

12TH WORLD RENEWABLE ENERGY TECHNOLOGY CONGRESS

- Energy Storage : The Future Of Electric Vehicles -



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OVERVIEW





DRIVERS FOR EVs



COP 21 (Paris 2015) - India's commitment is to reduce emissions intensity/carbon footprint by 33-35% from 2005 levels by 2030

Achieve 40% cumulative electric power demand from non-fossil fuels based energy resources by 2030

Ensuring energy security by reducing use of fossil fuels so as to achieve targets under COPs

Move towards EVs would lead to a potential savings on oil import bill

Scaling up domestic production of batteries critical (battery cost is a key component in the cost of EV)

EVs help curb vehicular and noise pollution in urban areas & address environmental concerns



INITIATIVES & APPROACH IN INDIA





NATIONAL PROGRAMME ON ACC BATTERY STORAGE, 2020 Key Features



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ADVANCED CHEMISTRY CELL (ACC)

Definition - New generation technologies that <u>can store electric</u> <u>energy</u> either as electrochemical or as chemical energy and <u>convert it</u> <u>back to electric energy as and when</u> <u>required</u>

> <u>Minimum Performance Specifications-</u> Technologies need to suffice the

> minimum performance specifications viz. Energy Density & Life Cycle, which are to be tested by Third Party Laboratory accredited by NABL

> > <u>Energy Density</u> - Amount of energy stored per unit weight of a cell measured in Wh/kg

> > > <u>Cycle Life</u> - Number of charge and discharge cycles that a cell is able to support at a specified Depth of Discharge (DOD) before its capacity degrades to End of Life (EOL)

Support 50 GWh of giga-scale ACC manufacturing facilities for meeting domestic demand Incentive offered in the form of "Cash subsidy" on output linked with volumes of cells manufactured and sold by beneficiaries Cells with high performance specifications (Energy Density & Life Cycle) are eligible to avail attract higher subisdies Imposition of suitable BCD to promote phased manufacturing of ACCs & components Manufacturers encouraged to invest in R&D for manufacture of cells in India Private entities to be selected through a bidding process to set up manufacturing facilities for producing ACC PPP Model Bid Documents issued by Niti Aayog allocating risk between Beneficiary & Government

NATIONAL PROGRAMME ON ACC BATTERY STORAGE, 2020 Bidding Conditions



BID FACILITATOR	• Niti Aayog	
SELECTION PROCESS	 Two Envelope Single State Selection Process for Selection of Bidder Bidder to submit Technical Capacity & Financial Bid (setting out Subsidy) 	
BIDDER QUALIFICATION CRITERIA	• Credit Rating & Networth	
CREDIT RATING	 CRISIL AA+ or ICRA AA+ (in case Bidder is incorporated in India) S&P BB+ or FITCH BB+ or Moody's Bal 1 (in case Bidder is incorporated in a jurisdiction other than India) 	
NETWORTH	 Minimum Networth of INR 225 Crores per GWh for the financial year preceding the date of submission of Bid 	
CONTROL OF SPV	 Lead Member to hold 26% in SPV (upto 5 years from date of COD of Project) & meet Networth & Credit rating requirements 	
CONSORTIUM	 Number of members to not exceed 3 and shall execute Joint Bidding Agreement One member to be nominated as Lead member 	
	• ACC manufacturing facility of minimum 5 GWh capacity	
PROJECT AGREEMENTS	 Programme Agreement with Central Government for availing Subsidy Tripartite Agreement with State Government for providing support & incentives (including additional incentives, if any, through direct negotiation) 	

NATIONAL PROGRAMME ON ACC BATTERY STORAGE, 2020 Project Agreements



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PLI SCHEME - 'NATIONAL PROGRAMME ON ACC BATTERY STORAGE' FOR IMPLEMENTATION OF GIGA-SCALE ACC MANUFACTURING FACILITIES IN INDIA (NOTIFICATION 9TH JUNE 2021



- Integrated battery value can be broadly divided (at the sales end)
 - Battery pack
 - ACCs.
- While several companies in India have already started investing in battery packs assembly, the capacities of these facilities are too small when compared to global averages.
- Incentive will not be offered to the conventional battery pack segment of the industry as it is already happening in India
- Investments in manufacturing and overall value addition for ACCs are still negligible in India. Hence almost entire domestic demand of ACCs is still being met through imports.
- Through this Scheme, the <u>GOI intends to optimally incentivize potential</u> investors, both domestic and overseas, to set- up Giga-scale ACC <u>manufacturing facilities</u> with emphasis on maximum value addition and quality output and achieving pre committed capacity level within a predefined time-period.

BATTERY MANUFACTURING - WHAT IS HAPPENING GLOBALLY ?



Original equipment manufacturers follow varying powertrain and battery supply-chain strategies for electric vehicles.



⁴ Formerly Eaton, now owned by Panasonic.

McKinsey&Company | Source: A2Mac1; McKinsey Center for Future Mobility

EV MANUFACTURER DECIDES BATTERY TYPE & COMPOSITION

BATTERY MANUFACTURING - SUPPLY CHAIN ISSUES & CHALLENGES



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MINERALS - MINING	The PLI scheme and Notification dated 9 th June 2021 is <i>"technologically</i> <i>agnostic"</i>	 Who decides which technology, cell chemistry to be used in battery manufacturing ? Road map for the future?
REFINERY CELL MANUFACTURING + MODULE	NESM had stressed the need for International partnerships and alliances to secure access to key minerals " in line with battery technology and chemistry roadmap"	 Is there need for clarity on the "battery technology" and "chemistry roadmap" in India?
MANUFACTURING + PACK ASSEMBLY VEHICLE MANUFACTURER	India is not rich in reserves of minerals - lithium, aluminium, cobalt manganese, nickel, graphite, copper. Global demand is increasing	 How are minerals proposed to be sourced on long term and "sustainable" basis ? What kind of State support is expected? What partnerships & alliances are in place?
CONSUMER	Pack assembly tends to occur near vehicle manufacturer location as transportation costs are high, while cell & module manufacturing could be conducted at different locations	 Where would the Manufacturing Unit be based ? Which States are looked upon as "ideal" bases?
RECYCLER	OEMs adopt different battery supply chain strategies i.e. they either procure or make - cell, battery pack, battery management system	 What is the "market " targeted by the ACC manufacturing hubs? What partnerships & alliances are in place?

WAY FORWARD SUSTAINABLE BATTERY MANUFACTURING CRITICAL FOR SUCCESS OF EV MARKET SUPPLY CHAIN ISSUES BE ADDRESSED







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