Chapter 3
2021 EU and National Policies Report
July 2021

FUEL CELLS AND HYDROGEN
OBSERVATORY

Disclaimer

This report is based on data gathered as part of the Fuel Cells and Hydrogen Observatory as at 31 May 2021. The authors believe that this information comes from reliable sources, but do not guarantee the accuracy or completion of this information. The Observatory and information gathered within it will continue to be revised. These revisions will take place annually and can also be done on a case by case basis. As a result, the information used as of writing of this report might differ from the changing data in the Observatory.

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This report was prepared for the Fuel Cells and Hydrogen 2 Joint Undertaking as part of the Fuel Cells and Hydrogen Observatory. Copies of this document can be downloaded from https://www.fchobservatory.eu/

The Fuel Cells and Hydrogen Observatory has been prepared for the FCH 2 JU under a public procurement contract.

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Executive Summary

Material and Geographical Scope

Purpose:	The policy module of the FCHO presents an overview of EU and national policies across various hydrogen and fuel cell related sectors. It provides a snapshot of the current state of hydrogen legislation and policy. https://www.fchobservatory.eu/observatory/policy-and-rcs/eu-policies https://www.fchobservatory.eu/index.php/observatory/policy-and-rcs/national-policies
Scope:	**While** FCHO covers 38 entities around the world, due to the unavailability of some data at the time of writing, this report covers 34 entities. The report reflects data collected January 2021 – May 2021.
Key Findings:	Hydrogen policies are relatively commonplace among European countries, but with large differences between Member States. EU hydrogen leaders do not lag behind global outliers such as South Korea or Japan.

The section of the Fuel Cells and Hydrogen Observatory (FCHO) on "Policy, Regulation, Codes" provides users with a comprehensive overview of **the most relevant policies at EU, national or regional level that directly or indirectly affect the development and deployment of the hydrogen technologies** under the scope of the Observatory.

While many legislative and non-legislative acts have a certain relevance for hydrogen technologies, the FCHO has chosen to focus on those policies that impact the business case for FCH technologies, meaning that they are **relevant to decision makers** when deciding whether to apply (or not) an FCH solution in a particular field. Legal and administrative requirements which have to be complied with by project developers when implementing hydrogen solutions are already covered comprehensively by other sources[1] and are not covered by the FCHO.

[1] www.hylaw.eu

Figure 1: Material scope of the FCHO Policy Module

At EU level, the FCHO covers all relevant legislative (Regulations and Directives) and non-legislative (Institutional Communications) policies pursued by the EU with a strong impact on hydrogen technologies (through May 2021).

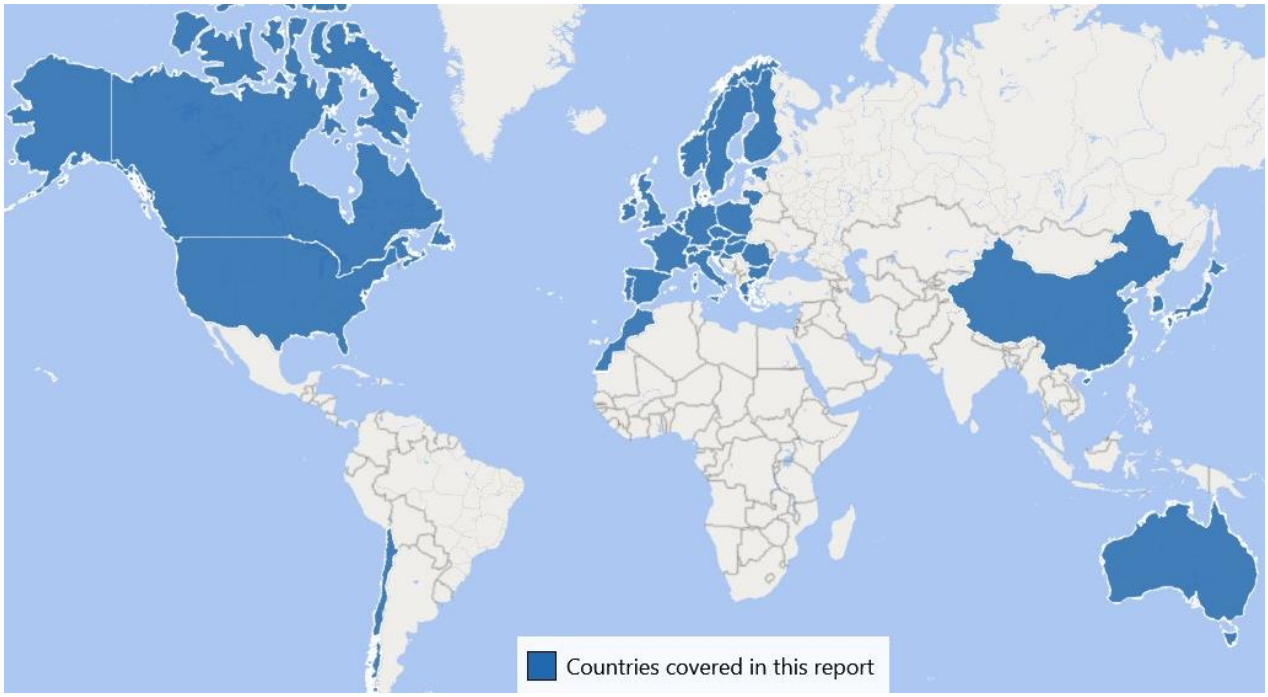
Table 1: EU policies covered by the FCHO

Legislative measures (in force)	Non-legislative policies (or planned legislative measures)
Renewable Energy Directive	EU Green Deal
Energy Efficiency Directive	European Climate Law
CO2 emission performance standards for new passenger cars and light-duty vehicles	Industrial Policy and State Aid
CO2 emission performance standards for new heavy-duty vehicles	ETS Innovation Fund
Alternative Fuel Infrastructure Directive	Sustainable Finance (including R&D) under the EU Green Deal
EU Emission Trading System (ETS)	The EU Hydrogen Strategy under the EU Green Deal
Public Procurement rules for clean vehicles	The EU Energy System Integration Strategy under the EU Green Deal
	The Offshore Renewable Strategy
	The Renovation Wave
	The Sustainable and Smart Mobility Strategy
	The Effort Sharing Regulation
	The TEN-E Regulation

At national and regional level, the FCHO covers 38 entities comprised of 37 countries and one sub-national unit, the State of California. The entities have been chosen to cover the EU, EEA, as well as other hydrogen outliers such as South Korea, Japan, China, and others. As of writing of this report in June 2021, the FCH Observatory contained updated information from 34 out of the 38 entities.[2] As a result, the data included in this report covers these 34 countries, 26 of which are members of the EU/EEA/UK. The FCH Observatory team will seek to complete its database to cover all 38 entities. The geographical coverage of this report is available in Figure 2, below.

[2] The entities for which data is only available from April 2020 and have not been updated as of the writing of this report are Australia, China, Japan, Morocco.

Figure 2: Geographical coverage of this report for national policies



National policies have been organized in the following categories: (i) fuel cell electric vehicles, (ii) stationary power, (iii) hydrogen as a fuel and hydrogen refuelling infrastructure, (iv) hydrogen production, transmission, and distribution, (v) hydrogen in industry, and (vi) general questions.

EU policies have been structured around 3 main areas of impact:

- Hydrogen production
- Hydrogen distribution[3]
- End-use sectors[4]

Main findings

At EU level, a year and half after the announcement of the EU Green Deal in December 2019, the framework of policies tackling the hydrogen industry is still profoundly changing. Understood as the EU's 'new growth strategy', the Green Deal is a high-level political strategy which aims at carbon neutrality in the EU by 2050, a target now enshrined in the European Climate Law, which it is to be formally approved shortly. The Green Deal, which encompasses all sectors of the economy, includes a broad legislative reviewing process of already-existing policies and a series of new legislative and non-legislative acts.

Essentially, 2020 has seen the announcement of several strategies, which complement the Green Deal by setting a vision in specific sectors or dimensions of the energy system. The Energy System Integration Strategy, the Hydrogen Strategy, or the Smart and Sustainable Mobility are some of the main ones.

The unprecedented uncertainties brought about by the COVID-19 crisis (and subsequent economic recovery package) will, no doubt, fundamentally change the policy landscape in the years to come. However, clear political messages have confirmed that the EU Green Deal will remain the path forward

[3] Further broken down into (i) 'large scale storage', (ii) 'hydrogen in the gas grid', (iii) 'transport and storage in liquid carriers', (iv) 'transport by road, ship, etc.', and (iv) 'HRS for multiple applications'.
[4] Further broken down into (i) 'transport' ('road transport', 'maritime', 'aviation', and 'trains'), 'heat and power' ('stationary fuel cells' and 'hydrogen burners and turbines'), and 'energy intensive industry'.

and will represent the backbone of the industrial and economic policies pursued by the EU. The Commission plans on releasing concrete legislative proposals aimed at implementing the Green Deal into law, that is aligning the regulatory framework with the increased ambition of 55% greenhouse gas reduction by 2030 and climate neutrality by 2050. In that respect, the upcoming Fit for 55 Package (which encompasses no less than 12 legislative proposals, including the RED II review) for July 14th and the Hydrogen and Decarbonised Gas Market Package for Q4 2021 will be crucial.

This report briefly presents the main policies which are relevant at EU level, while the FCHO website itself goes deeper into how each policy impacts hydrogen in the different areas of the value chain.

At national level, given the stage of the clean hydrogen industry, there are large discrepancies between the adoption rates of various policies among different countries. The outliers in having adopted the most hydrogen friendly policies in Europe are Austria, France, Germany, Italy, Sweden, United Kingdom, while, in the rest of the world, the countries with most hydrogen policies are South Korea, and the USA.

Policies supporting utilization of hydrogen in transport through fuel cell electric vehicles (FCEVs) are the most common from all sectors. The most common types of policies enacted in this field are purchase subsidies, registration tax benefits and ownership tax benefits. 31 out of the 34 countries included in this year's report have at least one policy supporting FCEVs with 25 of them having three or more policies in place.[5] 24 out of the 26 EU/EEA/UK countries have at least one FCEV supporting policy in place. Austria, France, and Norway have the largest number of subsidy policies supporting FCEVs with six financial and non-economic incentives in place while Portugal, Lithuania, and Morocco are the only countries with no FCEV supporting policies.

Policies supporting hydrogen as a fuel and hydrogen refuelling infrastructure are also quite common. This type of policies include CAPEX[6] support, mandates, permitting rules, and other policies. 27 out of 34 countries have at least one policy in place and 14 countries have three or more policies. Among EU/EEA/UK, 21 out of 26 countries have at least one policy with Czech Republic, Germany, Italy, and United Kingdom having adopted four different policies. The most common refuelling infrastructure policies include permitting guidelines and other policies in 17 countries and CAPEX support in 14 countries..

Policies supporting stationary fuel cell power such as CAPEX support and tax incentives are less common with only 15 out of the 34 countries having at least one policy in place. Among EU/EEA/UK, 12 out of 26 countries have at least one policy. The leaders are Germany with four different policies, followed by Bulgaria, Finland, Italy, Netherlands, Slovenia, and United Kingdom with two policies in place each. CAPEX support for stationary applications is available in ten countries while tax incentives are enacted in five countries.

The most common policies supporting hydrogen production are CAPEX subsidies with 13 countries providing CAPEX subsidies in some form for renewable or low-carbon hydrogen production plants.[7] These funding sources are implemented through different instruments. In Germany, electrolyzers built for hydrogen production for the transport sector are eligible for support at 45% funding rate. In Flanders, Belgium, support of renewable or low-carbon hydrogen production is eligible for funding at a rate between 20% to 40% of the required CAPEX through its "Strategische ecologiesteun". The second most common hydrogen production policies are exemptions from or reductions of electricity price components when producing hydrogen. Such types of incentives are available in five countries. In Sweden and Denmark, electricity for hydrogen production is exempt from the electricity tax. In Germany, under the German Renewable Energy Sources Act (EEG) 2021, the EEG levy for electricity for

[5] The full list of the 34 covered countries is in the Annex.

[6] CAPEX: capital expenditure to acquire, maintain or improve a fixed asset

[7] Eight of those are in EU/EEA/UK.

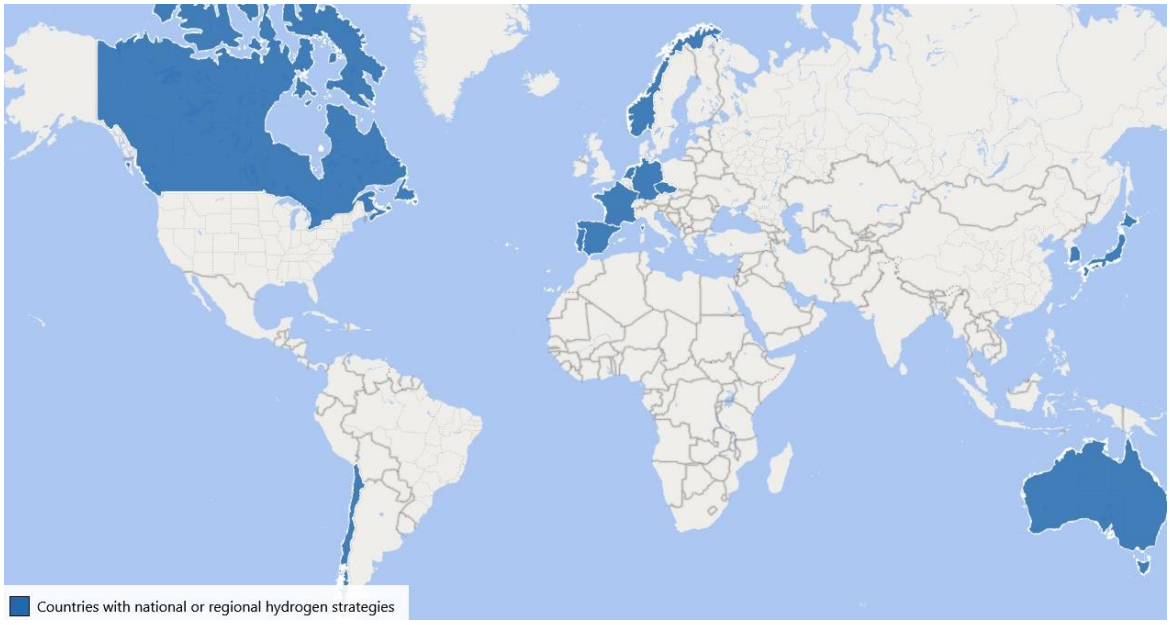
renewable hydrogen production is zero. In addition, in case of use of grid electricity with guarantees of origin, electrolysers are exempt from grid charges under the Energy Industry Act.

In regards to **hydrogen transmission**, out of the 34 countries covered in this report, Denmark and Germany are the only two countries with a specific policy in the area. The policies enacted in the two coutries applies tothe allocation of gas grid connection costs between network operator and hydrogen production plant operator.

While hydrogen is widely used in **industrial applications**, policies supporting the introduction of renewable or low-carbon hydrogen in industry are less common. Low-carbon hydrogen demonstration subsidies are the most common form of support, being available in 14 countries. (12 in EU/EEA/UK). Some form of CAPEX support for renewable/low carbon hydrogen production used in industry for non-demonstration projects are in effect in Austria, Belgium, Bulgaria, Finland, Germany, and Netherlands.

Hydrogen roadmaps and strategies are relatively commonplace. Among the surveyed countries, 12 out of 34 have national or regional hydrogen strategy. Figure 3 visualizes hydrogen strategy adoption in the covered countries.

Figure 3: Countries with national or regional strategies in place as of June 2021



1. EU Policies and Regulations

This report provides users with a comprehensive overview of the **most relevant policies at EU level that directly or indirectly affect the development and deployment of the hydrogen technologies** covered by the Fuel Cells and Hydrogen Observatory (FCHO). This report presents an overview of those EU policies.

This report analyses a total of 18 policies, both of legislative and non-legislative content and enacted at EU level. Legislative content typically involves a Directive (e.g. Renewable Energy Directive) or a Regulation (e.g. Regulation setting CO2 emission performance standards for new passenger cars and light-duty vehicles). In contrast, non-legislative content typically involves a high-level political strategy, roadmap or communication (e.g. EU Green Deal communication or the Hydrogen Strategy).

The policies covered are presented in the table below.

Table 2: EU Policies covered by the FCHO

Legislative measures (in force)	Non-legislative policies (or planned legislative measures)
Renewable Energy Directive	EU Green Deal
Energy Efficiency Directive	European Climate Law
CO2 emission performance standards for new passenger cars and light-duty vehicles	Industrial Policy and State Aid
CO2 emission performance standards for new heavy-duty vehicles	ETS Innovation Fund
Alternative Fuel Infrastructure Directive	Sustainable Finance (including R&D) under the EU Green Deal
EU Emission Trading System (ETS)	The EU Hydrogen Strategy under the EU Green Deal
Public Procurement rules for clean vehicles	The EU Energy System Integration Strategy under the EU Green Deal
	The Offshore Renewable Strategy
	The Renovation Wave
	The Sustainable and Smart Mobility Strategy
	The Effort Sharing Regulation
	The TEN-E Regulation

The FCHO website links these polices based on their relevance and impact across various value chain levels and applications of the hydrogen and fuel cell industry. Those are broken down into three main categories.

Table 3: Policy dimensions covered by the FCHO EU policies section

1. Hydrogen Production	2. Hydrogen Distribution	3. Hydrogen End-Uses
	Large scale storage	Transport • Road transport • Maritime • Aviation • Trains
	Hydrogen in the gas grid	Heat and Power • Stationary fuel cells • Hydrogen burners and turbines
	Transport and storage in liquid carriers	Energy Intensive Industry
	Transport by road, ship, etc.	
	HRS for multiple applications	

1.1. Overview

The **European energy policy landscape** has gone through many changes in 2020, with the objectives of increasing the ambition to establish a regulatory framework conducive to the transition towards a climate neutral economy, accelerate greenhouse gas reduction, and foster the emergence of clean technologies, such as hydrogen. In late 2019, the newly elected European Commission presented its proposal for a European Green Deal. This policy roadmap is meant to be 'the EU's new growth strategy'. This announcement builds on political momentum where climate issues gained significant importance across the EU, and marks a strong shift in EU energy policies, now giving significantly stronger emphasis to the decarbonisation dimension of the Energy Union. The Green Deal indeed is now materialising in many legislative and non-legislative initiatives, aimed at implementing the increased level of ambition. Most importantly, the European Climate Law, is on the verge of being formally adopted by EU institutions following their provisional agreement in April 2021, sets into EU law the binding target of net zero greenhouse gas emissions by 2050 (so-called 'carbon neutrality' or sometimes 'climate-neutrality'), as well as a 55% greenhouse gas reduction EU target by 2030. The initiatives meant to enable this transition include the Energy System Integration Strategy and the European Hydrogen Strategy. Both strategies, released in the form of Communications from the European Commission, clearly show the importance hydrogen is given in helping decarbonise the economy, not least 'hard-to-abate' sectors, that are harder to electrify, such as high temperature industry (steelmaking, cement...), fertilisers, and heavy and long-haul transport (maritime, aviation, heavy duty vehicles, etc.). In these two strategies, hydrogen is seen as a key technology to link the components of the energy system (thanks to its versatility and its potential for energy storage and for decarbonisation means in hard-to-abate sectors either as fuel or feedstock). The Commission, in the context of the Euroepan Hydrogen strategy sets clean hydrogen production targets: it will aim for at least 6 GW of renewable hydrogen production capacity (i.e. electrolysers) by 2024 in the EU (resulting in the. production of 1 million tonnes of renewable hydrogen) and for 40 GW by 2030 with an additional 40 GW intalled in the EU's neighbourhood. (resulting in the production of 10 million tonnes of renewable hydrogen).

The legislative agenda of 2021 is shaping up to be as important as 2020 for the EU's energy and hydrogen sectors. **The "Fit for 55" Package, meant to help achieving the 55% target, and the "Hydrogen and decarbonised gas market" package will be the two major bundles of legislation that will aim to**

enable the achievements of EU's climate targets. They should set a regulatory framework conducive to the clean energy transition aligned with 55% GHG reduction by 2030 and climate neutrality by 2050 and, among others, to the development of a hydrogen economy. **The former package is expected on July 14th, 2021, and the latter in Q4 2021.** The analysis provided by this report is therefore strictly based on the versions of legislations prior to the release of the Fit for 55 Package, which will aim to extensively review 8 already-existing legislations and propose 4 new ones, as outlined in Table 3 below.

Table 4: Policy items planned under the Fit for 55 Package

Revision of already-existing legislation	Proposals for new legislation
Revision of the EU Emission Trading System, including revision of the EU ETS Directive concerning aviation, maritime and CORSIA	ReFuelEU Aviation – sustainable aviation fuels
Revision of the Regulation on the inclusion of greenhouse gas emissions and removals from land use, land use change and forestry (LULUCF)	FuelEU Maritime – green European maritime space
Effort Sharing Regulation	Carbon border adjustment mechanism
Amendment to the Renewable Energy Directive to implement the ambition of the new 2030 climate target	Climate Action Social Facility
Amendment of the Energy Efficiency Directive to implement the ambition of the new 2030 climate target	
Revision of the Directive on deployment of the alternative fuels infrastructure	
Amendment of the Regulation setting CO2 emission standards for cars and vans	
Revision of the Energy Tax Directive	

(Source: European Commission)

1.2. Energy

In the **energy** sector, most policies covered by the analysis will have an impact on hydrogen deployment and could also support its scale up. The current version of the **Renewable Energy Directive** sets a 32% target share of renewable energy in the EU's gross final energy consumption by 2030. The legislation is set to be reviewed under the Fit for 55 Package: the target for renewables share will be revised upwards to align with the new 2030 objective of 55% reduction of greenhouse gas reduction in the EU. National contributions towards this target are determined by Member States, within integrated national energy and climate plans (NECPs) in accordance with Regulation (EU) 2018/1999 (The Governance Regulation) and other acts (e.g. Effort Sharing Regulation, which is also being revised under the upcoming package). Hydrogen can support Member States in the achievement of their respective targets by reducing average emissions from the gas system, by helping to integrate more renewable energy in transport and industrial sectors, and by acting as a grid balancing instrument through energy storage (increasingly needed with renewables deployment). Indeed, the Commission repeatedly mentioned hydrogen as one of the most popular forms of energy storage (not least for seasonal large-scale storage) and which is to play a "nodal role" to foster energy system integration. This was specifically acknowledged for the offshore context, for instance, in the **Offshore Renewable Strategy**, which highlights the potential of offshore hydrogen production to reap offshore and intermittent power production and of hydrogen pipelines to transport the energy back to shore in a cost-efficient manner. While the Strategy was

published in November 2020, the European Parliament is now drafting its position on the topic by means of an own-initiative (INI) report.

The **EU's Emission Trading System** (EU ETS) is another major legislation that is up for revision under the upcoming package. The current ETS covers around 45% of the EU's greenhouse gas emissions, which are not subject to the **Effort Sharing Regulation** (ESR). While the ESR provides binding targets for Member States per sector, ranging from 0% to -40% compared to 2005 emission levels, the ETS Directive (2003/87/EC) has the objective to contribute to reducing overall CO2 emissions by 40% by 2030 compared to 1990 levels (i.e. a 43% reduction by 2030 compared to 2005 levels), based on its last revision in 2018. Considering the upwards review of EU-level CO2 emission reduction targets, both emission reduction targets covered by the ESR and the ETS are expected to be revised upwards under the upcoming Fit for 55 Package.

More specifically, regarding the Commission's plans for ETS reform, both the emission (sectoral) coverage and the contribution of the ETS to emission reduction objectives (via reduced available allowances, etc.) could be expanded and boosted respectively under the upcoming revision proposal in July. This could especially help accelerate the deployment of hydrogen in the activities whose emissions are already covered by the cap-and-trade system, such as energy-intensive industries (e.g. steel, cement, etc.) or aviation, as well as in sectors that may be added with this review (e.g. maritime and road transport e.g.). Besides, allowances allocated for free to a number of industries so far could be progressively phased out, as a new **Carbon Border Adjustment Mechanism** (CBAM) would be phased in. This CBAM will be another proposal under the Fit for 55 Package and could put a carbon price on imported products by mirroring price levels in the EU ETS. It would aim at further encouraging third countries to reduce their emissions while protecting EU industry against carbon leakage. The CBAM could cover a limited amount of sectors at first, and then be gradually expanded to others. It would also provide 'own resources' (revenues) to the EU. **The Innovation Fund**, which is funded by ETS auction revenues, should, be a useful support tool to finance innovative projects in low-carbon technologies, including hydrogen.

The highly expected fourth Gas Package, or "**Hydrogen and decarbonised gas market**" package, will, as its prospective name reveals, shape new opportunities for hydrogen deployment. Building on the Energy System Integration and Hydrogen Strategies, the new framework will aim at establishing the regulatory framework for the development of hydrogen in Europe, as well as that of other clean alternative gas technologies, and at enabling sector integration. Hydrogen will also have a role to play in the futureproofing of already-existing natural gas infrastructure, in the context of the current revision of the **TEN-E regulation**, which includes two new energy infrastructure categories: hydrogen and electrolysyers.

1.3. Transport

In the **transport** sector, 2020 was marked by the publication of the European Commission's **Sustainable and Smart Mobility Strategy** at the end of the year. It presented the Commission's vision on transport, specifically under the light of the sector's decarbonisation challenge, entailing the required clean fuel supply ramp up, clean fuel infrastructure deployment, fleet renewals, and demand stimulation, to cite few key aspects. The Strategy highlights the role that hydrogen and hydrogen-based fuels are expected to play.

Both regulations setting **CO2 emission performance standards** for new passenger cars and light-duty vehicles and for new heavy-duty vehicles contribute to promoting low-carbon mobility, by making standards stricter, emission reduction targets more ambitious, and by including a precise timeframe for

this decade. The former regulation, for cars and vans, will be revised under the Fit for 55 Package in July and the latter, for heavy-duty vehicles, in 2022. **The Clean Vehicle Directive**, which sets public procurement rules for clean vehicles, and the **Alternative Fuel Infrastructure Directive** (AFID), which establishes a common framework for alternative fuels deployment, are also expected to boost demand in clean vehicles (including FCEVs) in public procurement and to bolster the deployment of infrastructure for the distribution of clean transport fuels, like hydrogen, such as via HRS and in ports, among others. The AFID will be revised under the Fit for 55 Package.

In **maritime transport**, the European Commission plans to extend the scope of the EU ETS to maritime in order to control and help reduce greenhouse gas emission from the sector. Besides, the Commission is considering the inclusion of **road transport** under the EU ETS, possibly under a separate system. The ETS Innovation Fund is intended to redirect revenues from ETS allowance auctioning into industry demonstration projects for innovative low-carbon technologies. In the aviation sector, the ETS is already implemented and plans are to reduce the number of free allowances allocated to airlines. The Renewable Energy Directive, which sets a 14% renewables target for transport, is expected to affect all levels of the transport sector. As mentioned, the Directive will be revised in July and the target for renewables in transport is expected to be increased accordingly. Moreover, two other upcoming policy initiatives under the Fit for 55 package, ReFuelEU Aviation and FuelEU Maritime, should promote the ramping up of decarbonised fuels in maritime and air transport sectors, including hydrogen. Overall, these policies will impact mobility and transport, with the main objective of reducing greenhouse gas emissions. Hydrogen and fuel cell technologies have a major opportunity to benefit from this change, thanks to the potential of their applications at many levels of the transport sector.

1.4. Industrial and financial policies

Industrial and financial policies are expected to have cross-cutting impacts on the hydrogen industry too and the deployment of H2. These include the Commission's Industrial Strategy (March 2020). It launched the **European Clean Hydrogen Alliance** and it planned the revision of state aid rules, notably for **Important Projects of Common European Interest (IPCEI)** and the **Environmental Protection and Energy State Aid Guidelines (EEAG)**, three key landmarks to foster the uptake in the production and deployment of clean hydrogen technologies. In the meantime, the Clean Hydrogen Alliance was kickstarted second half 2020, along with the work of its six round tables (Production, Transmission and Distribution, Industrial applications, Mobility, Energy sector, Residential applications), aimed at representing the whole hydrogen value chain, in early 2021. While the collection of hydrogen projects came to an end in May, a first overview was presented at the Hydrogen Forum in June and the pipeline of scale up investment projects will will be provided by the Commission at the November Hydrogen Forum. In the meantime, the Alliance Roundtables are preparing a report highlighting barriers and mitigation measures for hydrogen development, which will be presented in November too.

Regarding **State Aid**, the Commission is currently reviewing its Guidelines on State aid for environmental protection and energy in order to align with new energy and environment targets and initiatives and to deliver on the Green Deal. Hydrogen technologies should be able to reap some benefits from the flexibilisation foreseen to be provided by the revision.

Moreover, the **Energy Taxation Directive**, which is under review under the Fit for 55 Package too, aims to shift the tax burden from labour to pollution. Clean hydrogen should be positively impacted from the change, as low-carbon technologies could benefit from financial incentives compared to more highly taxed fossil fuels. Similarly, the Commission plans to channel financial flows to low-carbon investments and **review taxonomy** for this purpose.

Hydrogen will thereby benefit from extra funding means, not to mention the national **Recovery and Resilience Plans** making available available close to €700bn and of which 37% should be directed at 'climate expenses'. This adds up to further investment tools like the **Just Transition Mechanism** (made up of a Just Transition Fund, a just transition scheme under InvestEU, and a public sector loan facility with the European Investment Bank backed by the EU budget), **Horizon Europe** (particularly new the public-private partnership Clean Hydrogen for Europe), Connecting Europe Facility (CEF), InvestEU, among others.

2. National Incentives and Policies

2.1.Scope

Content

The National Policies part of the Observatory module on "Policy, Regulation, Codes)" provides users with a comprehensive overview of the most relevant policies on national or regional level that directly or indirectly affect the development and deployment of the hydrogen technologies covered by the Observatory.

Information is organized around six major chapters described in the table below.

Table 5: Categories of national policies covered by the Fuel Cells and Hydrogen Observatory

Sector	Explanation of context
1. Fuel cell electric vehicles	Policies that may prevent or support FCEVs and/or the substitution of conventional vehicles with zero-emission solutions
2. Stationary power	Policies that may prevent or support the deployment of stationary fuel cells and/or the substitution of grid electricity / gas with heat and power produced from fuel cells
3. Hydrogen as a fuel and hydrogen refuelling Infrastructure	Policies that may prevent or support hydrogen as a fuel / hydrogen refuelling stations and/or the substitution of fossil fuels with hydrogen
4. Hydrogen production, transmission, and distribution	Policies that may prevent or support production of hydrogen and its subsequent transmission and distribution
5. Hydrogen in the industry	Policies that may prevent or support the introduction of hydrogen in industrial processes, substituting conventional methods/fossil fuels
6. General questions	Strategy and planning policies such as hydrogen roadmaps as well as various renewable electricity subsidy policies

This report presents an analytical overview of the currently gathered national policies data structured around the six above-mentioned chapters. This report summarises information on several key questions in each chapter, but it is not exhaustive as it does not address all the questions included in the Observatory. Each chapter provides an introduction into the sector and presents preliminary results based on gathered data. It focuses on key insights in each chapter that provide informational value about the proliferation and scale of policies impacting the various hydrogen sectors.

2.2. Methodology

National respondents

Given the diverse scope of the policies monitored, no single authority could provide the data required for the Observatory. As a result, **data collection at the national level** has been done by **an extensive team of national contributors**. Their unique knowledge, expertise, and language skills ensured an efficient data collection process. Contributors include governmental organizations such as national energy agencies, national hydrogen associations, research centres, and ministries as well as individual experts.

Verification

Respondents' answers have been revised by Hydrogen Europe to the best of their ability to ensure both consistency and factual correctness of the information provided. Given the changing nature of policies, **data will be revised** on an annual basis.

Technical background

The data collection process has been implemented, from a technical perspective with the support of the consortia's technological partner, Inycom. Drupal questionnaires and data storage in a SQL database format were used. The platform's interface is complemented with Tableau for automatic creation of maps and other visualizations.

2.3. Geographical Coverage

Since the hydrogen sector is developing with different objectives around the world due to countries' different demands, policies adopted to support its further development also differ widely. In view of these developments, it is important to cover not only EU members, but also other major economies focused on hydrogen development.[8]

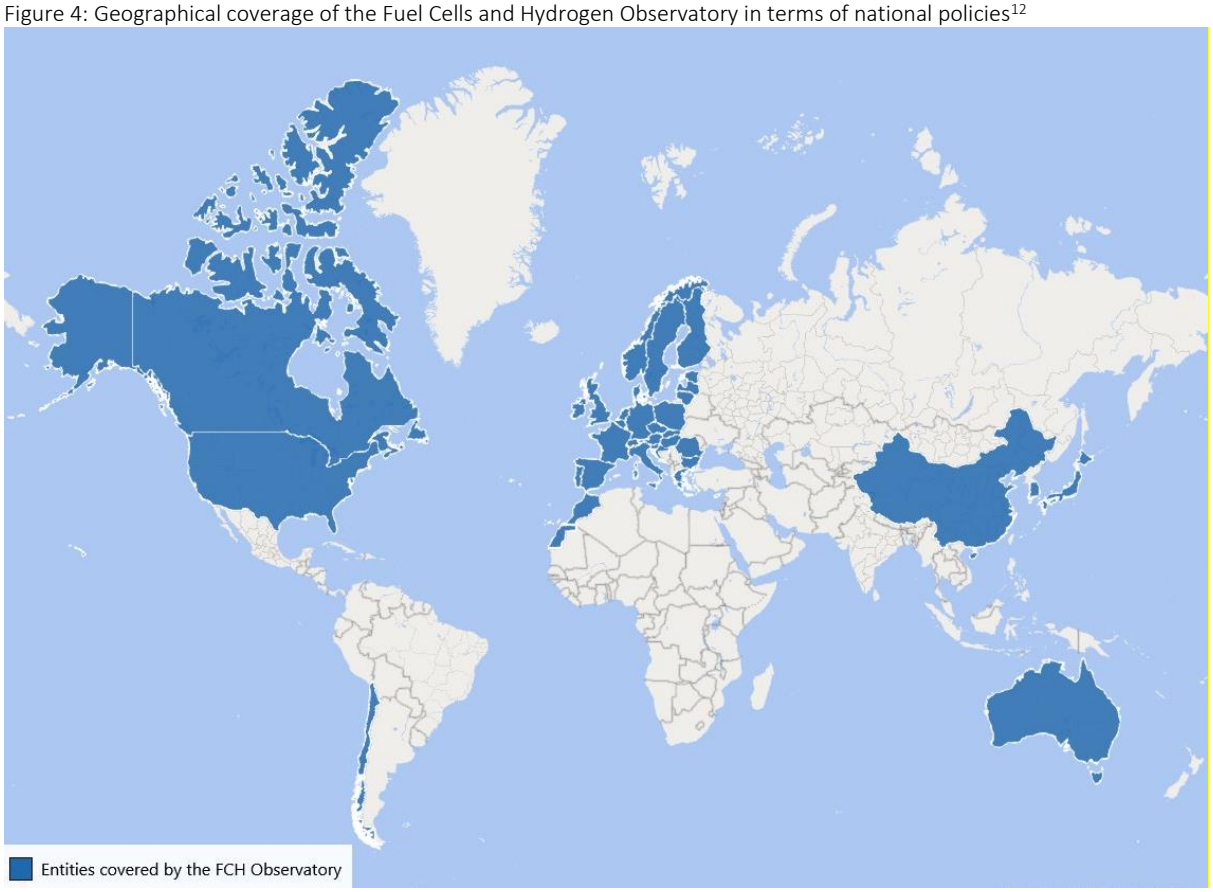
A more global policy coverage will allow for a more comprehensive analytical and comparative work given the inclusion of major economies.

The geographical coverage of the National Policies part of the FCH Observatory includes **38 entities.** These 38 entities are comprised of 37 countries and one sub-national unit, the State of California.[9]

As of writing of this report in June 2021, the FCH Observatory received responses from 34 out of the 38 entities.[10] As a result, the data included online and in this report covers these 34 countries, 26 of which are members of the EU/EEA/UK.[11] Figure 4 visualizes the geographical coverage.

[8] Major non-EU/EEA hydrogen economies already being tracked include Australia, Chile, China, Japan, and South Korea.
[9] When this report refers to USA, its data is represented by the State of California.
[10] The entities for which data is only available from April 2020 and have not been updated as of writing of this report include Australia, China, Japan, Morocco.
[11] The EU/EEA/UK countries for which information is not available on the portal nor in this report include Cyprus, Latvia, Luxembourg, and Malta.

Figure 4: Geographical coverage of the Fuel Cells and Hydrogen Observatory in terms of national policies[12]



2.4. Fuel Cell Electric Vehicles

The chapter covering policies on Fuel Cell Electric Vehicles covers questions related to different means of FCEV support via six different policy categories.

Table 6: Main questions answered in the FCEV chapter

Fuel cell electric vehicles chapter questions (selection)
Is there a purchase subsidy offered to FCEVs?
Are there any registration tax benefits offered to FCEVs
Are there any ownership tax benefits offered to FCEVs
Are there any company tax benefits offered to FCEVs
Are there other financial benefits and/or subsidies offered to FCEVs?
Are there any non-economic benefits / incentives applicable to FCEV's?

The questionnaire sought to answer whether policies are in place, their economic value (in EUR or as % of the vehicle cost or tax due), which modes of transport they apply to (heavy duty vehicles, passenger cars, boats etc.), and any other relevant details about the policy.

Policies for FCEVs are widespread among the surveyed countries. **31 out of the 34 countries** included in this survey have **at least one policy supporting FCEVs** with **25 of them having three or more policies**

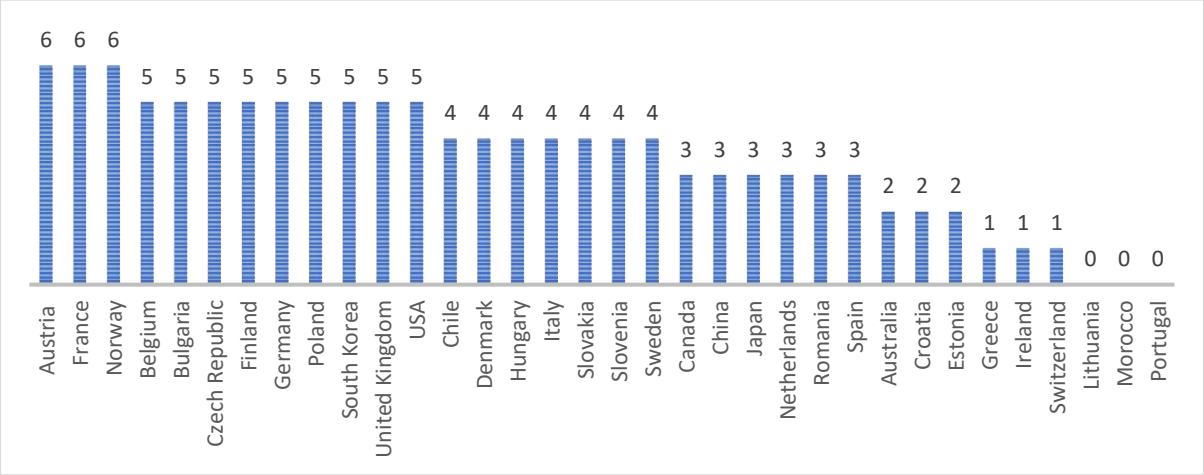
[12] Information for the United States of America is represented by California.

in place. For EU/EEA/UK, 24 out of 26 countries have at least one policy and 19 countries have three or more FCEV policies.

As evident in Figure 5, **Austria, France, and Norway** have the **largest number of policies supporting FCEV** vehicles with all six financial and non-economic incentives in place. Countries with five policy categories include Belgium, Bulgaria, Czech Republic, Finland, Germany, Poland, South Korea, United Kingdom, and USA.

On the other end of the spectrum, **Lithuania, Morocco, and Portugal** are the only countries with **no FCEV supporting policies** even though they all have at least some BEV support policy in place. In Portugal's case, BEV support includes exemption from annual road tax, purchase subsidy, deductible VAT for companies as well as some non-economic benefits such as access to bus lanes, free parking, and free circulation in some downtown areas.

Figure 5: Number of FCEV policies adopted by country

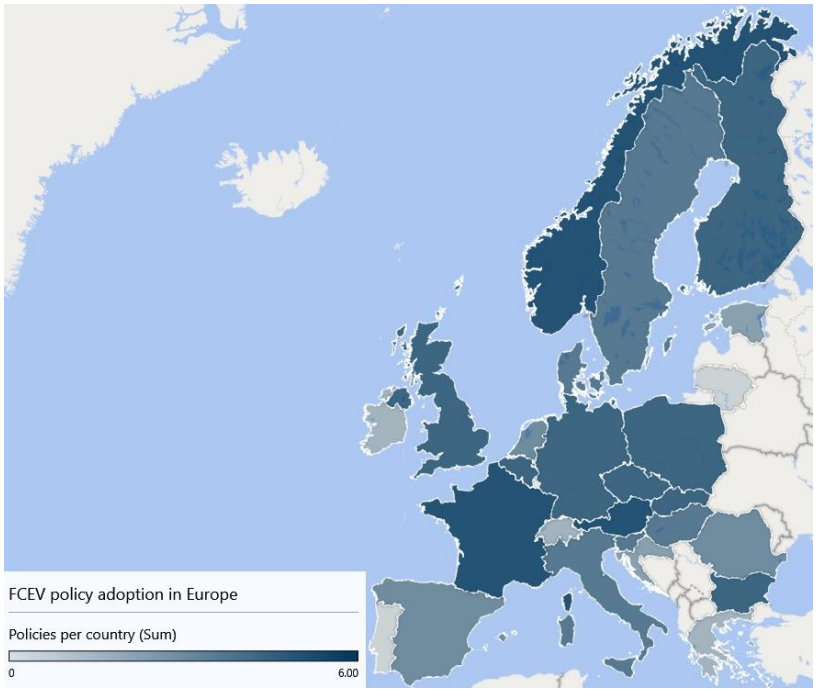


While various FCEV and BEV policies have been adopted across Europe, they are not equally represented as BEV policies continue to be more common. There are 12 EU/EEA/UK countries in which there is a BEV policy that excludes FCEVs.[13] Some of the examples that exclude FCEVs are Slovakia's purchase subsidies and accelerated depreciation policies applicable only for PHEVs and BEVs.

Current adoption of FCEV policies in Europe based on Figure 6 does not suggest any geographical trend with all regions being represented among both the most and least supportive.

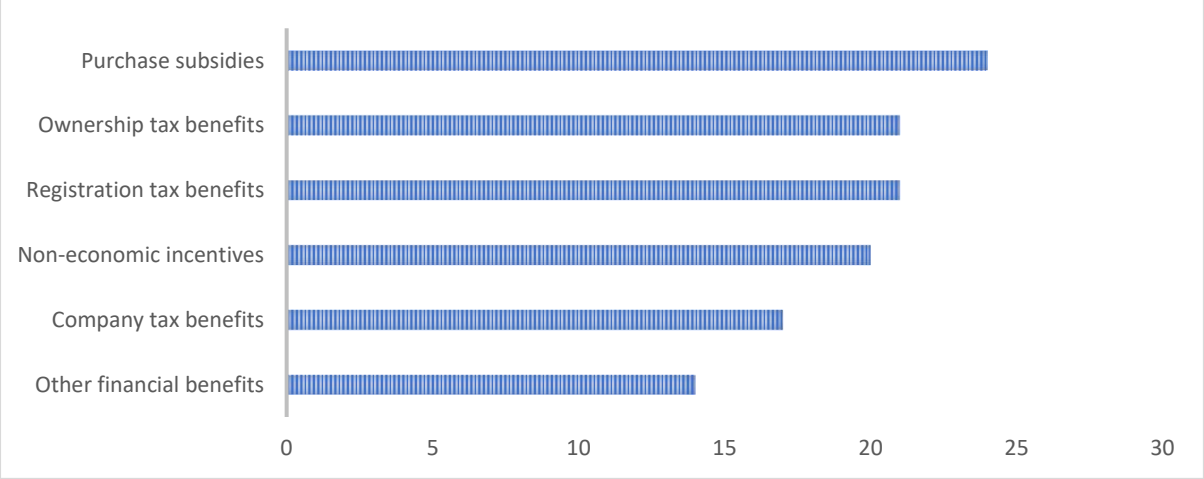
[13] Countries in which there is at least one policy intended to promote electric mobility that excludes FCEVs: Croatia, Finland, Germany, Hungary, Ireland, Italy, Lithuania, Netherlands, Norway, Portugal, Slovakia, Sweden.

Figure 6: Intensity of FCEV policy adoption in Europe



Considering all applications and modes of transport, the **most commonly implemented policies are purchase subsidies,** as they are present in **24 out of 34** countries, followed by registration tax benefits and and ownership tax benefits in 20 countries.[14]

Figure 7: Number of countries that adopted one of the six measured FCEV policies



The structure and scale of the provided policy support varies widely among countries. Some countries use absolute values while others use percentages, but most of them limit their policy support up to a specific amount, especially in the case of purchase subsidies.

The most common FCEV support policy are **purchase subsidies**. They are among the most common and well-known policy instruments for supporting emerging technologies as they decrease the capital investment and bridge the gap between the established and emerging technology.

[14] Registration tax benefits are present in 16, purchase subsidies in 18, and ownership tax benefits in 18 out of the 26 EU/EEA/UK countries included in this report.

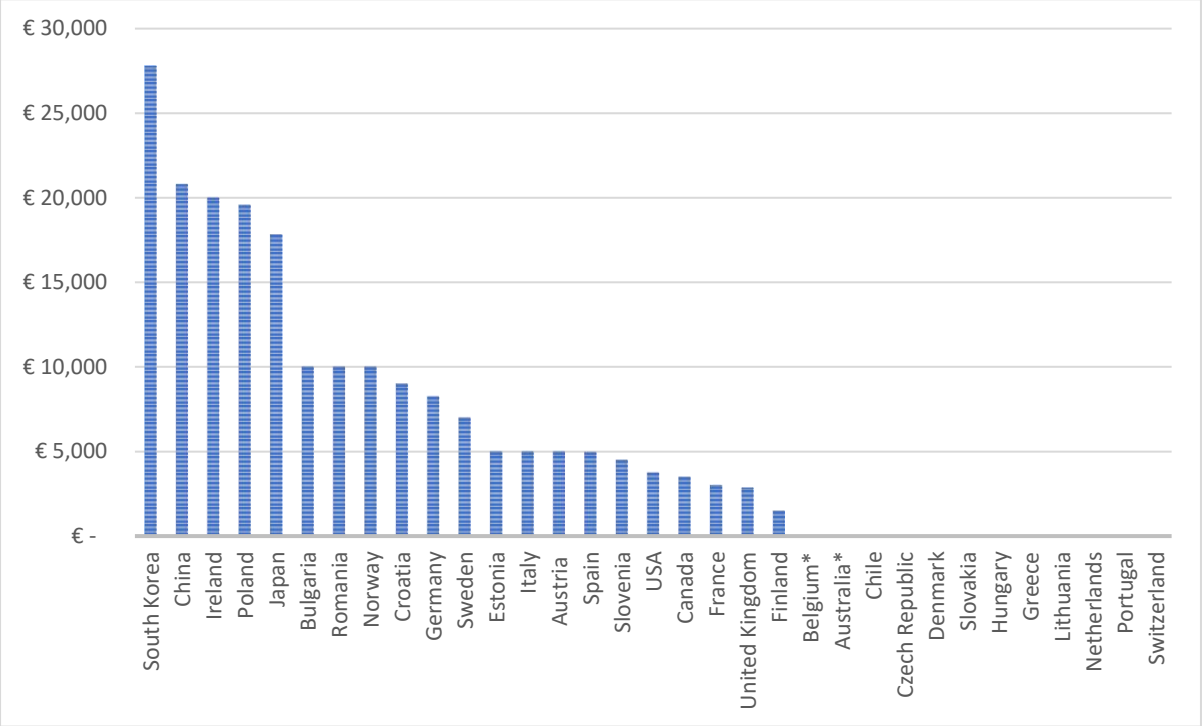
24 countries out of the 34 countries that are a part of this report currently have **purchase subsidies for passenger car FCEVs.**[15] All 24 of those countries also have purchase subsidies for passenger car BEVs. Countries **with purchase subsidies for BEV but which exclude FCEVs include Croatia, Hungary, Ireland, Lithuania, Netherlands, Norway, Portugal, and Slovakia.**

Countries with some form of current subsidies for internal combustion engines include Australia, Czech Republic, Estonia, Finland, Italy, Japan, and Sweden – all of which also have BEV and FCEV purchase subsidies in place.

The most common applications for **FCEV purchase subsidies** include **passenger cars in 23 countries, light duty vehicles in 15 countries, buses and coaches in 16 countries, heavy duty vehicles in 14 countries**, and motorcycles and scooters in six countries. Non-road mobile machinery is only supported in Austria and Belgium. Figure 8 presents values of purchase subsidies for FCEV passenger cars.

These figures range 27,800 EUR in South Korea to approximately 1,500 EUR in Finland. The absolute values are only indicative as in some countries, the subsidy can differ depending on the vehicle and additional conditions. Countries with * have policies for which information in absolute numbers is not available.

Figure 8: Overview of purchase subsidies for passenger cars across covered countries

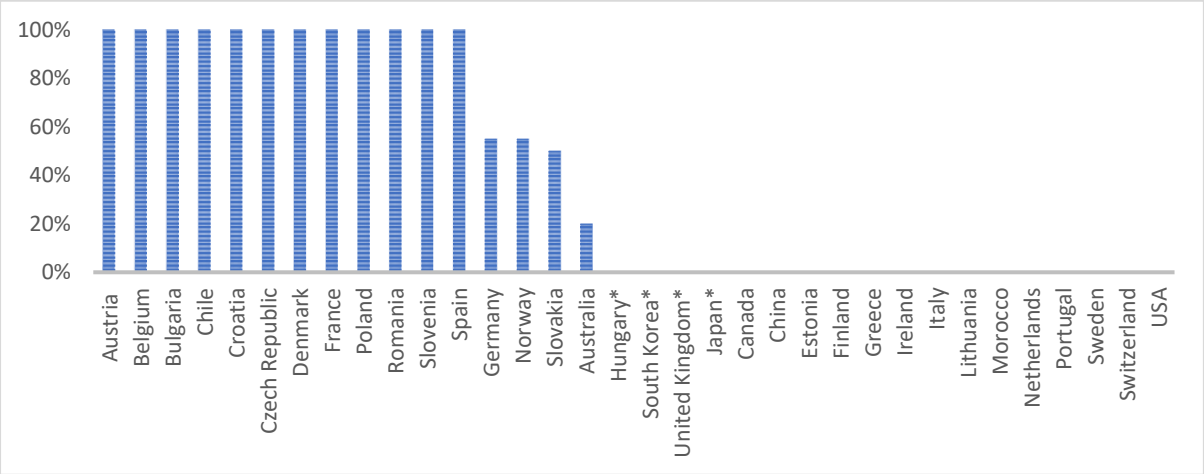


Registration tax benefits for FCEVs are commonplace with 20 countries providing at least some registration tax benefit and 13 countries providing at least 50%. In comparison, 22 countries provide registration tax benefits for battery electric vehicles. The two countries with registration tax benefits for battery and not fuel cell passenger cars are Netherlands and Ireland. Figure 9 below provides an

[15] 17 out of 26 for EU/EEA/UK.

overview of registration tax benefit values for passenger FCEVs. Countries with * have policies with absolute values or other representations that cannot be displayed in Figure 9.[16]

Figure 9: Overview of % values of registration tax benefits for passenger cars across covered countries



Equally common as registration tax benefits are **ownership tax benefits** being present in 20 countries. Belgium, Bulgaria, Denmark, France, Germany, Italy, Romania, and Slovenia have a 100 % tax exemption of their various versions of ownership taxes. Slovakia provides 50% reduction of the annual tax. Finland's benefits amount to ~150 EUR annually, UK's to 166 EUR, South Korea's to 100 EUR, and Hungary's 60-110 EUR.

With fuel cell electric vehicle fleets being promoted to replace the current fleets of ICE vehicles, more than half of the surveyed countries provide **company tax benefits** for passenger cars. Slovenia offers tax base reduction equal to 40% of the vehicle's purchase price. The Netherlands allows for tax reduction equal to 36% of the purchase price. Germany provides 100% tax benefit/reduction on FCEV purchases. Austria provides up to 6,667 EUR company tax benefit for FCEV purchases and Hungary's amounts to between 840-1,680 EUR/ year.

Lastly, 17 countries currently provide **other economic benefits** which include not having to pay for tolls in the Czech Republic or a reduction of the tax that an employee has to pay for using an employer-owned car in Sweden.

19 countries also provide **non-economic benefits** such as free parking in Austria, Bulgaria, Czech Republic, Denmark, Germany, Hungary, Norway, Poland, Spain, and USA. Another common benefit is free access to restricted zones and exemptions from driving bans France, Germany, Poland, and Spain which is especially relevant for light and heavy-duty trucks that will have to contend with these bans or restrictions in upcoming years.

[16] South Korea provides up to 5,095 EUR registration tax exemption. Hungary's registration tax benefit ranges between 760-1500 EUR. United Kingdom's registration tax benefit amounts to maximum 2,455 EUR. Japan also has registration tax benefit in place, but its value has yet to be determined.

2.5. Stationary Power

The stationary power chapter covers policy support for stationary fuel cells providing electricity and/or heat.

Table 7: Main questions answered in the stationary power chapter

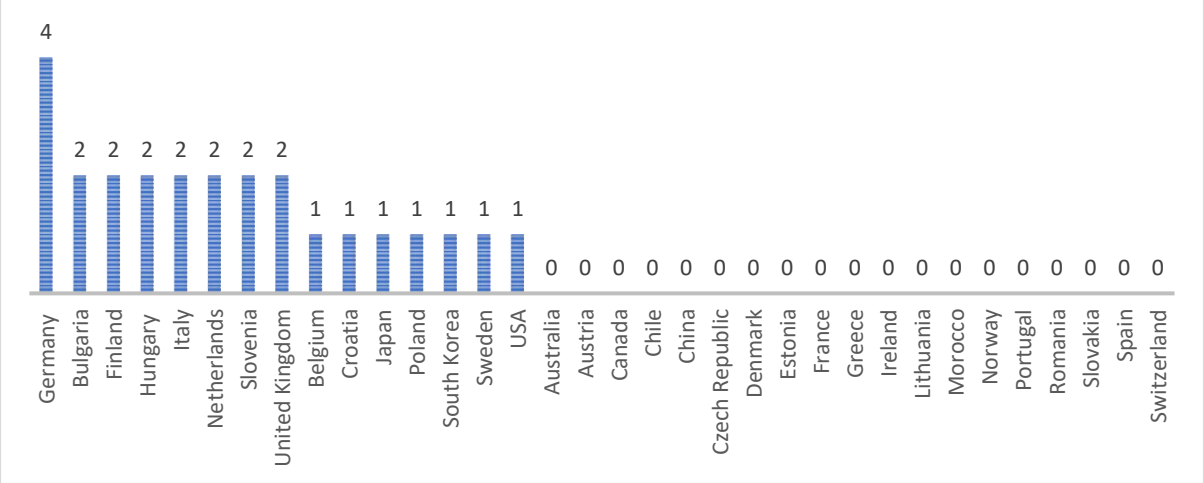
Stationary power chapter questions (selection)
Is there a purchase (CAPEX)[17] support offered to stationary fuel cell applications?
Are there feed-in tariffs for electricity generated by stationary fuel cell applications?
Are there feed-in premiums for electricity generated by stationary fuel cell applications?
Do quota obligation and certificate schemes exist for electricity generated by stationary fuel cell applications?
Do tax incentives exist that might support the deployment of stationary fuel cell applications?
Are there any other policies (e.g. incentives or obligations) that support or inhibit the replacement of conventional stationary power applications with stationary fuel cells?

The questionnaire sought to answer whether the policies are in place, their economic value (in EUR or as % of the investment or tax due), which applications they apply to (CHP, non-CHP, gensets), and any other relevant details about the policy.

The chapter also explores whether similar support mechanisms are available for conventional stationary power application.

Policy support for stationary power is less common compared to FCEV subsidies. Only **15 out of the 34 countries** included in the report have at least one policy in place.[18] The **leaders are Germany with four different policies**, followed by Bulgaria, Finland, Italy, Netherlands, Slovenia, and United Kingdom with two policies in place each.

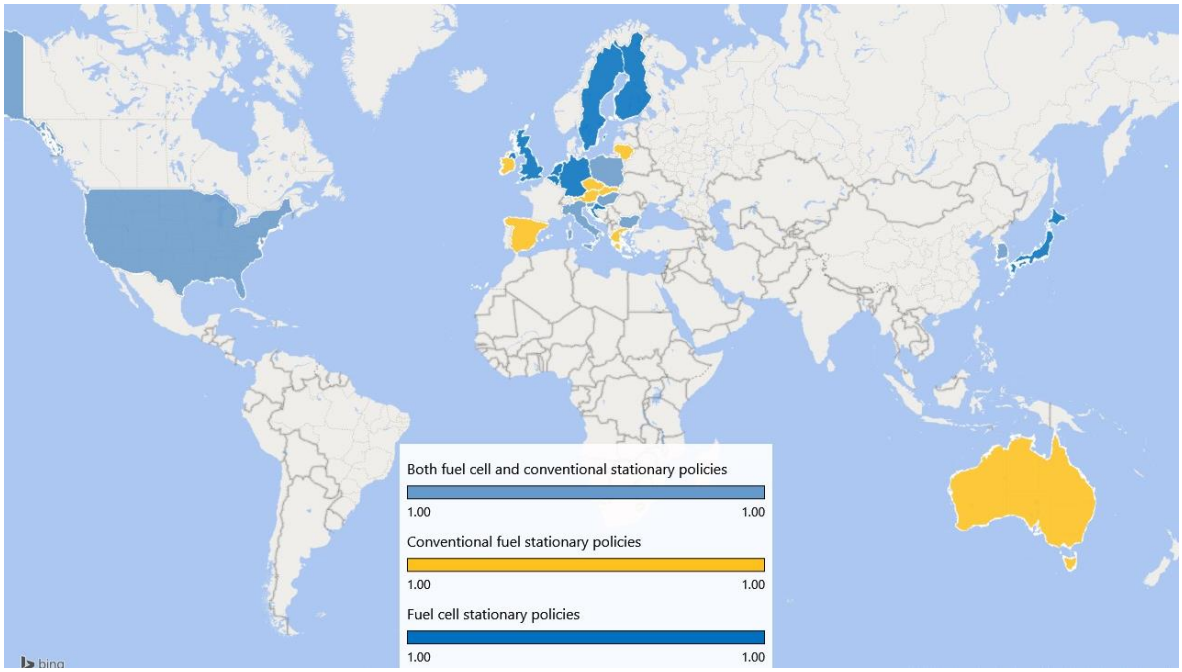
Figure 10: Number of stationary fuel cell policies adopted by country



As evidenced by Figure 10, there is no clear geographical distinction that would help explain the number of adopted policies in the surveyed countries. Figure 11 shows **eight countries,** in grey, **with subsidies for conventional stationary power applications** that lack stationary fuel cell subsidies.

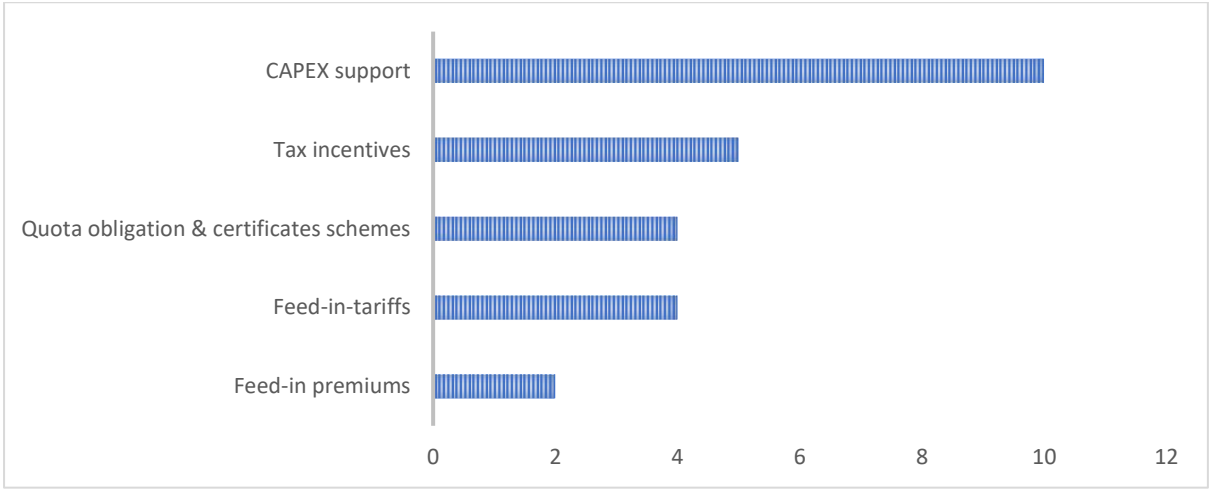
[17] CAPEX refers to Capital Expenditure.
[18] For EU/EEA/UK, it is 12 out of 26 countries.

Figure 11: Geographical coverage of fuel cell and conventional stationary power subsidies



According to Figure 12, the **most common** stationary power policy is **CAPEX support**, available in ten countries followed by **tax incentives** in five countries.

Figure 12: Number of countries that adopted one of the six measured stationary power policies



CAPEX support are some of the most common and well-known policy instruments. They decrease the necessary capital investment thus reducing the difference between the established and emerging technology.

Ten countries out of the 34 that are a part of this report currently have **CAPEX support for stationary fuel cell power applications**. These include Belgium, Bulgaria, Finland, Germany, Italy, Japan, Netherlands, South Korea, United Kingdom, and USA. Out of the 34, **nine have CAPEX support policies for conventional stationary power technologies, but not fuel cell technologies**. These include Austria, Bulgaria, Greece, Ireland, Lithuania, Poland, Slovakia, Slovenia, and USA.

The most common applications for stationary power CAPEX subsidies include **combined heat and power in 10 countries, other non-CHP stationary power applications in five countries, and genset CAPEX subsidies only in the Netherlands.**

2.6. Hydrogen as Fuel and Hydrogen Refuelling Infrastructure

The hydrogen as fuel and hydrogen refuelling infrastructure chapter covers various policy instruments used to promote the build-up of refuelling infrastructure and the use of hydrogen as a fuel.

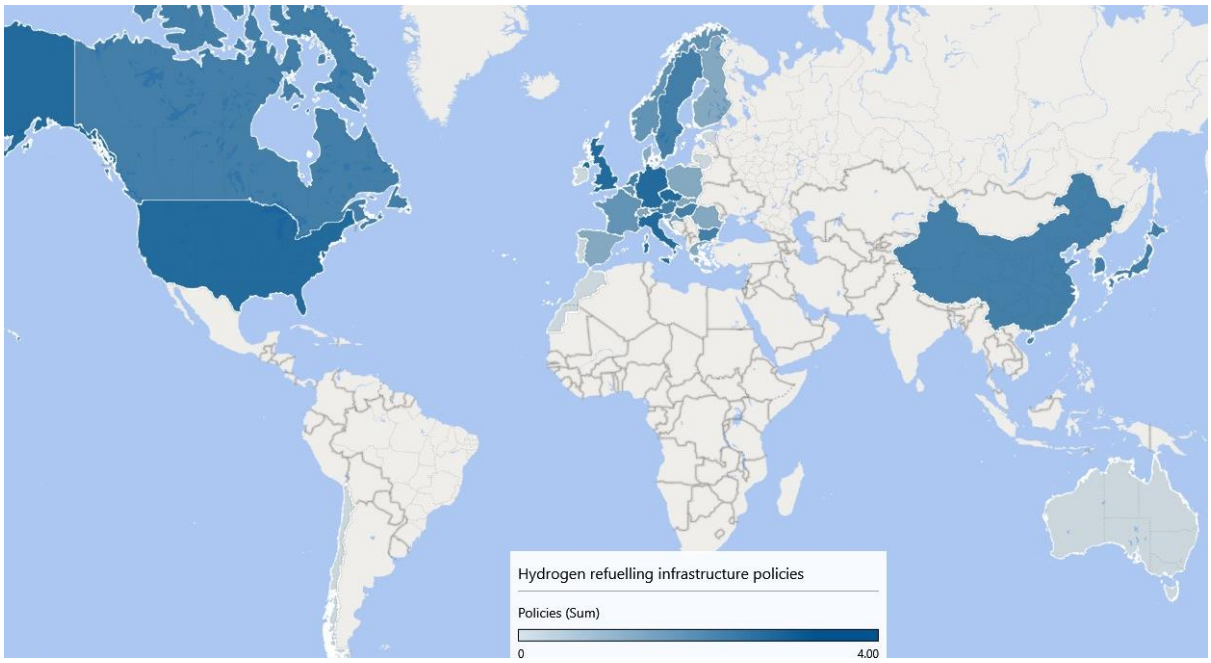
Table 4: Main questions answered in the hydrogen as fuel and hydrogen refuelling infrastructure chapter

Hydrogen as fuel and hydrogen refuelling infrastructure chapter questions (selection)
Is there any CAPEX support offered for HRSs in your country?
Is hydrogen used as fuel taxed in your country?
Are there any mandates / obligations in place requiring the construction of HRSs?
Are there clear rules or guidelines in place that cover permitting of HRS?
Are there any other policies (e.g. incentives or obligations) that support or inhibit the development of HRS in your country?

The questionnaire sought to answer whether the policies are in place, their economic value and any other relevant details about the policy.

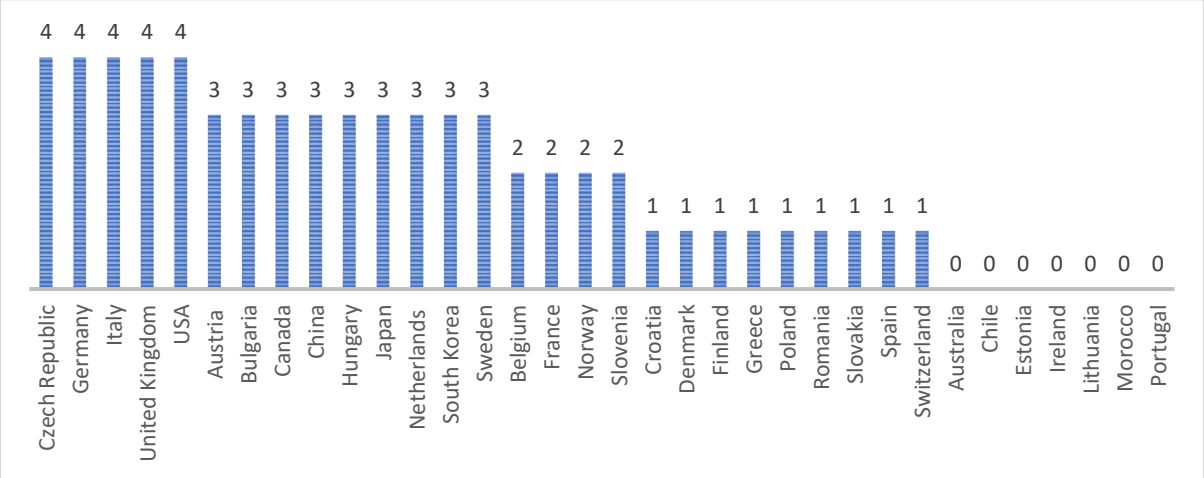
Figure 13 and Figure 14 provide an overview of countries with the most and least ambitious refuelling support policies with **Czech Republic, Germany, Italy, United Kingdom, and USA** having **adopted four different policies**.

Figure 13: Geographical coverage and intensity of subsidies for hydrogen refuelling infrastructure



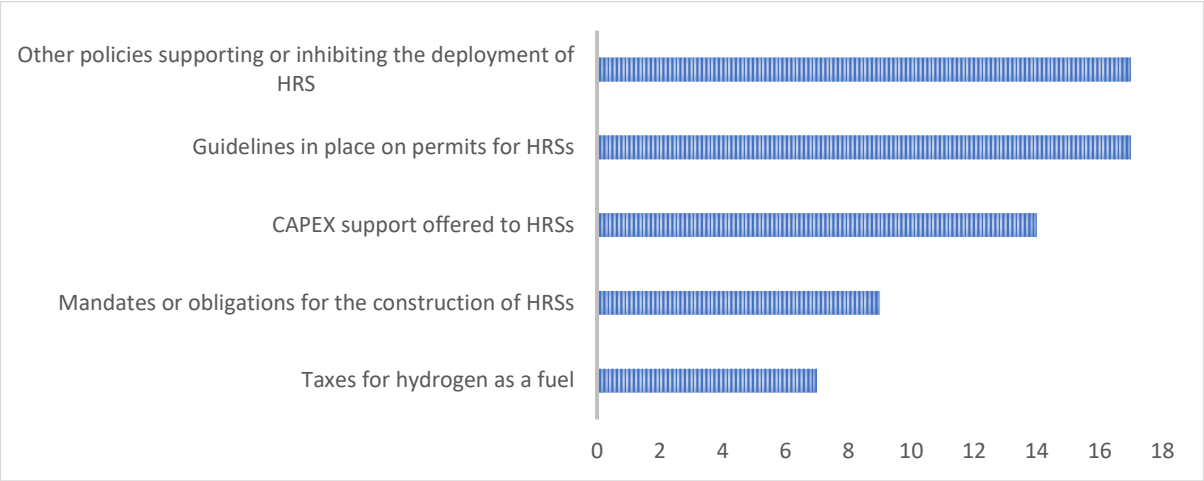
Nine countries have three policies in place including Austria, Bulgaria, Canada, China, Hungary, Japan, Netherlands, South Korea, Sweden.

Figure 14: Number of hydrogen refuelling infrastructure policies adopted by country



The **most common refuelling infrastructure policies** include **permitting guidelines for HRS in 17 countries**, **other policies supporting HRS deployments in 17 countries,** and **CAPEX support in 14 countries**.[19]

Figure 15: Number of countries that have adopted one of the five measured hydrogen as a fuel and refuelling infrastructure policies



Seven countries tax hydrogen as fuel (Austria, Canada, Hungary, Poland, Slovenia, United Kingdom, USA). Hungary taxes hydrogen fuel as natural gas while Poland taxes it at 0.04 EUR/kg. In Austria, hydrogen used as a fuel is treated the same as natural gas and taxed at 0.021 EUR/m3. France, Finland, Slovenia, and the United Kingdom are planning to introduce or revise their hydrogen fuel taxation. This is the least common policy in this category.

The **other policies provided by survey respondents cover a wide range of government and industry initiatives.** Slovakia is planning to introduce various incentives for HRS development to achieve the HRS targets of its Alternative fuel action plan. In Germany, companies created an industry initiative, H2 MOBILITY, whose primary task is the establishment of a nationwide infrastructure for hydrogen mobility. In the course of 2021, the government is also expected to publish decrees that will define rules and regulations related to installation and operation of HRS. Currently, the Swedish government policy requires fuel stations that sell over 1000 m^3 of petrol or diesel to provide at least one alternative

[19] Permitting guidelines are present in 13, CAPEX support in 9, and other policies in 14 out of the 26 EU/EEA/UK countries measured in this report.

fuel. This requirement is currently most commonly satisfied with E85, but could also incentivize HRS deployment in the future. In the Netherlands, quantitative risk analysis necessary for HRS installation is being developed that will simplify the safety guidelines and thus overall HRS deployment.

2.7. Hydrogen Production, Transmission, and Distribution

This chapter covers policies that support the production of hydrogen, its transmission, and distribution. Policies providing funding for hydrogen production could significantly contribute to scaling of the emerging electrolytic and low-carbon hydrogen production markets. Policies covering transmission and distribution of hydrogen in either the natural gas network or in dedicated hydrogen infrastructure are also covered by the chapter.

Table 8: Main questions answered in the hydrogen production, transmission, and distribution chapter

Hydrogen production, transmission, and distribution chapter questions (selection)
Is there any CAPEX support for renewable/low-carbon hydrogen production plants ?
Is there any OPEX support (e.g. in the form of carbon contract for difference or any other form of OPEX support) for renewable/low-carbon hydrogen production plants ?
Is there any exemption from or reduction of certain electricity price components for the electricity used for production of renewable/low-carbon hydrogen?
Is there any feed-in tariff for hydrogen when injected into the gas grid?
Is there a feed-in premium for hydrogen when injected into the gas grid?
Is any quota system in place for renewable content of the gas mix in the gas grid?
Are there any exemptions from or reduction of gas network fees and tariffs for hydrogen injected into the gas grid?
Is there a legal hydrogen concentration limit into the gas grid?

The policies supporting production, transmission, and distribution of hydrogen are less prevalent than policies in other sectors, such as transport.

The most common ones are **CAPEX subsidies** with 13 countries providing CAPEX subsidies in some form for renewable or low-carbon hydrogen production plants.[20] These funding sources are implemented through different instruments. In California, there are regular grant funding opportunities. Bulgaria is preparing its support scheme for renewable hydrogen with up to 50% CAPEX support as a part of its National Recovery and Resilience Plan. In Germany, one of the CAPEX subsidies concerns electrolyzers built specifically for hydrogen production for the transport sector with a funding rate of 45%. In Austria, hydrogen production plants continue to be eligible for funding from Kommunalkredit Public Consulting. In Belgium, the Flemish government includes support of renewable or low-carbon hydrogen production through its “Strategische ecologiesteun” and supports 20% to 40% of the required CAPEX for projects with minimal investment costs of three million EUR. Denmark announces call for support for which projects can apply and funding is awarded on a case by case basis. In Sweden, hydrogen production projects can get funding through “Industriklivet” initiative aimed at reducing emissions from industrial production. In Finland, projects introducing new technology, including electrolyzers can receive up to 40% of investment subsidy with specific amount to be decided on a case-by-case basis.

[20] Eight of those are in EU/EEA/UK.

There are five countries with some form of an **exemption from or reduction of electricity price components when producing hydrogen**. In Sweden, all electrolytic processes, including electrolytic hydrogen production, are exempt from electricity tax. In Denmark, as a part of energy tax deductions, electricity for hydrogen production is exempted from taxation. In Germany, under the German Renewable Energy Sources Act (EEG) 2021, the EEG levy for electricity consumed by a company to produce green hydrogen, regardless of its intended use, will be reduced to zero. In case of use of grid electricity with guarantees of origin, electrolysers are exempt from grid charges under the Energy Industry Act. In France, electrolytic processes are exempted from the domestic tax on final consumption. In addition, consumers with stable or counter-cyclical consumption profile can benefit from a tariff reduction for use of the public electricity network (TURPE). The reduction cannot exceed 90%, the consumption point must have utilization of at least 7000 hours/year and/or minimum rate of use in off-peak of at least 44%.

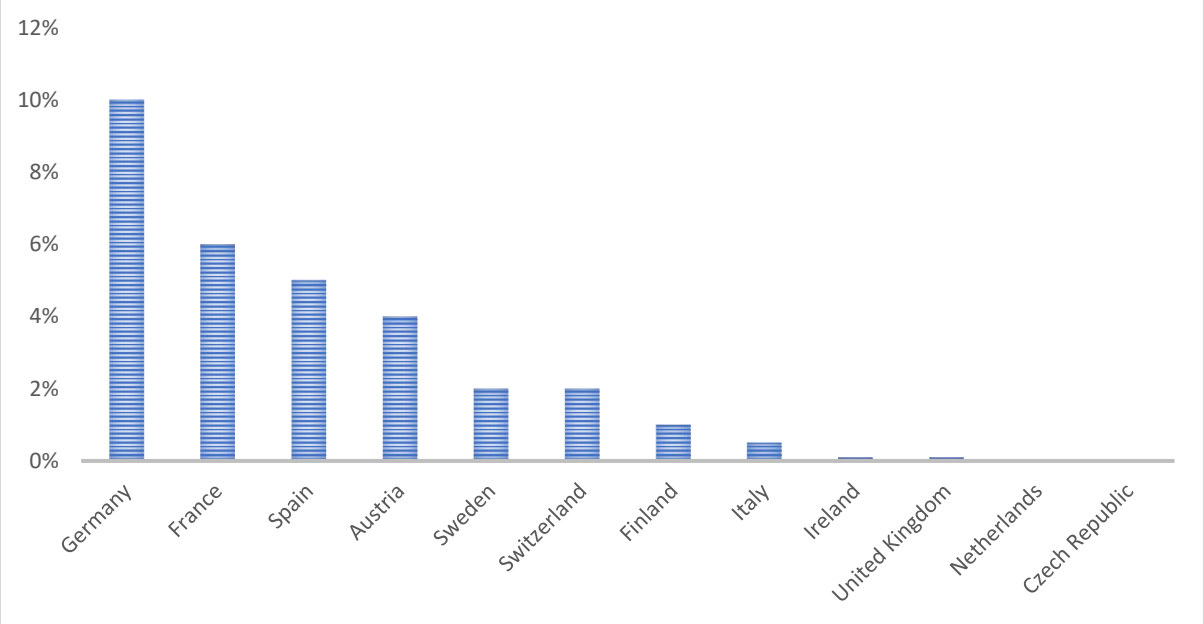
Nine countries (Czech Republic, Denmark, Estonia, France, Italy, Netherlands, Sweden, UK, and USA) currently provide tariffs or premiums for injection of biogas or synthetic methane into the gas grid. While excluding hydrogen for now these existing policies provide an opportunity for hydrogen to be included.

France and Germany provide **exemptions or reductions from gas network fees and tariffs** with Germany treating hydrogen similarly to biogas.

Out of the 34 countries covered in this report, **Denmark and Germany** are the only two countries with a **specific policy on the allocation of gas grid connection costs** between network operator and hydrogen production plant operator. In Germany, the connection cost split is 75% by the network operator and 25% by the connecting party with specific limits and details for connections of 10 km.

In terms of non-financial policies, the most common policy is a **legal hydrogen concentration limit in the gas grid**. Countries' acceptable H2 limits **range from 0% in Czech Republic, 0.1% in the United Kingdom to 5% in Spain, and 10% in Germany.**

Figure 16: Overview of countries with legal limits of hydrogen concentration in their gas grids[21]



[21] Non-graphically represented values include Ireland (0.1%), United Kingdom (0.1%), Netherlands (TSO 0.02%, DSO 0.5%), and Czech Republic (0%).

Another supporting policy is **guarantees of origin** (GoO) for renewable hydrogen. These have been or are in the process of being established in Flanders **Belgium, France, and the United Kingdom**. Similar to GoO in renewable electricity production, they provide potential buyers with certainty that the hydrogen was produced from renewable sources.

2.8. Hydrogen in Industry

Even though hydrogen has been used in the industry for decades, the future use of renewable or low-carbon hydrogen for heat, as a feedstock, or as a chemical agent are some of its most promising use cases. This chapter of the Observatory explores policies supporting increased usage of clean hydrogen in industry.

Table 9: Main questions answered in the hydrogen in the industry chapter

Hydrogen in the industry chapter questions (selection)
Are there any CAPEX subsidies for renewable/low-carbon hydrogen production plants used in industry and aimed at decarbonizing / reducing emissions for industry?
Is there any national funding for low-carbon demonstration projects in industry which involve the use of renewable or low carbon hydrogen?

The questionnaire sought to answer whether the policies are in place, their economic value, and any other relevant details about the policy.

The most common policies are **low-carbon hydrogen demonstration subsidies**. These exist in **14** of the 34 surveyed countries and provide funding for hydrogen demonstration projects.[22] Countries with relevant support include Australia, Austria, Bulgaria, Denmark, Finland, France, Germany, Lithuania, Netherlands, South Korea, Spain, Sweden, Switzerland, and the United Kingdom.

Denmark's funding is available through the Danish Energy Agency. **Finland's** includes hydrogen demonstrations under its **Energy Aid** program providing a wide range of funding to various projects and technologies under specific conditions. **The Netherlands** supports pilots and demonstration projects projects via **Demonstration Energy and Climate Innovation 2021+ policy**. In the **United Kingdom**, grant funding is offered under the Industrial Energy Transformation Fund (IETF) with £30 million in 2020 and **£285 million during 2021 - 2024**. Additional grant funding for hydrogen is also available under an Industrial Cluster Mission fund aimed at establishing at least one low-carbon cluster by 2030 and a net-zero carbon industrial cluster by 2040.

CAPEX subsidies for renewable/low carbon non-demonstration hydrogen production projects used in industry are in effect in **six countries Austria, Belgium, Bulgaria, Finland, Germany, and Netherlands.** Austria provides up to 1.5 million EUR in CAPEX costs through KPC (Kommunalkredit Public Consulting) that has the possibility to fund up to 30% of the environmentally relevant additional CAPEX costs of demonstration and innovation projects. **The Flemish government in Belgium covers 20 to 40% of the involved capital expenditure** with a maximum of 1 million EUR through its Ecology bonus Flanders program. This is a financial subsidy for SMEs and large companies to encourage them to make their processes more environmentally friendly and energy efficient. Similarly, to subsidies for demonstration projects, Bulgaria's various operational programs can also be used for CAPEX subsidies for specific renewable hydrogen projects. Finland's Energy Aid program provides up to 40% of the initial investment to new technologies and demonstration projects that achieve reduction of greenhouse gas emissions and/or energy savings. The **Netherlands's Energy Investment Allowance provides tax deductions up to 45% of the investment** under certain conditions.

[22] 12 out of 26 for EU/EEA/UK countries.

2.9. Hydrogen Roadmaps and Strategies

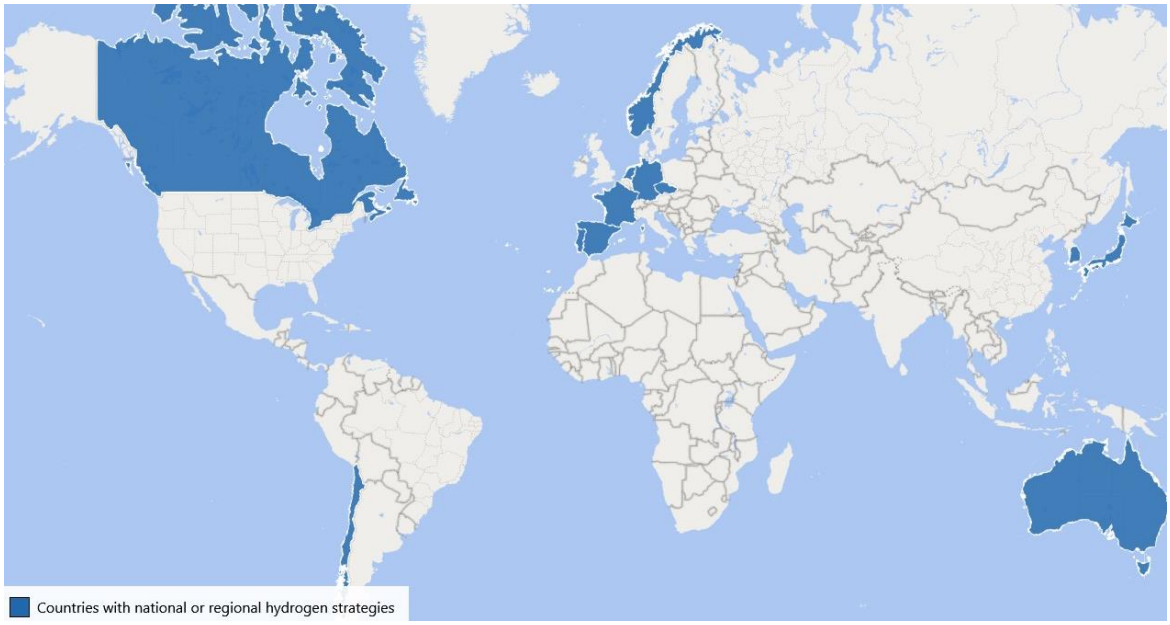
Hydrogen roadmaps and strategies are relatively commonplace among the surveyed countries with **12 countries**, displayed in Figure 17, having individual **national or regional hydrogen roadmaps or strategies.**[23]

Australia's National Hydrogen Strategy specifies Australia's potential through multiple scenarios, presents benefits of developing hydrogen in the various sectors, and identifies means of developing a hydrogen economy. Germany's strategy identified 9 bn EUR of spending on hydrogen technologies and related international cooperation. It also set a target of 5 GW of installed electrolysis capacity by 2030. The French strategy identified 7.2 bn EUR of funding to be spent on hydrogen development. The Spanish strategy set 4 GW electrolysis capacity target and identified 8.9 bn EUR of spending from both private and public sector. The Dutch Government Strategy on Hydrogen outlines the historical role of Netherlands as an energy hub, stresses the future importance of renewable gases in the future energy system with hydrogen at its core, and aims to for 3 GW of electrolysis capacity by 2030.

From outside Europe, Chile's hydrogen strategy aims to develop 25-40 GW of electrolysis capacity by 2030 and mobilize 8 bn USD from public and private funding sources by 2025.

In addition to the already adopted strategies, numerous countries are in various stages of development of their strategies. These include, among others, Austria, Bulgaria, Czech Republic (national), Greece, Hungary, Italy, Poland, Romania, Slovakia, Sweden, and United Kingdom.

Figure 17: Map of countries with national or regional hydrogen strategies



[23] Out of these 12 countries, EU/EEA/UK countries are Czech Republic (regional), France, Germany, Netherlands, Norway, Portugal, and Spain. Others include Australia, Canada, Chile, Japan, South Korea.

3. Ackowledgements

Authors: Matus Muron and Bastien Bonnet-Cantalloube (Hydrogen Europe)
Review: Alexandru Floristean (Hydrogen Europe)

National contributors:

EU COUNTRIES	
Austria	Austrian Energy Agency
Belgium	WaterstofNet vzw
Bulgaria	Bulgarian Hydrogen, Fuel Cell, and Energy Storage Association
Croatia	University of Split
Czech Republic	HYTEP
Denmark	BrintBranchen
Estonia	Estonian Hydrogen Association
Finland	VTT Technical Research Centre of Finland LTD
France	AFHYPAC
Germany	German Hydrogen and Fuel Cell Association (DWV)
Greece	National Centre for Scientific Research "Demokritos"
Hungary	Hungarian Hydrogen & Fuel Cell Association
Ireland	Hydrogen Ireland / Sustainable Energy Authority of Ireland
Italy	Italian Hydrogen and Fuel Cell Association
Lithuania	Lithuanian Hydrogen Energy Association
Netherlands	NEN
Poland	Institute of Power Engineering
Portugal	Aragon Hydrogen Foundation
Romania	Romanian Association for Hydrogen Energy
Slovakia	Slovak National Association, Ministry of Economy
Slovenia	Energy Agency of Savinjska, Šaleška and Koroška region
Spain	Aragon Hydrogen Foundation
Sweden	Hydrogen Sweden
ASSOCIATED COUNTIRES	
Norway	Norwegian Hydrogen Forum
Switzerland	Swiss Federal Office of Energy
Non-EU/EEA COUNTRIES	
Australia	Hydrogen Mobility Australia and the Government of Western Australia
California/United States of America	California Hydrogen Business Council and California Fuel Cell Partnership
Canada	CHFCA-Canadian Hydrogen and Fuel Cell Association
Chile	Chilean Hydrogen Association
China	Hack Heyward
Japan	New Energy and Industrial Technology Development Organization and Japan Electrical Manufacturers' Association
Morocco	Adil GAOUI, AMHID
South Korea	H2Korea
United Kingdom	UK Hydrogen and Fuel Cell Association