

EXPLANATORY MEMORANDUM

Historical Background

1. The Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2009 (hereinafter referred to as “the 2009 Tariff Regulations”) were notified on 20.1.2009. The 2009 Tariff Regulations were amended twice - first amendment on 2.5.2011 and second amendment on 12.6.2011. Based on the experience gained after operation of the 2009 Tariff Regulations over the past three years and on account of certain developments like change in tariff policy and decisions of the Commission on certain important issues, it has become necessary to amend the regulations further to keep pace with the developments.

2. In exercise of the powers under section 178 of the Electricity Act, 2003 (hereinafter “the Act”), the Commission has proposed to amend the 2009 Tariff Regulations and has accordingly posted the Central Electricity Regulatory Commission (Terms and Conditions of Tariff)(Third Amendment) Regulations,2012 inviting suggestions/objections/comments from the stakeholders and general public at large. The reasons for the proposed amendment have been discussed in the subsequent paragraphs.

(A) Regulation 3: definition of pumped storage hydro generating station

3. The Commission has decided to introduce provision regarding determination of tariff of pumped storage hydro generating station. Accordingly it has become imperative to define the term ‘pumped storage hydro generating station’. The proposed definition is as under:

“(31A) ‘Pumped storage hydro generating station’ means the hydro station which generates power through energy stored in the form of water energy, pumped from a lower elevation reservoir to a higher elevation reservoir.”

4. In order to ensure that the clauses pertaining to hydro generating stations are equally applicable to the pumped storage generating stations, sub-clause (b) of clause (12), clause (41) and sub-clause (d) of clause 42 of Regulation 3 have been amended to add the words “including pumped storage hydro generating station”.

(B) Regulation 7: Capital Cost

5. Fourth proviso to clause (2) of Regulation 7 of the 2009 Tariff Regulations provides as under:

“Provided also that the Commission may issue guidelines for scrutiny and approval of commissioning schedule of the hydro-electric projects of a developer, not being a State controlled or owned company as envisaged in the tariff policy as amended vide Government of India Resolution No 23/2/2005-R&R (Vol.IV) dated 31st March 2008.”

The above provision was specified in 2009 Tariff Regulations keeping in view the mandate in the tariff policy to issue guidelines for scrutiny and approval of the commissioning schedule of the hydro electric projects of a developer other than a State controlled or owned company. The Tariff Policy has been amended by the Government India, Ministry of Power vide Resolution No.23/22005-R&R(Vol-IV) dated 8.7.2011 in which the appropriate Commissions are required to issue guidelines for scrutiny and approval of the commissioning schedule of the hydroelectric projects irrespective of whether the project is developed by State controlled/owned company or a Private developer. Accordingly, it has been proposed to modify the above proviso as under:

“Provided also that the Commission may issue guidelines for scrutiny and commissioning schedule of the hydro-electric projects in accordance with the tariff policy issued by the Central Government under section 3 of the Act and as amended from time to time.”

6. Subsequent to the statement of Hon'ble Minister of Power, Government of India in the Parliament, Ministry of Power through letter dated 27.7.2009 has notified a scheme under which the Central Public Sector Undertakings (CPSUs) are required to create infrastructure for supply of reliable power to the rural households in the villages within a radius of 5 km of their existing and upcoming power stations. The scheme further provides that the appropriate Commission shall consider the expenditure incurred by the CPSUs for implementation of the scheme for the purpose of determining the tariff of their respective generating stations. NTPC in its various tariff petitions filed during the period 2009-14 has prayed for capitalisation of the said expenditure. Since there is no provision in the 2009 Tariff Regulations for capitalisation of such expenditure, the Commission has proposed to make appropriate provision for the same through amendment of the regulation.

Accordingly, the following proviso has been proposed to be added after the sixth proviso to clause (2) of the 2009 Tariff Regulations:

“Provided also that the capital cost of the generating station shall include the cost for creating infrastructure for supply of power to the rural households located within a radius of five kilometers of the power station.”

(C) Regulation 9: Spares

7. Regulation 8 of 2009 Tariff Regulations provides for capitalisation of spares as under:

“8. Initial Spares. Initial spares shall be capitalised as a percentage of the original project cost, subject to following ceiling norms:

(i) Coal-based/lignite-fired thermal generating stations	2.5%
(ii) Gas Turbine/Combined Cycle thermal generating stations	4.0%
(iii) Hydro generating stations	1.5%
(iv) Transmission system	
(a) Transmission line	0.75%
(b) Transmission Sub-station	2.5%
(c) Series Compensation devices and HVDC Station	3.5%

Provided that where the benchmark norms for initial spares have been published as part of the benchmark norms for capital cost under first proviso to clause (2) of regulation 7, such norms shall apply to the exclusion of the norms specified herein.”

8. Regulation 8(iii) provides for 1.5% of the project capital cost as initial spares for hydro generating station. Since ‘pumped storage hydro generating station is being included for the purpose of tariff through the present amendment, it is proposed to provide for initial spares for these station at the same rate as for the hydro generating stations. Accordingly, Regulation 8(iii) has been proposed to be substituted as under:

“(iii) Hydro generating station including pumped storage hydro-generating station-1.5%”

9. The Regulations do not provide for initial spares for Gas Insulated Sub-Station (GIS). The Commission in its order dated 27.1.2012 in Petition no. 37/2010 has observed the following in respect of the initial spares of Gas Insulated sub-station equipment:

“17. The petitioner has submitted that the Gas Insulated Sub-Stations owing to their unique technology and high import content fall under the category of non-conventional systems and should be allowed initial spares @ 3.5 % as in the case of Series Compensation devices and HVDC stations. We have considered the submission of the petitioner. GIS is comparatively a new technology and the spare

requirement may be project specific, which would result in higher initial spares. Further, the GIS equipments are imported and costlier as compared to conventional sub-station. Therefore, there is a requirement of higher ceiling for GIS systems. We notice that 2009 regulations do not contain any norms for GIS equipments. Accordingly, we direct the staff of the Commission to consider the requirement of spares in respect of the GIS equipment while processing the case for amendment of the 2009 regulations in future."

10. PGCIL has claimed initial spares in some of its petitions as under:

Sr. No	Name of the Asset	Capital Cost claimed as on Cut off date including sub-station & PLCC (in ₹. Lakhs)	Initial Spares claimed by the petitioner	Initial Spare as % of capital cost (including sub-station & PLCC)	Land Cost (in Rs. Lakhs)	Buildings & Civil Works Cost (In Rs. Lakhs)	Total capital Cost claimed as on Cut off date including sub-station PLCC, Land & Building (in Rs. Lakhs)	Initial Spare as % of capital cost (including sub-station & PLCC)
		1	2	3(=2/1)	4	5	6(=1+4+5)	7(=2/6)
1	Asset-1-400 kV GIS Bay for LIL0 of B'garh-Bhiwadi at Gurgaon (Pet No.343/TT/2011)	3304.62	321.86	9.74%	526.72	612.73	4444.07	7.24%
2	Asset-2-ICT1 at Gurgaon (Pet No. 343/TT/2011)	4744.72	221.23	4.66%	1053.44	1065.68	6863.84	3.22%
5	Asset-1-ICT2 at Gurgaon (Pet No.147/TT/2011)	5171.59	156.68	3.03%	1051.80	831.90	7055.29	2.22%
3	Asset-1-ICT3 at Maharani Bagh (Pet No. 3/TT/2011)	3237.33	266.61	8.24%	0.00	66.76	3304.09	8.07%
4	Asset-2-ICT-4 at Maharani Bagh (Pet No. 3/TT/2011)	2882.97	266.61	9.25%	0.00	0.00	2882.97	9.25%
6	Asset-1-ICT1 at Manesar	4523.02	220.71	4.88%	425.34	500.28	5448.64	4.05%
7	Asset-2-ICT-2 at Manesar	4523.02	220.71	4.88%	425.34	500.28	5448.64	4.05%

11. From the above data it is observed that the initial spares claimed by PGCIL in the above petitions are in the range of 2.22% to 9.25% of the capital cost (including cost of sub-station, land and building and civil works). It is also observed that the % of initial spares depends on cost of land, building and civil works to a great extent. On perusal of the data pertaining to ICTs at Maharani Bagh, it is noticed that the cost of land and building on civil works is very negligible and therefore the percentage of initial spares is very high i.e. 8.07% and 9.25%. Excluding the assets

at Maharani Bagh sub-station, the percentage of initial spare in respect of the remaining five assets is in the range of 2.6% to 4.05% with an average of 3.65%.

12. In the existing regulations, there is no separate norm for spares for GIS. However, the regulations provide for initial spares for HVDC and Series Compensation Devices @ 3.5% of the project cost. On the basis of the available data the initial spares ceiling of 3.5% of the project capital cost (including sub-station, PLCC, land and building and civil works) has been proposed in the draft regulations as under:-

"(d) Gas Insulated Sub-station (GIS) -3.5%"

(D) Regulation 9: Additional Capital Expenditure

13. It has been proposed to add a proviso under Regulation 7(2) of the 2009 Tariff Regulation to provide for the capitalization of the cost on creating infrastructure for supply of power to the rural households located within radius of the 5 km of the power station. In some cases, the generating stations may be required to capitalise the expenditure after the cut-off date. Accordingly, sub-clause (ix) under Regulation 9(2) has been proposed to be added as under:-

"(ix) Expenditure on account of creation of infrastructure for supply of reliable power to rural households within a radius of five kilometres of the power station."

14. In a number of petitions, NTPC has been claiming additional capital expenditures for efficient and successful operation of the generating stations. In case of existing generating stations, NTPC has claimed the expenditure under last proviso to Regulation 7(2) of the 2009 Tariff Regulations and in case of the new generating station under Regulation 5, 6 and 7 of the 2009 Regulations. It is pertinent to mention that under Regulation 19(e) of the 2009 Tariff Regulations, compensation allowance on normative basis has been provided for thermal generating station. Regulation 19(e) provides as under:

"(e) In case of coal-based or lignite-fired thermal generating station a separate compensation allowance unit-wise shall be admissible to meet expenses on new assets of capital nature including in the nature of minor assets, in the following manner from the year following the year of completion of 10, 15, or 20 years of useful life:

Years of operation	Compensation Allowance (Rs lakh/MW/year)
0-10	Nil
11-15	0.15
16-20	0.35
21-25	0.65

The expenditure under Regulation 19(e) is for defraying the expenses for minor works and works of capital nature. Similar provision has not been made for hydro generating stations and transmission systems. It is however experienced that some of the expenditure which are essential for the functioning of the generating stations cannot be accommodated under Regulation 19(e) for two reasons: firstly, the expenditure under Regulation 19(e) is admissible after 10 years of the commercial operation and therefore, the generating stations which have not completed the mandatory period are not eligible for it. Secondly, the expenditure claimed for additional capitalisation exceeds the normative expenditure admissible under Regulation 19(e). Therefore, there is a requirement to provide for adequate provision to take care of the requirement of the generating companies for capitalisation of expenditure which are considered necessary for the efficient operation of the thermal generating stations. Accordingly, a new sub-clause has been proposed under clause (2) of Regulation 9 of 2009 Tariff Regulations as under:

"(x) Any expenditure which is considered indispensable by the Commission for running the thermal generating station:

Provided that in case of coal-based and lignite-fired generating station, compensation allowance under clause (e) of Regulation 19 shall not be admissible."

(E) Regulation 15: Return on Equity

15. Regulation 15(2) of the 2009 Tariff Regulations provides as under:-

"(2) Return on Equity shall be computed on pre-tax basis at the base rate of 15.5% to be grossed up as per clause (3) of this regulation."

16. The Commission has proposed to amend the above regulation to provide for a higher rate of return in respect of reservoir based hydrogenating stations including pumped storage schemes. The justification for the above proposal has been explained in the succeeding paragraphs.

17. Hydro power when developed in accordance with good environmental and social practices, has the advantage of producing power that is both renewable and clean, as they emit less greenhouse gases than traditional fossil fuel plants and do

not emit polluting suspended particulate matter (from the high ash-content of indigenous coal). Hydro-electric generating stations have inherent ability for quick starting, stopping and load variations, and thus they help in improving reliability of the power system. This provides the network operator the vital flexibility to respond to wide fluctuations in demand across seasons and at different times of the day. This flexibility is particularly important in a highly-populated country like India where household electricity demand is a significant portion of total demand and this demand is concentrated in a short period of time (usually in the evening). Their generation cost is not only inflation free but reduces with time as loans are repaid. Further, storage type hydro-electric generating stations generally form a part of multipurpose river valley projects with added benefits of irrigation, flood control, drinking water supply, etc. The Hydro projects provide valuable peak power. The peaking power stations generally operate at a very low load level. Recognising the value of peak power to the system and resultant improvement in the system operation, hydro power should, therefore, be harnessed to the maximum extent possible. To encourage early development of vast untapped hydro potential of the country, the Central Government had specified a number of policy initiatives for hydro power developers from time to time.

18. The policy document of August 1998 emphasized rationalisation of hydro Tariff in order to boost the development of the Hydro Generation. Recognising the value of peak power to the system and resultant improvement in operation of thermal stations, it was proposed to allow a premium on the sale rate for hydro generation during peak period. The Hydropower Policy of January 2008 also provided for inducing private investment in hydro power development” - the policy describes itself as “one such initiative which seeks to induce substantial private investments in hydro power development.”

Development of Hydro sector since independence

19. Our country is endowed with an enormous hydro power potential, last assessed to be about 84,000 MW at 60% load factor, which translates to 1,48,700 MW in terms of installed capacity. In addition to the above, 6,782 MW of installed capacity has been assessed from small, mini and micro hydel schemes (i.e

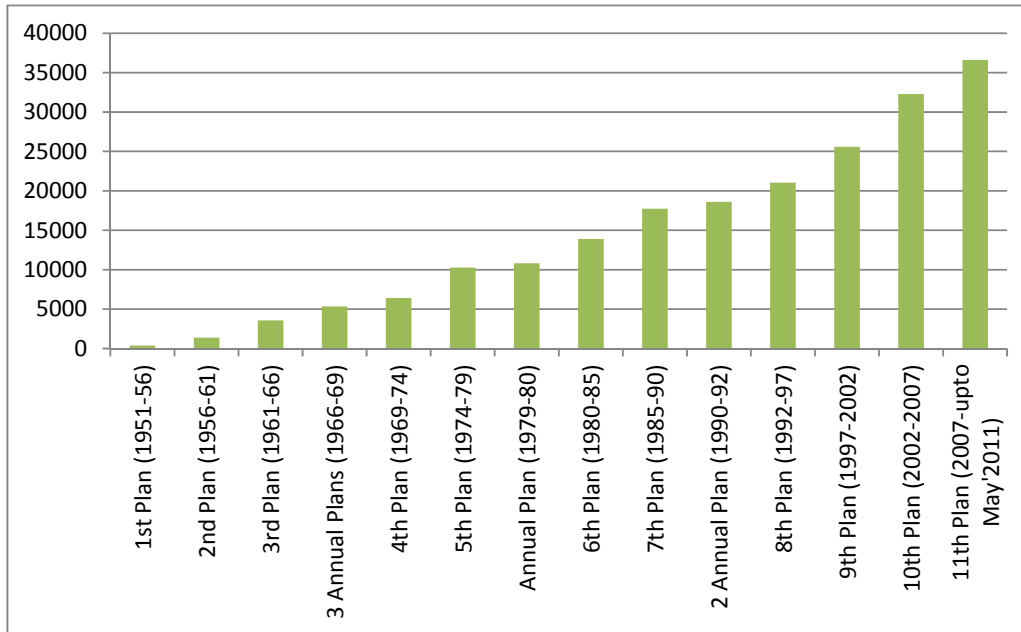
schemes of capacity up to 25 MW). Further, 56 potential pumped storage sites, with an aggregate installed capacity of 94,000 MW, have also been identified.

20. Since independence, there has been sizeable growth in the power sector as at the time of independence the generating capacity in the country was only 1750 MW which has since increased to 1,76,990.40 MW as on 30.06.2011. Despite being recognized as a relatively benign, the share of hydro power in the overall generating capacity in the country has been steadily declining since 1963. The hydro share has declined from 45.68 % in the 3rd Plan in 1961-66 to about 21.60% in May 2011. The Government of India has set the target for India's optimum power system mix at 40 percent from hydropower and 60 percent from other sources.

PLANWISE GROWTH AND SHARE OF HYDRO POWER

PLAN	HYDRO CAPACITY ADDITION DURING THE PLAN (MW)	HYDRO POWER SHARE AS % OF TOTAL INSTALLED CAPACITY
1st Plan (1951-56)	380	36.78
2nd Plan (1956-61)	977	41.19
3rd Plan (1961-66)	2207	45.68
3 Annual Plans (1966-69)	1783	45.58
4th Plan (1969-74)	1058	41.80
5th Plan (1974-79)	3868	40.60
Annual Plan (1979-80)	551	40.01
6th Plan (1980-85)	3076	33.96
7th Plan (1985-90)	3828	28.77
2 Annual Plan (1990-92)	882	27.79
8th Plan (1992-97)	2428	25.46
9 th Plan (1997-2002)	4538	25.40
10 th Plan (2002-2007)	6718	25.30
11 th Plan (2007-upto May'2011)	4332	21.60

INSTALLED HYDRO CAPACITY BY THE END OF PLAN (MW)



21. Several constraints have affected the pace of hydro power development. These have been technical (such as inadequate geological investigations, outdated tunnelling methods), financial (such as non availability of long term financing and viability of tariff) and managerial (inadequate contract management expertise) in nature. Most hydro projects have been adversely affected by geological surprises especially during underground tunnelling in the relatively young Himalayan Mountains. Other problems arising out of the inaccessible and remote locations of the site, delays in land acquisition and in resettlement of project affected families have also slowed down the pace of hydro power development in the country. The Government have accorded a high priority to the development of the hydro potential and have from time to time taken a number of policy initiatives to address the issues impeding the hydro power development.

22. Most of these constraints result in the time and cost overruns from the original schedule and the original project cost. As such, implication of geological surprises, problem of land acquisition and issues of R&R get factored into the increased capital cost of the project and gets passed on to the beneficiaries. Thereby the generator is not required to bear such costs implication. On the other hand, failure of the hydrology during the operation of the plant cannot be factored in

the capital cost and such implication of hydrology failure would have to be borne by either the beneficiaries or the generator or would have to be shared by both.

Tariff structure and Mode of recovery of Tariff

23. In the light of above historical background and for a better understanding and appreciation of issues involved in proper perspective, it is necessary that the concept of hydro tariff and the manner of its recovery is understood and appreciated. The hydro generating stations by virtue of use of hydro power for power generation consist of only the fixed cost elements and no variable cost. Therefore, generators interest would be served once the recovery of the fixed cost inclusive of cost of investment, return on investment and running cost (O&M cost) is ensured. On the other hand, the beneficiaries and system operators would like that there should be maximum availability and utilization of hydro power during monsoon season avoiding any spilling of water and optimum utilization of water during lean seasons (by supplementing generation during peak hours) in the overall interest of all concerned. Therefore, tariff structure should be such that it ensures and encourages generators to operate the station in such manner that the above objectives are fulfilled. At the same time generator should be able to recover its full fixed cost with reasonable returns.

24. In order to achieve these objectives, the Central Commission has adopted a two part tariff structure for the recovery of annual fixed cost of a hydro electric power station consisting of Capacity charge and Energy charge. Different methodologies have been adopted by the GoI and the CERC from time to time for the bifurcation of annual fixed charges into capacity charge and the energy charge.

25. The tariff Regulation 2009 applicable for the tariff period 2009-14 provided for of Annual fixed charges in to the capacity charges and energy charges in the ratio of 50:50. Such bifurcation of annual fixed charges in the ratio of 50 to 50 was to ensure that station provide peaking support which was lacking under the old regulations. Therefore, in our view this philosophy may continue in the backdrop of intended objective.

Sharing of hydrology risk and Development of Hydro

26. However, doing away with the concept of capacity index, the hydrology risk which was to be borne by the beneficiaries earlier, is now to be borne by the generating station. This was a material change from the earlier position. It is quite evident that the beneficiary as well as the generator has no control over the hydrology failures. But it needs to be appreciated that the Commission has also provided for the roll over option in respect of energy charges which are 50% of the fixed charges in the first 10 years of the operation. Through these provisions the Commission has attempted at equitable sharing of hydrology risk by the generator & the beneficiaries.

27. Theoretically, the implication of hydrological risk on the generator in case of complete hydrology failures could be of the order of 50% of the annual fixed charges during the first 10 years of operation of the generating station and could be as high as 100% of the annual fixed charges beyond 10 years of operation of the generating station. The Gol Tariff Notification as amended in Jan 1995 relating to hydro generating station provided for bearing of hydrology risk by the generators only after first 7 years of the operation.

28. However, the chances of hydrology risk are small because the station is designed based on the hydrology on the 90% dependable year basis.

29. The Government has also allowed merchant sale of power to the extent of 40% from the hydro generating stations. However, CPSUs which go for tie up entire power in long term PPAs would not have the opportunity to earn extra from the merchant sale.

30. Nevertheless considering that Commission has consciously taken a view regarding equitable sharing of hydrology risk between generator & beneficiaries the same may not be opened at present. However, there is a case to make the returns commensurate with the associated increase in risk for the generator.

31. The Crisil Report of 2000 on the Cost of Capital for the power sector, had suggested that the Business Risks is same across all elements of the power sector and therefore the returns, be considered the same across all CPSUs. The report also suggested that the financial risks are different considering the different level of gearing of each CPSU. The Cost of Equity could be considered different for each CPSU only on account of different levels of gearing. Differentiation in rate of return on account of vintage of assets (existing assets or new assets), ownership of assets (public or private), and mode of financing (balance sheet or project finance) was not suggested. Commission has specified a uniform rate of return on Equity for all Central PSUs as well as IPPs without making any distinction for the type of the station whether Hydro, Thermal or for the Transmission system.

32. In these circumstances there is no extra incentive for a developer to invest in the hydro power plant considering the high gestation period in Hydro projects due to various reasons.

33. The details of the various hydro generating stations of CPSUs regulated by CERC with regard to COD and their type as follows:

SI No.	Station	State	IC (Unit)	Date of COD	Type
NHPC			MW		
1	Baira siul	HP	3*60	1-Apr-82	RoR with small Pondage
2	Loktak	Manipur	3*35	1-Jun-83	Reservoir based
3	Salal	J&K	6*115	1-Apr-95	RoR
4	Tanakpur	Uttarkhand	3*41	1-Apr-93	RoR
5	Chamera -I	HP	3*180	1-May-94	RoR with Pondage
6	Uri-I	Uttarkhand	4*120	1-Jun-97	
7	Rangit	Sikkim	3*20	15-Feb-00	RoR with Pondage
8	Chamera-II	HP	3*100	31-Mar-04	RoR with Pondage
9	Dhauliganga-I	HP	4*70	1-Nov-05	RoR with Pondage
10	Dulhasti	J&K	3*130	7-Apr-07	RoR with Pondage
11	Teesta-V	Sikkim	3*170	10-Apr-08	RoR with Pondage
12	Sewa-II	J&K	3*40	24-Jul-10	RoR with small Pondage
13	Parbati-II	HP	4x200	June-July 2014	RoR
14	Subansiri Lower	Assam	8x250	Dec 2013 to Aug 2014	Dirunal Pondage
15	Uri-II	J&K	4x60	Sept 2011 to Nov 2011	RoR
16	Chamera-III	HP	3x77	July/Aug 2011	RoR with small Pondage

17	Teesta-III	WB	4x33	Mar 2012 to May 2012	RoR with Pondage
18	Teesta-IV	WB	4x40	Aug 2012 to Dec 2012	RoR with small Pondage
19	Parbati-III	HP	4x130	Dec 2011	RoR with Dirunal Pondage
20	Nimmo Bazgo	J&K	3x15	Aug 2011 to Sept 2011	RoR
21	Chutak	J&K	4x11	July/Aug 2012	RoR
22	Kishanganga	J&K	3x110	Nov 2015 to Jan 2016	RoR with Dirunal Pondage
NHDC					
1	Indira Sagar	MP	8*125	25-Aug-05	Reservoir based
2	Omkareshwar	MP	8*65	15-Nov-07	Reservoir based
THDC					
1	Tehri stage-I	Uttarkhand	4*250	9-Jul-07	Reservoir based
SJVNL					
1	Naptha Jhakri	HP	6*250	18-May-04	RoR
NEEPCO					
1	Khandong	Assam	2*25	4-May-84	Reservoir based
2	Kopili Stg.I	Assam	4*50	12-Jul-97	Reservoir based
3	Doyang	Nagaland	3*25	8-Jul-00	Reservoir based
4	Ranganadi	Nagaland	4*105	12-Apr-02	Reservoir based
5	Kopili Stage-II	Assam	1*25	26-Jul-04	Reservoir based

34. Most of the hydro projects being planned in India are mainly run-of-the-river projects. Multipurpose hydropower plants with water storage facilities can help manage critical water resources in an integrated manner by serving as flood controllers as well as sources of irrigation and much-needed drinking water and may also provide peaking support.

35. In the light of above, providing of higher return on equity for the reservoir based Hydro sector may encourage developers. There is also a case for providing higher returns to the reservoir based Hydro generating stations from the point of view of encouraging Hydro sector development to have energy security in the long run, to have peaking support and to harness renewable source of energy.

36. Contrary to popular belief, the green image of hydro power as a benign alternative to fossil fuels is not considered correct any more. It is said that Hydro

dams produce significant amounts of carbon dioxide and methane. A background paper of World Bank of June 2008 on **"Review Of Greenhouse Gas Emissions From The Creation Of Hydropower Reservoirs In India"** states as follows:

"The discovery that reservoirs might sometimes constitute important sources of greenhouse gases to the atmosphere is fairly recent. Although the observation immediately induced intensive studies in several countries with extensive hydropower resources, the scientific knowledge of the phenomenon is still inferior relative to for example similar emissions from agriculture.

There is no widely accepted methodology for estimating greenhouse gas emissions from existing or planned reservoir projects.

In India, impoundments cover about 5 million hectares, the majority being located in the southern part of the country. About half of this area is occupied by reservoirs that support hydropower plants, notwithstanding that the majority of dams satisfy multipurpose needs. The hydropower potential of India is estimated at about 149 GW of which about 23 percent has been exploited. The untapped potential is mainly in alpine environments in the northern part of the country.

Indian reservoirs represent the whole spectrum of different reservoir types found in the world. Some are located in alpine environments and share the same features that is typical of northern temperate reservoirs, i.e., can be assumed to release insignificant amounts of greenhouse gases."

37. In the light of the above, development of reservoir based hydro power in India deserves due attention from the energy security point of view, peaking support capability and harnessing of renewable source of energy to its potential. With larger perspective of future energy scenario and environment concerns, any implication on tariff becomes a small issue considering the cost implications in future. Further there is greater risk for the generator to bear the hydrology risk as well. It may therefore, be desirable to provide additional return on equity of 1% consciously in case of reservoir based hydro generating stations. Since pumped storage hydrogenating stations are also reservoir based and provide valuable peaking support, the additional return on equity @ 1% will also be admissible in case of pumped storage hydrogenating stations.

38. The proposed clause (2) of Regulation 15 (without the provisos) is as under:

"(2) Return on Equity shall be computed on pre-tax basis at the base rate of 15.5% for thermal generating stations, transmission system and run of the river hydrogenating station with or without pondage, and 16.5% for the reservoir based hydrogenating stations including pumped storage schemes:"

(F) Regulation 21: Cost of fuel

39. Clauses 5 to 8 of Regulation 21 of 2009 Tariff Regulations dealing with the manner of computation of energy charge and their recovery is extracted as under:-

"(5) The energy charge shall cover the primary fuel cost and limestone consumption cost (where applicable), and shall be payable by every beneficiary for the total energy scheduled to be supplied to such beneficiary during the calendar month on ex-power plant basis, at the energy charge rate of the month (with fuel and limestone price adjustment). Total Energy charge payable to the generating company for a month shall be:

(Energy charge rate in Rs./kWh) x {Scheduled energy (ex-bus) for the month in kWh.}

(6) Energy charge rate (ECR) in Rupees per kWh on ex-power plant basis shall be determined to three decimal places in accordance with the following formulae :

(a) For coal based and lignite fired stations

$$ECR = \{ (GHR - SFC \times CVSF) \times LPPF / CVPF + LC \times LPL \} \times 100 / (100 - AUX)$$

(b) For gas and liquid fuel based stations

$$ECR = GHR \times LPPF \times 100 / \{CVPF \times (100 - AUX) \}$$

Where,

AUX = Normative auxiliary energy consumption in percentage.

CVPF = Gross calorific value of primary fuel as fired, in kCal per kg, per litre or per standard cubic metre, as applicable.

CVSF = Calorific value of secondary fuel, in kCal per ml.

ECR = Energy charge rate, in Rupees per kWh sent out.

GHR = Gross station heat rate, in kCal per kWh.

LC = Normative limestone consumption in kg per kWh.

LPL = Weighted average landed price of limestone in Rupees per kg.

LPPF = Weighted average landed price of primary fuel, in Rupees per kg, per litre or per standard cubic metre, as applicable, during the month.

SFC = Specific fuel oil consumption, in ml per kWh.

(7) The landed cost of fuel for the month shall include price of fuel corresponding to the grade and quality of fuel inclusive of royalty, taxes and duties as applicable, transportation cost by rail / road or any other means, and, for the purpose of computation of energy charge, and in case of coal/lignite shall be arrived at after considering normative transit and handling losses as percentage of the quantity of coal or lignite dispatched by the coal or lignite supply company during the month as given below :

Pithead generating stations	:	0.2%
Non-pithead generating stations	:	0.8%

(8) The landed price of limestone shall be taken based on procurement price of limestone for the generating station, inclusive of royalty, taxes and duties as applicable and transportation cost for the month."

40. It may be seen from the above quoted regulations that the formula for computation of Energy Charge Rate is (ECR) provides for variation in the price of fuel and variation in the gross calorific value of the fuel namely coal, lignite or natural gas/RLNG or liquid fuel. The generators compute the energy charges on monthly basis in terms of the above regulations and bill the beneficiaries directly. Of late, some of the beneficiaries like Bihar State Electricity Board, Jharkhand State Electricity Board and Grid Corporation of Orissa Ltd had drawn the attention of the Commission towards abnormal variation on month to month basis in the energy billed by NTPC and the unwillingness of NTPC to share the information regarding computation of energy price considered and GCV value adopted.

41. The details of the energy charges of NTPC generation station for the month of April 2010 to August 2011 is enclosed as **Annexure-I** to this explanatory memorandum. Perusal of the data reveals that there is variation in the energy charges on month to month basis which ranges from (-) 24.59% to 29.69%. The energy charges in case of Farakka STPS are more than Rs. 3/kWh. The energy charges for Farakka STPS are Rs. 3.75/kWh and Rs. 3.94/kWh in the month of May 2011 and June 2011 respectively. The energy charges appear to be very high and needs clarification/explanation from NTPC. In case of gas/RLNG/liquid fuel based generating station also, there is variation on month to month basis.

42. Since many of the stations are getting coal from sources other than the linked mine, the fuel charges vary due to the variation in transportation cost depending upon quantity to be transported from the non-linked coal mines. Many of the generating stations have resorted to blending with imported coal to tide over the problem of fuel shortages and accordingly, the energy charges vary depending upon the proportion of blending of imported coal. The proportion of blending of imported coal in general can be of the order of 10-15% for the existing station using Run of Mine (ROM) coal. The implication of such blending on the energy charge of the station could be of the order of 15 to 40 Paise/kWh for the coastal and non-pit head

stations as per the report of the Central Electricity Authority. Some of the stations use auctioned coal also.

43. The Commission is of the view that significant variation in energy charge rate needs to be explained in clear terms. Variation in energy charges rate of the order of 30% puzzles the beneficiaries and they look for justification. There appears to be need for greater transparency on the part of generators in claiming the energy charges. Moreover, such increase in energy charges has to be recovered by the beneficiaries from their customers as fuel surcharge. Large variation in the energy charge rate may give rise to tariff shock for the beneficiaries/consumers. In view of the above, it should be the duty of the generators to provide details of parameters of GCV and price of fuel (i.e. domestic coal, imported coal, e-auction coal, lignite, natural gas, RLNG or liquid fuel) and blending ratio of imported and domestic coal, proportion of e-auction coal etc. justifying the variation in energy charges billed to the beneficiaries along with each bill/ supplementary bill. The billing information should also be available on the website of the generating company on monthly basis for period of at least 3 months.

44. In the light of the above, it is proposed to add two proviso under Clause 6 of Regulation 21 of 2009 Tariff Regulations as under:-

"Provided that the generating company shall provide details of parameters of GCV and price of fuel i.e. domestic coal, imported coal, e-auction coal, lignite, natural gas, RLNG, liquid fuel etc., details of blending ratio of the imported coal with domestic coal, proportion of e-auction coal with details of the variation in energy charges billed to the beneficiaries along with the bills of the respective month.

Provided further that a copy of the bills and details of parameters of GCV & price of fuel i.e. domestic coal, imported coal, e-auction coal, lignite, natural gas, RLNG, liquid fuel etc., details of blending ratio of the imported coal with domestic coal, proportion of e-auction coal shall also be displayed on the website of the generating company. The details should be available on its website for a period of a quarter on monthly basis."

(G) Regulation 22: Computation and payment of capacity charge and energy charge for hydro generating stations

45. Since, it has been decided to provide for tariff determination for hydro generating station other than pumped storage hydro generating station, it has necessitated amendment to the heading of Regulation 22. Accordingly, the proposed heading is as under:-

"Computation and Payment of Capacity charge and Energy charge for Hydro Generation Stations other than Pumped Storage Hydro Generating Stations."

46. The State Government of Jammu & Kashmir has enacted the Jammu & Kashmir Water Resources (Regulation and Management) Act, 2010 in terms of which the water usage charges have been levied on usage of water including generation of electricity by any user and the user of the electricity is required to obtain a licence. State Water Resources Regulatory Authority which has been established under Section 13.8 of the said Act has been notified the water usage charges and has fixed the water usage charges for generation of electricity @ Rs. 0.25/cu/mtr of water valid for a period of 2 years. NHPC Ltd. which is operating coal hydro generating stations in the State of Jammu & Kashmir namely, Salal (690 MW), Uri (480MW), Dulhasti (390 MW) and Sewa-II (120 MW) on ownership basis is required to pay the water usage charges in addition to annual licence fee of Rs. 5 lakh for each of the hydro generating stations. NHPC has also approached the High Court of J&K in OWP No. 604/2011 challenging the vires of the Act under Section 226 of the Constitution of India and Section 103 of Jammu & Kashmir Constitution. The High Court in its interim order dated 4.5.2011 has directed as under:-

"The amount raised through various bills shall be deposited with respondents, who shall maintain a separate account in this behalf. The deposits so made shall be subject to the outcome of this writ petition. This order is subject to modification or variation on motion."

47. NHPC Ltd filed Petition No. 106/2011 before the Commission seeking reimbursement of the water usage charges and levy of licence fee by the State of J&K. The Commission in para 13 of the order dated 21.10.2011 has observed as under:-

"13. It is apparent from the above that the Hon'ble High Court of J & K is seized with the matter and has directed the petitioner to deposit the amounts raised through various bills with the J & K authority which shall be subject the outcome of the writ petition. Therefore, the petitioner has taken available legal recourse to protect the interests of the beneficiaries of the four hydro power stations. However, in compliance with the directions of the Hon'ble High Court, the petitioner is required to deposit the amount raised through the various bills by the Government of J & K. The additional expenditure on account of water usage charges and licence fee has accrued to the petitioner on account of enactment of the J & K Act. Since the tariff of the generating stations of the petitioner are determined on cost plus basis, additional expenditure which are in the nature of input cost for generation of the hydro power stations should be borne by the beneficiaries."

The Commission directed the staff to process the case for amendment to the 2009 Tariff Regulations as under:-

"20. In view of our decision to reimburse the water usage charges and licence fees, we direct the staff of the Commission to move appropriate amendment to the 2009 regulations. The petitioner is pursuing the matter in the Hon'ble High Court of Jammu & Kashmir. The petitioner is directed to keep the Commission and the beneficiaries apprised about the development of the court case."

48. In view of the above discussion a new clause after Clause 7 of the Regulation 22 of 2009 Tariff Regulation has been proposed to be added as under:-

"7a. In case of the hydro generating stations of NHPC Limited located in the State of Jammu and Kashmir, any expenditure incurred for payment of water usage charges to the State Water Resources Development Authority, Jammu under Jammu & Kashmir Water Resources (Regulations and Management) Act, 2010 shall be payable by the beneficiaries as additional energy charge in proportion of the supply of power from the generating stations on month to month basis:

Provided that the provisions of this clause shall be subject to the decision of the Hon'ble High Court of Jammu & Kashmir in OWP No.604/2011 and shall stand modified to the extent of inconsistency with the decision of the High Court."

(H) Regulation 22A: Pumped Storage Hydro Generating Stations

49. The Pumped storage schemes utilize stored energy in the form of water, pumped from a lower elevation reservoir to a higher elevation for load balancing and peaking support. Approximately 70% to 85% of the electrical energy used to pump the water into the elevated reservoir can only be regained due to evaporation losses from the exposed water surface and due to conversion losses. The Commission had relied upon actual data for 2007-08 and 2008-09 of the Purullia Pump Storage Project (4x225 MW) and had proposed for generation of power during peak hours of 75% and above of the pumping energy.

50. It was proposed in a draft proposal to amend the tariff Regulation 2009 that the quantum of electricity required for pumping water from down-stream reservoir to up-stream reservoir shall be arranged by the beneficiaries duly taking into account the transmission and distribution losses etc. up to the bus bar of the generating station. In return beneficiaries will be entitled to equivalent of 75% of the energy utilized in pumping the water from the lower elevation reservoir to the higher elevation reservoir from the generating station during peak hours and the generating

station shall be under obligation to supply such quantum of electricity during peak hours. The O&M expenses were proposed to be on the same lines as that for the conventional Hydro generation. The proposed amendments also provided for passing of benefits from sale of power over and above the design energy +75% of the pumping energy consumed.

51. PTC had welcomed the proposal and had sought a tariff structure on the lines of conventional hydro generating stations. PTC had further submitted that the generator should not retain any benefit from sale of power over and above design energy. Tehri Hydroelectric Development Corporation (THDC) had submitted that the design energy of pumped storage station should be deemed to be zero. It had been further submitted that the initial spares should be capped at 2% of the original capital cost.

52. Since the pumped storage schemes are generally meant to take advantage of specific site for getting peaking support despite scanty water availability situations over the year, it is felt that the such stations should be paid full capacity charge as long as the station is able to provide such peaking support proportionate to the pumped energy provided by the beneficiary after accounting for pumping and evaporation losses. In this backdrop, the concept of NAPAF may not be of much relevance for such stations and hence, tariff structure could be further simplified. Recovery of capacity charge may be linked to the extent such support is provided by the generator. Further any revenue from the generation in excess of proportionate pumping energy of about 75% + the design energy may be provided to be shared with beneficiaries in the ratio of 75:25 (75% beneficiaries and 25% generator) as the hydrology risk is to be borne by the beneficiaries. The retaining of 25% revenue by the generator would incentivize them to provide additional support in excess of 75% of the pumping energy and over and above the design energy.

53. Since the beneficiaries are under payment obligation for full fixed charges and hydrology risk is to be borne by them it is necessary that they get full benefits of power generation which the station is capable of generating with the available water without any wastage and therefore, a provision could have been made to ensure that the generator takes all due care to maximize the use of water to its full potential

and in case, he fails to do that without any valid reason, then the generator loses the capacity charges for the day.

54. In view of the above, the Commission has proposed to add a new Regulation 22A to the 2009 Tariff Regulations as under:-

"22A. Pumped Storage Hydro Generating Stations

(1) The fixed cost of a pumped storage hydro generating station shall be computed on annual basis, based on norms specified under these regulations, and recovered on monthly basis as net capacity charge after deducting 75 % of the revenue earned by the station from the generation and sale of power in excess of the design energy plus 75% of the energy utilized in pumping the water from the lower elevation reservoir to the higher elevation reservoir in a month from the monthly fixed charges. The net capacity charge (inclusive of incentive) shall be payable by the beneficiaries in proportion to their respective allocation in the saleable capacity of the generating station, that is to say, in the capacity excluding the free power to the home State:

Provided that during the period between the date of commercial operation of the first unit of the generating station and the date of commercial operation of the generating station, the annual fixed cost shall provisionally be worked out based on the latest estimate of the completion cost for the generating station, for the purpose of determining the capacity charge payment during such period.

(2) The capacity charge (inclusive of incentive) payable to a pumped storage hydro generating station for a calendar month shall be:

$((AFC \times NDM / NDY) - 0.75 \times ECC_m)$ (in Rupees), if actual Generation during the month is $\geq 75\%$ of the Pumping Energy consumed by the station during the month

and

$((AFC \times NDM / NDY) \times (\text{Actual Generation during the month during peak hours} / 75\% \text{ of the Pumping Energy consumed by the station during the month}))$ (in Rupees), if actual Generation during the month is $< 75\%$ of the Pumping Energy consumed by the station during the month.

Where,

AFC = Annual fixed cost specified for the year, in Rupees.

NDM = Number of days in the month

NDY = Number of days in the year

ECC_m = Energy charge Credits for the sale of power in excess of the Design energy plus 75% of the energy utilized in pumping the water from the lower elevation reservoir to the higher elevation reservoir, of the month in Rupees as per sub-clause 4 and 5.

(3) The energy charge shall be payable by every beneficiary for the total energy scheduled to be supplied to the beneficiary in excess of the design energy plus 75% of the energy utilized in pumping the water from the lower elevation reservoir to the higher elevation reservoir, at a flat rate equal to the average energy charge rate of 80 paise per kWh, excluding free energy, if any, during the calendar month, on ex power plant basis. The revenue earned as energy charges during the month by the generating station from the beneficiaries shall be termed as Energy charge Credits (ECC_m) for the

sale of power in excess of the design energy plus 75% of the energy utilized in pumping the water from the lower elevation reservoir to the higher elevation reservoir of the month.

(4) Energy charge payable to the generating company for a month shall be:

$$= 0.80 \times \{ \text{Scheduled energy (ex-bus) for the month in kWh} - (\text{Design Energy for the month} + 75\% \text{ of the energy utilized in pumping the water from the lower elevation reservoir to the higher elevation reservoir of the month}) \} \times (100 - \text{FEHS}) / 100.$$

Where,

DE_m = Design energy for the month specified for the hydro generating station, In MWh, subject to the provision in clause (6) below.

FEHS = Free energy for home State, in per cent, as defined in regulation 32, if any.

Provided further that in case the Scheduled energy in a month is less than the Design Energy for the month plus 75% of the energy utilized in pumping the water from the lower elevation reservoir to the higher elevation reservoir of the month, then the energy charges payable by the beneficiaries and ECC_m shall be zero.

(5) The Generator shall be maintaining the record of daily inflows of natural water into the upper elevation reservoir and the reservoir levels of upper elevation reservoir and lower elevation reservoir on hourly basis. The generator shall be required to maximize the peak hour supplies with the available water including the natural flow of water. In case it is established that generator is deliberately or otherwise without any valid reason, is not pumping water from lower elevation reservoir to the higher elevation during off-peak period or not generating power to its potential or wasting natural flow of water, the capacity charges of the day shall not be payable by the beneficiary on an order of the Commission in this regard on an application made to it by any of the beneficiary."

(I) Amendment to Regulation 27: Norms of Operation of Hydro Generating Stations

55. Since, the tariff for pumped storage hydro generating stations is proposed to be introduced to the present regulation, it is necessary to specify the norms of operation of such types of stations. Accordingly, a new clause is proposed to be added after Regulation 27 (i) (1) (ii) as under:-

"(ii) In case of Pumped storage hydro generating stations, the quantum of electricity required for pumping water from down-stream reservoir to up-stream reservoir shall be arranged by the beneficiaries duly taking into account the transmission and distribution losses etc. up to the bus bar of the generating station. In return beneficiaries will be entitled to equivalent energy of 75% of the energy utilized in pumping the water from the lower elevation reservoir to the higher elevation reservoir from the generating station during peak hours and the generating station shall be under obligation to supply such quantum of electricity during peak hours.

Provided that in the event of the beneficiaries failing to supply the desired level of energy during off-peak hours, there will be pro-rata reduction in their energy entitlement from the station during peak hours.

Provided further that the beneficiaries may sell their share of capacity in the generating station, in part or full, whereupon the owner of the capacity share will be responsible for arranging the equivalent energy to the generating station in off-peak hours, and be entitled to corresponding energy during peak hours in the same way as the original beneficiary was entitled."

(J) Regulation 32: Billing and Payment of Charges

56. Note 3 of Regulation 32 of 2009 Tariff Regulations provides as under:-

"FEHS = Free energy for home State, in percent and shall be taken as 12%

Provided that in cases where the site of a hydro project is awarded to a developer (not being a State controlled or owned company), by a State Government by following a two stage transparent process of bidding, the 'free energy' shall be taken as 13%, which shall also include energy corresponding to 100 units of electricity to be provided free of cost every month to every project affected family for a period of 10 years from the date of commercial operation of the generating station."

57. The above proviso was applicable to a hydro project developer which is not a state controlled or owned company. After amendment of the tariff policy removing the distinction between the project developer being state controlled or owned company and other project developer, the provision of 13% free energy shall also be applicable to project developer being state controlled or owned company. Accordingly, it is proposed to delete the words "not being state controlled or owned company" from proviso to Note 3 under Regulation 32.

(K) Regulation 42A: Reimbursement of Fees and Expenses

58. The Commission in its order dated 6.2.2012 in Petition No. 129/MP/2011 and other related petitions pertaining to reimbursement of the RLDC fee and charges has directed as under:-

"35. We have considered the submission of the parties. As already pointed out, the petitioners before us are the generating companies and inter-State transmission licensees whose tariff is being determined by the Commission. Prior to the notification of the RLDC Regulations, all the beneficiaries were paying the RLDC charges to PGCIL in the form of ULDC charges as determined by the Commission. Therefore, while fixing the norms for the 2009 Tariff Regulations, RLDC fees and charges were not factored in the norms for O & M expenses. As a result, these

expenditures are an additional cost to the generators and transmission licensees whose tariff is being determined by the Commission. Moreover, the market operation function and system operation functions carried out by the RLDCs are for the benefit of the distribution companies and the ultimate consumers. Section 61(d) of the Act provides that the tariff should be guided by the principle of "safeguarding the consumer interest and at the same time recovery of the cost of electricity in a reasonable manner". If the RLDC fees and charges which are not factored in the 2009 Tariff Regulations are not reimbursed, the generating companies and the transmission licensees will not be able to recover the cost in a reasonable manner. Therefore, the generating companies and transmission licensees are entitled to reimbursement of the RLDC fees and charges from the beneficiaries as part of reasonable cost of electricity supplied to the beneficiaries. In our view, the system operation charges, market operation charges, proportionate share of NLDC charges and the registration charges etc. which are charged to the generating companies and inter-State transmission licensees whose tariff is being determined by the Commission shall be recovered from the beneficiaries.

36. A related question arises as to the manner of reimbursement of the RLDC fees and charges by the beneficiaries. These charges cannot be allowed as a part of O & M expenses as this would require retrospective revision of the norms for O & M expenses. In our view, RLDC fees and charges should be allowed as a pass through in the same manner as the filing fees and publication expenses. Accordingly, we direct the staff of the Commission to submit the draft amendment to the 2009 Tariff Regulations to incorporate the provision for reimbursement of RLDC fees and charges."

59. Power Grid Corporation of India Limited (PGCIL) had approached the Commission in Petition No. 21/2011 for reimbursement of the licence fee levied on it in accordance with the Central Electricity Regulatory Commission (Payment of Fees) Regulations, 2008 by relaxing the provisions of 2009 Tariff Regulations. PGICL has also approached the Commission in Petition No. 22/2011 for reimbursement of the licence fee during the period 2008-2009 by relaxing the provisions of 2004 Tariff Regulations. The Commission in its order dated 25.10.2011 has directed as under:-

"16. Licence fee never constituted a part of O & M expenses in the past periods and therefore, it has not been captured in the norms specified by the Commission in 2004 and 2009 regulations. The respondents have suggested that the licence fee should be borne by the petitioner from the savings under O & M expenses. We are of the view that since licence fee has not been considered while fixing the norms for O & M expenses, it would not be appropriate to ask the petitioner to bear the expenditure from O & M expenses. The petitioner has placed on record the copies of the regulations issued by some of the State Commissions which deal with the issue of bearing the cost of licence fee. We notice that the State Commissions have allowed the reimbursement of licence fee of intra-State transmission licensees as part of the ARR of the distribution companies. That being the case, the licence fee paid by the petitioner should be allowed as a pass through in tariff.

17. The petitioner has sought relaxation of the relevant provisions of 2004 and 2009 regulations pertaining to O & M expenses in order to allow the licence fee as a pass through. We are not inclined to relax the O & M norms to allow reimbursement

of licence on actual basis. The Commission has provided for a separate provision for reimbursement of application fees and publication expenses in Regulation 42 of 2009 regulations. We are of the view that Regulation 42 needs to be suitably amended to provide for reimbursement of licence fee during 2009-14. As regards reimbursement of licence fee for the period 2008-09, we allow reimbursement of the license fee by the beneficiaries by exercising our power to remove difficulties under Regulation 12 of 2004 Regulations.

18. We direct the staff of the Commission to take necessary action for suitable amendment to 2009 regulations to provide for reimbursement of licence fee."

60. In view of the above, it is proposed to add a new regulation to allow reimbursement of the various charges such as RLDC fee and charges and licence fee. The proposed regulation is as under:-

"42A. Reimbursement of Fees and Expenses

(1) The following fees shall be reimbursed directly by the beneficiaries or the transmission customers in proportion of their allocation in the generating stations or inter-State transmission systems:

(a) Fees and charges charged to the generating companies and inter-State transmission licensees (including deemed inter-State transmission licensee) under Central Electricity Regulatory Commission (Fees and Charges of Regional Load Despatch Centre and other related matters) Regulations, 2009 and as may be amended from time to time;

(b) Licence fees payable by the inter-State transmission licensees (including the deemed inter-State transmission licensee) in terms of the Central Electricity Regulatory Commission (Payment of Fees) Regulations, 2012 or any subsequent re-enactment thereof;

(c) Licence fees paid by NHPC Ltd to the State Water Resources Development Authority, Jammu in accordance with the provisions of Jammu & Kashmir Water Resources (Regulations and Management) Act, 2010;

(2) The Commission may, in its discretion and for the reasons to be recorded in writing and after hearing the affected parties, allow reimbursement of any fee or expenses as may be considered necessary."

