Ministry of New and Renewable Energy

Year End Review 2017 –MNRE

Government is on its way to achieving 175 GW target for installed Renewable Energy capacity by 2022

India attains global 4th and 6th position in global Wind and Solar Power installed capacity

By November 2017, a total of 62 GW Renewable Power installed, of which 27 GW installed since May 2014 and 11.79 GW since January 2017

Historic Low Tariffs for Solar (Rs. 2.44/ unit) and Wind (Rs. 2.64/ unit) achieved through transparent bidding and facilitation

Ambitious Bidding Trajectory for 100 GW capacity of Solar Energy and 60 GW capacity of Wind over the next 3 years laid down

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The Ministry of New and Renewable Energy (MNRE) has taken several steps to fructify Prime Minister Shri Narendra Modi's dream of a clean energy future for the 'New India'. The largest renewable capacity expansion programme in the world is being taken up by India. The government is aiming to increase share of clean energy through massive thrust in renewables. Core drivers for development and deployment of new and renewable energy in India have been Energy security, Electricity shortages, Energy Access, Climate change etc.

A capacity addition of 27.07 GW of renewable energy has been reported during the last three and half years under Grid Connected Renewable Power, which include 12.87 GW from Solar Power, 11.70 GW from Wind Power, 0.59 from Small Hydro Power and 0.79 from Bio-power. Confident by the growth rate in clean energy sector, the Government of India in its submission to the United Nations Frame Work Convention on Climate Change on Intended Nationally Determined Contribution (INDC) has stated that India will achieve 40% cumulative Electric power capacity from non-fossil fuel based energy resources by 2030 with the help of transfer of technology and low cost International Finance including from Green Climate Fund. As on 30.11.2017, Solar Energy Projects with an aggregate capacity of over 16611.73 MW including 863.92 MW from Solar Roof Top projects has been installed in the country.

The government is playing an active role in promoting the adoption of renewable energy resources by offering various incentives, such as generation-based incentives (GBIs), capital and interest subsidies, viability gap funding, concessional finance, fiscal incentives etc. The National Solar Mission aims to promote the development and use of solar energy for power generation and other uses, with the ultimate objective of making solar energy compete with fossil-based energy options. The objective of the National Solar Mission is to reduce the cost of solar power generation in the country through long-term policy, large scale deployment goals, aggressive R&D and the domestic production of critical raw materials, components and products. Renewable energy is becoming increasingly cost-competitive as compared to fossil fuel-based generation.

In order to achieve the renewable energy target of 175 GW by the year 2022, the major programmes/ schemes on implementation of Solar Park, Solar Roof Top Scheme, Solar Defence Scheme, Solar scheme for CPUs Solar PV power plants on Canal Bank and Canal Tops, Solar Pump, Solar Rooftop etc have been launched during the last two years.

Various policy measures have been initiated and special steps taken in addition to providing financial support to various schemes being implemented by the Ministry of New and Renewable Energy (MNRE) for achieving the target of renewable energy capacity to 175 GW by the year 2022. These include, inter alia, suitable amendments to the Electricity Act and Tariff Policy for strong enforcement of Renewable Purchase Obligation (RPO) and for providing Renewable Generation Obligation (RGO); setting up of exclusive solar parks; development of power transmission network through Green Energy Corridor project; guidelines for procurement of solar and wind power though tariff based competitive bidding process, National Offshore Wind Energy Policy notified, Repowering of Wind Power Projects, Standards for Deployment of Solar Photovoltaic systems/ devices, orders for waiving the Inter State Transmission System charges and losses for interstate sale of solar and wind power for projects to be commissioned by March 2019; identification of large government complexes/ buildings for rooftop projects; provision of roof top solar and 10 percent renewable energy as mandatory under Mission Statement and Guidelines for development of smart cities; amendments in building bye-laws for mandatory provision of roof top solar for new construction or higher Floor Area Ratio; infrastructure status for solar projects; raising tax free solar bonds; providing long tenor loans; making roof top solar as a part of housing loan by banks/ NHB; incorporating measures in Integrated Power Development Scheme (IPDS) for encouraging distribution companies and making net-metering compulsory and raising funds from bilateral and international donors as also the Green Climate Fund to achieve the target.

Other important initiatives and achievements of MNRE are:

ESTIMATED POTENTIAL OF RENEWABLE ENERGY

The increased use of indigenous renewable resources is expected to reduce India's dependence on expensive imported fossil fuels. India has an estimated renewable energy potential of about 1096 GW from commercially exploitable sources viz. Wind – 302 GW (at 100-meter mast height); Small Hydro – 21 GW; Bio-energy – 25 GW; and 750 GW solar power, assuming 3% wasteland

TARGETS

The Government of India has set a target of 175 GW renewable power installed capacity by the end of 2022. This includes 60 GW from wind power, 100 GW from solar power, 10 GW from biomass power and 5 GW from small hydro power.

A target of 14550 MW grid renewable power (wind 4000 MW, solar 10000 MW, small hydro power 200 MW, bio-power 340 MW and waste to power 10 MW), has been set for 2017-18. Besides, under off-grid renewable system, targets of 15 MW eq. waste to energy, 60 MW eq. biomass non-bagasse cogeneration, 7.50 MW eq. biomass gasifiers, 0.5 MW eq. small wind/hybrid systems, 100 MW eq. solar photovoltaic systems, 150/25 Nos. eq. micro hydel and 110,000 nos. family size biogas plants have been set for 2017-18.

SHARE OF RENEWABLE POWER IN TOTAL INSTALLED CAPACITY

Economic growth, increasing prosperity, a growing rate of urbanization and rising per capita energy consumption has increases the energy demand of the country. In order to meet the energy demand, India has total installed power generation capacity of 331.95 GW as on 31.10.2017 from all resources. With 60.98 GW installed renewable power capacity, the renewable power has a share of about 18.37% to the total installed capacity.

ACHIEVEMENTS

The details of year round initiatives and achievements of the Ministry of New and Renewable Energy are as follows:

Green Power Capacity Addition

A total of 11788 MW of grid-connected power generation capacity from renewable energy sources has been added so far this year (January 2017 to November 2017) in the country.

A total of 11319.71 MW of grid-connected power generation capacity from renewable energy sources like solar (5502.38 MW) and wind (5585.98 MW), Small Hydro Power (105.90 MW), Bio-Power (161.95 MW) has been added during 2016-17 in the country against target of 16660 MW. During 2017-18, a total 4809.51 MW capacity has been added till 30.11.2017, making cumulative achievement 62053.73 MW.

Sector-wise highlights of achievements

· **Largest ever Wind Power capacity addition** of 5502.39 MW in 2016-17 exceeding target by 38%. During 2017-18, a total **467.11 MW** capacity has been added till 30.11.2017, making cumulative achievement 32746.87 MW. Now, in terms of wind power installed capacity **India is globally placed at 4th position after China, USA and Germany**.

· **Biggest ever Solar Power capacity addition of 5525.98 MW in 2017-18**. During 2017-18, a total 4323.1 MW (including 207.92 MW Solar Roof Top) capacity has been added till 30.11.2017, making cumulative achievement 16611.73 MW (including 863.92 MW Solar Roof Top).

· So far, **1.42 lakh Solar Pump have been installed** in the Country as on 30.11.2017 including 1.31 lakh during last three and half year.

· **Solar projects** of capacity 23656 MW have been tendered and LoI for 19,340 MW issued.

· A capacity addition of **0.59 GW has been added under Grid Connected Renewable Power** since last three and half years from Small Hydro Power plants.

· **Biomass power** includes installations from biomass combustion, biomass gasification and bagasse co-generation making a cumulative achievement to **8181.70 MW**.

· Family Type Biogas Plants mainly for rural and semi-urban households are set up under the **National Biogas and Manure Management Programme (NBMMP**). During 2017-18, against a target of 1.1 lakh biogas plants, **0.15 lakh biogas plants installations** has been achieved making a cumulative achievement to 49.8 lakh biogas plants as on 30.11.2017.

Programme/ Scheme wise Physical Progress in year 2017-18 (January-November 2017)		
Sector	**FY- 2017-18**	
	Achievement (Jan-November 2017)	**Cumulative Achievement as on 30.11.2017**
I. GRID-INTERACTIVE POWER (CAPACITIES IN MWp)		
Wind Power	4046.44	32746.87
Solar Power	7599.31	16611.73
Small Hydro Power	64.80	4399.35
Bio Power (Biomass & Gasification and Bagasse Cogeneration)#	60.95	8181.70
Waste to Power	16.00	114.08
Total	**11787.50**	**62053.73**
II. OFF-GRID/ CAPTIVE POWER (CAPACITIES IN $MW_{EQ)}$		
Waste to Energy	12.11	175.45
Biomass(non-bagasse) Cogeneration	9.50	661.41
Biomass Gasifiers	0.92	163.37
Aero-Generators/Hybrid systems	0.32	3.29
SPV Systems	146.02	551.56
Total	**168.87**	**1555.08**

III. OTHER RENEWABLE ENERGY SYSTEMS		
Family Biogas Plants (in Lakhs)	0.15	49.80
Water mills/micro hydel (Nos.)	0.00	2690/72
#Progress of Bio power has been revised to installed capacity from exportable power capacity.		

Major Initiatives taken by Ministry

Solar Power

· Under National Solar Mission, the target for setting up solar capacity increased from 20 GW to 100 GW by 2021-22. Target of 10,000 MW, set for 2017-18 which will take the cumulative capacity over 20GW till 31st March 2018.

· As on date, **23656 MW has been tendered out**, of which **LOI issued for 19340 MW.**

· Capacity of the scheme for "Development of Solar Parks and Ultra Mega Solar Power Projects" has been enhanced from 20,000 MW to 40, 000 MW. **35 solar parks of aggregate capacity 20,514 MW have been approved in 21 States.**

· Kurnool Solar Park in Andhra Pradesh with 1000 MW capacity has already been commissioned and is operational. With commissioning of **1000 MW** capacity at single location, **Kurnool Solar Park has emerged as the World's Largest Solar Park.**

· **650 MW** capacity commissioned in **Bhadla Phase-II** Solar Park in Rajasthan.

· **250 MW** capacity commissioned in Phase –I of **Neemuch Mandsaur** Solar Park (500 MW) in Madhya Pradesh.

· **3 new solar parks have been approved** in this year at Rajasthan (1000 MW), Gujarat (500 MW) and Mizoram (23 MW) after issue of Guidelines for Enhancement of capacity from 20, 000 MW to 40, 000 MW under Solar Park Scheme.

· **Solar tariff has declined to lowest level of Rs 2.44 /kWh**. The chronology of down ward trend in Solar tariff during recent times is as given below:

S. No	Period	Capacity	Lowest Tariff (Rs./KWh)	Scheme	State
1	February-2017	750 MW	3.30	State Scheme	Madhya Pradesh (REWA Solar park)
2	May-2017	250 MW	2.62	VGF Scheme	Rajasthan (Bhadla IV Solar park)
3	May-2017	500 MW	2.44	VGF Scheme	Rajasthan (Bhadla III Solar park)
4	Aug-17	500 MW	2.65	State Scheme	Gujarat (Non-Solar Park)

· As on 30.11.2017 over **41.80 lakh Solar Lighting Systems, 1.42 lakh Solar Pumps, and power packs of 181.52 MWeq** have been installed in the country. Major achievements of 18.47 lakh Solar Lighting Systems, 1.31 lakh. Solar Pumps, Power Packs of 96.39 MWeq have been reported during last three and half years.

· Several schemes namely (i) Defence scheme (ii) Central Public Sector Undertakings (CPSUs) scheme (iii) Bundling scheme (iv) Canal Bank/ Canal Top scheme (v) VGF Scheme (vi) Solar Park scheme (vii) Solar rooftops, have been initiated/launched by the Ministry under National Solar Mission which are under implementation.

· Under **Defence scheme** against a target of 300 MW, 357.50 MW has been sanctioned; under **Central Public Sector Undertakings (CPSUs) scheme** against a target of 1000 MW, entire capacity sanctioned; under **3000 MW Bundling scheme**, Tranch-I: 3000 MW has been tendered; under **100 MW Canal Bank/ Canal Top scheme**, all capacity sanctioned; under **2000 MW & 5000 MW VGF Scheme;** and under **20,000 MW Solar Park scheme**, 35 Solar parks have been approved in 21 States with aggregate capacity of 20,514 MW.

Solar Rooftop

Ministry is implementing Grid Connected Rooftop and Small Solar Power Plants Programme which provides for installation of 2100 MW capacity through CFA/ incentive in the residential, social, Government/PSU and Institutional sectors.

Under the programme, central financial assistance upto 30% of bench mark is being provided for such projects in Residential, Institutional and Social sectors in General Category States and upto 70% of the benchmark cost in Special Category States. For Government sector, achievement linked incentives are being provided. Subsidy/CFA is not applicable for commercial and industrial establishments in private sector.

· So far sanctions for 1767 MWp capacity solar rooftop projects has been issued and around 863.92 MWp capacity has been installed.

· All the 36 State / UT ERCs have now notified net/gross metering regulations and/or tariff orders for rooftop solar projects

· **Concessional loans of around 1375 million US dollars** from World Bank (WB), Asian Development Bank (ADB) and New Development Bank (NDB) have been made available to State Bank of India (SBI), Punjab National Bank (PNB) and Canara Bank for solar rooftop projects.

· **Suryamitra programme** has been launched for creation of a qualified technical workforce and over **11 thousand persons have been trained** under the programme.

· An online platform for expediting project, approval, report submission, and monitoring of RTS projects has been created.

· Initiated geo-tagging of RTS projects, in co-ordination with ISRO, for traceability and transparency.

· Launched **mobile app ARUN (Atal Rooftop Solar User Navigator)** for ease of access of beneficiaries for request submission and awareness.

· MNRE has allocated Ministry wise expert PSUs for implementation of RTS projects in various Ministries/Departments.

· Published best practices guide and compendium of policies, regulations, technical standards and financing norms for solar power projects.

Wind Power

· During the year 2016-17, wind power capacity addition of 5.5 GW was made, which is highest ever wind power capacity addition in the country during a single year. The present wind power installed capacity in the country is around 32.75 GW. Now, in terms of wind power installed capacity India is globally placed at
4th position after China, USA and Germany.

· India has a strong manufacturing base of wind power equipment in the country. Presently, there are 20 approved manufacturers with 53 models of wind turbines in the country up to a capacity of 3.00 MW single turbines. Wind turbines being manufactured in India are of international quality standards and cost-wise amongst the lowest in the world being exported to Europe, USA and other countries.

· The wind power potential of the country has been reassessed by the National Institute for Wind Energy (NIWE), it has been estimated to be 302 GW at 100 meter hub-height. Online wind atlas is available on NIWE website. This will create new dimension to the wind power development in the country.

· **Signing of PPAs/ PSAs** for first SECI wind auction (1000 MW, tariff discovered was Rs. 3.46 in Feb 2017). **Second wind auction of 1000 MW** which resulted in **lowest tariffs of Rs. 2.64/ unit.**

· India has long coastline where there is a good possibility for developing offshore wind power projects. The cabinet has cleared the National Offshore Wind Energy Policy and the same has been notified on 6th October 2015. Certain blocks near Gujarat and Tamil Nadu coast line have been identified. First LiDAR installed and commissioned off Gujarat coast for gathering wind resource data.

· **Wind Forecasting**: Based on wind forecasting experience of Tamil Nadu with NIWE, MoUs for forecasting done with Gujarat and Rajasthan.

· **Meso scale map** prepared for wind resource at 120 meter height, as most of turbine hub heights being installed are more than 100 meters. Total assessed wind resource of India would go up from 302 GW at 100 m to about 600 GW at 120 m); MESO scale map also prepared for Offshore wind. However for actual use these would have to be correlated with actual site specific measurements.

· **Bidding guidelines** for wind auction under Section 63 of Electricity Act have been notified in December to Ministry of Power.

Small Hydro Power

A capacity addition of 27.07GW of renewable energy has been reported during the last two and half years under Grid Connected Renewable Power, **0.59 GW from Small Hydro Power**.

Biomass Power

Biomass power includes installations from biomass combustion, biomass gasification and bagasse co-generation. A cumulative achievement to **8181.70 MW has been reported as on 30.11. 2017.**

Family Size Biogas Plants

Family Size Biogas Plants mainly for rural and semi-urban households are set up under the National Biogas and Manure Management Programme (NBMMP). During 2017-18, against a target of 1.10 lakh biogas plants, **0.15 lakh biogas plants installations has been achieved making a cumulative achievement to 49.8 lakh biogas plants.**

Off-Grid Solar Applications

As on 30.11.2017 over 41.80 lakh Solar Lighting Systems, 1.42 lakh Solar Pumps, and power packs of 181.52 MWeq have been installed in the country. Major achievements of 18.47 lakh Solar Lighting Systems, 1.31 lakh. Solar Pumps, Power Packs of 96.39 MWeq have been reported during last three and half years.

Amendments in Tariff Policy to promote Renewable Energy

· Enhancement in Solar RPO to 8% by March 2022.

· Introduction of RGO for New coal/lignite based thermal plants after specified date.

· Ensuring affordable renewable power through bundling of renewable power.

· No inter-state transmission charges and losses to be levied for solar and wind power.

· Further, pursuant to the revised tariff policy, the Ministry of Power on 22nd July 2016 has notified the long term growth trajectory of RPO for solar and non-solar energy for next 3 years 2016-17, 2017-18 and 2018-19 as under:-

Long term trajectory	**2016-17**	**2017-18**	**2018-19**
Non-solar	8.75%	9.50%	10.25%
Solar	2.75%	4.75%	6.75%
Total	11.50%	14.25%	17.00%

IREDA

Indian Renewable Energy Development Agency (IREDA) has been awarded Mini Ratna Status and the authorised capital of IREDA is increased from Rs.1000 Cr. to Rs.6000 Cr.

Green Energy Corridor

Intra-State Transmission System is being **implemented by eight renewable rich States** (Tamil Nadu, Rajasthan, Karnataka, Andhra Pradesh, Maharashtra, Gujarat, Himachal Pradesh and Madhya Pradesh) with **total project cost of Rs. 10141 crores**, with funding mechanism consisting of 20% State Equity, 40% Government of India Grant (total 4056.67 crores) and 40% KfW loan (500 million EUR). The project includes about approx. 9400 ckm transmission lines and Substations of total capacity of approx. 19000 MVA to be completed by March 2020. The purpose is to evacuate approx. 20,000 MW of large scale renewable power and improvement of the grid in the implementing States.

Projects worth Rs. 6766 crore have been awarded and approx. Rs. 1400 crores have been disbursed to the States from the Government of India share.

Other Initiatives

- India is taking a leading role in the International Renewable Community and was a leading country along with France in formation of **International Solar Alliance (ISA)**, an international body of 121 countries lying between Tropic of Cancer and Tropic of Capricorn. 47 countries have signed the Framework Agreement and 18 countries have ratified it within 1 year of opening of Framework for signature. Accordingly, ISA became a **legal entity on 6.12.2017, with its headquarters in India.**

· **Bank loans up to a limit of Rs.15 crores** will be given to borrowers for purposes like solar based power generators, biomass based power generators, wind power systems, micro-hydel plants and for renewable energy based public utilities viz. Street lighting systems, and remote village electrification. For individual households, the loan limit will be **Rs.10 lakh per borrower**.

· **Foreign Direct Investment (FDI) up to 100% is permitted under the automatic route for renewable energy generation and distribution projects** subject to provisions of The Electricity Act, 2003.

In order to achieve the targets, various initiatives have been taken by the Government which interalia include:

i. Announced a **cumulative target of 175 GW** renewable energy based electric installed capacity of 100 GW solar power installed capacity;

ii. **Issued guidelines** for procurement of solar and wind power through tariff based competitive bidding process;

iii. **Declared Renewable Purchase Obligation (RPO)** up to the year 2018-19;

iv. Declare Renewable Generation Obligation on **new coal/lignite based thermal plants**;

v. Notified **National Offshore Wind Energy Policy**;

vi. Notified policy for **Repowering of Wind Power Projects**;

vii. Notified **standards for deployment of solar photovoltaic systems/devices**;

viii. Issued order for **waiving the Inter State Transmission System charges** and losses for inter-state sale of solar and wind power for projects to be commissioned by March 2019;

ix. Launched **Atal Jyoti Yojna for Solar LED Street Lights in five States**; and

x. Setting up of exclusive **solar parks**;

xi. Identification of large government complexes/ buildings for rooftop projects;

xii. Provision of roof top solar and 10 percent renewable energy as mandatory under Mission Statement and Guidelines for development of smart cities;

xiii. **Amendments in building bye-law**s for mandatory provision of roof top solar for new construction or higher FAR;

xiv. **Infrastructure status for solar projects**;

xv. Raising **tax free solar bonds**;

xvi. Making **roof top solar a part of housing loan** by banks/NHB;

xvii. Raising **funds from bilateral and international donors** as also from the Green Climate Fund to achieve the target. And

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RM/VM