribution DISCOs Performance Statistics. NEPRA Allowed: NEPRA determination from NEPRA Website. PESCO includes TESCO and HESCO includes SEPCO.

<sup>31</sup> The financial impact of NTDC transmission losses has not been included in the estimated circular debt given in Table I.

Table 8: High Transmission Losses<sup>32</sup>

		2009	2010	2011	2012
NTDC	Actual	3.6%	3.1%	2.9%	2.8%
	NEPRA Allowed	2.5%	2.5%	2.5%	2.5%

## 2.7. INSUFFICIENT PAYMENT BY THE KARACHI ELECTRIC SUPPLY COMPANY

KESC receives between 650 MW to 700 MW of power from NTDC/CPPA per day. However, KESC had not been making full payments for the electricity it receives. KESC argues that its electricity payments made to CPPA should be settled against the arrears of TDS from the GOP. KESC and CPPA signed a PPA in January 2010, according to which KESC was required to open a stand-by letter of credit with a commercial bank in favor of the CPPA to the extent of their monthly power purchase cost minus TDS for the same month. The contract is currently under review by the National Accountability Bureau (NAB) at the request of MWP, due to the fact that the monthly TDS values exceed the cost of power purchased by KESC. However, this agreement is not being implemented and KESC's receivables as of the end FY 2012 amounted to Rs54.7 billion<sup>33</sup> of circular debt.

<sup>32</sup> Source: Actual: PEPCO Power Distribution DISCOs Performance Statistics. NEPRA Allowed: NEPRA determination from NEPRA Website.

<sup>33</sup> PEPCO DISCOs Performance Statistics Reports 2012.

## 3. SECONDARY CAUSES OF CIRCULAR DEBT

Secondary causes are those which indirectly contribute to the circular debt. These include thermal inefficiencies of the GENCOs; inadequate budgeting of subsidies; unfavorable generation mix; impact of court decisions on payments to the DISCOs; LPS; neglect of demand-side management, energy efficiency and renewable energy; legacy payments; and payables to CPPA for power purchased. Each of these is addressed below.

### 3.1. THERMAL INEFFICIENCIES OF GENERATION COMPANIES

GENCO tariffs are based on the heat rates of generating units. The heat rate is defined as the amount of fuel consumed for each unit (kWh) generated. Over time, as efficiencies of generating units have declined, heat rates have increased. The higher the heat rate of the plant, the greater the amount of fuel consumed per unit of electricity generated. There are some allegations of fuel thefts at the GENCOS, which also results in lower efficiency. However, for tariff determination, NEPRA uses lower heat rates versus the actual GENCO rates as shown in Table 9<sup>34</sup>. Consequently, the price of power delivered by the GENCOs is underestimated as it does not reflect the true cost of fuel to the GENCOs. This reduces the GENCOs' income, resulting in cash flow difficulties, which causes the GENCOs to postpone maintenance and other essential expenses, including payment to fuel suppliers. A heat rate audit needs to be conducted to establish new benchmark heat rates for NEPRA to use for tariff determinations. Until this audit is conducted, NEPRA cannot update its heat rate figures for use in setting tariffs for the DISCOs.

Table 9: GENCO Heat Rate Comparison

GENCOs	NEPRA	Actual
<b>CPGCL (GENCO I)</b>		
Block 1	8,533	9,153
Block 2	9,481	10,200
Block 3	11,377	13,109
Block 4	12,189	14,041
<b>NPGCL (GENCO III)</b>		
Unit 1-3 (TPS Muzaffargarh)	10,788	11,677
Unit 4 (TPS Muzaffargarh)	10,692	11,087
Unit 5-6 (TPS Muzaffargarh)	12,158	14,164
Units 1-2 (SPS Faisalabad)	14,368	14,156
Units 1-4 (GTPS Faisalabad)	15,366	17,708
Units 5-9 (GTPS Faisalabad)	11,701	10,259
Unit 1-3 (Multan)	14,114	16,169
<b>JPCL (GENCO II)</b>		
Unit 1 (Jamshoro)	10,655	11,505
Units 2-4 (Jamshoro)	10,862	12,930
Unit 1-2 (Kotri)	21,813	22,353
Units 3-7 (Kotri)	10,564	11,902

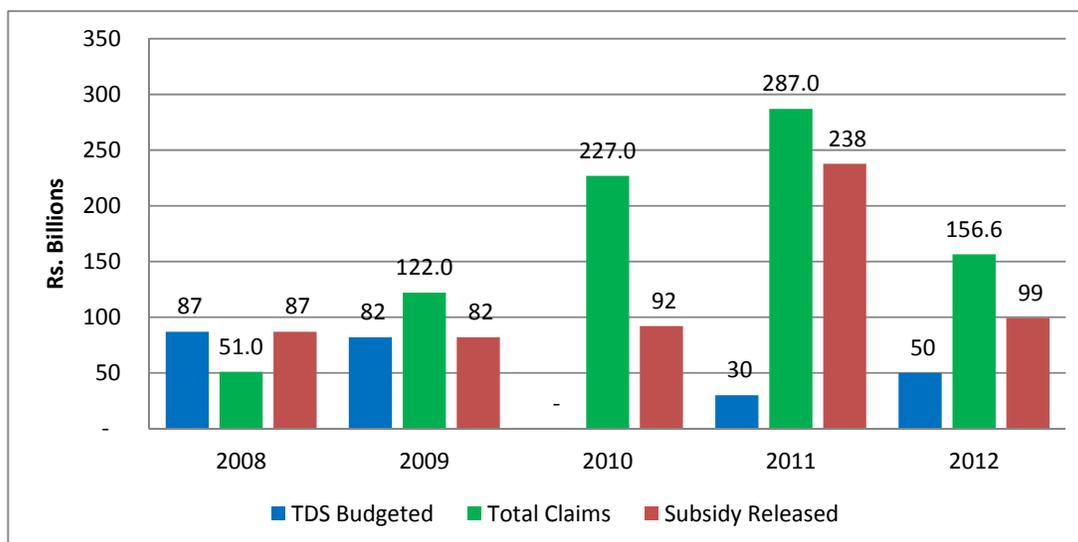
<sup>34</sup> Table 7 provides heat rate information for three GENCOs. The fourth GENCO, Lakhra, is small, with an operational capacity of 37MW and operates intermittently.

Fuel theft and fuel adulteration has been recognized now as a common problem at the GENCOS, which also results in lower efficiency. Due to lack of adequate fuel quality assessment tools at the GENCOS, any adulteration of fuel received by GENCOS by fuel providers cannot be detected. In addition, poor fuel storage and handling facilities further deteriorate fuel quality, resulting in lower fuel efficiency and deterioration of plant machinery. USAID's Energy Policy Program has conducted a survey of fuel management and handling capacity at the GENCOS. In 2010-2011, total fuel costs of the GENCOS amounted to Rs124 billion<sup>35</sup> which account for 94%<sup>36</sup> of the operating budget of the GENCOS, comparatively, fuel management costs amount to less than 1% of the operating costs.<sup>37</sup>

### 3.2. INADEQUATE BUDGETING OF SUBSIDIES

The TDS historically has been under-budgeted. The federal budgeting process relies on planning assumptions presented by various executing agencies. These assumptions pertain to improved performance parameters, such as reduced losses, greater collections, and increased tariffs. Based on these projections, the MOF budgets federal spending on power sector subsidies. In practice, the planning assumptions are generally found to be overly optimistic. As per MWP records, in FY 2012, the budgeted amount for TDS was Rs50 billion, while the amount disbursed over the year was Rs156 billion (see Figure 6). Financing of the unplanned subsidies takes time and adds an interest charge to the amount financed, further adding to the circular debt.<sup>38</sup>

Figure 6: Tariff Differential Subsidy Budgeted, Claimed & Disbursed



Source: Ministry of Water & Power, Chief Engineer's Office .

<sup>35</sup> Financial Statements of NPGCL, CPGCL, JPGCL (2010-2011)

<sup>36</sup> Ibid

<sup>37</sup> Ibid

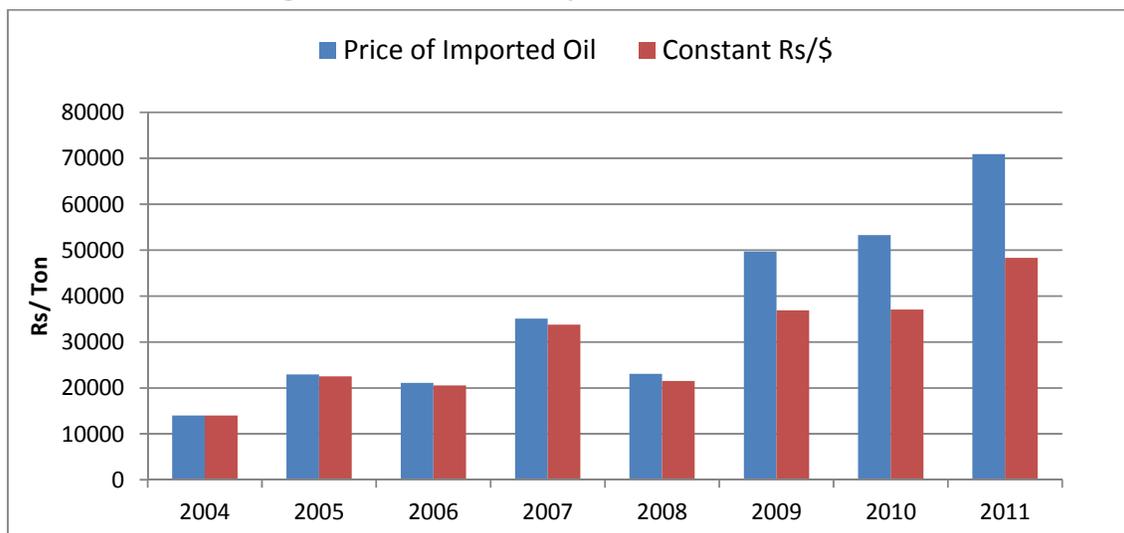
<sup>38</sup> The interest due to delayed payment has not been included in Table I for want of reliable data.

### 3.3. IMPACT OF UNFAVORABLE GENERATION MIX AND HIGH GENERATION COST

One of the primary reasons for high tariffs in Pakistan is the unfavorable generation fuel mix. Due to delay in exploitation of hydro power potential in the country, a number of private sector oil-based IPPs were added to the system in 1994 and 2002. While these IPPs provided much-needed new power generation capacity at the time, the country’s generation mix tilted heavily towards Fuel Oil/Furnace Oil (FO). The GOP’s policy to divert gas to other sectors of the economy, such as domestic consumers, and to encourage use of compressed natural gas (CNG) for private vehicles further limits gas supply to the power sector, forcing thermal generators to depend on more expensive fuels. Gas shortages further pushed thermal generation towards more expensive fuels. Over time, the price of imported FO increased substantially, inflating the cost of generation. This increase in cost was not passed on to consumers and the gap between the GOP-notified tariffs and NEPRA-determined tariffs increased, adding to the tariff differential subsidies required to be paid to the DISCOs. The increasing subsidy burden is one of the primary reasons for fiscal constraints facing the GOP in paying the TDS in a timely manner. The international price increase of FO occurred in Pakistan at a time when the rupee was depreciating, making FO even more expensive, thus driving up the cost of generating power.

As international oil prices are denominated in US dollars, the cost of imported FO increases as the Pakistani rupee devalues against the dollar. From 2005 to 2011, the cost of FO increased in real terms from \$236 per ton to \$639 per ton.<sup>39</sup> At the same time, the Pakistani rupee depreciated against the dollar such that the cost of imported FO rose from Rs21,087 per ton to over Rs70,930<sup>40</sup> per ton (Figure 7). As a result, the cost of power generated from FO grew 236% in six years.

Figure 7: Price of Imported Furnace Oil<sup>41</sup>



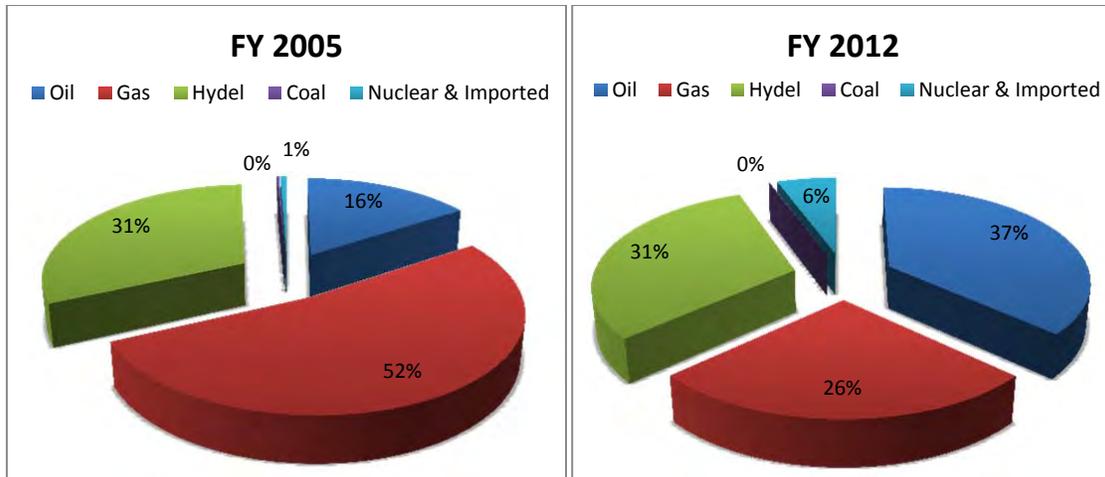
<sup>39</sup> Source: Pakistan Energy Year Book 2011

<sup>40</sup> Ibid.

<sup>41</sup> Source: Various editions of Pakistan Energy Yearbook.

The increase in the cost of furnace oil coupled with the increase in the share of oil-based generation from 16% in 2005 to 37% in FY 2012 (Figure 8) resulted in the high cost of power purchased by CPPA.

**Figure 8: Generation Mix<sup>42</sup>**



Its impact on circular debt depends upon how soon and how much of the price increase is passed on to, and eventually collected from customers. As explained in Section 2 above, delays in NEPRA’s application of the FPA contributed more than Rs33 billion to the circular debt in 2012 as the fuel price increase was not passed on promptly to customers, and whenever it was, it resulted in only partial recovery of cost.

### 3.4. IMPACT OF COURT DECISIONS

Another factor that contributes to circular debt is that some customers or entities manage to withhold the payments to DISCOs due to “stay orders” obtained through the courts. The total financial impact in such cases has been substantial. For example, in 2008 the KPK Government filed a petition against a tariff increase. Despite the fact that it later withdrew the case, PESCO was not able to recover Rs18.6 billion<sup>43</sup> from KPK consumers for the billing period from September 5, 2008 to September 15, 2010 (accrued while the court’s stay order was in effect) even after four years. HESCO faced a similar situation, when the Sindh Government filed a suit against HESCO before the Sindh High Court and managed to block HESCO from receiving payments from the Sindh Government for an extended period. It should be noted that the courts should not be hearing these complaints when NEPRA has made these determinations and allowed for a public hearing process, again showing the weakness of the regulator.

### 3.5. LATE PAYMENT SURCHARGES FOR INDEPENDENT POWER PRODUCERS

CPPA purchases power from various power generators and sells it to the DISCOs according to the wholesale tariff rates determined by NEPRA. Due to the inability of the DISCOs to fully

<sup>42</sup>NEPRA State of the Industry Report 2005, and NEPRA’s Determination for IESCO 2012.

<sup>43</sup> PEPCO DISCOs Performance Statistics Reports 2012.

pay for the cost of power, and due to delays in payment of TDS, CPPA is in many cases unable to make timely payments to the IPPs. As a result, CPPA bears the supplemental cost of paying a LPS<sup>44</sup> to IPPs as per the PPAS signed between CPPA and the IPPs. However, NEPRA has not allowed CPPA to recover this cost due to the absence of an appropriate sales purchase agreement between CPPA and the DISCOs. CPPA needs to complete and put into force a formal and enforceable PPAs with the IPPs. The estimated annual financial impact of the LPS over the past three years is estimated at Rs10-15 billion.<sup>45</sup>

### **3.6. NEGLECT OF DEMAND-SIDE MANAGEMENT, ENERGY EFFICIENCY AND RENEWABLE ENERGY**

Starting in the late 1970s, governments in many developing countries began promoting demand-side management, conservation, energy efficiency and renewable energy initiatives. With assistance from USAID, Pakistan began efforts to address these issues in the mid-1980s with the creation of the National Energy Conservation Centre (ENERCON). However, little effort to promote renewable energy was made until 2003. NEPRA has also not devised a tariff suited to the specific characteristics of renewable energy development.

Demand-side management and conservation also continue to be neglected. The DISCOs are in the business of selling power and collecting revenue and traditionally have not been motivated to engage in demand-side management unless required by regulators.

### **3.7. LEGACY PAYMENTS**

An analysis of circular debt and its components shows that the total debt increased from Rs84.07 billion as of June 30, 2005 to Rs872.41 billion as of June 30, 2012.<sup>46</sup>

Calculated circular debt has two distinct components – disputed and undisputed arrears – which need to be dealt with separately.

Disputed arrears are due to disputes related to billing between the DISCO and the provincial governments (particularly Sindh), and disputes over tariff rates in the case of AJK. In the past, efforts were made to settle the billing issue by deducting the amount of arrears from the release of funds to the provinces from the Consolidated Fund (budgets). However, this drew objections from the provinces who claimed that such deductions violated the constitution and argued that the DISCO's billing was inaccurate. In the late nineties, an arbitrator was appointed to settle the issue between the DISCO and Sindh province. But these efforts did not put the matter to rest and, following the 18th Amendment to the Constitution, "at-source" deduction by the Federal Government is now considered unconstitutional.

The undisputed component simply reflects consumers' inability to pay the bills. Over the years, shortfalls in the provision of subsidies by the federal and provincial governments, or the non-settlement of receivable from KESC against TDS, have added to this debt category. Some arrears are kept on the books because of the decision of the Peshawar and Sindh

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<sup>44</sup>At a rate of the Karachi Interbank Offered Rate (+3-4%), additional data being obtained.

<sup>45</sup> Source: EPPanalysis.

<sup>46</sup> See Sources for Table 1.

High Courts: Although the Sindh High Court ruled that the Sindh Government must pay all bills from February 2010 forward, the Sindh Government has yet to fully comply.

Moving forward, the arrears issue needs to be settled in a realistic manner. Separate approaches for disputed and un-disputed amounts need to be adopted, and all concerned stakeholders given a deadline to clear past arrears. In the future, any default on amounts owed should be dealt with strictly in accordance with the contract terms and conditions for the supply of electricity. As regards the disputed arrears, in the short run, arbitral tribunals – whose award must be final and binding – can be established. In the longer term, various options, such as the installation of smart meters, prepaid meters or a system of joint or community metering are possible. As this matter is between the provinces and the DISCO, the federal government needs to avoid any temptation to intervene. The law should be allowed to take its course for future defaulters.

Concerning the issue of rates with AJK, a federal government policy decision is needed regarding the rate to be charged to AJK, and NEPRA needs to accept that rate. Similarly, if the federal government owes TDS to KESC, then it may use the TDS to settle the KESC's arrears to the CPPA.

### **3.8. PAYABLES TO THE CENTRAL POWER PURCHASING AGENCY FOR POWER PURCHASED**

CPPA, which currently is part of NTDC, purchases power from generators on behalf of the DISCOs. It then is responsible for making payments to the generators by billing and collecting the cost of power delivered every month to each DISCO. Currently, CPPA's power sales to the DISCOs are not secured, since formal PPAs between CPPA and the DISCOs do not exist. CPPA needs to complete and put into force formal and enforceable PPAs with the DISCOs.

Payables to CPPA for power sold to the DISCOs are the result of the cumulative effect of the primary and secondary causes of the circular debt discussed above, and the fact that DISCOs give priority to meeting their own expenses from revenue collected, passing on only the residual amount to CPPA. This residual amount is less than the cost of power recovered and billed by the DISCOs.

The current trend of the DISCOs' insufficient payments to CPPA is intensified by the increased cost of generation in FY 2012, resulting from rising fuel prices. NEPRA allowed power generators to bill CPPA for fuel adjustment charges incurred in FY 2011, but the DISCOs were directed to recover the FY 2011 fuel adjustment charges in FY 2012, resulting in a mismatch in costs incurred and revenue collected.

This current situation of increasing DISCOs payables to CPPA will not improve unless CPPA is made autonomous and is covered by guarantees for full payment for the cost of power it purchases on behalf of the DISCOs. This, in turn, will require that all the primary and secondary causes of circular debt are addressed.

# 4. CONCLUSIONS AND RECOMMENDATIONS

## 4.1. CONCLUSIONS

Four of the five primary causes of circular debt are due to a lack of good governance and the inability of government/sectorial entities to effectively lay down policies/procedures and then enforce them. Government agencies often implement their current procedures and methodologies without considering their impact on circular debt. Capacity building of these entities must be the main priority to ensure improved governance at benchmarked standards. Tariffs must be in line with the current price of fuel and any time delay in tariff determination and notification can cause huge cash shortage to the sector.

The current fuel cost reference and adjustment mechanisms need to be revamped to include a forward vision approach for fuel cost recovery. Although the DISCOs' revenue collection will not improve overnight, NEPRA needs to give those DISCOs that have a program in place to improve collections an "allowance for doubtful accounts" in their tariff determination. This will raise their base tariff (schedule I<sup>47</sup>) and create a delta between schedule I and schedule II<sup>48</sup> that would become part of the TDS. System losses are also largely concentrated within the four poor-performing DISCOs. Implementing a purchase power agreement between the DISCO and CPPA will legitimize this expense for the regulator and allow it to be included in their tariff determination.

Most importantly, there is a failure of governance at all levels – federal and provincial government, corporate entities and the regulator. The federal government has failed to resolve the issues that would resolve the current circular debt problem and stop future accumulation of the debt. The government has been reluctant to initiate improvements in the legal framework to curb theft of electricity, limit the recourse to courts for debtors, and stop political interference in sector governance. The system of indirect subsidy payments by the MWP and MOF (including verification process, and data management of invoices and payment of subsidies) all require improvement. Development of domestic energy resources, including renewables, demand-side management and conservation continues to be neglected. Provincial governments also are not proactive in resolving issues such as the reconciliation of bills, tubewell subsidies, arrears of provincial government departments, and arrears due to court orders.

At the corporate level, the efficacy of the BODs in monitoring and enforcing management performance and accountability is lacking. Many areas of improvements of corporate governance have been recommended through USAID assistance programs, but these have yet to be implemented.

NEPRA's role also needs to be improved. The annual determination of tariff and subsequent adjustments for fuel costs is a lengthy process which currently creates revenue shortfalls.

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<sup>47</sup> NEPRA determined tariff.

<sup>48</sup> GOP notified tariff.

Similarly, the delays in fuel cost adjustments not only cause cash flow problems but confuse customers as to the true cost of electricity. NEPRA's responsibility for protecting customer interest also needs improvement. Overbilling is still an issue at DISCO level with NEPRA only playing a reactive role.

The problem of circular debt is not insurmountable if the sector's governance is improved. Legacy payments can be wiped out through decisions/reconciliation of bills, arrears can be reduced to the number of days of billing cycle through strict compliance with electricity agreements, and TDS can be curtailed by charging the cost of supply of electricity to end-users and targeting subsidies to deserving customers. Specific recommendations are given in the following section.

## **4.2. RECOMMENDATIONS**

The primary tasks before the GOP are to remove the current overhang of circular debt on the power sector, and to prevent its recurrence. The current level of debt prevents government owned entities from obtaining funding to support improvement in management and system operations and from attracting investment needed to support sector expansion and improved services. Major sector reforms and improvements in governance are needed to prevent its recurrence.

To resolve these problems, the GOP needs to achieve two tasks:

- (1) Remove the circular debt from the books of energy sector entities (DISCOs, CPPA) and take responsibility for the mismanagement of the power sector reform process. Move the circular debt amount to the government's debt, reallocate in consumers tariff or place a tax on the consumer to recovery over time
- (2) Undertake specific policies and programs to improve the governance and performance of energy sector entities to decrease costs, increase cash flow, and ensure operational/financial integrity of the sector.

The high level of TDS requires the GOP to commit a substantial amount of budgetary funds from scarce resources while reducing allocations for many other competing demands. Prudence demands that various avenues be explored to reduce TDS to make it as manageable as possible. This requires both short-term and long-term reforms at the GOP/Policy, ministry, regulatory, DISCO/corporate and functional levels. Specific reforms include the following:

### **4.2.1 ROLE OF GOVERNMENT**

The GOP needs to ensure effective management and operation of the power sector as well as its long-term financial viability. To do so, it needs to redefine its role in the sector from primarily acting as owner/operator, to policy formation and sector oversight. There needs to be a policy shift from Government to Governance. Accomplishing this role shift is a long-term prospect, but needs to begin immediately through development and implementation of the reform efforts outlined above. It also requires a covenant with the people of Pakistan and with energy sector stakeholders to achieve real reform of the sector for the betterment of all.

It is important to keep in mind that the power sector reform effort is a comprehensive program that affects all segments of the power sector, with short-term and long-term

objectives. Effectiveness of the program requires a comprehensive GOP strategy so that the specific reform elements move forward together, as progress in one part of the sector (e.g., improved revenue collection by the DISCOs) requires progress in the other parts (e.g., legislation to make power theft a crime).

Specific reform elements at the GOP level include:

- NEPRA needs to be made truly independent; its authority to move from a single-buyer to a more competitive market structure enhanced, the professional and technical requirements for members and staff strengthened, its enforcement authority increased, the composition of its technical staff reviewed and revised, and a comprehensive capacity building and training effort initiated.
- Tariff and subsidy disputes between the provincial governments and CPPA and the DISCOs need to be resolved, either by negotiations or arbitration.
- Legislation declaring electricity theft a punishable crime with penalties ranging from fines to imprisonment. Special courts should be constituted to swiftly handle and dispose of energy theft cases.
- The selection criteria and methodology for appointment of DISCO' BODs needs to be improved. Members of the BODs need to have high professional and technical capabilities; be independent of political influence; have full authority for decision-making at the DISCOs, and receive training to effectively monitor performance and enforce accountability of DISCO management and staff.
- Eliminate the uniform tariff and gradually move towards differential tariffs based upon true costs.
- Improve the fuel allocation policy in the short term to allocate fuel to the highest value uses (e.g., assign a high priority to the power sector in the allocation of natural gas), and in the long term eliminate fuel allocation so that fuel use is based on competitive market forces. Allocation of cheap fuel should be on the basis of its larger economic effect rather than political reasons.
- Formulate policies and plans to promote hydro power and other domestic sources of energy that will assist in balancing the electricity supply portfolio.
- As gas resources are already depleting and hydro power needs considerable lead time, and also since there is a significant availability of thermal based generation capacity within the country, therefore there needs to be an urgency to implement coal conversions at the available thermal power plants.
- Renewables as cheap fuel source with less dependency on imported fuel should be considered a priority. The advantage with renewables power generation is that the fuel spread is virtually all across the country and resultantly small to medium power plants can be built at load centers with the added advantage of being environmental friendly.

- Government/provincial government receivables to be paid as per other customers and a mechanism of billing disputes to be reviewed within three months and no option to file with the courts for the next five years.
- Implement a strong program of energy conservation and demand-side management.

#### **4.2.2 REGULATORY LEVEL**

- The system of annual tariff determination for all companies (DISCOs, NTDC, and GENCOs), needs to be reformed. There are time delays in tariff filings and determination, a lag in recovery of cost increases, and a mismatch between the timing of tariff determinations for various segments of the sector. NEPRA should institute a system of multi-year tariffs to overcome these issues and allow NEPRA time to focus on other regulatory functions.
- There is a considerable time delay in determination and implementation of the fuel adjustment charge. NEPRA should adopt a system of prospective fuel prices in tariff determination and make correcting adjustments on a more timely basis.
- NEPRA needs to have the authority to gradually move from a single buyer model to a multiple buyer/seller/open access model for the power sector.
- FPA mechanisms for DISCOs should be improved to eliminate the time lag for determination and billing of FPA to customers.
- Aggressively monitor the performance of power companies to enforce compliance with their license/tariff conditions/determinations.
- Tariffs and their terms and conditions need to be restructured.
- Out-of-the-box thinking for commercial governance. There are several commercial governance models available in the utility businesses that have turned loss-making entities into profit-earning ones.

#### **4.2.3 CORPORATE LEVEL**

- The DISCOs are owned by the government and therefore do not operate on a commercial basis and are unduly subject to political influence. To overcome this situation, the DISCOs should be corporatized and then privatized. Privatization is a long-term goal, but policies and procedures to accomplish it need to begin now. Transparency and openness in the privatization process is essential, and the privatization process should be managed by a reputable international consulting firm.
- Each DISCO should be managed at corporate level by a professionally selected top management. This team must be tasked with clearly defined JDs and KPIs. There must be a clear corporate vision and demonstrated business plans for running the DISCO.
- Top management must assign realistic targets with time lines to the operational management. Such targets should be made a part of the annual performance reviews (APRs) of the operation officers. The APRs should be a sliding scale and should identify and reward good performers and reprimand non-/poorer performers.

- DISCOs should be given realistic targets for losses, recovery, quality, quantity, safety and customer services.
- Implement a comprehensive energy loss reduction program in each DISCO, especially in PESCO, HESCO, QESCO, and SEPCO where distribution losses are relatively high. This program should focus on reducing technical losses to permissible technical operating limits, depending on investment available, and reducing non-technical losses initially to NEPRA's given targets.
- Design and implement programs focused on energy efficiency and demand-side management through tariff-charging appropriate to the usage.
- Enforce electricity supply contracts, disconnecting defaulting customers without discrimination.
- Implement a comprehensive revenue collection and theft prevention program in each DISCO, especially in HESCO, SEPCO, PESCO, and QESCO where revenue collection is relatively low as compared to FESCO, GEPCO, LESCO, MEPCO, and IESCO. Features of the program should include, but not limited to the, following:
  - Replacement of electromechanical meters with modern metering technology and digital AMR systems.
  - Business processes reengineering to improve management control and customer service.
- DISCOs must have improved visibility programs through better information technology solutions like emails, improved database management, AMRs and real time information of key commercial elements such as billing and recovery. Technology is available in the market. It only needs to be brought in.
- Load shedding needs to be recognized and prioritized on a commercial basis across all DISCOs. The benchmark should be 11KV feeder losses and recovery percentage.

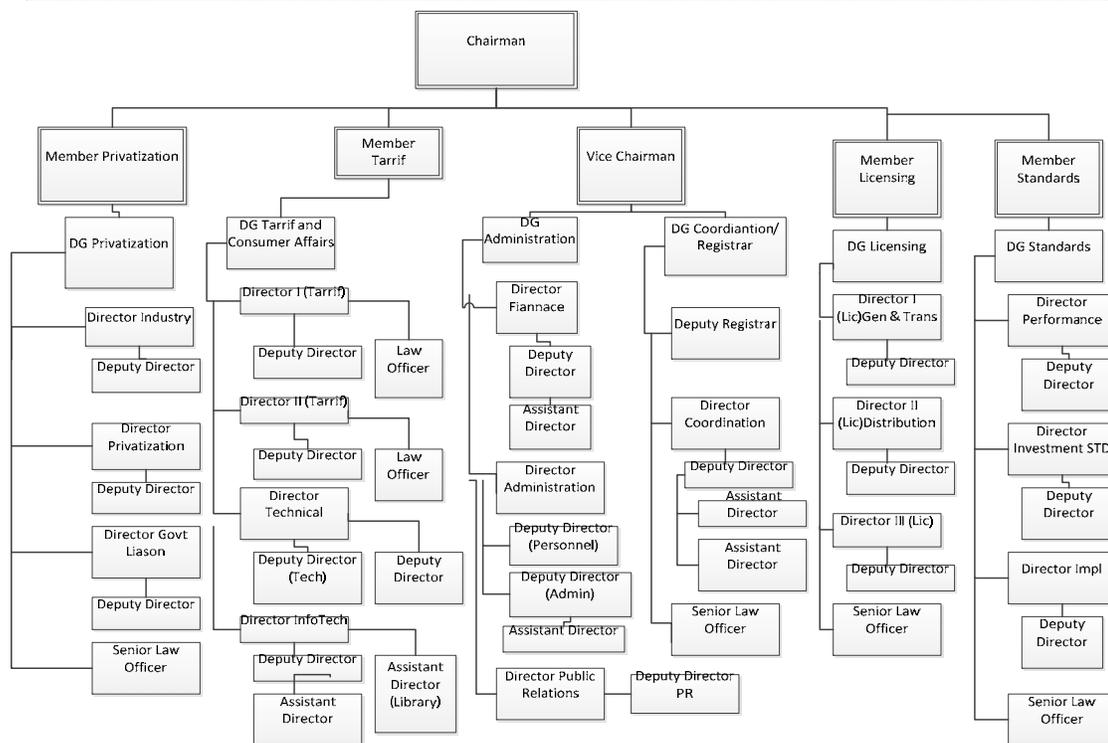
# APPENDIX A: TARIFFS IN PAKISTAN

## I. TARIFF SETTING PROCESS IN PAKISTAN

NEPRA was established by an Act of Parliament in 1997, and is legally responsible for the regulation of generation, transmission, and distribution of electricity in Pakistan. It is legally considered an independent, quasi-judicial authority. It has exclusive responsibility for determining the DISCOs' consumer-end tariffs, the tariff for the NTDC, and for all power generation companies supplying electricity through the national grid or otherwise.

The Prime Minister of Pakistan appoints NEPRA's chairman while one member represents each province as part of the authority, thus completing the five-member decision-making body. A pool of NEPRA employees that includes technical and financial professionals supports the members. See NEPRA's organization chart below.

Figure A-1: National Electric Power Regulatory Authority Organogram



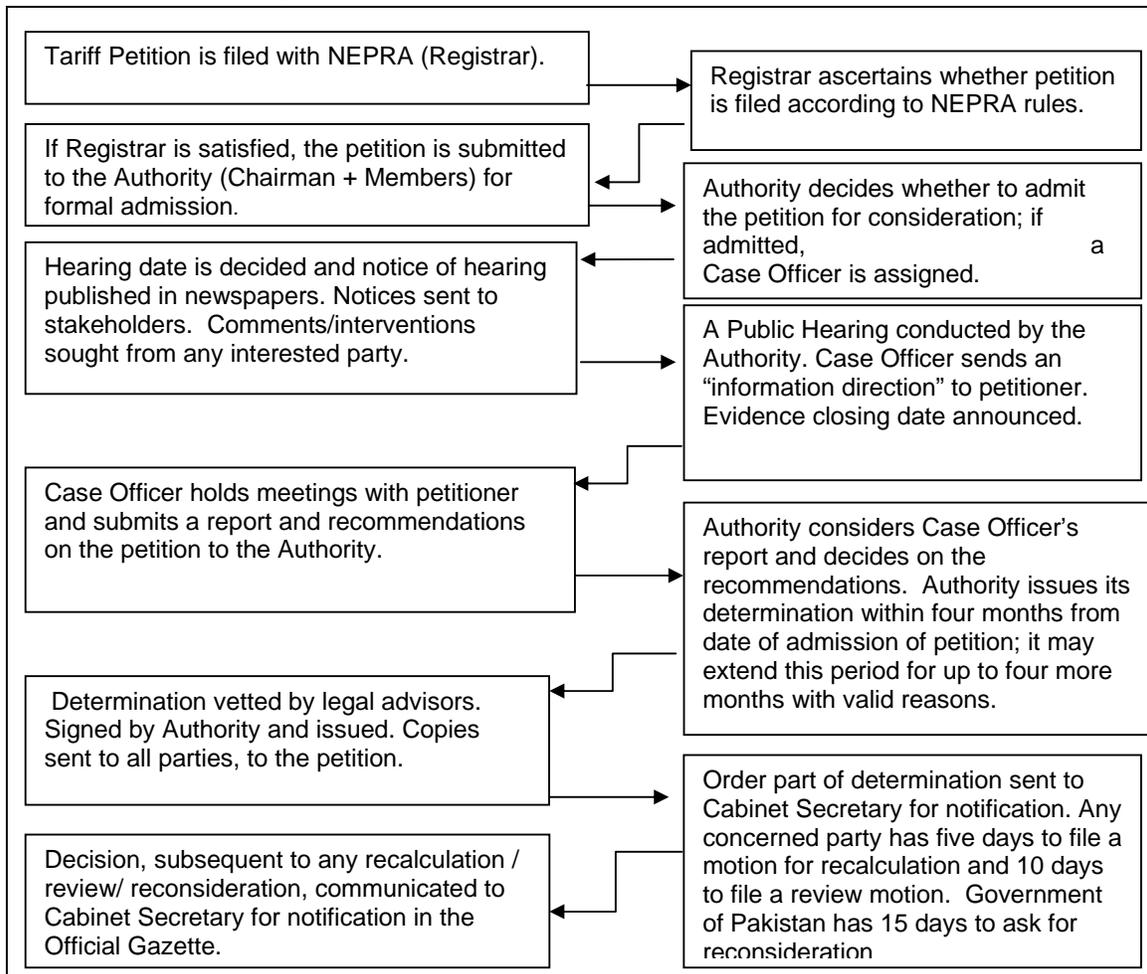
Under Rule 6 of NEPRA's Distribution Licensing Rules, only a distribution tariff approved by NEPRA may be charged against a consumer, including bulk power consumers.

Clear rules for filing tariff petitions are included in NEPRA's Tariff Standard and Procedures Rules, 1998. A tariff petition should include:

- Name and address of petitioner
- Requisite fee
- Grounds for petition
- Relief or determination sought
- Comparative financial or other information for NEPRA review
- Comparative table of tariff design, proposed design, etc.
- Evidence of facts to support the petition

In cases where a license is issued and NEPRA has not determined a tariff, the Licensee has 90 days following the granting of the license to file a tariff petition. The procedure for making a determination on a tariff petition is shown in Figure A-1. The process is described in more detail below:

**Figure A-2: Procedure for Tariff Determination**



### **STEP 1: FILING TARIFF PETITION**

All petitions are filed to the NEPRA Registrar. The registrar is responsible for determining that the petition has been filed in accordance with NEPRA Tariff Rules and Regulations, has been authorized by the Board of Directors of the filing company, and is duly accompanied by the requisite fee.

### **STEP 2: ADMISSION OF PETITION**

Once the Registrar has ascertained that the petition fulfills all legal and procedural requirements for a petition's filing, the petition is placed before NEPRA's members and Chairman for admission within 14 days of receipt. The Chairman and members are collectively referred to as the "Authority." If the Authority decides to admit a petition for consideration, it usually orders publication of a public notice and appoints a Case Officer from NEPRA staff.

### **STEP 3: PUBLIC COMMUNICATION**

The salient features of the petition are generally advertised in leading newspapers of the country and a date for a public hearing is fixed. The advertisement also solicits comments and intervention requests from interested parties and includes a notice that a copy of the petition can be obtained from the NEPRA offices for a token fee. In addition, most petitions are uploaded to the NEPRA website. Copies of the petition are also sent to important stakeholders, including power sector companies, government departments, industry representatives, chambers of commerce, etc.

### **STEP 4: PUBLIC HEARING**

Any "interested person" may file leave to intervene with respect to a tariff petition, upon payment of a fee to NEPRA. Public hearings are then held on the tariff petition. Most of the public hearings are held at NEPRA head office in Islamabad, but occasionally hearings may also be held in the city in which the relevant DISCO's headquarter is based. During the public hearing, the petitioner DISCO (through its representatives) pleads its case, giving reasons for the tariff requested and explaining how the tariff has been calculated. The petitioner also gives its response to the issues raised by the Case Officer, commentators, and interveners.

### **STEP 5: RESOLUTION OF ISSUES**

At the conclusion of the public hearing, the Authority announces a date for evidence closure and all stakeholders may submit evidence on or before that date. In most cases, the Case Officer also sends an information directive to the petitioner requesting information deemed necessary. The Case Officer also may hold subsequent meetings with the petitioner's representatives to seek further clarification and explanation of issues.

### **STEP 6: DECISION TIMELINE**

According to NEPRA's rules, the maximum time period available to NEPRA for issuing a tariff determination is four months from the date of the tariff petition filing. The Authority may extend the aforesaid four months period by one month, only for causes beyond its control and subject to a maximum of four such extensions. The reasons for such an extension must

be recorded in writing. In most cases, a tariff determination is issued before the maximum stipulated time.

### **STEP 7: ISSUANCE OF DECISION/DETERMINATION**

When a Case Officer is ready to make recommendations, a report is and submitted to the Authority. The Authority discusses the Case Officer's report in a meeting and, once a decision has been reached, begins writing its tariff determination. The draft determination is also vetted by legal experts before a final determination is issued by NEPRA. This determination is sent to all stakeholders and the "Order" part of the determination is forwarded to the Cabinet Secretariat for publication in the Official Gazette.

### **STEP 8: DECISION REVIEW/RECONSIDERATION**

Any stakeholder may file a motion for recalculation, where it believes that an inadvertent calculation error in the determination has taken place. This motion must be filed within five days of issuance of the determination. A motion for leave for review may be filed by any stakeholder within 10 days of the determination's issuance. NEPRA may or may not decide to review its decision in response to such a motion.

The federal government may also request NEPRA to reconsider its decision through the Cabinet Secretary, once NEPRA's decision is sent to the Cabinet Secretariat. On receipt of such a request, NEPRA reconsiders its determination and so informs the federal government (through the Cabinet Secretary) within 15 days in order to allow for notification to the Official Gazette. The tariff becomes effective only once it has been published in the Official Gazette.

In cases where the government is currently providing a subsidy, the tariff schedule as determined by NEPRA is published in the Official Gazette along with a second schedule based on subsidized tariffs; this second schedule is stated as the rate to be collected from consumers. The difference in revenues – based on the difference between NEPRA-determined tariffs and the second schedule subsidized tariff – is provided as a subsidy by the GOP to the relevant DISCO.

## **II. TARIFF DETERMINATION CRITERIA**

NEPRA's tariff standards and rules seek to:

- Protect consumers against monopolistic and oligopolistic prices.
- Take into consideration the research, development, and capital investment program costs of Licensees.
- Encourage efficiency in Licensees' operations and quality of service.
- Encourage economic efficiency in the electric power industry.
- Be mindful of the economic and social policy objectives of the Federal Government.
- Determine tariffs so as to eliminate exploitation and minimize economic distortions.

NEPRA, as a regulatory body, has a responsibility to protect consumer interests as well as promote efficiency in the sector while ensuring an enabling environment for service providers to earn an appropriate profit.

The regulatory regime aims for the determination of tariffs based on the following criteria:

- Allow Licensees to recover any and all costs prudently incurred.
- Allow Licensees to meet the demonstrated needs of their customers.
- Ensure the viability of the DISCO as a self-sustaining entity.
- Compensate for an increase in the salaries and wages of its employees due to inflation.
- Allow a depreciation charge and rate of return on capital investment.
- Allow a rate of return which promotes continued reasonable investment in equipment and facilities for improved and efficient services.
- Reflect marginal cost principles in tariff determination to the extent feasible.
- Reflect the full cost of service to consumer groups to the extent feasible.
- Strike a balance, to the extent possible, among tariff standards in order to optimize the benefits to all persons likely to be affected by the tariff.
- Tariff components for different companies are illustrated in Table A-3 below.

**Table A-3: Tariff Components Set by NEPRA**

Tariff Components	Issues
<p><b>1. Generation Companies:</b></p> <ul style="list-style-type: none"> <li>• Capacity Charge = (Interest Expenses + Return on Equity (ROE) + Depreciation + Fixed Operating Expenses) / (Dependable Generating Capacity) = Rs/kW/Month</li> <li>i. Energy Charge = (Fuel Cost + Variable Operating Expenses) / (Total Units generated) = Rs/kWh</li> </ul>	<ul style="list-style-type: none"> <li>• In some cases, dependable capacity has deteriorated from the NEPRA approved level.</li> <li>• Actual expenses often are more than allowed expenses.</li> <li>• Fuel Efficiency prescribed by NEPRA is not being achieved.</li> </ul>
<p><b>2. Transmission Company (NTDC):</b></p> <p><b>a. Use of System Charges:</b></p> <ul style="list-style-type: none"> <li>i. Fixed Charge = (Interest Expenses + ROE + Depreciation + Fixed Operating Expenses) / (Maximum Demand) = Rs/kW/Month</li> <li>ii. Variable Charge* = (Variable Operating Expenses) / (Total Units transmitted) = Rs/kWh</li> </ul> <p>* Variable Charge also adjusted for losses and load adjustment factor, which is assumed as one until NEPRA defines individual factors for each DISCO</p> <p><b>b. Transfer price to DISCOs:</b></p> <ul style="list-style-type: none"> <li>i. Capacity Transfer Charge = (Sum of Net Capacity Charges of all Generation Companies)** (Maximum Demand of relevant DISCO) / (Maximum Demand of all DISCOs) = Rs/kW/Month</li> <li>ii. Energy Transfer Charge** = (Sum of Energy Charges of all Generation Companies)** (Total Units transmitted to the relevant DISCO) / (Total Units transmitted to all DISCOs) = Rs/kWh</li> </ul> <p>** Energy Transfer Charge adjusted for allowed NTDC losses of 2.5% in terms of units transmitted</p>	<ul style="list-style-type: none"> <li>• Actual expenses often are more than allowed expenses.</li> <li>• Transmission losses greater than allowed level.</li> </ul>

<p>c. <b>Distribution Companies:</b> Category-wise consumer-end tariffs are determined by NEPRA so as to fully recover the total Revenue Requirement of the DISCO, based on the share of projected sales of each category. NEPRA keeps the rates of certain categories at a constant level in view of government guidelines. The total units sold are estimated based on the level of losses allowed to each DISCO.</p> <p>d. Revenue Requirements of a DISCO include: Power Purchase Price, which is a pass-through part of tariff, plus taxes paid, which are again pass-through plus distribution margin of the DISCO.</p> <p>e. Distribution Margin of the DISCO includes Net Operating Expenses, Depreciation, and Return on Rate Base.</p> <p>f. Any over / under recovery due to a change in sales mix is adjusted in the next tariff period.</p> <p>g. Fuel cost part of Power Purchase Price (i.e. fuel component in the Energy Charge portion of Transfer Price charged by NTDC to DISCOs) is adjusted retrospectively at the end of each month.</p> <p>h. The actual tariff notified for implementation by the GOP is lower than the NEPRA-determined tariff and the differential is provided to the DISCO in the form of a government subsidy.</p> <p>i. General Sales Tax is paid by DISCOs on the basis of revenue billed.</p>	<ul style="list-style-type: none"> <li>• Actual expenses often are more than allowed expenses.</li> <li>• Distribution losses greater than target set by NEPRA.</li> <li>• Difference in sales mix from the forecast can only be adjusted at the time of next tariff revision.</li> <li>• Problems in passing on fuel price changes retrospectively.</li> <li>• Effect of time lag in filing tariff petition and determination</li> <li>• Delay in subsidy payment by the GOP</li> <li>• GST actually recovered from consumers is less than that payable by DISCOs because of collections being lower than billing.</li> </ul>
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During the tariff determination process, NEPRA strives to perform due diligence of the tariff application by assessing the veracity of claimed costs. The aim is to allow operating costs at a normative level which should be reasonably incurred by a company operating in similar conditions as the tariff applicant. In addition to the operating costs, regulated utilities are also allowed a return on their asset base. The rate of return is such that it assures a reasonable profit and provides an incentive for continuous investment. Costs beyond the control of a utility, e.g. power purchase price or taxes, are treated as pass-through items in DISCO tariffs.

### III. RECENT DEVELOPMENTS IN THE TARIFF PROCESS

After the restructuring of the Water and Power Development Authority (WAPDA) and the creation of independent DISCOs, all DISCOs filed petitions for the determination of their respective tariffs. Accordingly, NEPRA allowed their tariffs to be valid for a period of one year with only FESCO getting a multi-year (five-year) tariff. This was because it was slated for privatization at the time and a multi-year tariff was thought to increase the chances for successful privatization. (Since then, all DISCOs except FESCO have been filing annual tariff petitions. NEPRA adopted quarterly tariff adjustments, but they have since been scrapped.)

In 2008, the NEPRA Act was amended through the Finance Bill approved by the Parliament, directing NEPRA to determine and notify monthly adjustments in consumer tariffs due to variations in fuel costs, i.e. energy portion of the power purchase price.

Most DISCO customer categories with small loads are billed on a single tariff in Rs/kWh terms. Industrial consumers above 25kW and commercial consumers above 5kW are billed for maximum demand (Rs/kW/month) as well as a variable charge for energy (Rs/kWh). All consumers are also billed a fixed minimum amount even when there is no actual consumption of electricity. Time-of-use metering and rates have also been introduced recently.

# APPENDIX B: SECTOR BACKGROUND<sup>49</sup>

## I. EVOLUTION OF PAKISTAN POWER SECTOR

Historically, the power system in Pakistan is comprised of WAPDA, KESC, and nuclear plants managed by Pakistan Atomic Energy Commission (PAEC); in addition to some local and private captive generation. WAPDA had a franchise to supply electric power throughout Pakistan, except for Karachi and a small adjoining area of Balochistan. Both WAPDA and KESC were vertically integrated public sector entities. In 1992, Pakistan adopted a strategic plan to reform and restructure the power system along modern competitive and commercial lines. The sector was opened up to IPPs in 1994, according to the GOPs policy to rely on private sector investment for new thermal generation.

Under the reform agenda, an office of Regulator (NEPRA) was created under an act of parliament in 1997. WAPDA was unbundled into three generation companies (GENCOs), one transmission and dispatch company (NTDC), and eight DISCOs in 1998. Later, one generation company, GENCO IV, with only the Lakhra coal-fired power station, and one DISCO, Tribal Areas Electricity Supply Company (TESCO), were created. However, TESCO has not yet been licensed. Recently, HESCO was bifurcated into HESCO and SEPCO, which was given a license last year. Hydropower remained the responsibility of WAPDA as it is responsible for dams and administration of water resources. A separate organization was created in WAPDA to sell hydro power to the CPPA.

Under the reform agenda, KESC was privatized in 2005 as an integrated company. The rest of the companies may be privatized in a gradual manner in due course of time.

## II. POWER MARKET

The power system of Pakistan is operating on a “Single Buyer Model,” where the CPPA purchases power from all GENCOs, IPPs, WAPDA Hydro, and other producers; pools the electricity; and sells it to DISCOs in proportion to their demand. KESC, however, buys a fixed amount of power per a decision of NEPRA and a contract between CPPA and NTDC. It is envisaged that, ultimately, the present single buyer power market will transform into an open access competitive market.

## III. POWER GENERATION

The total electricity generation in the country in FY 2011 was 102,484 gigawatt-hours (GWh),<sup>50</sup> of which 7,826 GWh<sup>51</sup> was generated by KESC and the rest by other

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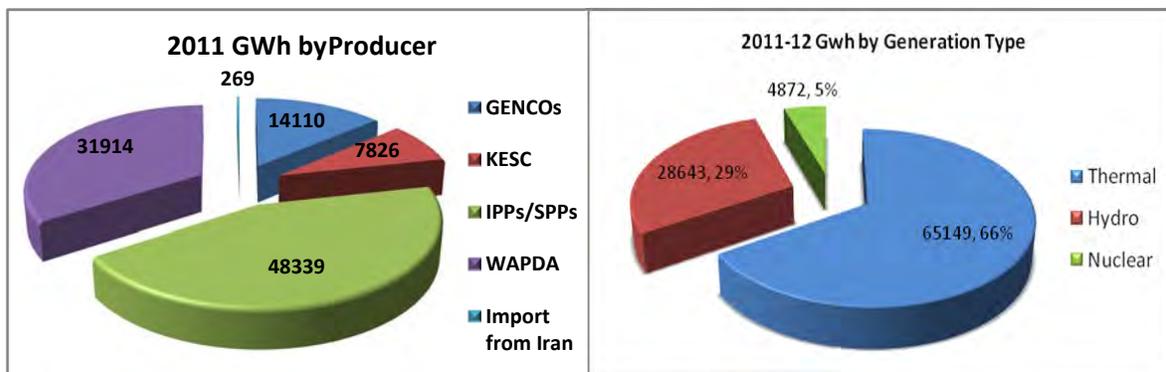
<sup>49</sup> The information for this appendix primarily comes from NEPRA’s State of the Industry Report 2011 and the State Bank of Pakistan’s annual report on the economy for FY2011. Latest figures for FY2012 have not yet been published and thus have not been included in this appendix.

<sup>50</sup> NEPRA State of the Industry Report, 2011.

<sup>51</sup> Ibid.

generators<sup>52</sup>(IPPs, GENCOs, and WAPDA Hydro) and some import of power from Iran. The composition of power generation by source and fuel type is shown in Figure B-1.

**Figure B-1: Power Generation in Pakistan in FY 2011 by Source and Type<sup>53</sup>**



The figure shows that the share of hydro power was about 31% of total generation in 2011, as compared to nearly 70% in the 1980s. Hydro power development suffered a slowdown due to controversies about major hydro power projects despite a large potential of hydro power in Pakistan. According to estimates, Pakistan has a hydro potential of about 60,000 MWs<sup>54</sup> of which only 6,555 MW has been installed.<sup>55</sup> Consequently, thermal power was relied upon. Initially, as natural gas was abundant and cheaper than oil, it was the preferred fuel for generation. However, a shortage of gas has resulted in a greater use of expensive furnace oil and high speed diesel oil. As a result, the cost of electricity has increased substantially. By comparison, the variable cost of hydropower generation was Rs0.80/kWh,<sup>56</sup> generation from nuclear plants Rs1.36/kWh,<sup>57</sup> furnace oil based generation Rs13.56/kWh<sup>58</sup> and HSD based generation Rs18.4/kWh<sup>59</sup> in FY 2011.

The total installed capacity for power generation at the end of FY 2011 was 23,412 MW. The distribution of generating capacity by ownership and fuel type is presented in Figure B-2.

<sup>52</sup> NEPRA, State of the Industry Report, 2011.

<sup>53</sup> NEPRA State of the Industry Report.

<sup>54</sup> PPIB and State Bank Annual Report 2010-2011.

<sup>55</sup> NEPRA State of Industry Report 2011.

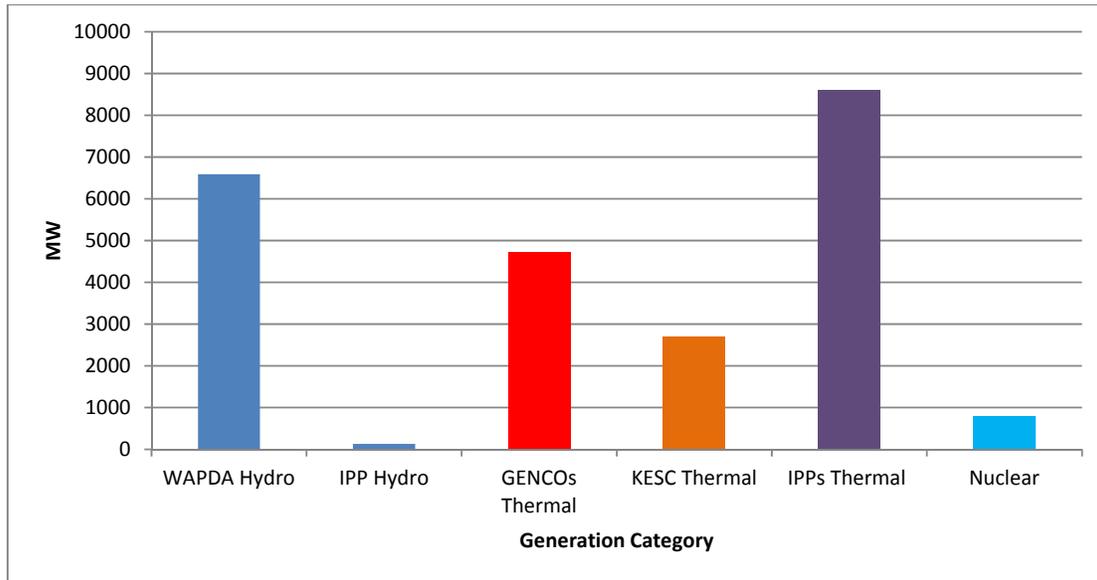
<sup>56</sup> Ibid.

<sup>57</sup> Ibid.

<sup>58</sup> Ibid.

<sup>59</sup> Ibid.

**Figure B-2: Distribution of Installed Generating Capacity in 2011 by Ownership and Fuel<sup>60</sup>**



#### **IV. DEMAND SUPPLY SITUATION**

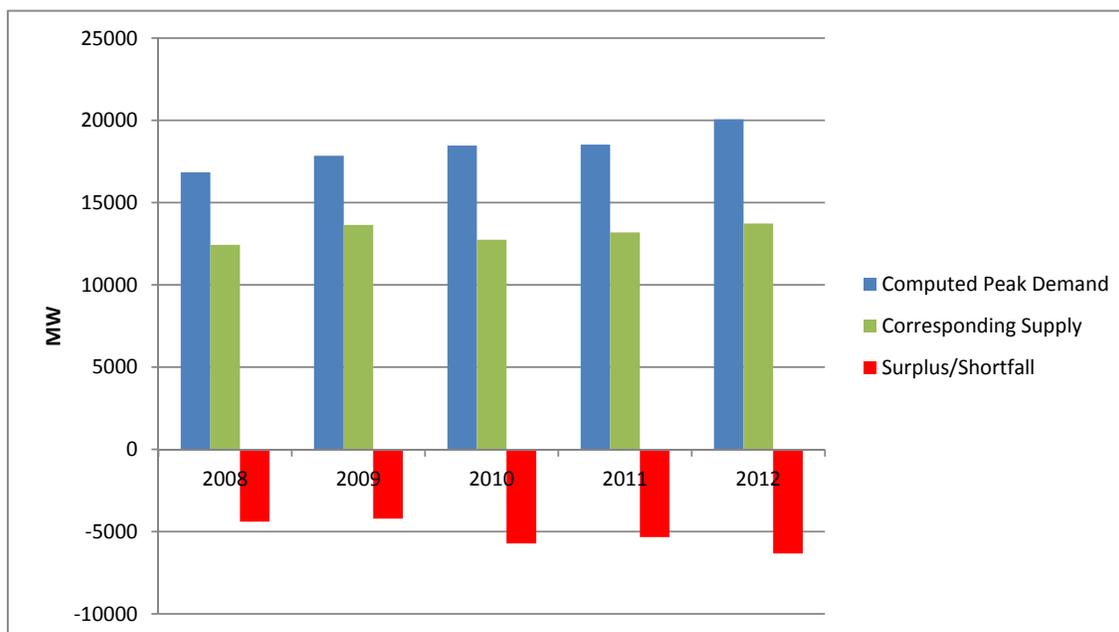
The capability of generation, however, is much below the installed capacity. This is due to variations in the natural availability of water and regulation of water supplies that gives first priority to agriculture needs, shortages of natural gas, and inefficiencies of public sector thermal plants and their frequent breakdowns. The efficiencies in some plants are as low as 24%.

The public sector thermal plants are mostly very old and are not sufficiently maintained. Some plants are being refurbished through assistance provided by USAID, resulting in recovery of some of the lost capacity. Also, due to a shortage of furnace oil, largely the result of fuel suppliers not being paid in time, the availability of thermal generation has continued to decline. For example, during FY 2011, only about 2,000 tons per day of fuel oil was being supplied as compared with a requirement of about 30,000 tons per day.<sup>61</sup> In FY 2011, the total capability of the power system other than KESC during the peak demand period was about 13,000–14,000 MW, compared with a demand of about 18,500 MW, resulting in load shedding of 4,500–5,500 MW (Figure B-3). Load shedding was reported to be as much as 8-10 hours in urban areas and about 16-18 hours in rural areas. This situation has gotten worse over last four years and is likely to continue for at least a few more years unless the underlying factors mentioned above are mitigated.

<sup>60</sup> Source: NEPRA State of the Industry Report 2011.

<sup>61</sup> State Bank Report 2011

**Figure B-3: Historic Supply Demand Situation in Pakistan**



Source: Ministry of Water and Power

## V. DISTRIBUTION OF POWER

Electricity is delivered to customers by the DISCOs and by KESC. During FY 2011, 76, 285 GWh were sold to customers of which 10,072 GWh were sold by KESC and 66,212 GWh by the DISCOs. The total number of consumers in KESC was 2.1 million and in the rest of the country 20.3 million. The mix is highly skewed with about 60% of consumption accounted for by the domestic and agriculture sectors, which are subsidized by the federal and provincial governments.

The power distribution infrastructure suffers from many problems. Many feeders and transformers are overloaded, a significant part of the system is old and dilapidated, engineering standards generally are not followed, workmanship is poor, maintenance is not done properly, a large stock of energy meters is outdated and maintained poorly, and human resources are, for the most part, not properly trained and motivated. As a result, the system suffers from high losses, electricity theft, frequent breakdowns, customer dissatisfaction, low collection of revenue in some areas, and poor financial performance. The intensity of problems is not uniform across all the DISCOs. The most stressed DISCOs are QESCO, PESCO, SEPCO, and HESCO. Electricity losses and revenue recovery in these DISCOs in FY 2011 ranged from 41% to 82%, while in the other DISCOs it is around 98% and above.

## VI. TARIFF AND CIRCULAR DEBT

Pakistan has adopted a policy of uniform tariff across the country, whereas the average cost-of-service-based tariffs determined by NEPRA show significant differences among the DISCOs. The average cost of electricity sold was Rs9.05/kWh in FY 2011, whereas the

average revenue billed to customers, excluding taxes and levies, was 7.05 Rs/KWh<sup>62</sup> necessitating a large subsidy. For FY 2009, FY 2010, and FY 2011 this subsidy totaled Rs488 billion. About 43% of this amount relates to PESCO, HESCO, and QESCO, whose share in GWh sold to customers in the same period was 28% of total units sold. The inability of the government to make full and timely payment of the subsidy, coupled with poor performance of DISCOs in revenue collection and system losses, have resulted in the current financial crisis in the power sector, and the source of the circular debt problem.

## **VII. CONSERVATION AND DEMAND-SIDE MANAGEMENT**

Energy conservation and demand-side management, although a stated priority of the GOP, have not received much attention. ENERCON (National Energy Conservation Center) was created in the mid-nineties, but it has not made much impact. An energy conservation law has been drafted, but has not been promulgated. A project for free distribution of compact fluorescent lamps was conceived four years ago but is yet to be implemented. According to estimates, at least 15% of energy demand can be saved through energy conservation and efficiency improvements.

## **VIII. INSTITUTIONAL ARRANGEMENTS**

The MWP is in charge of the power sector and is responsible for drafting policies and developing the sector. The Planning Commission of Pakistan is responsible for the development of overall plans for the sector. According to the Constitution of Pakistan as amended (after the 18th Amendment), power is exclusively the subject of the federal government and all policies are to be approved by the Council of Common Interest (CCI). The Board of Directors of the public sector power companies is appointed by the Federal Government, and is responsible for the operation of the companies, including the appointment of the CEOs. The MWP; however, remains responsible for the overall performance of the sector. It is accountable to the Public Accounts Committee (PAC), the Parliament and the public. An independent regulator (NEPRA) is responsible for the regulation of the sector. Its responsibilities, inter alia, include determination of tariffs, issue of licenses, development and enforcement of standards and codes and monitoring of overall sector performance.

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<sup>62</sup> Calculation based on sale of electricity figures reported in audited financial statements of DISCOs.

