



**Making an impact  
on the clean  
energy transition**

**TRANSPORT**

# SAFE, AFFORDABLE, HIGH-TECH HYDROGEN TANKS



© FCH JU Project COPERNIC

## Overcoming high cost barriers

Hydrogen fuel cells are an ideal alternative to fossil-fuel-reliant combustion engines for transport. However, fuel-cell-hydrogen vehicles have faced a barrier to widespread commercial adoption due to the high cost of many components, not least hydrogen storage tanks. New manufacturing techniques and more efficient tank designs using novel, more affordable materials and fewer parts are making on-board hydrogen tanks commercially viable, while enhancing safety, weight and capacity.

The FCH JU-supported COPERNIC project made significant advances in improving the design and manufacturing of hydrogen tanks. By developing a novel carbon-fibre composite, optimising the structure of high-pressure tanks and implementing automated, scalable manufacturing processes, the project lowered the cost of a hydrogen tank by EUR 12 000. It also made tanks simpler and safer, incorporating a novel on-tank valve and real-time monitoring via optical fibres and sensors.

## Market-ready on-board storage

COPERNIC's success has enabled companies involved in the project, mostly SMEs, to propose prototypes to vehicle manufacturers and bring the technology closer to commercialisation. HIPHONE, an EU-funded project, is further developing and certifying the tank, while the HYCE joint venture has begun making a 64-litre, 700-bar vessel for on-board hydrogen storage, providing extended range for fuel-cell vehicles and further building interest in hydrogen's potential as a clean and commercially viable transport solution.

**The commercial success of fuel-cell-powered vehicles hinges on achieving ranges and refuelling times comparable to internal combustion engine cars at an affordable price. Research supported by the FCH JU has helped address these challenges through the development of high-performance, cost-effective hydrogen storage tanks.**



istockphoto.com/Tramino



### KEY ACHIEVEMENTS

**150 > 80**

reduction in the number of parts in an on-board hydrogen tank

**6 kg > 3.5 kg**

weight reduction of hydrogen tanks valves achieved in COPERNIC

**20 %**

reduction in mass of composite material used for hydrogen tanks

**42 %**

reduction in composite winding time enabling mass production of hydrogen tanks

**EUR 600 PER kg OF HYDROGEN**

cost of hydrogen tanks developed in COPERNIC (assuming a yearly production of 8 000 units)

**5 kg OF HYDROGEN**

stored on-board in light-duty FCEVs



© FCH JU project TAHYA

### AFFORDABLE HYDROGEN TANKS

Range and refuelling times are important advantages of FCEVs over battery-powered vehicles but the cost of components must be addressed if FCH is to become a mainstream decarbonisation option in transport.

### INNOVATION OVERCOMES COMMERCIAL BARRIERS

By forging synergies among innovative SMEs, the FCH JU has supported the development of technological, material and manufacturing innovations. **The goal?** To address the high cost of fuel-cell-powered vehicles by improving manufacturing of on-board hydrogen storage tanks that offer better performance and safety, while contributing to EU leadership in the field. **Key results?** Rapid progress in addressing cost barriers means affordable hydrogen tanks are being manufactured and more hydrogen-powered cars will appear on the market sooner than expected.

### IMPACT

**80 %**

reduction in the cost of hydrogen tanks achieved in the COPERNIC project

**18 % REDUCTION IN TANK COST**

of the total cost of a commercially available hydrogen car

**ENABLING NEXT GENERATION OF PRODUCTS**

trials show special shaped pressure vessels have 85-90 % structural efficiency

FIND OUT MORE



[www.fch.europa.eu/page/fch-ju-projects](https://www.fch.europa.eu/page/fch-ju-projects)  
<https://tahya.eu/>



@fch\_ju



**FUEL CELLS AND HYDROGEN**  
JOINT UNDERTAKING

A partnership dedicated to clean energy and transport in Europe