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Ad Hoc Team of Specialists on Standardization and Regulatory Techniques

Report of the 5 April 2024 conference on harmonizing regulatory requirements on pipeline security for hydrogen

Submitted by the subgroup Chair*

Summary

This hybrid conference was organized during the third forum of the Working Party on Regulatory Cooperation and Standardization Policies (WP.6) in support of the project aiming to develop a common regulatory arrangement (CRA) for trunk pipeline safety in relation to hydrogen. This project and the conference were organized in close collaboration with the Hydrogen Task Force (HTF) of the Sustainable Energy Division (SED).

Mandate

The WP.6 Programme of work for 2024 foresees the development of “a common regulatory arrangement for trunk pipeline safety in relation to hydrogen...” (ECE/CTCS/WP.6/2023/14, paragraph 10b)

* This document is submitted under the responsibility of the subgroup Chair. This document has not been edited by a professional editor.

1. The Working Party on Regulatory Cooperation and Standardization Policies (WP.6) launched a project in January 2024 to create a common regulatory arrangement (CRA) to promote the harmonization of standards and conformity assessment systems for pipeline safety in relation to hydrogen. This conference was organized to identify the key challenges in this field as well as the as-is status on the subject. It will be followed by a questionnaire aiming to inform the CRA on this topic (see annex).
2. The conference was opened by the Sustainable Energy Division (SED) Secretary of the Committee on Sustainable Energy. He reminded the three action streams of the Hydrogen Task Force (HTF): value chain development, classifications and synergies; these are essential for today's conference. Although trade in the low-emissions hydrogen sector is not overly complex, the HTF welcomes the opportunity to work with other sectoral committees and their subgroups, particularly WP.6.
3. The Secretary of the HTF underlined the timeline of the work on hydrogen within the SED. Hydrogen was introduced as an emerging topic in 2017. Several proposal documents were prepared for the committee shortly thereafter including one on guarantees of origin and how to develop a hydrogen taxonomy. There was an interruption in activities during the COVID pandemic. Then a publication was developed on production pathways in Central Asia and countries of the Caucasus. In June 2023, the HTF was officially launched.
4. The publication *Towards a Hydrogen Economy in the UNECE Region* was finalized in 2023; it proposes the key elements of a proposed labelling (classification) of hydrogen as a product (based on green gas emissions), the current international efforts and steps towards certification. There are multiple hydrogen production pathways and the carbon footprint range of each of these can vary greatly from 0.4 to 6.4 kg carbon equivalent. Clean hydrogen production is about less than one million tons which represents about one per cent of total hydrogen production. There has been robust growth in electrolysis capacity. There are a number of large-scale industry use of hydrogen in North America, Europe and China.
5. The Secretary of the WP.6 underlined the positive cooperation with HTF. He presented the WP.6 *Recommendation L on an International Model for Transnational Regulatory Cooperation for Product Compliance* on product conformity and the CRA. The CRA is divided in five sections on scope, product requirements, reference to standards, compliance clauses and market surveillance clauses. The CRA are then used to encourage cross-border mutual recognition of conformity assessment. There have been some successful CRAs, notably on equipment for use in explosive environments which has effectively harmonized procedures in most major economies. The working party is now working towards a CRA for products used for the extraction or transport of hydrogen.
6. A student at the Geneva Business School provided a youth perspective on this topic. He underlined a keen interest in the transition from fossil fuels to green hydrogen which could help to reduce climate change. He reminded that fossil-based hydrogen produced more carbon emissions in 2022 (1 200 Mt CO₂) than the aviation industry (800 Mt CO₂); it is therefore essential to favour green-hydrogen solutions based on the advantages of each country (such as solar, offshore wind, biomass, geothermal). Luckily, the cost of production of green hydrogen has reduced up to 90 per cent and as demand rises, the cost could reduce further. He finalized by underlining the United Nations Human Rights Council resolution 48/13 which states that it is a human right to have a clean, healthy and sustainable environment. He called on those responsible to establish a strong, stable foundation for future generations.
7. The Chair of the HTF underlined that he has worked in the natural gas industry for over thirty years. At that time, natural gas was the cleanest solution that existed as it was cleaner than petrol. Today, the international community recognizes that we need even cleaner solutions. There is a need for an international hydrogen classification that deals with sustainability. The production, the transport and the sale of hydrogen need to use the same classification. Today, the hydrogen economy does not exist; the value chain for extraction, transport, storage and use has to be developed. On synergies, it is important to consider blending of natural gas with hydrogen which might allow to use the existing distribution and transportation systems, but not all experts agree on the percentages of mix. Over the coming period, the HTF will seek to promote and facilitate a policy dialogue, support projects on

hydrogen, prepare papers on international initiatives aiming to minimize duplication of efforts. The HTF serves a core function of information sharing.

8. The Director of the Spanish Gas Association (SEDIGAS) explained that his organization has integrated all elements of the value chain in the gas sector. There are already seven regasification plants and the country uses around 70 per cent of liquefied natural gas. There are plans to integrate more biomethanes and hydrogen in the gas network system. Long-term plans in Spain aim to expand the place of renewable energies including renewable gas while reducing use of natural gas and petroleum products. A hydrogen think tank was established in 2020 focusing on regulatory frameworks, hydrogen and gas mixes, and utilization and consumption. There are some relevant pilot projects and plans for hydrogen pipelines that are bringing results. One case study has shown that up to 20 per cent blending of hydrogen by volume will be able to be transported by existing distribution pipelines. He underlined that technical challenges are the pivotal point where we should start and from there develop a comprehensive framework.

9. A question was raised on how the current natural gas pipelines function between Spain and other countries. Currently, the linkage with Portugal is considered a single market in this field, where the prices and standards are nearly identical; however, Portugal is also pushing to integrate up to 20 per cent hydrogen blending whereas in Spain it is only up to 5 per cent. The linkages with France have been done through a European Union framework. The linkages to the south with Morocco is dealt with under a bilateral agreement.

10. The Head of Legal and International Metrology of the German Physikalisch-Technische Bundesanstalt presented the comprehensive approach of the ECE *Recommendation L* international model within the initiative for equipment in explosive environments. He reminded that the use of hydrogen is not new and there were plans for public street lighting over a hundred years ago. He also reminded the importance of the quality infrastructure network and the need to ensure that all aspects (certification, testing, metrology, market surveillance, conformity assessment, accreditation) are following the same basis. Within Europe, the hydrogen ecosystem roadmap calls for 40 gigawatts of energy within the EU in the coming years (which is half the daily consumption of Germany). There are currently over ten regulations covering hydrogen, each containing hundreds or thousands of harmonized standards with which users must comply. On the national level, there will also be national regulations and standards. He stressed the importance of the CRA on equipment in explosive environments which establishes an international recommendation under the ECE WP.6 which provides the requirements for service and repair facilities and for the competence of people.

11. An independent consultant on energy policy and technology research highlighted hydrogen blending in national hydrogen strategies. Each country can have a different priority. There are over 77 national hydrogen strategies and roadmaps around the world. Europe and the Americas have published 25, of which 16 address hydrogen blending targets. He underlined the example of Canada which is developing pilot projects and developing codes and standards in cooperation with the United States of America. The United Kingdom of Great Britain and Northern Ireland has an ambitious plan to support up to 20 per cent hydrogen blend. He underlined that the ECE region has published approximately half of the world's existing hydrogen strategies, so it is well placed to base alignment on this work.

12. The Project Leader of the WP.6 Hydrogen CRA project underlined the importance of the harmonization of standards and conformity assessment systems for pipeline safety in relation to hydrogen. This project is currently important as there are a large number of hydrogen pipeline projects, however the requirements for these pipelines are becoming more stringent. Harmonizing these requirements across borders based on internationally agreed standards can validate this process and contribute to common principles for the enforcement of products safety, security and market surveillance. The main problems to address within the CRA include risk assessment, material compatibility, leak detection, and emergency planning. The project team is currently finalizing a questionnaire in order to collect information for the project topic. He called on experts and government officials to respond to this questionnaire and participate within this project.

Annex

Product conformity for trunk pipeline safety in relation to hydrogen

1. The United Nations Economic Commission for Europe (UNECE) Working Party on Regulatory Cooperation and Standardization Policies (WP.6) is working to develop a model for the harmonization of conformity assessment procedures and approaches in relation to products used in the transportation and production of hydrogen. This is based on the UNECE Recommendation L on International Model for Transnational Regulatory Cooperation Based on Good Regulatory Practice and its model common regulatory arrangement (CRA).
2. This survey aims to identify current practices and planned, future practices related to the transportation and production of hydrogen. This information will be used to develop a CRA. It is organized in five parts which reflects the five sections of a CRA.

A. Scope

3. What state body authorizes the operation of pipelines including hydrogen or hydrogen gas-mixtures?
4. What state body (national or local) is authorized to issue permission for pipeline construction?
5. What state body (national or local) is authorized to issue permission for pipeline operation?
6. What documents regulate inspection, maintenance and repair issues of pipelines and equipment safety for hydrogen (international standards, national standards, laws, etc.)?
7. What are the arrangements in place to ensure the safe operation of pipelines for hydrogen between regulators and operators?

B. Product requirements (equipment, services, materials for pipeline systems)

8. What national directives / regulations set requirements for the provision of safety of pipeline systems for hydrogen or hydrogen gas-mixtures?
9. What rules or standards set requirements to pipeline safety for hydrogen or hydrogen gas-mixtures?
10. What safety criteria (ecological, technical, social, etc.) for pipeline safety for hydrogen are considered substantial for your national legislation? (are these linked with concerns of specific locations (mountain, polar regions, shelf region, etc.)?)
11. What additional laws, regulations contain provisions regulating processes of designing and construction of pipelines for hydrogen?
12. What provisions are planned or additionally in place for mixture of hydrogen with other gases?

C. Reference to standards clauses

13. Are the requirements of national standards for the design, construction and operation of pipelines for hydrogen mandatory for compliance of alternative requirement may be

applied (that of international standards, regional standards, etc.)? (please list those that apply with a brief description of their scope)

14. What standards have been adopted to regulate the design, construction and operation of pipelines for hydrogen? (please list those that apply with a brief description of their scope)

D. Compliance clause

15. Are there mandatory conformity assessment procedures in place for the design, construction and operation of pipelines for hydrogen? (please list those that apply with a brief description of their scope)

16. Are there voluntary conformity assessment systems in place for the design, construction and operation of pipelines for hydrogen that are recognized by national state authorities?

17. What role do national, regional and/or international standards have in conformity assessment procedures of pipelines and equipment for hydrogen? (are these mandatory or voluntary) (are these referenced in national laws and regulations) (please list those that apply with a brief description of their scope)

18. Are the results of foreign conformity assessment accepted in your country in relation to pipelines and equipment for hydrogen? (for which stages: design, construction, operation)

E. Market surveillance clause

19. Are there procedures in place to remove authorizations for the operation of pipelines for hydrogen if these are deemed unsafe? (if yes, please describe)

20. Are local inspector (under the umbrella of laws) involved in the surveillance of the safe use of plants, factories, etc.
