NATIONAL PROGRAMME ON ADVANCE CHEMISTRY CELL (ACC) BATTERY STORAGE

Presentation to Ministry of Heavy Industries & Public Enterprises
January 11, 2021

NITI Aayog

Agenda

- Background
- Need for National Programme on ACC
- Methodology and Assumption
- Program Structure and Mechanism
- Way Forward

BACKGROUD - MAKE IN INDIA

Time to Focus Upon *Value Capture* & *Economy of Scale* !

❖Solar Module/Cell Imports:

- ✓ Currently ~70% of the total domestic consumption in value terms is imported

❖ Mobile Phones:

- ✓ Currently ~65% of the total domestic consumption in value terms is imported

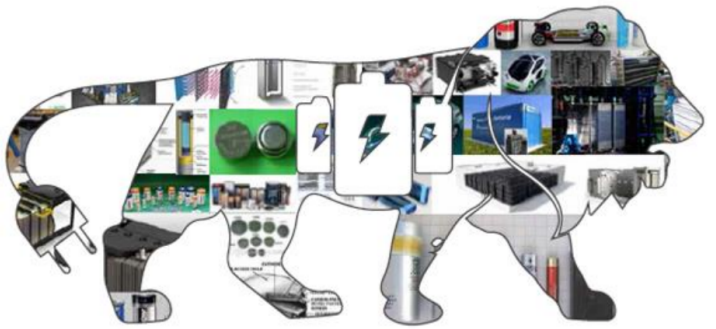
❖ Lithium-Ion Cells:

- ✓ **No policy framework around Li-ion/ advance batteries in India**
- ✓ ~ 65%-70% value of a complete Battery Pack, comprising cells, is currently being imported

70%

65%

70%



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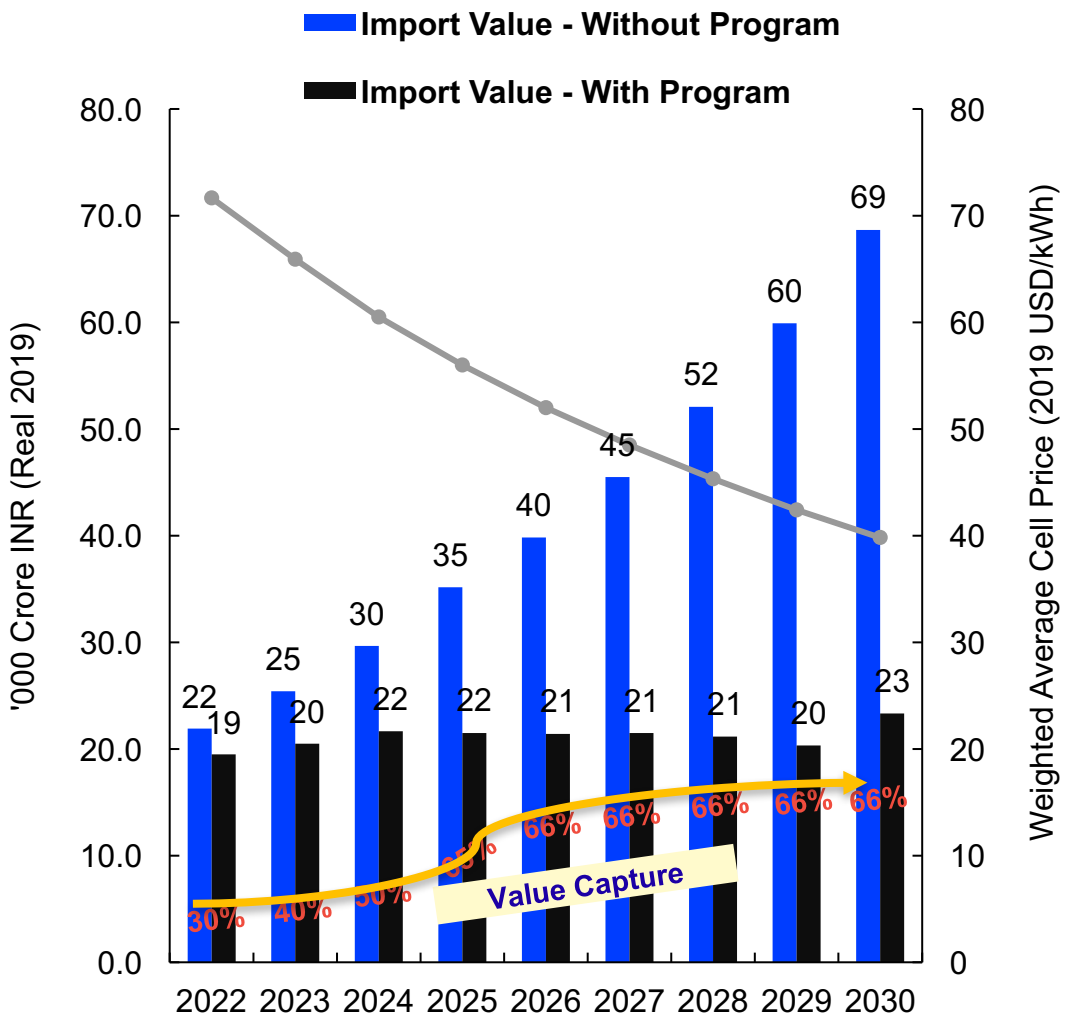
Advanced Battery Cell Import Bills & Savings From Programme



- Without the Programme, cumulative import bill between 2022 and 2030 would be **~ Rs 3.80 lakh crore**
- With **50 GWh capacity under the Programme** and the incremental capacity that would be implemented till 2030, total import bill could reduced by approximately **~Rs.1.90 lakh crores**
- Average YoY potential battery import savings is around **~Rs. 21,000 crore**

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GLOBAL POLICY BENCHMARKING

Continuous Government Support is critical in development of global battery manufacturing hubs

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NATION	Low Interest Loans* & Guarantees	Capital Subsidies	Support in Land Acquisition	R&D Support	Tax Breaks	Import Protection Duties	Market Development Initiatives^
China	✓	✓	✓	✓	✓	✓	✓
USA	✓	✓	✓	✓	✓	✓	✓
Korea	✓	✓	✓	✓	✓	✓	✓
India	X	X	X	X	X	X	≈ (FAME-II SCHEME)

➢ INCENTIVES TO OBTAIN CELL PRICE PARITY – GLOBAL MARKETS

*Subsidy in the form of interest-rate subvention
^Includes demand aggregation, purchase-subsidies, awareness programmes, enabling regulations, etc.

SOURCE: US DOE, KOREA BATTERY INDUSTRY ASSOCIATION, FEDERAL MINISTRY OF ECONOMIC AFFAIRS AND ENERGY – GERMANY, CHINA ENERGY STORAGE ALLIANCE

POTENTIAL FOR ACC GIGA-FACTORIES IN INDIA

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YoY DEMAND NUMBER OF ACC GIGA (GWh) FACTORIES IN INDIA

Scenario	YoY 2025	YoY 2030	Total 2020-30
Conservative Scenario	**50**	107	609
Base Scenario	80	230	1108

SOURCE : BLOOMBERG NEF; RMI ANALYSIS

- **Does not consider export markets**
- **Potential for at-least 5 (10GWh) Plants: i.e. cumulative capacity of ~50GWh immediately**
- **Investment in each ~10 GWh ACC fully-integrated manufacturing plant is expected to be ~USD 1.0 Bn *(Global Average)***

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- ACC Program Framework & Methodology
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PROGRAMME LEVEL INTERVENTION IN INDIA

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A. CENTRAL LEVEL FISCAL INCENTIVES

B. DEMAND

C. STATE INCENTIVES

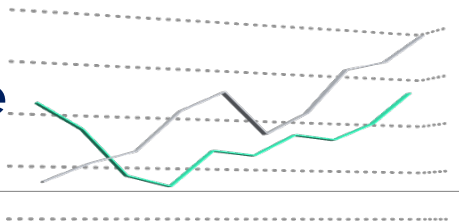
Transparent short-listing for P-L-I

No assured offtake by GOI

SINGLE WINDOW APPROACH

PRIVATE INVESTMENT

Market dynamics to drive Standards & specs



ADVANCED CHEMISTRY CELLS (“ACCs”)

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❑ Defined as New Generation Cells & Batteries Such as:

- Advanced Chemistry Cells (ACCs) are the new generation technologies that can store electric energy either as electrochemical or as chemical energy and convert it back to electric energy as and when required. Under the said Programme these technologies shall comprise of ACCs and integrated advanced batteries (Single Units) that suffice the minimum performance specifications as provided hereunder:

❑ Minimum Performance Specifications:

ACCs		Energy Density (Wh/Kg) ~ (Specific Density)				
		≥ 50	≥ 125	≥ 200	≥ 275	≥ 350
Cycle Life	<1000	N.A	N.A	N.A	N.A	ACC (1/5)
	≥ 1000				ACC (2/4)	ACC (2/5)
	≥ 2000			ACC (3/3)	ACC (3/4)	ACC (3/5)
	≥ 4000		ACC (4/2)	ACC (4/3)	ACC (4/4)	ACC (4/5)
	≥ 10000	ACC (5/1)	ACC (5/2)	ACC (5/3)	ACC (5/4)	ACC (5/5)

*Not Applicable (“N.A”)

TECHNOLOGY AGNOSTIC

BUILDING
globally competitive battery manufacturing ecosystem in india

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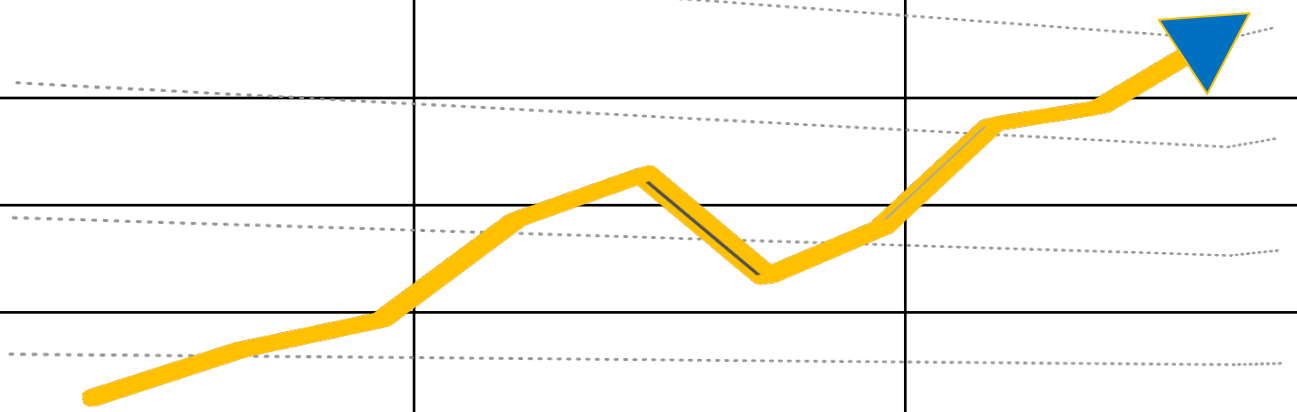
Capability for	China/ US
	2018
Raw material processing	✓
Cathode manufacturing	✓
Separator manufacturing	✓
Electrolyte manufacturing	✓
Anode manufacturing	✓
Cell manufacturing	✓
Pack manufacturing	✓
Value chain captured	100%

INDIA (INDICATIVE PHASING)* ~6-7 Year Lag !		
2020	2022-23	2025
<30%	~ 40%- 60%	~ 80%



*SOURCE: EY ANALYSIS/ STAKEHOLDER CONSULTATION

FISCAL SUPPORT

S.No	POLICY INTERVENTION	GOVERNANCE STRUCTURE
1	Central Sector Policy	"National Mission on Transformative Mobility & Battery Storage"

2-TIER INCENTIVE STRUCTURE

MINIMUM SUPPORT TO ENTIRE INDUSTRY

ADVANCED CHEMISTRY - CELL MANUFACTURING & SUPPLY-CHAIN

ADDITIONAL INCENTIVE BASED ON TRANSPARENT ALLOCATION

ENSURING MANUFACTURING OF ADVANCED CHEMISTRY CELL AT GIGA-SCALE LEVELS WITH CUMULATIVE CAPACITY OF 50GWH

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TRANSPARENT ALLOCATION! – ADDITIONAL INCENTIVES

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Qualification Consortium Members	➢ **Financial Qualification:** ▪ **Only Net Worth (US$ 30mn/GWh)** ▪ **Credit Rating (Domestic AA+)**
Prespecified Threshold	➢ **At-least 5 GWh ACC Installed Capacity &** ➢ **Minimum 60% Domestic Value Capture** **(Within 5 Years from Appointed Date)**
Ranking Criteria (QCBS)	➢ **Scale of Production** ➢ **Value-Capture in India** ➢ **Cash-Subsidy (Cap of INR 2000/ KWh)** **(Value Based Bidding)**
Subsidy Provisions	➢ **Subsidy offered for 10 Years** ➢ **Max award of 20GWh per beneficiary firm** ➢ **Actual Sales Linked Cash-Subsidy** ➢ **Total Subsidy capped at 50 GWh**

Mechanism	➢ **Transparent Selection** ➢ **Programme Agreement with GoI** *(Draft Ready)* ➢ **Support Agreement with the States** *(Draft Ready)*
Performance Check	➢ **Robust Monitoring & Penalty Provisions** ➢ **Additional penalty on account of failure** to implement both Committed Value Capture & Committed ACC Capacity ▪ **Cure Period** - 6 Quarters post that Termination of all Additional Incentives

PROPOSAL EVALUATION – QCBS MECHANISM

Indicative

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Technical Bid (80%)							Financial Bid (20%)	
1. Phasing for Value-Capture in India (70%)				2. Phasing for Scale of Production (30%)			3. Cash Subsidy for Base Category ACCs (INR/ KWh)	
Year	Weight	Comp X	Comp Y	Weight	Comp X	Comp Y	Comp X	Comp Y
Year-1	5	-	-	5	-	-	1800	2000
Year-2	4	30%	50%	4	3	2		
Year-3	3	-	30%	3	-	-		
Year-4	2	-	-	2	2	-		
Year-5	1	70%	20%	1	1	4		
Weight		4*0.3 + 1*0.7	4*0.5 + 3*0.3 + 1*0.2		4*3 + 2*2 + 1*1 +	4*2 + 1*4 = 12		
		1.9	3.1		17	12		
Standardized		0.61	1		1.0	0.71	1.0	0.9
TECHNICAL SCORE: X = 0.73 & Y = 0.91							FINANCIAL SCORE:	

Final Scores

X 0.78

Y 0.91

CASH SUBSIDY

MECHANISM

- Subsidy Amount = Applicable Base Subsidy X Value Capture (%) X Quantum (KWh) of Cell Sold
- Value addition: ACC manufacturing undertaken in India, either on own or through ancillary units or via domestic suppliers
- Robust Monitoring & Disbursement Mechanism - Certification by Statutory Auditors (Both Mother Unit & Ancillary Units)

FIXED BASE-SUBSIDY AMOUNT

BONUS (Cycle Life) ↓ BONUS (Energy Density) →

INR Per KWh		Energy Density (Wh/Kg)				
		≥ 50	≥ 125	≥ 200	≥ 275	≥ 350
Cycle Life	≥ 1000	N.A	N.A	N.A	A	A*(1.2)
	≥ 2000	N.A	N.A	A	A*(1.2)	A*(1.2)^2
	≥ 4000	N.A	A	A*(1.2)	A*(1.2)^2	A*(1.2)^3
	≥ 10000	A	A*(1.2)	A*(1.2)^2	A*(1.2)^3	A*(1.2)^4

*Not Applicable ("N.A")

SUBSIDY PHASING

TIMELINE	PERCENTAGE OF APPLICABLE BASE AMOUNT
AD + 10 Years	Tapering the Subsidy to ~10% of the initial amount

- **The Reserve Cash Subsidy Amount (For A) applicable for FY'21 shall be ~ INR 2000**
  (On Achieving 100% ACC Domestic Value Addition)

KEY FEATURES OF THE BID DOCUMENTS

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Programme Agreement (PA)

- >> Subsidy disbursement framework
- >> Market demand ➢variation safeguards
- >> Govt. default compensation
- >> Robust monitoring & penalty provisions
- >> Acknowledgement of the terms of MSS - Future Dispute Mitigants

Model State Support Agreement (MSS)

- > Enclosed as an annexure to the RFP
- > A model document to harmonise key terms of the Programme
- > Robust framework – Emphasis upon upfront Clearance & Approvals

Request for Proposal (RFP)

- > Single Stage – Two Envelop Methodology
- > QCBS: Value based bidding criteria
- > Technical Criteria - Prospective rather than Retrospective

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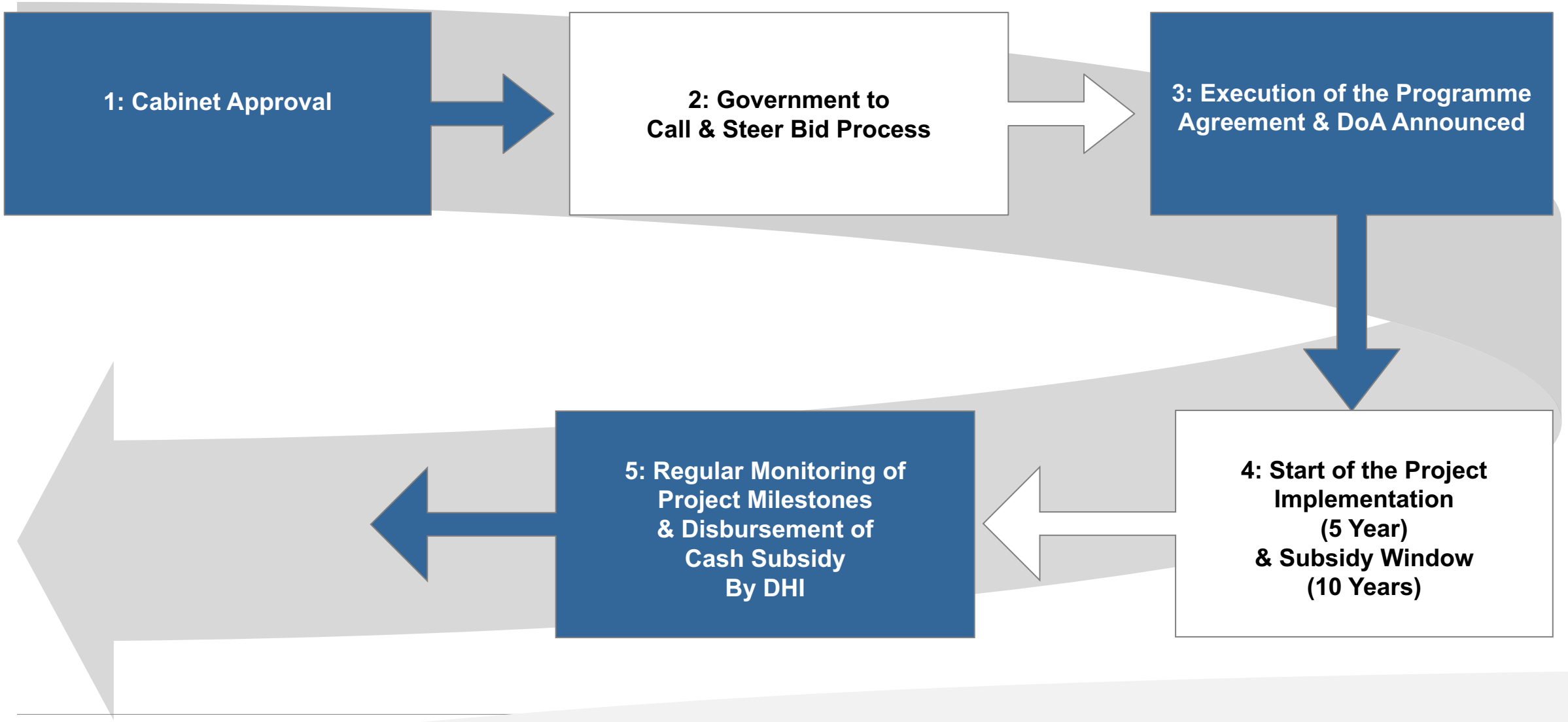
PROCESS – POST CABINET DECISION



STATE GRAND CHALLENGE FRAMEWORK

- **Non Binding for Potential Investors – Part of the RFP Document**
  - **Single Window Framework**

- **A Tri-Partite Agreement between Centre, State and the Manufacturer**

STATE GRAND CHALLENGE FRAMEWORK

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S.No	CATEGORIES
1.	**PROVISION OF LAND & TRUNK-INFRASTRUCTURE:** **a) Minimum Encumbrance Free Land Minimum 100 Acres** ▪ **Outright Sale at Circle Rate** ▪ **6%** of Circle Rate (S.D & Concessional Registration) for 99 Years Period ▪ **Connectivity** – National Highway Access (Within 5 Km) ▪ **Proximity to Port/ Train Linkage to Port**
2.	**PROVISION OF UTILITY:** **a) Adequate Water Supply** **b) Power Supply: Power Supply for 15 Years at Rationale Rate at Factory Meter** ▪ Provision of Open Access with Transmission, & Wheeling charges only ▪ Cost of Industrial Power Supply
3.	**ADDITIONAL INCENTIVES/ CONCESSIONS OFFERED BY THE STATE GOVERNMENT** **(Amount of Non-Variable Incentive for upto 10 GWh ACC Manufacturing)** **a) Upfront Capital Subsidy etc.**

STATE GRAND CHALLENGE FRAMEWORK

S.No	CATERGORIES
4.	**IN-PRINCIPLE UPFRONT CLEARANCE/NOC AS CONDITION PRECEDENTS**

SINGLE WINDOW MECHANISM:

UPFRONT CLEARANCE & APPROVALS

A dedicated

committee of secretaries ('COS')

to be set-up for each project

Chaired by the CEO, NITI Aayog &

Comprising Secretary (DHI), MoEF&CC,

& Respective State Chief Secretary

THANK-YOU

सत्यमेव जयते
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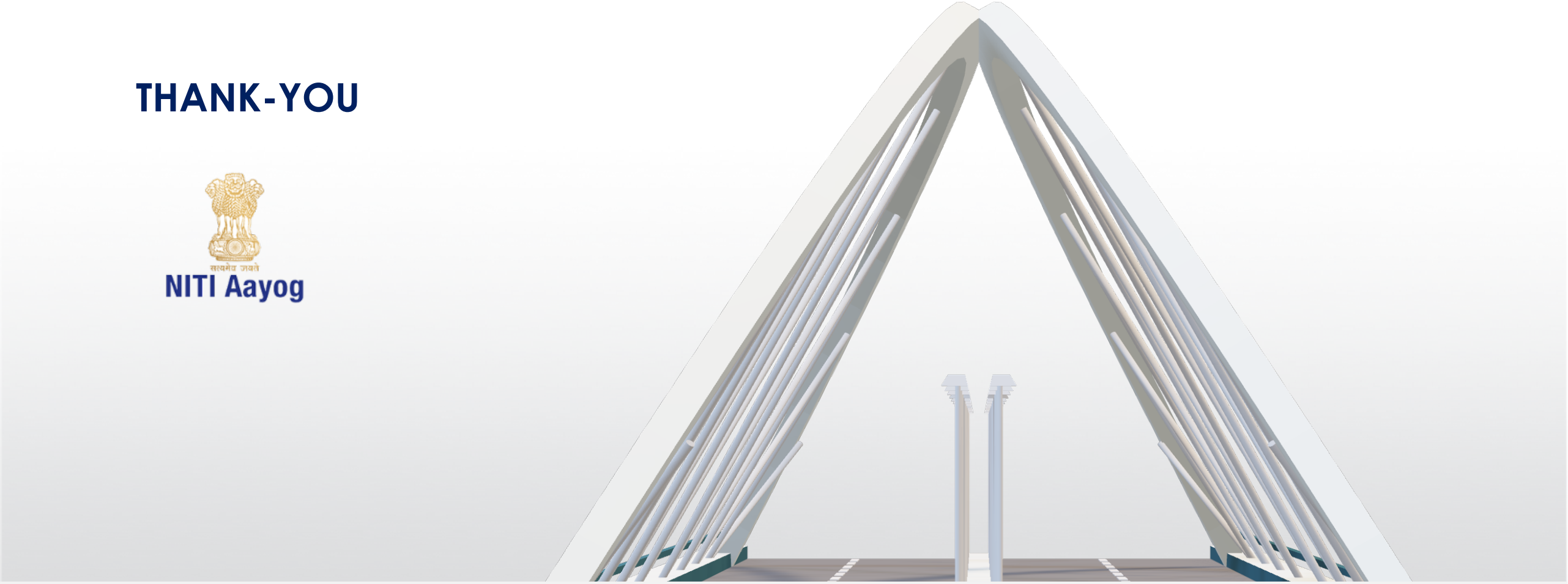

7 AFFORDABLE AND CLEAN ENERGY

13 CLIMATE ACTION

10 REDUCED INEQUALITIES

11 SUSTAINABLE CITIES AND COMMUNITIES

Annexure

FISCAL SUPPORT – ADDITIONAL INCENTIVE

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ADDITIONAL INCENTIVE BASED ON TRANSPARENT ALLOCATION
FRAMEWORK TO ENSURE MANUFACTURING OF ACC AT GIGA-SCALE LEVELS
TO BE EXTENDED TO THE GREENFIELD MOTHER UNIT (NEW SPV INCORPORATED)

❖ OUTPUT - PRODUCTION LINKED CASH SUBSIDY

- **Cash Subsidy disbursement linked to per KWh of ACC Sold**
- Cash subsidy to be provided to ensure & obtain global parity for the levelized cost of ACC production in India
- The base-subsidy amount pertains to hundred percent (100%) value addition in India for production of ACCs
- To avail the complete benefits of the base-subsidy, beneficiary firms are being incentivized to invest into R&D of newer technologies, whereby greater value addition can take place in India
- **Cash subsidy to capped at 20%** of effective ACC price (Net of GST) or the effective ACC sales turnover

PROPOSED BASIC CUSTOM DUTY MATRIX (2021-30):

PMP WITH INTENT TO PROMOTE MAXIMUM DOMESTIC VALUE CAPTURE

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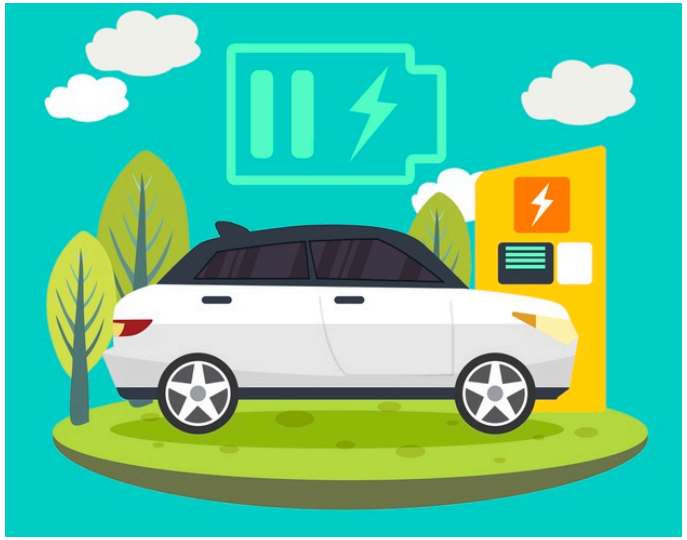
Phasing of Basic Customs Duty

S. No.	Goods	HSN	2020-22	2022-23	2023-25	2025-27	2027-31	2031 - onwards
1a	Batteries or battery packs of Advanced Chemistry Cells ("ACC") including batteries of Electric Vehicle, except for 1b and 1c	8507	5%			15%		
1b	Lithium ion batteries of cellular mobile phones					15%		
1c	ACCs & Batteries used to manufacture goods under Chapter 8471 of the custom tariff heading					0%		
2	ACC (such as lithium ion cells) for manufacture of battery packs	8507	5%	10%	10%	10%	10%	10%
3	Parts such as anode, cathode, electrolytes and separators required to manufacture ACCs	85 or specific tariff heading to be notified[6]	2.5%	2.5%	5%	10%	10%	10%
4	Goods (processed & unprocessed) required to manufacture parts of ACCs, such as graphite, cobalt, lithium, nickel except for copper and any other product as may be notified	Specific tariff heading as may be notified				2.5%		
5	Plant and machinery required to set up a plant for manufacturing ACCs	As may be notified	0%	0%	0%	5%		7.5%

MARKET DEMAND CREATION

critical component for attracting private capital into ACC manufacturing

government to focus on creating demand on best-effort basis



KEY POINTS (Demand Creation: Central Govt. Initiatives)

S.No	Recommendation	Action
~50% of the overall ACC & Battery Storage Demand – Electric Vehicles Segment		
1	A detailed action plan for promotion of Electric Vehicle on India Roads to be prepared in consultation with stakeholders	**NITI Aayog | MoRTH | DHI**
2	Replacement of ICE vehicles with EVs in all Central Government Ministries, agencies and public sector enterprises	**NITI Aayog | DHI | DPE**
3	Replacement of all ICE vehicles of the Cab-Aggregators in India	**NITI Aayog | DPIIT | MoRTH**
4	Framework for complete revamp of current installations of battery storage in locomotives and other static applications across Indian Railways with ACCs & batteries	**NITI Aayog | MoR (Railways)**
5	Implementation of e-Highways for Heavy Commercial Vehicles (“HCVs”) on few select highway corridors on pilot basis	**NITI Aayog | NHAI | MoRTH**

KEY POINTS (Demand Creation: Central Govt. Initiatives)

S.No	Recommendation	Action
~50% of the overall ACC & Battery Storage Demand – Electric Vehicles Segment		
6	Electric Buses/ Vehicles to be included in the portfolio of all the SRTUs	**NITI Aayog | M/o H&UA | DHI**
7	Increase proportion of Electric Commercial Trucks on Indian Roads	**NITI Aayog | DHI | M/o RTH**
8	All Town Planning Laws/ Schemes and the Model Documents prepared in this regard, to provide for provision of Charging infrastructure in all commercial buildings, shopping malls and multi-storied residential apartments etc., as well as Fuel Stations	**M/o H&UA | M/o P&NG**

KEY POINTS (Demand Creation: Central Govt. Initiatives)

S.No	Recommendation	Action
POWER: Energy Storage with Emphasis on Battery Application		
9	Demand aggregation and integration for Solar Pumps, along with Battery Storage under the KUSUM scheme. Suitable incentives for integrated solar roof-top and ACC battery storage	**NITI Aayog | MoP | MNRE**
10	Replacing diesel generators to minimize diesel consumption used for power back-up, especially in islands, in remote/hilly regions, military outpost (border areas) etc. where landed cost of fossil fuels is very high.	**NITI Aayog | MoH | MoD | MoP | MNRE**
11	Formulation of policy & regulations for ancillary services to the grid (e.g. fast response frequency regulation or system services to improve balancing etc.) and for applications in distribution systems like peak-shaving, load following etc. This would entail emphasis on battery storage. Storage service providers may be allowed to sell the above services on a per MW/MWh basis.	**NITI Aayog | CERC | MoP**

KEY POINTS (Demand Creation: Central Govt. Initiatives)

S.No	Recommendation	Action
POWER: Energy Storage with Emphasis on Battery Application		
12	New Projects: Firm bid trajectory and phasing of tenders till 2030 for renewable energy capacity addition, along with adequate provision for battery storage by SECI or any other central Government agencies as off-takers. Existing Projects: Government may provision additional incentives for integration with battery storage. Viability Gap Funding (“VGF”) / Grant based bid mechanism to be adopted either with prespecified rationale tariff for the new projects or on per KWh of ACC basis for the existing projects	**NITI Aayog | MoP | MNRE**
13	Soft Loans &/or other form of Concessional Finance to Powergrid Corporation of India Ltd., State Discoms / Transcos to deploy battery storage solutions. Battery storage can be explored for frequency regulation, optimizing transmission capacity, deferring transmission capacity investments etc.	**NITI Aayog | MoP**
14	Inclusion of storage-batteries for un-locking potential of spinning reserves - to be piloted on NTPC, NHPC	**NITI Aayog | MoP**