

Brazil, a future PtX hub in the making?

October 16, 2024



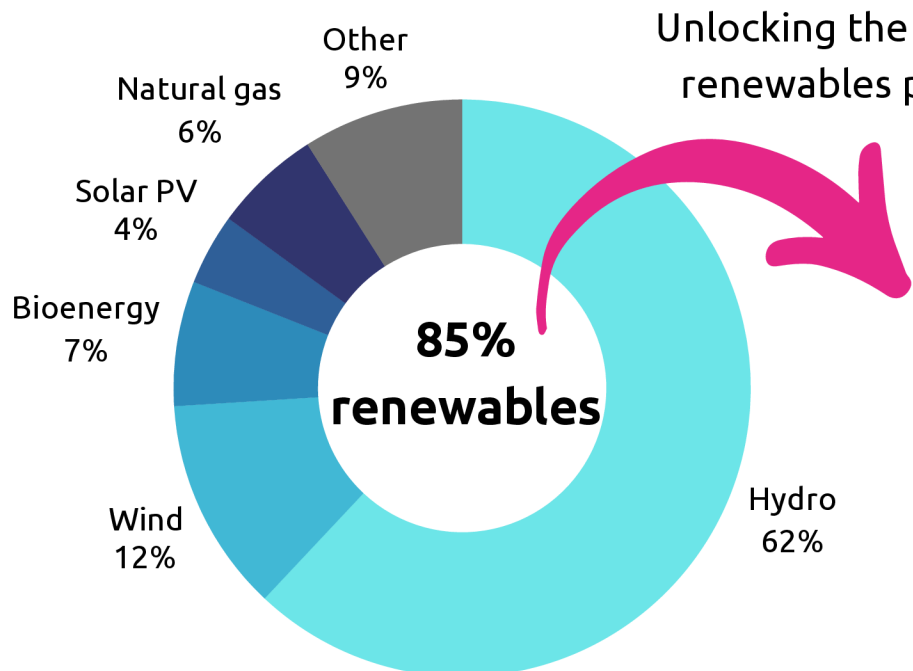
- **Excellent renewable potential**
- **4th largest consumer of fertilizers in the world**
- **Abundant biogenic CO₂ to produce e-fuels**

Abundant renewable resources allows Brazil to become a leading Power-to-X (PtX) hub

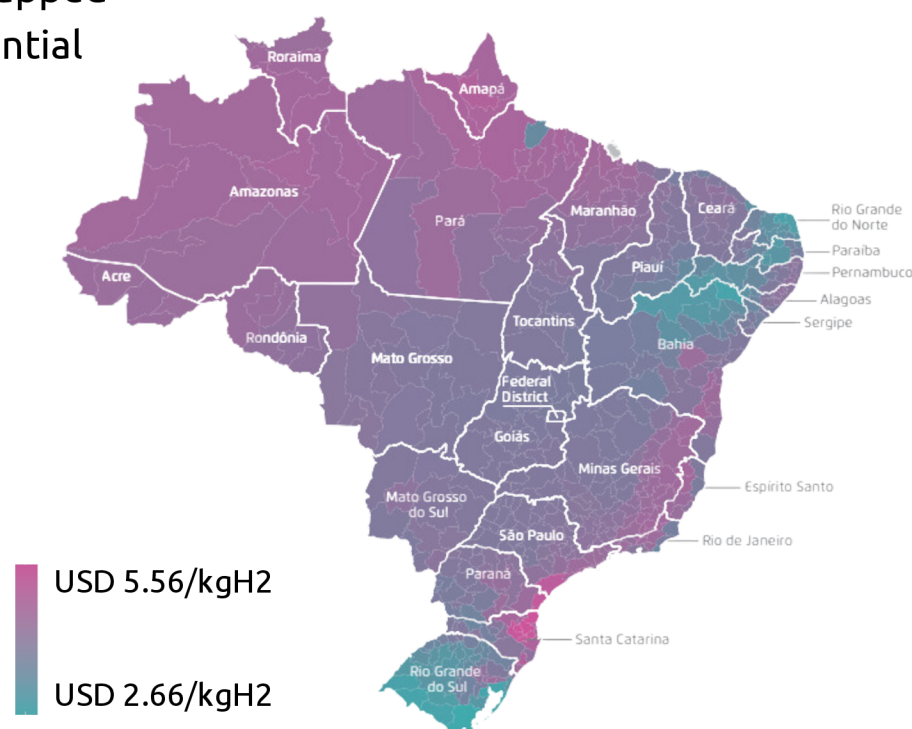


Brazil boasts a large renewables share in its electricity mix, mainly from hydropower as a baseload but also from increasing wind and solar PV capacity

Brazil's electricity mix in 2022

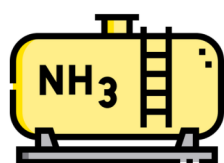


Estimated levelised cost of hydrogen (LCOH) in 2030



Source: Agora Energiewende and Agora Industry (2023)

Potential PtX products in Brazil



Ammonia



Fertilizers



Methanol and other synthetic fuels

Opportunity to increase domestic green fertilizers production



Brazil is the 4th largest fertilizers consumer in the world

46 Mt in 2021

However, it is highly dependent on foreign imports

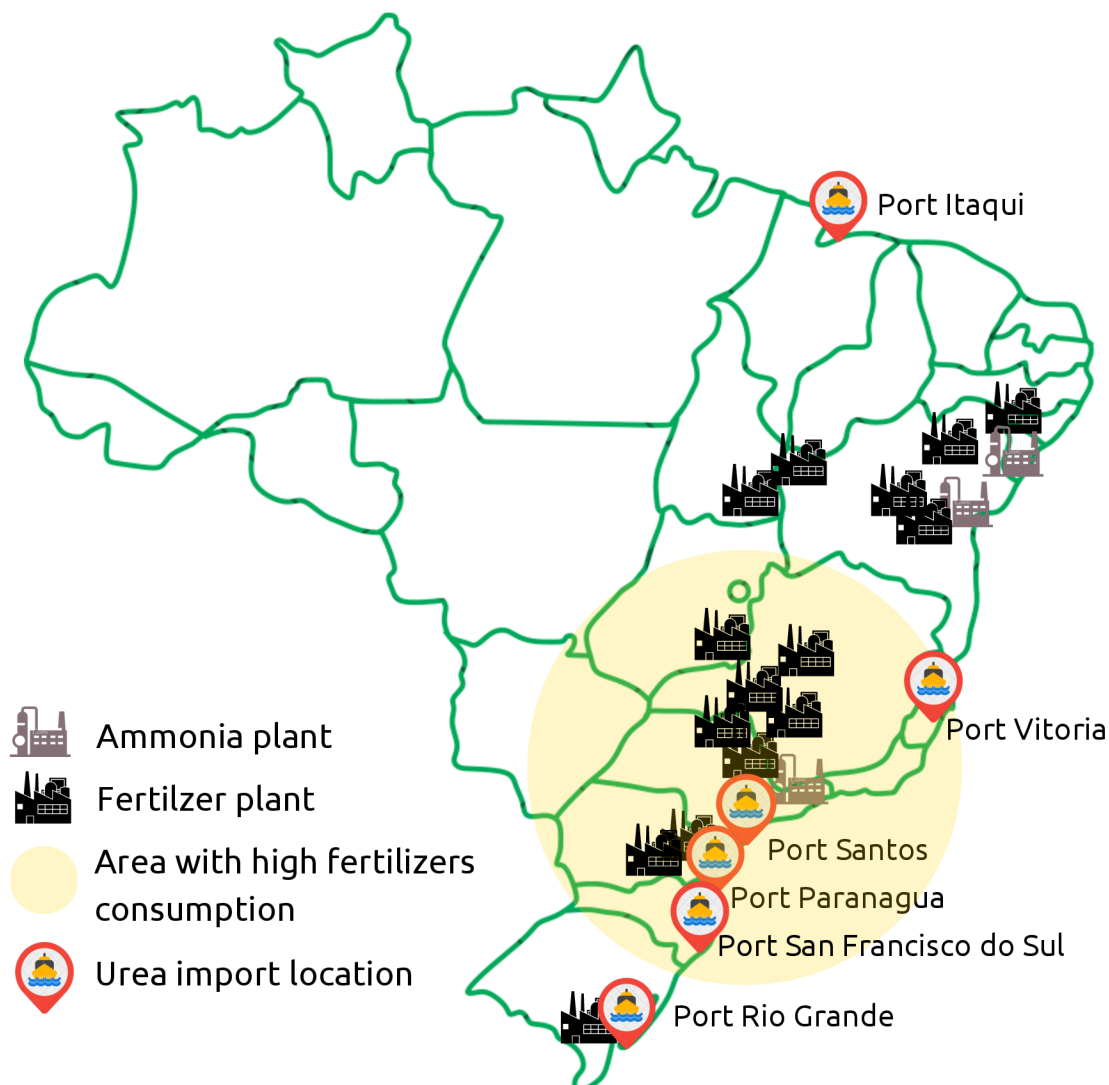
85% of total consumption
(mainly from Russia and China)

**To domestically produce
7 Mt of urea**
(2023 import amount)
with green ammonia



this would require around
**0.9 Mtpa of H₂,
7 GW electrolyser
capacity**

(assuming 80% load factor with the availability of hydro as a baseload)

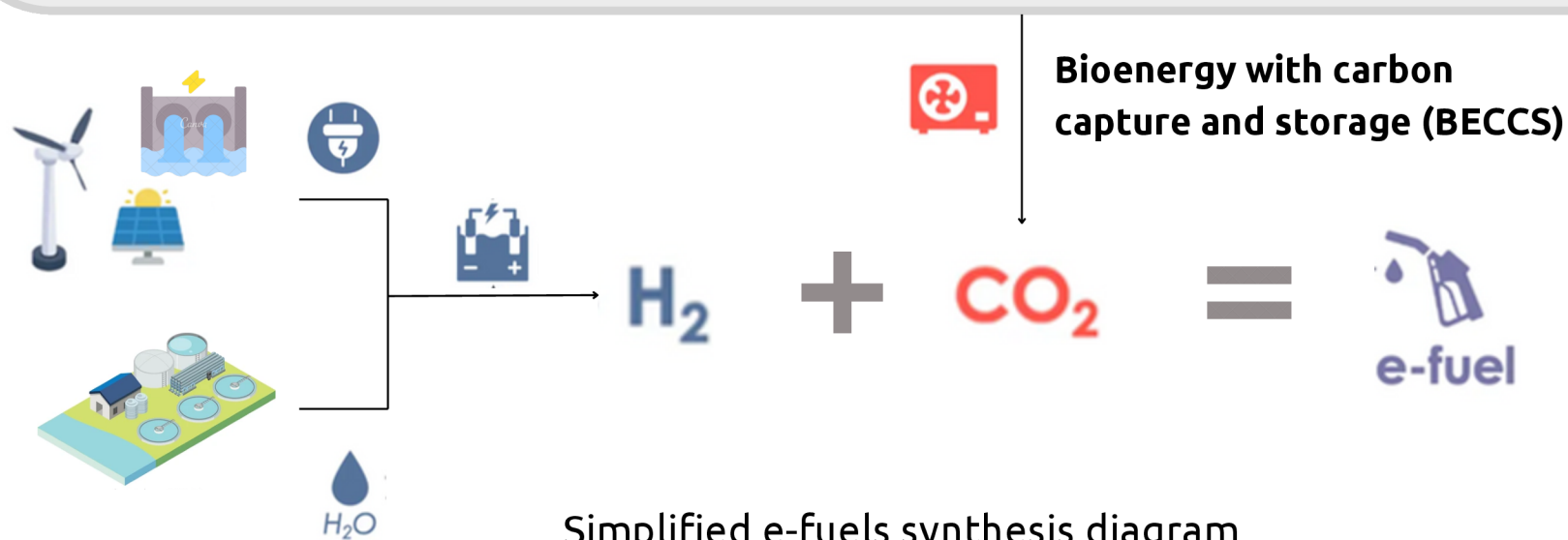
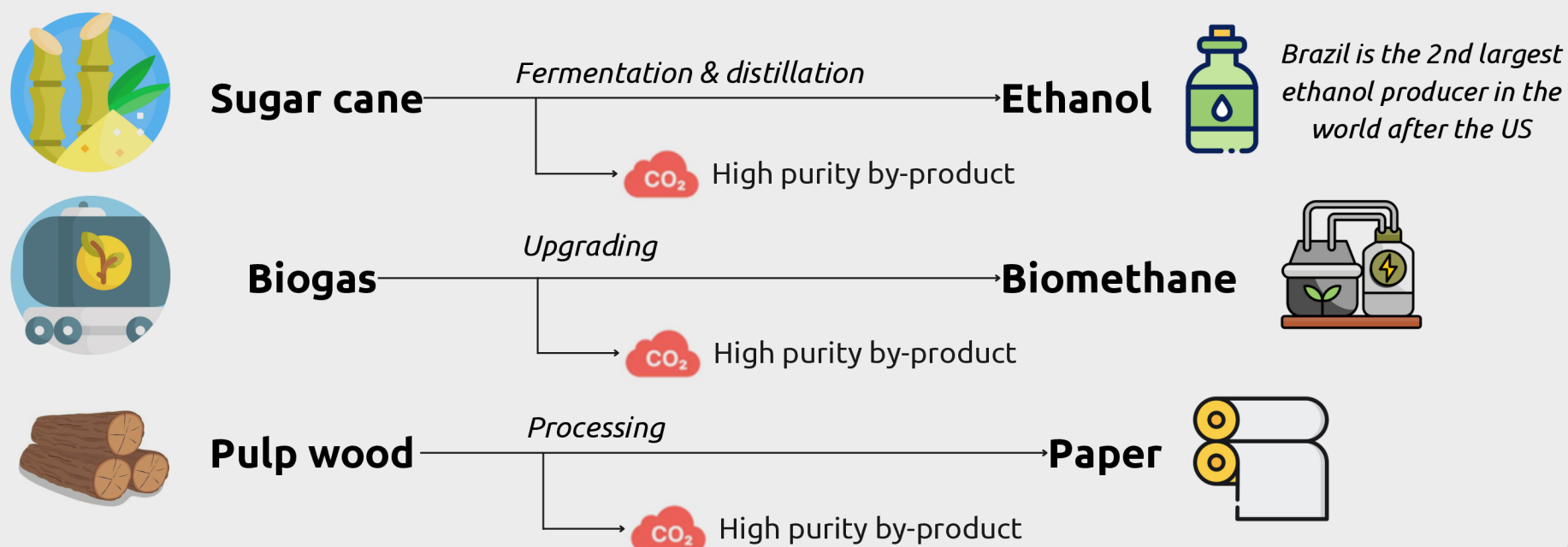


Existing bioenergy industry can contribute to e-fuels production



Brazil is uniquely positioned to capture and use biogenic CO₂ domestically from multiple sources, which is an essential feedstock for e-fuels production

Sources of biogenic CO₂ in Brazil



Simplified e-fuels synthesis diagram

Brazilian government set to maximize H2 potential through strategic initiatives



Timeline

2023

National Three-Year Plan 2023-2025

Focusing on cost-competitive hydrogen production

Low-carbon hydrogen pilot plants by 2025 across all regions of Brazil and low-carbon hydrogen hubs by 2035

2024

Tender for funding low-carbon H2 hubs

R\$6bn (\$1bn) for commercial-scale projects that contribute to decarbonizing hard-to-abate industries

Selected projects will receive financial support from Climate Investment Fund (CIF) in 2025

2028

Low-Carbon Hydrogen Development program (PHBC)

R\$18.3bn (\$3.4bn) tax credits approved for clean hydrogen producers

Subsidies will be granted via **competitive auctions between 2028-2032**, inversely proportionate to the emission intensity of the produced H2*

**The emission threshold for low-carbon hydrogen in Brazil is 7 kgCO₂e/kgH₂ which is the second highest after China's 14.5 kgCO₂e/kgH₂ and far above other countries' ceiling of 3-4 kgCO₂e/kgH₂. This is because Brazil is considering hydrogen production from ethanol reforming.*