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Adani New Industries Limited

Green Hydrogen Ecosystem

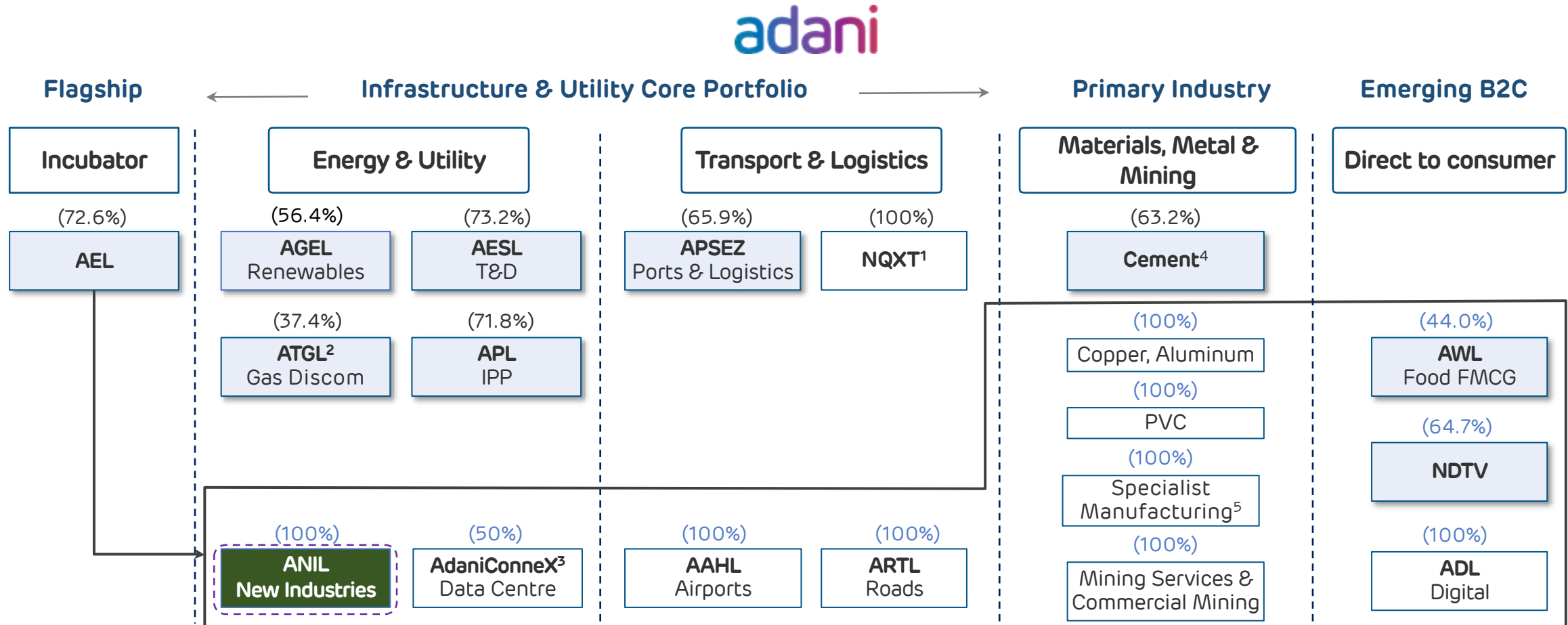
March 2024



01

Adani Portfolio Overview

Adani Portfolio: A World class infrastructure & utility portfolio



(%): Promoter equity stake in Adani Portfolio companies (%) : AEL equity stake in its subsidiaries

A multi-decade story of high growth centered around infrastructure & utility core

1. NQXT: North Queensland Export Terminal | 2. ATGL: Adani Total Gas Ltd, JV with Total Energies | 3. Data center, JV with EdgeConnex, | 4. Adani Cement includes 63.19% stake in Ambuja Cements which in turn owns 50.05% in ACC Limited. Adani directly owns 6.64% stake in ACC Limited | 5. Includes the manufacturing of Defense and Aerospace Equipment | AEL: Adani Enterprises Limited; APSEZ: Adani Ports and Special Economic Zone Limited; AESL: Adani Energy Solutions Limited; T&D: Transmission & Distribution; APL: Adani Power Limited; AGEL: Adani Green Energy Limited; AAHL: Adani Airport Holdings Limited; ARTL: Adani Roads Transport Limited; ANIL: Adani New Industries Limited; AWL: Adani Wilmar Limited; ADL: Adani Digital Limited; IPP: Independent Power Producer | NDTV: New Delhi Television Ltd | PVC: Polyvinyl Chloride | Promoters holding are as on 31st December, 2023

Adani Portfolio: Decades long track record of industry best growth with national footprint

Secular growth with world leading efficiency

National footprint with deep coverage

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Ports and Logistics

Growth 3x⁶

EBITDA 70%^{1,2}

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Renewables

Growth 4x⁶

EBITDA 92%^{1,4}

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Energy Solutions

Growth 3x⁶

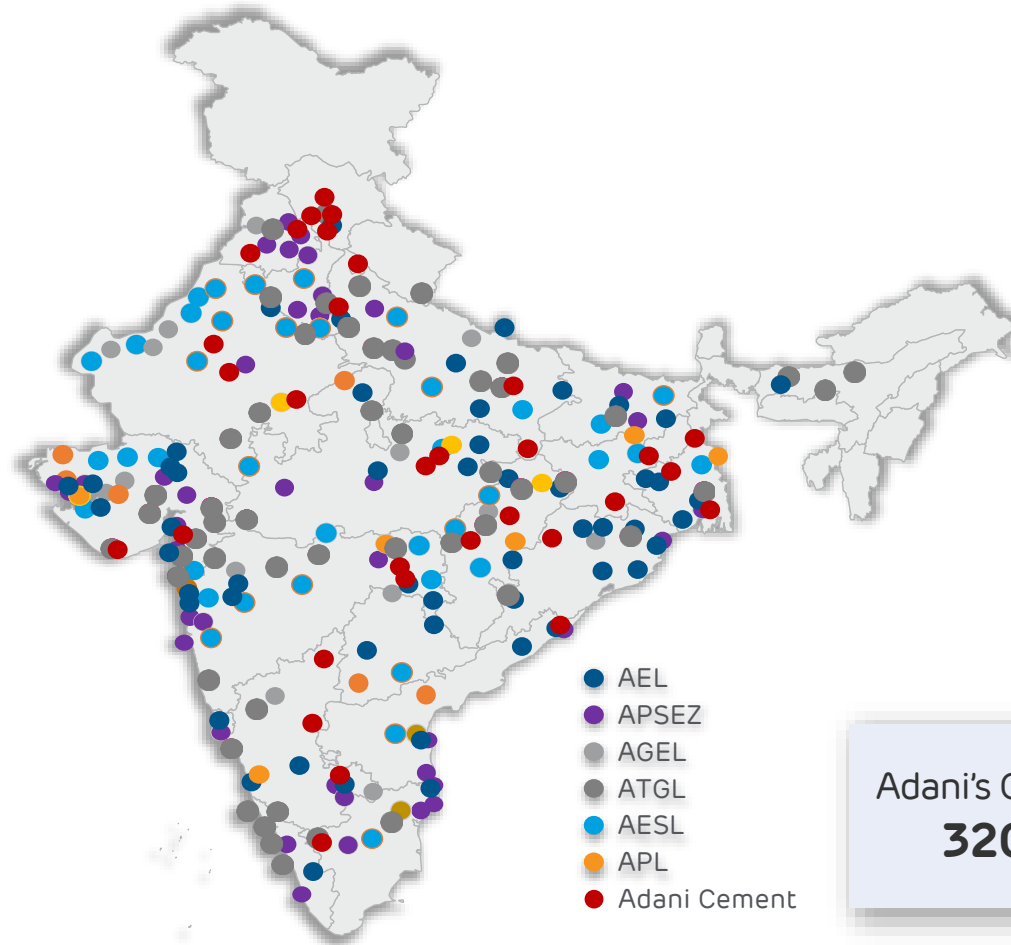
EBITDA 91%^{1,3,5}

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Gas

Growth 1.4x⁶

EBITDA 19%^{1,3}



Adani's Core Infra. Platform –
320 Mn Userbase

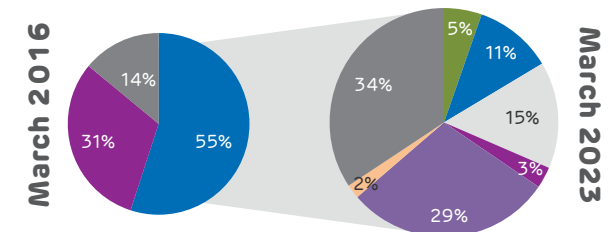
Note: 1. Data for FY23; 2. Margin for indian ports business only, Excludes forex gains/losses; 3. EBITDA = PBT + Depreciation + Net Finance Costs – Other Income; 4. EBITDA Margin represents EBITDA earned from power supply 5. Operating EBITDA margin of transmission business only, does not include distribution business, 6. Growth pertains to expansion and development aligned with market growth. Growth of respective Adani portfolio company vs. Industry growth is as follows: **APSEZ's** cargo volume surged from 113 MMT to 339 MMT (13%) between 2014 and 2023, outpacing the industry's growth from 972 MMT to 1433 MMT (4%). **AGEL's** operational capacity expanded from 0.3 GW to 8.1 GW (60%) between 2016 and 2023, surpassing the industry's growth from 46 GW to 125 GW (15%). **AESL's** transmission length increased from 6,950 ckm to 19,779 ckm (16%) between 2016 and 2023, surpassing the industry's growth from 3,41,551 ckm to 4,71,341 ckm (5%). **ATGL** expanded its geographical areas from 6 to 52 (31%) between 2015 and 2023, outperforming the industry's growth from 62 to 293 (21%). PBT - Profit before tax, ATGL-Adani Total Gas Limited, AEL: Adani Enterprises Limited, APSEZ: Adani Ports and Special Economic Zone Limited, AESL: Adani Energy Solutions Limited, APL: Adani Power Limited, AGEL: Adani Green Energy Limited | Growth represents the comparison with respective industry segment.

Adani Portfolio: Repeatable, robust & proven transformative model of investment



	Origination	Site Development	Construction	Operation	Capital Mgmt
Activity	<ul style="list-style-type: none"> Analysis & market intelligence Viability analysis Strategic value 	<ul style="list-style-type: none"> Site acquisition Concessions & regulatory agreements Investment case development 	<ul style="list-style-type: none"> Engineering & design Sourcing & quality levels Equity & debt funding at project 	<ul style="list-style-type: none"> Life cycle O&M planning Asset Management plan 	<ul style="list-style-type: none"> Redesigning capital structure of assets Operational phase funding consistent with asset life

Performance	<p>India's Largest Commercial Port (at Mundra)</p> <p>↓</p> <p>Highest Margin among Peers</p>	<p>Longest Private HVDC Line in Asia (Mundra - Mohindergarh)</p> <p>↓</p> <p>Highest line availability</p>	<p>2,140 MW Hybrid cluster operationalized in Rajasthan in FY23</p> <p>↓</p> <p>India's first and World's largest solar-wind hybrid cluster</p>	<p>Energy Network Operation Center (ENOC)</p> <p>↓</p> <p>Centralized continuous monitoring of plants across India on a single cloud based platform</p>	<ul style="list-style-type: none"> Duration Risk Matching Forex Currency Risk Management Interest Rate Risk management Governance & Assurance <p>(ABEX -Adani Business Excellence)</p>
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Note 1 Adani Environmental Resource Management Services Ltd. (additional company is being proposed)

O&M: Operations & Maintenance, HVDC: High voltage, direct current, PSU: Public Sector Undertaking (Public Banks in India), GMTN: Global Medium-Term Notes SLB: Sustainability Linked Bonds, AEM: Adani Electricity Mumbai Ltd., AIMSL: Adani Infra Mgt Services Pvt Ltd, IG: Investment Grade, LC: Letter of Credit, DII: Domestic Institutional Investors, COP26: 2021 United Nations Climate Change Conference; AGEL: Adani Green Energy Ltd. .NBFC: Non-Banking Financial Company; AII: Adani Infra India Limited

ANIL: Emulating Adani's Business Philosophy

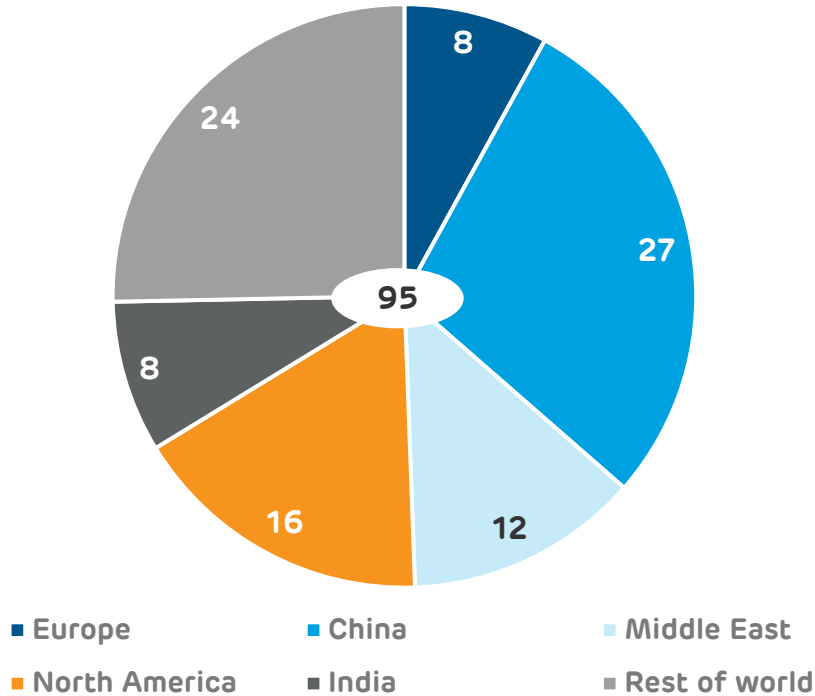


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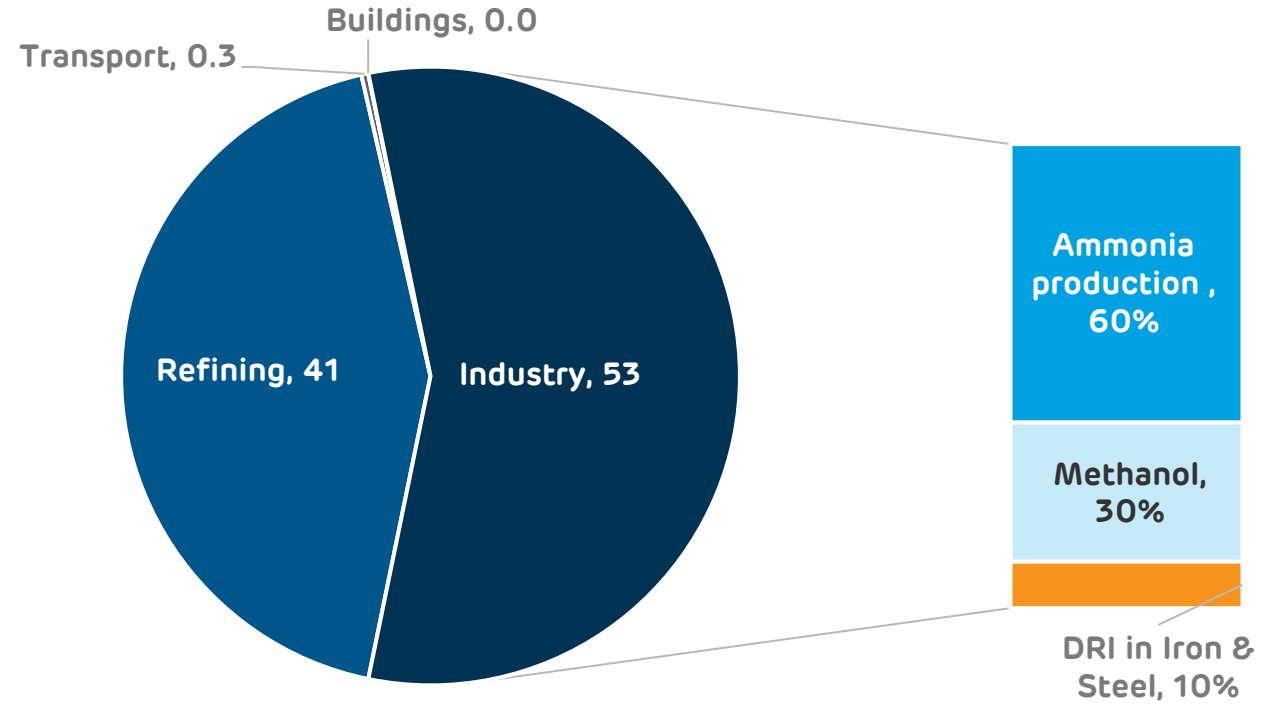
Global Hydrogen Landscape

Global Hydrogen Demand

Global demand for Hydrogen 2022 (MMTPA) by Region



Global demand for Hydrogen 2022 (MMTPA) by Sectors



- ❑ Global hydrogen use reached 95 MMTPA in 2022
- ❑ Low emissions hydrogen¹ production accounts for ~1 MMTPA out of which hydrogen from water electrolysis is ~ 0.135 MMTPA

Current low penetration of Green Hydrogen signals significant potential for replacement demand & new uses

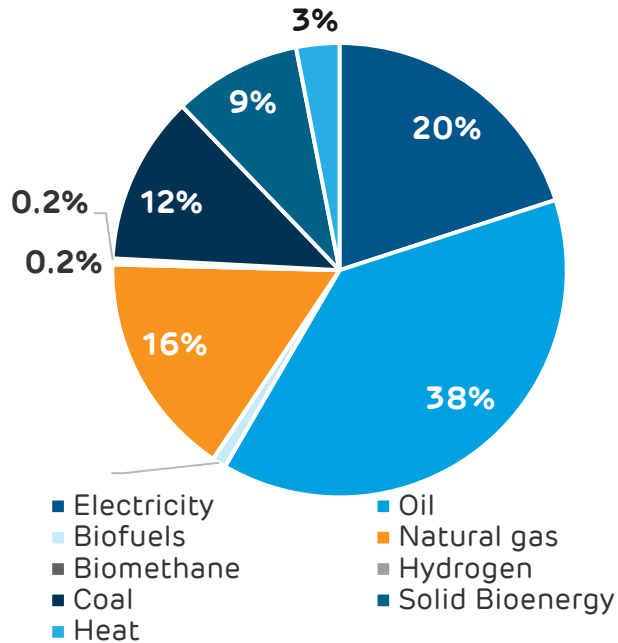
Source: World Energy Outlook 2023 (IEA); Global Hydrogen Review 2023 (IEA)

1. Low-emissions hydrogen is produced from electrolysis using electricity generated by RE or Nuclear, from Fossil Fuels with CCUS or derived from Bioenergy;

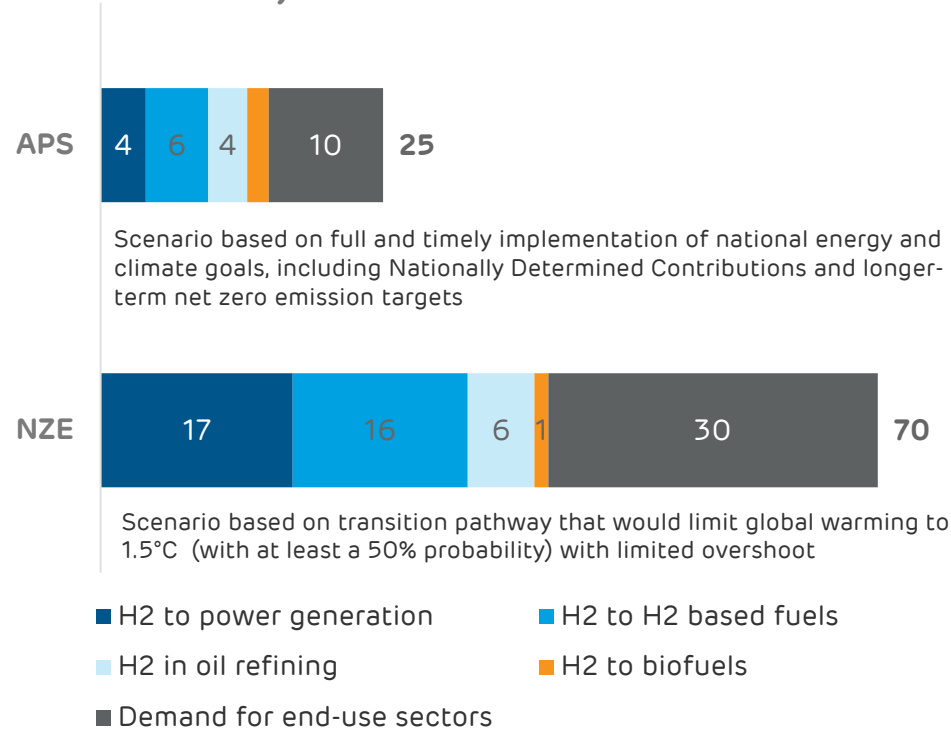
CCUS : Carbon Capture Utilization & Storage; MMTPA: Million Metric Tonnes per Annum; DRI: Direct Reduced Iron

Global Hydrogen Demand – Future Potential

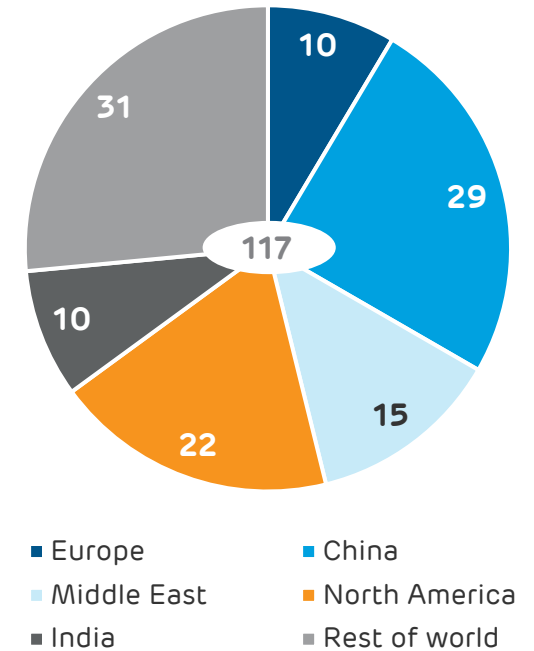
World energy consumption by Sources - 2022



Low-emissions H₂ demand (MMTPA) by 2030 across scenarios



Global H₂ demand (MMTPA) by 2030 - APS



- ❑ Electrification to contribute towards reducing fossil fuel demand, leading to increased share in future from current 20%.
- ❑ Green Hydrogen to also work as source of electricity in RE resources deficient areas.

- ❑ As per APS 2030, Low-emissions H₂ from electrolysis using RE or Nuclear will be 16 MMTPA and to be 8 MMTPA from Fossil Fuels with CCUS or Bioenergy.
- ❑ China, Europe, Middle East and North America to lead the growth in H₂ demand and will account for ~ 65% of 2030 total demand

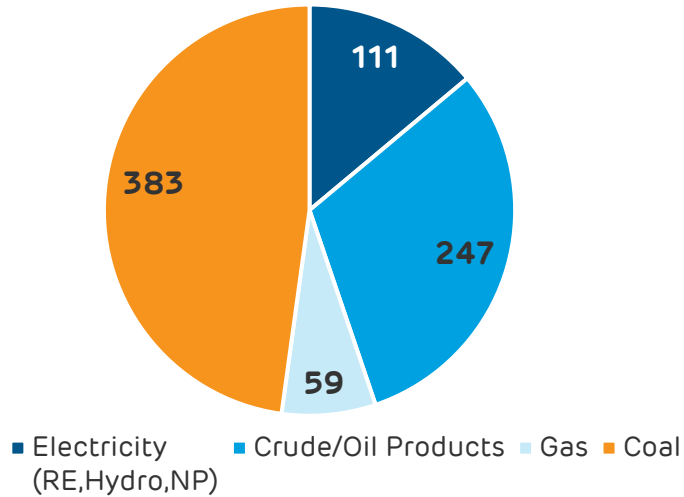
Green Hydrogen share in hydrogen demand to increase from 0.14% in 2022 to 13.67% in 2030 as per APS

03

India Market

India consumes 6 MMTPA Hydrogen (Grey)

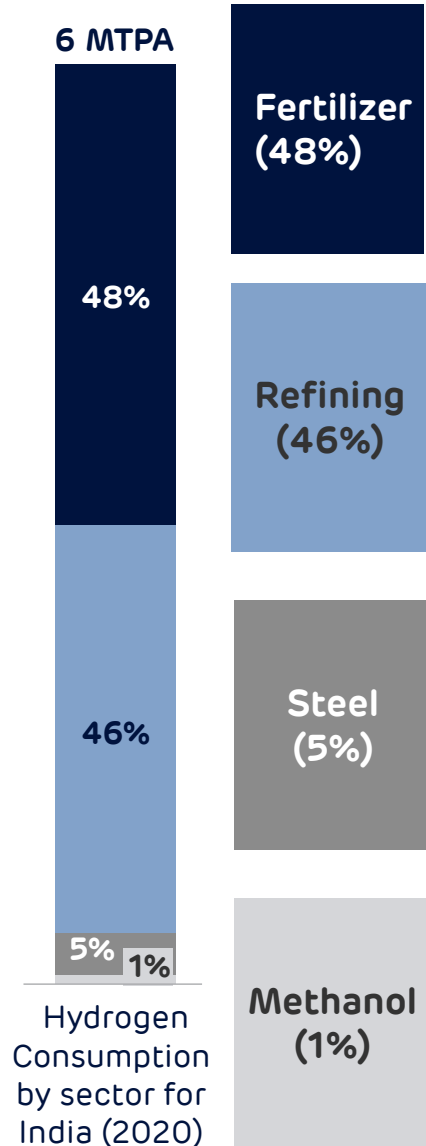
India's Energy Consumption – FY22
(MtOe)



Green H2 – Moving from Greening the Grid to Greening Industry and Mobility

- ~53% of Gas and ~85% of Oil imported for a net import bill of USD 113 Bn in FY22
- Green H₂ and Derivatives can substitute use of fossil fuels in industry thus reducing import requirements
- Green H₂ and Derivatives are also an option for hard to abate sectors such as fertilizers, steel and refineries

Source: MOSPI (Ministry of Statistics and Program Implementation) 2023 report on Energy Statistic



- Fertilizer (48%)**
 - H₂ is used to produce ammonia and ~90% of ammonia is used to manufacture fertilizers
 - Natural gas (80% imported) is the main feedstock for the fertilizer production.
- Refining (46%)**
 - Imported natural gas to produce H₂ through SMR process.
 - Hydrogen is used to process crude oil to obtain refined fuels e.g. gasoline, diesel. Sulphur impurities are removed via Hydro-desulfurization
- Steel (5%)**
 - To produce virgin metallics (DRI or HBI) from lump iron ore (or pellets) requires ~650 Nm³ of hydrogen (or 58 kg) per ton of DRI
 - Emerging sector where GH₂ will be used
- Methanol (1%)**
 - Hydrogen is used in production of methanol which is further used in production of acetic acid and formaldehyde

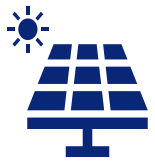
MTOE: Million Tonnes of Oil Equivalent; 1 MTOE is equivalent to 0.35 Million tonnes of Hydrogen on Lower Heating Value (LHV) basis; NP: Nuclear Power
SMR: Steam Methane Reforming; DRI: Direct Reduced Iron; HBI: Hot Briquetted Iron; ICE: Internal Combustion Engine

India Green Hydrogen (GH₂) target & demand by 2030

National Green Hydrogen Mission



At least
5 MMT GH₂
Annual production



125 GW RE
capacity for GH₂
generation &
associated
transmission network



60-100 GW
Electrolyser capacity



INR 8 Lakh Cr
Investment

Sectoral Demand

End Use Sectors	Green H ₂ Market (MMTPA)			Remarks
	FY26	FY30	FY35	
Refinery Demand	0.13	0.78	1.85	- Green H ₂ consumption by existing refining capacity
Green Ammonia	-	0.52	0.78	- Substitution of Ammonia imports (~2.34 MMTPA in FY23)
CGD Demand	0.06	0.19	0.46	- Green H ₂ blended with city gas distribution (15% blending expected)
Green Fertilizer	0.26	0.67	1.51	- India imports ~9 MMTPA (FY23) urea. Opportunity to substitute urea imports - GHCO mandates as decided by MNRE
Mobility - Methanol	0.18	1.35	8.66	- Pilots are being conducted for 15% methanol blending with diesel - ICEs being developed for H ₂ use
Exports and Shipping fuel	0.30	3.50	8.50	- Additional demand from green shipping fuel
Total	0.9	7.0	21.8	- Capex incentive scheme for GH ₂ pilot projects announced, for end use in Shipping, Ports, Steel, Mobility

04

ANIL Strategy

Green Hydrogen – India Story

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 Tonnes 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

Supportive policy environment

- 1 National Green Hydrogen Mission Phase-1 launched on 17th Feb 2022
- 2 Phase 1 included supply side incentives such as ISTS charges waiver, banking, etc.
- 3 Green Hydrogen Consumption Obligations (GHCO) for end-use sectors, PLI for Green Hydrogen & derivatives production
- 4 Support for value chain through PLI e.g., for Solar, Electrolyser manufacturing
- 5 Other measures such as ALMM, BCD

Adani New Industries Limited (ANIL): Designed to win in Green H2 market

What it takes to win

1

Competitive cost Green Electron



- Input power cost accounts for ~70% of cost of Green Hydrogen
- Economies of scale and large resources to facilitate lowest cost electron

2

End-to-end supply chain and resource control



- Execution Risk mitigation by full integration of supply chain
- Tighter control on capex and resources

3

Integrated Green H₂ ecosystem



- Integrated development across the value chain – pipelines/transport options, storage facilities, port facilities and terminals



How we are delivering it

Large scale with high quality resources

- Investment of **USD 50 bn** in Green H₂ ecosystem
- Secured land for RE production

Mine to module manufacturing ecosystem

- All key components of Green H₂ projects within ANIL – Solar, wind, Electrolysers

Leveraging broader Adani ecosystem – RE, Transmission, Ports, Logistics, Gas

- Green H₂ and derivatives hub at Mundra, Gujarat
- Integration into Global supply chain for Hydrogen and derivatives

Indicative GH₂ Value



Pricing

Opex 7%

Dep 23%

RE 70%

Deliver the lowest cost green molecule to transform India's energy landscape

ANIL: Structure Business Segments

Adani New Industries Limited

Supply Chain Products Manufacturing

- Manufacture key components and materials for RE projects
 - Independent P&L for each manufacturing entity.
- Under construction**
- Solar – MG and Polysilicon
 - Solar – Ingot, wafer, cell, modules
 - WTG
 - Electrolysers
 - Battery & Fuel cells

End-end supply chain control

Green Hydrogen Generation

- Integrated RE and H₂ Electrolyser Projects
- RE generation to power H₂ Electrolyser
- Part of H₂ will go into downstream products
- Initial anchor site in Gujarat near Mundra

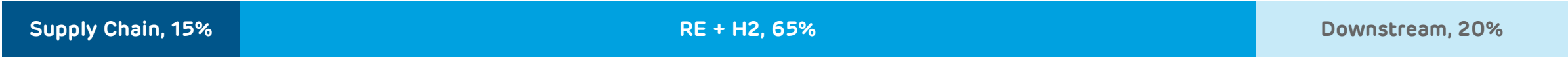
High quality resources deployed at scale

Downstream Products




- Large scale downstream projects
- Focus on Ammonia, urea, methanol / ethanol
- Largely established technology / projects
- Carbon capture as an enabler
- Storage of Hydrogen

Well integrated with Adani ecosystem

Indicative Capex break-up for integrated Green Hydrogen Project



Overall manufacturing footprint

Manufacturing Businesses	Capacities by 2026	Key Highlights
	<p>Polysilicon: 30 KTPA</p> <p>Ingot/Wafer: 10 GW</p> <p>Cells: 10 GW</p> <p>Modules: 10 GW</p>	<ul style="list-style-type: none"> – Existing 4 GW of cell and module manufacturing facility; – More than 7+ years of experience in cell and module manufacturing – Full backward integration starting from silicon till modules
	<p>WTG: 5 GW</p>	<ul style="list-style-type: none"> – 5.2 MW WTG in commercial production, received Global certification and RLMM approval – Manufacturing of Turbine, Nacelle & Rotor Blades – Technology partnership with well known global player (W2E & Windnovation)
	<p>Electrolyser: 5 GW</p>	<ul style="list-style-type: none"> – Backward integration for supply assurance and cost efficiency – Focus on reduction in stack & BOP cost through indigenization and scale – Manufacturing will cover multiple technologies such as Alkaline, AEM and others

ANIL – Electrolyser Strategy



Stack



BOP

Technology development

Multiple tie-ups with Electrolyser technology providers namely **Cavendish Renewable Technology (Australia)** and **Hydep (Italy)**

Alkaline

5 MW size Electrolyser Pilot in progress

AEM

Prototype stage in progress

C-Cell

Prototype stage in progress

Preferred Technology

Alkaline

- Proven technology for 100 years.
- Lower initial CAPEX

Anion Exchange Membrane (AEM)

- High operational flexibility
- Lower CAPEX compared to PEM
- Better efficiency than Alkaline

Product development

- Establishing **Electrolyser Testing Lab** to drive performance improvement
- Won 198.5 MW Capacity under PLI scheme (Tranche 1)
- Establishing **Electrolyser Manufacturing Facility**; to be commissioned by 2025
- **Supply chain development for achieving 90% indigenization of Electrolyser**

Green Hydrogen Project: Great Rann of Kutch (GRK), Gujarat



~85,000 hectares land allotted

Studies completed	Current Studies
Site survey	Pipeline and storage
Water level measurement	Feasibility report
Soil investigation	Power evacuation system
Campaign for RE resource assessment	Basic engineering

ANIL to leverage Group expertise

- Expertise in Giga-Scale RE Project development – **Largest RE developer in India**
- Expertise in setting up long distance transmission lines – **Largest transmission system developer in India**
- Expertise in developing and handling large ports and associated infrastructure – **Largest port operator in India**

Derivatives and Off-take

Green Ammonia Co-firing

Clean Energy Transition utilizing breakthrough technology from Japan	
Location	Unit 1 – 330 MW, Mundra Thermal (Coal) Power Plant
Description	<ul style="list-style-type: none"> Feasibility study on modification in Mundra Power Plant to achieve 20% liquid ammonia co-firing Supported by Japanese Government Agency NEDO MoU between Adani, Kowa Company and IHI Corp.



Phase	Description	Status
Phase 1	Technical Evaluation	Successfully Completed
Phase 2	Co-firing Combustion Test & FEED	Underway
Phase 3	Construction & Demonstration	Plan: 2024 – 2027

Off-take agreement



- JV with Kowa for marketing of Green Hydrogen and Derivatives in territories of Japan, Taiwan and Hawaii



- Discussions in progress with key players in Japan, Korea, Singapore and Europe for Off-take agreements

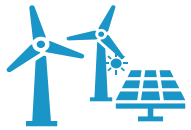
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ANIL: Green Hydrogen Generation

ANIL: Green Hydrogen Ecosystem for First phase of 1.0 MMTPA GH2 by 2030

Key components:

Hybrid RE Generation



- ~21 GW+ Renewable Energy

Electrolyser for Green H₂ production



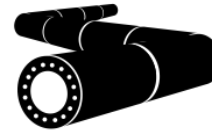
- Up to ~17.5 GW Electrolyser capacity

Green H₂ Compression



- 1 MMTPA Green Hydrogen (H₂) compression

H₂ Pipeline



- ~215 Km pipeline

Green Ammonia



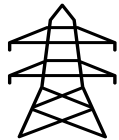
- ~5.6 MMTPA Green Ammonia capacity or equivalent derivatives
- Air separation Unit (ASU) for Nitrogen generation

Offtake of Derivatives¹



- Development of derivative transport infrastructure at Mundra port
- Export to Europe, Singapore, Japan and Korea
- Domestic demand

Transmission Line



- Grid connected

First drop of Ammonia in 2027

1. Ecosystem Optionality includes Urea, methanol, LH₂, SAF, and others based on offtake requirements
GH₂ : Green Hydrogen

Thank You