



## INDIA: TAKING THE GREEN HYDROGEN WAY

Bangalore & Mumbai



MINISTRY OF INDUSTRY  
AND TRADE OF THE  
CZECH REPUBLIC



EXPERT NA VÁŠ EXPORT

# INDIA AS GREEN HYDROGEN HUB

On the 75<sup>th</sup> Independence day Prime Minister of India Narendra Modi announced that India is moving towards 450GW renewable energy with India taking the path of being the Green Hydrogen Hub for the world.

## Major Objectives:

- Becoming energy independent, reducing import of energy (current value 12 lakh crore)
- Energy Security
- Integration of Renewables
- Decarbonization of sectors
- To achieve Net zero emission target by 2070.



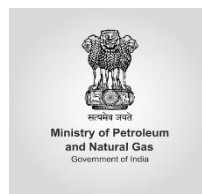
# THE LAUNCHING STEP

Government Initiatives to accelerate development in Hydrogen Energy sector:

- Indian Government has proposed spending INR 800 Cr by 2024 in its Union budget for FY 2021-22. Pilot projects, infrastructure and supply chain, research and development, and regulations and public outreach as core focus areas.
- Government as well as non-government funding agencies are engaged in R&D projects pertaining to hydrogen production, storage, utilisation, power generation and for transport applications (using either IC engines or fuel cell technologies)
- R&D projects in India focus on improving the efficiency of water-splitting reaction, and finding newer materials, catalysts and electrodes to accelerate the reaction. More than 100 research groups are focusing on fuel cell technology.



# MAJOR INDIAN PLAYERS FACILITATING HYDROGEN PROJECTS



## Government Players



## Private Players



# BIG INVESTMENT LEADING TO NEW OPPORTUNITIES

- Reliance Energy and Adani Enterprise has announced an investment of 10 Bn US\$ and 20 Bn US\$ in the Clean Energy space.
- Reliance will invest upto 8.1 Bn US\$ in 4 gigawatt factories producing decarbonization options such as hydrogen, fuel cells, integrated solar PV, and grid batteries.
- Reliance will invest upto 2.1 Bn US\$ in value chain, partnerships and future technologies.
- Adani to make all its port zero carbon emitter by 2025.
- Adani plans to invest the \$20 billion across renewable energy generation, component manufacturing, transmission and distribution businesses.



**Reliance and Adani India's biggest Business Conglomerates jointly driving India's Green Energy Vision**



# INITIATIVES LEADING THE INDIAN HYDROGEN REVOLUTION

Indian PSU, NTPC (National Thermal Power Corporation) is diversifying its portfolio to include renewable energy, energy storage, energy distribution, and electric car charging. NTPC intends to commercialize the production of green hydrogen directly helping decarbonizing industries like transportation, energy, chemical, fertilizer, steel, and others.

Indian Oil has set a target of converting at least 10% of its hydrogen consumption at refineries to green hydrogen soon.

Engineering major, L&T, has announced that it will set up a green hydrogen plant at its Hazira complex. The company plans to spend between INR 10-50 Bn on its green initiatives, spread over several years.



Hydrogen Filling station by Indian oil and Hydrogen fuelled three wheeler by IIT Delhi and Mahindra & Mahindra

# CHALLENGES IN HARNESSING HYDROGEN POTENTIAL IN INDIA



Expensive production of Hydrogen

Lack of manufacturers of fuel cells , electrolyzers, refueling stations

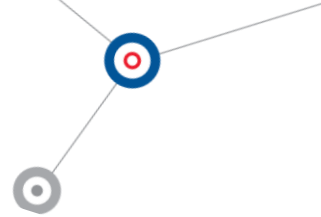
Slow Development of hydrogen infrastructure

Need for efficient and pure Hydrogen for Fuel cell applications

Lack of robust supply chain network

Lack of Hydrogen storage facilities and delivery networks

# OPPORTUNITIES IN ENHANCING HYDROGEN POTENTIAL IN INDIA



Wide application of hydrogen making it versatile for cross sector use

Opening gateway for advanced energy storage technologies

Solutions enabling easy transition of major industrial infrastructure to adopt hydrogen green economy

Offering cost effective fuel cells, electrolyzers and refueling station solutions

Offering solution for seawater electrolysis

Increasingly conducive business environment in India



# HYDROGEN MISSION FROM CZECH TO INDIA



Czech Trade Promotion Agency is organizing an incoming business mission from Czech to India in May 2022. The objective of the mission is to establish strong business networks between Czech hydrogen solution providers to Indian beneficiaries as well as sharing best practices from established Czech hydrogen economy.

**Interested Czech companies may contact:**

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Further details on exact dates and logistics will be shared eventually.