

## **Pakistan's Power Crisis: How Did We Get Here?**

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### **Abstract**

*This article has a rather modest aim. In contrast to most analyses that abound, it submits that Pakistan's energy crisis stems primarily from a suboptimal policy and only secondarily from governance issues. This does not mean that governance is not an important issue. With around 20 different organizations involved in the power sector—e.g., WAPDA, PEPCO, PPIB, AEDB, GENCOs, and IPPs—there is much scope for governance failures. In addition, there is much malfeasance perpetrated by political and other interests. Still, since governance mechanisms are significantly shaped by incentive systems and operating policy regimes, we will argue that the problem lies primarily in policy choices made earlier, and focus in particular on two elements of the policy that need to be revisited.*

**Keywords:** Power crisis, policy, governance, Pakistan.

**JEL classification:** G30.

### **1. Introduction**

In Pakistan, 2012 is proving to be the Year of Energy Summits. Typically, it all starts with a large mob emerging onto the streets of Lahore, Faisalabad, or another major city of the country, demanding an end to the rampant load-shedding that has been plunging entire cities into darkness for over 12 hours a day and rural areas for 18–20 hours a day, with the electricity shortfall reaching 7,000 MW in May 2011 (Malik, 2012). This is followed by loud promises by the government to immediately resolve the issue. Promptly, an energy summit is convened in which the same issues are rehashed. It produces no tangible results apart from (occasionally) a curious drop in load-shedding for a week or two due to the release of some payments to the independent power producers (IPPs). Almost invariably, however, the problem is treated as one of governance—issues of corruption in distribution companies (DISCOs), their failure to collect bill payments, the government's inability to pass on the full costs of energy production, or its failure to meet its obligations to investors who are left with no choice

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but to stop producing electricity, hog the headlines. Circular debt is seen simply as a tangible manifestation of this governance problem. Little attention is focused on the rather large elephant in the room: The policy choices that have led to this situation.

## **2. The Antecedents of the Current Crisis**

To trace the roots of the problem, one has to go back almost 25 years. Until the mid-1980s, the Water and Power Development Authority (WAPDA) and Karachi Electric Supply Company (KESC), the two public sector organizations responsible for the generation, transmission, and distribution of electricity were faring quite well (Malik, 2012, p. 2). Electricity was produced primarily through hydropower projects, keeping the production cost minimal, even when one took on board the much-maligned “public sector inefficiencies.” Since the cost of production and demand were low, so inevitably were the subsidies in absolute terms.

With an increase in demand in sight, it was felt that additional generation capacity was required. However, rather than adding it in the public sector, the opportunity was taken to privatize the sector, with much encouragement from the World Bank (Fraser, 2005). The move was justified on the basis that privatization would (i) lead to better, wider, more reliable service delivery; and (ii) free up government resources to spend on health and education. It was argued that cutting the subsidies would be good because they were not helping the poor anyway as they were mostly not connected to the grid (ironically, according to Malik (2012), the rural poor majority is still only receiving 0.42 percent of the tariff differential subsidy).

The first big step in this direction was the Hub Power Project (or HUBCO), a 1,292 MW, USD 1.6 billion project that was celebrated widely among global investors. Euromoney Institutional Investor first hailed the impressive Hubco deal as “Deal of the Year,” and later as “Deal of the Decade” (Fraser, 2005). The generous terms offered to investors in the Hubco deal became the basis of the 1994 power policy. The policy was lauded by investors as well as by the then United States Secretary of Energy, Hazel O’Leary, who described it as “the best energy policy in the whole world” (Hill, 1999). The US Congressional Record has this to report on O’Leary’s mission to Pakistan in 1994: “Energy Secretary Hazel O’Leary has just returned from a highly successful mission to Pakistan, which has opened new doors to American business leaders and may represent as well an important turning point in our diplomatic relationship with Pakistan” (Ackerman, 1994). On this “highly successful mission,” the Record suggests that O’Leary was accompanied by 80

American business executives, primarily from the energy sector. O'Leary's trip resulted in the signing of 16 contracts worth nearly USD 4 billion (Ackerman, 1994), and led to the Government of Pakistan contracting another 3,400 MW of power at a time when the future shortfall was assessed to be between 1,000 and 1,500 MW (Aziz, 1994).<sup>1</sup>

### 3. The Terms of the 1994 Power Policy

Structurally, the 1994 power policy (and later its 2002 version) was built on a cost-plus-return basis in US dollar terms. Investors were to be provided a US dollar-based internal rate of return of 15–18 percent over the 25–30-year-period of the power purchase agreement (in HUBCO's case, however, 18 percent was initially agreed)<sup>2</sup> after covering for operational costs. This was further backed by sovereign guarantees from the Government of Pakistan. In addition, the IPPs could be built using up to 80:20 debt–equity ratios, although most opted for a 75:25 ratio. The IPPs were to be paid every month in two parts, i.e., a capacity payment and an energy payment.<sup>3</sup> The capacity payment reimbursed the IPP for all the fixed costs of the power plant, including debt servicing (remember the 80:20 debt–equity ratio) and provided the investor's equity return on top. These payments were to be made *irrespective* of whether or not the IPP was asked to produce electricity. This stipulation also made sure that the off-takers, WAPDA/the Pakistan Electric Power Company (PEPCO)/KESC became contractually liable to repay the debt (and its interest payments) taken to finance up to 80 percent of the project cost whether or not electricity was produced.

The energy payment reimbursed the IPP for all variable costs of production, e.g., fuel costs, regardless of the type of fuel employed and its market price. All payments were indexed (if relevant) to the USD/PKR exchange rate and inflation (local or foreign) changes. Thus, if the fixed foreign operation and maintenance (O&M) cost of USD 1/kWh was to be paid in Year 1 and USD 1 was equivalent to PKR 60, then the IPP would be paid PKR 60/kWh for that fixed foreign O&M component in Year 1. However, if in Year 2, the rupee devalued to PKR 80 per US dollar and US inflation was 2 percent, then the IPP would be paid PKR 81.6/kWh

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<sup>1</sup> In two articles in *The Nation* (November 28 and 29, 1994) former finance minister, Sartaj Aziz, wondered aloud: “Why are so many agreements, MOIs, MOUs and LOS being issued at such frightening speed for power generation up to 13,000 MW, which is four times the capacity recommended by the government's own task force on energy?”

<sup>2</sup> Later to be decreased to 12.06 percent in 2000 under pressure from corruption investigations and court litigation.

<sup>3</sup> Fraser (2005) provides a simple description of the various terms of the policy.

(USD 1.02 multiplied by PKR 80). Furthermore, IPPs were exempted from corporate income tax, customs duties, sales tax, and other surcharges on imported equipment. Permission was also granted for power generation companies to issue corporate bonds and shares at discounted prices (Fraser, 2005).

To understand the ramifications of the above structure, let us take a stylized<sup>4</sup> example. Let us compare a hypothetical but typical 100 MW thermal (oil-fired) power plant in the public and private sectors, respectively. To keep things simple, let us assume that it will cost USD 100 million to set up a thermal IPP. Under the 1994 and 2002 power policies, 20–25 percent of the project cost has to be provided by the investor as equity while the rest is financed through the banks against the backdrop of sovereign guarantees because of which the government is contractually liable to pay the principal and interest costs through the monthly capacity payments. Since banks typically charge the IPPs 2–3 percent spread on top of government lending rates,<sup>5</sup> a private power-producer will end up paying 15 percent in interest (in rupee terms) as opposed to the 12 percent that a state-owned producer (e.g., a WAPDA one) would have to pay. Assuming a 10-year equal repayment and no exchange rate variation, cumulative interest payments for the IPP will be approximately USD 56 million, and approximately USD 45 million in the public sector—a difference of USD 11 million.

Either way, the government will be financing both loans through its own coffers. On top of that, the government pays an equity return of 15 percent per annum for the entire 25-year life of the plant, which comes to approximately USD 4 million per annum and cumulatively USD 97 million (the net present value when discounted on an approximate 8 percent<sup>6</sup> Pakistani long-term Eurobond coupon comes to USD 40 million). So, essentially, for the sake of the 25 percent equity (USD 25 million) that the IPP investors bring in, the government ends up spending approximately

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<sup>4</sup> The example is stylized because the figures are hypothetical, and we have simplified it to make a theoretical point. It merely posits that, *ceteris paribus*, the cost of installing and operating the same plant should be lower in the public sector.

<sup>5</sup> There may be occasions when some leading business groups, e.g., Engro Corporation, can borrow at the same rate as the government, if not less. However, this is generally atypical.

<sup>6</sup> The 30 30-year Pakistani Eurobond issued in 2006 (maturing in 2036) had a coupon of 7.875 percent. The yield has been fluctuating with the world markets but given that new IPP contracts were being given out on these terms back in 2006 allows us to compare the coupon to the IPP returns

USD 83 million (97+11-25) or, in net present value terms, USD 21.42 million<sup>7</sup> more through the life of a 100 MW thermal IPP (Munir & Khalid, 2012).<sup>8</sup>

Some might argue that the above analysis does not take into account the true cost of producing power in the public sector due to the inefficiency and corruption that may be present (in other words, an economic subsidy being provided by the state). Often, the current cost of production of public sector generation companies (GENCOs) is compared to the IPPs as evidence that the former incur higher production costs (Malik, 2012). However, such comparisons are not entirely fair as the GENCOs came online in the 1960s and 1970s (Malik, 2012) and most have long outlived their plant life and are operating with obsolete technology. The IPPs under the 1994 and 2002 power policies are not more than 17 years old at most and many came online less than a decade ago (typical thermal plants have a life of around 30 years). With WAPDA a picture of neglect and with the government choosing not to invest in upgradation, it is not surprising to know that such plants have become inefficient. Similar plants in both locations would offer a fairer comparison.<sup>9</sup> Furthermore, this comparison ignores the financing cost differential and equity returns required for IPPs versus GENCOs and focuses purely on the operational metrics of the ancient GENCOs to the much newer IPPs.

Setting up and running power plants is not “rocket science” and there is no theoretical reason why WAPDA should suddenly find itself unable to run a power plant relatively efficiently. Indeed, many of the groups running IPPs currently have no prior experience of running plants. If they can do it, WAPDA with all its experience of the sector and technologies is in a far better position to do the same. Either way, running a simple power plant in the public sector is a management or governance issue, and one that must be tackled just like other government-related governance issue.

While the public sector in Pakistan undoubtedly faces serious issues, criticism of it should be grounded in facts.<sup>10</sup> As with most instances

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<sup>7</sup> The cumulative result of discounting equity returns, investor equity investment, and the interest payment differential.

<sup>8</sup> This difference would be approximately USD 55 million if we were to use the long-term US treasury rate of 2.5 percent instead.

<sup>9</sup> A former managing director of PEPCO confided that, in his experience, HUBCO never delivered on the capacity for which it was being paid.

<sup>10</sup> If the state has already decided on ideological grounds that it should not be in the business of running things, then that is a separate matter. Unfair comparisons, however, must be avoided where possible to justify such a decision.

of privatization, the energy sector, too, seems to be left holding the short end of the stick. The most difficult tasks in the power value chain are more or less all in the public sector's domain at the moment, i.e., bill collection, and transmission and distribution (T&D), while the IPPs have conveniently kept the "easy" bit, i.e., generation. Indeed, the private sector's performance in T&D has not been any better. Consider the KESC, the only privatized distribution company in the country. With 34.89 percent T&D losses in 2009/10—as compared to 9.81 percent for the Islamabad Electric Supply Company (IESCO), 13.78 percent for the Lahore Electric Supply Company (LESCO) (National Electric Power Regulatory Authority, 2010, 2011), and 27 percent for neighboring India (Malik, 2012)—the KESC has not been able to make any significant dent in T&D losses due to legacy issues for a decade under the control of two different private sector player, i.e., Al-Jomaih (KSA) and Abraaj Capital (UAE) as of 2010.

#### 4. Policy-Engendered Fuel Mix

Let us now move to an even more troubling aspect of the private power policy in Pakistan, i.e., its complete lack of concern for the source of fuel for energy generation. In the 1980s, the country's electricity generation relied on a fuel mix of approximately 60:40 in favor of hydropower versus thermal. This changed dramatically over the next decade with the fuel mix going to 30 percent hydropower and almost 70 percent thermal by the end of 2010. According to a recent World Bank report, oil now accounts for nearly 40 percent of electricity generation with gas and hydropower at 29 percent each (Trimble, Yoshida, & Sakib, 2011). This dramatic shift in generation source occurred because the 1994 power policy (and later the 2002 power policy) did not discriminate on the fuel source being employed and made the country hostage to fluctuations in international oil prices.<sup>11</sup>

The cost of this strategic policy-level folly can be understood with the following comparison. As per the National Power System Expansion Plan 2010–2030, as of 2010, WAPDA (employing hydropower production) generated electricity at PKR 1.03/kWh (1.2 cents/kWh) while public sector thermal power plants provided the same at PKR 8.5/kWh (10 cents/kWh). However, the IPPs (primarily thermal) provided the same at PKR 9.58/kWh (11.2 cents/kWh). As a result, the average blended cost of generation was PKR 6.6/kWh (7.7 cents/kWh) in 2010, which further increased to PKR 9.81/kWh (11.5 cents/kWh) for the end consumer due to line losses and theft in the T&D systems (SNC-Lavalin International Inc., 2011). It is tragic

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<sup>11</sup> Oil prices increased from USD 18 per barrel to USD 145 per barrel between 1994 and 2008.

that the private sector with arguably far higher costs is responsible for generating almost 52 percent of the total production (Malik, 2012).

It should be noted that the above numbers underestimate the true cost, which in a financial sense might be lower since all debt has probably been paid off since, between 1990 and 2010, tariffs in rupee terms have climbed up approximately 530 percent for the median domestic consumer. Indeed, tariffs increased by almost 50 percent further in rupee terms during 2011/12 (Khan, 2012). Most new thermal IPPs are charging in the range of 15–18 cents/kWh at current oil prices. As a result, tariffs might increase further if oil prices jump.

Even after adjusting for debt repayment, power can be generated far better using indigenous hydropower resources than what we are given to believe. The estimated cost of energy stands at 1.6 cents/kWh for Kalabagh dam with a vast majority of new hydros expected to come under 4.5 cents/kWh (SNC-Lavalin International Inc., 2011). Furthermore, the country has so far completely failed to develop its coal reserves (only 30 MW of power come from coal), which are estimated at 175 billion tonnes (the second largest in the world). Engro estimates a tariff of 10–12 cents/kWh for Thar coal-based power production based on the current policy. Incredibly, the world average for coal-based power production in the energy mix is 40 percent while it is only 0.1 percent in Pakistan.

To make matters worse, many of the thermal IPPs set up under both the 1994 and 2002 power policy are of inefficient design<sup>12</sup> since these policies provided a cost-plus-equity return of 15 percent irrespective of the efficiency of the technology/fuel source being used in the power plant. Reportedly, China closed down all its oil-based power plants under 200 MW for precisely this reason a few years ago. Many of these IPPs would normally be used for load-balancing (matching sudden jumps in demand, etc.) in other countries and would fall low in the merit order for power plants used, but are instead employed to satisfy standard base demand in Pakistan.

## **5. Conclusion**

It is not our intention to prescribe a particular course of action. Instead, we merely wish to alert policymakers to some elements of the existing policy framework that seems to have been counter-productive.

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<sup>12</sup> These IPPs are under 200 MW in size and sometimes employ single-cycle rather than the more efficient combined-cycle technology, hence using more fuel to generate the same amount of electricity.

Specifically, it is the perverse incentives regarding the energy mix and guaranteed equity returns that are most problematic.

The right incentives with respect to an optimal energy mix are crucial. The ideal scenario is to shift to hydropower and indigenous coal resources, and continue to develop other renewable sources such as wind and solar power. In the short term, shifting to imported coal or gas might be one solution. However, changing the energy mix provides only a partial answer. The arrangement under which private or public providers of energy come online is equally important.

The private sector delivers through competition. Businesses compete with each other and in this process value gets passed on to the consumer. The existing power policy clearly does not foster such an environment. Instead, it encourages inefficiency in the system since private power has been given no incentive to utilize more efficient technology, optimize fuel, or scale choices.

For the private sector to lead the charge in this domain, the state has to be very strong—able and willing to protect the public interest—and this is certainly not the case right now. To begin with, it might consider moving away from the current policy and contracting all future IPPs (regardless of source) in the form of a hybrid merchant market: They will not be provided any guaranteed return—apart from ensuring that debt repayments can be made—with profitability depending squarely on their cost of production. This implies that the power off-taker (the National Transmission and Despatch Company) must only despatch them in order of merit based on their cost of production (and, hence, investors' equity returns will be inversely proportional to their cost of production). This will force the new IPPs coming online to look at issues of fuel mix/scale/technology upfront. However, for the merchant market to work properly, there has to be sufficient, low-cost generation capacity in place in the public sector so that the merchant plants do not end up charging their pound of flesh, which would defeat the whole purpose.

To conclude, even if getting prices “right” seems to be the only sensible solution to many economists, such a decision ignores the imperative to set the policy right in the first place. Moreover, it is fraught with danger. Increasing tariffs beyond what they are right now—a major proportion of a poor person's monthly wages—and imposing tougher

collection methods will only produce more social unrest.<sup>13</sup> Addressing the real cause of high costs is a wiser policy. Already, industrial output is down by up to 37 percent (Siddiqui, Jalil, Nasir, Malik, & Khalid, 2011) and Pakistan's poor are being continuously burdened by increasing tariffs and taxed via inflation with each new bailout for the circular debt as the government happily prints money when problems become untenable. The problem is by no means insurmountable. All it requires is putting the public interest first, something the past few regimes have singularly failed to do.

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<sup>13</sup> According to Trimble et al. (2011), nearly 90 percent of Pakistan's consumers benefit from a subsidy. However, a majority of these are "lifeline" consumers with absolutely minimal usage for mere survival. The government has imposed a further burden on these consumers by imposing a minimum charge.

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