

## Development & Certification of a Novel Flat Composite Hydrogen Storage Vessel

Vessel Energy Systems is developing the world's first flat composite hydrogen pressure vessel — a Type 3 COPV that replaces cylindrical tanks and delivers up to 40% more hydrogen storage within the same physical footprint. The flat, stackable design eliminates dead space in vehicles, trailers, and industrial equipment, improving range, reducing weight, and lowering system cost. The project covers FEA simulation, design and development, burst and cyclic pressure testing, customer field trials, and full certification to UN ECE R 134, HGV2 2023, DOT, and CTA standards. Target applications include heavy transport, hydrogen UAVs, and industrial power generation across Alberta and internationally.



**RECIPIENT:**  
**Vessel Energy  
Systems Ltd.**



**PARTNERS:**  
**AMS Solutions;  
Diesel Tech  
Industries;  
AeroVehicles  
Canada**



**TOTAL BUDGET:**  
**\$2,794,337**



**AI FUNDING:**  
**\$1,300,000**



**PROJECT DATES:**  
**May 2024 – Jul  
2026**



**PROJECT TRL:**  
**Start: 4  
End: 8**



**APPLICATION** heavy transport, hydrogen UAVs, and industrial power generation



PROJECT GOALS

Develop and certify the world's first flat composite hydrogen pressure vessel (Type 3 COPV) for rated operation at 350 bar. Validate structural performance through burst and cyclic pressure testing. Deliver first article samples to commercial customers for 100-hour in-situ field trials. Achieve formal certification to UN ECE R 134, HGV2 2023, DOT, and CTA standards by July 2026. Advance TRL from 4 to 8. Protect core IP through utility patent filings covering liner design, composite layup, and manufacturing process.

BENEFITS TO ALBERTA

Creates 6–8 direct skilled jobs in engineering, manufacturing, and quality assurance in Alberta, growing to 30–100 by 2035 as commercialization scales. Builds Alberta-based capability in advanced composite manufacturing, high-pressure vessel design, and hydrogen storage certification. Supports Alberta's hydrogen economy by enabling more efficient onboard storage for hydrogen trucks, UAVs, and industrial equipment. Addresses approximately 17.5 million tonnes of CO2-equivalent annual emissions from Alberta's heavy-duty transport sector. Leverages and grows partnerships with Alberta-based industry customers in trucking and oilfield services. Advances Alberta's position as a global center for hydrogen technology innovation.



3 New Products/Services



6+ Patents



6–8 Project Jobs



30–100 Future Jobs



0 kt/yr Project GHGs Reduced



300–650 kt/yr Future GHGs Reduced

CURRENT STATUS

MAR 2026

On track for certification by Jul 2026. Structural breakthrough validated Early 2026. First articles delivered to customers. Sealing redesign and cyclic testing in progress. Certification engagement to begin Q2 2026.

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