



A VICIOUS CRISIS CYCLE

The Energy-Economy Nexus in Pakistan

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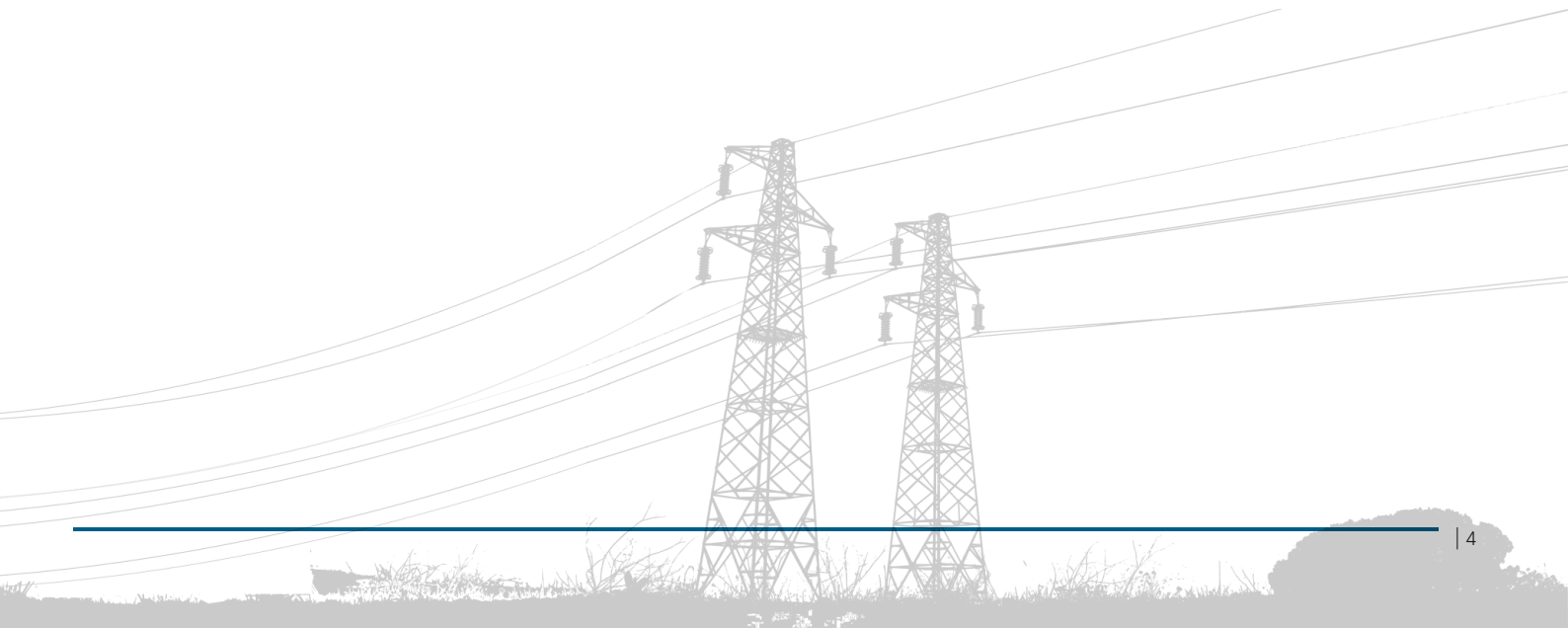
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ENERGY-ECONOMY CRISIS: AN OVERVIEW

Energy sector's crisis in Pakistan is deeply intertwined with its economic challenges, creating a complex web of interdependencies that exacerbate both problems. Pakistan's heavy reliance on expensive imported energy sources, such as liquefied natural gas (LNG), various petroleum products and imported coal, is a major contributor to the massive strain on its financial resources. Inefficient management and outdated infrastructure in the energy sector further compound this financial strain, resulting in high operational costs, heavy line leakages and thefts, poor cost recoveries and frequent supply disruptions.

In recent years, these problems have intensified because of a major rise in the prices of natural gas, oil and coal. To cite just one instance, the global rise in LNG prices, driven partly by geopolitical conflicts such as the war in Ukraine, has made it increasingly difficult for Pakistan to secure affordable energy supplies for its power plants and other consumers. Consequently, Pakistan paid 4.99 ¹billion US dollars for importing LNG in 2021-22, almost 90.6 percent higher than what it had paid previously. In 2023, too, Pakistan paid approximately 25 US dollars² for each million British thermal units (MMBtu) of imported LNG – almost double the price it paid in 2022. Pakistan similarly imported approximately 11 million tons of various petroleum products in nine months between the start of July 2023 and the end of March 2024, paying around 8.4 billion US dollars.³

In addition to these direct financial burdens, the energy crisis is also exerting a broad pressure on Pakistan's economy. The cost of generating electricity, for instance, has soared, with the price tag of RLNG-based power production reaching approximately 60 rupees per kilowatt-hour (KWh) in 2023. The consequent increase in electricity prices has led to increased production costs for industries and higher consumer prices for almost everything.

Even export-oriented industries that received subsidized RLNG from the government have lowered their output due to several macroeconomic challenges, contributing to an industrial slow down and a decreasing demand for electricity. Consequently, industrial productivity has suffered heavily, experiencing negative growth in fiscal year 2023.⁴

The figure⁵ Below shows that the industrial sector consumed 18,022 gigawatts per hour (GWh) of electricity in 2023-24, accounting for only 26 percent of all electricity consumed within the country during that fiscal year. This dismal industrial performance has resulted in job losses for hundreds of thousands of industrial workers across Pakistan.

1 https://www.pbs.gov.pk/sites/default/files/external_trade/Annual_Analytical_Report_On_External_Trade_Statistics_Of_Pakistan_2021-22.pdf

2 <https://ieefa.org/resources/consumers-may-pay-too-high-price-virtual-lng-pipelines-pakistan>

3 <https://tribune.com.pk/story/2471119/ipp-get-rs28-billion-windfall-every-year>

4 https://www.finance.gov.pk/survey/chapters_23/Highlights.pdf

5 https://www.finance.gov.pk/survey/chapter_24/Economic_Survey_2023_24.pdf

Sectoral Share in Electricity Consumption

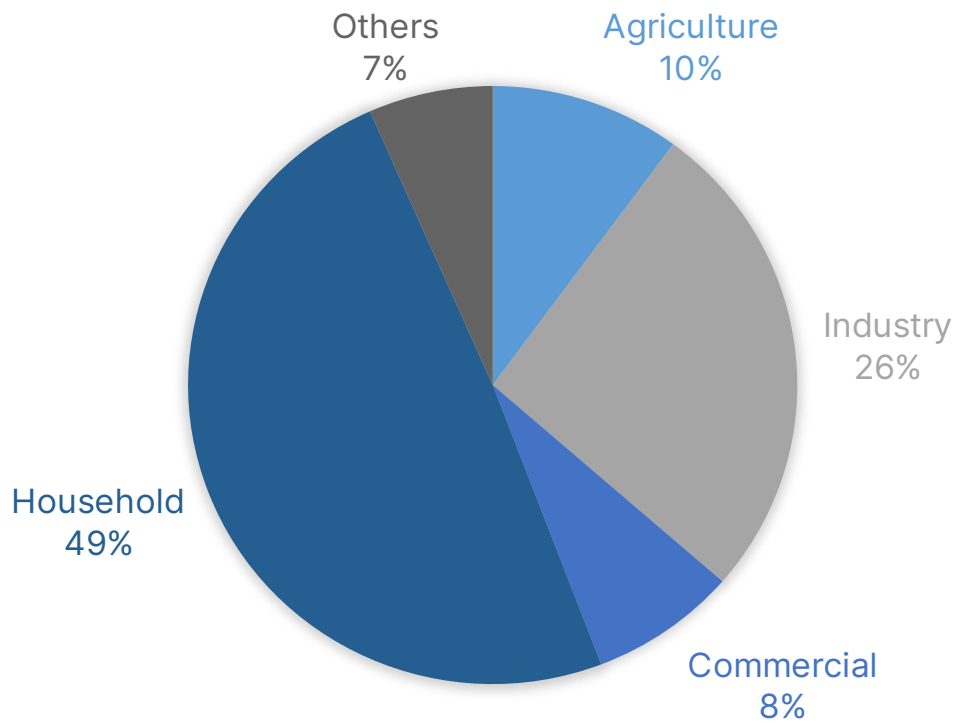


Figure 1, Source: Pakistan Economic Survey 2023-24

Also, in 2023, inflation reached 25 percent⁶ at one stage, mainly because of low local production of goods and high energy prices. Pakistan similarly paid approximately 1 trillion rupees⁷ as is apparent in the figure 2 below in fiscal year 2022-23 in energy subsidies. These subsidies, in turn, put a huge pressure on the country's income from revenue collection thereby increasing the budget deficit and fueling both currency devaluation and inflation.

6 <https://tradingeconomics.com/pakistan/inflation-cpi>

7 <https://macropakistani.com/pakistans-energy-enigma-a-historical-analysis/>

Subsidies Comparison

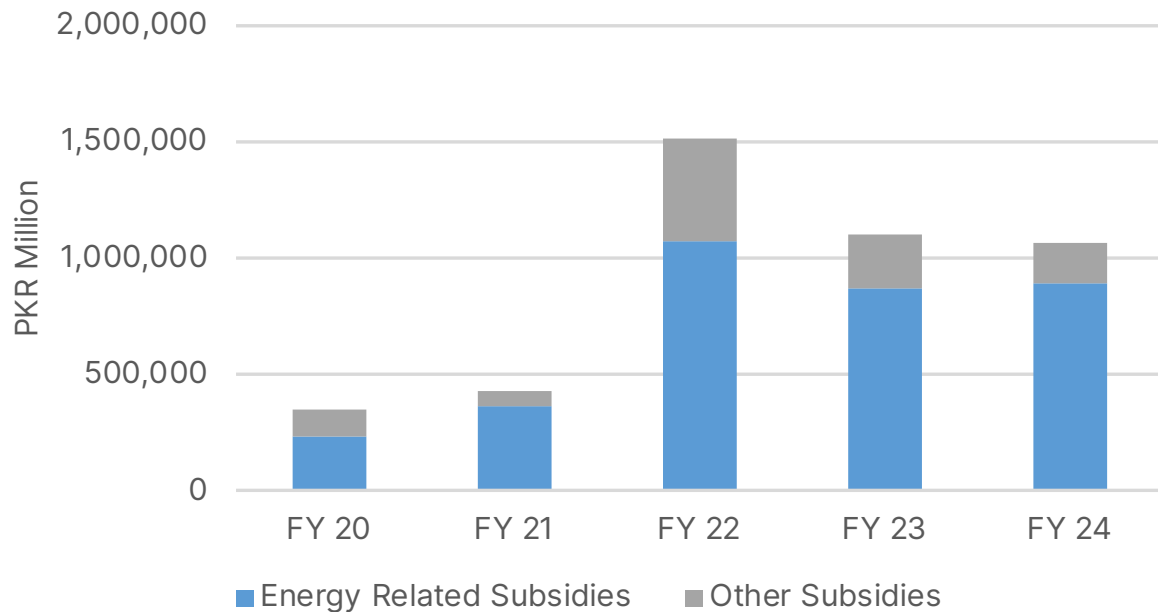


Figure 2, Source: Pakistan's Energy Enigma: A historical Analysis

To respond to these challenges, experts, civil society and everyone concerned have been calling for a strategic shift towards renewable energy sources. This transition, however, has been slow due to financial constraints and because of the existing and planned investments in energy infrastructure being built around fossil fuels such as RLNG, oil and coal. Consequently, in 2023-24 renewable energy accounted for only about 4.26 percent of Pakistan's energy mix (as shown in table 1 below), highlighting the need for a more robust policy framework and investments to facilitate an increase in its share.

Table 1 : Pakistan Energy Mix

Source	FY2023		July-March FY2023		July-March FY2024	
	GWh	Share (%)	GWh	Share (%)	GWh	Share (%)
Hydel	36,254.80	28.11	26,936.90	28.93	29,167.10	31.67
Thermal	62,639.00	48.57	43,525.60	46.75	42,249.20	45.88
Nuclear	24,054.60	18.65	18,738.80	20.13	16,753.70	18.19
Renewable	6,014.30	4.66	3,909.90	4.2	3,921.00	4.26
Total	128,962.70		93,111.20		92,091.00	

Source: National Electric Power Regulatory Authority

GROWTH AND SLOWDOWN: A CATCH-22

Gross Domestic Product (GDP) is the sum of gross value added by all resident producers in an economy plus any taxes levied on products and minus any subsidies not included in the value of products. Gross National Income (GNI), on the other hand, includes income from all the sources an economy has – both internal and external.

Growth in GDP, in particular, drives industrial activities, increases the use of transportation and electricity and leads to higher incomes and higher consumption for households. These changes inevitably lead to higher energy consumption but reliable and affordable energy is crucial for these changes to be consistent and sustained. If, however, economic growth is not matched by the required energy supplies, it becomes inconsistent and sometimes even gets disrupted, hence contributing to inflation. Conversely, high inflation can erode purchasing power, slowing economic growth. As in the case of Pakistan shown in Figure 3 below, our economic growth has fallen significantly during COVID-19 and the progress has been slow with a 0.7% decrease between 2022 and 2023, simultaneously inflation rising and energy consumption declining.

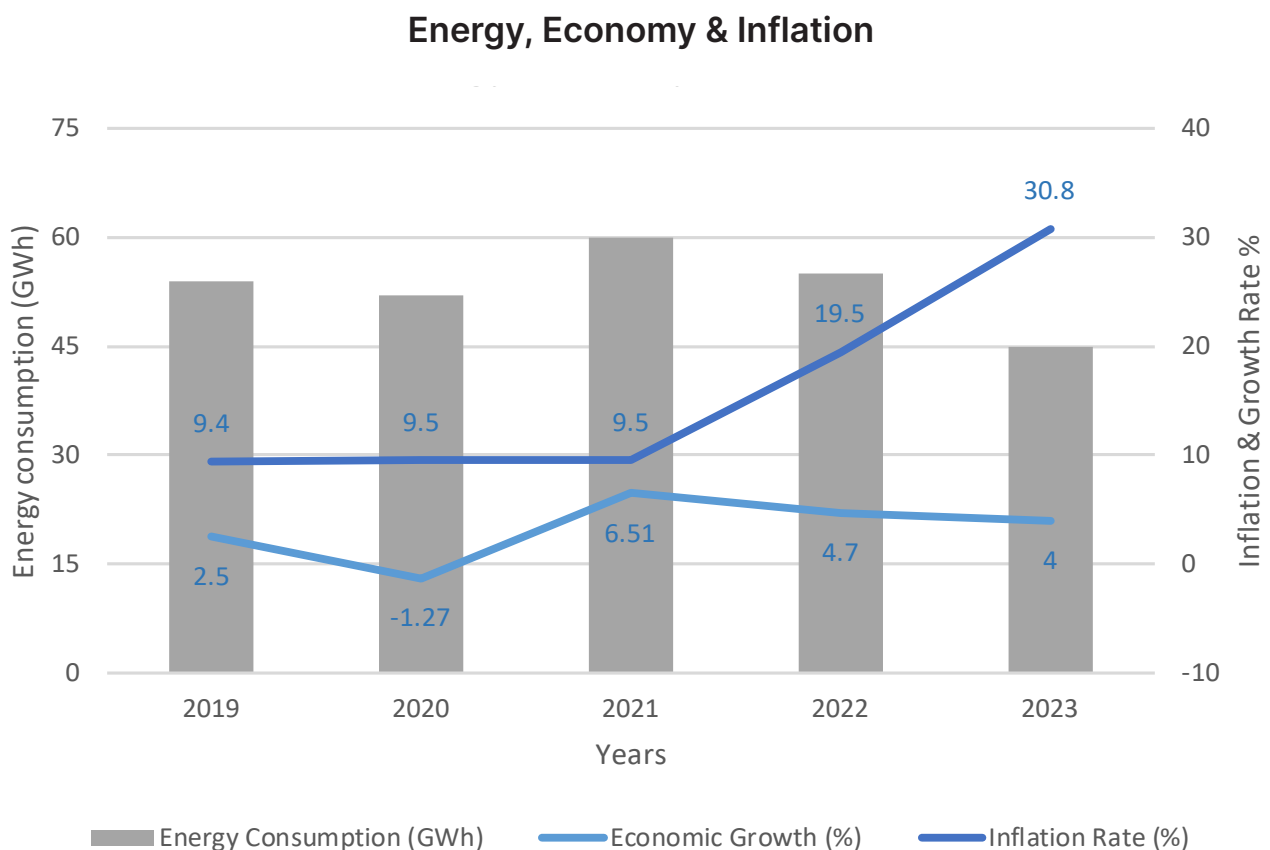


Figure 3: Source: Author; data obtained from NEPRA, Pakistan Economic Survey

2.1 Energy crisis: Causes and implications

Pakistan's case shows how an energy crisis first led to an economic crisis and then an economic crisis fed into an energy crisis. This is how it happened over the last two decades:

- In the mid-2000s, the government of Pakistan, flushed with foreign grants, easy loans and even secret funds coming into the country as part of the war on terror, fueled a consumption-based economic growth instead of encouraging a production-led economic growth. The number of household equipment running on electricity, motorcycles and cars rose dramatically during that period, leading to very quick spikes in the demand for both electricity and other fuels. While the government paid some lip service to the changing needs of energy sector by issuing Pakistan's first Renewable Energy Policy in 2006 and setting up the Alternative Energy Development Board in 2003, it did not do much to meet the rising demand for electricity and petroleum except converting local natural gas to Compressed Natural Gas (CNG) and allowing its use in transport at highly subsidized rates.
- In 2006-08, electricity shortages led to power breakdowns across Pakistan that lasted several hours each day.
- In 2008-10, the government tried to plug the gap between electricity demand and its supply by bringing in rental power plants – as a stopgap measure so that a medium-to-long term planning can be done in the energy sector in due course of time. The government also introduced the idea of generating power from wind and started working on exploring and exploiting Thar's indigenous coal reserves as a means to bring down the ever-rising energy import bill. These measures, however, proved either too controversial (rental power plants) or too slow (wind power and Thar coal development) to end power breakdowns and ensure smooth economic growth.
- In 2012-13, the situation became so bad that the then government lost elections mainly, if not entirely, for failing to address electricity shortages.
- In 2013-17, the government embarked upon a new course – signing agreements with independent producers (IPPs) to set up power plants running on imported coal and RLNG on urgent basis. The decision for setting up these power plants was based on the following assumptions:
 1. The prices of RLNG and imported coal will remain low for the foreseeable future;
 2. The exchange rate between dollar and Pak rupee will remain fairly stable;
 3. Pakistan's annual economic growth rate will remain around 5 per cent.

Consequently, the agreements with IPPs included several clauses that, in retrospect, suggest that the government was walking into them with its eyes totally shut. The most important of these clauses was about capacity payment: the IPPs will get paid for their production capacity regardless of how much electricity they will produce or how much electricity will be purchased from them. The government agreed to this clause

because it thought that the demand for electricity will not be lower than the electricity generation capacity as Pakistan will be having a 5 per cent economic growth rate. The IPPs, however, wanted to include this clause because of Pakistan's track record of reneging on its commitments with investors in the energy and other sectors.

The second most important clause in these agreements was that the IPPs will get return on their equity indexed with obtaining dollar rate.

In the event, Covid (2020-21) dealt the first blow to the government's premises by impeding economic growth. Then came Ukraine war (2021-onwards) which spiked up the prices of RLNG and imported coal and then, lastly, Pak rupees lost its value against dollar in a massive way, starting from late 2021 and continuing well into 2023.

The combined effect of these developments was:

- a. The demand for electricity dwindled because the economic growth remained much less than 5 percent but capacity payments increased as IPPs completed the installation of their power plants;
- b. The amount of foreign exchange required for importing RLNG and coal increased manifold after the IPPs started functioning, putting a heavy strain on Pakistan's meager foreign exchange reserve and necessitating the acquisition of expensive loans;
- c. The increase in dollar's exchange rate versus Pak rupee led to a massive increase in rupee payments to IPPs, fueling inflation, raising electricity prices for consumers and increasing budget deficit because massive subsidies had to be paid to various special categories of consumers.

It is clear from this brief history of the energy crisis that it was, indeed, an effort to avert it that landed the whole economy into a tailspin. Now, this economic crisis is not just hampering a solution to the energy crisis, it is indeed exacerbating that crisis.

2.2 Economy, Energy and Environment: A brief explanation on the interplay

- Pakistan does not have the money to make capacity payments to IPPs. This failure is hurting its relationship with all the energy sector investors in general and foreign investors in particular. Consequently, investment in the energy sector have been extremely hard to come by;
- Pakistan does not have sufficient foreign exchange to import RLNG and coal at current global prices so it shuts down its power plants running on these fuels more often than not. The demand-supply gap in the electricity sector, therefore, has emerged again even when we have the capacity to produce far more electricity than we need;

- Lower than expected economic growth – particularly stagnation in industrial output – means that the demand for electricity will take time before it starts outstripping our electricity production capacity which, in turn, means that the government has neither the fiscal room nor the financial resources to take bold decisions required for Pakistan’s transition towards renewable energy.

2.3 Circular debt

It was also during 2013-17 that the amount of circular debt started escalating enormously. This debt initially accumulated when power distribution companies failed to fully pay for electricity they were purchasing from the Central Power Purchasing Agency (CPPA). This failure then made it difficult for electricity generation companies to pay for all the fuel they consumed to produce electricity. Soon, the government’s failure to make capacity payments also started contributing to the problem. By December 2023, therefore, circular debt had reached an astronomical 2.63 trillion rupees, as shown in figure 4 below.⁸ And despite repeated increases in electricity tariff, through base annual prices, quarterly adjustments and fuel cost adjustments, it continues to rise, having registered a net increase of 325 billion rupees in the first seven months of fiscal year 2023-24⁹. In January 2024 alone, it rose by 84 billion rupees.

Circular Debt Accumulation

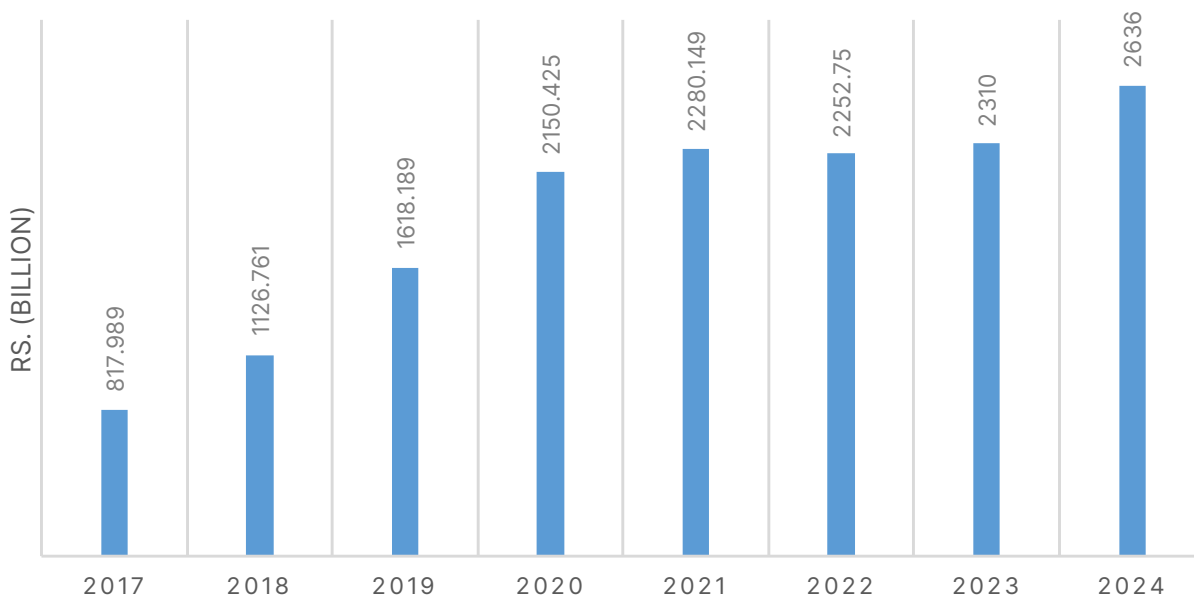


Figure 4, Source: State of Industry Report

A three-year bailout package that Pakistan is negotiating with the International Monetary Fund (IMF)¹⁰ is also expected to make matters worse before it can make them better. In the budgetary measures taken as

8 State of Industry report 2023

9 <https://www.dawn.com/news/amp/1834574>

10 <https://www.imf.org/en/News/Articles/2019/05/12/pr19157-IMF-Reaches-Staff-Level-Agreement-on-Economic-Policies-with-Pakistan-for-a-Three-Year-EFF>

a precursor to this package, the federal government has made several moves that will further slow down economic growth in the next couple of years. Imposition of a 20 percent petroleum development levy on all petroleum products, removal of subsidies for electricity consumers, privatization of electricity distribution companies and a range of other measures are aimed at what the government calls 'the stabilizing of the economy'. In other words, over the next three years, economic growth will remain low, import bills will remain higher than export earnings and investment and growth in the industrial sector will be weak given that interest rates are not expected to come down below 10 percent any time soon.

This surely sounds like a catch-22. The government's measures will push the energy sector deeper into the crisis in order to stabilize the economy but a deteriorating energy sector means that, if we do not simultaneously fix the energy sector, the economy will take longer time, more resources and stronger efforts than the IMF package alone.

WAY FORWARD

On paper, the quickest way to get out of this quagmire is to renegotiate agreements with IPPs. In practice, however, renegotiating an agreement between a business and the government involves massive complexities and complications – such as we have seen in the case of the Reko Diq gold¹¹ and copper mining project in Balochistan. But what makes this solution plausible – if not entirely possible – is the fact that in 2022 the government successfully renegotiated power purchase agreements with 32 IPPs working in Pakistan. This renegotiation primarily focused on fixing the return on equity to stabilize and reduce electricity costs – which, of course, will have a salutary impact across the energy sector. The last caretaker government continued these negotiations, expanding these to include hydroelectric power projects and gas-based and wind-based IPPs as well.

3.1. Key points renegotiated are listed below:

- Rate of return on equity for local investors was fixed at 17 percent, with a US dollar-Pak rupee exchange rate fixed at 148. This means that while investors will still earn a steady return annually for a 30-year period on their investment, reduction in return rate and delinking it from changes in dollar prices might make electricity prices affordable.
- Rate of return on equity for foreign investors was set at 12 per cent in US dollar terms. Given the changes in dollar prices, this means that net return for these investors in Pak rupees will remain around 17-18 percent annually, aligning it with the returns for local investors. This change, too, could help in bringing down electricity prices.

11 <https://www.dawn.com/news/1681071>

These renegotiated agreements, however, do not fix two major problems: capacity payments and the need to arrange foreign exchange for importing gas, oil and coal that IPPs use. Though the former remains a massive sticking point in the parleys between IPPs and the government — with the IPPs refusing to give up capacity payments given Pakistan’s not-so-commendable record in dealing with foreign investors unless there are financial costs involved — plans, indeed, are being made to do something about the latter.

Foreign exchange requirements for energy imports are, indeed, particularly important considering Pakistan’s heavy and continued reliance on fossil fuels which accounted for 48 percent (63,272.41 gigawatts per hour) of the energy mix in 2023 as shown in figure 5 below. This requirement not only drains the country’s foreign exchange reserves but also exposes it to global commodity price volatility, further straining its already depleting economic and financial resources.

Electricity Generation in Pakistan

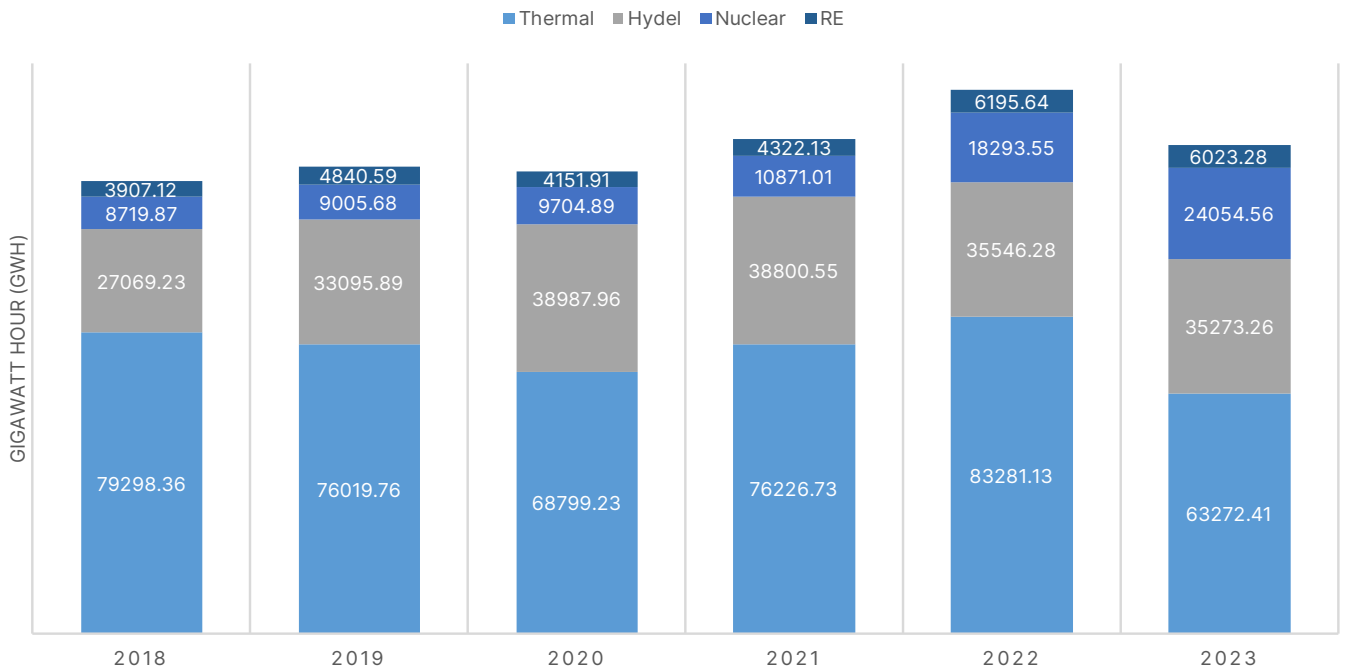


Figure 5, Source: NEPRA

The government’s solution to the problem is indigenization. In the narrative part of its latest planning document, Indicative Generation Capacity Expansion Plan (IGCEP), it has described indigenous coal being mined in Tharparkar as a guarantor of national energy security because it can be used as an alternative fuel for plants now running on imported coal and gas. The question is: is this solution viable financially and environmentally? Here’s a short answer.

- Firstly, it needs the retrofitting of boilers and other parts of power plants running on imported fuels. This conversion, however, cannot be done without importing equipment and technology. Considering that the appetite among investors to put their money into coal has already reached its limit — more on

this a little later — it will be an uphill task for the government to mobilize foreign investment required for these imports.

- Secondly, this plan necessitates a transport infrastructure — which requires both time and money to build — in order to take coal from Tharparkar to power plants situated outside this district.
- Lastly, increased coal mining in Tharparkar and the transportation of this coal through rail or road involve high risks of air and water pollution. Some early signs of this can already be seen in the coalfield block area of Tharparkar district where underground water is becoming increasingly contaminated and unfit for human and animal consumption.

3.2 Renewable Energy: Fuel for the Future

The medium and long term solution of the twin crises of energy and economy is to make a well planned transition towards renewable sources of energy, particularly wind and solar. As seen in the figure 5 above, Pakistan has been consistently underutilizing its renewable energy potential, having produced only 4.1 percent electricity from these sources in financial year 2022-23 (excluding for K-Electric). That is also where investors are more interested than they are in investing in coal — provided they get the right kind of deal from the government. Given the climatic crisis the globe is facing and considering that negotiations to address this crisis are moving fast towards the phasing out of all fossil fuels, particularly oil and coal, most investors believe that investments in fossil fuels offer them too small a time window — of 10 to 15 years at best — to earn sufficient return on their equity. This explains why the government's intention to convert a newly built power plant in Jamshoro, Sindh, from imported coal to Thar coal is not attracting the required investment: no investor is willing to put his money into this conversion since coal, whether imported or local, is considered to be the fuel of the past. Senior Senator Taj Haider put it eloquently in a recent meeting with the Pakistan Renewable Energy Coalition: "The age of fossil fuels is over," he said.

Renewable energy, on the other hand, is the fuel of the future — for Pakistan in particular and for the whole world in general. Admittedly, it requires large foreign investments at the beginning but it will free our country from having to import costly fuels every month. Of course, it is also not easy to integrate renewable energy into our existing grid but technology is improving by the day to make that possible. In fact, new breakthroughs in battery storage systems are likely to make many parts of the grids redundant in the next decade or so.

So, once these two obstacles are overcome, the electricity produced from wind and solar will be so cheap and abundant that it has a huge potential to take Pakistan out of its twin energy and economic crises. The catch is that we need to start working urgently and immediately to make that happen.



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