

# Norte: the Region and its energy sector

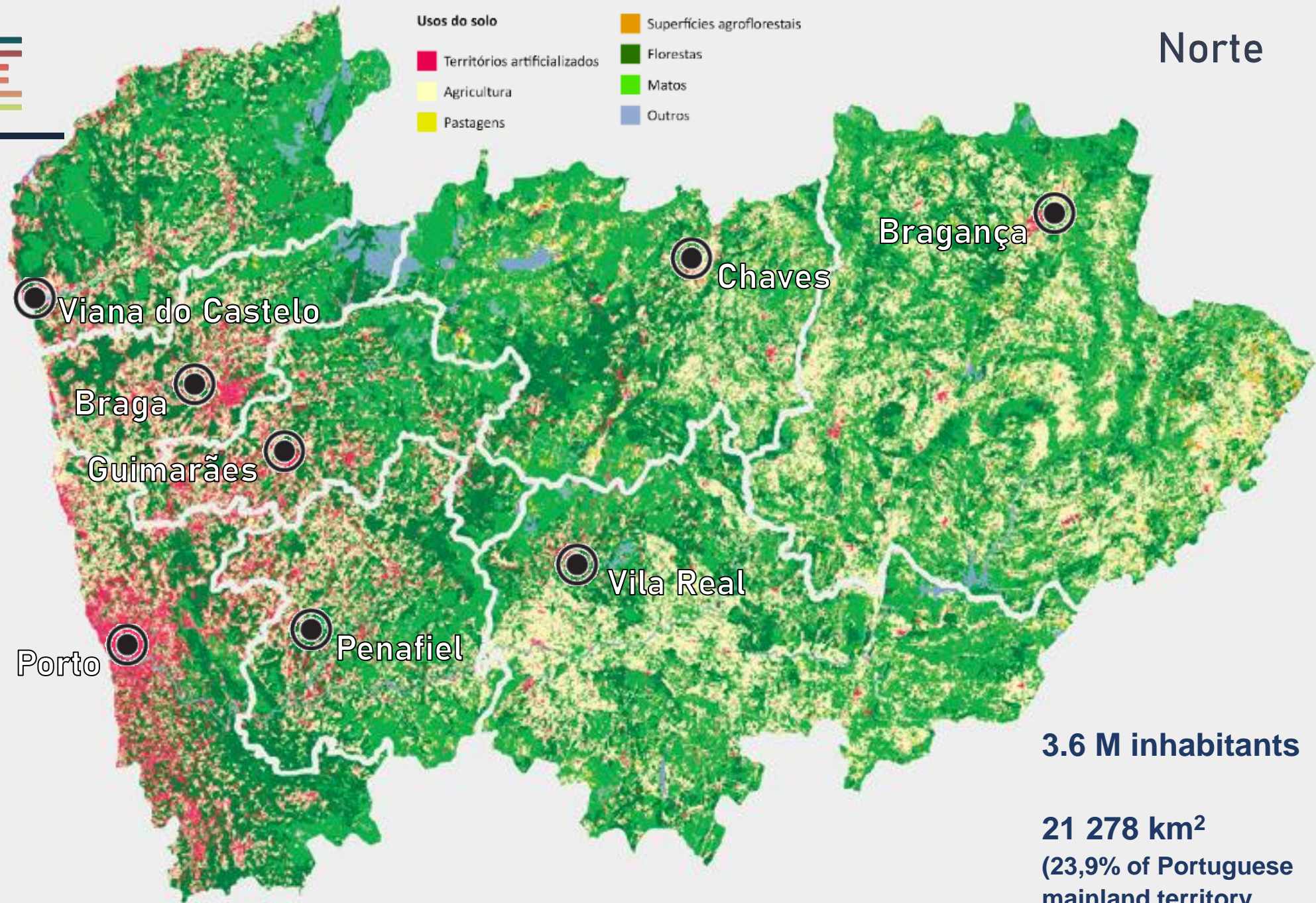
Ricardo Simões, Head of Innovation, [ricardo.simoes@ccdr-n.pt](mailto:ricardo.simoes@ccdr-n.pt)

Hydrogen Pilot Summit

18.November.2024

- Usos do solo
- Territórios artificializados
  - Agricultura
  - Pastagens
  - Superfícies agroflorestais
  - Florestas
  - Matos
  - Outros

Norte



**3.6 M inhabitants**

**21 278 km<sup>2</sup>**  
**(23,9% of Portuguese mainland territory)**



## Norte numbers and facts...

- 35% of the Portuguese population
- 34% of companies
- 33% of R&D expenditure

- 37% of national exports
- 52% of manufacturing industries employment
- Surplus region in the foreign trade scale
- Consolidated and dynamic regional innovation system
- More than 50% of the country's renewable energy production

- 30% of GDP
- 39% of social insertion income beneficiaries
- The only NUTS II PT region where all NUTS III have a wealth per inhabitant below 75% of EU average

# RIS 2023

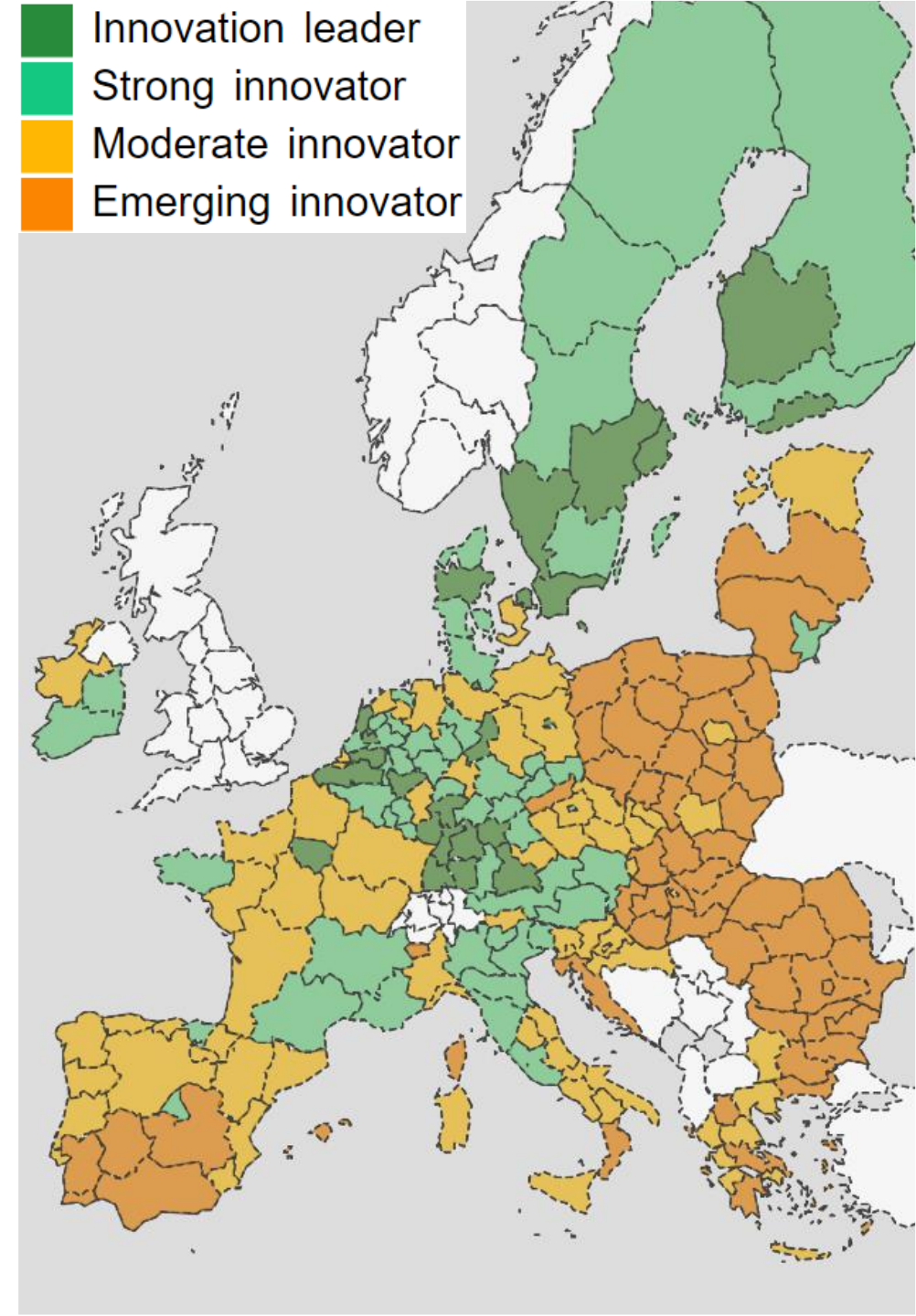
## Norte

### Regional Innovation Scoreboard:

▲ **Strongest point:** structure conditions (scientific publications, population with higher education, digital capabilities), registration of brands/design, and innovative products sales.

▼ **Weakest point:** cooperation of companies for innovation, patent registration, and employment in knowledge-intensive activities.

**Highest disparities between Norte and EU:** company investments, namely, SMEs with innovations in collaboration, PCT patents, and innovation expenses per worker.



# RCI 2022

## Norte

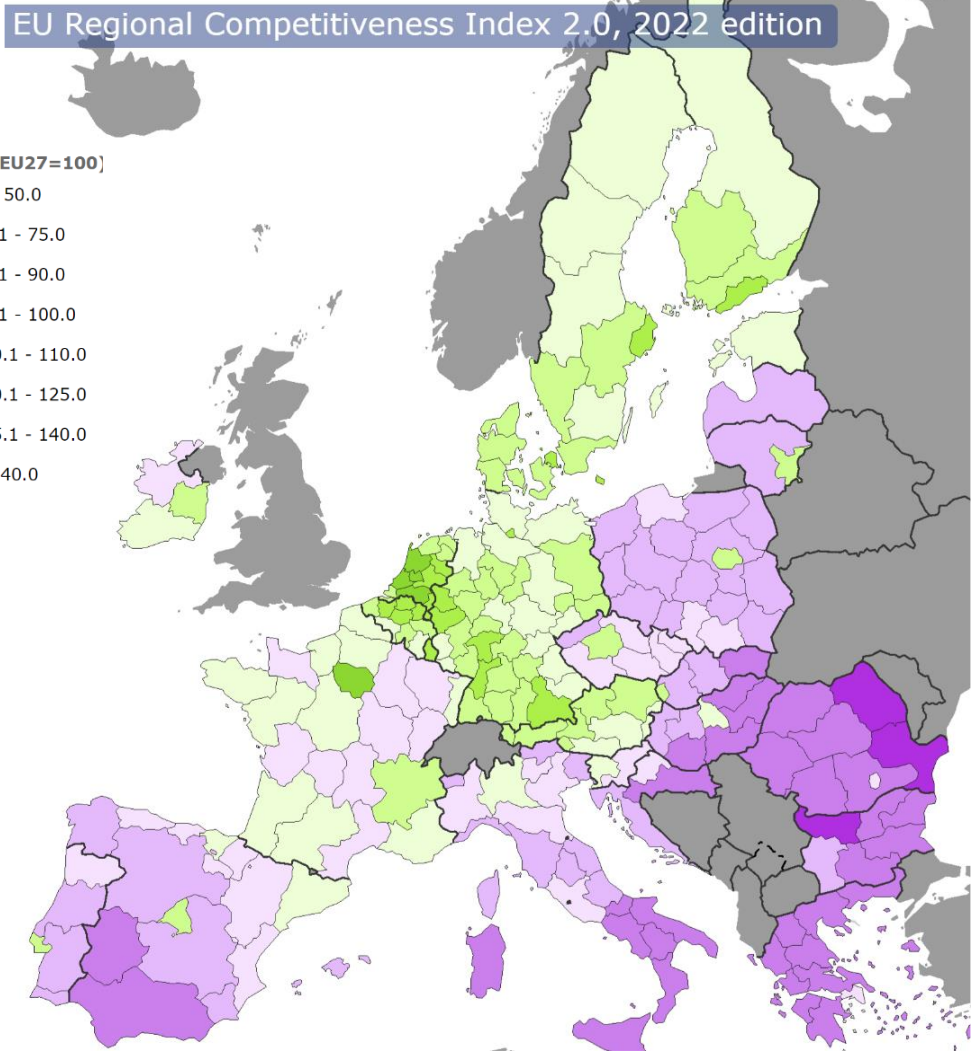
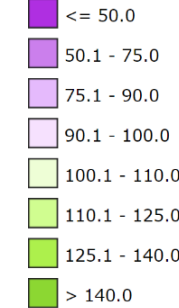
### Regional Competitiveness Index

▲ **Strongest point:** innovation.

▼ **Weakest point:** efficiency.

Largest disparity in the EU context: ‘market dimension’ (e.g. income / capita, and potential market dimension, which measures creation of wealth by inhabitant and km<sup>2</sup>, i.e. person-space productivity). It is necessary to increase the added value, accelerating the economy towards more productive sectors, i.e. with higher complexity products.

Index (EU27=100)



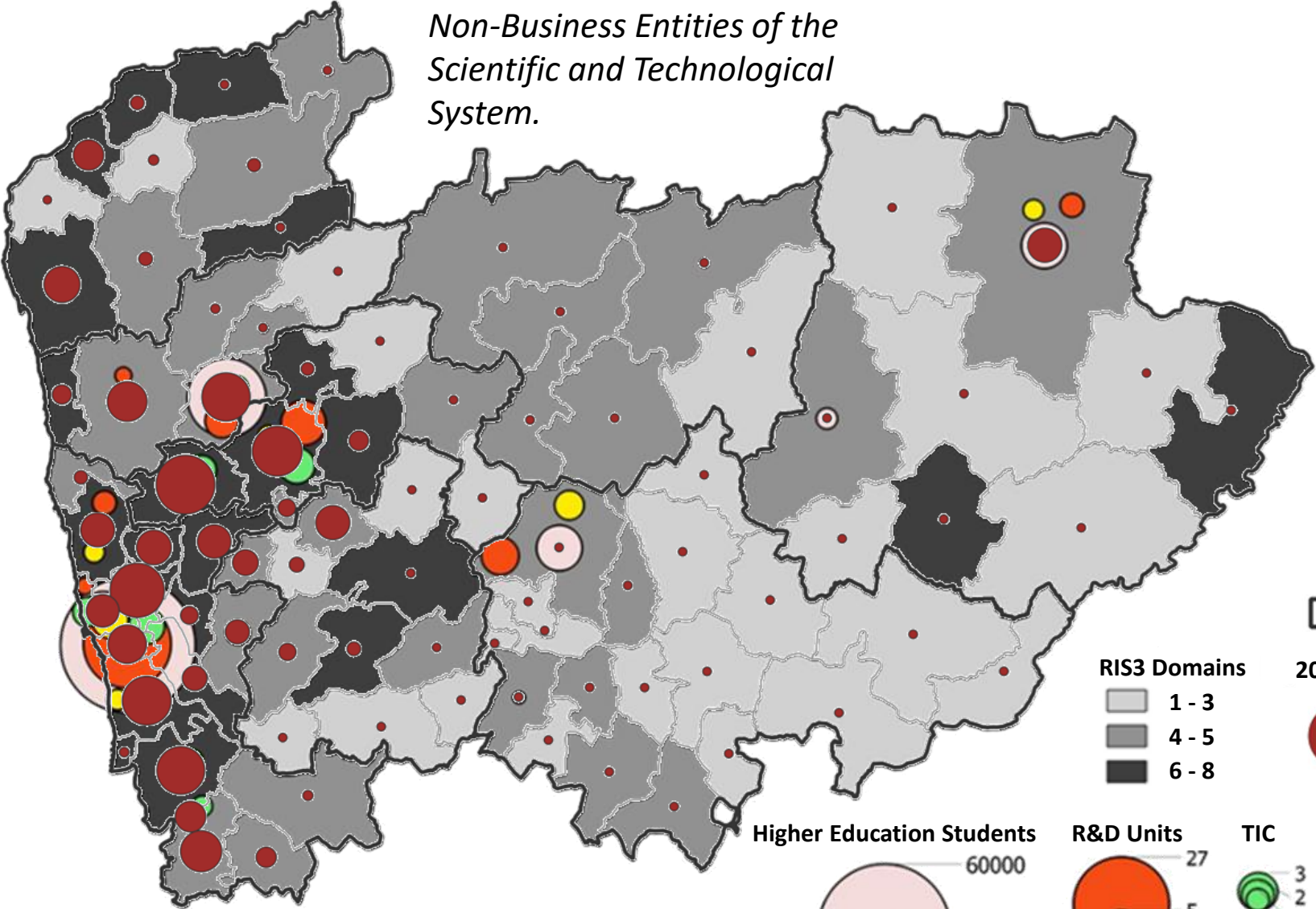


# Norte Exports (2021)

*High density, integrating 293 Non-Business Entities of the Scientific and Technological System.*

**Strong geographical correlation between technologic infrastructures and knowledge centers (universities, polytechnics, R&D centres) and industry.**

**Rebalance fundamental to support economic activities with higher potential of territorial widening of the regional economic structure.**



NUTSIII\_RN

RIS3 Domains

- 1 - 3
- 4 - 5
- 6 - 8

2021 Exports (M€)

- 2000
- 700
- 100

Higher Education Students

- 60000
- 20000
- 4500
- 1500
- 300

R&D Units

- 27
- 5
- 2
- 1

TIC

- 3
- 2
- 1

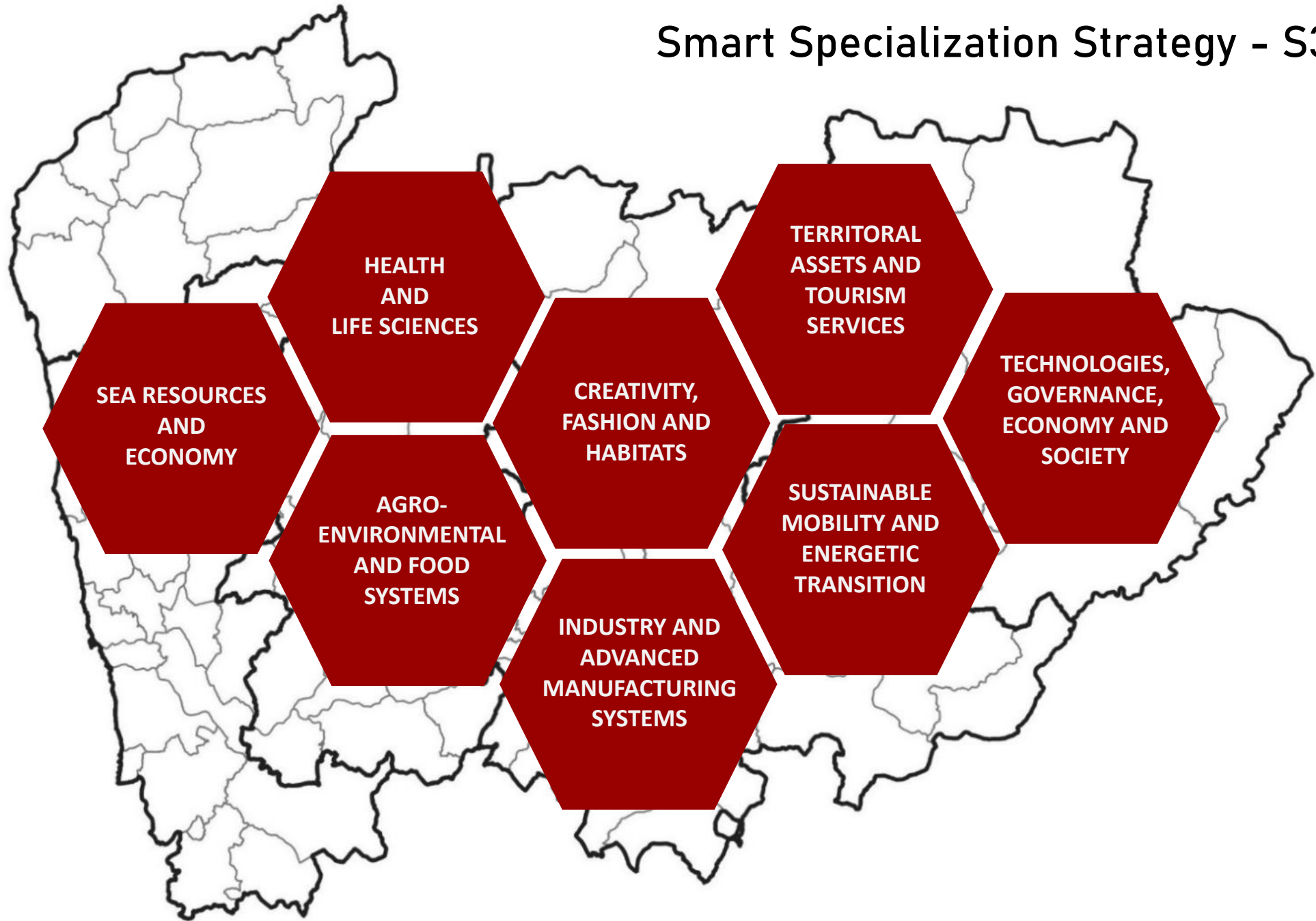
CoLAB

- 3
- 2
- 1





# Smart Specialization Strategy - S3 Norte





Norte energy mix strategy

# Renewable energy in Portugal and in the Norte

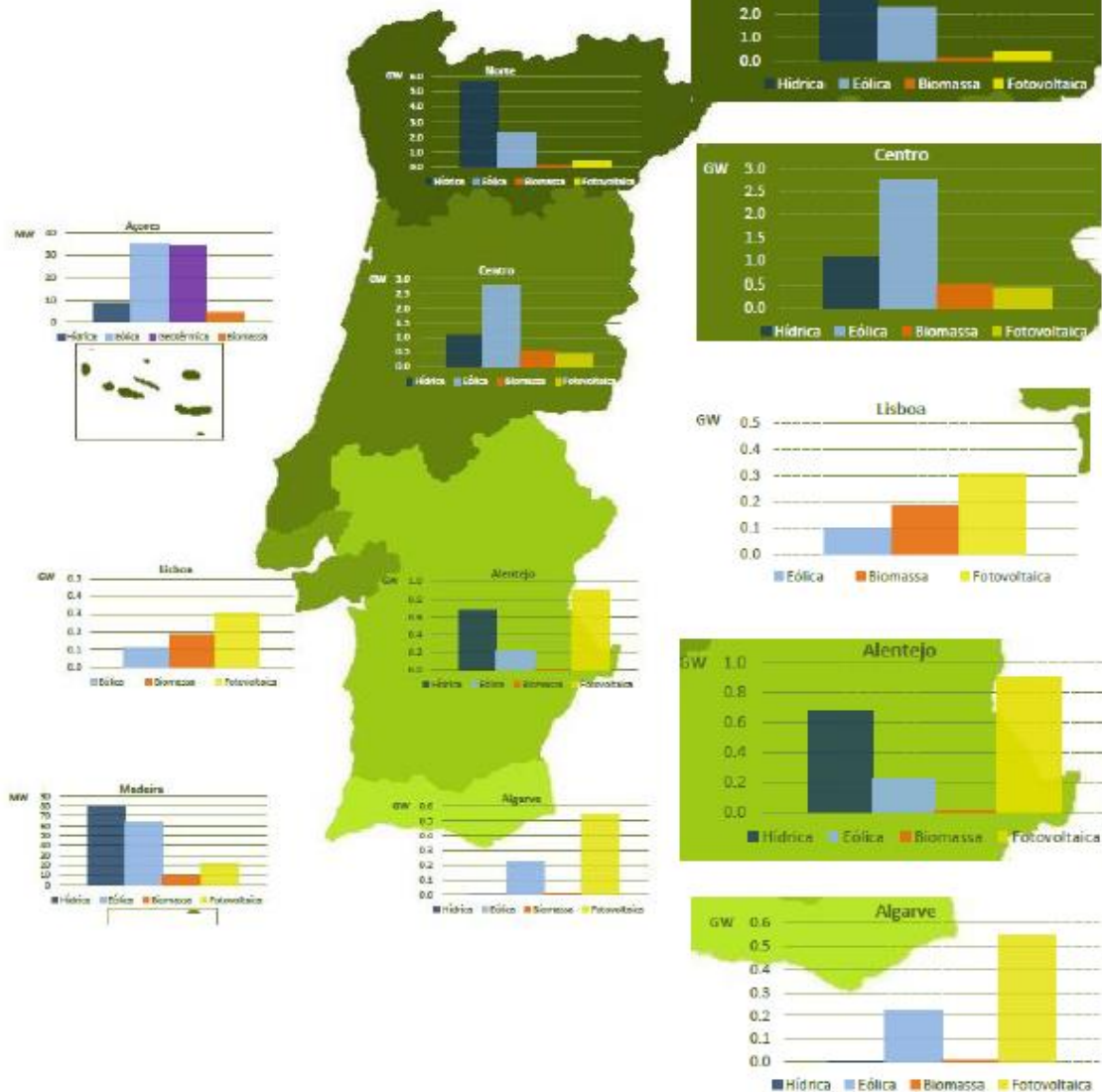
Norte: a region on the path to decarbonization...

- By 2023, 61% of the electricity consumed in the country should be coming from renewable sources, according to REN. This figure rose to 95% in April 2024, marking a record and placing Portugal among the world leaders in this area, well above the global average of 30%.
- For 6 consecutive days in December 2023 (setting a new record), the national renewable energy production was higher than the country's energy consumption.
- More than 50% of the country's renewable energy production is in the Norte.



# Territory: where things happen

## Renewable energy sources



<b>NORTE</b>	<b>7,9</b> GW	<b>50%</b>
HIDRICA	5,5	
EOLICA	2	
BIOMASSA	0,1	
SOLAR	0,3	

<b>CENTRO</b>	<b>4,7</b> GW	<b>30%</b>
HIDRICA	1	
EOLICA	2,75	
BIOMASSA	0,5	
SOLAR	0,45	

<b>LISBOA</b>	<b>0,6</b> GW	<b>4%</b>
HIDRICA	0,0	
EOLICA	0,1	
BIOMASSA	0,2	
SOLAR	0,3	

<b>ALENTEJO</b>	<b>1,75</b> GW	<b>11%</b>
HIDRICA	0,7	
EOLICA	0,2	
BIOMASSA	0	
SOLAR	0,85	

<b>ALGARVE</b>	<b>0,74</b> GW	<b>5%</b>
HIDRICA	0	
EOLICA	0,2	
BIOMASSA	0	
SOLAR	0,54	

<b>TOTAL</b>	<b>15,69</b> GW	<b>100%</b>
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# Regional Innovation Valleys

(NEIA flagship 3; I3 instrument under ERDF)

June 2024

149 REGIONS received RIVs label. Committed to:

- Strengthen their Research & Innovation (R&I) ecosystem
- Enhance the coordination and directionality of their R&I policy and investment towards key EU priorities
- Engage in R&I collaboration between more and less advanced regions with complementary S3

- |  |  |
|--|--|
|  Achieving circularity  |  Improving healthcare |
|  Digital transformation |  Reduce fossil fuels  |
|  Food security          |  Other areas          |

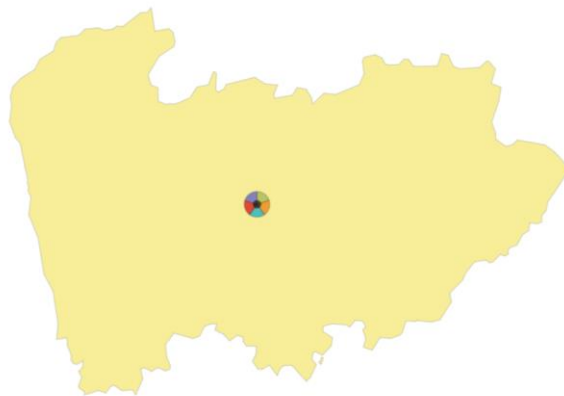
## Performance status:

Innovation leader

Strong innovator

Moderate innovator

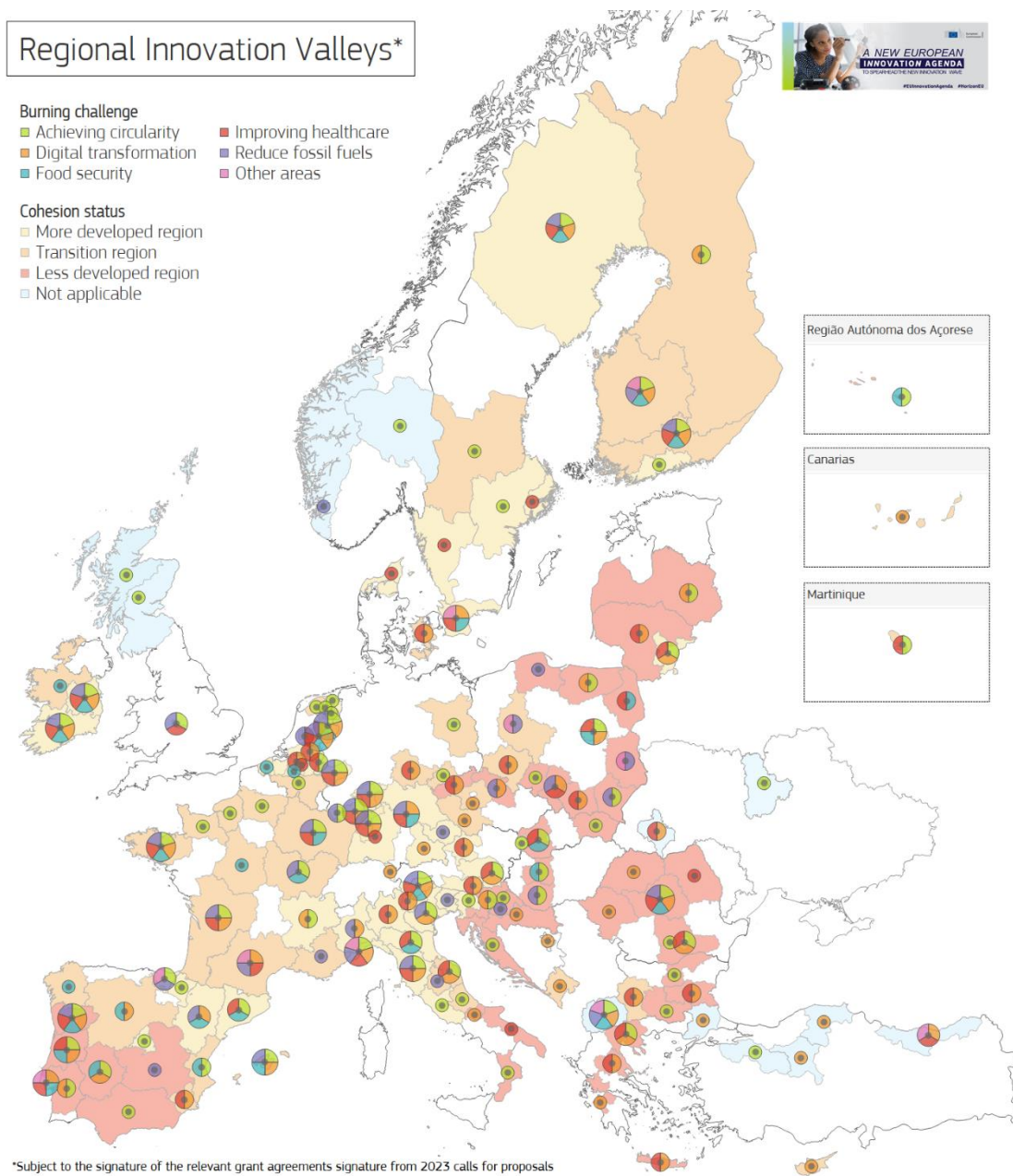
Emerging innovator



## Regional Innovation Valleys\*

- Burning challenge**
- |  |  |
|--|--|
|  Achieving circularity  |  Improving healthcare |
|  Digital transformation |  Reduce fossil fuels  |
|  Food security          |  Other areas          |

- Cohesion status**
- |   |
|---|
|  More developed region |
|  Transition region     |
|  Less developed region |
|  Not applicable        |



Região Autónoma dos Açores

Canarias

Martinique

\*Subject to the signature of the relevant grant agreements signature from 2023 calls for proposals



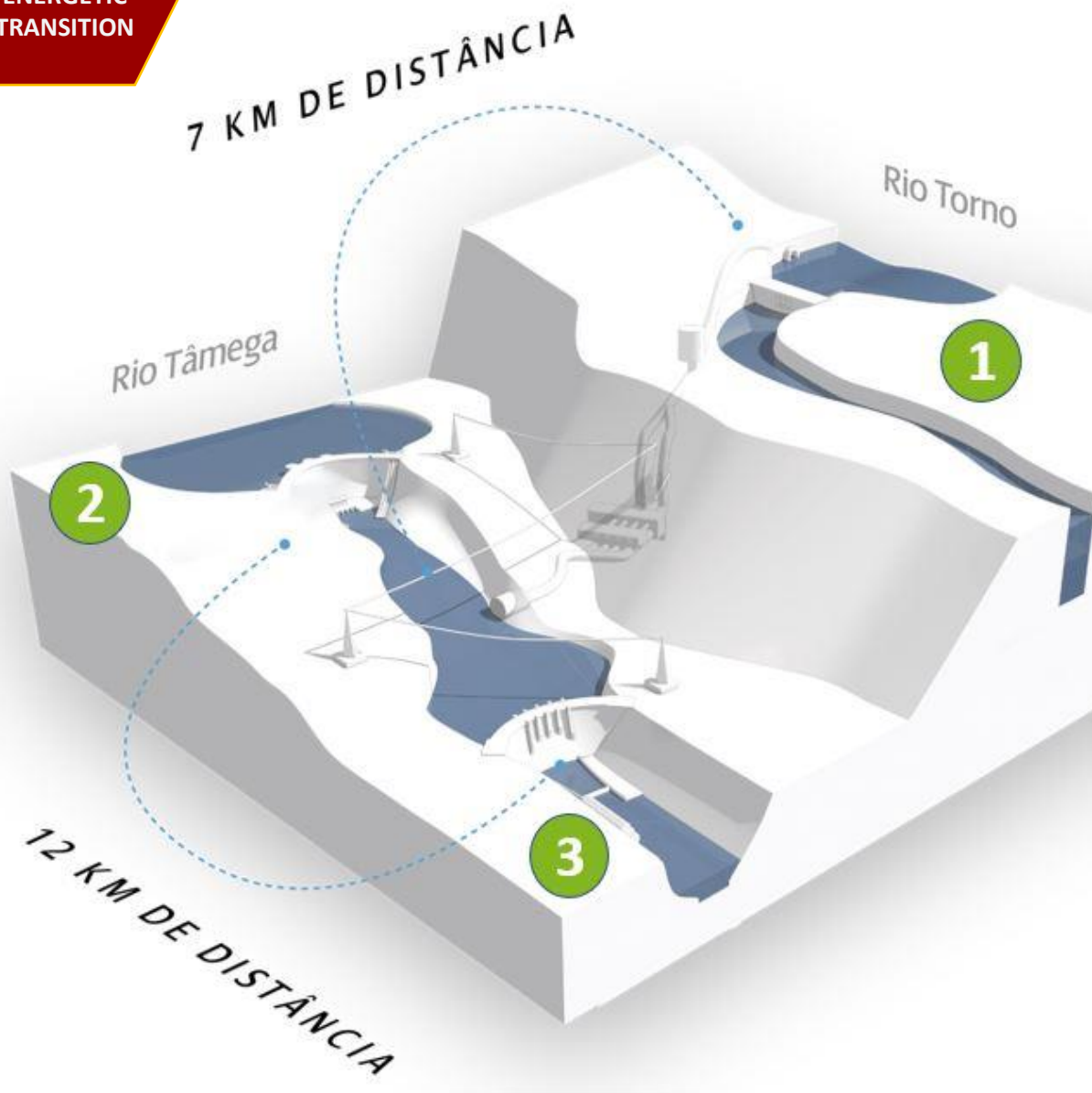
SUSTAINABLE  
MOBILITY AND  
ENERGETIC  
TRANSITION



Hydroelectric Tâmega complex, Iberdrola

- 3 dams (Gouvães, Daivões e Alto Tâmega)
- 3 hydroelectric plants, total power 1 158 MW





1

## Aproveitamento Hidroelétrico de Gouvães

Altura da Barragem: 30 m  
Comprimento do Circuito Hidráulico: 7.640 m  
Queda Estática Nominal: 657 m  
Potência Instalada: 880 MW  
Área da Albufeira: 176 ha  
Volume da Albufeira: 13,7 hm<sup>3</sup>

### Sistema de Bombagem

- / Única tecnologia que permite armazenar eficientemente grandes quantidades de energia.
- / É fundamental como backup e suporte a outras energias renováveis, sobretudo, eólica e fotovoltaica.
- / Contribui para a estabilidade do sistema elétrico graças à sua grande flexibilidade na resposta às variações da procura.
- / Modera os preços da eletricidade, produzindo a energia armazenada nos momentos de maior necessidade no sistema.

2

## Aproveitamento Hidroelétrico de Alto Tâmega

Altura da Barragem: 106,5 m  
Comprimento do Circuito Hidráulico: 50 m  
Queda Estática Nominal: 87 m  
Potência Instalada: 160 MW  
Área da Albufeira: 468 ha  
Volume da Albufeira: 132 hm<sup>3</sup>

3

## Aproveitamento Hidroelétrico de Daivões

Altura da Barragem: 77,5 m  
Comprimento do Circuito Hidráulico: 250 m  
Queda Estática Nominal: 64,5 m  
Potência Instalada: 118 MW  
Área da Albufeira: 340 ha  
Volume da Albufeira: 56,2 hm<sup>3</sup>



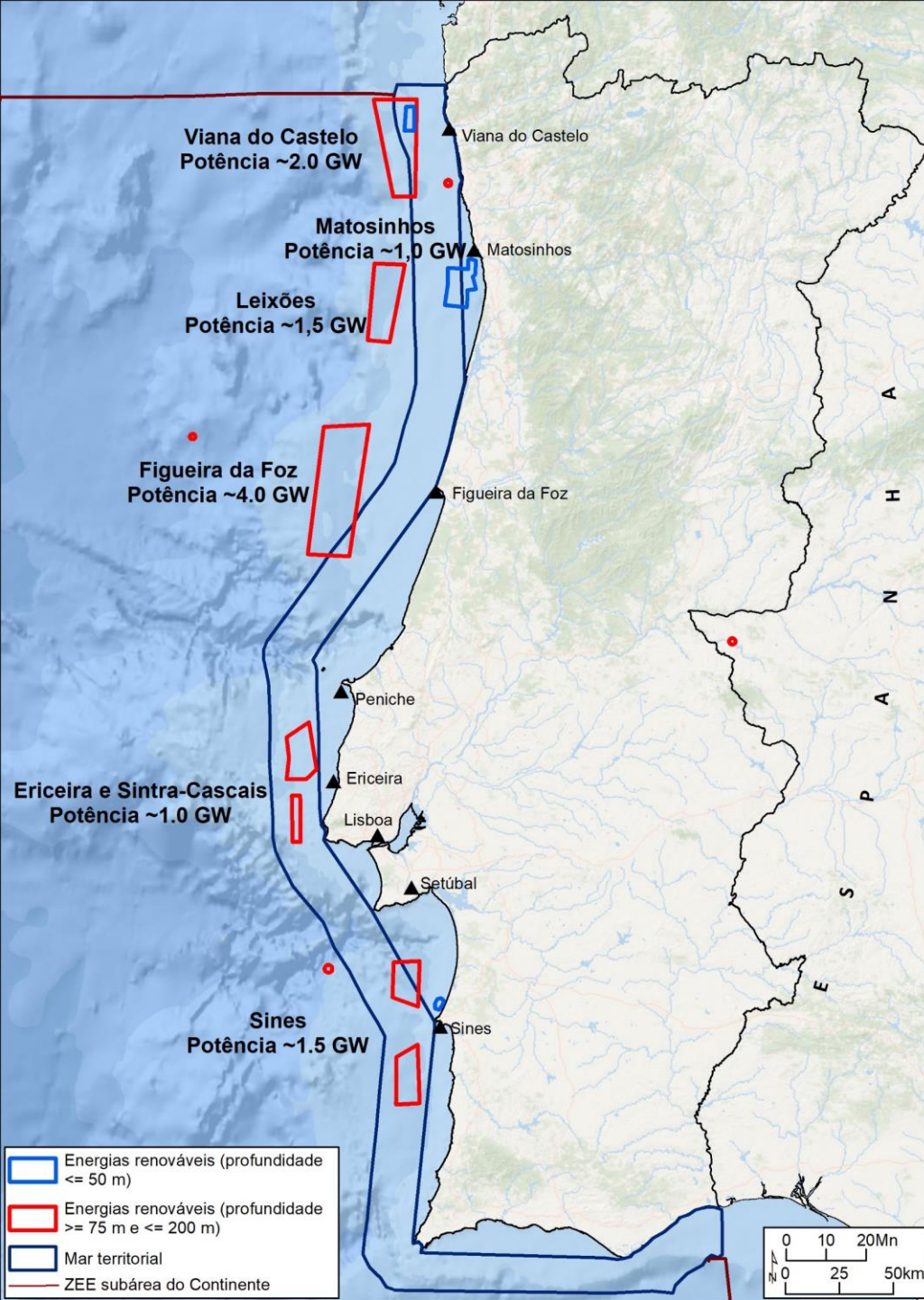
SUSTAINABLE  
MOBILITY AND  
ENERGETIC  
TRANSITION

SEA RESOURCES  
AND  
ECONOMY

# Windfloat, Viana do Castelo







SUSTAINABLE  
MOBILITY AND  
ENERGETIC  
TRANSITION

SEA RESOURCES  
AND  
ECONOMY

# Windfloat, Viana do Castelo



# Portugal and renewable energies: Recent story and future trends

Period	Main Investments
2000-2010	<b>Onshore wind</b>
2010-2020	<b>Dams</b> (in the existing dams)
2020-2030	<b>Solar</b> (Centralized and Decentralized) + repowering onshore wind + hydro gigabateries
2030-2040	<b>Offshore wind farms</b> (Floating) + alternative solar/AV solutions + green H2



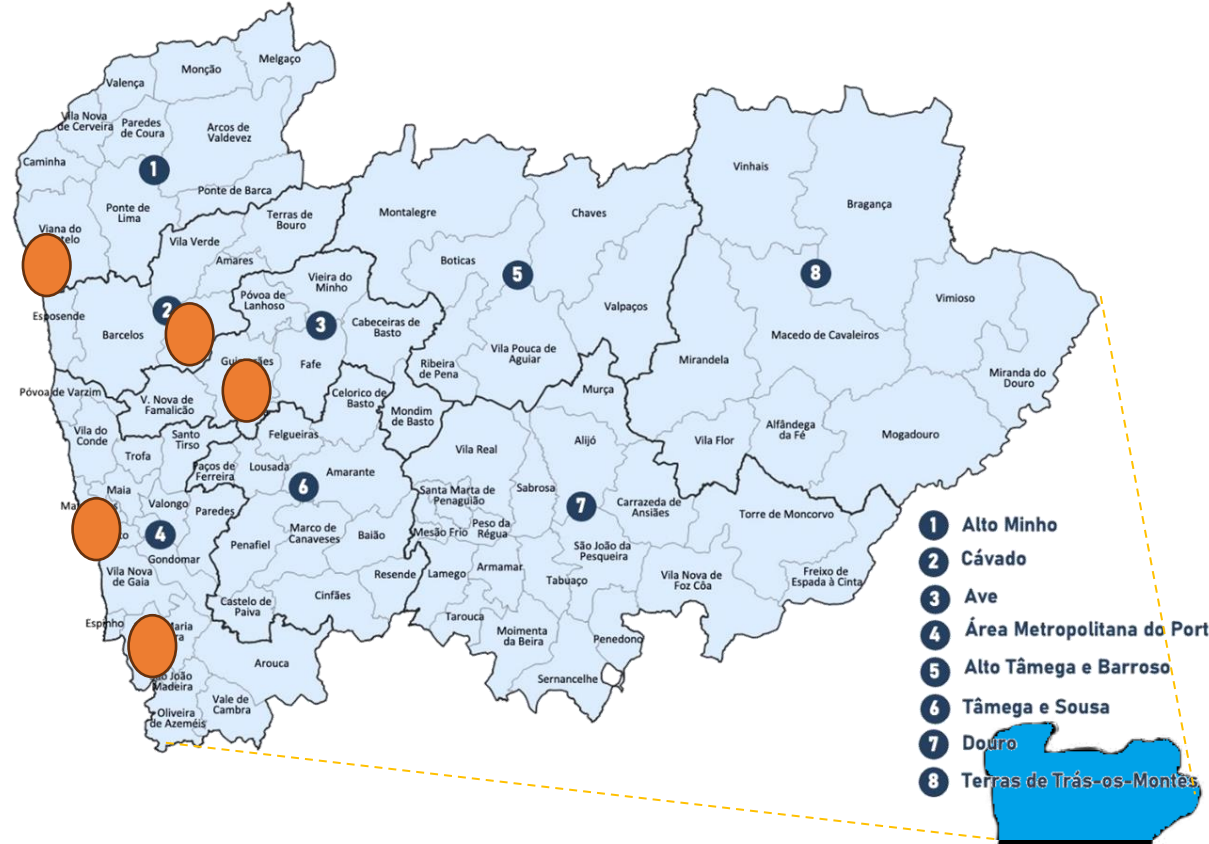
# North Region Ecosystem

NUTS III  
Regulamento delegado (UE) nº2023/674 da Comissão,  
de 26 de dezembro de 2022

## Academia in energy-related areas:



Universidade do Minho



## Research and Technology Organization:



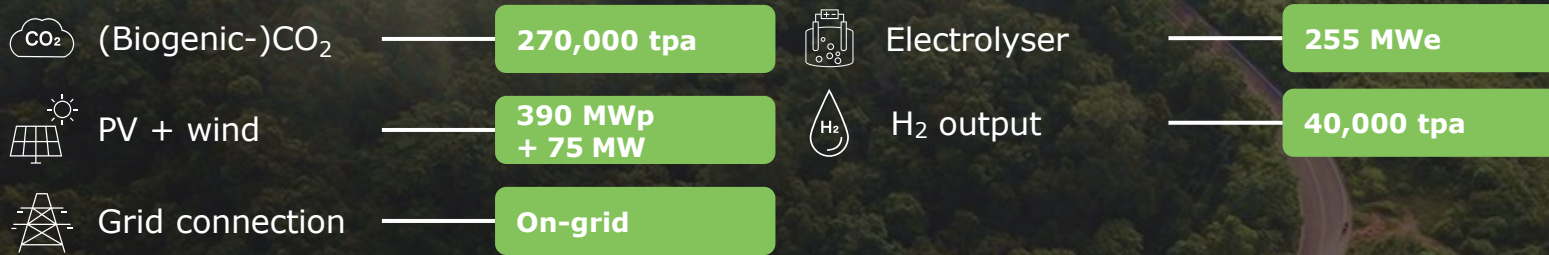
Case studies



# Pilot case study: Leça (SmartEnergy)

Project Leça

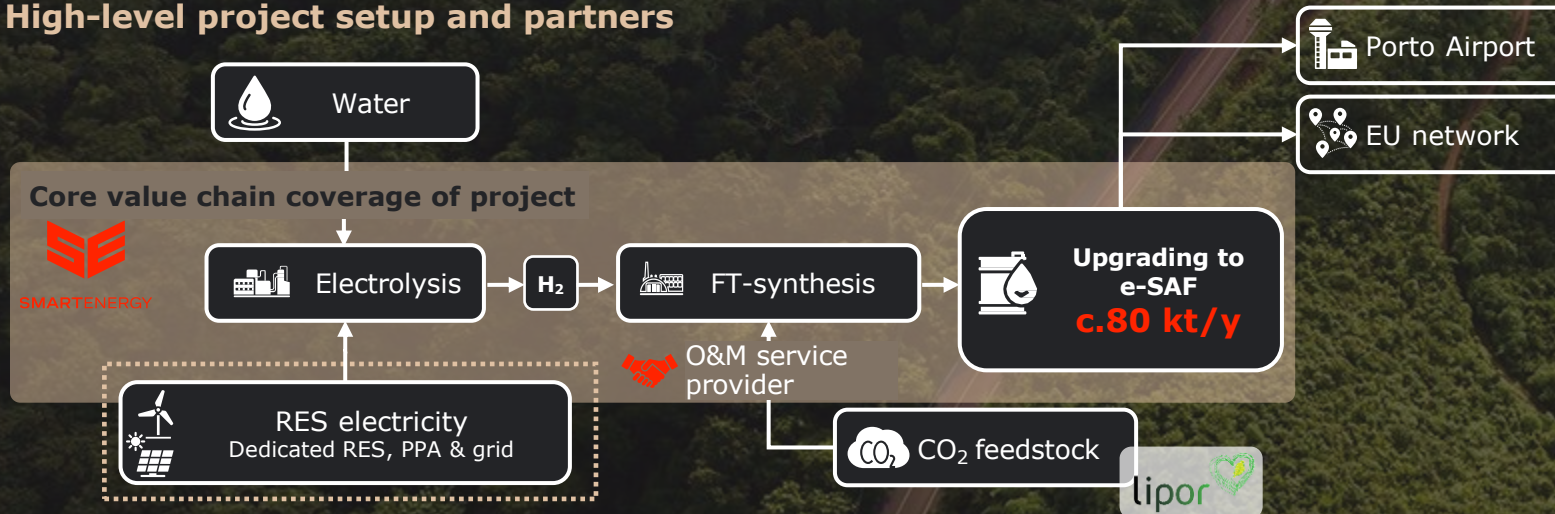
## Leça project targets production of H<sub>2</sub> and e-SAF to the Porto airport



### Project description

- Repurpose natural gas infrastructure for green H<sub>2</sub>
- SAF production via synthesis of CO<sub>2</sub> from Lipor & Green H<sub>2</sub> from SE
- Supply of SAF to Porto Airport
- Supply of H<sub>2</sub> to Industry
- SAF exports via Port of Porto

### High-level project setup and partners



MoU signed (12/2023)





# Pilot case study: HI\_MOV (Poctep)

## HI\_MOV Cross-Border Technological Mobility Corridor with Renewable Hydrogen

- The HI\_MOV project, co-financed by Interreg POCTEP, aims to articulate a cross-border ecosystem that promotes a value chain around green hydrogen in the Galicia-North Portugal Euroregion, contributing to sustainable mobility based on renewable sources.
- HI\_MOV will highlight existing and future capabilities at a scientific level, technical, industrial and business, to attract new projects and investments. Citizen awareness of the advantages of using H2 to achieve the decarbonization objectives of the transport sector will also be improved.
- The total budget for the three years of the project (2023-2025) amounts to 2,175,000 euros. HI\_MOV is co-financed by the European Union through the Interreg VI-A Spain-Portugal Program (POCTEP) 2021-2027.



# Pilot case study: HI\_MOV (Poctep)

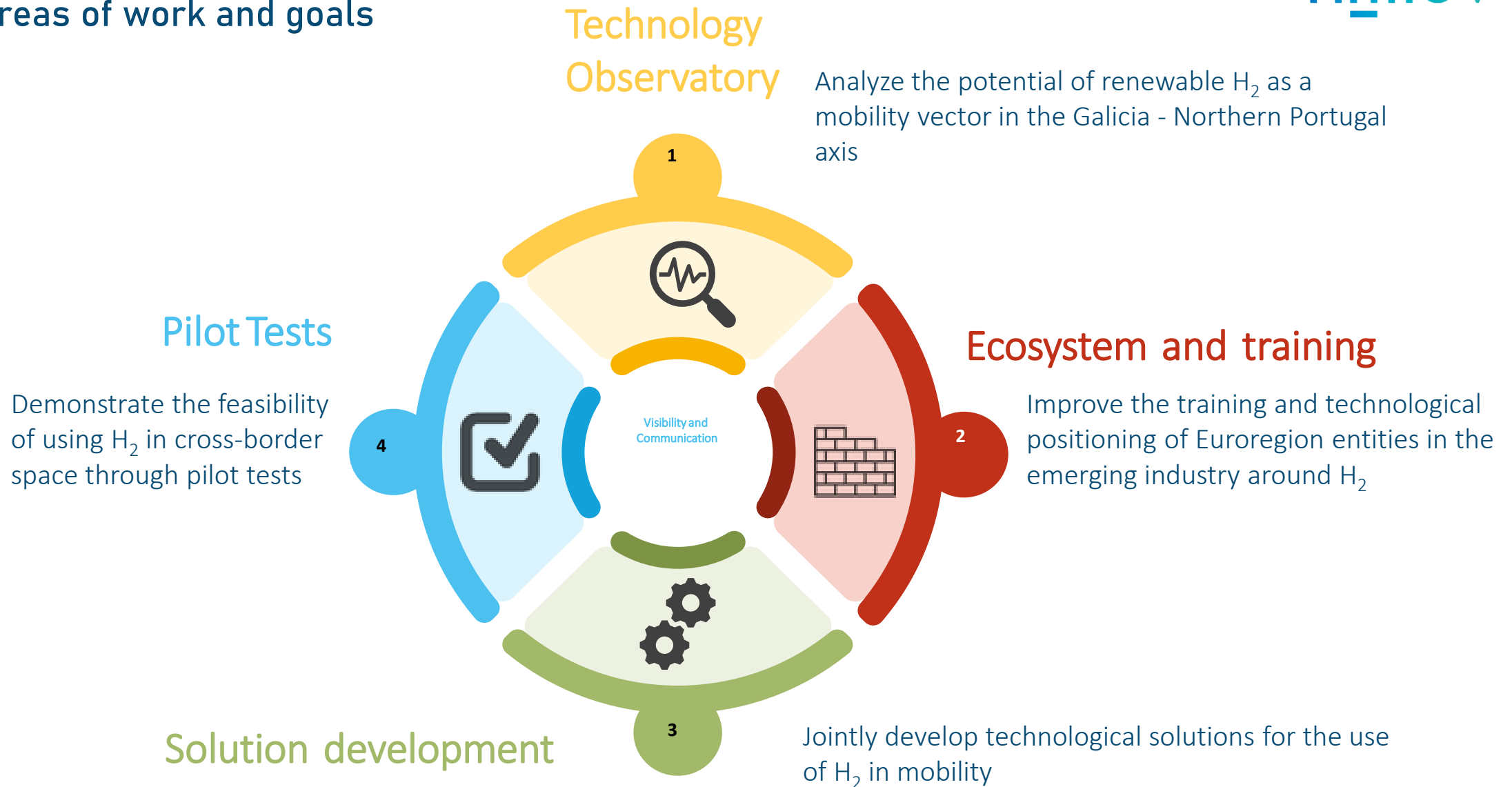
The project partnership is integrated by:

- Technology Centers:
  - Automotive Technology Centre of Galicia (CTAG) – Lead partner
  - EnergyLab
  - Centre of Engineering and Product Development (CEiiA)
  - Centre for Innovation in Polymer Engineering (PIEP)
- Universities:
  - Universidade de Santiago de Compostela
  - Universidade do Minho
  - Universidade do Porto
- Companies
  - Petrotec
- European Groupings of Territorial Cooperation
  - Galicia- Norte de Portugal EGTC
- Regional government agencies
  - Energy Institute of Galicia (INEGA)



# Pilot case study: HI\_MOV (Poctep)

### Areas of work and goals





# Pilot case study: HI\_M0V (Poctep)

## Content of the value chain development and technical work packages

- Definition and dynamization of a technological and prospective observatory and network modeling for cross-border hydrogen mobility corridor
- Strengthening the H2 value chain and training in H2 technologies
- Design and development of technological solutions:
  - In the field of mobile storage - Deposits in composite materials
  - In the field of distribution - Control and management of charging points
  - In the field of mobility use - Vehicle platform with fuel cell
- Demonstration pilots:
  - Validation pilot for vehicular H2 supply technologies
  - Last mile logistics use case pilot with H2 vehicle
  - H2 tank filling monitoring pilot

<https://himov.eu>

**Coordination:** Automotive Technology Centre of Galicia (CTAG) – Joaquín Sierra; [himov@ctag.com](mailto:himov@ctag.com)

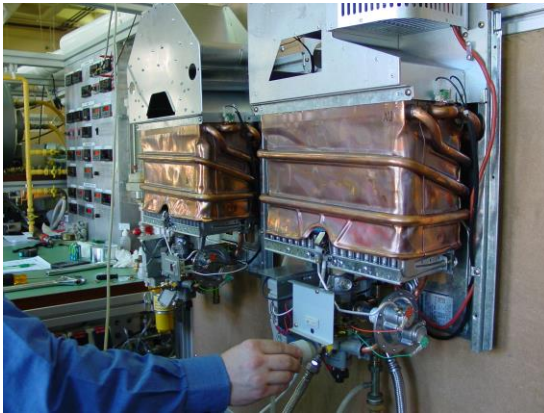
# Foreseen relevant developments



CATIM

Technological Support Center for the Metal-Mechanical Industry

- Technological center with a mission to contribute to the innovation and competitiveness of national metalworking industries and related or complementary sectors.
- Expanding facilities to include testing and development of components for the hydrogen value chain.
- Aim to have certified laboratories and the capability to certify products for H2 (storage, transportation, ...).
- Are applying for regional funds under a program to reinforce or create new Technological Infrastructure in the Norte, which includes energy as one of the priority areas.





CCDR

INNOVATION

INNOVATION

Consolidate

Widen scope

Internationalize

Strengthen

Territorialize