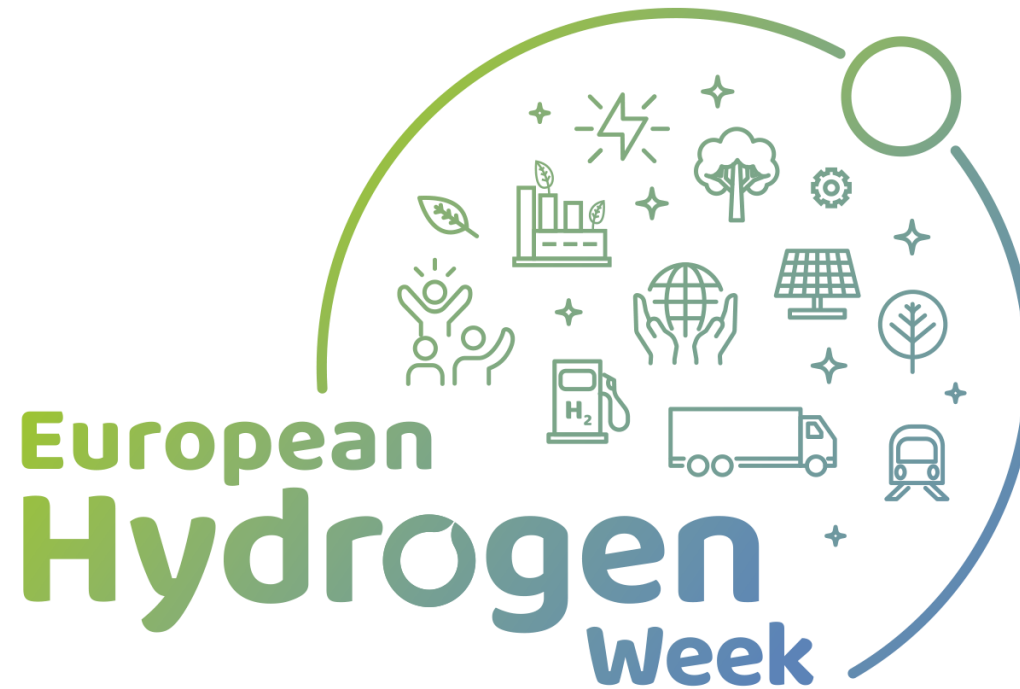


HIGGS

Hydrogen In Gas

GridS: a systematic
validation approach
at various admixture
levels into high
pressure grids



Dr. Vanesa Gil

HIGGS project
coordination

ARAID Senior Researcher
at FHa

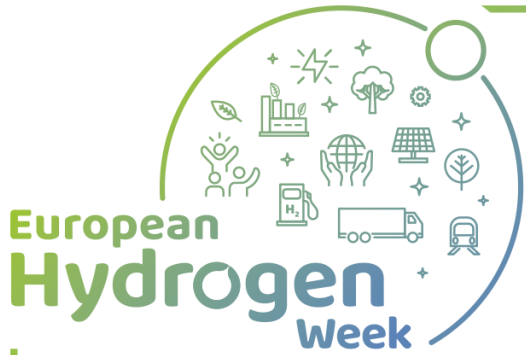
Aragon Hydrogen
Foundation (FHa), SPAIN

<https://www.higgsproject.eu/>

vgil@hidrogenoaragon.org

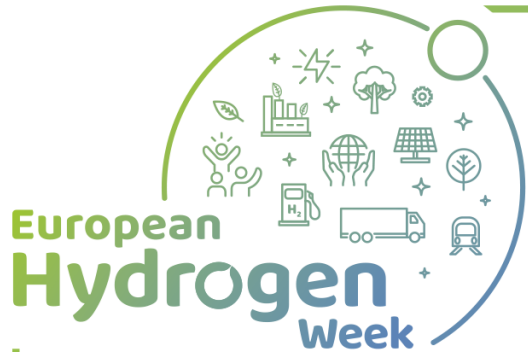
#PRD2021
#CleanHydrogen



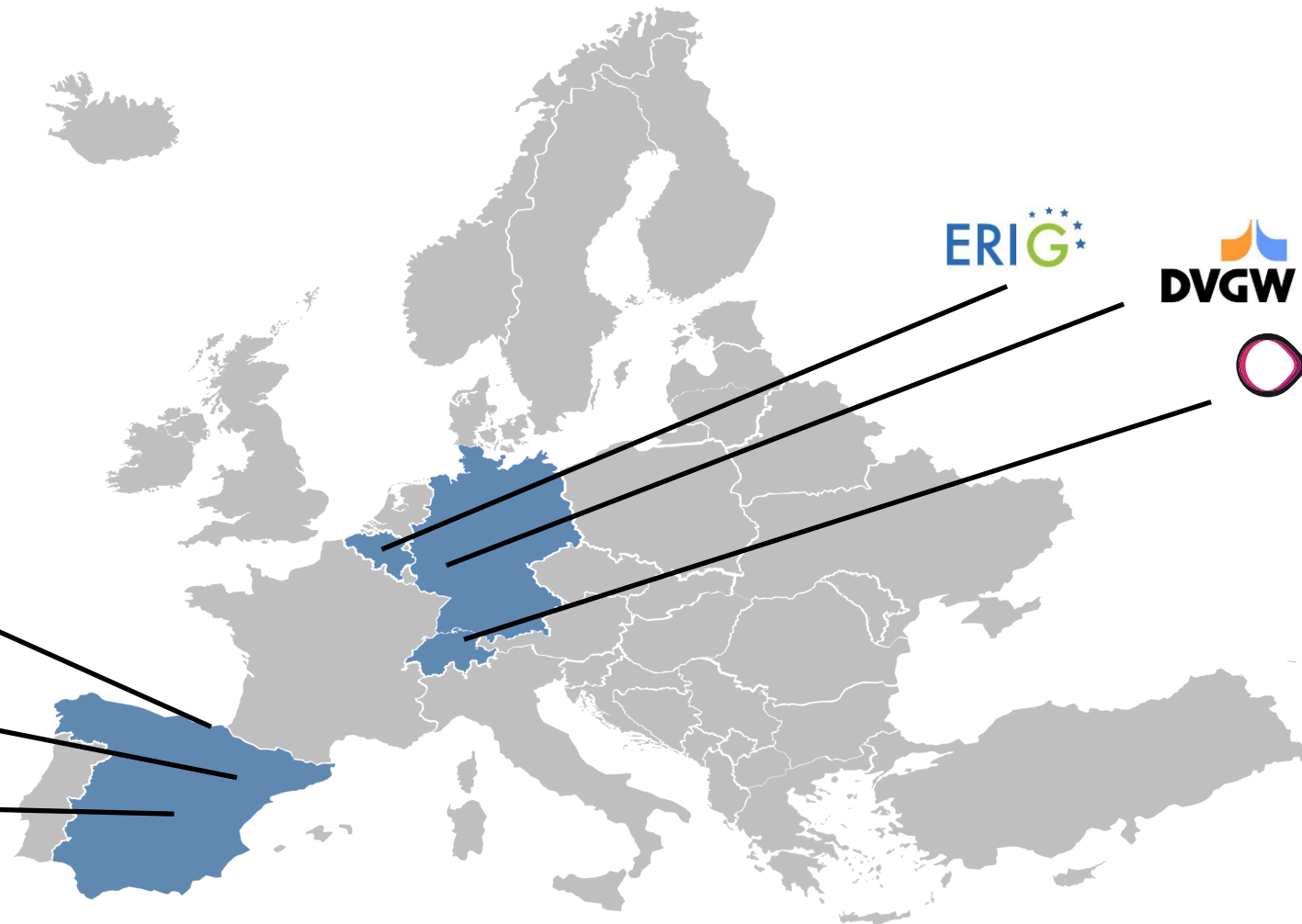


Project Overview

- Call year: 2019
- Call topic: Systematic validation of the ability to inject hydrogen at various admixture level into high-pressure gas networks in operational conditions - H2020 HORIZON FCH 02-5-2019
- Project dates: January 2020 - December 2022
- % stage of implementation 01/11/2019: 64 %
- Total project budget: 2 107 672,50 €
- FCH JU max. contribution: 2 107 672,50 €
- Other financial contribution: 0 €
- Partners: FUNDACION PARA EL DESARROLLO DE LAS NUEVAS TECNOLOGIAS DEL HIDROGENO EN ARAGON (FHa), DEUTSCHER VEREIN DES GAS- UND WASSERFACHES e.V. (DVGW), FUNDACION TECNALIA RESEARCH & INNOVATION (TECNALIA), OSTSCHWEIZER FACHHOCHSCHULE (OST), REDEXIS GAS SA, EUROPEAN RESEARCH INSTITUTE FOR GAS AND ENERGY INNOVATION (ERIG)



Partners



#PRD2021
#CleanHydrogen



Project Summary

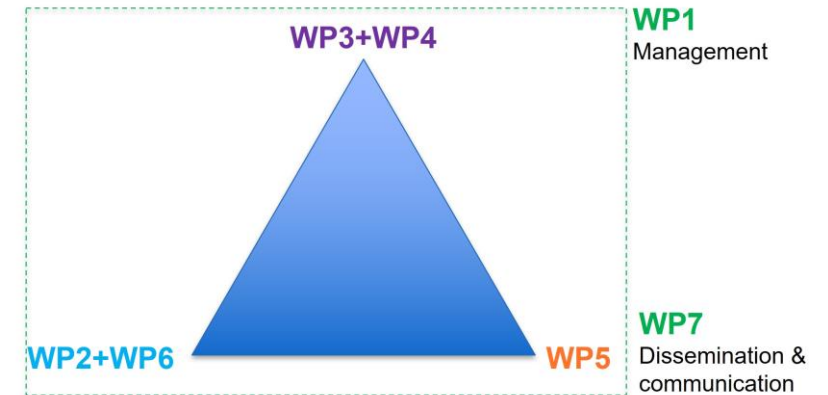
Goal

HIGGS project aims to pave the way to **decarbonisation of the gas grid** and its usage, by **covering the gaps of knowledge of the impact** that high levels of **hydrogen** could have on the **gas infrastructure**, its components and its management.

Specific objectives

- Mapping of technical, legal and regulatory barriers and enablers
- Testing and validation of systems and innovation
- Techno-economic modelling to develop operation strategies

➔ Defining a set of conclusions as a pathway towards enabling the injection of hydrogen in high-pressure gas grids



Project Summary

Positioning vs SoA

HIGGS	SoA
Descriptive picture of the European natural gas transmission grid	Marcogaz statistics (2013), EGIG report (2019), etc.
Construction of the R&D testing platform to work at 80 bar with H ₂ atmosphere at several concentrations, will allow the replication of operating conditions of the European transmission gas grid.	Existing demo projects
A methodology is developed to build and simulate a model of a network as efficiently as possible to perform techno-economic simulations of gas networks	Current TSOs' tools

Application and market area

- Components manufacturers
- Membrane producers
- TSO operators in Europe and abroad
- Software developers
- RSC bodies



Descriptive picture of the European natural gas transmission grid

Progress/Actions - Coverage grade



Achievement to-date

0 %



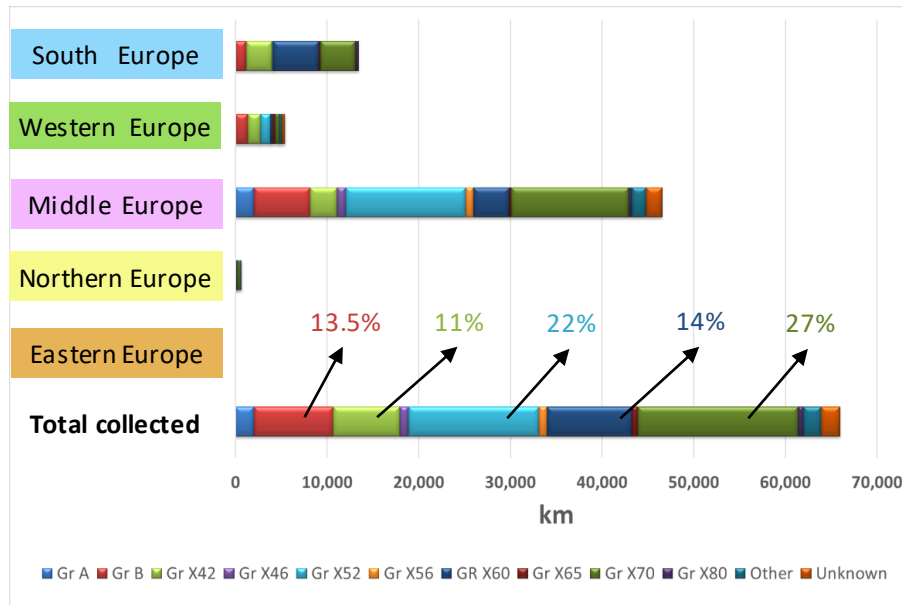
100 %

25%

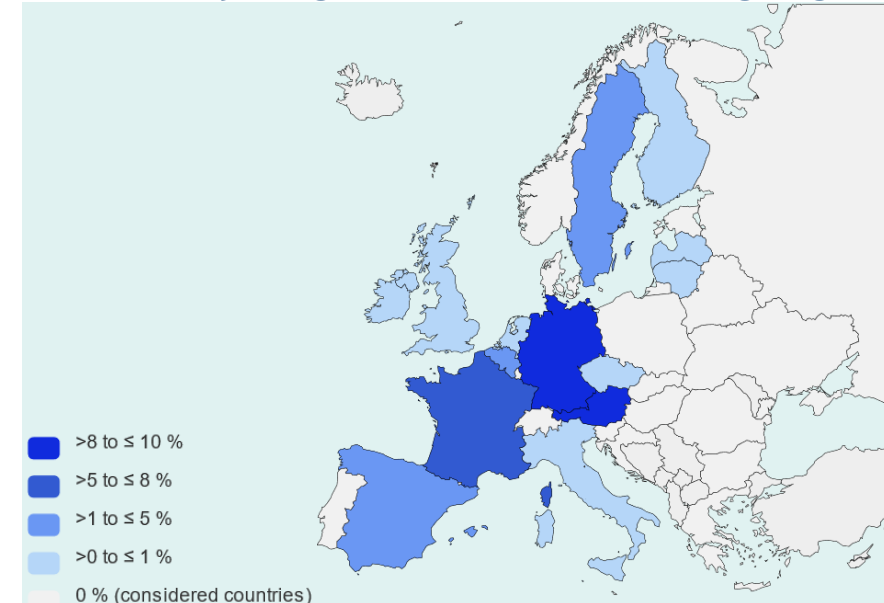
50%

75%

Pipeline steel types



Allowed hydrogen concentration in gas grid



Experimental testing campaign on components

Progress/Actions - Completion



Achievement to-date

0 %

10 %



100 %

25%

50%

75%



Risks, Challenges and Lessons Learned

Lack of information on the European high-pressure gas grid

- TSOs did not send the information
- Or were not willing to contribute either due to own projects or sorrows on the confidentiality

RSC and hydrogen strategies incomplete

- High dynamic process in Europe and member countries
- Gathering data in due time was very difficult or even impossible

Delay in assembly campaign of the R&D platform

- Modification of the testing campaign

Acquisition of network data for simulations

- Simplification of the model were necessary
- There is no standardized method for such tasks and it is very difficult to obtain solid data from TSOs

Dissemination Activities

What happened so far:

- 3 Conferences and 2 Workshops organized by HIGGS so far
- HIGGS was presented at 12 External Events, Conferences & fairs
- Digital materials (presentations, fact sheets and press kit) generated and available on the [project website](https://www.higgsproject.eu/)
- first public deliverables are published this year and made available on the [project website](https://www.higgsproject.eu/)

What is planned in 2022:

- Showcase Event at the demo-site of HIGGS
- Project Video to promote the results
- More Workshops, Conferences and fairs

HIGGS Online Presence:

- Project Homepage: <https://www.higgsproject.eu/home/>
- [LinkedIn](#)
- Twitter: [@HIGGS_Project](https://twitter.com/HIGGS_Project)



Exploitation Plan/Expected Impact

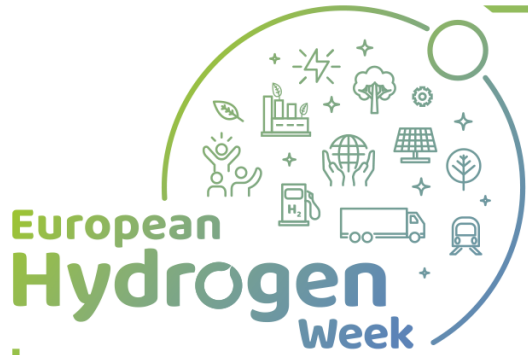
Applying for Horizon Results Booster

Exploitation

Name of the Result	Year accomplished	Result Type	KER	Potential
Testing Platform	in development (2021)	Infrastructure - Facilities (new or improved)	Scientific	Customized testing conditions
System for separation of low concentration of hydrogen in natural gas	in development (2022)	Product (new or improved)	Technological, business or economic	Better cost-competitive at H2 content below 15% than other technologies.
Design of injection sites	in development (2021)	Product (new or improved)	Technological, business or economic	Versatility in the flow of hydrogen and conditions to inject in NG grids
Recommendations on codes, standards adaption	in development (2022)	Policy recommendation, guidance, awareness raising	Policy or regulatory	Identification of the most critical RSC bottlenecks and fluent interaction with RSC bodies
Recommendations and inventory list for adaptations of the gas grid	in development (2021)	Policy recommendation, guidance, awareness raising	Policy or regulatory	Recommendations for the future RCS so mitigation measures
Adapted techno-economic models to include innovations and considerations for H2 admixtures	in development (2022)	Method, material or instrument (new or improved)	Policy or regulatory	Consideration of current and future gas separation technologies and innovations in the modelling.

Impact

Name of the Result	Expected time to impact	Target Group	Market maturity
Testing Platform	1-5 years	Policy-makers and authorities, international Standardisation Bodies Innovators	Emerging: Growing demand and few offerings
System for separation of low concentration of hydrogen in natural gas	1-5 years	Industry/Business Partners	Emerging: Growing demand and few offerings
Design of injection sites	1-5 years	Industry/Business Partners	Emerging: Growing demand and few offerings
Recommendations on codes, standards adaption	1-5 years	Policy-makers and authorities, international	-
Recommendations and inventory list for adaptations of the gas grid	1-5 years	Industry/Business Partners	-
Adapted techno-economic models to include innovations and considerations for H2 admixtures	1-5 years	Policy-makers and authorities, international)	-

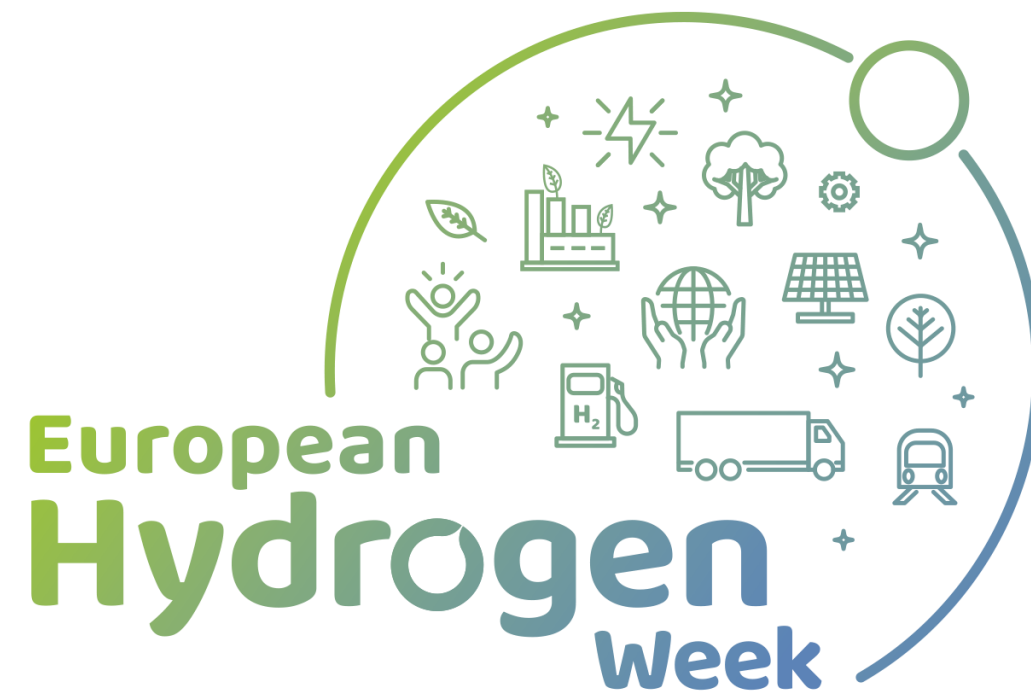


Thanks for your attention!



#PRD2021
#CleanHydrogen





#PRD2021
#CleanHydrogen

