



NrgStorEdge technology for hydrogen MHE

Reducing capital and operational costs with absolute safety

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General

MHEs use high compressed hydrogen, which requests expensive infrastructure and operational expenses for hydrogen feeding and operation.

NrgStorEdge replaces compressed hydrogen with its hydrogen rechargeable liquid, **NrgLiquid**, which is

- Non flammable
- Non toxic
- Inert
- Similar to water, easy to handle
- Environmentally friendly
- Safe (no free hydrogen in the system)

Use of **NrgLiquid** eliminates the need for expensive equipment at the refueling station

- No compressors
- No cooling units
- No high-pressure hydrogen dispensers
- No high-pressure hydrogen storage on-board tanks

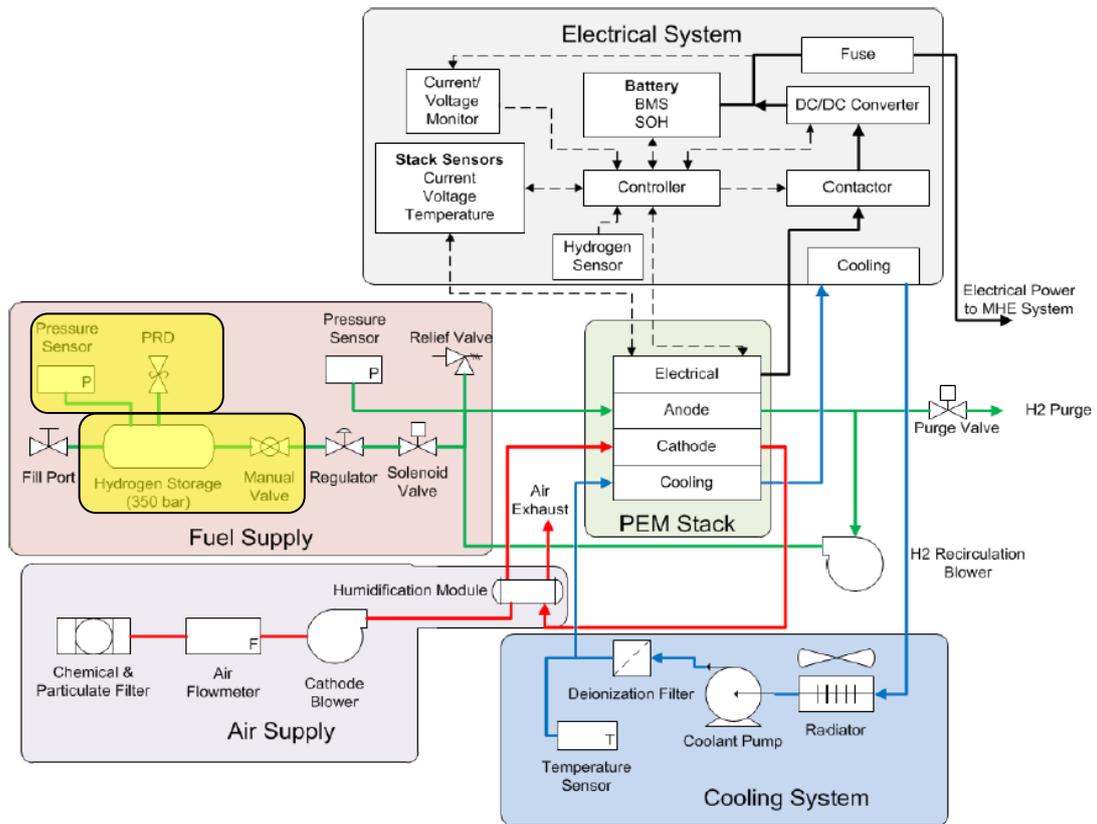
Operational costs are reduced because there is no need for energy-consuming hydrogen compression.

Hydrogen is released on demand for immediate consumption by a fuel cell. Used NrgLiquid is recharged by hydrogen, supplied by any hydrogen generator and the on-board fuel tank is refilled in few minutes at the refueling station.

Forklifts' components remain the same; only high-pressure units are replaced by NrgStorEdge system.

On-board system

The following drawing shows, in transparent yellow, which onboard components are replaced by NrgStorEdge technology



The cylindrical compressed hydrogen tank is replaced by:

1. Plastic tank with NrgLiquid (fresh and used)
As there is no pressure, the tank can be flexibly designed. No need of cylindrical shape surrounded by unused volumes.
2. Hydrogen Release Unit (HRU) that, on demand, extracts hydrogen from NrgLiquid.

No additional volumes are required.

A 50-liter tank contains more than 1.5 kg of hydrogen.

Refueling takes 2 – 4 minutes.



Dispenser

NrgLiquid behaves very similar to water (and indeed contains 50% water, by molecules counting). Therefore, the dispenser is more like using water tap and does not require expensive components or safety measures.

Cost benefits

NrgStorEdge technology reduces end user costs while raising MHEs' supplier income and profit.

NrgStorEdge offers MHE supplier the following HW at about half the price of current compressor, cooling unit, dispenser and 60 onboard hydrogen units:

- A Loading unit, that in-line transforms hydrogen into NrgLiquid
- Two tanks, for NrgLiquid and used-NrgLiquid
- Sixty onboard systems (tank and HRU)

NrgStorEdge special process catalysts should be replaced: about once a month for the loading unit and about once a year for onboard system. The replacement procedure is fast and simple.

These consumables are sold through MHEs' supplier that can add a valuable markup. End user's operation cost (compressor's electricity consumption) may be reduced by a factor of 8.

Therefore, both end user and MHE supplier significantly gain from NrgStorEdge technology.

Note

Specific values depend on:

- MHEs' supplier pricing policy
- End user needs
- Type of agreement with NrgStorEdge

NrgStorEdge system saves the customer both capital and operational expenses.

Additional optional saving

Operational costs do not include hydrogen generation, which is the same for current and NrgStorEdge technologies.

However, NrgStorEdge technology enables inexpensive centralized hydrogen production with low cost delivery to end user site.

This may reduce by 50% the annual hydrogen cost for a site.

Cooperation with NrgStorEdge

NrgStorEdge is ready for pilot program initiation with MHEs suppliers.

We are in engineering phase – implementation lab proven technology in industrial systems.

This is the time for lower cost cooperation, and you can be the first to benefit from an emerging technology than can make hydrogen MHEs affordable and profitable.