

RENEWABLE ENERGY



SCENARIO

&

REGULATORY

INITIATIVE

-- BY AMIT C. CHILWE



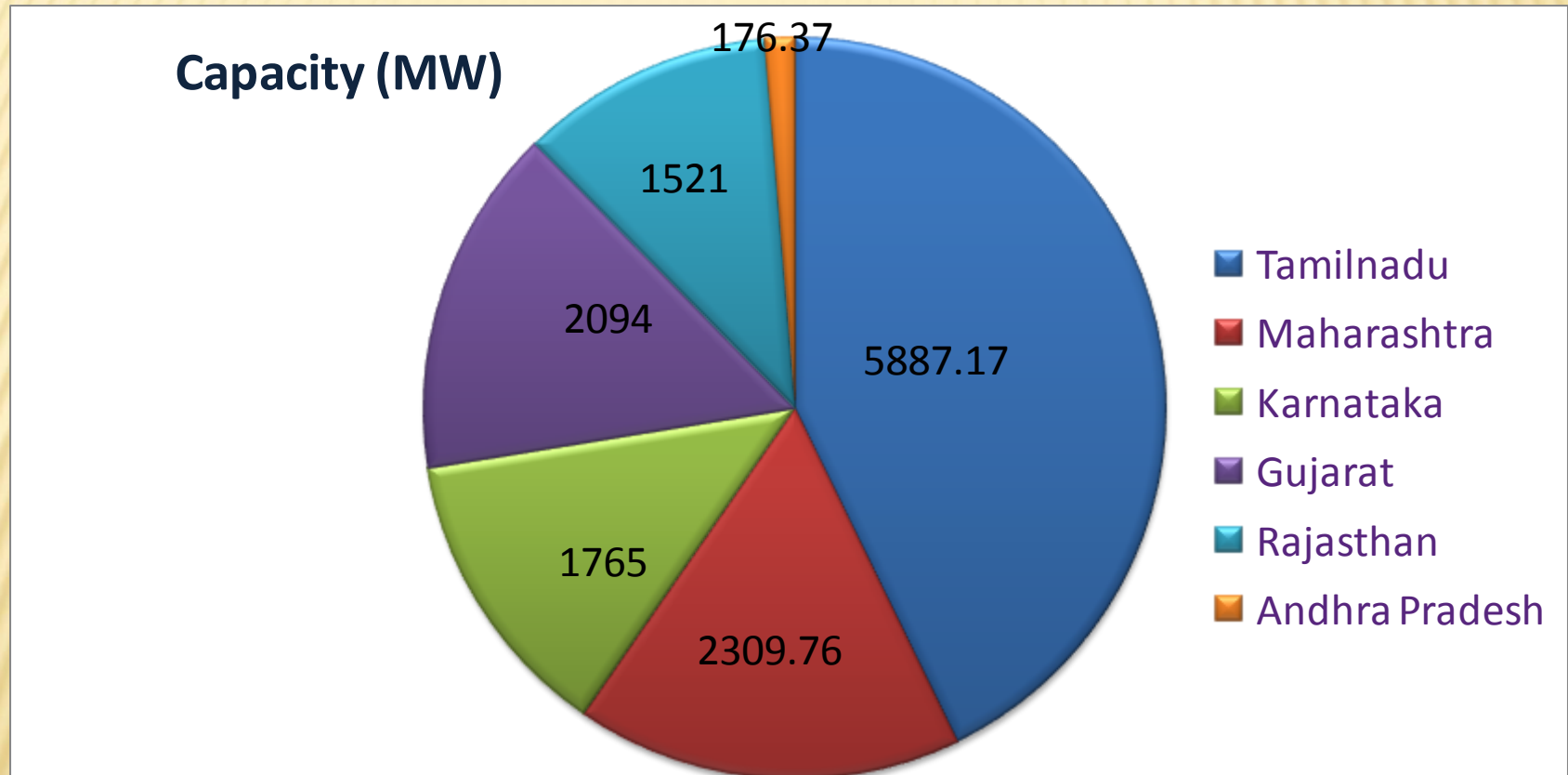
Renewable Energy Scenario



Sources	India		Maharashtra	
	Potential (MW)	Cumulative Achievements MW (upto 31.3.2011)	Potential (MW)	Cumulative Achievements MW (upto 31.03.2011)
Wind Power	48500	14157 (29%)	5439	2310 (42.5%)
Bagasse Cogeneration	5000	1668 (33%)	1250	499 (40 %)
Biomass	16881	997 (6%)	781	155 (20%)
Small Hydro Power	15000	3043 (20.28%)	600	238 (40%)
Waste to Energy	2700	72 (2.7%)	637	11 (1.7%)
Solar Power	20-30 MW/ Sq.Km	38	4-6 kwh/sqm per day	4
Total in MW	88081	19975 (22.7 %)	8707	3217 (37%)

Source: MNRE and MEDA

STATE-WISE WIND POWER INSTALLED CAPACITY AS ON 31-03-2011



MAHARASHTRA WINDY SITES



• TOTAL POTENTIAL FROM 40 SITES = 5439 MW

SERC'S ROLE & RESPONSIBILITY



- In exercise of the power conferred under Section 86 (1) (e) of Electricity Act, 2003 , the State Commission shall discharge the following functions, namely ;
 - (i) promote cogeneration and generation of electricity from renewable sources of energy by providing suitable measures for connectivity with the grid and sale of electricity to any person, and also**
 - (ii) specify for purchase of electricity from such sources, a percentage of the total consumption of electricity in the area of distribution licensee.**

MERC INITIATIVE THROUGH VARIOUS RE ORDERS



Wind Power Projects Tariff Order:

- The MERC issued a Tariff Order dated November 24, 2003 in Case No. 17(3), 3, 4 & 5 of 2002. The validity of the Tariff Order extended up to March 31, 2010.
- **Group I** - Wind Projects commissioned before December 27, 1999. Tariff started with 2.25 Rs/kWh for 1994-95 and escalated at the rate of 5% (i.e., 11 paise every year) till 10th year, then remained constant for next 3 years, then again escalated from 14th year onwards till 20th year at the same rate.
- **Group II** - Projects commissioned after December 27, 1999 but on or before March 31, 2003. Tariff started with 2.25 Rs/kWh with 5% simple escalation (i.e., 11 paise every year) for 8 years. Post expiry of respective EPAs, shall be Rs 2.52 per unit.
- **Group III** - Projects commissioned from April 1, 2003 onwards. Tariff started with 3.50 Rs/kWh in 2003-04 and increases at the rate of 15 paise per year for 13 years. The starting rate will be applicable from the year of Commissioning of the Wind Project

MERC INITIATIVE THROUGH VARIOUS RE ORDERS



Bagasse Co-generation Tariff Order:

- MERC order dated August 16, 2002 in Case No. 8/9/10 /15/17/18/19/ 20/21 of 2001 for purchase of power from non-fossil fuel based co-generation projects and in the matter of aiding the State Government in formulation of the Policy.
- The Tariff Rate and tariff structure, as approved, was valid till March 31, 2007 or 300 MW of capacity addition whichever is earlier. Subsequently, through RPS Order (Case No. 6 of 2006), the Commission extended the validity of the Tariff Rate, tariff structure and other conditions of said Order for co-generation projects to be commissioned upto March 31, 2010.
- The Tariff of Rs.3.05 per kWh for the first year of operation of the Co-generation project and the tariff escalated at the rate of 2% per annum on compounded basis.
- Commission determined the Tariff for non-qualifying non-fossil fuel based co-generation (NQNFFC) projects as Rs 1.94/kWh with escalation of 2% per annum on compounded basis under its Order (Case 26 of 2004) dated May 25, 2005.

MERC INITIATIVE THROUGH VARIOUS REGULATORY ORDERS



Biomass Power Projects Tariff Order:

- MERC issued Biomass order dated August 8, 2005 in Case No. 37 of 2003, which was extended up to 31st March 2010, applicable to Rankine cycle based biomass projects having PLF of 80%.
- Tariff for the projects commissioned during 2005-06 would be Rs.3.04 per kWh (fixed charge component Rs. 1.70 /kWh and a variable charge component of Rs 1.34 /kWh) with an escalation of approx. Rs. 0.03 per year per unit.
- MNRE capital subsidy is available.
- Govt is giving excise exemption and concessional custom duty on equipments procured for the project

MERC INITIATIVE THROUGH VARIOUS RE ORDERS



Small Hydro Power Projects Tariff Order:

- MERC order November 9, 2005 in Case No. 25 of 2004.
- The tariff in the first year of the project was Rs 2.84/unit, and increases by Rs.0.03/unit every year till the debt repayment is over i.e., in the 10th year.
- The tariff shall remain constant at Rs 3.11/unit between the 10th year and the 15th year after which it again increases annually at a constant rate of Re 0.03/unit.

MERC INITIATIVE BY PROMOTING RPO



PHASE - I

- Maharashtra Electricity Regulatory Commission (MERC) notified the first RPO order on September 3, 2004 in the matter of “Determination of RPO for the Distribution Licensees in the Maharashtra State”, which was implemented during **FY 2004-05 and FY 2005-06.**
- Specific RPO percentage were not mentioned but RPO mechanism entailed excess/under recovery to be settled by way of ‘financial settlement’ rather than ‘energy settlement’ amongst the Licensees.
- The ‘Percentage RPO’ for each Licensee was considered as, same as the ‘Percentage RPO’ for the State as a whole. The ‘Percentage RPO’ for the State for a financial year calculated as the ratio of ‘total RE generation’ in the State to the ‘sum of gross input energy units’ for all Licensees for that financial year, excluding any inter-se sale/consumption of electricity amongst the Licensees.
- During FY 2004-05, the Gross energy consumption was 82,207 Mus and total RE generation in the State was 639.54 Mus, which means RPO achieved is 0.77%, whereas during FY 2005-06, the Gross energy consumption was 84,820 Mus and total RE generation in the State was 924 Mus, resulted into 1.09 % RPO achievement.

PHASE – II

RENEWABLE PURCHASE SPECIFICATION (RPS)



- On 16th August, 2006, the MERC notified the Order in the matter of “Long term Development of Renewable Energy Sources and Associated Regulatory (RPS) Framework”
- Applicable to Eligible Person as Distribution Licensees, Captive Users and Open Access Consumers
- RPS percentage were:

Year	RPS percentage	Enforcement Charges for shortfall in RPS target
2006-07	3%	No enforcement charges
2007-08	4%	Rs. 5/Kwh
2008-09	5%	Rs. 6/Kwh
2009-10	6%	Rs. 7/Kwh

RENEWABLE PURCHASE SPECIFICATION (RPS)



F.Y : 2007-08

Licensees	Energy Input (MU)	RPS Obligation (4%)	RE procured (MUs)	Shortfall (MUs)	% achieved
MSEDCL	76452	3058	2659	399	3
TPC	2689	108	125	-17	5
Rinfra	9207	368	1	367	0
BEST	4608	184	3	181	0
MPECS	601	24	0	24	0
Total	93557	3742	2788	954	3

F.Y : 2008-09

Licensees	Energy Input (MU)	RPS Obligation (5%)	RE procured (MUs)	Shorfall (MUs)	% achieved
MSEDCL	77534	3877	3558	319	5
TPC	2604	130	133	-3	5
Rinfra	9639	482	22	460	0
BEST	4742	237	44	193	1
MPECS	607	30	0	30	0
Total	95126	4756	3757	999	4

F.Y : 2009-10

Licensees	Energy Input (MU)	RPS Obligation (6%)	RE procured	Shortfall	% achieved
MSEDCL	83819	5029	4380	649	5
TPC	2936	176	87	89	3
Rinfra	9712	583	202	381	2
BEST	4765	286	192	94	4
MPECS	640	38	0	38	0
Total	101872	6112	4861	1251	5

RPS/RPO National Level Status during FY 2009-10:

Province	RPO Target	RPO Met
Maharashtra	6%	5%
Gujarat	2%	2%
Karnataka	10%	11%
Tamil Nadu	13%	12%
Punjab	2%	1.0%
Haryana	10%	0.2%
Madhya Pradesh	10%	0.2%

MERC REGULATIONS

- In exercise of the power conferred under Section 61, 66, 86 (1)(e) & 181 of Electricity Act, 2003, the Commission has notified following regulations on June 07, 2010.
 - MERC (Terms & Conditions for Determination of RE Tariff) Regulations, 2010
 - MERC (RPO, Its compliance and implementation of REC framework) Regulations, 2010.
 - MERC vide Order dated July 1, 2010 (Case No. 21 of 2010) designated MEDA as a State Agency for Accreditation of RE projects in the Maharashtra State and Recommendation the same for Registration to Central Agency..

MERC (RPO, Its Compliance and Implementation of REC framework) Regulations, 2010

- Renewable Purchase Obligation (RPO) :
 - Obligated Entities such as Distribution Licensees , captive users and open access consumers in the state of Maharashtra
 - To achieve the following RPO targets

Year	Minimum Quantum of purchase (in %) from renewable energy sources (in terms of energy equivalent in kWh)		
	Solar	Non- Solar (Other RE)	Total
2010-11	0.25%	5.75 %	6.0 %
2011-12	0.25%	6.75 %	7.0 %
2012-13	0.25%	7.75 %	8.0 %
2013-14	0.50%	8.50 %	9.0 %
2014-15	0.50%	8.50 %	9.0 %
2015-16	0.50%	8.50 %	9.0 %

Actual Capacity Addition (in MW) in Last 7 yrs



Sr. No.	Type of Renewable Power	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	Cumulative Upto 31 st March 2011
1	Wind Power Projects	*456	545	485	268	178	139	239	2310
2	Biomass Power Projects (IPP)	8	0	10	16	61	20	40	155
3	Bagasse Co-generation	**85	18	58	82	30	29	197	499
4	Waste to Energy	0	0	0	0	6	0	5	11
5	Small Hydro Projects	***209	0	0	6	0	6	17	238
6	Solar Power	0	0	0	0	0	1	3	4
	Grand Total	758	563	553	372	275	195	498	3217

NOTE: Actual Capacity addition during FY 2004-05 was 74.25 MW only.

* Capacity includes projects of 407 MW commissioned before 2004-05

** Capacity includes projects of 67 MW commissioned before 2004-05

*** Capacity includes projects of 209 MW commissioned before 2004

RENEWABLE ENERGY LEVELLISED TARIFF FOR F.Y 2010-11 (NOTIFIED ON JULY 14, 2010)



Wind Power

Particulars	Wind Zone -1	Wind Zone -2	Wind Zone -3	Wind Zone -4
New Project	Rs. 5.07/ kwh	Rs. 4.41/kwh	Rs.3.75/kwh	Rs.3.38/kwh
Existing Project	Rs. 3.68/kwh for Group -I	Rs.2.52 /kwh for Group -II	Rs.4.55/kwh for Group -III	-



Small Hydro Power

Particulars	Mini and Micro (1 MW & below)	Above 1 MW & upto and including 5MW	Above 5 MW & upto and including 25 MW
New Project	Rs. 4.76/ kwh	Rs. 4.26/kwh	Rs.3.65/kwh
Existing Project	Rs. 2.99/kwh		



Bagasse Cogeneration

Particulars	Fixed Charges	Variable Charges	Tariff
Qualifying	Rs. 2.26/ kwh	Rs. 2.53/kwh	Rs.4.79/kwh
Non-qualifying	Rs. 2.14/kwh		



Biomass

Fixed Charges	Variable Charges	Tariff
Rs. 1.70/ kwh	Rs. 3.28/ kwh	Rs.4.98/ kwh



Solar Power

Solar PV	Solar Roof Top PV and small solar projects	Solar Thermal
Rs. 17.91/ kwh	Rs. 18.41/ kwh	Rs.15.31/ kwh



Municipal Solid Waste

- Rs.4.88/kwh (for the period of 20 yrs)

RENEWABLE ENERGY LEVELLISED TARIFF FOR F.Y 2011-12 (NOTIFIED ON APRIL 29, 2011)



Wind Power

Particulars	Wind Zone -1	Wind Zone -2	Wind Zone -3	Wind Zone -4
New Project	Rs. 5.37/ kwh	Rs. 4.67/kwh	Rs.3.97/kwh	Rs.3.58/kwh

Till the finalization of Wind Zone operationalization procedure, the interim uniform Tariff of Rs. 4.67/kwh (Wind Zone – 2 tariff) shall be applicable.



Small Hydro Power

Particulars	500 KW & below	Above 500 KW & up to and including 1 MW	Above 1 MW & upto and including 5MW	Above 5 MW & upto and including 25 MW
New Project	5.51/kwh	Rs. 5.01/ kwh	Rs. 4.51/kwh	Rs.3.87/kwh



Bagasse Cogeneration

Particulars	Fixed Charges	Variable Charges	Tariff
Qualifying	Rs. 2.26/ kwh	Rs. 2.53/kwh	Rs.4.79/kwh
Non-qualifying		Rs. 2.18/kwh	



Biomass

Fixed Charges	Variable Charges	Tariff
Rs. 1.70/ kwh	Rs. 3.28/ kwh	Rs.4.98/ kwh



Solar Power

Solar PV	Solar Roof Top PV and small solar projects	Solar Thermal
Rs. 15.61/ kwh	Rs. 16.11/ kwh	Rs.15.24/ kwh

INTER-CONNECTION POINTS FOR RE PROJECTS



As per MERC (Terms and Conditions for determination of RE Tariff Regulations) 2010 dated June 7, 2010, the inter-connection points can be define as follows;

- **‘Inter-connection Point’ shall mean interface point of RE generating facility with the transmission system or distribution system, as the case may be:**
- **In relation to Wind energy projects and Solar PV, inter-connection points shall be the line isolator on outgoing feeder on HV side of the pooling sub-station.**

INTER-CONNECTION POINTS FOR RE PROJECTS



Provided the Pooling Sub-station shall mean the Sub-station at project site of the wind farm or solar power plant, as the case may be, and shall constitute step-up transformer and associated switchgear, and to the LV side of which, multiple (more than one) generating unit (s) (i.e. wind turbine generators or solar PV modules/array/inverter units) are connected.

➤ **In relation to mini/micro hydro power, small hydro power, biomass power and non-fossil fuel based Co-generation power projects and Solar Thermal power projects, the inter-connection points shall be the line isolator on outgoing feeder on HV side of generator transformer.**

HURDLES IN THE ENERGY ACCOUNTING SYSTEMS



- Most of the Wind Power projects are located in remote/hilly regions and connected to the Distribution Network (33 KV and below).
- Energy generation is accounted on TOD meter/joint meter reading method. It is difficult for SLDC to measure energy injection into Grid in absence of Special energy Meter or ABT meters.
- The projects which are connected to transmission network i.e. above 33 KV, the on-line energy injection to the Grid can be accounted.

THANK



YOU