Proceedings of the Seminar
Economy of Pakistan
The Way Forward

CENTRE for
POLICY STUDIES
Centre for Policy Studies

COMSATS Institute of Information Technology
Proceedings of the Seminar

Economy of Pakistan – The Way Forward
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Program
Economy and Energy Security for Pakistan: What Lies Ahead!

Dr. Vaqar Ahmed

Introduction and Background

The Pakistan Economic Survey (2013) recognizes that during 2011-12 around 2 percent of gross domestic product (GDP) was lost due to the power sector outages. This is certainly not helping the economy in achieving its long term potential growth rate of 6.5 percent and currently over the past 5 years the average GDP growth rate stands at around 3 percent. During FY 2012 oil and gas continued to dominate Pakistan’s energy supplies having a share of 15 and 50 percent respectively. Total energy supplies for the same year stood at around 65 million Ton of Oil Equivalent (TOE). During the same year the share of oil and gas in energy consumption was 29 and 44 percent respectively (HDIP). This continues to point towards the inability to diversify the supply side where by important alternatives including coal, hydro and nuclear can be harnessed. The distortions created by untargeted subsidies in both oil and gas sectors have implied skewed policy priorities and supply preferences determined by political pressures. Box-1 below indicates that: the indigenous gas supplies have been heavily subsidized and occupy the dominant share among the various sources of energy. Second, and even if the gas had to be subsidized there was little preference to devote a greater share to industry, instead sectors such as CNG for transport and fertilizer were supported with cheap gas supplies.\textsuperscript{2} Third gas was allocated to transport sector despite the fact that this sector already had the dominant share in oil consumption.

Finally both oil and gas occupied a major chunk in electricity generation, however the sectoral share in electricity consumption reveals that there was decline in case of agriculture and industry, while the consumption increased substantially for the household sector. The reasons for growth in the share of households is well understood from the existing literature and factors other than population growth have also impacted such skewed energy consumption patterns. Pakistan is now the fastest urbanizing country across South Asia and while there are incentives

\textsuperscript{2} We have evidence now from Ahmed and Zeshan (2013) that indirect subsidies for agriculture (fertilizer subsidy in this case) had little impact on the surplus gains of small and medium farmers.
particularly in the urbanized services sector not to move into designated commercial areas, there is also a large part of production activity now taking place in the informal sector, most of which ultimately gets recorded under the indistinct category of households.

Box 1: Patterns of Energy Consumption

Source: Hydrocarbon Development Institute of Pakistan 2012.
Institutional Review

In this section we aim to explore the fragmented governance of energy sector in turn resulting in delayed implementation of reforms and increased transactions cost. We exhibit in Figure 1 that apart from the core tasks of Ministry of Petroleum and Natural Resources whereby it is responsible for ensuring availability of oil and gas, there are other ownership and management functions that it enjoys through public sector enterprises under its jurisdiction. Interestingly when one looks at the website of Ministry of Privatization, several of these corporations can be found on the privatization list as well. This points towards a deeper analysis of public sector overhang and capacity mapping in energy sector related ministries and departments.

Figure 1: Activity Portfolio at Ministry of Petroleum and Natural Resources

The position is not very different in the Ministry of Water and Power (see Figure 2), whereby on several occasions there have been demands from various quarters that DISCOs should be completely privatized. We know now from the recent data that even in case of GENCOS the efficiency level is far below the Independent Power Plants. However GENCOS continue to remain alive because of an obsolete rule which directs the government only to provide imported oil on credit basis to GENCOS and deal with IPPs on cash basis.
At the federal level the fragmentation and control over units that should otherwise be managed by the private sector is not limited to the above mentioned two ministries.

Figure 3 exhibits various other energy sector players at the federal and provincial levels. We see the research aspects being undertaken by Ministry of Science and Technology. The regulatory bodies namely NEPRA and OGRA approach the chief executive of the government via Cabinet Division. We have seen in the past 5 years that waiting for the Chief Executive for vetting the regulatory orders in fact implied lessened accountability for the Ministry of Petroleum and Natural Resources and Ministry of Water and Power, given that both these ministries were also reporting to the same Chief Executive of the federal government. This prompted the Supreme Court of Pakistan to take suo moto notice of this clear conflict of interests. However several energy sector experts have suggested that actions by Supreme Court further aggravated the matters in the energy sector and exacerbated the already existing uncertainty at the policy level. Also included in the same figure are the provincial energy departments who need to be effectively empowered to manage at least the administrative losses. This is particularly important in the aftermath of 18th Amendment and devolved powers available with the provinces to managed generation opportunities, energy-related levies and interacting independently with private sector investors willing to come via automatic or government routes of foreign direct investment in energy.
A more important question to ask at this stage is how the above mentioned federal and provincial players in the energy sector interact. While answering this we can establish at the outset that there has never been a meeting and reporting schedule towards coordinating energy sector on an emergency footing. Initially issues were taken to Economic Coordination Committee (ECC) meeting on need basis. The ECC could only forward recommendations to the Cabinet that use to be held after one week. However once the supply demand gap in the energy sector greatly widened it was decided to resurrect the Cabinet Committee on Energy. Interestingly this was headed by the same Chair responsible for heading ECC. Thus there was no effective decentralization that could bring about efficiency in the management procedures. One of the key consequences of the above mentioned lack of coordination and fragmented decision making can be seen in Table 1. We exhibit here the primary and related causes of circular debt. More importantly in FY 2012 around 234 billion rupees could have been saved if procedural delays (owing to lack of inter-departmental communication) related to tariff determination, fuel price adjustments and DISCOs claims had not occurred.
Table 1: Circular Debt Growth from 2006 to 2012 – PKR Billions

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>1. Primary Causes</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Stock of Debt – Beginning of the Year</td>
<td>84.07</td>
<td>111.26</td>
<td>144.99</td>
<td>161.21</td>
<td>235.65</td>
<td>365.66</td>
<td>537.53</td>
</tr>
<tr>
<td>Non-collection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discos Receivables from:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Federal Governments</td>
<td>0.22</td>
<td>0.35</td>
<td>0.08</td>
<td>0.15</td>
<td>1.79</td>
<td>1.57</td>
<td>0.19</td>
</tr>
<tr>
<td>FATA</td>
<td>10.87</td>
<td>6.36</td>
<td>9.43</td>
<td>10.24</td>
<td>-78.34</td>
<td>4.3</td>
<td>13.42</td>
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<tr>
<td>Provincial Governments</td>
<td>2.25</td>
<td>0.75</td>
<td>5.09</td>
<td>7.17</td>
<td>16.72</td>
<td>36.07</td>
<td>15.84</td>
</tr>
<tr>
<td>AJK Government</td>
<td>0.54</td>
<td>0.27</td>
<td>0.46</td>
<td>1.18</td>
<td>2</td>
<td>5.5</td>
<td>6.05</td>
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<tr>
<td>Agri-Tubewells</td>
<td>0.42</td>
<td>1.28</td>
<td>1.07</td>
<td>3.01</td>
<td>3.46</td>
<td>-3.68</td>
<td>-3.12</td>
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<td>Private Consumers</td>
<td>9.08</td>
<td>7.96</td>
<td>9.64</td>
<td>19.88</td>
<td>25.59</td>
<td>39.29</td>
<td>54.55</td>
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<tr>
<td>Sub-Total</td>
<td>23.38</td>
<td>16.97</td>
<td>25.77</td>
<td>41.63</td>
<td>-28.78</td>
<td>83.05</td>
<td>86.93</td>
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<td>CPRA Receivables from KESC</td>
<td>3.81</td>
<td>16.76</td>
<td>26.74</td>
<td>-11.87</td>
<td>4.04</td>
<td>-1.79</td>
<td>13.78</td>
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<td>2. Total Non-Collections (a)</td>
<td>27.19</td>
<td>33.73</td>
<td>52.51</td>
<td>29.76</td>
<td>-24.74</td>
<td>81.26</td>
<td>100.71</td>
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<td>TARIFF &amp; Subsidy Issues</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Tariff Determination &amp; Notification Delay (b)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>72.19</td>
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<tr>
<td>Fuel Price Adjustments I</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
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<tr>
<td>Difference Between DISCOs TDS claims Vs. Actual</td>
<td>N/A</td>
<td>N/A</td>
<td>-36.29</td>
<td>39.66</td>
<td>134.84</td>
<td>48.68</td>
<td>106.02</td>
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<tr>
<td>Disbursed (d)</td>
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<td></td>
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<td>Difference Between DISCOs NEPRA Allowed Vs.</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>5.02</td>
<td>19.91</td>
<td>21.84</td>
<td>22.78</td>
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<tr>
<td>Actual T&amp;D Losses (e)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Sub-Total Tariff &amp; Subsidy Issues</td>
<td>N/A</td>
<td>N/A</td>
<td>-36.29</td>
<td>44.68</td>
<td>154.75</td>
<td>90.62</td>
<td>234.18</td>
</tr>
<tr>
<td>Total Circular Debt (As of Year End) 4=1+2+3</td>
<td>111.26</td>
<td>144.99</td>
<td>161.21</td>
<td>235.65</td>
<td>365.66</td>
<td>537.54</td>
<td>872.42</td>
</tr>
</tbody>
</table>

Source: GoP (2013). Other sub-sources mentioned below.

a: PEPCO DISCOs Performance Statistics Reports FY 2005-2012

b: USAID PDP Analysis based on data from NEPRA’s DISCO tariff determination 2012 (Data only available for the year shown)
c: Data from MoWP – Tariff Cell (Data only available for the 2 years shown)

d: Chief Engineer’s Office – MWP

e: USAID PDP Analysis

Challenges Facing Energy Sector

In this section we split our analysis by energy sub-sectors and look into specific issues related to power, oil, gas and coal sectors. We submit here that each of them do require a dedicated action plan however ultimately they feed into the same objective of energy security and sustainability in Pakistan.

Power Sector: Starting with electric power the issues being currently faced can be categorized into policy, governance, technical and cost issues (Hassan 2013). In the policy sphere the foremost challenge is the absence of an integrated energy policy at a national level. As a consequence issues such as linkages between various energy sources, sustainability and affordability of energy supplies, choice of technology in production, rising input costs and resultant increased in energy prices remain unresolved. For reasons mentioned in the previous section it seems that even if a policy was in place its implementation would have been difficult with uncoordinated and inadequate institutional arrangements. The lackluster approach towards implementation of past policies has hindered any favorable change in the energy mix. The absence of policy has also implied a lack of consensus on major decisions such as large hydropower projects. The failure to develop such projects has implied Pakistan reaching out to development partners for assistance towards thermal projects which in turn raised the cost of power supply as this sector was now exposed to volatilities in global oil prices. For a while Pakistan remained confident of supporting thermal power plans given the availability of domestic gas at lower than global market prices. However as the gas reserves started to deplete the thermal power plants had to resort to imported oil whose price was already on a rising trajectory. Under such financial stresses and growing reluctance of development partners to provide funding to this sector (unless structural reforms are carried out), the introduction of independent power plants (IPPs) became inevitable. These plants were again oil-based and the added difficulty that came around was that the agreements were sanctioned allowing high tariffs and guarantees – usually not seen in other countries. Similar mistake was repeated in recent past when the rental power plants were introduced.
Finally the absence of an integrated energy policy has resulted in a politico-economic milieu whereby it is difficult to move from untargeted to targeted subsidies. There are small to large rent seeking objectives that do not allow any reduction in such fiscal transfers. The two key examples are those of subsidies provided for agricultural tube wells or free electricity allowed to employees of energy departments including WAPDA. Under the governance of electric power we realize that poor quality of management is recurrently resulting in power theft. The ultimate loss in this case is to the consumers who not only end up paying a surcharge on account of line losses (as part of the monthly bill) but also rising taxes in order to finance government’s subsidy to the energy sector. The private sector’s default i.e. non-payment of electricity bills is commonly reported, however it is worth noting that there are large entities in the public sector who have defaulted on their power bills. It is common to see municipal organizations, water and sewerage boards, Pakistan railways, Pakistan Steel Mill etc. to default on their energy related expenses.

The weaknesses of regulator also hurt the power companies. The Government in the past has often been unable to implement the tariff determined by NEPRA which has resulted in a variation between costs and revenues of power companies. This ultimately gives rise to the circular debt discussed in the previous section. The more dangerous aspect is the manner in which the government retires this debt. Since 2009 Finance Division has arranged bank borrowing (to retire circular debt) draining the pool of loanable funds that should otherwise have been available for the private sector. On the technical side of power sector challenges it is important to mention here that dilapidated and often obsolete transmission and distribution systems are in place. It is rare to see in the recent past, examples where the old transmission lines and related systems were replaced fully or refurbished as part of a maintenance exercise. Such technical weaknesses also contribute towards exacerbating the line losses.

It is also worth taking a step backwards in the supply chain where we observe lack of maintenance of power plants. The two key reasons namely non-availability of variable costs to maintain plants and lack of accountability ultimately leading to neglect in operations, has already been cited across the scientific literature and popular media.

The last issue of rising cost of producing electric power has impacted on consumer price index sharply. It is generally argued that this is not a separate issue rather
a result of the above mentioned problems in turn causing rising costs and prices. We however will argue here that there is a causal relationship between rising costs and line losses. We have seen in the past that as soon as the increased cost of power generation was transferred to the consumer power theft increased.

Oil and Gas: The import of oil by Pakistan witnessed a sharp increase from USD 12.5 to 14 billion during fiscal year 2012. Oil alone is responsible for 1/3rd of Pakistan's energy needs out of which 1/4th is utilized in the power sector. The petroleum crude and products contributed to 35.4 percent of total imports of Pakistan during 2012-13. The government has come up with a liberal incentives regime under the Petroleum Exploration and Development Policy however investment in this sector still remains sluggish. The lack of competition implies that the big three namely Pakistan State Oil, Pakistan Petroleum Limited and Oil and Gas Development Company Limited continue to dominate the market. These entities have presence of government officials on their board and sometimes in their management that further strengthens the red tape and its associated pitfalls.

Oil and gas pricing regime have also remained a disincentive for the foreign investors. This is also one area that neutralizes the other encouraging factors in the overall investment regime. The 1997 Petroleum Policy has lessons to offer and it has been recently recommended that in line with 1997 policy the well head gas pricing should be based on 70 percent of a basket of imported crude price (Pakistan Energy Forum (PEF, 2013).

It is worth noting here that the study by Pakistan Petroleum Limited reveals potential of investment towards Tight and Shale Gas and 100TCF recoverable reserves can become possible merely through improvements in the pricing regime for natural gas. The potential of off-shore gas has yet to be explored.

When one speaks of exploration activity in minerals, oil, gas and coal, there still seems considerable lack of clarity on the roles of provincial governments and how much initiative they may take on their own. This issue is of particular importance in the post-18th Amendment milieu. Furthermore in order to reduce the discontentment amongst some poorest of the poor, it is essential that local population should be made shareholders in the exploration as well as production processes. The inability to deregulate fully and not allowing all actors in the government and private sector to pitch in with their initiatives has implied that the discovery of new gas fields has been minimal ultimately leading to gas supply
cuts to power, CNG and industry. Even in case of household sector low pressure and unscheduled outages have become a norm.

Finally, the foreign investors have cited security and loose legislation in energy sector as a key impediment for their entry in oil and gas sectors. There are instances particularly in case of public private partnerships where foreign investors had to enter in to litigation in the first phase of their investment in Pakistan. These investors are of the view that local judicial system is also very weak to fully implement the legislative cover provided to foreign investment. Similarly the materialization of sovereign guarantees in their view can take longer than anticipated in the agreement.

Coal Sector: This is traditionally the most widely used fuel for energy across the world. In Pakistan’s neighbourhood, China and India produce 63 and 47 percent of their electricity from coal. Coal’s share in Pakistan’s energy mix remains dismally low despite the fact that the estimated coal reserves in Pakistan stand at 187 billion tons and are referred to as the second largest deposit in the world.

The key reasons cited in PEF(2013) for non-development of Thar coal include inappropriate handling of prospective investment proposals, disagreements between federal and provincial governments (on matters of ownership, control and pricing), lack of administrative and technical capacity in the public sector. Since the discovery of Thar coal 22 years back the Federal and the Provincial government have not been able to resolve their differences despite the fact that from 2007 to 2012 it was Pakistan People’s Party Government both at the Federal and provincial level. The key issues that will continue to prevent the development of coal sector in future include: lack of integrated lignite/coal mining and power generation policy, no indicative tariff on coal-fired power generation, continued circular debt implying reluctance of foreign investors to invest in coal mining and power generation, land acquisition and resettlement plan for Thar Coal Fields still not in place.

Fiscal Prudence and Operations Management in Power Sector.

In 2011 Planning Commission of Pakistan argued in the Framework for Economic Growth that even if no incremental investment could be attracted in the short term for alleviating power sector predicaments, better management of existing fiscal resources, assets and manpower could put the power sector back on track (GoP
In the same spirit we dedicate this section to the financial and operational issues curtailing the performance of power sector and resultanty slow redressal of circular debt issue. The key challenges confronting this sector can be categorized into demand-supply gap, inefficiency and pilferage, and affordability. In 2012 the average demand-supply gap was observed at 5000MW. Around 44 percent of power was generated through expensive thermal means. The transmission and distribution (T&D) losses stood at 25 percent and theft was valued at PKR 140 billion (Asif and Malik 2013).

In the flow chart below we exhibit the three desired pillars of financial rehabilitation and fiscal prudence in the power sector. These fall under efficiency, competition and sustainability. The neglect of any of these three will imply future recurrence of circular debt in this sector.

Source: Adapted from Asif and Malik (2013), SDPI (2012)
Supply-side Measures

(i) Tariff Structure and Subsidies: Power (and gas) subsidies should have limited availability only for the poorest of the poor. The criteria for assessing a poor consumer should be someone utilizing up to or less 200 units of electricity. Due to similar argument the tariff for commercial, industrial and bulk users needs to be carefully revisited. Finally all forms of subsidies including hidden and cross subsidies should be phased out over a period of two years.

(ii) Tapping Available Capacity: A timely retirement of the circular debt and clearing of the general sales tax refund should help to tap the idle capacity of the plants. There should be a maximum delay limit for payables after which those responsible should be held accountable by the regulator. This limit is proposed at 45 days for residual fuel oil and 30 days for gas (keeping in view the usual delays in the public sector receipts and payment cycle). The Ministry of Water and Power will need to devise a mechanism whereby short term funding facility may be made available for plants that lie dormant due to lack of funds or pending disputes. There is substantial operational loss due to poorly kept plants. The existing production facilities should be upgraded, brought on-line and subjected to maintenance and strict environmental standards regime.

(iii) Implementing Planned Projects: The top leadership will have to assume responsibility of expedient implementation of projects whose feasibilities have been prepared and ground work is near completion. The three power derivatives where opportunities have already been identified and conceptual understanding is abundant include coal, small hydro, and biomass initiatives. The Ministry of Water and Power will have to appoint dedicated Project Director and a team underneath him (for each of such projects in pipeline) with clear key performance indicators going forward.

(iv) Gradual Change in Energy Mix: A clear identification should be made of expensive furnace oil and high speed diesel plants and they should be transitioned towards gas and later coal (once indigenous supply is in place). A flexible pricing contract should be ensured when purchasing furnace oil. This comes in many qualities and any delivery of poor quality oil should imply a reduced payment to the supplier. The poor quality lends lesser generation and a higher per unit cost to GENCOS.
The tariff structure should be incentivized in favour of low cost energy sources (including hydel, coal and biomass). The slow moving or dispute ridden mining projects may be expedited. The unaccounted-for-gas (UFG) controls should be put in place and the saved gas may be diverted to power sector. It is estimated that only 10 percent of such diversion can lend 2000MW power.

(v) Challenging GENCOs for Operations Improvement: The allocation of fuel to GENCOs must be linked with their efficiency levels. The plant efficiency can be measured through heat rate testing. If the IPPs are better performing in efficiency terms then fuel allocation may be in favour of IPPs vis-à-vis GENCOs. According to Ministry of Water and Power’s own estimates a 4000mtoe shift from GENCOs to IPPs will save PKR 77 billion annually. The current generation comparison reveals that PKR 13 billion per month for GENCOs allows production of 650 MW and only PKR 10 million per month in case of IPPs produces 1150 MW. However this at the end of the day will remain a political decision and top leadership must show its intent to side with efficiency in production processes. An easy way to start will be to upload on the website in a transparent manner details regarding allocations and efficiency levels of various generation entities. Similarly a real time exhibition of efficiency levels of these plants will imply a system of monitoring that will challenge the power sector towards better service delivery.

Equally important is a strengthened accountability across the entire supply chain. This may be ensured through signing of performance contracts with GENCOs, Pakistan State Oil and fuel transporters. The role of a single supplier can be eliminated through transparent fuel procurement contracts through an announced bidding arrangement. In the longer term trucking and open decanting can be done away with through a reliable network of pipelines. However until the time this is done there should be a mechanism to measure the quantity and quality of fuel moving from the port to GENCO.

In the medium term however the government will need to think towards privatizing and leasing GENCOs on the basis of operations and maintenance to the private sector. This may be done immediately by piloting at least 3 GENCOs immediately.

(vi) Efficiency in Transmission and Distribution: The last leg in the supply chain is the transmission of generated power to the ultimate consumer. The current
transmission losses of approximately 3.6 percent are higher than the NEPRA allowed losses i.e., 2.5 percent. This immediately calls for signing of performance contracts with National Transmission and Dispatch Company (NTDC). Due to sheer lack of expertise the existing software for transmission optimization has not been actively used. This situation may be corrected and transmission effectiveness analysis software should be in place with reporting made publically available through website. At the DISCOs level a similar mechanism of performance contracts should be in place for the heads of these companies. Such a contract should have specific clauses on reduction in distribution losses and full collection of receivables from consumers. While smart metering can help, however equally important is to hold XEN and his or her staff accountable for administrative losses. In the medium term all DISCOs may be privatized.

Demand-side Measures

(i) Power Conservation Strategy: The Ministry of Water and Power is yet to finalize a power conservation strategy which will also include setting of standards for energy products labelling. The import of non-efficient consumer electronics needs to be checked and substituted with power saving technologies (e.g. light saver bulbs). The Pakistani manufacturers should be allowed only 2 – 3 year time period to bring their consumer electrical and electronics products up to a decent efficiency mark.

(ii) Tariff Management: The ‘time-of-use’ meters and related smart metering techniques may be brought to use so that different rates for peak timings may be charged. Unless the supply side improves it is essential that time limitations should be imposed on the operations of street lighting, commercial lighting, shopping malls etc. The large scale consumers may be provided ensured power supply but at higher rates. For other customers true economic cost of generation may be passed on with subsidy only for the poorest of the poor (criteria mentioned above).

(iii) Amendments to Financial Rules and Legislation: A chunk of provincial electricity dues can be deducted by the federal adjuster. For disputed payments and independent arbitrator’s bench may be appointed to settle such disputes between federal and provincial governments. This bench should only be allowed 6-8 months to perform this task. Federal Board of Revenue will have to devise a mechanism whereby future build-up of general sales tax can be avoided.
Amendments are required in PPC and CRPC to further strengthen punishments in the case of electricity (and gas) theft. Any future load shedding may be more intensified for areas where collections are lower. Finally a clear legislation is required that allows defaulters connections to be severed.

Coordination and Implementation of Reforms Strategy

While we have proposed (in line with sitting government’s party manifesto) that a single Ministry of Energy may be established that pulls together the currently fragmented governance structure in the energy sub-sectors. However until this is done the government should immediately notify a high level coordination committee which will have representation from Ministry of Water and Power, Ministry of Petroleum, Planning Commission, Ministry of Finance, Federal Board of Revenue and Provincial Governments. The Terms of References for this committee should be clear and Prime Minister should regularly seek update on the committee’s work progress.

Finally, it is more important now to look into factors that keep NEPRA and OGRA toothless organizations. They should have autonomy in its true spirit and must be empowered to assert at both strategic and tactical levels.

Possible Sectoral Measures

In developing the following matrices we have limited our focus on the reform of supply-side practices in power sector, oil & gas, and coal. We believe that any recovery in economic growth via resolve of energy crisis can come in the short to medium term through these interventions. We understand that there are other options as well (falling under financial management, attracting foreign investment and harnessing renewable sources) which we will take up in the next section.
### Short and Medium Term Options

<table>
<thead>
<tr>
<th>Sectors</th>
<th>Gas</th>
<th>Oil</th>
<th>Electricity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household</td>
<td>Increase the tariff for slabs consuming gas greater than 3.55 M.cu. ft/month, in order to discourage the excessive use and misuse of gas.</td>
<td></td>
<td>Promote energy conservation practices to manage the demand side.</td>
</tr>
<tr>
<td>Industry</td>
<td>The industry should be prioritized for the availability of gas. However the prioritization among the industrial sub-sectors should not be based on political favouritism rather on an integrated policy approved by the Cabinet. In case of cement industry, the use of waste to energy should be promoted further in order to spare the gas for other manufacturing industries.</td>
<td></td>
<td>The priority should be given to the export-oriented industries and this decision should have Cabinet approval. While the other industries should receive a single shift supply but on scheduled times.</td>
</tr>
<tr>
<td>Sectors</td>
<td>Gas</td>
<td>Oil</td>
<td>Electricity</td>
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<td>Agriculture</td>
<td>The gas relieved from cement industry and inefficient thermal power plants should be allocated to fertilizer. Hence the order of priority in allocating gas may be as follows:</td>
<td>Introduce the usage of solar tube wells to reduce the diesel usage and relive the oil for transport sector</td>
<td></td>
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</tbody>
</table>
|         | 1. Industry  
2. Efficient Thermal Power Plants  
3. Agriculture  
4. Domestic (cooking only)  
5. Commercial  
6. CNG for public transport only | | |
| Transport | Promote the use of efficient private sector led public transport for optimizing the use of fuel in transport sector. The Ministry of Petroleum and Ministry of Communication (also takes care of transport portfolio) should form a joint working group in order to press upon this mutual objective. | The transport sector may be prioritized for use of fuel oil and discourage the use of gas.  
In addition to this, the hybrid cars already introduced in Pakistan should be promoted | |
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<td>Power</td>
<td>Allocation of gas to the most efficient thermal power plants on immediate basis to optimize the utilization of this resource and spare the gas for industrial use.</td>
<td>Real time monitoring of quality and quantity of imported fuel oil through web based procurement system</td>
<td>Inclusion of contract performance clauses addressing the specification i.e. sulphur content, basic sediment and water and specific gravity, of procured fuel oils in sales/purchase agreement. These clauses, if present in contract would help to monitor the quality and quantity of procured fuel oil. As any deviation in the aforementioned specification would be subjected to the price variation accordingly.</td>
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<td></td>
<td>Modernization/maintenance of thermal power plants to enhance the fuel efficiency and optimize the gas usage.</td>
<td>The real time monitoring and presence of these performance based clauses if included would optimize the cost of generation thus having direct impact on end user tariff. Moreover, this step would also provide a relief to the circular debt as import bill is one of prime components of this debt.</td>
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<td>Re-negotiate the price of Iran-Pakistan Pipeline Project. As, the current price of imported gas is estimated around 15$/MMBTU which is subjected to further increase due to price formula linked with JCC. This linkage is not viable in view of other gas on gas markets which are comparatively cheaper.</td>
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<td>1. Gradual shift of power generation from thermal to other low cost sources</td>
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<tr>
<td>Commercial</td>
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<td>The practice of closing the business activities by 8:00 pm needs to be replicated again in order to cut down the electricity usage and spare it for domestic and industrial usage.</td>
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Similarly, the provincial governments may also consider allowing Saturday as a holiday in lieu of expanded working hours for the rest of 5 days per week.
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<tr>
<td>Provincial Governments and Municipal Authorities in Urban Areas</td>
<td>OGRA may be empowered to hold the provincial governments responsible for administrative and line losses. It is important now that in the post-18th Amendment milieu, provincial governments should assert themselves better in energy governance.</td>
<td></td>
<td>The municipal authorities must be held responsible for their failure to pay their electricity dues, negligence to check electricity theft and inability to cooperate with DISCOs in catching power sector defaulters. Ultimately NEPRA may be empowered to hold the provincial governments responsible for administrative and line losses.</td>
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# Long-term Options

| **Gas** | A strategic and concrete Natural gas policy addressing the demands of all sectors should be formulated after due collaboration of relevant stakeholders.

Shale gas needs to be explored keeping in view the current gas shortfall and increasing gas dependent needs. |
|---|---|
| **Oil** | Promotion of Biogas based public transport in order to reduce the dependence of oil in transport sector. It is estimated that Pakistan is the 13th largest country in cattle production and can produce biogas with high concentration of methane required in biogas buses.

The usage of petroleum products in transport can be reduced through modernization of railway system and shift both passenger and cargo trains from diesel to electricity, as practiced in India. It is estimated that around 1000MW of electricity would be required in modernizing the whole railway track which if implemented would play a pivotal role in reducing the burden of import component in circular debt.

In case of power, concerted efforts should be done to enhance the electricity generation through other low cost sources with hydropower (via small dams) as prime priority, (others include solar, wind, biomass, bagasse cogeneration, power generation through low Btu, nuclear and coal) thus reducing the dependence on oil and shifting to cost effective options. |
| **Electricity** | The building codes should be revisited for minimizing the usage of electricity at-least during day time.

The industries should be subject to annual energy audits in order to check for any wastages that could be addressed.

The municipal services requiring power e.g. street lights should be converted to LEDs to minimize the electricity consumption. |
The Federal Government and Government of Sindh should resolve the contractual issues relating to mining and power production from Thar Coal.

Furthermore there is a need to explore the coal resources in Baluchistan, Punjab, Khyber Pakhtunkhwa and Azad Jammu & Kashmir having heating value around 9000 Btu/LB -15000Btu/LB which is greater than the heating value of Thar coal resources i.e. 5000-13000Btu/LB.

In addition to this, new options should be explored for power generation using coal. In this regard, Coal Water Slurry (CWS) is a cost effective option and its retrofitting cost in case of coal conversion of thermal power plants is comparatively less than other technologies. Moreover, it is also suitable for using low quality Thar coal having greater moisture content (16%) as compared to other coal resources in Pakistan.

Way Forward

This study aims to review the current status, challenges and solutions at hand to address Pakistan’s energy woes. We argue that a fragmented governance structure with embedded rent seeking across the supply chain is the fundamental weakness in energy sector’s service delivery. The good news is that there is ample of idle capacity which can be made use of even under the currently low levels of new investment. Other short term measure may focus on:

(a) Reducing the pilferages in oil, gas and power sectors,

(b) Signing performance contracts at generation, transmission and distribution levels,

(c) Eliminating untargeted, hidden and cross subsidies,

(d) Bringing about transparency through online information regarding allocation of fuel and production efficiency levels. In the medium term the ongoing low cost energy sector projects may be completed. A momentum can be created through addressing the legislative lacunas in the execution of public private partnership projects particularly in the coal and hydro sectors.

In the last part of this short paper we suggest (as shown in Figure 4) the use of social accountability tools by the civil society to: a) counter the currently
existing distortive incentives for status quo in the energy sector, and b) allowing consumer to shape the public perception and thereby political will to perform on the energy front. The social accountability tools have recently been used by civil society organizations with help of local communities in holding local administrators in education and health sector accountable and for keep a track of delivering on political promises (see Ringold et. al., 2011).

Figure 4: Creating Demand-side Pull for Power Sector Reform

We propose a framework for stakeholder’s engagement (Figure 4) which shows citizens as clients make a coalition and drive the reforms process. The local area civil society organizations can act as the secretariat for this effort. By local area we imply for example the catchment area of a single DISCO. In the first phase a social accountability tools such as citizen’s report card may be used to document the challenges faced by producers and consumers as clients. This scoping exercise will also document through citizen’s own responses if any local area coping strategies have been developed by communities or businesses.

In the second phase consumer associations and business chambers should lead the effort of framing clear policy advice for energy security in their district and develop a mechanism to follow up this policy advice with the administrators. Usually the follow up work is done by social accountability committees which are formed at local areas level. Finally after a certain time period another round of citizen’s report card should reveal if the executive or legislative branch of the government has responded and on what specific reforms. The clients can quickly remodel their approach to social accountability if they feel that government’s response has not been satisfactory. By doing several such rounds the communities and business chambers / associations can in turn develop the capacity to benchmark
the various political regimes and how well they have performed to their energy demands.

References


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