


DOE Hydrogen and Fuel Cells Program Record		
Record #: 16010	Date: March 2016	
Title: Historical Fuel Cell and Hydrogen Budgets		
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Item

The Office of Energy Efficiency and Renewable Energy has spent more than \$1.5 billion (less than 1% of the total DOE budget) since 2005 on fuel cell and hydrogen research, development, and demonstration.^a This investment has led to more than 580 patents and more than 40 commercial technologies being introduced in the market and more than 65 emerging technologies that are anticipated to be in the market within the next three to five years.

Additional Information

Program History – From 1990 through 2015, the DOE activities related to hydrogen and fuel cells occurred in several different offices and programs. A summary of the contributing programs is below:

- From 1990 through 2002, the hydrogen and fuel cell programs within the Office of Energy Efficiency and Renewable Energy were two separate programs. The Hydrogen Program was funded from the Energy and Water Appropriations and Fuel Cells from the Interior Appropriations.
- In 2003, the Office of Energy Efficiency and Renewable Energy (EERE) combined the hydrogen and fuel cell programs into one program.
- In 2004, the Hydrogen Fuel Initiative (HFI) began and continued for 5 years, through 2008. The Hydrogen Fuel Initiative combined the DOE efforts of EERE, Fossil Energy (FE), Nuclear Energy (NE), and Basic Energy Sciences (BES), which is within the Office of Science.
- In FY 2009, hydrogen and fuel cell activities continued in the four DOE offices, as coordinated efforts.
- FE’s Solid Oxide Fuel Cell Program, which was also known as the Solid State Energy Conversion Alliance (SECA), focused on MW scale solid oxide fuel cell (SOFC) development but was not part of the HFI.

Funding – The charts below summarize the funding for hydrogen and fuel cells since 1990.¹⁻³ For the years 1990 through 1999, only EERE funding is shown in Figure 1. Funding for FE’s SOFC Program is shown beginning in 2000. The additional funding provided by FE along with NE and BES is shown beginning in 2004.

Overall, the funding for hydrogen and fuel cells from these programs is \$2.3 billion from 2006 through 2015. EERE has provided nearly \$1.4 billion (Figure 2) while SECA has provided over

^a During the last 10 years, funding for fuel cell and hydrogen research, development, and demonstration totaled nearly \$1.4 billion.

\$440 million during the same time frame (Figure 3). The combined total corresponds to less than 0.8% of the total DOE budget for the same time period.^{4,5}

As a comparison, in 2014, the global investment in the solar, wind, and biomass industries was more than \$260 billion.⁶ Over 10 years, DOE spent less than 1% of what was spent in just one year by the solar, wind, and biomass industries. Through EERE-funded efforts, significant progress has been made, including reducing the high-volume modeled cost of transportation fuel cell systems by more than 50% since 2006, and contributing to more than 580 patents and more than 45 commercial technologies out in the market.⁷

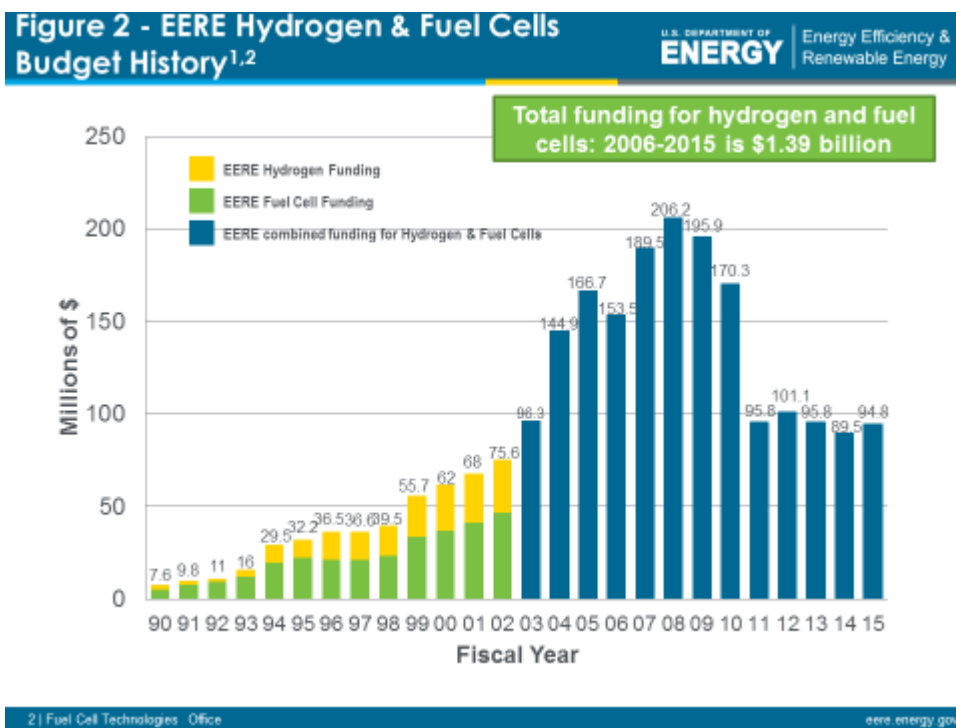
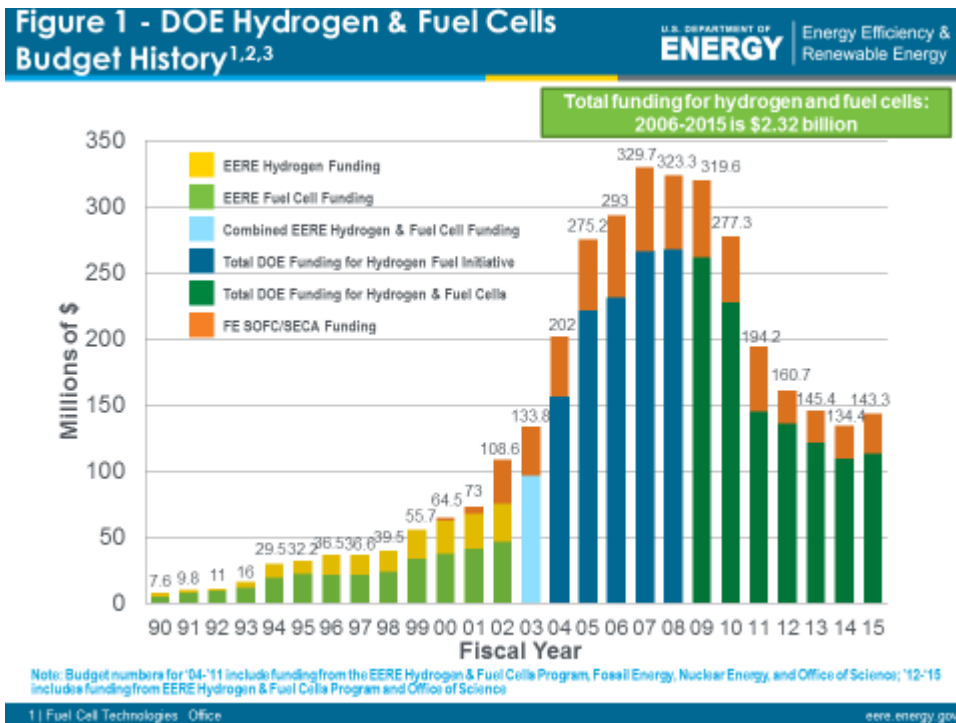
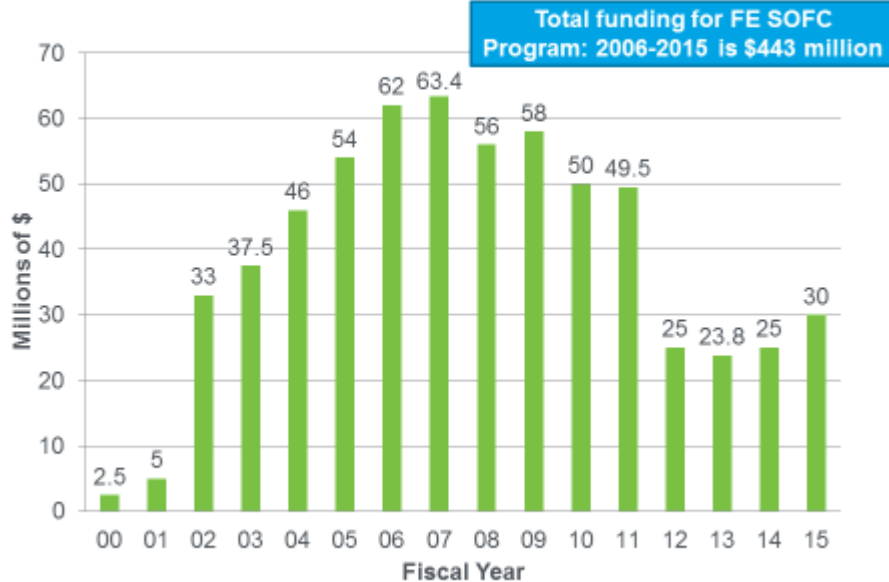


Figure 3 - Fossil Energy Fuel Cell Program: SOFC/SECA Budget History³



References

¹ Dr. JoAnn Milliken, “U.S. Department of Energy Hydrogen Program Annual Merit Review & Peer Evaluation Meeting,” Arlington, VA, June 2008, http://hydrogen.energy.gov/pdfs/review08/0_milliken_h2_program_overview.pdf.

² “Budget,” *Hydrogen and Fuel Cells Program*, U.S. Department of Energy, Web, March 2015, <http://www.hydrogen.energy.gov/budget.html>.

³ Dr. Shailesh Vora, “16th Annual SOFC Workshop: Office of Fossil Energy’s Solid Oxide Fuel Cell (SOFC) Program Overview,” National Energy Technology Laboratory, July 2015, <http://www.netl.doe.gov/File%20Library/Publications/Proceedings/2015sofc/SECA-Workshop-2015-Overview.pdf>.

⁴ DOE Funding History, <http://www.energy.gov/cfo/downloads/fy-2014-funding-history-detail-spreadsheet>.

⁵ FY 2015 DOE Agency Financial Report, <http://www.energy.gov/cfo/downloads/fy-2015-doe-agency-financial-report>.

⁶ Bloomberg New Energy Finance, *Global Trends in Renewable Energy Investment 2015*, <http://fs-unep-centre.org/publications/global-trends-renewable-energy-investment-2015>.

⁷ “Pathways to Commercial Success: Technologies and Products Supported by the Fuel Cell Technologies Office,” January 2016, http://energy.gov/sites/prod/files/2016/02/f29/fcto_2015_pathways_commercial_success.pdf.