

Hydrogen as Storage Alternative in Brazil



Glaucus R. S. Lima, Robert W. da Silva

glaucus.lima@estudante.ufjf.br, robert.william@engenharia.ufjf.br

Global July | 2023

Contents

- Context
- Hydrogen production routes
- Objective
- Reference energy system
- Scenarios
- Results
- Next steps



Context

- Hydrogen is a strategic element for the decarbonization of the global energy matrix.

- Importance:

Carbon-free

Storage

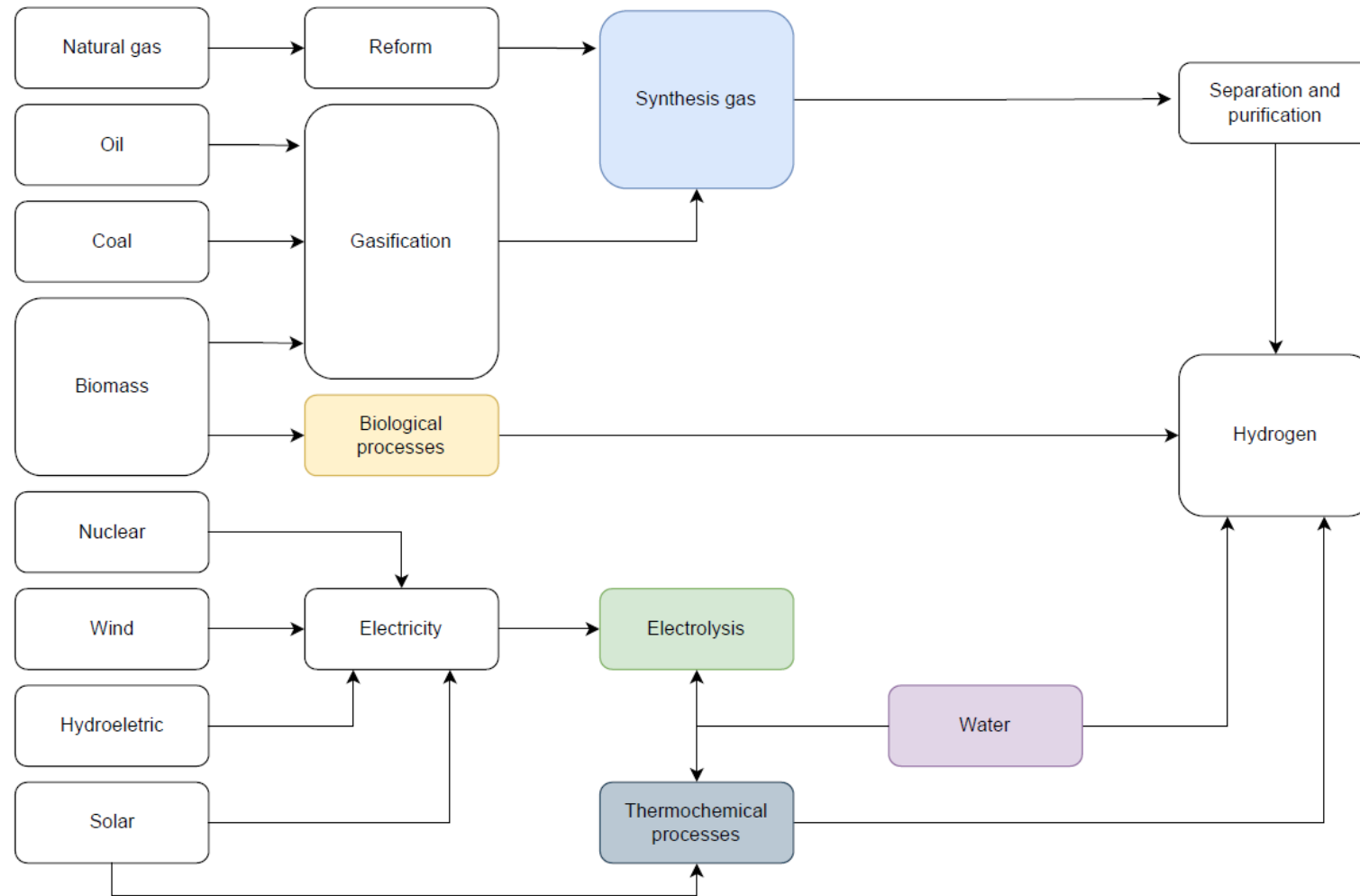
Flexibility

- Brazil:

Investment in research

Technology development

Hydrogen production routes



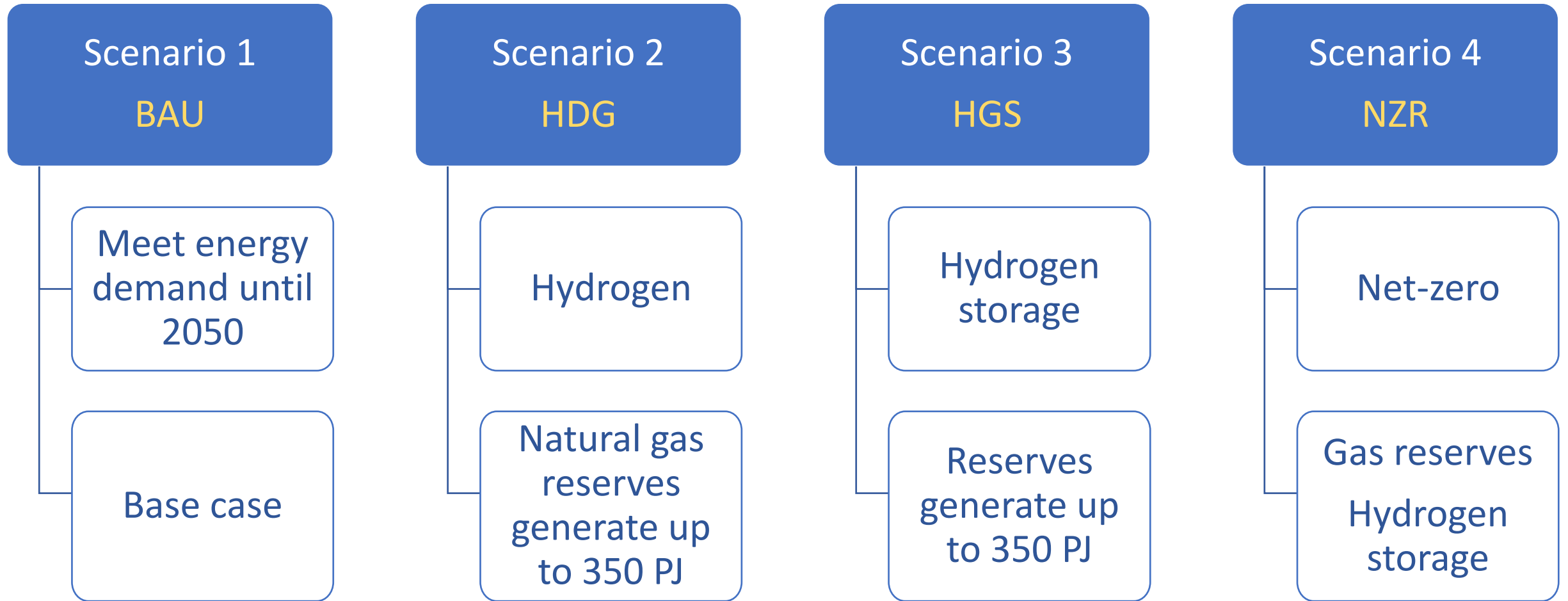
Source: Adapted from IPEA (2022) and Plazas-Niño (2023).

Objective

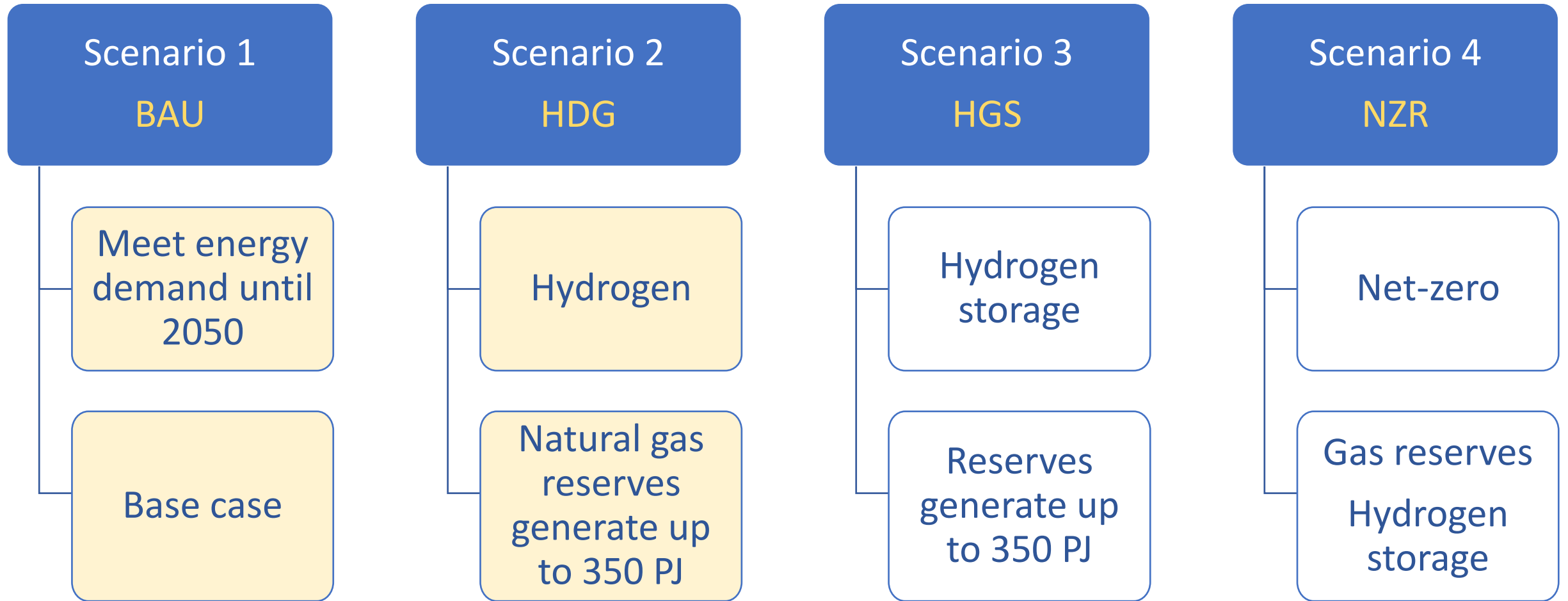
Investigate the introduction of **hydrogen** as an alternative for **storage** in the Brazilian energy system.



Scenarios

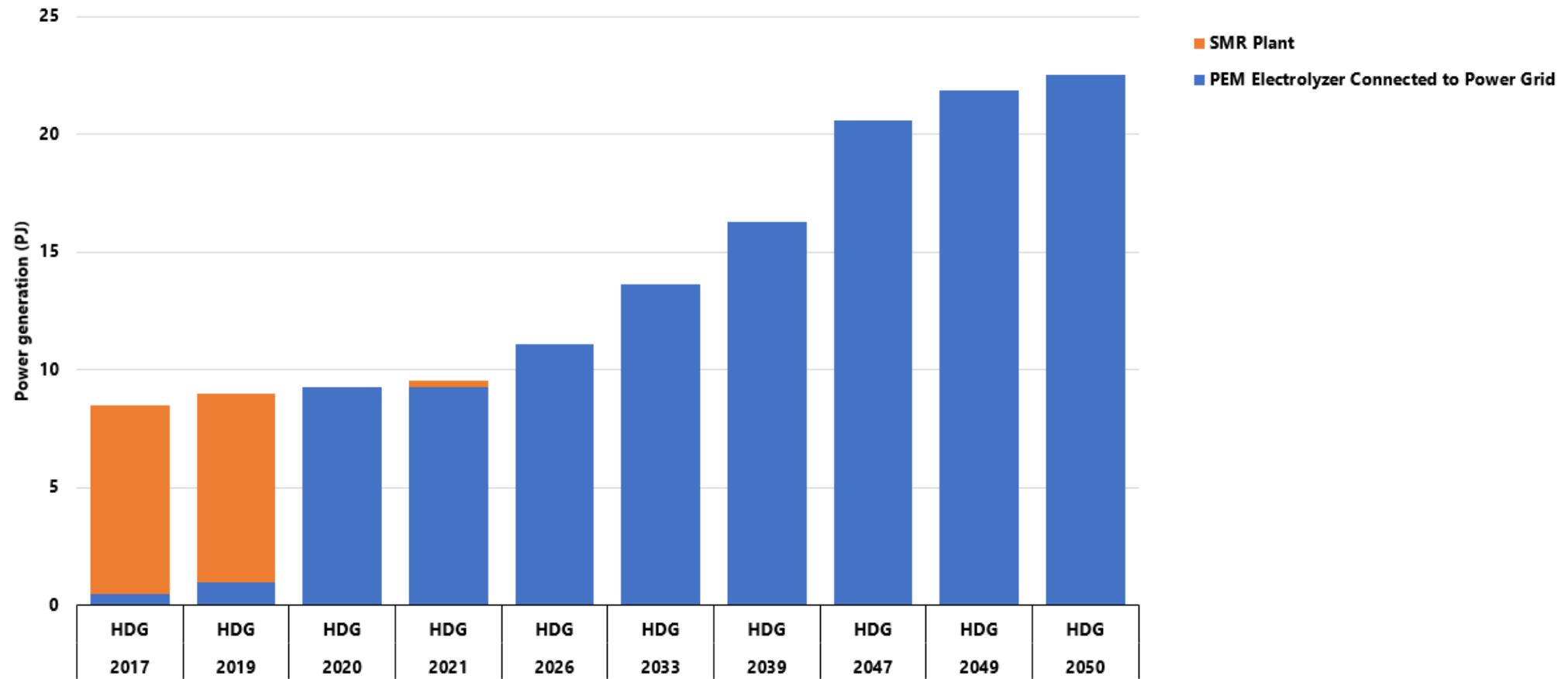


Scenarios



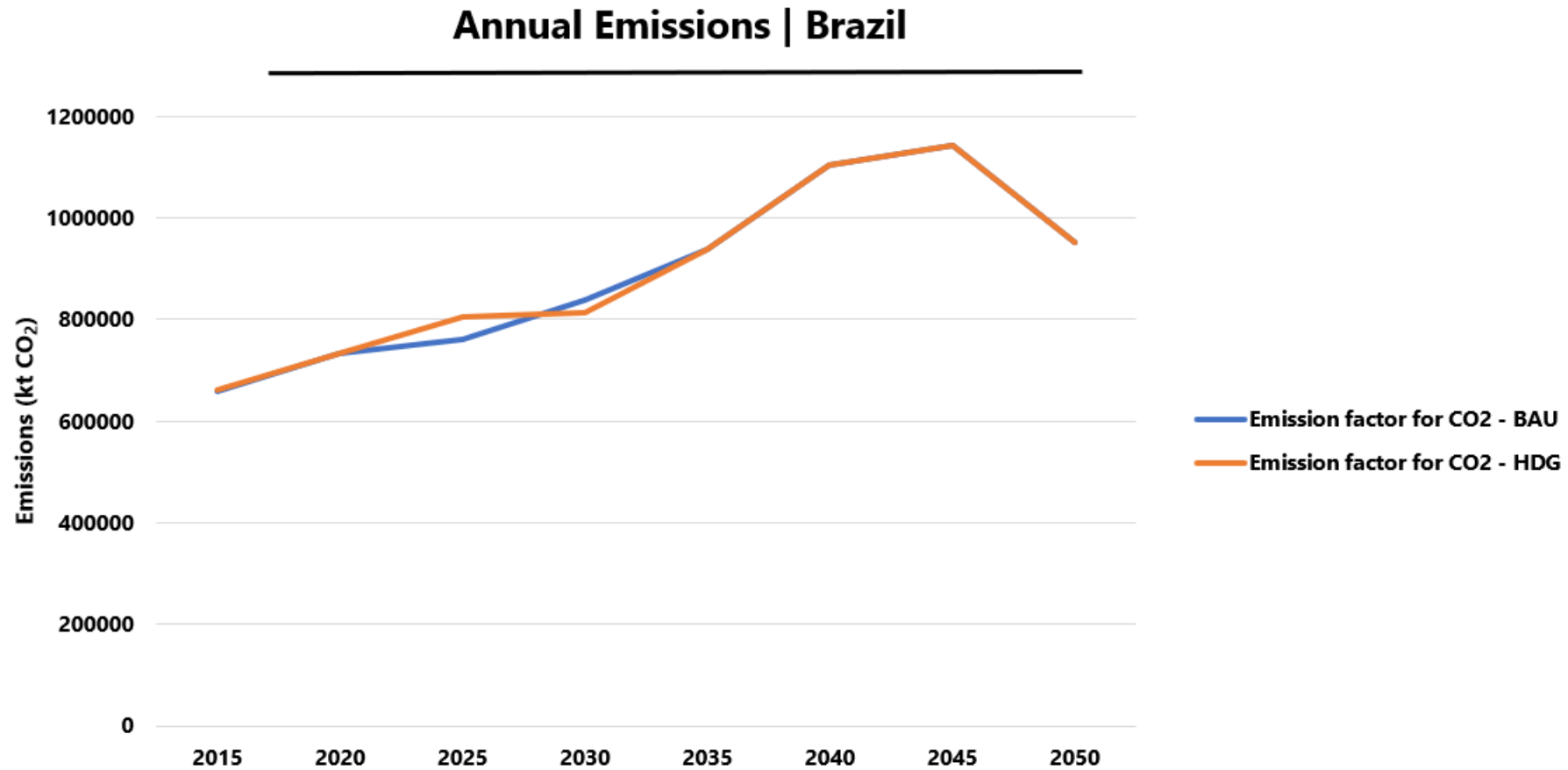
Results

Power Generation | Brazil



Source: Own authorship (2023).

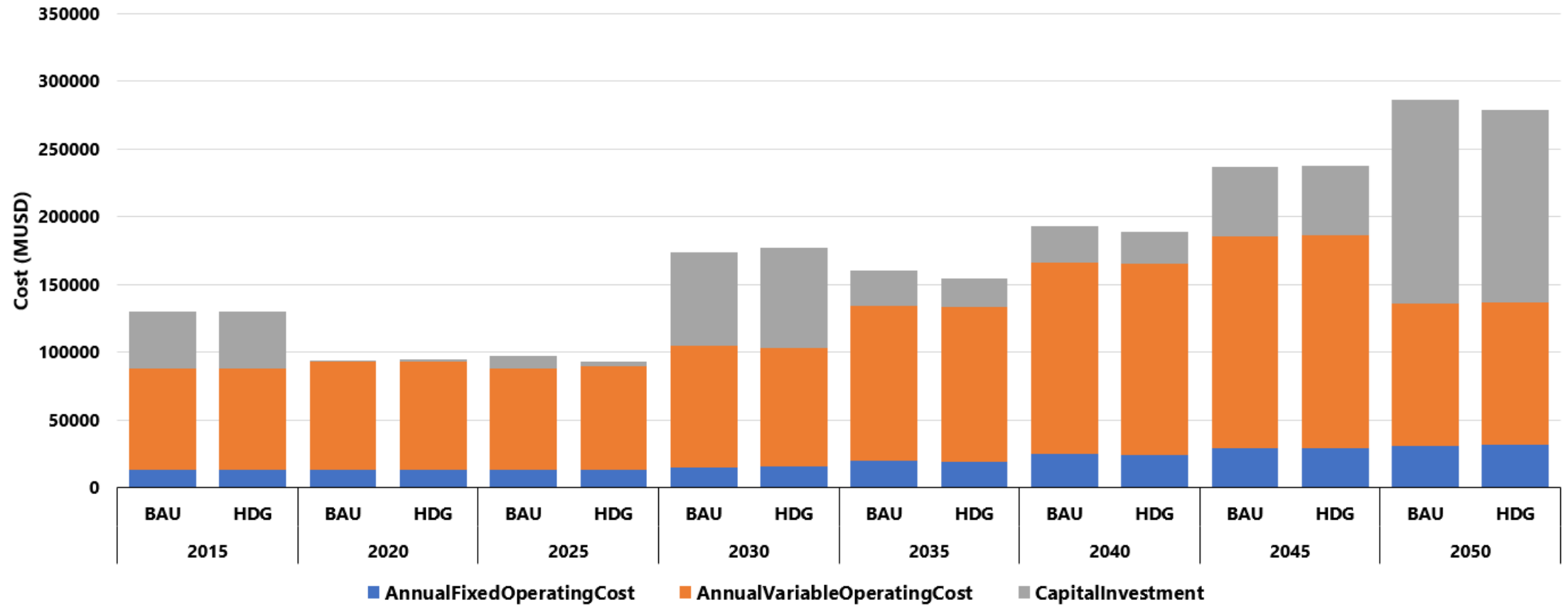
Results



Source: Own authorship (2023).

Results

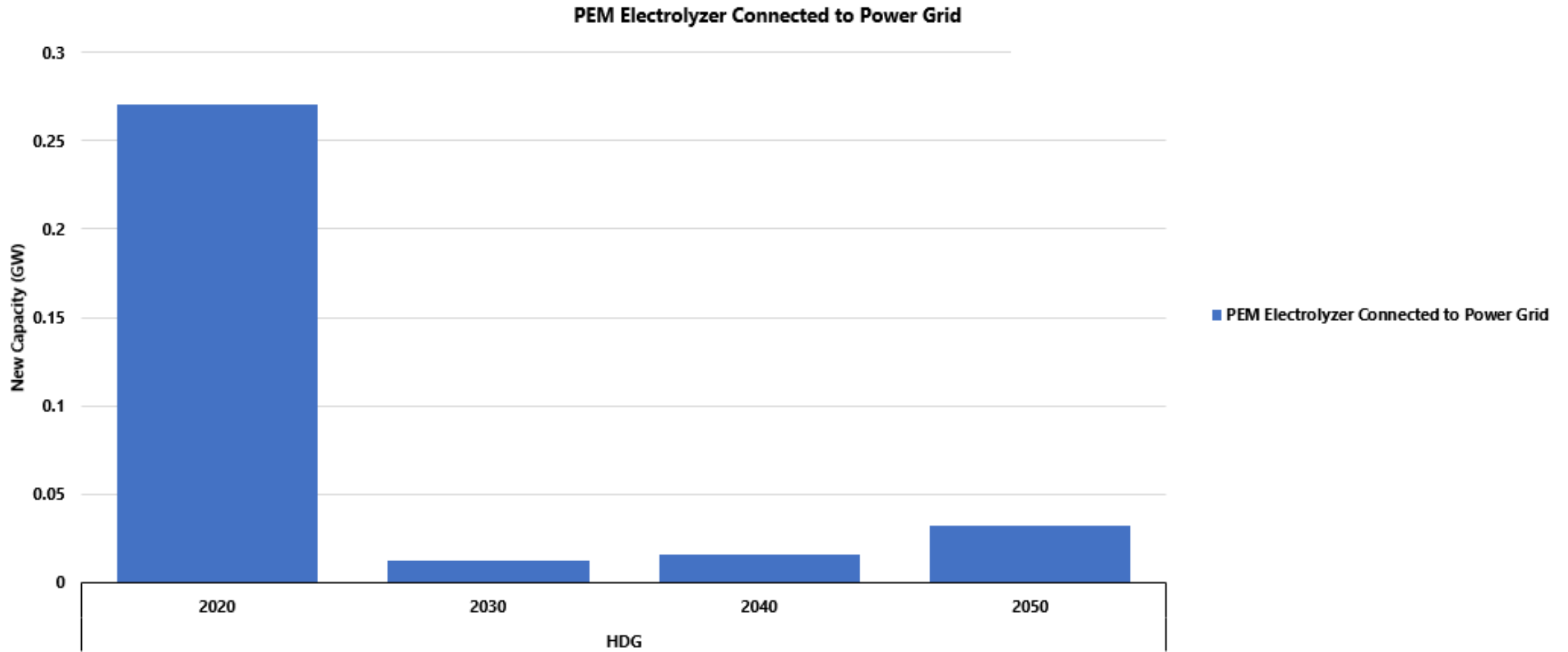
Annual Costs | Brazil



Source: Own authorship (2023).

Results

New Capacity | Brazil



Source: Own authorship (2023).

Next steps

- Calibrate data and model.
- Introduce storage.
- Perform comparisons.



Bibliography

IPEA – INSTITUTO DE PESQUISA ECONÔMICA APLICADA. **Texto para discussão: Panorama do Hidrogênio no Brasil**. Brasília, 2021.

PLAZAS-NIÑO, F. *Energy and Flexibility Modelling OSeMOSYS Applications: Low-emission Hydrogen Pathways*. Version 1.0, 2023.

BORBA, B.; BITENCOURT, L.; PETERS, P.; OLIVEIRA, M.; YEGANYAN, R.; CANNONE, C.; HOLEWELLS, M.; DIAS, B. Integrated Long-Term Expansion Planning and Short-Term Operation Assessment for Decarbonisation Pathways in Brazil Considering Utility-Scale Storage. 2023. DOI: <https://doi.org/10.33774/coe-2023-s7dxh> (preprint).

Thanks!