EQUITUS

Design | Engineering | Innovations

Green Hydrogen Solutions

Production | Transportation + Storage | Applications

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Production of Green Hydrogen

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The Problem

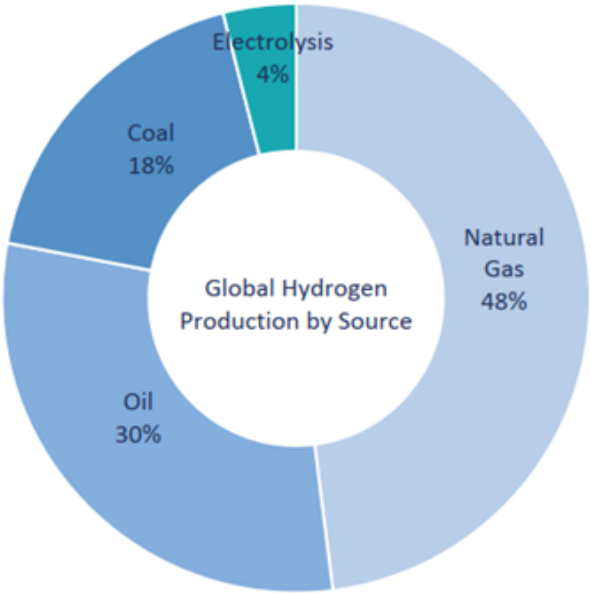
96% of H_2 production comes from conventional fossil fuels and is mostly Centralized

Steam Reforming

- × Fossil fuels dependent
- × Polluting
- × Costly (transportation)
- × Time-consuming

RE+Electrolysis

- × Poorly efficient
- × Space demanding
- × Costly
- × External dependence
- × Regulatory restrictions



Our Solution

Artificial Photosynthesis : multiple physics in one device

Real Tree

Artificial Tree

Mimicking Trees | 25 X More Efficient | Onsite | Direct Solar | Cost effective (H_2 @ <2$/kg)

Sun + Water = Fuel (H_2 + O_2) + Electricity + Heat

The Magic Sauce: Integrated Photo Electro Chemical (IPEC) Technology

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Our Solution

World's best technology

- Innovative **Integrated Photo-Electrochemical** device
- Concentrated light 1000x
- Smart thermal and mass-transport management
- Lifetime 25 years with minimal maintenance
- Plug & play automated co-generation system

25%
Solar to Hydrogen efficiency
(**>2x conventional**)

36% Solar to electricity efficiency (>2x conventional)

80% Overall system efficiency (>6x conventional)

World-wide

Our Arb

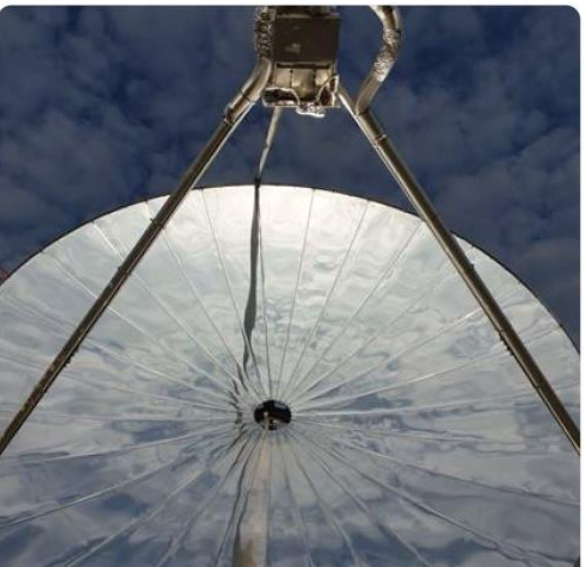
PATENTED

nature energy

Energy & Environmental Science

The 'ARB'

Versatile and Flexible co-generation system



Multiple Outputs:

- H_2 (pre-compressed till 30 bars inside Reactor, >99.999 % purity)
- O_2 (>99.9% purity)
- Heat (upto 80 °C)
- Electricity (on-demand)

Diverse Product Portfolio:
a. Hydrogen Arb (ready)
b. Electric Arb (ready)
c. Reversible Arb (in development)

The Magic Sauce: Integrated Photo Electro Chemical (IPEC) Technology

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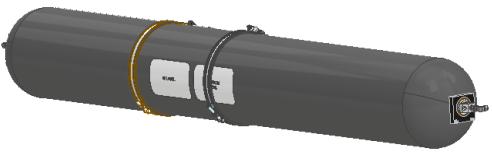
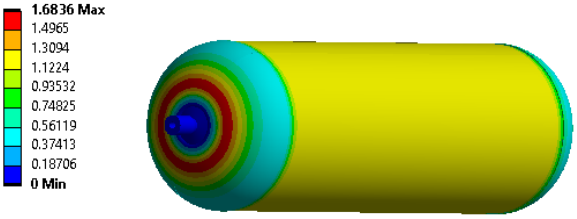
Transportation and Storage

Design of Cylinders

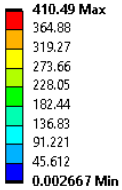
1. Design and validation of hydrogen carrying cylinders to withstand typical compressed hydrogen storage pressures (typically around 350 to 700 bar), and phenomena like embrittlement
2. Experience of developing systems as per standards such as ISO 11119, ISO 9809, ISO 7866, EN 13445, EN 14912 amongst others
3. Design for Manufacture
4. Validation and analysis
5. Experience of working with low permeability materials



3D Model of Cylinder Assembly



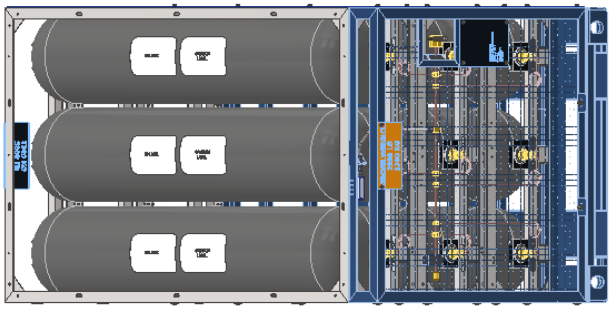
Displacement under 500bar Pressure



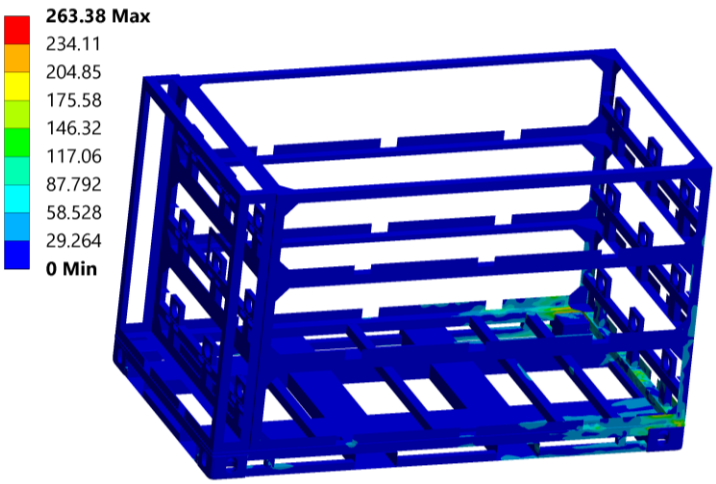
Von Mises Stresses under 500bar Pressure

Design of Cylinder Transporation Frames

1. Design and validation of hydrogen cylinder transportation frames
2. Experience of developing systems as per standards such as ISO 10961, amongst others
3. Design for Manufacture
4. Validation and analysis to include impact, roll over and fall over protection systems as per ISO 10961
5. Experience of working with various metals



3D Model of Multi-Cylinder Transportation Frame



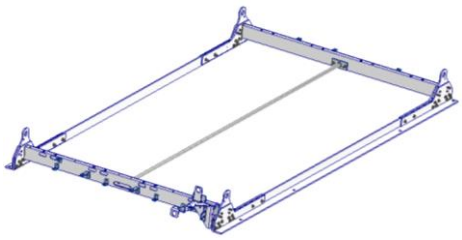
Von Mises Stresses due to Impact as per ISO 10961

Application – Heavy Vehicles (Trucks and Buses)

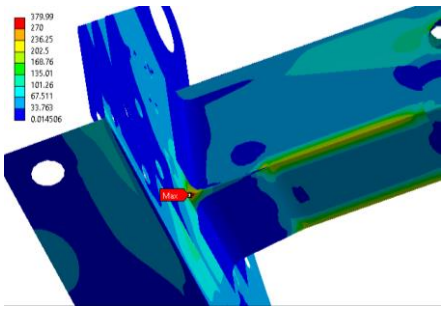
Design of Hydrogen and Battery Frames

Design of hydrogen frames for trucks and buses as per the following standards amongst others:

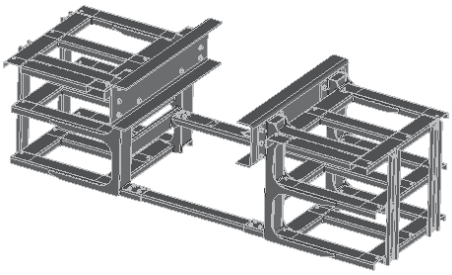
1. EC79: type-approval of hydrogen-powered motor vehicles
2. ECE-R115: retrofitting compressed gases as part of motor vechiles' propulsion systems
3. ECE-R134: safety-related performance of hydrogen-fuelled vehicles



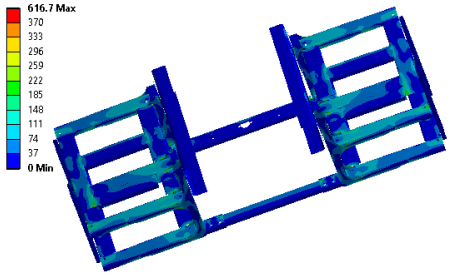
3D Model of Cylinder Frame Assembly



Von Mises Stresses on Frame as per ECE – R134



3D Model of Battery Frame Assembly



Von Mises Stresses on Frame as per EC79

Supply of Battery Packs for Battery Hydrogen Hybrids

Ability to provide battery packs for converting buses to battery – hydrogen hybrids.

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Application – Fleet Conversion Engineering

Fleet Conversion Engineering

We are able to provide fleet conversion engineering support across the entire exercise from feasibility studies including (evaluating the bus's suitability for conversion, space for batteries, a hydrogen fuel cell, hydrogen cylinders, weight considerations, and structural integrity) to certification and compliance. This is a natural extension of our capability developed in-house as a direct consequence of the work we have delivered in this space, as shown in the previous slides.

We deliver this in three stages:

Stage 1: Removal and Scrappage of the dirty, polluting bits
Stage 2: Installation of the clean, green bits
Stage 3: Testing and validation of the entire green system