European Association for Storage of Energy

Power-to-Gas: Policies and Actions in Europe

Brussels, March 2021

Table of Contents

Introduction 3

1. European Union 4
   1.1. Target 5

2. Spain 6
   2.1. Targets 7
   2.2. Key Policy Actions 7
      2.2.1. Market Design
      2.2.2. Cost Reduction and Scaling Up
      2.2.3. Research and Innovation
   2.3. Keywords 7

3. The Netherlands 8
   3.1. Targets 9
   3.2. Key Policy Actions 9
      3.2.1. Market Design
      3.2.2.Cost Reduction and Scaling Up
      3.2.3. Research and Innovation
   3.3. Keywords 9

4. Germany 10
   4.1. Targets 11
   4.2. Key Policy Actions 11
      4.2.1. Market Design
      4.2.2.Cost Reduction and Scaling Up
      4.2.3. Research and Innovation
   4.3. Keywords 11

5. EASE Comments 12

This paper was elaborated by the EASE TF 1.5 Power-to-Gas and Biofuels, chaired by Mr Yves Schlumberger, EDF. EASE Secretariat would like to thank all the EASE members who contributed to this document.

Introduction

Hydrogen and Power-to-Gas (PtG) are chemical energy storage technologies, one of five energy storage "families" identified by EASE. Electricity-produced hydrogen can be used for transport (fuel), for heating (fuel), as a raw material (chemical feedstock); to balance electricity demand and supply and to support the management of the electricity grid (through storage).

The European Union (EU), and many of its Member States, consider clean hydrogen a key priority to achieve the European Green Deal and Europe's clean energy transition. Yet, today, hydrogen is a modest fraction of the European energy mix.

EASE welcomes the two strategies presented by the European Commission in 2020, the Energy System Integration and Hydrogen. While it seems clear that coordination at the EU level is necessary, different states are trying to introduce complementary policies and initiatives to favour its uptake. It seems one-size-fits-all solutions may not exist – States have different characteristics and priorities, so different approaches are necessary.

As highlighted at the 34th Madrid Forum, it is vital to design a regulatory framework at the European Union level for hydrogen to develop a competitive market within an integrated energy system.

In this document, we will focus solely on hydrogen produced through Power-to-Gas, i.e. by electrolysis. Other technologies to produce hydrogen are not considered.

1. European Union

1.1. Targets

- 2030: At least 55% cuts in greenhouse gas emissions (from 1990 levels).
- 2030: At least 32% share for renewable energy*.
- 2030: At least 32.5% improvement in energy efficiency** .
- 2050: EU climate neutral.

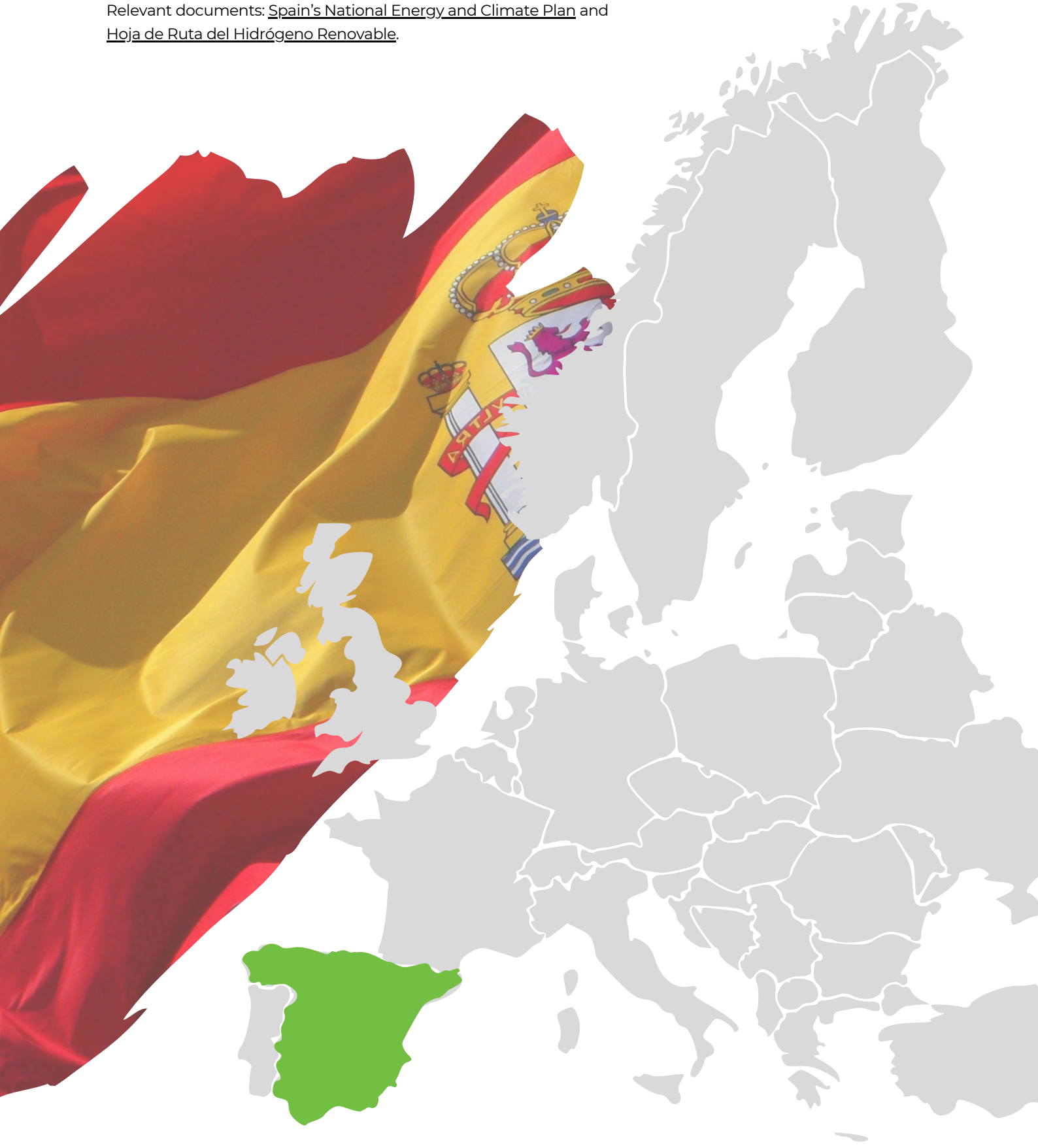
H2 Specific objectives***

- 2024: installation of at least 6 gigawatts of hydrogen electrolysers and the production of up to 1 million tonnes of renewable hydrogen.
- 2030: installation of 40 gigawatts of electrolysers and up to 10 million tonnes of renewable hydrogen.

* The European Commission will propose an increase of 2030 target up to 38-40% by June 2021.
** The European Commission will present a revision of the Energy Efficiency Directive by June 2021.
*** As per the European Commission " A Hydrogen Strategy for a Climate Neutral Europe".

2. Spain

Relevant documents: Spain's National Energy and Climate Plan and Hoja de Ruta del Hidrógeno Renovable.



2.1. Targets

2030

- 23% reduction in greenhouse gas (GHG) emissions in 2030 compared to 1990.
- 42% share of energy end-use from renewables (74% in electricity generation) in 2030.
- 39.5% energy efficiency improvement in 2030.
- 4,6 million of CO2eq emissions reduction.

2050

- At least 90% reduction in greenhouse gas (GHG) emissions in 2050 compared to 1990.
- ≈100% share of energy end-use from renewables (100% in electricity generation).

Hydrogen Specific:

- 4 GW of renewable hydrogen electrolyser, ideally close to consumption centres.
- Industry: At least 25% of the total hydrogen used in 2030 should be renewable.
- Transport-specific hydrogen targets: 100 hydrogen stations, 150-200 fuel cell buses, at least 5000 light and heavy-duty vehicles by 2030.

2.2. Key Policy Actions - Upcoming and Existing

2.2.1. Market Design

- Renewable hydrogen should be used for hard to decarbonise sectors.
- Any new regulatory framework should recognise the potential of renewable hydrogen.
- An EU framework should be set for labelling and guarantees of origin.
- Taxes and CO2 markets can contribute to provide price signals for the replacement of non-renewable hydrogen by renewable hydrogen.
- Incentives for the purchase of hydrogen-powered vehicles.
- Clarify the operational framework to allow Power-to-Gas to participate as balancing service provider.
- Blending with natural gas implies the loss of the hydrogen intrinsical value - assessment of gas infrastructure adaptation possibilities; technical and regulatory features of blending to increase the share of renewable hydrogen in existing gas networks.

2.2.2. Cost Reduction and Scaling Up

- Incentivise further discussion with France, Portugal and other member states to increase regional cooperation.
- Incentive Spanish companies to participate in European/international fora.
- Design financial instruments to support the adaptation of Industries that use hydrogen as feedstock.

2.2.3. Research and Innovation

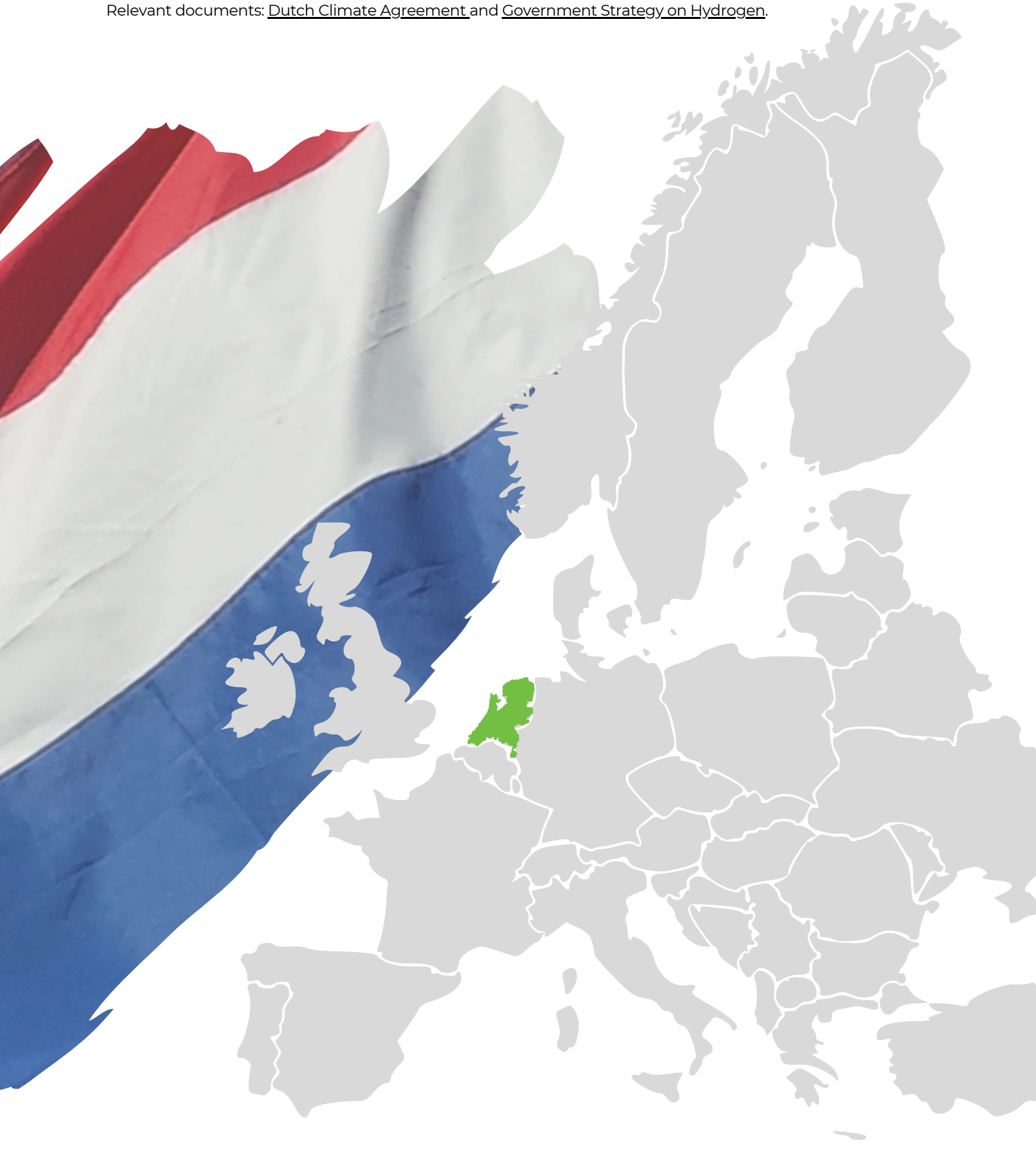
- Creation of an excellence centre for the research on energy storage, with a focus on hydrogen- based storage.
- A crucial role of European support for research and innovation, especially in the context of the European Union Recovery Fund.
- Creation of a specific research finance mechanisms for hydrogen solution.
- “Knowledge hub” to inform stakeholders, citizens of renewable hydrogen’s role and opportunities.

2.3. Keywords

Solar, Renewable Hydrogen, Electrolysers Manufacturing, Industry, Transport.

3. The Netherlands

Relevant documents: Dutch Climate Agreement and Government Strategy on Hydrogen.



3.1. Targets

- 49% CO2 reduction in 2030 (48.7 Mton).
- 84 TWh of renewable electricity by 2030 (70 % of the mix).
- Sustainable energy transition subsidy scheme (SDE) for CO2 reduction techniques.
- Phasing out coal in power plants by 2030.
- CO2 levy in industry above emissions trading system.
- All new cars in 2030 electric.

Hydrogen Specific:

- 3 – 4 GW of electrolysis capacity by 2030; 500 MW by 2025.
- In 2025: 50 tank stations, 15.000 fuel cell electric vehicles, 3.000 heavy-duty vehicles.
- Pilot projects to enable the use of hydrogen for urban heating by 2030.
- Until 2030, the government will contribute €30-40 million extra subsidies annually for demonstration of energy and climate innovation projects (DEI+).

3.2. Key Policy Actions - Upcoming and Existing

3.2.1. Market Design

- Use of existing gas grid.
- Market regulation and temporary tasks for network operators.
- Guarantees of origin & certification.
- New safety regulation.
- New blending obligations.
- New infrastructure programme to ensure coordinated and properly spaced gas infrastructure, electrolysers set up, and capacity of electricity infrastructure.

3.2.2. Cost Reduction and Scaling Up

- Ports and industry clusters.
- Temporary operating cost support for scaling up and rolling out.
- Stimulation/subsidy schemes further expanded and streamlined, especially for energy and transport sector.
- Measures to further link hydrogen to offshore wind energy.
- Regional, international cooperation.

3.2.3. Research and Innovation

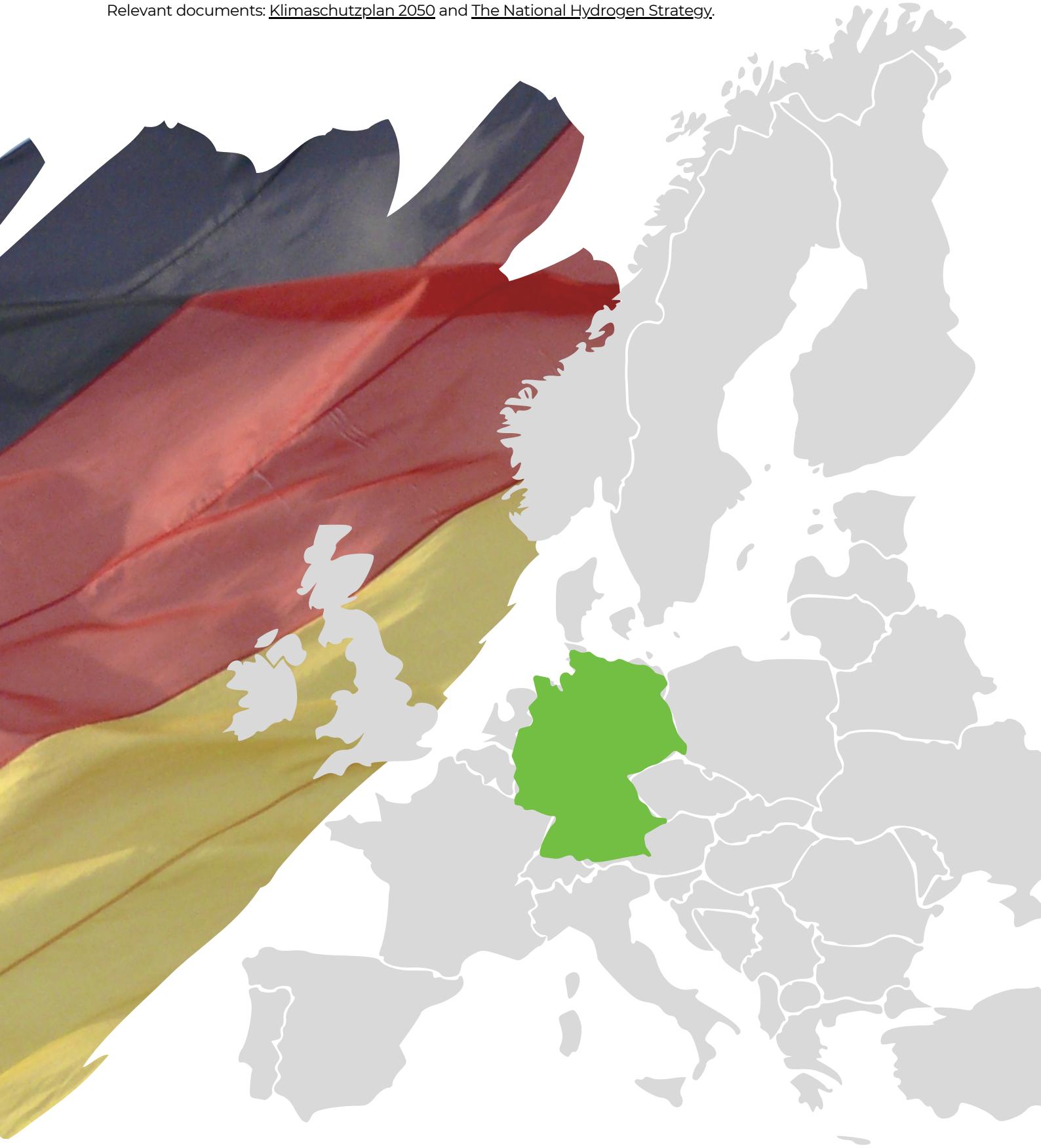
- Support schemes for research, additional funding.

3.3. Keywords

Ports, Industry, International Cooperation, Wind, Trade, Transport.

4. Germany

Relevant documents: Klimaschutzplan 2050 and The National Hydrogen Strategy.



4.1. Targets

- 2030: At least 40% cuts in greenhouse gas emissions (from 1990 levels).
  - Specific, sectorial targets (energy, buildings, transport, industry, agriculture).
- 5 GW of renewable hydrogen electrolysers.

4.2. Key Policy Actions - Upcoming and Existing

4.2.1. Market Design

- Implementation of EU provisions fast-tracked.
- New tariff system.
- Assessments for use/reconversion of the existing gas grid.
- Guarantees of origin & certification.
- Hydrogen electrolysis plants exempted from electricity grid charges.
- Electricity used for power-to-gas is exempted from charges and levies if hydrogen is transformed directly into electricity again.
- New renewables electricity framework, focus on sector coupling.
- New legislation to support zero-emissions vehicles.
- Need for reliable sustainability and quality standards – especially European level.

4.2.2. Cost Reduction and Scaling Up

- Funding for investments in electrolysers.
- Measures to incentivise wind plus power-to-gas solutions.
- Developing refuelling infrastructures.
- Support for the establishment of a competitive supply industry for fuel-cell systems.
- New programmes to reward Industry players switching from fossil fuel-based solutions (e.g., Carbon Contracts for Difference).
- International energy partnerships.

4.2.3. Research and Innovation

- New strengthened, national funding with particular attention to the transport sector.
- Demonstration projects for short-term, roadmaps and campaigns for long-term.
- Foster educational and vocational training.

4.3. Keywords

Transport, Industry, European Perspective, Wind.

5. EASE Comments

The three national strategies for hydrogen present several similarities, but a surprising number of aspects are different.

Starting with the common points, all countries have highlighted that hydrogen will have a relevant role to decarbonise those sectors hard to electrify. Also, their strategies all agree that the hydrogen used as feedstock for industrial processes is the "low hanging fruit" and should be established as a priority for decarbonisation. Another relevant common point is that all strategies recognised that technology is still immature and that direct subsidies would be needed to kick – start demonstration projects. All the countries have highlighted the importance of certification and Guarantee of Origins schemes. EASE equally agrees that these are key aspects to favour the uptake of hydrogen and Power-to-Gas solutions. EASE put forward several recommendations on this topic in a recent paper. Such a provision would significantly foster hydrogen uptake, and it is currently under discussion at the EU level at the European Commission and Parliament levels.

Similarly, understanding how and to what extent rely on existing gas grid seems paramount in national strategies. EASE indeed discussed it when looking at the Power-to-Gas Business Cases paper. It is key to maximise cost efficiency and minimise investment costs while also taking into account safety and integrate gas and hydrogen quality consideration. In this context, it seems paramount to have a decision-making process that, on top of the European Commission, includes the Agency for the Cooperation of Energy Regulators (ACER), Member States, national regulatory authorities (NRAs), market participants, and electricity/gas grid operators. ACER and NRAs, in particular, may be further empowered e.g. in the selection process of PCI projects, as discussed in the EASE Power-to-Gas Business Cases paper. Besides, it is critical to have a revised TEN-E Regulation that properly values system integration and flexibility through hydrogen infrastructure, especially from an energy storage point of view.

But the measures set up to provide support the uptake of hydrogen vary widely between different countries. And so are the targets set by the States, how to favour sector integration, and how countries see the European Union's role. This situation should not surprise: different countries have different starting points, various opportunities, and various challenges. For example, Spain primarily focuses on solar power to power electrolysers; while the Netherlands stresses wind power's role for the same objective. And therefore, they rely on a different set of instruments to reach their targets.

Many of these aspects may sound familiar – indeed, they have also been tackled during the previously mentioned 34th Madrid Forum. As discussed in that venue, it seems clear that significant regulatory work needs to be done at the European level to improve coordination and to ensure the achievement of the European energy and climate targets. Energy transition, sector integration, and many other key topics can be achieved only through valid, science-based regulation to create a level playing field between different energy carriers.

To conclude, EASE welcomes the policy activity at the Member State level and invites the European Commission to facilitate the uptake of renewable and low-carbon hydrogen. It is paramount to promote the creation of an integrated EU renewable and low-carbon-focused market that can ensure a cost-efficient energy transition.

Notes

***

About EASE:

The European Association for Storage of Energy (EASE) is the leading member - supported association representing organisations active across the entire energy storage value chain. EASE supports the deployment of energy storage to further the cost-effective transition to a resilient, climate-neutral, and secure energy system. Together, EASE members have significant expertise across all major storage technologies and applications. This allows us to generate new ideas and policy recommendations that are essential to build a regulatory framework that is supportive of storage.

For more information please visit www.ease-storage.eu

***

Disclaimer:

This content was elaborated by EASE and reflects a consolidated view of its members from an energy storage point of view. Individual EASE members may adopt different positions on certain topics from their corporate standpoint.

***

Policy Contact: Jacopo Tosoni | Policy Officer | j.tosoni@ease-storage.eu |+32 (0)2 743 29 82

Avenue Adolphe Lacomblé 59/8
1030 Brussels | Belgium
Tel: +32.2.743.29.82
@EASE_ES

www.ease-storage.eu
info@ease-storage.eu