Chapter - III
Tariff and Revenue generation

Unit I of KKNPP started commercial operation on 31 December 2014. The power generated before the date of commissioning of the plant is termed “infirm power” and the power generated after the start of commercial operation is termed as “firm power”. The tariff for selling the power generated by the Nuclear Power Stations was to be fixed by the Department of Atomic Energy (DAE). Pending fixation of tariff by DAE, provisional tariff was arrived at by NPCIL which was stated to be as per the DAE Notifications dated 8 December 2010 and 23 May 2013.

The operational performance of KKNPP for the last four years ending 31 March 2017 was as follows:-

Table 3.1: Operational performance of the KKNPP

Electricity	Particulars	Nuclear energy	
		Infirm power (Units I and II)	**Firm power** (Unit I)
Generation (Units in million KWh)	For the year ended 31.03.2014	1,105.62	--
	For the year ended 31.03.2015	2,242.59	2,087.37
	For the year ended 31.03.2016	--	2,261.22
	For the year ended 31.03.2017	2,326.57	6,224.96
Total		**5,674.78**	**10,573.55**
Net export[19] (Units in million KWh)	For the year ended 31.03.2014	776.96	--
	For the year ended 31.03.2015	1,837.92	1,917.12
	For the year ended 31.03.2016	--	2,056.53
	For the year ended 31.03.2017	2,083.31	5,726.09
Total		**4,698.19**	**9,699.74**
Net export (Amount in ₹ crore)	For the year ended 31.03.2014	95.94	--
	For the year ended 31.03.2015	234.77	740.03
	For the year ended 31.03.2016	--	801.87
	For the year ended 31.03.2017	255.43	2,302.34
		586.14	**3,844.24**

It may be seen from the Table 3.1 that during 2013-14 to 2016-17, 5,674.78 million KWh units of infirm power were generated out of which 4,698.19 million KWh units were exported at a value of ₹ 586.14 crore. Further, 10,573.55 million KWh units of firm power were generated out of which 9,699.74 million KWh units were exported at a value of ₹ 3,844.24 crore.

[19] *Represents electricity sold to State Electricity Board.*

3.1 Ad-hoc fixation of tariff resulting in short revenue realisation - ₹ 90.63 crore

The tariff for sale of electricity (firm power) by Atomic Power station to the State Electricity Board was to be fixed based on norms prescribed in the tariff notification of DAE (8 December 2010) which prescribed components to be considered while fixing tariff for power to be sold by nuclear power plants. The prescribed components are return on equity, interest on debt, depreciation, operation and maintenance cost, foreign exchange rate revision and hedging costs, fuel consumption, interest on working capital, annual fuel recovery, provision for taxation and decommissioning levy.

Audit observed that NPCIL, while fixing tariff for infirm power, deliberated (July 2013) that the DAE notification of 8 December 2010 was silent on the rate to be charged on infirm power generated by nuclear reactors. It was proposed by NPCIL (July 2013) for fixation of infirm tariff at 61.15 paisa per kilowatt hour (KWh) considering the Operation and Maintenance charges and fuel cost as was the practice in vogue in the case of other units of NPCIL. Considering the rate 61.15 paisa per KWh to be too low, two additional components of interest on working capital and depreciation were considered for working out the infirm tariff on the ground that these two expenditures were incurred between 22 October 2013 and 31 December 2014. After including these components, the rate of infirm power was fixed (November 2013) at 122.37 paisa per KWh.

During the review of tariff fixation process for infirm power, Audit observed that NPCIL did not adopt uniform criteria for inclusion of components for tariff fixation. While it considered two additional components *i.e.,* interest on working capital and depreciation on the ground that these components did get incurred, but NPCIL did not consider two other similar components *i.e*., interest on foreign debt and interest on domestic borrowings which were also incurred during the same period between 22 October 2013 and 31 December 2014 and involved outflow of funds in the form of interest payments. There were no justifiable reasons recorded for non-consideration of these two components in the tariff fixation for infirm power.

Non-consideration of interest on foreign debt (19.89 paisa per KWh) and interest on domestic borrowings (14.77 paisa per KWh) in tariff fixation for infirm power generated (2614.88 million KWh) resulted in short realisation of revenue to the tune of ₹ 90.63 crore for the period between 22 October 2013 and 31 December 2014.

The Management replied (28 June 2017) that there are no fixed components of tariff for the infirm power. Moreover, there is no short realisation or loss to the corporation, as all the expenditure till the date of commercial operations (COD) is capitalised and is recovered through tariff of the firm power. Any expenditure which does not get reflected in the tariff gets capitalised and is recovered subsequently, along with cost of funds, through the sale of firm power after COD.

The reply of the Management is not relevant as the audit observation is not about the treatment of sales receipts i.e. whether to consider as revenue receipt or as reduction in capital expenditure. The issue is about non-consideration of two components of expenditures (i.e. interest of foreign debt and domestic borrowings which involves outflow of funds) - while fixing tariff for infirm power, on which the reply is silent. The method adopted for fixation of infirm tariff was indicative of the fact that tariff related decision having impact on revenue was taken by NPCIL in an *ad hoc* and discretionary manner and there was no fully structured exercise and prefixed criteria for the same.

Audit Recommendation No. 4	DAE's reply to the Audit Recommendation
All cases of infirm tariff fixation may be processed by NPCIL according to prefixed criteria to avoid discretionary adhocism in decision making for the same.	DAE informed that presently no formula has been fixed by GoI for arriving at infirm tariff rate and that infirm power sales realization is adjusted against project cost. Hence only variable cost is being taken as per policy. Due to considering two additional items of cost, than that being considered as per practice, has given rise to the audit observation. DAE accepted the audit recommendation and confirmed need for consistency in formula adopted.

3.2 Non recovery of notified additional component of tariff on sale of power - ₹ 7.04 crore

DAE, vide its notification dated 23 May 2013, levied an additional component of 1.5 paisa per KWh in tariff on sale of power from the existing and future atomic power stations, towards Self Insurance Fund[20] of Hot Zone Assets [21]of Atomic Power Plants. As per the notification, these charges were fixed and were payable with immediate effect till further notification. The charges were applicable for sale of power from all the atomic power stations irrespective of any revision or re-notification of the base tariff.

It was observed in audit that while fixing tariff for infirm power, NPCIL did not include the additional component of 1.5 paisa per KWh in tariff fixed for power generated from its Unit 1 of KKNPP. The infirm power generated from Unit I (2,614.88 million units) and from Unit II (2,083.31 million units) was sold to State Electricity Boards. NPCIL levied the component of 1.5 paisa in tariff only from the date of commercial operation of Units I and II. NPCIL sold 4,698.19 Million KWh of infirm power during October 2013 to March 2017 to the State Electricity Boards on which an amount of ₹ 7.04 crore was forgone due to non inclusion of levy for self insurance fund in the tariff.

[20] *The Self-Insurance fund is being collected on the concept of building a self corpus to mitigate the risks not covered under the general insurance policies.*
[21] *Radiation and Nuclear reactors*

The Management replied that the atomic power project upon declaration of commercial operation is treated as a station and other levies such as decommissioning levies are not charged during the infirm power period. It further stated that even as per the accounting treatment, during the period from criticality of the plant to commencement of commercial operation, all the revenue earned from sale of power (infirm) is treated as reduction of capital cost of the project and all the expenditures including interest on the loan, are capitalised.

The reply is not acceptable as the audit observation is not on the accounting treatment of receipt on sale of infirm power. The observation was on non-inclusion of additional component mandated by DAE for self insurance fund in the fixation of tariff of infirm power resulting in under recovery and consequently loss of revenue on which the reply is silent.

3.3 Non-recovery/ adjustment of energy charges from Tamil Nadu Generation and Distribution Corporation Limited on account of wheeling

NPCIL installed (2007) eight number of wind mills of 1250 KW capacity each at its Kudankulam premises. The wind power generated by five out of eight units installed were used for captive consumption and the power generated from the remaining three units were sold to Tamil Nadu Generation and Distribution Corporation Limited[22] (TANGEDCO) for which necessary agreements were entered (January 2007) between NPCIL and TANGEDCO. The arrangement was revised in October 2009 which also provided for wheeling[23] and banking[24] of the surplus wind energy, if any generated. The electricity (wind energy) was being sold to TANGEDCO at ₹ 2.90 per unit with effect from March 2009. As per the agreement, the change of utilization of wind energy for captive to sale was permissible. Further, the unutilized portion of banked energy, if any, available at the end of banking period i.e., 31 March every year was deemed to have been purchased by TANGEDCO at the rate of 75 *per cent* of the normal purchase rate of ₹ 2.90 per unit i.e., ₹ 2.175 per unit.

Audit noticed that TANGEDCO raised bills at High Tension connection rates of ₹ 9.50 for Site and ₹ 4.50 for township against these connections for the months of July and August 2012 without adjusting the wind energy generated and the bills were paid by NPCIL at higher rates. This resulted in excess payment of ₹ 2.09 crore to TANGEDCO.

The Management replied that the non adjustment of Wind Energy Generation against the consumption in HT 131 and HT 132 as in agreement had already been taken by the company vide letter dated 14 August 2012. Further, letter was also written to TNEB by on 27 June 2015; however response is awaited.

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[22] *Tamil Nadu Electricity Board (TNEB) was restructured on 1 November 2010 into TNEB Limited, Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO) and Tamil Nadu Transmission Corporation Limited (TANTRANSCO)*

[23] *Wheeling refers to the transfer of electrical power through transmission and distribution lines from one utility's service area to another's.*

[24] *Banking means residual electrical energy after utilization for captive consumption out of the injected energy in a month into the transmission/ distribution system which will be utilized later for its own use or for wheeling.*

Even though Tamil Nadu Generation and Distribution Corporation Limited disallowed the benefit for the bills of July and August 2012 and matter has been pursued regularly with company, the amount still stands unadjusted. This indicates absence of effective monitoring system which is necessary to ensure that payments to TANGEDCO are made after verification and as per agreed terms.

3.4 Avoidable delay in restart after refuelling of Unit I leading to abnormal extended shutdown and consequent revenue loss of ₹ 947.99 crore

NPCIL had planned to undertake the refueling work of Unit I by the departmental manpower as well as the Indian contractor's manpower to be engaged by it. Accordingly the planned shutdown of Unit I was for 60 days from last week of May 2015 to third week of July 2015. However, Audit noticed that NPCIL belatedly realised (July 2015) that the experience of departmental manpower as well as Indian vendors on various equipments supplied was limited and the technical assistance/advice from manufacturer specialist or other specialists from Russian as well as third countries was required during refuelling outage.

NPCIL therefore decided to enter a new contract with ASE for deputation of specialists from Russia or third countries during refueling outage and for subsequent operation in case of exigencies. Accordingly, a new contract was signed between NPCIL and ASE on 24 August 2015 for engaging Russian Specialists for 95 man months at a contract value of USD 1.88 million (plus applicable taxes) at the rate of USD 19,800 per man month for rendering consultancy services at KKNPP Unit I during refueling outage.

It was observed that the cost of the contract awarded to ASE for engaging Russian specialist in August 2015 was 76 *per cent* more than NPCIL's own estimated cost of USD 1.06 million for the same. Moreover as against USD 11,220 per man month paid earlier to the Russian specialists, the amount agreed to be paid to the Russian specialist in connection with refuelling connected work was USD 19,800 per man month *i.e.*, 76 *per cent* higher. As the engagement of Russian specialists was considered after the shutdown, owing to NPCIL's incorrect assessment about its own capabilities relating to carrying out the refuelling work on its own, it had no option but to accept the higher rate without any scope of significant negotiation in view of the stated time constraint.

It was further noticed that as against the planned shutdown of 60 days, Unit I was actually shut down for 222 days from 24 June 2015 to 31 January 2016. This extended shutdown continued despite the engagement of Russian scientists for carrying out the refuelling related works. NPCIL took 162 days more than the estimated 60 days for restarting of Unit I. NPCIL's initial decision to shut down the plant and execute the refuelling work on its own without evaluating and ensuring its technical competency for the same, before the shutdown, was not prudent.

The extended delay in restarting the reactor caused non generation of power for a long period of time and had adverse consequences on revenue generation. This resulted in revenue loss amounting to ₹ 947.99 crore to NPCIL on account of non-generation of electricity for sale for the subject period.

The Management replied (28 June 2017) that the requirement of technical assistance from specialist from Russia and third countries was realised well in advance and that the higher rates quoted by ASE was justified as the estimate prepared was based on contract entered with ASE in July 2013. It further stated that the scope of work required deputation of highly qualified specialist and NPCIL had no option but to accept the negotiated rate as ASE was only capable of executing the work. The Management also stated that refuelling shut down consumed more time than expected due to unanticipated maintenance jobs like replacement of failed rope, dismantling the main mast, TV mast cable and camera, RFM with new rope, leak detection of 163 fuel assemblies, overhauling of four reactor coolant pump as against one planned etc.

The reply of the Management clearly indicates that NPCIL did not properly assess the level of expertise required for refuelling before shutting down Unit I in June 2015 for the same. Moreover, the 1,500 activities planned were to be carried out by departmental labour and contract manpower engaged through Indian firms and the purpose of Technical assistance/ advice from the Specialists was primarily to enhance the progress of 1,500 activities planned. Further, the rate finalised in contract entered in July 2013 was applicable upto 2016, hence the increase in rate by 76 *per cent* in the contract for deputation entered in August 2015 was not justified. Even though NPCIL claimed that delay in restarting the plant was due to time taken for repairing various equipment, the fact remains that though the equipment were designed and supplied by ASE and despite Russian manpower presence at site, NPCIL took 162 more days for restarting the Unit I which resulted in revenue loss to the tune of ₹ 947.99 crore.

Audit Recommendation No. 5	DAE's reply to the Audit Recommendation
For all future planned shutdowns, NPCIL may do a competency analysis by mapping with a structured breakdown analysis, to take timely decision, if required, for engaging external consultants to avoid prolonged shutdown and consequential revenue loss.	DAE informed that shutdown for refueling are mandatory and planned. In the present case, the unplanned shut down was for compliance of regulatory requirements of AERB. DAE noted the recommendations for future compliance.

Conclusion

NPCIL did not have in place a firm pre fixed criteria to avoid discretion/adhocism in tariff fixation of infirm power, and to ensure that relevant cost components are considered in the light of applicable Regulatory Rules/Orders and principles of cost recovery in infirm power tariff fixation process. The shutdown activity for refueling of plant also lacked proper planning and assessment by the NPCIL which resulted in closure of Unit I of KKNPP for a longer time than estimated, resulting in substantial revenue loss.