

Tecnologia e Centros de Excelência de Hidrogênio em Portugal e Brasil -GESEL

SENAI CIMATEC

Decarbonizing Energy with Green Hydrogen

Sistema FIEB



PELO FUTURO DA INOVAÇÃO

(Modified from the website siemens-energy.com/electrolyzer)



Sistema FIEB

SENAI
CIMATEC

SENAI
CIMATEC
PARK

PELO FUTURO DA INOVAÇÃO

- Site at Salvador

- Capital of the Brazilian state of Bahia.
- 2.9 million people
- Largest city in the Northeast Region and the 4th largest city in the country, after São Paulo, Rio de Janeiro and Brasília.

Expansion of SENAI CIMATEC Competences





Atlas Eólico



Bahia



Processo MesoMap

Adaptado de: Brower (2008)^[14]



MAPAS EÓLICOS



ANÁLISES E DIAGNÓSTICOS



CIMATEC

SACRÉTARIA DE CIÉNCIA,
TECNOLOGIA E INOVAÇÃO

SACRÉTARIA DE
INFRAESTRUTURA



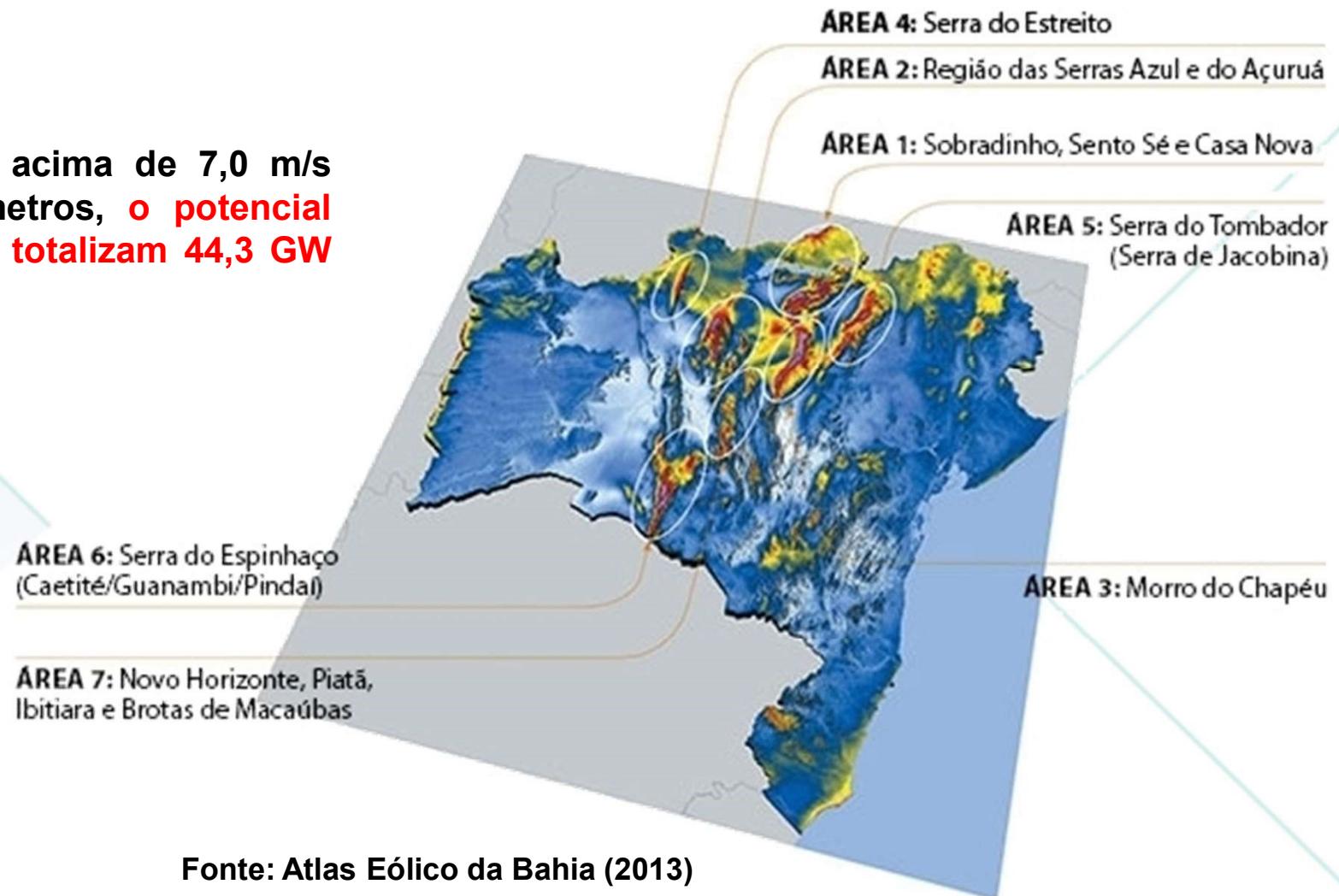
Áreas Promissoras

Sistema FIEB

SENAI
CIMATEC

PELO FUTURO DA INOVAÇÃO

- ✓ Considerando ventos acima de 7,0 m/s em alturas de 100 metros, o potencial eólico dessas regiões totalizam 44,3 GW de potência.



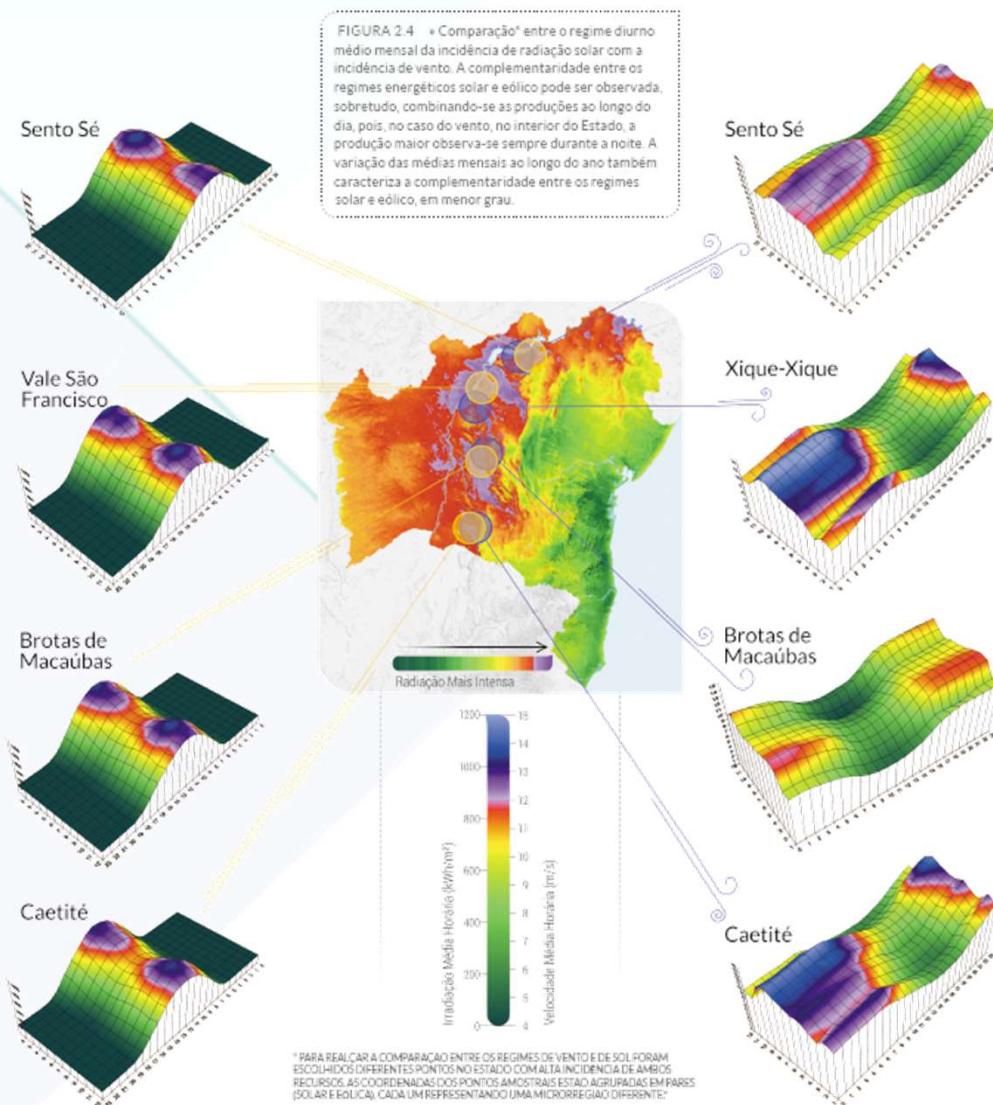
Atlas Solar Bahia



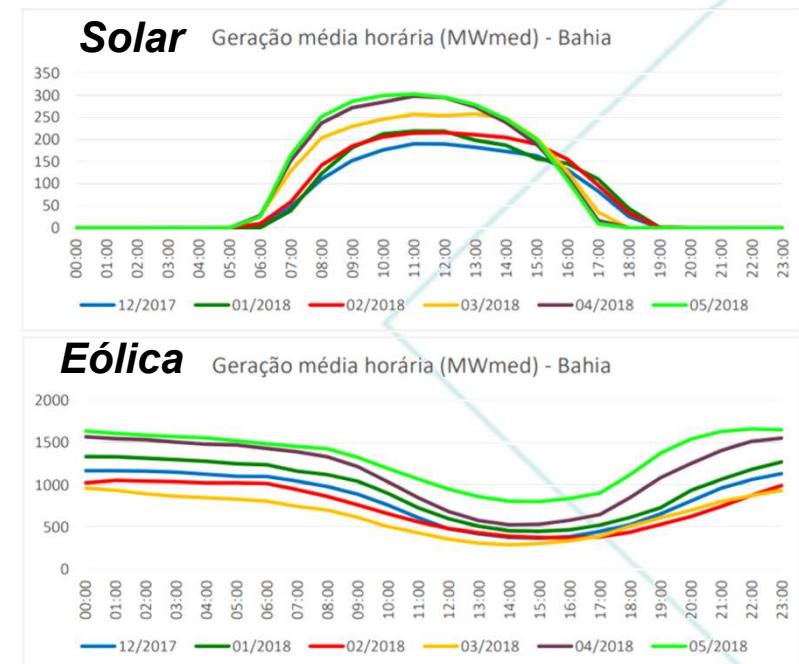
Complementaridade entre as Fontes

Itema FIEB

SENAI
CIMATEC
PELO FUTURO DA INOVAÇÃO



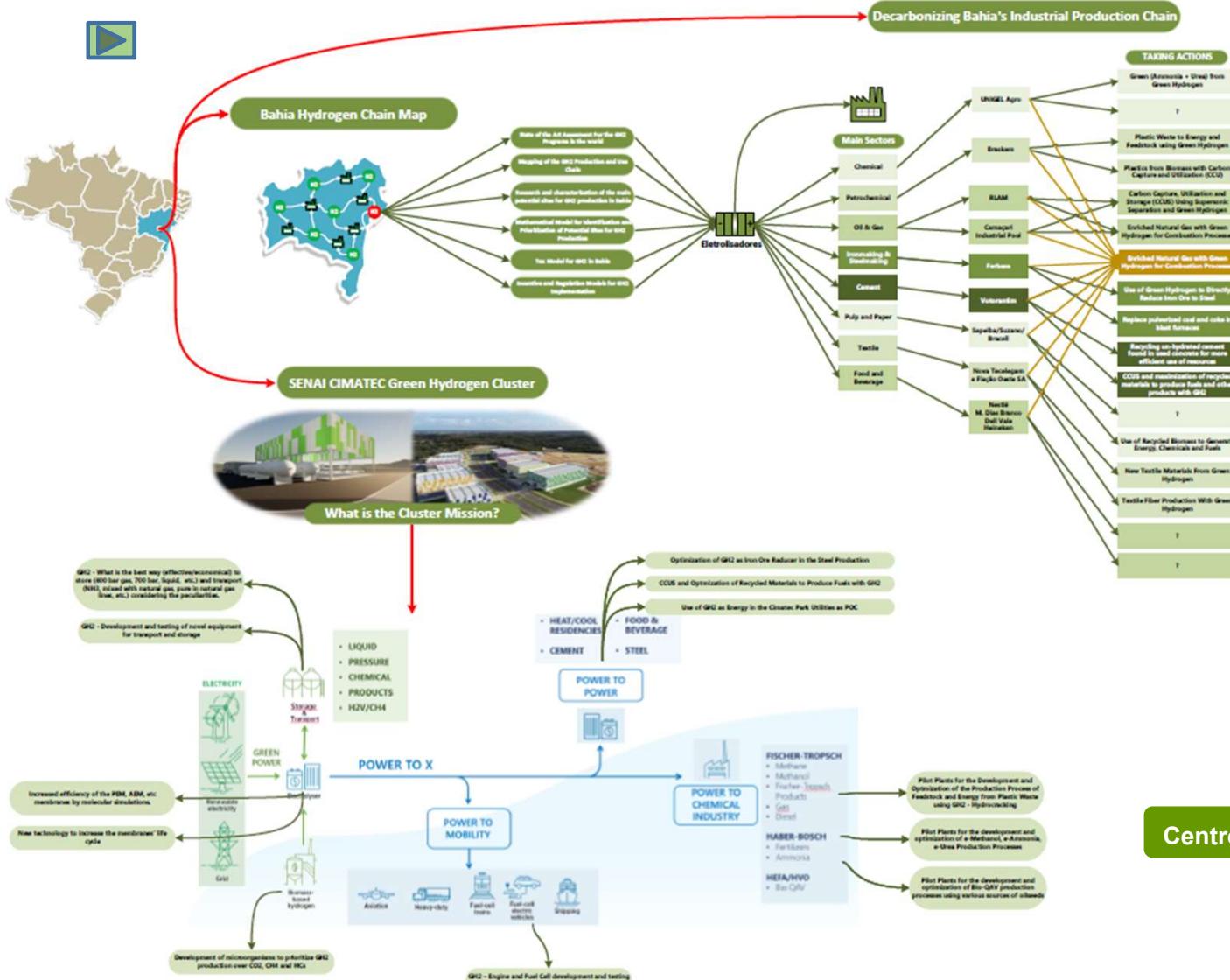
- ✓ Áreas promissoras apresentadas no Atlas Eólico do Estado também possuem **os melhores níveis de irradiação**. Na figura ao lado é possível notar a complementariedade das duas fontes.



Fonte: Atlas Solar da Bahia (2018)



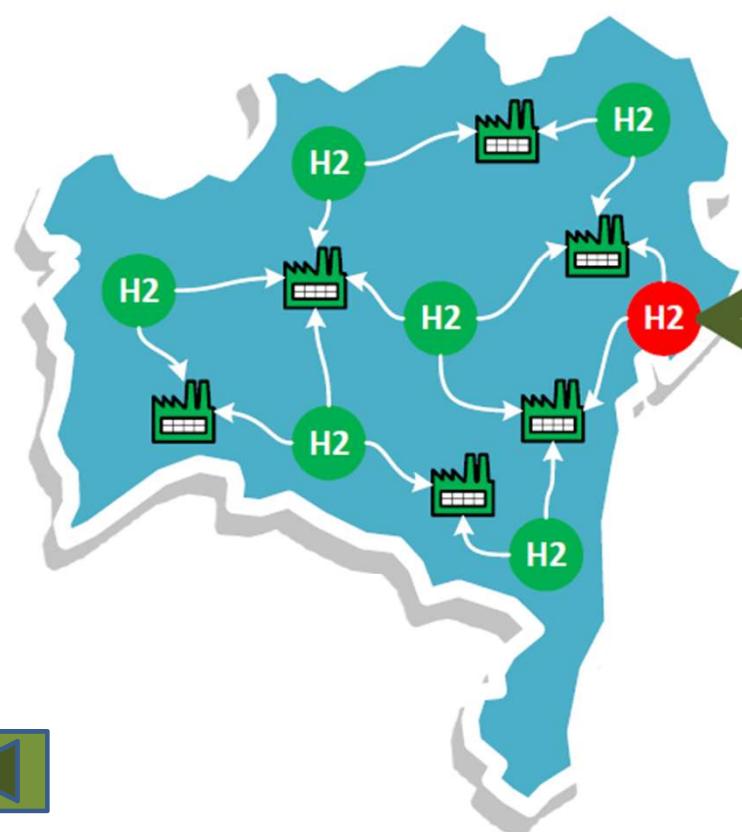
Bahia Hydrogen Strategy Overview



Centro de Competência



Bahia Hydrogen Chain Map



- State of the Art Assesment For the GH2 Programs in the world
- Mapping of the GH2 Production and Use Chain
- Research and characterization of the main potential sites for GH2 production in Bahia
- Mathematical Model for Identification and Prioritization of Potential Sites for GH2 Production
- Tax Model for GH2 in Bahia
- Incentive and Regulation Models for GH2 Implementation

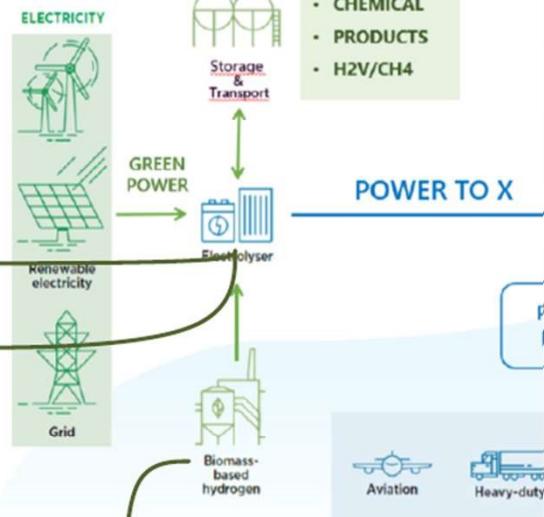


SENAI CIMATEC Green Hydrogen Cluster

GH2 - What is the best way (effective/economical) to store (400 bar gas, 700 bar, liquid, etc.) and transport (NH₃, mixed with natural gas, pure in natural gas lines, etc.) considering the peculiarities.

GH2 - Development and testing of novel equipment for transport and storage

- LIQUID
- PRESSURE
- CHEMICAL
- PRODUCTS
- H₂V/CH₄



Increased efficiency of the PEM, AEM, etc membranes by molecular simulations.

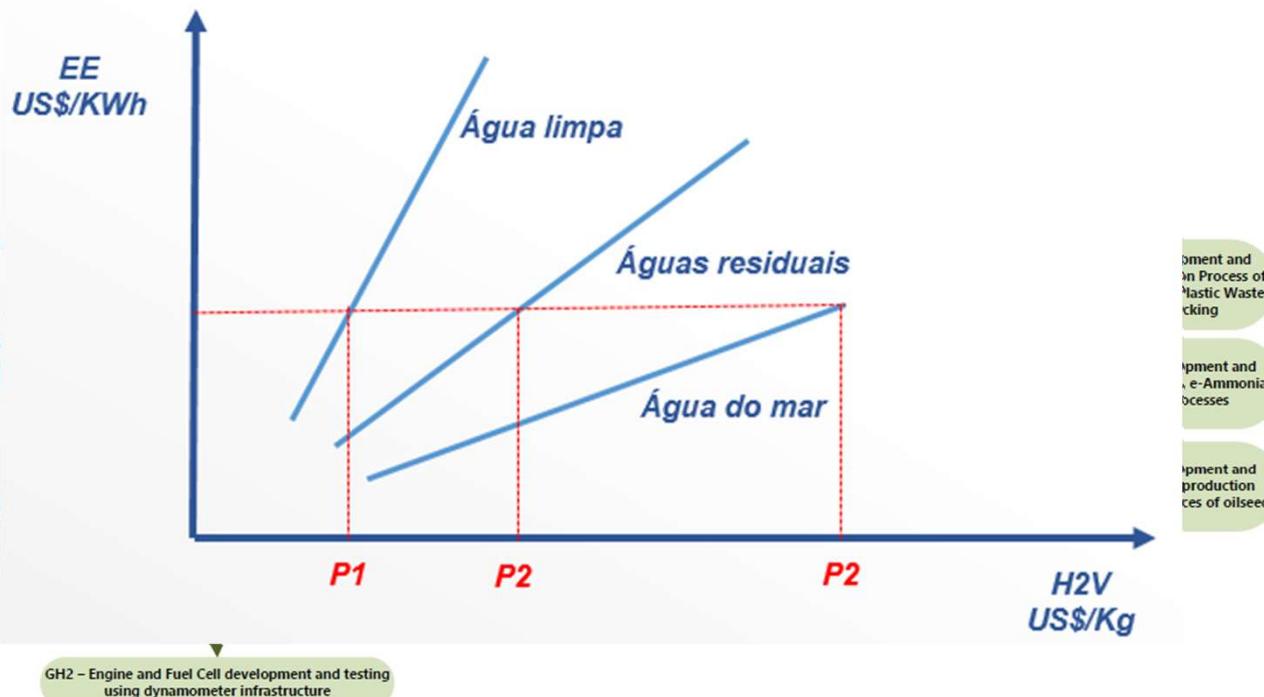
New technology to increase the membranes' life cycle

Development of microorganisms to prioritize GH2 production over CO₂, CH₄ and HCs



- Optimization of GH2 as Iron Ore Reducer in the Steel Production
- CCUS and Optimization of Recycled Materials to Produce Fuels with GH2
- Use of GH2 as Energy in the Cimatec Park Utilities as POC

Polo Industrial de Camaçari e Proximidades – Eletrolisador PEM



Development and Process of Plastic Waste

Development and e-Ammonia, processes

Development and production of oilseeds

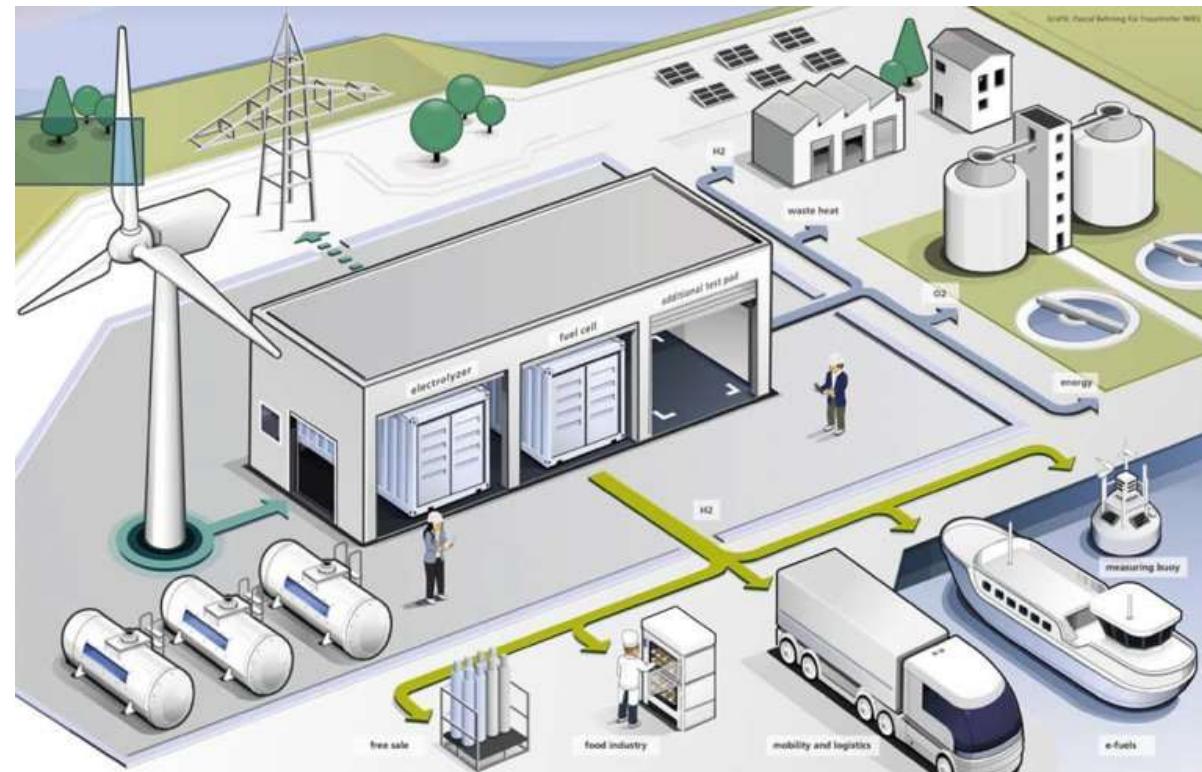
Green Hydrogen Cluster- GHC

SHORT PROJECT DESCRIPTION

The Green Hydrogen Cluster will be implemented at **CIMATEC Park** with the objective of producing high purity hydrogen using water electrolysis (PEM/AEM). The Cluster will involve the production of H2V, its **storage, transport** and **application testing**.

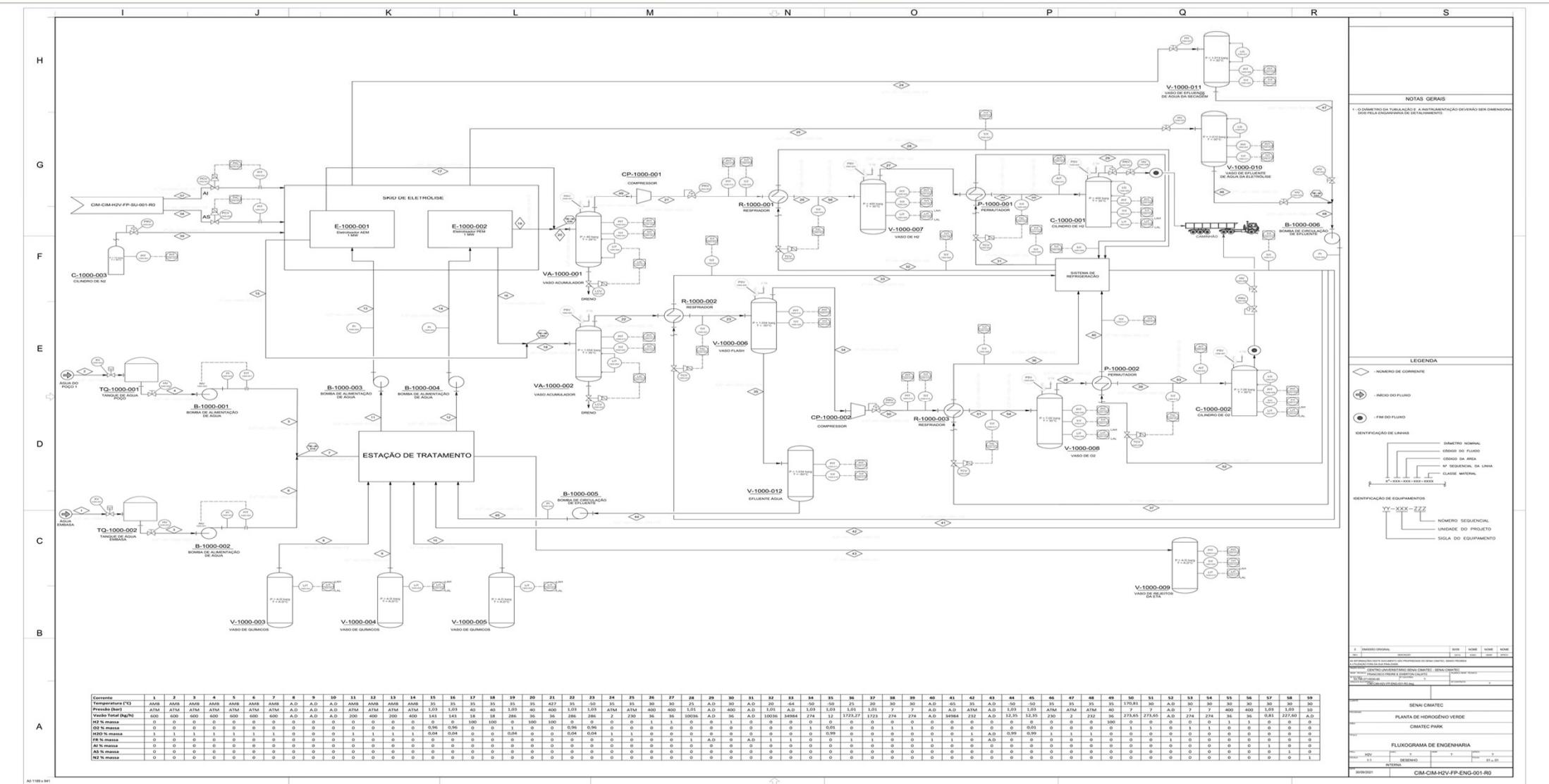
H2V PRODUCTION

It is intended to produce **280 t/year (2MW)**, expandable to **1400 t/year**, with consumption by the **10 MW** clean energy supply unit.



Fluxograma de Engenharia – Projeto Básico

SENAI CIMATEC



Localização CIMATEC PARK

SENAI CIMATEC



Green Hydrogen Cluster- Cimatec Park

COMPANIES THAT INDICATED SUPPORT FOR THE CLUSTER



TAKING ACTIONS

Green (Ammonia + Urea) from Green Hydrogen

?

Plastic Waste to Energy and Feedstock using Green Hydrogen

Plastics from Biomass with Carbon Capture and Utilization (CCU)

Carbon Capture, Utilization and Storage (CCUS) Using Supersonic Separation and Green Hydrogen

Enriched Natural Gas with Green Hydrogen for Combustion Processes

Enriched Natural Gas with Green Hydrogen for Combustion Processes

Use of Green Hydrogen to Directly Reduce Iron Ore to Steel

Replace pulverized coal and coke in blast furnaces

Recycling un-hydrated cement found in used concrete for more efficient use of resources

CCUS and maximization of recycled materials to produce fuels and other products with GH2

?

Use of Recycled Biomass to Generate Energy, Chemicals and Fuels

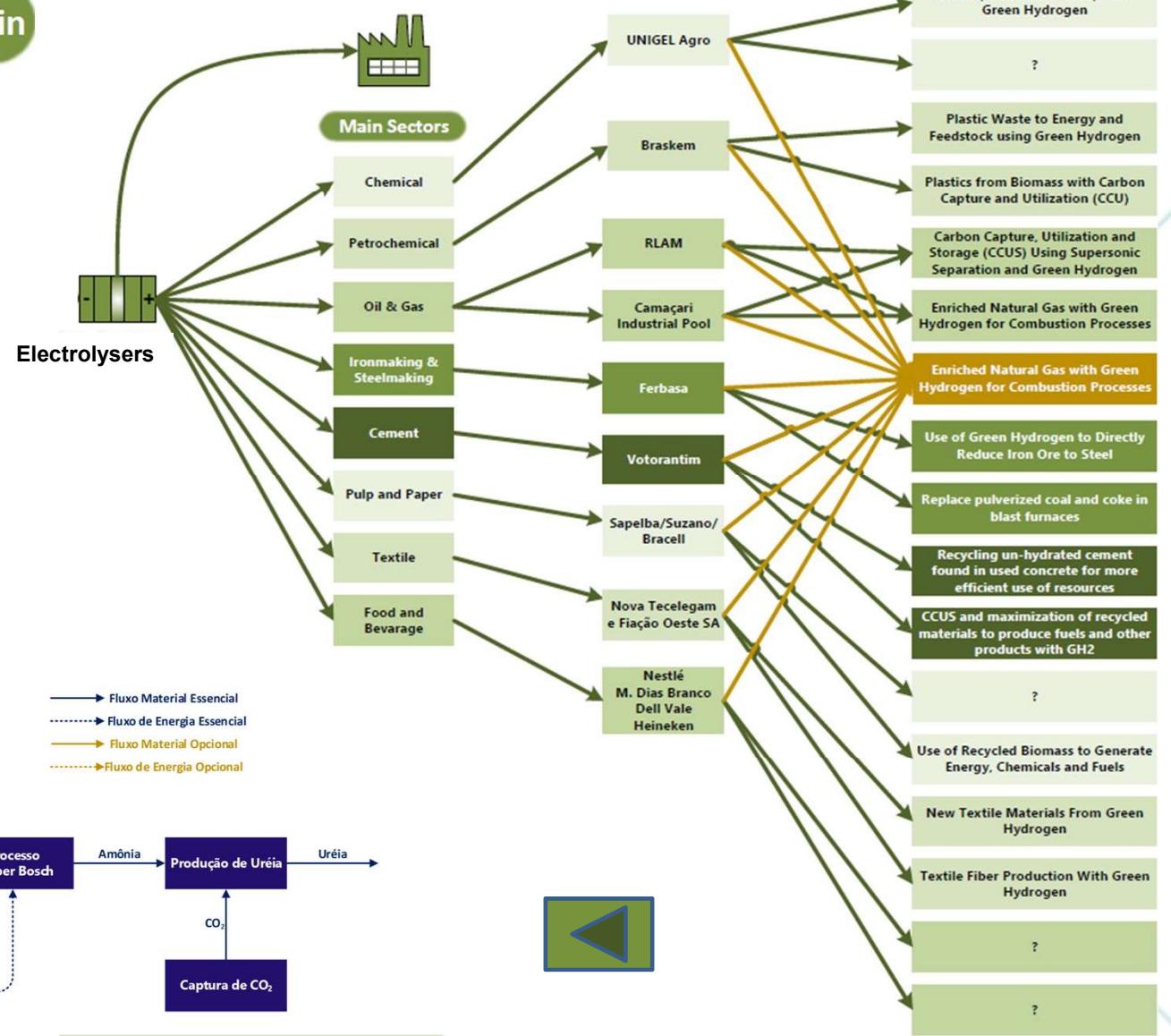
New Textile Materials From Green Hydrogen

Textile Fiber Production With Green Hydrogen

?

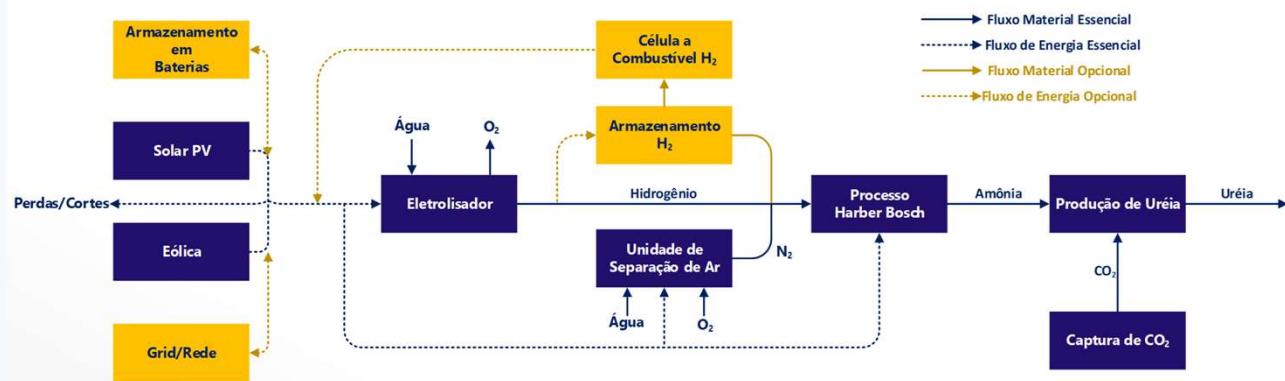
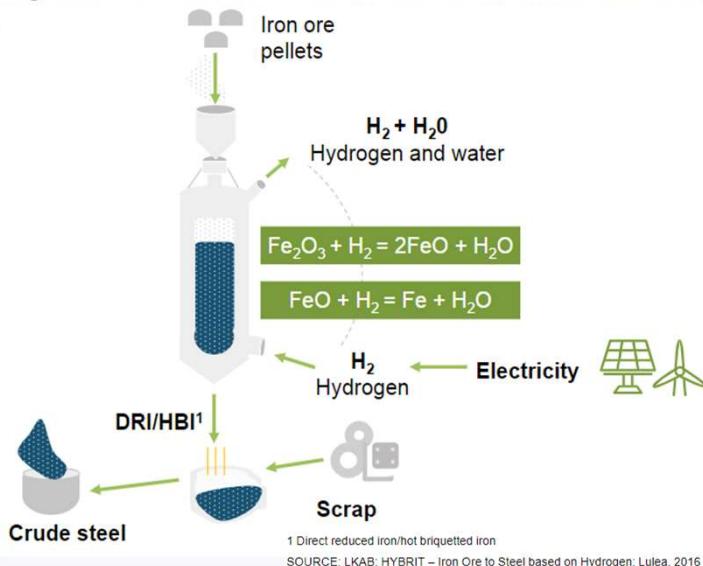
?

?



Decarbonizing Bahia's Industrial Production Chain

Hydrogen-based reduction allows emission-free ironmaking

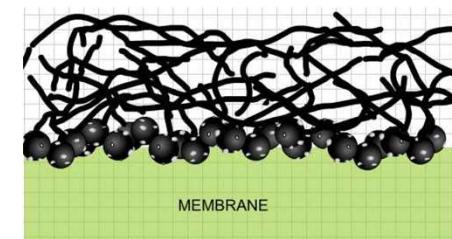
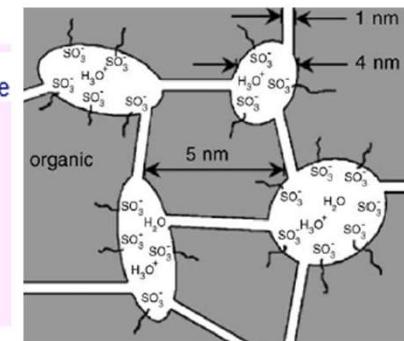
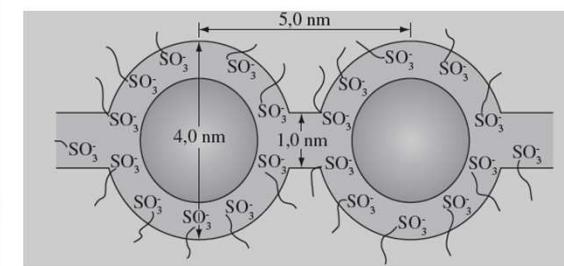
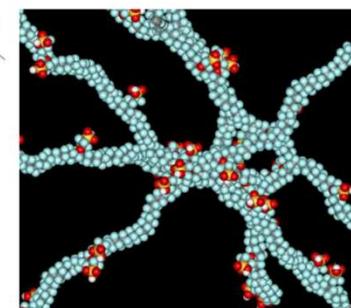
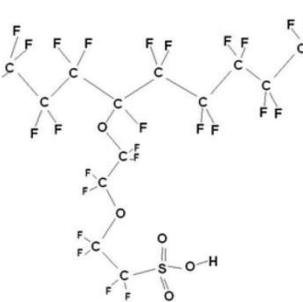
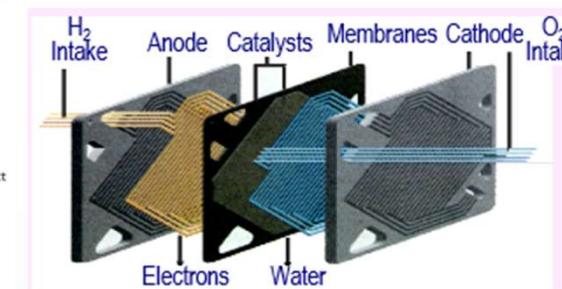
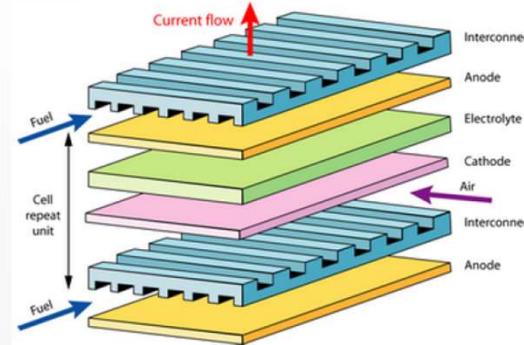
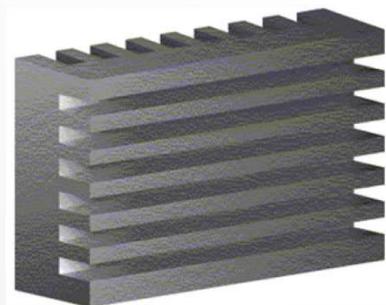


O Centro de Competência

Excelência na Formação e Capacitação para a Cadeia Produtiva Brasileira de H2V

EQUIPE

Bolsistas	Quantidade
Iniciação Tecnológica (IT)	1
Mestrado (MSc)	3
Doutorado (DSc)	2
TOTAL	6



I hope you enjoyed it.
Thank you!

