HyLAW

National Policy Paper - Latvia

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1. Introduction and summary

1.1 HyLAW Summary and Methodology

HyLaw stands for Hydrogen Law and removal of legal barriers to the deployment of fuel cells and hydrogen applications. It is a flagship project aimed at boosting the market uptake of hydrogen and fuel cell technologies providing market developers with a clear view of the applicable regulations whilst calling the attention of policy makers on legal barriers to be removed.

The project brings together 23 partners from Austria, Belgium, Bulgaria, Denmark, Finland, France, Germany, Hungary, Italy, Latvia, Norway, Poland, Romania, Spain, Sweden, Portugal, the Netherlands and United Kingdom and is coordinated by Hydrogen Europe.

Through extensive research, interviews and legal analysis, the HyLaw partners have identified the legislation and regulations relevant to fuel cell and hydrogen applications and legal barriers to their commercialization.

This National Policy Paper provides public authorities with country specific benchmarks and recommendations on how to remove these barriers.

2. Hydrogen refueling and production station deployment.

2.1. Policy Summary at National level.

Looking for a sustainable and decarbonised future for Latvia, hydrogen may be an alternative which allows decreasing the pollution in both the transport and energy sector, at the same time that helps the industry improving their energy efficiency and incomes. However, nowadays hydrogen is generally unknown for the Latvian society.

On 25th of April 2017 the Alternative Fuels deployment plan 2017-2020 entered in force describing the implementation of alternative fuels in Latvia. The alternative fuels deployment plan describes the potential plan of numerous alternative fuels (BioGas, LNG, CNG, Hydrogen, Electricity) implementation. Regarding the fact that the hydrogen as alternative fuel implementation plan is not described clearly in the Alternative Fuels deployment plan. The first Hydrogen Refueling and Production Station is already in operation in Riga, implemented within a EU Co-funded project H2NODES "Evolution of a European Hydrogen Refuelling Station network by mobilizing the local demand and value chains". Despite the fact that the first Hydrogen Refueling Station has already deployed, it is still not sufficient to allow Fuel Cell Electric Vehicles (FCEV) commercialisation in Latvia. The intention of hydrogen related activities are already received from a number of municipalities i.e. Liepāja and Valmiera, thus taking into account that the hydrogen refuelling infrastructure net has not established it is necessary to provide additional steps to develop the hydrogen refuelling infrastructure net in Latvia.

As stated in the EU Co-funded project H2NODES "Evolution of a European hydrogen refuelling station network by mobilizing the local demand and value chains" the hydrogen refueling infrastructure may perform a business case only if the FCE-vehicles are deployed. Therefore, within project H2NODES a number of Hydrogen powered trolleybuses are deployed in Riga and will be used for public transport operations.

By 2050, hydrogen will represent 18% of the total worldwide energy consumption. This would decrease the amount of CO_2 released in the atmosphere by 6 gigatonnes per year and, at the same time, create 30 millions of jobs within an industry worth 2.5 trillion dollars annually.

These estimations, although ambitious, have already began to be implemented in different nations: 400 Hydrogen Refuelling Stations are planned in Germany in 2023, in Japan, hydrogen is being seen as the main energy vector of the future with the Olympic games in Tokyo putting hydrogen to the main stage. In France, the national "Plan Hydrogène" proposes to use hydrogen as a key solution for the energy transition of the country, in the US major fleets of hydrogen trucks and a large infrastructure of refuelling stations is under development. These are some of the examples that show that that the world is starting to move towards the hydrogen economy.

Latvia, with 2 million of inhabitants, should continue to promote emissions reduction and deep decarbonisation of all sectors, securing these goals by taking advantage of the economic and environmental potential of hydrogen technology and should:

- Promote sustainable mobility with hydrogen through incentives for vehicles and infrastructure;
- Introduce hydrogen by promoting large FCEV fleets;
- Support the integration of renewable sources in the energy sector and the energy storage in order to achieve a deep energy transition which is clean, secure, and low emission. Hydrogen, as energy storage and carrier for renewable energy is essential for supporting this objective.
- Reduce the legal and administrative barriers in the production, storage and distribution of hydrogen.
- Promote the injection of hydrogen into the gas grid in order to allow the interchange of energy between the electric and the gas grid, allowing the use of renewable energy on both sides.

Hydrogen Fuel Cell Electric Vehicle (FCEV) passenger cars could represent almost 3% of new vehicle sales by 2030 (i.e. 4 million cars sold in 2030), ramping up to 35% by 2050 . Hydrogen refuelling infrastructure is essential to a transport sector which allows emission-free, FCEVs to operate. This infrastructure would not only service cars, buses or trucks on public roads as it is also necessary for the refuelling of captive fleets of forklifts and other special vehicles for material handling. Once hydrogen has been produced and stored it can be used in mobile applications, securing mobility without any emissions. The deployment of Hydrogen Refuelling Stations, self-standing or integrated in existing refuelling infrastructure will be necessary to refuel these vehicles. Unlike other fuels, hydrogen can be produced on site in the Hydrogen Refueling and Production stations, requiring only electricity and water. This avoids the extraction, refining and distribution stages of fossil fuels and, in addition, retains value creation in the regional area of influence. In this way, by guaranteeing a supply of renewable energy, the whole cycle of hydrogen is zero emission.

2.2. Overview and assessment of current legal framework

Latvia On 25th of April 2017 the Alternative Fuels deployment plan 2017-2020 has developed the first strategy of alternative fuel deployment initiative in Latvia. Regarding the fact that the hydrogen as alternative fuel implementation plan is not described clearly in the Alternative Fuels deployment plan and does not detail the efforts nor measures necessary to accomplish this objective a further activity are necessary to be held. In 2018 there are only 1 HRS operating in Latvia. The publicly accessible HRS whereas it will be possible to refuel both passenger cars and heavy duty vehicles is deployed within an demonstration project partly funded by the EU. While in other countries (i.e. Denmark, Germany), a small but growing refueling network already exists thanks to the efforts of national governments, in Latvia HRS are still in the pending phase.

There are different pathways to producing hydrogen

Hydrogen as a fuel can be produced by the use of renewable sources when using an electrolyser by the only mean of electricity and water without any harmful emission. The hydrogen produced by electrolysis does not contains impurities as water and oxygen can be the only “pollutants”, therefore, a high degree of purity is easily achievable and its quality can easily conform the quality requirements for fuel cells.

Hydrogen can also be produced by reforming natural gas which has been the leading source of low-cost hydrogen gas for industrial use. The steam methane reformer uses the methane to produce H2 and CO2 and this hydrogen may require a purification process to conform further quality requirements for non-industrial use. This hydrogen is not emissions-free but can play a role in early stages before electrolysis becomes widely and economically available.

Renewable, low-carbon hydrogen requires a supporting regulatory environment and certification of origin.

The certification and Guarantee of Origin of (renewable, low CO2) Hydrogen as fuel is not yet available. The CertifHy project works in this direction and it is foreseeable that the new European Renewable Energy Directive will define the character of renewable and low carbon Hydrogen at European level, paving the way for the establishment of the guarantee of origin scheme. Independently of the EU status, several countries (DE, DK, BE) have tried to define renewable hydrogen within their national frameworks. A Guarantee of Origin scheme will be needed to determine the carbon emissions of the fuel when it was produced and to promote low carbon hydrogen production at national and EU level.

Regulatory and technical issues continue to be a barrier to deployment for hydrogen as a fuel

Currently, only the Cabinet of Republic of Latvia 6th of February 2018 Regulation No.78 “Requirements for electric vehicle charging points, gas filling, hydrogen refuelling and shore electrical charging units” establishes a framework of measures for the implementation of an infrastructure for alternative fuels in which the technical specifications of the hydrogen refuelling points are established, indicating exclusively that they must comply with various ISO standards relating to the supply of gaseous hydrogen. This is the partial transposition of the EU Directive of Alternative fuels but does not reach the level of detail as for gas stations.

In addition, due to the very high purity requirements for hydrogen, standard ISO 14687–2:2018 is costly to implement, measure and enforce. Importantly, purity requirements should be verifiable, which is not the case in Latvia. The reason for this is that there are just a few independent laboratories (in the world) who can verify the purity required by ISO 14687–2:2018. In other words, the purity of hydrogen for FCEV cannot be guaranteed because the required measurements to show compliance with the standard are expensive/not available.

Quality of fuel is an obvious matter of importance, but it should be taken in account in a reasonable way, not detracting the maketing of hydrogen due to extremely technical measures that cannot be satisfied in an economical way today.

Taking into account that a number of ISO standards are implemented in Latvian National law i.e. ISO 19880-1:2018 and ISO 17268:2012 that clearly defines the overall technical requirements for a publicly accessible Hydrogen Refuelling Station. Thus, in the absence of a reasonable treatment of Hydrogen Refueling Station competent administrations would consider a potential Hydrogen Refueling Station as a set of independent facilities for the production and storage of inorganic chemical products resulting in high requirements, costs and significant prohibitions.

Hydrogen Refueling Station with on-site production has clear advantages in terms of refuelling and managing the energy, storing surplus renewable energy to satisfy energy demand of transportation. However this kind of Hydrogen Refueling Stations are discouraged by the administration due to severe barriers for its construction. HRSs with on-site production are usually considered as a chemical facility for the production of an inorganic gas such as hydrogen, regardless of the method of production of hydrogen, the daily amount produced or the storage capacity. This consideration restricts this type of infrastructure to be constructed on industrial soil, limiting its implementation on other places as existing gas stations or in other kinds of strategic locations. obligations of large industrial plants to avoid or minimize polluting emissions in the atmosphere, water and soil, as well as waste from industrial and agricultural installations. To this purpose, the operators of industrial installations are required to obtain an integrated permit. Presently hydrogen production falls under the Directive and is subject to a permitting process as production of inorganic chemical (Annex I, 4. Chemical industry, 4.2 Production of inorganic chemicals). The Industrial Emissions Directive stipulates that production should be understood as “production on an industrial scale by chemical processing of substances or groups of substances listed in sections 4.1 to 4.6 “ leaving space for interpretation at national level.

The lack of experience of the authorities and the lack of relevant legislation regarding Hydrogen Refueling Station deployment is toughening the administrative process to obtain the necessary permits causing delay and extra costs. One of the changes that is necessary to make is to clearly define the Annex 2 point 1.4. of “Procedure by Which Polluting Activities of Category A, B and C Shall Be Declared and Permits for the Performance of Category A and B Polluting Activities Shall Be Issued”. The Rulling determines that it is necessary to obtain a C category certification for Polluting activities (installations), thus it is not clear if a hydrogen refueling station with on-site water-electrolysis hydrogen production units (small scale that does not exceed the other thresholds of inorganic chemical substance storage) is necessary to obtain, because the water-electrolysis process is not generating any emissions. It is necessary to review these situations since an electrolyser has more similarities with an electrical transformer than with the petrochemical industry since it does not result in any emissions or pollutants. For this reason, the necessary environmental impact studies must differentiate between the production of hydrogen for industrial uses and the production of hydrogen as an energy carrier by the means of electrolysis.

Another EU legal act laying down permitting requirements for hydrogen production is the Environmental Impact Assessment Directive, only electrolyser will be built (without methanation plant) production and storage of hydrogen falls within the projects listed in Annex II (6a and 6c - production of chemicals; and storage facilities for chemical product), for which Member States shall determine whether the project shall be made subject to an Environmental Impact Assessment (EIA) or not.

At EU as well as at national level the hydrogen production plants are considered as traditional chemical production facilities, without regard to the method of hydrogen production (steam reforming, chloralkaline electrolyse, water electrolyse) or the presence (or absence) of hazardous substances involved in the process. This could place a disproportionate burden on environmentally friendly production technologies, as it subjects them to the same requirements as industrial, emission emitting processes.

Clear legislation in this regard can pave the way to establish our nation as suitable for the development of hydrogen trucks, or for facilitating the logistic warehouses to easily incorporate hydrogen fuel cell forklifts within its fleets. A clear and ambitious legislation will finally promote that the national entities as well as large fleet operators and fuel distributors will look forward for this technology deployment and increase their sales with the result of further cost reductions and increased market share.

Looking at the whole picture, in absence of a national network of Hydrogen Refueling Stations, the manufacturers of fuel cell vehicles do not see Latvia as a potential market where they can invest, develop and sell their technology.

2.3. Conclusions

The effective decarbonisation of transport involves electrifying all means of transport, either directly using electricity (catenary), storing this energy in electrochemical devices (batteries) or in fuels that act as an energy vector (hydrogen) that subsequently generates electricity on board the vehicles.

In the case of hydrogen, the energy used to produce the fuel must come from local renewable energies, favouring management of the intermittency of these sources, while at the same time retaining the value generation in the regional area of influence and avoiding the external energy dependence based in fossil fuels.

The lack of specific rules regarding HRS – which do not differ significantly from conventional refueling stations in terms of land use perspective - raises the risk that legislation applicable to hydrogen production or hydrogen storage would be strictly interpreted and applied mutatis mutandis to hydrogen refueling stations thus limiting the zones where some Hydrogen Refueling Station could be located.

For any of these solutions to work, an appropriate legislation is needed to facilitate the deployment of the necessary infrastructure. To promote the installation of Hydrogen Refueling Stations, it is necessary that the concept of hydrogen as an energy carrier and as a fuel is known by the administration and the authorities and furthermore, that the legal and administrative processes to develop such infrastructures are clear and do not produce uncertainty in its development.

Hydrogen Refueling Station with an onsite production of hydrogen is classified as an industrial activity. Thus such an Hydrogen Refueling Station would only be permitted in an area designated as an industrial zone, significantly reducing the convenience-level of users. The other issue is that it is necessary to perform a initial environmental assessment for every Hydrogen Refueling Station no matter what is the capacity of the station that significantly increases the costs for the infrastructure implementers.

Without much experience and guidance, authorities are left to interpret which requirements would apply and which would not when considering permitting a Hydrogen Refueling station on a case-by-case basis.

Lack of experience of both operators and public authorities on building up Hydrogen Refuelling infrastructure, coupled with the lack of guidelines for local authorities cause delays and extra costs. Permitting authorities impose overly-restrictive, excessive safety distances for Hydrogen Refuelling stations in some countries because of over-reliance on general rules applicable to industrial production and storage.

2.4. Policy Recommendations

- Strengthen and secure funding for HRS in the national alternative fuels plan considering the necessary actions for these objectives to materialise;
- Develop changes in legislation, limiting the uncertainty of the administration and delimiting the necessary permits for their construction and commissioning.
- Eliminate the barriers to the production of hydrogen in-situ in the service stations due to the fact that hydrogen production is considered as industrial activity of chemical production regardless of the source of production.
- Establish a competent authority responsible for verifying the quality of hydrogen as fuel.
- Establish and promote at EU level a Guarantee of Origin system similar to that of the electricity to determine the carbon intensity of the generated hydrogen.
- Considerate a minimum fraction of renewable hydrogen to be sold at nozzle in public Hydrogen refueling station as California (USA) does.
- Ensuring that Hydrogen Refueling Stations are explicitly treated in the same manner as conventional refueling stations from the perspective of land use plans and zone prohibitions.
- Support the harmonisation of a practical implementing method for hydrogen quality control in which minimum analysis requirements of impurities are specified per hydrogen supply.

2.5. References

- Project "Certifhy" http://www.certifhy.eu
- Alternative fuel implementation plan 2017-2020, https://likumi.lv/doc.php?id=290393
- Procedure by Which Polluting Activities of Category A, B and C Shall Be Declared and Permits for the Performance of Category A and B Polluting Activities Shall Be Issued https://likumi.lv/doc.php?id=222147
- Environmental Impact Assessment Directive https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32011L0092

3. Hydrogen injection in the GAS grid (Power 2 gas applications).

As part of its Clean Energy for all Europeans package, the European Commission proposed in 2016 an update of the Renewable Energy Directive for the period 2021 – 2030 (RED II). A final compromise document was agreed among EU Institutions on 14 June 2018.

In addition to the new binding renewable target of at least 32% of EU final consumption in 2030, some other key changes to the promotion of renewables in the EU introduced by RED II are relevant to the integration of gas from renewable energy sources into the gas grid:

- guarantees of origin (GOs) are extended to cover renewable gas. This would provide a consistent means of proving to final customers the origin of renewable gases and would facilitate greater cross- border trade in such gases. It would also enable the creation of guarantees of origin for other renewable gases such as hydrogen,
- annual increase of 1.3 % of renewables share in heating and cooling starting from the level achieved in 2020 is introduced; One of the possible measures is „the physical incorporation of renewable energy in energy and energy fuel, supplied for heating and cooling",
- the Member States, where relevant, shall assess the need to extend the existing gas network infrastructure to facilitate the integration of gas from renewable energy sources and require system operators to publish the connection tariffs to connect renewable gases based on transparent and non-discriminatory way.

The RED II does not provide a definition for renewable gases. It contains only the definition set out in Directive 2015/1513 concerning renewable liquid and transport fuels of non-biological origin, which energy content comes from renewable energy sources other than biomass, and which are used in transport.

Renewable hydrogen and synthetic methane could contribute to the achievement of national energy targets if they could be count towards the share of energy from renewable sources in a certain sector (electricity, heating and cooling, transport). As the conversion of energy from one energy carrier to another could lead to double counting the electricity and gas from renewable sources could be counted only once towards renewable share in electricity, heating and cooling, or transport. Unlike biogas injected into gas network, hydrogen and synthetic methane are currently not eligible to be counted toward the renewables share in heating and cooling.

Hydrogen produced by usage of renewable sources and injected in the natural gas network would effectively contribute to the decarbonisation of the relevant sectors. The transport and storage capacities of the existing gas network infrastructure could be used for indirect electricity transport and for (seasonal) energy storage. The Power to Gas (P2G) process chain links the electric power grid with the gas grid by converting (surplus) electric power into hydrogen and direct injection of gaseous hydrogen into the gas grid at either the Transmission level (TSO) or Distribution level (DSO).

The alternative to direct hydrogen injection is to create a grid compatible gas via a conversion of hydrogen to CH_4 via methanisation process to create substitute natural gas (SNG), which can be injected into the existing gas grid (or into gas storage systems, used as CNG motor fuel, or utilized in natural gas facilities).

In all cases, the main limitation at present is typically the concentration of hydrogen allowed in the natural gas streams entering and carried in the national gas grid networks.

3.1. Overview and assessment of the current legal framework.

There is a overall legislation in Latvia about the possibilitie of mixtures to be injected in the gas transmission and distribution network. There are gas quality requirements in place defining the characteristics of the natural gas and overall rulling to deploy an injection site for the gas network, thus the allowed concentration of hydrogen at an injection level is set 0,1%. In several EU countries an upper limit for the hydrogen content in the gas in defined; values vary from 0,01 to 10 %. i.e. in Germany, the German legislation does not limit the hydrogen concentration in the natural gas network in Germany. All grid users are required to ensure the gas which they feed in is compatible with the grid.

On DSO level, the allowed hydrogen concentration might be substantially higher. A recent study of KIWA[1] for influence of hydrogen. Under the typical DSO conditions, the used materials (steel, PE and PVC) are not expected to degrade. The main attention point is the low energy density of hydrogen that would lead to a significantly higher volume to be transported (at equal energy demand), which requires adaptation of the gas meters.

Safety requirements are typically based on conventional natural gas flows in national gas grid networks. The injection of hydrogen at higher concentration levels for HNG blends will engender safety concerns across all aspects of generation sites, blending, connection and injection since, so far, safety requirements are typically based on conventional natural gas flows in national gas grid networks. While varying levels of hydrogen concentration in the gas grid is accepted there is no consistent approach to safety aspects across member states for hydrogen facilities and hydrogen flows. Thereto related missing provisions have resulted in a substantive barrier to the business case of P2G and overlook the value of related de-carbonisation and sustainability benefits.

Also the end-user applications connected to the distribution network, ranging from domestic cooking and heating appliances to industrial equipment and mobility applications (CNG), are effected by a higher hydrogen content. The key concern for gas network operators (primarily the DSO) and appliance makers is the threshold at which overall appliance design and individual component changes will need to be made. A variety of studies have recently been made around this issue and research results in Germany have shown that operation of gas appliances with hydrogen admixture up to 10 vol.% is possible without adaptation of the devices. Only for CNG tanks of the older generation a limit of 2 vol% should be adopted.

[1] https://www.kiwa.com/gb/en/products/hydrogen-appliance-supply-chain-report/

3.2. Conclusion

A common definition for renewable gases at EU level has to be adopted including biogases and renewable gases of non-biological origin. It is important to clear whether the carbon used for production of synthetic methane is required to originate from renewable sources or it could be fossil carbon captured at the end point.

At European level should be developed a guarantees of origin system for renewable gases of non- biological origin in order to demonstrate the renewable properties of the electricity used and stimulate certain final consumers to buy renewable hydrogen. Guarantees of origin should allow for the inclusion of additional optional information including greenhouse gas savings, the type of feedstock used and other benefits towards a circular economy. Guarantees of origin must be transferred, independently of the energy to which they relate, from one holder to another. Therefore, it is important that they are mutually recognized among the Member States.

The allowed quantity of hydrogen for injection in the gas grid is set at 0,1% as result it prevents the Power 2 Gas applications in Latvia. By evaluating the technical aspects and operational aspects and increasing the thresholds of allowed injection of hydrogen the efficiency of the gas would significantly increase.

A system of “guarantees of origin” for green hydrogen is not yet established but is essential for the valorization of renewable hydrogen injected in the gas grid.

3.3. Policy Recomondations

- Review relevant technical and gas quality issues for injection in the Latvia gas network and establish legal pathways to support Power-to-Gas operations and increased hydrogen use in gas networks;
- In some countries, such as France and Germany, demonstration projects regarding gas injection are running and more experience with legislative issues is available. They can serve as an example for Latvia legislation for this topic;
- Follow-up of the normalization activities in this field is essential (establishment of international standards regarding all technical, quality and safety aspects);
- Support the set-up of an operational basis and legal framework for hydrogen access to gas grid. The development of the operational basis and the legal framework should be done by EC member states, national gas grid operators, and the hydrogen industry.

4. Electricity grid issues for electrolysers

In order to produce hydrogen using water-electrolysis process it requires a fair access to the electricity grid. The produced hydrogen may be used for mobility purposes i.e. as Fuel cell electric vehicle fuel, or in energy purposes i.e. injected in the gas grid. Thus Electrolyser connection to the electricity grid can benefit the electricity grid itself by assuring the balancing of the grid.

At the EU level, the electricity from a renewable source feds in part to the electrolyser and the balance to a grid connection. The market and legal barriers were removed and the market was opened to competition, thus the electrolyser, hydrogen and fuel cell technology could be included in the electricity sector.

In the context of the power-to-gas aspects of a grid connected electrolyser and operated to generate hydrogen, the covering legal framework establishes common rules for the transmission, distribution, supply and storage of natural gas and sets rules relating to the organisation and functioning of the natural gas sector, access to the market, the criteria and procedures applicable to the granting of authorisations for transmission, distribution, supply and storage of natural gas and the operation of systems.

A “power-to-gas” or P2G facility would typically include an electrolyser directly connected to the e-grid or directly connected to a renewable energy system (wind, solar) to draw electricity for electrolyser operation to generate hydrogen. The hydrogen can be temporarily stored and then supplied to fuel cells, ICE turbines or other power-electric generation system, or injected into the gas grid.

As an electricity storage technology, P2G can contribute to compensating the increasing fluctuations in electricity generation from wind and solar energy and facilitate long-term use of electricity which could not be integrated directly into the electricity grid at times of particularly high renewable generation. And unlike other energy storage technologies, power-to-gas can both store and transport energy. By storing hydrogen or substituting natural gas in the existing natural gas pipeline network and associated underground storage facilities, the stored energy can be discharged where and when it is needed most.

4.1. Overview and assessment of the current legal framework.

Electricity grid balancing, or load balancing, is an ancillary service required by the transmission or distribution system operator (TSO / DSO) to enable the integrity and stability of the transmission or distribution system, as well as the power quality (frequency and voltage), to be maintained within set network limits and which would typically be part of regulated (mandatory) network requirement.

P2G offers considerable energy independence and sustainability benefits in enhancing the use of renewables (and addressing intermittency) alongside electricity and gas grid operation, and electricity grid connection for electrolysis is well understood and legally supported. Nevertheless the lack of legal recognition and formative regulatory framework is constraining wider P2G deployment.

It can be concluded that there are few, if any, fundamental issues across the partner member states in connecting an electrolyser to the grid. This can be seen as a tribute to the wide scale implementation of the 'energy package' legislative framework and associated directives and which has liberalised and opened electricity markets to competition. Having said this, there are hence no specific recommend- dations that are needed for this legal administrative process.

It is essential that the operational framework for P2G has to be clarified with regard to the combination of electrolyser plants and related energy storage facilities in order to provide a legal basis for P2G. Regardless of the operation mode - energy consumption and energy generation (ancillary services) mode and the extent to which safety requirements are typically already covered under existing legal codes - regulatory frameworks and existing support mechanisms can be carried over to P2G operations and services.

A P2G plant can potentially provide a balancing service to 'switch-on' the electrolyser when the net- work has excess power; and to generate power (using stored hydrogen or SNG) when the grid has less power than needed to maintain load/frequency, subsequently it should be part of a regulated (mandatory) network requirement. This would necessarily exclude primary reserve provision (typically for large scale generators) and mainly cover secondary reserve provision.

4.2. Conclusion

Despite the fact that electricity grid connection for electrolysers is well understood and legally supported, recognition of the basis for the provision of ancillary services via electrolysers is blurred – and interpreted differently across partner states. In order to ensure wider utilisation of electrolysers in the provision of ancillary services it is essential that the operational framework and technical capabilities (and merits) are more coherently framed and should meet all applicable EC regulatory frameworks.

At present, there is no legal definition for P2G either at European nor at national level. In view of the provisions of current Natural Gas Market Directive 2009 and proposed definition and ownership regime for energy storage under the Recast Electricity Directive, there is a need to clear to what extend and whether P2G is both a gas production activity and an energy storage. It should be also clarified to what extend and whether the gas network system operators are allowed to operate a P2G as storage facility, when this could be also considered as a gas production plant.

4.3. Policy Recomondations

Support the provision of a legal basis for P2G more widely across Europe, clarifying the operational framework with regard to the combination of electrolyser plants and related energy storage facilities – in both energy consumption and energy generation (ancillary services) modes.