



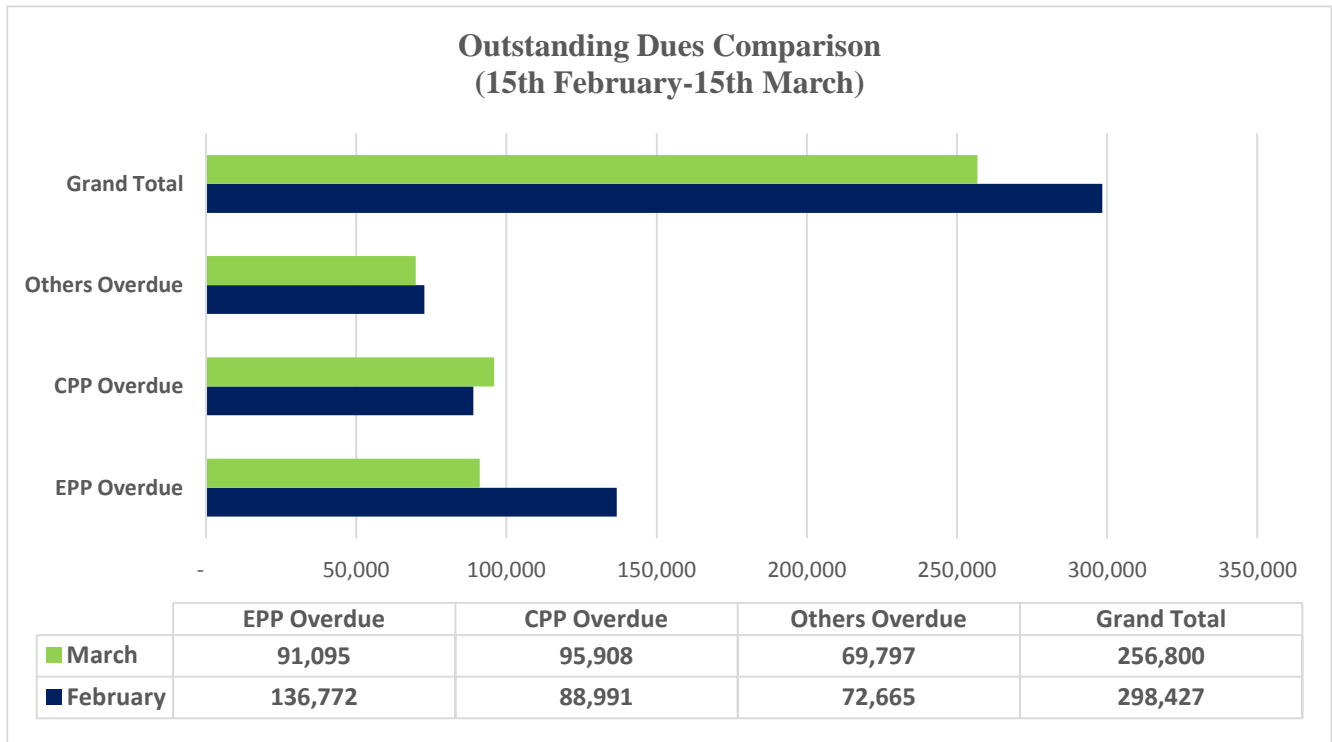
INDEPENDENT POWER PRODUCERS ASSOCIATION

MONTHLY NEWSLETTER

Welcome to the twenty-fifth edition of Independent Power Producers Association (IPPA) Newsletter. The newsletter is published on a monthly basis to ensure regular dissemination of information to Member IPPs and other stakeholders, and also to provide a platform to discuss issues pertinent to the energy sector of Pakistan. We would like you to send us your feedback and comments on how to improve the monthly newsletter.

Monthly Infographics

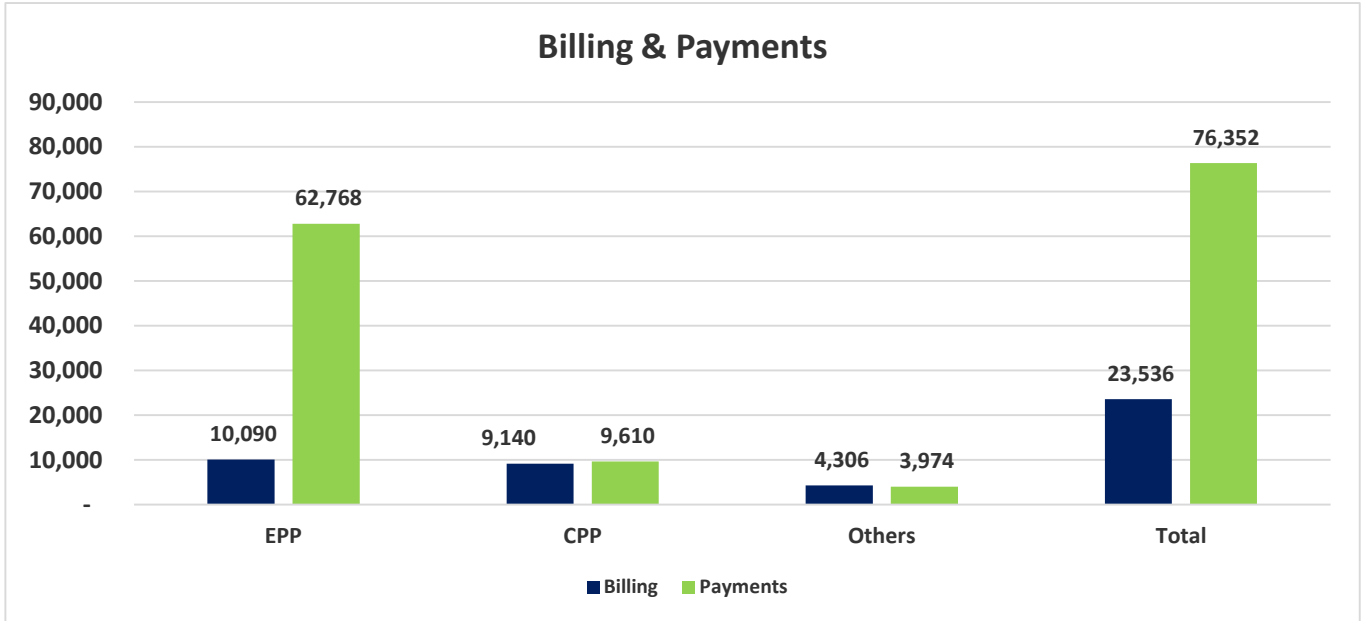
Outstanding Dues as of 15th March, 2019 in PKR Millions



Source: Member and Subsidiary IPPs

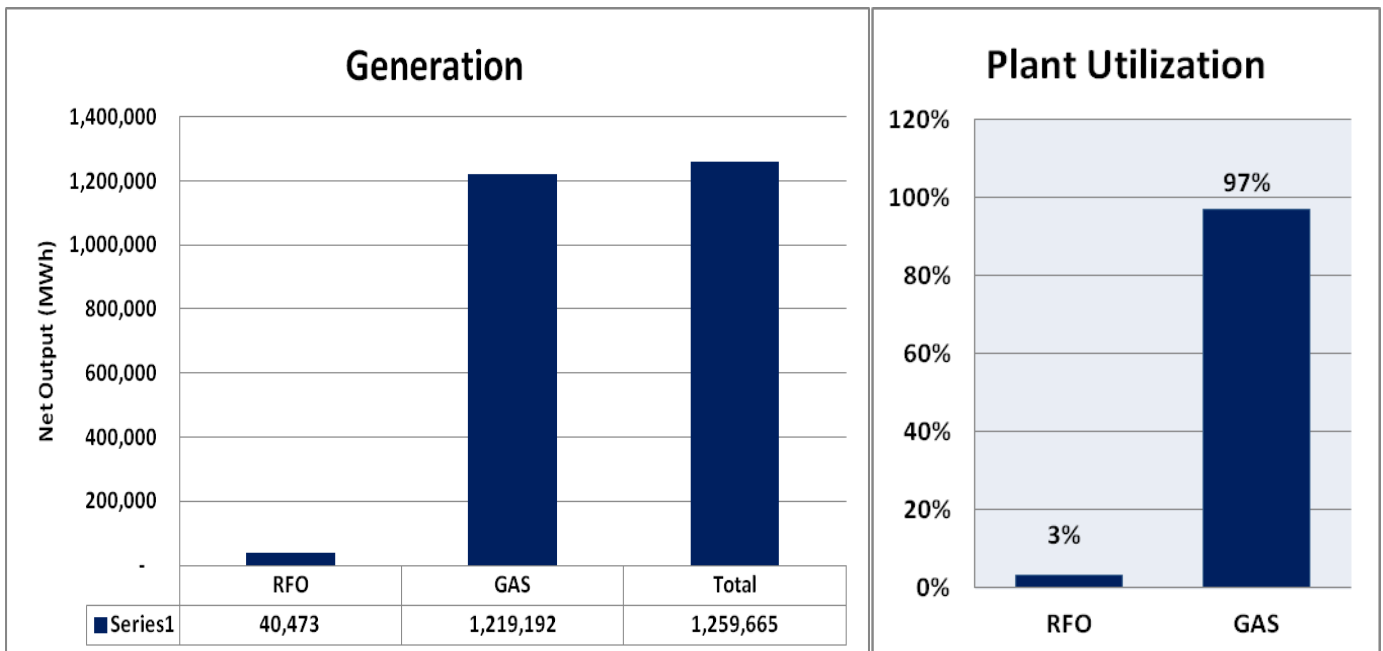
Monthly Infographics

Billing and Payments in March 2019 in PKR Millions



Source: Member and Subsidiary IPPs

Net Generation and Plant Utilization in March 2019



Source: Member and Subsidiary IPPs

K-Electric to Set Up 700MW Power Plant

K-Electric has planned to set up a 700MW power project with the assistance of a Chinese engineering firm, China Machinery Engineering Corporation (CMEC) to establish a state-of-the-art 700MW IPP based power project at Port Qasim. This was announced at the Pakistan Trade and Investment Forum held alongside the second Belt and Road Forum in Beijing. As per official statement, the project was being developed under an IPP mode structure, with K-Electric as the single off-taker. KE holds equity share in this IPP, whereas CMEC is both an equity partner and EPC (engineering, procurement and construction) contractor. The power project already has an approved tariff from NEPRA.

IMF Wants Islamabad to Budget Power Sector's Subsidies

As part of ongoing IMF-Pakistan's bailout discussion; IMF asked the government to clearly make electricity subsidies – including those announced by the present government for industrial sector – part of the federal budget 2019/20. As per sources, government is in the process of making that happen. However, IMF holds no reservation over power sector's subsidies. Most of the power sector's subsidies are expected to continue under the program.

Government Cuts Gas Supply To Zero-Rated Industry to Fuel Power Plants

The government has convinced zero-rated industries (textile, leather, carpet, sports goods and surgical) to curtail 80 million metric cubic feet/day (mmcf) from gas quota allocated to them i.e. 200 mmcf, for the next two months to fuel power plants amid imminent peak electricity demand in summer. In return, the government assured the industry representatives of 24-hour electricity supply in May

and June. As per sources, the power division of the ministry of energy and a delegation of the All Pakistan Textile Mills Association (Aptma) agreed to the arrangement in writing.

CPPA-G Opposes LNG Import On G2G Basis

Central Power Purchasing Agency-Guaranteed (CPPA-G) has reportedly opposed import of LNG on ten-year term contract on Government to Government (G2G) basis, saying any such decision will have adverse implications on the generation mix. This was done in response to the comments sought by the Power Division from different stakeholders; concerning the matter. Additionally, CPPA-G, has apprised that operational and financial aspects –based on Supply and Demand variations – should be considered prior to moving on the proposal for import of additional LNG volumes of 200-400 MMCFD on term contract under G2G instead of spot purchases. “Supply chain risk should not be parked with the power sector, therefore, no Net Price Differential (NPD) should be charged to the power sector,” the sources quoted Zubair Mahmood, Team Lead, Policy Governance & Corporate Planning (PG&CP) saying in his letter to the Power Division. CPPA-G further maintains that in case NPD is to be charged to power sector, it should be ascertained that the savings from term contract verses spot purchase should be higher than the NPD to be charged to power sector due to demand-supply variability risk (in case it is not hedged through storage facility).

CPPA-G further argued that since the current government's vision is to increase the share of Renewable Energy (RE) in the generation mix, the term contract for LNG for ten years will have adverse implications on the generation mix as well as on the consumer end basket price.

Government Begins Talks to Renegotiate Power Purchase Agreements with IPPs

The government has started renegotiating power purchase agreements with the independent power producers (IPPs) to ease burden of mounting circular debts and to seek some cushion in the payment mechanism. Irfan Ali, secretary of Power Division said that such reduction in financial burden will ultimately pass on to consumers (in form of) revision of electricity tariffs. An official said that the federal government is presently discussing revised agreements with around 14 IPPs as part of power sector's reforms. Following the revision, late payment surcharge is expected to be applicable after 60 days instead of 30 days.

Govt Decides To Issue Fresh Sukuk Worth Rs200bn

Federal Government has decided to issue fresh Sukuk worth Rs 200 billion, in addition to earlier Sukuk of Rs 200 billion through the same consortium of Islamic banks aimed at reducing circular debt. The consortium comprising Meezan Bank Limited, Faysal Bank Limited, Bank Islami Pakistan Limited, Dubai Islamic Bank Pakistan, MCD Islamic Bank Limited and Al Baraka Bank Pakistan Limited (mandated lead arrangers) have already submitted their term sheets to Power Division. Energy sector has been a source of concern for the IMF indicated by time bound structural benchmarks in the previous two Fund programmes - Standby Arrangement in 2013 and Extended Fund Facility in 2016 - which were not implemented.

The sources said the government has to pledge new properties of Distribution Companies (Discos), Generation Companies (Gencos) and Water and Power Development Authority (Wapda) or Discos as collateral as the properties already pledged cannot be re-pledged. According to sources, the same consortium of banks have approached the federal government and indicated that they have additional liquidity of Rs 200 billion and if the

power sector is ready to avail this opportunity they are ready to send term sheets (conditionalities). The syndicate of Islamic Banks had also forwarded a tentative term sheet for Rs 100-200 billion which specifies that the facility is subject to availability of suitable assets, arrangement of No Objection Certificates (NoCs) from Gencos/ Discos to sell their assets to financiers, federal government guarantee for rental payments and declaring the facility SLR-eligible and all payments to be made at State Bank of Pakistan counter.

The country's energy sector's circular debt is around Rs 1.5 trillion of which the actual circular debt, as per its definition, stood at around Rs 650 billion and loans parked in the books of Discos are estimated at Rs 850 billion. According to Minister for Power, Omer Ayub, the government would bring down circular debt to Rs 250 billion by December this year. The Power Division has claimed that the power sector revenue has increased by Rs 50 billion due to recent drive against theft and recovery of outstanding arrears.

Inauguration of 660MW Thar Coal Plant

PPP chairman Bilawal Bhutto inaugurated the open-pit coal mine and 660 megawatts coal-based power generation project in Thar block-II in Islamkot on 10th April. The project is a public private partnership between the Government of Sindh and a Chinese company; and consists of two power generation units of 330MW each. For this project, the Sindh government had given the sovereign guarantee of \$700 million. For the succession of the project, Mai Bakhtawer Airport, roads and bridges were also established beside provision of water for power generation. The project manager of Thar Block-II coal mine, Naeem Pasha said that coal mine of Thar block-II tapped into just 1 per cent of the massive Thar coal reserves of 175 billion tonnes, which was enough to generate electricity for the next 50 years

WHY CIRCULATING FOSSILIZED FUEL BED TECHNOLOGY IS THE FUTURE OF COAL FIRED POWER PRODUCTION FOR PAKISTAN

Pakistan has historically ignored Coal based Power Production (CBPP) even when it has been a major part of the global energy mix. According to IEA, coal's contribution to the global electricity production was 37% in 2017¹. CBPP is being retired in Europe and USA while its contribution in Asia is rising².

Pakistan has installed more than 4800 MW of coal-based power generation capacity (CBPGC) since 2017. According to Private Power and Infrastructure Board (PPIB), another 5850 MW of CBPGC will be added by the end of 2023. Such investments have invited criticism of going against global commitments for decreasing carbon emissions in an effort to contain climate change. However, this critique will soon lose its merit based on two facts. First, with the introduction of Zero Emissions Coal based Power Production Technology (CBPPT)³, carbon emissions from coal power plants will become negligible. Second, advances in material sciences will decrease the required coal consumption per MW of power production⁴. Within CBPPT, FBC provides the most robust measures for containing harmful environmental emissions.

Fluidized Bed Combustion (FBC) technology is the future of coal base powered production technology (CBPPT) in Pakistan. FBC becomes relevant on grounds of environmental friendliness, efficiency, cost effectiveness and Pakistan's unique geopolitical situation. The three main types of CBPPT technologies are

1. Pulverized Coal power Production (Traditional Setup).
2. Fluidized Combustion Bed (FBC)
3. Integrated Gasification Combine Cycle (IGCC)

Out of these three technologies, FBC is a more appropriate technology on grounds of environmental protection, high efficiency and low cost of power generation. The following discussion will elaborate on each of these advantages.

Environment Protection

Capturing the harmful emissions from non-renewable power production has become a necessity in light of global warming and deteriorating air quality. FCB has the best pollution capturing technology among all the CBPPT. CBPPT pollution consists of Sulphur Oxides (SO_x), Nitrogen Oxides (NO_x) and Particulate Matter (PM) emissions. All three of these emissions have unique disadvantages. SO_x cause respiratory diseases while NO_x emissions can lead to acid rain. Furthermore, PM causes premature death for people with heart disease⁵. Keeping these effects in mind, all coal-based power technologies attempt to control pollution. Within CBPPT, FBC has some of the best mechanisms when it comes to minimizing pollution from NO_x, SO_x and PM. Nitrogen becomes harmful after oxidization.

Nitrogen oxidization maximizes at around 1600 Degree Celsius. This is not a problem for FBC whose boilers operate at ranges of 750-850 degree Celsius. In contrast, Pulverized Coal technology boilers have higher emissions because they operate at higher temperatures. Similarly, capturing Sulphur is also very easy in FBC technology. FBC relies on a bed of inert material for heat transfer (refer to Annexure A). A sorbent for Sulphur can be introduced into the bed of FBC to capture Sulphur during oxidization. Usually, lime or limestone is a

¹ This was an increase of 3% over 2016.

² <https://www.iea.org/coal2018/>

³ Zero emission coal power generation will be based on carbon capture and sequestration technology

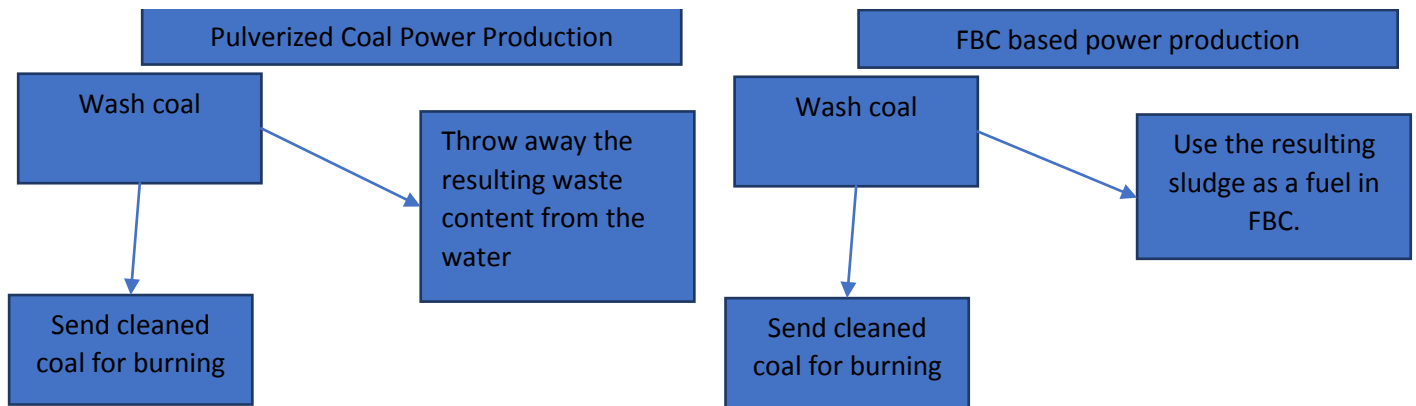
⁴ This decrease in coal requirement will come as a result of increase in turbine efficiency due to material that can sustain higher heat temperatures.

⁵ <https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm>

potent sorbent. In addition, when lime-based sorbents react with Sulphur, they often lead to the creation of gypsum (Calcium Sulphate) which can be used as a building material⁶. Such building materials can subsidize the cost of lime/lime-stone.

Similarly, one of the simplest ways of removing particulate matter from the coal includes washing the coal. When this method is used in the pulverized coal technology, it has the disadvantage of reducing the content in the coal. However, for FBC, this disadvantage does not apply because the mixture after washing the coal can be used as a fuel in FCB. Using the mixture as a fuel input increases cost effectiveness. The following figure illustrates the advantage of using such technology.

Figure 1 Comparison of the waste use for FBC vs Pulverized Coal



Efficiency

Apart from being environmentally friendly, FBC also has one of the highest efficiencies for CBPPT. This guarantees highly profitable FBC operations. Discussing the efficiency of FBC technology begs the question of the overall importance of efficiency in power production. Efficiency in power production has physical, financial and environmental consequences. In physical terms, Efficiency of CBPPT determines how much of the calorific value contained within the coal is converted into electricity. Financially, efficiency determines variable cost per Kilo-Watt-Hour (KWh) of power production. Environmentally speaking, increased efficiency means lower coal consumption which implies lower pollution.

These financial, physical and environmental benefits are maximized when it comes to circulating FBC technology. Critical and super critical circulating FBC technology can achieve efficiencies of around 43%⁷ which is at par with Pulverized Coal technology. This efficiency can be maintained with any fuel that has similar store of energy⁸. Therefore, FBC efficiency is more resilient as compared to other CBPPT which requires reliable supplies of high-quality fuels.

⁶ Provided it is in a pure enough form

⁷ Power Generation Technologies by Paul Breeze, 2nd Edition.

⁸ Calorific values are expressed in kcal/kg. These fuels can include processed garbage and other similar fuels

Lower Cost of Power Generation

FBC based power production will be cheaper because of the domestic source of its fuel⁹ and flexibility of FBC for different types of fuel. FBC in Pakistan is a cost-effective technology for two reasons. First, it is domestically available. This domestic availability has been ensured due to the untiring efforts of engineers from Thar Energy Limited. Due to their pioneering work, electricity generated from Thar's lignite reserves has started flowing to the Pakistani grid. Moreover, as we are expecting currency devaluation, therefore, any resource that is available in local currency¹⁰ will become relatively cheaper.

Second, FBC can take in any type of fuel which includes low quality lignite. Since lignite is in low demand¹¹, the price will always remain low enough to ensure cost-effective power generation. In addition to low global demand, Engro Corp's experience in initially opening the first lignite-based coal mine will decrease cost and development time for similar future endeavors. This decrease in cost will translate to lower electricity tariffs in the future.

Conclusion

FBC is the future of coal mining in Pakistan on the grounds of efficiency, environmental protection and cost effectiveness. Its efficiency ensures low-cost power generation and lower emissions while its potential for environmental protection technologies increases its congruency with climate protection goals.

⁹ Thar based lignite reserves

¹⁰ Domestically available

¹¹ Because of its low energy quality, it cannot be used in other types of power production.

Our Members

	Member IPPs	Primary Fuel	Alternate Fuel	Gross Capacity (MW)	Net Capacity (MW)
1	The Hub Power Company (Tehsil Hub)	RFO	HSD	1292	1200
2	Pakgen Private Limited	RFO	-	365	350
3	Lalpir Private Limited	RFO	-	362	350
4	Kohinoor Energy Limited	RFO	-	131	126
5	TNB Liberty Power Limited	GAS	HSD	235	211
6	Uch Power (Private) Limited	GAS	-	586	551
7	Rousch (Pakistan) Power Limited	GAS	HSD	412	395
8	Habibullah Coastal Power (Pvt.) Co.	GAS	HSD	140	126
9	Attock Gen Limited	RFO	HSD	165	156
10	Atlas Power Limited	RFO	HSD	225	214
11	Nishat Power Limited	RFO	HSD	200	195
12	Nishat Chunain Limited	RFO	HSD	200	195.6
13	Liberty Power Tech. Limited	RFO	HSD	200	195
14	Orient Power Company Limited	GAS	HSD	229	213
15	Saif Power Limited	GAS	HSD	229	209
16	Sapphire Electric Company Limited	GAS	HSD	225	209
17	Halmore Power Generation Co. Ltd.	GAS	HSD	225	209
18	Engro Powergen Qadirpur Limited	GAS	HSD	227	217
Subsidiary IPPs					
19	Hub Power Company Ltd (Narowal)	RFO	-	220	214
20	Uch-II Power (Pvt) Ltd	GAS	-	404	375.2
21	Saba Power Company (Private) Limited	RFO	-	134	125.5



Established in 2010, IPPA serves as an advisory body for Independent Power Producers (IPPs) in Pakistan. IPPA liaises with the government and related departments such as NEPRA, SECP, WAPDA, CPPA-G, NTDC and PPIB and also serves as a facilitator between various IPPs and stakeholders within the power sector.

If you have any suggestions or feedback, kindly write to us at feedback@ippa.com.pk