

Chhattisgarh State Electricity Regulatory Commission

Petition No.20 of 2006(T)

In the matter of determination of tariff and related dispensation for procurement of power from Small Hydel Power Plants

M/s Chhattisgarh Hydropower Pvt. Ltd. : Petitioner
Panchsheel Nagar, Raipur

V/s

Chhattisgarh State Electricity Board : Respondent

**Present : S.K. Misra, Chairman
Sarat Chandra, Member**

ORDER (Passed on 28/02/2007)

M/s Chhattisgarh Hydropower Pvt. Ltd (CHPL, for short), Raipur, has filed a petition on 28/04/2006 for determination of the tariff at which the Chhattisgarh State Electricity Board (CSEB or Board, for short), may purchase power generated by its proposed 9.9 MW hydro power project i.e. Gullu Hydro Project at Jashpur in the State under Section 62 and 86 (1) (e) of the Electricity Act, 2003 (Act, for short) read with clause 7 and 10 of CSEB (Details to be furnished by licensee or generating company for determination of tariff and the manner of making application) Regulations, 2004. The petitioner has stated that it has started work on the project but to avail the requisite funds from financial institution, the latter would like to assess the viability of the project on the basis of the tariff at which the power generated may be sold. Hence the need for determination of tariff by the Commission. The petitioner prayed the Commission for fixing of provisional tariff and for orders on other related issues, this being the first small hydel project proposed for implementation by a private developer in the State. However, in course of consideration of this petition, the petitioner has enlarged its scope and has requested the Commission to fix the norms for determination of sale price of power generated by small hydel plants and also deal with other related issues for the promotion of this important source of renewable energy as mandated under the Act and the National Electricity Policy. The petitioner has in fact, submitted an application on 20/02/07 requesting deferment of determination of tariff for his proposed plant. the capacity of which is being reworked. His project report is under preparation. He has however, requested that the Commission may pass orders on the norms and other issues. He would submit a separate application for determination of tariff. This order is

therefore of a general nature giving out the Commission's decisions regarding the norms of fixation of tariff for small hydel plants for purchase of power by licensees and related issues.

2. Policy framework regarding renewable sources of energy

Section 86 (1) (e) of the Act mandates the State Regulatory Commission to *"promote co-generation and generation of electricity from renewable sources of energy by providing suitable measures for connectivity with the grid and sale of electricity to any person, and also specify, for purchase of electricity from such sources, a percentage of the total consumption of electricity in the area of a distribution licensee."* The National Electricity Policy (NEP, for short) also gives a similar mandate. In para 5.12 of the policy a reference has been made to the provision in the Act and a duty has been cast on the SERCs to prescribe a percentage of the total consumption of electricity in the area of the licensee for purchase of power from non-conventional sources and to determine a differential price for such purchase at the earliest. The policy stipulates: *"Considering the fact that it will take some time before non-conventional technologies compete, in terms of cost, with conventional sources, the Commission may determine an appropriate differential prices to promote these technologies."* The National Tariff Policy (NTP, for short) also provides for measures to be taken for promotion of non-conventional energy including cogeneration. According to the para 6.4 of the NTP, *"the Appropriate Commission shall fix a minimum percentage for purchase of energy from such sources taking into account availability of such resources in the region and its impact on retail tariffs. xxxxxxxxxxxxxxx. It will take some time before non-conventional technologies can compete with conventional sources in terms of cost of electricity. Therefore, procurement by distribution companies shall be done at preferential tariff determined by the Appropriate Commission. Such procurement by distribution licensees for future requirement shall be done, as far as possible, through competitive bidding process under Section 63 of the Act within suppliers offering energy from same type of non-conventional sources. In the long-term, these technologies would need to compete with other sources in terms of fuel cost. The Central Commission should lay down guidelines within three months for pricing non-firm power, specially from non-conventional sources, to be followed in cases where such procurement is not through competitive bidding."* The Central Commission is yet to issue the guidelines as required under the NTP.

3. Even before the present Act, the NEP and the NTP came into being, the Ministry of New and Renewable Energy (MNRE) then Ministry of Non-Conventional Energy Sources (MNES), Government of India had issued guidelines to the State Governments in the year 1994 for fixation of purchase price for power produced by small hydel power projects, and guidelines for promotional and fiscal incentive by the State Government for power generation from such sources. To promote generation of power from renewable energy sources in the State, the State Government has created a nodal agency in the

name of Chhattisgarh Renewable Energy Developing Agency (CREDA, for short). Since, this is first case of small hydro units and decision taken in this case on tariff and related issues would have implications for other such developers in future it has become necessary for the Commission to consider the present position of hydro generation in the State and the potential of the small hydro generation. The Commission has obtained the details from CREDA. CREDA has intimated that as on 30/12/06 it had sanctioned and entered into agreements with various investors for 27 small hydel projects with a total capacity of 228.3 MW. It has also sanctioned 8 projects of 34.99 MW, but agreement is yet to be signed with the parties. Another 8 projects with a capacity of 50 MW are under process for sanction. This comes to a total of 313.29 MW. However, the Commission has noted that there has been no comprehensive survey in the State of the potential of small hydro power. A survey by M/s AHEC of IIT, Roorkee, commissioned by CREDA, has come to a conclusion that the potential is only of the order of 179.9 MW. That survey is also not based on scientific data. CREDA has been relying on the assessment made by the power developers only. The question as to what capacity of the estimated potential of 313.29 MW may ultimately be realized in the State is very much open. Since most of the hydel projects in the State will be run-off-river projects and historical flow data of such rivers are not available, there is a large element of uncertainty about the potential. Rivers in the State are rain-fed and hence the potential will always be subject to precipitation. Presently there are only two small hydel units, both of CSEB, both at dam-toe: Gangrel with the capacity of 10 MW and Sikasar 7.5 MW. These projects are not run-off-river and hence may not be any guide for the Commission in the matter of issues relating to small hydel plants being considered.

4. The State Government has notified a policy on allotment of sites and on incentives to small hydro power projects up to 10 MW capacity vide notification No. 1131/TOE/2002 dated 29/08/2002 which was subsequently made applicable to hydel projects up to 25 MW capacity vide notification dated 13/07/06. As per the policy directives issued on 29/08/02, which is valid for a period of 5 years, CSEB shall mandatorily buy the excess power after actual captive consumption by the entrepreneur or sale to third party/sister unit, at the rate of Rs. 2.25 per unit. The Government has reserved the right to revise the rate from time to time. Further, the entrepreneur can wheel electricity produced at the power plant to his unit or that of a third party or sister concern using the grid of CSEB on payment of wheeling charges which shall be fixed 'as per the policy of the CSEB.' As regard grid interface/transmission line, it shall be borne by the entrepreneur if the transmission line is up to be distance of 2 Km. For distances exceeding 2 Kms. the expenditure on laying of transmission line shall be shared equally by the entrepreneur and the CSEB. However, the cost sharing by the CSEB will be limited up to a maximum distance of 5 Kms. Besides, the policy also envisages other issues regarding investment, identification of sites, eligibility conditions and basis of allotment, water royalty, exemption from electricity duty, allotment of land etc. which also indicates the intention of the State Government to promote

generation of electricity from small hydel projects. This policy is in operation till August 2007 and much of it would need change because of the Act coming into force.

5. In view of the generality of the issues involved and the need for wider consultation, the Commission floated a discussion paper on tariff and other related issues relating to small hydel projects, i.e. projects with a capacity upto 25 MW. A discussion paper was floated for obtaining comments from the State Government/CREDA/CSEB and other distribution licensees of the State namely, M/s Jindal Steel and Power Ltd. (JSPL, for short) and Bhilai Steel Plant (BSP, for short), Association of Industries, all stakeholders and the general public. A copy of discussion paper was also made available to the members of the State Electricity Advisory Committee as also to all known developers including those who have applied to CREDA. The discussion paper was placed in the Commission's website and a press note was also released in order to give wide publicity. Comments/suggestions/views were invited by 20/08/2006. A public hearing on the discussion paper was also arranged on 25/08/06. Representatives from following firms and organizations participated in the public hearing:

1. M/s Chhattisgarh Hydro Power (P) Ltd.
2. M/s Mainpat Green Energy (P) Ltd.
3. M/s Pattu Power Projects (P) Ltd.
4. M/s Padmapriyan Energy Solution (P) Ltd.
5. M/s Balaji Hydel Electricity Ltd.
6. Representatives from CSEB.
7. Representatives from CREDA.

After the public hearing, CSEB and the petitioner made written submissions to the Commission on 11/09/06 and 04/10/06 respectively. Since there were some deviations in the written statement of CSEB as well as the petitioner, from what was stated by them during the public hearing, the Commission decided to have one more hearing which was held on 17/11/06. Apart from CREDA and the State Government, all the three distribution licensees of the State were noticed for the same. In this public hearing held on 25/08/06, apart from the petitioner, 4 more project developers participated and gave written submissions, but they did not choose to become interveners in the petition filed by M/s CHPL.

6. The petitioner through his petition dated 28/04/06 and through written submissions made on 10/08/06 and 04/10/06 on the discussion paper floated by the Commission has sought orders and directions of the Commission with regard to the following:

- (a) mandatory minimum purchase of power by distribution licensee;
- (b) fixation of tariff;

- (c) plant utilization factor;
- (d) computation of transformation losses;
- (e) fixation of operation and maintenance (O&M) expenses and escalation;
- (f) tariff for infirm power;
- (g) fixation of wheeling charges;
- (h) banking facility;
- (i) demand charges for start up power and mode of payment thereof; and
- (j) third party sale.

In course of the hearing of the petition, the Commission directed CREDA to formulate their views on the issues raised in the petition and make their written submission to the Commission. CREDA submitted to the State Government a draft policy on small hydro power projects up to 10 MW for orders and submitted the same as their views to the Commission. The State Government has given no indication as to whether CREDA's proposals have been accepted by them. CREDA also suggested that 10% of their installed capacity should be procured from renewable energy including small hydel projects, by the distribution licensees. There was no representation from the Government of Chhattisgarh. Respondent CSEB has submitted its reply to the petitioner's proposal on tariff and other related issues.

7. The following main issues were identified as arising out of the petition, discussion during public hearing and the written submissions made to the Commission:

- (a) Mandatory minimum purchase of power.
- (b) Determination of tariff including tariff for infirm power for small hydro power projects.
- (c) Wheeling charges.
- (d) Cross-subsidy surcharge.
- (e) Banking facilities.
- (f) Demand charges payable for availing start up power and mode of payment thereof.
- (g) Security deposit.
- (h) Sharing of demand charges.
- (i) Sharing of expenditure on grid interface/transmission line.
- (j) Term for PPA.
- (k) Application for tariff determination.
- (l) Scheduling of power.

These issues are discussed in the following paras.

8. Mandatory minimum purchase of power by licensee:

The petitioner has sought a minimum of 10% of the total power consumption of the distribution licensee to be made mandatory for purchase of power from small hydel plants. In support of this, the petitioner has stated that the Commission has made it mandatory for the licensee to purchase 5% of its

requirement from biomass based power projects which have a potential of generation of 100 MW in the State whereas in case of small hydro the expected capacity is said to be about 300 MW. This is also not a firm figure. Further, the plant utilization factor in case of small hydro in Chhattisgarh is around 40% whereas in case of biomass, it is considered to be minimum 80%. As such, the effect of 10% mandatory purchase would result in annual 5% purchase of energy from small hydro by the distribution licensee. Moreover, the small hydro is more environmental friendly than biomass power. In response, the CSEB has stated that the mandatory power purchase by the distribution licensees should be fixed as a particular percentage of total consumption within the area of individual licensee and should be distributed amongst all the renewable energy source generators. CSEB has proposed to restrict the mandatory purchase from all types of renewable energy sources to 5% of its consumption. It has further submitted that with the development of its own generating capacity already planned, it would not be required to purchase any power after a year or two. Under the circumstances, mandatory purchase of power at higher cost will be an additional burden on consumers. The Board has further requested that mandatory purchase should be prescribed for a short period of 2 to 3 years only. M/s BSP, the other licensee of the State has submitted that whatever percentage the Commission fixes would be acceptable to them. The third licensee, JSPL did not submit their views. CREDA has suggested that up to 10% of installed capacity of the licensee should be procured from various renewable energy sources including small hydel generators by the licensees. Although, as per the CREDA's assessment, the total small hydel potential in the State is estimated at about 313 MW, these plants would mostly be run-off-river projects and will have low plant load factor. These would be able to supply continuous power during the rainy season only. The average plant utilization factor of some of the small hydro projects as identified by the consultants of CREDA are in the vicinity of 40%. As we have mentioned in para 3 above, the present estimates are not based on survey nor any scientific data. How much power is ultimately available from small hydel plants can not be said at present with any degree of certainty. As informed by the CREDA, presently only the petitioner has started work on the very first project and its completion will take at least three years. Capacity addition in this sector may be possible in the coming 3 to 4 years. Hence not much of small hydel power will be available to the distribution licensees in coming 3-4 years' time. Regulatory Commissions of States like Maharashtra and Karnataka have fixed quantum of power purchase varying from 3% to 6% and 5% to 10% respectively over a period of time, whereas Andhra Pradesh has fixed 5% power purchase from small hydel power projects by the licensees. Looking to the status of implementation of small hydel projects in the State and considering the potential of generation of electricity from small hydro projects and the requirement of power by the main distribution licensee, i.e. CSEB, it is expected that in the coming 3 to 4 years, mandatory purchase of 3% of requirement by distribution licensees from small hydel stations will be sufficient to promote this sector for the present. For CSEB alone this would mean on a projected total requirement of 2500 MW in the year 2007-08, about 75 MW

which comes to about an installed capacity of 250 MW at 30% PUF or about 190 MW at 40% PUF.

Taking an over all view, the Commission mandates the distribution licensees to buy power from small hydel power projects to the extent of 3% of their total consumption during a year on the "first-cum-first serve" basis. In view of the fast changing power scenario of the State, the position will be reviewed after 5 years. However, power available from small hydro plants beyond the mandatory fixed percentage may be purchased by the licensees through a bidding process within suppliers offering energy from small hydro power projects within the tariff approved by the Commission.

9. Determination of tariff including tariff for infirm power for small hydro projects:

For the purpose of determination of tariff, the following factors need to be considered by the Commission.

- (i) Tariff to be project specific or uniform for all.
- (ii) Tariff to be cost plus basis or otherwise.
- (iii) Tariff to be two part or single part/application of merit order dispatch.
- (iv) Capital expenditure
- (v) Plant load factor
- (vi) Auxiliary consumption and transformation loss
- (vii) Operation and maintenance expenses and escalation
- (viii) Interest on term loan
- (ix) Interest on working capital
- (x) Return on equity
- (xi) Depreciation and advance against depreciation
- (xii) Separate tariff for firm and infirm power
- (xiii) Royalty on water
- (xiv) Subsidy by MNRES
- (xv) CDM benefits

These issues are discussed in the following paragraphs:

(i) Tariff to be project specific or uniform:

Detailed project reports (DPR) of Gangrel, Sikasar and small hydel projects of CSEB already implemented in the State; the project report of Gullu Hydel Project of the petitioner and pre-feasibility reports of some other small hydel projects, as also the details given in the report of the Alternate Hydro Energy Center, IIT, Roorkee commissioned by CREDA were perused by the Commission. As per these reports, the PUF of dam site projects varies from 20.7% to 87.9%, PUF of canal site projects varies from 28.38 to 60.08% and PUF for run-off-river site projects varies in the range of 38.05% to 40.33%. PUF of some of the projects such as Gullu, Kanhar, Jhelha, Mainpat, Raksaganda, Bagdhara hydel projects is estimated to be 46.4%, 46%, 86.8%, 54%, 51.04% and 64.4% respectively. Thus, there is wide variation in the PUF of small hydel

projects. Secondly, these estimates are not based on any data which are verified in the field. It is also observed that the project cost of small hydel projects varies considerably because of various reasons such as size of the plant, type of plant whether on dam toe or canal or run off river, whether it is on the surface or underground etc. Because of this, there is considerable variation in civil works of the projects resulting in wide variation in the project cost. The type of turbine used, RPM of generator and type of excitation system also contribute to considerable variation in the project cost. Geological factors play a major role in the cost of the project which vary from site to site. Apart from all these factors which can be assessed at the time of starting the project, sometime there may be geological surprises also which come to notice only when the project work is in progress. This may also result in increase in the cost of the project considerably. The projects registered with CREDA have capacities varying from 1.2 to 24 MW.

In view of the above, it would not be feasible to decide a general tariff for all small hydro projects. The Commission, therefore, decides to determine tariff separately for each project.

(ii) Tariff to be on cost plus basis or otherwise:

The cost based tariff method guarantees a fair return on investment for the investor after recovering all costs, although it is generally not recommended mainly because it does not include any incentive for efficiency. The advantages of the cost based tariff methodology is that it takes into account the technology-specific issues such as capacity factor and technology cost etc. which are required for any new technology to develop and subsequently compete with other technologies. Further the tariffs can be set for a longer period, giving a signal for tariff security to the investors. Considering that this sector needs to be promoted and the efficiency benchmark for such plants do not exist at present and NTP provides for preferential tariff for renewable energy, **the Commission decides in favour of cost plus tariff.**

(iii) Tariff to be two part or single part/application of merit order despatch:

The petitioner has requested for single part tariff. Looking to the likely practical difficulties in implementing two part tariff for such projects being of low capacity, **the Commission decides that single part tariff should be fixed for small hydel projects.**

As regards application of merit order, ideally, the overall cost of purchase of power by a licensee could be optimized following the merit order. However, in practice, it would be difficult to follow this approach with a large number of small units. Since the tariff will be single part, application of merit order despatch for purchase of power from small hydel projects would be detrimental to the interest

of promotion of such plants. Otherwise also, when power is to be purchased mandatorily, the merit order despatch carries no meaning.

The Commission, therefore, decides that merit order despatch may not be applied for power purchase from small hydel plants to the extent of mandatory purchase.

(iv) Capital expenditure:

M/s CHPL has indicated project cost of Rs. 60.80 crore for its 9.9 MW power project which includes the cost of 132 KV transmission line amounting to Rs. 5.70 crore. This comes to Rs. 6.14 crore per MW including transmission line. In course of public hearing Mainpat Green had indicated capital cost to the tune of Rs. 5.00 crore to Rs. 5.5 crore per MW whereas Shalivahana Projects Ltd. indicated fixed cost of Rs. 5.5 crore per MW. In the recent past, CSEB has set up two small hydel projects on the existing irrigation dam at Gangrel and at Sikasar. DPRs of these projects indicate project cost of Rs. 3.448 crore and Rs. 4.70 crore per MW respectively. The DPR/pre-feasibility reports of some of the hydro power projects registered with CREDA have been looked into and it is found that the project cost varies from Rs.4.97 crore to Rs. 5.90 crore per MW. In Maharashtra the project cost of Rs. 4.40 crore per MW has been assumed, whereas Karnataka and Andhra Pradesh have taken Rs. 3.9 crore and 3.75 crore per MW respectively. Uttaranchal is taking actual cost of project for determination of tariff with a ceiling of Rs. 5.50 crore per MW. **The Commission is of the view that it will be appropriate to agree for the purpose of tariff to a maximum ceiling of Rs. 5.00 crore per MW, as the capital cost which would also include the laying of transmission line for evacuation of power. However, this will be subject to prudence check by the Commission and the actual capital expenditure incurred on completion of project up to the date of commercial operation shall be taken into account for determination of tariff. However, the Commission in consideration of the topography of this State, the fact that many such projects would be located in remote areas which may require considerable length of transmission line exceeding 10 Km and also that there may be some geological surprises which may not have been foreseen and may come to be known only at the time of execution of the project, shall consider the project cost upto a maximum ceiling of Rs. 5.50 crore per MW, which would be the exception rather than the rule.**

(v) Plant utilization factor (PUF):

The petitioner has indicated that 46% PUF may be considered for fixation of tariff. Maharashtra and Karnataka have taken 30% CUF whereas Uttaranchal and Andhra Pradesh have taken 45% and 35% CUF respectively. As we have observed earlier the PLF of small hydel power projects may vary from 20.7% to 87.9%, since most of the small hydel projects in the State would be run-off- river, **the Commission feels that it will be appropriate to take 40% PUF for the**

purpose of determination of tariff including such of the projects whose actual deemed PUF comes below 40%.

(vi) Auxiliary consumption and transformation loss:

The petitioner has projected auxiliary consumption to the tune of 7%. In the subsequent submission he has asked for 1% towards transformation loss. This would appear to be excessive and without any basis. In Maharashtra and Andhra Pradesh 0.5% and 1% have been taken as auxiliary consumption respectively, whereas in case of Uttaranchal it is varying from 0.2% to 0.7%. **The Commission had a look at the auxiliary consumption projected in the various DPRs and pre-feasibility reports and comes to the conclusion that a maximum 2% may be allowed towards auxiliary consumption and transformation losses. However, this is subject to the actual auxiliary consumption and transformation loss taken into account at the time of determination of tariff, which in no case will be allowed to exceed 2%.**

(vii) Operation and maintenance expenses and escalations:

The petitioner has indicated that the O&M expenditure of small hydel projects is not comparable with large projects in terms of percentage of capital cost but comparison may be based on manpower requirement of such projects. The petitioner has submitted the following scale of O&M charges for small hydro projects:

<u>Project Capacity</u>	<u>O&M expenditure in percentage of total cost</u>
Up to 5 MW	8%
over 5 MW and up to 10 MW	6%
over 10 MW and up to 25 MW	4%

He has further submitted that escalation of 10% on the above be also considered for determination of tariff. We have gone through DPR and pre-feasibility report of various projects and have observed that the O&M expenditure as demanded by the petitioner is on a much higher side. We are aware of the fact that most of the small hydro projects would be located in remote areas with virtually no infrastructure and technical personnel may not be available there. Karnataka and Andhra Pradesh have taken 1.5% O&M whereas Maharashtra has taken 2.5% and in case of Uttaranchal it is varying from 3 to 4%. Taking into consideration all these factors, **the Commission decides to fix O&M expenses at 2.5% of the capital cost with 5% annual escalation including insurance charges as already allowed in case of biomass power.**

(viii) Interest on term loan:

The petitioner has stated that the interest on term loan should be taken as 11.75% per annum. The Commission has observed from the letter dated 17/05/06 of HUDCO addressed to the petitioner, that the fixed interest rate for

power project is 11.5% per annum for a repayment period of 10 years. During public hearing on the discussion paper, it was pleaded by the developers that interest rate may be taken as 12%, the rate at which Indian Renewable Energy Development Agency (IREDA) has been providing finance to small hydel projects. Maharashtra for the purpose of tariff determination has taken 9% interest on loan capital whereas it is 11% and 12% in case of Karnataka and Andhra Pradesh respectively. Since tariff will be decided project-wise, **it appears appropriate to the Commission that the actual interest rate at which the developer gets loan for capital expenditure be considered with the ceiling of 11.5% per annum. Debt/equity ratio of 70:30 will be considered for the purpose of determination of tariff. However, any equity above 30% will be treated at par with loan and if the equity is below 30%, it will be taken on actual basis for the purpose of allowing return on equity.**

(ix) Interest on working capital:

The petitioner has asked for interest on working capital loan at the rate of 12.75% per annum. It is taken as 11% in Maharashtra and 12.5% and 12% by Karnataka and Andhra Pradesh respectively. Since tariff determination will be project specific, **the Commission is of the view that it will be appropriate to consider the interest on working capital on actual basis as per the agreement executed between the developer and the financial institutions with a cap of 12.50% per annum** as normally it should not be 1% more than the interest rate for term-loan which the Commission has allowed as 11.50% per annum.

(x) Return on equity:

The petitioner has requested to allow 16% return on equity per annum. The Central Electricity Regulatory Commission has recommended ROE for generation projects at 14% and has allowed alternate tax at the rate of 7.5% of ROE (i.e. 1%) which totals to 15%. The Government of India has subsequently enhanced MAT to 11.22% on ROE which comes to 1.57%. Hence, the ROE inclusive of income tax comes to 15.57%. Considering the overall benefit from such projects and in order to promote the development of small hydel projects, **the Commission decides ROE of 16% per annum on equity capital which, as already mentioned shall be normative 30% of capital cost.** It is noted that in States like Maharashtra, Karnataka and Andhra Pradesh the same percentage of ROE has also been allowed whereas only 14% has been allowed by Uttaranchal.

(xi) Depreciation and advance against depreciation:

The petitioner, in the petition and in subsequent submission, has not said anything about the rate of depreciation while that depreciation is an essential component of the cost. Hence, the Commission decides to allow depreciation even though not demanded by the petitioner. The Commission feels that the rate of depreciation should be sufficient to cover the debt obligation fully. The Commission further notes that the moratorium and debt repayment period may

vary from project to project depending upon various factors including the bargaining strength of the parties. However, a uniform rate of depreciation should be provided for all small hydel projects so that it covers loan repayment in a normative period. The Commission notes that CERC guidelines also provide for an Advance Against Depreciation (AAD) to cover the debt repayment obligation. The Commission considers that with a debt equity ratio of 70:30 as discussed above and considering normative debt repayment period as 10 years from the year of commercial operation of the project, a uniform 7% of the project cost as depreciation under straight line method (SLM) would cover fully the debt repayment obligation. **Accordingly, the Commission decides to allow the total amount of normal depreciation at 7% per annum, which includes AAD under SLM for 10 years for the purpose of tariff computation. Since the project cost includes certain non-depreciable assets like land and margin money for working capital, 7% on the entire project cost is considered appropriate as benchmark depreciation for the purpose of computation of tariff.**

(xii) Separate tariff for firm and infirm power:

The petitioner has demanded that the infirm power injected by small hydro project be treated as sale of energy to the licensee. The Commission observes that the CERC, in the CERC (terms and conditions of tariff) Regulations, 2004 has categorized the electricity generated prior to commercial operation of the unit of a generating station as "infirm power." Before the commercial operation of the project, there would be generation of power which will necessarily be injected into the grid of the licensee to which the project is connected. Only such power would be termed as infirm power. Otherwise power generated by small hydel units has to be treated as firm power irrespective of load factor because of the uncertain nature of such generation. **The Commission directs that the price of infirm power should be half of the cost of firm power considering that it will only be the pre-commercial operation power. After commercial operation starts, the licensee shall purchase, within the mandated limits, whatever power is fed into the grid and offered for sale.**

(xiii) Royalty on water:

The petitioner has requested for 5% escalation on the water charges payable for use of water for generation of electricity to be paid to the State Government. The Commission was informed that presently the Water Resource Department of the State Government levies royalty of 6 paise per unit of generation. Since this is subject to change by the State Government any time, **the Commission decides that whatever royalty is paid by the small hydro power generator to the Government of Chhattisgarh will be treated as pass through in tariff.**

(xiv) Subsidy by Ministry of New and Renewable Energy (MNRE):

Though the petitioner has not raised this issue, the Commission has been informed that the MNRE offers different subsidies for different capacities of small hydel power projects located in hilly and non-hilly area. In the State of Chhattisgarh, this is to the tune of 20% of project cost limited to Rs. 0.75 crore plus Rs. 12.5 lakh per MW. Though, with this subsidy the cost of project will come down considerably, **we are not inclined to take this into account in the determination of tariff in view of the fact that the power generated through hydro project is eco-friendly and pollution free and the intention of the Government of India to provide capital subsidy to such power projects is to promote such power generation. We, in any case, are not quantifying and taking into account the benefits to the environment from such projects.**

(xv) Clean Development Mechanism (CDM) benefits:

Since small hydel power projects generate power without carbon emission, CDM benefits can be availed by the developers under KOYOTO Protocol. But it may be difficult for small hydro power projects to avail this due to complexities involved in meeting of the eligibility criteria for the benefit. Considering this, the Commission is of the view that in the present situation it will not be appropriate to take into account the CDM benefits for the purpose of tariff determination. **The Commission decides that as and if CDM benefit is available, the promoters should be allowed to retain it considering the financial risk involved in run-off-river small hydro power projects.**

10. Wheeling charges:

The petitioner has requested that wheeling charges should not be more than 3% of the energy fed into the grid if the supply is for captive use or sale to any consumer. Section 86 (1) (e) of the Act casts a responsibility on the Commission to promote co-generation and generation of electricity from renewable sources of energy by providing suitable measures for connectivity with the grid and sale of electricity to any person. Hence, promoter of small hydro power projects are free to sell power either to the licensee or to any consumer or to both. However, if he intends to sell power to any consumer, it has to be through open access only and on payment of wheeling charges as per Section 42 of the Act. In the discussion paper floated by the Commission, it was indicated that wheeling charges will be to the extent of 6% as decided in the case of biomass generation. The CSEB has objected to this on the ground that wheeling charge at 6% is on the lower side. The pooled energy loss at the State transmission system itself is about 4%. Therefore, if transmission and wheeling both activities are involved in the transaction of electrify from renewable energy sources then the utility has to bear at least 4% losses incurred in the transmission system which has not been factored into the reimbursement claim. The utility is thus not being compensated for providing the services for evacuation of energy from renewable energy sources; on the contrary, it has to

bear the transmission losses. CSEB has argued that logically any utility has to be remunerated reasonably for the services provided by it and every service entails certain expenditure. Karnataka has levied 5% wheeling charge as against 2% fixed in Maharashtra. In Andhra Pradesh, it is the same as applicable to the open access customers. **However, the Commission, considering the importance of promotion of generation from renewable energy sources including hydro power and in the overall interest of the State decides that the transmission and wheeling charges payable by small hydro power generators shall be 6% of the energy input into the system irrespective of the distance. Other than this charge, they shall not be liable to pay any transmission charges or wheeling charges, either in cash or in kind.**

11. Cross-subsidy surcharge:

Section 42 of the Act provides that cross-subsidy surcharge is leviable in case open access is provided to a person except in the case of captive power plants carrying electricity to the destination of their own use. The Commission feels that for promotion of the use of electricity generated from small hydro power plants, the consumers willing to purchase electricity from such generators through open access should be liable to pay cross-subsidy surcharge at a lower rate than others. **The Commission decides that this rate shall be 50% of the rate of cross-subsidy surcharge prescribed by the Commission from time to time.**

12. Banking facilities:

The petitioner has prayed that banking facility should also be considered for small hydel projects in line with the judgement of the Appellate Tribunal for Electricity in appeal No. 20 of 2006 dated 07/09/2006 for biomass energy in Chhattisgarh. The Commission feels that banking of electricity is a facility to help small generating stations to produce power by maximizing the utilization of available fuel stock without demand restrictions. Under this arrangement, entire power generated by a plant, even if it is more than the quantum under agreement and the demand of the third party, is injected into the grid and the licensee utilizes the excess power to meet its current demand by adjusting purchases from other outside sources. The excess power so utilized (banked) with the distribution licensee is released back from its own source to the generators when required by them. This facilitates optimal utilization of available sources of energy. But the accounting of such arrangement creates a lot of complications as timing of deposits and timing of withdrawal from the banked energy could be different. This issue of course can be resolved by providing ABT meters at the point of injection and at the point of drawal and by proper monitoring by the State Load Despatch Centre (SLDC). Different SERCs have made different provisions for banking. Maharashtra has allowed banking of surplus energy at the end of FY, limited to 10% of the net energy delivered into grid. Karnataka has permitted banking subject to payment of difference of UI

charges between the time of injection and time of drawal of power with banking charge at the rate of 2% of input energy. Andhra Pradesh has allowed banking for 12 months with 2% charges and has permitted drawal only during 6 months period from January to December. Banked energy unutilized as on 31st December shall lapse and permitted drawal of banked energy during peak hours. After considering all aspects including accounting, **the Commission decides to allow banking facility in respect of small hydel projects subject to payment of difference of UI charges between the time of injection and time of drawal of the power from such projects and also payment of banking charges at the rate of 2% of the input of banked energy. In case, the UI charges are negative the licensee shall not be liable to pay the difference in UI charges.**

For this purpose, installation of ABT meter at the point of injection as well as at the point of drawal, by the hydro power generator, shall be necessary. They have to supply the required software also to the licensee. Unless and until, ABT meter is installed, this facility shall not be extended to the generator. However, the promoter has to exercise his option to avail this facility by submitting an application to the licensee. The distribution licensee should immediately take steps to develop necessary process and software to track small hydel power energy credits and maintaining accounting data base.

13. Demand charges payable for availing start-up power and mode of payment thereof:

The petitioner has requested that demand charges for start up power should be in line with the policy of biomass energy purchase and as per the order of the Appellate Tribunal dated 07/09/06. In response, the CSEB has contended that no separate dispensation is required as the Commission has already provided a separate tariff for start-up purposes under HV-6 of the tariff order for the year 2006-07. The Commission also feels that in view of there being a separate tariff for start up purposes in the current tariff order, there is no need to fix up separate start up tariff for small hydro projects. **The Commission decides to make applicable the start-up tariff to the hydro power projects provided in the tariff order 2006-07 and as may be revised from time to time.**

14. Security deposit

This issue was not raised by the petitioner but was discussed on the basis of the discussion paper floated by the Commission. It was pointed out that when small hydro power producers sell power to consumers, other than the distribution licensee, they may not be able to collect any security deposit. In case of default by such consumers, power producers may be put to loss. **The Commission feels that since the supply of power is through a bilateral agreement**

between the power producer and its consumer, this matter should be settled between the producers and consumers bilaterally.

15. Sharing of demand charges

This point was also not raised by the petitioner but came up for discussion in the hearing on the discussion paper. It was raised that when supply of power to a consumer is by more than one supplier including the distribution licensee, collection and appropriation of the entire demand charges by the distribution licensee on the contracted maximum demand may not be justified. It was contended that there was, thus, a case for sharing of demand charges on pro-rata basis. **The Commission feels that sharing of demand charges may not be practicable nor justified since transmission and wheeling charges proposed is only 6% of energy input as against technical losses of about 10% at 33 KV voltage level.**

16. Sharing of expenditure on grid interface/transmission line

This issue also came up during consideration of the petition. The contention of the petitioner is that the cost of transmission line required to be laid for evacuation of power be taken as additional project cost. The Commission has noted that the policy directives issued by the State Government vide notification dated 29/08/02 provides that expenditure required for evacuation of power like grid interfacing equipment and transmission lines shall be borne by the entrepreneur if the transmission line is up to a distance of 2 Km. For a distance exceeding 2 Kms expenditure for laying transmission line shall be shared equally by the entrepreneur and CSEB. However, the cost sharing of the CSEB shall be limited to a maximum distance of 5 Km. **The Commission decides that the provisions of the policy directives may be maintained and it should be extended to the other distribution licensees of the State besides CSEB.**

17. Term for PPA

The petitioner has indicated that he is ready to sell his power to CSEB for 10 years which is generally the period of repayment of debt. **The Commission agrees and decides to fix the term of the PPA at 10 years from the date of commercial operation. PPAs may be renewed for such further period of 10 years, 90 days prior to the expiry of the initial period of the PPAs, on terms and conditions and tariff as may be decided by the Commission at the time of renewal.**

18. Application for tariff determination

Promoters of small hydro power projects may make application for determination of provisional tariff in advance of the anticipated date of completion of project based on their capital expenditure actually incurred up to

the date of making application or a date prior to making application, duly audited and certified by a statutory auditor and provisional tariff shall be effective from the date of commercial operation of the respective unit of generation. The developers may make the application for provisional tariff 6 months before the anticipated date of commercial operation. He shall make a fresh application for determination of final tariff within 12 months after the date of commercial operation based on actual capital expenditure incurred up to the date of commercial operation of the small hydro power project duly audited and certified by the statutory auditor.

19. Scheduling of power:

The power from small hydel plants is non-firm in nature. The seasonal variations in generation are substantial particularly in run-off-river projects. Besides, the installed capacity of individual small hydel plants are considerably lower than the conventional power plants and it may not be practicable to bring these plants under scheduling. **The Commission hence decides that such plants need not do scheduling of their power and whatever power is generated may be injected into the licensee's grid and shall attract payment from the licensee as per the approved tariff. However, this will be applicable only when the entire generated power is sold to the licensee. Further, the promoters shall endeavour to generate maximum power during evening peak hours if the conditions so permit.**

If the promoter after commercial operation of the small hydro project sells the entire power to the licensee then such power in its entirety will be treated as firm power and will be paid at the tariff decided by the Commission. However, if the promoter sells power to a third party' and /or supplies to captive user in addition to the licensee then he has to go for daily scheduling of energy being supplied to the licensee and the energy injected between 70% and 105% load factor shall be treated as firm power and will be paid at the rate decided by the Commission. Accounting of energy shall be monthly. However, if in a month, the overall load factor is less than 70% or above 105% of the contracted energy then such power will be treated as infirm power and the price of such infirm power shall be half of the cost of firm power.

20. The gist of the Commission's above orders are as follows:

- (i) Mandatory minimum purchase of power: Distribution licensees shall procure power from small hydel power projects to the extent of 3% of their total consumption in a year on the first-cum-first serve basis at a tariff as may be determined by the Commission.
- (ii) Determination of tariff: Tariff shall be determined separately for each project and shall be single part tariff. Procurement by the licensee shall be without applying merit order despatch.

- (iii) Wheeling charges: 6% wheeling charges shall be payable by hydro generators if the power is taken through the licensee's grid for own use or sale to any consumer.
- (iv) Cross-subsidy surcharge: The rate for cross-subsidy surcharge shall be 50% of the normal rate fixed by the Commission.
- (v) Banking facilities: Banking facility is allowed subject to payment of difference of UI charges between the time of injection and time of drawal of power and payment @ 2% of the input banked energy..
- (vi) Demand charges payable for availing start up power and mode of payment thereof: Demand charge for start up power will be as per the prevailing tariff order.
- (vii) Security deposit: This is to be settled between the power producer and consumer bilaterally.
- (viii) Sharing of demand charges: This is not allowed.
- (ix) Sharing of expenditure on grid interface/transmission line: This will be as per the State Government policy notified on 29/08/02 and subsequent amendment.
- (x) Term for PPA: Period of PPA will be for 10 years from the date of commercial operation with provision for renewal for a further period of 10 years.
- (xi) Application for tariff determination: Developers may make application for provisional tariff before 6 months from the anticipated date of commercial operation and fresh application for determination of final tariff within 12 months after the date of commercial operation.
- (xii) Scheduling of energy: No scheduling of energy is required if entire generated power is sold to the licensee. But if the promoter sells power to a third party and/or supplies to captive user, then daily scheduling will be necessary.

21. This order shall be applicable to all small hydel projects upto a capacity of 25 MW. It will be reviewed after a period of five years. Such a review the Commission feels is necessary considering that not a single project has come up in the State so far and some projects are likely to come up in three years and will offer operational data of some certainty only thereafter.

**Sd/-
Member**

**Sd/-
Chairman**

True Copy

**(N.K.Rupwani)
Secretary**