2010

FUEL CELLS 2000

www.fuelcells.org

State of the States:
Fuel Cells in America

Authors and Acknowledgements

This report was written and compiled by Sandra Curtin, Elizabeth Delmont and Jennifer Gangi of Fuel Cells 2000, an activity of Breakthrough Technologies Institute in Washington, DC, with significant contribution from Semee Jang and Brian Woodlock. Support was provided by the US Department of Energy's Fuel Cell Technologies Program.

About This Report

The information contained in this report was collected from public records, websites and contact with state and industry representatives as of April 2010, particularly the State Fuel Cell and Hydrogen Database (http://www.fuelcells.org/info/statedatabase.html) and North Carolina Solar Center's Database of State Incentives for Renewables & Efficiency (DSIRE - http://www.dsireusa.org/). To the best of our knowledge, fuel cell installations listed are currently active unless otherwise marked.

Front Cover Photos:

Top right: Three fuel cell buses demonstrated at Chicago Transit Agency

Middle left: Four 250-kW FuelCell Energy DFC fuel cell systems at the Sheraton San Diego Hotel

Middle right: Plug Power GenDrive™ fuel cell powered forklift

Bottom left: ClearEdge Power residential fuel cell system

Bottom right: General Motors Chevy Equinox fuel cell vehicle

Contents

Fuel Cells: Here Today

There is no doubt that there will be fuel cells in our future. **In fact, fuel cells are here today, available for purchase and already taking off in early markets:**

- Telecommunication companies are purchasing fuel cells to provide back-up or primary power to cell phone towers.
- Major companies are buying fuel cells to power forklifts and other materials handling equipment at their warehouses.
- Energy suppliers in the US, Europe and Asia are selling fuel cells to heat, power and air condition homes and small businesses.
- Large stationary fuel cells are being purchased to help power manufacturing facilities, hotels and public buildings, to name just a few.
- Major auto manufacturers (GM, Daimler, Honda, Toyota, Hyundai-Kia) plan commercial fuel cell vehicle sales by 2015.

The United States is home to major fuel cell manufacturers, small start-ups, fuel providers, as well as hundreds of component suppliers, end users and companies involved at one point or another on the development and manufacturing spectrum**. Fuel Cells 2000 estimates that there are more than 630 active companies and laboratories in 47 states involved in the fuel cell and related fuels industry, investing an estimated $1 billion a year.** Other estimates put the total supply chain in the thousands of companies.

The Fuel Cell Top Five

Here are the top five fuel cell states in 2009, based on their policies and activism:

- **California**
- **Connecticut**
- **New York**
- **Ohio**
- **South Carolina**

To learn why, see page 9

In this report, Fuel Cells 2000 has analyzed the seven regions of the United States, compiling state activities supporting fuel cell (FC) and hydrogen (H2) policy, as well as installations and demonstrations in each state, so that readers can see how their state performs and compare efforts with their neighboring states.

We give green checkmarks to states that have put policies in place supportive of fuel cells and hydrogen (or red X's to those who don't!). These policies include fuel cell or hydrogen

roadmaps that outline steps a state will take to encourage use of the technology. We assess not only the roadmap but the state's willingness to implement these plans.

We also examine Renewable Portfolio Standards that expressly include hydrogen as a qualifying energy source, and fuel cells as qualifying technology. Net metering and interconnection standards, which allow small energy producers to connect and send energy to the grid, are another place we look for fuel cells and hydrogen – a fuel cell's clean energy generation can potentially helping to meet a state's electric renewable energy requirement. Finally, we examine a state's tax incentives, and available funding sources (grants and loans) that aid in promoting fuel cell use or attracting industry to the state.

We also note large and small stationary fuel cell installations; fuel cell-powered vehicles such as cars, buses and forklifts; and the presence of hydrogen fueling stations.

After detailing these state efforts, we chose the Top Five fuel cell states – states that are committed to supporting fuel cell technology and reaping the benefits of their investment, and who have made visible progress in their efforts.

These choices admittedly are subjective. Each state in our Top Five is recognized for different reasons - some for multiple stationary installations, vehicle demonstrations, and hydrogen fueling stations; others for taking the lead by providing grants and funding; supporting research and development; attracting business and jobs; or putting regulations in place to facilitate demonstrations and installations.

These are not the only states actively involved in fuel cell demonstrations and policy. States are realizing that the fuel cell and hydrogen industry provides much more than environmental benefits, it also provides economic benefits in the form of jobs and business. How can your state move up on our list? Use the Top Five as examples and follow their leads– your state's Department of Development is a good place to start. Attracting

A fuel cell is an electro-chemical device that combines hydrogen and oxygen to produce electricity, with heat and water as its only byproducts. In principle, a fuel cell operates like a battery, but does not run down or require recharging. It will produce energy in the form of electricity and heat as long as fuel is supplied.

To learn about the different types of fuel cells, visit www.fuelcells.org

Fuel cells are being tested or deployed in the following applications:

Portable – soldier power applications in the field, consumer electronics, auxiliary power units

Vehicles – cars, buses, trucks, materials moving equipment, shuttles, golf carts, wheelchairs, bicycles, motorcycles, scooters, boats, submarines, airplanes, trains, mining vehicles, military all-terrain vehicles

Stationary power – hospitals, hotels, municipal buildings, breweries, data centers, wastewater treatment plants, universities, high schools, police and fire stations, food production facilities, cell phone towers, E-911 and homeland security critical communications, airports, and many more

fuel cell businesses to your state and assisting start-up ventures means high-tech jobs and a leg up on the future, and federal support is available to help.

The Federal Investment Tax Credit (ITC) for fuel cell technology provides business property owners with a credit of 30% of the cost of the fuel cell units or up to $3,000 per kW, whichever is lower. This credit also can be applied to converting a materials handling fleet to fuel cell power and expires on December 31, 2016. There is additional help for home owners, for fueling station operators and for those buying a fuel cell vehicle. For more information, see the **US Fuel Cell Council's Q&A**[1].

Your governor and legislatures can create and implement attractive policies and tax credits, to facilitate fuel cell installations and entice foreign and U.S. companies to your area. Here are some concrete examples of how some of our Top Five states are already showing benefits from their efforts to attract hydrogen and fuel cell industry and encourage deployments:

- Ohio's Third Frontier Fuel Cell Program has resulted in the creation or retention of 295 jobs with an average salary of $61,651. They also report a leverage ratio of 4.5, meaning that for every dollar spent the state attains $4.50 in benefits. The range of fuel cell technologies being pursued and commercialized has expanded to cover virtually all of those being seriously considered for the developing end-use markets, and the program's efforts have gained the state national recognition as a leader in fuel cell technology development. This recognition, backed-up with a strong support program, has attracted several new fuel cell new companies to Ohio (relocating from other states and the United Kingdom).[2]

[1] **http://www.usfcc.com/ITC-Tax9-2009.pdf**
[2] Ohio Department of Development, ***An Update on Ohio's Fuel Cell Roadmap***, Mar. 2009

Fuel cells can use a variety of energy sources, including:

- **Hydrogen**
- **Hydrogen rich fuels -** Hydrogen is separated from these fuels using steam and heat:
  - *Traditional:* natural gas, gasoline, diesel, propane,
  - *Renewable/alternative*: methanol, ethanol, landfill gas, biogas, methane, ammonia
- **Renewable energy sources** - solar, wind, geothermal, using water (see below)
- **Water -** Hydrogen is separated from water molecules when an electric current passes through water
  - *Traditional:* electricity from the electric power grid
  - *Renewable/alternative*: electricity from solar, wind, hydropower or geothermal power
- **Innovative -** sodium borohydride, algae, peanut shells, and industrial gases are just a few of the potential sources being examined

To learn about the different types of fuel cells and their applications, visit **www.fuelcells.org**

- In Connecticut, which is home to several of the world's major fuel cell manufacturers, it is estimated that 240 jobs are created per MW of installed capacity, so annual production of 50 MW could yield around 7,500 – 8,000 jobs. In 2010, job growth is anticipated to increase by yet an additional 40%.[3]

- The South Carolina Hydrogen and Fuel Cell Alliance reports 65% job growth in its hydrogen cluster since 2004 and a 10:1 return on its hydrogen investment.[4]

A recent US Department of Energy (DOE) study estimates a net increase of 361,000 to 675,000 jobs[5] is possible by 2035 in fuel cells and hydrogen. Fuel Cell Today predicts that the global fuel cell industry could create 700,000 green manufacturing jobs over the next decade. But state support will be needed to help retain these jobs in the US. Other countries, including Japan, Korea and Germany, are aggressively pursuing fuel cell development, deployment and new markets, and are anxious to lure companies overseas and overtake the US advantage.

This report attempts to summarize State activity in a format that is easy to read and to compare states. For more extensive descriptions of the policy, installations or demonstrations you find in the pages that follow, please visit **Fuel Cells 2000's State Fuel Cell and Hydrogen Database**[6]. You can also contact Fuel Cells 2000 at **states@fuelcells.org** for help connecting to industry and potential collaborators as well as for general fuel cell information. Please also refer to the Appendices for additional resources.

[3] Connecticut Center for Advanced Technology, **Connecticut Fuel Cell Activities: Markets, Programs, & Models**, Dec. 2009
[4] South Carolina Hydrogen and Fuel Cell Alliance, **Jobs and Investments for Hydrogen and Fuel Cells**
[5] U.S. Department of Energy, **Effects of a Transition to a Hydrogen Economy on Employment in the United States: Report to Congress,** Jul. 2008
[6] Fuel Cell 2000's State Fuel Cell and Hydrogen Database - **www.fuelcells.org/dbs**

Fuel Cell Benefits

- High quality, reliable power
- High efficiency
- Exceptionally low / zero emissions
- Modularity / scalability / flexible installation
- Silent operation
- Lightweight / long-lasting
- Can be used with or instead of batteries and diesel generators

Did you know?

Fuel cells are here today.
According to Fuel Cell Today, almost 25,000 fuel cell units were shipped in 2009.

Some fuel cell systems have achieved billions of kilowatt hours (kWh) of successful operation at customer sites worldwide, including many Fortune 500 companies.

Fuel Cells 2000 estimates that there are at least 500 forklifts currently deployed and we expect to see another 1,000 forklifts, if not more, shipped in 2010. These forklifts will be located in 18 states.

Efficiency is one of the key benefits of fuel cells. Fuel cells can operate on renewable or conventional fuels. Whatever the source of fuel, fuel cells save energy, save customers money and reduce emissions.

- Residential fuel cells reduce home energy use by one-third or more. Thousands of units are installed and millions are anticipated.
- Fuel cell passenger vehicles are nearly 60% efficient, and the best are even more efficient, according to tests monitored by the US Department of Energy, and the best vehicles yield 60 to 70 miles per gallon equivalent. Hundreds are on the road and millions more are anticipated by 2025.
- Fuel cell forklifts are 10% more efficient than battery forklifts (US grid mix) and 30% more efficient than forklifts using petroleum. More than a thousand are operating and market acceptance is growing.
- Fuel cell CHP systems are 80% to 90% efficient when both heat and electricity are used. Systems optimized to produce electricity achieve 50% or greater electrical efficiency. Hundreds of megawatts are installed and hundreds more are anticipated within the next five years.
- All this means CO2 reductions: 20% to 40% for combined heat and power systems operating on natural gas, up to 100% on renewable fuel; 30% for residential systems; 60% or more for forklifts; 50% or more from passenger cars.

The Best of the Best:
Top Five Fuel Cell States

California

- **Progressive policy, worldwide leader in fuel cell cars and buses, hydrogen stations, numerous stationary installations**

Connecticut

- **Home to major manufacturers, high profile installations, supportive funding policies**

New York

- **High profile and long-running installations, supportive funding policies**

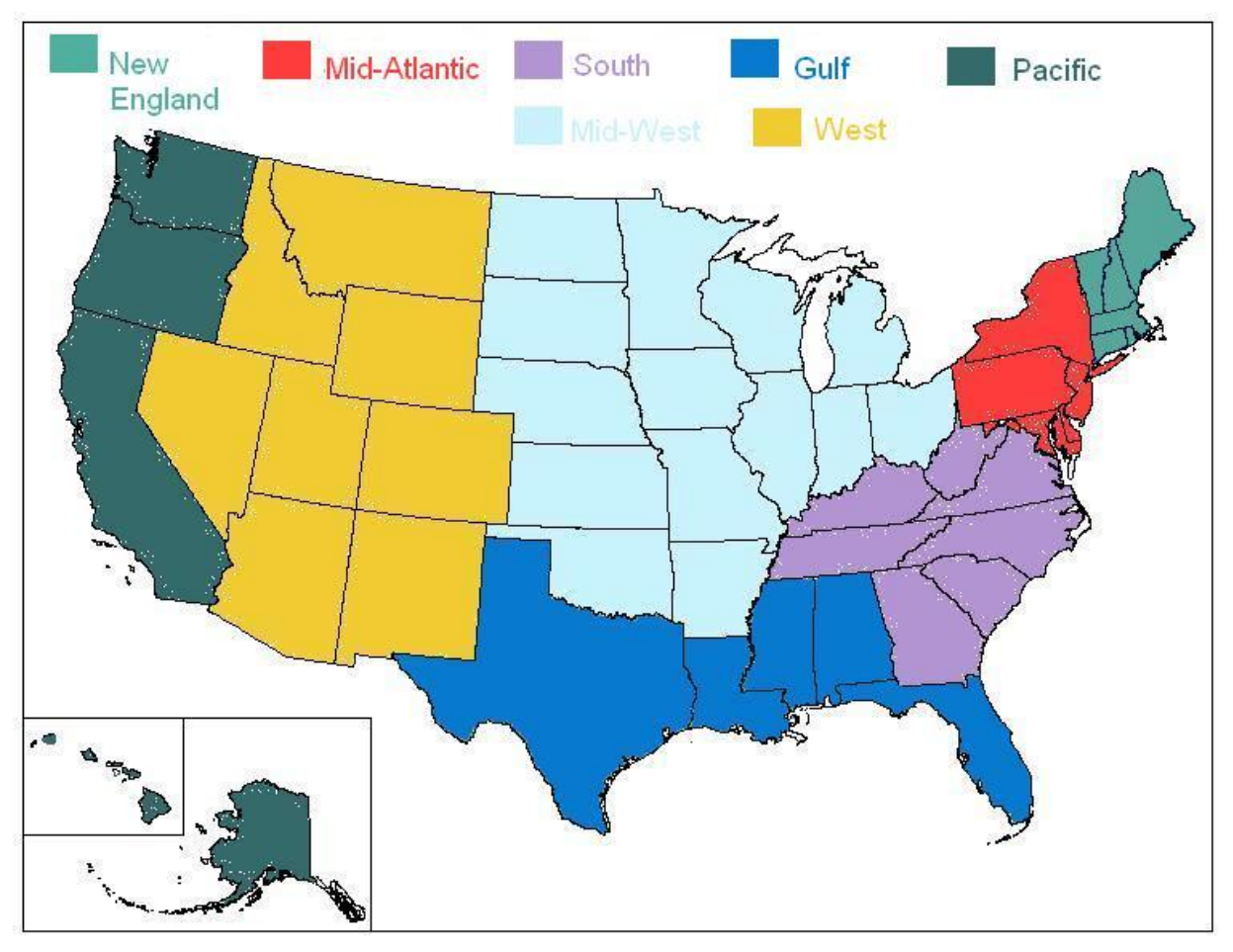
Ohio

- **Focus on business attraction and development, building supply chain and manufacturing base**

South Carolina

- **Promoting demonstrations, hydrogen stations, business development**

Regions of the United States



Highlights by Region

New England has become a hotbed of fuel cell activity, with major stationary fuel cell installations, fuel cell buses, and favorable policy and tax environments to those looking to invest in fuel cells. **Connecticut** and **Massachusetts** stand out with generous grant programs and comprehensive energy policies, and are home to several major fuel cell manufacturers.

The **Mid-Atlantic** is working hard to create markets for fuel cell applications. **Delaware** has made it easy for fuel cell manufacturing to move into the State, and **New York** has set up a great financing mechanism through the New York State Energy and Research Development Authority (NYSERDA). Other states in the region have installations, forklift demonstrations and sound policies that include the technology.

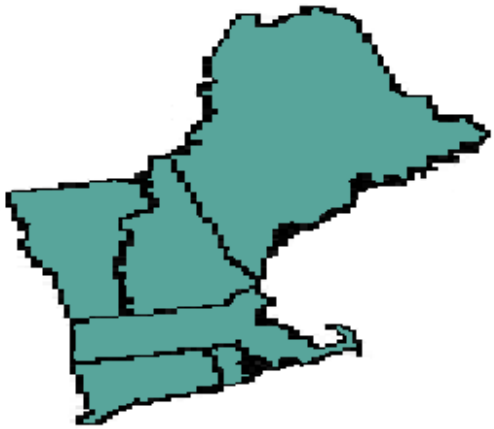
The **South**'s hotbed of fuel cell activity is found in **South Carolina**. The state, and city of Columbia, want to be fuel cell leaders and both are working to facilitate fuel cell development and demonstrations. Several Southern states include hydrogen and/or fuel cells in their Renewable Portfolio Standards, their net metering and interconnection policies, as well as offer tax incentives. In addition, the Southern Fuel Cell Coalition and Fuel Cell South are two regional organizations helping to advance the industry in the region.

In the **Gulf** region, **Florida** and **Texas** have been the most active supporters of fuel cells. Florida has designated the hydrogen technology industry as a Qualified Target Industry, providing tax refunds for companies that create high wage jobs. The state has also launched H2 Florida, a statewide program to accelerate the commercialization of hydrogen technologies. Texas has a hydrogen Roadmap in place to increase hydrogen production and increase demand in the transport sector. Texas is also home to the Houston Advanced Research Center (HARC), which has been active in fuel cell research and development for many years.

Two states strongly stand out in the **Mid-West** region – **Ohio**, with its plethora of research and manufacturing and proactive business development policies; and **Michigan**, with its roots in the auto industry. There is also activity in the other states of the Mid-West region, and those lacking in actual systems and products have at least laid the groundwork with legislation and policy. Farm-focused states, such as **Minnesota**, are realizing the potential of using biomass, methane and other farm-produced anaerobic digester gas in fuel cells.

The **West**, with a few exceptions, is a relatively quiet region with respect to fuel cell installations and demonstrations. Many of the fuel cell installations in the West were initiated by the US Department of Defense through their various fuel cell demonstration programs at military bases and facilities and are now decommissioned. Las Vegas, **Nevada** has two hydrogen stations – one station incorporates power generation that is sold back to the grid – which fuel several fuel cell and hydrogen vehicles.

States in the **Pacific** region are some of the most accomplished with regards to fuel cell installations and policy. **California** is a stellar example of how policy can influence the market, with the Self-Generating Incentive Program (SGIP) helping to fund many recent large-scale stationary installations. California also leads the country, if not the world, with fuel cell vehicle and bus demonstrations and hydrogen fueling stations. **Hawaii** is demonstrating hydrogen fuel cell buses and a fueling station at Hickam Air Force Base and has many policies in place to support the technology. **Oregon** and **Washington** are both home to fuel cell manufacturers and Oregon's Congressman joined with a representative from California to secure tax parity for residential fuel cells.



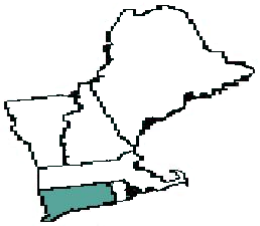
New England

The EVermont Hydrogen Filling Station opened in Burlington, Vermont in 2006. Hydrogen is produced from wind-powered electrolysis with a Proton Energy Systems electrolyzer.

The US Coast Guard Aid to Navigation Team maintenance facility in Bristol, Rhode Island hosted a Department of Defense Residential PEM Fuel Cell Demonstration Project installation.

CTTransit operates a fuel cell bus in daily transit service. The vehicle is powered by a fuel cell from UTC Power, a Connecticut fuel cell manufacturer. The transit agency is planning deployment of additional fuel cell buses.

The Whole Foods Market in Denham, Massachusetts uses a 400 kW fuel cell power system from UTC Power to provide 90% of the stores electrical needs, and virtually all its hot water.



Connecticut

State Policies Supporting Fuel Cells	**State H2 or FC Roadmap**	√
	H2 or FC in Renewable Portfolio Standard	√
	Net Metering / Interconnection Standards	√
	Tax Incentives	√
	Grants / Loans	√
Fuel Cell Vehicles		
Fuel Cell Buses	• **CTTransit fuel cell bus operated in daily transit service (Hartford), additional buses are planned**	
Fuel Cell Forklifts		
Hydrogen Stations	• **UTC Power, South Windsor** • **SunHydro hydrogen station planned, Wallingford**	
Large Stationary Fuel Cell Installations*	• **Connecticut Science Center, Hartford** • **Cabela's Sporting Goods, East Hartford** • **Pepperidge Farm Bakery, Bloomfield** • **Whole Foods Market, Glastonbury** • **Eastern Connecticut State University, Willimantic** • **Fuel cells were installed at five locations in Connecticut during the 1990s/2000s under the Department of Defense PAFC Demonstration (Groton) and Climate Change Rebate Program (Windsor Locks, Middletown, Uncasville, South Windsor).** ***we've selected a few installations but there are many more, please go to http://www.fuelcells.org/info/statedatabase.html to see the complete list**	
Small Stationary Fuel Cell Installations		
State or Regional H2FC Partnerships	• **Connecticut Hydrogen Fuel Cell Coalition**	
Comments	• **A market analysis* by the Connecticut Center for Advanced Technology reports that:** ○ **For each job the hydrogen and fuel cell industry directly supports, an additional 1.31 jobs are indirectly supported elsewhere in Connecticut.**	

	○ For every $1.00 of revenue generated by the hydrogen and fuel cell industry, an additional $0.84 of revenue is received by the state of Connecticut. ○ For every $1.00 paid to industry employees, an additional $0.72 is paid by other employers in the supply chain. • Fuel cell manufacturers: ○ UTC Power, South Windsor ○ FuelCell Energy, Danbury ○ Proton Energy System, Wallingford • Connecticut is also home to the Connecticut Clean Energy Fund which has helped to fund installations of six major fuel cell projects around the state. • The Mohegan Tribe of Connecticut has deployed fuel cells at the Mohegan Sun Casino and have implemented a fuel cell education program. • The Center for Clean Energy Engineering (formerly the Connecticut Global Fuel Cell Center) is located at the University of Connecticut. *Connecticut Fuel Cell Activities: Markets, Programs, & Models (Dec. 2009)

The following are some of the important elements that contribute to Connecticut's success as a Top Five Fuel Cell State:

Fuel Cell Economic Development Plan Hydrogen Roadmap
http://www.ct.gov/ecd/lib/ecd/fuel_final.doc

Connecticut Clean Energy Fund
http://www.ctcleanenergy.com

Connecticut Hydrogen-Fuel Cell Coalition
http://www.chfcc.org

Center for Clean Energy Engineering (formerly the Connecticut Global Fuel Cell Center)
http://www.energy.uconn.edu

Mohegan Fuel Cell Education Program
http://www.cleanair-coolplanet.org/information/pdf/mohegan-tribe-of-ct.pdf

CTTransit – fuel cell bus
http://www.cttransit.com/Press/Display.asp?PressID=%7B1CC84229-30CE-4859-BBEF-538B908E60F0%7D

Maine

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	X
	H2 or FC in Renewable Portfolio Standard	√
	Net Metering / Interconnection Standards	√
	Tax Incentives	X
	Grants / Loans	√
Fuel Cell Vehicles		
Fuel Cell Buses		
Fuel Cell Forklifts		
Hydrogen Stations		
Large Stationary Fuel Cell Installations		
Small Stationary Fuel Cell Installations	• Chewonki Foundation Environmental Education Center, Wiscasset - hydrogen is provided by electrolysis from solar panels	
State or Regional H2FC Partnerships	• Maine Hydrogen Energy Fuel Cell Partnership	
Comments	• The Chewonki Renewable Hydrogen Project is a joint venture between the Hydrogen Energy Center, the Chewonki Foundation and Maine Energy Investment Corporation to accelerate deployment of renewable energy systems using hydrogen and fuel cells.	

Massachusetts

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	X
	H2 or FC in Renewable Portfolio Standard	√
	Net Metering / Interconnection Standards	√
	Tax Incentives	√
	Grants / Loans	√
Fuel Cell Vehicles		
Fuel Cell Buses	• Fuel cell bus planned (Boston)	
Fuel Cell Forklifts		
Hydrogen Stations	• Nuvera Fuel Cells, Inc. headquarters, Billerica	
Large Stationary Fuel Cell Installations	• Star Market, Newton • Whole Foods, Dedham • Fuel cells were installed at four sites in Massachusetts during the 1990s/2000s under the Department of Defense PAFC Demonstration (Natick, West Chicopee) and the Climate Change Rebate Program (Boston, West Barnstable).	
Small Stationary Fuel Cell Installations	• Verizon Engineering Facility, Woburn - first fuel cell-powered telecommunications site in the US	
State or Regional H2FC Partnerships	• Massachusetts Fuel Cell Partnership • Massachusetts Hydrogen Coalition	

Comments	• Fuel cell manufacturers:
	  •Nuvera Fuel Cells, Billerica
	  •Lilliputian Fuel Cells, Inc., Wilmington
	  •Protonex Technology Corporation, Southborough
	  •Ballard Material Products, Lowell
	• Nuvera Fuel Cells received funding from the American Recovery and Reinvestment Act to deploy 10 fuel cell forklifts in Pennsylvania.
	• The state-run Massachusetts Technology Collaborative offers several programs that fund fuel cell projects.
	• The Massachusetts Hydrogen and Fuel Cell Institute is located at Worcester Polytechnic Institute.	

New Hampshire

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	X
	H2 or FC in Renewable Portfolio Standard	√
	Net Metering / Interconnection Standards	X
	Tax Incentives	X
	Grants / Loans	√
Fuel Cell Vehicles		
Fuel Cell Buses		
Fuel Cell Forklifts		
Hydrogen Stations		
Large Stationary Fuel Cell Installations		
Small Stationary Fuel Cell Installations		
State or Regional H2FC Partnerships		
Comments	• New Hampshire lists fuel cells running off biogas or other renewable sources of hydrogen in their renewable energy portfolio standards.	

Rhode Island

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	X
	H2 or FC in Renewable Portfolio Standard	√
	Net Metering / Interconnection Standards	√
	Tax Incentives	√
	Grants / Loans	√
Fuel Cell Vehicles		
Fuel Cell Buses		
Fuel Cell Forklifts		
Hydrogen Stations		
Large Stationary Fuel Cell Installations	• South County Hospital, Wakefield • Fuel cells were installed at two sites in Rhode Island during the 1990s/2000s under the Department of Defense PAFC Demonstration (Naval Station Newport) and the Climate Change Rebate Program (South County Hospital, Wakefield).	
Small Stationary Fuel Cell Installations	• One fuel cell was installed in 2004 (USCG Aids to Navigation Team site, Bristol) under the Department of Defense Residential PEM Fuel Cell Project.	
State or Regional H2FC Partnerships		
Comments		

Vermont

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	X
	H2 or FC in Renewable Portfolio Standard	√
	Net Metering / Interconnection Standards	√
	Tax Incentives	√
	Grants / Loans	√
Fuel Cell Vehicles	• Hydrogen-powered Prius deployed under EVermont Electric/Hybrid Station Car Project	
Fuel Cell Buses		
Fuel Cell Forklifts		
Hydrogen Stations	• EVermont Hydrogen Station, Burlington (uses wind-powered PEM electrolysis)	
Large Stationary Fuel Cell Installations		
Small Stationary Fuel Cell Installations		
State or Regional H2FC Partnerships		
Comments		

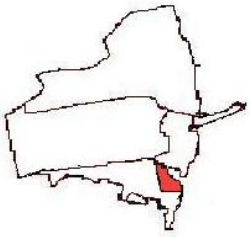
Mid-Atlantic

The Hunts Point Waste Water Treatment Plant, in the Bronx, New York, uses three 200 kW units from UTC Power that operate in parallel with the grid.

The University of Delaware's Department of Mechanical Engineering conducts research on two fuel cell buses that operate along normal campus routes. The 20 kW fuel cells are from Ballard Power Systems.

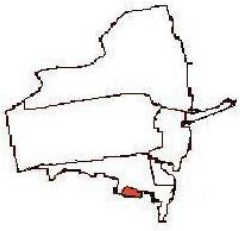
The Sheraton Hotel in Edison, New Jersey uses a 250 kW molten carbonate fuel cell from FuelCell Energy. The fuel cell provides 25% of the hotel's electric and hot water needs.

New York Police Department in Central Park uses a 200 kW phosphoric acid fuel cell from UTC Power that operates independently from the grid. During a major city-wide power outage in 2003, the station was unaware of the situation because the fuel cell continued to supply electricity to the building.



Delaware

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	X
	H2 or FC in Renewable Portfolio Standard	√
	Net Metering / Interconnection Standards	√
	Tax Incentives	√
	Grants / Loans	√
Fuel Cell Vehicles		
Fuel Cell Buses	• Two University of Delaware fuel cell shuttle buses used in daily transit service, two more buses planned	
Fuel Cell Forklifts		
Hydrogen Stations	• Air Liquide, Newark • SunHydro hydrogen station, Claymont (planned)	
Large Stationary Fuel Cell Installations		
Small Stationary Fuel Cell Installations	• Ion Power, New Castle	
State or Regional H2FC Partnerships	• Mid-Atlantic Hydrogen Coalition	
Comments	• Clean Energy Research Center provides grant funds and support for the fuel cell industry. • Delaware uses grants to attract clean energy manufacturing, in an effort to build a fuel cell industry in the State. • The Center for Fuel Cell Research is located at the University of Delaware.	



District of Columbia

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	X
	H2 or FC in Renewable Portfolio Standard	√
	Net Metering / Interconnection Standards	√
	Tax Incentives	X
	Grants / Loans	X
Fuel Cell Vehicles	• Six Chevy Equinox fuel cell vehicles used by the federal government, including one used by USPS for mail delivery • Additional Chevy Equinox fuel cell vehicles deployed under Project Driveway	
Fuel Cell Buses		
Fuel Cell Forklifts		
Hydrogen Stations	• Shell Hydrogen Station. First US hydrogen pump at a Shell retail gas station	
Large Stationary Fuel Cell Installations		
Small Stationary Fuel Cell Installations	• One fuel cell is currently operating at the Department of State ICC Administrative Building, installed through the Department of Defense Residential PEM Fuel Cell Project.	
State or Regional H2FC Partnerships		
Comments	• Georgetown University has been working on fuel cell powered buses since 1994, and are now on their third generation bus.	

Maryland

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	X
	H2 or FC in Renewable Portfolio Standard	√
	Net Metering / Interconnection Standards	X
	Tax Incentives	X
	Grants / Loans	X
Fuel Cell Vehicles		
Fuel Cell Buses		
Fuel Cell Forklifts	• 61 fuel cell forklifts at Whole Foods warehouse, Landover	
Hydrogen Stations		
Large Stationary Fuel Cell Installations	• One fuel cell at the Naval Academy in the 1990s, installed through the Department of Defense PAFC Demonstration program (decommissioned).	
Small Stationary Fuel Cell Installations	• Emergency 911 (MEIMSS) System remote telecommunications site, Elk Neck State Park • Two fuel cells were installed in 2004 at NAS Patuxent River through the Department of Defense Residential PEM Demonstration Project.	
State or Regional H2FC Partnerships	• Mid-Atlantic Hydrogen Coalition	
Comments	• The Maryland Renewable Portfolio Standard includes fuel cells powered by methane or biogas. • Ballard/UMD/Army Research Laboratory FuelWorks Center of Excellence is located at the University of Maryland, College Park, focusing on reformer-based fuel cell systems. • German fuel cell manufacturer SFC Smart Fuel Cell has relocated a sales and service office to Rockville, Maryland.	

New Jersey

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	X
	H2 or FC in Renewable Portfolio Standard	√
	Net Metering / Interconnection Standards	√
	Tax Incentives	√
	Grants / Loans	X
Fuel Cell Vehicles		
Fuel Cell Buses		
Fuel Cell Forklifts		
Hydrogen Stations	• Private residence, Hopewell	
Large Stationary Fuel Cell Installations	• Sheraton Hotel, Edison and Parsippany (fuel cell at each location) • Johnson & Johnson World Headquarters, New Brunswick • Ramapo College, Mahwah • Ocean County College, Toms River • The College of New Jersey, Ewing Township • Fuel cells were installed at three sites in the 1990s/2000s through the Department of Defense PAFC Demonstration (Dover) and the Climate Change Rebate Program (Mahwah, Rahway).	
Small Stationary Fuel Cell Installations	• Private residence, Hopewell	
State or Regional H2FC Partnerships	• Mid-Atlantic Hydrogen Coalition	
Comments	• BASF, a fuel cell component supplier, has closed its facility in Germany and consolidated its manufacturing in Somerset, New Jersey.	

New York

State Policies Supporting Fuel Cells	State H2 or FC Roadmap:	√
	H2 or FC in Renewable Portfolio Standard	√
	Net Metering / Interconnection Standards	√
	Tax Incentives	√
	Grants / Loans	√
Fuel Cell Vehicles	• Chevy Equinox fuel cell vehicles deployed under Project Driveway • State leased two Honda FCX fuel cell vehicles in 2005 , two-year demonstration	
Fuel Cell Buses	• Two fuel cell buses are planned, one in Albany, the other location to be determined	
Fuel Cell Forklifts	• Fuel cell forklifts deployed at Raymond Corp., Greene	
Hydrogen Stations	• Albany Airport hydrogen station • Hempstead hydrogen station • Shell hydrogen stations at JFK Airport, the Bronx, and White Plains • Rochester Green City Hydrogen Station • State University at Buffalo hydrogen station for a two year trial • GM facility hydrogen stations in Honeoye Falls and Ardsley • Plug Power facility hydrogen station, Latham	
Large Stationary Fuel Cell Installations*	• Coca-Cola Enterprises Production Facility, Elmsford • Bronx Zoo, Lion House, Bronx • East Rochester Elementary School, East Rochester • Hilton New York, New York City • NASDAQ sign at the Condé Nast building, New York City • Sheraton New York Hotel & Towers, New York City • Verizon Call Center & Communications Building, Garden City • New York Aquarium, Coney Island • Central Park Police Headquarters, New York City • Fuel cells installed at 5 wastewater treatment plants (two in Brooklyn, Staten Island, Bronx, Yonkers) • Fuel cells were installed in the 1990s/2000s at seven sites in New York through the Department of Defense PAFC Demonstration (West Point, Albany) and the Climate Change Rebate Program (Staten Island, Liverpool,	

	Syracuse, New York City and the Bronx). Installations include a fuel cell at the North Central Bronx Hospital and Liverpool High School. *we've selected a few installations but there are many more, please go to http://www.fuelcells.org/info/statedatabase.html to see the complete list
Small Stationary Fuel Cell Installations	• 22 state public safety communication facilities, used for backup power • In the early 2000s, the Long Island Power Authority (LIPA) installed 100 fuel cells around Long Island • Fuel cells were installed at four sites in the 2000s through the Department of Defense Residential PEM Demonstration Project (Sarasota Springs, West Point, Albany, Westhampton).
State or Regional H2FC Partnerships	• New York Fuel Cell Network
Comments	• The NYSERDA and NYPA programs facilitate fuel cell demonstrations • New York State's Public Service Commission recently allocated $21.6 million for fuel cell installations. • GM's Fuel Cell Development Center is located in Honeoye Falls. • Fuel cell manufacturers: •Plug Power, Latham •MTI Micro Fuel Cells, Inc., Albany • American Recovery and Reinvestment Act funding was awarded to New York state fuel cell companies, MTI Micro Fuel Cells ($2.4 million) and Plug Power ($6.1 million) for fuel cell demonstrations. • The Cornell Fuel Cell Institute is located at Cornell University.

The following are some of the important elements that contribute to New York's success as a Top Five Fuel Cell State:

New York State Hydrogen Energy Roadmap
http://www.nyserda.org/programs/Research_Development/Roadmap.pdf

New York State Energy Research and Development Authority (NYSERDA)
http://www.nyserda.org/programs/Research_Development/hydrogen.asp

New York Power Authority (NYPA)
http://www.nypa.gov/wwwnypagov/wwwroot/services/fuel%20cell%20projects.htm

LIPA
http://www.lipower.org/pdfs/cei/vbdocument.pdf

New York State Fuel Cell Network
http://www.neny.org/NYFCN/index.cfm

Pennsylvania

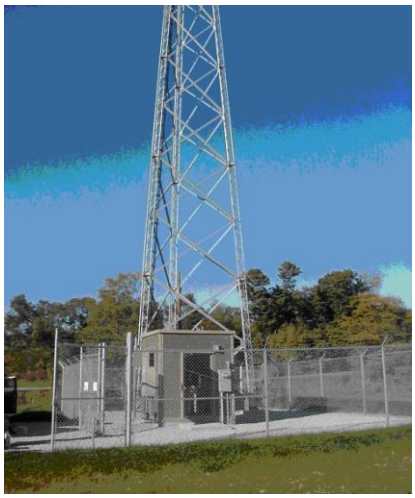
State Policies Supporting Fuel Cells	State H2 or FC Roadmap	X
	H2 or FC in Renewable Portfolio Standard	√
	Net Metering / Interconnection Standards	√
	Tax Incentives	√
	Grants / Loans	√
Fuel Cell Vehicles		
Fuel Cell Buses	• Centre Area Transportation Authority operates a fuel cell bus serving University Park / Pennsylvania State University	
Fuel Cell Forklifts	• GENCO received $6.1 million from the American Recovery and Reinvestment Act to deploy 156 fuel cell systems for lift trucks at six of GENCO's existing distribution centers, including sites in Pennsylvania. • Wegmans Retail Service Center, Pottsville, 50 pallet trucks and 9 stand-up forklifts , partially funded by a $1 million grant from the Pennsylvania Energy Development Authority (PEDA) • East Penn Manufacturing Company, Topton, 10 forklifts • DDSP - Defense Distribution Depot, New Cumberland, 40 forklifts	
Hydrogen Stations	• East Penn Manufacturing Center, Topton • Penn State/Air Products, University Park	
Large Stationary Fuel Cell Installations	• Two fuel cells were installed in the 1990s through the Department of Defense PAFC Demonstration program (Pittsburgh, Johnstown).	
Small Stationary Fuel Cell Installations	• Phipps Conservatory and Botanical Garden, Pittsburgh • Hyner Run State Park radio tower • Cellular communications tower, Wilkes Barre	
State or Regional H2FC Partnerships	• Pennsylvania Hydrogen and Fuel Cell Consortium	

Comments	• Air Liquide Headquarters, Allentown
	• Fuel cell manufacturers:
	  •Franklin Fuel Cells, Pottstown
	  •Siemens Energy, Inc., Pittsburgh
	• The Penn State Hydrogen Energy (H2E) Center is located at Pennsylvania State University	

Mid-West

Central Grocers has purchased 221 Yale forklifts powered by PlugPower GenDrive PEM fuel cells for their distribution center in Joliet, Illinois. Air Products is providing the hydrogen gas and fueling stations.

In Detroit, Michigan, the Ford Focus fuel cell vehicle has undergone testing as part of the Department of Energy's National Hydrogen Learning Demonstration.



Ohio has installed 1 kW PEM fuel cells from ReliOn to provide back-up power to four Multi-Agency Radio Communications System towers across the state.

The Haubenschild Family Farm in Princeton, Minnesota uses an anaerobic digester to produce methane gas from animal waste. The methane gas is used as fuel for a 5 kW Plug Power fuel cell that generates electricity for the farm.

Arkansas

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	X
	H2 or FC in Renewable Portfolio Standard	√
	Net Metering / Interconnection Standards	√
	Tax Incentives	√
	Grants / Loans	X
Fuel Cell Vehicles		
Fuel Cell Buses		
Fuel Cell Forklifts		
Hydrogen Stations		
Large Stationary Fuel Cell Installations	• Two fuel cells were installed in the 1990s through the Department of Defense PAFC Demonstration program (Jacksonville, White Hall).	
Small Stationary Fuel Cell Installations		
State or Regional H2FC Partnerships		
Comments	• Arkansas-based FedEx Freight East (Harrison) received $1.3 million in the American Recovery and Reinvestment Act funding to deploy 35 fuel cell systems as battery replacements for a complete fleet of electric lift trucks at an existing FedEx service center in Missouri.	

Illinois

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	√
	H2 or FC in Renewable Portfolio Standard	X
	Net Metering / Interconnection Standards	√
	Tax Incentives	X
	Grants / Loans	√
Fuel Cell Vehicles		
Fuel Cell Buses	• Chicago Transit Authority fuel cell bus demonstration (concluded in 2000)	
Fuel Cell Forklifts	• Central Grocers, Joliet, 220 forklifts	
Hydrogen Stations	• CTA's Chicago/Pulaski Avenue Garage Hydrogen Station • Ethanol to Hydrogen Station, Chicago • Gas Technology Institute Hydrogen Fueling Station, Des Plaines	
Large Stationary Fuel Cell Installations	• Caterpillar Technical Center, Peoria	
Small Stationary Fuel Cell Installations	• One fuel cell was installed in the 1990s through the Department of Defense Residential PEM Demonstration Project (Champaign).	
State or Regional H2FC Partnerships	• Illinois 2H2 Partnership • Chicago Area Clean Cities Coalition	
Comments	• Argonne National Laboratory, one of the U.S. Department of Energy's oldest and largest national science and engineering laboratories, conducts fuel cell research in Illinois.	

Indiana

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	X
	H2 or FC in Renewable Portfolio Standard	X
	Net Metering / Interconnection Standards	√
	Tax Incentives	√
	Grants / Loans	√
Fuel Cell Vehicles		
Fuel Cell Buses		
Fuel Cell Forklifts		
Hydrogen Stations	• Naval Surface Warfare Center Hydrogen Station, Crane	
Large Stationary Fuel Cell Installations	• Crane Naval Surface Warfare Center, during the 1990s field tested the world's first 250 kW PEM fuel cell generator • Wabash River Energy Facility, 2MW, hydrogen derived from natural gas and coal-derived synthesis gas	
Small Stationary Fuel Cell Installations		
State or Regional H2FC Partnerships		
Comments	• In 2006, Indiana University-Purdue University (IUPUI) was awarded $1.5 million to collaborate with the U.S. Army in the development of fuel cells powered by ethanol and grain alcohol.	

Iowa

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	√
	H2 or FC in Renewable Portfolio Standard	√
	Net Metering / Interconnection Standards	X
	Tax Incentives	√
	Grants / Loans	√
Fuel Cell Vehicles		
Fuel Cell Buses		
Fuel Cell Forklifts		
Hydrogen Stations		
Large Stationary Fuel Cell Installations		
Small Stationary Fuel Cell Installations		
State or Regional H2FC Partnerships	• Was a member of the Upper Midwest Hydrogen Initiative which was part of the Great Plains Institute (now dissolved).	
Comments	• Iowa has a Renewable Energy Tax Credit that includes $1.44 per 1,000 standard cubic feet of hydrogen fuel generated by and purchased from an eligible renewable energy facility.	

Kansas

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	X
	H2 or FC in Renewable Portfolio Standard	√
	Net Metering / Interconnection Standards	√
	Tax Incentives	X
	Grants / Loans	X
Fuel Cell Vehicles		
Fuel Cell Buses		
Fuel Cell Forklifts		
Hydrogen Stations		
Large Stationary Fuel Cell Installations		
Small Stationary Fuel Cell Installations		
State or Regional H2FC Partnerships		
Comments		

Michigan

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	√
	H2 or FC in Renewable Portfolio Standard	X
	Net Metering / Interconnection Standards	√
	Tax Incentives	√
	Grants / Loans	√
Fuel Cell Vehicles	• Site of US Department of Energy National Hydrogen Learning Demonstration, operating four Ford Focus fuel cell vehicles and five Daimler F-Cell vehicles.	
Fuel Cell Buses	• Methanol fuel cell/battery plug-in demonstration (Traverse City), planned	
Fuel Cell Forklifts	• Michelin tested two fuel cell lift trucks	
Hydrogen Stations	• Chevron Hydrogen Energy Station, Selfridge • City of Taylor hydrogen station, Taylor • General Motors (Milford) and Ford (Romeo) Proving Grounds • NextEnergy Hydrogen Station, Detroit • DTE Hydrogen Technology Park Station, Southfield • EPA National Vehicle and Fuel Emissions Lab, Ann Arbor	
Large Stationary Fuel Cell Installations	• Grand Valley State University, Muskegon	
Small Stationary Fuel Cell Installations	• Ford Assembly Plant, Dearborn, fuel augmented with paint fume emissions • Fuel cell installed through the Department of Defense Residential PEM Demonstration Program (Selfridge ANGB).	
State or Regional H2FC Partnerships	• NextEnergy	
Comments	• Delphi, located in Troy, received $2.4 million from the American Recovery and Reinvestment Act for a 3- to 5-kW solid oxide fuel cell auxiliary power unit for heavy duty, commercial Class 8 trucks. • Adaptive Materials, Ann Arbor, received $3 million from Michigan's Centers of Energy Excellence Program (COEE) to develop fuel cells for RVs. • Energy Conversion Devices, Inc. is a fuel cell manufacturer located in Rochester Hills. • The Center for Fuel Cell Systems is located at Kettering University.	

Minnesota

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	√
	H2 or FC in Renewable Portfolio Standard	√
	Net Metering / Interconnection Standards	√
	Tax Incentives	√
	Grants / Loans	√
Fuel Cell Vehicles		
Fuel Cell Buses		
Fuel Cell Forklifts		
Hydrogen Stations		
Large Stationary Fuel Cell Installations	• Through the US Department of Defense's PAFC Demonstration Program, a 200-kW unit was installed at the 934th Airlift Wing in Minneapolis (now decommissioned).	
Small Stationary Fuel Cell Installations	• Eden Prairie Library, Eden Prairie • FTTH Communications facility, Albertville • Haubenschild Farm, Princeton (an anaerobic digester is used to turn cow manure at the farm into methane gas that is used to power the 5-kW fuel cell. Provides power for the farm.)	
State or Regional H2FC Partnerships	• Minnesota Renewable Hydrogen Initiative (MRHI) • Was a member of the Upper Midwest Hydrogen Initiative which was part of the Great Plains Institute (now dissolved).	
Comments		

Missouri

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	X
	H2 or FC in Renewable Portfolio Standard	√
	Net Metering / Interconnection Standards	√
	Tax Incentives	√
	Grants / Loans	√
Fuel Cell Vehicles		
Fuel Cell Buses	• Two hydrogen-powered shuttle buses operated at Fort Leonard Wood, later by the Missouri University of Science and Technology	
Fuel Cell Forklifts	• FedEx Freight East, Springfield, 35 forklifts • Wal-Mart Fuel Cell Forklift Pallet Truck Demonstration	
Hydrogen Stations	• Missouri University of Science and Technology hydrogen station (formerly the University of Missouri, Rolla)	
Large Stationary Fuel Cell Installations		
Small Stationary Fuel Cell Installations		
State or Regional H2FC Partnerships		
Comments	• Students at the Missouri University of Science and Technology's (Missouri S&T) are designing a hydrogen fuel cell vehicle for EcoCAR: The Next Challenge, a three-year collegiate competition established by the DOE and GM.	

Nebraska

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	X
	H2 or FC in Renewable Portfolio Standard	√
	Net Metering / Interconnection Standards	X
	Tax Incentives	X
	Grants / Loans	√
Fuel Cell Vehicles		
Fuel Cell Buses		
Fuel Cell Forklifts		
Hydrogen Stations		
Large Stationary Fuel Cell Installations	• First National Bank, Omaha • A fuel cell is located at Henry Doorly Zoo (Omaha), installed through the Department of Defense Climate Change Rebate Project.	
Small Stationary Fuel Cell Installations	• Through the U.S. Department of Defense's Residential PEM Fuel Cell Demonstration Program, two 2-kW units were installed at Offutt Air Force Base in Omaha, Nebraska (now decommissioned).	
State or Regional H2FC Partnerships		
Comments	• The 800 kW fuel cell system at the First National Bank of Omaha was installed in 1999 and since then has reduced heating bills by more than $1 million.	

North Dakota

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	√
	H2 or FC in Renewable Portfolio Standard	√
	Net Metering / Interconnection Standards	X
	Tax Incentives	√
	Grants / Loans	√
Fuel Cell Vehicles		
Fuel Cell Buses		
Fuel Cell Forklifts		
Hydrogen Stations	• State University North Central Research Extension Center hydrogen station, Minot	
Large Stationary Fuel Cell Installations		
Small Stationary Fuel Cell Installations	• In Fargo, a 1-kW fuel cell is used in a radio communication-air to ground system.	
State or Regional H2FC Partnerships	• Was a member of the Upper Midwest Hydrogen Initiative which was part of the Great Plains Institute (now dissolved)	
Comments	• Despite the lack of installations and demonstrations, North Dakota's retiring Senator, Byron Dorgan, is a staunch fuel cell and hydrogen supporter and helped find funding and support to open the National Center for Hydrogen Technology Research Facility at the University of North Dakota in Grand Forks.	

Ohio

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	√
	H2 or FC in Renewable Portfolio Standard	√
	Net Metering / Interconnection Standards	√
	Tax Incentives	√
	Grants / Loans	√
Fuel Cell Vehicles		
Fuel Cell Buses	• NASA Glenn Research Center (Cleveland) and the Greater Cleveland Regional Transit Authority are planning to deploy a fuel cell bus.	
Fuel Cell Forklifts	• GENCO received $6.1 million from the American Recovery and Reinvestment Act to deploy 156 fuel cell systems as battery replacements for fleets of electric lift trucks at six of GENCO's existing distribution centers, including two locations in Ohio.	
Hydrogen Stations	• Ohio State University hydrogen station, Columbus	
Large Stationary Fuel Cell Installations	• Electric Substation, Westerville. Will feed power to 180 homes.	
Small Stationary Fuel Cell Installations	• Environmental Education Center, Cuyahoga Valley National Park (decommissioned) • Multi-Agency Radio Communications System – fuel cells are providing long-term emergency back-up power to multiple microwave radio towers	
State or Regional H2FC Partnerships	• Ohio Fuel Cell Coalition • Wright Fuel Cell Group	
Comments	• Ohio is aggressively recruiting industry by enacting policies and providing funding to attract business to the state. ○ The Third Frontier Program, created in the Ohio Department of Development, has helped to make Ohio a national technology leader and is credited with creating or retaining 48,000 jobs statewide. ○ The Ohio Fuel Cell Initiative, developed under the Third Frontier Program, has successfully attracted fuel cell companies to the state, including UltraCell and Rolls-Royce Fuel Cell Systems. • Fuel Cell Prototyping Center is located at the Stark State College of Technology.	

	• **The Ohio Fuel Cell Coalition has developed an interactive map of the state's fuel cell and hydrogen industry. 90% of the companies are involved in the supply chain.** • **Edison Materials Technology Center has developed a fuel cell supply chain database.**

The following are some of the important elements that contribute to Ohio's success as a Top Five Fuel Cell State:

Ohio's Fuel Cell Roadmap
http://www.development.ohio.gov/cms/uploadedfiles/Development.ohio.gov/Annual_Reports/OhioFuelCellRoadmapUpdate-033109_FINAL.pdf

Ohio Fuel Cell Coalition / Ohio Fuel Cell Corridor
http://web.memberclicks.com/mc/page.do?sitePageId=105145&orgId=ofcc

Ohio Third Frontier
http://www.thirdfrontier.com

Fuel Cell Supply Chain Database
http://www.emtec.org/db

Wright Fuel Cell Group
http://www.case.edu/energy/Wright%20Fuel_FINAL.pdf

Oklahoma

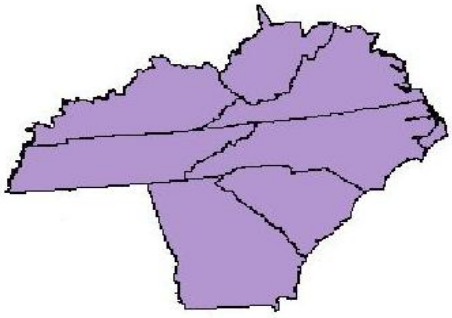
State Policies Supporting Fuel Cells	State H2 or FC Roadmap	X
	H2 or FC in Renewable Portfolio Standard	X
	Net Metering / Interconnection Standards	X
	Tax Incentives	X
	Grants / Loans	√
Fuel Cell Vehicles		
Fuel Cell Buses		
Fuel Cell Forklifts		
Hydrogen Stations		
Large Stationary Fuel Cell Installations		
Small Stationary Fuel Cell Installations		
State or Regional H2FC Partnerships	• In 2004, the State Legislature created the Fuel Cell Initiative Task Force, a 12-member team to assess the fuel cell industry and develop a statewide plan to encourage commercialization efforts in the state.	
Comments		

South Dakota

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	√
	H2 or FC in Renewable Portfolio Standard	X
	Net Metering / Interconnection Standards	√
	Tax Incentives	X
	Grants / Loans	X
Fuel Cell Vehicles		
Fuel Cell Buses		
Fuel Cell Forklifts		
Hydrogen Stations		
Large Stationary Fuel Cell Installations		
Small Stationary Fuel Cell Installations		
State or Regional H2FC Partnerships	• Was a member of the Upper Midwest Hydrogen Initiative which was part of the Great Plains Institute (now dissolved).	
Comments		

Wisconsin

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	X
	H2 or FC in Renewable Portfolio Standard	√
	Net Metering / Interconnection Standards	√
	Tax Incentives	√
	Grants / Loans	X
Fuel Cell Vehicles		
Fuel Cell Buses		
Fuel Cell Forklifts		
Hydrogen Stations		
Large Stationary Fuel Cell Installations		
Small Stationary Fuel Cell Installations	• 1-kW fuel cell is used in a radio communication-link repeater system, Swinn's Valley • CellCom fuel cell/solar/wind-powered telecom site	
State or Regional H2FC Partnerships	• Focus on Energy	
Comments	• The Focus on Energy group awarded $15,000 to Virent Energy Systems (formerly ACR Energy Systems), a Wisconsin startup company based on technology developed at the University of Wisconsin-Madison, which converts renewable biomass to hydrogen fuel. This hydrogen fuel can then be used to generate renewable electricity.	

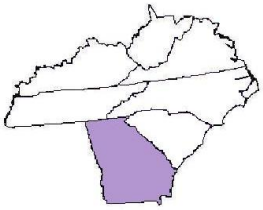


South

Bridgestone-Firestone is converting 22 battery powered forklifts to fuel cell power, using Plug Power GenDrive fuel cells at a plant in Aiken, South Carolina. This represents Bridgestone's fifth order for fuel cells in two years.

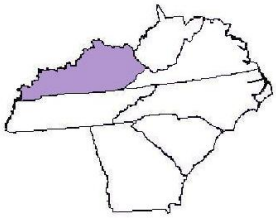
Yeager Airport in West Virginia opened its hydrogen station in 2008. The station will become part of a hydrogen corridor between Charleston and Pittsburgh, where additional stations are planned. Currently the station serves hydrogen powered vehicles at the airport, and an Air National Guard fork lift. Eventually the station will be converted into a public fueling station.

This 2.5 kW Plug Power fuel cell at the Fort Bragg Environmental Center in North Carolina was part of the Department of Defense Residential Fuel Cell Demonstration Program.



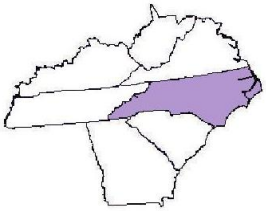
Georgia

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	X
	H2 or FC in Renewable Portfolio Standard	X
	Net Metering / Interconnection Standards	√
	Tax Incentives	√
	Grants / Loans	X
Fuel Cell Vehicles		
Fuel Cell Buses		
Fuel Cell Forklifts	• Defense Distribution Depot, Warner Robins Air Force Base (Defense Logistics Agency), 20 forklifts	
Hydrogen Stations		
Large Stationary Fuel Cell Installations		
Small Stationary Fuel Cell Installations	• Fuel cells have been installed at six sites during the 2000s through the Department of Defense Residential PEM Demonstration Project (Fort Gordon, Robins AFB, Fort Benning, Sandersville, and two sites in Atlanta). The fuel cell deployment at the Sandersville Airport (an FAA site) has been extended.	
State or Regional H2FC Partnerships	• Georgia is home to the Southern Hydrogen and Fuel Cell Coalition	
Comments	• The Fuel Cell Research Center is located at the Georgia Institute of Technology	



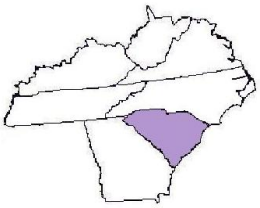
Kentucky

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	X
	H2 or FC in Renewable Portfolio Standard	X
	Net Metering / Interconnection Standards	X
	Tax Incentives	√
	Grants / Loans	X
Fuel Cell Vehicles		
Fuel Cell Buses		
Fuel Cell Forklifts		
Hydrogen Stations		
Large Stationary Fuel Cell Installations		
Small Stationary Fuel Cell Installations	• A fuel cell was installed at Fort Knox in 2004 through the Department of Defense Residential PEM Demonstration Project (now decommissioned).	
State or Regional H2FC Partnerships		
Comments		



North Carolina

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	X
	H2 or FC in Renewable Portfolio Standard	√
	Net Metering / Interconnection Standards	√
	Tax Incentives	√
	Grants / Loans	√
Fuel Cell Vehicles	• Advanced Vehicle Research Center of North Carolina (AVRC) tests hydrogen-fueled vehicles	
Fuel Cell Buses		
Fuel Cell Forklifts	• Coca-Cola production plant, Charlotte, 40 forklifts	
Hydrogen Stations		
Large Stationary Fuel Cell Installations		
Small Stationary Fuel Cell Installations	• Edgecombe-Martin Electric Membership Cooperative, Tarboro • Fuel cells were installed at three sites in North Carolina through the Department of Defense Residential PEM Demonstration Program (Cherry Point, Fort Bragg, Greensboro).	
State or Regional H2FC Partnerships	• NC Fuel Cell Alliance • The Hydrogen Economy and Advancement Team (HEAT) • Charlotte Hydrogen Action Team (CHAT)	
Comments	• Mooresville Hydrail Initiative is seeking to deploy fuel cell-powered train between Mooresville and Charlotte. • John Deere (Charlotte) has been involved in developing, demonstrating and pre-commercializing fuel cell-powered forklifts.	



South Carolina

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	X
	H2 or FC in Renewable Portfolio Standard	X
	Net Metering / Interconnection Standards:	√
	Tax Incentives	√
	Grants / Loans	√
Fuel Cell Vehicles		
Fuel Cell Buses	• Dual Variable Output fuel cell bus demonstration (planned), Columbia	
Fuel Cell Forklifts	• GENCO received $6.1 million from the American Recovery and Reinvestment Act to deploy 156 fuel cell systems as battery replacements for fleets of electric lift trucks at six of GENCO's existing distribution centers, including the GENCO-operated Kimberly-Clark distribution center, Graniteville, where 25 forklifts are planned • Bridgestone Firestone, Aiken, 22 forklifts	
Hydrogen Stations	• Columbia Hydrogen Station, Columbia • Sage Mill Industrial Park Hydrogen Station, Aiken	
Large Stationary Fuel Cell Installations		
Small Stationary Fuel Cell Installations	• City of Columbia Radio Network • Zero Net Energy Use solar/fuel cell home, The Ridge at Chukker Creek, Aiken • Fuel cells were installed at three sites in South Carolina through the Department of Defense Residential PEM Demonstration Program (McEntire ANG, Shaw AFB, Columbia).	
State or Regional H2FC Partnerships	• South Carolina Hydrogen Coalition • South Carolina Hydrogen and Fuel Cell Alliance • South Carolina is home to the regional organization, FuelCellSouth	
Comments	• The SC Hydrogen and Fuel Cell Alliance reports 65% job growth in SC's hydrogen cluster since 2004, and a 10 to 1 return for its hydrogen investment. • South Carolina's "hydrogen highway" opened in 2009, located between Aiken and Columbia. • The City of Columbia Council unanimously passed a resolution in 2006	

	supporting the city's objective to become a leader in fuel cell innovation. • The Greater Columbia Fuel Cell Challenge, an initiative of the USC Columbia Fuel Cell Collaborative, is collaborating with the private sector for the deployment of fuel cell technologies into multiple city, university and commercial applications throughout the region. • The state is home to the Center for Fuel Cell Research (University of South Carolina) ARC-Hydrogen (Aiken).

The following are some of the important elements that contribute to South Carolina's success as a Top Five Fuel Cell State:

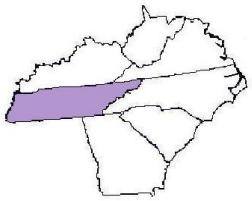
SCH2 - The South Carolina Hydrogen Economy: Capitalizing on the State's R&D Assets
http://www.energy.sc.gov/publications/SCH2%20ROADMAP.pdf

South Carolina's Hydrogen and Fuel Cell Economy Strategy
http://www.schydrogen.org/documents/SC_H2-FuelCellEconomy-Rev_3_2-20-08_x2x.pdf

South Carolina Hydrogen & Fuel Cell Alliance
http://www.schydrogen.org/index.html

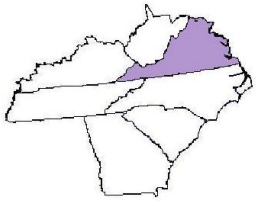
Engenuity SC
http://www.engenuitysc.com/intro.html

USC-City of Columbia Fuel Cell Collaborative
http://www.fuelcellchallenge.com



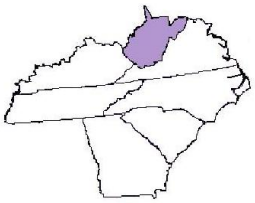
Tennessee

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	X
	H2 or FC in Renewable Portfolio Standard	X
	Net Metering / Interconnection Standards:	X
	Tax Incentives	X
	Grants / Loans	X
Fuel Cell Vehicles		
Fuel Cell Buses	• A hybrid (methanol fuel cell/battery plug-in) bus demonstration is planned in Chattanooga.	
Fuel Cell Forklifts	• Nissan North America, Smyrna, 60 methanol-powered fuel cell forklifts • Ozburn-Hessey Logistics, Smyrna, four pallet jacks	
Hydrogen Stations		
Large Stationary Fuel Cell Installations	• Oak Ridge National Laboratory, Oak Ridge	
Small Stationary Fuel Cell Installations	• EPB building, Chattanooga (planned) • The UTC SimCenter, Chattanooga • Falls Creek Inn, Falls Creek State Park (decommissioned) • Tennessee Valley Authority, Chattanooga	
State or Regional H2FC Partnerships	• Southern Hydrogen and Fuel Cell Coalition members include the Chattanooga Area Regional Transportation Authority, EVAmerica (Chattanooga), and the University of Tennessee-Knoxville.	
Comments		



Virginia

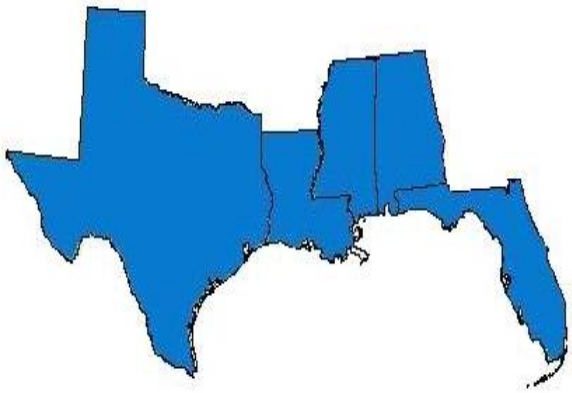
State Policies Supporting Fuel Cells	State H2 or FC Roadmap	X
	H2 or FC in Renewable Portfolio Standard	X
	Net Metering / Interconnection Standards:	X
	Tax Incentives	√
	Grants / Loans	X
Fuel Cell Vehicles	• USPS fuel cell postal truck delivers mail at Fort Belvoir	
Fuel Cell Buses		
Fuel Cell Forklifts	• DDNV-Defense Distribution Depot, Norfolk, 20 forklifts	
Hydrogen Stations	• Fort Belvoir	
Large Stationary Fuel Cell Installations	• A fuel cell was located at Fort Eustis (Newport News) through the Department of Defense PAFC Demonstration Program.	
Small Stationary Fuel Cell Installations	• The Stella Group Ltd., Arlington • Rappahannock Electric Cooperative, Bowling Green • Fuel cells were located at two sites through the Department of Defense Residential PEM Demonstration Project (Fort A.P. Hill, Fort Belvoir).	
State or Regional H2FC Partnerships	• Hydrogen-related activities are conducted by the Hampton Roads Clean Cities Coalition. Members include several Virginia state agencies. In 2006, the group released a report entitled, "Building a Hydrogen Economy in Virginia, Suggested Strategies."	
Comments	• Virginia is home to the Center for Automotive Fuel Cell Systems at Virginia Tech. • Sprint Communications, in Reston, received $7.3 million from the American Recovery and Reinvestment Act (ARRA) to demonstrate 1-kW to 10-kW fuel cell systems for backup power to state and local first responders and public safety answering points (911 centers).	



West Virginia

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	X*
	H2 or FC in Renewable Portfolio Standard	√
	Net Metering / Interconnection Standards:	√
	Tax Incentives	X
	Grants / Loans	X
Fuel Cell Vehicles		
Fuel Cell Buses		
Fuel Cell Forklifts		
Hydrogen Stations	• Yeager Airport Hydrogen Station, Charleston	
Large Stationary Fuel Cell Installations		
Small Stationary Fuel Cell Installations		
State or Regional H2FC Partnerships		
Comments	• The Yeager Airport Hydrogen Station will be part of a hydrogen highway along the I-79 corridor - there are plans for another station to be located at WVU at Morgantown, and a third will be located in Pittsburgh. * One of the three Energy Action items in the state's 2002 Energy Roadmap recommends the state utilize its abundant coal and natural gas resources in the production of hydrogen. Two Hydrogen Roadmap studies were commissioned, examining carbon sequestration and hydrogen markets.	

Gulf



Fuel cells provide critical back-up power to telecommunications sites, such as this tower in Tarpon Springs, Florida, and all across the state.

H.E.B Grocers uses 14 of these Nuvera Class II forklifts at their perishable foods distribution center in San Antonio, Texas.

A 5 kW photovoltaic array on the roof of this pavilion runs an electrolyzer that generates hydrogen fuel for a Hydrogenics PEM fuel cell at Homosassa Wildlife Park, Homosassa, Florida.

Alabama

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	X
	H2 or FC in Renewable Portfolio Standard	X
	Net Metering / Interconnection Standards	X
	Tax Incentives	X
	Grants / Loans	X
Fuel Cell Vehicles		
Fuel Cell Buses	• University of Alabama fuel cell bus (planned)	
Fuel Cell Forklifts		
Hydrogen Stations		
Large Stationary Fuel Cell Installations	• Mercedes Benz M-class production facility, Tuscaloosa	
Small Stationary Fuel Cell Installations	• A fuel cell was installed at Fort Rucker as part of the US Department of Defense Residential PEM Fuel Cell Demonstration Program. The fuel cell has since been decommissioned.	
State or Regional H2FC Partnerships	• Southern Hydrogen and Fuel Cell Coalition members include the University of Alabama at Birmingham	
Comments		

Florida

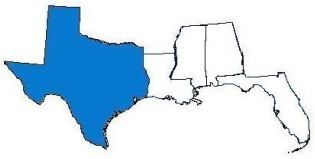
State Policies Supporting Fuel Cells	State H2 or FC Roadmap	X
	H2 or FC in Renewable Portfolio Standard	X
	Net Metering / Interconnection Standards	√
	Tax Incentives	√
	Grants / Loans	√
Fuel Cell Vehicles	• Five Ford Focus fuel cell vehicles operated by Florida's Department of Environmental Protection and Progress Energy	
Fuel Cell Buses		
Fuel Cell Forklifts	• United Natural Foods, 65 lift trucks	
Hydrogen Stations	• Boggy Creek hydrogen fueling station, Orlando • BP – Progress Energy hydrogen station, Orlando	
Large Stationary Fuel Cell Installations	• One fuel cell was located at Naval Hospital Jacksonville (1990s) through the Department of Defense PAFC Demonstration Project.	
Small Stationary Fuel Cell Installations	• Homosassa Springs State Wildlife Park, Homosassa • Hugh Taylor Birch State Park Visitors Center, Fort Lauderdale • Palm Garden skilled nursing facility, Largo • Florida Department of Environmental Protection field offices • North Point High School, North Point • Telecommunication sites (Bradenton, Madeira Beach, Springhill, Tampa, Tarpon Springs) • A fuel cell was located at Tyndall AFB through the Department of Defense Residential PEM Demonstration Program	
State or Regional H2FC Partnerships	• Florida Hydrogen Business Partnership • Florida Hydrogen Initiative	
Comments	• H2 Florida, a statewide program to accelerate the commercialization of hydrogen technologies, was launched in 2003. The state has also designated hydrogen as a "Qualified Target Industry." • Sarasota has begun an initiative to replace lead acid batteries and their associated charging equipment with hydrogen fuel cells.	

Louisiana

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	X
	H2 or FC in Renewable Portfolio Standard	X
	Net Metering / Interconnection Standards	√
	Tax Incentives	√
	Grants / Loans	X
Fuel Cell Vehicles		
Fuel Cell Buses		
Fuel Cell Forklifts		
Hydrogen Stations		
Large Stationary Fuel Cell Installations	• Louisiana Gas Services Systems Operation Facility (1990s) • Fuel cells were installed at two sites in the 1990s through the Department of Defense PAFC Demonstration (Bossier City) and Climate Change Rebate Project (Harvey).	
Small Stationary Fuel Cell Installations	• Destec Energy coal gasification plant (1990s) • Two fuel cells were located in Louisiana through the Department of Defense Residential PEM Demonstration Project (Bossier City, Metairie).	
State or Regional H2FC Partnerships		
Comments		

Mississippi

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	X
	H2 or FC in Renewable Portfolio Standard	X
	Net Metering / Interconnection Standards	X
	Tax Incentives	X
	Grants / Loans	√
Fuel Cell Vehicles		
Fuel Cell Buses		
Fuel Cell Forklifts		
Hydrogen Stations		
Large Stationary Fuel Cell Installations	• Three fuel cells were installed through the Department of Defense PAFC Demonstration (Stennis Space Center) and the Climate Change Rebate Project (Lorman, Gulfport).	
Small Stationary Fuel Cell Installations	• Three fuel cells were located in Mississippi through the Department of Defense Residential PEM Demonstration Program (Alcorn State University ROTC facility, Keesler Air Force Base, Stennis Space Center).	
State or Regional H2FC Partnerships		
Comments		



Texas

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	√
	H2 or FC in Renewable Portfolio Standard	X
	Net Metering / Interconnection Standards	√
	Tax Incentives	X
	Grants / Loans	√
Fuel Cell Vehicles		
Fuel Cell Buses	• University of Texas, Austin - Fuel Cell Hybrid Shuttle Bus • Dual Variable Output Fuel Cell Bus, Austin (planned)	
Fuel Cell Forklifts	• Nestlé Waters Bottling Facility, Dallas, 32 lift trucks • Sysco, Houston, 90 pallet trucks, using American Recovery and Reinvestment Act funding • H-E-B (grocer), San Antonio, 14 forklifts	
Hydrogen Stations	• University of Texas hydrogen fueling station	
Large Stationary Fuel Cell Installations	• Fuel cells were installed in the 1990s/2000s through the Department of Defense PAFC Demonstration (Fort Bliss, Laughlin AFB) and Climate Change Rebate Program (Houston, Bellaire).	
Small Stationary Fuel Cell Installations	• Fuel cells were installed through the Department of Defense Residential PEM Demonstration Program (Brooks Air Force Base, Camp Mabry, Fort Hood). • NASA Johnson Space Center, Houston • Texas DOT TransGuide headquarters, San Antonio • Dallas/Fort Worth International Airport • Cell phone tower back up power at multiple sites, including more than 70 located in Houston • Dow Chemical Company, Freeport	
State or Regional H2FC Partnerships	• Fuel Cells Texas • Texas Fuel Cell Partnership • Texas H2 Coalition • Southern Hydrogen and Fuel Cell Coalition (Texas H2 Coalition and the University of Texas, Austin are members)	
Comments	• Houston is home to HARC – the Center for Fuel Cell Research and Applications.	

West

This public hydrogen station in Phoenix, Arizona sells to the public at a price of $2.25 gallon gas equivalent. More than 2,500 fuelings have occurred since the station opened in 2002.

This hydrogen station in Las Vegas, Nevada, uses a solar array to produce hydrogen via electrolysis. The station serves hydrogen vehicles used by the Las Vegas Valley Water Department, and the hydrogen storage is provided by Air Products.

This 5 kW Plug Power PEM fuel cell was installed as a demonstration unit at the Washington Park Fire Station, in Denver, Colorado. The fuel cell provided electricity and heat to run the station's computers, lights and garage door. There are plans to replace the unit with future production models.

Arizona

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	X
	H2 or FC in Renewable Portfolio Standard	√
	Net Metering / Interconnection Standards	√
	Tax Incentives	√
	Grants / Loans	X
Fuel Cell Vehicles		
Fuel Cell Buses		
Fuel Cell Forklifts		
Hydrogen Stations	• Arizona Public Service Hydrogen Station, Phoenix • Ford's Arizona Proving Grounds mobile fueler, Yucca	
Large Stationary Fuel Cell Installations	• Arizona State University's Polytechnic campus Photovoltaic Testing Laboratory • Fuel cells were located at three sites through the Department of Defense PAFC Demonstration Program (Fort Huachuca, Davis-Monthan AFB) and the Department of Defense PAFC Demonstration Project (Mesa).	
Small Stationary Fuel Cell Installations	• Three fuel cells were installed through the Department of Defense Residential PEM Demonstration Program: Arizona Army National Guard Center (Mesa), two at the Sgt. Herrera U.S. Army Reserve Center (Mesa).	
State or Regional H2FC Partnerships		
Comments	• In Scottsdale, an off-grid home owned by the Beaulieu family uses solar panels to power their home and run an electrolyzer that produces hydrogen. The hydrogen is stored in high pressure tanks for use in the home's fuel cell, which powers appliances that normally use natural gas. Hydrogen also fuels the family car. The fuel cell's water byproduct provides moisture for the family's hydroponic garden.	

Colorado

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	X
	H2 or FC in Renewable Portfolio Standard	√
	Net Metering / Interconnection Standards	√
	Tax Incentives	√
	Grants / Loans	X
Fuel Cell Vehicles		
Fuel Cell Buses		
Fuel Cell Forklifts	• Anheuser-Busch, Fort Collins, will deploy 23 fuel cell lift trucks using funding from the American Recovery and Reinvestment Act.	
Hydrogen Stations	• National Renewable Energy Laboratory (NREL) renewable hydrogen station, Boulder • Proterra mobile hydrogen station, Golden	
Large Stationary Fuel Cell Installations		
Small Stationary Fuel Cell Installations	• Washington Park Fire Station , Denver • General Services Administration's Denver Federal Center, Denver • One fuel cell was located at the US Air Force Academy, Cadet Gymnasium through the Department of Defense Residential PEM Demonstration Program (now decommissioned).	
State or Regional H2FC Partnerships	• Colorado Fuel Cell Center (CFCC) - partners Colorado School of Mines (CSM), Gas Technology Institute (GTI), DOE's National Renewable Energy Laboratory (NREL) and Versa Power Systems, Inc.	
Comments	• Colorado is home to the NREL, the US Department of Energy's primary national laboratory for renewable energy and energy efficiency research and development.	

Idaho

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	X
	H2 or FC in Renewable Portfolio Standard	√
	Net Metering / Interconnection Standards	X*
	Tax Incentives	√
	Grants / Loans	X
Fuel Cell Vehicles		
Fuel Cell Buses		
Fuel Cell Forklifts		
Hydrogen Stations		
Large Stationary Fuel Cell Installations		
Small Stationary Fuel Cell Installations		
State or Regional H2FC Partnerships		
Comments	• Idaho National Engineering and Environmental Laboratory, Idaho Falls * Idaho does not have statewide net metering policies or interconnection standards in place. However, several utilities operating in the state have filed net metering tariffs with the state's Public Utilities Commission. Two of these utilities allow net metering of fuel cells and have issued interconnection guidelines.	

Montana

State Policies Supporting Fuel Cells	**State H2 or FC Roadmap**	√
	H2 or FC in Renewable Portfolio Standard	√
	Net Metering / Interconnection Standards	√
	Tax Incentives	√
	Grants / Loans	√
Fuel Cell Vehicles		
Fuel Cell Buses		
Fuel Cell Forklifts		
Hydrogen Stations		
Large Stationary Fuel Cell Installations	• **Deaconess Billings Clinic hospital, Billings** • **Zoot Enterprises' business park, Bozeman**	
Small Stationary Fuel Cell Installations	• **Montana Army National Guard Armed Forces Reserve Center (Department of Defense Residential PEM Demonstration Project).**	
State or Regional H2FC Partnerships	• **Montana's Hydrogen Futures Project**	
Comments	• **The installation at the Deaconess Billings Clinic is a fuel cell/microturbine hybrid, one of the first of its kind, and provides the base load power needs of the hospital.**	

Nevada

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	X
	H2 OR FC in Renewable Portfolio Standard	√
	Net Metering / Interconnection Standards:	X
	Tax Incentives	√
	Grants / Loans	√
Fuel Cell Vehicles	• Honda Fleet Program, two vehicles	
Fuel Cell Buses		
Fuel Cell Forklifts		
Hydrogen Stations	• Las Vegas Hydrogen Energy Station • Las Vegas Valley Water District Hydrogen Fueling Station	
Large Stationary Fuel Cell Installations	• In the 1990s, fuel cells were located at two sites in through the Department of Defense PAFC Demonstration Project: Nellis AFB (Las Vegas), Naval Air Station (Fallon) (now decommissioned).	
Small Stationary Fuel Cell Installations		
State or Regional H2FC Partnerships		
Comments		

New Mexico

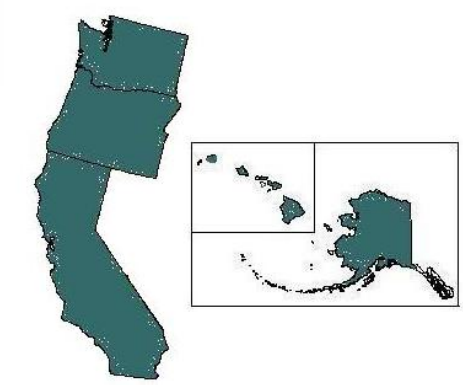
State Policies Supporting Fuel Cells	State H2 or FC Roadmap	X*
	H2 or FC in Renewable Portfolio Standard	√
	Net Metering / Interconnection Standards	√
	Tax Incentives	√
	Grants / Loans	√
Fuel Cell Vehicles		
Fuel Cell Buses		
Fuel Cell Forklifts		
Hydrogen Stations	• Renewable Electrolysis Fueling Station, Taos	
Large Stationary Fuel Cell Installations	• A fuel cell was located at Kirtland Air Force Base in the 1990s through the Department of Defense PAFC Demonstration Project (now decommissioned).	
Small Stationary Fuel Cell Installations	• National Guard statewide communications and computer systems, 20 units	
State or Regional H2FC Partnerships	• New Mexico Hydrogen Technology Partnership (HyTeP) • Hydrogen Research Collaborative	
Comments	* In 2003/2004, the legislature allocated funding to develop the fuel cell and hydrogen strategy for New Mexico.	

Utah

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	X
	H2 OR FC in Renewable Portfolio Standard	X
	Net Metering / Interconnection Standards:	√
	Tax Incentives	√
	Grants / Loans	√
Fuel Cell Vehicles		
Fuel Cell Buses		
Fuel Cell Forklifts		
Hydrogen Stations		
Large Stationary Fuel Cell Installations		
Small Stationary Fuel Cell Installations	• A fuel cell was located at Hill AFB fire station through the Department of Defense Residential PEM Demonstration Project (now decommissioned).	
Fuel Cell Vehicles		
State or Regional H2FC Partnerships		
Comments		

Wyoming

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	X
	H2 OR FC in Renewable Portfolio Standard	X
	Net Metering / Interconnection Standards:	X
	Tax Incentives	√
	Grants / Loans	X
Fuel Cell Vehicles		
Fuel Cell Buses		
Fuel Cell Forklifts		
Hydrogen Stations		
Large Stationary Fuel Cell Installations		
Small Stationary Fuel Cell Installations	• In 2005, a fuel cell was installed Big Goose Ranger Station in Bighorn National Forest (Sheridan) for a demonstration (now decommissioned). • Yellowstone National Park (decommissioned)	
State or Regional H2FC Partnerships		
Comments		



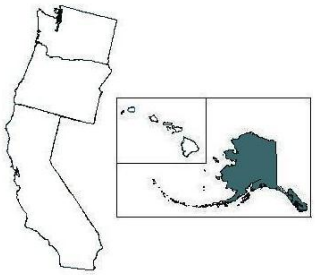
Pacific

AC Transit has partnered with UTC Power to place three fuel cell buses on the road in California, with 12 more buses planned.

Four 250 kW units from FuelCell Energy provide 90% of the Santa Rita Jail's base load power. The project used funding from the California Public Utilities Commission's Self Generation Incentive Program.

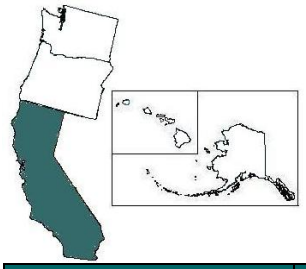
This IdaTech PEM fuel cell system provides back-up power to the Oregon State Police emergency response transmitters. The fuel cell replaces a diesel generator.

This fuel cell bus uses a 20 kW fuel cell from Hydrogenics. The bus originally was used in a yearlong demonstration at Hickman Air Force Base in Honolulu, Hawai'i. It has since entered into regular service on the base.



Alaska

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	X
	H2 or FC in Renewable Portfolio Standard	X
	Net Metering / Interconnection Standards	X
	Tax Incentives	X
	Grants / Loans	√
Fuel Cell Vehicles		
Fuel Cell Buses		
Fuel Cell Forklifts		
Hydrogen Stations		
Large Stationary Fuel Cell Installations	• In the 1990s, fuel cells were located at several sites in Alaska through the PAFC Demonstration (Fort Richardson in Anchorage) and the Climate Change Rebate Project (Nikiski, two sites in Anchorage). The US Postal Service Headquarters in Anchorage installed a 1 MW fuel cell system in 2000, at that time, the largest in the country and the first time a fuel cell was incorporated into the electric grid. That fuel cell is now decommissioned. • Exit Glacier Nature Center and Kenai Fjords National Park also completed successful demonstration trials.	
Small Stationary Fuel Cell Installations		
State or Regional H2FC Partnerships		
Comments		



California

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	√
	H2 or FC in Renewable Portfolio Standard	√
	Net Metering / Interconnection Standards	√
	Tax Incentives	√
	Grants / Loans	√
Fuel Cell Vehicles	• 320 fuel cell vehicles (customer leases, demonstration vehicles)	
Fuel Cell Buses	• There are currently five fuel cell buses operating in daily revenue service, through transit agencies in Thousand Palms (SunLine Transit), Burbank, and Alameda Contra Costa (AC Transit). • AC Transit, in collaboration with Golden Gate Transit, SamTrans, Santa Clara VTA, and SF MTA, will receive 12 fuel cell buses in 2010 and SunLine Transit will also receive two new buses.	
Fuel Cell Forklifts	• Ace Hardware Corp., 6 forklifts • DDJC -Defense Distribution Depot, San Joaquin, 20 forklifts • Kaiser Permanente, Fremont • Super Store Industries, entire freezer fleet at Lathrop facility	
Hydrogen Stations	• California is developing a hydrogen highway and leads the US with 22 operating hydrogen stations, with 10 more planned. The California Fuel Cell Partnership has a great map with all the locations - http://www.cafcp.com/stationmap.	
Large Stationary Fuel Cell Installations*	• 10 wastewater treatment plants around the state, three more planned • Santa Rita Jail, Santa Barbara Jail • Sierra Nevada Brewery, Chico • California State University - Northridge • Gills Onions, Oxnard • eBay, San Jose • Staples distribution center, Ontario • Google headquarters, Mountain View • Wal-Mart stores in Hemet and Lancaster • Chevron Corporate Headquarters (data center), San Ramon • Cache Creek Casino Resort, Brooks • St. Helena Hospital, St. Helena	

	• Sheraton Hotel, San Diego • Fuel cells were located at 11 sites through the Department of Defense PAFC Demonstration project (Vandenberg, Nellis & Edwards AFBs, Port Hueneme, MCAGCC Twentynine Palms) and Climate Change Rebate Project (Playa Vista, San Francisco, San Ramon, Calabasas, Fresno, Irvine). *we've selected a few installations but there are many more, please go to http://www.fuelcells.org/info/statedatabase.html to see the complete list
Small Stationary Fuel Cell Installations*	• FAA control tower (personnel safety), Santa Maria • Telecom site (back up power), St. Helena • Fuel cell manufacturer, ReliOn, received $8.6 million in American Recovery and Reinvestment Act funding to deploy 180 fuel cells at 25 northern California locations. The fuel cells that will provide back up to a utility communications network. • Jadoo Power received $1.8 million in American Recovery and Reinvestment Act funding to demonstration 1 kW fuel cells in the city of Folsom. • Fuel cells were located at three sites through the Department of Defense Residential PEM Demonstration Program (Los Angeles, Riverside, Herlong). *we've selected a few installations but there are many more, please go to http://www.fuelcells.org/info/statedatabase.html to see the complete list
State or Regional H2FC Partnerships	• California Fuel Cell Partnership (CaFCP) • California Hydrogen Business Council (CHBC) • California Stationary Fuel Cell Collaborative (CaSFCC)

Comments	• California's generous Self-Generation Incentive Program (SGIP) which provides rebates for purchases of advance power technologies, has made the state is a leader in stationary fuel cell installations. With the CaFCP and strict California Air Resources Board emissions standards, California is also the focal point for automakers' fuel cell vehicle rollouts.
	• As of early 2010, there were more than 20 MW of installed fuel cell capacity in California.
	• The California Public Utilities Commission has authorized Pacific Gas and Electric Company and Southern California Edison to install utility-owned fuel cells on several University of California and California State University campuses – 3 MW at CSU East Bay and San Francisco State University, and up to 3 MW on three California State University campuses.
	• Fuel cell manufacturers:
	  •ClearEdge Power, Sunnyvale, Irvine, and Palm Desert
	  •Bloom Energy, Sunnyvale
	  •UltraCell Corporation, Livermore

	•Oorja Protonics, Fremont •Altergy Systems, Folsom •Jadoo Power, Folsom • Fuel cell membrane technology company, Polyfuel, located in Mountain View, received $2.5 million in American Recovery and Reinvestment Act funding to further integrate and miniaturize components of its portable fuel cell power system. • The National Fuel Cell Research Center is located at the University of California, Irvine

The following are some of the important elements that contribute to California's success as a Top Five Fuel Cell State:

California Fuel Cell Partnership
www.cafcp.org

Stationary Fuel Cell Collaborative
http://stationaryfuelcells.org

California Hydrogen Business Council
http://www.californiahydrogen.org

Air Resources Board
http://www.arb.ca.gov/fuels/altfuels/electric_hydrogen/electric_hydrogen.htm
http://www.arb.ca.gov/energy/dg/eo/eo-current.htm

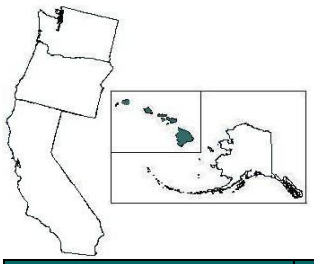
California Hydrogen Highway
http://www.hydrogenhighway.ca.gov

Self Generation Incentive Program
http://www.cpuc.ca.gov/PUC/energy/DistGen/sgip

AC Transit – fuel cell buses
http://www2.actransit.org/environment/hyroad_main.wu

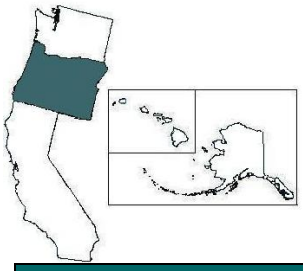
SunLine Transit – fuel cell buses
http://www.sunline.org/clean-fuels-fleet

Santa Clara VTA – fuel cell buses
http://www.vta.org/projects/ZEBs.html



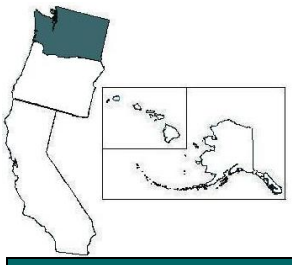
Hawaii

State Policies Supporting Fuel Cells	**State H2 or FC Roadmap**	√
	H2 or FC in Renewable Portfolio Standard	√
	Net Metering / Interconnection Standards	√
	Tax Incentives	√
	Grants / Loans	√
Fuel Cell Vehicles	• **Hickam Air Force Base (AFB) fuel cell step van demonstration**	
Fuel Cell Buses	• **Hickam AFB battery-dominant, plug-in hybrid fuel cell bus demonstration**	
Fuel Cell Forklifts		
Hydrogen Stations	• **Hickam AFB Hydrogen Station**	
Large Stationary Fuel Cell Installations		
Small Stationary Fuel Cell Installations	• **Through the Department of Defense Residential PEM Demonstration Program, fuel cells have been located at Marine Corp Base Hawaii-Kaneohe Bay base housing and Schofield Barracks fire station.**	
State or Regional H2FC Partnerships	• **Hawaii Natural Energy Institute**	
Comments	• **The majority of Hawaii's activities are through the Hickam Air Force Base in Honolulu. There is also research, development and demonstration projects being conducted at the University of Hawaii Manoa and at the Hawaii Center for Advanced Transportation Technologies.** • **Hawaii has implemented a $10 million hydrogen investment capital special fund through the Hawaii Renewable Hydrogen Program and plans to install a hydrogen fueling station on the Big Island as part of a larger planned Hawaii Hydrogen Highway.** • **The Hawaii Fuel Cell Test Facility is located at the University of Hawaii.**	



Oregon

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	√
	H2 or FC in Renewable Portfolio Standard	√
	Net Metering / Interconnection Standards	√
	Tax Incentives	√
	Grants / Loans	√
Fuel Cell Vehicles		
Fuel Cell Buses		
Fuel Cell Forklifts		
Hydrogen Stations		
Large Stationary Fuel Cell Installations	• A fuel cell was located in Portland (Columbia Blvd. Waste Water Treatment Plant) through the Department of Defense Climate Change Rebate Project.	
Small Stationary Fuel Cell Installations	• Harkins House Juvenile Detention Facility • LIFT facility at Powell Garage • Oregon State Police	
State or Regional H2FC Partnerships	• Combined Heat and Power Consortium • Regional Climate Change Initiative	
Comments	• Fuel cell manufacturers: •IdaTech, Bend •ClearEdge Power, Hillsboro •Hydra Fuel Cell Corporation, Beaverton	



Washington

State Policies Supporting Fuel Cells	State H2 or FC Roadmap	X
	H2 or FC in Renewable Portfolio Standard	X
	Net Metering / Interconnection Standards	√
	Tax Incentives	√
	Grants / Loans	√
Fuel Cell Vehicles		
Fuel Cell Buses	• Ft. Lewis Army Base , Tacoma, will receive a Proterra/Hydrogenics fuel cell bus	
Fuel Cell Forklifts	• Ft. Lewis Army Base, Tacoma, 19 fuel cell forklifts	
Hydrogen Stations		
Large Stationary Fuel Cell Installations	• Through the Department of Defense Climate Change Rebate Project, a fuel cells was located at Double Tree Inn Hotel in Spokane.	
Small Stationary Fuel Cell Installations	• Many of Washington's smaller stationary fuel cell installations (1 - 5 kW) have been and are installed as back up power for telecommunications and radio towers. They are used by the Washington State Department of Transportation and State Highway Patrol for their Emergency 911 Systems. • Through the Department of Defense Residential PEM Demonstration Project, fuel cells were located at four locations (two sites in Spokane, including Dept. of Homeland Defense sites, Fort Lewis, McChord AFB).	
State or Regional H2FC Partnerships	• Northwest Energy Technology Collaborative	
Comments	• ReliOn, a fuel cell manufacturer, is located in Spokane and recently received $8.6 million from the American Recovery and Reinvestment Act to install 180 units at 25 AT&T Mobility Network sites throughout central and northern California.	

Alphabetical State Index

New Jersey	**25**
New Mexico	**66**
New York	**26**
North Carolina	**48**
North Dakota	**39**
Ohio	**41**
Oklahoma	**40**
Oregon	**75**
Pennsylvania	**28**
Rhode Island	**19**
South Carolina	**49**
South Dakota	**43**
Tennessee	**51**
Texas	**59**
Utah	**67**
Vermont	**20**
Virginia	**52**
Washington	**76**
West Virginia	**53**
Wisconsin	**44**
Wyoming	**68**

Appendix 1 – Additional Resources

Fuel Cells 2000

Fuel Cells 2000 is a non-profit education and outreach program of the Breakthrough Technologies Institute and offers numerous resources on its website, **http://www.fuelcells.org** for any audience.

In addition to the basics such as how a fuel cell works, applications, benefits, image galleries, Fuel Cell Library and two free newsletters, the website includes:

- State Fuel Cell and Hydrogen Database, which includes all US fuel cell installations, vehicle demonstrations, hydrogen fueling stations and state legislation and policies: **http://www.fuelcells.org/info/statedatabase.html**
- Worldwide Stationary Installation Database: **http://www.fuelcells.org/info/databasefront.html**
- Comprehensive charts, including Fuel Cell Vehicles, Specialty Vehicles, Fuel Cell Buses, Worldwide Hydrogen Fueling Stations and Fuel Cell Equity and Investment: **http://www.fuelcells.org/info/charts.html**
- An interactive map and list of Colleges and Universities with fuel cell degrees, courses or research: **http://www.fuelcells.org/ced/career/university.htm**
- A report on Worldwide Hydrogen Bus Demonstrations, 2002-2007: **http://www.fuelcells.org/info/busreport.pdf**
- Links to other resources mentioned in this report, such as regional and state alliances, funding entities and federal resources: **http://www.fuelcells.org/info/links.html**

US Fuel Cell Council

The US Fuel Cell Council (USFCC) is the trade association for the fuel cell industry. The USFCC has several useful charts, brochures and information on its website, **http://www.usfcc.com**, including:

- Industry Overview 2010
- Chart of Commercial Products
- Fuel Cells for Stationary Power brochure
- Federal Tax Credit Q&A

Department of Defense

The US Department of Defense (DoD), through the U.S. Army Corps of Engineers team, the Engineer Research and Development Center (ERDC) and Construction Engineering Research

Laboratory (CERL), has played a major role in the deployment of stationary fuel cells, demonstrating units at various military and civilian sites around the country. The ERDC/CERL programs included Residential PEM Demonstration Project, which focused on 5-kW units; the PAFC Demonstration, which installed phosphoric acid fuel cells (PAFC) at 30 U.S. Department of Defense bases between 1994 and 1997; the Climate Change Rebate Project, which provided up to $1,000 per kilowatt of power plant capacity with a not to exceed limit of one-third of the total project cost (capital and installed costs, pre-commercial operation); and the upcoming Backup Demonstration Overview, which just sent out a Broad Agency Announcement for proposals in December 2009. Many of the units listed in this report were demonstration trials and have since been decommissioned.

The DoD website - **http://dodfuelcell.cecer.army.mil/index.php** - has information about all of the programs, sites and installations, including contact information, images and final reports where submitted. Also see our Appendix 2, summarizing DoD fuel cell installations.

Database of State Incentives for Renewables & Efficiency

DSIRE is a comprehensive source of information on state, local, utility and federal incentives and policies that promote renewable energy and energy efficiency. Established in 1995 and funded by the US Department of Energy, DSIRE is an ongoing project of the N.C. Solar Center and the Interstate Renewable Energy Council.
http://www.dsireusa.org

US Department of Energy's Energy Efficiency and Renewable Energy Fuel Cells Technologies Program

The US Department of Energy (DOE) Fuel Cell Technologies Program conducts comprehensive efforts to overcome the technological, economic, and institutional obstacles to the widespread commercialization of fuel cells and related technologies. The program works with partners in industry, academia, non-profit institutions, and the national labs, and coordinates closely with other programs in four DOE offices—Energy Efficiency and Renewable Energy, Science, Fossil Energy, and Nuclear Energy.

The mission of the program is to enable the widespread commercialization of fuel cells in diverse sectors of the economy—with emphasis on applications that will most effectively strengthen our nation's energy security and improve our stewardship of the environment.
http://www1.eere.energy.gov/hydrogenandfuelcells

For more information about any of the information included in this report, please contact Fuel Cells 2000 at states@fuelcells.org.

Appendix 2 – Hydrogen and Fuel Cell Industry: Examples of Quantified Benefits to States

Connecticut

Connecticut Center for Advanced Technology, Inc.*, Connecticut Fuel Cell Activities: Markets, Programs, & Models*, Dec. 2009[7]

- In 2006, there were over 900 jobs associated with research and development and manufacturing of equipment (1,156 in 2007).
- Over 1,200 indirect jobs in 2006 (over 1,500 in 2007).
- The industry contributed $29 million in local tax revenue, and over $340 million in gross state product in 2006.
- For each job the hydrogen and fuel cell industry directly supports, an additional 1.31 jobs are indirectly supported elsewhere in Connecticut.
- For every $1.00 of revenue generated by industry, and additional $0.84 cents of revenue is received by the state of Connecticut.
- For every $1.00 paid to industry employees, an additional $0.72 is paid by other employers in the supply chain.
- Approximately 7,100 direct, indirect and induced jobs per 50 MW of consistent annual production of hydrogen and fuel cell manufacturing.
- Approximately $1 billion in gross domestic product per the annual production of 50 MW of hydrogen and fuel cell manufacturing.
- Approximately $400 million in federal, state, and local taxes annually for 50 MW of annual hydrogen and fuel cell production.

Navigant Consulting for the Connecticut Clean Energy Fund and Connecticut Energy Efficiency Fund, ***CT Renewable Energy / Energy Efficiency Economy Baseline Study*****,** Mar. 2009[8]

- Every $1 million in subsidies for fuel cells produces approximately 40 manufacturing and indirect and induced jobs ($25,000 per job).
- Fuel cells account for $165 million of the total $217 million renewable energy revenues in the state.
- Fuel cell jobs and employment income are concentrated in manufacturing and engineering (product development, process engineering).

[7] **www1.eere.energy.gov/hydrogenandfuelcells/pdfs/ccat_hydrogen_ct.pdf**
[8] **http://www.cga.ct.gov/2009/rpt/2009-R-0234.htm** and **http://www.ctcleanenergy.com/Portals/0/Phase%201%20Deliverable%20Final%20Full.pdf**

Ohio

Ohio Department of Development, *An Update on Ohio's Fuel Cell Roadmap*, Mar. 2009[9]

- Ohio's Third Frontier Fuel Cell Program has resulted in the creation or retention of 245 jobs with an average salary of $64,329.

South Carolina

South Carolina Hydrogen and Fuel Cell Alliance, *Jobs and Investments for Hydrogen and Fuel Cells*[10]

- **229** jobs in SC's hydrogen cluster as of 2009
- **65%** job growth in SC's hydrogen cluster since 2004
- **40** private companies in SC's hydrogen cluster
- **10 to 1** return for SC's hydrogen investment

SCRA[11] **reports:**

- Current estimations state that hydrogen and fuel cell job potential for South Carolina and surrounding communities is 40,000.

[9] **http://www.development.ohio.gov/cms/uploadedfiles/Development.ohio.gov/Annual_Reports/OhioFuelCellRoadmapUpdate-033109_FINAL.pdf**

[10] **http://www.schydrogen.org/documents/Factsheets/Fact_Sheet_-_ROI_Analysis.pdf**

[11] **http://www.scra.org/hidf.shtml**

Appendix 3 – State Activity At-A-Glance

State Fuel Cell Activity At-a-Glance

	Roadmap	RPS	Net Metering/ Inter-connection Standards	Tax Incen-tives	State Grants / Loans	State / Regional Partner-ships	Current Installa-tions*
New England							
Connecticut	√	√	√	√	√	√	√
Maine		√	√		√	√	√
Massachusetts		√	√	√	√	√	√
New Hampshire		√			√		
Rhode Island		√	√	√	√		√
Vermont		√	√	√	√		√
Mid-Atlantic							
Delaware		√	√	√	√	√	√
District of Columbia		√	√				√
Maryland		√				√	√
New Jersey		√	√	√		√	√
New York	√	√	√	√	√	√	√
Pennsylvania		√	√	√	√	√	√
Mid-West							
Arkansas		√	√	√			
Illinois	√		√		√	√	√
Indiana			√	√	√		√
Iowa	√	√		√	√		
Kansas		√	√				
Michigan	√		√	√	√	√	√
Minnesota	√	√	√	√	√	√	√
Missouri		√	√	√	√		√
Nebraska		√			√		√
North Dakota	√	√		√	√		√
Oklahoma					√		

Ohio	√	√	√	√	√	√	√
South Dakota	√		√				
Wisconsin		√	√	√			

South

Georgia			√	√		√	√
Kentucky				√			
North Carolina		√	√	√	√	√	√
South Carolina			√	√	√	√	√
Tennessee						√	√
Virginia				√		√	√
West Virginia		√	√				√

Gulf

Alabama						√	√
Florida			√	√	√	√	√
Louisiana			√	√			
Mississippi					√		
Texas	√		√		√	√	√

West

Arizona		√	√	√			√
Colorado		√	√	√		√	√
Idaho		√		√			
Montana	√	√	√	√	√	√	√
Nevada		√		√	√		√
New Mexico		√	√	√	√	√	√
Utah			√	√	√		
Wyoming				√			

Pacific

Alaska					√		
California	√	√	√	√	√	√	√
Hawaii	√	√	√	√	√	√	√
Oregon	√	√	√	√	√	√	√
Washington			√	√	√	√	√

***Installation column includes large/small stationary fuel cell installations, fuel cell vehicles, fuel cell buses, fuel cell forklifts and/or hydrogen fueling stations. See individual state entries for more details.**

Appendix 4 – Fuel Cell-Powered Materials Handling Equipment

Fuel Cell-Powered Materials Handling Equipment* (demonstrations and purchases - corporate and federal fleets)

State	Company	Details
California	Ace Hardware	6 forklifts demonstrated
	Super Store Industries	Converting entire material handling fleet operating in the freezer at SSI's Lathrop facility
	Kaiser Permanente	Deploying fuel cell forklifts
	Defense Logistics Agency (Dept. of Defense)	20 forklifts
Colorado	Anheuser-Busch**	23 lift trucks
Florida	United Natural Foods	65 lift trucks
Georgia	Defense Logistics Agency (Dept. of Defense)	20 forklifts
Illinois	Central Grocers	220 fuel cell forklifts
Maryland	Whole Foods**	61 forklifts
Michigan	Michelin	Tested 2 forklifts
Missouri	Fed Ex	35 forklifts
	Wal-Mart	Trialed 12 fuel cell pallet trucks at a location in Missouri, later purchased fuel cells to convert vehicles at a distribution center
New York	Raymond Corp.	Built and operates fuel cell forklifts
North Carolina	Coca-Cola	40 forklifts
Ohio	GENCO**	GENCO will be deploying fuel cell forklifts at two locations in Ohio
Pennsylvania	GENCO**	GENCO will be deploying fuel cell forklifts at a location in Pennsylvania
	East Penn Manufacturing**	10 fuel cell forklifts
	Wegmans	50 pallet trucks and 9 stand-up forklifts, $1 million grant from the Pennsylvania Energy Development Authority

	Defense Logistics Agency (Dept. of Defense)	**40 forklifts**
South Carolina	**Kimberly Clark **** **Bridgestone-Firestone** **Michelin, PBR, Isola Laminates, Leigh Fibers and others**	**25 lift trucks** **43 forklifts** **Tested fuel cell forklifts for two weeks through the Greater Columbia Fuel Cell Challenge project**
Tennessee	**Ozburn-Hessey** **Nissan North America**	**Trialed 4 forklifts** **Trialed fuel cell tugs / purchased 60 fuel cells to convert tugs to fuel cell power**
Texas	**H-E-B** **Sysco**** **Nestlé Waters**	**14 lift trucks** **90 pallet trucks** **Converting entire Dallas facility lift truck fleet to fuel cell power**
Virginia	**Defense Logistics Agency (Department of Defense)**	**20 forklifts**
Washington	**Defense Logistics Agency (Department of Defense)**	**19 forklifts**

*** includes forklifts, stand-up forklifts, tugs, lift trucks, pallet trucks, etc.**
****these deployments are receiving funding through the American Recover and Reinvestment Act.**

Appendix 5 – Summary of Department of Defense (DoD) Stationary Fuel Cell Installations

Summary of Department of Defense (DoD) Stationary Fuel Cell Installations

State	Residential PEM Demonstration Project	PAFC Demonstration Project	Climate Change Rebate Project
Alabama	1	-	-
Alaska	-	1	3
Arizona	2	2	1
Arkansas	-	2	-
California	3	5	6
Colorado	1		1
Connecticut	-	1	4
Delaware	-	-	-
District of Columbia	1	-	-
Florida	1	1	
Georgia	6	-	1
Hawaii	2	-	-
Idaho	-	-	-
Illinois	1	-	-
Indiana	-	-	-
Iowa	-	-	-
Kansas	-	-	-
Kentucky	1	-	-
Louisiana	2	1	1
Maine	-	-	-
Maryland	1	1	-
Massachusetts	-	2	2
Michigan	1	-	-
Minnesota	-	1	-
Mississippi	3	1	2
Missouri	-	-	-
Montana	1	-	-

Nebraska	**1**	**-**	**2**
Nevada	**-**	**2**	**-**
New Hampshire	**-**	**-**	**-**
New Jersey	**-**	**1**	**2**
New Mexico	**-**	**1**	**-**
New York	**4**	**2**	**3**
North Carolina	**3**	**-**	**-**
North Dakota	**-**	**-**	**-**
Ohio	**-**	**-**	**-**
Oklahoma	**-**	**-**	**-**
Oregon	**-**	**-**	**1**
Pennsylvania	**-**	**2**	**-**
Rhode Island	**1**	**1**	**1**
South Carolina	**3**	**-**	**-**
South Dakota	**-**	**-**	**-**
Tennessee	**-**	**-**	**-**
Texas	**3**	**2**	**2**
Utah	**1**	**-**	**-**
Vermont	**-**	**-**	**-**
Virginia	**2**	**1**	**2**
Washington	**4**	**-**	**1**
West Virginia	**-**	**-**	**-**
Wisconsin	**-**	**-**	**-**
Wyoming	**-**	**-**	**-**