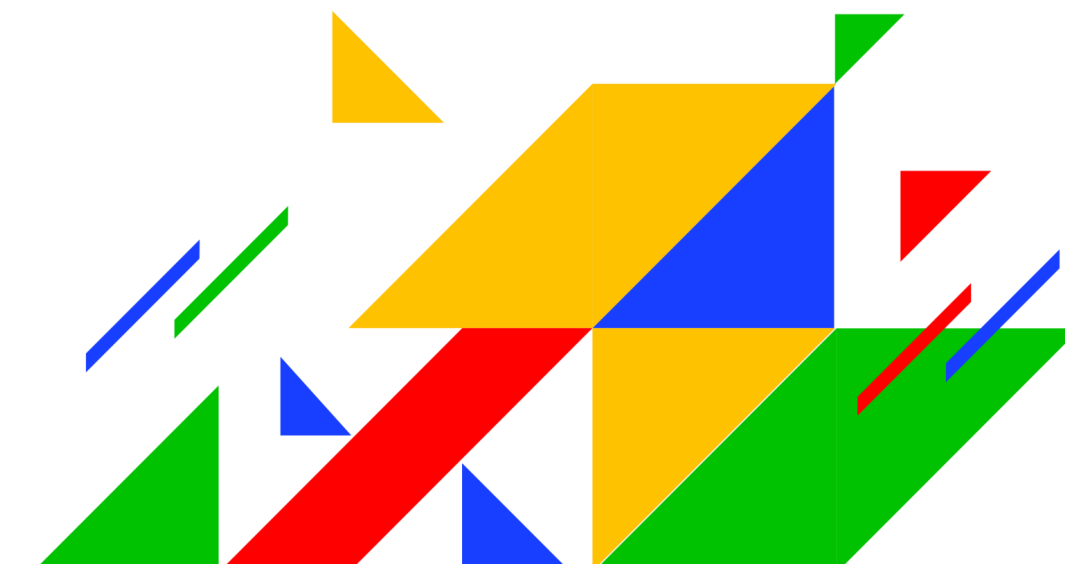




Low-Carbon Hydrogen in Brazil – Milestones and the road ahead – to COP 30 and beyond

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Background on the Brazilian Energy Matrix

- Energy Matrix – 49.1% of renewable sources
(12.6% in OECD countries average)

Electricity matrix - 89.2% of renewable sources
(32.5% in OECD countries average)

Source: National Energy Balance 2024.



H2 programs outside China

- ▶ United States – Since 2021, USD 9.5 billion in funding and USD 8 bi for clean hydrogen hubs, incentives of up to \$3 kg for green H2.

European Union – Since 2020, phased approach (by 2024 – 6GW of electrolyzers and 1 million tonnes of green H2 / by 2030 – 40 GW of electrolyzers capacity and 10 million tonnes of green H2.)

Germany – Since 2020, target 5GW of electrolyzers capacity by 2030 and 10GW by 2035.



The PNH₂

- ▶ Brazil's National Hydrogen Program (2022)
7 guidelines and 6 areas of work.

Workplan (2022-2025)

Low-Carbon Hydrogen Law (August, 2024)

Low-Carbon Hydrogen Development Program (September, 2024)





The PNH2

Area 1 – Technology

Area 2 – Capacity building

Area 3 – Energy resources planning

Area 4 – Legal and regulatory framework

Area 5 – Neoliberalisation and market regulation

Area 6 – International Cooperation

Workplan

2023 - 2025

- Definition of the Strategy and activities at the operational level under the responsibility and management of Thematic Chambers

Objective guide the promotion and development of hydrogen economy.

65 Tasks



Disponível em: <https://www.gov.br/mme/pt-br/assuntos/noticias/PlanodeTrabalhoTrienalPNH2.pdf>

Milestones in the Brazilian Workplan

2025 – Pilot projects across the country

2030 – Brazil as the most competitive producer of low-carbon H₂

2035 – Strong hubs of low-carbon hydrogen in Brazil

Low-Carbon Emission Hydrogen Law

► Law n° 14.948/2024



▪ Brazilian System for hydrogen certification

- ✓ Based on carbon footprint and life cycle analysis
- ✓ Certification system authority, regulator, accreditation body, registration body (conducted by existing institutions)



▪ Tax incentives to investment, production and use

- ✓ Rehydro → Incentives for low-carbon hydrogen projects



▪ Regulation on hydrogen, including natural H₂

- ✓ To be conducted by ANP (National Agency for Oil, Gas and Biofuels)

Low-Carbon Hydrogen Development Program

► Law 14.990/2024 establishes ceilings for the tax incentives to be provided.

✓ 2028 – 1.8 bi R\$ (around 22.6 亿 RMB)

✓ 2029 – 2.9 bi R\$ (around 36.5 亿 RMB)

✓ 2030 – 4.2 bi R\$ (around 52.9 亿 RMB)

✓ 2031 – 4.5 bi R\$ (around 56.7 亿 RMB)

✓ 2032 – 5 bi R\$ (around 63 亿 RMB)

Financing

- ▶ Hydrogen projects included in the **BIP**



Plataforma Brasil de
Investimentos Climáticos e para
a Transformação Ecológica

Vale

HBI production
with hydrogen

Atlas Agro

Green fertilizers
produced with
hydrogen

Fortescue

H2 production

Hubs



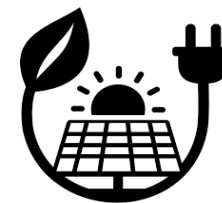
Projects:

- ✓ Northeast: BA, PE, CE, MA, PI, RN e SE;
- ✓ North: PA;
- ✓ West: GO, MS;
- ✓ Southeast: MG, RJ e SP;
- ✓ South: PR; RS e SC.



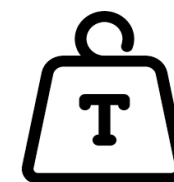
Products:

- ✓ Hydrogen;
- ✓ Amonia;
- ✓ Methanol.



Energy for H2 production:

- ✓ connection to SIN
- ✓ wind
- ✓ solar
- ✓ ethanol
- ✓ biomass



Production

- ✓ 1.000 a 350.000 ton/anual



Industries:

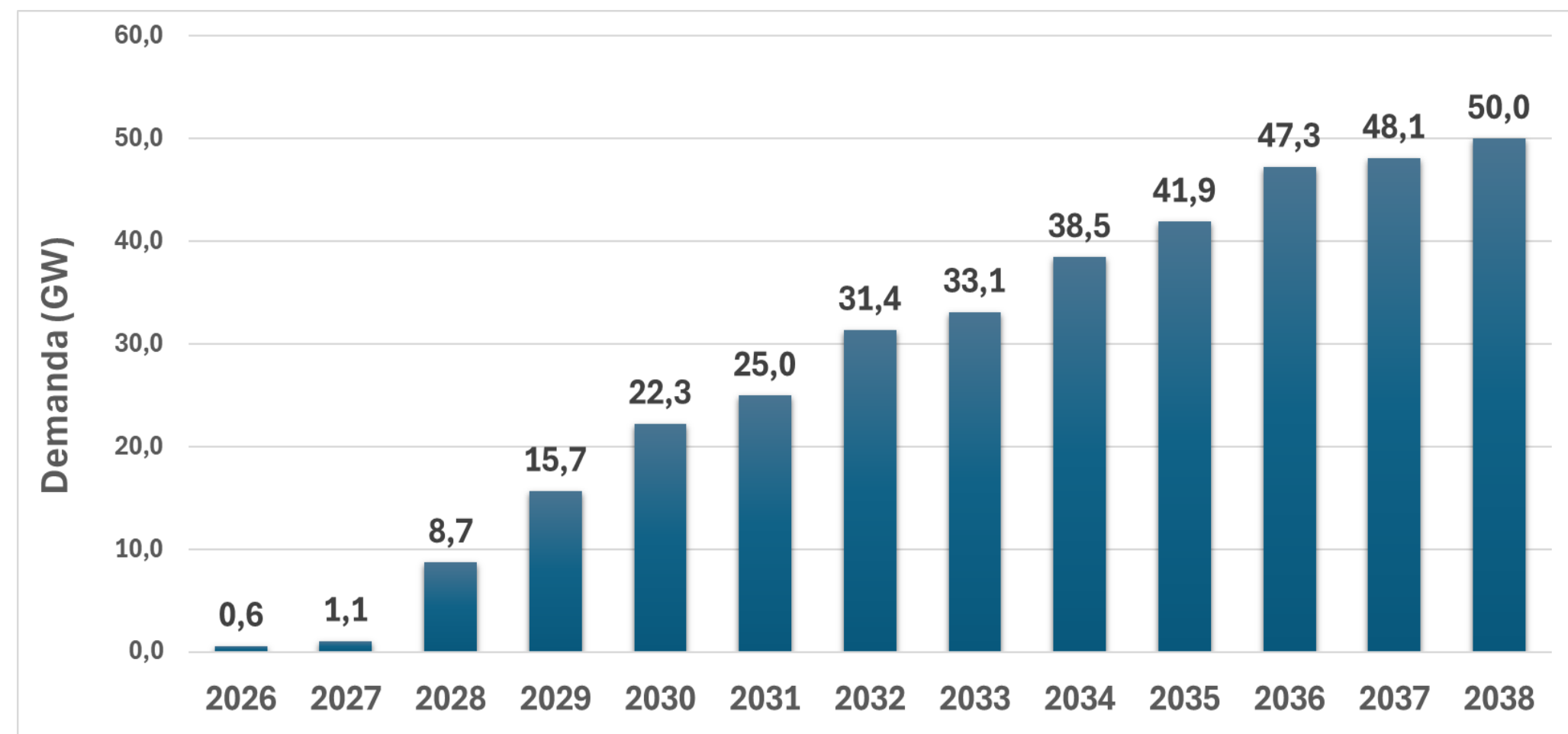
- ✓ Fertilizers
- ✓ Cement
- ✓ Chemical
- ✓ Steel mills
- ✓ Transportation



Production Cost (LCOH):

- ü 2 - 8 US\$/Kg;
- ü average 4,5 US\$/Kg

Connection to the Grid



Closing remarks

- ▶ Brazil has a long term Hydrogen strategy
- ▶ Our country has specific regulation and incentives
- ▶ Competitive advantage in low-carbon hydrogen production
- ▶ Brazil welcomes partnerships with China.



The background image shows a landscape with rolling hills and power lines. The hills are covered in green grass, and the power lines are supported by metal towers. The sky is bright and clear. On the left side of the image, there is a colorful geometric graphic consisting of various triangles and polygons in red, green, blue, and yellow. The text "Obrigado! Thank you! 谢谢!" is overlaid on the image in a bold, white font.

Obrigado! Thank you! 谢谢!