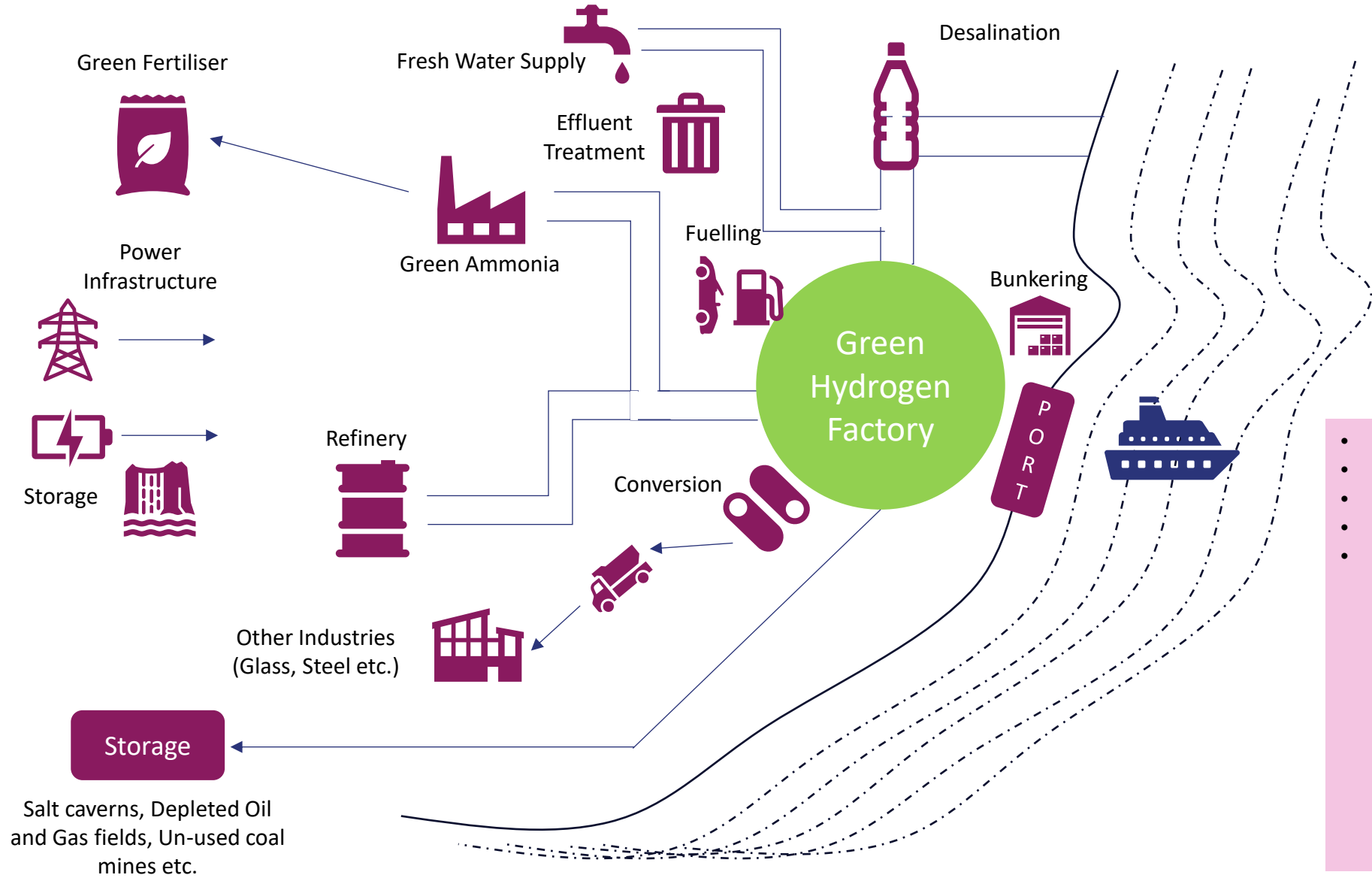
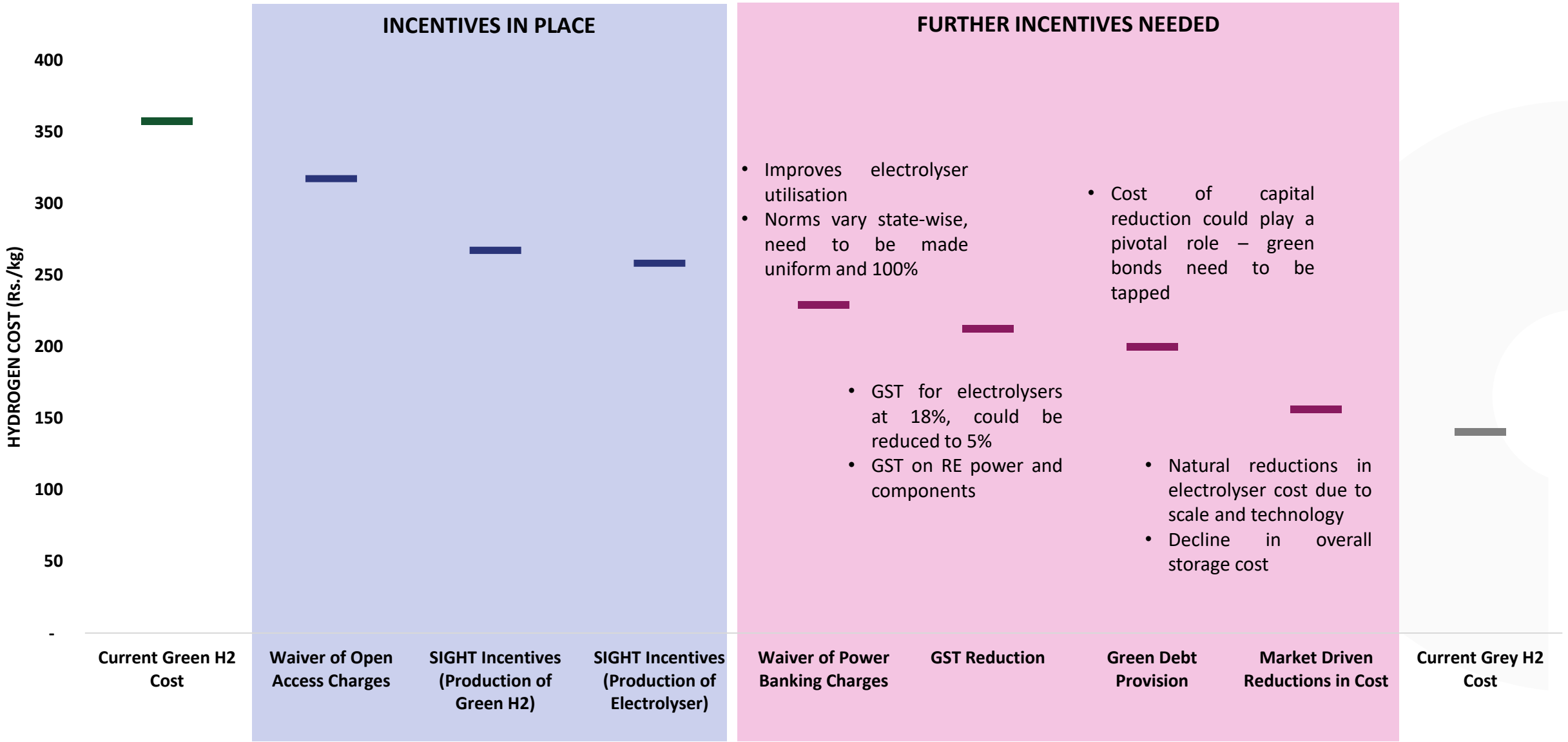


# GREEN HYDROGEN HUBS TO SOLVE THE STORAGE AND TRANSPORT PROBLEM

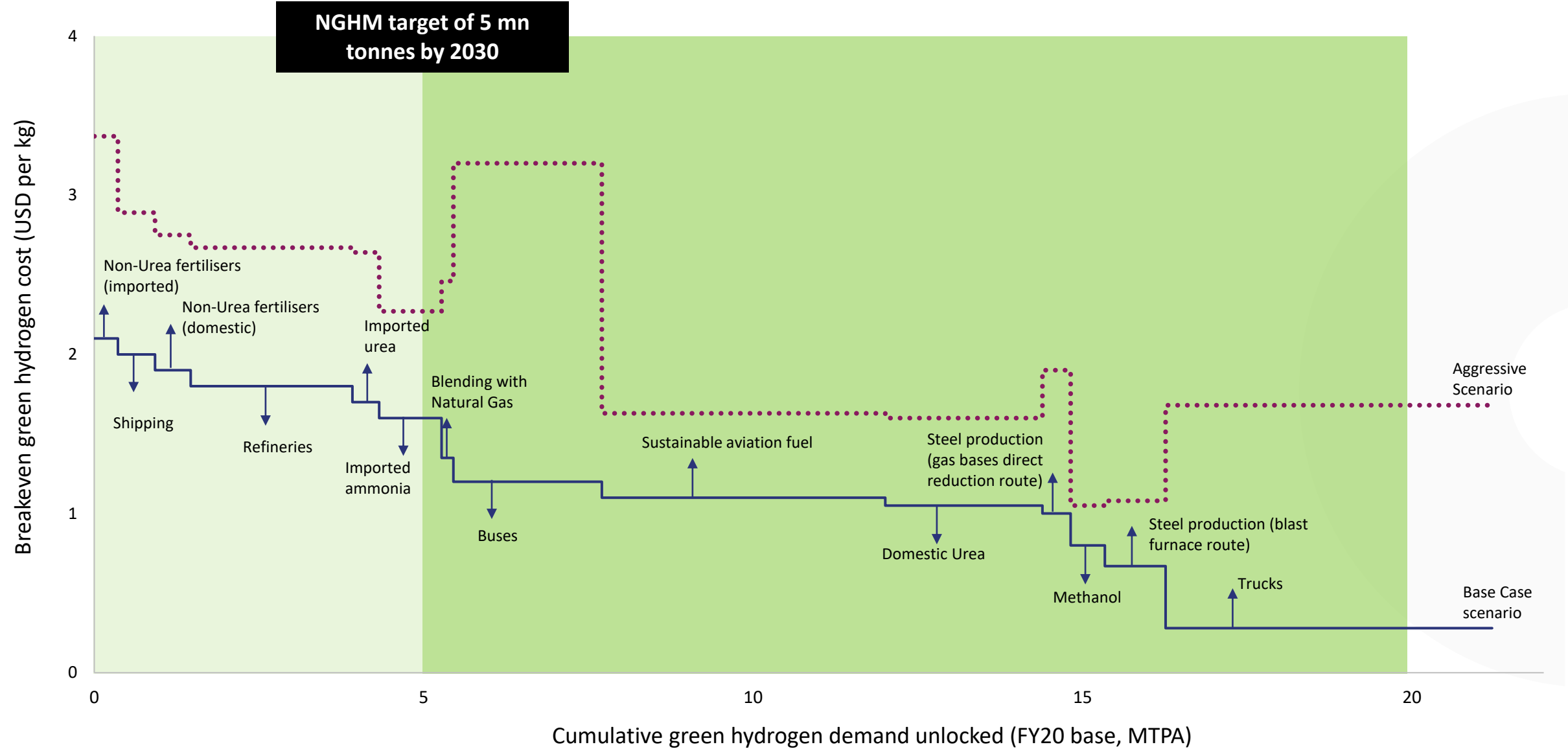


- Two Green H<sub>2</sub> Hubs to be made by FY26
- Capacity per hub of 100 ktpa
- Central Financial Assistance of Rs. 1 bn per hub
- Overseen by SECI
- Bidding based on:
  - Tpa of Green H<sub>2</sub> projects approved
  - DPR of infrastructure available or planned
  - Natural Resource Availability – water, power, land
  - Presence of demand centres
  - Proximity to export centre
  - Firm offtake agreements
  - Financial viability
  - Debt/Equity tied up

# INCENTIVES WILL BOOST VIABILITY, MORE IS NEEDED



# WIDER APPLICATIONS THAN NOW ENVISAGED POSSIBLE

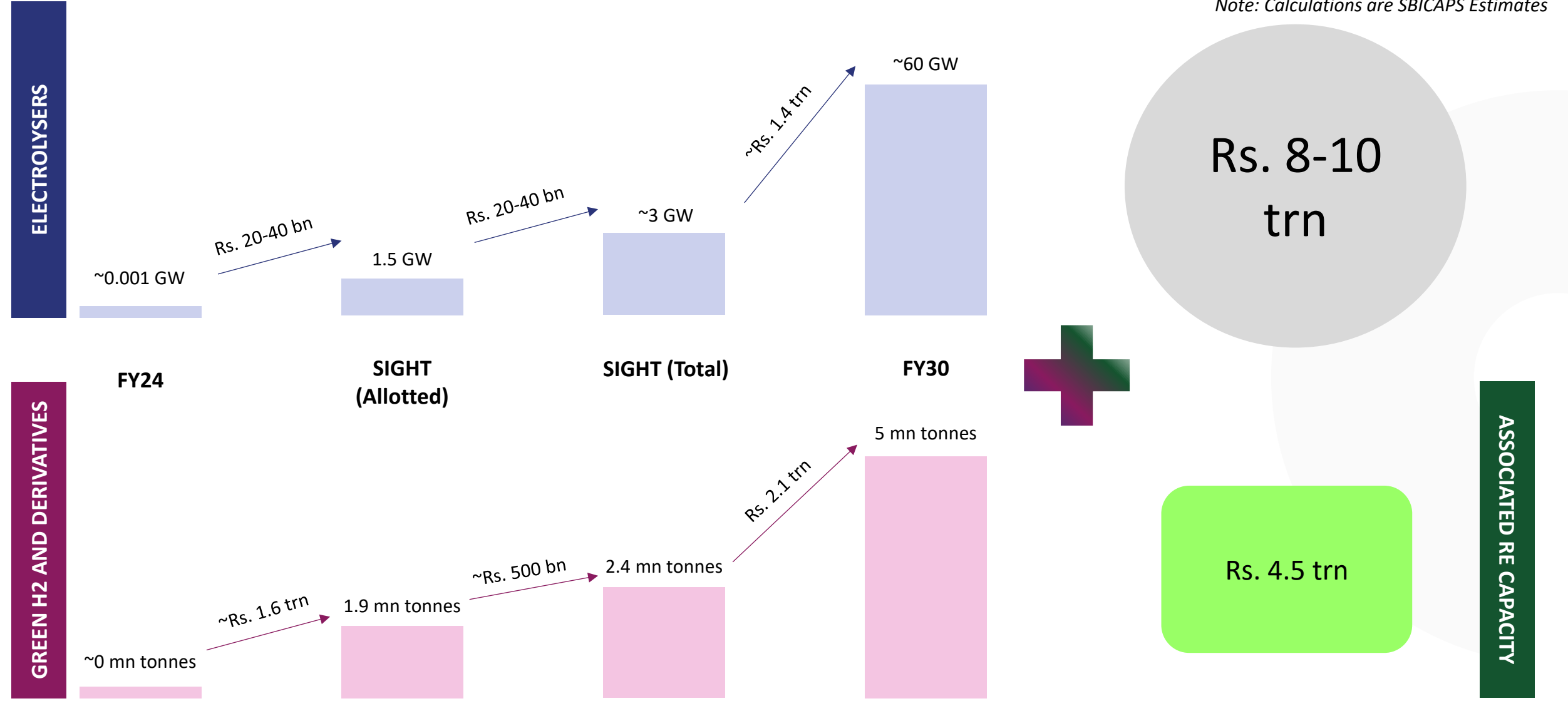


# GREENBACK FOR GREEN H<sub>2</sub>: FINANCING THE FUTURE



# THE G(R)AS(S) IS GREEN FOR INVESTMENTS

Note: Calculations are SBICAPS Estimates



# EFFECTIVE FINANCING CONTINGENT ON ADDRESSING ISSUES

## CHALLENGES

High cost of setup and operations vs. expected cost from consumers

Logistical difficulties in arranging water, electricity, storage, offtake infrastructure etc.

Offtake agreement tenure mismatch – offtakers want lower tenure (5-7 years), while producers want higher tenure (20-30 years)

Limited debt financing

Stranded asset risk – high-cost producers today may be left high and dry when lower cost plants come in

## SOLUTIONS (IN PLACE)

- SIGHT Component 1 provides an incentive of to reduce cost for electrolyzers
- Waiver of ISTS charges

Green Hydrogen Hubs which provide all inputs at a centralised location near demand centres

Firm demand commitments in SIGHT programme tenders for Green H<sub>2</sub> and derivatives

Presence of specialised power finance institutions

Firm demand commitments in SIGHT Component 2

## SOLUTIONS (NEEDED)

- Investment in indigenous stacks
- Reduction in electrolyser GST from 18%
- Selling of byproduct O<sub>2</sub> can improve viability

Increased impetus to develop RE capacity dedicated to Green H<sub>2</sub>

- Standard medium-term offtake agreements of ~10 years (FI expectations)
- Increase in firm demand incentives

- Tapping into MLIs for concessional debt
- Raising labelled debt in global markets
- Guarantees

- Tripartite agreements with state agencies to enforce take-or-pay losses
- Award of monopolies in specific hubs

# 05

## **ANNEXURE**



# GLOSSARY OF KEY TERMS

Item	Explanation
°C	Degrees Celcius
ADB	Asian Development Bank
AEM	Anion Exchange Membrane
BESS	Battery Energy Storage System
bn	billion
BNEF	Bloomberg New Energy Finance
BofA	Bank of America
BoP	Balance of Plant
BPCL	Bharat Petroleum Corporation Limited
capex	Capital Expenditure
CCUS	Carbon Capture, Utilisation, and Storage
CEA	Central Electricity Authority
CEEW	Council on Energy, Environment and Water
CHT	Centre of High Technology, MoPNG
CO <sub>2</sub>	Carbon Dioxide
CO <sub>2</sub> e	Carbon Dioxide Equivalent
CY	Calendar Year
EPC	Engineering, Procurement, and Construction
EY	Ernst & Young Global Limited
FDRE	Firm Despatch Renewable Energy
FI	Financial Institution
GHG	Greenhouse Gas
GST	Goods and Services Tax
GW	Giga Watt
H <sub>2</sub>	Hydrogen
IEA	International Energy Agency
IRENA	International Renewable Energy Agency
ISTS	Inter State Transmission System
kg	kilogramme
kW	kilo Watt
L&T	Larsen and Toubro
M	Mega

Item	Explanation
MLI	Multilateral Institution
mn	million
MNRE	Ministry of New and Renewable Energy
MW	Mega Watt
NGHM	National Green Hydrogen Mission
NH <sub>3</sub>	Ammonia
Ni	Nickel
NREL	National Renewable Energy Laboratory
NZE	Net Zero Emissions
O <sub>2</sub>	Oxygen
Opex	Operating Expenditure
PEM	Proton Exchange Membrane
PFA	Perfluorosulfonic Acid
PIB	Press Information Bureau
PSP	Pumped Storage Project
PV	Photovoltaic
R&D	Research & Development
RE	Renewable Energy
Rs.	Indian Rupees
SECI	Solar Energy Corporation of India
SIGHT	Strategic Interventions for Green Hydrogen Transition
SOEC	Solid Oxide Electrolysis Cell
t	tonne
tpa	tonne per annum
trn	trillion
TW	Tera Watt
USAID	United States Agency for International Development
USD	United States Dollar
w/	with
w/o	without
WEF	World Economic Forum



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