

TAMIL NADU ELECTRICITY REGULATORY COMMISSION

Consultative Paper on “Comprehensive Tariff Order on Wind Energy”

(Comments/Suggestions are invited on or before 27 -10-2014)

1. Need for the Consultative paper

The Commission’s “comprehensive tariff order on wind energy” was last issued on 31-07-2012. In the said order the Commission adopted a control period of two years. The next tariff revision would have normally been due on 01-08-2014. Therefore the Commission proposes to issue a “Comprehensive Tariff Order on Wind Energy” for the next control period for purchase of wind energy by distribution licensee in the State and to deal with other related issues. The Commission has prepared this consultative paper to elicit the views and suggestions of the stake holders.

2. Legal provisions

2.1. Related Provisions of Electricity Act, 2003

Relevant provisions of Electricity Act, 2003 are reproduced below.

“Section 3(1): The Central Government shall, from time to time, prepare the National Electricity Policy and tariff policy, in consultation with the State Governments and the Authority for development of the power system based on optimal utilisation of resources such as coal, natural gas, nuclear substances or materials, hydro and renewable sources of energy.

Section 61: The Appropriate Commission shall, subject to the provisions of this Act, specify the terms and conditions for the determination of tariff, and in doing so, shall be guided by the following namely

.....

(h) the promotion of cogeneration and generation of electricity from renewable sources of energy;

(i) the National Electricity Policy and Tariff Policy.

Section 62(1): The appropriate Commission shall determine the tariff in accordance with the provisions of this Act for –

(a) Supply of electricity by a generating company to a distribution licensee:

Section 62(2): The appropriate Commission may require a licensee or a generating company to furnish separate details, as may be specified in respect of generation, transmission and distribution for determination of tariff.

Section 62(5): The Commission may require a licensee or a generating company to comply with such procedures as may be specified for calculating the expected revenues from the tariff and charges which he or it is permitted to recover.

Section 63: Notwithstanding anything contained in section 62, the Appropriate Commission shall adopt the tariff if such tariff has been determined through transparent process of bidding in accordance with the guidelines issued by the Central Government.

Section 86(1)(e): The State Commission shall 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;”

2.2. Related Provisions of National Electricity Policy

Relevant provisions of National Electricity Policy are reproduced below:

“Section 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.

Section 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.”

2.3. Related Provisions of Tariff Policy:

Relevant provisions of Tariff Policy are reproduced below.

“Para 6.4 “(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.

(i) Within the percentage so made applicable, to start with, the SERCs shall also reserve a minimum percentage for purchase of solar energy from the date of notification in the Official Gazette which will go up to 0.25% by the end of 2012-2013 and further up to 3% by 2022.

(ii) It is desirable that purchase of energy from non-conventional sources of energy takes place more or less in the same proportion in different States. To achieve this objective in the current scenario of large availability of such resources only in certain parts of the country, an appropriate mechanism such as Renewable Energy Certificate (REC) would need to be evolved. Through such a mechanism, the renewable energy based generation companies can sell the electricity to local distribution licensee at the rates for conventional companies and can recover the balance cost by selling certificates to other distribution companies and obligated entities enabling the latter to meet their renewable power purchase obligations. In view of the comparatively higher cost of electricity from solar energy currently, the REC mechanism should also have a solar specific REC.

(iii) 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.”

2.4. Commission's Regulations on Power Procurement from New and Renewable Sources:

2.4.1. This consultative paper has been prepared in consonance with Commission's "Power Procurement from New and Renewable Sources of Energy Regulations 2008" notified on 8.02.2008 as amended from time to time.

2.4.2. Commission's Wind Order No. 6 dated 31-07-2012 was challenged in the APTEL vide Appeal No.197 of 2012 and others. Hon'ble APTEL in its order dated 24-05-2013 on the said Appeals has remanded the following matters and has given directions to the Commission:

- (1) **Circulation of Consultative paper prior to issuing the tariff order:** The matter is remanded for reconsideration of the issues where the Appellants have to be heard by the Commission.
- (2) **Annual Maintenance Contract Charges and Insurance Charges:** State Commission to allow the same O&M charges and insurance charges as a percentage of Capital Cost as decided in the previous tariff order dated 20.3.2009.
- (3) **Plant Load Factor/Capacity Utilisation Factor:** TANGEDCO and TANTRANSCO to appropriately augment the transmission and distribution system to avoid loss of generation due to inadequate power evacuation infrastructure from wind energy projects. TANGEDCO and TANTRANSCO are also directed to file an affidavit in this regard before the State Commission indicating the extent of the problem, identification of weak areas in transmission system affecting evacuation from wind generators, remedial measures proposed and schedule of implementation of the preventive measures within three months from the date of this Judgment. The State Commission is directed to consider those details contained in the said Affidavit and pass appropriate order after hearing the parties on this issue.

- (4) **Abnormal Rise of Banking Charges:** The findings of the State Commission on this issue are set aside. The State Commission is directed to reconsider the computation of the charges after hearing the stakeholders and decide the issue afresh keeping in view the observations made by this Tribunal in Appeal No.98 of 2010.
- (5) **Deemed Demand Charges:** We set aside the order of the State Commission and remand the matter to the State Commission for reconsideration after giving opportunity to all the persons concerned and in the light of the earlier tariff orders.
- (6) **Encashment or lapsed Units by REC Captive users:** The findings of the State Commission on this issue are set aside and the matter is remanded back to the State Commission with directions to hear all the parties concerned and decide the issue in the light of the judgment rendered by this Tribunal in Appeal No. 45 and 91 of 2012.

2.4.3. Hearing on the the above matters are yet to be completed by the Commission. However, the Commission considers that every order is an independent order. Accordingly the Commission proposes parameters for the next tariff order on wind energy in this consultative paper and invites comments from the stakeholders.

3. Power position in Tamil Nadu

3.1. The generating capacity connected to the Tamil Nadu's grid including the allocation from Central Generating stations is 12909.10 MW as on 31-05-2014 comprising of 4,660 MW from TANGEDCO's four thermal stations, 516 MW from four gas turbine stations, 2284 MW from hydro stations, 1154 MW from private generating stations, 68 MW as contribution to Tamil Nadu grid by sale of electricity from captive generating and biomass plants, 4177.10 MW as Tamil

Nadu's share from central generating stations and 50 MW as external assistance.

3. 2. Generating capacity from privately owned wind farms is 7262 MW as on 31-05-2014. The installed capacity of cogeneration plants is 659.4 MW and biomass power projects is 215.40 MW. The solar generation capacity is 107.20 MW.

3.3 The restriction and control in electricity supply has been lifted with effect from 01-06-2014 in the state. The present demand of power in the state is around 13,000 – 13,500 MW. It is expected to go upto 14,500 MW by the end of 2014-15. This demand will be met by the generation from the existing power stations and power from projects to be commissioned in the year 2014-15. In addition to the above, TANGEDCO will make long term, medium term and short term power purchase as and when required.

4. Wind Power Scenario

4.1 Total installed capacity of power generation in the country is 2,28,722 MW as on 31-03-2014 out of which the contribution of NCES power to the country's installed capacity is around 31,707 MW. As on 31-05-2014, the total installed capacity of wind power in Tamil Nadu is 7,262 MW. As on 31-03-2014, the wind power represents 21,136 MW in the country. The installed capacity of wind power in different States as on 31-04-2013 is furnished below:

State	Installed Capacity (MW)	Percentage to the total installed capacity
Andhra Pradesh	471	2.43%
Gujarat	3196	16.51%
Karnataka	2149	11.10%
Kerala	55	0.80%

Madhya Pradesh	395	2.04%
Maharashtra	3107	16.05%
Rajasthan	2721	14.06%
Tamil Nadu	*7163	37.00%
TOTAL	19357	100.00%

Source: Indian Wind Turbine Manufacturers Assn.

* The wind energy installed capacity in Tamil Nadu was 7262 MW as on 31-05-2014

4.2. Tamil Nadu accounted for 37% of the wind energy over the country's installed capacity as on 31-04-2013. The following locations are endowed with favourable wind flow:-

Name of the Passes/Districts	Area
Palghat	Coimbatore, Erode and Dindigul
Shencottah	Tirunelveli and Tuticorin
Aralvoimozhi	Kanyakumari, Radhapuram and Muppandal
Theni District	Theni, Cumbum and Andipatty
Sea coast	Uvari, Tuticorin, Rameswaram, Poompuhar and Ennore

4.3. The year wise capacity addition in Tamil Nadu is furnished below:

Year	Capacity addition (MW)
Up to 1998-99	725
1999-00	46
2000-01	42
2001-02	44
2002-03	133

2003-04	371
2004-05	679
2005-06	858
2006-07	578
2007-08	381
2008-09	431
2009-10	602
2010-11	997
2011-12	1083
2012-13	175
2013-14	107
2014-15(Up to May)	10
Total as on 31-05-2014	7262

(Source: TANGEDCO)

5. Applicability of the proposed order

5.1 The Order shall come into force from the date of its issue. The tariff as approved in this order is applicable for purchase of wind energy by the Distribution Licensee from WEGs confirming to this order during the control period. The open access charges and other terms and conditions specified in the proposed order shall be applicable to all the wind energy generators, irrespective of their date of commissioning.

6. Tariff Determination Process

6.1 With regard to tariff determination process, the relevant portion of Regulation 4 of the Power Procurement from New and Renewable Sources of Energy Regulation, 2008 is reproduced below:

“(1) The Commission shall follow the process mentioned below for the determination of tariff for the power from new and renewable sources based generators, namely;-

- a) initiating the process of fixing the tariff either suo motu or on an application filed by the distribution licensee or by the generator.*
- b) inviting public response on the suo motu proceedings or on the application filed by the distribution licensee or by the generator.*
- c) (Omitted)*
- d) issuing general / specific tariff order for purchase of power from new and renewable sources based generators.”*

7. Tariff / Pricing Methodology

7.1 Tariff / Pricing Methodology specified in Regulation 4 of the Power Procurement from New and Renewable Sources of Energy Regulation, 2008 is reproduced below.

“(2) While deciding the tariff for power purchase by distribution licensee from new and renewable sources based generators, the Commission shall, as far as possible, be guided by the principles and methodologies specified by:

- (a) Central Electricity Regulatory Commission*
- (b) National Electricity Policy*
- (c) Tariff Policy issued by the Government of India*
- (d) Rural Electrification Policy*
- (e) Forum of Regulators (FOR)*
- (f) Central and State Governments*

(3) The Commission shall, by a general or specific order, determine the tariff for the purchase of power from each kind of new and renewable sources based generators by the distribution licensee.

Provided where the tariff has been determined by following transparent process of bidding in accordance with the guidelines issued by the Central Government, as provided under section 63 of the Act, the Commission shall adopt such tariff.

(4) While determining the tariff, the Commission may, to the extent possible consider to permit an allowance / disincentive based on technology, fuel, market risk, environmental benefits and social impact etc., of each type of new and renewable source.

(5) While determining the tariff, the Commission shall adopt appropriate financial and operational parameters.

(6) While determining the tariff the Commission may adopt appropriate tariff methodology.”

The Commission has proposed to follow the tariff methodology as specified in the said Regulation.

7.2. Project specific or Generalized Tariff

7.2.1. A generalized tariff mechanism would provide incentive to the investors for use of most efficient equipment to maximize returns and for selecting the suitable site while a project-specific tariff would provide each investor, irrespective of the machine type, the stipulated return on equity which, in effect, would shield the investor from the uncertainties involved. This order mainly provides for power purchase by distribution licensees for their Renewable Purchase Obligation (RPO) compliance as specified in the Commission’s Regulations. The wind mills in the State have mostly adopted similar technology with minor modifications. Hence the Commission decides to issue a generalized tariff order for wind energy projects.

7.3. Preferential Tariff vs. Bidding

7.3.1 At this juncture it is relevant to discuss the following stipulations of National Tariff Policy, which are reproduced below:

***Section 6.4(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.*

***Section 6.4(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.

7.3.2. As on date, installed capacity of the WEGs is around 54% of the total installed capacity of the TANGEDCO. Wind energy contributes around 25% in terms of demand and energy during the wind season. The comparison of wind energy tariff and that of the conventional power in the state clearly shows that the wind energy in the state is in a position to compete with power from conventional sources as specified in section 6.4 of the tariff policy. However the Government of India has not issued any bidding guidelines for NCES power procurement as on date as specified in section 63 of the Electricity Act 2003. Further, Hon'ble APTEL's order on appeal No. 129 of 2005 on the subject of competitive bidding for procurement of power from NCES issued on 14-05-2007 has been stayed by the Hon'ble Supreme Court by its order dated 26-11-2011 passed in Civil Appeal No.D 26531 of 2007. Hence, the Commission decides to continue the present system of preferential tariff for determination of wind tariff for this control period.

7.4. Single Part Tariff vs. Two Part Tariff

Two-part tariff is generally adopted when the variable component is significant. In the case of wind energy generation, wind being the motive force, variable generation cost is nil. Reduction in capacity utilization and variation in operation, maintenance and insurance cost could be taken care of by adopting suitable parameters. Therefore, the Commission proposes to continue with the single-part tariff for wind energy generation in accordance with Clause 4.6 of Power Procurement from New and Renewable Energy Sources Regulations 2008.

7.5. Cost plus, single part, average tariff

7.5.1. The Commission's earlier orders have adopted "cost plus single part average tariff". Tariff order No.3 dated 15-05-2006 was challenged by Wind Power Producers Association before the Hon'ble Appellate Tribunal for Electricity

(ATE). The ATE in its order dated 18-12-2007 against the appeal No 205/2006 and 235/2006 have directed the Commission that “the tariff for the wind power producers be re-determined within the next two months by taking into consideration the time value of money”. The order of the ATE was challenged by the erstwhile TNEB and the Commission before the Hon’ble Supreme Court and the Hon’ble Supreme Court had granted stay on ATE’s order in its order dated 03-03-2008. Therefore, the Commission decides to continue with the present methodology of cost plus, single part, average tariff.

8. Tariff Components

8.1 The Commission has carried out a detailed analysis of the existing policies/procedures and commercial mechanisms in respect of wind power generation. The tariff determined in a cost plus scenario, would depend significantly on the following operating and financial parameters:

1. Capital investment
2. Capacity Utilization Factor
3. Operation and maintenance expenses
4. Term of Loan and Interest
5. Life of plant and machinery
6. Return on equity
7. Debt-equity ratio
8. Depreciation rate applicable
9. Auxiliary consumption
10. Interest on Working Capital

8.2. Capital Investment

8.2.1. The CERC in its order dated 15-05-2014 has fixed a Capital cost of Rs. 6.04 Crores/MW in respect of Wind Energy Projects which is inclusive of the

power evacuation cost. The Capital Costs adopted by the other Commissions including the CERC are tabulated below:

Sl. No	Agencies	Reference	Capital cost Rs. Crores/MW
1.	CERC	Order dt.15-05-2014	6.04
2.	GERC	Order No.1/2012	6.06
3.	RERC	Draft Order dated 29-05-2014	5.65
4.	MERC	Draft Order dated 06-05-2014	5.75

8.2.2. Commission in the last tariff order fixed a capital cost of Rs.5.75 Crores. Commission proposes to consider a capital cost of Rs.6.04 Crores/ MW.

8.3. Capacity Utilization factor (CUF)

8.3.1. Commission has adopted a CUF of 27.15% in the last tariff order. Though the new wind sites are considered to be second grade locations, the Commission observes that the new wind machines are technically advanced, more efficient, can run even at low speed with higher hub heights. Therefore, the Commission decides to retain the present CUF of 27.15% for the new machines also for this control period.

8.4. Operation and Maintenance Cost (O&M Cost)

8.4.1. The O&M cost adopted by other entities are tabulated below:

Sl. No	Agencies	Reference	Operation and Maintenance Cost
1.	CERC	Order dt.15-05-2014	Rs.10.05 lakhs/MW (1.66% of capital cost) for the 1 st year of

			operation with escalation of 5.72% p.a.
2.	GERC	Order No.1/2012	Rs.8.00 lakhs/MW for the 1 st year of operation with escalation of 5.72% p.a.
3.	RERC	Draft Order dated 29-05-2014	Rs.7.87 lakhs/MW for the 1 st year of operation with escalation of 5.85% p.a.
4.	MERC	Draft Order dated 06-05-2014	Rs.8.58 lakhs/MW for the 1 st year of operation with escalation of 5.72% p.a.

8.4.2. The Commission decides to adopt an O&M expense of 1.1% on 85% of Capital investment and 0.22% on 15% of the Capital investment with an escalation of 5% from second year onwards in this order as adopted in the Wind Order issued in 2009.

8.5. Insurance cost

8.5.1. In the last Wind Order, insurance cost has been included in the O&M Cost. The Commission decides to adopt in this order an insurance cost of 0.75% on the plant and machinery which is 85% of the Capital Cost for the first year and to reduce by 0.5% every year as adopted in the Wind Order issued in 2009.

8.6. Debt-equity ratio

8.6.1. The Tariff Policy lays down a debt equity ratio of 70: 30 for power projects. The Commission has proposed to adopt this ratio as specified in its Tariff Regulations 2005 and as adopted in the earlier Orders on new and renewable power.

8.7. Term of the Loan

8.7.1 The terms of loan adopted by different entities are tabulated below:

Sl. No	Agencies	Reference	Term of the Loan
1.	CERC	Order dt.15-05-2014	12 years
2.	GERC	Order No.1/2012	10 years
3.	RERC	Draft Order dated 29-05-2014	12 years
4.	MERC	Draft Order dated 06-05-2014	10 years

8.7.2 The Commission proposes to adopt the term as 10 years with 1 year moratorium as adopted by the Commission in its previous orders on Wind, Bagasse and Bio-mass power.

8.8. Rate of Interest

8.8.1 The CERC has adopted the normative interest rate as average State Bank of India (SBI) Base rate prevalent during the first six months of the previous year plus 300 basis points which is equivalent to interest rate of 12.70%. The rate of interest adopted by various entities is tabulated below:

Sl. No	Agencies	Reference	Rate of Interest
1.	CERC	Order dt.15-05-2014	12.70%
2.	GERC	Order No.1/2012	13.00%
3.	RERC	Draft Order dated 29-05-2014	12.71%
4.	MERC	Draft Order dated 06-05-2014	12.78%

8.8.2. The Commission decides to consider 12.70% of interest rate on loan with ten years pay back period.

8.9. Life of Plant and machinery

8.9.1 The Commission has adopted a life period of 20 years in the last tariff order. CERC, GERC, RERC and MERC have adopted a life period of 25 years for the wind power projects. The Commission proposes a life period of 25 years for this order.

8.10. Interest and components of Working Capital

8.10.1. The interest on working capital adopted by various entities is tabulated below:

Sl. No	Agencies	Reference	Interest on Working Capital
1.	CERC	Order dt.15-05-2014	13.20%
2.	GERC	Order No.1/2012	12.00%
3.	RERC	Draft Order dated 29-05-2014	12.21%
4.	MERC	Draft Order dated 06-05-2014	13.28%

8.10.2. CERC has adopted Operation & Maintenance expenses for one month, Receivables equivalent to 2 (Two) months of energy charges for sale of electricity calculated on the normative CUF and Maintenance spare @ 15% of operation and maintenance expenses in their latest order. It has adopted an interest rate of 13.20%.

8.10.3. The Commission decides to consider one month Operation & Maintenance cost and two months receivables as working capital components and an interest rate of 13.20% for the working capital.

8.11. Return on Equity (RoE)

8.11.1. The RoE adopted by the CERC and other Commissions are tabulated below.

Sl. No	Agencies	Reference	Return on Equity
1.	CERC	Order dt.15-05-2014	20% per annum for the first 10 years and 24% per annum from 11th years onwards
2.	GERC	Order No.1/2012	14% and MAT and corporate tax
3.	RERC	Draft Order dated 29-05-2014	16%
4.	MERC	Draft Order dated 06-05-2014	19% per annum for the first 10 years and 24% per annum from 11th years onwards

8.11.2. The Tariff Regulations of the Commission stipulates 14% post tax RoE for conventional fuel based generating stations. With the objective of promoting renewable energy, Commission in its renewable energy (RE) Tariff Orders issued during 2009 has adopted 19.85% pre-tax return on equity, wherein the RoE was adopted linking it to MAT and IT. Since these factors are changing frequently, the Commission in its RE tariff orders issued in 2012, adopted a RoE of 19.85% without linking to MAT and IT. Now it is proposed to adopt a RoE of 20% (pre tax) per annum for WEG without linking it to MAT and IT.

8.12. Depreciation

8.12.1. The depreciation rates adopted by the CERC and other Commissions are tabulated below.

Sl. No	Agencies	Reference	Depreciation Rate
1.	CERC	Order dt.15-05-2014	5.83 % per annum for initial period of 12 years and 1.54% from 13 th year onwards.
2.	GERC	Order No.1/2012	6% for the first 10 years and 2% from 11 to 25 years
3.	RERC	Draft Order dated 29-05-2014	5.83% for the first 12 years and from 13th year onwards, the remaining depreciable value has been spread over the balance useful life
4.	MERC	Draft Order dated 06-05-2014	7% for the first 10 years and 1.33% from 11 th year onwards

8.12.2. The Commission in its Orders on Wind, Bio-mass and Bagasse based energy issued during the year 2012 has depreciated the value of plant and machinery to 90% of the initial value for the life period using the straight line method. This translates into a rate of 3.6% per annum. The depreciation was calculated on 85% of the capital investment. The Commission proposes to adopt the same method in this Order for the life period of 25 years.

8.13. Tariff Determinants

8.13.1. The financial and operational parameters in respect of Wind Power projects proposed in the paper are tabulated below:

Tariff Components	Values
Capital cost	Rs. 6.04 Crores/MW
CUF	27.15%
Operation and maintenance expenses	1.1% on 85% of Capital investment and 0.22% on 15% of the Capital investment with an escalation of 5%
Insurance	0.75% on 85% of the Capital Cost for the first year and to be reduced by 0.5% every year
Life of plant and machinery	25 years
Term of Loan	10 years with 1 year moratorium period
Interest on loan	12.70%
Working Capital components	one month O&M cost and two months receivables
Interest on working capital	13.20%
Return on equity	20% (pre-tax) per annum without linking it to MAT and IT
Debt-equity ratio	70:30
Depreciation rate	3.60% per annum

9. Wind Power Tariff

9.1. Wind power tariff is computed with reference to the determinants listed above. The tariff works out to **Rs.3.59** per unit. The above tariff rate along with the tariff of other states and CERC are tabulated below:

Sl. No	Agencies	Reference	Tariff Rs./kWh
1.	CERC	Order dt.15-05-2014	Rs.3.96 to Rs.6.34

2.	GERC	Order No.1/2012	Rs.4.23
3.	RERC	Draft Order dated 29-05-2014	Rs.5.28 to Rs.5.55
4.	MERC	Draft Order dated 06-05-2014	Rs.3.61 to Rs.5.25
5	TNERC	Consultative paper	Rs.3.59

10. Other issues related to power purchase by distribution licensee from WEGs.

1. Quantum of power purchase by the Distribution licensee
2. CDM benefits
3. Billing and Payments
4. Energy Purchase Agreement
5. Tariff Review Period / Control Period

10.1. Quantum of wind energy purchase by the distribution licensee

10.1.1. The distribution licensee shall purchase wind energy under section 63 of the Act in confirming to this order from WEGs for their RPO requirement on “first come first served basis”. For any procurement in excess of RPO, specific approval shall be obtained from the Commission.

10.2. CDM Benefits

10.2.1 In the earlier orders issued on renewable energy, the Commission adopted the following formula for sharing of CDM benefits as suggested by the Forum of Regulators (FOR).

“The CDM benefits should be shared on gross basis starting from 100% to developers in the first year and thereafter reducing by 10% every year till the sharing becomes

equal (50:50) between the developer and the consumer in the sixth year. Thereafter, the sharing of CDM benefits will remain equal till such time the benefits accrue.”

10.2.2. The Commission accepted the formula recommended by the Forum of Regulators in its earlier order. The Commission proposes to adopt the same formula in this order also. The distribution licensee shall account for the CDM receipts in the next ARR filing.

10.3. Billing and payment

10.3.1. When a wind generator sells power to the distribution licensee, the generator shall raise the bill every month for the net energy sold after deducting the charges for power drawn from distribution licensee, reactive power charges etc. The distribution licensee shall make payment to the generator in 60 days of receipt of the bill. Any delayed payment beyond 60 days is liable for interest at the rate of 1% per month.

10.4. Energy Purchase Agreement (EPA)

10.4.1. The format for Energy Purchase Agreement (EPA) shall be evolved as specified in the Commission's "Power procurement from New and Renewable sources of energy Regulations 2008" and amended from time to time. The agreement shall be valid for 25 years or life of the plant specified in the respective tariff order. The distribution licensee shall execute the Energy Purchase Agreement or convey his decision in line with this order within a month of receipt of the proposal from the generator for selling his power. The agreement fees are governed by the Commission's Fees and fines regulation.

10.5. Control period / Tariff Review Period.

10.5.1. Regulation 6 of the Power Procurement from New and Renewable Sources of Energy Regulations, 2008 of the Commission specifies the

following:

“The tariff as determined by the Commission shall remain in force for such period as specified by the Commission in such tariff orders and the control period may ordinarily be two years.”

Hence, the Commission decides the control period of this order shall be for two years from the date of issue of the final order and tariff period is 25 years.

11. Issues related to open access

1. Open access charges and Line losses
2. Cross subsidy surcharge
3. Reactive power charges
4. Grid availability charges
5. Energy Accounting and Billing Procedure
6. Energy wheeling agreement and fees
7. Security Deposit
8. Power factor disincentive
9. Metering
10. Connectivity and power evacuation.
11. Banking period and Charges
12. Deemed demand charges
13. Lapsed energy by REC captive users
14. Harmonics

11.1. Open access charges and line losses

11.1.1. Transmission, wheeling and Scheduling & system operation charges are generally regulated by the Commission's Tariff regulations, Grid Connectivity & Open access regulations and Commission's order on open access charges issued from time to time. However as a promotional measure, under sections 61 and 86(1) (e) of the Act, the Commission proposes to adopt 40% in each of the transmission, wheeling and scheduling and system

operation charges as applicable to the conventional power to the wind power. Apart from these charges, the WEGs shall have to bear the actual line losses in kind as specified in the respective orders of the Commission issued from time to time.

11.2. Cross subsidy surcharge

10.2.1 The Commission in its other tariff orders related to different renewable power, has ordered to levy 50% of the cross subsidy surcharge for third party open access consumers. Commission proposes to adopt the same for wind energy generators also.

11.3. Reactive Power Charges

11.3.1. Due to inherent characteristics, the induction type wind energy generators are prone to draw reactive power from the grid, if adequate power factor correction is not applied. During the wind season, wind energy generators contribute around 25% of the grid demand and in such a situation grid stability will be jeopardized, if the wind energy generators are allowed to draw considerable reactive power from the grid. Therefore, the Commission decides to retain the charges proposed in Order No.6 dated 31-07-2012. Thus, 25 paise per kVARh will be levied on wind energy generators, who draw reactive power up to 10% of the net active energy generated. Anyone drawing in excess of 10% of the net active energy generated will be liable to pay double the charge.

11.4. Grid Availability Charges

11.4.1. Start up power

11.4.1.1. Due to its infirm nature of the wind, stoppage of wind energy generation and frequent start up of WEGs are common in the wind energy sector. Therefore

the drawal of energy by the wind generators during the start up from the distribution licensee shall be adjusted against the generated energy.

11.4.2. Stand by charges

11.4.2.1. If adequate generation does not materialize or if drawal by the captive / third party consumer exceeds generation, the energy charges and demand charges at the user end shall be regulated as per the Tamil Nadu Electricity Regulatory Commission Grid Connectivity and Intra-State Open Access Regulations,2014 and Commission's Order on ABT and other relevant orders.

11.5. Energy Accounting and Billing Procedure

11.5.1 The energy accounting shall be regulated by the Commission's Regulations / Order on open access, Order on ABT. Till such time the ABT is implemented in the State, if a wind energy generator utilizes power for captive use or if he sells it to a third party, the distribution licensee shall raise the bill at the end of the billing period for the net energy supplied. The licensee should record the slot wise generation and consumption during the billing period. Slot-wise adjustment shall be made for the billing period. Peak hour generation can be adjusted to normal hour or off peak hour consumption of billing period. Normal hour generation can be adjusted to off peak hour consumption of the billing period. Excess consumption will be charged at the tariff applicable to the consumer subject to the terms and conditions of supply. After the banking period, the balance energy may be sold at the rate of 75% of the tariff rate fixed by the Commission in this order.

11.6. Energy Wheeling Agreement and fees

11.6.1 The format for Energy Wheeling Agreement, application and agreement

fees, procedure and terms & conditions are governed by Commission's following regulations in force.

- (1) Tamil Nadu Electricity Regulatory Commission Grid Connectivity and Intra-State Open Access Regulations, 2014.
- (2) Power procurement from New and Renewable sources of energy Regulations 2008.

11.7. Security deposit

11.7.1 As regards the security deposit to be paid by captive /third party user, the Commission proposes to retain the present arrangements i.e., charges corresponding to two times the maximum net energy supplied by the distribution licensee in any month in the preceding financial year shall be taken as the basis for the payment of security deposit.

11.8. Power Factor disincentive

11.8.1 Power factor disincentive may be regulated for the power factor recorded in the meter at the user end as specified in the relevant regulations/orders in force.

11.9. Metering

11.9.1 The Commission proposes that metering and communication shall be in accordance with the following regulations in force:

- (1) Central Electricity Authority (Installation and Operation of Meters) Regulations
- (2) Tamil Nadu Electricity Distribution and supply Codes
- (3) Tamil Nadu Electricity Grid Code
- (4) Tamil Nadu Electricity Regulatory Commission Grid Connectivity and Intra-State Open Access Regulations, 2014.

11.10. Connectivity and Evacuation of power

11.10.1 The connectivity and power evacuation system shall be provided as per the Act / Codes/ Regulations/orders in force.

11.11 Banking period and Charges

11.11.1 The banking period of one year from 1st April to 31st March of the following year has been permitted in the previous wind orders. The banking provision was introduced by the erstwhile TNEB way back in 1986, when the development of wind power was at its nascent stage not only in the state, but in the country as well. Now, the wind generation has matured with an installed capacity of 7262 MW in the State. During the period of wind season in Tamil Nadu, there is a considerable generation from TANGEDCO's Hydro Power Stations. This also coincides with the south west monsoon which results in increased hydro generation in all southern states. Hence the Distribution Licensee has to back down lower cost generation also to absorb the wind energy part of which will be treated as banked energy. But, during the non-wind season when the demand is more and consequently cost of power is also high, the Captive users / third party users will utilize the banked energy resulting in high cost power purchase by the distribution licensee to service the banked energy. Keeping this in mind both the TANGEDCO and Government of Tamil Nadu recommended withdrawal of banking provision during the last wind order. Banking provision for wind power is not provided in most of the other states. Hence, the Commission proposes to dispense with the one year banking for all the WEGs in the State in the proposed order. However, a banking period of one billing cycle will be available for WEG as in the case of conventional power subject to the Commission's proposed ABT Order / Regulation.

11.11.2 Alternatively, the Commission may consider banking for one year. Due to extension of banking facility, the loss that may be accrued to the Distribution

Licensee would be the difference between marginal cost of power purchase of TANGEDCO and the applicable wind tariff. In case the banking facility is to be extended, the TANGEDCO shall be permitted to collect banking charges which may be upto the difference as stated above. The stakeholders are requested to offer their comments on both the above alternatives.

11.12 Deemed demand Charges

10.12.1 Keeping in view the various factors, the Commission in Wind Order No.6 of 2012 discontinued the deemed demand concept for calculating the demand charges for the open access consumers. None of the regulations of the Commission including the Open Access Regulation recognize deemed demand concept applicability for Open Access consumers. Demand charge is meant for the fixed charges incurred by the Distribution Licensee in providing infrastructure and also incurring the capacity charges. In case of failure of the generator feeding the open access consumer, the licensee is providing the standby supply (demand). Hence the Commission proposes not to continue the deemed demand concept in this order also.

11.13. Lapsed energy by REC captive users

10.13.1. With regard to WEGs availing REC, one month adjustment period is allowed as permitted for conventional power and the unutilized energy will get lapsed as in the case of conventional power as per Wind Order No.6 of 2012. The Commission may continue the same in this order.

11.14 Harmonics

11.14.1. The WEGs shall follow the CEA (Technical Standards for Connectivity of the Distributed Generation Resources) Regulations, 2013 in respect of

harmonics. It is the responsibility of the generator to provide adequate filtering mechanism to limit the harmonics within the stipulated norms. It shall be done before connecting the generator to the grid and the harmonics shall be measured by the respective distribution licensee during the commissioning. If the WEGs inject the harmonics beyond the stipulated limit, they shall pay a compensation of 15% of applicable generation tariff rate to the distribution licensee in whose area the plant is located till such time it is reduced within the stipulated limit. The distribution licensee is responsible for measurement of harmonics with standard meters and issue notices for payment of compensation charges if the harmonics is beyond the stipulated limit. A minimum of 15 days notice period shall be given for payment of compensation charges.

11.14.2. In case of existing WEGs, an initial notice shall be issued to the wind generators by the distribution licensee for implementing harmonic norms within three months. The harmonics shall be measured by the Distribution Licensee after three month notice period. The enforcement mechanism will come into force after the three month notice period and after such measurement.

(By Order of the Commission)

Sd.....
Secretary
Tamil Nadu Electricity
Regulatory Commission

