O2 Legal

“Regulatory challenges for NH3 in Chile”

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O_2 New energy vector

- A world moving away from fossil fuels which provide a permanent energy supply, requires means to store and transfer of energy in time and place on a large scale (global warming and renewables variability).
- Due to significant costs involved in direct green hydrogen production and transport, NH_3 in contrast emerged as an excellent vector for energy storing and transporting. In liquid state it has 50% more volumetric energy than liquid H_2, it can be handled at lower pressures, it is less flammable and easier to liquefy than H_2, which requires less energy consumption to store and transport it.
- As in many industries, NH_3 production benefits from economies of scale (investment costs per unit produced falling as production volumes grow) a critical part of costs coming from electricity supply by renewable sources. Typically, for every tonne of green ammonia, 10 MWh of energy is required, of which 90% is used in the electrolysis process.
- Also, as a widely produced chemical and internationally traded commodity since the 1920s, there are facilities and regulations already for its handling, conduction and storage as a chemical product, so the required infrastructure would be expandable faster.

O_2 Other uses

- Although this requires improvements in combustion technologies, there are important initiatives boosting use in maritime transport. One of the greatest challenges is to reduce or eliminate NOx emissions and increase its calorific value to sufficient efficiency ranges
- International Maritime Organization (IMO) has established mandatory limitations and improvements for shipping bunkering, and adopted the "2023 IMO GHG Strategy" with goals of achieving net-zero by 2050 in maritime transport and reducing CO2 emissions by at least 40% by 2030, as well as promoting the adoption of increasingly less polluting technologies.
- Although operational and safety requirements and rules are already well established for tankers that transport and handle NH3, such guidelines do not currently exist for the use of ammonia as fuel.
- As these are new technologies, several tests and trials are necessary as well as the development of regulations and standards. This is a critical stage for spreading adoption of safety regulations and loading protocols in as many countries as posible.
- A leading role by the "*Global Centre for Maritime Decarbonisation*" formed by various companies not only shipping, with a global reach, that has been developing a series of pilots and tests in the port of Singapore, to develop ammonia supply systems for bunkering and acquiring operational experience. Its initial work was implemented from 2022 to 2023 (Safety Study) and the results of its second phase of tests are ongoing (detailed evaluation of ship-to-ship transfers of ammonia cargoes).

O_2 Concurrent regulations 1

- Given its chemical features and that use has been focused in explosives and fertilizers, ammonia is considered and regulated in Chile as a hazardous substance (products that may pose a risk to the health, safety or well-being of humans and animals, in accordance with NCh 382, more specifically a Class 2 substance, toxic gas).
- This s particularly relevant: (i) safety measures that must be adopted; (ii) need to obtain a health authorization for the operation of storage facilities that exceed a certain volume (30 ton); (iii) this will affect the industrial qualification each productive activity must be subject according to the Urban Planning and Use of Land Regulation OGUC, which includes all types of industry and storage or warehousing facilities and, therefore, will determine if and where the facilities may be located; and (iv) consequently will impact the environmental approval that the project requires.
- On the other hand, Ministry of Energy with jurisdiction over development of the emerging H2 industry, relating to all activities of study, generation, transportation, storage, import and export *"on hydrogen and hydrogen-based fuels"*. However, there has been no provision that clarifies or expands on what "fuels [produced] from hydrogen" mean.

O_2 Concurrent regulations 2

- On the contrary, in 2022, interpretation was issued on the use of land applicable to facilities and networks associated with hydrogen production, under which H2 facilities are considered as "energy infrastructure" but, paradoxically provided that projects where ammonia is produced, even if hydrogen is used as feedstock, will be regarded as "productive activities" and not energy facilities, since ammonia is not considered a fuel, but "… *a substance that is not part of the energy sector …*"
- This complicates the planning and compatibility of the different elements included in a project within a certain territorial area. In addition, difficult for authorities to provide an express and more elaborate definition due to the absence to date of any foreign parameter developed for the application and treatment of ammonia as a fuel that can be used as a technical, safety and regulatory reference for its adoption.
- Thus, even though the hydrogen used in the production of ammonia constitutes a fuel and forms part of the energy infrastructure subject to regulation, the ammonia generated, stored and exported as a vector of H2 will continue to be classified as a productive activity and a hazardous substance, without being considered a fuel.

O_2 Concurrent regulations 3

- So current regulation seems to provide that products and fuels will ultimately be regulated according to the use that is made of them, which can bring about a complexity and confusion that is unnecessary and inefficient to manage.
- But even if a product is classified as a "fuel" the problem still remains for products also being classified as dangerous, because the regulation is based on the "use".
- A good solution: quantitative risk analisis "QRA" system so that projects are evaluated considering the risks they may cause and applicable mitigation measures to limit or avoid their effects. It is in force in several other jurisdictions.

O_2 Exporting to EU

- European Union has bet on these fuels as a key part of its energy and decarbonisation policy that will enable the decarbonisation of certain hard-to-abate sectors. EU seeks to produce 10 million tonnes by 2030 and import the same amount from other countries.
- Goals refer to “renewable hydrogen” and various regulations establish the requirements that fuels must meet to be qualified as a “renewable fuel of non-biological origin” or “RFNBO” as it is known in European regulations to make sure that: (i) hydrogen is produced from renewable energy sources; and (ii) achieves at least 70% greenhouse gas (GHG) emission reduction.
- European law increases the share of renewable energy in its overall consumption to 42.5% by 2030 and sets targets for each sector. Consequently, it is regulation that builds the demand for RFNBOs to impulse investments by producers.
- Important: EU regulations are applicable to both local producers and foreign producers who export to the EU. This can create barriers and their application to foreign producers will generate challenges to overcome, leaving foreign producers in a disadvantage position.

Highlights:

1. 100% of the electricity used to produce hydrogen must be renewable. Import of RFNBOs is not mandatory but objectives imposed, as well as other stimuli (such as access to special bank loans) generate incentives to adhere.

O_2 Exporting to EU

2. Strict requirements for considering electricity from grid systems as renewable based on the particular market framework of EU. To ensure origin, guarantees ("GO") are granted at the request of a producer for the equivalent of each MWh unit (1 GO = 1 MWh). Recognition of GOs or similar issued by third countries will only be permitted if there is a prior agreement with the EU on mutual recognition of guarantees of origin.

3. Foreign producers must also demonstrate that in the place of origin they apply electricity market rules similar to the "zonal pricing" system that applies in the EU, that is, geographical differentiation of hourly energy prices in a given area where the share of renewable energy exceeded 90% during the previous calendar year.

4. Additionality: RFNBO will be considered 100% renewable when producer generates electricity in its own facilities or agrees PPAs equivalent to at least the total amount of electric energy that is classified as renewable, provided that (i) generation plants have entered into operation not earlier than 36 months prior to the start of facilities to produce the RFNBO, and (ii) power generation plants have not received any subsidy or benefit for their investment or operation.

5. Renewable PPAs are acceptable to the extent they are entered into "directly" with generators as counterparties, thereby excluding contracts with intermediaries or marketers, who in any case may always act as advisors or facilitators.

6. *CBAM factor:* will come fully effective in 2026, set a price on the carbon emitted in the production of certain GHG-intensive goods entering the EU. CBAM will have a discriminatory effect on foreign producers compared to local ones, as well as on the type of product (for example, substances outside the CBAM catalogue, such as methanol or efuels), due to higher regulatory burdens on the goods subject to CBAM (H2 and NH3) and because imported products are treated differently than the same products produced within the EU.

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