

Eninrac Hydrogen Surveys, 2023: Market Prospects for India

Our collection of research-based insights confirms the market prospects that companies and Government have been considering in the still-evolving H₂ business landscape

The logo for H2 MARKET. The "H2" is rendered in a large, bold, dark blue font with a white square above the "2". Below it, the word "MARKET" is written in a smaller, bold, dark blue font.



Copy right ©2023 Eninrac Consulting Private Limited. All rights reserved.

This publication is not intended to be used as the basis for any business decisions or trading in the shares of any company or making any complex financial decisions. It is advised to consult the experts before taking any such professional/business decisions.

No part of this publication may be copied or redistributed in any form without the prior written consent from Eninrac Consulting Private Limited.

Contents



07 Need for concrete/comprehensive national level hydrogen policy in India



08 Application most suited for hydrogen mobility in India



09 Major drivers for setting more hydrogen valleys in India



10 Possible pathways for hydrogen certificates in India



12 Level of capital subsidy most suited for driving hydrogen adaptation in India



13 Combination of coastal states preferred for port-based hydrogen ecosystem in India



14 Major drivers to create hydrogen bunkers at major ports in India



15 Level of cruciality held by ports for hydrogen development in India



17 Production target likely to be achieved by 2030 for hydrogen production in India



18 Adaptability transition roadmap of low carbon hydrogen development by 2030

Contents (Contd.)



19

Sectors in which hydrogen shall play a key role in India by 2035



20

India's ability to sustain global competitiveness in hydrogen space



21

Hydrogen trade routes and development in India by 2050



22

Status of India as a hydrogen market by 2050



24

Top companies investing in hydrogen production & electrolysis development in India



25

Top companies investing in hydrogen production & electrolysis development in India



#Bridging gaps in Market Research

Introduction

Hydrogen has been in the buzz from last couple of years across the globe as many countries have already pushed for concrete steps for its development in order to formulate a robust future where the carbon emissions are neutralized. India is not different either with national level hydrogen policy already in place with subsequent investments, incentives and other enablers in place. Many of the Indian state's have started recognizing the role which hydrogen potentially can play in limiting carbon emissions and thus drafting dedicated policy levers to enable their transition to low carbon economies leading the country to be one eventually.

Hence, to develop a comprehensive and deeper understanding of the ongoing intent and transition of India towards a low carbon economy with large scale shift to renewables and adapting pathways for new energy alternative like green hydrogen Eninrac established a framework to analyze the development in a phased manner. After the framework got established market surveys were designed to get concrete feedback for the overall hydrogen and green hydrogen development landscape in India.

The survey is focused upon three main categories of current status, key drivers/enablers to the market and the outlook for development, investments, and value chain for hydrogen in the quest of India to transition into a low carbon hydrogen economy. We thank you for your interest in Eninrac Market Survey Research, and we hope the insights that follow prove thought-provoking and useful.

Ravi Shekhar

Managing Director
Eninrac Consulting Private Limited

Nitika Sharma

Senior Vice President
Eninrac Consulting Private Limited

Abhishek Painuli

Senior Designer
Eninrac Consulting Private Limited

ROADMAP

ROADMAP **1**

Hydrogen Policy

Need for concrete/comprehensive national level hydrogen policy in India

Survey question



Do you think there is a need for a more concrete/comprehensive National Hydrogen Strategy & Policy in India?

Yes, India needs one

84.8%

No, Current policy is good

3.40%

May be, India needs one

11.80%

No idea about hydrogen

0%



ROADMAP 2

Hydrogen Mobility

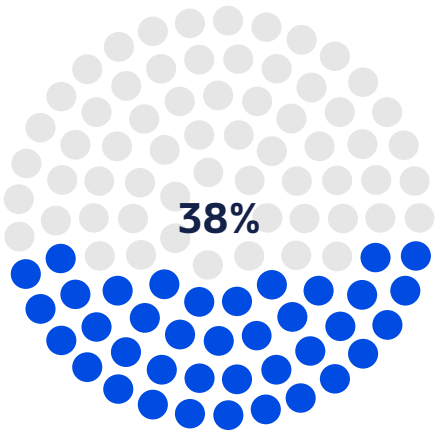
Application most suitable for hydrogen mobility in India

Survey question

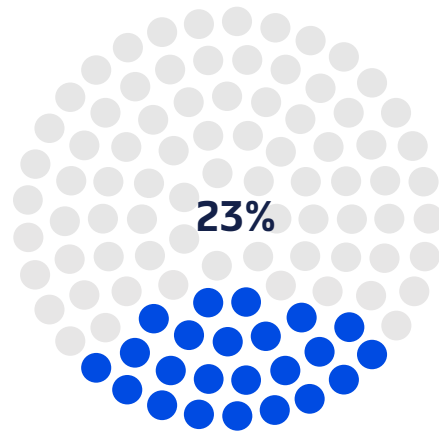


Which application will be most suitable for hydrogen mobility in India? (% of respondents)

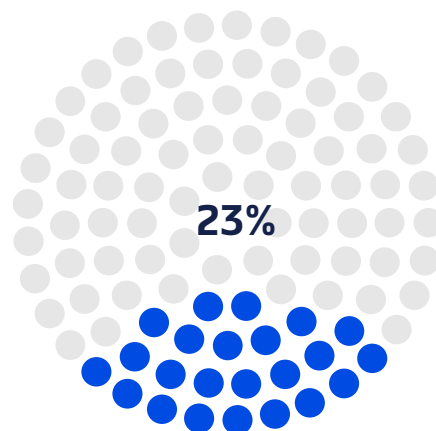
Hydrogen fuel cell vehicles (FCEVs)



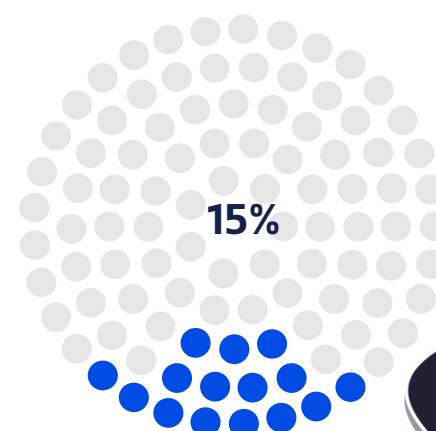
Hydrogen Internal Combustion Engines (ICEs)



Hybrid Hydrogen Vehicles (HHVs)



Hydrogen as Refueling Option (FCEVs)



ROADMAP **3**

Hydrogen Valleys

Major drivers for setting more hydrogen valleys in India

Survey question



Which initiatives could prove as a major driver for setting more H₂ valleys in India?

Public-Private-Partnership (PPP) for "Hydrogen Valleys"

67%

Clear Hydrogen Policy Roadmap for India

33%



ROADMAP 4

Hydrogen Certificates

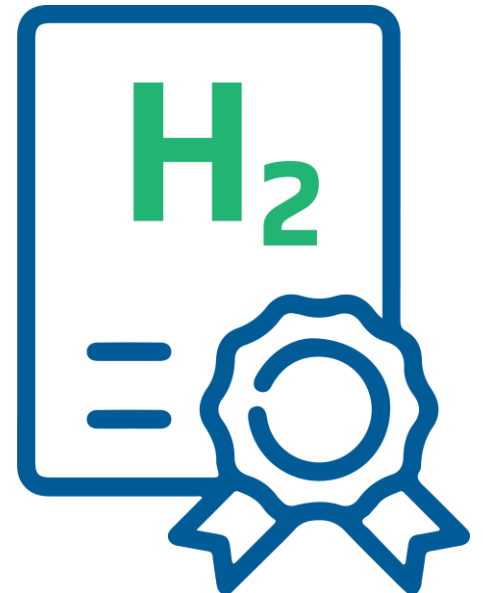
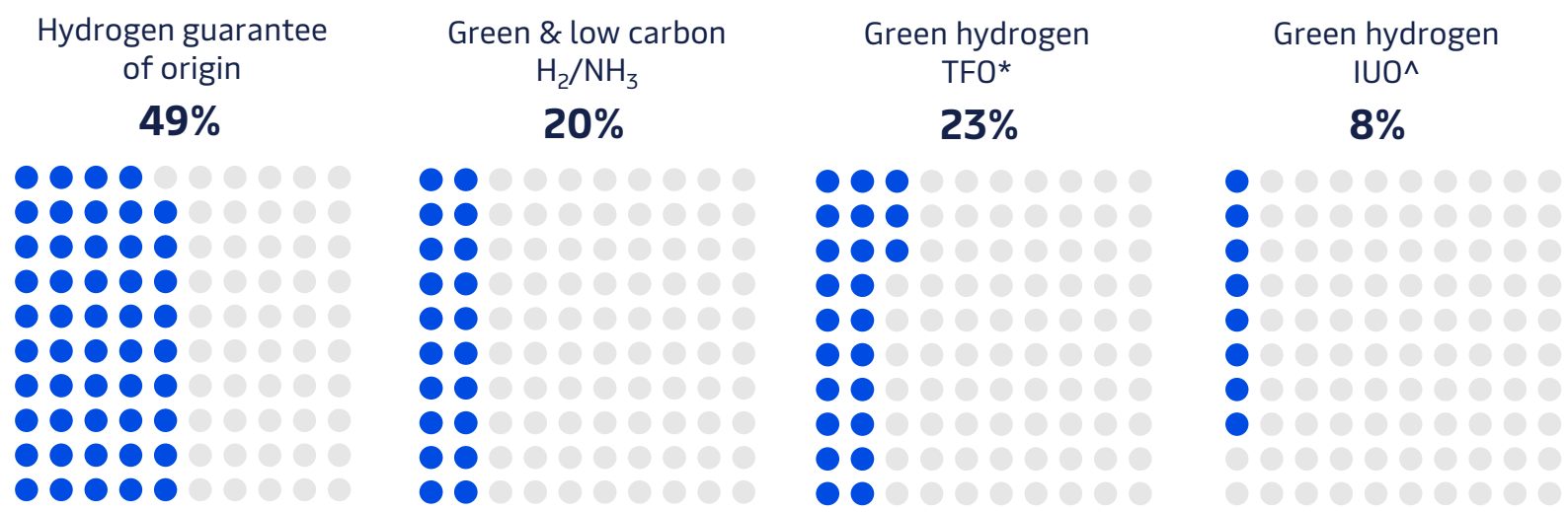
Possible pathways for Hydrogen in India

Survey question

*TFO: Transport Fuel Obligation
^IUO: Industry Use Obligation



If hydrogen certificates are to be introduced in India, what will be the possible pathways?



DRIVERS

DRIVERS **1**

Capital Subsidy

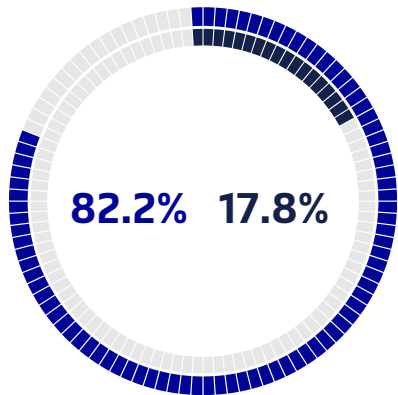
Level of capital subsidy most suited for driving hydrogen adaptation in India

Survey question

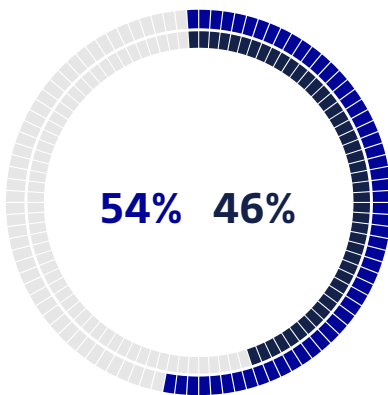


What should be the ideal capital subsidy (in \$/kg) in India for encouraging investment in Green H2?

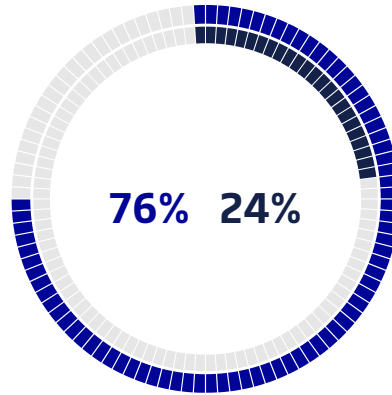
Capital subsidy above US\$ 3.50



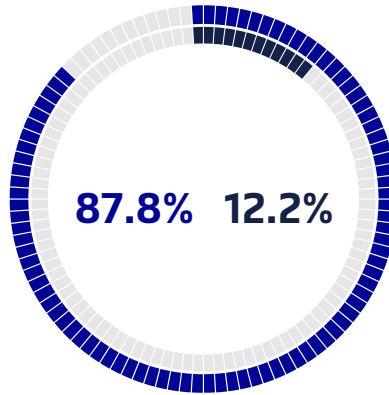
Capital subsidy from US\$ 2 – US\$ 3.50



Capital subsidy from US\$ 0.5 – US\$ 2



Capital subsidy upto US\$ 0.5



DRIVERS **2**

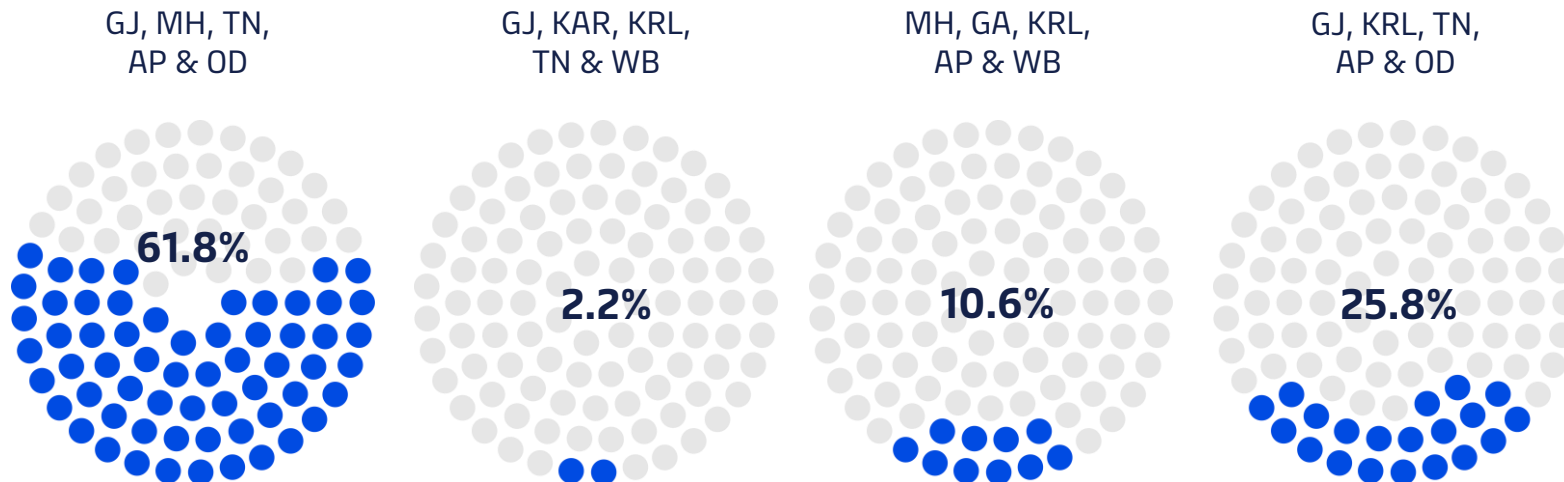
Hydrogen Ecosystem

Combination of coastal states preferred for port-based hydrogen ecosystem in India

Survey question



Which combination of Coastal states in India offer the best opportunity for building the port based on H2 ecosystem for Tier 1 Development?



DRIVERS **3**

Port Infrastructure

Major drivers to create hydrogen bunkers at major ports in India

Survey question



What will drive India to create Green H2 bunkers at major ports?

Government Financing

50.8%

New Shipping Guideline

6.00%

Boost to use of Gas

10.00%

Decarbonization Goals

33.2%



DRIVERS **4**

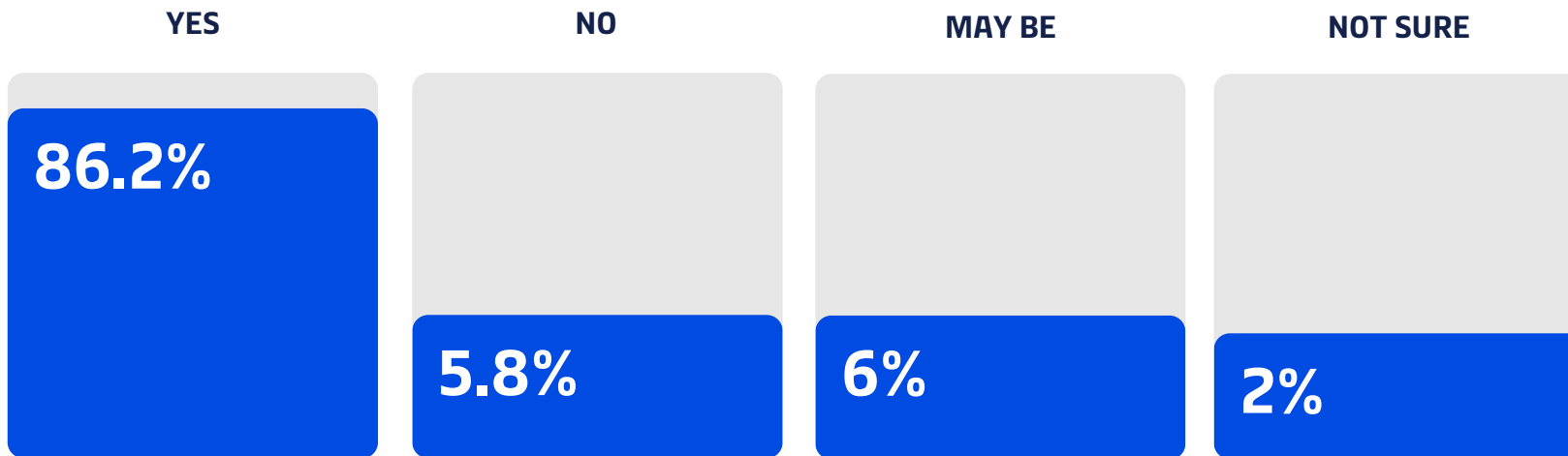
Port Ecosystem

Level of cruciality held by ports for hydrogen development in India

Survey question



Are port ecosystem expected to play a crucial role in the development & expansion of H2 market in India?



A thick, bright blue diagonal stripe runs from the bottom-left towards the top-right of the page. The rest of the background is plain white.

OUTLOOK

OUTLOOK **1**

Hydrogen Production

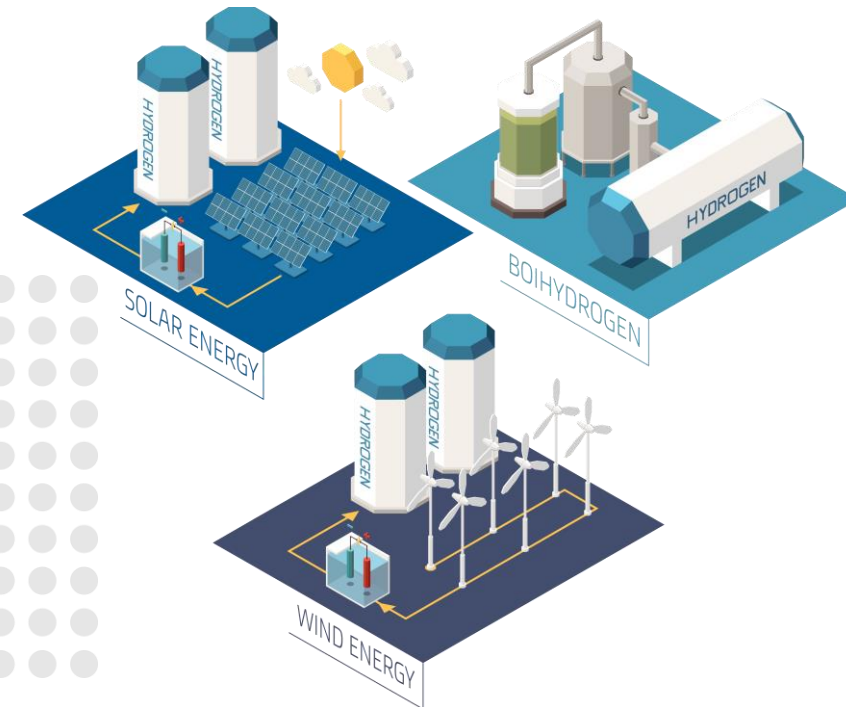
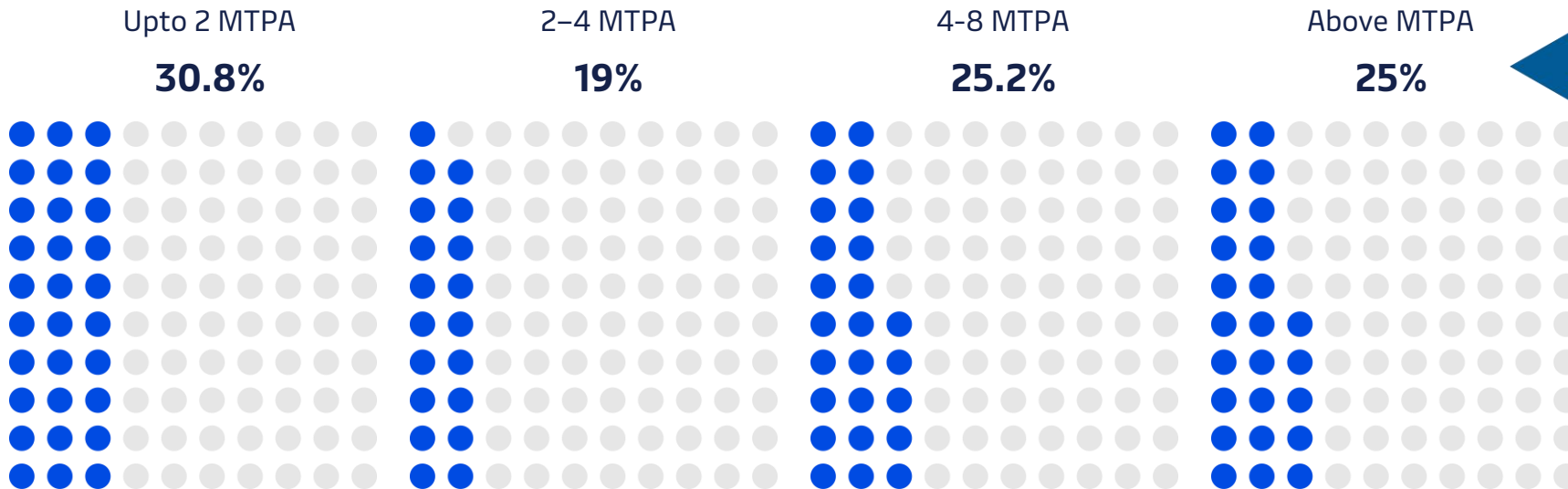
Production target likely to be achieved by 2030 for hydrogen production in India

X MTPA: Million Tonnes Per Annum

Survey question



What can possibly be the achievable target for green H2 production in India by 2030 in MTPA?



Source: eninrac hydrogen survey, July 2023, Base:2656

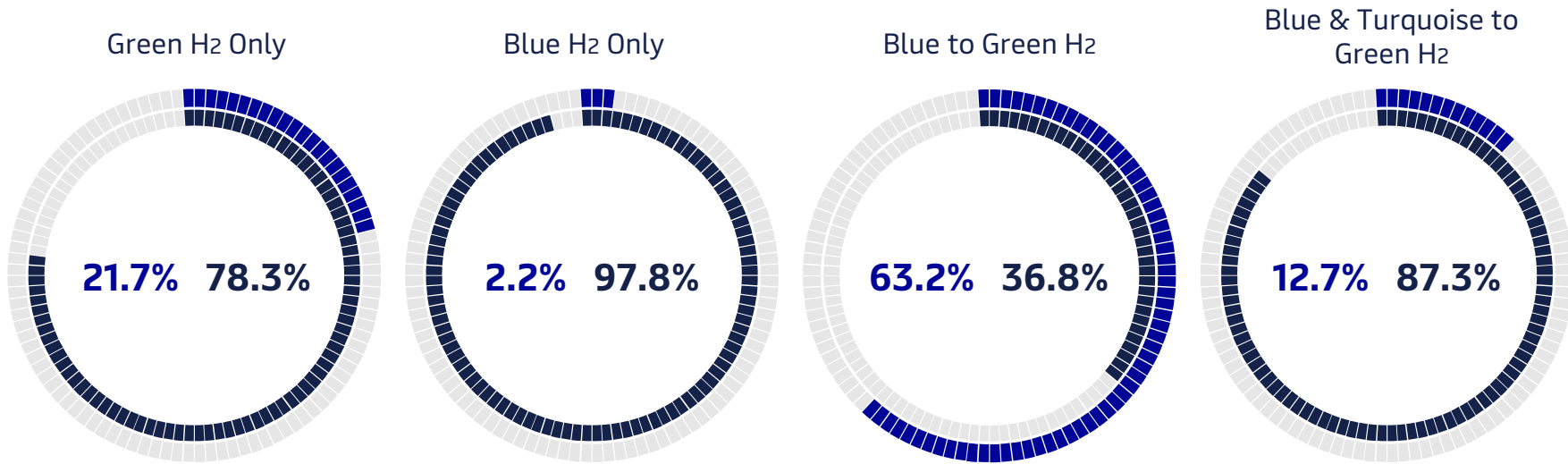
OUTLOOK **2**

Low Carbon Economy Adaptability transition roadmap of low carbon hydrogen development by 2030

Survey question



What would be the adaptability transition roadmap for low carbon H2 development in India by 2030 & beyond?



OUTLOOK **3**

Hydrogen Role

Sectors in which hydrogen shall play a key role in India by 2035

Survey question



In which sectors of the economy does India see H2 playing a key role by 2035?

Transport, Road

53.6%

Power, Balancing

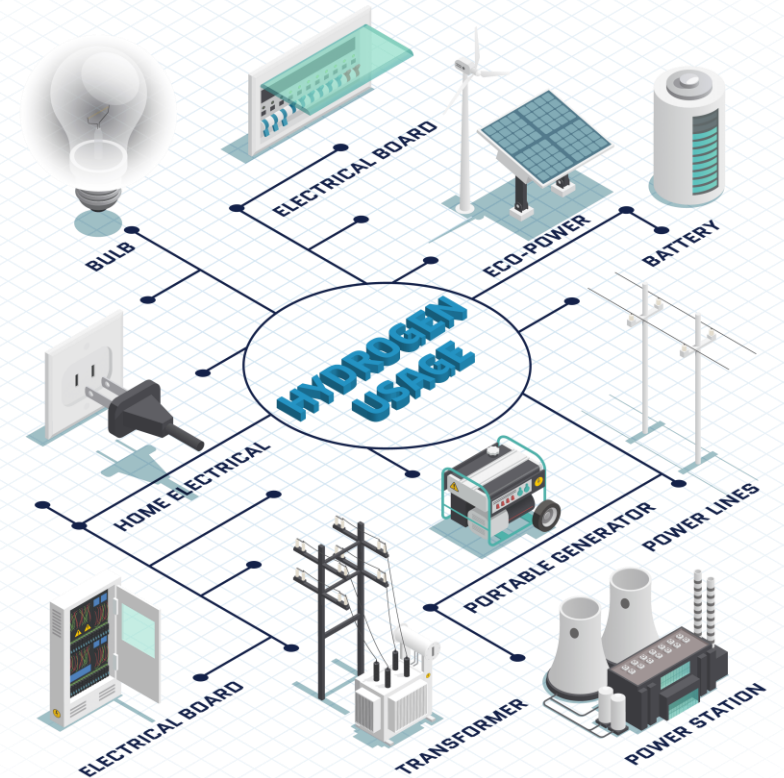
14.40%

Industry, Chemicals

25.00%

Industry, Refining

7%



OUTLOOK **4**

India's H₂ Competitiveness

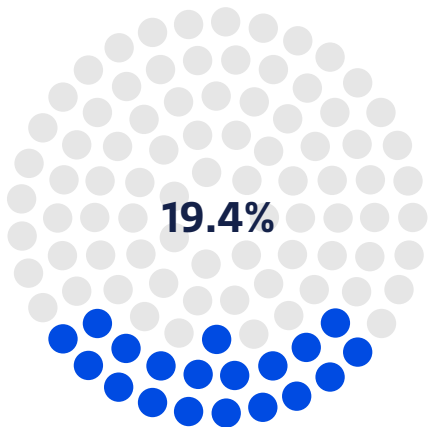
India's ability to sustain global competitiveness in hydrogen space

Survey question

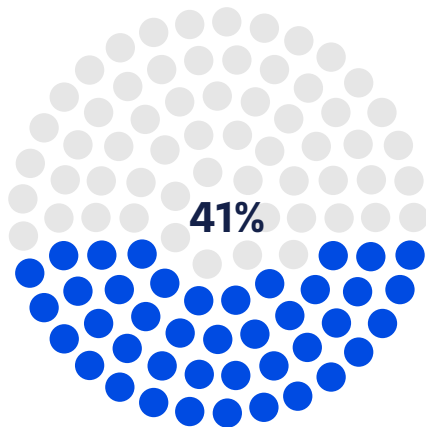


Will India be able to sustain Green H₂ global competitiveness?

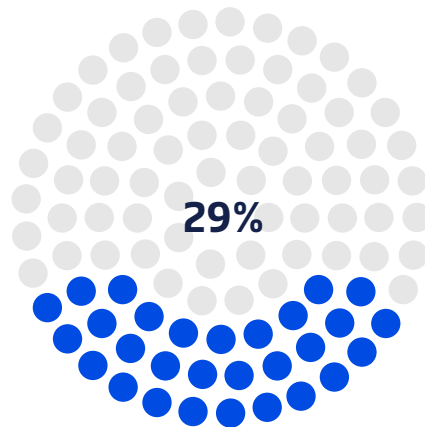
Yes, & By 2030



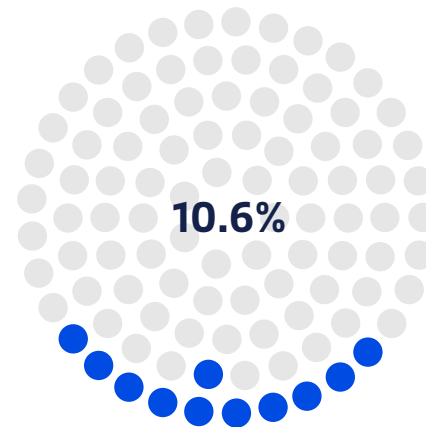
Yes, & By 2035



Likely, & By 2050



No



OUTLOOK **5**

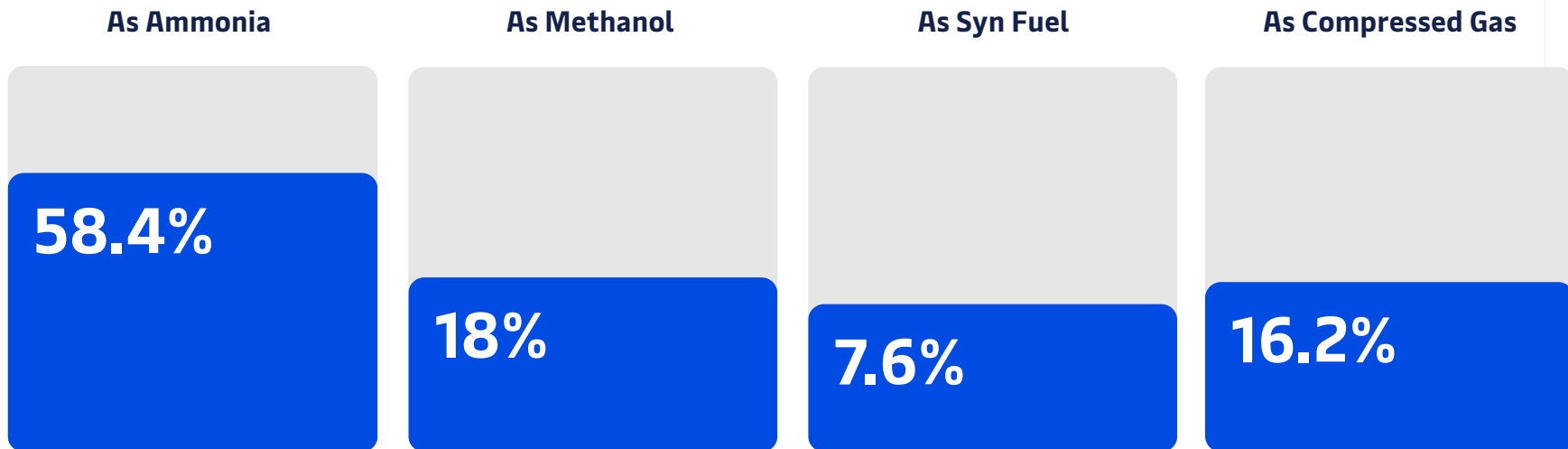
Hydrogen Trade

Hydrogen trade routes and development in India by 2050

Survey question



How will International Trade in H2 develop for India by 2050?



OUTLOOK **6**

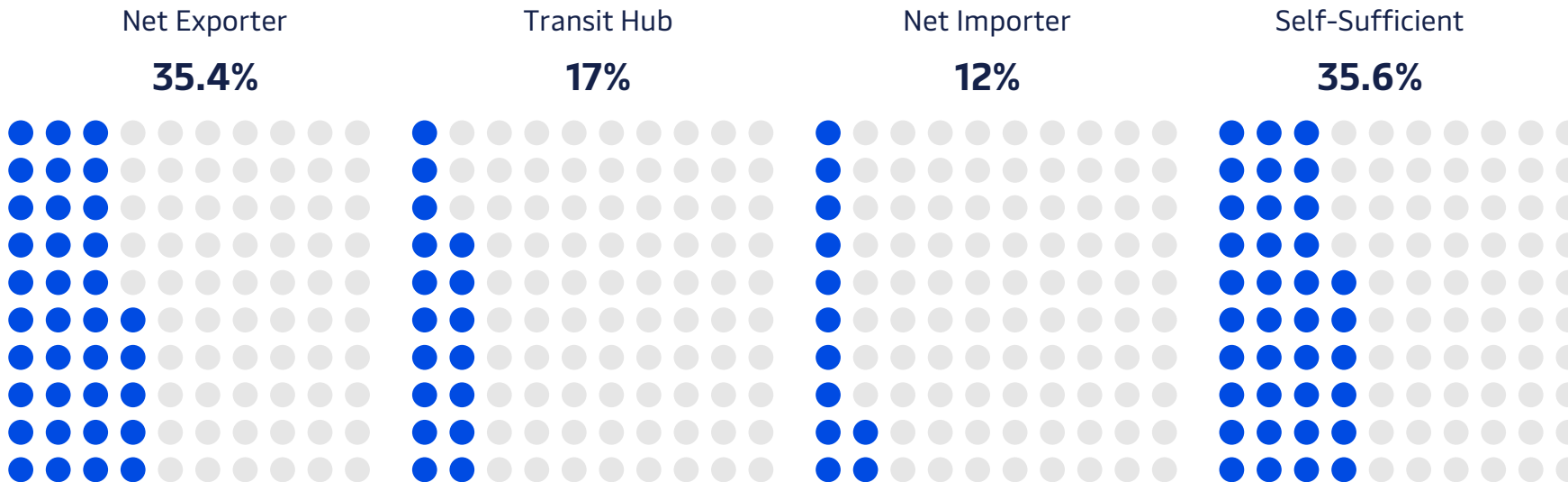
Country Status - India

Status of India as a hydrogen market by 2050

Survey question



What would be the status of India for the H2 market by 2050?





**CURRENT
INVESTMENTS**

CURRENT INVESTMENTS 1

Hydrogen Investments – Production

Top companies investing in hydrogen production & electrolysis development in India

Survey question



Which are the top 5 companies investing in Green H2 production in India?



CURRENT INVESTMENTS **2**

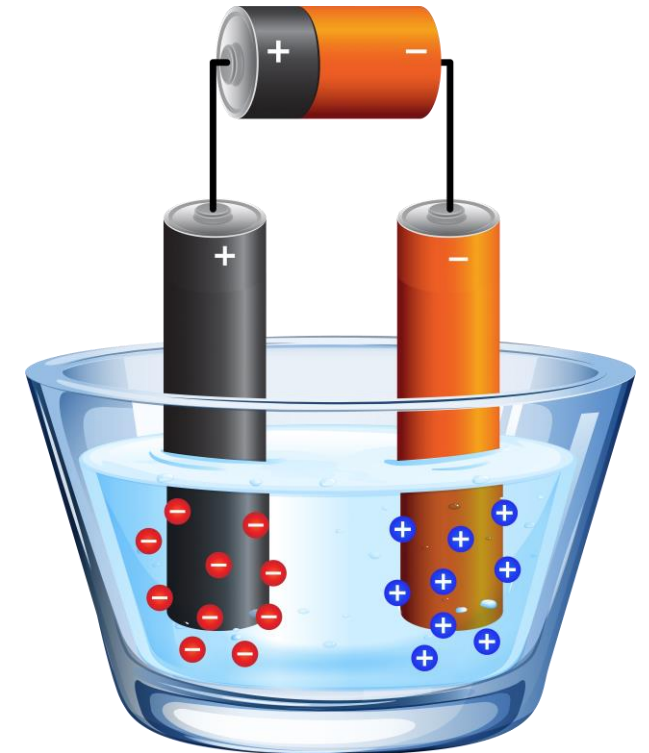
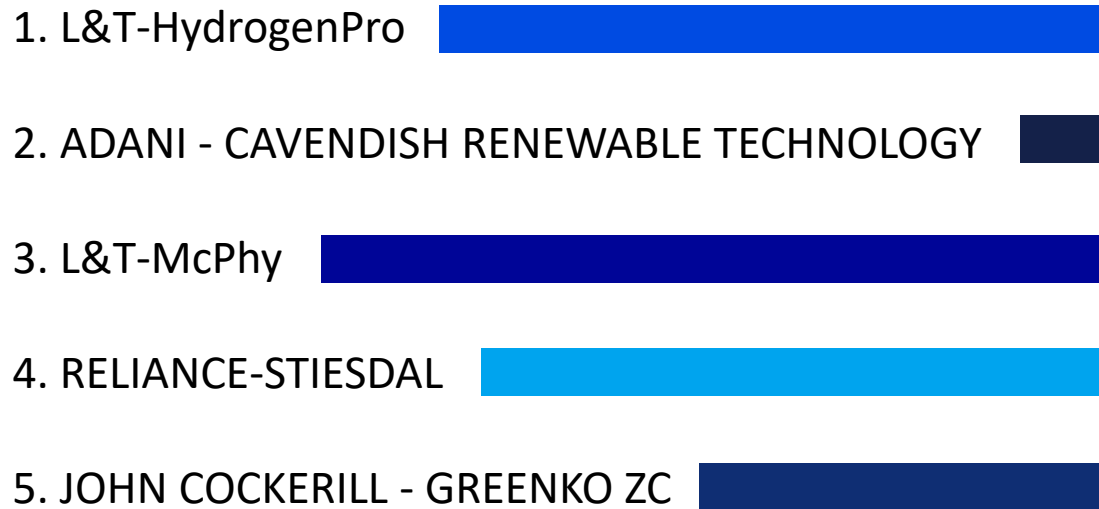
Investments - Electrolyzer Manufacturing

Top companies investing in hydrogen production & electrolysis development in India

Survey question



Which are the top 5 companies investing in electrolyser manufacturing in India?



Truth is ever to be found in the simplicity, and not
in the multiplicity and confusion of things

– **sir Isaac Newton**

WRITE OR CALL TO US

at connect@enirac.com / nsharma@enirac.com

+91 9319048963 / +91 9319047963

NCR : 3rd floor, Joy Tower, C-20, 1/1A, C Block, Phase 2, Industrial Area, Sector 62, Noida,
Uttar Pradesh - 201301