

**Government of India**  
**Ministry of New and Renewable Energy**  
**Dated: 20<sup>th</sup> March, 2018**  
**Pravasi Bhartiya Kendra, New Delhi**  
**By**  
**Sohail Akhtar**  
**Adviser**

Set up in 1982 as Department of Non-Conventional Energy Sources (DNES). Converted in 1992 into full-fledged scientific Ministry.

## **MANDATE**

Nodal Ministry for all matters relating to new and renewable energy covering:

- Solar energy
- Wind energy
- Small hydro power (up to 25 MW)
- Bio-energy (biomass/ bio-wastes: agricultural / rural/ urban/ industrial)
- New energy sources (Hydrogen, Fuel Cells, Geothermal, Tidal, etc.)

Coordinating Ministry for bio-fuels policy and applications.

<b>S.No</b>	<b>Autonomous Institutions</b>	<b>Objective/Focus Areas</b>
<b>1</b>	<b>Solar Energy Corporation of India</b>	<b>Facilitating Implementation of Renewable Energy Programmes</b>
<b>2</b>	<b>Indian Renewable Energy Development Agency (IREDA)</b>	<b>Term-loans for RE and EE Projects</b>
<b>3</b>	<b>National Institute of Solar Energy (NISE)</b>	<b>Solar Energy Development</b>
<b>4</b>	<b>Sardar Swaran Singh National Institute of Renewable Energy (SSS-NIRE)</b>	<b>Bio-energy Development.</b>
<b>5</b>	<b>National institute of Wind Energy (NIWE)</b>	<b>Wind Energy Development</b>

# STRUCTURE OF THE PRESENTATION

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## **1. Indian Renewable Energy Scenario**

## **2. Mission 175 GW by 2022**

**a. Solar Power**

**b. Wind Power**

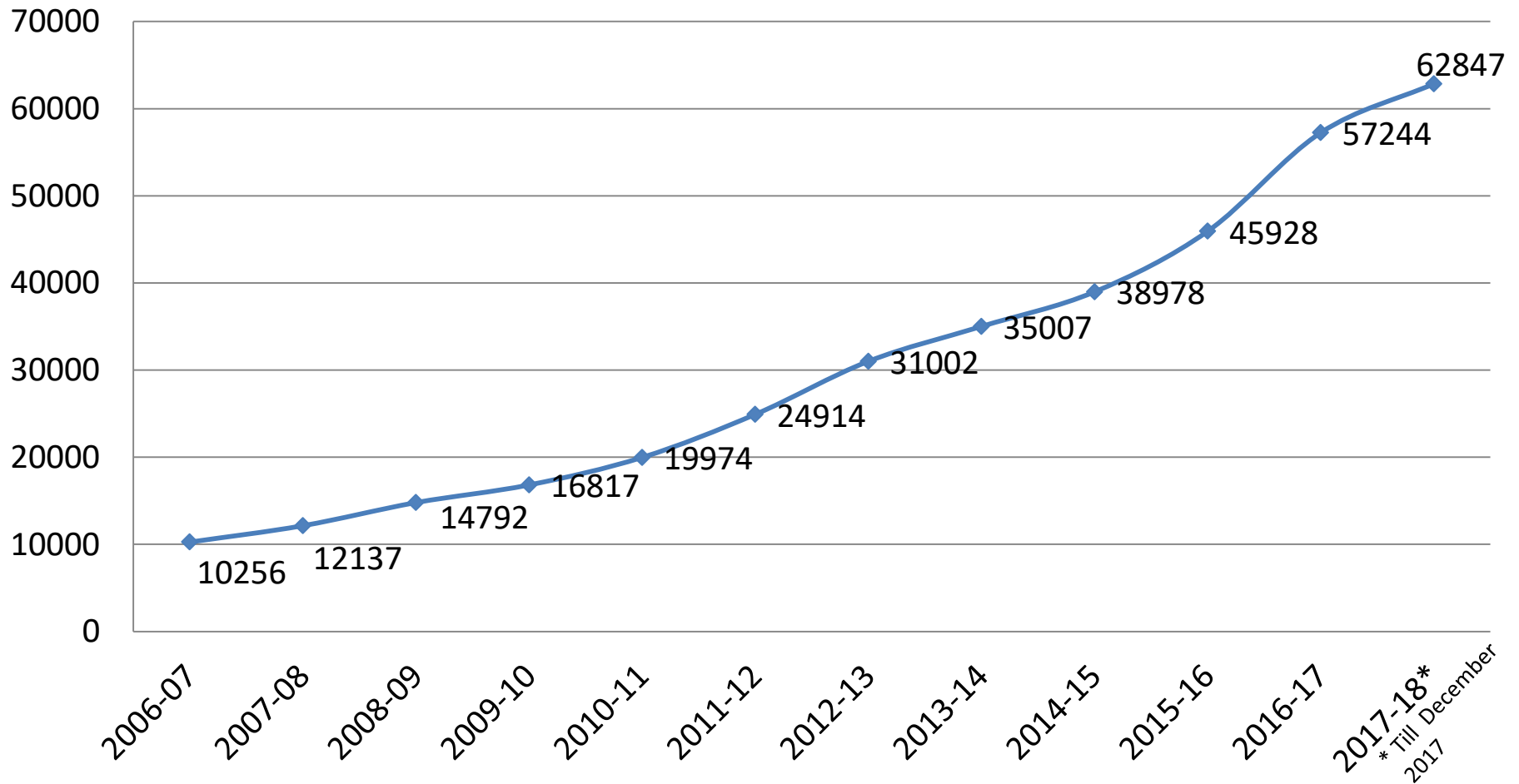
**c. Small Hydro Power**

**d. Biomass**

## **3. Green Energy Corridor**

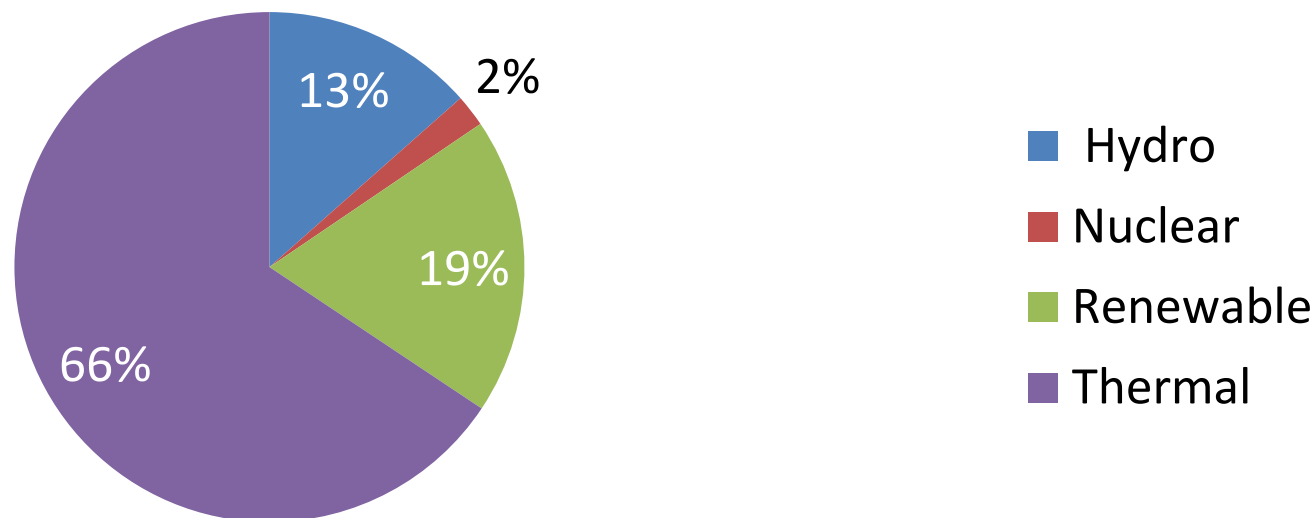
# Renewable Capacity Addition in the last decade (as on 31.12.2017)

## Total Installed Renewable Capacity (GW)



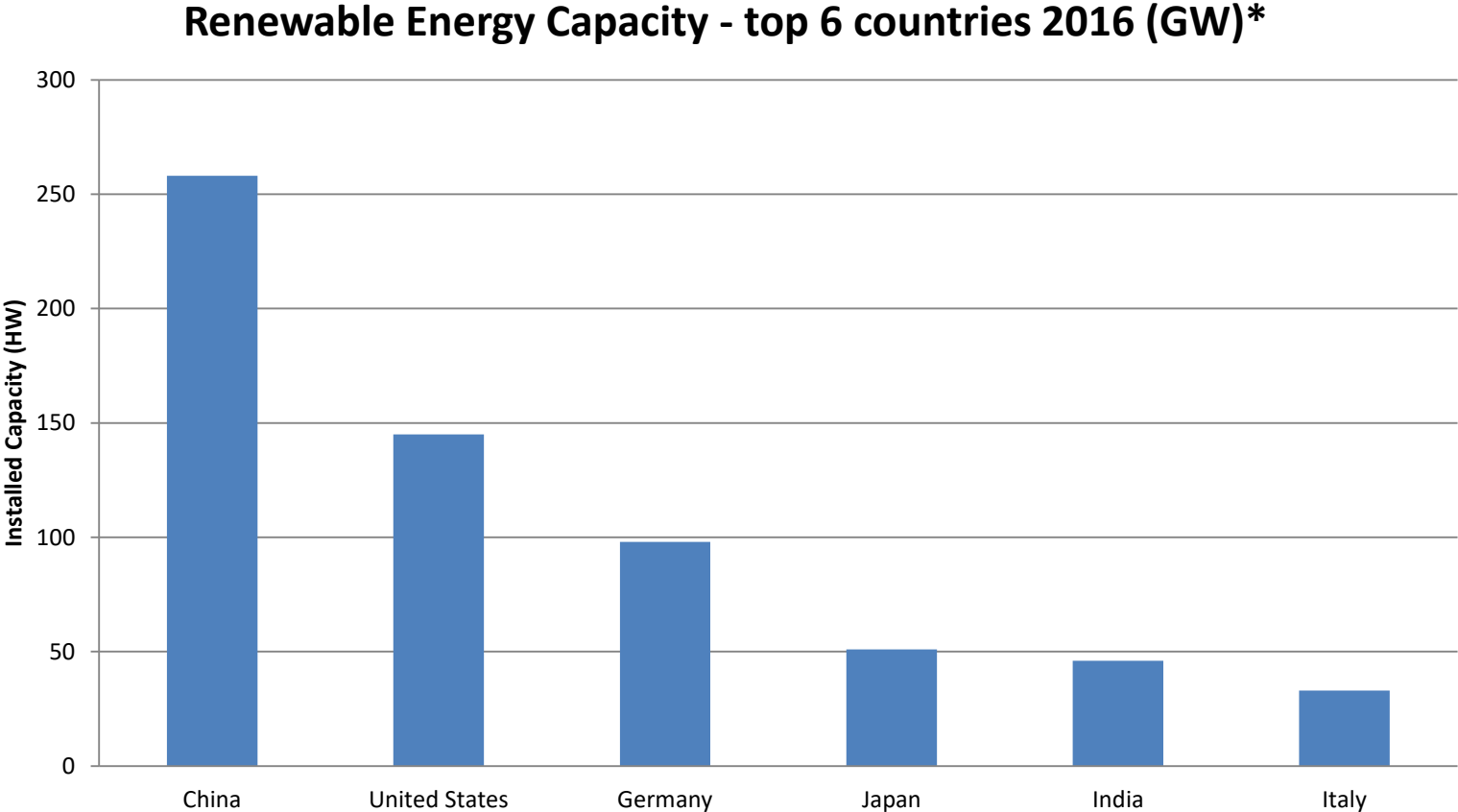
# Share of RE Capacity in Total Installed Capacity (as on 31.12.2017)

Installed Capacity in Country : 333.53 GW



SOURCE	INSTALLED CAPACITY (GW)	% SHARE
RENEWABLE ENERGY	62.84	18.84
LARGE HYDRO	44.96	13.48
NUCLEAR	6.78	2.03
THERMAL	218.95	65.65
<b>TOTAL</b>	<b>333.53</b>	<b>100.00</b>

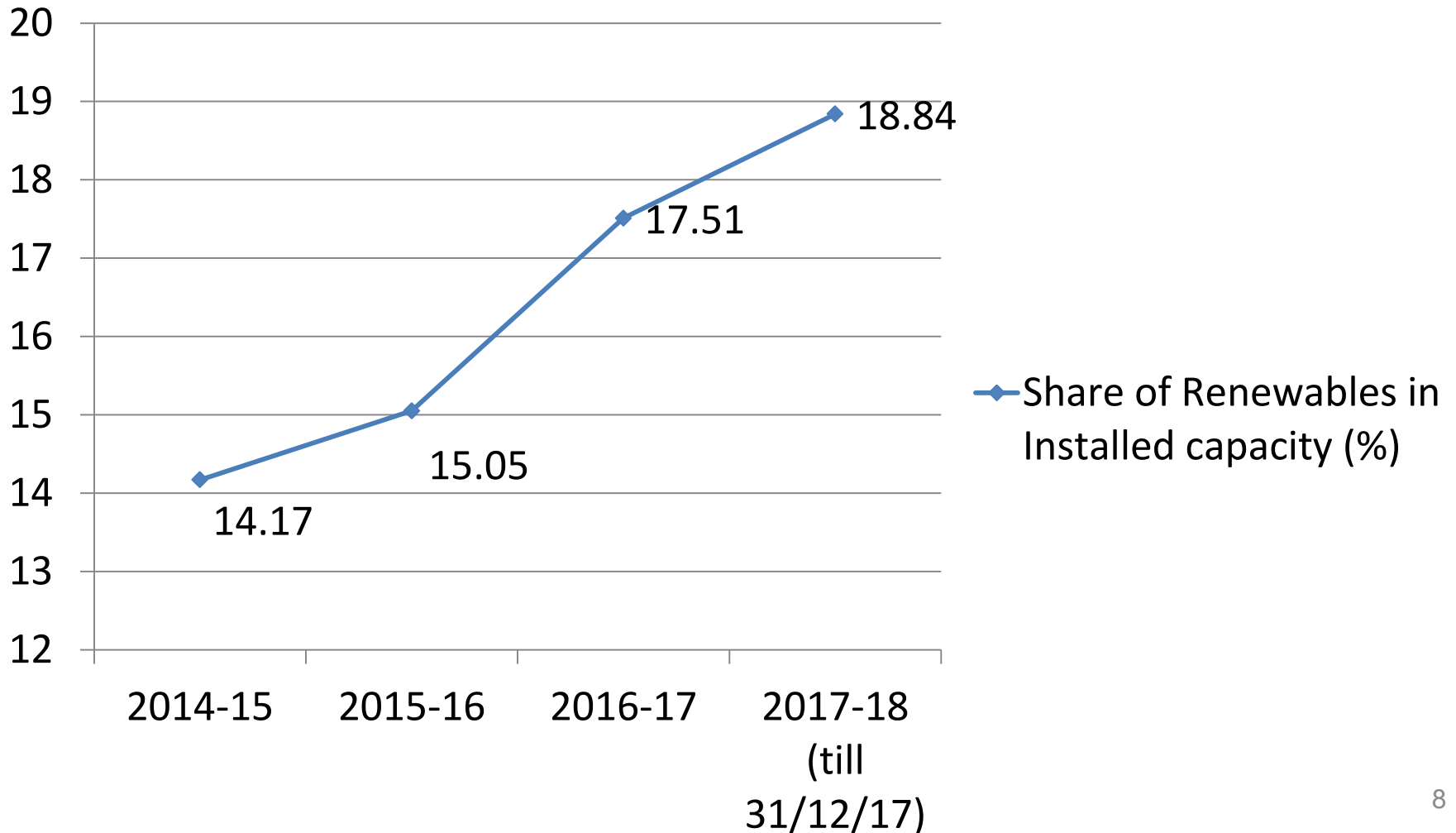
# Position of India in the World in the Renewable Sector



\*Source : REN21 RENEWABLES GLOBAL STATUS REPORT 2017

# Change in % share of Renewable Capacity in Total Capacity (as on 31.12.2017)

## Share of Renewables in Installed capacity (%)

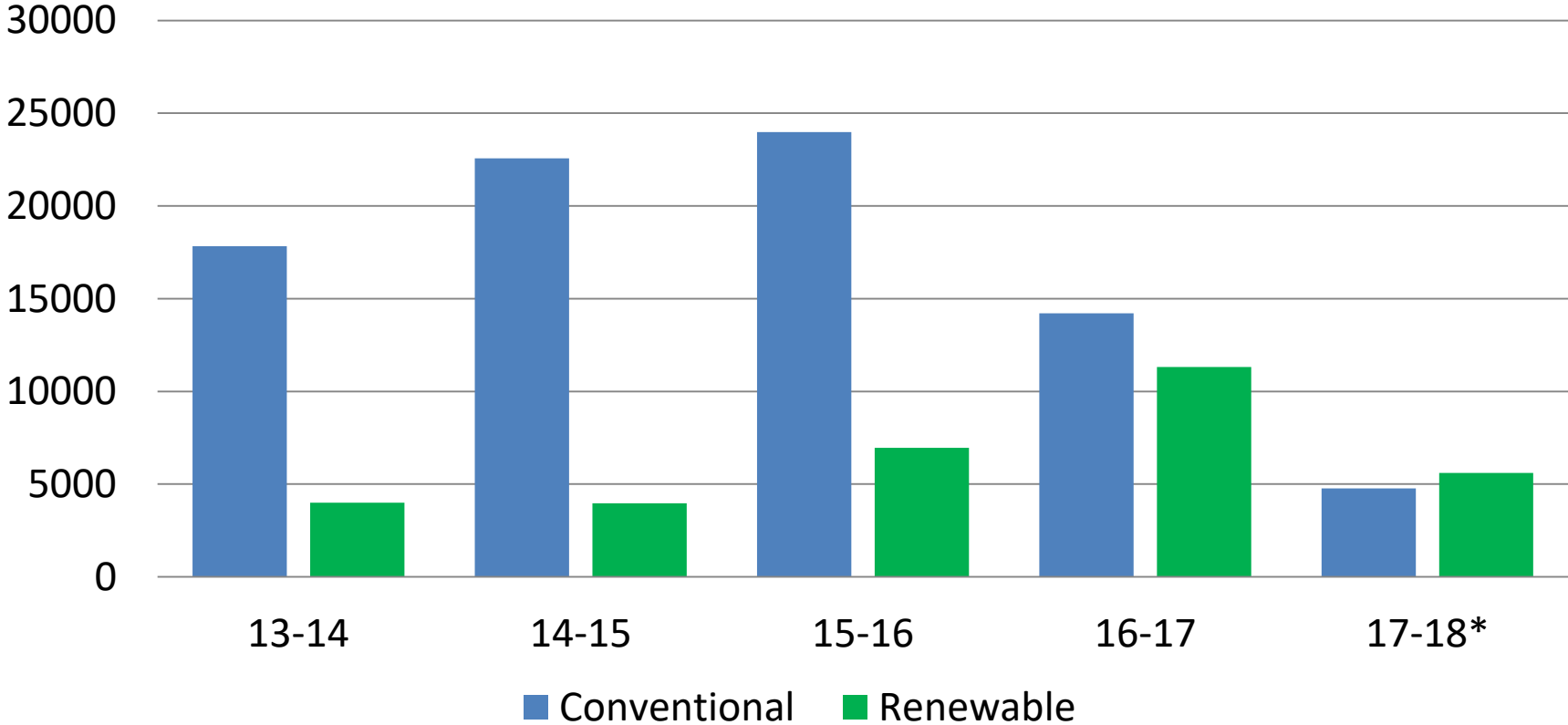




# Comparative Expansion of Conventional vs Renewal

(as on 31.12.2017)

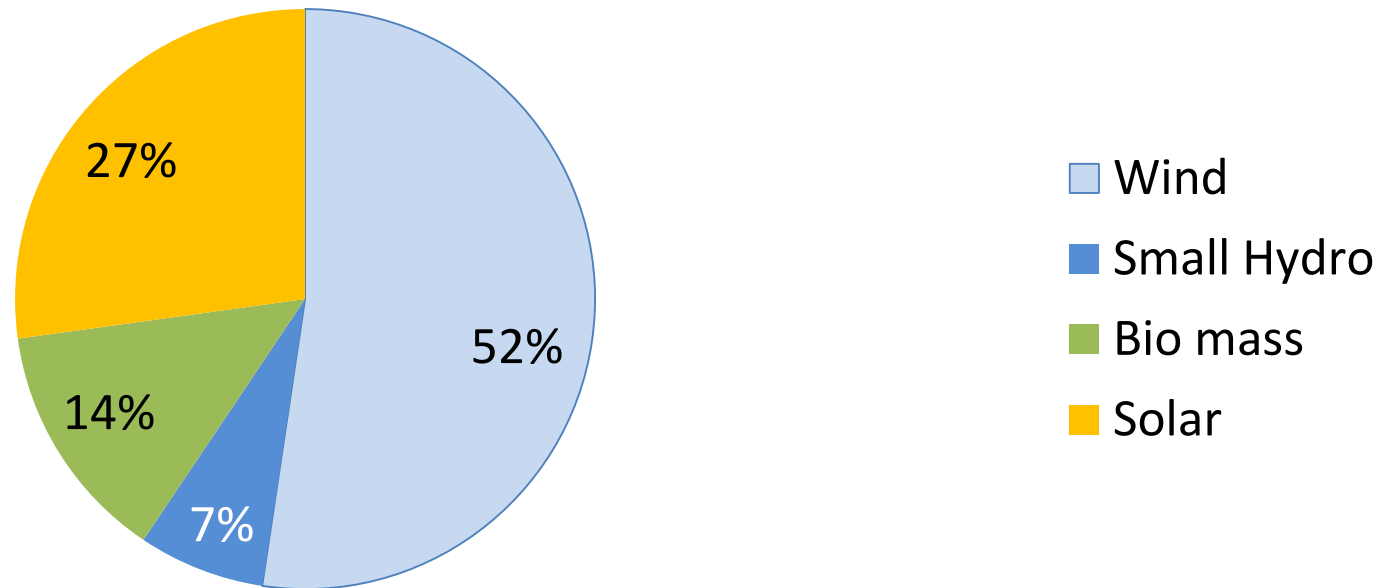
### Capacity Addition from Conventional and Renewable Energy Sources over the years



# Renewable Energy - Installed Capacity Source-wise

(As on 31.12.2017)

Renewable Installed capacity : 62.84 GW



	SOLAR POWER	WIND POWER	BIO POWER	SMALL HYDRO POWER
INSTALLED CAPACITY (GW)	17.05	32.84	8.53	4.42

# Renewable Capacity Addition in 2017-18 (as on 31.12.2017)

	Achievement (April - Dec, 2017) (MW)	Cumulative Achievements (as on 31.12.2017) (MW)
Wind Power	568.71	32848.46
Solar Power - Ground Mounted	4492.05	16070.07
Solar Power - Roof Top	271.49	982.30
Small Hydro Power	38.30	4418.15
BioPower (Biomass & Gasification and Bagasse Cogeneration)	232.10	8413.80
Waste to Power	0.00	114.08
<b>Total</b>	<b>5602.65</b>	<b>62846.86</b>

# **Mission 175 GW by 2022**

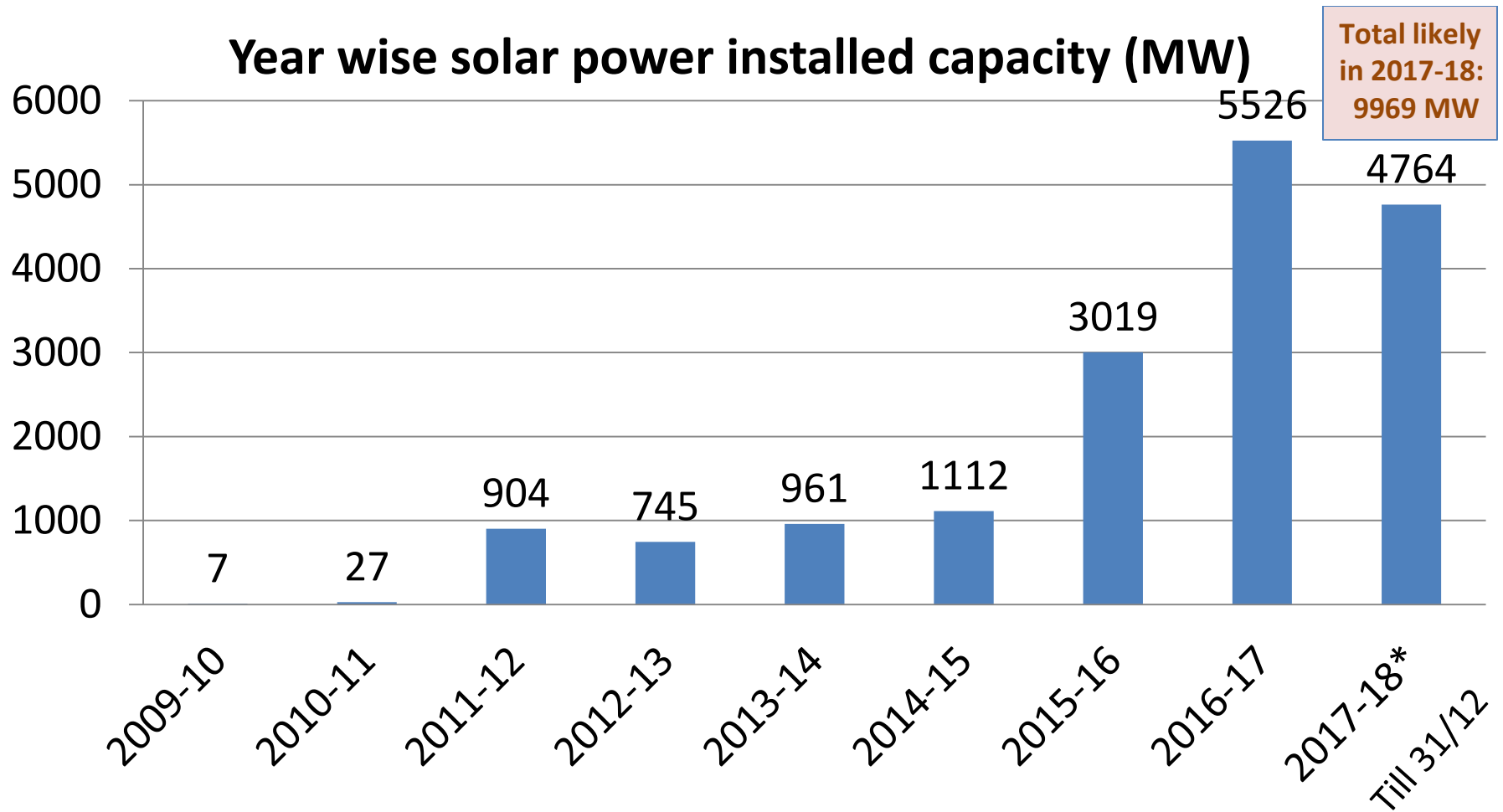
# Mission 175 GW RE by 2022

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- India made a commitment in Paris Climate Agreement
  - to reduce emission intensity of the economy by one-third and
  - for having at least 40 % electric power installed capacity from clean energy sources by the year 2030
- Towards this an ambitious target of 175 GW by 2022 announced in 2015:
  - Solar: 100 GW
  - Wind: 60 GW
  - Biomass: 10 GW
  - Small Hydro: 5 GW

# **Mission 100 GW through Solar by 2022**

# Annual addition to Solar Power Installed Capacity



# State-wise Solar Power Installed Capacity (1/2)

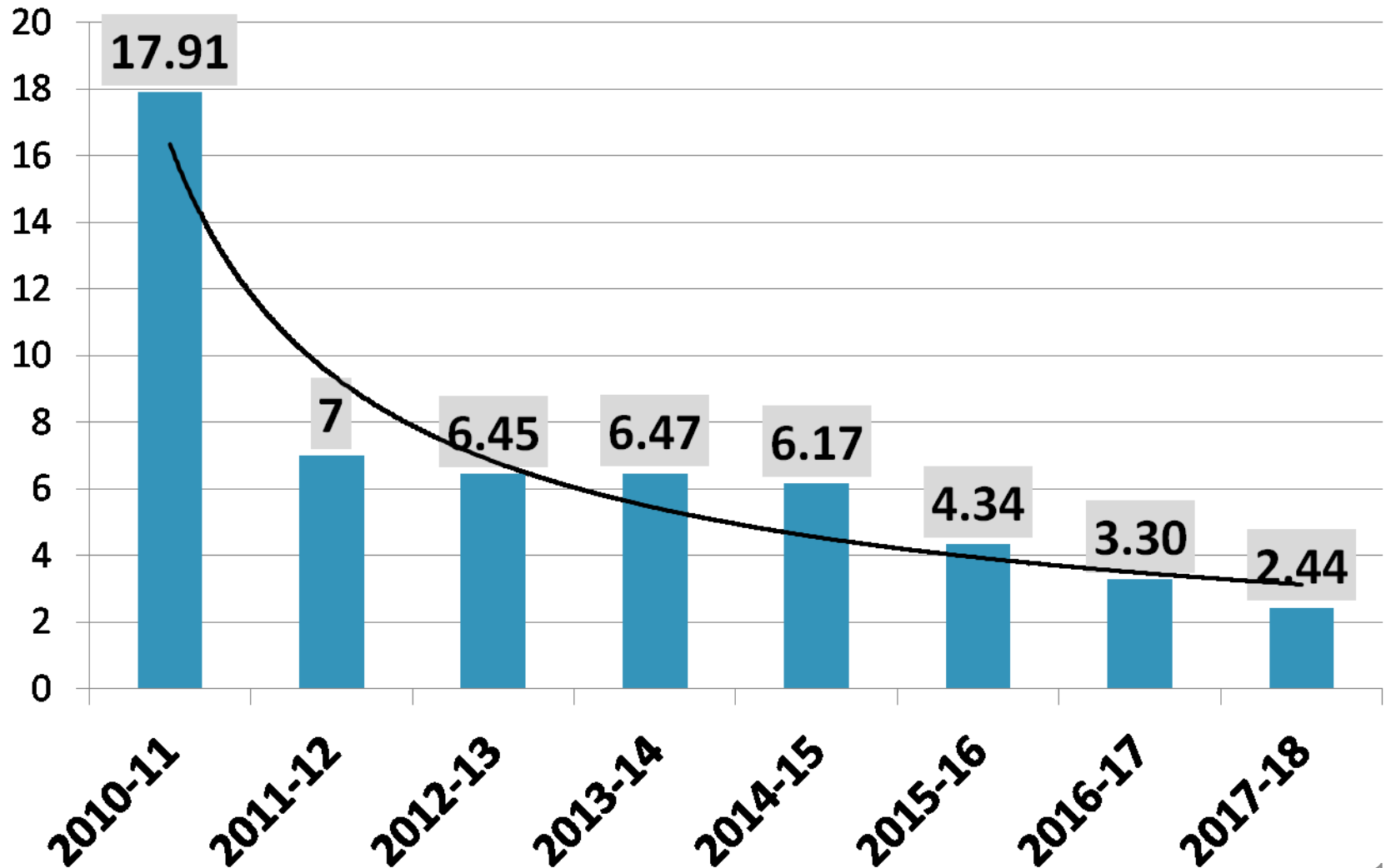
<b>State/UT</b>	<b>Total cumulative capacity till 31-12-17 (MW)</b>	<b>State/UT</b>	<b>Total cumulative capacity till 31-12-17 (MW)</b>
Andaman & Nicobar	12.61	Goa	0.71
Andhra Pradesh	2165.21	Gujarat	1344.69
Arunachal Pradesh	4.39	Haryana	203.85
Assam	11.78	Himachal Pradesh	1.48
Bihar	141.52	Jammu & Kashmir	2.36
Chandigarh	18.89	Jharkhand	23.27
Chhattisgarh	179.38	Karnataka	1800.85
Dadar & Nagar	2.97	Kerala	88.20
Daman & Diu	10.46	Lakshadweep	0.75
Delhi	58.02	Madhya Pradesh	1210.11



## State-wise Solar Power Installed Capacity

State/UT	Total cumulative capacity till 31-12-17 (MW)	State/UT	Total cumulative capacity till 31-12-17 (MW)
Maharashtra	763.08	Sikkim	0.01
Manipur	1.33	Tamil Nadu	1819.42
Meghalaya	0.06	Telangana	2990.07
Mizoram	0.20	Tripura	5.09
Nagaland	0.50	Uttar Pradesh	550.38
Odisha	79.51	Uttarakhand	246.89
Puducherry	0.11	West Bengal	39.84
Punjab	905.64	Other/MoR/PSU	58.31
Rajasthan	2310.46	<b>TOTAL</b>	<b>17052.37</b>

# Year-wise lowest solar tariff in(Rs./kWh)





**Solar Steam Cooking System at Leh  
for 500 Jawans**

**Ladakh**



**SOLAR FRUITS DRYING AT LEH**



**50 kg Solar Turmeric drier at Mizoram, India**





# New Solar Initiatives in Pipeline

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- KUSUM (*Kisan Urja Suraksha evam Utthaan Mahabhiyan*)
- Solar Manufacturing Policy
- Special Provision for LWE areas
- Floating Solar

# Floating Solar

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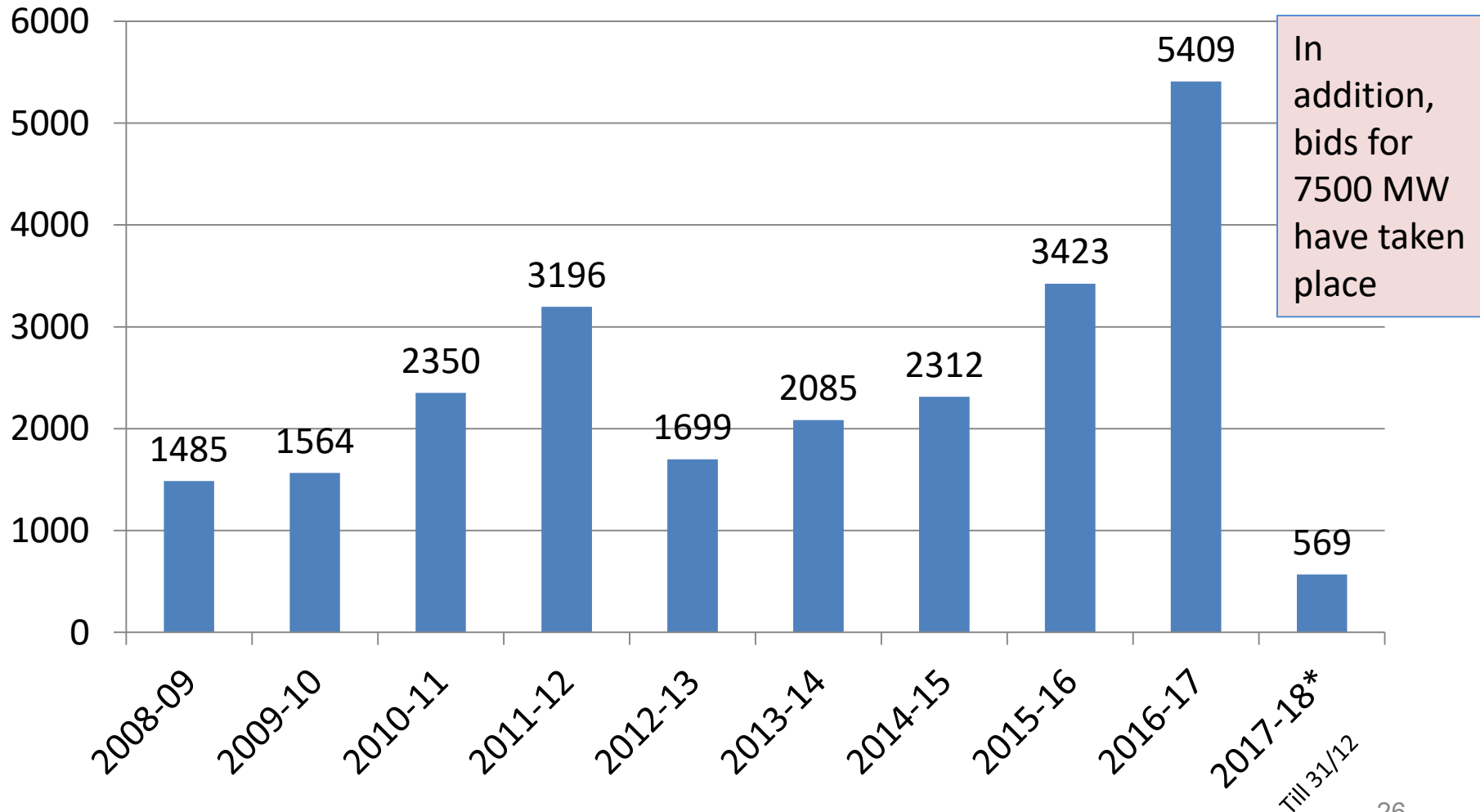
- Proposal to set up solar power plants on reservoir surfaces
  - Advantage : Existing evacuation capacity, no land acquisition, pump storage
- An EOI was floated for the same by SECI; received good response
- Based on the response, reservoirs are being identified for floating tenders



# **Mission 60 GW through Wind by 2022**

# Annual addition to Wind Power Installed Capacity

Year wise wind power installed capacity (MW)



# State Wise Wind Power Installed Capacity

<b>S. No.</b>	<b>State</b>	<b>Wind Power Installed Capacity(MW)</b>
1.	Andhra Pradesh	3834.75
2.	Gujarat	5537.37
3.	Karnataka	3793.1
4.	Kerala	51.5
5.	Madhya Pradesh	2497.79
6.	Maharashtra	4777.63
7.	Rajasthan	4281.72
8.	Tamil Nadu	7969.5
9.	Telangana	100.8
10.	Others	4.3
	<b>Total</b>	<b>32848.46</b>

# New Initiatives in Wind Sector

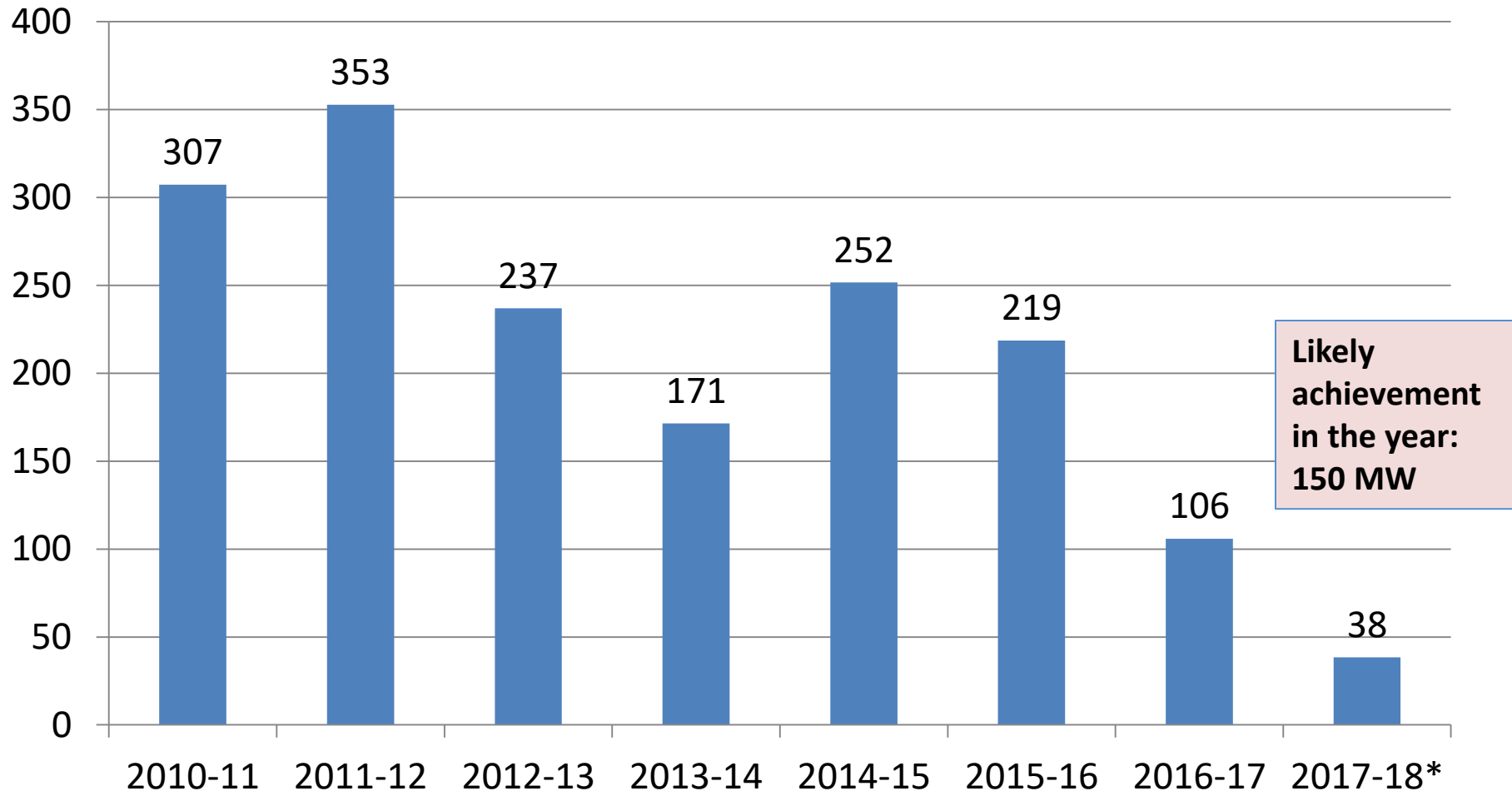
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- Offshore Wind
- Wind Solar Hybrid

# **Mission 5 GW through Small Hydro by 2022**

# Annual addition to Small Hydro Installed Capacity

Year wise Small hydro power installed capacity (MW)



# Small Hydro Power

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- Target for 2022- 5000 MW
- Achievement by January 2018- 4458 MW
- Likely achievement by March 2018- 4530 MW
- Target for next FY- 250 MW
- Target of 5000 MW likely to be achieved by 2020

Ministry of New and Renewable Energy had been implemented a programme on AFST since 1985-86.

- The Programme Objectives were:
- To promote Battery Operated Vehicles (BOV) which are non-polluting and quiet in operation, conserve petroleum products, curb environmental pollution and to get feedback on the performance of BOVs in operating conditions.



## Major activities under the Programme:

- R&D support on various components of BOVs including chopper controller, charger, chassis, battery, motor, battery management system, computerized controls and secondly.
- To Provide subsidy/incentive for purchasing of new battery operated vehicles (two, three and four wheelers) to the consumers.

## Activities under the Programme:

- Today there are over 16 Manufacturers/Industries of two wheelers in India and 1 manufacturer of car (M/s. Mahindra took over Reva in 2010).
- Currently battery operated two wheelers and Mahindra Reva car are available in the Indian market.
- The two wheelers are about 30-40% expensive than conventional ones.
- The new Reva car is about 35-40% expensive.
- Currently the development is to charge these vehicles using SPV modules.

# Type of BOVs Covered with Performance Specifications For Subsidy

## 1. Battery Operated Two Wheelers (Low Speed & High Speed).

low speed: 25km/h (60km/charge)

high speed: 40km/h (70-80 km/charge)



## 2. Battery Operated Three Wheelers.

Seating capacity: 7 seater and above

Range: 90 kms/charge

Top speed: 45 km/hour



## 3. Battery Operated Passenger Cars.

Seating capacity: 4 seater

Range: 90 kms/charge

Top speed: 50 km/hour



## 4. Battery Operated Buses/Mini-buses.

Seating capacity: 10 seater and above

Range: 70 km/charge

Top speed: 40 km/hour



- Vehicles must have ARAI/VRDE/ICAT Test Certificates.

## Subsidy Pattern for BOVs

Two Wheelers  
(Low speed / High  
speed)

20% Ex works cost of vehicle or Rs.4,000 / Rs.5000/-  
per vehicle, whichever is less.

Three-wheelers  
(7-seater and above)

20% Ex works cost of vehicle or Rs. 60,000/- per  
vehicle, whichever is less

Passenger Cars  
(each 4-seater)

20% Ex works cost of vehicle or Rs.1,00,000/- per  
vehicle, whichever is less

Mini bus / Bus  
(10-seater and above).

20% Ex works cost of vehicle or Rs.4,00,000/- per  
vehicle, whichever is less.

## Eligible Beneficiaries

### Eligible Beneficiaries for B. O. V.s 2/3/4 Wheelers Vehicles

- Government organizations, Government Undertakings and autonomous institutions, Public/private limited companies, Registered Voluntary institutions under the Societies' Registration Act, Registered professional Associations of repute.
- Thus it covers all categories of Indian individuals and institutional users.





# Electric Vehicle Technology

**Electric vehicle Technology can be a sustainable solution for road transportation.**

## Benefits

- **Zero Emissions**
- **No Fuel**



## Challenges

- **Drive Range**
- **Infrastructure**









*Thank You*

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