Reaction to Public consultation in NL on quality criteria for H2 in a transport network

Question 1. Do you see objections in starting with a national hydrogen specification in order to make the hydrogen network in the Netherlands possible in the short term in the light of future European specifications. And if so, which ones?

No objection as such but a recommendation would be using as reference the specifications proposed already at European level i.e. CBP by Easee-Gas or the on-going EU Mandate for Hydrogen quality spec under preparation by DG ENER. These specifications have been developed in collaboration with gas suppliers, TSOs and industry consumers.

Question 2. How important is making agreements about quality at European level for your organization and is your organization involved in an international forum for the alignment of quality criteria for hydrogen?

It's important to harmonize the quality specification for hydrogen as in many cases hydrogen will be transported through the hydrogen backbone interconnecting different countries i.e. Belgium and south of The Netherlands.

Making agreements at European level means putting the right focus on renewable hydrogen for decarbonization. Research and industrial innovation in hydrogen applications is an EU priority and receives substantial EU funding to support the transition towards a climate neutral economy.

My organization is involved in the following forums / working groups: Easee-gas H2 quality CBP development and CEN-Cenelec H2qlnd CAG.

Question 3. Are the recommended specifications as included in the table on page 5 of the KIWA DNV report acceptable for your organization? And if not, on which parts of the specification do you propose changes and for what reasons?

The hydrogen specification on page 5 of the KIWA DNV report is NOT acceptable to my organization. We require "Oxygen free dry high grade hydrogen":

Parameter	max value	unit
Hydrogen	> 99,999	%
Oxygen (atomic)	< 10	ppm
Carbon monoxide	< 10.000	ppmV
Carbon dioxide	< 100	ppmV
Water	< 10	ppm
Hydrocarbons (i.e. methane)	1,5	mol-%
Phosphorous	0	
Halogens	0	
Arsenic	0	
Sulfur	0	

The risk that small amounts of a particular contaminant result in poisoning the reactors catalysts of the process.

Another comment in comparison to KIWA' spec is that nitrogen concentration is not an issue although it shall remain within the ppm range (as the required hydrogen concentration is > 99,999%).

Question 4. How do you view the advice of KIWA and DNV to use a minimum hydrogen purity of 98 mol% and to review three years after commissioning of the hydrogen transport network? Is it workable to revise the criteria a few years after the infrastructure is put into operation on the basis of then available European criteria and experience gained? And if not, what concrete barriers do you foresee?

Not acceptable. We need high purity hydrogen, please see high grade hydrogen spec in question 3.

Question 5: During the development of the advice of KIWA and DNV, we also looked at the developments within Europe. The quality criteria at European level and more specifically Germany should therefore be broadly comparable to that advice. If you do not think this is the case, could you indicate on which points there is a deviation?

The quality requirements mentioned in the hydrogen spec in chapter 3.3.2 (page 29) of the German study “H2 short study: Hydrogen quality in overall German hydrogen network” for Ammonia process are similar to ours.

No specific mention to hydrogen concentration which, for our process, shall be > 99,999%.
Water vapor values of 30 ppm are too high for our process. Please refer to high grade hydrogen spec in question 3 with < 10 ppm water vapor limit.