Central Electricity Regulatory Commission (CERC)
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Ref.No.:2/7(4)/2008-TP(Renewable)/CERC Dated : 16th May, 2008

Dear Sir / Madam,

In pursuance of the provisions of sections 61 and 79 (1)(c) of the Electricity Act, 2003 and requirement under section 6.4 (3) of the Tariff Policy issued on 06.01.2006, the Central Commission has evolved a Discussion Paper on "Promotion of Co-generation and Generation of Electricity from Renewable Sources of Energy". A copy of the discussion paper is **enclosed.**

2. Comments are invited from all stakeholders on the aforementioned discussion paper by **16.06.2008** to enable this Commission to finalize the guidelines on "Promotion of Co-generation and Generation of Electricity from Renewable Sources of Energy".

With regards,

Yours sincerely,

Encl : as above.

(Alok Kumar)
Secretary

PROMOTION OF CO-GENERATION AND GENERATION OF ELECTRICITY FROM RENEWABLE SOURCES OF ENERGY

A DISCUSSION PAPER

(May 2008)

Central Electricity Regulatory Commission
New Delhi

CONTENTS

INTRODUCTION

1. India has a huge latent and un-met demand for electricity, and it is necessary to harness all viable sources of energy for electricity generation. The indigenous reserves and supply of fossil fuels are limited, and would get exhausted in a few decades. Besides, there are growing environmental concerns with regard to their use. Electricity generation from renewable sources, i.e. hydro, wind, bio-mass, etc. is therefore most desirable, to the extent it is techno-economically feasible. Even if not possible on a large scale, all viable renewable energy sources need to be harnessed to produce electricity, for local supply as well as for feeding into the larger grid.

2. In this Discussion Paper, the subject is covered from this larger perspective, but limited to grid-connected generation. The terms 'renewable' and 'non-conventional' have been used inter-changeably, and broadly cover small hydro, wind, bio-mass and solar plants which are presently perceived as viable in the country. Co-generation has also been included due to its high energy conversion efficiency and consequent benefits from environmental angle. Similarly, distributed generation has been included because of its high delivery efficiency on account of avoidance of transmission and distribution costs and losses.

3. Individual power plants of the above category of generation would normally be of only a few MW capacity, and would therefore connect into the intra-State system. Consequently, they would come under the direct jurisdiction of the respective State Electricity Regulatory Commission. However, the intra-State power systems are now fully integrated with the inter-State system, and injection of non-conventional generation in intra-State grid can have a reflection on the inter-State transmission of electricity, regulation of which is a function of

the Central Commission as per section 79 (1)(c) of the Electricity Act, 2003. Further, the Central Commission is required to lay down the guidelines for pricing of non-firm power, especially from non-conventional sources, under section 6.4(3) of the Tariff Policy issued on 6.1.2006. Also the Section 61 of the Electricity Act, 2003 provides that the Appropriate Electricity Regulatory Commission while specifying the terms and conditions for determination of tariff, shall be inter-alia guided by the need for promoting co-generation and generation of electricity from the renewable sources of energy.

4. The State Electricity Regulatory Commissions across the country have undertaken various steps for promoting non-conventional/renewable sources of energy and these initiatives have also started showing results. Central Electricity Regulatory Commission is floating this discussion paper to address various aspects related to non-conventional/renewable sources in India with the object of taking further the initiatives started at State level.

STATUTORY PROVISIONS

5. The Electricity Act, 2003 provides as follows:

Section 61 provides that the Appropriate Commission shall be guided inter alia by the factors, including "promotion of co-generation and generation of electricity from renewable sources of energy".

Further section 86(1) provides that:

"The State Commission shall discharge the following functions, namely :-

* * * * * *

(e) promote cogeneration 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;

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6. In the National Electricity Policy issued by the Ministry of Power on 12.2.2005, the following statements have been made on the subject :

“Non-conventional Energy Sources

5.2.20 Feasible potential of non-conventional energy resources, mainly small hydro, wind and bio-mass would also need to be exploited fully to create additional power generation capacity. With a view to increase the overall share of non-conventional energy sources in the electricity mix, efforts will be made to encourage private sector participation through suitable promotional measures.

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5.2.26 A large number of captive and standby generating stations in India have surplus capacity that could be supplied to the grid continuously or during certain time periods. These plants offer a sizeable and potentially competitive capacity that could be harnessed for meeting demand for power. Under the Act, captive generators have access to licensees and would get access to consumers who are allowed open access. Grid inter-connections for captive generators shall be facilitated as per section 30 of the Act. This should be done on priority basis to enable captive generation to become available as distributed generation along the grid. Towards this end, non-conventional energy sources including co-generation could also play a role. Appropriate commercial arrangements would need to be instituted between licensees and the captive generators for harnessing of spare capacity energy from captive power plants. The appropriate Regulatory Commission shall exercise regulatory oversight on such commercial arrangements between captive generators and licensees and determine tariffs when a licensee is the off-taker of power from captive plant.

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5.12 COGENERATION AND NON-CONVENTIONAL ENERGY SOURCES

5.12.1 Non-conventional sources of energy being the most environment friendly, there is an urgent need to promote generation of electricity based on such sources of energy. For this purpose, efforts need to be made to reduce the capital cost of projects based on non-conventional and renewable sources of energy. Cost of energy can also be reduced by promoting competition within such projects. At the same time, adequate promotional measures would have to be taken for development of technologies and a sustained growth of these sources.

5.12.2 The Electricity Act 2003 provides that co-generation and generation of electricity from non-conventional sources would be promoted by the SERCs by providing suitable measures for connectivity with grid and sale of electricity to any person and also by specifying, for purchase of electricity from such sources, a percentage of the total consumption of electricity in the area of a distribution licensee. Such percentage for purchase of power from non-conventional sources should be made applicable for the tariffs to be determined by the SERCs at the earliest. Progressively, the share of electricity from non-conventional sources would need to be increased as prescribed by State Electricity Regulatory Commissions. Such purchase by distribution companies shall be through competitive bidding process. 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 in prices to promote these technologies.

5.12.3 Industries in which both process heat and electricity are needed are well suited for cogeneration of electricity. A significant potential for cogeneration exists in the country, particularly in the sugar industry. SERCs may promote

arrangements between the co-generator and the concerned distribution licensee for purchase of surplus power from such plants. Cogeneration system also needs to be encouraged in the overall interest of energy efficiency and also grid stability."

7. The Tariff Policy issued by the Ministry of Power on 6.1.2006 stipulates the following on the subject :

"6.4 Non-conventional sources of energy generation including Co-generation :

(1) Pursuant to provisions of section 86(1)(e) of the Act, 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. Such percentage for purchase of energy should be made applicable for the tariffs to be determined by the SERCs latest by April 1, 2006.

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 tariffs determined by the Appropriate Commission.

(2) Such procurement by Distribution Licensees for future requirements 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 full costs.

(3) The Central Commission should lay down guidelines within three months for pricing non-firm power, especially from non-conventional sources, to be followed in cases where such procurement is not through competitive bidding."

8. It would be abundantly clear from the foregoing that maximization of non-conventional electricity generation is a national priority. Because of its small plant capacity and distributed nature, it would be best to leave its development to private entrepreneurship. The primary role of the State utilities would be to enable the setting up of non-conventional generation by removing the various bottlenecks and to facilitate its transmission to the notional destination. The regulatory commissions have basically to specify the framework in which non-conventional electricity generation would be judiciously encouraged, but in a manner that the State utilities are not subjected to financial loss.

THE PRESENT STATUS

9. In pursuance of the provisions in the Electricity Act, the National Electricity Policy and the Tariff Policy, many State Electricity Regulatory Commissions have already specified the rates and other conditions on which the concerned State utilities can purchase non-conventional generation from the respective producers. **Annexure-1** may be seen for a summary of these stipulations, State-wise. In most cases, the non-conventional energy is to be purchased by the State utilities at a fixed, single-part paise/kWh tariff. The State Commissions must have kept in view the cost of such generation but many developers complain that with the plant costs having gone up in recent years, the specified tariffs are no longer remunerative.

10. On the other hand, the State utilities are generally reluctant to purchase non-conventional energy because its tariff is higher than the average cost of power procured from elsewhere, and also because its generation pattern has no relationship with the grid load profile. There have been instances when State utilities have asked the wind plants to stop generation under low grid load conditions, because it would have been necessary otherwise to backdown much “cheaper” generation. (This has been entirely due to defective commercial

arrangements : wind energy has zero variable cost, but the same does not get reflected in the constant single-part tariff system in vogue. The State utilities only see the given single-part tariff, and compare it with the variable cost of other power. Zero cost energy is then sought to be shut out, against all principles of merit-order and economy generation). State utilities have also been resenting the provision of escalation in tariff for energy from renewable sources despite of assets getting depreciated.

11. Unpredictability and non-dispatchability of the non-conventional generation are the other features due to which the State utilities are averse to its absorption in the grid. The non-conventional energy developers, therefore, do not get adequate encouragement from the host State utility, and in turn lack enthusiasm about supplying power to the host utility. In fact, it has been seen in many cases that the distribution utilities are resenting export of power and trying to block the grant of open access to non-conventional sources based generators with the intent of forcing them to sell the energy to the utilities at dictated price. In the ensuing tussle, the setting up of non-conventional plants suffers, and much of the viable capacity fails to get installed.

12. "Sale of electricity to any person" is specifically mentioned in section 86.(1)(e) of the Electricity Act quoted earlier. A "person" has been defined in section 2(49) of the Act as any company or body corporate or association or body of individuals, whether incorporated or not, or artificial juridical person. It is clear from the above that the Act contemplates sale of electricity from co-generation and renewable energy plants not only to the host utility, but also to others including utilities in other States. Given this liberty under the Act, some developers of non-conventional electricity are keen to sell power to States which are offering better terms. But here again, their efforts are getting thwarted due to various costs and formalities of inter-State "open access".

13. In section 6.4(3) of the Tariff Policy dated 6.1.2006 quoted earlier, “non-firm” power has been mentioned, particularly in the context of non-conventional sources. This would imply power which cannot be supplied on a firm (committed) basis under a contract, but is nevertheless available, for supply on as-and-when-available basis.

14. Many industries have set up wind plants (or have got them set up by plant manufacturers) as captive generation units, also availing taxation benefits. Now that such wind plants are installed, inducing them to maximize generation should be our endeavour.

15. In early days of promotion of non-conventional energy, certain incentives were specified by the then Ministry of Non-conventional Energy Sources (MNES). One specific provision was a rate of Rs. 2.25 per kWh with 5% annual escalation (with 1993 as the base year). Other incentives included concessions regarding the banking, wheeling, third party sale and fiscal incentives like allowing 100% accelerated depreciation for renewable energy projects, etc. MNES guidelines were valid for a period of 10 years. These have been generally taken as the starting point by the SERCs for formulation of their present regulations on the subject. As of now, the support as extended by the Ministry of New and Renewable Energy (MNRE) is as highlighted at **Annexure-II.**

OPEN ACCESS REGULATIONS

16. The Central Commission has already issued the regulations for open access on inter-State transmission system, which lay down the rules and procedures for inter-State wheeling, and sale of power. These would also be applicable to sale of power from a non-conventional plant to a person outside the host State, as also for wheeling power to the associated industry in case of a

non-conventional plant set up as a captive generating station. However, advance scheduling is a strict pre-requisite for inter-State open access, for dispute-free operation of the whole system.

17. One of the inherent features of most non-conventional plants as already noted is their unpredictability. Though some broad prediction of next day's generation is possible based on weather forecast, etc. there is generally a variation (due to changes in wind speed in case of wind plants, and due to changes in inflow in case of hydro plants) from hour to hour, which is very difficult to predict. In case the schedule is based on expected average generation level, which is perhaps the best that the generator can advise on day-ahead basis, all variations/deviations from that level would get registered as unscheduled interchange (UI). The non-conventional plant owner may perceive this as too risky.

18. The scheme of UI has now been well-established at the inter-State level. When applied in a bidirectional/reciprocal manner, it carries little risk. The revenue reduction for deviation from schedule in one direction would get largely offset by revenue gain for deviation from schedule in the other direction, as long as the actual average generation over a day is close to the schedule. Application of UI scheme in a bidirectional/reciprocal manner means that the extra payment to the generating station for its over-generation would be at the same paise/kWh rate as that at which the generating station has to pay back for its under-generation, the frequency being the same. Serious problems arise when UI rates for over-supply and under-supply differ by a large margin, and/or differing criteria are applied for over-supply and under-supply by the non-conventional plant.

19. It has generally been seen in connection with inter-State and intra-State open access that the State utilities are not applying UI in a reciprocal manner. An over-supply by a captive/non-conventional plant is seen as gaming

and is paid for at only a small rate, or is not paid for at all. An under-supply, on the other hand, is seen as a serious default and is sought to be penalized. With such unbalanced provisions, it is only natural that the non-conventional generator is effectively discouraged from seeking open access.

20. From the foregoing discussion, it is clear that the prospective developers of non-conventional generation do have problems in selling power to the host utility, and also in selling power elsewhere. This Discussion Paper focuses on finding solutions to these problems.

A NATIONAL PRIORITY

21. Maximisation of non-conventional electricity generation has been highlighted as a national priority in para 8 above. It requires, in the first place, removal of the various road blocks, not only in setting up of these plants, but also in sale and wheeling of the power generated. The latter is essential for establishing commercial viability of the plants, which in turn is a pre-requisite for getting the funds for setting up a plant. Any concessions and incentives come later. Also, there is little point in one Government agency offering incentives for setting up of a plant while the rules and regulations of certain other Government agencies prevent them from generating and delivering. The matter requires a national initiative in which all Government agencies need to contribute.

22. In the matter of enabling sale of power generated by non-conventional plants, it is hereby proposed that all possible routes for such sale be opened up. The various modes for sale/utilization of non-conventional electricity presently contemplated are :

i) Sale to the host distribution licensee or an authorized State entity, as per tariff and terms specified/approved by the concerned SERC.

ii) Sale to a distribution licensee or an authorized State entity in another State, as per tariff and terms specified/approved by the SERC of that State.

iii) Wheeling to an associated entity, as captive generation.

iv) Sale to any consumer, in the home State or elsewhere, subject to the regulations made under section 42(2) of the Act.

v) Sale to the host distribution licensee or an authorized State entity, as unscheduled interchange (UI).

vi) Notional injection into the regional grid, as unscheduled interchange (UI).

23. Each of the above modes have been discussed in some detail, in the following paragraphs. Sale of non-conventional energy through a power exchange (PX) is presently not contemplated as they are mostly non-compatible. The former has an unpredictability, while any transaction through a PX requires commitment to a firm schedule. However, some co-generation plants may be able to commit to a firm schedule of power supply, and may be able to sell power through a PX. Similarly, sale of non-conventional energy through a trading licensee, or to a separate aggregating entity is also not contemplated (except in case of co-generation), for reasons of incompatibility in the matter of scheduling. In other words, the above would be the seventh and eighth routes available to co-generation plants which can supply power as per a firm schedule on committed basis. These would have to comply with the normal open access regulations, and are therefore not covered in the present discussion.

MODE - 1

24. Sale to the host distribution licensee or an authorized State entity shall be an intra-State transaction, totally within the jurisdiction of the concerned SERC. Therefore, only the following general observations/suggestions are made for consideration of the State Commissions while specifying/approving the tariff and terms for such sale.

i) The agreement between the non-conventional plant owner and the host distribution licensee/authorized State utility should clearly specify that the latter shall take and pay (at the specified paise/kWh rate) for the entire injection of the plant, whatever is the energy quantum (up to the capacity for which PPA has been concluded) and whenever it is supplied. The plant owner shall never be asked to back down his generation, except in case of a genuine transmission constraint.

ii) Since there would be a blanket commitment to take all energy generated by the non-conventional plant upto the capacity agreed in PPA, there need be no requirement for declaration of availability and issuance of a schedule. There would be no UI either.

iii) However, the generator must timely coordinate with STU his proposal of setting up of the non-conventional plant of a certain MW capacity at a particular location so that there would be no transmission congestion normally. The following is already mandated in section 10(3) of the Electricity Act, 2003 :

"Every generating company shall –

(a) ……

(b) Coordinate with the Central Transmission Utility or the State Transmission Utility, as the case may be, for transmission of electricity generated by it."

Developers/owners of non-conventional plants too have to comply with the above stipulation, and it is incumbent upon them to coordinate with the STU, sufficiently in advance, to ensure that any required transmission system augmentation is carried out in good time and there is no transmission constraint when their plant becomes operational.

iv) As an encouragement for non-conventional energy, the SERCs should consider putting in place appropriate mechanism providing that the STU may build the transmission lines upto the injection point at its cost, and exempt the non-conventional plant owner from payment of any transmission charges. This would effectively mean that the tariff specified by SERC for non-conventional energy would be payable on the energy metered at the injection point. The benefit of liberal transmission connectivity being proposed here for the non-conventional energy plants would also get reflected in tariff, if obtained through the competitive bidding as stipulated in Para 6.4(2) of the Tariff Policy.

v) A voltage-linked bidirectional reactive energy charge may be applied at the injection point, similar to the scheme specified in Indian Electricity Grid Code (IEGC). No other charge need be levied on the non-conventional plants. Insistence on a power factor close to unity, and high charges if power factor is lower than the specified limit, as being levied in some States, are not optimal, and should be avoided.

MODE - 2

25. Sale of power to a distribution licensee or an authorized State entity in another State would be an inter-State transaction, which would normally be governed by the CERC (Open Access in Inter-State Transmission System) Regulations, 2008. An inherent difficulty in compliance with these regulations for non-conventional plants has been pointed out in para 17. Another problem is inevitable involvement of two SLDCs and one or more RLDCs in every inter-State transaction. There would be a risk of the whole mechanism of inter-State open access being jammed when many non-conventional plants come on line in future. Further, the efforts involved would hardly be justifiable for transactions of only a few MW each. It is therefore necessary to find a way around the requirement of advance scheduling, which is inherent in the conventional inter-State open access.

26. In case the concerned non-conventional plant is of only a few MW, and notional transmission of its output to another State in the same region can be accommodated in the existing intra-State and inter-State transmission systems, the approach described in para 28 to 31 can be adopted to overcome the above-mentioned problem of scheduling. The solution is also premised on the non-conventional plant finding the terms and conditions offered by purchasing State acceptable, and the purchasing entity agreeing to purchase the entire generation of the non-conventional plant, complying with (i) and (ii) of para 24.

27. The State in which the non-conventional plant is located, not being a beneficiary of the plant, would be justified in refusing to provide any monetary concessions to the plant. However, the utilities of the home State should not come in the way of setting up and operation of the plant, and provide facilities which only they can provide, without demur, and at a reasonable price. For example, the STU or local distribution licensee would have to extend its sub-transmission system upto the injection point of the non-conventional generating plant, provide the connectivity and organize the energy metering of non-conventional injection. The utilities of the

home State would be justified in asking for reasonable compensation for their investment, recurring expenditure, efforts and incremental wheeling losses (if any). Such compensation can be in the form of upto 10% of energy injected by the non-conventional plant, as may be specified by the SERC of the home State. Reactive energy charges may be applied as per (v) of para 24, but there should be no other charge or levy on the non-conventional generation.

28. The proposal can best be described through an example, which is representative of a typical situation. Suppose a developer is interested in setting up a 5 MW run-of the river hydro plant in Himachal Pradesh, and finding the tariff offered by Punjab to be more attractive, proposes to enter into a PPA with PSEB for sale of its entire generation. Suppose there is no transmission constraint, either in Himachal system or in the inter-State system, and the parties are agreed on 10% of injected power being taken by HPSEB as a compensation for wheeling charges, losses and services. In case the conventional inter-State open access procedures are to be followed, the above supply would have to be scheduled day-by-day on day-ahead basis. If 5 MW is proposed to be injected, the net drawal schedule of HPSEB from NR grid shall have to be lowered by 4.5 MW, and the net drawal schedule of PSEB increased by 4.5 MW. Deviations from the respective adjusted schedules for the two SEBs would appear in the regional energy accounting, and involve payments from/to regional UI pool account. Deviations of the hydro plant from its schedule shall involve payment of UI charges between the plant and HPSEB.

29. The above scheduling process would invariably involve the SLDCs of Himachal and Punjab, as also the NRLDC. All of them would also be involved whenever the generation of the hydro plant changes. The whole exercise may be found to be too tedious for the quantum of power considered in this example. Further, if the contractual arrangement is to fully comply with Punjab's commitment to take the entire output of the hydro plant at the agreed rate of say Rs. 3.50 per

unit, PSEB should compensate the hydro plant for extra liability arising out of UI charges paid to HPSEB.

30. The above complications can be avoided if the following procedure is followed. The net drawal schedules of HPSEB and PSEB may not be adjusted on account of the hydro plant's injection. The (unscheduled) injection of 5 MW by the hydro plant in HPSEB system would then reflect as a corresponding underdrawal by HPSEB from the NR grid, resulting in payment of UI charges for 5 MW from NR UI pool account to HPSEB. Assuming that PSEB does draw 4.5 MW that it is entitled to on account of hydro plant's injection, it would be metered as an overdrawal, for which PSEB would have to pay UI charges to NR UI pool account. Since PSEB is committed to pay Rs. 3.50 per unit for 4.5 MW (by virtue of its PPA with the hydro plant), and it has paid the prevailing UI rate for 4.5 MW through the NR UI pool account, the differential between the prevailing UI rate and Rs. 3.50 (the contracted rate) has to be further adjusted. For example, if the prevailing UI rate is Rs. 2.50, PSEB would pay Re. 1.00 for 4.5 MW to the hydro plant. If the prevailing UI rate is Rs. 6.00 per unit, PSEB would get back Rs. 2.50 per unit for 4.5 MW from the hydro plant. This would square up PSEB's account.

31. HPSEB would be paid for 5 MW at the prevailing UI rate from the NR UI pool account, as mentioned earlier, and would pay 90% of the amount received to the hydro plant. In the process, HPSEB's requirement of retaining 10% of injected power is met, in monetary terms: it gets 5 MW but pays only for 4.5 MW. The hydro plant would receive the prevailing UI rate for 4.5 MW from HPSEB, and the balance (the differential between the contracted rate of Rs. 3.50 and the prevailing UI rate) directly from PSEB. In this manner, contractual requirements of all parties would have been met, without any scheduling.

32. It should be clearly understood by all concerned that the above proposal is a very special arrangement, which would be allowed only for small renewable energy generation, to circumvent the problems associated with their

scheduling. As a further encouragement for small renewables, they may be exempted from levy of any inter-State open access charges (transmission charges, losses and scheduling charges) which are otherwise leviable, provided the existing transmission system can accommodate the incremental power flow. In case of large renewable plants, and where transmission capacity may be an issue, normal inter-State open access procedures shall apply.

MODE – 3

33. Wheeling of renewable energy to an associated entity as captive generation is a commercial proposition, and is to be treated in that manner. In case it is inter-State, all relevant provisions of inter-State open access, as specified by the Central Commission, would apply. If intra-State, the provisions specified by the concerned State Commission would apply. The matter mentioned in para 18 and 19 is of special significance here. It needs to be seen in a wider perspective, as discussed in the following paragraphs.

34. Power systems in all developed countries work at a substantially constant frequency, which is tightly controlled by applying a cardinal rule that every utility must maintain its net power interchange equal to its net schedule at all times. In such a system, it would be necessary to closely monitor all open access customers to ensure that their drawals / injections are generally as per the respective schedules. If any open access customer deviates from his schedule, he has to be told immediately to get back to his schedule, or else the control area has to absorb the deviation (by maintaining spinning reserve, etc.), so that the control area does not have an area control error. On the other hand, in the system operation scheme adopted in India, we permit the frequency to float in a range, and allow the utilities to deviate from schedule as long as the transmission system is not over-stressed. Consequently, it is not necessary for them to monitor each open access customer too closely, on-line, and to put restrictions on the latter's

deviations. Further, the deviations from schedule are commercially settled through the UI mechanism, automatically and without any subjectivity or scope for dispute.

35. Another feature of our system operation scheme is that deviations of an embedded entity are catered to by the entire grid, and not by the host utility alone. It is not necessary for the host utility to maintain any spinning reserve, etc. for this purpose, as it can pass on the resulting fluctuations to the larger grid. Whichever utility absorbs the fluctuations / deviations gets automatically compensated through the UI mechanism on back-to-back basis. In such a scheme, it would not at all be reasonable for the host utility to ask the open access customer to pay any 'stand-by support charges' or 'excess demand charges' other than the applicable UI charges. The Central Commission has already prohibited any charges other than UI for deviations of inter-State open access customers. The intra-State system should be similar.

36. Wheeling of renewable energy to an associated entity would normally involve two embedded entities, either in the same State or in different States. For dispute-free operation of the open access mechanism, there has to be a schedule for the above wheeling, at every inter-utility interface, and given out on day-ahead basis. All deviations from the given schedules have to be settled through an agreed mechanism. The UI mechanism is now well-established at the inter-State level, and is fully proven. There can be no valid reason for not adopting it in the intra-State systems, particularly in view of the explanation in para 34 and 35. The Tariff Policy also required introduction of ABT at State level by April, 2006. In fact, questions are likely to be raised in case the same scheme is not adopted in an intra-State system, as explained below.

37. Suppose an embedded supplier of inter-State open access under-supplies by 100 units, for which the host utilities penalizes him at Rs. x per unit. The under-supply would result in the host utility over-drawing 100 units from the

larger grid, for which it would have to pay the prevailing UI rate. In case the prevailing UI rate is higher than Rs. x per unit, the host utility would suffer a loss. So, x should not be lower than the prevailing UI rate. However, the latter is variable, and can (and does) reach the ceiling level, which is presently Rs. 10 per unit. So, if x is to be a fixed figure, it would have to be at least Rs. 10. When UI is down to Rs. 3 or 4 only, as may be the case at times, the host utility would have an income without any justification. In other words, the host utility should charge only the UI rate for any under-supply by the inter-State open access customer, since that is what it has to pay for the resulting overdrawal from the larger grid. At the most, the charge could be jacked up by 5 – 10% to compensate the host utility for any incremental transmission loss, use of its transmission system, and handling, energy accounting effort, etc.

38. In case of any over-supply by the open access customer (generator), the host utility would have a corresponding under-drawal from the larger grid, and would get paid the UI rate. It would only be logical that 90-95% of the payment received is passed on to the open access customer. For the same reasons as explained above, the recipient of the wheeled energy should be charged by his host utility at 105-110% of the prevailing UI rate for any over-drawal, and paid back at 90-95% of the prevailing UI rate for any under-drawal.

MODE – 4

39. Sale to any other consumer (not an associated entity) has been listed here as an option to be available for utilization of renewable energy. It too would be a commercial proposition, and would therefore have to be according to all relevant open access regulations, as also according to regulations made under section 42(2) of the Act. The entire discussion under Mode-3 is applicable to this mode as well.

MODE – 5

40. Sale of the entire output of a renewable energy plant to the host distribution licensee or an authorized State entity, as unscheduled interchange (UI), is the simplest of all modes, on the following counts :

i) There would be no need for determination of tariff, either plant-wise or plant type-wise, at which renewable energy is to be taken, no related subjectivity, and no question about whether the tariff is remunerative and/or reasonable.

ii) There would be no heart-burning about compulsion to absorb costly energy when a utility does not need it.

iii) The utilities absorbing the incremental energy would automatically be paying a high rate during peak load hours and a low rate during off-peak hours, which nobody should object to.

iv) The renewable energy plant developer would need to ascertain the financial viability of his project, taking into account the average UI rate he is likely to get.

v) There would be no hassles about scheduling, and no complaints about deviations from schedules, or the generator not meeting any given commitments.

41. The logic of this mode is very simple. Any extra power received into the State grid from a renewable plant would directly result in a corresponding reduction in the actual net drawal of the State from the regional grid, MW for MW. Such net drawal reduction would fetch UI payment for the State from the regional UI pool account. The entire UI payment received from the regional account can be passed on to the renewable plant, in case the power injection by the renewable plant does not cause any increase in the transmission loss in intra-State system. However, the State utilities may not be interested in facilitating such injection of renewable energy into their grid, unless there is some gain for them as well. It is

very likely that the State utilities would want a compensation for incremental transmission losses, at least some sharing of transmission charges, and a reimbursement of extra efforts and expenses on account of metering, energy accounting, and handling of UI charges. In a progressive State, the SERC may be able to get the State utilities to be satisfied with a compensation of 4 – 5%, in which case it may be specified that the renewable plant would be paid @ 95% of the UI rate at State's periphery. In other States, the above payment may be @ 90%.

42. The developers of renewable energy plants have had an apprehension in the past that payment at UI rate (or 90-95% of UI rate on State's periphery) would not be remunerative. With the growing demand for power, and value being attached to continuous (or extended hours of) power supply, UI rates are bound to remain at a high level. This mode may therefore be more remunerative than the other modes. However, it does have an element of uncertainty, and it would be for the renewable plant developers to examine as to which mode would be more remunerative for their generation pattern. From the regulatory perspective, we should be opening up all possible routes, and letting the developer select the route he would like to take.

43. Harnessing renewable energy through Mode –5 could immensely help in mopping up additional electricity into the system in the present scenario of severe peaking shortages prevailing in most of the States. However, there are two possible counter arguments about harnessing renewable energy through UI mechanism. On the one hand, it is being said that revenues from UI would be uncertain not only because of variation in UI rate over a day but also due to likely change in power availability scenario in the long term. On the other hand, it is being apprehended that the renewable energy suppliers would make sizeable profits in the present period of shortages which is accompanied with rising UI rates over the years and there might be a tendency on the part of the renewable energy generators to get out of already concluded PPAs and to make profits through sale in UI. Regarding the uncertainties in revenues, it needs to be made clear that Mode-5

is only one of the options being proposed and the investor will have to judge the profitability and the likely risks. The likely concerns about huge profits which could be made through sale under UI would need two considerations. Firstly, the existing PPAs would need to be honoured in all circumstances and the route of sale under UI is being suggested only for the new power plants based through renewable energy sources. Secondly, level of subsidy, if any, for energy generation from renewable sources of energy would need to be continuously calibrated taking into account the possible revenues from UI stream and the costs of generation from difference sources of renewable energy. For this approach to be successful, subsidy should be linked to actual generation and not for capital investments. MNRE has recently adopted this approach in its scheme for supporting generation based on solar power.

MODE – 6

44. This mode, i.e. notional injection into the regional grid as unscheduled interchange, is not a preferred mode, but has been proposed only to kick start Mode-5. As of now, the renewable plant developers have little idea about the returns possible in Mode-5, and other implications of adopting this mode. The State utilities too have not shown any enthusiasm towards the idea, though they have nothing to lose as this solution will only mobilize extra power during shortages.

45. As mentioned earlier, the renewable energy plants because of their comparatively small size would be connecting into the intra-State grid of the State in which they are located. They should therefore be treated as a part of the intra-State system, and within the jurisdiction of the State organizations. However, the State grids are now fully integrated with the regional grids. We are therefore proposing that in case a renewable plant developer wants to inject power into the grid as UI, and the home State is not willing to take the power under Mode – 5, the developer would be allowed to opt for Mode – 6, in which the power generated by his plant would be considered as a notional injection into the regional grid. In other words, his plant would be treated as electrically outside the State. This special treatment is

proposed primarily to encourage setting up of renewable energy plants, and to maximize their injection into the grid.

46. In Mode – 6, the concerned RLDC shall be responsible for metering and UI accounting of the renewable energy plant, and its energy output shall be an additional infeed for the home State. It is proposed that for its net output, the renewable plant be paid at 90% of the UI rate on home State's periphery, from the regional UI pool account. It is further proposed that 8% of the UI rate, applied on the plant's net output, be paid to the State utilities toward wheeling charges and losses in intra-State system, and 2% be retained by RLDC for its related work in Mode – 6. (In Mode – 5, RLDCs do not come in picture, and energy accounting responsibility lies with SLDC, which would be justified in retaining 2% of the UI amount).

47. It is further proposed that Mode – 6 be adopted for not more than 10 – 12 renewable plants in each region, on first come first served basis, to demonstrate the benefits and viability of this model. It is expected that their feed back would suffice for general acceptance and adoption of Mode – 5 thereafter.

CONCLUDING REMARKS

48. Maximisation of electricity generation from renewable energy sources should be taken up as a national priority, and the present hurdles in its assimilation in the electricity grid should be overcome at the earliest. Towards this goal, it is proposed that all possible routes (Modes – 1 to 6 discussed in this paper, and any others which may be developed) be opened up, for the renewable energy developers to choose from. The small renewable energy plants, output of which could be accommodated on the existing inter-State transmission system, should be exempted from all inter-State open access charges, e.g. transmission/wheeling charge, scheduling fee, etc. Only a reactive energy charge may be applied by the

host utility, as per the reactive charge scheme specified in Indian Electricity Grid Code (IEGC), but there should be no other charge, e.g. standby charge, grid connection charge, etc. Any further encouragement that may be specified/offered by the State Regulatory Commission and State utilities would also be welcome.

49. As mentioned earlier, the focus of this discussion paper has been on finding solutions to the various problems presently being faced by developers of renewable energy generation, by providing them more options regarding sale of their output. As for tariff for renewable energy in Modes – 1 and 2, many State Commissions have already done considerable work. They may also consider the Consultation Paper (March 2007) on "Pricing of power from Non-Conventional Sources" prepared by TERI under a study entrusted to them by CERC. The consultation paper is also being uploaded on the Commission's website for general dissemination. It complements this discussion paper by covering various related aspects like legislation and policies, international practices, review of SERCs' tariff orders, analysis of pricing options, suggested pricing strategy, etc.

50. One of the accepted approaches for pricing of renewable energy, as per TERI's consultation paper, is short-run marginal cost (SRMC). TERI has gone on to state as follows : "the UI charges can be used as an approximation of short run marginal cost and thus technically this could be the best available option for treating the purchase from any non-firm power." It has further suggested that while applying UI charges to non-conventional energy, its impact on viability of the project and its impact on the grid should be critically analyzed.

51. Modes – 5 and 6 are in line with the above quoted observation. The impact on project viability is an aspect for the project developer to take care of while opting for these modes. As for the impact on the grid, it may be pointed out that renewable energy is to be absorbed in the grid on must-take (non-dispatchable) basis, and therefore its pricing approach would make no difference.

52. The issues relating to minimum percentage of power procurement from renewable sources, renewable credits, share of different renewable sources in such percentage, feasibility of renewable credits, sharing CDM benefits, etc. are proposed to be discussed separately in the Forum of Regulators (FOR) for harmonization of approach between different States.

Annexure-I

TARIFF OF RENEWABLE SOURCE OF ENERGY IN STATES

<table>
<tr><th>S. No.</th><th>SERC</th><th>Tariff</th></tr>
<tr><td>1.</td><td>APERC</td><td>
<table>
<tr><th>NCE Source</th><th>Variable charges (Rs./kWh)</th></tr>
<tr><td>Biomass</td><td>2.87</td></tr>
<tr><td>Bagasse</td><td>2.71</td></tr>
<tr><td>Municipal Waste to Energy</td><td>3.59</td></tr>
<tr><td>Industrial Waste to Energy</td><td>2.96</td></tr>
<tr><td>Wind Power</td><td>3.31</td></tr>
<tr><td>Mini Hydel</td><td>2.20</td></tr>
<tr><td>NCL Energy Ltd.</td><td>1.78</td></tr>
</table>
Rates acc. to Tariff Order 2006-07
</td></tr>
<tr><td>2.</td><td>CSERC</td><td>(1) Biomass plants - Rs.2.67 to 2.98 per unit (provisions for review after 3 yrs).
(2) Tariff Order issued for small hydro generating stations.</td></tr>
<tr><td>3.</td><td>GERC</td><td>Wind - Rs.3.37/unit (fixed for 20 yrs)
Bagasse based Cogen plants-Rs. 3.00/unit
Biomass gasification based plants-Rs. 3.08/unit</td></tr>
<tr><td>4.</td><td>HERC</td><td>
<table>
<tr><td></td><td>Wind</td><td>Mini Hydel (upto 2 MW)</td><td>Biomass</td><td>Bagasse (Co-generation)</td></tr>
<tr><td>Tariff (Rs./kWh) (For base year FY 2007-08)</td><td>4.08</td><td>3.67</td><td>4.0</td><td>3.74</td></tr>
<tr><td>Annual escalation from 2008-09</td><td>1.5%</td><td>1.5%</td><td>2.0%</td><td>2.0%</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><td>5.</td><td>HPERC</td><td>Levelised tariff for the 40 years of commercial operation of SHPs at Rs.2.87/Unit.</td></tr>
<tr><td>6.</td><td>KERC</td><td>(1) Mini hydel – Rs.2.80/unit, without escalations
(2) Wind – Rs.3.40/unit, without escalations
(3) Biomass – Rs.2.85/unit, with 2% simple annual escalations.
(4) Co-gen – Rs.2.80/unit, with 2% simple annual escalations.</td></tr>
<tr><td>7.</td><td>KSERC</td><td>Wind : Rs. 3.14 (Levelised)
Small Hydro : Rs. 2.44 (Levelised)</td></tr>
<tr><td>8.</td><td>MPERC</td><td>(i) Wind: The tariff order dt. 11/06/04 for a period of three year had already been issued which is as follows:
1) Existing Wind generators: existing agreement @ Rs.2.25/unit & after expiry of the agreement Rs.2.87/unit.
2) New Wind generators:
1st yr – Rs.3.97/unit, 2nd yr – Rs.3.80/unit, 3rd yr – Rs.3.63/unit
4th yr – Rs.3.46/unit, 5th yr & onwards up to the 20th yr – Rs.3.30/unit.
(ii) Bio Mass: Tariff (Rs./Unit)
<table>
<tr><th>Year</th><th>Tariff</th><th>Year</th><th>Tariff</th><th>Year</th><th>Tariff</th></tr>
<tr><td>1</td><td>3.33</td><td>8</td><td>3.65</td><td>15</td><td>4.15</td></tr>
<tr><td>2</td><td>3.36</td><td>9</td><td>3.71</td><td>16</td><td>4.33</td></tr>
<tr><td>3</td><td>3.39</td><td>10</td><td>3.79</td><td>17</td><td>4.52</td></tr>
<tr><td>4</td><td>3.43</td><td>11</td><td>3.51</td><td>18</td><td>4.71</td></tr>
<tr><td>5</td><td>3.48</td><td>12</td><td>3.65</td><td>19</td><td>4.92</td></tr>
<tr><td>6</td><td>3.53</td><td>13</td><td>3.81</td><td>20</td><td>5.14</td></tr>
<tr><td>7</td><td>3.59</td><td>14</td><td>3.97</td><td></td><td></td></tr>
</table></td></tr>
<tr><td>9.</td><td>MERC</td><td>
<table>
<tr><th>NCE Source</th><th>Variable charges (Rs./kWh)</th><th>Escalation</th></tr>
<tr><td>Bagasse based Cogeneration</td><td>Rs. 3.05 (Rs./kWh)</td><td>2 % per annum for 13 years</td></tr>
<tr><td>Wind Energy</td><td>Rs.3.50 (Rs./kWh)</td><td>Rs.0.15/unit per annum</td></tr>
<tr><td>Small Hydel</td><td>Rs.2.84 (Rs./kWh)</td><td>Rs.0.03 per annum for 13 years</td></tr>
<tr><td>Biomass</td><td>Rs. 3.04 (Rs./kWh)</td><td>2% per annum for 13 years</td></tr>
</table></td></tr>
<tr><td>10.</td><td>Punjab Govt. Policy Direction</td><td>a) Mini/Micro Hydel Projects – Rs.3.49 per unit (Base year 2006-07) with five annual escalation @ 3% upto 2011-12.
b) Baggasse/Biomass Cogeneration Projects – Rs.3.49 per unit (Base year 2006-07) with five annual escalation @ 3% upto 2011-12.
c) Biomass Power Projects – Rs.3.49 per unit (Base year 2006-07) with five annual escalation @ 5% upto 2011-12.
d) Power Generation from Urban, Municipal and Industrial Liquid/Solid Base – Rs.3.49 per unit (Base year 2006-07) with five annual escalation @ 5% upto 2011-12.</td></tr>
</table>

		e) Power Generation from Solar Energy – Rs.7.00 per unit (Base year 2006-07) with five annual escalation @ 5% upto 2011-12. **f) Wind Power Projects –** Rs.3.49 per unit (Base year 2006-07) with five annual escalation @ 5% upto 2011-12.
11.	RERC	(1) Tariff for Wind Power: For Jaiselmer, Barmer & Jodhpur District: Levelised tariff of Rs. 3.60 at 33 KV or 11 KV and Rs.3.71/KWh at EHV for 20 years at 10.6% discount factor. For other Districts: Levelised tariff of Rs. 3.78 at 33 KV or 11 KV and Rs/3.89 /KWh at EHV for 20 years at 10.6% discount factor. (2) Bio-Mass: Levelised tariff of Rs. 4.17/KWh for water cooled and Rs. 4.55/KWh for air cooled plants for 20 years at 10.6% discount factor.
12.	TNERC	(1) Wind mills (commissioned and agreement executed prior to 15-05-06 but renegotiated after 15.5.2006) - Rs.2.75/unit (2) Wind mills (commissioned and agreement executed after 15-05-06) – Rs.2.90/unit (3) Biomass Plants – Rs.3.15/ unit (4) Bagasse based Cogen – Rs.3.15/unit
13.	UERC	Up to 1MW – SHP normative tariff on pooled rate of CGS supply. 1MW-25MW – hydro, determined on cost plus based on regulations.
14.	UPERC	Tariff for Biomass/Bagasse based Co-gen: For 5 years starting at Rs.2.92/KWh for 2005-06 Mini/Micro hydel power plants will be based on its year of commissioning and year of operation. For other Non conventional and renewable sources tariff would be Rs. 2.50/Unit for 2005-06 with an escalation of 4% per annum for subsequent years without compounding.
15.	WBERC	(1) Biomass - Rs. 3.35/unit (2) Wind - Rs.4/unit (3) Small Hydel - =Rs. 3.6/ unit (validfor 3 yrs w.e.f May 2006)

Annexure-II

CENTRAL FINANCIAL ASSISTANCE PROVIDED UNDER VARIOUS RENEWABLE ENERGY SCHEMES/ PROGRAMMES (Ref. www.mnes.nic.in)

I. Grid-interactive power programme

Renewable Source	Special Category States (NE Region, Sikkim, J&K, HP & Uttaranchal)	Other States
Small Hydro Power projects	Rs.2.25 crore X (C)^0.646	Rs.1.50 crore X (C)^0.646
Biomass Power projects	Rs.25 lakh X (C)^0.646	Rs.20 lakh X (C)^0.646
Bagasse Co-generation projects by private sector 40 bar & above	Rs.18 lakh X (C)^0.646	Rs.15 lakh X (C)^0.646
Bagasse Co-generation projects by cooperative/ public/joint sector 40 bar & above 60 bar & above 80 bar & above	Rs.40 lakh/MW Rs.50 lakh/MW Rs.60 lakh/MW (maximum support Rs.8.0 crore per project)	Rs.40lakh/MW Rs.50 lakh/MW Rs.60 lakh/MW (maximum support Rs.8.0 crore per project)
Biomass Power using Advanced Technologies	Rs.1.2 crore X (C)^0.646	Rs.1.0 crore X (C)^0.646
Wind Power projects	Rs.3.00 crore X (C)^0.646	Rs.2.50 crore X (C)^0.646

C - Capacity of the project in MW; ^: raised to the power

* *For new sugar mills (which are yet to start production and sugar mills employing backpressure route/seasonal/incidental cogeneration) subsidies shall be one-half of the level mentioned above.*

II. Off-grid renewable energy programmes:

S. No.	Programmes/Sector	Subsidy
1.	**Small aero-generators and hybrid systems**	75% of ex-works cost or Rs.2.00 lakh/kW, whichever is less, in other areas, for government community use. 50% of ex-works cost or Rs.1.25 lakh/kW, whichever is less, for all other users
2.	**Family Type biogas plants**	
	NE Region States including Sikkim (except plain areas of Assam)	Rs.11,700 for 1 cum.
	Plain areas of Assam	Rs.9,000 1 cum.
	J&K, Himachal Pradesh , Uttaranchal (excluding terai region), Nilgiris of Tamil Nadu, Sadar Kursoong and Kalimkpong sub-divisions of Darjeeling, Sunderbans, A&N Islands	Rs.4,500 (limited to Rs.3,500/- for 1 cum. fixed dome type plant)
	Scheduled Caste, Scheduled Tribe desert districts, small and marginal farmers, landless laborers, terai region of Uttaranchal, Western Ghats and other notified hilly areas.	Rs.3,500 (limited to Rs. 2,800/- for 1 cum. fixed dome type plant)
	All Others	Rs.2,700 (limited to Rs. 2,100/- for 1 cum. fixed dome type plant)

3 (i).	**Biomass Gasifiers for rural areas**	Rs.1.50 lakh/100 kWe - for thermal and electro-mechanical applications (with dual fuel engine)Rs.15.00 lakh/100 kWe - for power generation upto 1MW (with 100% producer gas engine) 20% higher subsidy for Special Category States & Islands
(ii)	**Biomass gasifier for industrial applications**	Rs.2.00 lakh/300 kWe for thermal applications Rs.2.50 lakh/100 kWe with dual fuel engine Rs.10.00 lakh/100 kWe with 100% producer gas engine Rs.15.00 lakh/100 kWe with 100% producer gas engine in institutions
4.	**Industrial Waste-to-Energy projects**	Rs.50.00 lakh to Rs.1.00 crore/ MWe, depending on technology. (20% higher subsidy for Special Category States)
5.	**Solar Photovoltaic (SPV)**	
	SPV lanterns	Rs.2,400 for NE and special areas; nil for other
	SPV home lighting systems.	Rs.4500 to 8,600 for NE and special areas, and Rs.2500 to 4,800 for general areas, depending on model
	SPV street lighting systems	Rs.17,300 for NE and special areas Rs.9,600 for general areas
	SPV standalone power plant of capacity > 1 kW_p	Rs.2,25,000/kWp for NE and special areas Rs.1,25,00/kWp for general areas
	SPV standalone power plant of capacity > 10 kW_p	Rs.2,70,000/kW_p for NE and special areas Rs.1,50,000/kW_p for general areas
6.	**Solar Photovoltaic (SPV) Applications in Urban Areas :**	
	SPV streetlight control systems	25% of cost subject to a max. of Rs.5000/-
	SPV steet/public garden lights (74/75 Wp modules).	50% of cost subject to a max. of Rs.10,000/- & Rs.12,000/- for 11 W and 18 W CFL respectively.
	SPV illuminated hoardings (with maximum $_{1kWp}$ SPV	50% cost subject to a max. of Rs.15,000/100 Wp modules

	module) SPV road studs SPV blinkers (minimum 37 Wp modules) SPV traffic signals (minimum 500 Wp modules) SPV power packs (maximum 1 k Wp module)	 50% of cost subject to a max. of Rs.1000/- 50% of cost subject to a max. of Rs.7,500/- 50% of cost subject to a max. of Rs.2.5 lakh 50% of cost subject to a max. Rs.1.00 lakh per kWp
7.	**SPV water pumping systems**	Rs.30/ Wp of SPV array used, subject to a max. of Rs.50,000/- per system.
8.	**Solar Thermal systems/devices**	Box type cookers: Incentive to SNA: - Rs.200 per cooker of ISI brand - Rs.100 per cooker of non-ISI brand - Upto Rs.1.50 lakh for publicity/workshops etc. - Support to manufacturers : reimbursement of 50% fees for obtaining BIS approval. Solar Water Heating systems: - Subsidized Loan @2% to domestic users, 3% to institutions and 5% to community users plus Rs.100/square meter of collector area as incentive to motivator. - Capital subsidy @ Rs.825/1100 per sqm. To commercial establishments/institutions. Solar Air Heating/Steam Generating Systems: Capital subsidy @ 35-50% of the cost subject to certain ceilings. Dish / community type solar cookers: 50% of cost limited to Rs.2,500 for dish type cookers and Rs.25,000 for Scheffler/community type cooker.
9.	**Akshay Urja Shops**	Subsidized loan @ 7% upto Rs.10 lakh and performance based grant & incentive upto Rs.10,000 per month.

III. Remote Village Electrification programme :

1.	**Remote Village Electrification**	90% of the costs of electricity generation systems subject to pre-specified maximum and the following ceilings: - Rs.18,000 per household for distributed generation systems, and - Rs.11,250 per household for SPV home-lighting systems.

Extract from "Guidelines for Generation based Incentive for Grid Interactive Solar Power Generation Projects":

- The Ministry may provide, through IREDA, a generation-based incentive of a maximum of Rs.12 per kWh to the eligible projects which are commissioned by 31st December, 2009, after taking in account the power purchase rate (per kWh) provided by the State Electricity Regulatory Commission or utility for that project.

- The maximum amount of generation based incentive applicable for a project will be determined after deducting the power purchase rate for which PPA has been signed by the utility with a project developer, from a notional amount of Rs.15 per kWh. In all cases the maximum amount of generation-based incentive shall not exceed Rs.12 per kWh.

TERI REPORT

to CERC

on

Pricing of power from Non-Conventional Sources