

Distribution Reforms and Energy Transition – Changing Paradigms

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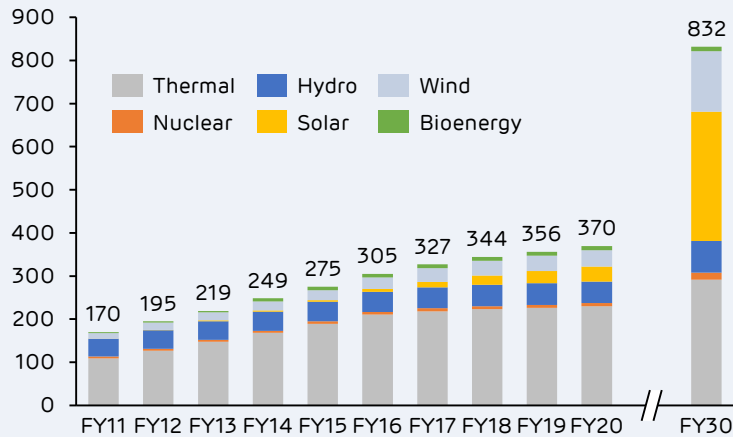
MD – Adani Power

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Distribution Reforms and Changing Paradigms

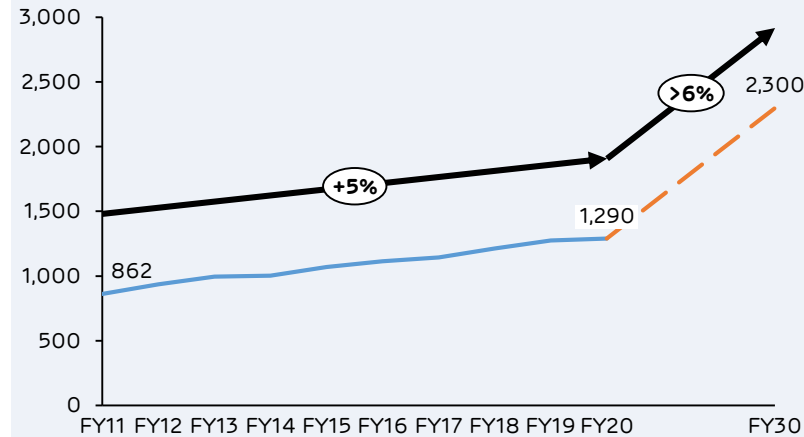
India's power sector has seen major developments in last few years

Total Installed Capacity (in GW)



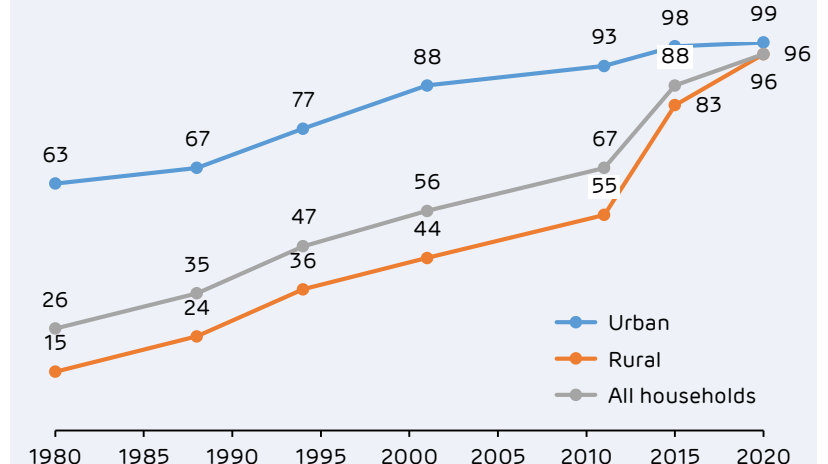
- Installed Capacity has doubled over last 10 years and has positioned India among top 3 global power producers
- With ambitious targets set, the capacity is expected to further grow 2.3x in next decade, largely led by renewables

Overall Electricity demand (in TWh)



- Electricity demand has historically shown positive correlation with GDP growth and has been growing at over 5% in last decade. However, our per capita consumption is still ~1200 much below global average
- Over the next few years, demand to grow at a CAGR of 6-7% primarily led by Manufacturing and Residential segments

India's household electricity access (in %)

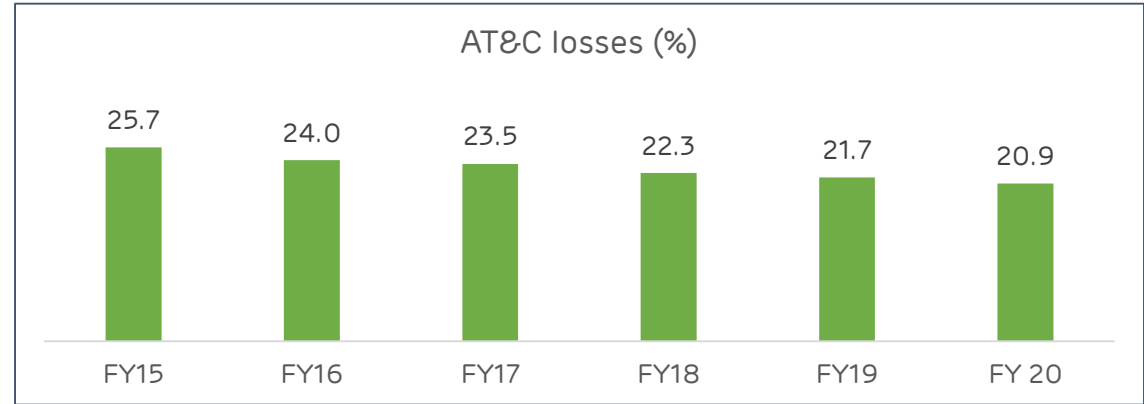
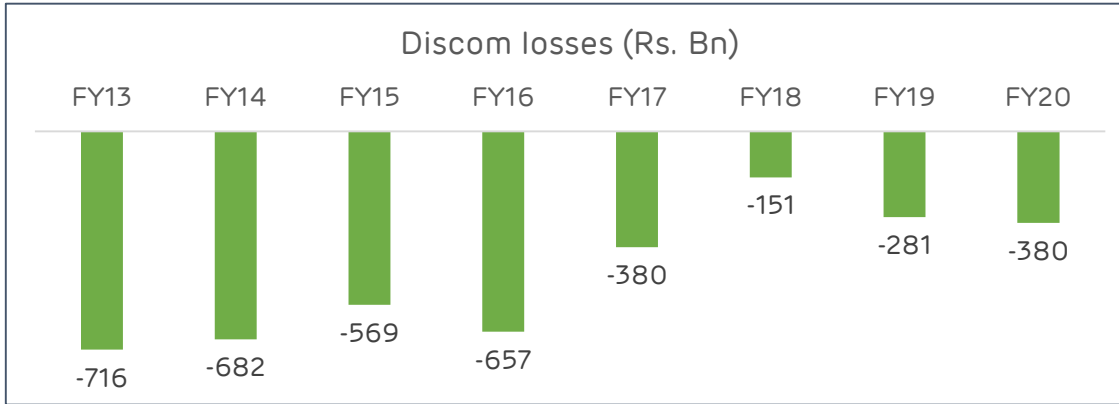


- Almost every household now has access to grid electricity with aggressive pursuit of rural electrification
- The transmission grid has been unified into a "national grid" which has helped improve transmission, increase availability & facilitate better management of electricity demand

However, Distribution sector continues to be hit with huge Fiscal losses, Payables & Debt; with Covid & recent Power crisis fueling further deterioration

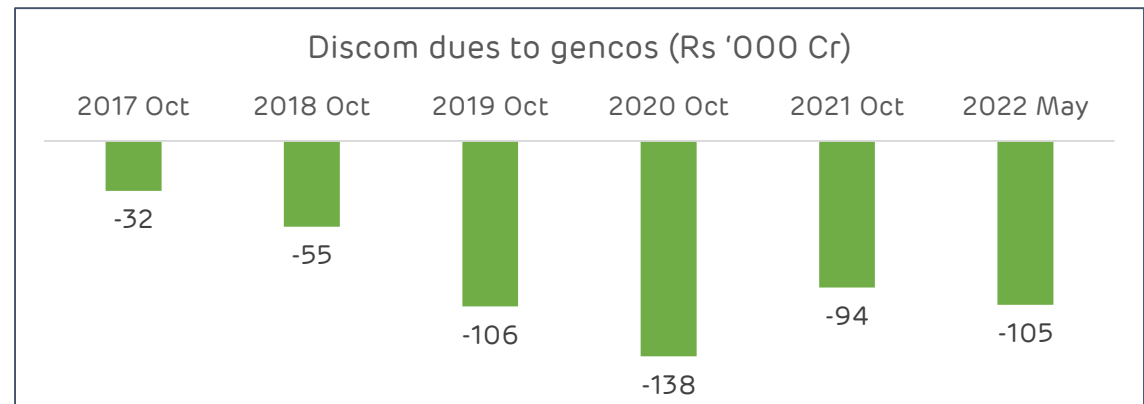
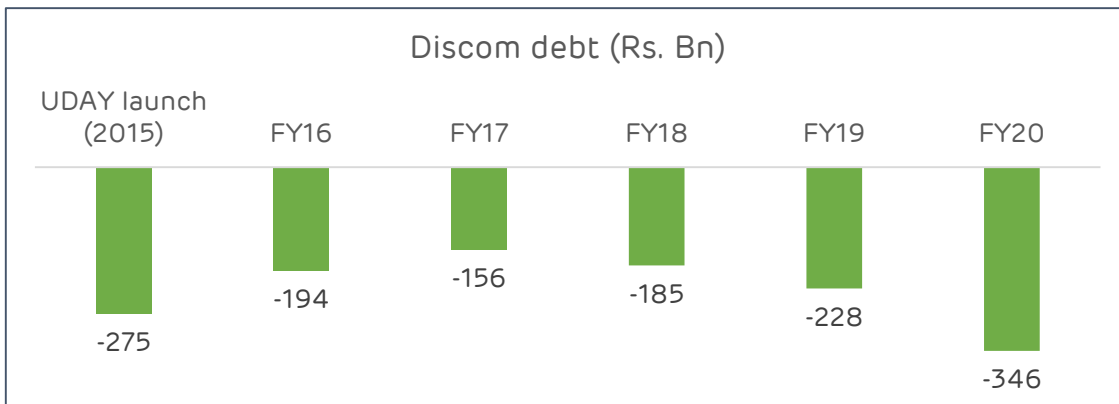
Debt restructuring under UDAY improved the balance sheet but the relief was temporary as losses are growing again

AT&C losses have reduced but still significantly above Govt targets



While discoms enjoyed the reduction in debt burden, structural reforms have been slow to come which is increasing the debt levels again to pre-UDAY levels. This may undo the attempt to clean the balance sheets.

Reforms have had little impact on discom dues which continue to rise, further driven by Covid effect



Government has continuously pursued several reforms/initiatives for improving financial and operational efficiencies, however Discom issues haven't got resolved

	Description	Outcome
Shunglu committee report	<ul style="list-style-type: none"> ▪ Stop bankrolling of revenue gap of DISCOMS ▪ Changes to governance, Board ▪ Identified 255 towns as DF candidates 	<ul style="list-style-type: none"> ▪ Banks are once again financing unbankable DISCOMs to ensure electricity supply ▪ However only a few DF candidates have taken off
Financial Restructuring Plan	<ul style="list-style-type: none"> ▪ Discoms to issue bonds with state Gov Guarantee ▪ Debt restructuring: Rs 51K liabilities restructured 	<ul style="list-style-type: none"> ▪ 8 states that together accounted for more than 80% of losses failed
RAPDRP (Rs 65K Cr outlay)	<ul style="list-style-type: none"> ▪ Strengthening of trans. & distribution network, ▪ IT enablement of distribution Sector 	<ul style="list-style-type: none"> ▪ Investments were below the total funding ▪ Rolled out pan-India resulting in capacity crunch so it could not be well implemented (esp. IT part)
UDAY	<ul style="list-style-type: none"> ▪ Loss financing only as per trajectory finalised with MoP & only through Discom bonds backed by State ▪ Quarterly tariff revision envisaged 	<ul style="list-style-type: none"> ▪ Debt at pre-UDAY levels ▪ PB, JK, MN, GA widened ACS-ARR gap ▪ Only few states have performed well
DDUGJY (Rs 43K Cr outlay)	<ul style="list-style-type: none"> ▪ Separation of agriculture and non-agriculture feeders ▪ Strengthening of sub-transmission & distribution ▪ Rural Electrification 	<ul style="list-style-type: none"> ▪ Considerable progress in intensive electrification: has been completed in around 80% of villages ¹
Saubhagya (Rs 16K Cr outlay)	<ul style="list-style-type: none"> ▪ 100% household electrification 	<ul style="list-style-type: none"> ▪ 99.93% of households electrified with only about 0.07% remaining in Chhattisgarh ▪ But scheme increased distribution costs, losses & very low % of such households use >30 units/month

Impact of recent crises (COVID & Fuel Price) will need both Central and State absorption along with fuel pass-through arrangement & regulatory asset management for sector survival

Impact of COVID

Estimated cumulative Tariff Impact at National Level –INR 30-40 paisa per Unit*

- The lockdown due to Covid-19 has significantly reduced energy demand and overall revenue of Discom
- Considering simulation of 2-3 Discom on likely impact on ARR estimated for all India level with comparison from pre-COVID level

Impact of high bulk cost

Estimated impact 5.0% rise in the cost of supply and a 4.5% average tariff increase^

- Increased coal prices triggered Govt. to allow 4% import fuel usage
- Which will result increased levels of coal imports (from 4% to 12-13% in FY2023)
- Considering same trend of imported coal price variable cost from imported fuel ,DAM, Short term market price likely to remain above FY 21 level

Regulatory assets

Above 1 Lakh Cr Regulatory Assets*

- Estimated INR 30K-40K Cr additional regulatory assets on account of COVID
- Existing INR 66K Cr regulatory Assets (FY 19 ICRA)
- Additional Regulatory asset on account of fuel cost rise that's not passed through FAC

Global fuel crises along with disruptions triggered by Russia's war will have multiple economic impact and triggers requirement of self-reliance in energy security and achieving net zero supply will be critical

Several Distribution Reforms are already underway...

	Key Detail	Current Status
Draft Amendment to EA	<ul style="list-style-type: none"> Proposes multiple distribution licensees, with the new licensees being able to use the incumbent licensee's network. This significantly lowers the barrier to entry in the distribution sector 	<ul style="list-style-type: none"> Currently on hold due to revision after stakeholder consultation. Due for clearance from Standing committee and parliaments
Privatization	<ul style="list-style-type: none"> Odisha Privatization UT privatization 2nd License 	<ul style="list-style-type: none"> Tata started operation in Odisha Discoms Bids concluded for Chandigarh, DNH, Daman & Diu UT
RDSS Scheme	<ul style="list-style-type: none"> Revamped Distribution Sector Reforms-Base and Result-Linked Scheme Reduce AT&C of 12-15% & ACS-ARR Gap to zero by 2024-25 	<ul style="list-style-type: none"> Total outlay of INR 3 Trillion Govt approves Rs 1.62 lakh Cr proposals from 13 states
Infrastructure reforms	<ul style="list-style-type: none"> IPDS: investing funds in network infrastructure National Smart Grid Mission: address key issues of Smart Grid Initiatives Smart Meter implementation by Discoms 	<ul style="list-style-type: none"> Utilities infused capex funded from IPDS however it is not sufficient to bring down losses to desired level Many smart grid projects under implementation across four states/UT
Increased Service Delivery Expectation	<ul style="list-style-type: none"> Discom to focus on consumer centric model rather than earlier approach of infra development and power procurement management 	<ul style="list-style-type: none"> Govt, facilitating the service delivery through Electricity (Rights of Consumers) Rules, 2020

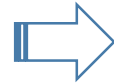
...there are other initiatives that need to also taken forward

Power purchase cost



- Stricter enforcement of RPO
- Innovative schemes like RTC to better utilize existing thermal capacity
- Implementation of national MOD to incentivize efficient generation

Technology disruptions



- EV charging infrastructure
- Innovation in rooftop solar/ smart appliances with storage
- Virtual power plant
- Mandating application of analytical tools and lower forecasting deviation
- Mandating 100% digital billing, online payment to improve billing/collection efficiency

Metering for Accounting and audit



- Metering agriculture/rural & urban feeder
- Completion of consumer indexing, GIS, DT & meter upgrades

Regulatory



- Quality in financial reporting
- Regularly revise tariffs
- Timely payment of subsidy
- Financial, operational independence with third-party monitoring

Financial health



- Utilize innovative ways to liquidate regulatory assets in a time-bound manner
- Promoting schemes to incentivize debt and interest cost reduction

Demand response



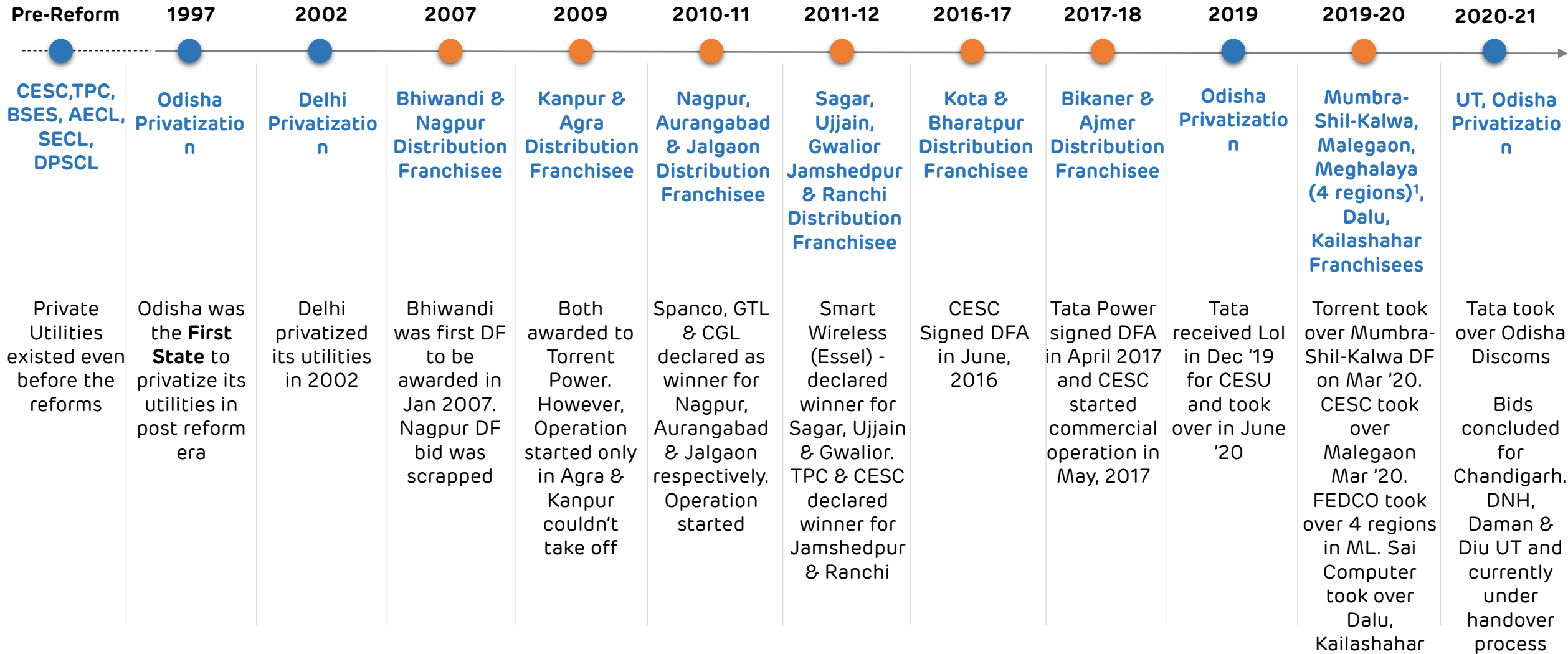
- Mandate discoms to include DR as a resource to meet their peak power deficit
- Promote financial tools to fund the growth of needed technological infrastructure

Broadly two business models emerge to be lucrative to industry players

	State				Private Player			
	Resistance from Employees & local communities	Justification for need of privatization	Political mileage for the government	OVERALL ATTRACTIVE-NESS	Risk from wrong Baseline data	Contractual Risk	Demand Risk	OVERALL ATTRACTIVE-NESS
Model 1: Subject wise Efficiency Challenge (MR, Billing, Collection)	Low	High	Medium	Low	Low	High	Medium	Low
Model 2: PPP / Privatisation	High	High	Mixed	High	High	High	Low	High
Model 3: VGF based transition support	High	High	Low	Medium	High	Low	Low	High
Model 4: Multiple Supplier Franchisee	Low	Medium	Low	Medium	Low	Low	High	Low
Model 5: Discom Turnaround Challenge	High	High	High	Medium	High	Low	Low	Medium



Private participation in the distribution sector has been very limited mainly dominated by two models - licensee model and franchisee model



Notes: 1) Mawkyrawat-Mawsynram- Nangalbibra –Phulbari

Adani Group is uniquely placed with experience of managing both large urban and small power distribution areas - AEML (Mumbai) & MUL (Mundra SEZ)

Largest Integrated utility in India's Commercial Capital -Mumbai

About Mumbai

- ~11.0% Real GDP CAGR (FY12 – 18)
- ~6.0% of India's real GDP
- 4th Most Populous City in World
- 24th Richest City in world based on GDP (US\$)

Mumbai Consumers

- 2.2x Per capita income of India
- \$ 4,630 Per capita income of Mumbai
- ~ \$ 31 Average Electricity Bill of AEML Consumer for FY21
- ~1% Average electricity bill as % of per capita income

Consumer Centricity

- CSAT survey for 12 critical processes (Supply restoration, Call Centre, Billing, etc.) to gauge & ensure high consumer satisfaction
- Advanced Metering for 7 lakh consumers in phase 1



Acquisition of MPSEZ Utilities Limited (MUL)

About MPSEZ Utilities Limited (MUL)

- Area: 8,481 hectares
- Distribution Network : 100 km
- Energy Sale : 371 Mus
- Standalone Revenue : INR 216 Cr
- Distribution Loss : 3.21%
- License Period: 11 years
- No. of consumers: 76

Growth Plan

Key customers :Railways, Adani Port, Mundra Solar, GSPC

Scalability potential: MUL's operations are expected to grow multifold with demand offtake from Mundra Industrial cluster (Copper, Coal-to PVC, etc.) and nearby areas



Servicing 12 million consumers with multi utility competition

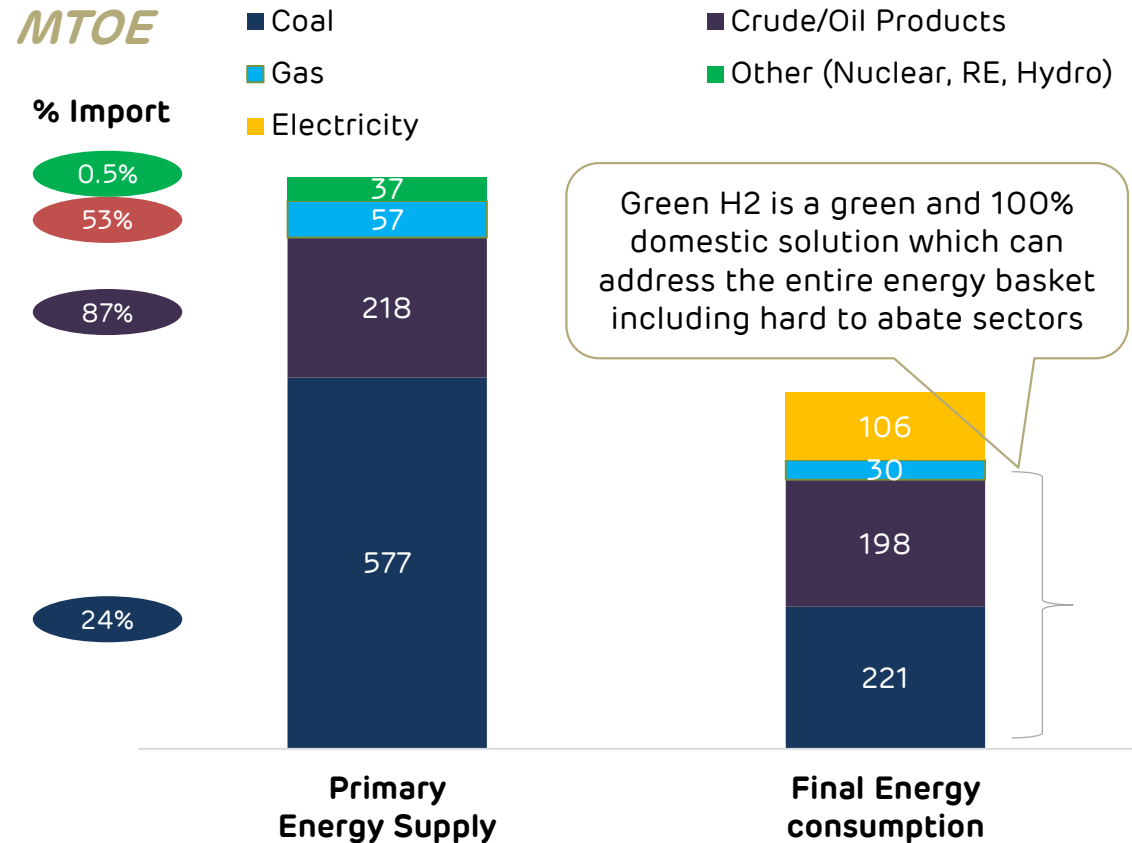
Experience of managing Industrial distribution licensee area

Notes: * - Others include BEST, MSEDCCL & Tata Power, AMI – Advanced Metering Infrastructure; BKC – Bandra Kurla Complex, MW- Mega Watt, GDP, GDP – Gross Domestic Product, PU- per unit, ABR- Average billing rate, Source – Population Of Mumbai 2020 (Demographic, Facts, etc.) – India Population 2020 , CAGR: Compound Annual Growth Rate , RAB: Regulatory Assets Base, IG : investment Grade

Energy Transition and Adani Group's Positioning

Energy Basket – India Story

Energy Security: Import dependence in energy



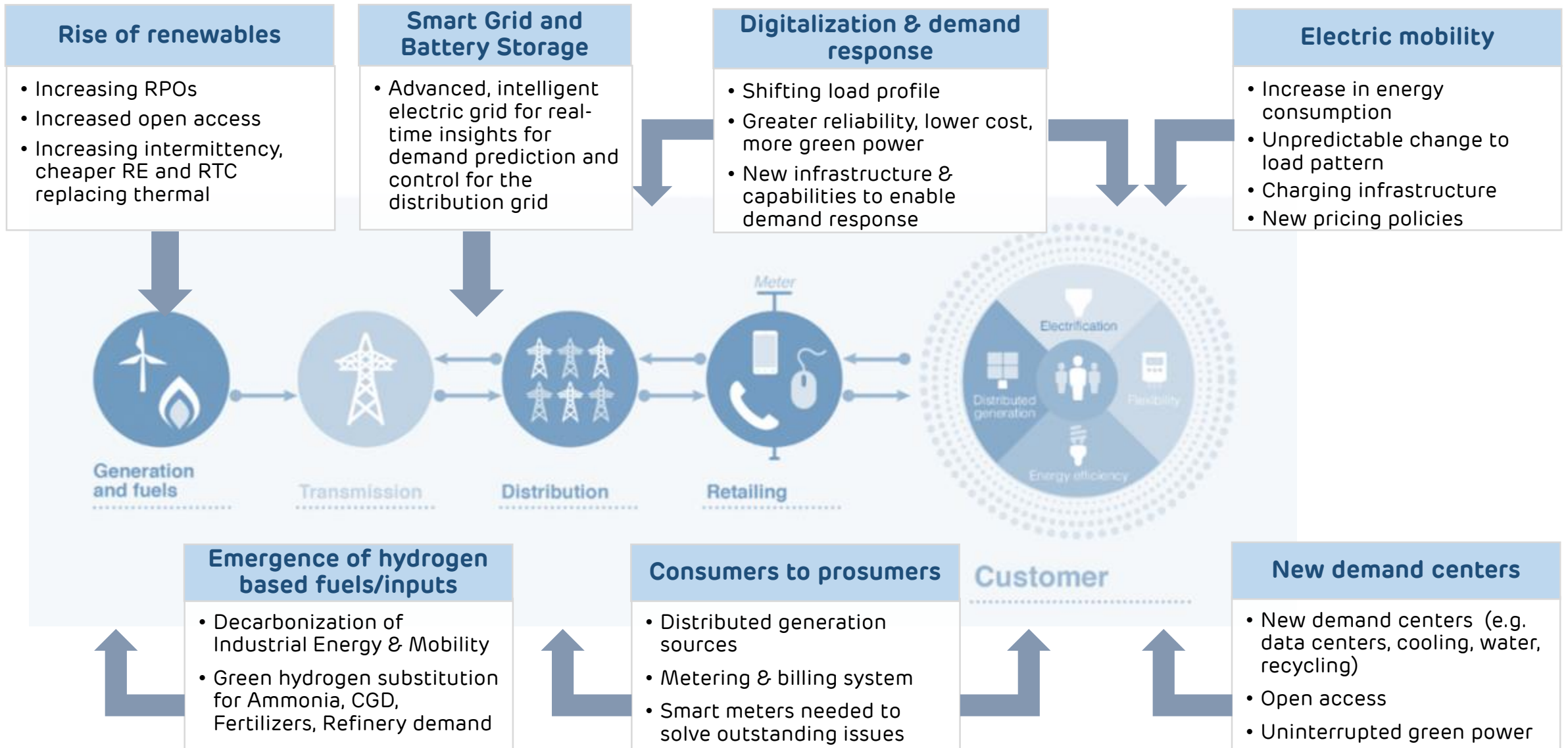
Source: MOSPI (Ministry of Statistics and Program Implementation) report on Energy Statistic – FY21 (P)

Decarbonization: “Panchamrit” strategy (COP26)

- 1 500 GW non-fossil energy capacity by 2030
- 2 50% of India's energy requirements from RE by 2030
- 3 Reduction in total projected carbon emissions by 1 Bn Tons between 2022 & 2030
- 4 Reduction in carbon intensity of the economy by 45% by 2030, over 2005 levels
- 5 Target of net zero emissions by 2070

Green H2 is central to delivering dual objectives of Energy Security and Decarbonization and can build on existing advantages of Scale and Globally competitive RE cost

The Indian Power sector is undergoing tremendous transition



Energy Transition in Charts...

Figure 1: Share of technologies in installed capacity mix in India %

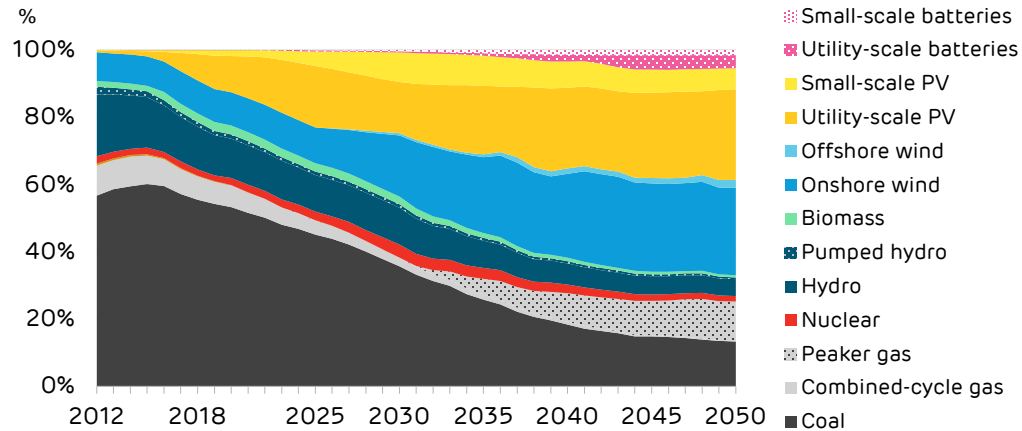


Figure 2: Electricity generation from various technologies (TWh)

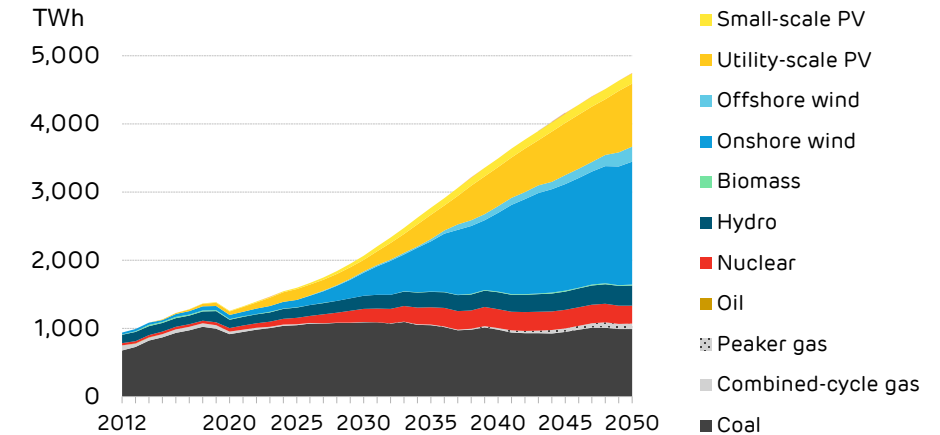


Figure 3: Electricity generation from various technologies %

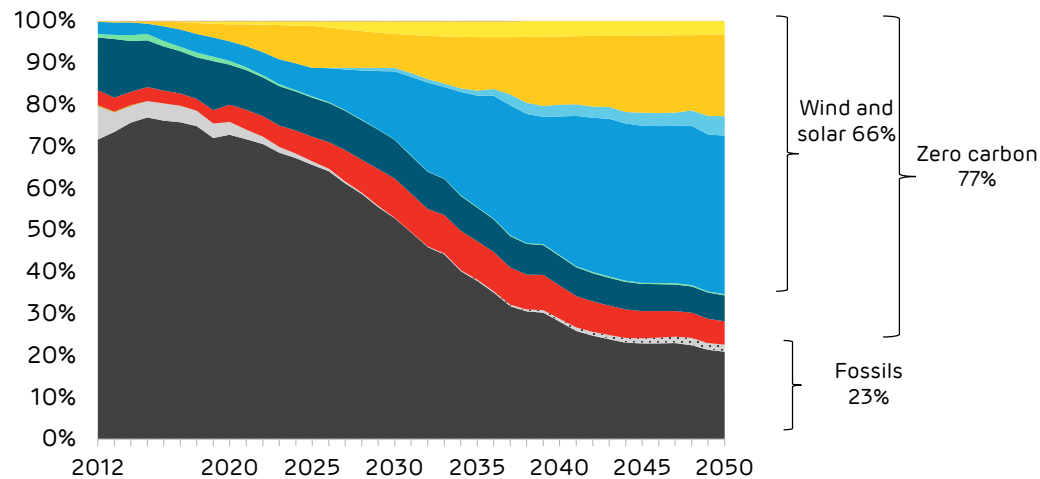
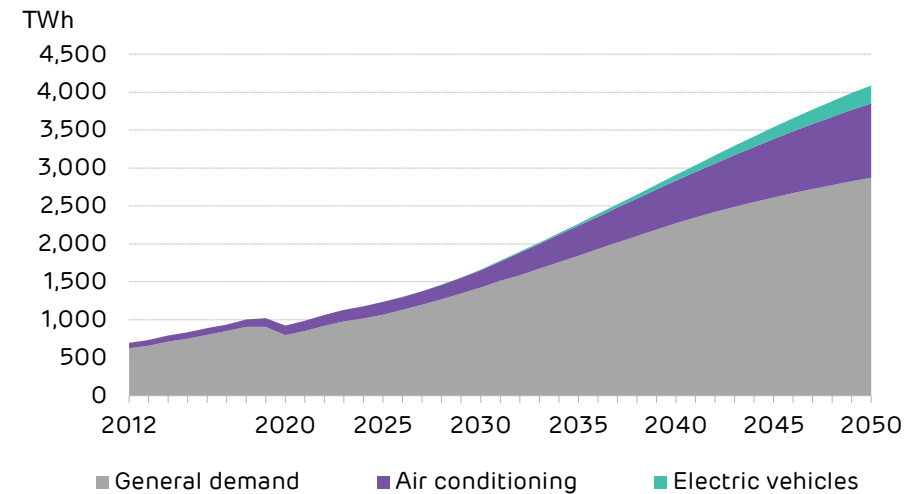
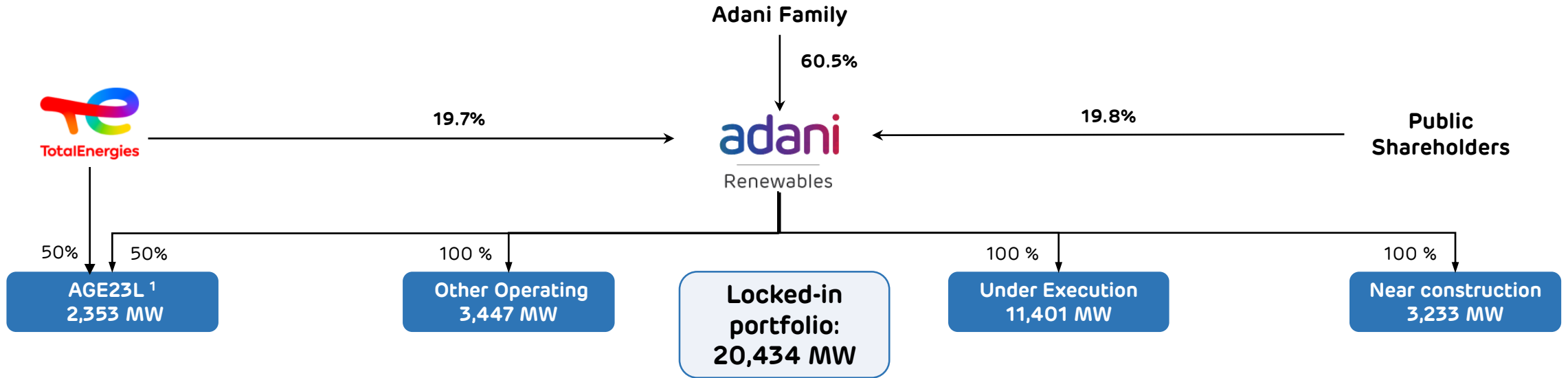


Figure 4: Final electricity demand (TWh)



Adani Green's Renewable Portfolio – A Case Study



20.4 GW

Large Renewable Portfolio

5,800 MW – Operational²
14,634 MW – Locked-in Under Execution

89%
Sovereign Counterparties

Resource and Counterparty Diversification

12 resource-rich states
18 different counterparties
89% sovereign counterparties³



Locked-in Resource

~200,000 acres of resource rich sites in strategic locations
~40 GW of sites with geotechnical, resource analysis & design work done



Fully Contracted Portfolio

100% contracted portfolio⁴
25-year fixed tariff PPAs⁴
Avg. Portfolio tariff: INR 2.99/unit⁵

Renewable capacity of 20.4 GW is fully funded and confirmed

Notes: ¹ Includes RG 1 (Restricted Group 1) and RG 2 (Restricted Group 2) SPVs, ² Declared operational capacity as of 30-Jun-2022, ³ Includes 5% sovereign equivalent rated counterparties - Gujarat Urja Vikas Nigam Limited (GUVNL) and Adani Electricity Mumbai Limited (AEML), ⁴ Excluding a small merchant solar capacity of 50 MW, ⁵ Average tariff for locked-in growth of 20.4 GW, Capacity in MW_{AC}; Under Execution projects include capacity where PPA is signed, Near Construction projects include capacity awarded and is pending for PPA execution

Adani New Industries Limited (ANIL): The Vision

1 Significant Green Hydrogen demand



- Green H₂ market of ~6 MMTPA by 2030 and 20-30 MMTPA by 2050

5 Decarbonization of Industrial Energy & Mobility



- Decarbonisation covering
- Manufacturing ecosystem,
- Green H₂ generation and
- Downstream products like LH₂, ammonia, methanol, urea and DAP



2 Transform India's Energy Ecosystem



- Transitioning from imported fossil fuel energy to domestic green energy
- Adani Group investment of **USD 50 bn** by 2030 in Green H₂ ecosystem

4 Integrated Green H2 ecosystem



- Green H₂ generation hub at Khavda, Gujarat
- Green H₂ consumption hub at Mundra, Gujarat

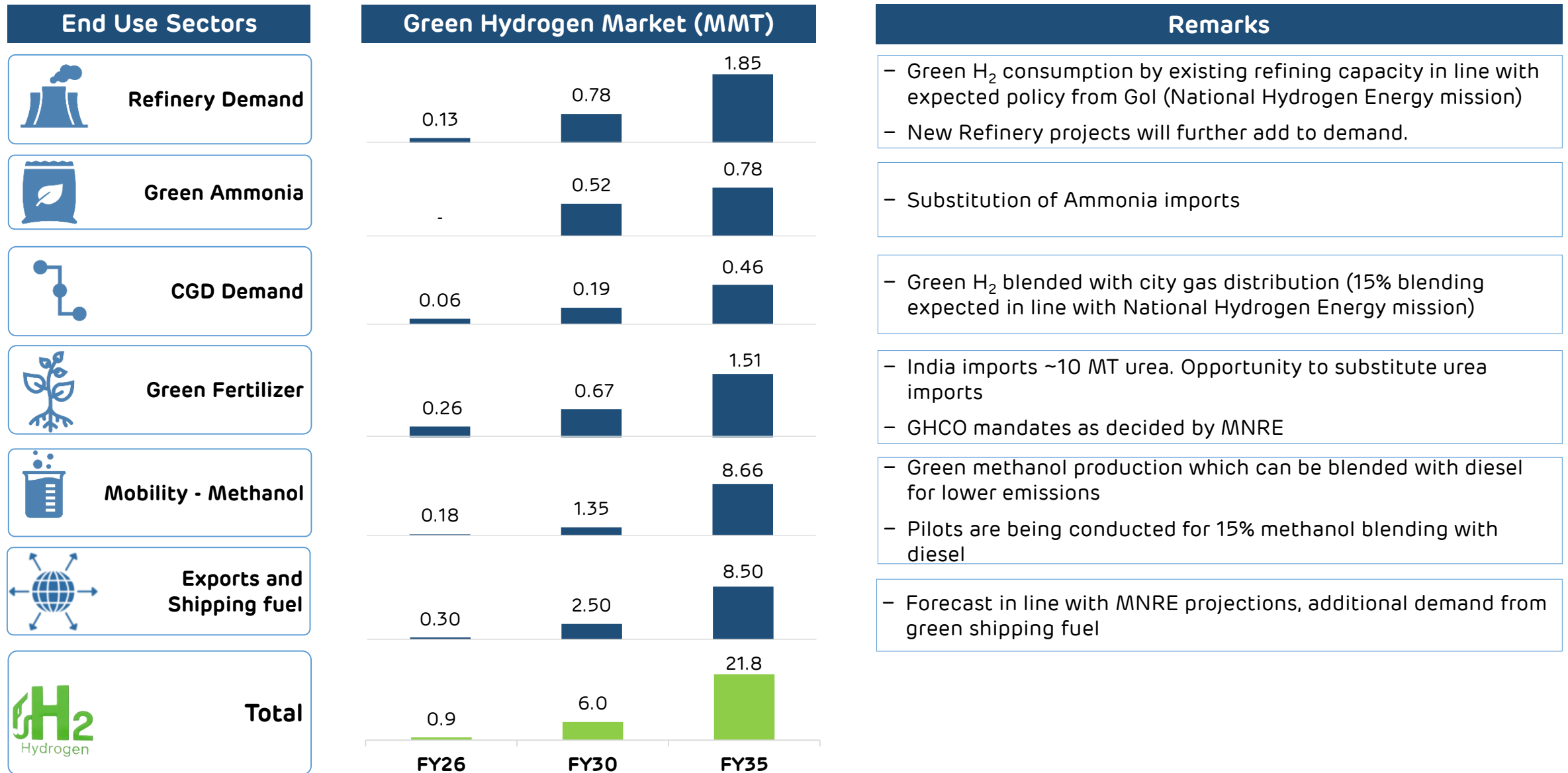
3 End-to-end supply chain and resource control



- Execution Risk mitigated by full integration of supply chain
- Tighter control on cost and resources

Decarbonize and deliver the lowest cost green molecule to transform India's energy landscape

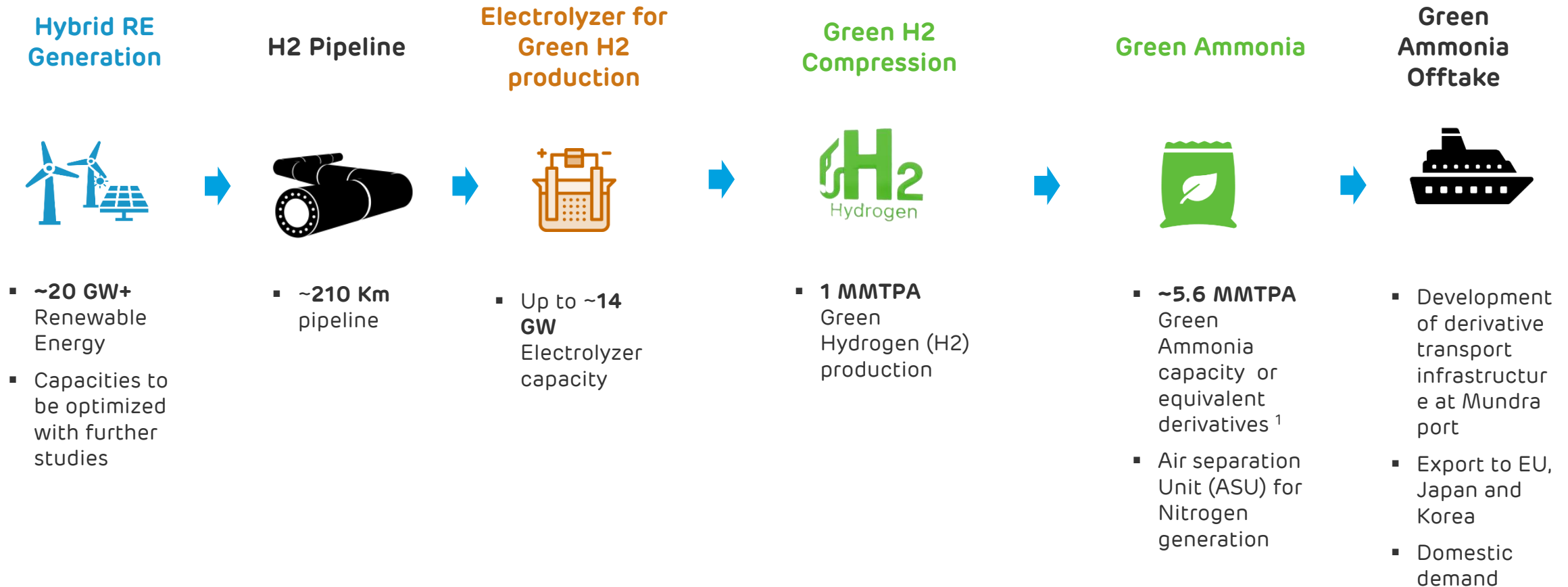
Green Hydrogen – Massive Potential to Decarbonize Industries



Notes: GHCO: Green Hydrogen Consumption Obligation; CGD: City Gas Distribution; MMT: Million Metric Tons; MT: Metric Tons; MNRE: Ministry of New & Renewable Energy; H2: Hydrogen; Gol: Government of India

ANIL: Green Hydrogen Ecosystem for First phase of 1.0 MMTPA

Key components of the project which is to be executed for 1.0 MMTPA Green H2 ecosystem include:



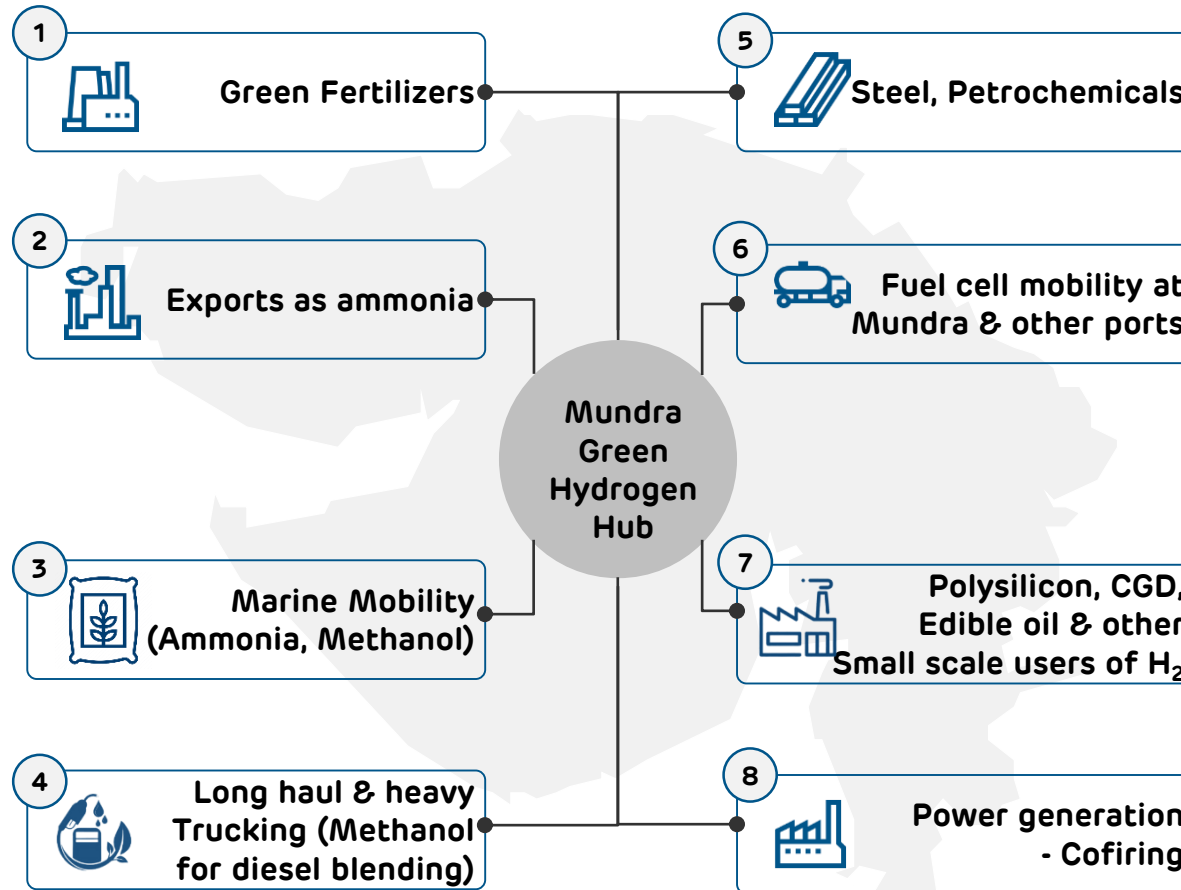
1) ANIL to also explore Urea and/or methanol production or LH2 possibilities as per Carbon Dioxide (CO2) availability and market study

Mundra SEZ: The largest integrated Green Hydrogen Hub in the world

Full suite of Hydrogen offerings ...

RE capacity directly connected	48 GW
Green Hydrogen	Up to 2.54 MMTPA
Green Ammonia	Up to 7.54 MMTPA
Green Methanol	Up to ~1.7 MMTPA
Hydrogen Compression & Storage	Supports 1.5 MMTPA ecosystem
Other technologies (LH ₂ , LOHC)	Available as required

... For multiple end uses including substantial captive use in Adani Portfolio businesses ...



... And backed by credible action on ground



Only Hydrogen Hub developed by a player with

- Renewable and Port infrastructure expertise
- Downstream demand



Backed by ongoing investments

- Polysilicon capacity (30 KMTA by FY25)
- MOU with POSCO for integrated Green Steel plant



Enabling infrastructure in place

- Logistics network to North India hinterland
- Handling of Methanol / fuels, RE and power
- Demand from edible oil
- Net zero aspiration of port

Notes: RE: Renewable Energy; PVC: Polyvinyl chloride; MMTPA: Million Metric Tons Per Annum; LH₂: Liquid Hydrogen; LOHC: Liquid Organic Hydrogen Carrier; CGD: City Gas Distribution; KMTA: Kilo Metric Tons Per Annum; GW: Gigawatt; MOU: Memorandum of Understanding; SEZ: Special Economic Zone

The Defining Decade for Indian Power Sector...

India's energy landscape has evolved very rapidly over the last decade...

...and as a country we had many achievements and strides to boast in areas like grid stability, demand growth, electrification...

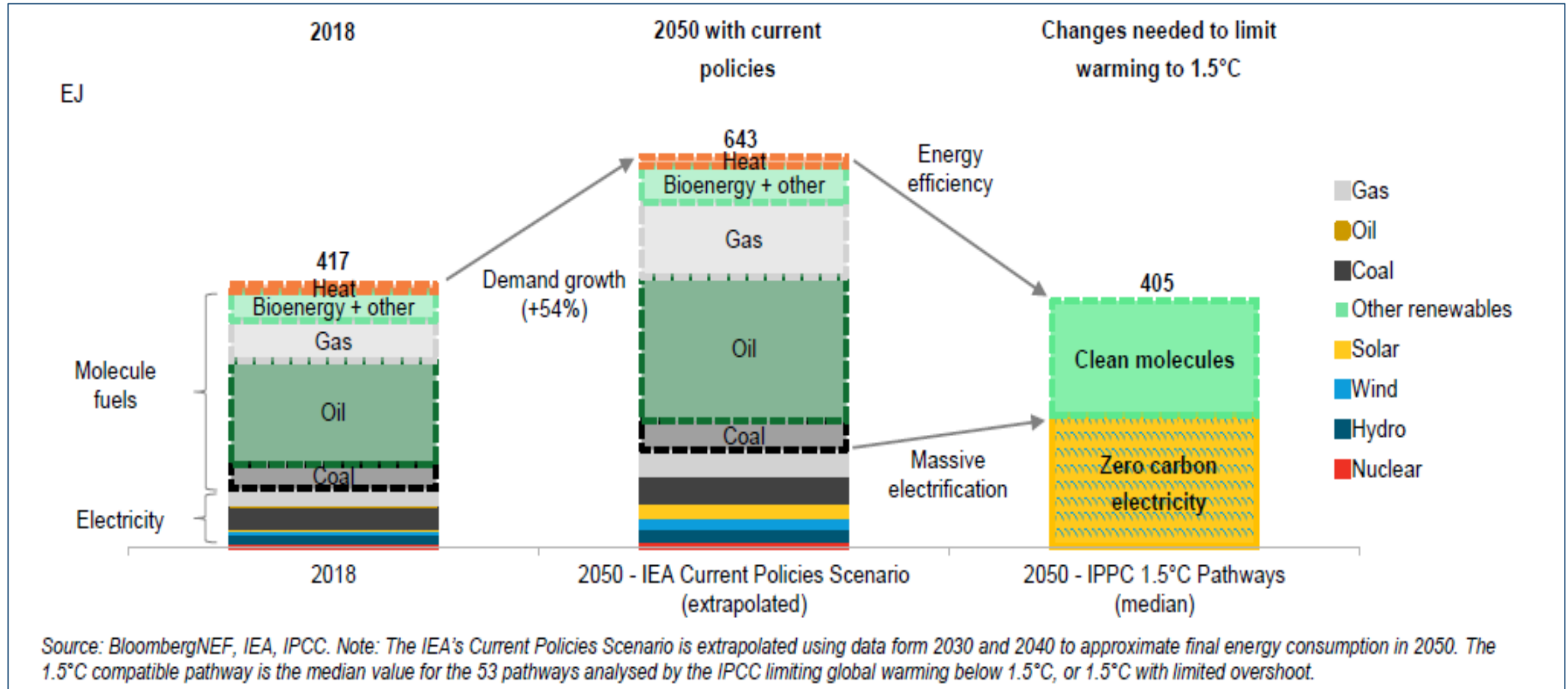
...however next decade is extremely crucial in terms of clean energy transition, energy security and delivering net zero

Distribution is a very critical link which can make or break the vision...

...however, with right set of reforms and decisive actions sector is well poised to grow and achieve the desired goals

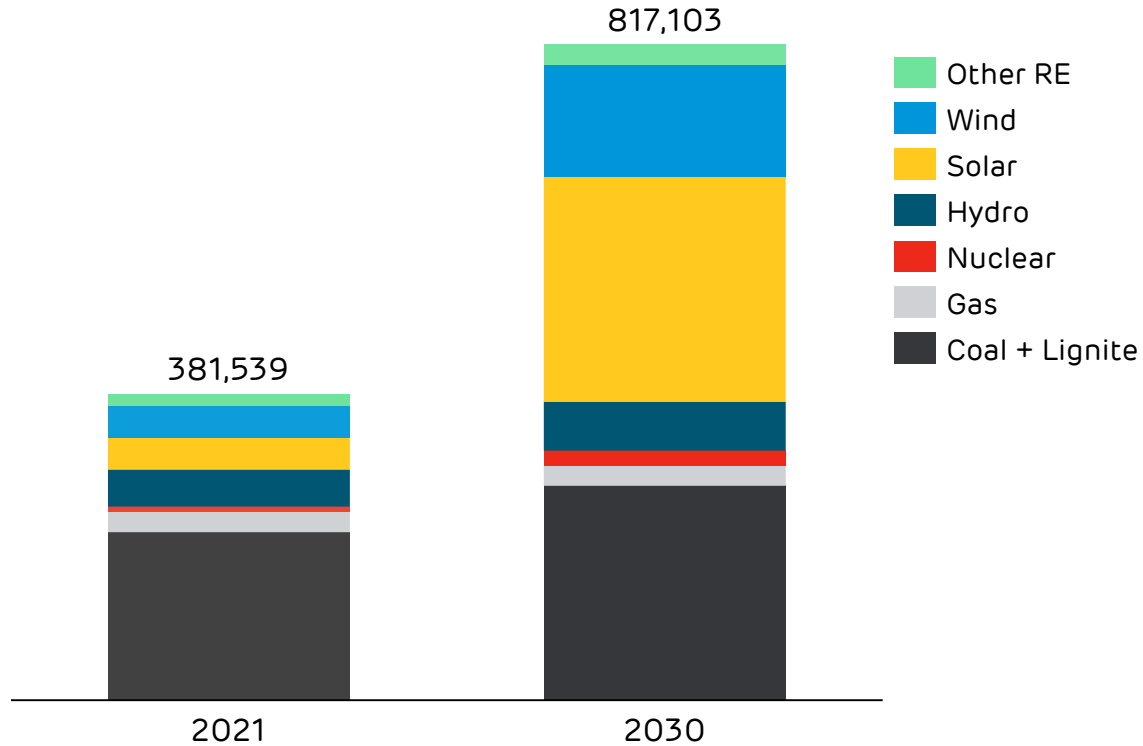
Annexure

Convergence: With the advent of Hydrogen the power and fuels space are coming together – Excess RE can be converted to Hydrogen which can replace liquid fossil fuels currently prevalent



Innovation is the key factor in facilitating energy transition...

High RE is expected to be penetrated in the grid by 2030....



....resulting in higher variable generation and making it necessary to have a flexibility option



High variable generation in the grid causes system balancing issues to accommodate the supply side variability during various load conditions

India needs to build flexibility in the existing coal plants to address the variable RE challenge and to provide grid stability

Thank You
