

PUBLISHED IN THE EXTRAORDINARY ISSUE OF TRIPURA GAZETTE

Agartala, Friday, December 18, 2015 A.D., Agrahayana 27, 1937 S.E.

TRIPURA ELECTRICITY REGULATORY COMMISSION

No.F.25/TERC/241

Dated 16th Oct' 2015

NOTIFICATION

In exercise of powers conferred under Section 61,66,86(1)(e) and 181 of the Electricity Act, 2003 and all other powers enabling it in this behalf, the State Electricity Regulatory Commission is mandated to promote Co-Generation and Generation of electricity from renewable energy sources of Energy. The Tripura Electricity Regulatory Commission hereby makes the following regulations for promoting the sale of power from renewable energy sources to any person and for procurement of energy from renewable sources within the State of Tripura.

CHAPTER-1: REGULATIONS

1. SHORT TITLE AND COMMENCEMENT

- a) These regulations shall be called the Tripura Electricity Regulatory Commission Renewable Energy Regulations(Multi Year Tariff), 2015.
- b) These Regulations shall extend to the whole state of Tripura and shall be applicable to renewable energy based generating stations established in the state.
- c) These regulations shall come into force from the date of their publication in the Official Gazette, and unless reviewed earlier or extended by the Commission, shall remain in force for a period of 5 years from the date of publication or until notification of the revised Regulations whichever is later.

2. DEFINITIONS

In these regulations, unless the context otherwise requires,

- 1) 'ABT' means Availability Based Tariff;
- 2) 'Act' means the Electricity Act, 2003 (36 of 2003);
- 3) 'Auxiliary energy consumption' or 'AUX' in relation to a period in case of a generating station means the quantum of energy consumed by auxiliary equipment of the generating station, and transformer losses within the generating station, expressed as a percentage of the sum of gross energy generated at the generator terminals of all the units of the generating station;

- 4) Biomass' means wastes produced during agricultural and forestry operations (for example straws and stalks) or produced as a by-product of processing operations of agricultural produce (e.g: husks, shells, deoiled cakes, etc); wood produced in dedicated energy plantations or recovered from wild bushes/weeds; and the wood waste produced in some industrial operations;
- 5) 'Biomass gasification' means a process of incomplete combustion of biomass resulting in production of combustible gases consisting of a mixture of Carbon monoxide (CO), Hydrogen (H₂) and traces of Methane (CH₄), which is called producer gas;
- 6) 'Biogas' means a gas created when organic matter like crop residues, sewage and manure breaks down in an oxygen-free environment (ferments);
- 7) 'CUF' or 'Capacity utilization Factor' for a given period, means the total electricity corresponding to actual generation (gross generation) during the reference period, expressed as a percentage of gross generation electricity corresponding to installed capacity in that reference period and shall be computed in accordance with the following formula;

$$\text{CUF} = \frac{\text{Gross generation over the reference period} \times 100\%}{\text{Installed capacity} \times \text{total hours during the reference period (including outage hours)}}$$
- 8) 'Commission' means the Tripura Electricity Regulatory Commission;
- 9) "Control Period" means a multi-year period comprising of five financial years from April 1, 2015 and as may be extended by the Commission, for submission of forecast in accordance with these Regulations;
- 10) "Central Agency" means the agency as may be designated by the Central Commission from time to time under the CERC (Terms and Conditions for recognition and issuance of Renewable energy Certificate for Renewable Energy Generation) Regulations, 2010 as amended from time to time;
- 11) 'Central Commission' means the Central Electricity Regulatory Commission referred to in sub-section (1) of section 76 of the Act;
- 12) 'Certificate' means the Renewable Energy Certificate issued by the Central Agency in accordance with the procedures prescribed by it and under the provisions specified in the Central Electricity Regulatory Commission (Terms and Conditions for recognition and issuance of Renewable Energy Certificate for Renewable Energy Generation) Regulations, 2010 as amended from time to time;
- 13) 'Cogeneration' means a process which simultaneously produces two or more forms of useful energy (including electricity);

- 14) 'Cross Subsidy' is a mechanism whereby some consumer groups are charged a higher tariff as compared to the cost of supplying power to them. The additional revenue generated from them is used to tide over the revenue shortfall from other consumer groups, who are charged lesser tariff as compared to the cost of supplying power to them. Cross Subsidy shall be such that the tariff of consumer categories is within $\pm 20\%$ of the average cost of supply except for the consumers below the poverty line ;
- 15) 'Discount Rate' is the interest rate used in discounting to determine the present value;
- 16) 'Forbearance Price' means the ceiling price as determined by the Central Commission in accordance with the Central Electricity Regulatory Commission (Terms and Conditions for recognition and issue of Renewable energy certificate for Renewable Energy Generation) Regulations, 2010 as amended from time to time, within which only the certificate can be dealt in power exchange;
- 17) 'Gross calorific value' or 'GCV' in relation to a fuel used in generating station means the heat produced in kCal by complete combustion of one kilogram of solid fuel or one liter of liquid fuel or one standard cubic meter of gaseous fuel, as the case may be;
- 18) 'Gross station heat rate' or 'GHR' means the heat energy input in kCal required to generate one kWh of electrical energy at generator terminals of a thermal generating station;
- 19) 'Hybrid Solar Thermal Power Plant' means the solar thermal power plant that uses other forms of energy input sources along with solar thermal energy for electricity generation, and wherein not less than 75% of electricity is generated from solar energy component;
- 20) 'Installed capacity' or 'IC' means the summation of the name plate capacities of all the units of the generating station or the capacity of the generating station (reckoned at the generator terminals), approved by the Commission from time to time;
- 21) 'Inter-connection Point' shall mean interface point of renewable energy generating facility with the transmission system or distribution system, as the case may be:
- in relation to wind energy projects and Solar Photovoltaic Projects, interconnection point shall be line isolator on outgoing feeder on HV side of the pooling sub-station;
 - in relation to small hydro power, biomass power and non-fossil fuel based cogeneration power projects and Solar Thermal Power Projects the, interconnection point shall be
 - line isolator on outgoing feeder on HV side of generator transformer;

- 22) 'Licensee' means any person licensed under Section-14 of Electricity Act,2003;
- 23) 'Levelized Tariff' is Weighted Average of all tariff with weights as discount factor

$$\text{Levelized Tariff} = \frac{\sum \text{Normal Tariff} * \text{Discount Rate}}{\sum \text{Discount Rate}}$$

- 24) 'Load Factor' is the ratio of the average power to the maximum demand. The load factor depends on the interval of time of the maximum demand and the period over which the average is taken.

$$\text{Load Factor} = \frac{\text{Units consumed in a given period}}{\text{Maximum demand} \times \text{No. of hours in the period}}$$

- 25) 'MNRE' means Ministry of New and Renewable Energy of Government of India
- 26) 'MW' means Mega Watt
- 27) 'Nodal Agency For Connectivity' means State Load Despatch Centre/Sub-State Load Despatch Centre
- 28) 'Non-firm power' means the power generated from renewable sources, the hourly variation of which is dependent upon nature's phenomenon like sun, cloud, wind, etc., that cannot be accurately predicted;
- 29) 'Non fossil fuel based co-generation' means the process in which more than one form of energy (such as steam and electricity) are produced in a sequential manner by use of biomass provided the project may qualify to be a co-generation project if it fulfills the eligibility criteria as specified in Regulation 4(IV) ;
- 30) "Obligated Entity" means the entity mandated under clause (e) of subsection (1) of section 86 of the Act to fulfill the renewable purchase obligation and any other entities identified under Regulation 25 of these Regulations;
- 31) 'Operation and maintenance expenses' or 'O&M expenses' means the expenditure incurred on operation and maintenance of the project, or part thereof, and includes the expenditure on manpower, repairs, spares, consumables, insurance and overheads;
- 32) 'Pooled Cost of Power Purchase' means the weighted average pooled price at which the distribution licensee has purchased the electricity including cost of self-generation, if any, in the previous year from all the long-term and short-term energy suppliers, but excluding those based on renewable energy sources, as the case may be.
- 33) 'Power Exchange' means any exchange operating as power exchange for electricity in terms of the orders issued by the Central Commission;

- 34) 'Preferential Tariff' means the tariff fixed by the Appropriate commission for sale of energy from a generating station based on renewable energy sources to a distribution licensee.
- 35) 'Project' means a generating station or the evacuation system up to inter-connection point, as the case may be, and in case of a small hydro generating station includes all components of generating facility such as dam, intake water conductor system, power generating station and generating units of the scheme, as apportioned to power generation;
- 36) 'Quantum of Purchase' means percentage share of purchase of electricity from renewable sources as specified in these Regulations. The quantum would be the sum of all direct purchases from generation stations based on renewable sources and purchase from any other licensee which would arise from renewable sources.
- 37) 'Renewable Energy' means the grid quality electricity generated from renewable energy sources;
- 38) 'Renewable Energy Power Plants' means the power plants other than the conventional power plants generating grid quality electricity from renewable energy sources;
- 39) 'Renewable Energy Sources' means renewable sources such as small hydro, wind, solar including its integration with combined cycle, biomass, bio fuel cogeneration, urban or municipal waste and other such sources as approved by the MNRE;
- 40) 'Small Hydro' means Hydro Power projects with a station capacity up to and including 25 MW;
- 41) 'Solar PV' is a type of RE technology by which sunlight can be directly converted to electricity through a device known as the Solar Cell;
- 42) 'Solar PV power' means the Solar Photo Voltaic power project that uses sunlight for direct conversion into electricity through Photo Voltaic technology. Such Projects will include rooftop PV projects also unless specifically mentioned separately;
- 43) 'Solar Thermal power' means the Solar Thermal power project that uses sunlight for direct conversion into electricity through Concentrated Solar Power technology based on either line focus or point focus principle;
- 44) "State Nodal Agency" means the agency in the State of Tripura to be designated by the Commission to act as the agency for accreditation and recommending the renewable energy projects for registration and to undertake functions under these regulations;
- 45) 'Straight Line Depreciation' is a method of depreciation allocating a given percentage of the cost of an asset each year for a fixed period;
- 46) 'Tariff period' means the period for which tariff is to be determined by the Commission

on the basis of norms specified under these Regulations;

47) 'UI' means Unscheduled Interchange;

48) 'Year' means a financial year.

The words and expressions used in these regulations and not defined herein but defined in the Act or any other regulation of the Commission or CERC shall have the meaning assigned to them under the Act or any other regulation of the Commission or CERC.

3. SCOPE AND EXTENT OF APPLICATION

- I. These Regulations shall apply in all cases where tariff, for a generating station or a unit thereof based on renewable sources of energy, is to be determined by the Commission under Section 62 read with Section 79 of the Act. Provided that in cases of wind, Small Hydro projects, Biomass power based on Rankine cycle, non-fossil fuel based cogeneration projects, Solar PV, Solar Thermal power projects, Biomass gasifier and Biogas power project these Regulations shall apply subject to the fulfilment of eligibility criteria specified in Regulation 4 of these Regulations.

4. ELIGIBILITY CRITERIA

- I. **Wind power project** – using new wind turbine generators.
- II. **Small hydro project** – located at the sites approved by State Nodal Agency/ State Government using new plant and machinery, and installed power plant capacity to be lower than or equal to 25 MW at single location.
- III. **Biomass power project based on Rankine cycle technology** – Biomass power projects using new plant and machinery based on Rankine cycle technology and using biomass fuel sources, provided use of fossil fuel is restricted only up to 15% of total fuel consumption on annual basis.
- IV. **Non-fossil fuel based co-generation project** – The project shall qualify to be termed as a non-fossil fuel based co-generation project, if it is using new plant and machinery and is in accordance with the definition and also meets the qualifying requirement outlined below:
 - i. **Topping cycle mode of co-generation** – Any facility that uses non-fossil fuel input for the power generation and also utilizes the thermal energy generated for useful heat applications in other industrial activities simultaneously.
 - ii. Provided that for the co-generation facility to qualify under topping cycle

mode, the sum of useful power output and one half the useful thermal output be greater than 45% of the facility's energy consumption, during season.

Explanation- For the purposes of this clause,

- a. 'Useful power output' is the gross electrical output from the generator. There will be an auxiliary consumption in the cogeneration plant itself (e.g. the boiler feed pump and the FD/ID fans). In order to compute the net power output it would be necessary to subtract the auxiliary consumption from the gross output. For simplicity of calculation, the useful power output is defined as the gross electricity (kWh) output from the generator.
- b. 'Useful Thermal Output' is the useful heat (steam) that is provided to the process by the cogeneration facility.
- c. 'Energy Consumption' of the facility is the useful energy input that is supplied by the fuel (normally bagasse or other such biomass fuel).
- d. 'topping cycle' means a cogeneration process in which thermal energy produces electricity followed by useful heat application in industrial activities.

- V. **Solar PV and Solar Thermal Power Project** – Based on Technologies approved by MNRE.
- VI. **Biomass Gasifier based Power Project** – The project shall qualify to be termed as a biomass gasifier based power project, if it is using new plant and machinery and having a Grid connected system that uses 100% producer gas engine, coupled with gasifier technologies approved by MNRE.
- VII. **Biogas based Power Project** – The project shall qualify to be termed as a biogas based power project, if it is using new plant and machinery and having grid connected system that uses 100% Biogas fired engine, coupled with Biogas technology for co-digesting agriculture residues, manure and other bio waste as may be approved by MNRE.

CHAPTER-2: THE PROPOSED GENERIC LEVELLISED GENERATION TARIFF FORVARIOUS RENEWABLE ENERGY TECHNOLOGIES

The proposed generic levelised generation tariffs for various renewable energy technologies, for 1st Control Period i.e. FY 2015-16 are discussed below:

5. USEFUL LIFE

- I. 'Useful Life' in relation to a unit of a generating station including evacuation system shall mean the following duration from the date of commercial operation (COD) of such generation facility:

Renewable Energy Projects	Years
Wind Energy	25
Small Hydro	35
Non-fossil fuel based Co-generation	20
Biomass based on Rankine Cycle	20
Solar PV	25
Solar Thermal	25
Biomass Gasifier	20
Biogas	20

6. TARIFF PROCEDURE

- I. The renewable generating company may make an application for determination of tariff for MYT Control Period in accordance with this Regulation within 180 days from the date of notification of these regulations or by November 30th or within 180 days of the anticipated date of commercial operation of the new Project (whichever is later).

Provided that the applicant shall submit suitable tariff petition fee at the time of filing of application as per TERC regulation (Miscellaneous Provisions Relating to Petition Fess Regulations,2005) and subsequent amendments made from time to time.

- II. The Control Period or Review Period under these Regulations shall be of five years, of which the first year shall be the financial year 2015-16.
- III. Provided that the benchmark capital cost for Solar PV and Solar thermal projects may be reviewed annually by the Commission.
- IV. Provided further that the biomass price may be reviewed at the end of the third year of the Control Period.
- V. Provided also that the tariff determined as per these Regulations for the RE projects commissioned during the Control Period, shall continue to be applicable for the entire duration of the Tariff Period as specified in Regulation 7 below.

- VI. Provided also that the revision in Regulations for next Control Period shall be undertaken at least six months prior to the end of the first Control Period and in case Regulations for the next Control Period are not notified until commencement of next Control Period, the tariff norms as per these Regulations shall continue to remain applicable until notification of the revised Regulations subject to adjustments as per revised Regulations.

7. TARIFF PERIOD

- I. The tariff period in respect of the RE Projects is as under:

Renewable Energy Projects	Years
Wind Energy	13
Small Hydro below 5 MW	35
Small Hydro (5 MW-25 MW)	13
Biomass based on Rankine Cycle	13
Non fossil fuel Co-generation	13
Solar PV and Solar Thermal	25
Biomass Gasifier and Biogas	20

- II. Tariff period under these Regulations shall be considered from the date of commercial operation of the renewable energy generating stations. Tariff determined as per these Regulations shall be applicable for Renewable Energy power projects, only for the duration of the Tariff Period.

8. TARIFF STRUCTURE

- I. The tariff for RE projects shall be single part tariff consisting of the following fixed cost Components
- a) Return on equity;
 - b) Interest on loan capital;
 - c) Depreciation;
 - d) Interest on working capital;
 - e) Operation and maintenance expenses;
- II. For renewable energy technologies having fuel cost component, like biomass power projects and non-fossil fuel based cogeneration, single part tariff with two components, fixed cost component and fuel cost component, is to be determined.

9. TARIFF DESIGN

The tariff design for renewable energy generating stations is as under:

- I. The generic tariff shall be determined on levelised basis for the Tariff Period. Provided that for renewable energy technologies having single part tariff with two components, tariff shall be determined on levelised basis considering the year of commissioning of the project for fixed cost component while the fuel cost component shall be specified on year of operation basis.
- II. For the purpose of levelised tariff computation, the discount factor equivalent to Post Tax weighted average cost of capital shall be considered
- III. Levelisation shall be carried out for the 'useful life' of the Renewable Energy project while Tariff shall be specified for the period equivalent to Tariff Period
- IV. Project Specific tariff ,on case to case basis, shall be determined by the Commission for the following types of projects:
 - a) Municipal Solid Waste Projects;
 - b) Hybrid Solar Thermal Power plants;
 - c) Other hybrid projects include renewable–renewable or renewable–conventional sources, for which renewable technology is approved by MNRE;
 - d) Biomass project other than that based on Rankine Cycle technology application with water cooled condenser;
 - e) Any other new renewable energy technologies approved by MNRE.

10. LEVELLISED TARIFF

- I. Levelised Tariff is calculated by carrying out levelisation for 'useful life' of each technology considering the discount factor as specified in Regulation 9(II)

11.DISCOUNT FACTOR

- I. The discount factor considered for this purpose is equal to the Post Tax weighted average cost of the capital on the basis of normative debt: equity ratio (70:30) specified in the Regulations.

Explanation: Considering the normative debt equity ratio and weighted average of the post-tax rates for interest and equity component, the discount factor is calculated. Interest Rate considered for the loan component (i.e.70 %) of Capital Cost is 13.00 % (as explained later). For equity component (i.e. 30 %) rate of Return on Equity (ROE) considered at Post Tax ROE of 16 % considered. The discount factor derived by this method for all technology is 10.81 % $((13.00 \% \times 0.70 \times (1 - 33.99 \%) + (16.0\% \times 0.30))$.

12. CAPITAL COST

- I. The norms for the capital cost as specified in the technology specific chapter shall be inclusive of all capital works like plant and machinery, civil works, erection and commissioning, financing and interest during construction, and evacuation infrastructure up to inter-connection point. The Commission has specified the normative capital cost, applicable for the first year of control period i.e. FY 2015-16, for various RE technologies as specified in this regulation.
- II. In order to determine the normative capital cost for the remaining years of the control period, the regulations stipulate the indexation mechanism, Wind Energy, Small Hydro Power, Biomass Power, Non-Fossil Fuel based Cogeneration, Biomass Gasifier and Biogas based power projects. However, the Capital Cost norms for Solar PV and Solar Thermal Power Projects shall be reviewed on annual basis. The indexation mechanism shall take into account adjustments in capital cost with the changes in Wholesale Price Index of Steel and Wholesale Price Index of Electrical Machinery as per formulation stipulated below:

$$CC(n) = P\&M(n) * (1 + F1 + F2 + F3)$$

$$P\&M(n) = P\&M(0) * (1 + d(n))$$

$$d(n) = [a * \{(SI(n-1)/SI(0)) - 1\} + b * \{(EI(n-1)/EI(0)) - 1\}] / (a + b)$$
 Where,

CC_(n) = Capital Cost for nth year

P&M_(n) = Plant and Machinery Cost for nth year

P&M₍₀₎ = Plant and Machinery Cost for the base year

Note: P&M (0) is to be computed by dividing the base capital cost (for the first year of the control period) by (1 + F1 + F2 + F3). Factors F1, F2, F3 for each RE technology has been specified separately, as summarized in following table.

d(n) = Capital Cost escalation factor for year (n) of Control Period

SI (n-1) = Average WPI Steel Index prevalent for calendar year (n-1) of the Control Period

SI (0) = Average WPI Steel Index prevalent for calendar year (0) at the beginning of the Control Period

EI (n-1) = Average WPI Electrical Machinery Index prevalent for calendar year (n-1) of the Control Period

EI(0) = Average WPI Electrical Machinery Index prevalent for calendar year (0) at the beginning of the Control Period

a = Constant to be determined by Commission from time to time, (for weightage to Steel Index)

b = Constant to be determined by Commission from time to time, (for weightage to Electrical Machinery Index)

F1 = Factor for Land and Civil Works

F2 = Factor for Erection and Commissioning

F3 = Factor for IDC and Financing Cost

The default values of the factors for various RE technologies are summarized in the table overleaf:

Parameters	Wind Energy	Small Hydro Projects	Biomass based Rankine Cycle, Non fossil based Co-Generation, Biomass Gasifier and Biogas
a	0.6	0.6	0.7
b	0.4	0.4	0.3
F1	0.08	0.16	0.10
F2	0.07	0.10	0.09
F3	0.10	0.14	0.14

The Commission has relied on the following sources for relevant information on various indices: Source for WPI (electrical & machinery and iron and steel), WPI (all commodities), WPI (Price of HSD): Office of Economic Advisor, Ministry of Commerce & Industry (www.eaindustry.nic.in)

Source for IRC (Average Annual Inflation rate for indexed energy charge component in case of captive coal mine source): CERC (www.cercind.gov.in)

Capital Cost for FY 2015-16

Renewable Energy Projects	Capital Cost Norm for FY 2015-16 (Rs. Lakh/MW)
Wind Energy	619.522
Small Hydro below 5 MW	850.000
Small Hydro (5 MW-25 MW)	775.000
Biomass based on Rankine Cycle (For rice straw and juliflora (plantation)with water cooled condenser)	610.437
Non fossil fuel Co-generation	452.479
Solar PV	600.000 for PV and 630.000 for rooftop PV
Solar Thermal	1200.00
Biomass Gasifier Power Projects	592.532
Biogas Power Projects	1185.064

Provided the capital subsidy received from Central/State Government or any other source shall be deducted from the Capital Cost to arrive at net Capital Cost for the Project.

13. DEBT-EQUITY RATIO:

- I. For generic tariff to be determined based on suo-motu petition, the debt equity ratio shall be 70:30.

- II. For Project specific tariff, the following provisions shall apply:-
If the equity actually deployed is more than 30% of the capital cost, equity in excess of 30% shall be treated as normative loan.
- III. Provided that where equity actually deployed is less than 30% of the capital cost, the actual equity shall be considered for determination of tariff.
- IV. Provided further that the equity invested in foreign currency shall be designated in Indian rupees on the date of each investment.

14. RETURN ON EQUITY

- I. The value base for the equity shall be 30% of the capital cost or actual equity as determined under Regulation 13.

The normative Return on Equity shall be:

- a) Pre-tax 20% per annum for the first 10 years.
- b) Pre-tax 24% per annum 11th years onwards

15. LOAN AND FINANCE CHARGES

I. Loan Tenure

- a) For the purpose of determination of tariff, loan tenure of 12 years shall be considered.

II. Interest Rate

- a) The loans arrived at in the manner indicated in the Regulation 13 shall be considered as gross normative loan for calculation for interest on loan. The normative loan outstanding as on April 1st of every year shall be worked out by deducting the cumulative repayment up to March 31st of previous year from the gross normative loan.
- b) For the purpose of computation of tariff, the normative interest rate shall be considered as average State Bank of India (SBI) Base rate prevalent during the first six months of the previous year plus 300 basis points.
- c) Notwithstanding any moratorium period availed by the generating company, the repayment of loan shall be considered from the first year of commercial operation of the project and shall be equal to the annual depreciation allowed.

16. DEPRECIATION:

- I. The value base for the purpose of depreciation shall be the Capital Cost of the asset admitted by the Commission. The Salvage value of the asset shall be considered as 10% and depreciation shall be allowed up to maximum of 90% of the Capital Cost of the asset.
- II. Depreciation per annum shall be based on 'Differential Depreciation Approach' over loan period beyond loan tenure over useful life computed on 'Straight Line Method'. The

depreciation rate for the first 12 years of the Tariff Period shall be 5.83% per annum and the remaining depreciation shall be spread over the remaining useful life of the project from 13th year onwards.

- III. Depreciation shall be chargeable from the first year of commercial operation. Provided that in case of commercial operation of the asset for part of the year, depreciation shall be charged on pro rata basis.
- IV. In accordance with the above, the rate of depreciation for the first 12 years has been considered as 5.83% and the rate of depreciation from the 13th year onwards has been spread over the balance useful life of the RE project as under:

Details	Wind Energy	Small Hydro	Biomass based on Rankine Cycle	Non fossil fuel based Co-Generation	Solar PV	Solar Thermal	Biomass Gasifier	Biogas
Useful Life (in years)	25	35	20	20	25	25	20	20
Rate of Depreciation for 12 years (%)	5.83	5.83	5.83	5.83	5.83	5.83	5.83	5.83
Rate of Depreciation after 12 years (%)	1.54	0.87	2.51	2.51	1.54	1.54	2.51	2.51

17. INTEREST ON WORKING CAPITAL

I. Wind Energy / Small Hydro Power /Solar PV / Solar thermal

- Operation & Maintenance expenses for one month;
- Receivables equivalent to 2 (Two) months of energy charges for sale of electricity calculated on the normative CUF;
- Maintenance spare @ 15% of operation and maintenance expenses

II. Biomass(Rankine Cycle Technology), Biomass Gasifier, Biogas Power and Non-fossil fuel Co-generation

- Fuel costs for four months equivalent to normative PLF;
- Operation & Maintenance expense for one month;
- Receivables equivalent to 2 (Two) months of fixed and variable charges for sale of electricity calculated on the target PLF;
- Maintenance spare @ 15% of operation and maintenance expenses

- III. Interest on Working Capital shall be at interest rate equivalent to the average State Bank of India Base Rate prevalent during the first six months of the previous year plus 350 basis points.

- IV. Receivables equivalent to two months of actual fixed cost and variable cost, (as applicable for biomass power and non-fossil fuel based co-generation) have been considered. The interest on working capital has been worked out as specified below for determination of tariff of the RE projects:

18. OPERATION AND MAINTENANCE EXPENSES

- I. Operation and Maintenance or O&M expenses' shall comprise repair and maintenance (R&M), establishment including employee expenses and administrative & general expenses.
- II. Operation and maintenance expenses shall be determined for the Tariff Period based on normative O&M expenses specified by the Commission subsequently in these Regulations for the first Year of Control Period.
- III. Normative O&M expenses allowed during first year of the Control Period (i.e. FY 2015-16) shall be escalated at the rate of 5.72% per annum over the Tariff Period.
- IV. The normative O&M expenses for various RE technologies for FY 2015-16 are as under:

Renewable Energy Projects	O&M Expenses (Rs. Lakhs/MW)
Wind Energy	10.63
Small Hydro below 5 MW	30.00
Small Hydro (5 MW-25 MW)	21.60
Biomass (For rice straw and juliflora (plantation)with water cooled condenser)	44.71
Non fossil fuel Co-generation	18.91
Solar PV	13.25
Solar Thermal	18.00
Biomass Gasifier Power Projects	47.26
Biogas Power Projects	47.26

19. CAPACITY UTILISATION FACTOR

- I. The Capacity Utilization Factor (CUF)/Plant Load Factor (PLF) in respect of the Wind Energy, Small Hydro, Solar PV and Solar Thermal based power generating stations shall be as per the details given in the table below which has been considered for determination of tariff.

Renewable Energy projects	CUF
Wind Energy	20%
Small Hydro	45%
Solar PV	19%
Solar Thermal	23%

20. PLANT LOAD FACTOR (PLF)

- I. The plant load factor for Biomass, Biomass Gasifier and Biogas based renewable energy generating stations shall be as given in the table below which has been considered for

determination of fixed charges component of tariff.

Renewable Energy projects	CUF
Biomass based on Rankine Cycle	
a. During stabilization (6 months)	60%
b. During remaining period of the first year (after stabilization)	70%
c. Second year onwards	80%
Non fossil fuel based Co-Generation	53%
Biomass Gasifier	85%
Biogas	90%

21. AUXILIARY POWER CONSUMPTION

I. The auxiliary power consumption factor which has been considered for determination of tariff of the RE projects is as under:

Renewable Energy Projects	Auxiliary Consumption Factor
Small Hydro	1%
Biomass (Project Using Water Condenser)	i. During first year of operation:11% ii. From 2 nd year Onwards:10%
Non fossil fuel Co-generation	8.5%
Solar PV	0.25%
Solar Thermal	10%
Biomass Gasifier Power Projects	10%
Biogas Power Projects	12%

22. STATION HEAT RATE:

I. The Station Heat Rates (SHR) for biomass and non-fossil fuel based co-generation projects are as under:

Renewable Energy Projects	SHR (kCal/kWh)
Non fossil fuel Co-generation	3600
Biomass based on Rankine Cycle	4200

23. FUEL

I. Fuel Mix

- a) The Biomass based power generating stations are to be designed in a way that it uses different types of non-fossil fuels available within the vicinity of biomass power project such as crop residues, agro-industrial residues, forest residues etc. and other biomass fuels as may be approved by the Ministry of Non- Renewable Energy (MNRE). The biomass power generating companies are to ensure fuel management plan to ensure adequate availability of fuel to meet the respective project requirements.

- b) The normative specific fuel consumption shall be 1.25 kg per kWh for Biomass Gasifier based power generating stations.
- c) The normative specific fuel consumption shall be 3 kg of substrate mix per kWh for Biogas based power generating stations.

II. Calorific value

- a) The gross calorific value of biomass fuel used for determination of tariff shall be at 3100 kCal/Kg.
- b) The gross calorific value for bagasse to be considered in case of non-fossil fuel co-generation projects is 2250 kCal/kg.

III. Fuel cost

- a) In case of Biomass Power Projects, non-fossil fuel based co-generation projects, Biomass Gasifier based power Projects and Biogas based power projects, variable component of tariff is calculated based on the fuel cost for FY 2015-16. This variable component will be escalated at the rate of 5% every year. The fuel price for FY 2015-16 is as below:

Renewable Energy Technology	Fuel Price (Rs/ton)
Biomass based on Rankine Cycle/Biomass gasifier	3144.80
Non fossil fuel based Co-generation	2010.58
Biogas	1257.41

24. SUBSIDY OR INCENTIVE BY THE CENTRAL / STATE GOVERNMENT

- I. The Commission shall take into consideration any incentive or subsidy offered by the Central or State Government, including accelerated depreciation benefit if availed by the generating company, for the renewable energy power plants while determining the tariff under these Regulations.
- II. Provided that the following principles shall be considered for ascertaining income tax benefit on account of accelerated depreciation, if availed, for the purpose of tariff determination:
 - a) Assessment of benefit shall be based on normative capital cost, accelerated depreciation rate as per relevant provisions under Income Tax Act and corporate income tax rate.
 - b) Capitalization of RE projects during second half of the fiscal year. Per unit benefit shall be derived on levelised basis at discount factor equivalent to Post Tax weighted average cost of capital.

CHAPTER-3: RENEWABLE PURCHASE OBLIGATION AND ITS COMPLIANCE

25. OBLIGATED ENTITY

The Obligated Entities include:

- a) Distribution licensee (or any other entity procuring power on their behalf).
- b) Any person consuming electricity (i) generated from conventional Captive Generating Plant having capacity of 1 MW and above for his own use and or (ii) procured from conventional generation through open access and third party sale.

26. RENEWABLE PURCHASE OBLIGATION

- I. Every “Obligated Entity” may meet its RPO target by way of its own generation or procurement of power from RE developer or by purchase from other licensee or by way of purchase of Renewable Energy Certificate (REC).
- II. Where, RPO target is a percentage of
 - a. Total consumption of electricity for Captive and Open Access Consumer
 - b. Total consumption of electricity within the licensee area for distribution licensee.

Financial Year	Solar (%)	Non-Solar (%)	Total (%)
2015-16	5.00%	6.00%	11.00%
2016-17	6.00%	6.00%	12.00%
2017-18	7.00%	6.00%	13.00%
2018-19	8.00%	6.00%	14.00%
2019-20	9.00%	6.00%	15.00%

Provided further, such obligation to purchase renewable energy shall be inclusive of the purchases, if any, from renewable energy sources already being made by concerned obligated entity.

Provided also that the power purchases under the power purchase agreements for the purchase of renewable energy sources already entered into by the distribution licensees and consented to by the Commission shall continue to be made till their present validity, even if the total purchases under such agreements exceed the percentage as specified hereinabove.

Provided further that, the Power purchased at pooled cost as per Regulation 27(IV) shall not be included in the calculation of RPO Compliance.

Provided further that, in case solar power purchase is more than stipulated Solar RPO and utility is unable to sell REC equivalent to the extra solar purchase, the same can be used for meeting non solar RPO. However the vise-versa shall not be true.

- III. If the RPO for any of the year is not specified by the Commission, the RPO specified for the previous year shall be continued beyond the period till any revision is effected by the Commission in this regard.

27. CERTIFICATES UNDER THE REGULATIONS OF THE CENTRAL COMMISSION

- I. Subject to the terms and conditions contained in these Regulations the Certificates issued under the Central Electricity Regulatory Commission (Terms and Conditions for recognition and issuance of Renewable Energy Certificate for Renewable Energy Generation) Regulations, 2010 and amendments thereafter shall be the valid instruments for the discharge of the mandatory obligations set out in these Regulations for the obligated entities to purchase electricity under renewable energy sources.

Provided that in the event of the Obligated Entities fulfilling the RPO by purchase of certificates, the obligation to purchase electricity from generation based on solar as renewable energy source can be fulfilled by purchase of solar certificates only, and the obligation to purchase electricity from generation other than solar can be fulfilled by purchase of non-solar certificates.

- II. Subject to such directions as the Commission may give from time to time, the Obligated Entities shall act consistent with the Central Electricity Regulatory Commission (Terms and Conditions for recognition and issuance of Renewable Certificate for Renewable Energy Generation) Regulations, 2010 notified by the Central Commission in regard to the procurement of the certificates for fulfillment of the RPO under these regulations.
- III. The Certificates purchased by the obligated entities from the power exchange in terms of the regulation of the Central Commission mentioned in clause 27 (I) of this regulation shall be deposited by the obligated entities to the State Agency in accordance with the detailed procedure issued by the Central Agency. State Agency may develop the required detailed procedure in connection with its own function and submit to the Commission for approval.
- IV. The Power Sold through REC mechanism entails pricing of two components namely, electricity component and renewable energy component or REC. The effective electricity component price shall be equivalent to pooled cost of power purchase of the host utility purchasing such Power, whereas the price of RECs shall be discovered in Power Exchange.

28. STATE AGENCY

- I. The Commission shall designate an agency as State Agency for accreditation and recommending the renewable energy projects for registration and to undertake functions under these regulations.
- II. The State Agency shall function in accordance with the directions issued by the Commission and shall act in consistent with the procedures/rules laid by Central Agency for discharge of

its functions under the Central Electricity Regulatory Commission (Terms and Conditions for recognition and issuance of Renewable Energy Certificate for Renewable Energy Generation) Regulations, 2010.

- III. The State Agency shall submit quarterly status to the Commission in respect of compliance of renewable purchase obligation by the obligated entities in the format as stipulated by the Commission and may suggest appropriate action to the Commission if required for compliance of the renewable purchase obligation.
- IV. The Commission may from time to time fix the remuneration and charges payable to the State Agency for discharge of its functions under these regulations to be recovered from the accredited entities and obligated entities.
- V. If the Commission is satisfied that the State Agency is not able to discharge its functions satisfactorily, it may by general or special order, and by recording reasons in writing, designate any other agency to function as State Agency as it considers appropriate

29. DISTRIBUTION LICENSEE

- I. Each distribution licensee (or any entity procuring power on their behalf) shall indicate, along with sufficient proof thereof, the estimated quantum of purchase from renewable energy sources for the ensuing year in tariff/ annual performance review petition in accordance with Regulations notified by the Commission from time to time. Provided that the estimated quantum of purchase shall be in accordance with Clause 26 (I) of these Regulations basing on the proposed power purchase quantity for the ensuing year(s). In the event of the actual consumption in the licensee area being different from that approved by the Commission, the RPO shall be deemed to have been modified in accordance with clause 26(I) and (II). If the distribution licensee is unable to fulfill the obligation, the shortfall of the specified quantum of that year would be added to the specified quantum for the next year. However, credit for excess purchase from renewable energy sources would not be adjusted in the ensuing year.
- II. Despite availability of renewable energy sources, if the distribution licensee fails to fulfill the minimum quantum of purchase from renewable energy sources, it shall be liable to pay compensation as per clause 30(I,II) of these Regulations.

29. CAPTIVE AND OPEN ACCESS USER(S)/CONSUMER(S)

- I. The quantum of RPO mentioned in clause 26(I) shall be applicable to captive and open access user(s)/ consumer(s) from the date as would be notified in the Official Gazette.
- II. Every Captive and Open access consumer(s)/user(s) shall have to submit necessary details regarding total consumption of electricity and purchase of energy from renewable sources for fulfillment of RPO on yearly basis on or before 30th April to the State Agency.

- III. If the Captive user(s) and Open Access consumer(s) are unable to fulfill the criteria, the shortfall of the targeted quantum would attract compensation as per Clause 30(I,II) of these Regulations

30. EFFECT OF DEFAULT

- I. In the event of the Obligated Entities not able to fulfill the RPO as provided in these regulations during any year and also does not purchase the certificates, the Commission may direct the obligated entity to deposit a penalty into a separate fund, to be created and maintained by such State Agency, such amount as the Commission may determine:

Provided that the amount of penalty shall be calculated on the basis of the shortfall in units of RPO and the forbearance price decided by the Central Commission.

Provided that fund so created shall be utilized, as may be directed by the Commission, partly for purchase of the certificates and partly for development of transmission infrastructure for evacuation of power from generating stations based on Renewable Energy Sources or any other expenses relating to development of RE.

Provided that the State Agency as well as obligated entities shall not be authorized to use the fund created in pursuance of the above, without prior approval of the Commission.

Provided further that the Commission may empower an officer of the State Agency to operate the Fund and procure from the Power Exchange the required number of certificates to the extent of the shortfall in the fulfillment of the obligations, out of the amount in the fund

- II. Where any obligated entity fails to comply with the obligation to purchase the required percentage of power from renewable' energy sources or the renewable energy certificates, it shall also be liable for penalty as may be decided by the Commission under section 142 of the Act.

Provided that in case of genuine difficulty in complying with the renewable purchase obligation because of non-availability of certificates, the obligated entity can approach the Commission for carry forward of compliance requirement to the next year.

Provided further that where the Commission has consented to the carry forward of compliance requirement, the provision of clause 30 (I) of these Regulations or the provision of section 142 of the Act shall not be invoked.

31. GRID CONNECTIVITY:

- I. Any person generating electricity from renewable energy sources, irrespective of Installed capacity, shall have open access to any Licensee's transmission system and/ or distribution system or grid as the case may be. On an application from such person, the

transmission licensee or distribution licensee shall provide appropriate interconnection facilities, as far as feasible, before Commercial Operation date of the renewable energy project. Such interconnection shall follow the grid connectivity Standards as specified in the Indian Electricity Grid Code, State Grid Code and/ or the manner prescribed by the Central Electricity Authority.

The STU/ SLDC / Licensee shall make best efforts to strengthen the system to provide timely open access to transmit power from renewable energy sources

32. APPOINTMENT OF COMPLIANCE AUDITORS

- I. The Commission may appoint from time to time Compliance Auditors to inquire into and report on compliance of these Regulations. The Auditor shall also certify the fund operated by the State Agency and created under of these Regulations. The Auditors could be an individual person or a firm having persons with qualification and experience in Finance or Accounts, Commerce and Engineering.

33. CROSS- SUBSIDY

- I. Third Party Sale from renewable energy sources shall be exempted from the cross-subsidy surcharge determined by the Commission from time to time. However, no banking facility shall be provided for supply (third party sale) from renewable energy sources through open access. Further, ABT compatible interface metering system capable of energy accounting for each block of 15 minutes shall be provided at both supply as well as drawal point.

For third party sale, energy generation from renewable energy sources in each 15 minute time block shall be set off against the captive/ open access user(s) consumption in the same 15 minute time block.

CHAPTER-4: MISCELLANEOUS PROVISIONS

34. FOREIGN EXCHANGE RATE VARIATION:

- I. The generating company may hedge foreign exchange exposure in respect of the interest on foreign currency loan and repayment of foreign loan acquired for the generating station, in part or in full in the discretion of the generating company.
- II. As and when the petitioner enters into any hedging based on its approved hedging policy, the petitioner should communicate to the beneficiaries concerned about its hedging decision within thirty days of entering into such hedging transaction(s).
- III. Every generating company shall recover the cost of hedging of foreign exchange rate variation corresponding to the normative foreign debt, in the relevant year on year-to-year basis as expense in the period in which it arises and extra rupee liability corresponding to such foreign exchange rate variation shall not be allowed against the hedged foreign debt.
- IV. To the extent the generating company is not able to hedge the foreign exchange exposure, the extra rupee liability towards interest payment and loan repayment corresponding to the normative foreign currency loan in the relevant year shall be permissible provided it is not attributable to the generating company or its suppliers or contractors.
- V. Every generating company shall recover the cost of hedging and foreign exchange rate variation on year-to-year basis as income or expense in the period in which it arises.

35. RECOVERY OF COST OF HEDGING OR FOREIGN EXCHANGE RATE

VARIATION:

- I Recovery of cost of hedging or foreign exchange rate variation shall be made directly by the generating company from the beneficiaries, without making any application before the Commission:

Provided that in case of any objections by the beneficiaries, to the amounts claimed on account of cost of hedging or foreign exchange rate variation, the generating company may make an appropriate application before the Commission for its decision expenses shall be reimbursed directly by the beneficiary

36. POWER TO RELAX.

- I. The Commission, for reasons to be recorded in writing, may relax any of the provisions of these regulations on its own motion or on an application made before it by an interested person.

37. POWER TO REMOVE DIFFICULTIES

- I. If any difficulty arises in giving effect to the provisions of these Regulations, the Commission may, by general or specific order, make such provisions not inconsistent with the provisions of the Act, as may appear to be necessary for removing the difficulty.

38. ISSUE OF ORDERS AND DIRECTIONS

- I. Subject to the provisions of the Act and these regulations, the Commission may, from time to time, issue orders and practice directions with regard to the implementation of these regulations and procedure to be followed for such implementation and matters incidental or ancillary thereto.

39. SAVING OF INHERENT POWERS OF COMMISSION

- I. Nothing contained in these Regulations shall limit or otherwise affect the inherent powers of the Commission to adopt a procedure, which is at variance with any of the provisions of these regulations, if the Commission, in view of the special circumstances of the matter or class of matters and for reasons to be recorded in writing, deems it necessary or expedient to depart from the procedure specified in these regulations.

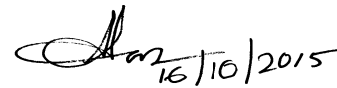
40. POWER TO AMEND

- I. All issues arising in relation to interpretation of these regulations shall be determined by the Commission and the decision of the Commission on such issues shall be final.

41. INTREPRETATION

- I. All issues arising in relation to interpretation of these regulations shall be determined by the Commission and the decision of the Commission on such issues shall be final.

By Order of the Commission



(Er.H.K.Das)
Secretary
T.E.R.C.

Annexure 1

Assumptions: Wind Energy Projects					
S.No	Assumption	Sub-Head	Sub-Head(2)	Unit	Wind Zone 1
1	Power Generation	Capacity	Installed Power Generation Capacity Capacity Utilization Factor Useful Life	MW % Years	1 20% 25
2	Project Cost	Capital Cost/MW	Power Plant Cost	Rs. Lakhs/MW	619.522
3	Sources of Fund	Debt:Equity	Tariff Period Debt Equity Total Debt Amount Total Equity Amount Loan Amount Moratorium Period Repayment Period Interest Rate Equity Component RoE for first 10 Years RoE from 11 th Year Onwards Weighted Average of RoE Discount Rate	Years % % Rs. Lakhs Rs. Lakhs Rs. Lakhs Years Years % p.a. Rs. Lakhs % p.a. % p.a.	13 70 30 433.665 185.857 433.67 0 12 13% 185.86 20.00% 24.00 22.40 10.81%
4	Financial Assumptions	Fiscal Assumption Depreciation	Income Tax Depre rate for first 12Years Depre rate 13 th Year Onwards	% % %	33.99 5.84 1.54
5	Working Capital	For Fixed Charges O&M Charges Maintenance Spare Receivables For variable Charges Interest on WC	% of O&M Expense	Months Months %	1 15% 2 13.5%
6	Operation & Maintenance	O&M (FY 15-16) Total O&M Escalation O&M (FY12-13)		Rs. Lakhs/MW % Rs. Lakhs/MW	10.63 5.72% 9.00

Determination of Tariff for Wind Power projects

Units generated	Unit	Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Installed Capacity	MW		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Gross/Net generation	MU		1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75
Capital Cost	Rs.Lakh	619.52																									
Debt	Rs.Lakh	433.67	70%																								
Equity	Rs.Lakh	185.86	30%																								
Principal paid Per Year	Rs.Lakh	36.14																									
Debt Opening	Rs.Lakh		433.67	397.53	361.39	325.25	289.11	252.97	216.83	180.69	144.56	108.42	72.28	36.14													
Debt Closing	Rs.Lakh		397.53	361.39	325.25	289.11	252.97	216.83	180.69	144.56	108.42	72.28	36.14	0.00													
Fixed Cost																											
O&M Expenses	Rs.Lakh		10.63	11.24	11.88	12.56	13.28	14.04	14.84	15.69	16.59	17.54	18.54	19.60	20.72	21.91	23.16	24.48	25.88	27.37	28.93	30.59	32.34	34.18	36.14	38.21	40.39
Depreciation for first 12 Yr	Rs.Lakh	5.83%	36.12	36.12	36.12	36.12	36.12	36.12	36.12	36.12	36.12	36.12	36.12	36.12	36.12	9.54	9.54	9.54	9.54	9.54	9.54	9.54	9.54	9.54	9.54	9.54	9.54
Depreciation from 13th Yr		1.54%																									
Interest on Term Loan	Rs.Lakh		54.03	49.33	44.63	39.93	35.24	30.54	25.84	21.14	16.44	11.75	7.05	2.35													
Interest on WC	Rs.Lakh		3.52	3.44	3.37	3.30	3.23	3.17	3.10	3.04	2.98	2.93	3.04	2.99	2.39	2.46	2.53	2.60	2.68	2.76	2.84	2.94	3.03	3.13	3.24	3.36	3.48
RoE	Rs.Lakh		37.17	37.17	37.17	37.17	37.17	37.17	37.17	37.17	37.17	37.17	37.17	44.61	44.61	44.61	44.61	44.61	44.61	44.61	44.61	44.61	44.61	44.61	44.61	44.61	44.61
Total Fixed Cost	Rs.Lakh		141.5	137.30	133.2	129	125	121	117.1	113.2	109.3	105.5	109.4	106	77.3	78.5	80	81.2	82.71	84.3	85.922	87.7	89.5	91.47	93.5	95.7	98.02
Levelised Tariff Corresponding to useful Life																											
O&M Expenses	Rs/kWh	0.97	0.61	0.64	0.68	0.72	0.76	0.80	0.85	0.90	0.95	1.00	1.06	1.12	1.18	1.25	1.32	1.40	1.48	1.56	1.65	1.75	1.85	1.95	2.06	2.18	2.31
Depreciation	Rs/kWh	1.71	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54
Interest on Term Loan	Rs/kWh	1.48	3.08	2.82	2.55	2.28	2.01	1.74	1.47	1.21	0.94	0.67	0.40	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest on WC	Rs/kWh	0.18	0.20	0.20	0.19	0.19	0.18	0.18	0.18	0.17	0.17	0.17	0.17	0.17	0.14	0.14	0.14	0.15	0.15	0.16	0.16	0.17	0.17	0.18	0.19	0.19	0.20
RoE	Rs/kWh	2.25	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55
Total COG	Rs/kWh	6.58	8.07	7.84	7.60	7.37	7.14	6.91	6.68	6.46	6.24	6.02	6.24	6.03	4.41	4.48	4.56	4.64	4.72	4.81	4.90	5.00	5.11	5.22	5.34	5.46	5.59
COG exc RoE			5.95	5.72	5.48	5.25	5.02	4.79	4.56	4.34	4.12	3.90	3.70	3.49	1.86	1.94	2.01	2.09	2.17	2.26	2.36	2.46	2.56	2.67	2.79	2.92	3.05
Discount Factor			1	0.902	0.814	0.73	0.663	0.599	0.54	0.487	0.44	0.397	0.358	0.32	0.29	0.26	0.2	0.21	0.19	0.17	0.1576	0.14	0.13	0.116	0.1	0.09	0.085
Levelised Tariff	Rs/Unit	6.58																									

Determination of Accelerated Depreciation for Wind Power Projects

Depreciation Amount	90%																					
Book Depreciation rate	5.28%																					
Tax Depreciation Rate	80%																					
Addl Depreciation	20%																					
Income Tax (Normal Rates)	33.99%																					
Capital Cost	619.52																					
Years	Unit	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Book Depreciation	%	2.64%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	2.88%	0	0	
Book Depreciation	Rs.Lakhs	16.36	32.71	32.71	32.71	32.71	32.71	32.71	32.71	32.71	32.71	32.71	32.71	32.71	32.71	32.71	32.71	32.71	17.84	0.00	0.00	
Accelerated Depreciation																						
Opening	%	100%	50%	5%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Allowed during the year	%	50%	45%	4.00%	0.80%	0.16%	0.03%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
Closing	%	50%	5%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Accelerated Depreciation	Rs Lakhs	309.8	278.8	24.78	4.96	0.99	0.20	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Net Depr Benefit	Rs Lakhs	293.41	246.07	-7.93	-27.75	-31.72	-32.51	-32.67	-32.70	-32.71	-32.71	-32.71	-32.71	-32.71	-32.71	-32.71	-32.71	-32.71	-17.84	0.00	0.00	
Tax Benefit	Rs Lakhs	99.73	83.64	-2.70	-9.43	-10.78	-11.05	-11.10	-11.12	-11.12	-11.12	-11.12	-11.12	-11.12	-11.12	-11.12	-11.12	-11.12	-6.06	0.00	0.00	
Energy Generation	MU	0.876	1.752	1.752	1.75	1.752	1.752	1.752	1.752	1.752	1.752	1.752	1.75	1.752	1.752	1.75	1.75	1.75	1.75	1.752	1.75	
Per Unit Benefit	Rs/Unit	11.38	4.77	-0.15	-0.54	-0.62	-0.63	-0.63	-0.63	-0.63	-0.63	-0.63	-0.63	-0.63	-0.63	-0.63	-0.63	-0.63	-0.35	0.00	0.00	
Discounting Factor		1	0.95	0.86	0.78	0.70	0.63	0.57	0.52	0.47	0.42	0.38	0.34	0.31	0.28	0.25	0.23	0.20	0.18	0.17	0.15	
Tax Benefit Levelised	11.69																					
Electricity generation	1.66																					
Levelised Benefit	0.70																					

Annexure 2

Assumptions: Small Hydro Energy Projects <5 MW					
S.No	Assumption	Sub-Head	Sub-Head(2)	Unit	Assumpti ons
1	Power Generation	Capacity	InstalledPower Generation	MW	1
			Capacity		
			Capacity Utilization Factor	%	45%
			Auxiliary Consumption	%	1
2	Project Cost	Capital Cost/MW	Power Plant Cost	Rs. Lakhs/MW	850.000
			Useful Life	Years	35
3	Sources of Fund	Debt:Equity	Tariff Period	Years	35
			Debt	%	70
			Equity	%	30
			Total Debt Amount	Rs. Lakhs	595.000
			Total Equity Amount	Rs. Lakhs	255.000
			Loan Amount	Rs. Lakhs	595.000
			Moratorium Period	Years	0
			Repayment Period	Years	12
			Interest Rate	% p.a	13%
			Equity Component	Rs. Lakhs	255.000
			RoE for first 10 Years	% p.a	20.00%
			RoE from 11 th Year Onwards	% p.a	24.00
Weighted Average of RoE		22.86			
Discount Rate		10.81%			
4	Financial Assumptions	Fiscal Assumption Depreciation	Income Tax	%	33.99
			Depre rate for first 12Years	%	5.83
			Depre rate 13 th Year Onwards	%	0.87
5	Working Capital	For Fixed Charges		Months	1
		O&M Charges			15%
		Maintenance Spare Receivables	% of O&M Expense	Months	2
		For variable Charges		%	13.5%
		Interest on WC			
6	Operation & Maintenance	O&M (FY 15-16)		Rs. Lakhs/MW	30.00
		Total O&M Escalation		%	5.72%

Determination of Tariff for Small Hydro power projects (0-5 MW)

Units generated	Unit	Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	
Installed Capacity			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
PLF	%	45%																																				
Gross/Net generation			3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942		
Capital Cost	Rs.Lakh	850.00																																				
Debt	Rs.Lakh	595.00																																				
Equity	Rs.Lakh	255.00																																				
Principal Paid per Year	Rs.Lakh	49.58																																				
Debt Opening	Rs.Lakh		595.00	545.42	495.83	446.25	396.67	347.08	297.50	247.92	198.33	148.75	99.17	49.58																								
Debt Closing	Rs.Lakh		545.42	495.83	446.25	396.67	347.08	297.50	247.92	198.33	148.75	99.17	49.58	0.00																								
Fixed Cost																																						
O&M Expenses	Rs.Lakh		30.00	31.72	33.53	35.45	37.48	39.62	41.89	44.28	46.81	49.49	52.32	55.32	58.48	61.83	65.36	69.10	73.05	77.23	81.65	86.32	91.26	96.48	101.99	107.83	114.00	120.52	127.41	134.70	142.40	150.55	159.16	168.26	177.89	188.06	198.82	
Depreciation for first 12 Yrs	Rs.Lakh	5.83%	49.56	49.56	49.56	49.56	49.56	49.56	49.56	49.56	49.56	49.56	49.56	49.56	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40		
Depreciation from 13th Yr	Rs.Lakh	0.87%																																				
Interest on Term Loan	Rs.Lakh		74.13	67.68	61.24	54.79	48.34	41.90	35.45	29.01	22.56	16.11	9.67	3.22																								
Interest on WC	Rs.Lakh		5.68	5.62	5.58	5.53	5.50	5.47	5.44	5.43	5.42	5.42	5.66	5.68	4.81	4.99	5.19	5.40	5.61	5.85	6.09	6.35	6.62	6.91	7.21	7.54	7.88	8.24	8.62	9.02	9.45	9.90	10.37	10.87	11.41	11.97	12.56	
RoE	Rs.Lakh		51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00	61.20	61.20	61.20	61.20	61.20	61.20	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2	
Total Fixed Cost	Rs.Lakh		210.36	205.58	200.90	196.33	191.87	187.54	183.34	179.27	175.35	171.58	178.41	174.97	131.88	135.41	139.15	143.09	147.26	151.67	156.33	161.26	166.47	171.98	177.8	183.96	190.47	197.35	204.62	212.31	220.44	229.04	238.13	247.73	257.89	268.63	279.98	
Levelised Tariff Corresponding to useful Life																																						
O&M Expenses	Rs/kWh	1.34	0.76	0.80	0.85	0.90	0.95	1.01	1.06	1.12	1.19	1.26	1.33	1.40	1.48	1.57	1.66	1.75	1.85	1.96	2.07	2.19	2.31	2.45	2.59	2.74	2.89	3.06	3.23	3.42	3.61	3.82	4.04	4.27	4.51	4.77	5.04	
Depreciation	Rs/kWh	0.97	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	
Interest on Term Loan	Rs/kWh	0.86	1.88	1.72	1.55	1.39	1.23	1.06	0.90	0.74	0.57	0.41	0.25	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Interest on WC	Rs/kWh	0.15	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.12	0.13	0.13	0.13	0.14	0.15	0.15	0.16	0.17	0.18	0.18	0.19	0.20	0.21	0.22	0.23	0.24	0.25	0.26	0.28	0.29	0.30	0.32	
RoE	Rs/kWh	1.38	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	
Total COG	Rs/kWh	4.69	5.34	5.22	5.10	4.98	4.87	4.76	4.65	4.55	4.45	4.35	4.53	4.44	3.35	3.44	3.53	3.63	3.74	3.85	3.97	4.09	4.22	4.36	4.51	4.67	4.83	5.01	5.19	5.39	5.59	5.81	6.04	6.28	6.54	6.81	7.10	
COG exc RoE			4.04	3.92	3.80	3.69	3.57	3.46	3.36	3.25	3.15	3.06	2.97	2.89	1.79	1.88	1.98	2.08	2.18	2.30	2.41	2.54	2.67	2.81	2.96	3.11	3.28	3.45	3.64	3.83	4.04	4.26	4.49	4.73	4.99	5.26	5.55	
Discount Factor			1.00	0.90	0.81	0.73	0.66	0.60	0.54	0.49	0.44	0.40	0.36	0.32	0.29	0.26	0.24	0.21	0.1935	0.1746	0.1576	0.1422	0.1284	0.1158	0.1045	0.0943	0.0851	0.0768	0.0693	0.0626	0.0565	0.0510	0.046	0.0413	0.0375	0.0338	0.0305	
Levelised Tariff	Rs/Unit	4.69																																				

Determination of Accelerated Depreciation for Small Hydro Projects (0-5 MW)

Determination of Accelerated Depreciation

Depreciation Amount	90%
Book Depreciation rate	5.28%
Tax Depreciation Rate	80%
Addl Depreciation	20%
Income Tax (Normal Rates)	33.99%
Capital Cost	850.00

Years	Unit	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Book Depreciation	%	2.64%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	2.88%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Book Depreciation	Rs Lakhs	22.44	44.88	44.88	44.88	44.88	44.88	44.88	44.88	44.88	44.88	44.88	44.88	44.88	44.88	44.88	44.88	44.88	24.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Accelerated Depreciation																																				
Opening	%	100%	50%	5%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Allowed during the year	%	50%	45%	4.00%	0.80%	0.16%	0.03%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
Closing	%	50%	5%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Accelerated Depreciation	Rs Lakhs	425	382.5	34	6.80	1.36	0.27	0.05	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Net Depr Benefit	Rs Lakhs	402.56	337.62	-10.88	-38.08	-43.52	-44.61	-44.83	-44.87	-44.88	-44.88	-44.88	-44.88	-44.88	-44.88	-44.88	-44.88	-44.88	-24.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Tax Benefit	Rs Lakhs	136.83	114.76	-3.70	-12.94	-14.79	-15.16	-15.24	-15.25	-15.25	-15.25	-15.25	-15.25	-15.25	-15.25	-15.25	-15.25	-15.25	-8.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Energy Generation	MU	1.971	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942		
Per Unit Benefit	Rs/Unit	6.94	2.91	-0.09	-0.33	-0.38	-0.38	-0.39	-0.39	-0.39	-0.39	-0.39	-0.39	-0.39	-0.39	-0.39	-0.39	-0.39	-0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Discounting Factor		1	0.95	0.86	0.78	0.70	0.63	0.57	0.52	0.47	0.42	0.38	0.34	0.31	0.28	0.25	0.23	0.20	0.18	0.17	0.15	0.14	0.12	0.11	0.10	0.09	0.08	0.07	0.07	0.06	0.05	0.05	0.04	0.04	0.04	0.03

Annexure 3

Assumptions: Small Hydro Energy Projects 5 MW-25 MW					
S.No	Assumption	Sub-Head	Sub-Head(2)	Unit	Assumpti ons
1	Power Generation	Capacity	InstalledPower Generation Capacity	MW	1
			Capacity Utilization Factor	%	45%
			Auxiliary Consumption	%	1
			Useful Life	Years	35
2	Project Cost	Capital Cost/MW	Power Plant Cost	Rs. Lakhs/MW	775.000
3	Sources of Fund	Debt:Equity	Tariff Period	Years	13
			Debt	%	70
			Equity	%	30
			Total Debt Amount	Rs. Lakhs	542.50
			Total Equity Amount	Rs. Lakhs	232.50
			Loan Amount	Rs. Lakhs	542.500
			Moratorium Period	Years	12
			Repayment Period	Years	13%
			Interest Rate	% p.a	
			Equity Component	Rs. Lakhs	232.5016
			Normative RoE	% p.a	20.00%
			RoE for first 10 Years	% p.a	24.00
RoE from 11 th Year Onwards		22.86			
Weighted Average of RoE		10.81%			
Discount Rate					
4	Financial Assumptions	Fiscal Assumption Depreciation	Income Tax	%	33.99
			Depre rate for first 12Years	%	5.83
			Depre rate 13 th Year Onwards	%	0.87
5	Working Capital	For Fixed Charges		Months	1
		O&M Charges			15%
		Maintenance Spare Receivables	% of O&M Expense	Months	2
		For variable Charges		%	13.5%
6	Operation & Maintenance	O&M (FY 15-16)		Rs. Lakhs/MW	21.60
		Total O&M		%	5.72%
		Escalation			

Determination of Tariff for Small Hydro power Projects (5-25 MW)

Units generated	Unit	Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	
Installed Capacity			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
PLF	%	45%																																				
Gross/Net generation			3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	3.942	
Capital Cost	Rs.Lakh	775.00																																				
Debt	Rs.Lakh	542.50																																				
Equity	Rs.Lakh	232.50																																				
Principal paid per Year	Rs.Lakh	45.21																																				
Debt Opening	Rs.Lakh		542.50	497.29	452.08	406.88	361.67	316.46	271.25	226.04	180.83	135.63	90.42	45.21																								
Debt Closing	Rs.Lakh		497.29	452.08	406.88	361.67	316.46	271.25	226.04	180.83	135.63	90.42	45.21	0.00																								
Fixed Cost																																						
O&M Expenses	Rs.Lakh		21.60	22.84	24.14	25.52	26.98	28.53	30.16	31.88	33.71	35.63	37.67	39.83	42.11	44.51	47.06	49.75	52.60	55.61	58.79	62.15	65.70	69.46	73.44	77.64	82.08	86.77	91.74	96.98	102.53	108.40	114.60	121.15	128.08	135.41	143.15	
Depreciation for first 12 Yrs	Rs.Lakh	5.83%	45.18	45.18	45.18	45.18	45.18	45.18	45.18	45.18	45.18	45.18	45.18	45.18	45.18	45.18	45.18	45.18	45.18	45.18	45.18	45.18	45.18	45.18	45.18	45.18	45.18	45.18	45.18	45.18	45.18	45.18	45.18	45.18	45.18	45.18	45.18	
Depreciation from 13th Yr	Rs.Lakh	0.87%																																				
Interest on Term Loan	Rs.Lakh		67.59	61.71	55.83	49.96	44.08	38.20	32.32	26.45	20.57	14.69	8.82	2.94																								
Interest on WC	Rs.Lakh		4.86	4.79	4.73	4.67	4.62	4.57	4.52	4.48	4.45	4.42	4.41	4.39	4.37	4.36	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35
RoE	Rs.Lakh		46.50	46.50	46.50	46.50	46.50	46.50	46.50	46.50	46.50	46.50	46.50	46.50	46.50	46.50	46.50	46.50	46.50	46.50	46.50	46.50	46.50	46.50	46.50	46.50	46.50	46.50	46.50	46.50	46.50	46.50	46.50	46.50	46.50	46.50	46.50	46.50
Total Fixed Cost	Rs.Lakh		185.73	181.02	176.39	171.83	167.36	162.97	158.68	154.49	150.40	146.43	142.58	138.84	135.21	131.68	128.25	124.92	121.68	118.54	115.49	112.53	109.65	106.85	104.12	101.46	98.87	96.35	93.89	91.49	89.14	86.84	84.59	82.38	80.21	78.08	75.98	73.91
Levelised Tariff Corresponding to useful Life																																						
O&M Expenses	Rs/kWh	0.97	0.55	0.58	0.61	0.65	0.68	0.72	0.77	0.81	0.86	0.90	0.96	1.01	1.07	1.13	1.19	1.26	1.33	1.41	1.49	1.58	1.67	1.76	1.86	1.97	2.08	2.20	2.33	2.46	2.60	2.75	2.91	3.07	3.25	3.43	3.63	
Depreciation	Rs/kWh	0.88	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	
Interest on Term Loan	Rs/kWh	0.78	1.71	1.57	1.42	1.27	1.12	0.97	0.82	0.67	0.52	0.37	0.22	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest on WC	Rs/kWh	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.11	0.11	0.11	0.11	0.12	0.12	0.10	0.10	0.10	0.11	0.11	0.11	0.12	0.12	0.13	0.13	0.14	0.15	0.15	0.16	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
RoE	Rs/kWh	1.26	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42
Total COG	Rs/kWh	4.01	4.71	4.59	4.47	4.36	4.25	4.13	4.03	3.92	3.82	3.71	3.66	3.76	2.75	2.81	2.88	2.95	3.03	3.11	3.20	3.29	3.38	3.48	3.59	3.70	3.82	3.95	4.08	4.22	4.37	4.52	4.69	4.87	5.05	5.25	5.46	
COG exc RoE			3.53	3.41	3.29	3.18	3.07	2.95	2.85	2.74	2.64	2.53	2.44	2.35	1.33	1.40	1.47	1.54	1.62	1.70	1.78	1.87	1.97	2.07	2.17	2.29	2.40	2.53	2.66	2.80	2.95	3.11	3.28	3.45	3.64	3.83	4.04	
Discount Factor			1.00	0.90	0.81	0.73	0.66	0.60	0.54	0.49	0.44	0.40	0.36	0.32	0.29	0.26	0.24	0.21	0.1935	0.1746	0.1576	0.1422	0.1284	0.1158	0.1045	0.0943	0.0851	0.0768	0.0693	0.0626	0.0565	0.0510	0.0460	0.0415	0.0375	0.0338	0.0305	
Levelised Tariff	Rs/Unit	4.01																																				

ANNEXURE 4

Assumptions: Biomass based on rankine cycle technology					
S.No	Assumption	Sub-Head	Sub-Head(2)	Unit	Assumpti ons
1	Power Generation	Capacity	Installed Generation Capacity	MW	1
			PLF (Stabilization for first six months)	%	60%
			PLF (during first yr after stab.)	%	70%
			PLF(second year onwards)	%	80
			Auxiliary Consumption during stabilization	%	11
			Auxiliary Consumption after stabilization	%	10
			Useful Life	Years	
2	Project Cost	Capital Cost/MW	Power Plant Cost	Rs. Lakhs/MW	610.437
3	Sources of Fund	Debt:Equity	Tariff Period	Years	13
			Debt	%	70
			Equity	%	30
			Total Debt Amount	Rs. Lakhs	427.306
			Total Equity Amount	Rs. Lakhs	183.131
			Loan Amount	Rs. Lakhs	427.306
			Moratorium Period	Years	0
			Repayment Period	Years	12
			Interest Rate	% p.a	13%
			Equity Component	Rs. Lakhs	181.131
			RoE for first 10 Years	% p.a	20.00%
			RoE from 11 th Year Onwards	% p.a	24.00
			Weighted Average of RoE		22.86
Discount Rate(equity to WACC)		10.81%			
4	Financial Assumptions	Fiscal Assumption Depreciation	Income Tax	%	33.99
			Depre rate for first 12Years	%	5.83
			Depre rate 13 th Year Onwards	%	0.87
5	Working Capital	For Fixed Charges	% of O&M Expense	Months	1
		O&M Charges		Months	15%
		Maintenance Spare		Months	2
		Receivables		%	13.5%
		For variable Charges			
		Interest on WC			

6	Operation & Maintenance	O&M (FY 15-16) Total O&M Escalation		Rs. Lakhs/MW %	21.27 5.72%
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Determination of Tariff for Biomass Power Projects based on Rankine Cycle technology

Units generated	Unit	Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Installed Capacity			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
PLF	%	80%																				
Gross Generation			5.69	7.01	7.01	7.01	7.01	7.01	7.01	7.01	7.01	7.01	7.01	7.01	7.01	7.01	7.01	7.01	7.008	7.008	7.008	7.008
Aux Consumption		10.00%	0.63	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Net Generation			5.07	6.31	6.31	6.31	6.31	6.31	6.31	6.31	6.31	6.31	6.31	6.31	6.31	6.31	6.31	6.31	6.31	6.31	6.31	6.31
Capital Cost	Rs.Lakh	610.44																				
Debt	Rs.Lakh	427.31																				
Equity	Rs.Lakh	183.13																				
Principal paid per Year	Rs.Lakh	35.61																				
Debt Opening	Rs.Lakh		427.31	391.70	356.09	320.48	284.87	249.26	213.65	178.05	142.44	106.83	71.22	35.61								
Debt Closing	Rs.Lakh		391.70	356.09	320.48	284.87	249.26	213.65	178.05	142.44	106.83	71.22	35.61	0.00								
Variable Cost																						
Biomass Base price	Rs/Tonne	3144.80																				
GCV	Kcal/Kg	3100.00																				
SHR	Kcal/kWh	4200.00																				
Biomass Cost			242.60	254.73	267.47	280.84	294.89	309.63	325.11	341.37	358.44	376.36	395.18	414.94	435.68	457.47	480.34	504.36	529.57	556.05	583.86	613.05
Fixed Cost																						
O&M Expenses	Rs.Lakh		44.71	47.27	49.97	52.83	55.85	59.05	62.42	65.99	69.77	73.76	77.98	82.44	87.15	92.14	97.41	102.98	108.87	115.10	121.68	128.64
Depreciation for first 12 Yrs	Rs.Lakh	5.83%	35.59	35.59	35.59	35.59	35.59	35.59	35.59	35.59	35.59	35.59	35.59	35.59	15.32	15.32	15.32	15.32	15.32	15.32	15.32	15.32
Depreciation from 13th Yr	Rs.Lakh	2.51%																				
Interest on Term Loan	Rs.Lakh		53.24	48.61	43.98	39.35	34.72	30.09	25.46	20.83	16.20	11.57	6.94	2.31								
Interest on WC	Rs.Lakh		22.11	22.98	23.90	24.88	25.91	27.00	28.15	29.36	30.64	31.99	33.59	35.09	36.26	38.04	39.91	41.88	43.95	46.12	48.40	50.80
RoE	Rs.Lakh		36.63	36.63	36.63	36.63	36.63	36.63	36.63	36.63	36.63	36.63	43.95	43.95	43.95	43.95	43.95	43.95	43.95	43.95	43.95	43.95
Total Fixed Cost	Rs.Lakh		192.27	191.07	190.07	189.27	188.69	188.35	188.25	188.40	188.83	189.54	198.05	199.39	182.69	189.46	196.60	204.14	212.09	220.49	229.36	238.72
Levelised Tariff Corresponding to useful Life																						
Variable COG	Rs/kWh	6.74	4.79	5.03	5.28	5.54	5.82	6.11	6.42	6.74	7.07	7.43	7.80	8.19	8.60	9.03	9.48	9.95	10.45	10.97	11.52	12.10
O&M Expenses	Rs/kWh	1.31	0.88	0.93	0.99	1.04	1.10	1.17	1.23	1.30	1.38	1.46	1.54	1.63	1.72	1.82	1.92	2.03	2.15	2.27	2.40	2.54
Depreciation	Rs/kWh	0.63	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Interest on Term Loan	Rs/kWh	0.53	1.05	0.96	0.87	0.78	0.69	0.59	0.50	0.41	0.32	0.23	0.14	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest on WC	Rs/kWh	0.58	0.44	0.45	0.47	0.49	0.51	0.53	0.56	0.58	0.60	0.63	0.66	0.69	0.72	0.75	0.79	0.83	0.87	0.91	0.96	1.00
RoE	Rs/kWh	0.76	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Total COG	Rs/kWh	10.55	3.79	3.77	3.75	3.73	3.72	3.72	3.71	3.72	3.73	3.74	3.91	3.93	3.61	3.74	3.88	4.03	4.19	4.35	4.53	4.71
COG exc RoE			3.07	3.05	3.03	3.01	3.00	2.99	2.99	2.99	3.00	3.02	3.04	3.07	2.74	2.87	3.01	3.16	3.32	3.48	3.66	3.84
Discount Factor			1.00	0.90	0.81	0.73	0.66	0.60	0.54	0.49	0.44	0.40	0.36	0.32	0.29	0.26	0.24	0.21	0.1935	0.1746	0.1576	0.1422
Variable Cost	Rs/Unit																					
Levelised Tariff	Rs/Unit	10.55																				

Determination of Accelerated Depreciation for Biomass Power Projects based on Rankine Cycle technology

Determination of Accelerated Depreciation																						
Depreciation Amount	90%																					
Book Depreciation rate	5.28%																					
Tax Depreciation Rate	80%																					
Addl Depreciation	20%																					
Income Tax (Normal Rates)	33.99%																					
Capital Cost	610.44																					
Years	Unit		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Book Depreciation	%		2.64%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	2.88%	0	0
Book Depreciation	Rs'.Lakhs		16.12	32.23	32.23	32.23	32.23	32.23	32.23	32.23	32.23	32.23	32.23	32.23	32.23	32.23	32.23	32.23	32.23	17.58	0.00	0.00
Accelerated Depreciation																						
Opening	%		100%	50%	5%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Allowed during the year	%		50%	45%	4.00%	0.80%	0.16%	0.03%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Closing	%		50%	5%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Accelerated Depreciation	Rs Lakhs		305.22	274.7	24.418	4.88	0.98	0.20	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Depr Benefit	Rs Lakhs		289.10	242.47	-7.81	-27.35	-31.25	-32.04	-32.19	-32.22	-32.23	-32.23	-32.23	-32.23	-32.23	-32.23	-32.23	-32.23	-32.23	-17.58	0.00	0.00
Tax Benefit	Rs Lakhs		98.27	82.41	-2.66	-9.30	-10.62	-10.89	-10.94	-10.95	-10.95	-10.96	-10.96	-10.96	-10.96	-10.96	-10.96	-10.96	-10.96	-5.98	0.00	0.00
Energy Generation	MU		2.847	7.008	7.008	7.008	7.008	7.008	7.008	7.008	7.008	7.008	7.008	7.008	7.008	7.008	7.008	7.008	7.008	7.008	7.008	7.008
Per Unit Benefit	Rs/Unit		3.45	1.18	-0.04	-0.13	-0.15	-0.16	-0.16	-0.16	-0.16	-0.16	-0.16	-0.16	-0.16	-0.16	-0.16	-0.16	-0.16	-0.09	0.00	0.00
Discounting Factor			1	0.95	0.86	0.78	0.70	0.63	0.57	0.52	0.47	0.42	0.38	0.34	0.31	0.28	0.25	0.23	0.20	0.18	0.17	0.15
Tax Benefit Levelised	11.52																					
Electricity generation	6.56																					
Levelised Benefit	0.18	Rs/Unit																				

Annexure 5

Assumptions: Non fossil based Co-generation					
S.No	Assumption	Sub-Head	Sub-Head(2)	Unit	Assumptions
1	Power Generation	Capacity	Installed Power Generation Capacity	MW	1
			PLF	%	53%
			Auxiliary Consumption	%	8.5%
			Useful Life	Years	20
2	Project Cost	Capital Cost/MW	Power Plant Cost	Rs. Lakhs/MW	452.479
3	Sources of Fund	Debt:Equity	Debt	%	704
			Equity	%	30
			Total Debt Amount	Rs. Lakhs	316.735
			Total Equity Amount	Rs. Lakhs	135.744
			Loan Amount	Rs. Lakhs	316.74
			Moratorium Period	Years	0
			Repayment Period	Years	12
			Interest Rate	% p.a	13%
			Equity Component	Rs. Lakhs	135.74
			RoE for first 10 Years	% p.a	20.00%
RoE from 11 th Year Onwards	% p.a	24.00			
Weighted Average of RoE		22.00			
Discount Rate		10.81%			
4	Financial Assumptions	Fiscal Assumption Depreciation	Income Tax	%	33.99
			Depre rate for first 12Years	%	5.83
			Depre rate 13 th Year Onwards	%	2.51
5	Working Capital	For Fixed Charges O&M Charges Maintenance Spare Receivables <u>For variable</u> Biomass Stock Interest on WC		Months	1
			% of O&M Expense		15%
				Months	2
				Months	4
				%	13.5%
	Fuel Related Assumptions	Heat rate Biomass	During/After Stabilization	Kcal/kWh	3600
			Bagasse Price	Rs/T	2010.58
			GCV-Bagasse	Kcal/Kg	2250
			Bagasse Price Escalation factor		5%
6	Operation & Maintenance	O&M (FY 15-16) Total O&M Escalation		Rs. Lakhs/MW	18.91
				%	5.72%

Determination of Tariff for Non fossil fuel based Co-Generation Projects

Units generated	Unit	Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Installed Capacity			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
PLF	%	53%																				
Gross Generation			4.64	4.64	4.64	4.64	4.64	4.64	4.64	4.64	4.64	4.64	4.64	4.64	4.64	4.64	4.64	4.64	4.6428	4.6428	4.6428	4.6428
Aux Consumption		8.50%	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39
Net Generation			4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
Capital Cost	Rs.Lakh	452.48																				
Debt	Rs.Lakh	316.74																				
Equity	Rs.Lakh	135.74																				
Principal paid per Year	Rs.Lakh	26.39																				
Debt Opening	Rs.Lakh		316.74	290.34	263.95	237.55	211.16	184.76	158.37	131.97	105.58	79.18	52.79	26.39								
Debt Closing	Rs.Lakh		290.34	263.95	237.55	211.16	184.76	158.37	131.97	105.58	79.18	52.79	26.39	0.00								
Variable Cost																						
Biomass Base price	Rs/Tonne	2010.58																				
GCV	Kcal/Kg	2250.00																				
SHR	Kcal/kWh	3600.00																				
Biomass Cost			149.36	156.82	164.66	172.90	181.54	190.62	200.15	210.16	220.67	231.70	243.28	255.45	268.22	281.63	295.71	310.50	326.02	342.33	359.44	377.41
Fixed Cost																						
O&M Expenses	Rs.Lakh		18.91	19.99	21.14	22.34	23.62	24.97	26.40	27.91	29.51	31.20	32.98	34.87	36.86	38.97	41.20	43.56	46.05	48.68	51.47	54.41
Depreciation for first 12 Yrs	Rs.Lakh	5.83%	26.38	26.38	26.38	26.38	26.38	26.38	26.38	26.38	26.38	26.38	26.38	26.38	11.36	11.36	11.36	11.36	11.36	11.36	11.36	11.36
Depreciation from 13th Yr	Rs.Lakh	2.51%																				
Interest on Term Loan	Rs.Lakh		39.46	36.03	32.60	29.17	25.73	22.30	18.87	15.44	12.01	8.58	5.15	1.72								
Interest on WC	Rs.Lakh		13.50	14.00	14.52	15.08	15.67	16.29	16.95	17.64	18.38	19.15	20.10	20.96	21.57	22.61	23.71	24.86	26.07	27.34	28.68	30.08
RoE	Rs.Lakh		27.15	27.15	27.15	27.15	27.15	27.15	27.15	27.15	27.15	27.15	27.15	32.58	32.58	32.58	32.58	32.58	32.58	32.58	32.58	32.58
Total Fixed Cost	Rs.Lakh		125.40	123.54	121.78	120.12	118.55	117.09	115.75	114.52	113.42	112.46	111.78	111.50	102.37	105.52	108.84	112.35	116.05	119.96	124.08	128.42
Levelised Tariff Corresponding to useful Life																						
Variable COG	Rs/kWh	4.95	3.52	3.69	3.88	4.07	4.27	4.49	4.71	4.95	5.19	5.45	5.73	6.01	6.31	6.63	6.96	7.31	7.67	8.06	8.46	8.88
O&M Expenses	Rs/kWh	0.66	0.45	0.47	0.50	0.53	0.56	0.59	0.62	0.66	0.69	0.73	0.78	0.82	0.87	0.92	0.97	1.03	1.08	1.15	1.21	1.28
Depreciation	Rs/kWh	0.55	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
Interest on Term Loan	Rs/kWh	0.47	0.93	0.85	0.77	0.69	0.61	0.53	0.44	0.36	0.28	0.20	0.12	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest on WC	Rs/kWh	0.42	0.32	0.33	0.34	0.35	0.37	0.38	0.40	0.42	0.43	0.45	0.47	0.49	0.51	0.53	0.56	0.59	0.61	0.64	0.68	0.71
RoE	Rs/kWh	0.67	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Total COG	Rs/kWh	7.73	2.95	2.91	2.87	2.83	2.79	2.76	2.72	2.70	2.67	2.65	2.76	2.74	2.41	2.48	2.56	2.64	2.73	2.82	2.92	3.02
COG exc RoE			2.31	2.27	2.23	2.19	2.15	2.12	2.09	2.06	2.03	2.01	1.99	1.98	1.64	1.72	1.80	1.88	1.96	2.06	2.15	2.26
Discount Factor			1.00	0.90	0.81	0.73	0.66	0.60	0.54	0.49	0.44	0.40	0.36	0.32	0.29	0.26	0.24	0.21	0.1935	0.1746	0.1576	0.1422
Variable Cost	Rs/Unit																					
Levelised Tariff	Rs/Unit	7.73																				

Determination of Accelerated Depreciation for Non fossil fuel based Co-Generation Projects

Determination of Accelerated Depreciation																					
Depreciation Amount	90%																				
Book Depreciation rate	5.28%																				
Tax Depreciation Rate	80%																				
Addl Depreciation	20%																				
Income Tax (Normal Rates)	33.99%																				
Capital Cost	452.48																				
Years	Unit	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Book Depreciation	%	2.64%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	2.88%	0	0
Book Depreciation	Rs Lakhs	11.95	23.89	23.89	23.89	23.89	23.89	23.89	23.89	23.89	23.89	23.89	23.89	23.89	23.89	23.89	23.89	23.89	13.03	0.00	0.00
Accelerated Depreciation																					
Opening	%	100%	50%	5%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Allowed during the year	%	50%	45%	4.00%	0.80%	0.16%	0.03%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Closing	%	50%	5%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Accelerated Depreciation	Rs Lakhs	226.24	203.62	18.099	3.62	0.72	0.14	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Depr Benefit	Rs Lakhs	214.29	179.72	-5.79	-20.27	-23.17	-23.75	-23.86	-23.89	-23.89	-23.89	-23.89	-23.89	-23.89	-23.89	-23.89	-23.89	-23.89	-13.03	0.00	0.00
Tax Benefit	Rs Lakhs	72.84	61.09	-1.97	-6.89	-7.87	-8.07	-8.11	-8.12	-8.12	-8.12	-8.12	-8.12	-8.12	-8.12	-8.12	-8.12	-8.12	-4.43	0.00	0.00
Energy Generation	MU	2.3214	4.6428	4.6428	4.6428	4.6428	4.6428	4.6428	4.6428	4.6428	4.6428	4.6428	4.6428	4.6428	4.6428	4.6428	4.6428	4.6428	4.6428	4.6428	4.6428
Per Unit Benefit	Rs/Unit	3.14	1.32	-0.04	-0.15	-0.17	-0.17	-0.17	-0.17	-0.17	-0.17	-0.17	-0.17	-0.17	-0.17	-0.17	-0.17	-0.17	-0.10	0.00	0.00
Discounting Factor		1	0.95	0.86	0.78	0.70	0.63	0.57	0.52	0.47	0.42	0.38	0.34	0.31	0.28	0.25	0.23	0.20	0.18	0.17	0.15
Tax Benefit Levelised	8.54																				
Electricity generation	4.40																				
Levelised Benefit	0.19	Rs/Unit																			

Annexure 6

Assumptions: Solar PV Power Projects					
S.No	Assumption	Sub-Head	Sub-Head(2)	Unit	Assumptions
1	Power Generation	Capacity	Installed Power Generation Capacity	MW	1
			Capacity Utilization Factor	%	19%
			Auxiliary Consumption	%	1
			Useful Life	Years	25
2	Project Cost	Capital Cost/MW	Power Plant Cost	Rs. Lakhs/MW	600.00
3	Sources of Fund	Debt:Equity	Tariff Period	Years	25
			Debt	%	70
			Equity	%	30
			Total Debt Amount	Rs. Lakhs	420.00
			Total Equity Amount	Rs. Lakhs	180.00
			Loan Amount	Rs. Lakhs	420.00
			Moratorium Period	Years	0
			Repayment Period	Years	12
			Interest Rate	% p.a	13%
			Equity Component	Rs. Lakhs	180.00
RoE for first 10 Years	% p.a	20.00%			
RoE from 11 th Year Onwards	% p.a	24.00			
Weighted Average of RoE		22.40			
Discount Rate		10.81%			
4	Financial Assumptions	Fiscal Assumption Depreciation	Income Tax	%	33.99
			Depre rate for first 12Years	%	5.83
			Depre rate 13 th Year Onwards	%	1.54
5	Working Capital	For Fixed Charges O&M Charge Maintenance Spare Receivables For variable Charges Interest on WC	% of O&M Expense	Months	1
					15%
				Months	2
				%	13.5%
6	Operation & Maintenance	O&M (FY 15-16)		Rs. Lakhs/MW	13.25
		Total O&M Escalation		%	5.72%

Determination of Tariff for Solar PV power Projects

Units generated	Unit	Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Installed Capacity			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
PLF	%	19%																									
Gross/Net generation			1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.6644	1.6644	1.6644	1.6644	1.6644	1.6644	1.6644	1.6644	1.6644
Capital Cost	Rs.Lakh	600.00																									
Debt	Rs.Lakh	420.00																									
Equity	Rs.Lakh	180.00																									
Principal paid Per year	Rs.Lakh	35.00																									
Debt Opening	Rs.Lakh		420.00	385.00	350.00	315.00	280.00	245.00	210.00	175.00	140.00	105.00	70.00	35.00													
Debt Closing	Rs.Lakh		385.00	350.00	315.00	280.00	245.00	210.00	175.00	140.00	105.00	70.00	35.00	0.00													
Fixed Cost																											
O&M Expenses	Rs.Lakh		13.25	14.01	14.81	15.66	16.55	17.50	18.50	19.56	20.68	21.86	23.11	24.43	25.83	27.31	28.87	30.52	32.26	34.11	36.06	38.12	40.31	42.61	45.05	47.62	50.35
Depreciation	Rs.Lakh		34.98	34.98	34.98	34.98	34.98	34.98	34.98	34.98	34.98	34.98	34.98	34.98	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22
Interest on Term Loan	Rs.Lakh		52.33	47.78	43.23	38.68	34.13	29.58	25.03	20.48	15.93	11.38	6.83	2.28													
Interest on WC	Rs.Lakh		3.57	3.51	3.45	3.39	3.33	3.28	3.23	3.19	3.14	3.10	3.23	3.20	2.54	2.62	2.71	2.80	2.90	3.00	3.11	3.22	3.34	3.47	3.60	3.75	3.90
RoE	Rs.Lakh		36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	43.20	43.20	43.20	43.20	43.20	43.20	43.20	43.20	43.20	43.20	43.20	43.20	43.20
Total Fixed Cost	Rs.Lakh		140.13	136.27	132.46	128.70	124.99	121.33	117.74	114.20	110.72	107.32	111.35	108.09	76.79	78.35	80.00	81.74	83.582	85.529	87.588	89.765	92.066	94.499	97.071	99.79	102.66
Levelised Tariff Corresponding to useful Life																											
O&M Expenses	Rs/kWh	1.27	0.80	0.84	0.89	0.94	0.99	1.05	1.11	1.18	1.24	1.31	1.39	1.47	1.55	1.64	1.73	1.83	1.94	2.05	2.17	2.29	2.42	2.56	2.71	2.86	3.03
Depreciation	Rs/kWh	1.69	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31
Interest on Term Loan	Rs/kWh	1.51	3.14	2.87	2.60	2.32	2.05	1.78	1.50	1.23	0.96	0.68	0.41	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest on WC	Rs/kWh	0.20	0.21	0.21	0.21	0.20	0.20	0.20	0.19	0.19	0.19	0.19	0.19	0.19	0.15	0.16	0.16	0.17	0.17	0.18	0.19	0.19	0.20	0.21	0.22	0.23	0.23
RoE	Rs/kWh	2.29	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60
Total COG	Rs/kWh	6.95	8.42	8.19	7.96	7.73	7.51	7.29	7.07	6.86	6.65	6.45	6.69	6.49	4.61	4.71	4.81	4.91	5.02	5.14	5.26	5.39	5.53	5.68	5.83	6.00	6.17
COG exc RoE			6.26	6.02	5.80	5.57	5.35	5.13	4.91	4.70	4.49	4.28	4.09	3.90	2.02	2.11	2.21	2.32	2.43	2.54	2.67	2.80	2.94	3.08	3.24	3.40	3.57
Discount Factor			1.00	0.90	0.81	0.73	0.66	0.60	0.54	0.49	0.44	0.40	0.36	0.32	0.29	0.26	0.24	0.21	0.1935	0.1746	0.1576	0.1422	0.1284	0.1158	0.1045	0.0943	0.0851
Levelised Tariff	Rs/Unit	6.95																									

Determination of Accelerated Depreciation for Solar PV Power Projects

Determination of Accelerated Depreciation

Depreciation Amount	90%
Book Depreciation rate	5.28%
Tax Depreciation Rate	80%
Addl Depreciation	20%
Income Tax (Normal Rates)	33.99%
Capital Cost	600.00

Years	Unit	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Book Depreciation	%	2.64%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	2.88%	0	0	0	0	0	0	0
Book Depreciation	Rs.Lakhs	15.84	31.68	31.68	31.68	31.68	31.68	31.68	31.68	31.68	31.68	31.68	31.68	31.68	31.68	31.68	31.68	31.68	17.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Accelerated Depreciation																										
Opening	%	100%	50%	5%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Allowed during the year	%	50%	45%	4.00%	0.80%	0.16%	0.03%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Closing	%	50%	5%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Accelerated Depreciation	Rs Lakhs	300	270	24	4.80	0.96	0.19	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Depr Benefit	Rs Lakhs	284.16	238.32	-7.68	-26.88	-30.72	-31.49	-31.64	-31.67	-31.68	-31.68	-31.68	-31.68	-31.68	-31.68	-31.68	-31.68	-31.68	-17.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tax Benefit	Rs Lakhs	96.59	81.00	-2.61	-9.14	-10.44	-10.70	-10.75	-10.77	-10.77	-10.77	-10.77	-10.77	-10.77	-10.77	-10.77	-10.77	-10.77	-5.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy Generation	MU	0.8322	1.6644	1.6644	1.6644	1.6644	1.6644	1.6644	1.6644	1.6644	1.6644	1.6644	1.6644	1.6644	1.6644	1.6644	1.6644	1.6644	1.6644	1.6644	1.6644	1.6644	1.6644	1.6644	1.6644	1.6644
Per Unit Benefit	Rs/Unit	11.61	4.87	-0.16	-0.55	-0.63	-0.64	-0.65	-0.65	-0.65	-0.65	-0.65	-0.65	-0.65	-0.65	-0.65	-0.65	-0.65	-0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Discounting Factor		1	0.95	0.86	0.78	0.70	0.63	0.57	0.52	0.47	0.42	0.38	0.34	0.31	0.28	0.25	0.23	0.20	0.18	0.17	0.15	0.14	0.12	0.11	0.10	0.09
Tax Benefit Levelised	10.68																									
Electricity generation	1.58																									
Levelised Benefit	0.68	Rs/Unit																								

Annexure 7

Assumptions: Solar Thermal Power Projects					
S.No	Assumption	Sub-Head	Sub-Head(2)	Unit	Assumpti ons
1	Power Generation	Capacity	InstalledPower Generation Capacity Capacity Utilization Factor Auxiliary Consumption Useful Life	MW % % Years	1 23% 10 25
2	Project Cost	Capital Cost/MW	Power Plant Cost	Rs. Lakhs/MW	1200.00
3	Sources of Fund	Debt:Equity	Tariff Period Debt Equity Total Debt Amount Total Equity Amount Loan Amount Moratorium Period Repayment Period Interest Rate Equity Component RoE for first 10 Years RoE from 11 th Year Onwards Weighted Average of RoE Discount Rate	Years % % Rs. Lakhs Rs. Lakhs Rs. Lakhs Years Years % p.a Rs. Lakhs % p.a % p.a	25 70 30 840 360 840 0 12 13% 360 20.00% 24.00 22.40 10.81%
4	Financial Assumptions	Fiscal Assumption Depreciation	Income Tax Depre rate for first 12Years Depre rate 13 th Year Onwards	% % %	33.99 5.83 1.54
5	Working Capital	For Fixed Charges O&M Charges Maintenance Spare Receivables For variable Charges Interest on WC	% of O&M Expense	Months Months %	1 15% 2 13.5%
6	Operation & Maintenance	O&M (FY 15-16) Total O&M Escalation		Rs. Lakhs/MW %	17.72 5.72%

Determination of Tariff for Solar Thermal power Projects

Units generated	Unit	Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Installed Capacity			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
PLF	%	23%																									
Gross generation			2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.0148	2.0148	2.0148	2.0148	2.0148	2.0148	2.0148	2.0148	2.0148
Aux Consumption			0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Net generation			1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81
Capital Cost	Rs.Lakh	1200.00																									
Debt	Rs.Lakh	840.00																									
Equity	Rs.Lakh	360.00																									
Principal paid per Year	Principal paid Per Year	70.00																									
Debt Opening	Debt Opening		840.00	770.00	700.00	630.00	560.00	490.00	420.00	350.00	280.00	210.00	140.00	70.00													
Debt Closing	Debt Closing		770.00	700.00	630.00	560.00	490.00	420.00	350.00	280.00	210.00	140.00	70.00	0.00													
Fixed Cost																											
O&M Expenses	Rs.Lakh		17.72	18.73	19.81	20.94	22.14	23.40	24.74	26.16	27.65	29.23	30.91	32.67	34.54	36.52	38.61	40.82	43.15	45.62	48.23	50.99	53.90	56.99	60.25	63.69	67.33
Depreciation	Rs.Lakh		69.96	69.96	69.96	69.96	69.96	69.96	69.96	69.96	69.96	69.96	69.96	69.96	69.96	18.48	18.48	18.48	18.48	18.48	18.48	18.48	18.48	18.48	18.48	18.48	18.48
Interest on Term Loan	Rs.Lakh		104.65	95.55	86.45	77.35	68.25	59.15	50.05	40.95	31.85	22.75	13.65	4.55													
Interest on WC	Rs.Lakh		6.66	6.50	6.35	6.20	6.06	5.92	5.79	5.66	5.53	5.41	5.29	5.17	5.05	4.93	4.81	4.69	4.57	4.45	4.33	4.21	4.09	3.97	3.85	3.73	3.61
RoE	Rs.Lakh		72.00	72.00	72.00	72.00	72.00	72.00	72.00	72.00	72.00	72.00	72.00	86.40	86.40	86.40	86.40	86.40	86.4	86.4	86.4	86.4	86.4	86.4	86.4	86.4	86.4
Total Fixed Cost	Rs.Lakh		270.99	262.75	254.57	246.45	238.41	230.43	222.54	214.72	206.99	199.35	206.54	199.09	143.74	145.83	148.03	150.36	152.83	155.43	158.19	161.1	164.17	167.43	170.87	174.5	178.35
Levelised Tariff Corresponding to useful Life																											
O&M Expenses	Rs/kWh	1.55	0.98	1.03	1.09	1.15	1.22	1.29	1.36	1.44	1.52	1.61	1.70	1.80	1.90	2.01	2.13	2.25	2.38	2.52	2.66	2.81	2.97	3.14	3.32	3.51	3.71
Depreciation	Rs/kWh	3.20	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Interest on Term Loan	Rs/kWh	2.77	5.77	5.27	4.77	4.27	3.76	3.26	2.76	2.26	1.76	1.25	0.75	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest on WC	Rs/kWh	0.32	0.37	0.36	0.35	0.34	0.33	0.33	0.32	0.31	0.30	0.30	0.31	0.30	0.24	0.24	0.25	0.26	0.26	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34
RoE	Rs/kWh	4.21	3.97	3.97	3.97	3.97	3.97	3.97	3.97	3.97	3.97	3.97	3.97	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76
Total COG	Rs/kWh	12.05	14.94	14.49	14.04	13.59	13.15	12.71	12.27	11.84	11.41	10.99	11.39	10.98	7.93	8.04	8.16	8.29	8.43	8.57	8.72	8.88	9.05	9.23	9.42	9.62	9.84
COG exc RoE			10.97	10.52	10.07	9.62	9.18	8.74	8.30	7.87	7.44	7.02	6.63	6.21	3.16	3.28	3.40	3.53	3.66	3.81	3.96	4.12	4.29	4.47	4.66	4.86	5.07
Discount Factor			1.00	0.90	0.81	0.73	0.66	0.60	0.54	0.49	0.44	0.40	0.36	0.32	0.29	0.26	0.24	0.21	0.1935	0.1746	0.1576	0.1422	0.1284	0.1158	0.1045	0.0943	0.0851
Levelised Tariff	Rs/Unit	12.05																									

Determination of Accelerated Depreciation for Solar Thermal Power Projects

Determination of Accelerated Depreciation

Depreciation Amount	90%
Book Depreciation rate	5.28%
Tax Depreciation Rate	80%
Addl Depreciation	20%
Income Tax (Normal Rates)	33.99%
Capital Cost	1200.00

Years	Unit	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Book Depreciation	%	2.64%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	2.88%	0	0	0	0	0	0	0
Book Depreciation	Rs' Lakhs	31.68	63.36	63.36	63.36	63.36	63.36	63.36	63.36	63.36	63.36	63.36	63.36	63.36	63.36	63.36	63.36	63.36	34.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Accelerated Depreciation																										
Opening	%	100%	50%	5%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Allowed during the year	%	50%	45%	4.00%	0.80%	0.16%	0.03%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Closing	%	50%	5%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Accelerated Depreciation	Rs Lakhs	600	540	48	9.60	1.92	0.38	0.08	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Depr Benefit	Rs Lakhs	568.32	476.64	-15.36	-53.76	-61.44	-62.98	-63.28	-63.34	-63.36	-63.36	-63.36	-63.36	-63.36	-63.36	-63.36	-63.36	-63.36	-34.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tax Benefit	Rs Lakhs	193.17	162.01	-5.22	-18.27	-20.88	-21.41	-21.51	-21.53	-21.54	-21.54	-21.54	-21.54	-21.54	-21.54	-21.54	-21.54	-21.54	-11.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy Generation	MU	0.9067	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81
Per Unit Benefit	Rs/Unit	21.31	8.93	-0.29	-1.01	-1.15	-1.18	-1.19	-1.19	-1.19	-1.19	-1.19	-1.19	-1.19	-1.19	-1.19	-1.19	-1.19	-0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Discounting Factor		1	0.95	0.86	0.78	0.70	0.63	0.57	0.52	0.47	0.42	0.38	0.34	0.31	0.28	0.25	0.23	0.20	0.18	0.17	0.15	0.14	0.12	0.11	0.10	0.09
Tax Benefit Levelised	21.37																									
Electricity generation	1.72																									
Levelised Benefit	1.24	Rs/Unit																								

Annexure 8

Assumptions: Biomass Gasifier					
S.No	Assumption	Sub-Head	Sub-Head(2)	Unit	Assumpti ons
1	Power Generation	Capacity	InstalledPower Generation Capacity PLF Auxiliary Consumption Useful Life	MW % % Years	1 85% 10% 20
2	Project Cost	Capital Cost/MW	Power Plant Cost(before Subsidy) Power Plant Cost (after Subsidy)	Rs. Lakhs/MW	592.532 442.532
3	Sources of Fund	Debt:Equity	Debt Equity Total Debt Amount Total Equity Amount Loan Amount Moratorium Period Repayment Period Interest Rate Equity Component RoE for first 10 Years RoE from 11 th Year Onwards Weighted Average of RoE Discount Rate	% % Rs. Lakhs Rs. Lakhs Rs. Lakhs Years Years % p.a Rs. Lakhs % p.a % p.a	70 30 309.772 132.760 309.772 0 12 13% 132.76 20.00% 24.00 22.00 10.81%
4	Financial Assumptions	Fiscal Assumption Depreciation	Income Tax Depre rate for first 12Years Depre rate 13 th Year Onwards	% % %	33.99 5.83 0.87
5	Working Capital	For Fixed Charges O&M Charges Maintenance Spare Receivables For variable Charges Interest on WC	% of O&M Expense	Months Months %	1 15% 2 13.5%
6	Operation & Maintenance	O&M (FY 15-16) Total O&M Escalation		Rs. Lakhs/MW %	21.27 5.72%

Determination of Tariff for Biomass gasifier based Power Projects

Units generated	Unit	Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Installed Capacity			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
PLF	%	85%																				
Gross generation			7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.446	7.446	7.446	7.446
Aux Consumption			0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74
Net generation			6.70	6.70	6.70	6.70	6.70	6.70	6.70	6.70	6.70	6.70	6.70	6.70	6.70	6.70	6.70	6.70	6.70	6.70	6.70	6.70
Capital Cost	Rs.Lakh	442.53																				
Debt	Rs.Lakh	309.77																				
Equity	Rs.Lakh	132.76																				
Principal Paid per Year	Rs.Lakh	25.81																				
Debt Opening	Rs.Lakh		309.77	283.96	258.14	232.33	206.51	180.70	154.89	129.07	103.26	77.44	51.63	25.81								
Debt Closing	Rs.Lakh		283.96	258.14	232.33	206.51	180.70	154.89	129.07	103.26	77.44	51.63	25.81	0.00								
Variable Cost																						
Biomass Base price	Rs/Tonne	3144.80																				
Specific Fuel Consumption	Kg/kWh	1.25																				
Biomass Cost	Rs.Lakh		292.70	307.34	322.70	338.84	355.78	373.57	392.25	411.86	432.45	454.08	476.78	500.62	525.65	551.93	579.53	608.51	638.93	670.88	704.42	739.64
Fixed Cost																						
O&M Expenses	Rs.Lakh		47.26	49.96	52.82	55.84	59.04	62.41	65.98	69.76	73.75	77.97	82.43	87.14	92.13	97.40	102.97	108.86	115.08	121.66	128.62	135.98
Depreciation for first 12 Yrs	Rs.Lakh	5.83%	25.80	25.80	25.80	25.80	25.80	25.80	25.80	25.80	25.80	25.80	25.80	25.80	11.11	11.11	11.11	11.11	11.11	11.11	11.11	11.11
Depreciation from 13th Yr		2.51%																				
Interest on Term Loan	Rs.Lakh		38.59	35.24	31.88	28.52	25.17	21.81	18.46	15.10	11.75	8.39	5.03	1.68								
Interest on WC	Rs.Lakh		18.18	18.92	19.71	20.55	21.42	22.35	23.33	24.37	25.46	26.61	27.95	29.23	30.28	31.78	33.36	35.02	36.76	38.59	40.52	42.55
RoE	Rs.Lakh		26.55	26.55	26.55	26.55	26.55	26.55	26.55	26.55	26.55	26.55	26.55	31.86	31.86	31.86	31.86	31.86	31.862	31.862	31.862	31.862
Total Fixed Cost	Rs.Lakh		156.38	156.48	156.77	157.26	157.98	158.93	160.13	161.58	163.30	165.32	173.07	175.71	165.37	172.14	179.29	186.84	194.81	203.23	212.12	221.5
Levelised Tariff Corresponding to useful Life																						
Variable COG	Rs/kWh	6.15	4.37	4.59	4.82	5.06	5.31	5.57	5.85	6.15	6.45	6.78	7.11	7.47	7.84	8.24	8.65	9.08	9.53	10.01	10.51	11.04
O&M Expenses	Rs/kWh	1.05	0.71	0.75	0.79	0.83	0.88	0.93	0.98	1.04	1.10	1.16	1.23	1.30	1.37	1.45	1.54	1.62	1.72	1.82	1.92	2.03
Depreciation	Rs/kWh	0.34	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Interest on Term Loan	Rs/kWh	0.29	0.58	0.53	0.48	0.43	0.38	0.33	0.28	0.23	0.18	0.13	0.08	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest on WC	Rs/kWh	0.37	0.27	0.28	0.29	0.31	0.32	0.33	0.35	0.36	0.38	0.40	0.42	0.44	0.45	0.47	0.50	0.52	0.55	0.58	0.60	0.63
RoE	Rs/kWh	0.42	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48
Total COG	Rs/kWh	8.61	6.70	6.92	7.15	7.40	7.67	7.95	8.24	8.56	8.89	9.24	9.70	10.09	10.31	10.80	11.32	11.87	12.44	13.04	13.68	14.34
Discount Factor			1.00	0.90	0.81	0.73	0.66	0.60	0.54	0.49	0.44	0.40	0.36	0.32	0.29	0.26	0.24	0.21	0.1935	0.1746	0.1576	0.1422
Levelised Tariff	Rs/Unit	8.61																				

Determination of Accelerated Depreciation for Biomass Gasifier Power Projects

Determination of Accelerated Depreciation

Depreciation Amount	90%																					
Book Depreciation rate	5.28%																					
Tax Depreciation Rate	80%																					
Addl Depreciation	20%																					
Income Tax (Normal Rates)	33.99%																					
Capital Cost	442.53																					
Years	Unit		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Book Depreciation	%		2.64%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	2.88%	0	0
Book Depreciation	Rs Lakhs		11.68	23.37	23.37	23.37	23.37	23.37	23.37	23.37	23.37	23.37	23.37	23.37	23.37	23.37	23.37	23.37	23.37	12.74	0.00	0.00
Accelerated Depreciation																						
Opening	%		100%	50%	5%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Allowed during the year	%		50%	45%	4.00%	0.80%	0.16%	0.03%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Closing	%		50%	5%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Accelerated Depreciation	Rs Lakhs		221.266	199.14	17.701	3.54	0.71	0.14	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Depr Benefit	Rs Lakhs		209.58	175.77	-5.66	-19.83	-22.66	-23.22	-23.34	-23.36	-23.36	-23.37	-23.37	-23.37	-23.37	-23.37	-23.37	-23.37	-23.37	-12.74	0.00	0.00
Tax Benefit	Rs Lakhs		71.24	59.75	-1.93	-6.74	-7.70	-7.89	-7.93	-7.94	-7.94	-7.94	-7.94	-7.94	-7.94	-7.94	-7.94	-7.94	-7.94	-4.33	0.00	0.00
Energy Generation	MU		3.3507	6.70	6.70	6.70	6.70	6.70	6.70	6.70	6.70	6.70	6.70	6.70	6.70	6.70	6.70	6.70	6.70	6.70	6.70	6.70
Per Unit Benefit	Rs/Unit		2.13	0.89	-0.03	-0.10	-0.11	-0.12	-0.12	-0.12	-0.12	-0.12	-0.12	-0.12	-0.12	-0.12	-0.12	-0.12	-0.12	-0.06	0.00	0.00
Discounting Factor			1	0.95	0.86	0.78	0.70	0.63	0.57	0.52	0.47	0.42	0.38	0.34	0.31	0.28	0.25	0.23	0.20	0.18	0.17	0.15
Tax Benefit Levelised	8.35																					
Electricity generation	6.34																					
Levelised Benefit	0.13	Rs/Unit																				

Annexure 9

Assumptions: Bio Gas					
S.No	Assumption	Sub-Head	Sub-Head(2)	Unit	Assumptions
1	Power Generation	Capacity	Installed Power Generation Capacity	MW	1
			PLF	%	90%
			Auxiliary Consumption	%	12%
			Useful Life	Years	20
2	Project Cost	Capital Cost/MW	Power Plant Cost(before Subsidy)	Rs. Lakhs/MW	1185.06
			Power Plant Cost (after Subsidy)		885.06
3	Sources of Fund	Debt:Equity	Debt	%	70
			Equity	%	30
			Total Debt Amount	Rs. Lakhs	619.545
			Total Equity Amount	Rs. Lakhs	265.519
			Loan Amount	Rs. Lakhs	619.545
			Moratorium Period	Years	0
			Repayment Period	Years	12
			Interest Rate	% p.a	13%
			Equity Component	Rs. Lakhs	265.519
			RoE for first 10 Years	% p.a	20.00%
			RoE from 11 th Year Onwards	% p.a	24.00
			Weighted Average of RoE		22.00
			Discount Rate		10.81%
4	Financial Assumptions	Fiscal Assumption Depreciation	Income Tax	%	33.99
			Depre rate for first 12Years	%	5.83
			Depre rate 13 th Year Onwards	%	2.51
5	Working Capital	For Fixed Charges O&M Charges Maintenance Spare Receivables	% of O&M Expense	Months	1
				Months	2
		For variable Biomass Stock Interest on WC	Months	4	
			%	13.5%	
6	Fuel Assumption	Biomass	Fuel Price	Rs/T	1257.41
			Specific Fuel Consumption	Kg/kWh	3
			Substrates Price Escalation		5%
7	Operation & Maintenance	O&M (FY 15-16)		Rs. Lakhs/MW	21.27
		Total O&M Escalation		%	5.72%

Determination of Tariff for Biogas based Power Projects

Units generated	Unit	Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Installed Capacity			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
PLF	%	90%																				
Gross generation			7.88	7.88	7.88	7.88	7.88	7.88	7.88	7.88	7.88	7.88	7.88	7.88	7.88	7.88	7.88	7.88	7.884	7.884	7.884	7.884
Aux Consumption			0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Net generation			6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94
Capital Cost	Rs.Lakh	885.06																				
Debt	Rs.Lakh	619.54																				
Equity	Rs.Lakh	265.52																				
Principal paid per Year	Rs.Lakh	51.63																				
Debt Opening	Rs.Lakh		619.54	567.92	516.29	464.66	413.03	361.40	309.77	258.14	206.51	154.89	103.26	51.63								
Debt Closing	Rs.Lakh		567.92	516.29	464.66	413.03	361.40	309.77	258.14	206.51	154.89	103.26	51.63	0.00								
Variable Cost																						
Biomass Base price	Rs/Tonne	1257.41																				
Specific Fuel Consumption	Kg/kWh	3.00																				
Biomass Cost	Rs.Lakh		297.40	312.27	327.89	344.28	361.49	379.57	398.55	418.48	439.40	461.37	484.44	508.66	534.09	560.80	588.84	618.28	649.19	681.65	715.73	751.52
Fixed Cost																						
O&M Expenses	Rs.Lakh		47.26	49.96	52.82	55.84	59.04	62.41	65.98	69.76	73.75	77.97	82.43	87.14	92.13	97.40	102.97	108.86	115.08	121.66	128.62	135.98
Depreciation for first 12 yrs	Rs.Lakh	5.83%	51.60	51.60	51.60	51.60	51.60	51.60	51.60	51.60	51.60	51.60	51.60	51.60	22.22	22.22	22.22	22.22	22.22	22.22	22.22	22.22
Depreciation from 13th Yr		2.51%																				
Interest on Term Loan	Rs.Lakh		77.18	70.47	63.76	57.05	50.34	43.63	36.91	30.20	23.49	16.78	10.07	3.36								
Interest on WC	Rs.Lakh		27.33	28.36	29.44	30.58	31.79	33.07	34.43	35.86	37.37	38.96	40.89	42.67	43.95	46.08	48.33	50.69	53.16	55.77	58.51	61.39
RoE	Rs.Lakh		53.10	53.10	53.10	53.10	53.10	53.10	53.10	53.10	53.10	53.10	53.10	53.10	63.72	63.72	63.72	63.72	63.725	63.725	63.725	63.725
Total Fixed Cost	Rs.Lakh		256.48	253.50	250.72	248.18	245.87	243.82	242.03	240.52	239.31	238.41	248.71	248.49	222.01	229.42	237.23	245.48	254.19	263.37	273.07	283.31
Levelised Tariff Corresponding to useful Life																						
Variable COG	Rs/kWh	6.03	4.29	4.50	4.73	4.96	5.21	5.47	5.74	6.03	6.33	6.65	6.98	7.33	7.70	8.08	8.49	8.91	9.36	9.83	10.32	10.83
O&M Expenses	Rs/kWh	1.01	0.68	0.72	0.76	0.80	0.85	0.90	0.95	1.01	1.06	1.12	1.19	1.26	1.33	1.40	1.48	1.57	1.66	1.75	1.85	1.96
Depreciation	Rs/kWh	0.66	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32
Interest on Term Loan	Rs/kWh	0.57	1.11	1.02	0.92	0.82	0.73	0.63	0.53	0.44	0.34	0.24	0.15	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest on WC	Rs/kWh	0.52	0.39	0.41	0.42	0.44	0.46	0.48	0.50	0.52	0.54	0.56	0.59	0.62	0.63	0.66	0.70	0.73	0.77	0.80	0.84	0.88
RoE	Rs/kWh	0.81	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Total COG	Rs/kWh	9.60	3.70	3.85	3.81	3.58	3.54	3.51	3.49	3.47	3.45	3.44	3.58	3.58	3.20	3.31	3.42	3.54	3.66	3.80	3.94	4.08
Discount Factor			1.00	0.90	0.81	0.73	0.66	0.60	0.54	0.49	0.44	0.40	0.36	0.32	0.29	0.26	0.24	0.21	0.1935	0.1746	0.1576	0.1422
Levelised Tariff	Rs/Unit	9.60																				

Determination of Accelerated Depreciation for Biogas Power Projects

Determination of Accelerated Depreciation

Years	Unit	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Depreciation Amount	90%																					
Book Depreciation rate	5.28%																					
Tax Depreciation Rate	80%																					
Addl Depreciation	20%																					
Income Tax (Normal Rates)	33.99%																					
Capital Cost	885.06																					
Book Depreciation	%	2.64%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	2.88%	0	0	
Book Depreciation	Rs Lakhs	23.37	46.73	46.73	46.73	46.73	46.73	46.73	46.73	46.73	46.73	46.73	46.73	46.73	46.73	46.73	46.73	46.73	25.49	0.00	0.00	
Accelerated Depreciation																						
Opening	%	100%	50%	5%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Allowed during the year	%	50%	45%	4.00%	0.80%	0.16%	0.03%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
Closing	%	50%	5%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Accelerated Depreciation	Rs Lakhs	442.53	398.28	35.403	7.08	1.42	0.28	0.06	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Net Depr Benefit	Rs Lakhs	419.17	351.55	-11.33	-39.65	-45.32	-46.45	-46.67	-46.72	-46.73	-46.73	-46.73	-46.73	-46.73	-46.73	-46.73	-46.73	-46.73	-25.49	0.00	0.00	
Tax Benefit	Rs Lakhs	142.47	119.49	-3.85	-13.48	-15.40	-15.79	-15.86	-15.88	-15.88	-15.88	-15.88	-15.88	-15.88	-15.88	-15.88	-15.88	-15.88	-8.66	0.00	0.00	
Energy Generation	MU	3.469	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	
Per Unit Benefit	Rs/Unit	4.11	1.72	-0.06	-0.19	-0.22	-0.23	-0.23	-0.23	-0.23	-0.23	-0.23	-0.23	-0.23	-0.23	-0.23	-0.23	-0.23	-0.12	0.00	0.00	
Discounting Factor		1	0.95	0.86	0.78	0.70	0.63	0.57	0.52	0.47	0.42	0.38	0.34	0.31	0.28	0.25	0.23	0.20	0.18	0.17	0.15	
Tax Benefit Levelised	16.70																					
Electricity generation	6.57																					
Levelised Benefit	0.25	Rs/Unit																				