

Insights and Opportunities in Solar PV and Energy Storage Manufacturing Value- chain

Presented by:

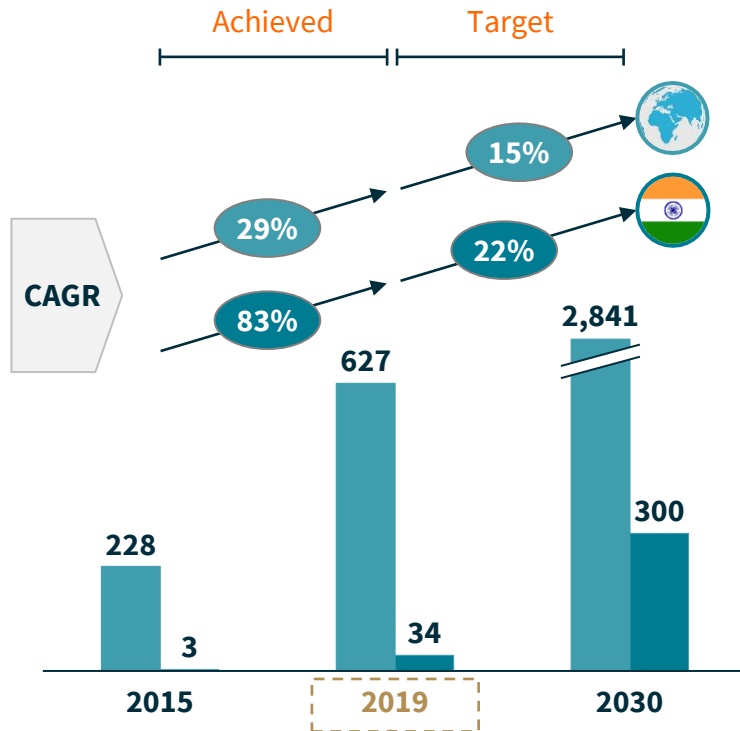
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EAC International Consulting*

24th March 2021

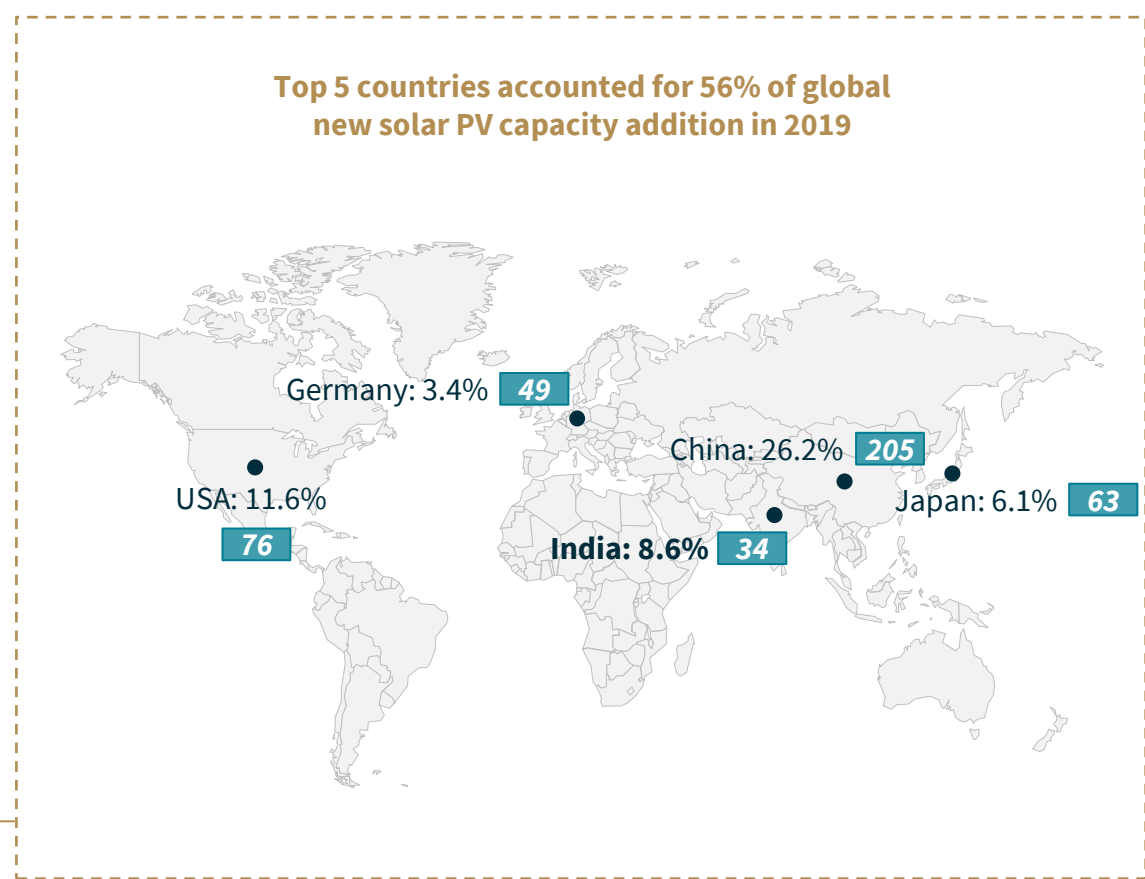


India, with 34 GW capacity, has the 5th largest solar PV installed capacity growing at an accelerated 83% CAGR from 2015-19; India was the 3rd largest country for new capacity addition in 2019

SOLAR PV INSTALLED CAPACITY (GW)



GLOBAL NEW SOLAR PV CAPACITY ADDITION IN 2019 – 115 GW



■ Global ■ India

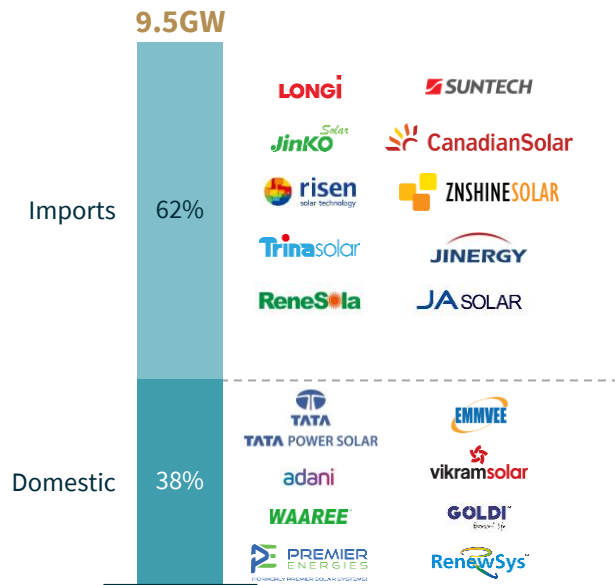
● % share of Global new Solar PV capacity addition in 2019

■ XX Cumulative Installed capacity in GW

INDIAN SOLAR PV MODULES – SHIPMENT OVERVIEW

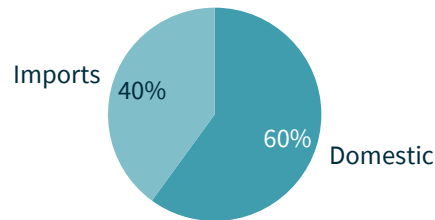
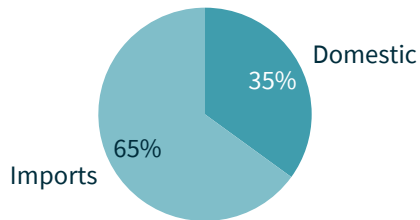
Imports preferred over domestic suppliers owing to availability of efficient low-cost modules; however, major expansion plans by some of the biggest domestic players to spur growth of domestic module sales

INDIA SOLAR PV MODULES & SHIPMENT (GW), 2020

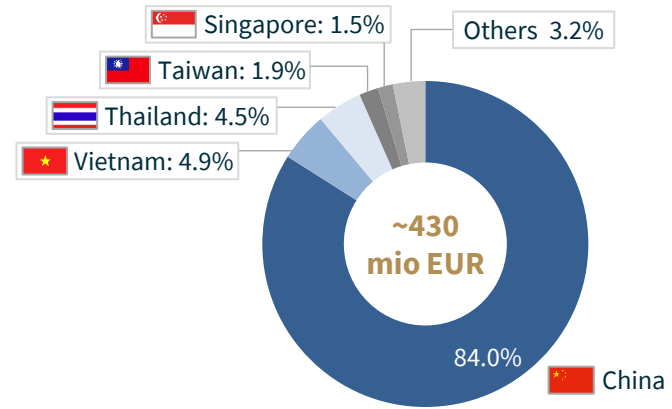


Utility scale solar

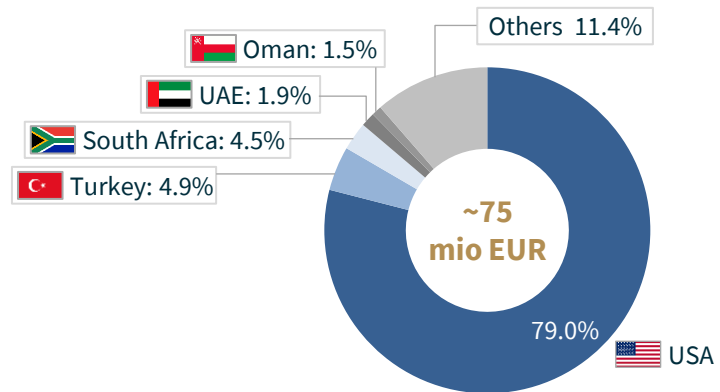
Distributed solar



SOLAR PV CELLS & MODULES IMPORTS (MIO EUR)



SOLAR PV CELLS & MODULES EXPORTS (MIO EUR)



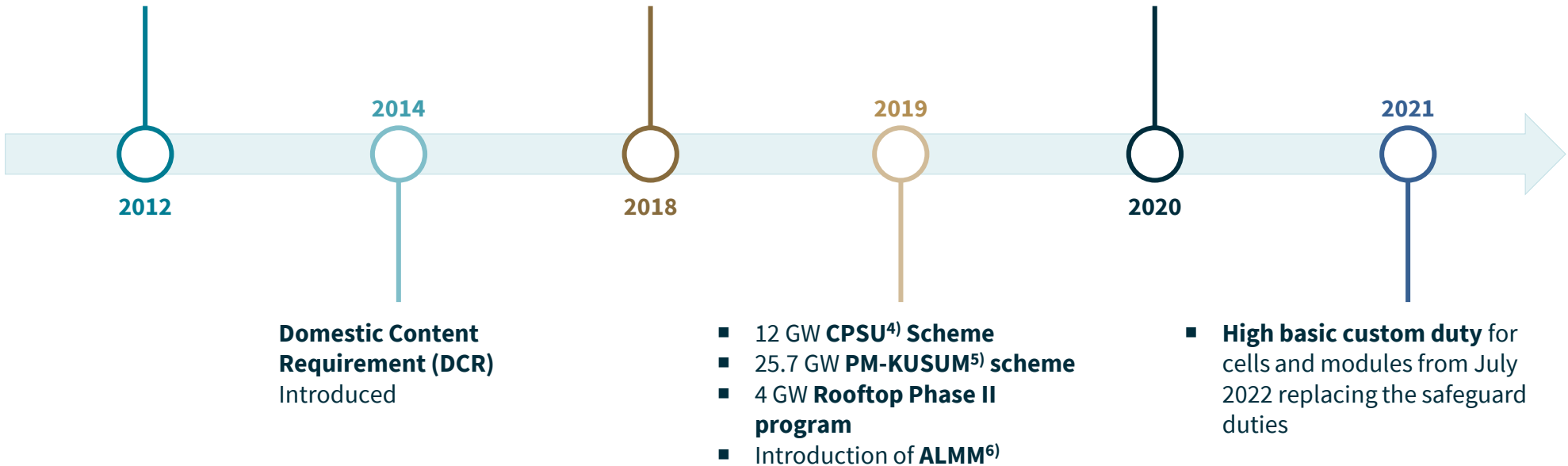
The Government, over the years, has introduced a series of measures to promote domestic module manufacturing including DCR¹⁾, manufacturing linked tenders, M-SIPS²⁾ and duties

Modified Special Incentive Package Scheme (MSIPS)

up to 25% financial subsidy to manufacturers for capital and/or operating expenditure

- Imposition of **safeguard duty** for 2 years from July 2018 till July 2020
- Introduction of **BIS³⁾ Certification**
















- **Safeguard duty extension** for one year till July 2021
- **Manufacturing-linked solar** scheme tenders by SECI
- ~550 mio EUR of **production linked incentive** announced for solar sector



1) Domestic Content Requirement 2) Modified Special Incentive Package Scheme 3) Bureau of Indian Standards 4) Central Public Sector Undertaking
5) Pradhan Mantri Kisan Urja Suraksha evam Utthan Mahabhiyan 6) Approved List of Models and Manufacturers

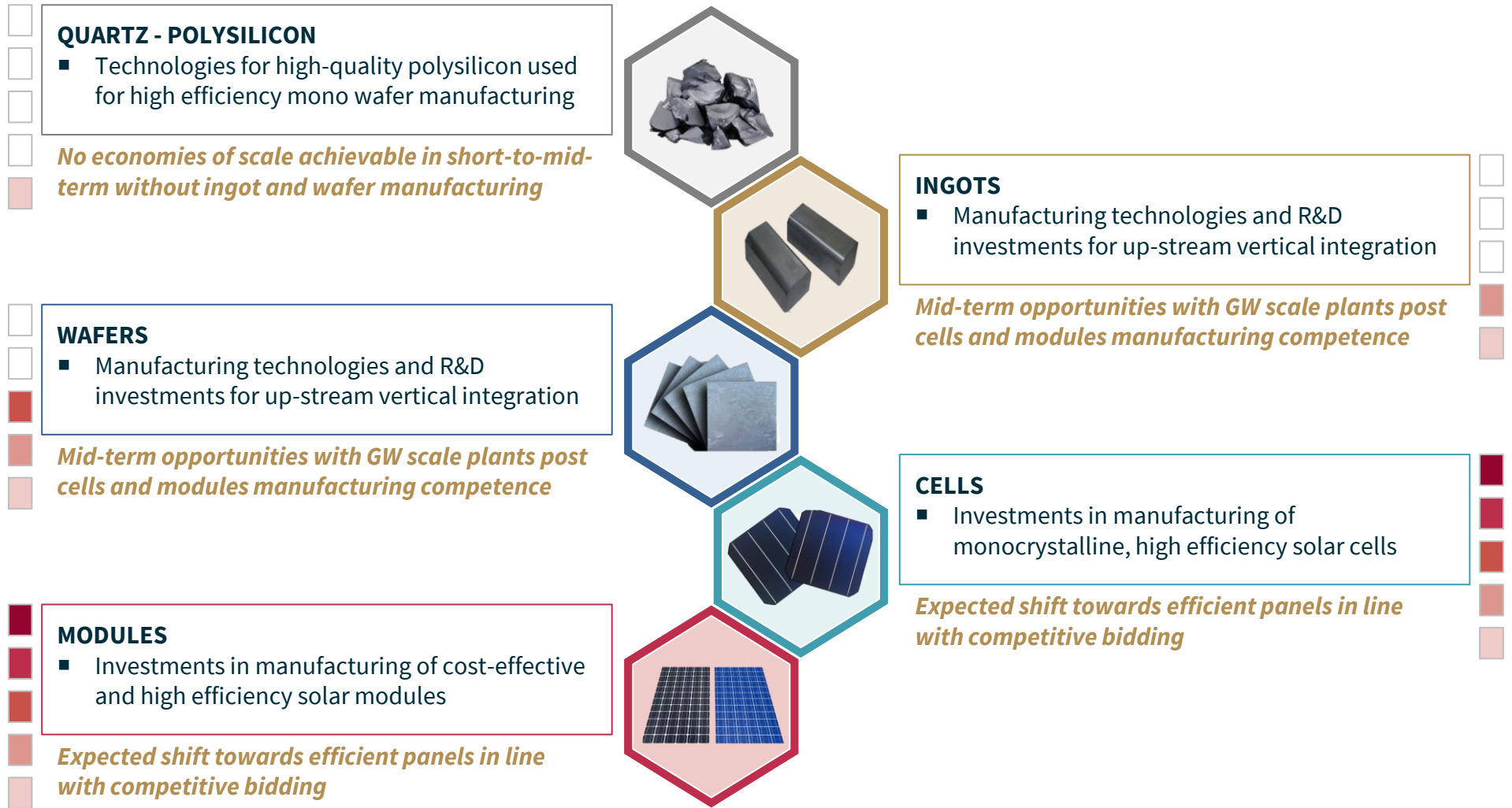
INDIA SOLAR PV MANUFACTURING VALUE-CHAIN – STATUS-QUO

India exhibits ~3.5 GW of solar cells and ~15 GW of solar modules manufacturing capacities; however the maturity levels are moderate considering focus on polycrystalline technologies; no up-stream capabilities

	 QUARTZ - POLYSILICON	 INGOTS	 WAFERS	 CELLS	 MODULES
Status-quo	<ul style="list-style-type: none"> No production in India High grade quartz silica suitable for semi-conductor grade Silicon manufacturing is available 	<ul style="list-style-type: none"> No production in India 	<ul style="list-style-type: none"> No production in India 	<ul style="list-style-type: none"> Production Capacity: ~3.5 GW Operational Capacity: 1.5 GW Capacity Utilization: <50% Key Technology: Polycrystalline 	<ul style="list-style-type: none"> Production Capacity: ~15 GW Operational Capacity: 7-8 GW Capacity Utilization: <40% Key Technology: Polycrystalline
Key Players	—	—	—		
Planned Capacity Addition	<ul style="list-style-type: none"> No plans from solar PV perspective 	<ul style="list-style-type: none"> No plans from solar PV perspective 	<ul style="list-style-type: none"> >3 GW 	<ul style="list-style-type: none"> >7.5 GW 	<ul style="list-style-type: none"> >10 GW 
Value-chain Maturity	Low 	Low 	Low 	Moderate-low 	Moderate 

OPPORTUNITIES IN THE SOLAR PV VALUE-CHAIN

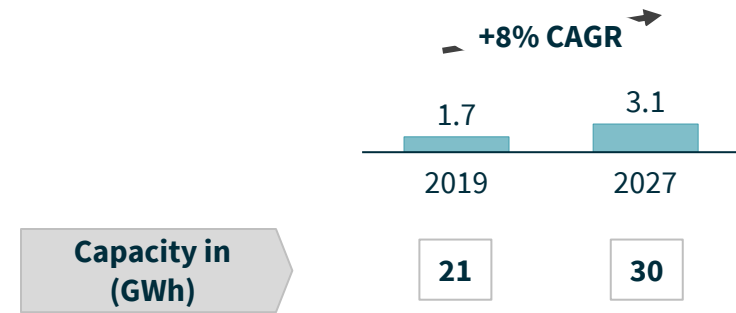
High attractiveness for cells and modules manufacturing in short-term focussed on high efficiency technologies; moderate opportunities for ingots and wafers in mid-term with established downstream competence



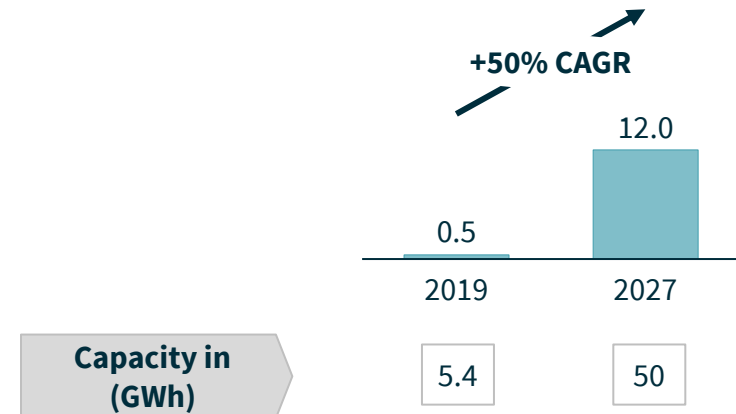
Low High

India energy storage market is at nascent stage and dominated by lead acid batteries – increasing need for energy storage across industries and strong government push would be growth key drivers

STATIONARY ENERGY STORAGE, MARKET SIZE (BLN EUR)



EV BATTERIES, MARKET SIZE (BLN EUR)



INDUSTRY OVERVIEW AND NEED FOR ENERGY STORAGE

Market Characteristic



Nascent stage market dominated by lead acid batteries manufactured domestically; **heavy import dependence** on China, Taiwan and Japan for **Li-ion** technologies

Government Support



“Transformative Mobility and Energy Storage Mission” launched in **Mar’19** to promote clean, connected, shared and sustainable mobility initiatives



Phased roadmap to implement battery manufacturing at Giga-scale in-consideration – large-scale module and pack assembly plants to integrated cell manufacturing

Need for Energy Storage

e-Mobility thrust- GoI plan for 30% EV adoption by 2030



Need for grid stability in renewable energy sector

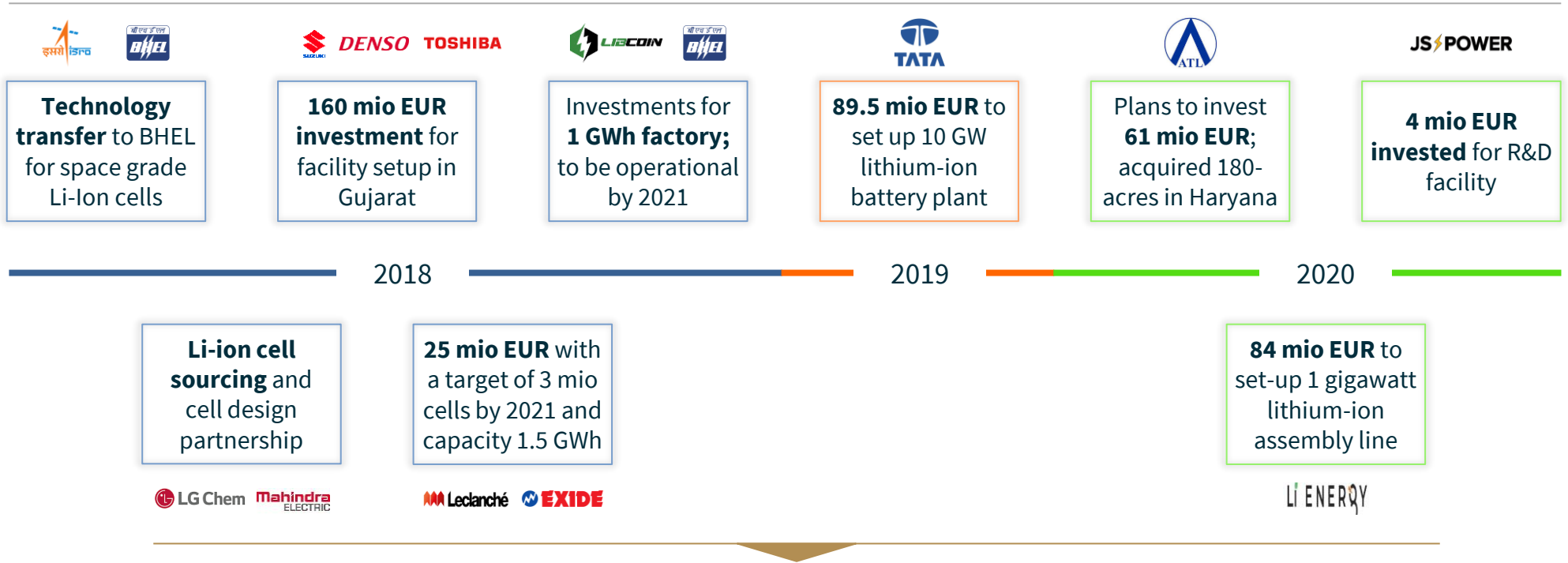
Power back-up need for telecom towers

Government push for **distributed energy system**

INDIA ENERGY STORAGE MANUFACTURING LANDSCAPE

India has already established presence of Japanese and Korean groups while India origin start-ups have also invested in sector – attracting investments for setting up localised production partnering Indian companies

KEY INVESTMENTS FOR LITHIUM-ION BATTERIES MANUFACTURING



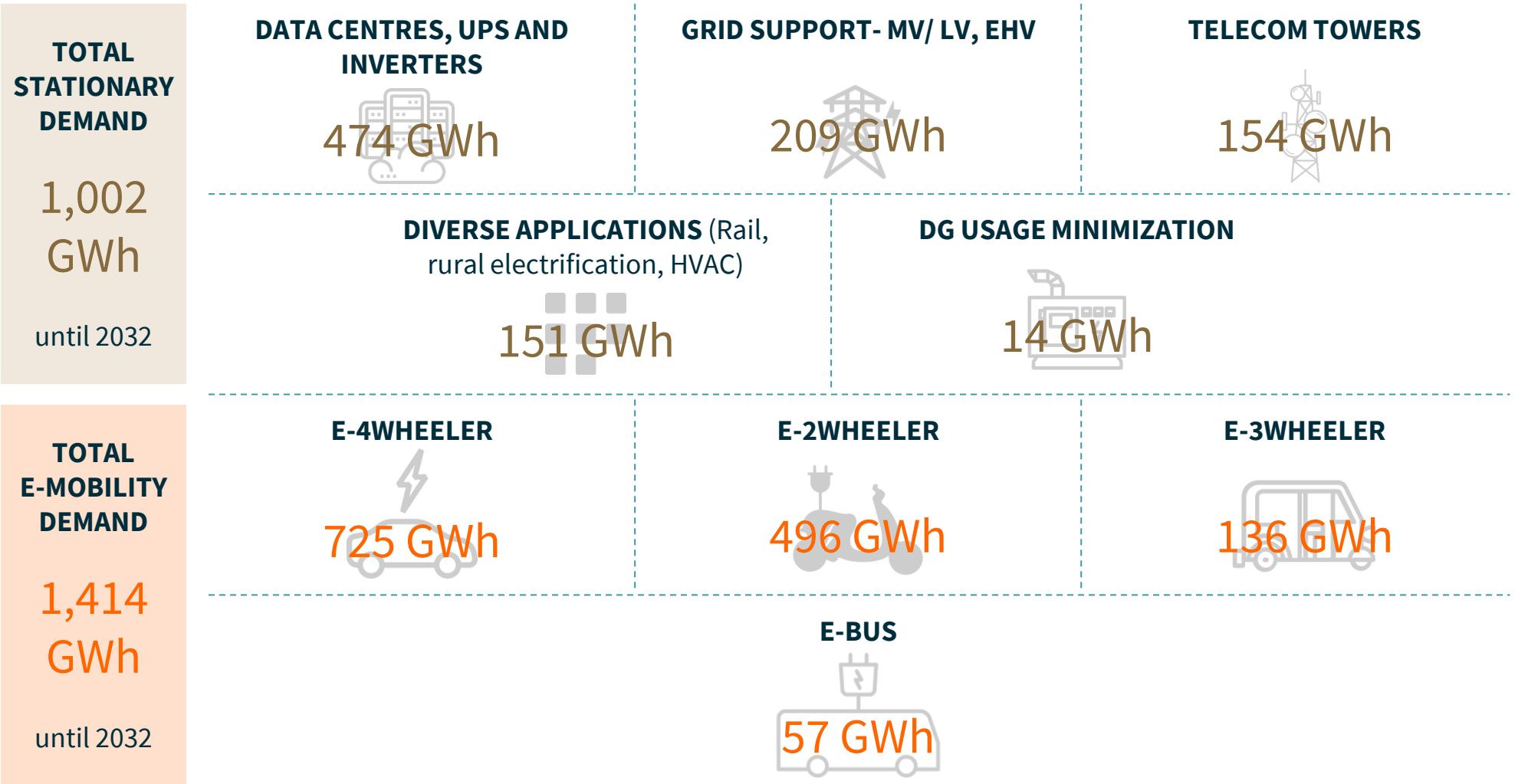
Li-ion industry attracting cross-border partnerships for setting up localized production units and cell design

Most of the **energy storage system investments** in India are still **EV/ mobility focused**

Presence of start-ups such as RAC Energy, ION Energy as **VC firms have shown greater interest** in energy storage ventures

INDIA ENERGY STORAGE OPPORTUNITY, 2032

The energy storage roadmap envisages a cumulative potential opportunity of >2,400 GWh until 2032 driven by e-Mobility demand and key stationary applications- data centres, grid support and telecom towers



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- BUILDING & CONSTRUCTION
- ENERGY & ENVIRONMENT
- PHARMA & HEALTHCARE
- CHEMICALS
- CONSUMER GOODS
- EXHIBITION



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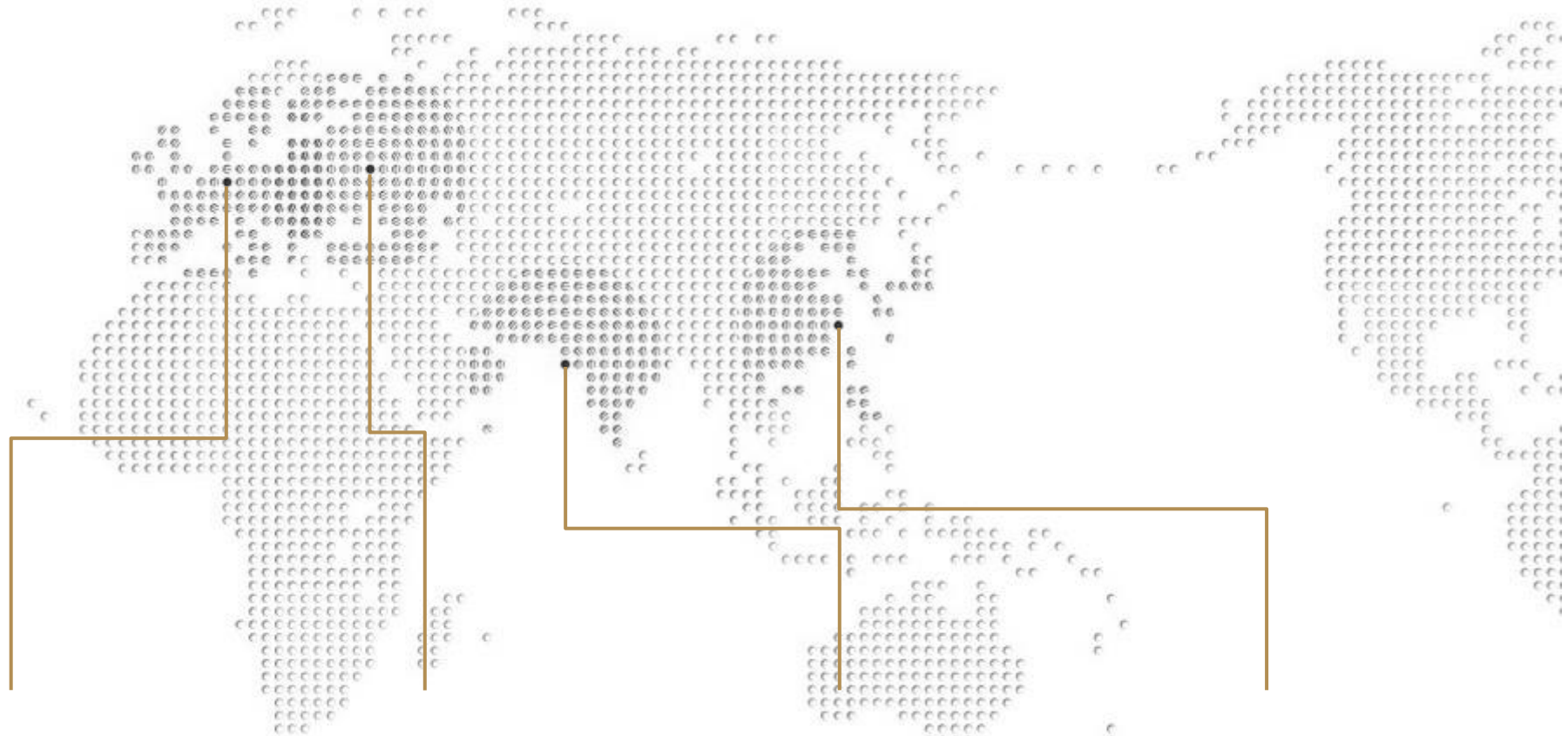


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