

## Hydrogen regulation/standards survey Summary of answers

22<sup>nd</sup> October 2020

This document replaces the UTIL-GQ-15-18 (19/10/2015)

Questions		Spain	Germany	France	The Netherlands	Italy	Belgium	Denmark	Slovakia	Sweden	Portugal
<b>Q1. - Is it allowed to inject pure hydrogen into:</b>											
- Distribution natural gas network?	Yes / No	NO	YES	NO	NO	NO	NO	YES [7]	NO	NO	NO
- Transmission natural gas network?	Yes / No	NO	YES	NO	NO [1]	NO	NO	YES [7]	NO	NO	NO
If the answer to Q1. is <b>YES</b> :											
Name of regulation / standard / rule / specification (including publication date) for:											
- Distribution			DVGW G262 (technical rule on gas quality G260 refers to "renewable gas technical rule" G262)					[5], §27-29			
- Transmission								[8], Does not specify H <sub>2</sub> limits specifically, but refers to Gasloven for additional restrictions (see [5])			
Final hydrogen concentration the natural gas network after injection:											
- Distribution	%mol / %vol / other										
- Transmission	%mol / %vol / other										
If the answer to Q1. is <b>NO</b> :											
Is it forecast to review the current regulation to consider hydrogen injection into natural gas network?	Yes / No / Not known	NOT KNOWN		NO	YES, via a so called "Order in council" (Algemene Maatregel van Bestuur) the injection of pure hydrogen in the TSO network for blending purposes	NOT KNOWN.	YES, the gas law is currently being reviewed (expected end 2020)		NOT KNOWN.	NO	YES. Umbrella law was already published. Several subsidiary regulation documents have now to be adjusted. The government drive to H <sub>2</sub> and renewables injection is large, so the adjustment process should start soon.
Comments/remarks to the injection of pure hydrogen into natural gas network:											

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		There exists the possibility of an interpretation of current regulation that could allow to inject pure hydrogen if the resulting blend in the pipeline does not exceed the % for an injected mixture (see below).	DVGW G 262 to be included into DVGW G 260 in 2021		[1] In legislation (gas law) the definition of gas contains a requirement that the main constituent is methane and therefore the injection of pure hydrogen is excluded		Injection of pure H <sub>2</sub> is only possible at the conditions that: - Quality of the mixing (maximum % H <sub>2</sub> ) is controlled after H <sub>2</sub> injection - The flow in the pipeline can be interrupted (at least temporarily) should the mixing results in an off spec situation (SOS guaranteed)	[6] The regulation [5] stipulates that "the % Volume of H <sub>2</sub> in the distribution grid shall be approved by the safety authorities". There is no value mentioned in the regulation.		In Sweden, there is no current legislation or regulation for handling hydrogen.	See note [9] below
<b>Q2. - Is it allowed to inject hydrogen/natural gas mixtures into:</b>											
- Distribution natural gas network?	Yes / No	YES	YES	YES	YES	YES	YES	YES [7]	NO	NO	Not defined [10]
- Transmission natural gas network?	Yes / No	YES	YES	YES	YES	YES	YES	YES [7]	NO	NO	Not defined
If the answer to Q2. is <b>YES</b> :											
Name of regulation / standard / rule / specification (including date) for:											
- Distribution		Norma de Gestión Técnica del Sistema. Protocolo de Detalle 1, NGTS PD-01 (Technical Management of the Gas System Regulations. Detail Protocol 1). 8 <sup>th</sup> October 2018	DVGW G262 (technical rule on gas quality G260 refers to "renewable gas technical rule" G262)	French gas operators technical prescriptions	Regeling van de Minister van Economische Zaken van 11 juli 2014, nr. WJZ/13196684, tot vaststelling van regels voor de gaskwaliteit (Regeling gaskwaliteit)		EN 16723-2 Natural gas and biomethane for use in transport and biomethane for injection in the natural gas network. Part 2: Automotive fuels specification	[5], §27-29			
- Transmission								[8], Does not specify H <sub>2</sub> limits specifically, but refers to Gasloven for additional restrictions (see [5])			
Maximum hydrogen concentration in the mixture for injection into the natural gas network:											
- Distribution	%mol / %vol / other	5 %mol	See below	6 %mol	0.5 %mol	0.5 %mol	2 %mol	The regulation referred below stipulates that "the % Volume of H <sub>2</sub> in the distribution grid shall be approved by the safety authorities". There is no value mentioned in the regulation.			
- Transmission	%mol / %vol / other				0.02 %mol [2]		2 %mol				
Final hydrogen concentration in the natural gas network after injection:											
- Distribution	%mol / %vol / other	5 %mol		6 %mol	0.5 %mol		2 %mol				Not defined [11]

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- Transmission	%mol / %vol / other				0.02 %mol [3]		2 %mol				
Is it compulsory/required to monitor hydrogen concentration mixture prior to injection point?											
	Yes / No	YES	NO, but for billing purposes it is required that hydrogen is either measured or less than 0.2% (technical PTB G14)	YES, to verify that the H <sub>2</sub> concentration is below the authorized maximum value (6%) and to determine the GCV of the mixture.	Although not legally required, it will be part of the grid connection agreement between producer and TSO/DSO		YES, provided that the administrative documents such as the connection contract are adapted.				YES
If the answer to Q2. is <b>NO</b> :											
Is it forecast to review the current regulation to consider hydrogen/natural gas mixture injection?											
	Yes / No / Not known	-	YES. New draft DVGW-G 260 published in September 2020.	More works are expected in the coming years (French law 2019-1147 on Energy and the climate) on support mechanisms, guarantees of origin to the tracking of H <sub>2</sub> production, guaranteed access to gas infrastructures for low carbon H <sub>2</sub> producers, etc.	YES [4], there is an initiative to extend the maximum hydrogen content for both transmission as well as distribution grid to 2 mol-% hydrogen.			This is a possibility that is under consideration within the gas industry and several investigations are presently on-going	NOT KNOWN	NO	YES [11]
Comments/remarks to the hydrogen/natural gas mixture injection into natural gas network:											

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		<p>Hydrogen mixtures are considered as non-conventional gases in the regulation. It is foreseen an early updated of the regulation where H<sub>2</sub> concentration allowed will be linked to the one in the EN standards in force.</p>	<p>There is not a clear limit value as such. An examination on a case-by-case basis is required. If the grid and the entire infrastructure and applications downstream proof suitable, up to 20% hydrogen will be permitted</p>	<p>In France there are some working groups dedicated to H<sub>2</sub> injection: stakeholders work on the definition and the framing of H<sub>2</sub> injection from a technical and contractual point of view and share a common vision on H<sub>2</sub> roadmaps.</p>	<p>See notes below</p>	<p>For the time being, the only specification for the injection of a max quantity of 0.5 %mol of H<sub>2</sub>, is in a Technical report for the injection of biomethane in the grid (UNI TR 11537 of July 2014)</p>	<p>The acceptable percentage is constraint by the safe operation of the appliance connected to the grid.                      Injection of pure H<sub>2</sub> is only possible at the conditions that :</p> <ul style="list-style-type: none"> <li>- Quality of the mixing (maximum % H<sub>2</sub>) is controlled after H<sub>2</sub> injection</li> <li>- The flow in the pipeline can be interrupted (at least temporarily) should the mixing results in an off spec situation (SOS guaranteed)</li> </ul>	<p>[6]                      The regulation stipulates that "the % Volume of H<sub>2</sub> in the distribution grid shall be approved by the safety authorities". There is no value mentioned in the regulation</p>		<p>In Sweden, there is no current legislation or regulation for handling hydrogen.</p>	<p>See Notes below</p>

NOTES

Germany	<p>Up to now the maximum H<sub>2</sub> content is limited by DVGW-code of practice G 262 to below 10 %. However, the new draft DVGW G 260 (which incorporates G 262) will allow up to 20 % hydrogen in the gas, given that the respective grid and all its downstream infrastructure and application are checked and deemed suitable. However, the following limitations remain:</p> <ul style="list-style-type: none"> <li>• The hydrogen content needs to be considered in the Calorific Value measurement; otherwise, its addition is limited to 0,2 % (see PtB code G 14)</li> <li>• In the infrastructure, in particular gas turbines and underground storages are regarded as limiting factors</li> <li>• As CNG stations will dispense the fuel to any vehicle, including those with steel tanks coming under the 2 % limit of UN ECE R 110, CNG stations are a limiting factor.</li> </ul>
The Netherlands	<p><b>[1]</b>: In legislation (gas law) the definition of gas contains a requirement that the main constituent is methane and therefore the injection of pure hydrogen is excluded.  <b>[2]</b>: The TSO is allowed to accept gas with a hydrogen content of &lt; 50 mol-% if it is possible to bring to required exit specification (0,02 mol-%) by blending. Gas with a hydrogen content of ≤ 0,02 mol-% needs to be accepted by the TSO  <b>[3]</b>: In a closed transmission network conveying refinery gas a hydrogen content of 40 mol-% is allowed  <b>[4]</b>: Seems to be relevant information although strictly the answer should be No since injection of hydrogen is already allowed</p>
Denmark	<p><b>[5]</b>: BEK nr 230 - Bekendtgørelse om gaskvalitet (21st March 2018): <a href="https://www.retsinformation.dk/eli/ta/2018/230">https://www.retsinformation.dk/eli/ta/2018/230</a>  <b>[6]</b>: Requirements on H<sub>2</sub> for injection in the natural gas net: H<sub>2</sub> &gt; 98 %vol; C<sub>n</sub>H<sub>m</sub> &lt; 0,5 %vol (CH<sub>4</sub> equivalent); DP -50 °C at P<sub>atm</sub>; O<sub>2</sub> &lt; 0,1 %vol; CO<sub>2</sub> &lt; 0,2 %vol;  <b>[7]</b>: Subject to individual authority approval on case-by-case evaluation (max 2 %vol expected). CH<sub>4</sub> shall be minimum 80 %vol.  <b>[8]</b>: Rules for Gas Transport, Version 19.0, 1<sup>st</sup> Oct. 2019: <a href="https://en.energinet.dk/-/media/4FD6C9840E694FC9A9BD9251F75A9C01.pdf?la=en&amp;hash=CB49CB8B0D3A0183C583B59BE0D48CC74CE583DD">https://en.energinet.dk/-/media/4FD6C9840E694FC9A9BD9251F75A9C01.pdf?la=en&amp;hash=CB49CB8B0D3A0183C583B59BE0D48CC74CE583DD</a></p>
Portugal	<p><b>[9]</b>: New legislation came out last August (Decreto-Lei n.º 62/2020 of August the 28th) concerning the organization of the gas system (distribution, transport, storage, LNG terminal and renewable, or low carbon content gas producers). It introduces the concept of gas production and gas producer (not existing in previous legislation) and defines general conditions under which DSO/TSO has to accept/receive, inject and distribute/transport produced gas.  The document does not focus on technical aspects such as H<sub>2</sub> percentage, effects on the user's appliances, or billing issues. Percentage of H<sub>2</sub> in the distributed/transported gas is to be defined in subsequent regulations. Rising percentage targets are forecasted in the Portuguese Plan for Hydrogen published by the Government at about the same time.  <b>[10]</b>: Portuguese legislation and subsidiary regulations have no reference to H<sub>2</sub> content. It is up to the TSO to guarantee the quality of the gas, since up to now no gas injection was allowed in the DSO side. The new legislation will change this situation. As far as we know, discussion about technical regulations has not yet stated.  Historically no H<sub>2</sub> was ever reported by the TSO as part of Natural Gas composition. More than 80% of the consumption comes from LNG, which will not have any H<sub>2</sub> anyway.  <b>[11]</b>: The new legislation, Plan for Hydrogen and other documents or positions from the Portuguese Government points to establishing objectives of H<sub>2</sub> percentage in the distributed gas. Objectives will increase along time. No technical details or concerns are discussed in these documents, or positions, but DSOs are aware of the issues the injection of H<sub>2</sub> will bring along. DSO are ready to participate in the preparation of the regulations that will support operations and practices in the future.</p>