

GEGHA Project Hydrogen Production, Storage and Transport

Hydrogen and Hydrogen production

Hydrogen is a colourless, odourless gas that is a very effective carrier of energy. Hydrogen will be produced via a process called electrolysis where water molecules are split using electricity to produce hydrogen, which is captured, and oxygen which is released to atmosphere.

The process is relatively energy intensive. It takes approximately raw 20 litres of water (10 litres of ultra-pure water) and 51-54 kWh of energy to produce a kilogram of hydrogen.

The GEGHA Project will be utilising rainfall runoff as a water source and renewable energy primarily sourced from the adjacent solar farm to ensure that sustainable sources of water and power are selected.

Hydrogen Storage

A portion of produced hydrogen will be stored onsite whilst the majority will be sent to the ammonia plant.

Hydrogen will be stored on Multi-Element Gas Containers (MEGC – Figure 1) which are specialist storage vessels that are manufactured to sit within a standard 40 foot shipping container. The advantage of this type of storage is that it can be used as both stationary and transportable storage, saving a ‘double handling’ of product from storage to transportation.

Each MEGC stores 18 vessels that can store approximately 40 kgs of hydrogen each (720 kg per load). The hydrogen is stored at ambient temperature under approximately 350 bar of pressure (this may be increased to 450 bar to increase storage mass).

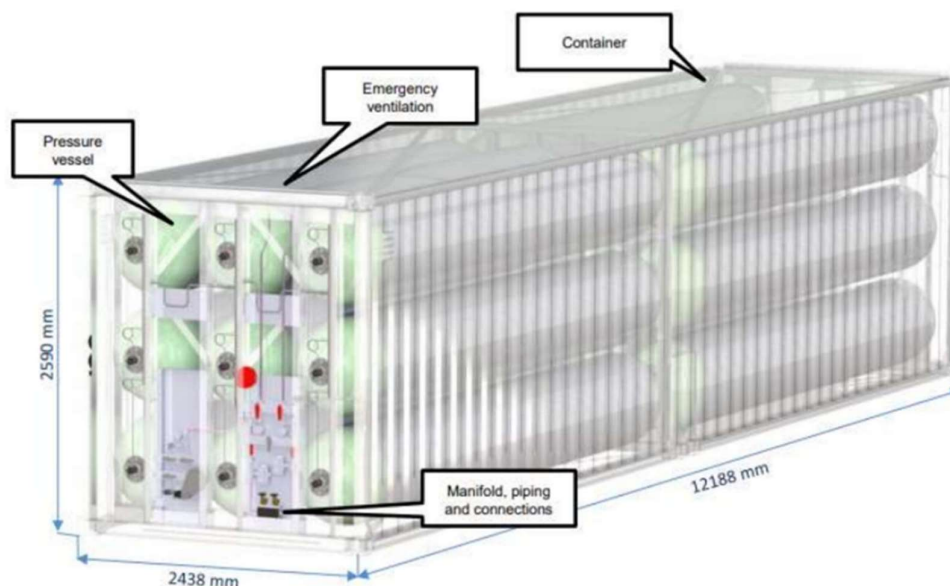


Figure 1: Multi Element Gas Containers

Transport of Hydrogen

Hydrogen delivery would comprise of three main methods. For larger users, the whole MEGC would be unloaded and connected, with an empty MEGC being loaded to be taken back to the GEGHA Plant site for refilling. For smaller users, the hydrogen can be decanted from each vessel. Hydrogen tankers may also be utilised, filling a large-chambered bullet to safely transport and deliver to customers.



Figure 2: Hydrogen tanker trailer.
Credit Victrex for image

Hydrogen is specified as Dangerous in the Australian code for the Transport of Dangerous Goods. Transport of Hydrogen itself is not that common at the moment but hydrogen movement will become more prevalent in the future. It is equivalent to transportation of other gas vessels such as LPG and has a full suite of design and safe operating standards to ensure safe transportation.

Production of hydrogen at the GEGHA plant will generate savings in fuel use and emissions. When substituting diesel for hydrogen, the number of dangerous goods movements would be neutral when compared with a diesel delivery programme to rural properties.

There would be savings in sourcing and transporting the diesel from Brisbane, Sydney or Newcastle by transitioning to a locally produced fuel source.

Delivery routes for hydrogen will be analysed as part of the Environmental Impact Statement to determine 'least risk' routes for delivery to end users.