



India Energy Storage Opportunities

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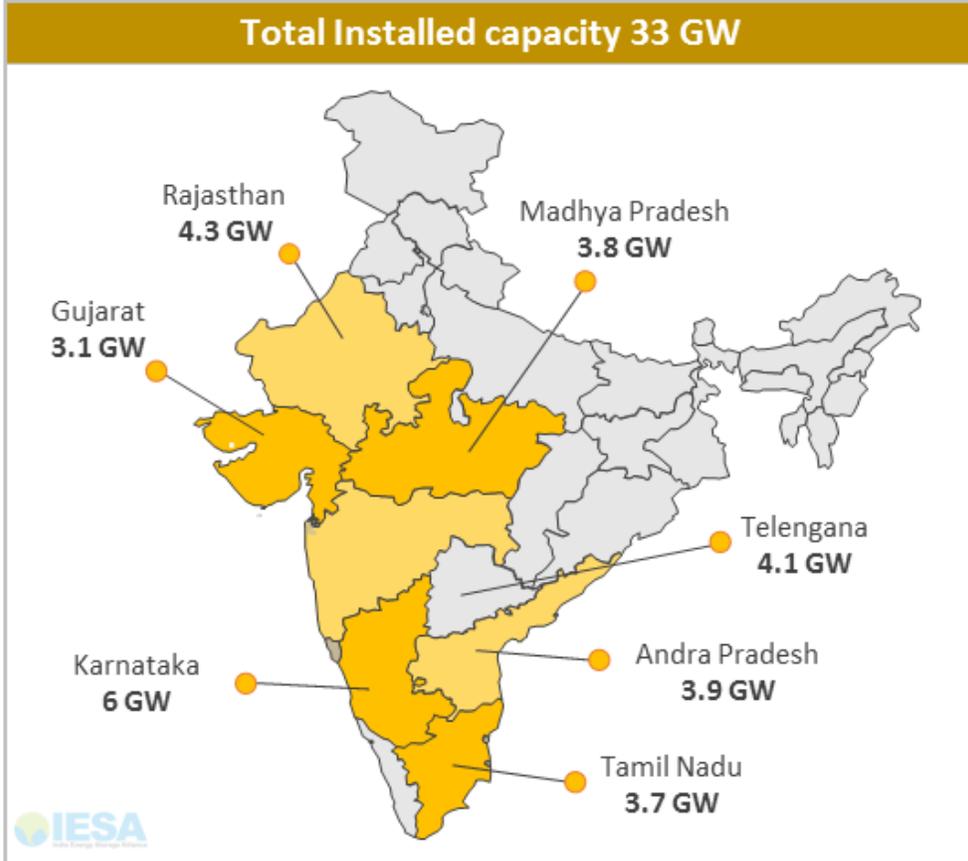
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President & MD, Customized Energy Solutions (India)

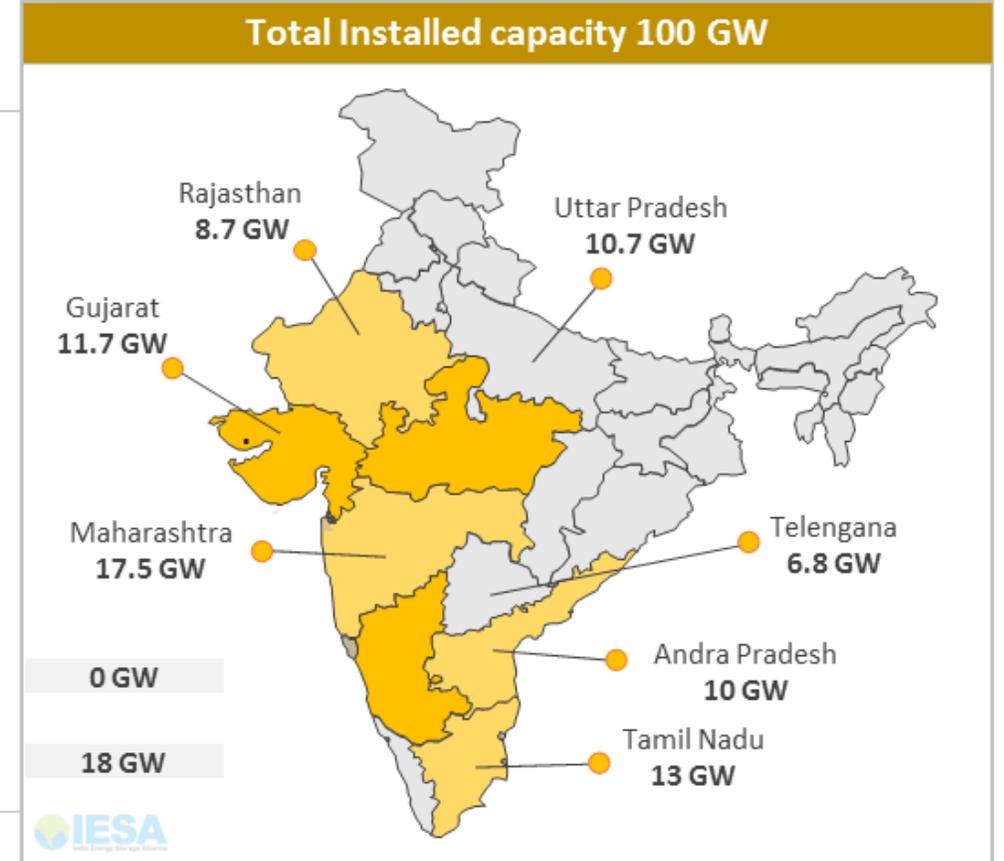


GRID-SCALE SOLAR POWER CAPACITY PROJECTION

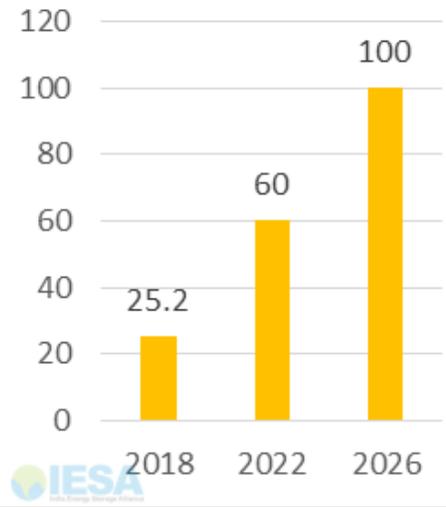
Top Grid-Scale Solar Power Generating States, India, 2019



Top Grid-Scale Solar Power Generating States, India, 2026



India Cumulative Grid-Scale Solar Addition, 2018-2026

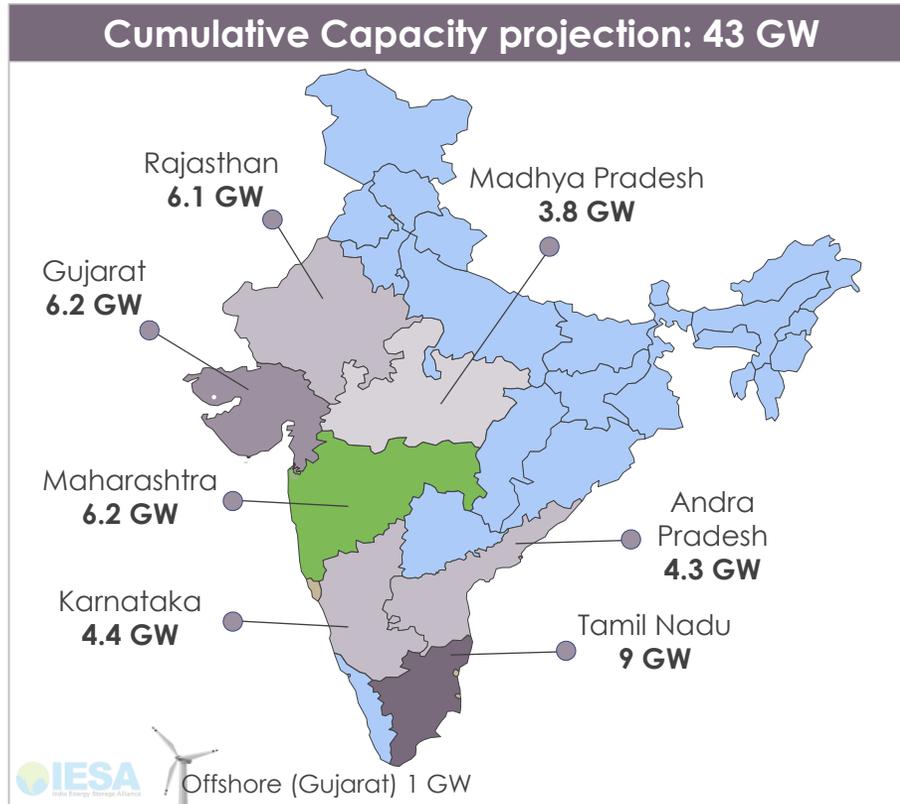


In 2018, 6.6 GW of Grid-Scale solar projects were added to the grid. However, it was lesser than what was anticipated and additions were lower than that of 2017. 40GW of tenders were floated in 2018 and nearly 12 GW were cancelled due to high tariffs quoted by the developers. During 2019 and 2020 nearly 10 GW of tenders are to be floated according to MNRE.

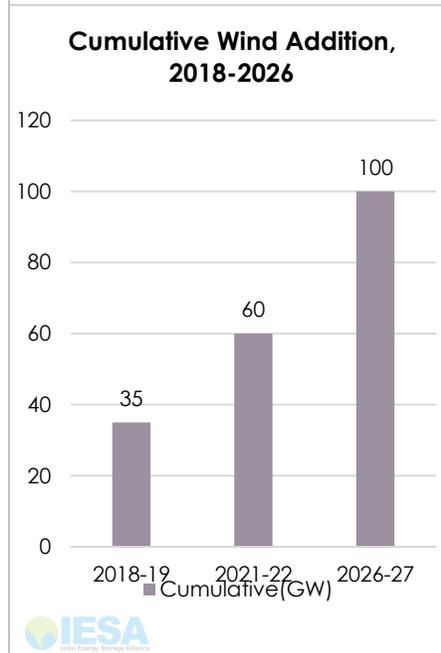
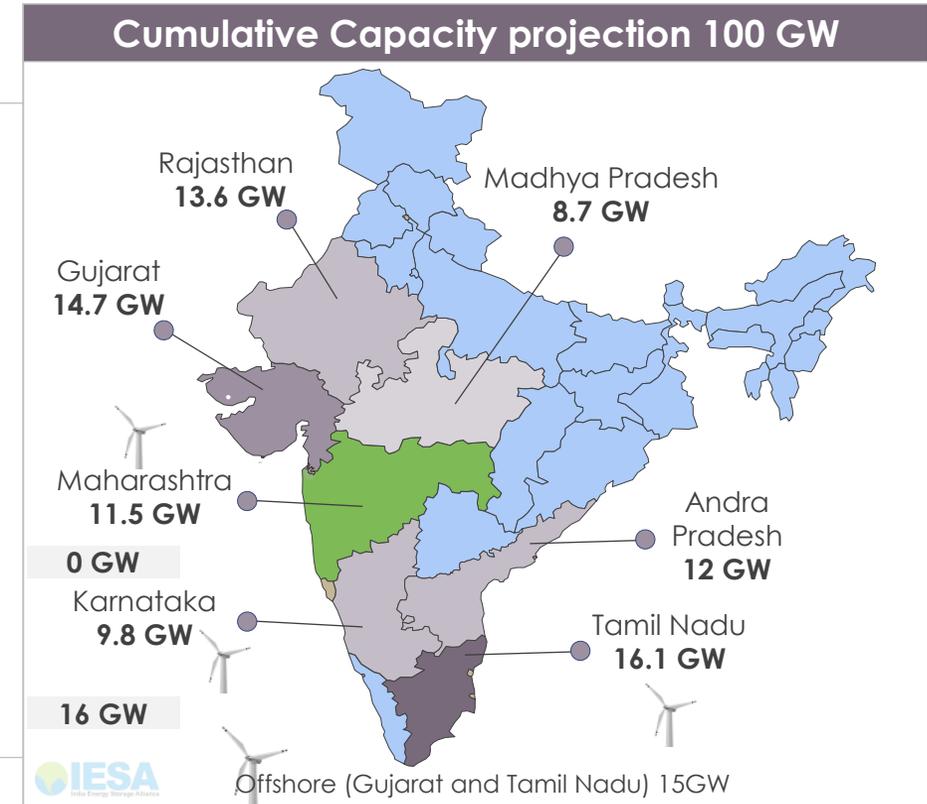
* Source: MNRE/Gol, 19th EPS, CES Analysis Dec, 2018

WIND CAPACITY PROJECTION 2019 AND 2026

Top wind power generating States, India, 2019

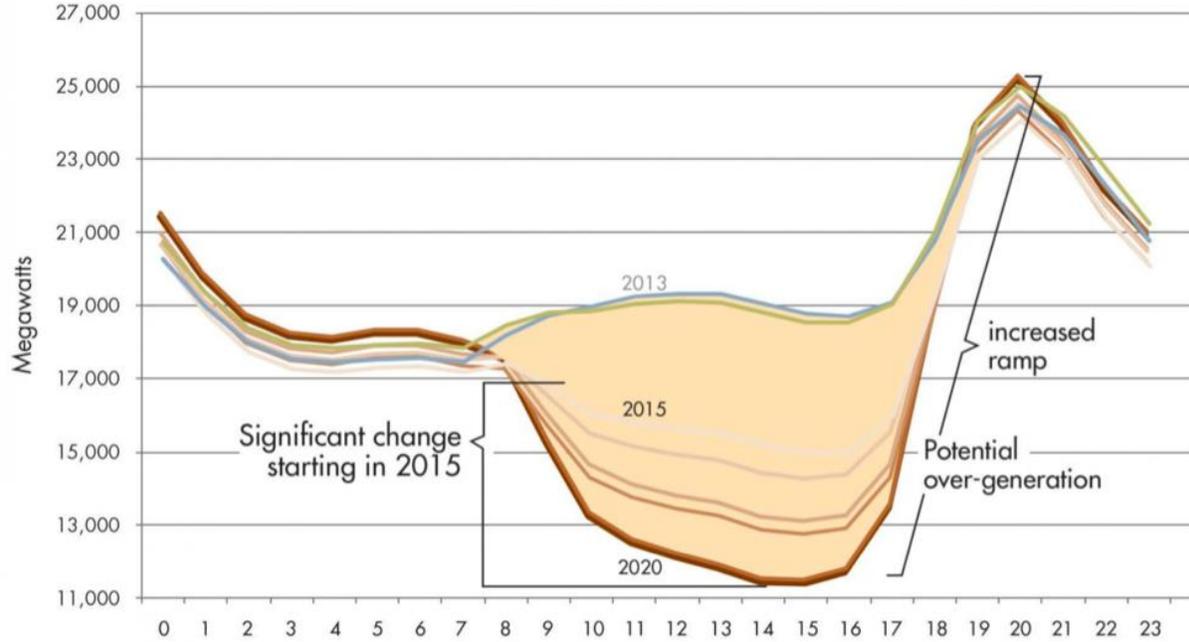


Top Wind power generating States, India , 2026

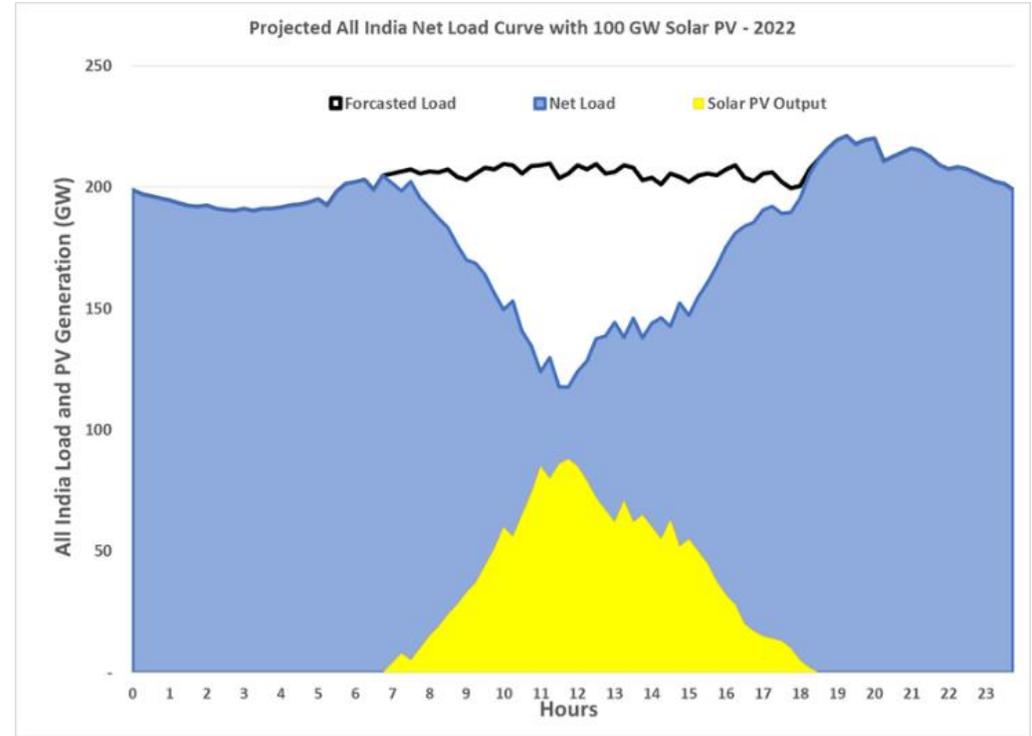


In 2018 MNRE announced tenders for nearly 6.9 GW, of which 1.2 GW was cancelled. During 2019 and 2020, nearly 10 GW of Wind projects will be tendered as per MNRE. Going forward, it is assumed that at least 8GW of wind tenders will be released annually till 2026 to achieve country's 2026 target of 100GW of wind power. MNRE announced EOI for developers interested in offshore wind energy projects. In 2019, total wind power projects opening for tender will be 10 GW of which offshore projects contribute to 1 GW.

A need for flexible generation with growing solar penetration



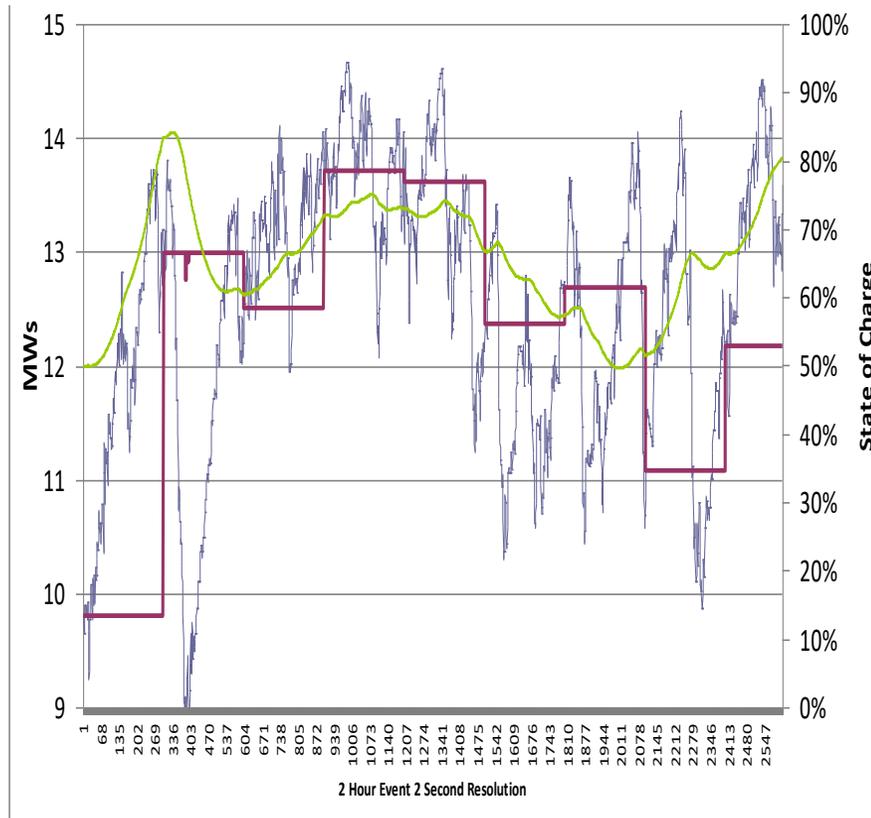
Original California Duck Curve (2020)



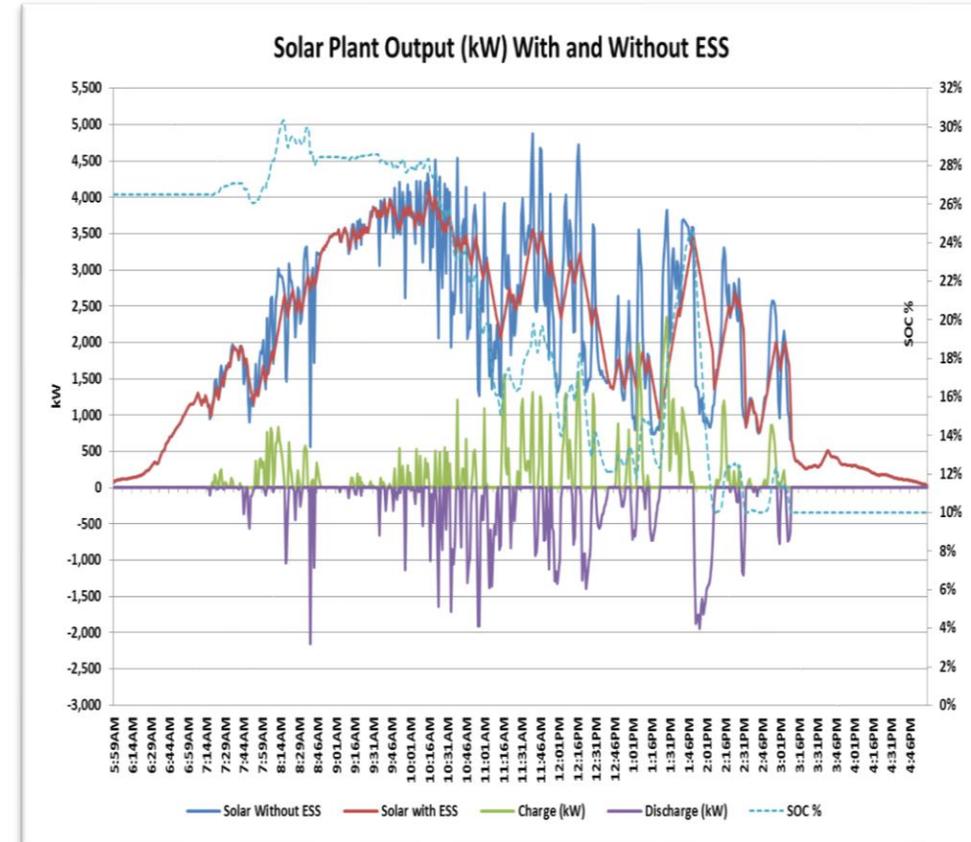
Anticipated India Camel Curve (2022) with 100 GW solar

Energy Storage :

Renewable Smoothing & Scheduling and Ramp Rate Control



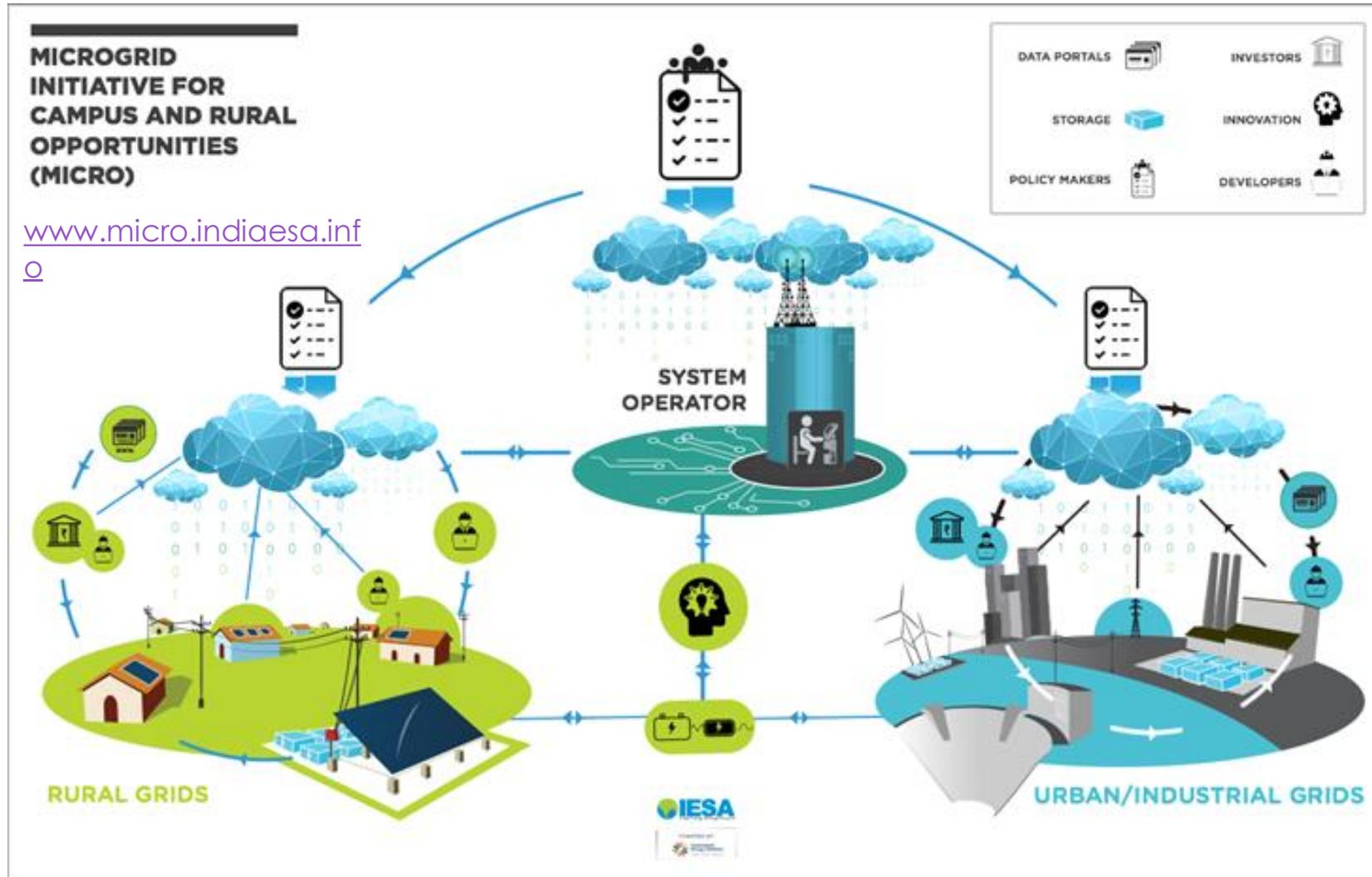
Potential smoothing of 18 MW wind farm with a 4 MW – 1 MWh ESS to help with forecasting errors under Deviation Settlement Mechanism



Potential smoothing of 5 MW solar farm with a 2 MW – 1 MWh ESS to help with ramp rate control in island grid

Microgrid Initiative for Campus & Rural Opportunities (MICRO)

Campus Microgrids and Smart Cities



Developing EV Policy Scenario in India



2013

National Electric Mobility Mission Plan (NEMMP 2020)

2015

FAME - I

2017

- Karnataka EV policy
- Telangana draft EV policy

2018

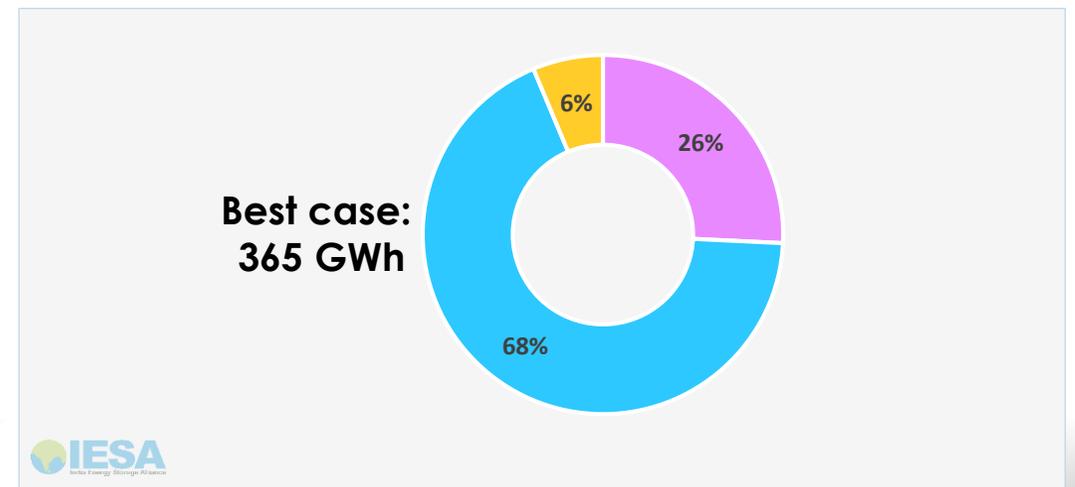
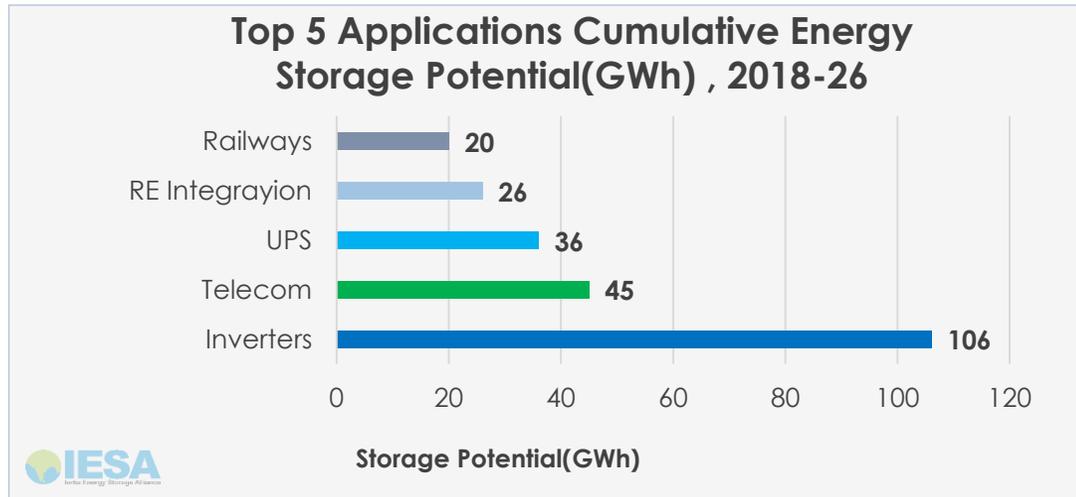
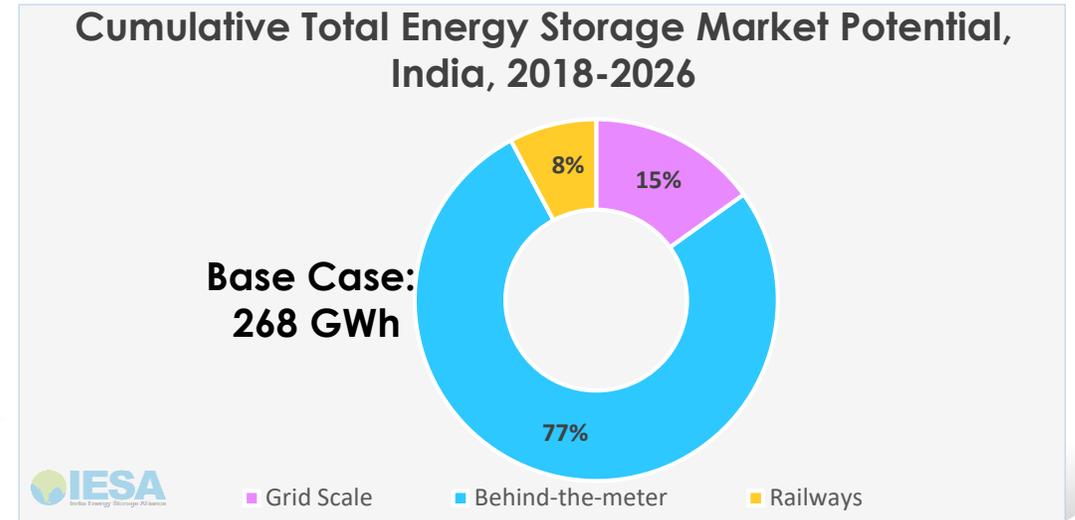
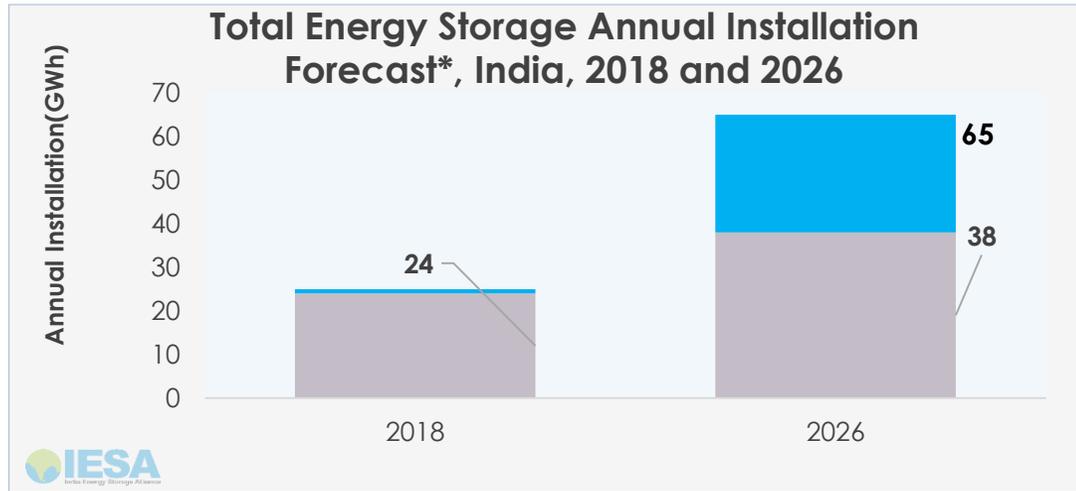
- Maharashtra EV policy
- UP draft EV policy
- Andhra Pradesh EV policy
- Kerala EV policy
- Uttarakhand EV policy
- Delhi draft EV policy

- Clarification on requirement of license for EV charging station by MoP
- Guidelines & Standards for setting up of public charging infra by MoP

2019

- Amendments in Model Building Byelaws by MoUD
- PMP - Phased Manufacturing Plan for EV's & its components
- FAME-II scheme
- Draft Notification by MoRTH to waive off Registration Charges for EV's.
- UP EV Policy

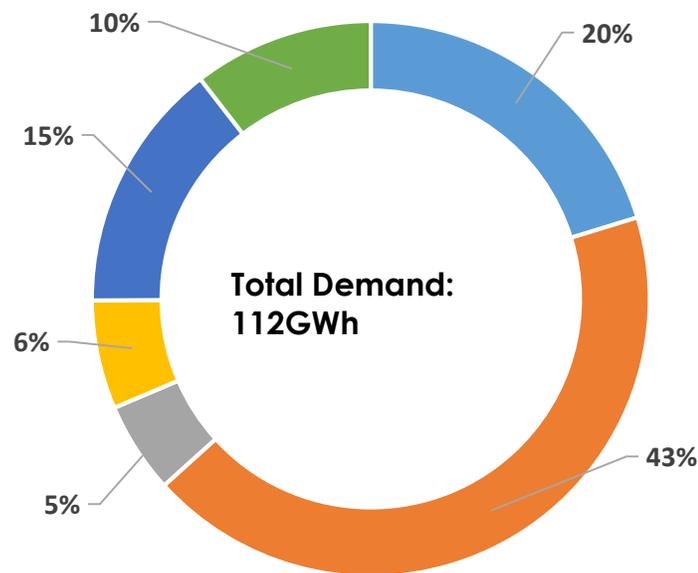
STATIONARY ENERGY STORAGE MARKET 2018 - 2026



Battery Market Outlook for EV's in India

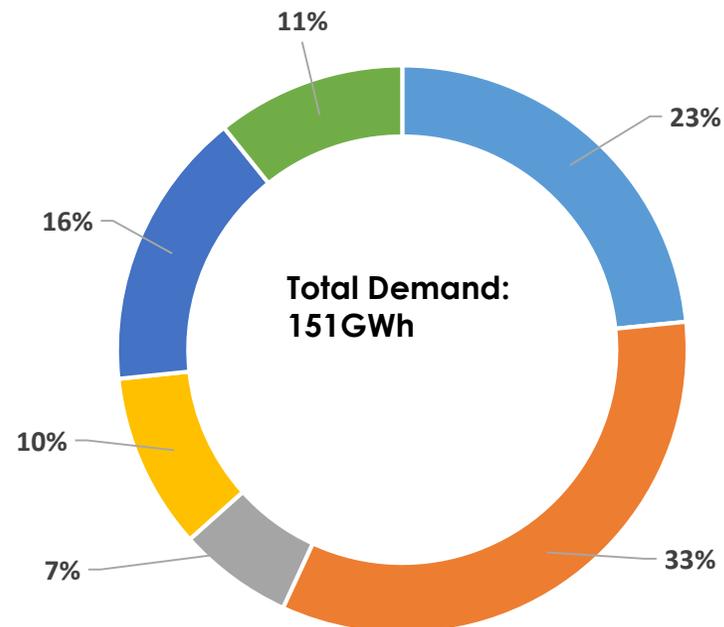
The battery market for EV's in India is expected to grow at a CAGR of 25% over a period of 2018-2026 in case of BAU scenario whereas in case of NEV scenario, it is expected to grow at a CAGR of 32%.

BAU Scenario, Battery Demand, 2018-26



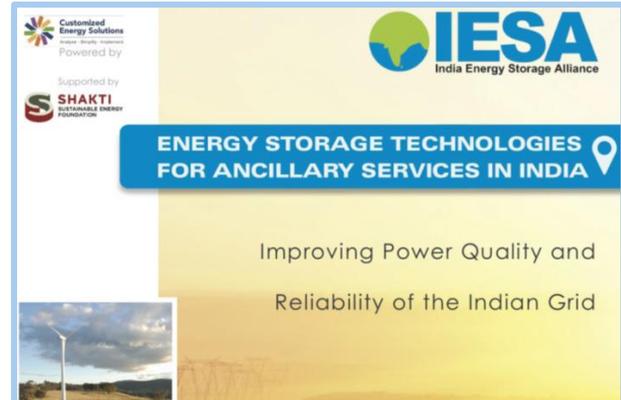
- E2W
- Low Speed E3W
- High Speed E3W (L5M)
- E4W (Personal)
- E4W(Fleet)
- E-Buses

NEV Scenario, Battery Demand, 2018-26



- E2W
- Low Speed E3W
- High Speed E3W (L5M)
- E4W (Personal)
- E4W(Fleet)
- E-Buses

The evolving policy framework for adoption of Energy Storage in India



MOP and CEA taskforce on Integration of Large Scale renewables in India
2013

Creation of MNRE Standing Committee on Energy Storage to develop Energy Storage Roadmap
2014

IESA releases report on the role of energy storage for providing ancillary services in India
Dec 2014

CERC issues Ancillary Services Operations Regulation (August 2015) and Roadmap to operationalise Reserves in the country (Oct 2015)

CERC Staff Paper on ESS-
Jan 2017

National Energy Storage Mission and National Mission for Transformative Mobility
2019



October 2012



December 2014

Energy storage need of the hour: Hon. Prime Minister Modi, 2nd Oct 2018



Inaugurating the first assembly of International Solar Alliance, Prime Minister Narendra Modi said **“Under the National Energy Storage mission, the government is focusing on demand creation, indigenous manufacturing, innovation and energy storage,”**

Why Domestic 'Giga'-Scale Battery Manufacturing is Critical for India?



MAKE IN INDIA
(Emphasis on Value Capture & Economy of Scale)

GLOBAL COMPETITIVENESS
(Global Policy Benchmarking)

STRATEGIC REASONS
(Energy Security)



ENVIRONMENT SUSTAINABILITY
(Negligible Emission)

YoY DEMAND NUMBER OF GIGA (10GWh) STORAGE PLANTS IN INDIA		
Scenario	2025	2030
Conservative Scenario	5	11
Base Scenario	8	23

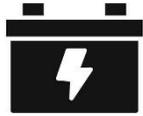
YOUR GATEWAY TO
**ENERGY STORAGE
& EV MARKETS**



LEADERSHIP
COUNCIL



IESA MEMBERS



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LEADERSHIP CIRCLE

Analyze · Simplify · Implement

SoftBank Group

GOLD

The high-technology battery manufacturer

The power of new standards

SILVER

Leading Through Innovation

FLUIDIC ENERGY

SOLAR FROM THE CORE

BRONZE

energy storage solutions

BRONZE

Twarit Mobility

SPECIAL MEMBERSHIP

Progress through Research

अध्ययन, शोध, विचारों को संस्थापित करने के लिए आवश्यक है।



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18



06



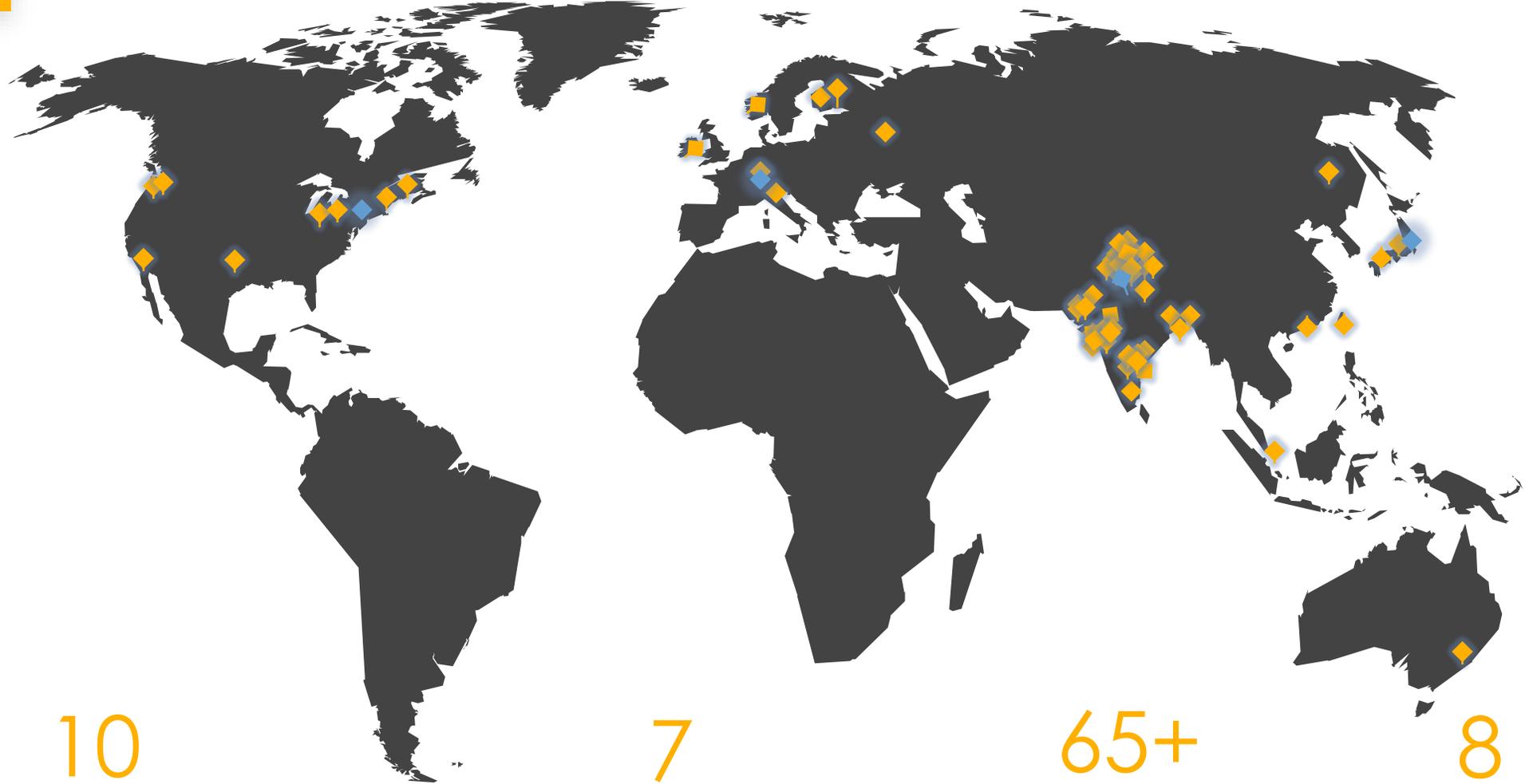
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90+ MEMBERS



LEADERSHIP COUNCIL



Customized Energy Solutions



SB Energy
SoftBank Group



INNOLITH

10



7



65+



8

APAC & OCEANIA

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