Indústria de baixo carbono: Infraestrutura logística e supply chain

Wind of Change, Porto Alegre

Tchiarles Coutinho Hilbig, Market Area Manager South America

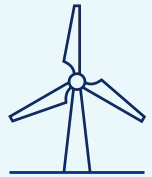
02/04/2025

A global assurance and risk management company

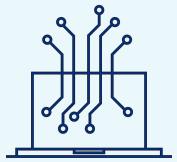
160	~15,000	~100,000	100+	5%+
years	employees	customers	countries	of revenue in R&D

Ship and offshore classification and advisory

Energy advisory, certification, verification, inspection, and monitoring



Software, cyber security, platforms, and digital solutions



Management system certification, supply chain, and product assurance

DNV

TheGreatTransition.org

Our experience

Renewables in Brazil

20 years
Supporting the renewable industry in Brazil

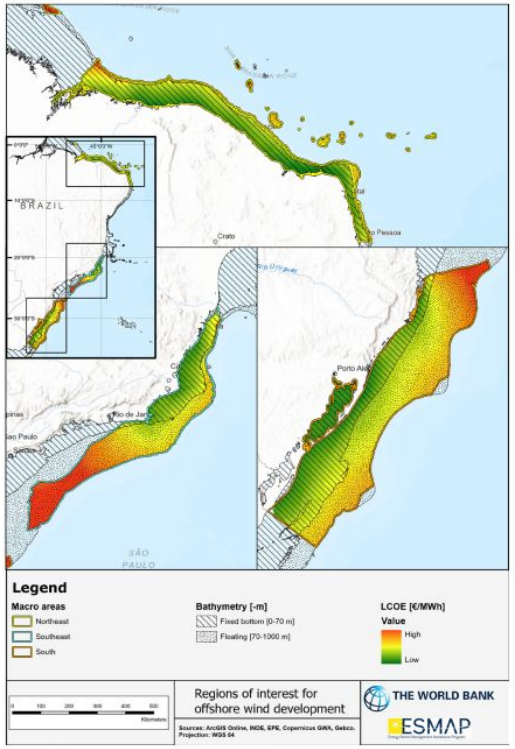
+ 60 GW
Advisory services for wind farms

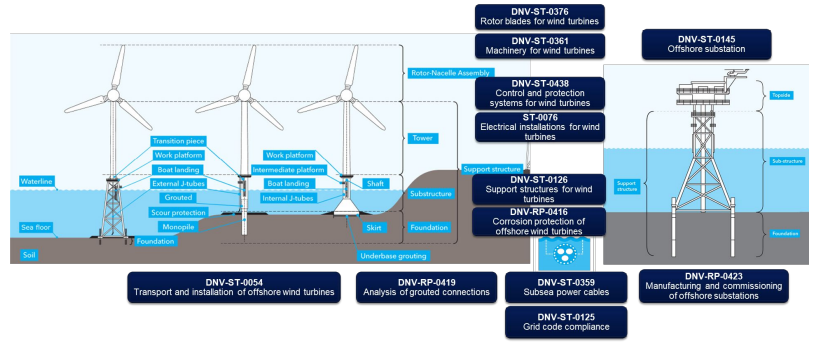
+1000 masts
Unparallel knowledge of the Brazilian wind and solar resources

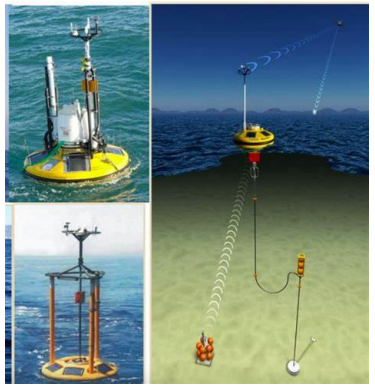
+ 30 GW
Advisory services for Solar projects utility and DG

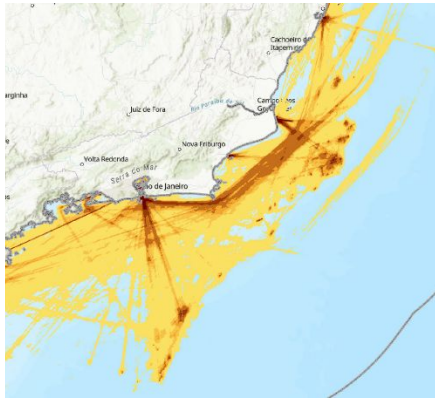
+40 %
Performance of 40% of all wind farms in operationa

+ 20 GW
Technical Due Diligence Lender's, Project Finance & M&A









Trusted voice to the industry

Offshore Wind

+ 50 GW
In-depth knowledge of all Brazilian coastline, and development of +50 GW projects

+97 %
involved in the majority of the world's offshore wind farms

+80 %
of the world's offshore wind farms are certified by DNV

Hydrogen*

20 GW
Electrolysis capacity in various technologies

> 39 projects
Hydrogen and Derivatives projects

> 17 FEL
FEL 1 and FEL 2 studies

> 14 TDD/LTA
Technical Due Diligence /Lender's Technical Advisory Studies

> 22,700 tpd
Renewable methanol and ammonia plants

> 300 projects
energy storage systems

> 250,000 km
transmission and distribution cables and overhead lines

> 100,000 km
of gas transmission and distribution pipelines

> 5,000 km
of heat transmission and distribution pipelines

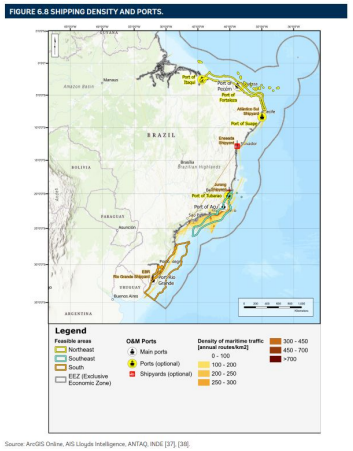
*only SEMELA – Southern Europe, Middle East, Latin America and Africa

Offshore Wind Readiness Level (Brazil)

TABLE 8.5 READINESS LEVEL (WEIGHTED SCORE)—SORTED FROM HIGHEST TO LOWEST.

Service or component	Weighted score	Service or component	Weighted score
Legal, consenting, and regulatory	40	Tower	30
Onshore infrastructure	40	Nacelle, hub, and assembly	29
Onshore substation installation	40	Blades	29
Project management	39	Decommissioning	25
Engineering and consultancy	39	Array and offshore export cable supply	21
Metocean campaigns and environmental survey	39	Array and offshore export cable installation	21
Geophysical and geotechnical surveys	37	Foundation supply (monopile, jacket, and floating)	20
Wind farm operation	36	Offshore substation installation	19
Turbine maintenance and service	33	OSS supply	19
Balance of plant maintenance and service	33	Turbine installation (offshore)	19
Turbine loose items	31	Foundation installation (offshore)	19
		Offshore substation installation	19

Source: Scenarios for Offshore Wind Development in Brazil, World Bank



Supply Chain complexity: High supply chain complexity: Choose between multi-contract and local, hybrid EPCI, determine local supplier percentages for CAPEX and OPEX, and assess financial risks.

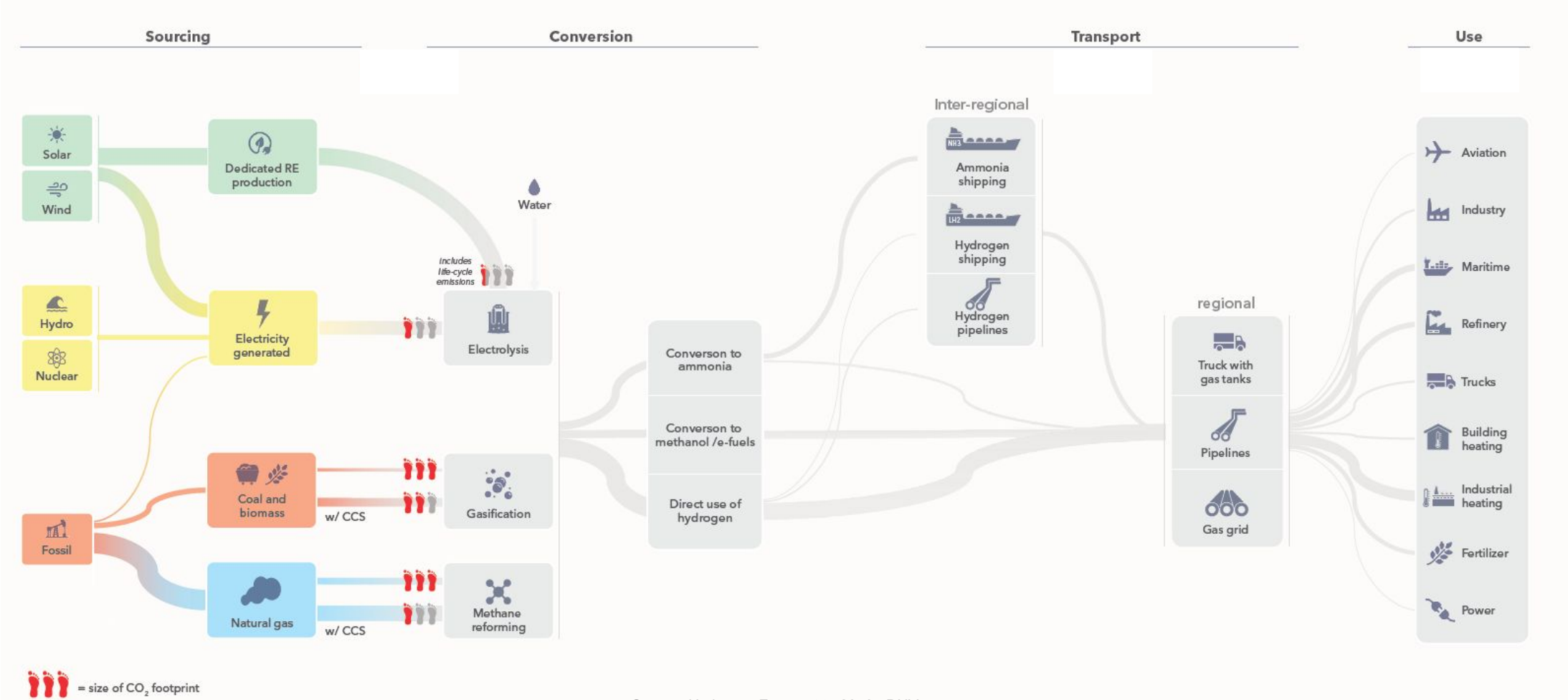
Strengths

- **Overall development services**, engineering and consultancy, **onshore infrastructure** and electrical, **geophysics and metocean** survey
- Operation and maintenance to some extent draw from the experience with onshore wind and O&G

Shortfalls

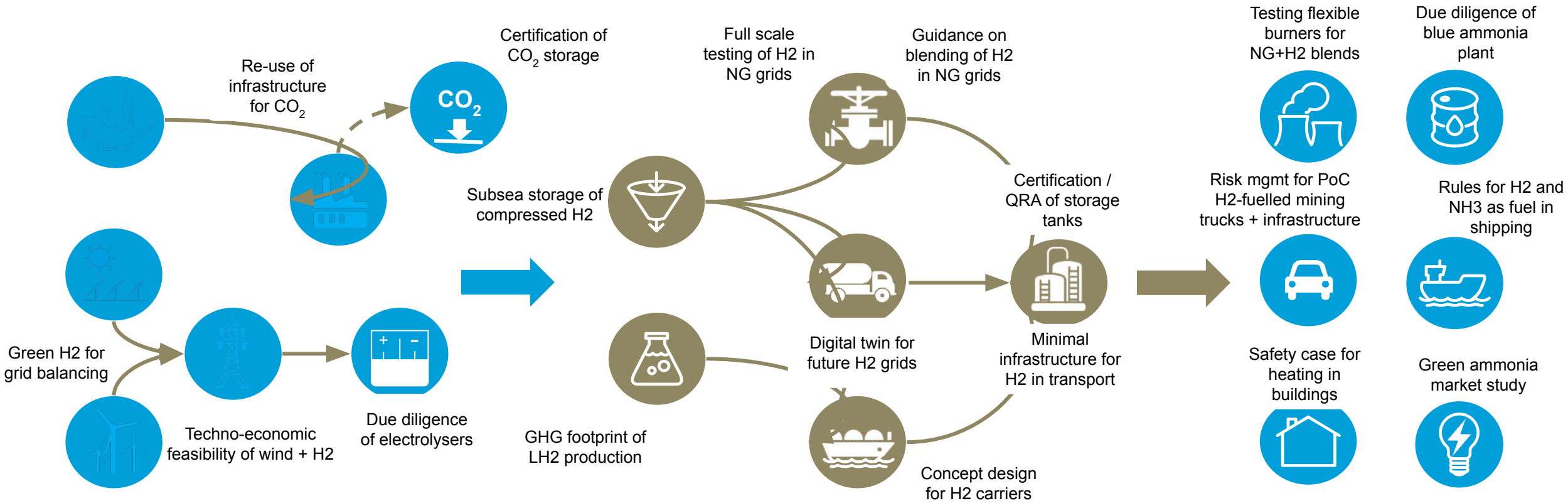
- Installation capabilities (limited number of companies that operated the specific purpose **installation vessels**)
- **Manufacturing** capabilities (**large specialized facilities**) – mainly **turbine and foundations**

Hydrogen potential production and use by 2050



Source: Hydrogen Forecast to 2050 , DNV

Hydrogen value chains



Breakdown of barriers for policies to overcome

1. Costs and financial support

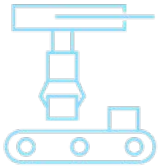
No carbon cost internalization and limited support to first phase scaling and commercialization

2. Demand and competition

Competition between 1) low-carbon blue and renewable green hydrogen 2) electrification, and 3) fossil alternatives

3. Technology and manufacturing

Limited manufacturing for green and blue H_2 technologies, and offshore PtX needs maturing



Hydrogen barriers which policies must overcome

4. Safety and hazards

Acceptance criteria and documentation varying from country to country

5. Infrastructure and indirect enablers

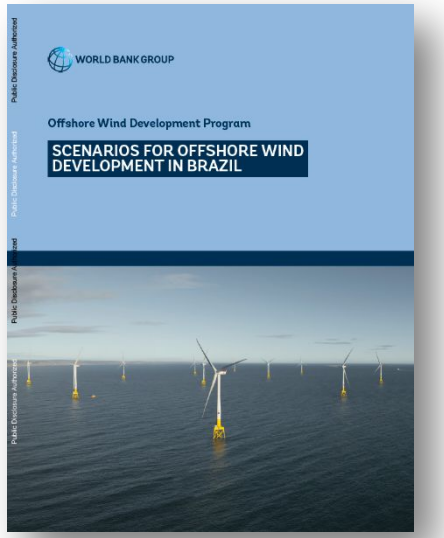
Renewable power production with robust grids onshore and offshore, and CCS value chains

6. Standards & certification

No GoO certification with traceability and LCA frameworks, standards for large-scale safe design needs updating

DNV

Presenting insights to guide strategic decisions



Scenarios for Offshore Wind in Brazil

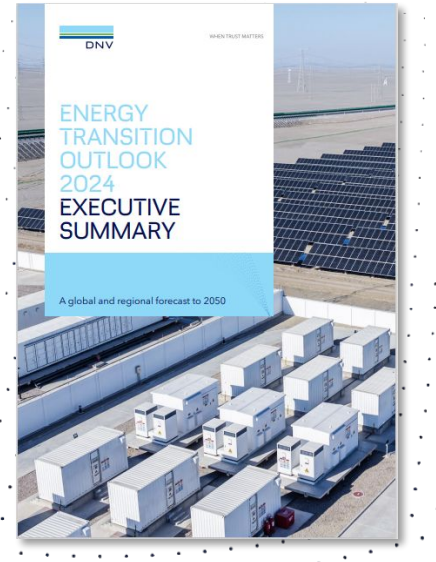
– strategic analysis and advice on the role offshore wind could play in Brazil's energy mix

Report download link (free access):

PT-BR Version | ENG Version

Caderno FGV + DNV

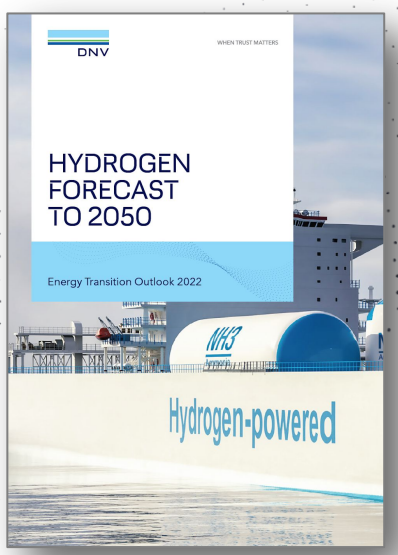
– Low-Carbon Hydrogen Energy, offering an overview of the challenges associated with the development of the production chain.



Energy Transition Outlook

– A forecast of the shape and timing of the ongoing energy transition distributed over 10 regions.

Go to: eto.dnv.com



Hydrogen Forecast to 2050

– new and expanded hydrogen findings from our Energy Transition Outlook Globally, regionally, and by sector

Go to: eto.dnv.com

Obrigado

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