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Renewable gas and natural gas regulation in Germany, Denmark, Austria, Italy, and Netherlands

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Publication date:
2021

Document Version
Publisher's PDF, also known as Version of record

Renewable gas and natural gas regulation in Germany, Denmark, Austria, Italy, and Netherlands

Report/Working paper prepared in WP7 of the SuperP2G project

February 2021

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This project has received funding in the framework of the joint programming initiative ERA-Net Smart Energy Systems. The initiative has received funding from the European Union's Horizon 2020 research and

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Introduction

This document aims to analyse the status of green gas regulation in the partner countries of the Super P2G project and compare to the natural gas regulation. The information in this report is derived from a questionnaire that the project partners have answered, and is attached as appendix A. The coverage for hydrogen regulation is limited mainly because it is almost not in effect yet. This is due to hydrogen still being an emerging topic for regulating authorities, and the EU-level regulations and categorization of different hydrogen generation pathways is not there yet. The regulation on electricity and power markets is affecting input costs for hydrogen and renewable gas production and therefore this is included in the document.

We divide this document into two parts. In the first part we offer a brief description over the natural gas markets and regulation of the respective partner countries, and the support mechanisms they have been using in order to incentivize renewable gas production in their countries. This is important since the regulation of natural gas use including taxation issues widely impact the competitiveness of green gases and hydrogen. Additionally, we look into the current hydrogen market and the regulatory framework hydrogen is affected by in the partner countries. This might differ strongly amongst member states, depending on the industry intensity and the de-carbonization path the national policy makers have decided for. In the second part, we examine the power to gas (P2G) value chain, starting from power consumption by the electrolyser, and ending at the injection of the end-product of the power to gas process (biomethane or hydrogen) into the national gas grid. Here the importance relates to the regulation affecting the input costs of green gas and hydrogen production.

This document aims to describe important regulatory issues and enable the evaluation of the current development of hydrogen and P2G regulation within a limited number of European Member states, and the possible development of a more harmonized framework that could enable the inclusion of hydrogen in the EU-level trade for energy carriers and support an efficient allocation of both hydrogen production and consumption.

Gas market regulation in 5 EU countries

The third EU Energy Package that came into action in September 2009 and will be replaced by the clean energy for all package by 2021. It has driven the EU energy regulation into the area of renewable gases and their use in industry and transport. It led to the implementation of a number of directives with the objectives of:

- **Abolition of natural monopolies** through unbundling, enabling third party access to infrastructures, abolition of destination clauses, and opening downstream markets
- **Independence of energy regulators**

Additionally, the package implemented a number of rules to promote Energy trading hubs as market places for the physical and virtual trade of energy commodities. The rules are supposed to increase the liquidity and efficiency of gas market hubs.

Another measure following the third EU energy package is the establishment of the Agency for the Cooperation of Energy Regulators (ACER). ACER has the task to monitor and ensure a well-functioning internal energy market within the European Union. It drafts guidelines for the operation of cross-border transfer of gas and electricity through pipelines and electricity networks, and reviews the implementation

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of EU-network development plans. ACER is also the intervening authority in case of any disagreements emerging amongst national regulators regarding cross-border transfer.

It is the responsibility of national transmission system operators (TSOs) that electricity and natural gas are transported across the EU MSs borders. For this purpose, national TSOs of EU Member States form the European Network for Transmission System Operators for Electricity (ENTSO-E) and the European Network for Transmission System Operators for Gas (ENTSOG) to develop standards and draft network codes to adjust the transfer of gas and electricity across different transmission systems. They also publish the EU-wide 10-year investment plans for electricity and gas to help identify investment gaps.

The market zones, that consist of the several gas TSO's, have contractual agreements with gas suppliers, which define the capacities in each exit or entry point. This creates a virtual trading point [1]. The changes and adaptions that are needed for the gas grid to be adjusted to the gas system's needs and the development of the national and European gas market are described in the EU MSs Network Development Plans [2].

Regulation of natural gas network tariffs

The third energy package of the EU is implemented in the national law of EU member states. The Entry-Exit model is the tariff setting system introduced in this package. The entry-exit model is a locational model for infrastructure pricing and is mandatory for all EU member states. The model establishes prices at the entry and exit points of the countries' national gas grid ideally such, that they inform new grid users about the additional costs caused to the transmission grid at a specific location within the network. Prices should also "adequately" differentiate between the different types of products.

However, the entry-exit model leaves the details of tariff such as cost allocation, capacity/commodity split, entry-exit split, etc. to the MSs national regulators. Thus, a lack of consistency and transparency in pricing regimes may arise which could lead to inefficiencies in several areas [3]. In order to address this issue, the European Commission has introduced a network tariff code where a number of details of tariff pricing are harmonised to some extent[4].

The exact tariff pricing schemes vary amongst the partner countries. Figure 1 shows the transmission grid tariff level for gas consumers in the partner countries. For Austria, the entry and exit point of Murfeld have been taken into account. The Italian and German transmission grid tariffs are missing from the figure. This is because their tariff system differs from the other countries of this study. Germany lets TSOs to determine gas grid tariffs through an incentive regulation ("Anreizregulierung"), where the national regulator ("Bundesnetzagentur") publishes a revenue ceiling to the gas TSOs. This gives them an efficiency incentive. Thus, there is no fixed entry or exit tariff known to the authors, and a direct comparison of the transmission grid tariffs of Germany with other countries is not possible. The Italian tariff pricing scheme is strongly related to the location, and a number of different factors that make a direct comparison with other countries difficult. However, the tariff variation is interesting in that it may impact the location of new green gas production more than in other countries with less variation. One observation is the difference in composition between entry and exit tariffs, where Denmark seems to have higher entry tariffs relative to especially Austria. Entry tariffs may thus provide an isolated incentive to locate renewable gas production in Austria rather than in Denmark.

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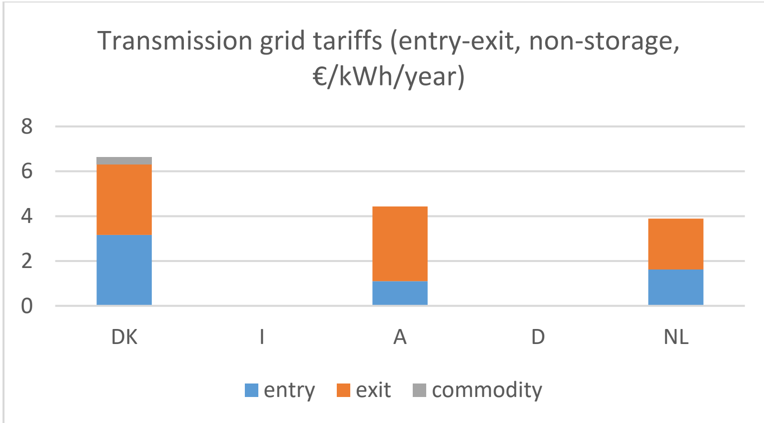

Figure 1: Entry-Exit tariffs (not fully comparable)

Regulation of hydrogen and size of the market

Hydrogen and renewable gases are a novelty within the EU policy framework. It is after the recast of the renewable energy directive from 2018, that biogas is mentioned separately from biofuels. Following this directive, Gaseous fuels are included in the Guarantee of Origin scheme, and under certain conditions such as mass balancing, renewable gases can even contribute to renewable energy target fulfillment of respective Member States. How this directive is implemented in national regulatory frameworks will be evident by June 2021, where the directive is supposed to be executed in the MSs.

It is unclear how hydrogen will fit under these regulatory frameworks. Hydrogen has different production paths that can be green, or based on fossil fuels. Thus, unlike biogas, hydrogen is not a renewable fuel by default. Additionally, current national regulation and classification for hydrogen vary strongly amongst member states. As an example, the allowed threshold of hydrogen injection into the natural gas grid is different for neighboring countries (see figure 3). This issue needs to be addressed when cross border trades of hydrogen are being evaluated and a trading regime is being developed in the future just as it is important regarding biomethane share in gas being traded. Hydrogen production by itself does not add to total renewable energy if produced by electrolysis using renewable electricity that have alternative use. It facilitates the use of renewable electricity in replacing energy demand components not otherwise easily transferable to electricity or other green fuels. First of all the renewable hydrogen may substitute conventional hydrogen used today as an industrial feedstock, which is the dominating hydrogen market.

There is a direct relationship between the industrial structure of a country and the size of its hydrogen market, since hydrogen is a raw material for many industries such as steel and aluminum, there is a high demand for hydrogen in the industrial sector in those areas where these industries are present. As evident from figure 2, amongst the partner countries Germany and Italy have a high share of industrial demand and production of hydrogen. Austria also has a hydrogen market, but much smaller. These markets are handled by private companies such as Linde and Airliquide, but new market developments are underway and large oil companies, utilities and potential large end-users are entering the market.

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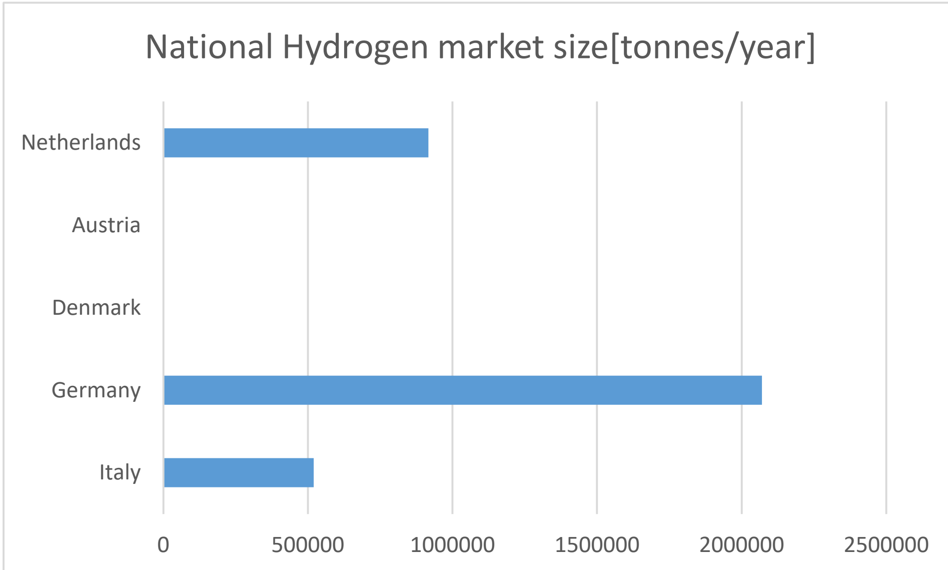

Figure 2 Total size of the hydrogen market (tonnes/year) in 2017

In countries with large steel, aluminum, cement, and other industries that use hydrogen as a raw material, there is already a hydrogen market and its infrastructure implemented, to the extent that it fulfills the needs of the respective consumers. In countries with less industrial hydrogen consumers (Denmark), hydrogen is perceived as an emerging fuel for substituting industrial natural gas consumption, the transport sector, especially in air, maritime and heavy weight transport.

For substituting natural gas consumption in general hydrogen could be injected in the natural gas grid to a smaller scale. This option is covered by national technical regulation limiting the allowed share of hydrogen (Figure 3).

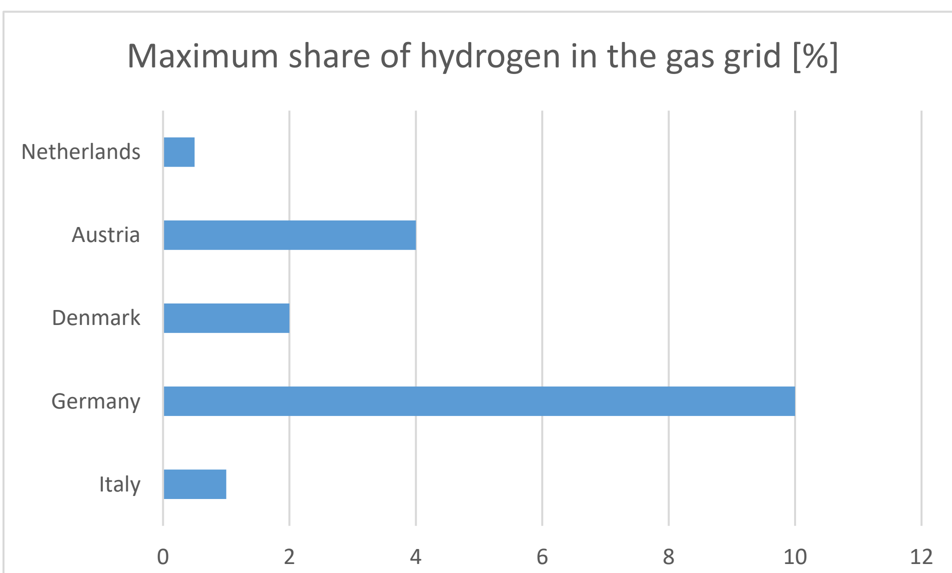

Figure 3: thresholds for hydrogen injection into the gas grid

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Germany introduced its national hydrogen strategy in June 2020. This strategy assigns hydrogen a central role in the energy transition. According to this strategy document, hydrogen will be a major contribution to Germany's decarbonization, especially in the steel and chemical industries and in the transport sector. Similar to the later published EU strategy, the long-term goal is to promote hydrogen from renewable energy sources.

The National Hydrogen Strategy contains an action plan with 38 measures in the fields of action. The Federal Ministry for Economic Affairs and Energy (BMWi) predicts a hydrogen demand of 90-110 TWh by 2030. In order to meet this demand, national expansion of electrolysers (5 GW by 2030 - 5 GW by 2040), but also a large share of hydrogen imports, are planned. The future package of the coalition committee of June 3, 2020 provides for € 7 billion for the hydrogen market ramp-up.

Currently, in Germany, only green hydrogen, that can be proven to be up to 80% from renewable resources through the German national biogas registry (DENA Biogasregister) or mass balancing, is mentioned in the energy law (EnWG) as a subcategory of "biogas". Thus, it is treated and regulated similarly to biomethane and biogas. If the 80% renewable origin is not given, hydrogen is not subject to the energy law and is not regulated. On the distribution level, industrial hubs in Germany have a hydrogen infrastructure to a limited extend, where in industrial areas hydrogen is transferred from producers to consumers through a pipeline infrastructure, currently operated by the private sector (Linde and Airliquide). There are currently three such hydrogen hubs in Germany.

CO2 taxes, energy taxation and specific natural gas taxes

Natural gas prices for end-users and thereby also demand are influenced by CO2 taxes, ETS prices and energy taxes in general. EU directives cover also some principles on how taxes should be imposed. Most EU countries use the taxes both as an incentive for substitution for green fuels and for general tax collection purpose. For industrial renewable gas and hydrogen demand, a major incentive may be if natural gas use and thereby also conventional hydrogen was subject to the same level of energy taxes as the one applied on residential natural gas demand in for example Denmark.

Energy taxes in the taxation directive and the contribution to national tax revenues

The EU Energy Taxation Directive determines the minimum level of energy taxes for fuels used for electricity production, transport and industrial purposes. Member States then decide to set up their energy taxes, considering the framework of the EU directive, and on which applications are eligible for which tax level.

Some Member States implement additional environmental taxes on top of energy taxes for fuels, on different fuels and applications. These taxes address externalities resulting from certain fuels and applications such as NOx emissions, CO2 emissions, and other emission factors. The CO2 taxation in the EU is determined on a national level for non EU-ETS sectors. The CO2 emission within ETS sectors is priced within the EU ETS trading scheme.

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Figure 4 shows, the level of environmental taxes (including energy taxes) differs amongst the Partner countries. How these taxes are implied is different from country to country. Often national tax and levy laws include exemptions for energy intensive sectors in order to maintain their competitiveness on a global scale. What falls under energy intensive sectors is determined differently from country to country. Electrolysis is defined as energy intensive in Denmark, and is thus paying the EU minimum tax rate for electricity consumption, whereas in other countries this is not the case and electrolysers are treated as any other industrial energy consumer.

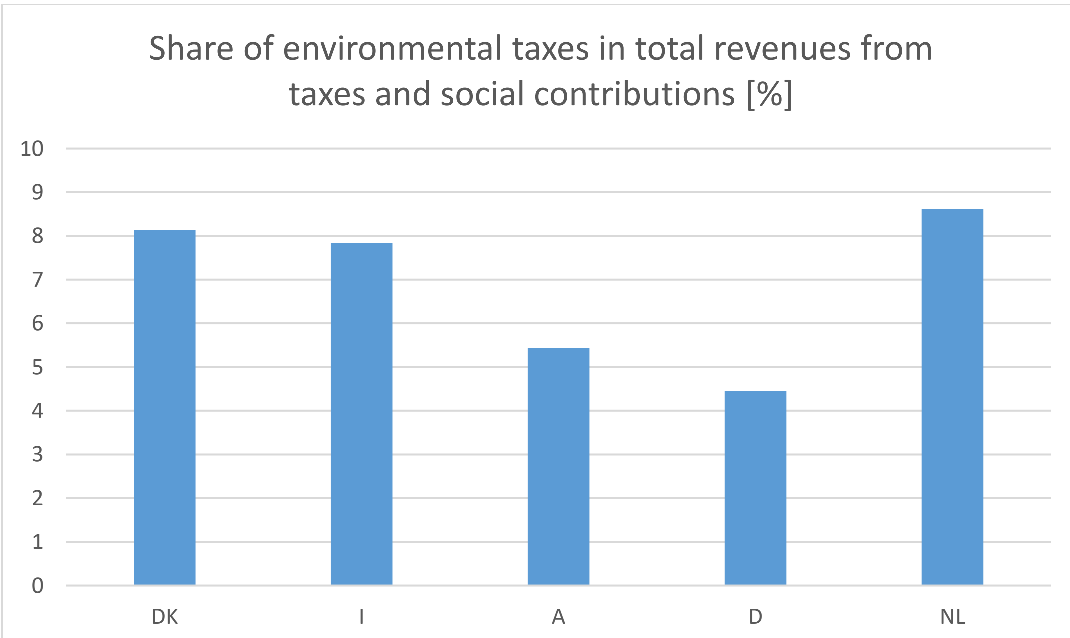

Figure 4: Share of environmental taxes from the total revenue of taxes and contributions [5]

Natural gas tax in the 5 countries

On the domestic level, Figure 5 shows that the end- consumers of natural gas pay very different prices across EU countries. However, these differences may be related to varying definitions of the customer category and type of tariffs reported in the questionnaire in Appendix A.

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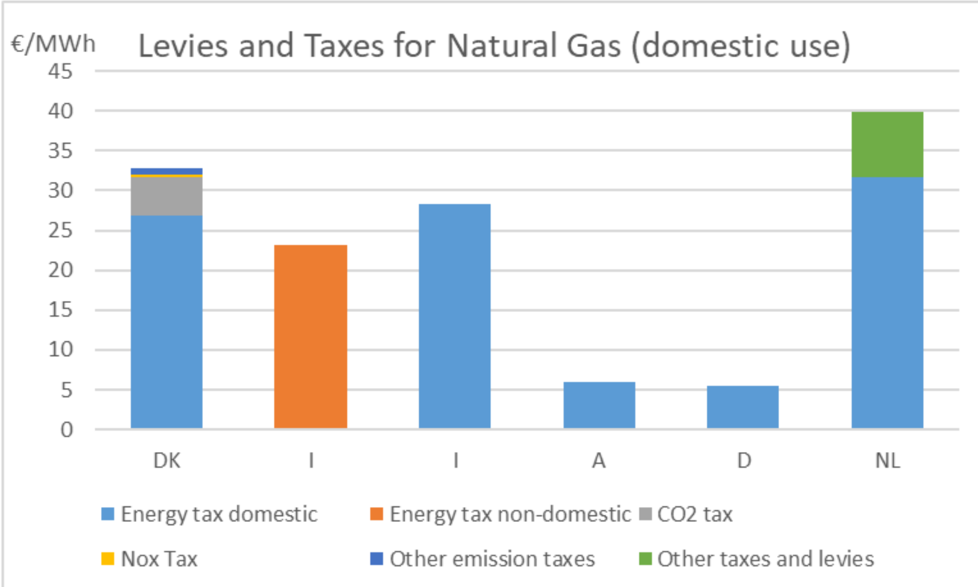

Figure 5: Levies and taxes for natural gas for domestic consumption (treat with care)

In most countries, the level of energy taxes varies substantially between consumer categories (households, industry, commercial). Therefore, the indirect effect from tax on natural gas may impact potential industrial and residential green gas demand quite different. For example, in DK the natural gas tax does not apply on gas for process purposes in industry at the moment. A new government proposed tax increase for the industrial processes may shift demand to a larger extent to green gases, as this is probably the most elastic part of gas demand. The indirect effect of taxing industrial natural gas use similar to households rate combined with the cost of ETS quotas may have just as big an influence on green gas demand as direct subsidies. Out of the partner countries, only Denmark has already implemented a CO2 taxation scheme applicable for the non-ETS sector. From 2021 on, Germany will impose CO2 taxes as well. The German CO2 taxation scheme is a national expansion of the EU-ETS scheme. Within this scheme, there is a fixed price for CO2 emission certificates. These certificates are sold to heating and transport fuel selling companies. When companies sell heating oil, liquid gas, natural gas, coal, petrol or diesel, they need a certificate as a pollution right for every ton of CO2 that the substances will cause in consumption.

Support schemes: Design and implementation for renewable gas?

Support mechanisms are playing a central role in many national energy transition plans. The global success of increasing the production of renewable electricity by introducing national support schemes emphasizes the importance of support mechanisms in shaping the global energy landscape. With more competitive electricity generation costs from renewables the level of support has been declining in most countries. For renewable gas (biogas) used for electricity generation, a similar feed in tariff has been used in some countries but now this is considerably higher than the support to other RES. Support for biogas and other renewable gases used elsewhere than in electricity generation is limited and practically non-existent for hydrogen.

There are many classifications of support mechanisms. In this report, we first divide support schemes in two approaches to support renewable gases: commodity-based or destination-based. You could

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alternatively classify the distinction as production based support or consumption based support. When the consumption of a certain fuel (for example biomethane) is incentivized by measures such as tax exemptions, or feed in tariffs paid to the producer the support is commodity based. When the support payment happens at the point of conversion for certain applications or end-uses, the support is destination-based. The current national support schemes in the EU are a combination of these two approaches. However, we can see that for renewable gases including biomethane, there is a policy objective of diversifying based on final use leading to more destination based support schemes. The German auctions are an evidence of this. In Germany, biomethane competes with biogas and other renewable gases for the renewable energy auctions.[1] With the emergence of technology neutral auctions in the EU, this effect may be strengthened. The problem will arise if there is technology neutral auctions across several produced energy products that are not fully comparable (for example electricity, district heat, biogas and biomethane). While from an economic theory point of view this is beneficial, if the final product is identical. Biomethane can have positive externalities besides their energetic value, and if not handled outside the support for the green energy property this positive externality is not remunerated. Additionally, renewable gases based on various sources can have different levels of sustainability, which will be ignored in such a support regime.

One inconsistency we can observe regarding renewable gas support and regulation in the EU Member States, is the different interpretation what renewable gas and biogas entails. For example, in Germany hydrogen originating from renewable sources by min 80% is considered as “biogas”, whereas in Denmark even the share of biomethane produced from hydrogen is not eligible for support. The EU RED II coming into force in June 2021 will clarify some of these uncertainties. Table 1 shows different support instruments used in the partner countries to incentivize biogas production and consumption in different sectors (status 2017).

Table 1: Support instruments for biogas in Partner countries

		DK	A	I	NL	D
FIT		Electricity*	Electricity	Electricity(a)	-	-
FIP		Electricity Transport Injection into the gas grid		Injection	-	Electricity (special cases)
Certificate	Price instrument	Injection into the gas grid			Injection into the gas grid	-
	Quantity instrument **	Transport		Electricity (b) Transport	Transport	Transport

[1] In the German energy law (EnWG) biogas is defined as Biomethane, gas from biomass, landfill gas, sewage gas and mine gas as well as hydrogen that has been generated by water electrolysis and synthetically generated methane, if the electricity used for electrolysis and the carbon dioxide or carbon monoxide used for methanation can be proven to be predominantly from renewable energy sources as defined by Directive 2009/28 / EC (OJ L 140 of 5.6.2009, p. 16)

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Tax reduction	Direct consumption***	Injection into the gas grid	Electricity Heating Biogas****		Transport
Auction on FIT/FIP	-		Electricity (c)	Electricity, Injection into the gas grid	Electricity
Other	-	facilities that convert electricity into hydrogen or synthetic natural gas, do not have to pay any of the system utilisation charges and charges for system losses prescribed for the purchase of electrical energy until the end of 2020, Exemption from CHP-flat rate payment and system utilisation and contribution payments in some cases*****[2]	Green public procurement criteria for transport		Partial grid connection cost, grid tariff discount

*when a CHP is not able to control production- 100% biogas based
**For example quota
***Without injection
****income tax refund
*****See Appendix A and § 111 (3) ElWOG 2010

Certification and renewable gas registries

In order to identify and characterize biomethane throughout its value chain EU Member States implement biomethane registries. These registries document the sustainable characteristics, origin, and in some cases the origin of the feedstock of the biomethane consignment. Biomethane registries offer the space and possibility to implement the EU RED II GO scheme and the EU mass balance system in order to differentiate between differently certified and audited biomethane consignments. The German DENA biogas registry is an example of a biomethane registry with a scope that enables this, with the background,

[2] Cf. §2/2,3 Electricity levy act (so-called 'Elektrizitätsabgabegesetz'); https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=10005027.

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that such a registry is necessary for biomethane users to be eligible to receive the feed in premium [6], [7]. The "Nabisy" registry of the German Federal Office for Agriculture and Food (BLE) is the agency that provides additional proof and auditing for biomethane to comply with the EU RED I mass balance system [8]. The product matrix published by the German Energy Agency lists the criteria required for using the biogas in different categories.

The Austrian biomethane register managed by AGCS Gas Clearing and Settlement AG (AGCS) offers a framework for gas suppliers of any kind, to follow the legal requirements according to the § 130 Natural Gas Sector Act 2011 in connection with the gas labelling ordinance[3]. The gas labeling within this framework includes the identification of origin and on a voluntary basis of environmental impacts, the requirements for the design of certificates for the various primary energy sources.

The Dutch certification process assesses firms that produce, process or trade biomass, and ensures that these activities are in line with the standards for sustainable biomass lined out in the Netherlands Technical Agreements (NTA) 8080, which in turn is complying with the EU RED I mass balance system and are therefore voluntary ("better biomass certificate"). On top of that, there is another certification layer which is the certification by Vertogas, a subsidiary of Gasunie, the legal operating unit of the dutch certification system. A Vertogas certificates proves to market participants and authorities, that the gas originates from sustainable sources and has physical characteristics identical with natural gas. With a Vertogas certificates, companies are able to sell their biogas as renewable gas and receive the dutch support for renewable gases [9].

While in Netherlands the revenue from selling green certificates, (HBE) excludes them from other support payments, in Denmark this is not the case. With renewable gas certificates being implemented in the national regulations more thoroughly, the development of how double support is perceived and treated by national regulators will become more clear.

Power to Gas regulation

Limited information about the specific regulation of power to gas is available, and limited information was obtained from the questionnaire. Some issues are clearly relevant as influencing the cost side of renewable gas production.

Electricity tax and tariff regulation influence the cost of power to gas. Referring to Figure 6 the production of hydrogen is heavily influenced by electricity costs. This has a primary wholesale cost element, a network tariff and in some cases also electricity tax. High and constant network tariffs will work against sourcing the electricity mainly from the grid (1a) and towards installing the electrolyser directly where there is renewable generation. However, the local renewable investment option 1b may be negatively impacted by a high connection cost to the power grid. Therefore regulation regarding DSO's/TSO's tariff distribution between electricity network tariff per unit consumed (MWh) and connection charges per connection capacity (MW), as well as the cost reflective time varying network tariff, is important for an integrated renewable electricity-hydrogen-biomethane plant. Some cases where connection charges for connecting the renewable electricity and the electrolyser has been high only reflecting the max output of the

[3] Gas labelling ordinance (so-called 'Gaskennzeichnungsverordnung – G-KenV'); https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20010762.

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renewable generation not taking into account that a large share of the renewable generation will be consumed by the electrolyser has been reported as a major barrier.

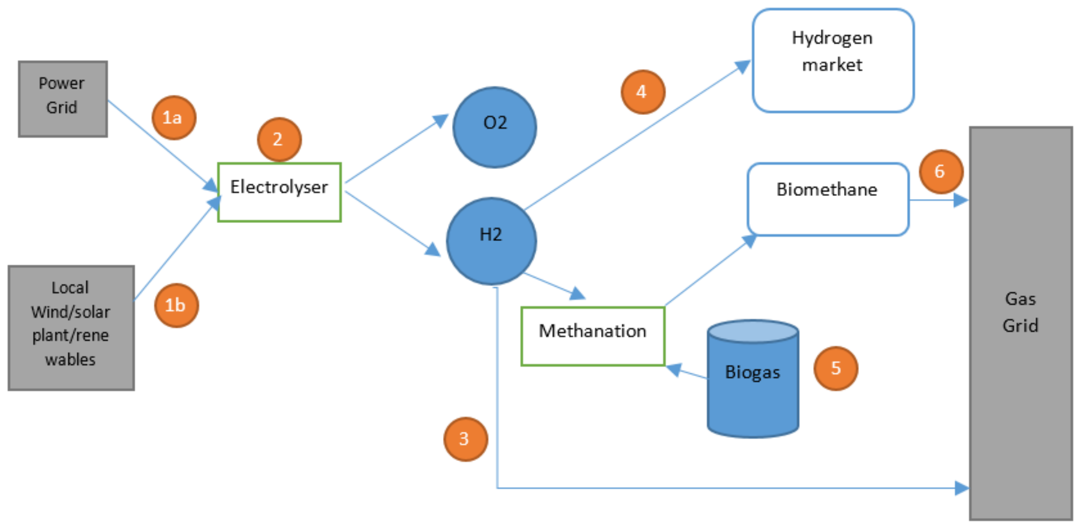

Figure 6 Exemplary illustration of power to gas production chains with processes influenced by regulation and tariffs

Table 2 Remarks for countries concerning the regulation in power to gas processes

	1a	1b	2	3	4	5	6
Germany	Power grid tariffs, EEG-Umlage, electricity tax	-	-	If min 80% of the hydrogen is proven to be of renewable origin, its defined as "biogas" and is regulated, otherwise not regulated and private operators		Subsidy payment (FIT), Certificate	Prioritised injection, Gas distribution grid tariffs, Gas transmission grid tariffs, Gas grid entry tariffs, Certification

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Denmark	Power grid tariffs, minimum EU electricity tax	-	Excess heat tax	Gas distribution grid tariffs, Gas transmission grid tariffs, Gas grid entry tariffs			Gas distribution grid tariffs, Gas transmission grid tariffs, Gas grid entry tariffs, Certification

Germany specific comment

1a: For industrial customers which have a major share of their core business being dependent on the power consumption, and with a power consumption more than a certain threshold, and businesses in the Annex 4 of the EEG, the "EEG-Umlage" is not applied.

Concluding remarks

This paper provides an overview of natural gas and renewable gas regulation in 5 countries which are partners in the SuperP2G project. Natural gas regulation is important since one option for renewable gas is to use the natural gas network and thereby it will be exposed to the same types of regulation including network tariffs and access charges. Furthermore, natural gas is one competing fuel and any taxes and fees imposed on natural gas but not renewable gas will improve the competitive position of renewable gases.

Renewable gases are today mostly biogas, partly going through methanation for feeding into natural gas grid and much less green hydrogen. The overview of hydrogen market and regulation highlights that there is mainly a few local hydrogen trade/markets in place and the regulation of this area is not very advanced or harmonised.

A few main points to raise for further investigation and for improvement with regard to regulation design are the following:

- Regulation of network tariffs for natural gas and renewable gas is very important for localisation of gas production and for achieving flexibility in operation of hydrogen and biomethane production
- Transport and distribution tariffs are complex and highly varying among the countries and difficult to compare also for entry and exist tariffs in gas grids. Connection charges are also extremely varying and not especially transparent - complicating optimal localisation choices and transborder trade.
- General tax levels for natural gas varies among covered countries and especially also between residential and industrial use, where especially exemptions or ultra-low industrial tax rates are a barrier for competitiveness of renewable gases including hydrogen for industrial use.
- No general and direct support for renewable gas and hydrogen production is in place. Some investment support and for demonstration projects exists.

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- Some support for biogas mainly for electricity production but also some upgraded biomethane (the biogas part) support exists and for transport use.
- Renewable (green hydrogen) is a small share of total hydrogen production in EU (less than 5%)
- For partner countries, hydrogen conventional use is of some size in Germany, Netherlands and Italy but very limited in Denmark. Hydrogen use for energy or transport purpose is very limited so far but with a bit of transport demand developing.
- Certificates can provide additional support for renewable gas, but the amount of this support is low. Guarantees of Origin for gaseous fuels is included in the Renewable Directive - but it is unclear how the different original resources for hydrogen or biomethane should be distinguished and quantified for the renewable share.
- Cost for hydrogen production is affected by electricity network tariffs especially fixed per kWh tariffs. Such tariffs work against exploiting electricity price variation and providing the flexibility that electrolyses can. Also, connection charges can be excessive for renewable electricity that will only partly be fed to the grid, but primarily used in the electrolyser.
- A general issue is the potential double counting by countries domestic renewable target contribution and the export of certificates to foreign buyers/companies that don't need to use the mass balancing approach. The mass balancing requirements on the other hand can be very restrictive requiring potential physical exchange/trade for the gas to be possible between neighbouring countries.

In SuperP2G therefore the role of diversified energy taxation on all kinds of gas products is further investigated and modelled with the substitution in demand caused by changed relative competitiveness of renewable gases in focus. Effects of gas grid tariff differentials and connection charges on regional localisation of renewable gas including hydrogen is also considered.

The specific role of green gas certificate schemes (Guarantees of Origin) will be addressed in a specific SuperP2G activity as the support/financing effect of these may play a larger role in the future as supposed to the present limited role. Focus is on identifying how trans-border trade with certificates may support an efficient development of renewable gas and hydrogen production in the EU focusing on the project partner countries.

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Appendix 1: Questionnaire data received

Taxes	DK	I	A	D	NL
Energy tax [€/MWh]	26.83	28.24 (42%) – Domestic users 2.1 (7.3%) – 23.1 (32.2%)	Natural gas levy (so-called 'Erdgasabgabe'): 0,066 €/m³ → 5,97 €/MWh[4]	Konzessionsabgaben': Gas for special contract customers: 0.3 cooking gas basic service (seize of municipality) 5.1 (< 25'000) 6.1 (< 100'000) 7.7 (< 500'000) 9.3 (> 500'000) heating gas basic service 2.2 (< 25'000) 2.7 (< 100'000) 3.3 (< 500'000) 4.0 (> 500'000)	0 until 170.000 m³: m³: € 0,33307 170.001 until 1 million m³: 0,06444 € Between 1 and 10 million m³: € 0,02348 Above 10 million m³ - private-industry € 0,01261
CO2 tax [€/MWh]	4.77 (retail)	Italy does not have a specific carbon tax. (please read the reported document in the link that we suggest in the comment section)	None	1.895 €/MWh (from Jan 2021) 2.464 €/MWh (from Jan 2022) 3.033 €/MWh (from Jan 2023) 3.601 €/MWh (from Jan 2024) 4.170 €/MWh (from Jan 2025)	
Other emission taxes [€/MWh]	Methane Tax for CHPs: 0.81 €/MWh (6.70 øre/Nm3) NOx Tax for non-engine applications: 0.097 (0.8 øre/Nm3) For engine applications: 0.35 (2.9 øre/Nm3)	Not present – To be verified	No direct emission taxes		
Value Added Taxes (retail) [%]	25%	10 or 22%	20%	VAT': 19%. On top of the gas prize although it already includes the energy tax	

[4] Cf. §5/2 Natural gas levy act (so-called 'Erdgasabgabegesetz'); https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=10005028.

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				'Konzessionsabgaben' (look above).	
Are there any exemptions for paying any of these taxes for natural gas?		Part of the natural gas, consumed by CHP plants (if they work in a cogeneration mode), is tax exempted			
Transmission and distribution fees	DK	I	A	D	NL
Transmission [€/MWh]	Entry capacity: 3159 (annual?) Exit capacity: 3159 (annual?) Commodity charge: 0.323	It depends on several variables	System Utilisation Charge: EUR/kWh/h per year and per entry/exit point[5] System Admission Charge: one-off payment, shall be cost-reflective.[6] System provision charge: fixed rate; for firm arrangements: 3,00 EUR/kWh/h; for interruptible arrangements: 0,- - EUR/kWh/h.[7]	Individual for each provider	In €/kWh/h/y- Non-storage entry: 1,620 Non-storage exit: 2,268 Storage entry: 0,648 Storage exit: 0,907
Distribution [€/m3]	0.016-0.063	0.00285-0.187	System utilisation charge: Cent/kWh per metering point for energy rate; Cent/kWh/h/a and per metering point for demand charge or as flat rate → Cent/month per metering point.[8] System admission charge: one- off payment; charge shall be cost-reflective.[9] System provision charge: EUR/kWh/h[10] Metering charge: metering charges set	Individual for each provider	

[5] Cf. § 3 Gas system charges ordinance 2013 (so-called 'Gas-Systemnutzungsentgelte-Verordnung 2013 - GSNE-VO 2013'); https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20007992.
[6] Cf. § 5 Gas system charges ordinance 2013.
[7] Cf. § 6 Gas system charges ordinance 2013.
[8] Cf. § 10 Gas system charges ordinance 2013.
[9] Cf. § 75 Federal Act Providing New Rules for the Natural Gas Sector - Natural Gas Sector Act 2011 (so-called 'Gaswirtschaftsgesetz 2011 – GWG 2011'); https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20007523.
[10] Cf. § 9 Gas system charges ordinance 2013.

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			shall be ceilings for each meter type.[11] Supplementary-service charges: System operators may bill system users for services provided in addition to those covered by the charges listed above if such services are directly caused by the system users themselves.[12]		
Balance charges [€/MWh]	0.021		The compensation payments between TSOs shall be determined as net payments which are annual amounts and shall be paid monthly in 12 equal instalments. Gas Connect Austria GmbH (Transmission and distribution system operator) is obliged to pay TAG GmbH (Trans Austria Gasleitung GmbH → Transmission System Operator) EUR 9,751,000 in compensation.[13]		

Renewable Gas regulation in 5 countries ()

	DK	I	A	D	NL
Thresholds for renewable gas injection into the gas grid	None for biomethan e	None for biomethane (to respect quality limits)	Biogas → Methane CH_4 ≥ 96% Total silicon (siloxanes, silanes) ≤ 5 mg/m^3 [14]	None for biomethane , but quality regulations	x
Threshold for share of hydrogen in the gas system	2%	1%	≤ 4%[15]	Up to 10 % individual approval needed	0.5% (https://www.rvo.nl/onderwerpen/duurzaam-ondernemen/energie-en-milieu-innovaties/gassamenstelling/waterstof-aardgas/de-eisen-voor-waterstof-aardgas)

[11] Cf. § 15 Gas system charges ordinance 2013.
[12] Cf. § 18 Gas system charges ordinance 2013.
[13] Cf. § 7 Gas system charges ordinance 2013.
[14] Cf. ÖVGW Richtlinie G B220, Regeneratives Gases – Biogas (2011) 7.
[15] Cf. ÖVGW Richtlinie G 31, Natural Gas in Austria – Gas composition (2001) 4.

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The cost of connecting biomethane plants		It is defined by the system operator to which we want to connect based on the specific case.	The costs are dependent on the distance to the feed-in point, the pressure level (grid level 2 or network level 3) and the feed-in quantity (plant size) the required quality control and measurement e.g. CAPEX for feed-in station 140.000 € (gas pipe 1000 m and feed-in station, no compressor) OPEX 9.500 €/a	grid operator bears costs	In the Netherlands, the connection costs for bio-methane plants are completely equal to that of another (natural) gas supplier. With the current regulation, the network operator only offers a connection point to the supplier of the gas. The costs for the pipeline connection from the production facility to this connection point in the grid are paid by the producer.
Prioritized injection?	yes	During the technical evaluation, the gas DSO, verify the compatibility of the expected profile for the introduction of biomethane into the network with the technical characteristics of the existing natural gas distribution network and with the absorption capacities in safe conditions	No.	Yes	No prioritized injection

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		(identification of the allowable flows in the existing distribution network). Therefore, the existing network is able to accept the injection, and we should not use the term “prioritized injection” like for electricity			
Responsibility of connecting biomethane production plants to the grid			Distribution system operators are obliged to connect producers of biogas that meet the quality requirements laid down in the General Network Conditions to their natural gas network for the purpose of supplying customers.[16]	Yes	Under the new law ‘Voortgang Energietransitie’ (01-01-2020), the network operator has to offer a connection (instead of only a connection point). This means that in future, both the cost for the connection point and the pipeline connecting the producer are paid for by the network operator. The costs are billed by transport fees to the shipping parties.

Support for renewable gas in 5 countries ()

	DK	I	A	D	NL
Which inputs qualify for support	Biomethane injected into the grid (only the methane share in biogas), biogas on-		Biogas, hydrogen based on renewable energy and synthetic gas produced from renewable hydrogen is tax-exempt with respect to the payment of the natural gas levy (the so-called ‘Erdgasabgabe’).[17]		

[16] Cf. § 58/1/10 Natural Gas Sector Act 2011.
[17] Cf. § 3/2/3 Natural gas levy act.

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	site use in CHPs				
What support instrument (Feed in Tariff/Feed in Premium/Auction/Certificates/Tax Exemption/Investment support/etc.) is used to incentivize renewable gas for: (If possible, also with a support rate)		Incentive	When calculating gross final consumption of energy from renewable sources, account shall also be taken of electricity used for the production of renewable liquid or gaseous fuels of non-biological origin used in the transport sector. When calculating the contribution of electricity produced from renewable energy sources and consumed in all types of electrically powered vehicles and in the production of liquid or gaseous renewable fuels of non-biogenic origin used in the transport sector the average share of electricity from renewable energy sources in Austria measured two years before the year in question shall be used. In addition, when calculating the quantity of electricity produced from renewable energy sources and consumed in electrified rail transport, this consumption shall be taken as 2,5 times the energy content of the electricity supplied from renewable energy sources. When calculating the amount of electricity produced from renewable energy sources and consumed in electric road vehicles, this consumption shall be taken as five times the energy content of the electricity supplied from renewable energy sources.[18] Exemption of pure electric vehicles from the standard consumption tax (so-called 'Normverbrauchsabgabe').[19] Subsidies:		

[18] Cf. §5/6/1,3 Ordinance on the calculation of the share of energy from renewable sources (so-called 'Verordnung betreffend die Berechnung des Anteils von Energie aus erneuerbaren Quellen'); https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20008950.

[19] Cf. Standard consumption tax act (so called 'Normverbrauchsabgabegesetz - NoVAG 1991'); https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=10004698.

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			● For private individuals: E-cars with purely electric drive (BEV) and fuel cell (FCEV): 5,000 € per vehicle. ● 'Electric cars and light electric utility vehicles' (class M1, N1) for companies, local authorities, associations: BEV and FCEV, N1≤2,0 Tons of maximum permissible total weight: 5,000.- € per vehicle; Light electric utility vehicle N1>2.0 and ≤2,5 Tons of maximum permissible total weight --> 7,500.- € per vehicle; light electric utility vehicle N1>2.5 Tons of maximum permissible total weight: 12,500.- € per vehicle; And further subsidies for electric buses, electric light vehicles and electric utility vehicles.[20] Vehicles that are exclusively electrically powered are exempt from engine-related insurance tax (so-called 'motorbezogene Versicherungssteuer').[21] [22] Pure electric cars are input tax deductible (vorsteuerabzugsfähig) if they are purchased as company cars.[23]		
Injection into the gas grid	FIT	Certificates	No.		
Transport sector	Blending Obligation with certificates		Feed-in tariff for green electricity from biogas: for applications submitted in 2018: 19,14 Cent/kWh for applications submitted in 2019: 18,97 Cent/kWh.[24]		
Heating sector	None-maybe		No direct support yet.		

[20] Cf. https://www.umweltfoerderung.at/fileadmin/user_upload/media/umweltfoerderung/Uebergeordnete_Dokumente/Factsheet_E-Mobilitaetsoffensive_2019_2020.pdf.
[21] Cf. § 4/3/6 Insurance tax act.
[22] Cf.https://www.usp.gv.at/Portal.Node/usp/public/content/steuern_und_finanzen/weitere_steuern_und_abgaben/motorbezogene_versicherungssteuer/67840.html.
[23] Cf. § 12/2/2a Value Added Tax Act (so called ‚Umsatzsteuergesetz 1994 – UStG 1994); https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=10004873.
[24] Cf. § 11/1 Green Electricity feed-in tariff ordinance (so called ‚Ökostrom-Einspeisetarifverordnung 2018 – ÖSET-VO 2018'); https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20010106.

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	changed due to EU RED II				
Electricity production	FIT		According to § 111 (3) ElWOG 2010, facilities that convert electricity into hydrogen or synthetic natural gas, which are commissioned for the first time after 7 August 2013 until the end of 2020, do not have to pay any of the system utilisation charges and charges for system losses prescribed for the purchase of electrical energy until the end of 2020. In addition, the exemption under Section 111/3 ElWOG 2010 could result in an exemption from the obligation to pay further charges. Specifically, these are the renewables contribution, flat-rate renewables charge, and the CHP flat-rate. Under § 48 par. 1 ÖSG 2012, the renewables contribution is to be paid in proportion to the respective system utilisation charge and charge for system losses, whereas the flat-rate renewables charge (under § 45 par. 1 ÖSG 2012) and the CHP flat-rate (under § 10 par. 2 KWKG) are to be levied together with the respective system utilisation charge. However, since plants that convert electricity into hydrogen do not have to pay system utilisation charges and charges for system losses for the purchase of electrical energy, and since renewables contribution/ flat-rate renewables charge/CHP flat-rate is to be levied in proportion to or together with the system utilisation charge (and charge for system losses in the case of the renewables contribution), it can be assumed that the	Auction for the payment of a feed in tariff (EEG)	

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			renewables contribution/flat-rate renewables charge/CHP flat-rate is not to be paid either. However, there is no clear explicit regulation in this respect. Furthermore, it can be assumed that the electricity input necessary for the production and feed-in of hydrogen or synthetic natural gas is exempt from the electricity levy (so-called 'Elektrizitätsabgabe'), however, there is no clear provision in this respect.[25]		
Industrial use	FIT				HBE
Renewable Gas Production					Auctions for the payment of a Feed in Premium (SDE+)

[25] Cf. §2/2,3 Electricity levy act (so-called 'Elektrizitätsabgabegesetz'); https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=10005027.

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