Durable Low-Cost Pressure Vessels for Bulk Hydrogen Storage

DE-FE-0032002

WireTough Cylinders, LLC

PI: Ashok Saxena

Sub-Recipients: Siemens Corporation Corporate Technology Center

Location: Bristol, Virginia

DOE: $500,000
Non-DOE: $193,176

Total: $693,176

Objectives

- To develop and build a prototype of a Type-IIs, low-cost and durable pressure vessel with a capacity between 1,500 to 2,000 liters to safely store 50 to 60 KG hydrogen at 450 to 500 bar pressure for use in fossil power plants. The vessel will also be suitable for nuclear, wind/solar plants and for ground storage of hydrogen in fueling stations

Relevance and Outcomes/Impact

- The design will fully comply with ASME-BPVC Section VIII-Division 3 requirements including Article KD-10 for vessels built to store hydrogen.
- The design life will be determined as per ASME Section VIII-Division 3 code and will be capable of withstanding one full pressure cycle per day for 20+ years of service.
- The vessel will be modular in design and can be configured based on the capacity need of the power generating station.
- All construction materials used will be economical, off-the-shelf, and readily available, that will facilitate scaling of numbers.
- The new vessel for bulk storage of hydrogen will be ready for commercialization at the end of the program.

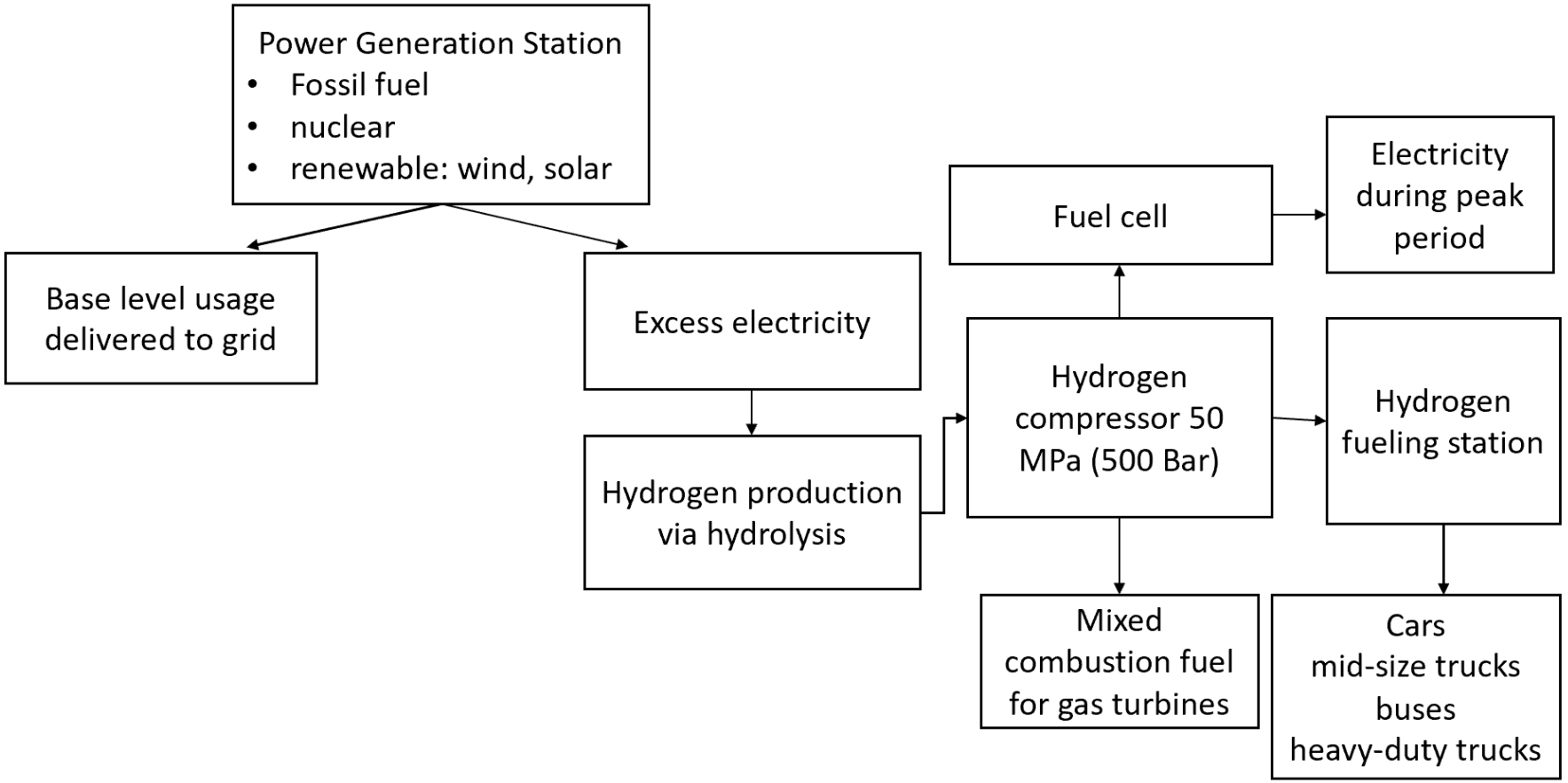
Durable Low-Cost Pressure Vessels for Bulk Hydrogen Storage

- **Award Number:** DE-FE-0032002

A new product for bulk storage of hydrogen will be developed and will be ready for commercialization. The solution will be suitable for excess energy storage during peak-production/low-demand periods in

- Fossil-fuel power plants
- Nuclear energy generation plants
- Renewable solar/wind energy generation plants
- Ground storage of hydrogen in fueling stations
- Each vessel will be capable of storing hydrogen that can produce 1 to 1.4 MWH of electricity
- The vessel will have a small foot-print. For example, an array of 36 vessels will be capable of storing hydrogen that can produce 50 MWH of electricity and can be house in a facility with a floor area of 1200 sq. ft.
- We expect that at the end of the program, the technology will be ready for commercialization

Concept of a Demonstration Plant (5 MWH) by 2025 and Large-scale Deployment by 2030



Alternate Implementation Strategy

- Sell discounted electricity to hydrogen fueling stations that have onsite hydrolyzers during off-peak-hours

Durable Low-Cost Pressure Vessels for Bulk Hydrogen Storage

- **Award Number:** DE-FE-0032002

Ashok Saxena, President
WireTough Cylinders, LLC
14570 Industrial Park Road, Suite C
Bristol, VA 24202
asaxena@wiretough.com
479-466-4301