

Chapter 6

Power Procurement on the basis of Merit Order Dispatch by Haryana Power Purchase Centre for Haryana State

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Haryana Power Purchase Centre (HPPC) was set up (2008) to procure and trade electricity for Haryana State Consumers on behalf of both distribution companies i.e. Uttar Haryana Bijli Vitran Nigam Limited (UHBVNL) and Dakshin Haryana Bijli Vitran Nigam Limited (DHBVNL). It has signed power purchase agreements with various power generators including Central Generating Stations i.e. National Thermal Power Corporation Limited (NTPC), National Hydroelectric Power Corporation (NHPC), State Generator (HPGCL) and independent private producers i.e. Adani Power Limited (ADANI), Coastal Gujarat Power Limited (CGPL), Lanco Amarkantak Power Limited (LANCO AMARKANTAK), Jhajjar Power Limited (JPL), Aravali Power Corporation Limited (APCPL), etc. HPPC had total tied up capacity of 11,624 MW as on 31 March 2021. The following procedure is being followed by HPPC for procurement and scheduling of power:

6.1 Preparation of merit order and scheduling of power

Electricity is purchased on day to day basis as per assessed demand of the entire state. To assess the daily demand, load forecasting is done on day ahead basis (one day before) after considering the various factors which may affect the demand like weather, temperature, crop season and industrial load etc. The schedule of the whole day (24 hours) is divided into 96 slots of 15 minutes each. Schedule once decided can be changed intraday if there is sudden change in demand due to change in weather or any other reason.

To meet the assessed demand, a bucket filling approach is followed while allocating schedule among power generators. Schedule is allocated as per ranking of power generator in the merit order which is determined on the basis of Variable cost of generation of each plant including transmission losses. While scheduling of power, cheaper plants get priority over other expensive plants. Plants are normally scheduled upto the level of average demand/ load of the day. For the peak hours during the day when demand remains more than average load (especially in the evening or during some particular slots), instead of lighting up a power plant for the whole day, short term power is purchased from Energy Exchange to meet the demand as well as to minimise the deviation settlement charges¹ (Unscheduled interchanges). In some cases,

¹ **Unscheduled interchanges/ Deviation settlement charges**-These charges are levied by Northern Region Power Committee in case of any over-drawal/under-drawal by DISCOMs in variation to the schedule given to generators. Means there should be balance between energy injected by Generators into the grid and energy consumed by State consumers to maintain the grid security and frequency. For this purpose, load forecasting is done on day ahead basis and adjustments during the day are carried out by purchasing/selling short term power through exchange.

last scheduled plant is directed to run at technical minimum capacity (55 per cent of total capacity) to match the demand of the particular slots.

6.1.1 Analysis of Merit Order and scheduling of Power

HPPC had tied up with 30 thermal power plants (TPP) having capacity of 8,766 MW. The available capacity from these plants is 7,204 MW on the basis of normative Plant Load Factor (80/85 PLF). HPPC prepares merit order of 30 thermal power plants on the basis of their variable cost including Point of Connection (PoC) losses during the year 2019-20.

Audit has examined the 96 slots of one day (1 November 2019), demand of power and power purchase quantum from various sources. The slot wise minimum, maximum, Average and median demand *vis-à-vis* power purchase are as under:

(in MW)

| Particular | Time slot | Demand of Power | Total Purchase of Power | Purchase of Renewable Power/ Nuclear Power | Purchase of Thermal Power (Merit Order Purchase) | Purchase of Short Term Power purchase | Purchase of power from Open Exchange |
|------------|----------------|-----------------|-------------------------|--|--|---------------------------------------|--------------------------------------|
| Minimum | 2:30 to 2:45 | 4,338.51 | 4,494.81 | 576.07 | 3,544.50 | 171.33 | 202.91 |
| Maximum | 18:30 to 18:45 | 5,941.19 | 6,046.61 | 1,628.69 | 4,027.02 | 263.59 | 127.31 |
| Average | | 5,076.35 | 5,139.35 | 800.19 | 3,902.14 | 199.79 | 237.23 |
| Median | | 4,950.66 | 5,097.04 | 665.84 | 3,884.37 | 193.90 | 201.98 |

(Source: Information supplied by the DISCOMs)

It is seen from the above table that against the maximum demand of 5,941.19 MW on 1 November 2019, HPPC had purchased 6,046.61 MW. Above power purchase included 1,628.69 MW from renewable sources (must run power), 4,027.02 MW from thermal power on merit order basis, 263.59 MW from short term thermal power and 127.31.MW from Energy Exchange.

Audit analysis showed that against the total tied up capacity of thermal power (as per normative PLF) of 7,204 MW, the HPPC could utilise maximum 4,378.68 MW from 22 Coal/Gas based thermal power plants (TPP) on merit order basis and remaining eight Coal/Gas based thermal power plants remained backed down/shut down.

6.1.2 Analysis of power purchase from Exchange and short term power

Further analysis for the period 2019-21 revealed that HPPC had purchased short term thermal power ranging between 208.41 MW to 391.21 MW. This power was purchased from two private thermal power plants (SKS Power and MB Power) at variable cost of ₹ 4.29 per unit. Similarly, power purchased from Energy Exchange ranged between 0.57 MW to 1405.40 MW at average cost of ₹ 3.18 per unit.

It was noticed that during the period of 2019-21, Unit-VI of HPGCL (210 MW) remained backed down (except July 2020). Audit observed that instead

of purchasing power at the rate of ₹ 4.88² per unit from private plants, Unit-6 of HPGCL having lower variable cost of ₹ 3.90 per unit could have also been considered for scheduling for power purchase.

6.2 Analysis of Demand and Purchase of Power

HPPC had total tied up capacity of 11,212 MW as on 1 April 2019 which increased to 11,648 MW as on 1 April 2021. The details of total tied up capacity and availability of power as per Plant Load factor were as under:

(Capacity in MW)

| As on | Total installed capacity | | | Power available as per PLF | | |
|---------------|--------------------------|-----------------|-------------|----------------------------|-----------------|-------------|
| | Thermal power | Renewable Power | Total power | Thermal power | Renewable Power | Total power |
| 01 April 2019 | 8,766 | 2,446 | 11,212 | 7,204 | 1,363 | 8,567 |
| 01 April 2020 | 8,766 | 2,447 | 11,213 | 7,204 | 1,365 | 8,569 |
| 01 April 2021 | 8,766 | 2,882 | 11,648 | 7,204 | 1,455 | 8,659 |

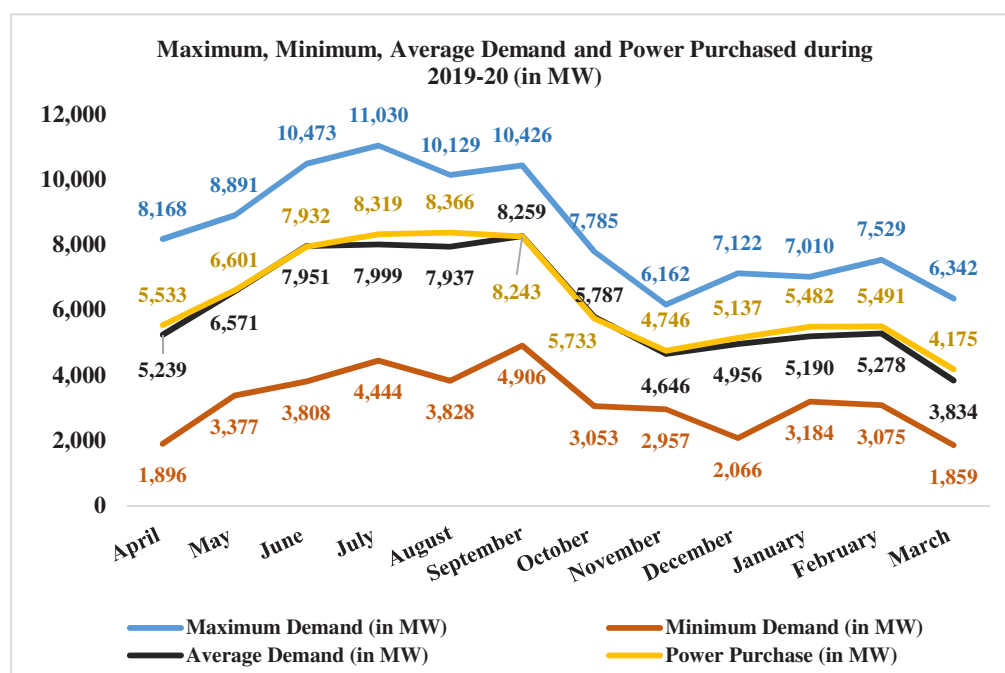
(Source: Information supplied by the HPPC)

From these tied up sources, the HPPC fulfills the demand of state consumers. The Maximum Minimum, Median demand and power purchased during the 2019-20 and 2020-21 were as under:

| Year | Maximum Demand (in MW) | Minimum Demand (in MW) | Median Demand (in MW) | Average Demand (in MW) | Power Purchased (in MW) |
|---------|------------------------|------------------------|-----------------------|------------------------|-------------------------|
| 2019-20 | 11,030 | 1,859 | 6,203 | 6,137 | 6,313 |
| 2020-21 | 10,897 | 1,274 | 6,106 | 6,037 | 6,175 |

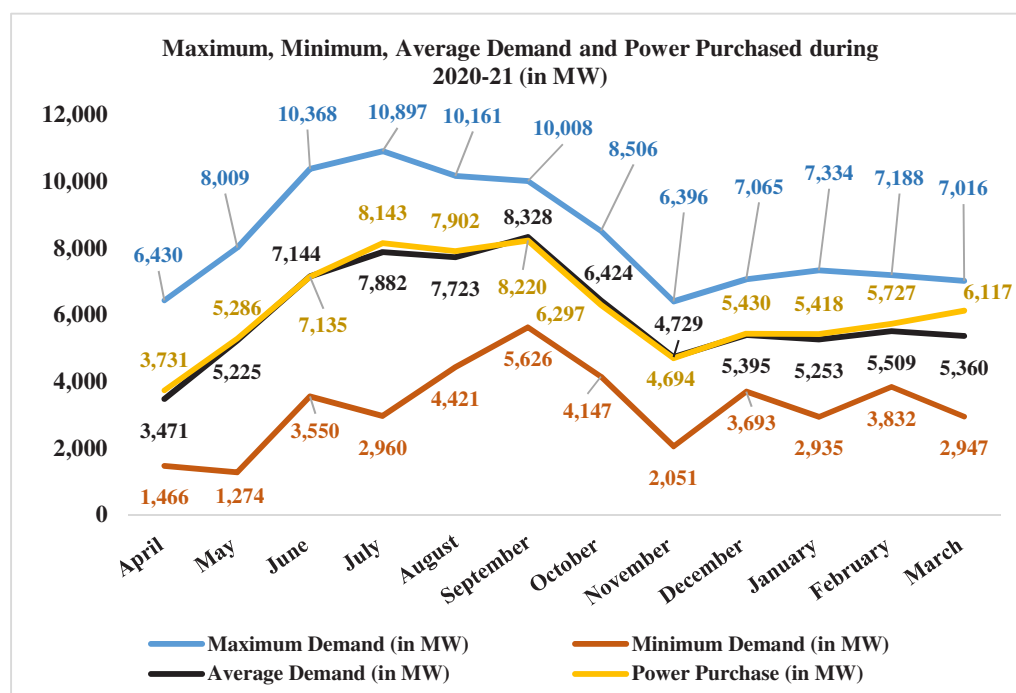
(Source: Information supplied by the HPPC)

Month wise demand and power purchased during 2019-20 from various sources are as under



² ₹ 4.88 per unit = Variable cost ₹ 4.29 per unit and Transmission cost & Losses (+) ₹ 0.59 per unit.

Month wise demand and power purchased during 2020-21 from various sources are as under



It is seen from the above graphs that during the year 2019-20 and 2020-21, total power purchased were almost equal to average demand of the state consumers. It was further noticed that during 2019-20 and 2020-21, the maximum demand of the power was 11,030 and 10,879 MW respectively and minimum demand during this period was 1,859 and 1,274 MW respectively. Thus, the difference of Maximum and Minimum demand was 9,171 MW and 9,623 MW during 2019-20 and 2020-21 respectively. To cater to meet the maximum demand of the state consumers, besides tied up sources, the HPPC had purchased short term power from banking arrangements and Energy Exchange etc. and in case of minimum demand, after matching the demand, backing down instructions are being issued to the remaining thermal power generators.

6.3 Comparative analysis of Scheduling of power

Audit analysed procuring/scheduling power on merit order as per current practice existing with preparation of merit order based on revised variable cost (incorporating variable cost, point of connection losses and transmission cost as part of variable cost in place of fixed cost) as well as preparing merit order based on landed cost. These findings are detailed subsequently at paragraph 6.3.2 and paragraph 6.3.1 respectively. It is seen that in both these scenarios there is an adverse impact on the distribution companies but positive impact on the state power generating utilities.

The analysis also shows that the existing basis of bifurcation of variable cost for preparation of merit order is disadvantageous to state generating units as while cost of transportation of coal for thermal plants of HPGCL located in Haryana (distant from Principal source of raw material viz. coal) is incorporated as a variable cost, the cost of transmission for plants located at a distance from Haryana is incorporated as a fixed cost. The scheduling of power including merit order preparation etc. is a product which has multiple variables and constraints and advanced techniques of historic data analysis and use of optimisation techniques for various permutations and combinations is required to be done by HPPC. The details of analysis are as under:

6.3.1 On the basis of Variable cost and Landed cost

Audit has conducted a comparative study for the year 2019-20 and 2020-21 to work out the difference between total power purchase cost when power is scheduled as per actual landed cost and when it is scheduled as per existing variable cost. For this purpose:

- A revised merit order was prepared on the basis of actual landed cost of electricity by all generators at Haryana periphery. Normative fixed cost, variable cost, Interstate transmission charges and transmission losses per unit were added to calculate the actual landed cost of the plant.
- Quantum of Actual power purchased during the year 2019-20 and 2020-21 was re-distributed among all thermal plants as per their ranking in revised merit order.
- It was assumed that all the power plants were available upto their full normative capacity during the whole year and full fixed cost was paid to all.

It was observed that most of the intra state generators (HPGCL Plants and other plants situated in Haryana) are likely be benefited by preparation of Merit order Dispatch on landed cost basis as their ranks were improved in MoD as their generation cost did not have transmission charges and losses which are being paid by DISCOMs in case of electricity purchase from Inter-State Generating stations. Overall cost of power purchase increased when scheduling was done as per landed cost, after factoring in the full fixed cost of all plants (whether power scheduled or not), and excess cash outflow of ₹ 103.96 crore and ₹ 442.24 crore during 2019-20 and 2020-21 respectively is assessed when power is scheduled as per merit order prepared on the basis of landed cost. These details are given in the table below:

| Year | Units purchased (in MUs) | When power is scheduled on the basis of Variable cost only (existing system) | | When power is scheduled on the basis of Landed cost | | Excess cash outflow when power is scheduled on landed cost basis instead of variable costing (₹ in crore) |
|---------|--------------------------|--|---------------------------|---|---------------------------|---|
| | | Total cost of power purchase (₹ in crore) | Average rate (₹ per unit) | Total cost of power purchase (₹ in crore) | Average rate (₹ per unit) | |
| 2019-20 | 38,013.91 | 16,807.17 | 4.421 | 16,911.13 | 4.449 | 103.96 |
| 2020-21 | 37,761.23 | 15,782.09 | 4.179 | 16,224.33 | 4.297 | 442.24 |

(Source: Compiled on the basis of information supplied by the HPPC)

It is evident from the above table that the existing system of power scheduling is economical in comparison to the scheduling of power on landed cost basis for the distribution Companies and in turn to the consumers. However it is likely to be advantageous to State Generating Stations.

Further analysis revealed that this gap decreases whenever capacity utilization increases i.e. during 2020-21, excess cash flow becomes ₹ 442.24 crore for 37,761.23 MUs (lesser Quantity) purchased in comparison to ₹ 103.96 crore for 38,013.91 MUs during 2019-20. From the above it can be concluded that the difference of cash flow as per scheduling on the basis of landed cost and variable cost decreases when capacity utilization increases. We have analysed the capacity utilization for the period 2019-21.

Audit also noticed that the following thermal plants will be benefited (improve their rank³ in Merit Order Dispatch) while preparing merit order on the basis of landed cost as tabulated below:

| Rank as per Variable cost | Rank as per landed cost | Impact on Rank | Name of the Thermal Plant | Average VC including POC Losses | Average landed cost per unit |
|---|-------------------------|----------------|---------------------------|---------------------------------|------------------------------|
| Plants which will be advantageous while preparing MoD on the basis of landed cost comprising variable cost, transmission cost and fixed cost | | | | | |
| 6 | 11 | Improved | DCRTPP (YTPP) | 3.626 | 4.686 |
| 7 | 12 | Improved | JHAJJAR POWER Ltd. | 3.594 | 4.662 |
| 2 | 13 | Improved | PTPS- VII & VIII | 3.658 | 4.628 |
| 9 | 15 | Improved | Auriya (Gas GT+ST) | 3.505 | 4.574 |
| 4 | 16 | Improved | RGTPP -Khedar | 3.639 | 4.549 |

(Source: Compiled on the basis of information supplied by the HPPC)

The list of plants losing out in comparison is tabulated below:

| Rank as per Variable cost | Rank as per landed cost | Impact on Rank | Name of the Thermal Plant | Average VC including POC Losses | Average landed cost per unit |
|---------------------------|-------------------------|----------------|---------------------------|---------------------------------|------------------------------|
| 11 | 2 | Down | Unchahar-3 | 3.477 | 5.258 |
| 14 | 3 | Down | Unchahar-4 | 3.255 | 5.248 |
| 10 | 6 | Down | Unchahar-1 | 3.477 | 4.992 |
| 17 | 7 | Down | DVC RAGHUNATHPUR | 2.879 | 4.973 |
| 16 | 9 | Down | DVC MEJIA | 2.948 | 4.831 |
| 18 | 10 | Down | DVC KODERMA | 2.596 | 4.710 |
| 23 | 18 | Down | LANCO Amarkantak | 2.037 | 3.921 |

(Source: Compiled on the basis of information supplied by the HPPC)

³ Higher value of rank means better position in Merit Order Dispatch.

The mechanism of bifurcation of costs into variable cost and fixed cost as applied currently acts against the HPGCL as detailed in subsequent paragraph 6.3.2. Haryana Electricity Regulatory Commission while approving (18 February 2021) tariff order for the year 2021-22 of HPGCL had considered view that the DISCOMS, while evaluating any new proposal for purchase of power in future, shall give due weightage to the landed cost of power at its interface with the STU.

6.3.2 On the basis of Variable cost and Variable cost including transmission cost.

Audit has conducted a comparative study for the month of November 2019 to work out the difference between total power purchase cost when power is scheduled as per variable cost incorporating transmission cost as an additional component and when it is scheduled accordingly in merit order for this purpose:

- A revised merit order was prepared on the basis of variable cost including transmission cost of electricity by all Generators at Haryana periphery. Variable cost, Interstate transmission charges and transmission losses per unit were added to calculate the variable cost including transmission cost of the plant.
- Quantum of Actual power purchased for the month of November 2019 was re-distributed among all thermal plants as per their ranking in revised merit order.
- It was assumed that all the power plants were available upto their full normative capacity during the whole year and full fixed cost was paid to all.

It was observed that ranking of most of the Intra state Generators (Thermal power plants of HPGCL and other plants situated in Haryana) improved as their generation cost did not have transmission charges which are being paid by DISCOMs in case of electricity purchase from Inter-State Generating stations.

Audit also noticed that the following thermal plants will be benefited (by improving their rank⁴ in Merit Order Dispatch) while preparing merit order by considering transmission cost as a part of variable cost, as tabulated below:

⁴ Higher value of rank means better position in Merit Order Dispatch.

| MoD as per Variable cost | MoD by considering transmission cost as part of VC | Impact | Name of the Generator/ Plant | Variable cost | Variable Cost including transmission charges |
|--|--|----------|------------------------------|---------------|--|
| Plants which will be advantageous while preparing MoD by considering transmission cost as a part of variable cost | | | | | |
| 1 | 6 | Improved | PNP TH-VI | 3.894 | 3.894 |
| 2 | 7 | Improved | PNP TH- VII&VIII | 3.799 | 3.799 |
| 3 | 9 | Improved | DCRTPP unit-1 - 2 | 3.784 | 3.784 |
| 4 | 11 | Improved | RGTPP | 3.769 | 3.769 |
| 5 | 13 | Improved | JHAJJAR POWER LTD. | 3.691 | 3.691 |
| 6 | 14 | Improved | Aravali Co. Pvt. Ltd. | 3.678 | 3.678 |

(Source: Compiled on the basis of information supplied by the HPPC)

The list of plants losing out in comparison is tabulated below:

| MoD as per Variable cost | MoD by considering transmission cost as part of VC | Impact | Name of the Generator/ Plant | Variable cost | Variable Cost including transmission charges |
|--------------------------|--|--------|------------------------------|---------------|--|
| 7 | 1 | Down | Feroz Gandhi Unchahar-2 | 3.595 | 4.029 |
| 9 | 2 | Down | Feroz Gandhi Unchahar-1 | 3.564 | 3.998 |
| 8 | 3 | Down | Feroz Gandhi Unchahar-3 | 3.564 | 3.998 |
| 10 | 4 | Down | PRAGATI POWER | 3.559 | 3.993 |
| 11 | 5 | Down | Auriya | 3.504 | 3.938 |

(Source: Compiled on the basis of information supplied by the HPPC)

Comparative analysis of procurement/scheduling of power on the basis of Merit order Dispatch on the basis of Variable cost and variable cost including transmission cost are given in the table below:

| Period | Units purchased (in MUs) | When power is scheduled on the basis of Variable cost only (existing system) | | When power is scheduled on the basis of variable cost including transmission cost | | Excess cash outflow when power is scheduled on variable cost including transmission cost basis instead of variable costing (₹ in crore) |
|---------------|--------------------------|--|---------------------------|---|---------------------------|---|
| | | Total cost of power purchase (₹ in crore) | Average rate (₹ per unit) | Total cost of power purchase (₹ in crore) | Average rate (₹ per unit) | |
| November 2019 | 2,621.284 | 1,209.87 | 4.616 | 1,238.12 | 4.723 | 28.25 |

(Source: Compiled on the basis of information supplied by the HPPC)

It is evident from the above table that the existing system of power scheduling is economical for DISCOMs in comparison to the scheduling of power by considering transmission cost as a part of variable cost. However such a scheduling is likely to be advantageous to State Generating Stations.

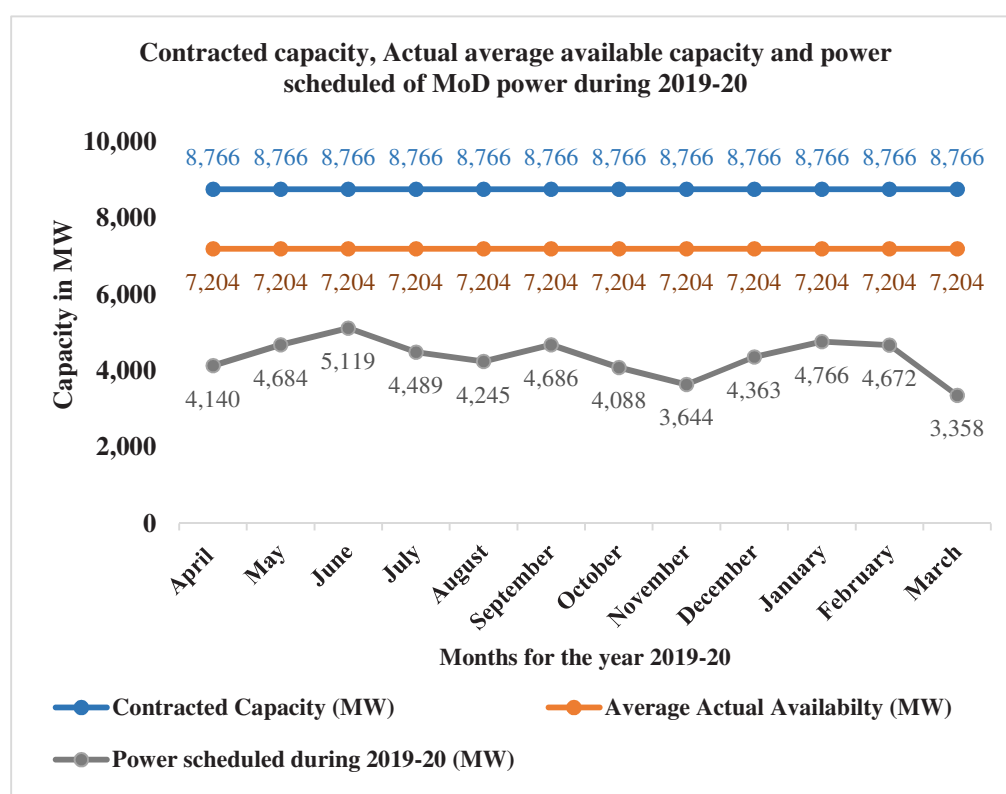
6.4 Excess tied up contracted capacity of thermal power

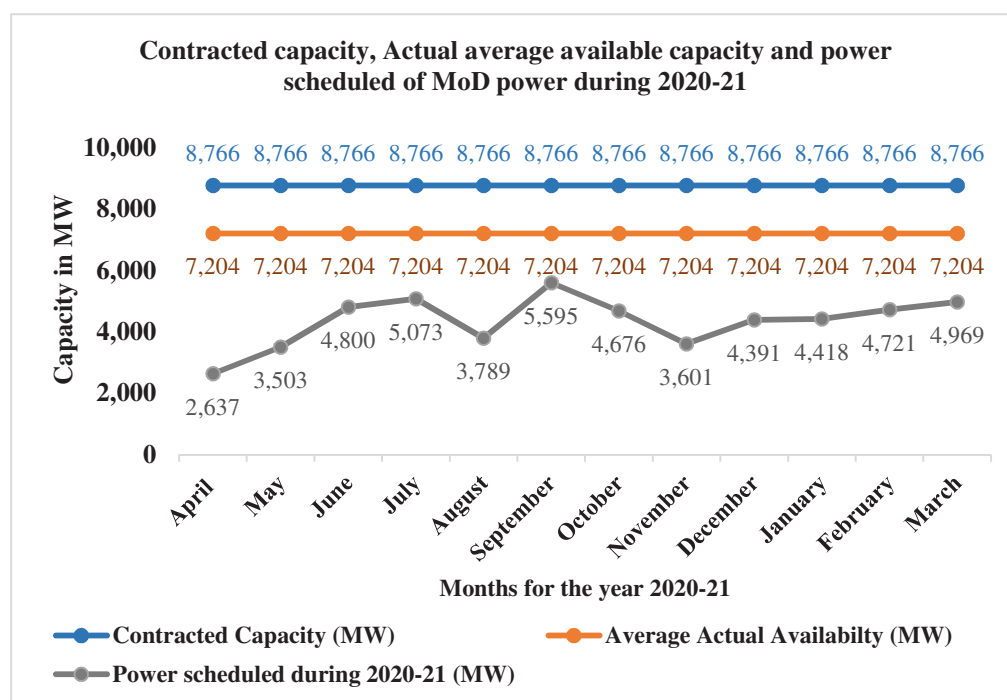
Haryana Power Purchase Centre (HPPC) on behalf of both the DISCOMS (UHBVNL and DHBVNL) procures and trades electricity to cater the electricity requirement of Haryana State. A proper cost benefit analysis should be carried out before adding new capacities as the procurer has to bear the liability of fixed cost for entire life (25 years appx.) of Power generating unit

irrespective of the scheduling of plant which results into creation of undue liability on the State Consumers.

HPPC had total contracted capacity of 11,624 MW as on 31 March 2021. Of which 8,766 MW is subject to merit order scheduling and remaining capacity of 2,858 MW are of must run generation category which includes Hydro, Solar, Wind, other Renewable power which might be expensive but dispensed with merit order scheduling being environmental friendly.

During the years 2019-20 and 2020-21, total contracted capacity of HPPC was 8,766 MW against which normative availability was 7,204 MW (as per normative plant load factor of 85/80 per cent). Audit has conducted an exercise to work out the actual capacity utilization against actual availability of power during the period 2019-21. The contracted capacity, actual average available capacity and actual capacity utilization of thermal power purchased on the basis of Merit Order Dispatch by the HPPC during the years 2019-20 and 2020-21 are as under:





It is seen from the above chart that during 2019-20 and 2020-21 the HPPC could utilize maximum 5,119 MW and 5,595 MW capacity against the actual available of 7,204 MW capacity during 2019-20 and 2020-21 respectively. Thus, 2,085 MW capacity during 2019-20 and 1,609 MW capacity during 2020-21 remained unutilized. Due to which, the units of thermal power plants including Haryana State owned generating units were backed down (non-operational) for significant period of time during these years. However, HPPC had to pay fixed cost to these power generators which put undue financial burden on state consumers. The proportionate fixed cost of unutilized capacity works out to be ₹ 3,030.64 crore (₹ 1,757.92 crore and ₹ 1,272.72 crore) for the period 2019-21. This has resulted into additional financial burden on state consumers due to increase in power purchase cost.

6.5 Capacity addition by Haryana DISCOMs

Audit has conducted analysis on the capacity addition by Haryana Power Purchase Centre over the years. During the period of 2006-2008, Maximum capacity had been added. During this period 18 Power Purchase Agreements (PPAs) of 5,600 MW capacity (almost 50 per cent of total capacity as on date) were signed. Above PPAs includes PPA with 6 major private plants i.e. Lanco Amarkantak Power Limited 285 MW (2006), Sasan Ultra Mega Power Project 445 (2007), Coastal Gujarat Power Limited 380 MW (2007), Adani Power Limited 1,424 MW (2008), Jhajjar Power Limited 1,188 MW (2008), GMR Kamalanga Energy Limited, 300 MW (2008). The power from above power plants started flowing from the year 2011. It was observed that although power purchase cost from these power plants (except Jhajjar Power Limited) was cheaper in comparison to existing power plants but over addition of

capacity has resulted into backing down of other existing plants except during peak season.

The table below shows the capacity added by HPPC during last 10 years.

| Year | Power available at the beginning of the year (in MW) | Capacity added during the year ⁵ (in MW) | Power available at the end of year (in MW) | Source added, its capacity (PPA Signing year) |
|------|--|---|--|--|
| 2011 | 3,890 | 2,434 | 6,324 | Rajeev Gandhi Thermal Power Plant Hisar 1,200 MW (2003), Aravali 693 MW (2008), Lanco Amarkantak 285 MW (2006), Pragati Power 137 MW (2009), DVC Mejia 100 MW (2010) |
| 2012 | 6,324 | 3,074 | 9,398 | Adani 1,424 MW (2008), CGPL-380 MW (2007), JPL-1,188 MW (2008) |
| 2013 | 9,398 | 577 | 9,975 | SASAN 445 (2007), DVC Koderma 100 MW (2006) |
| 2014 | 9,975 | 758 | 10,733 | PTC GMR 300 MW (2008), Karchamwangtoo 376 MW (2006) |
| 2015 | 10,733 | 158 | 10,891 | Only Renewable power has been added since 2014 |
| 2016 | 10,891 | 110 | 11,001 | |
| 2017 | 11,001 | 61 | 11,062 | |
| 2018 | 11,062 | 25 | 11,087 | |
| 2019 | 11,087 | 100 | 11,187 | |
| 2020 | 11,187 | 124 | 11,311 | |
| 2021 | 11,311 | 699 | 12,011 | |

Since 2015 renewable power of 1,433 MW had also been added in compliance to Renewable Power Obligations (RPO) Regulations notified by the Commission. Under RPO Regulations, DISCOMs are bound to purchase certain quantum of power (as determined by the commission) from Renewable Sources. The power purchased from Renewable power plants further reduced the utilization of existing thermal power plants and contributed towards their backing down. Renewable Power plants have ‘Must Run’ status and they are not subject to merit order scheduling.

Audit has observed that HPPC/DISCOMs had added capacity on an adhoc assessment basis in the past which has resulted into underutilization of existing sources and undue burden of fixed cost on State Consumers. Existing capacity was utilized during peak time for the year 2019-20 and 2020-21 as the peak demand during the period remained at 11,030 MW on 3 July 2019 and 10,897 MW on 3 July 2020 respectively and in remaining period it remained underutilized. Therefore, every new PPA should have been signed after conducting detailed cost benefit analysis. Future demand and availability of power from existing sources should have been kept in mind before adding new capacity to get the maximum benefit with minimum cost and to avoid

⁵ Capacity added means – the year during which generator started the power supply. Year of PPA is mentioned in bracket in the last column. Generally, the process of installation of plant is started after Signing of PPA and approval of Commission. It takes approx. 4-5 years in commissioning of coal based thermal power plant since PPA. The installation cost of coal based thermal power plant is approx. ₹ 4 to 5 crore per MW.

unnecessary financial burden of unutilized capacity. HPPC should use Operational Research/Optimisation Techniques to get the best mix for procurement of power. The addition of the capacities through PPA are assessed to be beyond the requirement of Haryana even after lapse of 10 to 15 years and recommended to be investigated.

Apart from above detailed analysis, audit has noticed specific cases related to Merit order and PPA which is given in subsequent paragraph:

6.6 Consideration of variable cost in case of Jhajjar Power Limited Bills while preparing Merit Order

DISCOMs had signed a Power Purchase Agreement (PPA) with Jhajjar Power Limited (JPL) on 7 August 2008. As per PPA, the fuel cost was to be worked out on the basis of 'average weighted Invoice Price' of the coal and no transit loss was allowed to the generator. It is worthwhile to mention that HPGCL and other generators are entitled for normative transit loss of 1.5 *per cent* or as determined by the Electricity Regulator. But in the instant case of Jhajjar Power Limited, it was not incorporated at the time of finalizing the PPA.

It was noticed that M/s JPL had raised/submitted its bills after loading the impact of transit loss of coal in violations of PPA which had resulted into increase in variable cost of generation. HPPC, however, while making payments deducted the amount of transit loss claimed by JPL. Aggrieved upon this deduction, M/s JPL lodged claims in respect of Transit loss amounting to ₹ 286.60 crore (₹ 170.60 crore transit loss claims and ₹ 116 crore as late payment surcharge) and the matter was under consideration in Appellate Tribunal for Electricity (APTEL).

Resultantly, there were two variable rates available for the purpose of merit order i.e variable cost as per bills submitted by M/s JPL and variable cost as per payments made by HPPC. Variable cost shown in the bills was higher than the rate at which actual payments were made by HPPC. Audit observed that HPPC considered the lower of the variable cost while preparing merit order (as per final payment made to generator) despite the fact that the generator was claiming this deducted amount and filed petition in Central Electricity Regulatory Commission (CERC)/ Appellate Tribunal for Electricity (APTEL). Thus, M/s JPL was getting the benefit of lower variable cost while scheduling power (merit order basis) as well as claiming benefit of higher variable costs. HPPC was allowing the generator to benefit in form of placing it in merit order on lower of the two costs. Audit has conducted an exercise regarding impact in position of M/s JPL in merit order, it placed on the basis of higher of the two costs i.e. as per bill by M/s JPL. It was noticed that in 8 out of 23 Months (for the years 2020-21 & 2021-22), the rank of generator got downgraded. The details of variable cost claimed by JPL and as per payments made by HPPC for the period 2020-21 and 2021-22 along with its position in merit order are as under:

| Months | Variable cost considered in Merit Order as per payments made by HPPC | Position in merit order | Variable cost as per bills submitted by the JPL | Revised Position in merit order as per bills submitted by the JPL | Change in position |
|----------------|--|-------------------------|---|---|------------------------|
| 2020-21 | | | | | |
| April | 3.533 | 7 | 3.56 | 7 | No change |
| May | 3.533 | 8 | 3.56 | 7 | Rank downgraded |
| June | 3.349 | 11 | 3.43 | 10 | Rank downgraded |
| July | 3.478 | 3 | 3.56 | 3 | No change |
| August | 3.409 | 6 | 3.46 | 6 | No change |
| September | 3.314 | 7 | 3.37 | 5 | Rank downgraded |
| October | 3.417 | 6 | 3.48 | 6 | No change |
| November | 3.411 | 5 | 3.44 | 5 | No change |
| December | 3.259 | 7 | 3.26 | 7 | No change |
| January | 3.198 | 6 | 3.2 | 6 | No change |
| February | 3.17 | 6 | 3.17 | 6 | No change |
| March | 3.231 | 6 | 3.24 | 6 | No change |
| 2021-22 | | | | | |
| April | 3.277 | 7 | 3.31 | 6 | Rank downgraded |
| May | 3.318 | 7 | 3.41 | 5 | Rank downgraded |
| June | 3.409 | 4 | 3.5 | 2 | Rank downgraded |
| July | 3.318 | 5 | 3.4 | 4 | Rank downgraded |
| August | 3.487 | 2 | 3.55 | 1 | Rank downgraded |
| September | 3.534 | 5 | 3.59 | 5 | No change |
| October | 3.511 | 5 | 3.61 | 5 | No change |
| November | 3.606 | 7 | 3.71 | 7 | No change |
| December | 3.491 | 6 | 3.52 | 6 | No change |
| January | 3.561 | 4 | 3.68 | 4 | No change |
| February | 3.642 | 8 | 3.64 | 8 | No change |

Audit noticed that HPPC never raised any objection on the bills submitted by the M/s JPL and kept accepting the bills although those were not as per PPA. Audit is of the opinion that bills should have been got revised as per PPA before making final payment. Further, while preparing merit order the benefit of reduced cost was also passed on to the generator despite the fact that the Generator has lodged the claim for the differential cost (transit loss) through CERC/APTEL. Thus, HPPC was comparing variable cost in a manner for M/s JPL which was advantageous to M/s JPL over HPGCL.

The said matter was also deliberated in the meeting of Steering Committee for Power Planning (SCPP) on 28 October 2021, wherein it was deliberated that HPPC shall take up the matter with M/s JPL (China Light and Power- CLP) to raise the bills as per PPA and if CLP does not agree then CLP should be placed in the merit order as per the bills raised by them. In this regard, other than correspondence with the Generator, no action has been taken as of April 2022.

6.7 Conclusion

Against the total tied up capacity of thermal power (as per normative PLF) of 7,204 MW from 30 thermal power plants, the HPPC could utilised maximum 4,378.68 MW from 22 thermal power plants on merit order basis and remaining eight thermal power plants remained backed down/shut down. HPPC had purchased short term thermal power from two private thermal power plants (SKS

Power and MB Power) at variable cost of ₹ 4.29 per unit ranging between 208.41 MW to 391.21 MW. Audit observed that instead of purchasing power at the rate of ₹ 4.88 per unit from private plants, Unit-VI of HPGCL having lower variable cost of ₹ 3.90 per unit could have been considered to be scheduled for power purchase. Most of the Intra state Generators (HPGCL Plants and other plants situated in Haryana) are likely to be benefited in case of preparation of Merit order Dispatch on landed cost basis as their ranks improved in Merit Order Dispatch as their generation cost did not have transmission charges and losses which are being paid by DISCOMs in case of electricity purchased from Inter-State Generating stations. But overall cost of power purchase increased when scheduling was done as per landed cost. Besides revising the components of variable cost to include transmission charges and losses as a component of variable costs is assessed to be beneficial to generating units in Haryana because Haryana is in the northern part of the Country and thermal power plants of HPGCL located in Haryana have to pay significant cost on transportation of coal which is incorporated as component of variable cost and principal reason for low positioning of HPGCL plants in Merit order Dispatch. However, HPGCL plants have negligible transmission cost as its plants are closer to the consuming centres. As per MoD prepared by considering transmission cost as part of variable cost will increase the cost of power purchase to DISCOMs, however, it will be advantageous to Intra State power Generators including State generating Power Plants. HPPC could utilize maximum 5,119 MW and 5,595 MW capacity against the actual available of 7,204 MW capacity during 2019-20 and 2020-21 respectively. Thus, 2,085 MW capacity during 2019-20 and 1,609 MW capacity during 2020-21 remained unutilized. Due to which, the units of thermal power plants including Haryana State owned generating units were backed down (non-operational) for significant period of time during these years. The proportionate fixed cost of unutilized capacity works out to be ₹ 3,030.64 crore (₹ 1,757.92 crore and ₹ 1,272.72 crore) for the period 2019-21. This has resulted into additional financial burden on state consumers due to increase in power purchase cost. HPPC considered the lower of the variable cost in respect of M/s Jhajjar Power Limited while preparing merit order (as per final payment made to generator) despite the fact that the generator was claiming this deducted amount and filed petition in Central Electricity Regulatory Commission (CERC)/APTEL. HPPC was allowing the generator to benefit in form of placing it in merit order on basis of lower of the two variable costs.

6.8 Recommendations

- HPPC should use Operational Research/ Optimization Techniques to get the best mix for procurement of power.
- HPPC should take prompt action for consideration of proper variable cost of M/s JPL while preparing Merit Order Dispatch.