U.S. Department of Energy’s Fuel Cell Technologies Office

The Fuel Cell Technologies Office (FCTO) focuses on early-stage research and development (R&D) to advance hydrogen and fuel cells for transportation and diverse applications that contribute to U.S. energy independence, security and resiliency, and add to a strong domestic economy.

Office Highlights

**FCTO strengthens U.S. energy independence and security through cutting-edge technology R&D.**

- Hydrogen can be produced from diverse domestic resources, such as natural gas, oil, coal, and biomass, as well as from water splitting using any form of electricity.

- Fuel cell electric vehicles using hydrogen can achieve significantly higher efficiencies than combustion engines, and domestically produced hydrogen enables energy independence.

- Stationary hydrogen and fuel cell technologies can also improve energy security and reliability providing responsive back-up power and other electric and fuel distribution services.

- The H2@Scale concept lays a framework for the potential wide-scale production and utilization of hydrogen to address key issues such as grid resiliency and energy security by generating hydrogen when power generation exceeds load for multiple applications across sectors.

**FCTO focuses on early-stage R&D – projects include:**

- Hydrogen production, delivery and storage R&D to achieve $4/gasoline gallon equivalent (gge), including advanced water-splitting and materials for storage and delivery.

- Platinum-free catalysts, innovative membranes and electrodes for breakthroughs in fuel cell cost to achieve $40/kW and 5,000 hour targets.

- Materials R&D for components to enable H2@Scale (liners, pipeline, infrastructure components etc.) and advanced liquefaction.

- Technical analysis to inform FCTO R&D strategies and prioritization.
**Major Accomplishments**

FCTO R&D makes cutting-edge technology advances.

- FCTO funding enabled a 5-fold reduction in platinum based catalyst and a 60% reduction in automotive fuel cell cost since 2006, to roughly $50 per kilowatt (kW) when projected to 100,000 units per year manufacturing volumes.

- Fuel cell durability has been quadrupled since 2006 to 120,000 miles.

- FCTO cost-shared efforts enabled the world’s first tri-generation station using natural gas or waste to co-produce power, heat and hydrogen fuel.

- FCTO reduced hydrogen production costs and cut electrolyzer stack costs by 80% in the last decade.

- FCTO continues to achieve world record breaking energy material performance through its laboratory led consortia for materials discovery and developed the H2@Scale initiative.

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**FUEL CELLS INTRODUCTION**

**THE BASICS**

» Electricity produced directly

» No combustion involved

» No pollution from tailpipe

» Water and Heat only byproducts

**HIGHLIGTHTS**

- >2X as efficient as today’s gasoline engine

- >60 MPG Fuel Cell vs <30 MPG Gasoline Engine

**IN CARS**

- Honda Clarity, Hyundai Tuscon, and Toyota Mirai. Photo credit Honda, Hyundai, and Toyota.

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**JOB POTENTIAL**

**Today**

Approximately 16,000 jobs in the fuel cell car sector


**Future**

More than 200,000 jobs from future fuel cell car sector

Sources: Preliminary results from employment study update (ANL)

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**U.S. DEPARTMENT OF ENERGY**

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For more information, visit:

energy.gov/eere/fuelcells

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