



NETRA's experience in CCUS, Green Hydrogen & Long duration energy storage



Follow us on:



Presentation Outline:

- 1. Netra in a snapshot**
- 2. Focus Area**
 - **Carbon Capture, Utilisation, and Storage (CCUS)**
 - **Green Hydrogen**
 - **Long Duration Energy Storage**
 - **Advanced Scientific Services**





NETRA – In a Snapshot



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NETRA in a Snapshot: Genesis

Genesis:

Formed in 2009 by merging:

- R&D Centre-Set up in 1981: Testing & Analysis
- Energy Technology: Set up in 2004: Tech. Development

Credentials:

- **IPR:**
 - ✓ Patents : 83 Nos filed, 59 Nos granted
 - ✓ Copyrights : 37 Nos filed, 29 Nos Granted
- **Governmental Expert Panel:**
 - ✓ NITI Aayog: 7 Nos of committees/panels,
 - ✓ DST: 7 Nos of committees/panels,
 - ✓ CSIR Labs: 2 Nos of 'Research Advisory Council'
- **Certification & Recognition:**
 - ✓ DSIR recognition
 - ✓ Boiler Board certification
 - ✓ 11 Nos of NABL Accredited Laboratories



NETRA Main Building



NETRA in a Snapshot: NABL Accredited Labs

NABL Accredited Lab	
SN	Lab
1	Metallurgy & Material Science Lab
2	Creep Lab
3	NDE & Imaging Lab
4	Corrosion Analysis Lab
5	Analytical Lab
6	Water Treatment Tech Lab
7	Transformer Oil Lab
8	Tribology & Lub Oil
9	Coal & Combustion Lab
10	Environmental Science Lab
11	Electrical Lab



NETRA in a Snapshot: Knowledge Alliance

Alliances

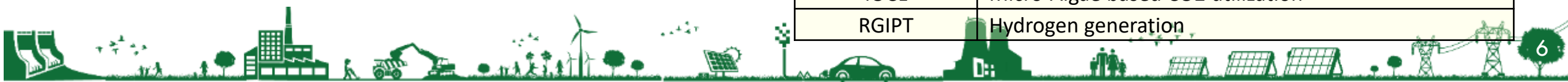
- National Knowledge Alliance: 22
- International Knowledge Alliances: 07
- Collaborations: 09

INTERNATIONAL ALLIANCES

DLR Germany	Solar Thermal Lab
ISE Germany	Concentrated PV
VGB Germany	ESP Performance Improvement
Curtin University Australia	Boiler/Biomass Combustion
NETL USA	CFD based AI Modeling of Boiler
University of South California, US	CO2 derived Liquid Fuel
ESB, Ireland	Green Fertilizer & Fuel

NATIONAL ALLIANCES

EIL	Coal Gasification & CO2 Compression & Pipeline Transportation
SVNIT, Surat	Carbon-Negative Fly Ash Sand
CSIR-CMERI	Robotic System
CSIR – IIP	Methanol Catalyst
CSIR – CGCRI	Fiber Optic Sensor for APH FG temp.
CSIR – NML	Creep Damage Assess. of High Temp. Headers & Pipe
CSIR – SERC	Structure & Corrosion Assessment
IISc, Bangalore	Carbonated Aggregate
Zakir Husain Delhi College	Robotic System
IGCAR	A-USC
NCCBM	Fly Ash to Sand, RCC Structure-Audit and Survey
CIPET	Floating Solar
IIT B	Solar, Robotics, MEMS, Corrosion, CO2 Capture Amine
IIT K	Power Sys., Smart grid, Sensors,
IIT D	Simulation & Modeling, AI, CFD, Solar PV
IIT Gh	Metal Hydride based H2 Compressor, CO2 Capture Amine
MIDHANI	Development of erosion resistant component
IOCL	Micro-Algae based CO2 utilization
CPRI	Drop Tube Reactor, Fly ash bricks
IOCL	Micro-Algae based CO2 utilization
RGPT	Hydrogen generation



NETRA in a Snapshot: Presence in various platforms & forums

**NITI
Aayog**

1. Expert Group - CO2 Capture
2. Expert Group - CO2 Utilization
3. Expert Group - CO2 Storage
4. Expert Group - CO2 Transport
5. Expert Group - CCUS Codes & Std
6. Expert Group (Steel Sector) – Carbon Capture
7. Expert Group (Steel Sector) – CO2 Utilization

DST

1. Jury on Hydrogen Valley Cluster
2. Expert Group - CCUS
3. Expert Group - Particulate Emission

CSIR

1. CMERI - Research Advisory Council
2. CGCRI - Research Advisory Council





Focus Area



Follow us on:



Focus Area:

In the new paradigm



- 1 Carbon Capture, Utilization & Storage (CCUS)
- 2 Green Hydrogen
- 3 Long Duration Energy Storage
- 4 Coal Gasification based Synthetic Fuel & Chemical
- 5 Advanced Scientific Services



Clean Energy Transition

Indian Scenario



Indian Scenario - CO2 Emissions by Sector

Electricity based Economy

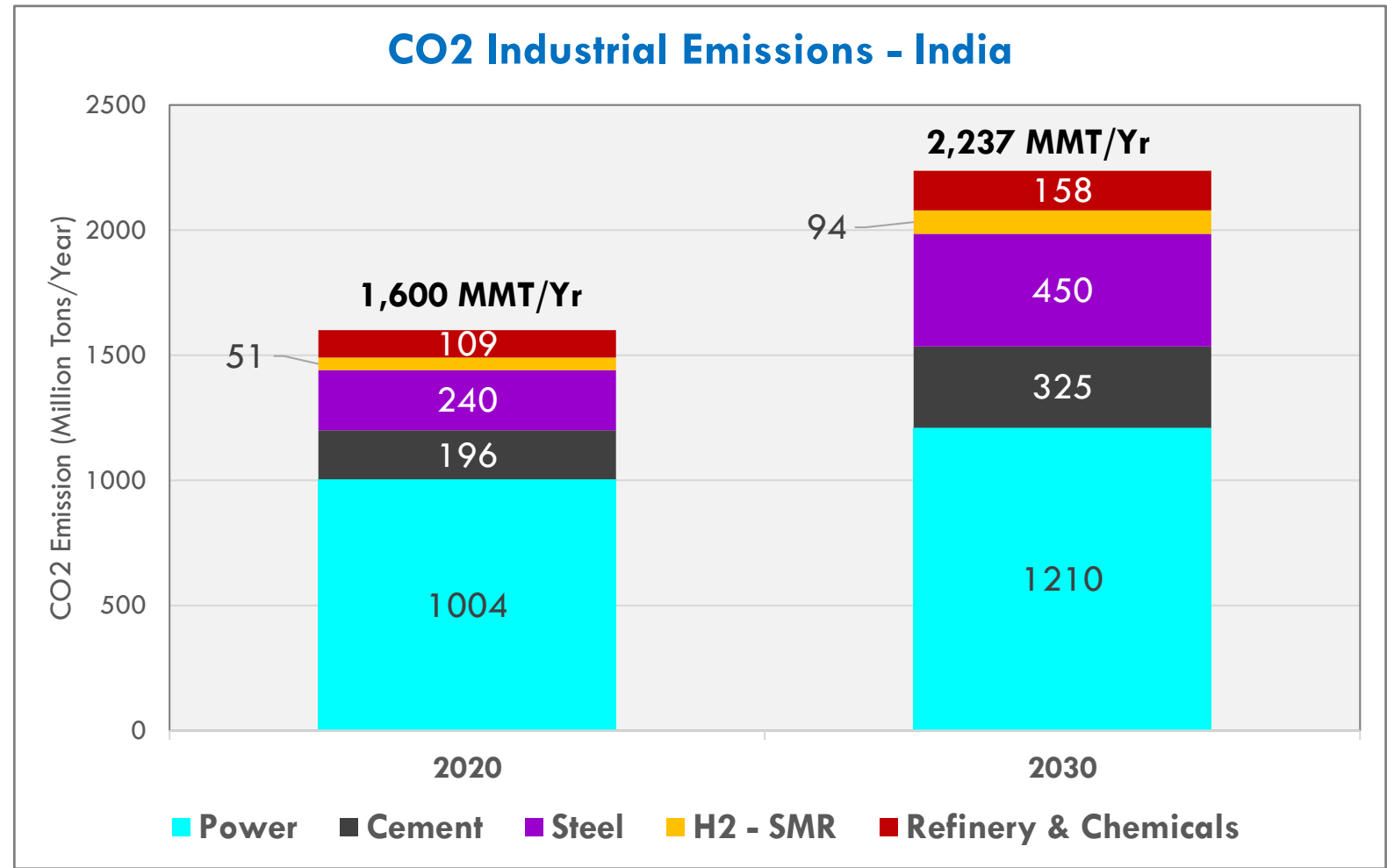
CCUS shall be critical for 'Clean Energy Transition'

- CO2 emissions from Coal Power Plants are significant ~62% in 2020 & ~54% in 2030,
- In order to sustain Coal Power Plant, its CO2 intensity needs to be reduced

Key Takeaway

CCUS shall be important – in Indian context

Hydrogen shall play a 'critical' role to support CCUS

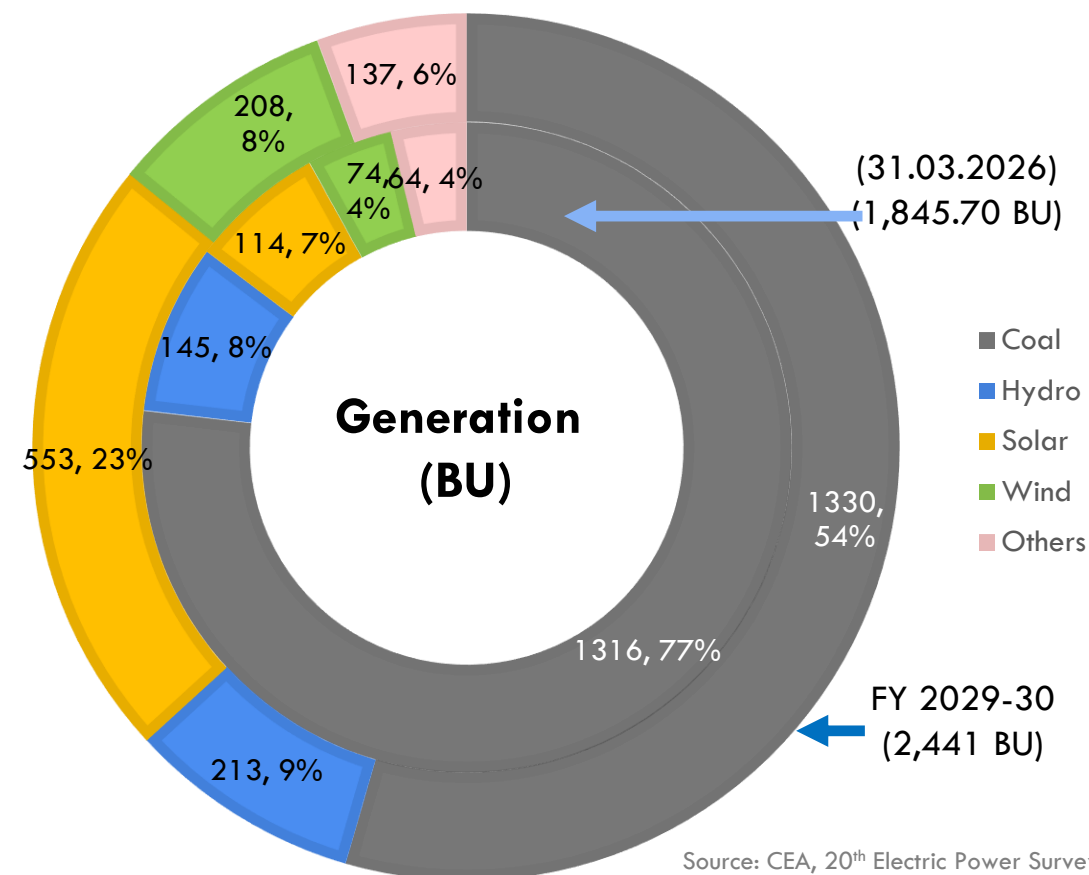
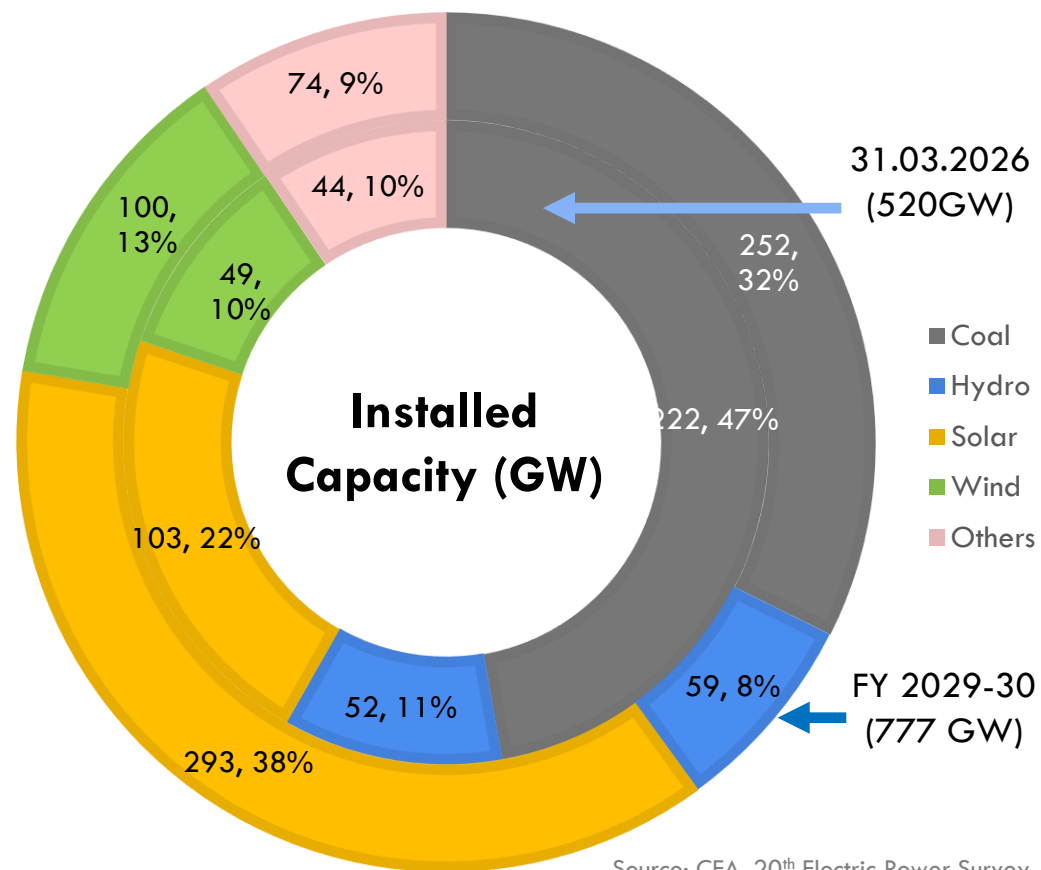


Source: NITI Aayog – CCUS Framework



Electricity based Economy

Coal Power Plant shall remain the 'Mainstay' of electricity



In absolute numbers, Coal Power Plants are expected to hold their position - both in terms of 'Installed Capacity' & 'Power Generation'

1. PRIMARY ENERGY SOURCE:

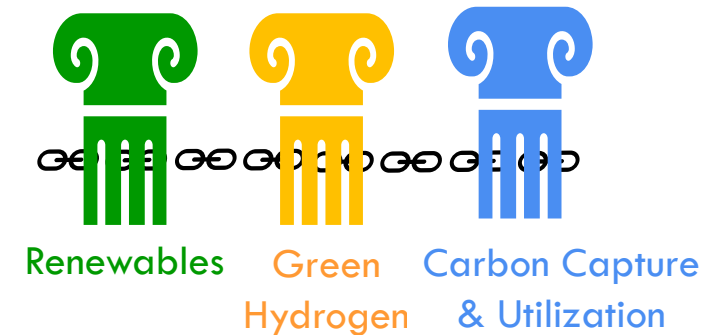
- India has 149 Billion Tons of 'Proven Coal Reserve' & 319 Billion Tons of 'Total Coal Reserve' (GOI-Ministry of Coal),
- Bulk of Indian coal is of 'Non-coking' variant - can only be used in Coal Power Plant (129 /149 Billion Tons i.e ~87% & 283 / 319 Billion Tons i.e ~89%) (GOI-MOC),
- India does not have meaningful oil and gas reserve – bulk of it is imported.

2. ECONOMY: Economy of few Indian States are critically dependent on coal mining.
(i) Jharkhand: 91%, (ii) MP: 73%, (iii) Chhattisgarh: 66%, (TERI: Coal Transition in India)

3. EMPLOYMENT: Coal mining generates large quantum of employment – estimated 355,000 to 500,000 Nos – across various skillset (TERI: Coal Transition in India)

4. FINANCIAL INVESTMENT: Total investment made in coal power plants are in excess of 10 Trillion INR – this is a significant investment - needs to be handled carefully

LOW CARBON TRANSITION THE INDIAN MODEL



Inter-linking of 3-Green Pillars
(Renewables, Green Hydrogen & Carbon Capture and Utilization)

Every country needs to find its own unique path



NETRA's Initiatives

Greening the Coal
Carbon Capture, Utilization & Storage



CO2 Capture Technology & Pilot Plants

Physical Route

Pressure Swing Adsorption

1 No of Pilot Plant

(Collaborative R&D Project of NETRA with 4 Institutes – CSMCRI, NEERI, IITB & IIP)



Chemical Route

Modified Amine

2 Nos of Pilot Plant

(Collaborative R&D Project with IIT Guwahati & IIT Bombay)



Biological Route

Micro Algae

1 No of Pilot Plant

(Collaborative R&D Project of NETRA with IOCL)

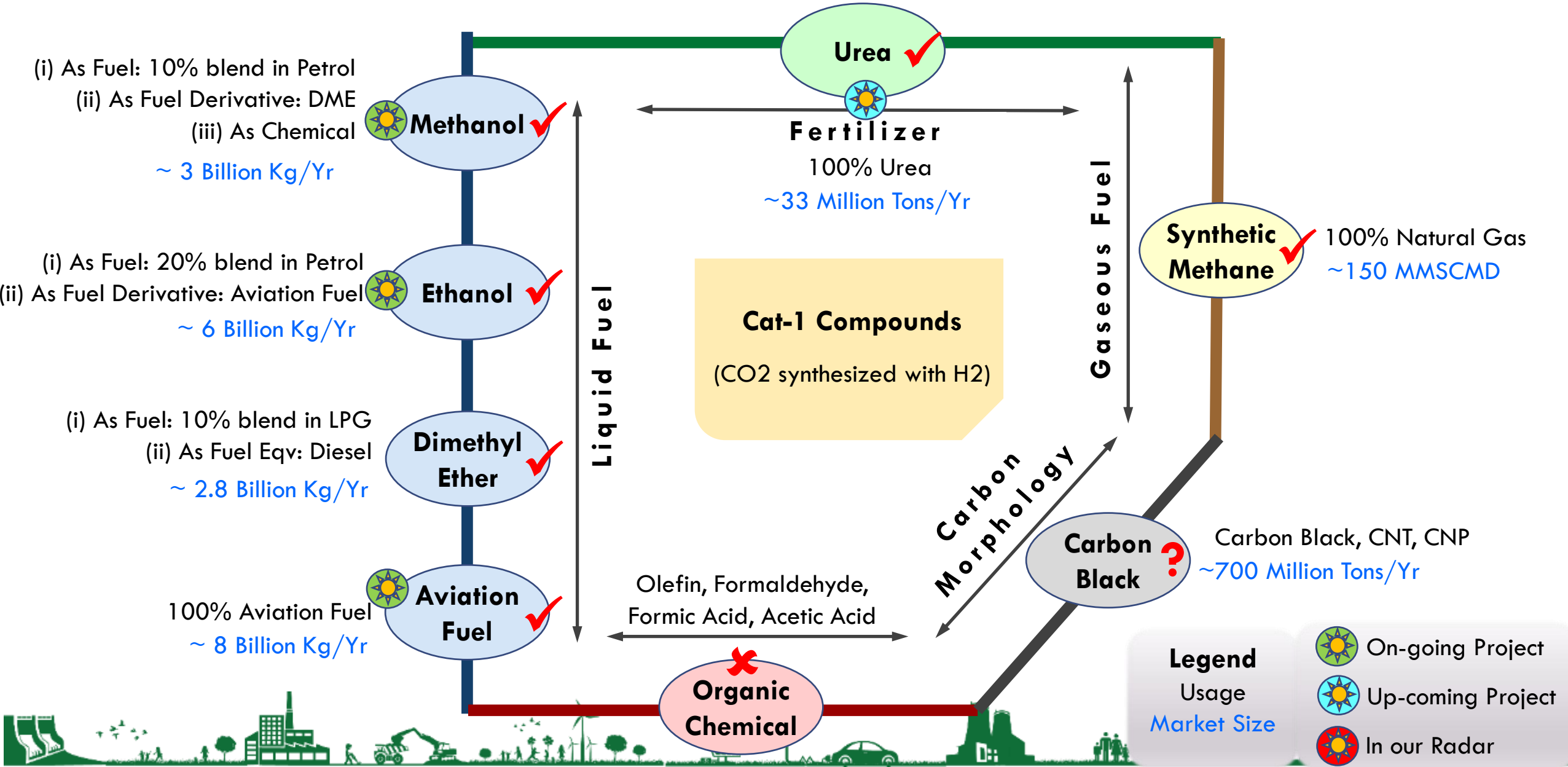


Completed

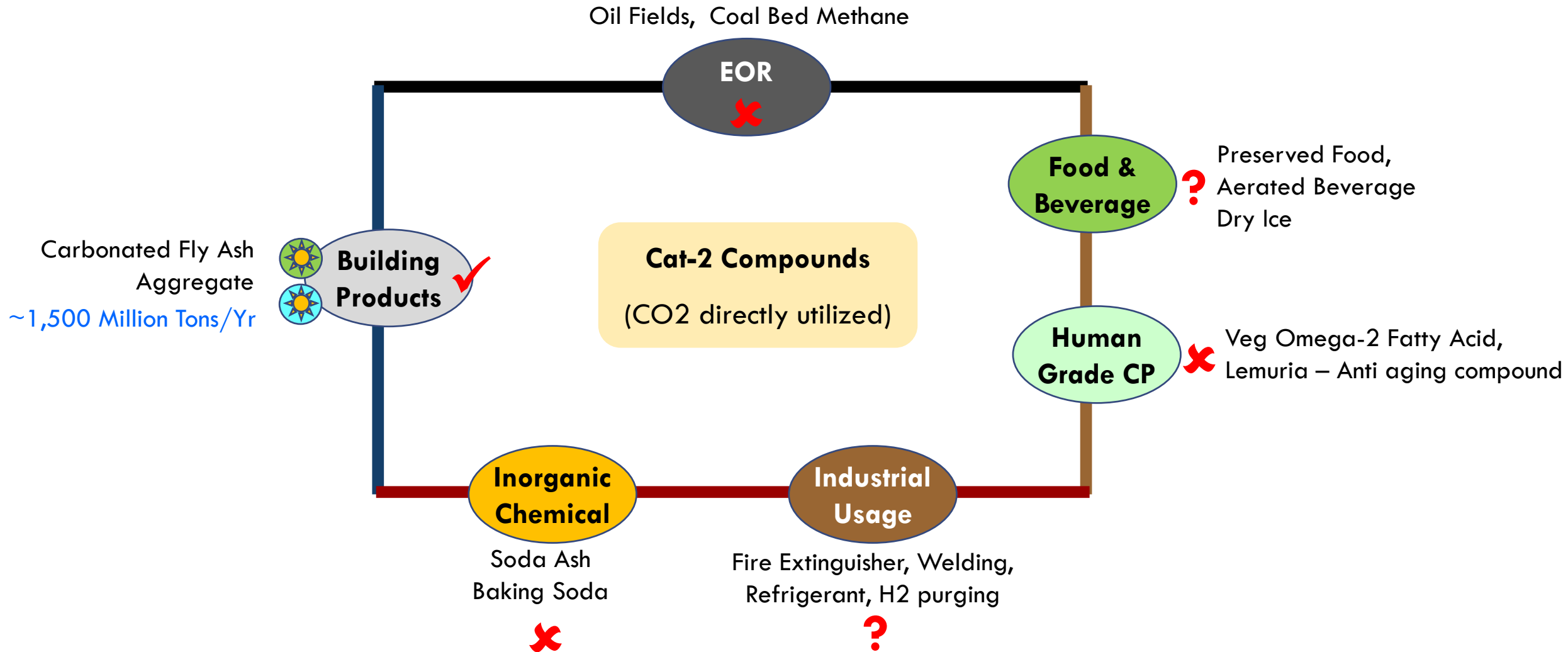
Gave us Confidence and data for scaling to Demonstration Plant



Carbon Capture & Utilization: Potential Avenues



Carbon Capture & Utilization: Potential Avenues



CCUS – NTPC Initiatives:

NTPC is working on all four (4) verticals of CCUS Technology – (i) CO₂ Capture, (ii) CO₂ Compression & Pipeline Transportation, (iii) CO₂ Utilization and (iv) CO₂ Sequestration

CO₂ Capture Hub (At NTPC Simhadri)

- 6,000 TPA Plant at NTPC Vindhyachal (Commissioned in Aug'23)
- 7,500 TPA Plant (under execution)
- 1,00,000 TPA Plant (Upcoming),

CO₂ Compression & Pipeline Transportation

(From NTPC Simhadri to NTPC Pudimadaka)

- CO₂ Transportation in 'Supercritical Phase' (150 Bar, 40C),
- Configuration: 2,00,000 TPA CO₂
- Distance: ~18 KM,
- **First CO₂ Pipeline in India**

CO₂ Utilization (At NTPC Pudimadaka)

- CO₂ to Sustainable Aviation Plant – 1,800 TPA Plant,
 - CO₂ to Green Urea – 50,000 TPA Plant,
 - CO₂ to Green Methanol (Planned),
 - **First CO₂ to Methanol, SAF, Urea Plants, globally**
-
- **3,000 TPA CO₂ to Methanol at NTPC Vindhyachal commissioned**



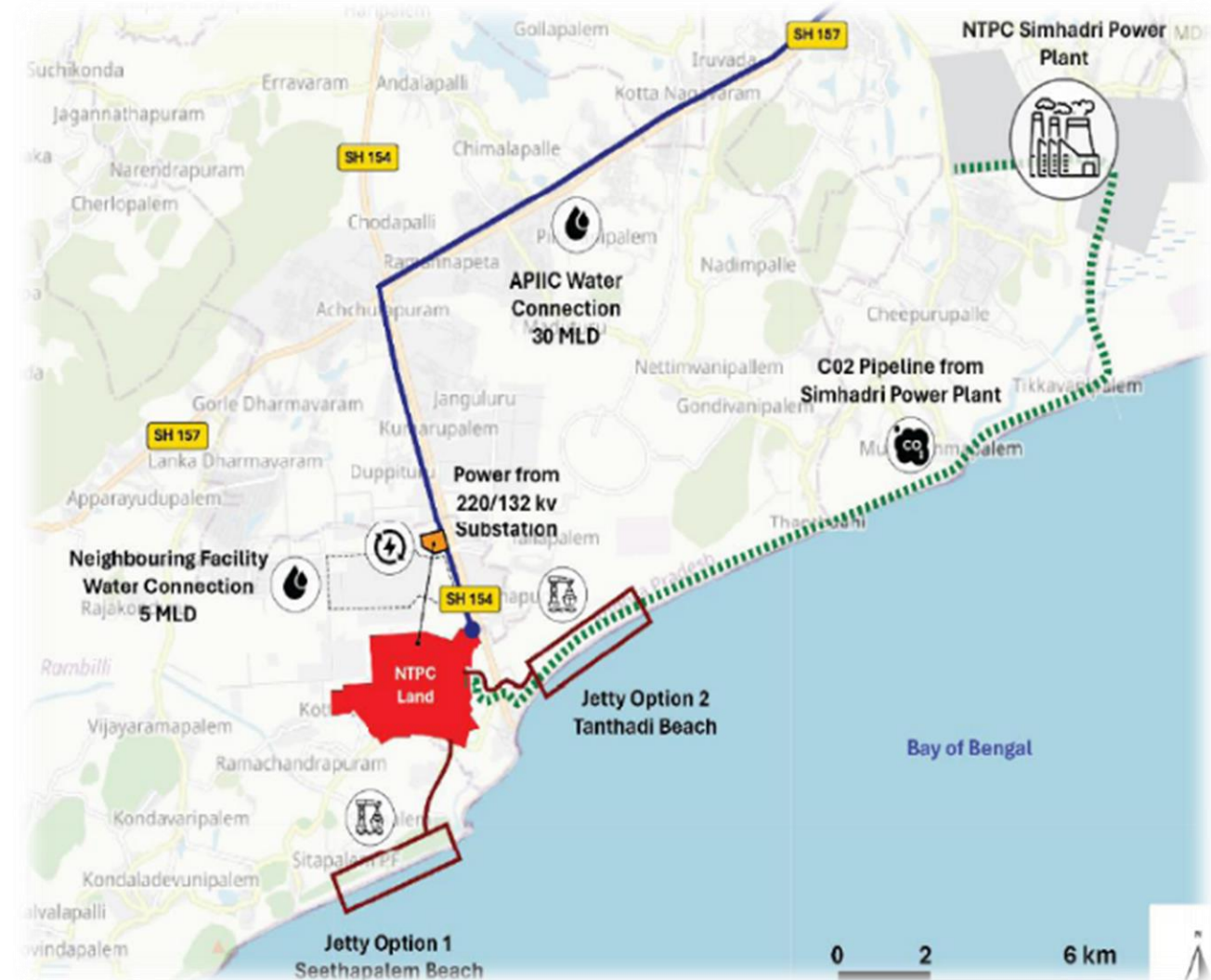
Green Chemical Hub: Pudimadaka



Project Location	: Pudimadaka, Visakhapatnam, AP
Land Size	: 1200 + 400 Acre (₹ 1,006 Cr.)
Road	: NH 16 (20km), SH 154 (50m)
Seaport	: Gangavaram (36km), Visakhapatnam (46km)
Airport	: Visakhapatnam (44km)
Seashore	: 2km
Water source	: Fresh - APIIC Network/Yeluru Canal (15km) 80 MLD Desalination (2km)
Power Supply	: 7 GW RE-RTC through CTU Open access

Status:

1. Foundation Stone laid by the Hon'ble Prime Minister on 8th Jan 2025
2. Land Registration is Completed
3. Additional land for captive jetty, desalination, storage- 220 acres (Seethapalem)



1. CO₂ to Methanol



CO2 TO METHANOL PLANT AT NTPC Vindhyachal

- **20 TPD CO2 CAPTURE PLANT**
- **2 TPD PEM ELECTROLYSER**
- **10 TPD METHANOL PLANT**
- **DEMONSTRATION & TECHNOLOGY DEMONSTRATION**

**Methanol
Block**

H2 Block

**CO2 Capture
Block**

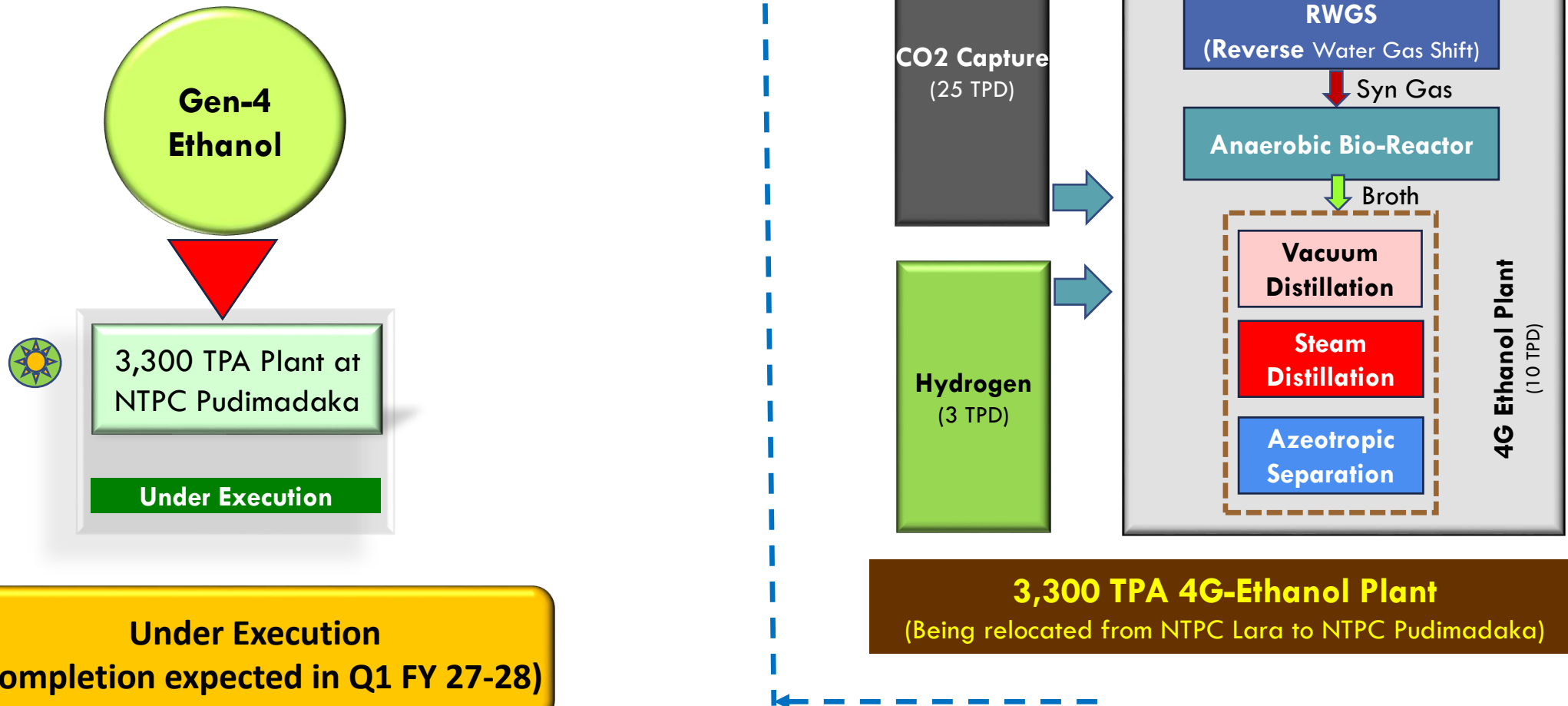


10 kg CO₂ to Methanol
Pilot Plant
At NETRA
With indigenous
reactor & catalyst



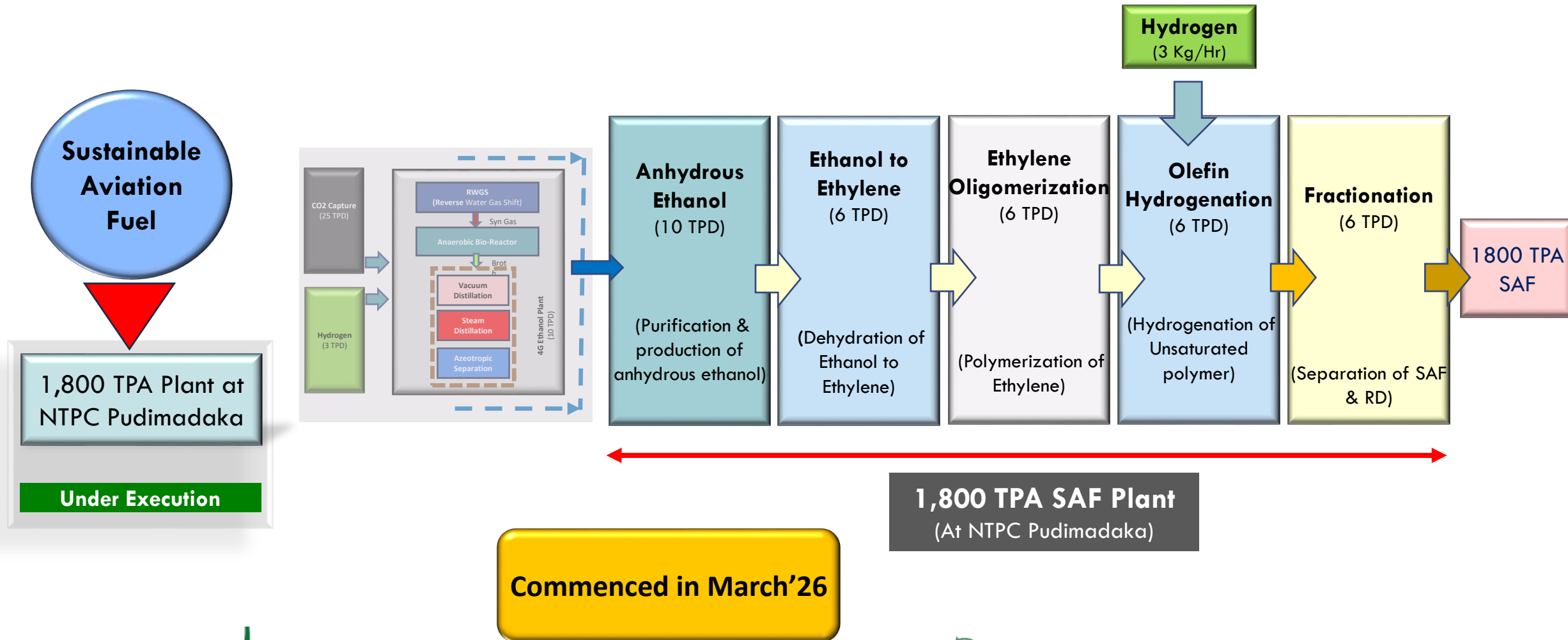
Flue Gas CO₂ to SAF: 1,800 TPA Plant at NTPC Pudimadaka

2. CO₂ to Gen-4 Ethanol:



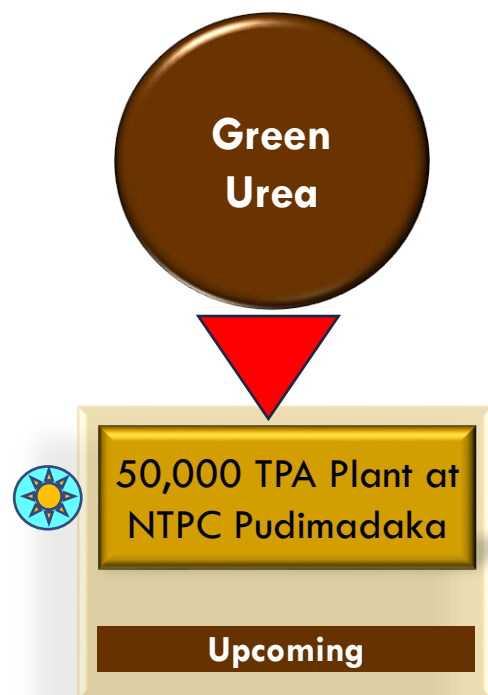
Flue Gas CO₂ to SAF: 1,800 TPA Plant at NTPC Pudimadaka

3. CO₂ to Sustainable Aviation Fuel

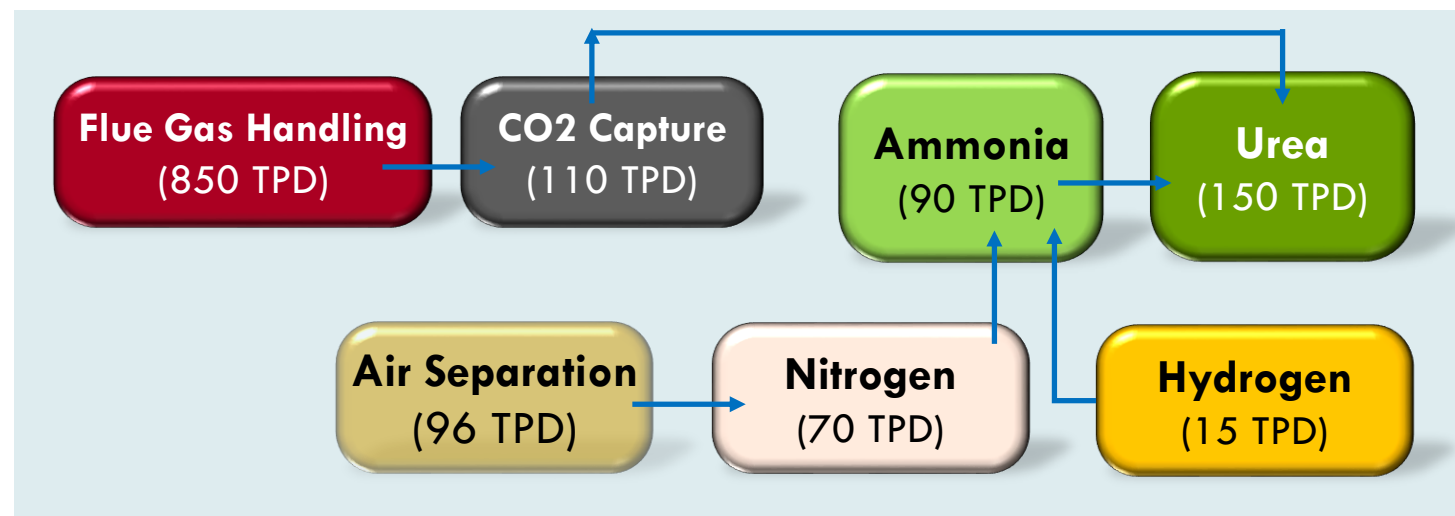


CO2 to Green Urea: 50,000 TPA Plant at NTPC Pudimadaka

4. CO2 to Green Urea



Building Blocks



Commencement expected
in Q2 FY 26-27

First 'Flue Gas CO2 to Green Urea Plant, globally



CO2 TO CARBONATED BRICKS CO2 NEGATIVE PROJECT



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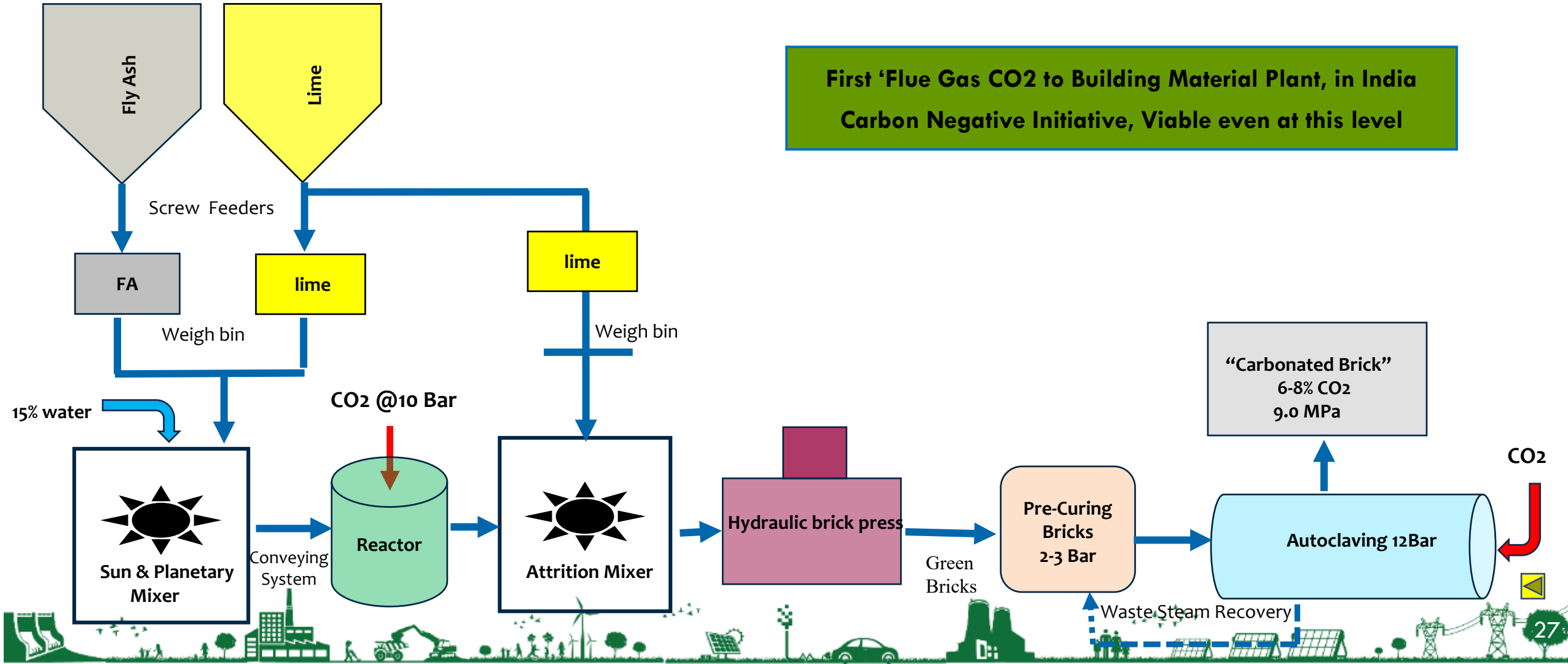
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CCUS Technology Demonstration: 2 Lakhs/day Carbonated Brick Plant at NTPC Ramagundam

First 'Flue Gas CO₂ to Building Material Plant, in India
Carbon Negative Initiative, Viable even at this level



CO2 Derivatives – Cost Benchmarks

Product Category	CCUS Route Derivative	India's Consumption	Import Quantity (MMT)	Cost of Production (Without CCUS Program Support) #	Cost of Production (With CCUS Program Support) #	Market Benchmark Price Brown / Green
CO2 products with optional 'Green Label'						
Liquid Fuel	<u>Methanol</u>	4.0 MMT	3.4 MMT (80%)	~79 Rs/Kg	~55 Rs/Kg	43/80 Rs/Kg
	<u>Aviation Fuel</u>	9.8 MMT	1 MMT	~242 Rs/Kg	~175 Rs/Kg	105/220 Rs/Kg
CO2 products not requiring 'Green Label'						
Fertilizer	<u>Urea</u>	36	9	~51 Rs/Kg	~42 Rs/Kg	35-51 Rs/Kg
Building Materials	Carbonated Brick	~300 Billion Units	Nil	~5 Rs/Unit	4 Rs/Unit	4-6 Rs/Unit
#: Scaled-up plant with CO2 Capture Capacity of 100 TPD.						





NTPC EFFORT IN CO2 STORAGE



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CCUS Technologies: R&D Initiatives

CCUS R&D Initiatives – CO₂ Storage:

CO₂ Emissions – The Big Picture:

- CO₂ emission from Coal Power Plant in FY 2022-23: ~ 1,000 Million Tons (@ 0.85 KgCO₂ /kWh, 1182 BU)
- CO₂ emissions reduction to match Gas Plant emissions: ~ 400 MT/Yr
- CO₂ emissions reduction thru CCUS: ~100-200 Million Tons/Yr
- CO₂ utilization in CCU technologies: ~50 Million Tons/Yr
- CCS will be compulsion – if Net Zero is to be achieved

Project-1:

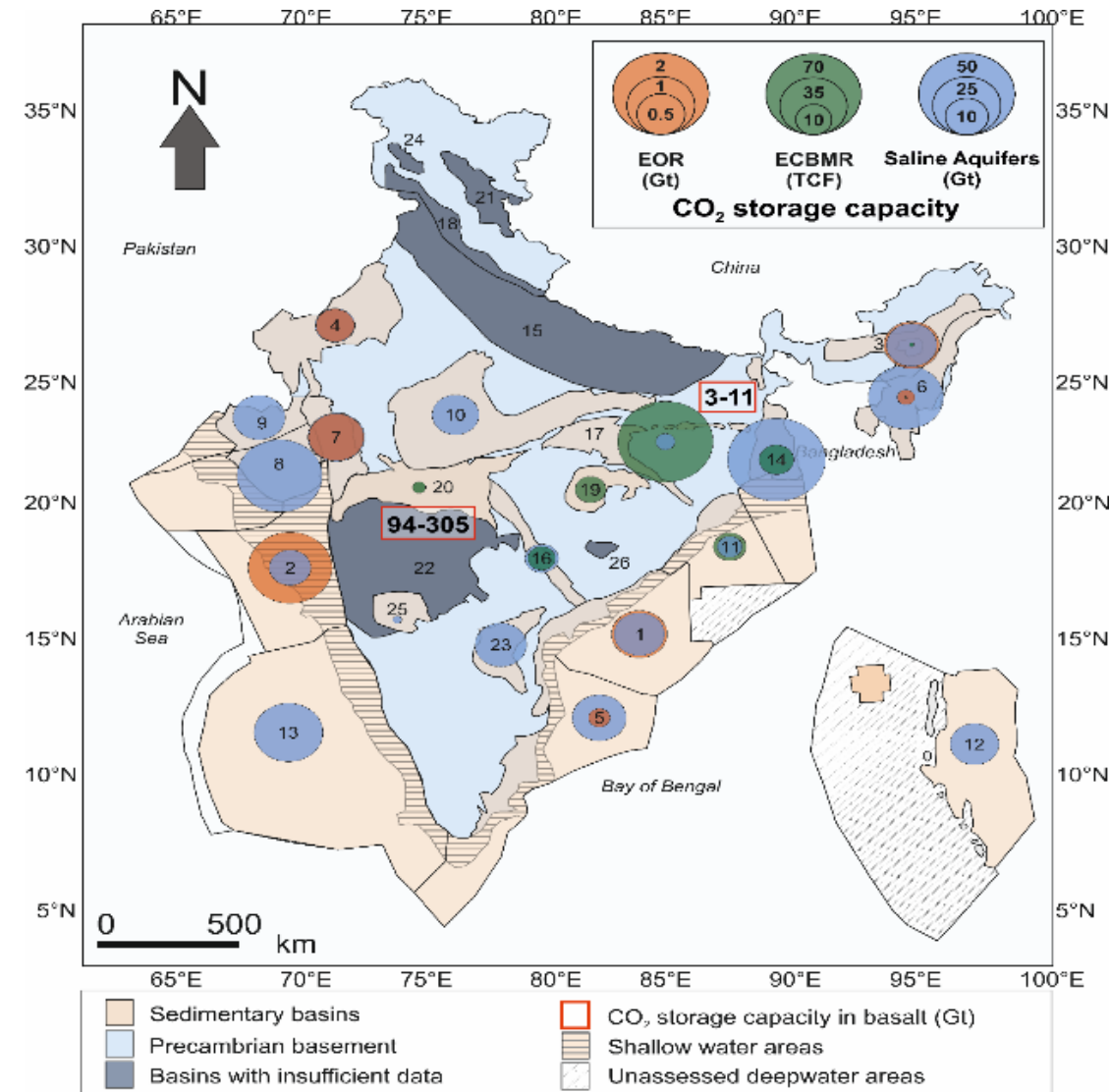
CO₂ Storage potential in 'Unusable Cat-1 Coal Seam' of NTPC

- First project of its kind, globally
- Collaborative Project with IIT Bombay
- Completed in Jan'24

Project-2:

Drilling of 'CO₂ Injection Bore' and detailed Geological Studies

- CO₂ Bore-1 & 2: drilled ~ 1087 meters



Country's First CO2 Injection Borewell at Pakri Barwadih- Jharkhand.

Supported by NITI Aayog and based on IIT-Bombay and NETRA R&D Wing of NTPC studies, the site was identified for its high CO2 storage potential (4.3–15.5 million tons).

Two 1200-meter-deep borewell drilled

Lab Analysis:

- Core analysis

- Adsorption Isotherm

- Permeability Studies

Simulations:

- Dual Porosity Model: Fractured coal system

- Geo-Mechanical Coupling: Coal & permeability

- Injection Protocol

Actual Injection & Monitoring



NETRA's Initiatives

Green Hydrogen



GREEN HYDROGEN – NTPC R&D EFFORTS

- Endeavour is to establish both routes to produce 'Green Hydrogen' i.e. (i) Electrolysis route and (ii) Gasification & Reformation route,
- Intent is to design and setup fully automated 'Demonstration Plants'

H2 Generation
Biomass Gasification &
Reformation

1. Plasma Gasification based Hydrogen Plant

Legend

Commissioned

Under Execution

H2 Generation
Electrolysis based

2. Hydrogen from STP – EDR Route

3. Hydrogen from Sea Water – Flue Gas DeSal Route



Plasma Gasification based Green Hydrogen (330 TPA) Plant at NETRA

Project Brief:

This plant shall be a unique plant, globally - where plasma assisted 'oxy gasification' of MSW-RDF / Agri-waste shall be carried out to produce 'very high quality syn-gas' – from which high purity hydrogen (> 99.9%) shall be separated using a novel configuration of 'gas membrane' and 'pressure swing adsorption'.

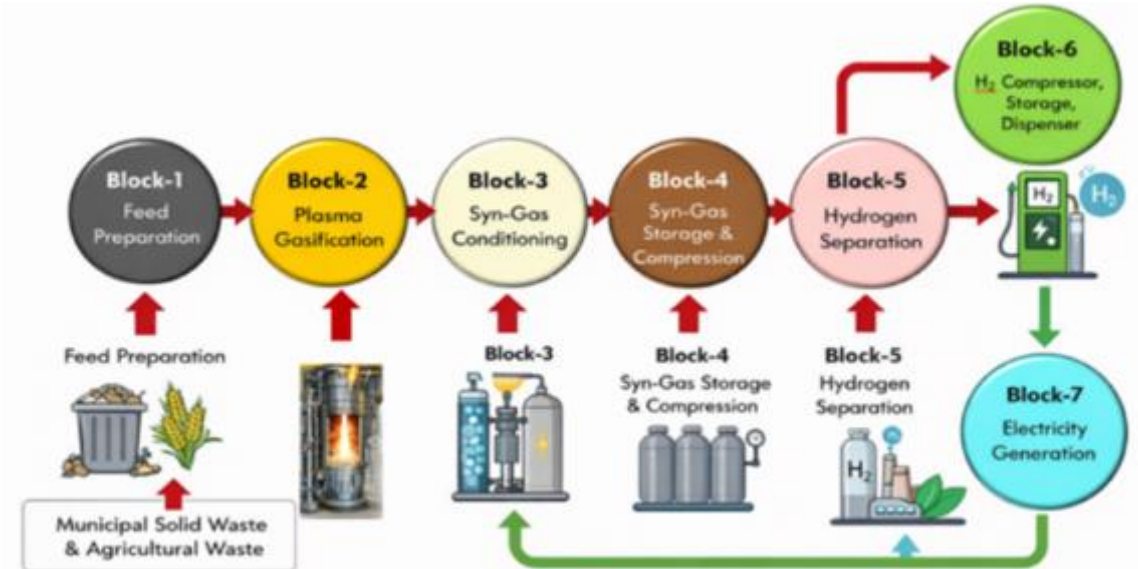
Technology: Plasma assisted 'oxy gasification

Salient Strength:

- **Low Electricity Consumption:** ~70% less electricity consumption compared to electrolysis (Plant: ~17 kWh/Kg H₂, Electrolyzer: ~55 kWh/Kg H₂).
- **Highest Value Quotient for MSW-RDF / Agri-waste:** (i) Fuel (torrefied, non-torrefied, charcoal), (ii) Biogas / Bio-CNG, (iii) Liquid Fuel (Gen-2 & Gen-4 Ethanol), (iv) **Hydrogen.**
- **Cleanest Gasification Technology:** Operates at very high temperature (>4000C), eliminates any possibility of emission of dioxin, furan, tar etc

Building Blocks:

- (i) **Plasma based Oxy-gasification:** 25 TPD,
- (ii) **Syn-gas cleanup,**
- (iii) **Membrane based Hydrogen separation:** ~ 1,200 Kg/Hr,
- (iv) **Residual Syn Gas based Power Generation:** 400 kWe

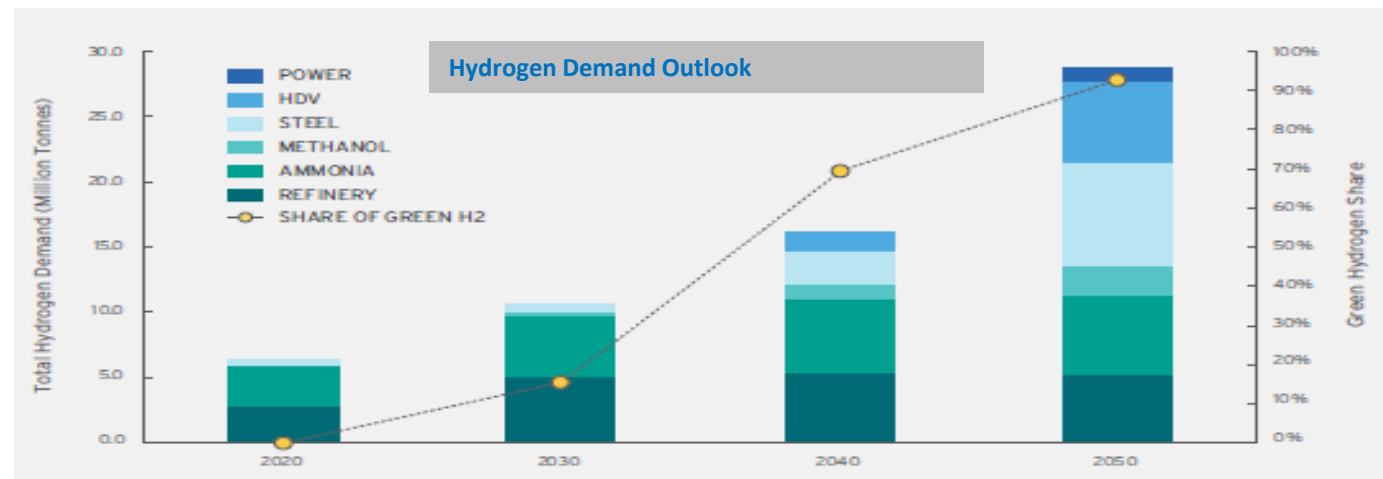


Under Execution (Completion expected in Q2 FY27-28)

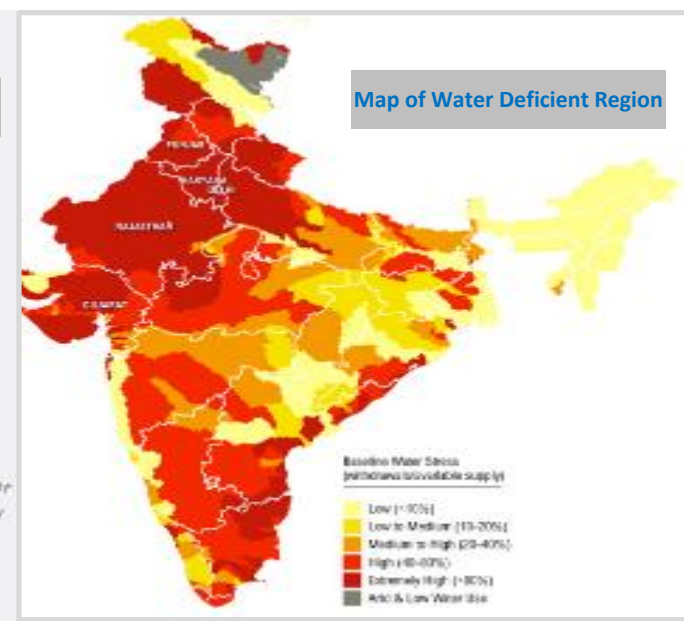
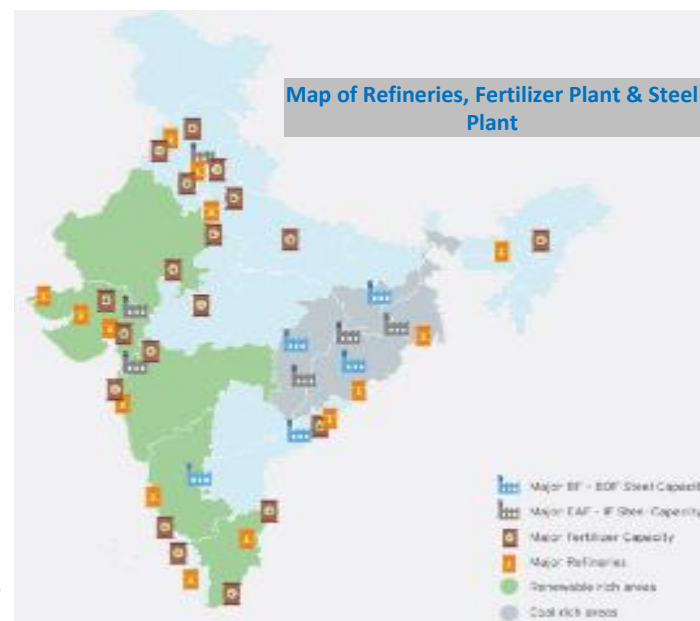
Green Hydrogen from Low Grade water

Broad Perspective:

- Present H₂ demand is **~6 Million MT/Yr** (Fertilizer: 50%, Refinery: 46%, Steel: 4%)
- By 2030, H₂ demand is expected to be **2X i.e ~11 Million MT/Yr** (Fertilizer: 44%, Refinery: 48%, Steel: 5.5%, Methanol: 2.5%)
- **~10X** quantity of DM Water is required to produce H₂. **~110 Billion Liters/Yr** of DM Water shall be required in 2030 – which shall progressively increase in future
- India is water deficient country. Coincidentally, majority of the refinery, fertilizer & steel plants are located in the water deficient zones,
- Hence, focus is to develop & demonstrate technologies – wherein **H₂ can be produced from 'Low Grade Water'**
- Technological solution is required for both **Coastal & Terrestrial region.**



Source: MoS, MoC&F, MoPNG, IEA, TERI, BCG, World Bank, RMI Analysis



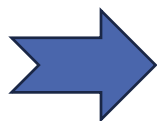
Source: PPAC, NITI Aayog, CEFV

Source: World Resource Institute

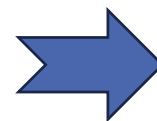
Green Hydrogen from Low Grade water

NTPC R&D Initiative

Technology-1
H₂ generation from Sea Water
thru Flue Gas Desalination



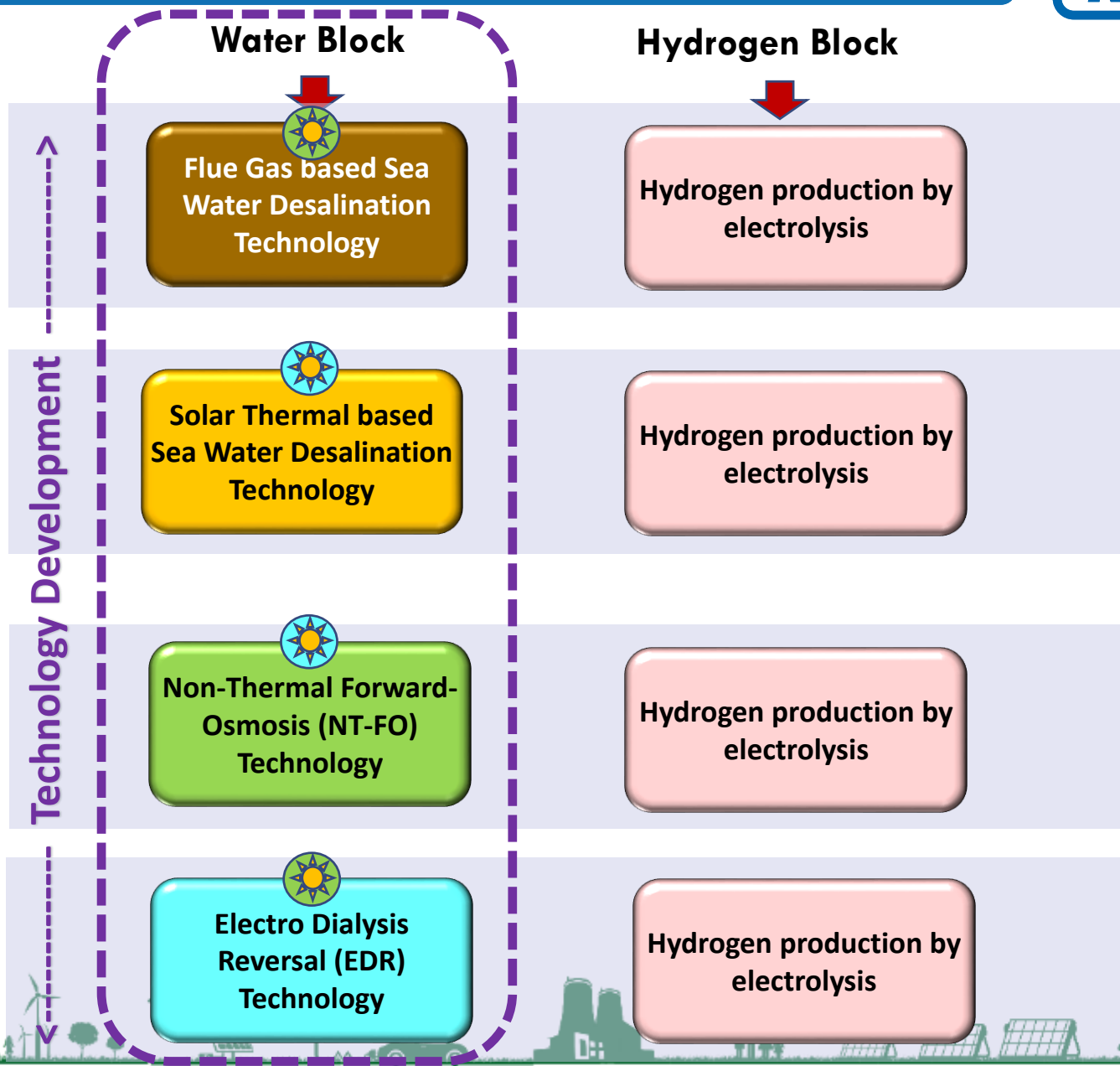
Technology-2
H₂ generation from Sea Water
thru Solar Thermal Desalination



Technology-3
H₂ generation from STP Water
thru NT-FO Technology



Technology-4
H₂ generation from STP Water
thru EDR Technology



Green Hydrogen from STP Water – Electro Dialysis Reversal

Water Technology for 'Terrestrial Region'

STP Water to 'High Grade' Water – Electro Dialysis Reversal (EDR)

Salient Strength:

- **High Yield:** High water recovery (>80%) compared to Industrial RO (~60%),
- **Low Electricity Consumption:** Low power consumption (~2 KWH/M3) compared to RO (~7 kwh/M3),
- **Higher Life:** Membrane Life (~10 Years) compared to RO (~4 Years),
- **Low Water Pre-Treatment:** Minimal water pre-treatment requirement compared to RO.



150 Kg/Day 'Green H2' Plant at Netra, NTPC
Commissioned (March'24)

Electro Dialysis Reversal (EDR) Technology
24 TPD Plant at Netra, NTPC (Commissioned)



**240 TPD Plant Non-Thermal Forward Osmosis based Water Purification Plant at NTPC Mauda
Suited for Water having Calcium, Magnesium Hardness
Under Operation**



Green Hydrogen from Sea Water - Flue Gas based Sea Water Desalination

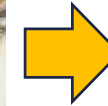


Water Technology for 'Coastal Region'

Flue Gas based Sea Water Desalination

Salient Strength:

- **Waste flue gas as primary energy source:** ~360 kJ/Kg of 'Thermal Energy' is needed in MED plant – which is tapped from waste flue gas
- **Minimal chemical consumption:** FG-MED operating temperature (650C) is below the solubility temperature of carbonates (700C) and sulphates (670C).
- **No dependency on 'Sweet Water':** DM water produced directly from sea water – independent of availability and cost of sweet water.
- **Stable cost of water:** Bulk of the cost is Capital Cost which is incurred upfront - therefore stable cost of water through out its life period.



Flue gas based Sea Water Desalination - Multi Effect Distillation Technology

120 TPD Plant at NTPC Simhadri
(Commissioned)



1000 Kg/Day 'Green H2' Plant at NTPC Simhadri
Commissioned (Nov'25)



**Using Waste Flue Gas from Coal Based Plant
120 TPD Desalination Plant at NTPC Simhadri
Under Operation**



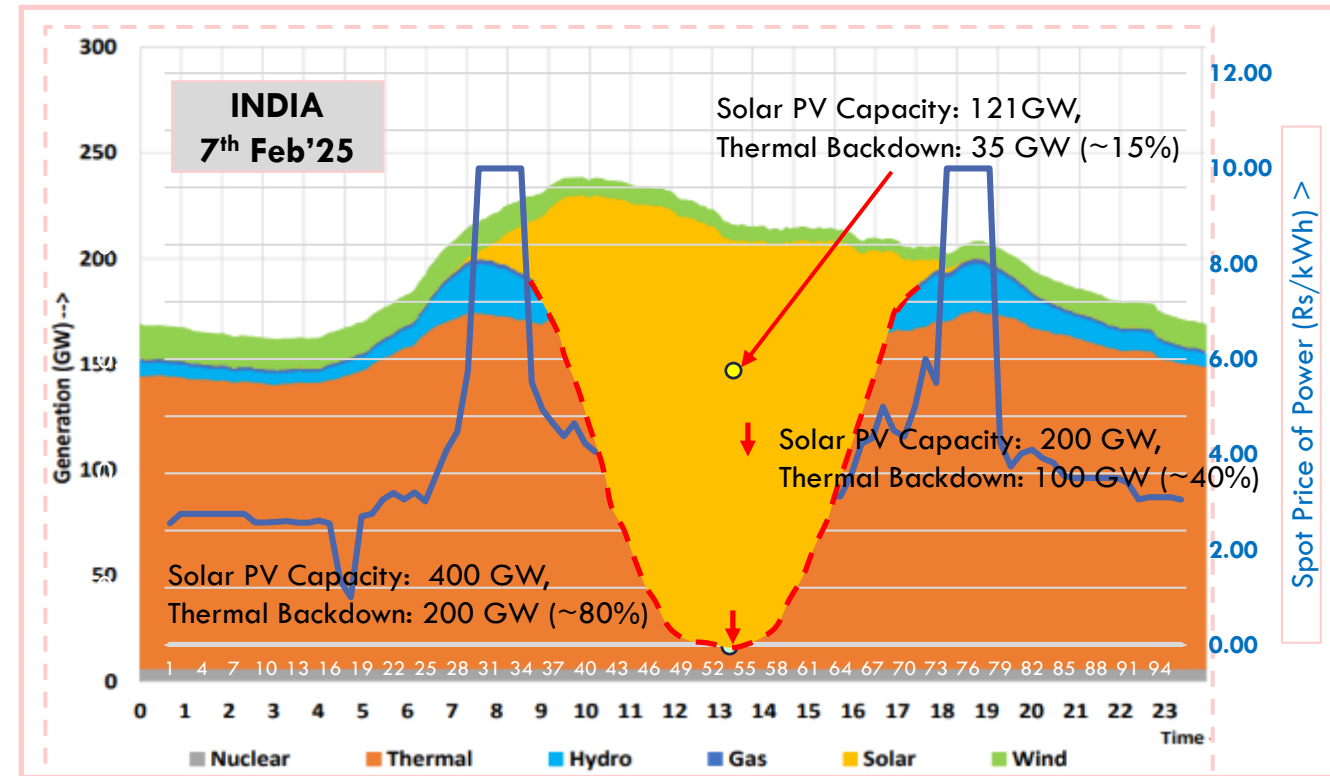
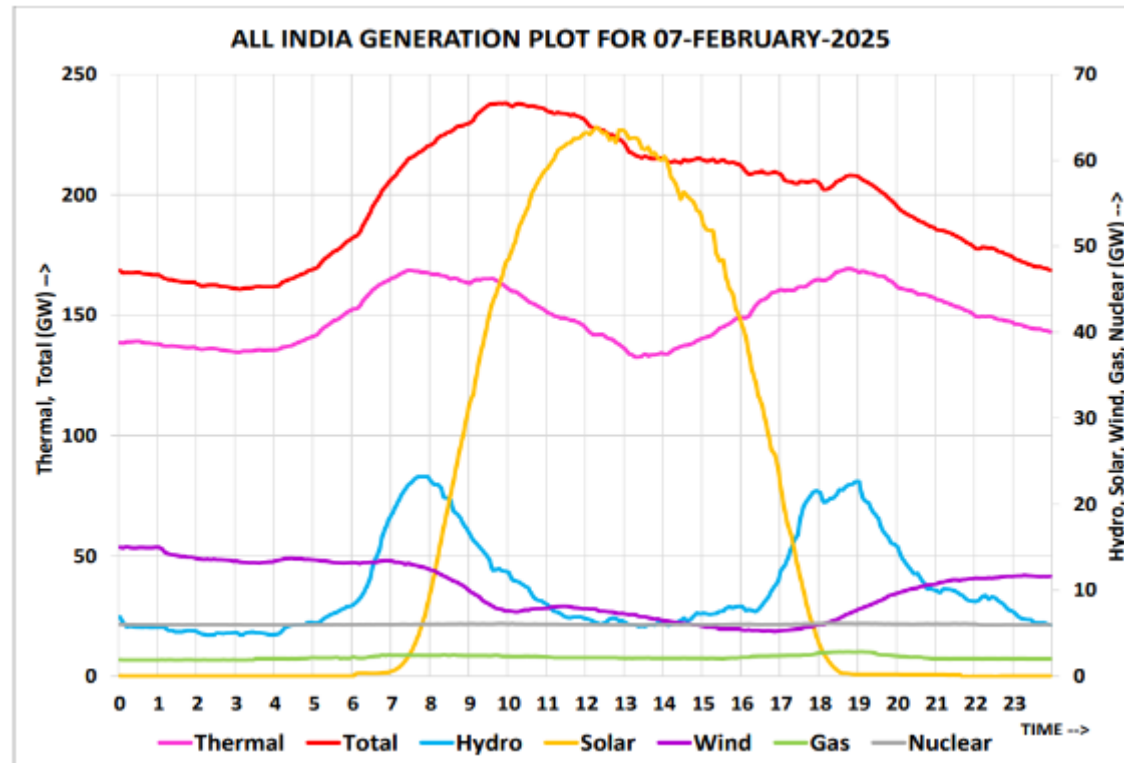
**Using Solar Thermal for Desalination Plant at
NTPC Vallur
Under Operation**



Long Duration Energy Storage

Electro-Chemical & Electro-Mechanical

Energy Storage: The Big Picture

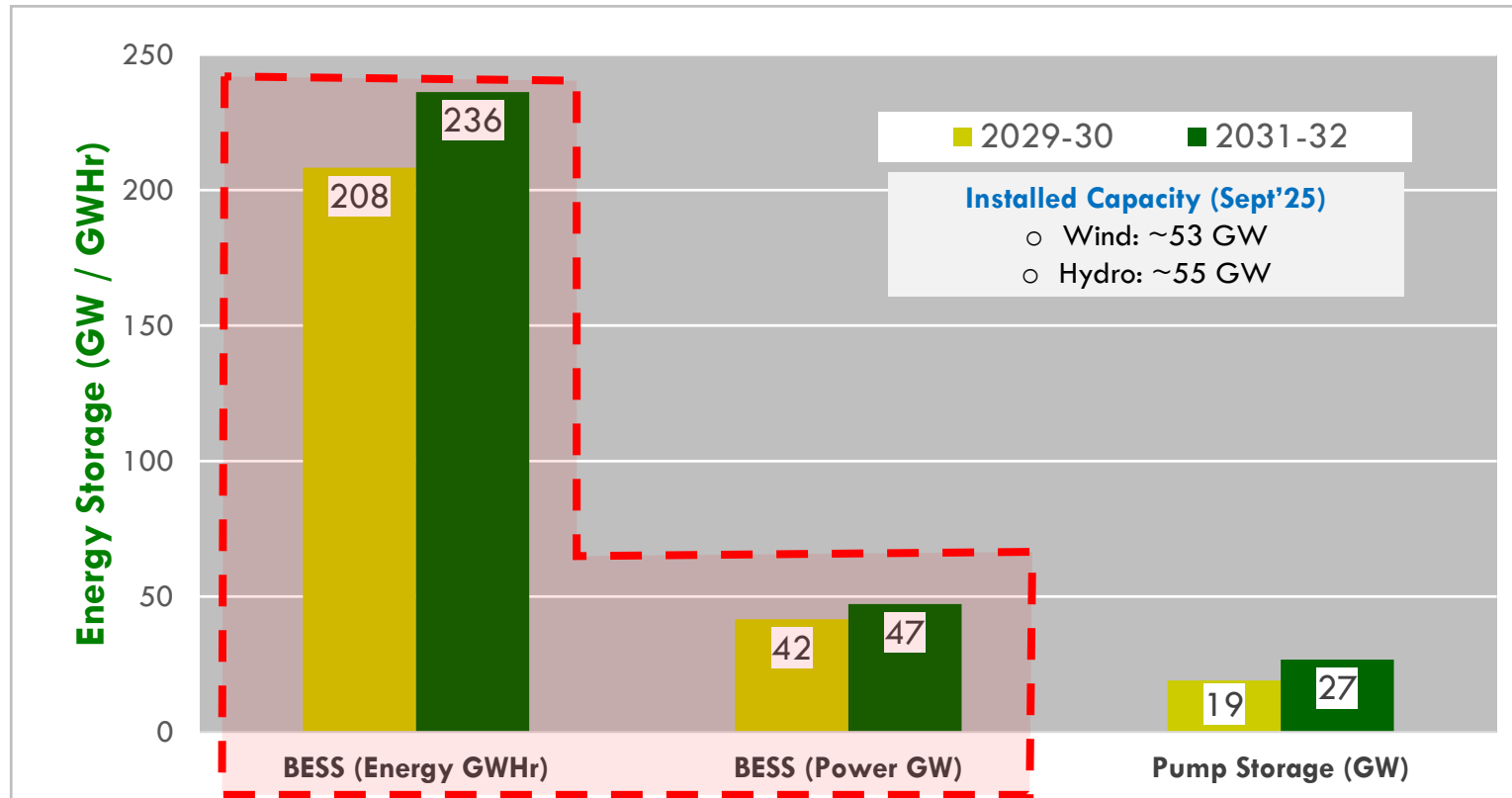


Key Takeaway

'Energy Storage' shall be critical to sustain 'Renewables' – both for 'Peak Hour Power' & RTC Power

Energy Storage can also find application in Fossil Fired Power Plant – Operation below 'Technical Minimum'

Energy Storage: The Big Picture



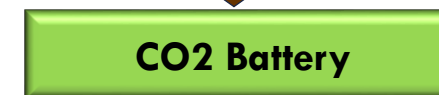
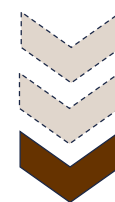
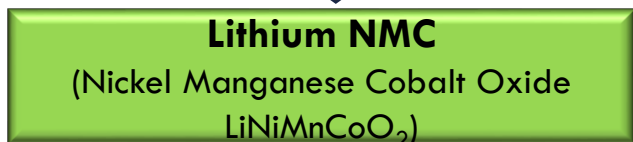
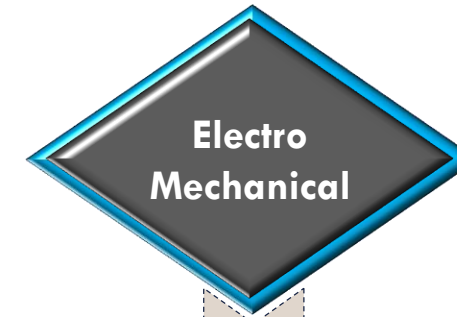
Source: CEA, 20th Electric Power Survey

Key Issues: (i) Critical Mineral dependence (Li); (ii) Less Life (8-15 Yrs); (iii) Low DVA (Domestic Value Addition)



Electrical Battery

(Electrical Energy Storage)



Thermal Battery (Thermal Energy Storage)



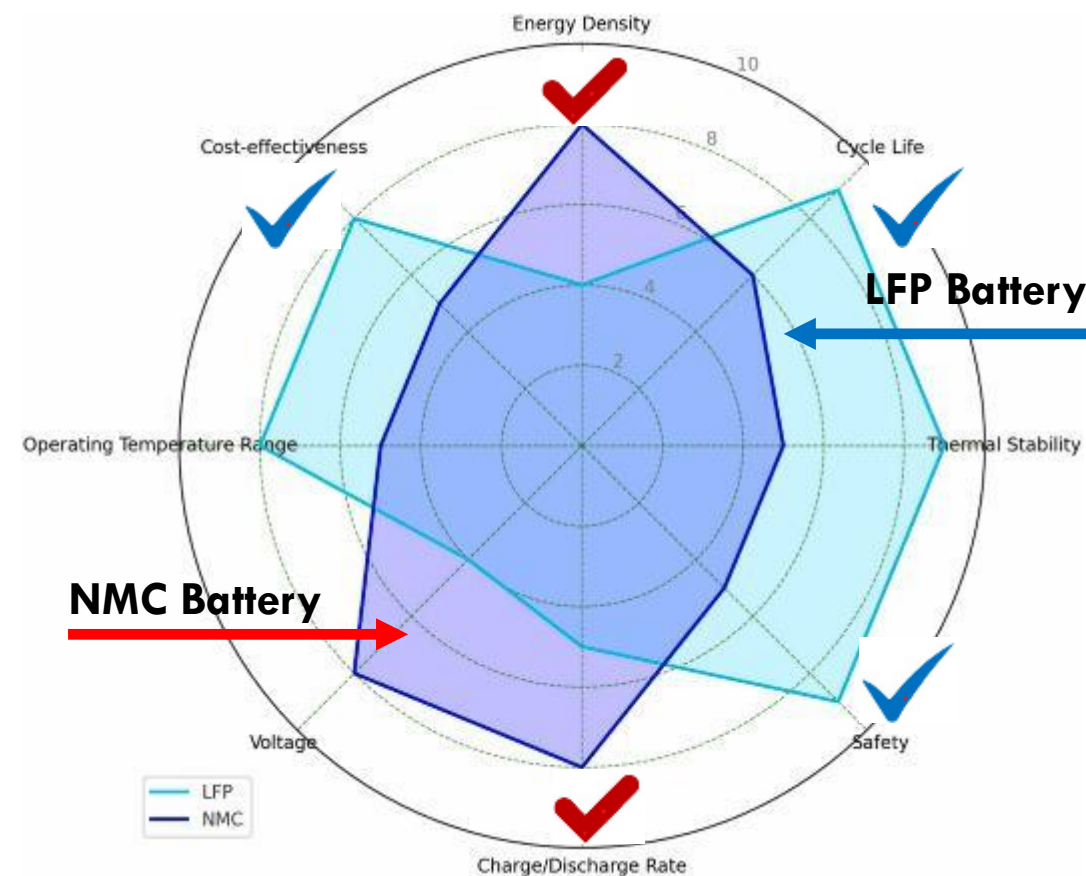
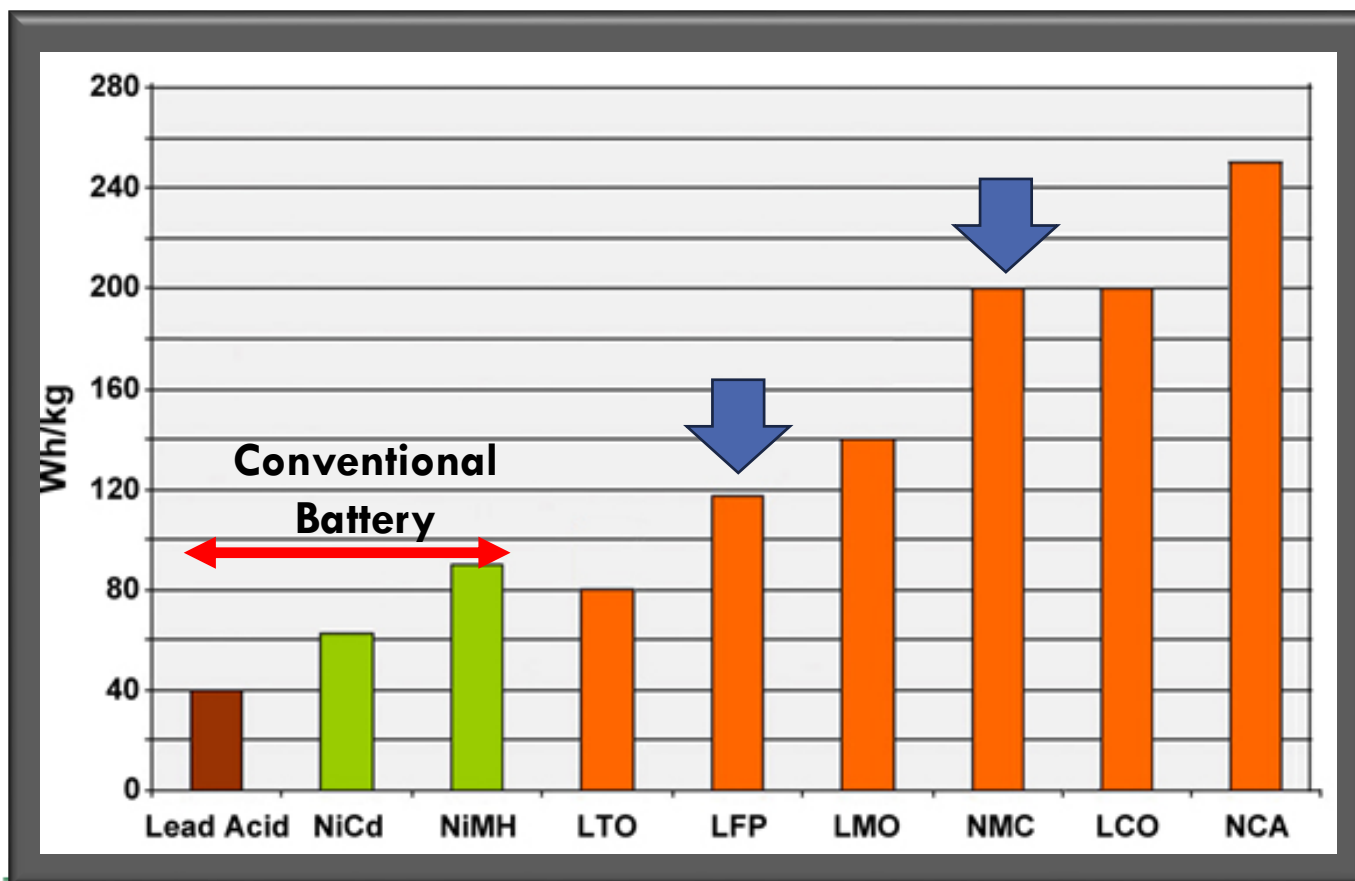
Present / Upcoming Batteries



Future / Limited Availability Batteries

Electrical Battery

(Electrical Energy Storage)



Energy Storage: The Big Picture

Undertaken by NETRA

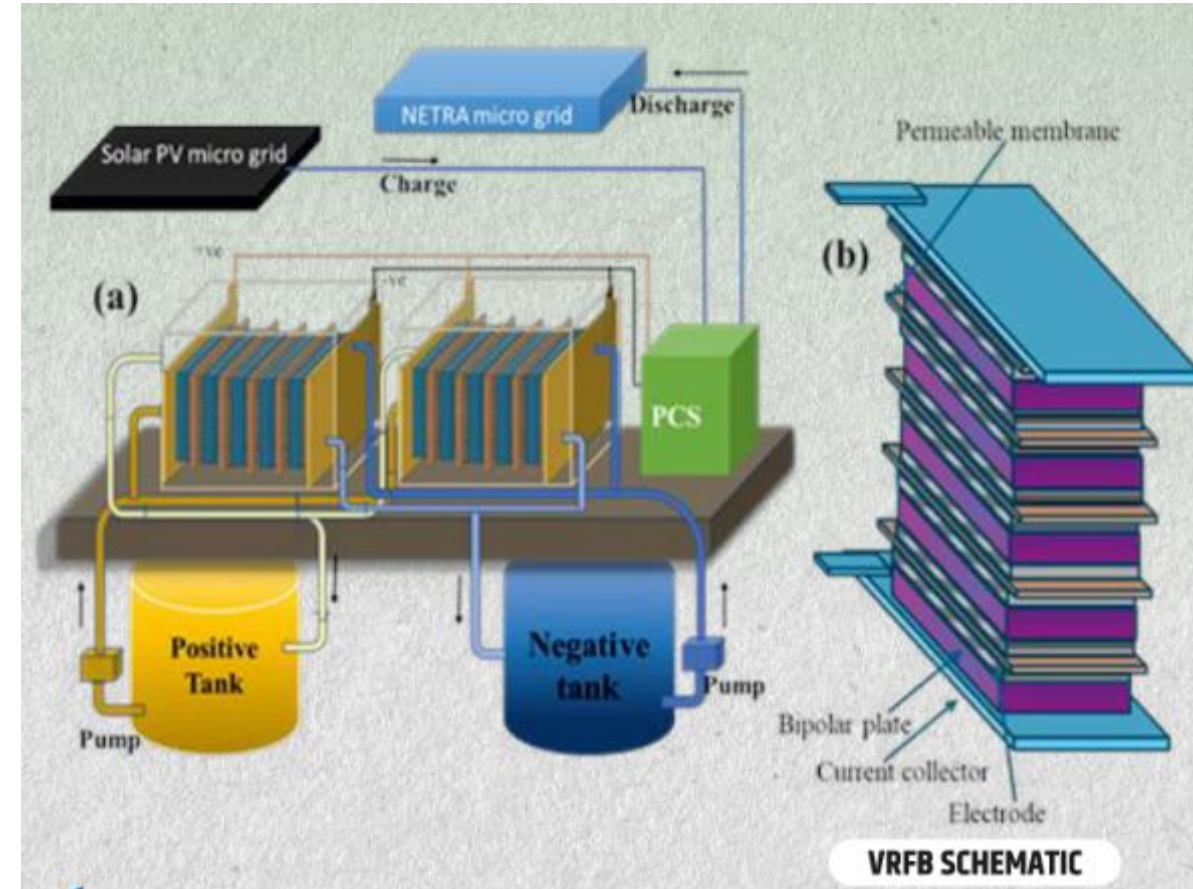
	Li-NMC / LFP Battery	Vanadium Flow Battery	CO2 Battery
No Critical Mineral	No (Lithium)	Yes	Yes
Long Life (>25 Yrs)	5-8 / 8-12 Years	> 25 Years	> 25 Years
Domestic Manufacturing	Yes (Variable DVA)	Yes (100%)	Yes (except CO2 Comp)
Topography Agnostic	Yes	Yes	Yes
'Zero' Capacity Degradation	No (4-6% / 2-4%)	Yes (0%)	Yes (0%)
High RTE (Round Trip Efficiency)	Yes (85%)	Moderate (75%)	Moderate (75%)
100% DoD (Depth of Discharge)	No (70-80% / 80-90%)	Yes (100%)	Yes (100%)
Low Cost	Yes	Yes	Yes

A. Salient Strength:

- i. **De-coupling of 'Power' & 'Energy':** Independence in Scaleup,
- ii. **Long Lifetime:** >20,000 cycles),
- iii. **High Depth of Discharge (DoD):** ~95% DoD, unlike ~80% in BESS.
- iv. **Low Fire / Explosion Risk:** Significantly less compared to Li-ion,
- v. **Recyclability:** Significantly more compared to Li-ion,

B. Technology:

- I. **Electrolyte:** Vanadium in different oxidation states (V^{2+} , V^{3+} , VO^{2+} , VO_2^{+})
- II. **Membrane** Perfluorosulfonic acid (PFSA)



**3 MWhr / 600 KW Vanadium RedOx Flow
Battery at NETRA
Commissioned in Oct'25**

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Netra1



**3 MWhr / 600 KW Vanadium RedOx Flow
Battery at NETRA
Commissioned in Oct'25**

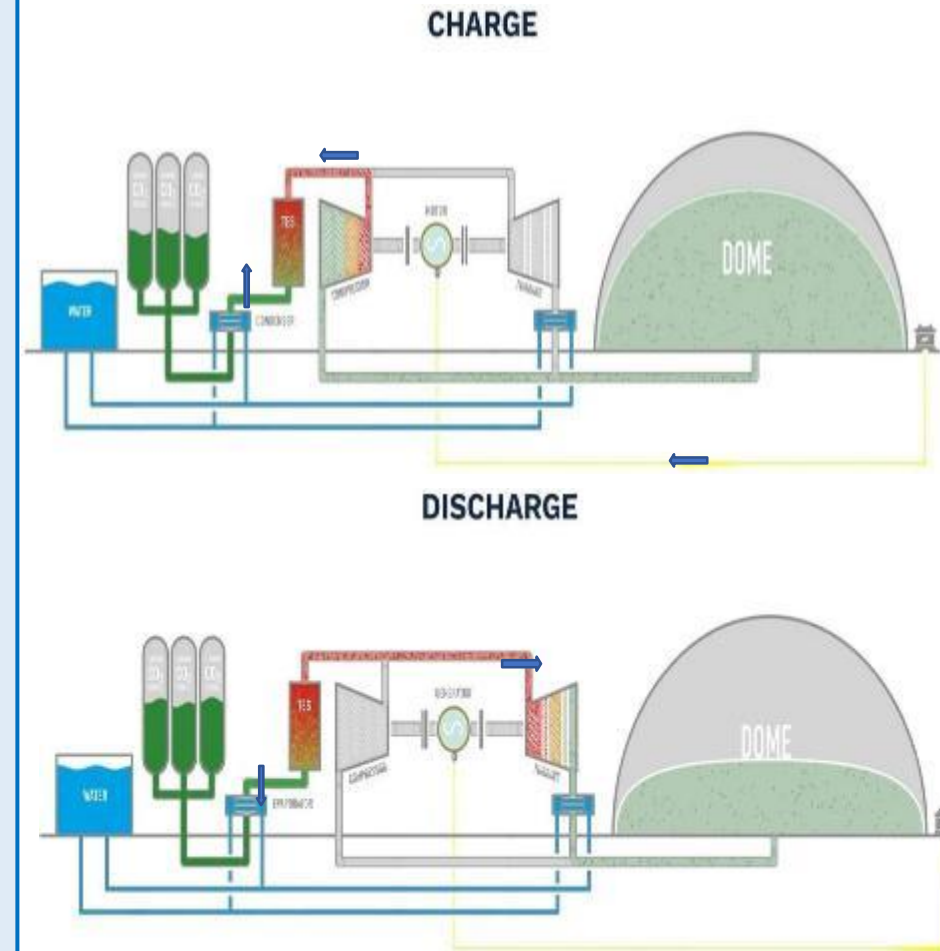
A. Salient Strength:

‘CO₂ based Closed Brayton Cycle Energy Storage (CO₂-CBC-ES) System’ is a novel ‘**Long Duration & Large Scale**’ ‘**Electrical Energy Storage**’ which has multiple strength:

- i. **Long Lifetime:** >25 year (BESS is 3000-6000 cycles),
- ii. **Sustainable & Indigenous Materials:** No critical minerals viz Lithium, Cobalt,
- iii. **Topography Agnostic Technology:** Unlike PSP, it can be installed anywhere,
- iv. **Multi MW & Modular Technology,**
- v. **Low Performance Degradation:** Minimal, unlike BESS where intricate electrochemistry is involved,
- vi. **Reduced Carbon Footprint:** Much less than BESS (due energy intensive mining & manufacturing),
- vii. **High Depth of Discharge (DoD):** 100% DoD, unlike ~80% in BESS.

B. Technology:

- I. **Thermodynamic Cycle:** Closed Brayton Cycle ,
- II. **Process Fluid:** Anhydrous CO₂ (alternately in gaseous and liquid phase),
- III. **Functioning:** Manipulating ‘physical parameters’ of CO₂ – in ‘charging’ and ‘discharging’ mode.



160 MWhr / 20 MW CO₂ Battery at NTPC Kudgi
Under Execution
(Completion expected in Q3 FY26-27)





ENERGY DOME, SARDINIA 20 MW/200 MW hr CO₂ ENERGY STORAGE

NTPC KUDGI

NETRA's Initiatives

Ash Technology



Fly Ash Based FALG Aggregate Plant (30,000 m³/Yr) at Korba

Project Brief:

The technology is modified FALG (Fly Ash - Lime - Gypsum) process, wherein Fly ash is cold bonded using lime to produce angular shaped aggregates. NETRA has also been granted based on technology (Patent application no. 457555, 2023).

Technology:

- Fly ash content 88% & 12% lime as a binder
- Technology involves mixing of fly ash in an optimum ratio followed by compaction, autoclave (12 Bar) & crushing
- Fulfill the required specifications parameter of MoRTH for road aggregates and specifications of IS 9142: Part-II & IS 383 for structural concrete aggregates
- Patent no: 457555 granted 09.10.2023

Salient Strength

- Bulk fly ash utilisation
- High Value Building Material- Aggregate
- Conservation of natural resource



Completed in May'26



NETRA's Initiatives

Solar Technologies

Enable innovative RE generation technology
Optimization of Land use
Integrating Solar to Thermal Plant





100 MW Floating Solar PV at NTPC Ramagundam
Effective Use of Large water bodies for RE Generation





2 MW Wind + 1.37 MW Solar PV Plant
Optimization use of land for RE
NTPC Kudgi
Under operation



Solar Thermal Hybrid Plant
3.578 MU Solar Thermal Plant
Integrated to 210 MW Coal based Plant
Under Operation



Advanced Scientific Services

**Provide Enabling Scientific Services to Power Plants
Improve Reliability and Availability of Assets**





Creep & Fatigue Lab



Creep Lab





NDE Imaging & Life Management



Transformer Oil Testing





Corrosion Research Lab



Resin Testing Lab



Thank You

