

# ENERGY STORAGE IN INDIA

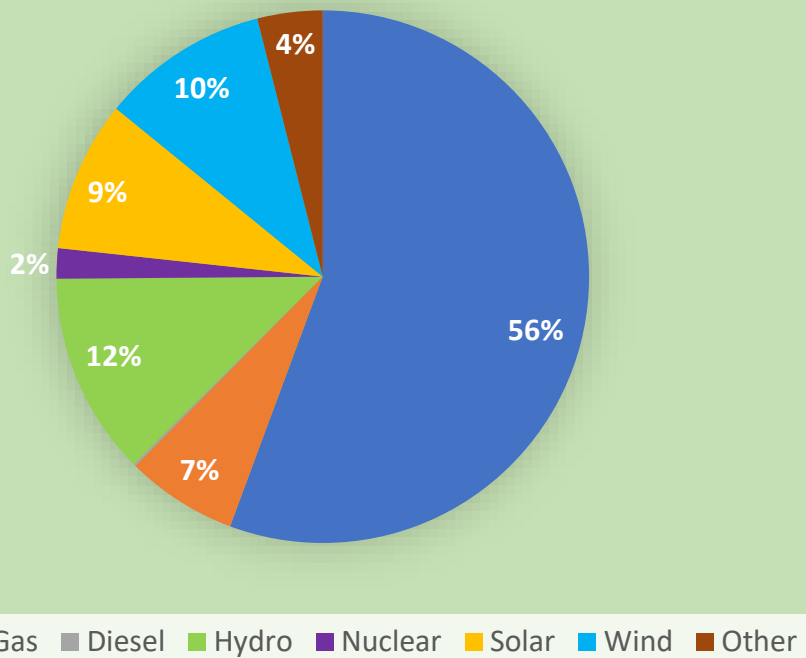
SECOND MEETING OF THE ENERGY STORAGE PARTNERSHIP, PRETORIA –SOUTH AFRICA

JANUARY 20-22, 2020

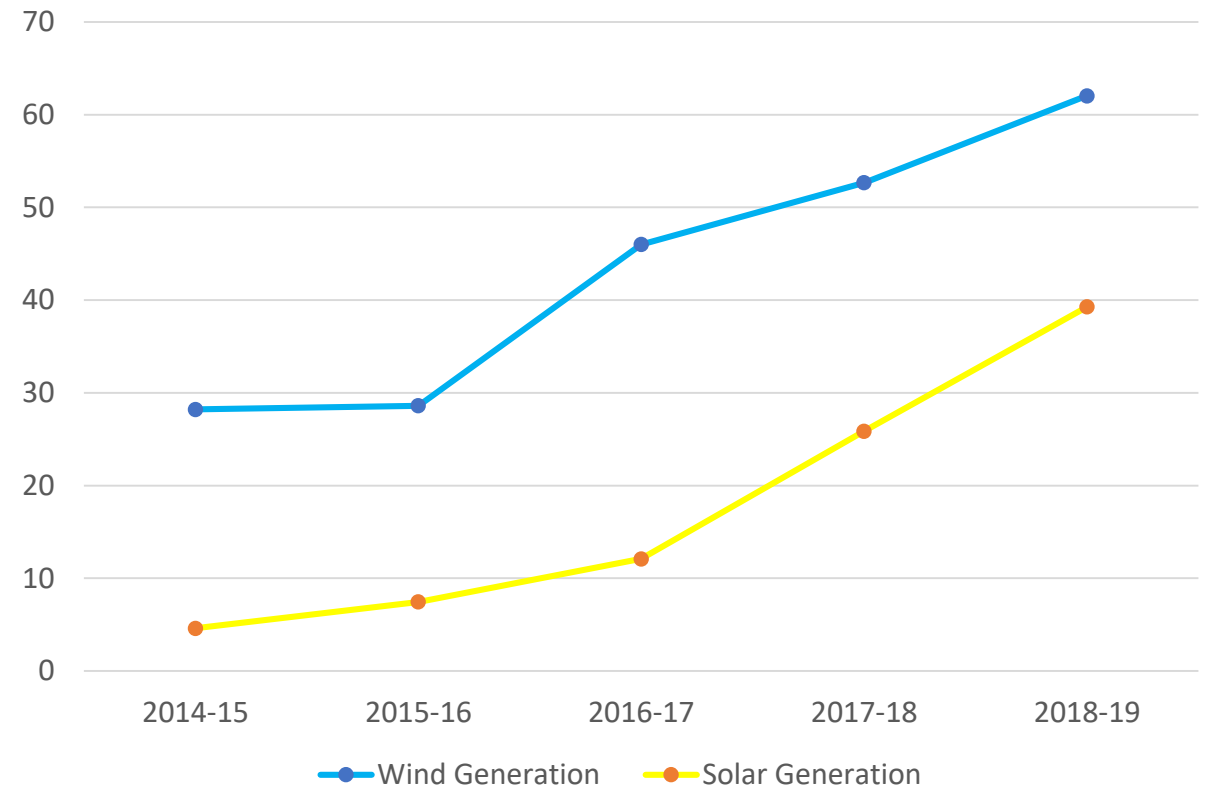


# Power Sector Snapshot : 2019

## Installed Capacity Generation Mix 2019



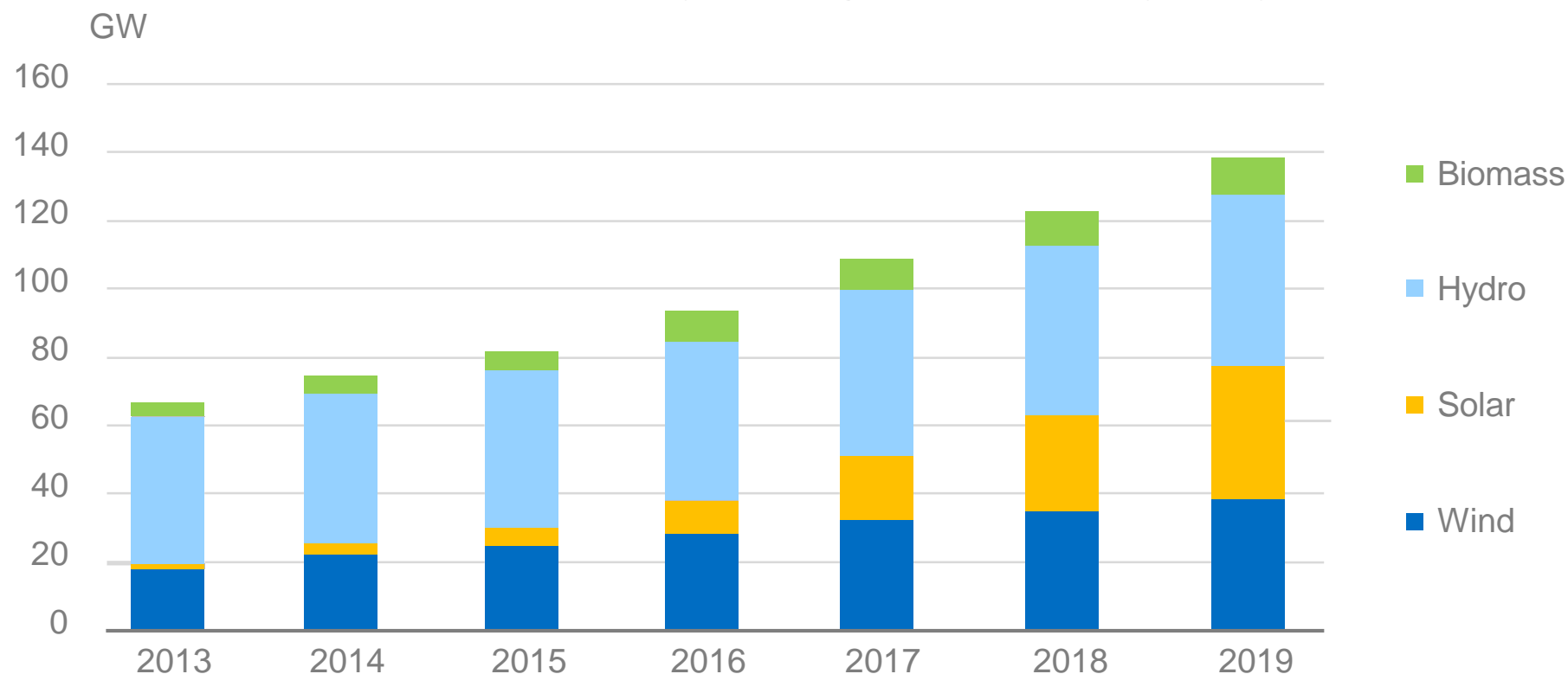
## Energy (TWh)



Source :CEA

# India's rapid growth in renewables

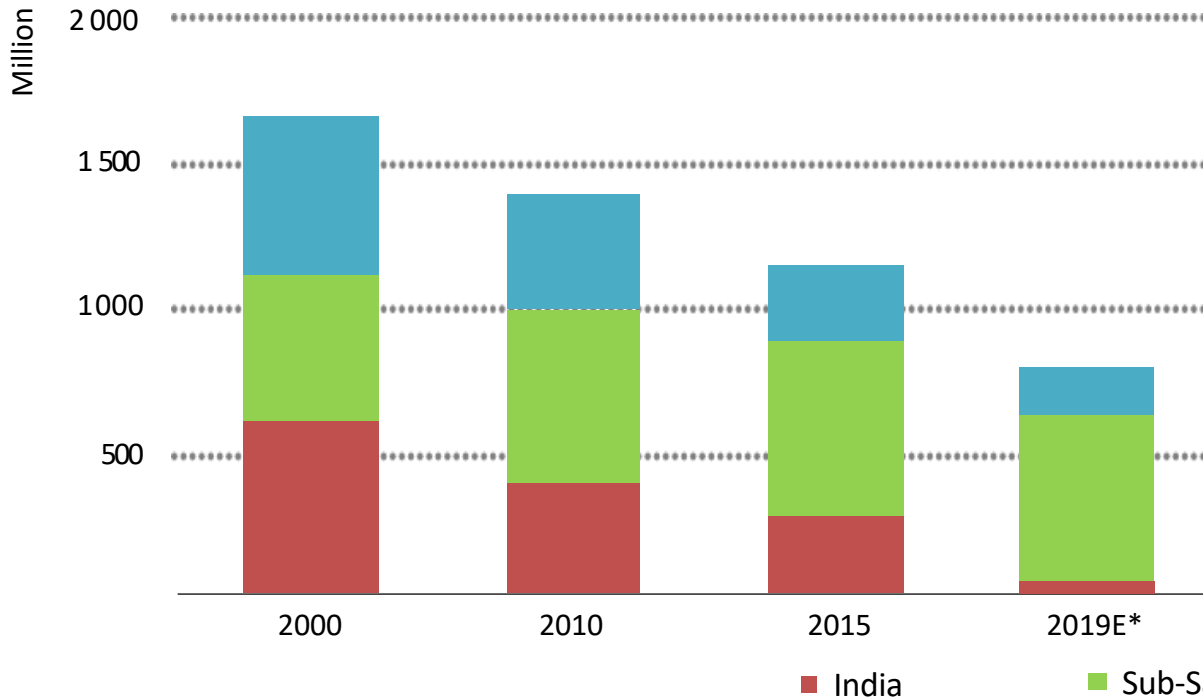
India's renewable power generation capacity, 2013-19



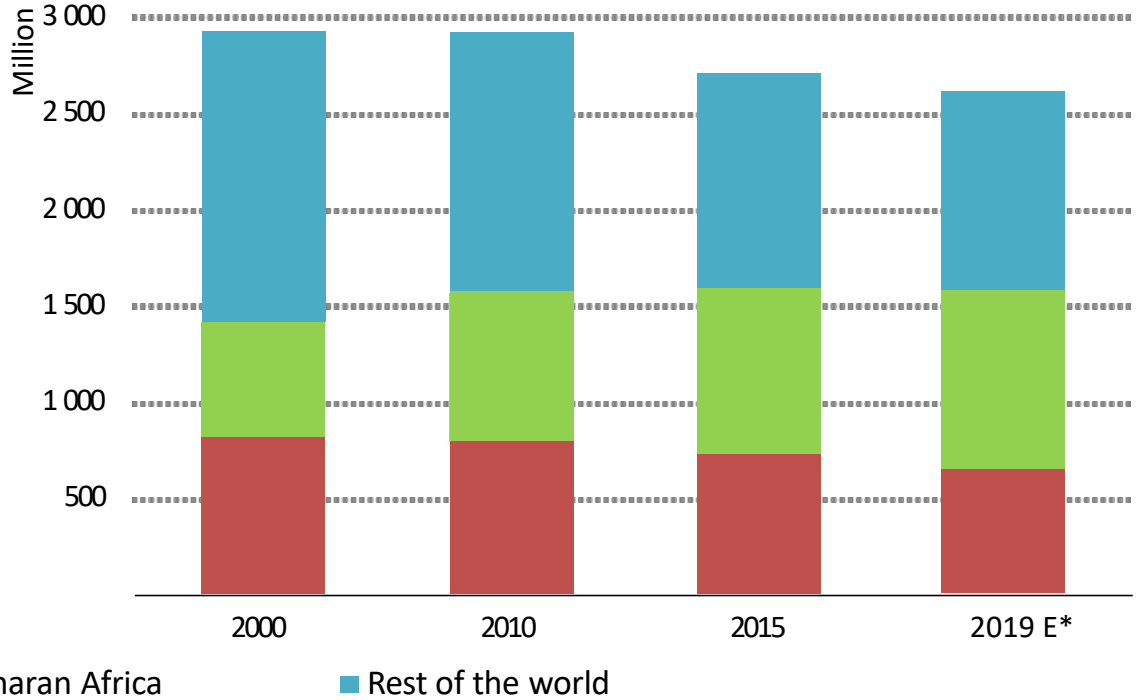
Solar PV and onshore wind have seen strong growth, overtaking for the first time investment in thermal power generation in 2018. To reach 175 GW by 2022 and 450 GW by 2030

# India achievement in providing electricity access for all and clean cooking

World: Number of people without access to electricity



World: Number of people relying on traditional use of biomass



\*2019 estimates.

Almost 750 million people gained access to electricity in India since 2000, while vigorous programmes have helped replace biomass use in cooking. India can offer good experience to Africa and the world.



# SECI



## Solar Energy Corporation of India Limited

*A Government of India Enterprise. Schedule-A Central Public Sector Undertaking*

- Incorporated on 20<sup>th</sup> September 2011 (not for profit)
- Converted into a Commercial Company on 9<sup>th</sup> Nov, 2015
- Scope covers all forms of Renewable Energy
- Debt-free company
- Category I (highest) Power Trading Licensee by CERC
- Dividend paying company since 2015-16



# Tenders for large-scale RE projects

- Central Implementing agency for large-scale tenders for Solar , Wind and Solar-Wind Hybrid technologies

## Solar

- Capacity awarded: 20 GW,
- Commissioned: 5.3 GW, balance under execution

## Wind

- 11 GW tendered,
- 9.4 GW awarded,
- 1.8 GW commissioned

## Hybrid

- 2.4 GW tendered,
- 1.4 GW awarded

# Innovative tenders

7.5  
GW

- Solar PV Projects in Leh and Kargil Districts

7 GW

- Solar projects linked with 2 GW Solar Manufacturing Plants

1.2  
GW

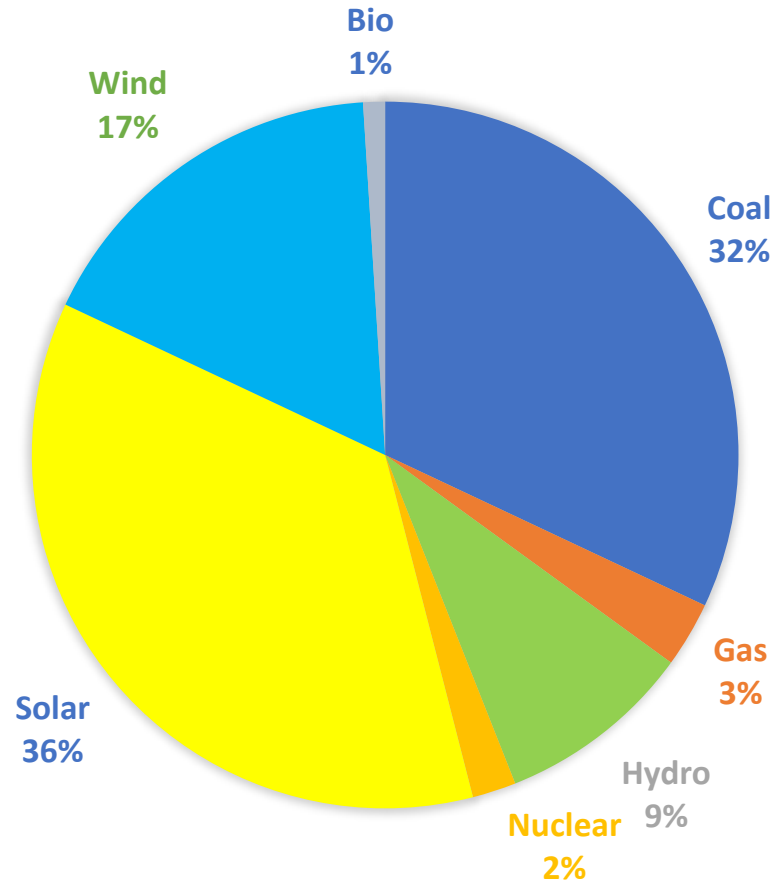
- ISTS Connected Solar PV projects with Peak Power Supply (ISTS-VII)

0.4  
GW

- Round-the-clock Renewable Energy

# Expected Power Sector Snapshot : 2030

## EXPECTED INSTALLED CAPACITY GENERATION MIX 2030



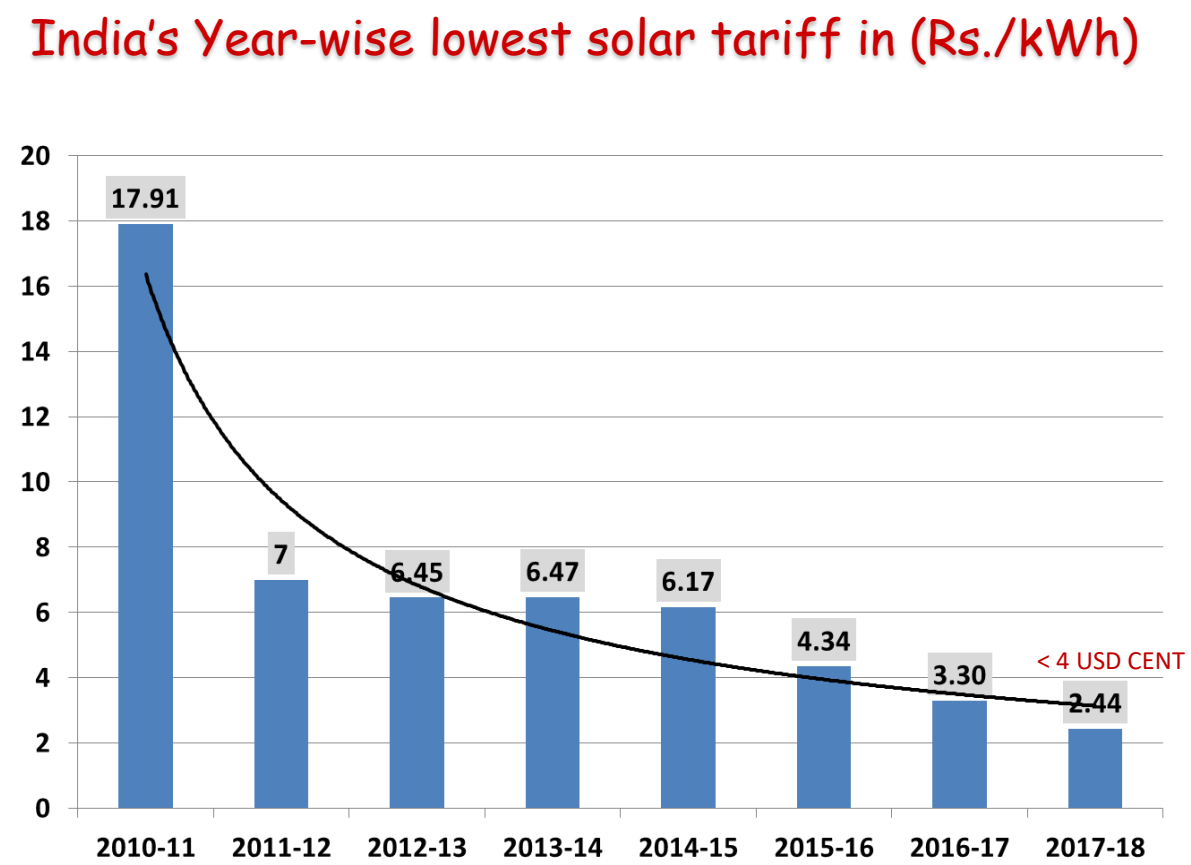
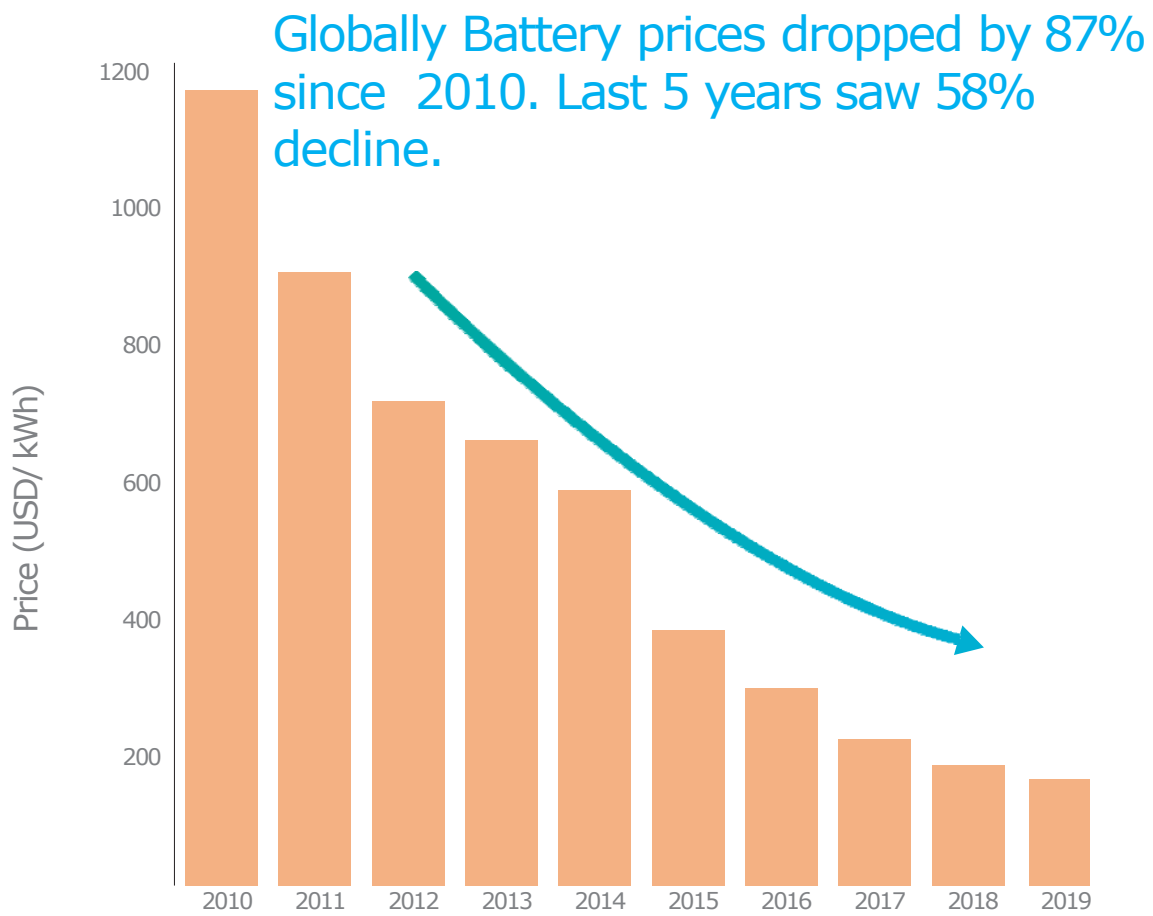
Source :CEA

Under the Paris Agreement , India made a commitment that by the year 2030, India would increase the share of electricity generated from non-fossil fuels to about 40% of its total generation. The shift in Generation mix would be driven by :-

- Decrease in tariff of Renewable Energy Sources
- Falling cost of energy storage systems



# Drivers of Energy Storage System – Global and Local factors



Source: Bloomberg New Energy Finance (BNEF)

# Energy Storage System - Implementation & Tenders

- Some 2.6GW of PHS are already operational with another 3.1GW under construction
- India's first and biggest battery-storage system of 10 MW has been commissioned in Delhi in 2019 by a DISCOM.

Location	Capacity	Current Status	Date Issued
PAN India	400 MW RE Projects "Round- the-Clock" Supply	RFS issued	Oct 2019
PAN India	1200 MW RE Projects with assured Peak Power Supply	RFS issued	Sep 2019
Lakshadweep	4 MW Solar with 2 MWh battery energy storage	RFS Issued	Sep 2019
Andhra Pradesh	160 MW wind solar hybrid with 20-40 MWh storage	Bids submitted	Apr 2019
Leh	2 MW solar, 2 MWh storage	Awarded	December 2019
Leh and Kargil	14 MW solar, 42 MWh storage	NIT issued	
Lakshadweep	20 MW floating solar, 60 MWh storage	NIT issued	

# Project Description

- **Project:** ISTS-Connected RE Projects with assured Peak Power Supply.
- **Energy Storage System:** Flexibility to choose.
- **Technical specifications:** Minimum 6 hours peak power supply (Capable to supply minimum 3000 kWh/MW on daily basis during peak hours) with minimum X/2 MWh ESS (X is contracted capacity).
- **Business model:** Wind/Solar/Wind-Solar Hybrid Power Technology along with Energy Storage technologies.
- **Disposal and recycling:** Under the purview of the national regulations pertaining to handling of e-waste Rules notified by the Gol.
- **Project status:** Under Bidding Process

# Project Description

- **Project:** “Round-the-Clock” Supply of 400 MW RE Power
- **Energy Storage System:** Technology agnostic
- **Technical specifications:** Available round the clock basis for the full capacity for scheduling of power by the Buying utility.
- **Business model:** “Renewable energy sources” as defined by MNRE, along with energy storage on Build-Own-Operate (BOO)
- **Disposal and recycling:** Under the purview of the national regulations pertaining to handling of e-waste Rules notified by the Gol.
- **Project status:** Under Bidding Process.

# Energy Storage Sector : TBD

- How is energy storage classified within the regulatory framework? Any changes needed?
  - Currently energy storage is not classified within the current regulatory framework. This makes framing of Business Use cases of Storage Systems a challenge for IPPs.
- What are the main use cases for energy storage?
  - DSM penalties Mitigation
  - Peak Power Supply
  - Transmission System Utilization
  - Ramp Rate Control
  - Curtailment Avoidance (with Wind Power)
- What are the local conditions and capacity to operate the asset?
  - Hot, Dry Climate with High humidity and Dust levels typical of the Indian Subcontinent. Capacity to operation of asset not envisaged a challenge.

# Key issues and apprehensions

- Lack of Operational data from operative ESS in public domain – Application performance data, safety handling issues have not been scrutinized.
- Safety – Some Apprehension on safety aspects of particular battery chemistries/technologies, To overcome, clear articulation of safety requirements and strict enforcement is needed but the same could be a challenge
- Technology – Many different technology claims in market with starkly differing capabilities. Challenge is to build/adopt a future roadmap relying on technologies, materials that can be scaled over time on local value chains. This would ease enforcement of accountability on performance, safety, recyclability.
- Standards - BIS Working Group is deliberating on existing IEC standards and are likely to be adopted
- Commercialization – Absence of a commercial framework or regulatory obligation for power quality of VRE makes commercialization of solutions difficult since business cases need to be created
- Limited local capacity- Currently limited local capabilities exist. However, there is a noticeable movement with manufacturers taking steps in the direction. Stakeholders like SECI are working on creating a visible, long term roadmap which should encourage local capacity building.

# Thank You !

## Q &A

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