

Transparency in Power Sector through ABT



S.K. Soonee

GM. SRLDC



V.V. Sharma

AGM, Dir. (Oper.) Sectt.

1.0 Abstract

POWERGRID's contributions in introducing Availability Tariff (ABT) in Indian Power Sector is well known and duly recognized by the Power Engineers not only in India but Worldwide. In particular, the un-tiring efforts and contributions made by Shri Bhanu Bhushan in the last decade has resulted in making the implementation of ABT a reality after lot of hesitation and objection by the various players in the Power Sector. Although, the readers of the 'Candour' may be familiar with the concept and mechanism of ABT but it is worthwhile to refresh the memories of the readers by explaining the mechanism in this paper before discussing its impacts and transparency aspect. We may also mention here that ABT mechanism is not only transparent but it works as vigilance in Power System Operation. This mechanism has all the similarities of Vigilance department in an organization, like discipline, ethics, honesty in system operation penalties for breaking the discipline/reward for following the discipline, transparency, etc. etc. It is a self-healing mechanism. We would be covering above aspects here one by one.

2.0 Availability Tariff (ABT)

The term 'Availability Tariff' stands for a rational tariff structure and scientific settlement system for power supplied from Generating stations on a contracted basis. In the ABT mechanism, the fixed and variable cost components are treated separately. The payment of fixed cost is linked to availability of the plant, that is its capability to deliver MWs on a day-by-day basis. The total amount payable to generating company over a year towards the fixed cost would depend on the average availability (MW delivering capability) of the plant over the year. In case the average availability achieved is lower, the payment would be lower. Hence, the name Availability Tariff. This is the first component of the Availability Tariff, and is termed as Capacity Charge. The second component of Availability Tariff is the Energy Charge, and this would comprise of the variable cost (i.e. fuel cost of the power plant for generating energy as per the given schedule for the day). It may be particularly noted that energy charge is not according to

the actual generation and plant out put, but is for the schedule. To recapitulate, the Availability Tariff would comprise of three components: (a) Capacity Charge, (b) Energy Charge & (c) Unsheduled Interchange or UI, a payment for deviations from the schedule, at a rate dependent on system conditions.

3.0 Necessity for introduction of Availability Tariff

India has been divided into five geopolitical electrical regions. The regional grids were operating in a very dissatisfactory manner due to large deviations in frequency from the rated frequency of 50.0 cycles. Low frequency situation results when the total generation available in the grid is less than the total consumer load connected at that time. This can be checked by enhancing the generation and/or curtailing the consumer load. High frequency is the result of insufficient backing down of generation when load comes down during off-peak hours. We have seen the off-peak time frequency rise up to 53 Hz. drop to 47.5 Hz. during peak hours. This wide excursion of frequency (rise and fall) had been a major cause for many system disturbances and grid collapse in last decade. The findings of experts and consultants, like K. P. Rao Committee & ECC, USA, pointed out the faulty tariff mechanism as cause of grid indiscipline. The availability tariff directly addresses these issues. Firstly, by giving incentive for enhancing the out put capability of power plant, it would enable more consumer load to be met during peak load hours. Secondly, backing down during off-peak hours would not result in a financial loss to the generating station, and therefore the present incentive for not backing down and raising the system frequency would get neutralized.

4.0 How the Availability Tariff mechanism works

The ideal way to operate the power system shall be that the generation from the generating stations should match the demand of beneficiaries of the power system. Day ahead scheduling and coordination for central sector generation and beneficiaries in 15 minutes time block, is the key to the ABT mechanism. The drawal schedules of all beneficiaries are pre-decided and generation schedule for the generating stations are advised before the actual day of operation. With ABT, the generators are encouraged to operate their station as per merit order and SEBs and beneficiary states are encouraged to draw from the grid as per merit order. The variations from the schedule are known on line and are priced with respect to grid frequency.

5.0 Transparency through Availability Tariff

The generation and drawal schedule are conveyed to all players in advance of actual date of operation. The schedules and actual generation/drawal is displayed on line and the unsheduled inter-changes are also displayed on line to all the players. The ethics and discipline requirement for the players is to honour the agreed schedule. If any beneficiary or generator deviates from the schedule on the actual date of operation, the payment for unsheduled inter-change linked to frequency shall be paid on priority. Other ethics are to follow the guidelines of IEGC in regard to maintaining the parameters

of regional grid and operate the generating units in free governor mode, providing adequate reactive power compensation, etc. etc.

6.0 Implementation of ABT in India

The CERC had prescribed the implementation of ABT in the various regions in a staggered manner commencing with Southern Region w.e.f. 1.4.2001. This was to be followed by Eastern Region (w.e.f. 1.5.2001), Northern Region (w.e.f. 01.08.2001) and lastly in Western Region (w.e.f. 01.10.2001). However, at the instance of a number of State Power Utilities including some Central Sector Generation Companies, various High Courts granted an interim stay on the implementation of ABT. The Supreme Court later vacated these interim stays, thus clearing the legal hurdles for the implementation of ABT. The constituent utilities of Western Region (WR) agreed to implement ABT in WR w.e.f. 01.07.2002. ABT was thus implemented for the first time in India in WR w.e.f. 1.7.2002. In a similar manner the constituents utilities of Northern Region (NR) agreed and implemented ABT in NR w.e.f. 01.12.2002, followed by Southern Region (SR) w.e.f. 01.01.2003 and Eastern Region (ER) w.e.f. 01.04.2003.

7.0 Major Achievements of ABT implementation

In 2003, after the implementation of Availability Tariff (ABT) in four regions and implementation of Indian Electricity Grid Code (IEGC) in true sense, a framework has now been put in place wherein inter-State and inter-regional bilateral trading can take place in a rational manner. Also, surplus captive generation can be harnessed; embedded utilities/plants (e.g.; Tata Power, Essar) can sell surplus power to other SEBs. The major achievements so far after implementation of Availability Tariff in these Regions are as follows:

- A marked improvement in frequency profile in these Regions has been observed. Now, the frequency is being maintained for much larger durations within the desirable band of 49.0 Hz. to 50.5 Hz. There has been a dramatic improvement in frequency in Southern Region. The frequency in SR is now maintained in the band of 49-50.5 Hz for almost 100% of time. It is noteworthy that prior to implementation of ABT, the Southern Region frequency was remaining below 48.5 HZ for 85-90% of time.
- Almost all CGS are being scheduled to their available capacity (being cheaper) and almost no backing down is sought by SEBs.
- Constituents are now actively forecasting their loads and merit order dispatch is now gaining importance.
- Constituents are themselves taking self-regulatory measures to maintain frequency in desirable Band i.e.; 49-50.5Hz. Prior to implementation of ABT, RLDCs had to constantly issue messages for maintaining frequency in the normal band.

- Inter-State as well as inter-regional bilateral trading is now taking place.
- Another noteworthy feature is the quick response of the constituents in correcting the system frequency in the event of contingencies.
- GEB has harnessed surplus IPP generation, which was idling earlier.
- Substantial improvement in Voltage profile leading to improvement in Grid Security particularly in Southern Region has been noticed.
- Hydro Generation is being optimally utilized. Pumped Storage schemes in SR are now running two times in a day leading to Optimum Utilisation.
- All the regions exploit full advantages of UI mechanism.

8.0 Impact of Availability Tariff in India

- Quality Frequency and voltage: After the introduction of ABT, wide frequency excursions are a thing of the past. Voltage profile in the grid is stable and mostly within the range specified by IEGC. This has given added benefits to the end user in terms of quality.
- Reliability: Due to the new regime of discipline, transparency and ethical behaviour, grid disturbances are very rare and occur more due to malfunction rather than constrained operation.
- Generators: Generators are operating with economy in mind as their cost realization depends on their availability and schedule rather than actual generation. Maintenance procedures have been made aggressive and compressed. A new work culture has emerged in Power stations.
- Constituents: The States have started to utilize their resources optimally, thereby saving the exchequer crores of rupees in losses and sub optimal operation. For example, Kadamparai Pumped Storage Scheme which was highly under-utilised for decades is doing several cycles of pump generation every day. The States have also started forecasting their load and planning for it. The work culture has also improved in all facets.
- Trading: As mentioned earlier this 'Transparent and fair' platform (ABT Settlement System) has also increased the number of bilateral transactions. Trading, especially in the short-term market is increasing because the price (i.e. the frequency) is known to all players and there is no scope for 'price fixing' or other unethical practices.
- Economy: The ABT mechanism creates a fair platform in which all the players can interact to create a 'win-win' situation. The cost of operation is coming down with the end user greatly benefited. The ABT mechanism also fosters Merit Order operation in the power pool.
- Increased Power Availability: After introduction of ABT in four major regions in India, the availability of power to meet the peak demand has been increased by about 2000 MW without addition of new generation. In financial terms, the above additional availability is equivalent to addition of 2000 MW new capacity additions, which would have required a capital investment of about Rs.10,000 Crores about 4 years back.

9.0 Looking Further

The States are looking towards implementing the ABT mechanism for their Generators and distribution companies, thereby extending this 'Fair and Transparent' mechanism to the doorstep of the consumer.

Shri Bhanu Bhushan has recently outlined a mechanism based on ABT for Captive Power Plants to supply power to the grid during times of need. This is expected to have an overwhelming response, as the mechanism is likely to exploit the latent capacity in the country.

10.0 Conclusion

Availability tariff mechanism is simple, transparent and fair. It is based on strong scientific and social philosophy and has delivered the desired result. We would conclude saying that UI (ABT) mechanism induces self-discipline, transparency and ethics in the Power Sector and India can show to the world.