INFRASTRUCTURE
WEDNESDAY, NOVEMBER 6 - ROOM 102-A/B, 1:30 PM - 3:30 PM

- **Electrochemical Hydrogen Purification and Compression from Pure and Waste Gas Streams -** *Trent Molter, Skyre, Inc.*

  - Skyre has developed Electrochemical Hydrogen Separation and Compression (EHSC) technology and deployed it in its H2RENEWTM product family. The H2RENEW is capable of recycling and generating high-purity (99.999+%), high-pressure hydrogen using a solid-state. Hydrogen normally exhausted and/or flared from an industrial process is captured, purified, compressed, and stored for later use. As a result, up to 98% of process hydrogen can be recycled, greatly reducing the amount of purchased hydrogen and handling costs and risks.

- **Development of a New Hybrid Hydrogen - Electrical Energy Storage System for Plug-in Cell Fuel Electric Vehicles -** *Paolo Di Giorgio, Università Parthenope di Napoli*

  - This work describes the development of a new hybrid storage system intended for a Plug in Fuel Cell Electric Vehicles (PFCEV). It is composed by a fully integrated metal hydride tank to store in a solid solution hydrogen intended to feed a fuel cell in the PFCEV and battery pack. In this work several configurations of the system are designed and proposed in order to replace battery pack for existing electric vehicles transformed in plug in fuel cell hybrid vehicles. In particular, the new hybrid storage system is designed for an electric scooter, a microcar and an electric bus. The proposed solutions are than compared to the commercial battery packs, in terms total useful energy stored, useful energy density and weight. Moreover, the performance of the system is evaluated in standard test conditions using a 2D FEM model, focusing with particular attention the thermal management capability of the system.

- **SimpleFuel -** *Jim Petrecky, PDC Machines*

  - Roll-out of hydrogen stations to support mobility applications can be very expensive, difficult to permit, difficult to install, and costly to operate until a critical mass of vehicles is present to substantiate the CapEx of the station. SimpleFuel is a hydrogen appliance that offers up to 20 kg/day production integrated with compression, storage, and dispensing for 350 and 700 bar applications. SimpleFuel is a path for a low-cost network of early-market H2 availability that can be moved to new locations once the business case for a full-up hydrogen station in an area is justified for financing, planned, installed, and commissioned.

- **Fuel Cell Compressor Power Calculations, Efficiency Definitions and Compressor Maps –** Ski Milburn, VAIREX Systems

  - The power consumption of the cathode air compressor is critical to the optimization of a fuel cell powerplant for fuel efficiency, and a key input to trade-off studies for cost, packaging and compressor technology selection.

However, there is a lack of understanding of the basic physics of air compression in the industry, and also a lack of standardization in reporting of compressor performance across the compressor industry. In this presentation, we will cut through the clutter by giving a basic primer in the physics of air compression, and a presentation of the derivation and use of the basic formula for the calculation of air power.

- **New Industry Mindset Possible with 950 Bar Transport Modules -** *Kevin Harris, Hexagon*

  - In late 2018, the Department of Transportation issued a Special Permit to Hexagon Purus to allow hydrogen transport trailers using composite overwrapped tanks at pressures up to 950 bar. It is believed that this is highest pressure rating the DOT has allowed in its history. This presentation discusses the new possibilities in the field of hydrogen distribution and refueling applications with the permitting of 950 bar hydrogen to be transported over US roads, as well as current and possible future 950 bar products.