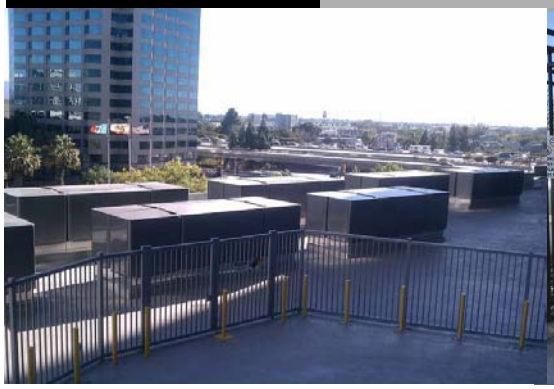
FUEL CELLS 2000

www.fuelcells.org

FUEL CELLS 2000

STATE OF THE STATES: FUEL CELLS IN AMERICA



June 2011

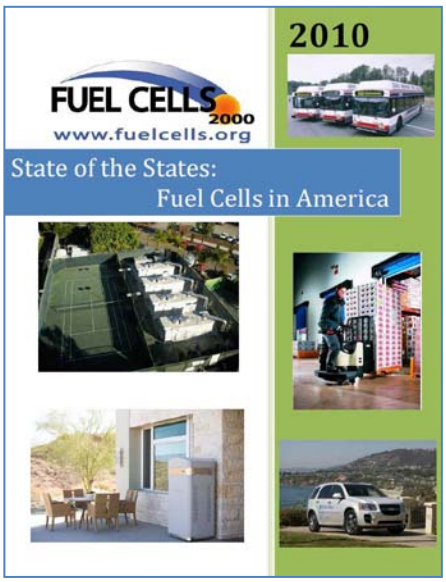
Foreword by Connecticut Governor Dannel P. Malloy

Authors and Acknowledgements

This report was written and compiled by Sandra Curtin, Jennifer Gangi and Elizabeth Delmont of Fuel Cells 2000, an activity of Breakthrough Technologies Institute in Washington, DC. Support was provided by the U.S. Department of Energy's Energy Efficiency and Renewable Energy Fuel Cells 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 June 2011, particularly the State Fuel Cell and Hydrogen Database and North Carolina Solar Center's Database of State Incentives for Renewables & Efficiency (DSIRE). It is a follow-up to the 2010 report, State of the States: Fuel Cells in America.



Front Cover Photos:

ReliOn fuel cell at cellular tower (top left)
University of Delaware's fuel cell bus (top middle)
Fuel cell forklift at Kimberly-Clark facility, SC (top right)
Bloom Energy fuel cells at Adobe Systems (bottom left)
Toyota FCHV-adv fueling at Hempstead, NY hydrogen station (bottom middle)
FuelCell Energy installation at Turlock Irrigation District, CA (bottom right)

STATE OF CONNECTICUT
GOVERNOR DANNEL P. MALLOY

Oil and other fossil fuels have often been at the crux of our nation's economic and political woes. Shortages in supply of these vital resources and Wall Street speculation have led to volatility in energy prices. Most recently, we have seen prices increasing, often dramatically. The global challenge today is to develop and manufacture alternative energy technology to help meet the world's needs for low-cost, reliable power and economic development.

Fuel cells – which provide clean, reliable and highly efficient power (particularly when used in combined heat and power applications) – offer one of the best available solutions and deserve our full support and attention. Our nation is currently the leader in the advancement of this industry, and we are beginning to see market adoption of fuel cells. But we need to do more to accelerate this effort. State and national leaders must work together to develop additional strategies and incentives to advance the fuel cell industry in the United States. The rewards will be worth the effort: job creation as the industry grows, predictable and lower energy costs, a more reliable electric supply, and a cleaner environment.

Here in Connecticut, for example, our Connecticut Clean Energy Fund offers grants to support on-site installation of fuel cells, and our Department of Economic and Community Development and Connecticut Development Authority provide financing to fuel cell projects. We have also instituted virtual net metering, established renewable portfolio standard requirements, eliminated demand ratchets when equipment is down for servicing, and discounted natural gas delivery charges for fuel cell operators. All of these policies will help boost demand for fuel cells and grow the industry.

Energy performance contracts have been used in a growing number of fuel cell projects in Connecticut. Through such contracts, fuel cell developers offer host organizations predetermined, predictable rates for electricity and heat from on-site fuel cells over the term of their contracts, thereby reducing the overall volatility of the hosts' energy costs. These contracts also allow nontaxable entities – such as nonprofit organizations, state universities and municipalities – to leverage federal tax incentives that are not available to them, but are available to the fuel cell developers.

Existing federal incentives – such as the accelerated depreciation on, tax credit against, and grants to support on-site fuel cells – must be sustained and strengthened, and the states should

encourage the federal government to consider adopting new incentives. These incentives help drive down costs for developers who install fuel cells and ensure that developers can provide attractive, stable power rates to their fuel cell host customers.

Whether for everyday use as a primary power source, for use during periods of peak grid demand, or for backup use during emergencies, fuel cells offer an attractive, efficient and eco-friendly solution. I call on the federal government and our own state leadership to continue to invest in and offer incentives to advance this industry, to lead by example, to encourage innovation, and to open markets for American-manufactured fuel cells and hydrogen infrastructure equipment. Investment in this industry is just and appropriate, and will yield high-paying jobs in the United States. I applaud my state colleagues for all they have done thus far, and their courage to continue with this challenge.

Dannel P. Malloy

Governor
Connecticut

Table of Contents*

** Italicized states: No fuel cell or hydrogen-related activity could be found during the last year.*

Fuel Cells: Investing in America

America's fuel cell footprint is growing tremendously, helping to keep the United States at pace - and even ahead in some applications - of determined and increasing international competition.

In April 2010, Fuel Cells 2000 released *State of the States: Fuel Cells in America*, a report cataloguing the span of fuel cell and hydrogen activity and policies of all 50 states. In just over a year, the states have greatly expanded the playing field for the fuel cell industry, in some cases by adopting fuel cell friendly policies, but in most cases providing a marketplace for fuel cells and fuel cell powered systems.

The Message is More

Fuel Cells 2000 has found impressive movement on many market fronts, with significant numbers reported from both the states and fuel cell industry.

There were **more** sales of primary fuel cell power and combined heat and power (CHP) systems to grocery and retail markets, corporate sites and production facilities, local governments, municipalities, schools and universities in the U.S.

- More than 50 MW of stationary power either installed or recently purchased.
- A dozen current or soon to be opened fuel cell installations in the megawatt (MW) range - between 1.2 and 2.8 MW in size each - in California alone.
- Repeat customers such as Coca-Cola, Cox Communications, and Whole Foods.
- Installations in new states such as Arizona, New Mexico and Wisconsin.

More fuel cell-powered forklifts were deployed at warehouses and distribution centers.

- The U.S. is the world leader in fuel cell forklift deployments.
- More than 1,500 forklifts deployed or ordered, in more than a dozen states.
- Repeat customers that include Coca-Cola (CA, NC), Walmart (OH, MO and Alberta, Canada), and Sysco (PA, TX, VA).
- New customers such as BMW (SC), EARP Distribution (KS) and WinCo Foods, LLC (CA).

More fuel cell buses and light duty vehicles were placed on American roadways.

- 30 fuel cell buses were either put on the road or plans were announced for deployment in numerous states, including AL, CA, CT, DE, IL, MA, MI, OH, SC, TN and TX.
- Honda and Daimler began leasing programs in California, and Toyota announced it will place more than 100 of its FCHV-adv fuel cell vehicles with universities, private companies and government agencies in both California and New York over the next

three years. Two Toyota FCHV-adv vehicles have been delivered to New York, and 10 have also been delivered to Connecticut.

More hydrogen fueling stations were opened, serving light duty vehicles, buses and fuel cell forklifts.

- By the end of 2011, California plans to have at least 20 public stations operating or under construction, with California Energy Commission support for more stations down the pike.
- New hydrogen stations were opened in Delaware, New York, and South Carolina to fuel cars and buses.
- New private hydrogen fueling stations were opened at warehouses around the country to serve fuel cell-powered forklifts.
- Air Products reports 347,000 hydrogen fuelings per year at its fueling stations and hydrogen dispensers.

More fuel cells are now backing up telecommunication and radio towers and utility substations.

- Federal American Recovery and Reinvestment (ARRA) funding supported hundreds of installations around the country by Sprint Nextel and fuel cell manufacturer ReliOn (for AT&T and PG&E), respectively.
- Microcell Corporation also installed fuel cell units at CA, MD, NC, OH and VA telecom and utility sites.

More incentives and policies were enacted to benefit fuel cells and fuel cell vehicles.

- Ohio, one of Fuel Cells 2000's Top 5 Fuel Cell States, has implemented a Qualified Energy Project Tax Exemption for which fuel cell installations are eligible.
- California, also a Top 5 Fuel Cell State, created the CAEATFA (California Alternative Energy and Advanced Transportation Financing Authority) program to finance alternatively-powered facilities and facilities used to develop and commercialize advanced transportation technologies. Fuel cell technology is eligible for funding.
- Louisiana initiated a renewable energy pilot program for which fuel cells are eligible.
- Oklahoma instituted alternative fuel vehicle and infrastructure tax credits, and a renewable energy goal, that includes fuel cells and hydrogen.
- Maryland made fuel cell technology eligible for the state's net metering policies.
- Hawaii's state government, in partnership with 10 companies, agencies and universities, as well as General Motors, the U.S. Department of Energy and Department of Defense, initiated the Hawaii Hydrogen Initiative (H2I) to make hydrogen-powered vehicles and a fueling infrastructure a reality in Hawaii by 2015.

More jobs were created in the industry, helping bring new life to American manufacturing and engineering.

- Fuel Cells 2000's current estimate of direct fuel cell industry jobs in the U.S. totals more than 3,600, based on company reports and expert opinion. Supply chain employment is estimated at more than 7,000.[1]
- The Northeast Electrochemical Energy Storage Cluster (Vermont, New Hampshire, Maine, Massachusetts, Connecticut, Rhode Island, New York, and New Jersey) estimate the fuel cell and hydrogen production and distribution industry cluster provides substantial economic value to the region estimated at $979 million in revenue and investment, $407 million in labor income, and between $55.4 million and $61.6 million in state and local taxes.[2] The cluster also estimates 2,228 direct jobs with Original Equipment Manufacturers (OEMs) and 5,319 full and part time jobs.
- A report by the Connecticut Center for Advanced Technology on the "Connecticut Hydrogen Fuel Cell Industry Status and Direction" for 2010 and 2011 estimates that employment in Connecticut's hydrogen and fuel cell industry has grown by 28 percent from 2006 to 2010.
- Fuel cell manufacturer Bloom Energy is greatly expanding its Sunnyvale, California manufacturing facility and adding more than 1,000 new jobs. Bloom Energy expanded its workforce by over 70 percent in 2010 alone, and has grown 525 percent over the past four years. The company is also planning to build a manufacturing facility in Newark, Delaware, hiring 900 employees over five years and predicting a minimum of 600 more jobs to follow as its suppliers open Delaware bases of operations.
- Bing Energy relocated to Florida, receiving a $1.9 million Qualified Target Industry (QTI) Tax Refund award from Florida's Office of Tourism, Trade and Economic Development, and is expected to create at least 244 new Florida jobs paying an average salary of $41,655.

More intellectual property development

- The U.S. filed more fuel cell patents than any other country, according to the Clean Energy Patent Growth Index[3] by the Cleantech Group of Heslin Rothenberg Farley & Mesiti P.C.
- The number of fuel cell patents has been the largest in the clean energy field for the past eight years - in 2010, the U.S. fuel cell industry had three times the number of patents (996) than the second place holder, solar, with just 363 patents.
- The U.S. holds 47 percent of fuel cell patents registered between 2002-2010.
- The report shows that fuel cell patents originated from 30 states, with Michigan as the leader with 136 patents, followed by California with 59, New York with 24 and Connecticut with 22.

[1] http://www.fuelcells.org/Fuel_Cell_Industry_Job_Estimates.pdf
[2] Todd Gabe, Economic Impact of the Northeastern Hydrogen and Fuel Cell Industry, April 2011.
[3] http://cepgi.typepad.com/heslin_rothenberg_farley_/

- Other states registering patents include Oregon (16), Ohio (12), Florida (11), Massachusetts (11) and Illinois (11) and Pennsylvania (9), plus 20 other states with at least one patent.

More Benefits

It is the combination of benefits that make fuel cells so attractive for so many applications. Fuel cells are extremely reliable, scalable, quiet, efficient and rugged, and generate low to zero greenhouse gas emissions. They can operate using a wide variety of fuels, including natural gas, renewable hydrogen from solar, wind or food/beverage/wastewater anaerobic digester processing. Fuel cells offer a high quality power output, which is extremely important for mission critical applications at banks, data centers and hospitals, where loss of power could cost millions of dollars or even lives.

Federal and state support is crucial to moving the emerging fuel cell industry into full-fledged commercialization for a wide variety of applications and power needs. The federal Investment Tax Credit (ITC), federal ARRA funding, and state grants and programs such as California's Self-Generation Incentive Program (SGIP), Connecticut's Clean Energy Fund, and the New York State Energy Research and Development Authority (NYSERDA), are motivating businesses to consider fuel cell technology among their many energy options.

Companies such as Walmart, Google, Bank of America and Coca-Cola, as well as state governments and municipalities, are recognizing not only the environmental benefits but also the economic ones, with operational cost savings via increased productivity and lower energy costs. Many are achieving returns on investment much faster than expected due to these savings. Once businesses try fuel cells, they recognize the value and benefits, and are returning to buy more. Be sure to see Fuel Cells 2000's *Business Case for Fuel Cells: Why Top Companies are Purchasing Fuel Cells Today* report for more details.

The fuel cell industry is vital to American industrial growth, manufacturing and our environmental and economic well-being. The fuel cell marketplace is expected to grow exponentially in the coming years and is rapidly expanding as more companies are entering the marketplace with commercial products for more applications and energy needs. By encouraging American manufacturing, jobs are created, and economies of scale can be attained that will lead to further price reductions for fuel cell and hydrogen technology and related equipment.

"Ohio Third Frontier, an unprecedented and bipartisan commitment to create new technology-based products, companies, industries, and jobs, has attracted more than $5.9 billion in other investments to Ohio, and has a nearly 9:1 return on investment since its inception. Specifically, the Ohio Third Frontier Fuel Cell Program has attracted more than $173 million in other investments to Ohio, and has a nearly 5:1 return on investment since its inception, resulting in about 2100 direct and indirect jobs created and retained in Ohio in the fuel cell industry."

Mike McKay, Senior Advanced Energy Programs Manager, Technology and Innovation Division, Ohio Department of Development

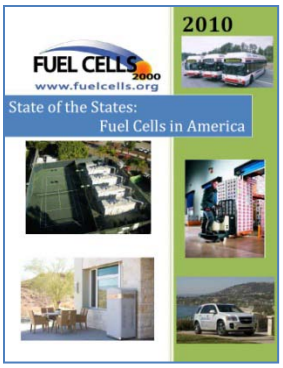
The states that are helping foster fuel cell installations, company relocations and growth are helping keep the U.S. at the forefront of fuel cell commercialization. The U.S. fuel cell industry faces heavy competition from countries such as Japan, Korea, Germany and China that have strong fuel cell commercialization plans and roadmaps, and committed national government funding. Currently, the U.S. is home to many of the major fuel cell manufacturers and fuel providers, as well as hundreds of component suppliers, end users, universities and companies involved at one point or another on the fuel cell research, development and manufacturing spectrum. Some of our companies are finding critical support from overseas, which could determine whether manufacturing stays in the U.S. or moves abroad.

Recent Foreign Activity by U.S. Companies

- FuelCell Energy, based in Connecticut, recently sold 70 MW to POSCO Power in South Korea
- Oregon-based fuel cell manufacturer, ClearEdge Power entered into a $40 million distribution agreement with LS Industrial Systems in South Korea.

More Detail

In the 2010 report, *State of the States: Fuel Cells in America*[4], Fuel Cells 2000 ranked the Top Five states in the U.S. based on their fuel cell and hydrogen policies and deployments. We also provided a checklist of each state's activities with regards to policies (net metering, interconnection standards, renewable portfolio standards), roadmaps, grants and tax credits, as well as stationary fuel cell installations, both large and small, and vehicle deployments, including light-duty vehicles, fuel cell-powered forklifts and fuel cell buses. We also included hydrogen fueling stations.



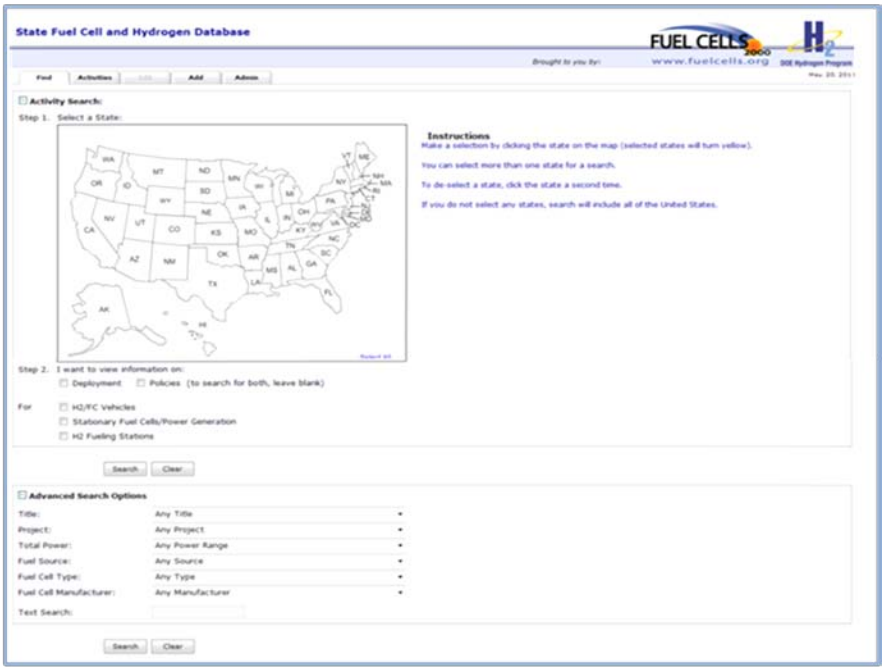
For this update report, we provide much more detail on the progress and activities that happened in the past year or so since the first report. For each state, we include: New Policies and Funding, Recent Fuel Cell and Hydrogen Installations, Planned Fuel Cell and Hydrogen Installations, and Recent Activity by State Industry and Universities. The Recent Activity by State Industry and Universities section is not meant to be a directory of industry in the state, but rather highlight the companies receiving funding awards or making news with sales, deployments or product launches. For a complete listing of fuel cell companies in the United States, visit Fuel Cells 2000's Industry Map[5].

The original Top 5 are still at the top of the pack, but many more states are moving up the list. In this report we have called out five more up-and-coming states that are working to make their mark in the industry – Delaware, Florida, Hawaii, Maryland, and Texas. As with last year's report, we chose these five for different reasons, including incentive policies to attract fuel cell business to their state; present or planned deployments of hydrogen fueling stations and fuel

[4] http://www.fuelcells.org/StateoftheStates.pdf
[5] Fuel Cells 2000's Industry Map
http://www.fuelcells.org/info/maps.html#company

cell-powered vehicles, buses and forklifts; and university research projects that attract funding to the state while also advancing the industry. Read more about what each of the Top Five, the Up and Comers, and the rest of the United States are doing in the pages that follow.

For more information on past and current policy, installations or demonstrations not included in this report, 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 or www.fuelcells.org for additional resources.



[6] Fuel Cells 2000's State Fuel Cell and Hydrogen Database - http://www.fuelcells.org/info/statedatabase.html

Still the Best of the Best: Top Five Fuel Cell States

California

- Worldwide leader in - hydrogen stations, fuel cell vehicles, fuel cell buses, stationary installations; Progressive emissions and funding policies

Connecticut

- Home to major fuel cell manufacturers and hydrogen generation companies, numerous installations, supportive funding policies

New York

- High profile and long-running installations, funding support, favorable policies

Ohio

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

South Carolina

- Numerous forklift demonstrations and deployments, hydrogen permitting leading to hydrogen stations, business development

Rising Stars: Recognizing the Value of Fuel Cells and Hydrogen

Delaware

- Added non-renewable fuel cells to net metering, two fuel cell buses operating with more on way, home to major fuel cell component suppliers, Bloom Energy opening East Coast facility

Florida

- Cleantech Industry Cluster includes fuel cells, more than 100 university hydrogen and fuel cell research projects, business attraction/development policies that target the hydrogen industry

Hawaii

- Fuel cell vehicles, hydrogen station at Hickam Air Force Base, recently launched the Hawaii Hydrogen Initiative (H2I) with GM, DOE, TGC to install 25 hydrogen stations in Oahu

Maryland

- FuelWorks research center opened at the University of Maryland, Whole Foods forklift fleet among country's largest, attracted North American Headquarters of a German fuel cell manufacturer

Texas

- Fuel cell forklift deployments by several major corporations at TX facilities, University of Austin fuel cell vehicle projects

State of the States: Fuel Cells in America

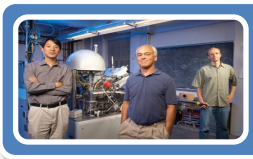
States in Review (2010 through mid-2011)

Discussed in Each State Entry:

- New Policies & Funding

- Recent Fuel Cell & Hydrogen Installations

- Planned Fuel Cell & Hydrogen Installations



- Recent Activity by State Industry & Universities

Alabama

New Policies and Funding	**AlabamaSAVES (Sustainable and Verifiable Energy Savings)**: AlabamaSAVES is an energy revolving loan fund for existing industries and businesses within the state. The program, initially capitalized through the American Recovery and Reinvestment Act (ARRA) and boosted by private lending, provides low cost financing solutions for commercial and industrial energy-efficiency and renewable-energy projects in Alabama. Eligible renewable energy systems include fuel cell technologies. Minimum loan size is $250,000, maximum loan is $4,000,000. The interest rate is two percent.
Recent Fuel Cell and Hydrogen Installations	None found
Planned Fuel Cell and Hydrogen Installations	**Fuel Cell Bus and Hydrogen Station, Birmingham:** The Center for Transportation Excellence, the Birmingham-Jefferson County Transit Authority, EV America, The University of Alabama-Birmingham, Ballard Power Systems and Altairnano have been awarded $1,545,148 by the Federal Transit Administration's (FTA) National Fuel Cell Bus Program to develop and demonstrate a 30-foot battery-dominant fuel cell bus with advanced lithium battery technology and with improved range, acceleration, and fuel economy.
Recent Activity by Alabama Industry and Universities	**University of Alabama:** Researchers from Los Alamos National Laboratory and the University of Alabama were highlighted in the March 2011 issue of *Science* for discovering a method for recycling a hydrogen fuel source. Ammonia borane, a lightweight material, can be a feasible material for storing hydrogen on vehicles. Once the hydrogen is used, spent fuel remains in the car and hydrogen can be added back into the material to make ammonia borane again.

Alaska

New Policies and Funding	None found
Recent Fuel Cell and Hydrogen Installations	**Wrangell Floating Camp, Anan Bay, Tongass National Forest:** As part of a U.S. Forest Service project, a commercially-available fuel cell was deployed in May 2010, on a small 4-person float house to provide backup power to an existing battery bank that is part of an existing solar array/inverter/battery bank electrical system. The fuel cell is part of a pilot study on the use of fuel cells at the remote field camp sites on the Tongass National Forest.
Planned Fuel Cell and Hydrogen Installations	None found
Recent Activity by Alaksa Industry and Universities	None found

Arizona

New Policies and Funding	None found
Recent Fuel Cell and Hydrogen Installations	**AT&T Mobility Network:** ReliOn, a fuel cell manufacturer, was awarded $8.6 million in ARRA/DOE Market Transformation funding to deploy fuel cells to 180 AT&T Mobility Network sites in multiple regions, including Arizona.
Planned Fuel Cell and Hydrogen Installations	None found
Recent Activity by Arizona Industry and Universities	None found

California

New Policies and Funding

Air Resources Board (ARB): ARB is evaluating a number of approaches to provide policy incentives to energy companies who invest in ultra-low carbon fuels including hydrogen. This includes the use of credit multipliers under the Low Carbon Fuel Standard and changes to the Clean Fuels Outlets program which requires energy companies to provide infrastructure once a certain number of vehicles have been sold. These regulatory tools have the potential to create a clear business model for private investment in hydrogen infrastructure as vehicle numbers grow.

Since 2004, ARB has helped co-fund fuel cell bus demonstration programs in the San Francisco area and Southern California and, under ARB's Clean Vehicle Rebate Project, a fully-functioning fuel cell vehicle (FCV), such as the Honda Clarity FCX, is eligible for a $5,000 per vehicle rebate. $11.1 million was appropriated for the program for Fiscal Years 2009-2011.

California Alternative Energy and Advanced Transportation Financing Authority (CAEATFA): Passed in 2010, Senate Bill 1754 provides authority for CAEATFA to use bonds to finance power purchase agreement (PPA) arrangements, to provide and promote the establishment of:

(1) facilities utilizing alternative methods and sources of energy; and
(2) facilities needed for the development and commercialization of advanced transportation technologies.

The authority is directed to establish a renewable energy program to provide financial assistance to public power entities, independent generators, utilities, or businesses manufacturing components or systems, or both, to generate new and renewable energy sources, develop clean and efficient distributed generation, and demonstrate the economic feasibility of new technologies. The authority will give preference to utility-scale projects that can be rapidly deployed to provide a significant contribution as a renewable energy supply. In the bill, fuel cells are included in the definition of "advanced transportation technologies" and "renewable energy."

California Energy Commission (CEC) 2010-2011 Investment Plan for the Alternative and Renewable Fuel and Vehicle Technology Program: A strategic decision by the CEC to match federal ARRA funding has resulted in significant uncommitted Program funding from the first investment plan. The CEC is releasing a series of focused

solicitations for approximately $113 million that, among other efforts, further expands the state's hydrogen fueling network. $14 million was allotted to this effort in 2010 (See the Hydrogen Stations entry in the California *Planned Fuel Cell and Hydrogen Installations* section below).

Since adoption of the first investment plan in 2009, the CEC has committed funds to a variety of alternative fuel efforts, including the certification of hydrogen dispensing equipment for retail hydrogen fueling stations and establishing specifications for hydrogen and biodiesel fuels.

Public Utilities Commission (PUC) Self-Generation Incentive Program (SGIP): SGIP provides rebates for qualifying distributed energy systems installed on the customer's side of the utility meter. Qualifying technologies include wind turbines, fuel cells, and corresponding energy storage systems. The program was to expire at the end of 2011, but PUC code was amended to enable continuation of incentives through the end of 2015. Additional program funding, however, may not be available after 2011. The program year 2010 budgets by SGIP Program Administrator were:

Program	Administrator Percentage	2010 SGIP Budget (millions)
PG&E	44%	$36
SCE	34%	$28
CCSE	13%	$11
SoCalGas	9%	$8
TOTAL	**100%**	**$83**

Recent Fuel Cell and Hydrogen Installations

Award Ceremonies, Los Angeles: Altergy Systems' Freedom Power™ hydrogen fuel cell systems supplied lighting and "zero emission" power needs for all four major Hollywood Awards Ceremonies – The Golden Globes, The Screen Actors Guild Awards, The Grammy Awards, and the Academy Awards.

Adobe Headquarters, San Jose: Twelve Bloom Energy Servers - 1.2 MW total power - were installed in September 2010 at Adobe's headquarters campus.

Albertsons, San Diego: A new Albertsons supermarket in San Diego generates nearly 90 percent of its electricity using a 400-kW UTC Power fuel cell. Byproduct heat from the fuel cell is captured and used to warm water used in the store, heat the store when necessary and to power a chiller to help cool the refrigerated food, resulting in an overall energy efficiency of approximately 60 percent, nearly twice the efficiency of the U.S. electrical grid. During power outages, the store can operate without

disruption because electricity is generated on-site by the fuel cell, allowing Albertsons to avoid costly food spoilage and ensure a reliable food supply in emergency situations.

Bank of America, Southern California: Bank of America installed five Bloom Energy Servers to run a large 24/7 call center in southern California.

Cox Communications:

- In February 2011, Cox Communications' **Rancho Santa Margarita** location deployed an 800-kW UTC Power fuel cell system to generate 60 percent of its own electricity. The fuel cells will use a biogas/natural gas blend for fuel.
- In January 2011, Cox's **San Diego** site installed two 400-kW UTC Power fuel cell systems - one fuel cell will meet the entire electrical load for one building, while the second fuel cell will provide nearly 60 percent of the electrical requirement for the main building.
- In 2010, Cox located a 400-kW Bloom Energy fuel cell system at its KTVU television station in **Oakland**.

FedEx, Oakland: FedEx has installed five 100-kW Bloom Energy Servers. The package sorting facility project is expected to achieve a return on investment in five years.

NextEra Energy Resources Wind Farm, Livermore: A ClearEdge CE5 fuel cell was installed in 2010 at the site of an existing wind farm owned by NextEra Energy Resources. The 5-kW fuel cell has been operating with a 98.6 percent availability since its installation.

Office Park, Alhambra: In December 2010, an Alhambra office park deployed five Bloom Box Energy Servers (500-kW total power). The owners are considering adding five more Bloom fuel cells to the site, as well as to other properties they own.

Orange County Sanitation District (OCSD) Fuel Cell and Hydrogen Station, Fountain Valley: OCSD is routing a small portion of biogas, produced during the wastewater treatment process, to a FuelCell Energy molten carbonate fuel cell (MCFC) tri-generation energy station located at the facility. The unit will generate 250 kW of energy and excess hydrogen anode exhaust gas that will be compressed and stored onsite for use in hydrogen fueling dispensers. Waste heat from the fuel cell will be used for OCSD digester operations.

Rialto Wastewater Treatment Plant: Three 300-kW FuelCell Energy

units use biogas, generated onsite in the wastewater sludge digester tank, to generate power. Fats, oils and grease collected at the receiving station are added to the digester to increase biogas production. Waste heat from the fuel cells is used to warm the wastewater sludge inside the digester to stimulate optimal production.

Safeway, Santa Cruz: The new, 60,000 sq. ft. Westside Safeway market features solar panels on its roof and two 100-kW Bloom Energy fuel cells. The two systems provide the store 100 percent renewable electricity: the fuel cells will provide 60-70 percent of the store's electricity and the solar panels will supply the remaining demand. The building is LEED certified by the U.S. Green Building Council.

Sonoma County Government Buildings, Santa Rosa: The county has installed a 1.4 MW FuelCell Energy power plant to power government buildings in Santa Rosa. The fuel cell system provides 90 percent of the energy used at the facility, powering about 12 buildings and heating the buildings with the fuel cell's waste heat.

Southern California Gas Engineering, Pico Rivera: In November 2010, Ceramic Fuel Cells Limited installed their BlueGen fuel cell system at a Southern California Gas facility.

Sprint: Sprint has located 19 fuel cells at cell towers around California.

St. Helena Hospital, Thousand Palms: A 400-kW UTC Power PureCell® fuel cell system installed at St. Helena Hospital meets 63 percent of the hospital's electricity needs and its byproduct thermal energy is used for hot water and space heating for three of the hospital's buildings.

Time-Warner Cable, Southern California: A 30-kW Altergy Systems' PEM fuel cell has been installed at a Time Warner Cable facility, replacing a diesel generator that would be deployed for backup power during a commercial power outage and enabling customers to continue to receive digital telephone, internet and video services without interruption.

Universal Studios Hollywood, Hollywood: Universal Studios, part of the Universal Parks & Resorts division of NBCUniversal, has installed four ClearEdge5 fuel cells to provide power and hot water needs to the Universal production kitchen serving the theme park. The fuel cells will cut CO_2 emissions from its enormous food production operations by 40 percent compared to traditional forms of power generation.

Various ClearEdge Installations: ClearEdge CE5 units have been installed around California at multiple locations:

- Bancroft Hotel, Berkeley
- Enclave Apartments (Essex Property Trust), San Jose

- Geffen Playhouse, Los Angeles
- Holiday Inn Express and Suites at Morgan Hill
- Oakland Hills Swim and Tennis Club
- Stockton Unified School District
- San Diego State University (Lindo Paseo Dormitory project)
- Stone Edge Farm and Vineyards, Sonoma

Walmart, Lancaster: Walmart has installed a Bloom Energy 400-kW system at its retail store in Lancaster (2010), the second California retail site to use fuel cell power (the first was deployed at Walmart's Hemet location in 2009). Walmart also uses fuel cell-powered forklifts at several of its distribution warehouses across the country.

Burbank Fuel Cell-Battery Hybrid Bus, Burbank: In 2006, Burbank started a zero-emission bus demonstration project funded primarily through a grant from ARB. The city has partnered with Proterra, a Colorado-based bus manufacturer, to bring its first fuel cell bus to the area, as part of the FTA's National Fuel Cell Bus Program.

SunLine Transit Advanced FC Bus Demonstration, Thousand Palms: The New Flyer 6th Generation Advanced Technologies Bus arrived February 2010 and is used in the transit agency's fixed route bus service.

Zero Emission Bay Area (ZEBA) Advanced Fuel Cell Bus Demonstration, Oakland: Five Bay Area transit agencies have joined to form the ZEBA demonstration group: Alameda-Contra Costa (AC) Transit, Golden Gate Transit, Santa Clara Valley Transportation Authority, San Mateo County Transit District and the San Francisco Municipal Transportation Agency. AC Transit is leading the project by purchasing the buses; providing facilities to house, maintain, and fuel them; and serving as the primary operator. AC Transit has begun taking delivery of the buses; once all 12 buses are deployed, they will comprise the largest fuel cell bus fleet in the U.S.

Honda Solar Hydrogen Station, Los Angeles: Honda has deployed its "next generation" solar hydrogen refueling station that uses Honda's own solar cells. The unit collects solar energy during the day and the customer

can slow-fill with hydrogen over an eight-hour period at night.

Shell/Toyota Hydrogen Fueling Station, Torrance: Opened in May 2011, this is the first hydrogen fueling station in the U.S. fed directly from an active industrial hydrogen pipeline. The station is a collaborative effort between Toyota, Air Products, Shell, South Coast Air Quality Management District (SCAQMD) and DOE. The facility will provide hydrogen for the Toyota fuel cell hybrid demonstration program vehicles as well as other manufacturers' fuel cell vehicle fleets in the Los Angeles area.

Mercedes B-Class F-Cell Leases, Los Angeles and San Francisco: Daimler AG is leasing 70 Mercedes-Benz B-Class F-cell vehicles to drivers in the Los Angeles and the San Francisco areas. The monthly lease is $849 a month, which includes the hydrogen fuel. Vehicle deliveries started in December 2010.

Port of Los Angeles and Port of Long Beach: The Ports of Long Beach and Los Angeles and Vision Industries Corp. have been demonstrating the Tyrano fuel cell-battery hybrid truck in drayage use for two years, using the fuel cells to recharge the batteries. The Port of Los Angeles recently approved a $1.4 million contract to retrofit 15 electric trucks with Vision's fuel cell system.

Martin-Brower Fuel Cell Forklifts and Methanol Fueling, Stockton: Oorja Protonics sold 15 of its fuel cells to power Martin-Brower's Class 3 forklifts in their Stockton food distribution facility. The OorjaPac operates as an on-board battery charger on the vehicles. Martin-Brower placed second purchase order in 2011 for additional OorjaPac fuel cells.

U.S. Foodservice Fuel Cell Forklifts, Livermore: U.S. Foodservice-San Francisco purchased 40 Oorja Protonics methanol fuel cells to retrofit onto pallet jacks in its Livermore food distribution facility. U.S. Foodservice is gaining significant operational efficiencies as the fuel cells eliminate the need for a battery swap mid-shift, leading to an estimated four hours of productivity savings per day or about 920 hours per year. With longer charges than traditional batteries, the fuel cells outlast their predecessors, running for a full eight hours, versus an average four to six hours.

Planned California Fuel Cell and Hydrogen Installations

AT&T Mobility Network/PG&E Utility Communications Network: ReliOn, a fuel cell manufacturer, was awarded $8.6 million in ARRA / DOE Market Transformation funding to deploy fuel cells to 180 AT&T Mobility Network sites in multiple regions, including California. ReliOn fuel cells will also provide backup power to a PG&E utility communications network where no backup power was previously available. The fuel cells use a

new refillable 72-hour fuel system.

Cambrian Center, San Jose: The senior and disabled adult U.S. Department of Housing and Urban Development housing facility is being retrofitted for energy efficiency. Four ClearEdge Power 5-kW fuel cells will be installed to supply the building with approximately 20 percent of its total energy needs and as much as 50 percent of the domestic hot water.

Coca-Cola, San Leandro: A new fleet of 37 Plug Power GenDrive™-powered Caterpillar lift trucks will be deployed at Coca-Cola's 250,000 square foot bottling and distribution center. Coca-Cola will recover more than 2,000 square feet of facility space by removing battery charging infrastructure and will be reducing its electricity consumption by an estimated 1.6 million kWh/year.

Compound Fuel Cell Hybrid Bus, San Francisco: The bus will link fuel cell, conventional engine and battery energy sources in one system to double the fuel efficiency of a diesel bus in an affordable package. A Hydrogenics fuel cell will serve as an auxiliary power unit (APU).

FuelCell Energy Direct Fuel Cell (DFC) Power Plants:

- **California State University (CSU)-East Bay:** Pacific Gas and Electric Company has ordered a 1.4-MW fuel cell power plant to install as utility-owned fuel cells at the campus of CSU-East Bay. The campus plans to utilize the waste heat for heating a swimming pool and utilize the waste water for landscape irrigation.
- **CSU-Long Beach and CSU-San Bernardino:** Southern California Edison's Fuel Cell Project will include two 1.4-MW units located at CSU-San Bernardino and CSU-Long Beach. The fuel cells will interconnect and operate in parallel with Edison's distribution system and utilize the byproduct heat.
- **Olivera Egg Ranch, French Camp:** The 1.4 MW DFC 1500 fuel cell power plant will utilize anaerobic digester gas (ADG) generated from chicken waste and will supply approximately all of the power needs of the ranch. Byproduct heat from the fuel cell will be used by the anaerobic digester, avoiding the need for a combustion-based boiler.
- **Perris Valley Regional Water Reclamation Facility, Riverside:** Two 300-kW DFC300 fuel cell power plants will be used at the Eastern Municipal Water District and will be fueled using renewable biogas.
- **Rancho California Water District, Temecula:** A 1.4 MW DFC1500 fuel cell power plant, fueled by natural gas, will be installed at the Rancho California Water District. Electricity generated by the fuel cell will be used to power a pumping station.
- **San Francisco State University:** A 1.4 MW DFC1500 power plant

will be installed as utility-owned fuel cells at San Francisco State University (SFSU). SFSU plans to utilize the waste heat for facility management.

- **San Jose/Santa Clara Water Pollution Control Plant:** UTS Bioenergy LLC will purchase the 1.4 MW DFC1500 power plant and will sell the power generated to the San Jose/Santa Clara Water Pollution Control Plant under a 20-year PPA.
- **Project to install 4.5 MW of fuel cell power in the San Diego area:** This project is financed through bonds authorized by the California Pollution Control Authority, equity and debt investments from the New Energy Capital Cleantech Infrastructure Fund and the North Sky Capital CleanTech Alliance fund, and grants under both SGIP and the U.S. ITC. U.S. Bancorp provided tax credit financing, representing their first fuel cell project. BioFuels Energy LLC will own all three of the fuel cell power plants:
  - ❖ **University of California-San Diego:** A 2.8 MW DFC3000 power plant will be installed to supply power to the campus electrical grid. Power produced at night will be stored and used during peak-demand hours the following day when electricity rates are highest. Byproduct heat will help to cool campus buildings, increasing the overall efficiency of the power plant and generating cost savings for the University. Renewable biogas will be collected at the city of San Diego's Point Loma Wastewater Treatment Plant (the methane is currently flared off as waste).
  - ❖ **Point Loma Wastewater Treatment Plant:** A 300-kW DFC300 fuel cell will generate the power required for the biogas purification process. Biogas generated from the wastewater treatment process will fuel the DFC300 power plant and provide directed biogas to the existing gas pipeline. The City of San Diego estimates the project will generate $2.6 million of revenue over ten years from payments made by BioFuels Energy for the biogas.
  - ❖ **South Bay Water Reclamation Plant pump station, San Diego:** A 1.4 MW DFC1500 fuel cell power plant will provide reliable baseload power around-the-clock, replacing power purchased from the electric grid. Byproduct heat will be used for heating at the pump station. San Diego expects to save $780,000 in electricity costs to power the South Bay Water Reclamation Plant under a ten year PPA with BioFuels Energy.

Bloom Energy Servers, Various locations: Bloom will install fuel cell systems at :

- Becton Dickinson and Company, San Jose

- California Institute of Technology (Caltech), Pasadena
- Fireman's Fund, Novato
- Kaiser Permanante, 4 MW at 7 Southern California sites
- San Francisco State University
- Sharks Ice, San Jose
- Sutter Home Family Vineyards, St. Helena
- University of California-Santa Barbara

Hydrogen Fueling Stations: The CEC selected 11 hydrogen fueling station projects for its "Hydrogen Fuel Infrastructure" solicitation under the Alternative and Renewable Fuel and Vehicle Technology Program. The awards include:

- $3,396,309 to Linde LLC for a Laguna Nigel Station and a West Sacramento Station (funding has been released for contracting – April 2011).
- $567,003 to the Airport Commission, City and County of San Francisco for the San Francisco International Airport (SFO) West Bay Hydrogen Fueling Complex (funding has been released for contracting – April 2011).
- $8,484,871 to Air Products and Chemicals, Inc. for eight stations located at UC Irvine; Santa Monica; Beverly Hill (Los Angeles); West Los Angeles; Hermosa Beach; Irvine North Station (Irvine); Diamond Bar; and Hawthorne.

Three new hydrogen stations are under construction: CSU LA station, Harbor City station (where a hydrogen dispensing island is going into an existing gasoline station), and AC Transit's station in Emeryville (the station will have a dispenser inside the bus yard for buses, and a separate dispenser outside for passenger vehicles - car drivers will fill with renewably-generated hydrogen).

Inland Empire Utilities Agency (IEUA), Ontario: Inland Empire Utilities Agency signed a landmark 20-year PPA with UTS BioEnergy to install, operate and maintain a 2.8 MW fuel cell system, fueled primarily with renewable biogas. IEUA will purchase power generated from the fuel cell plant at the agreed upon price over the next 20 years, and will use the heat generated from the process to heat the biogas producing anaerobic digesters at the water recycling facility.

Irvine Unified School District: The District will install fuel cells at two high schools (University and Woodbridge High Schools) to generate heat and additional power. Each school will receive six 5-kW ClearEdge Power fuel cell units. The fuel cells will be partially funded SGIP.

K2 Pure Solutions Bleach Plant, Pittsburg: Ballard's CLEARgen^{TM} fuel cell system will convert by-product hydrogen into clean load-following electricity that will partially offset power demand at the bleach plant.

National Aeronautical and Space Administration's (NASA) Ames Research Center, Moffett Field: Selected under the U.S. Army Corps of Engineers' Engineer Research and Development Center, Construction Engineering Research Laboratory (CERL) PEM Fuel Cell Backup Demonstration Program to receive emergency fuel cell backup power units in June 2011. The fuel cells will operate for five years with an option for the host sites to fund an extension at that time.

Ramona Band of the Cahuilla Indian Tribe Eco-Resort, Anza: The Ramona Band is building an eco-resort which is designed to be independent of the energy grid and will include a fuel cell.

SunLine Transit American Fuel Cell Bus, Thousand Palms: Funded under the FTA's National Fuel Cell Bus Program, SunLine is leading a team to develop a purpose-built fuel cell bus that meets "Buy America" requirements. Team partners include BAE, El Dorado Bus and Ballard Power Systems. The bus will be put in service at SunLine in 2011. SunLine already has several hydrogen fuel cell buses in service.

Toyota Fuel Cell Vehicle Deployments: Toyota Motor Sales, USA, Inc. announced that more than 100 Toyota Fuel Cell Hybrid Vehicle – Advanced (FCHV-adv) vehicles will be placed with universities, private companies and government agencies in California and New York.

University of California, Davis: UC Davis' Waste-to-Renewable Energy (WTRE) system is one component of a campus oriented mixed housing and commercial development venture. Housed alongside the WTRE system within the Community Energy Park will be an advanced storage battery and a 300-kW fuel cell that will be fueled by the on-site biogas and provides electric power to West Village end-users. The project has been awarded $2.5 million in ARRA funding.

U.S. Marine Corps Air Ground Combat Center, 29 Palms: Selected under the U.S. Army Corps of Engineers' Engineer Research and Development Center, CERL PEM Fuel Cell Backup Demonstration Program to receive emergency fuel cell backup power units in June 2011. The fuel cells will operate for five years with an option for the host sites to fund an extension at that time.

Whole Foods Market, San Jose: Whole Foods Market will power a new San Jose retail store with a 400-kW UTC Power fuel cell system. The fuel cell system will generate 90 percent of the store's power and its byproduct thermal energy will be used for store heating, cooling and refrigeration.

WinCo Foods, Modesto: WinCo Foods will use 184 Plug Power

	GenDrive® fuel cell units to power its electric lift truck fleet at its 800,000 sq. ft. grocery distribution center.
Recent Activity by California Industry and Universities	**Altergy Systems, Folsom:** Altergy's *Freedom Power*™ PEM fuel cell systems provided power to lighting system at numerous award shows in the past year, including the Golden Globes, Academy Awards, and the Grammy Awards. Altergy's international fleet of installations has achieved more than 5 million hours of operation. **Bloom Energy, Sunnyvale:** Bloom Energy Servers, solid oxide fuel cell (SOFC) systems are installed at many high profile locations – eBay, Google, Coca-Cola, FedEx. Bloom also offers Bloom Electrons™, a PPA that allows customers to lock in their electricity rates for 10 years, delivering fixed predictable costs and significant savings versus the grid with no initial investment. Bloom manages and maintains the systems on the customers' sites and the customers pay only for the electricity consumed. Bloom has more than 20 MWs of power (200 systems) already installed, with several repeat customers. The company is expanding its Sunnyvale manufacturing facility by four times to over 210,000 square feet, and providing over 1000 new jobs for Californians. Bloom Energy expanded its workforce by over 70 percent in 2010 alone, and has grown 525 percent over the past four years. **Jadoo Power, Folsom:** Jadoo Power and its partners received $1.8 million in ARRA funding to establish the environmental and cost benefits of using a 1-kW fuel cell power system to generate power, as opposed to traditional gas/diesel generators and lead acid batteries, for the Folsom Police and Fire Departments. **Oorja Protonics, Fremont:** Oorja's product, the methanol-fueled OorjaPac, operates as an on-board battery charger for vehicles in the material handling industry. Oorja has multiple units deployed at several major corporation warehouses and has received follow-on orders for more.

Colorado

New Policies and Funding

Renewable Energy Standard (RES): This ballot initiative, passed by voters in 2004, requires Colorado utilities with 40,000 or more customers to generate or purchase a percentage of their electricity from renewable sources. In 2010, the legislation boosted Colorado's RES to 12 percent of retail electric sales from 2011 to 2014, 20 percent from 2015 to 2019, and 30 percent beginning in 2020. A fuel cell using hydrogen derived from an eligible energy resource may be used under the standard**.**

Alternative Fuel Vehicle Tax Credit: Colorado income tax credits are available for the purchase of an alternative fuel vehicle, for a motor vehicle that is converted to use alternative fuel, or for the replacement of the power source with a power source that uses alternative fuel. Hydrogen fuel cell vehicles are included in Category 1 of qualifying vehicles.

Recent Fuel Cell and Hydrogen Installations

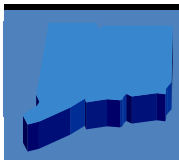
AT&T Mobility Network Sites, Arvada, Byers: ReliOn, a fuel cell manufacturer, was awarded $8.6 million in ARRA/DOE Market Transformation funding to deploy fuel cells to 180 AT&T Mobility Network sites in multiple regions. Three systems have been installed in Colorado.

NREL Hydrogen Internal Combustion Engine (HICE) bus, Boulder: The H2ICE shuttle bus in use at NREL was manufactured by Ford. It uses the same basic technology as a conventional gasoline-powered engine but runs on the hydrogen fuel created at NREL's Wind to Hydrogen (Wind2H2) Project. The Wind2H2 project links wind turbines to electrolyzers, which pass the wind-generated electricity through water to split it into hydrogen and oxygen. The hydrogen can then be stored and used later to generate electricity from an internal combustion engine or a fuel cell.

Planned Fuel Cell and Hydrogen Installations

Cheyenne Mountain Air Force Base, Colorado Springs: Selected under the U.S. Army Corps of Engineers' Engineer Research and Development Center, CERL PEM Fuel Cell Backup Demonstration Program to receive emergency fuel cell backup power units in June 2011. The fuel cells will operate for five years with an option for the host sites to fund an extension at that time.

Recent Activity by Colorado Industry and Universities	**Colorado Fuel Cell Center, Golden:** The Colorado Fuel Cell Research Center at the Colorado School of Mines advances fuel cell research, development, and commercialization and promotes business opportunities in Colorado. **Engineering, Procurement & Construction, LLC, Lakewood:** The company has received Small Business Innovation Research program (SBIR) and Small Business Technology Transfer program (STTR) funding for its "Hydrogen Fueling Station Cost Reduction: Study of a Cryogenic Liquid Phase Pump as an Alternative to Gas Compression" project. **TDA Research, Wheat Ridge:** TDA Research has been awarded $1.9 million from DOE for Bio-fueled Solid Oxide Fuel Cells and a SBIR award for Post-SOFC Residual Fuel Oxidizer for CO_2 Capture. The Clean Coal Task Force (Wyoming) has awarded TDA $340,000 to demonstrate a process to make ultra-pure hydrogen from coal by using a system based on coal gasification, warm-gas desulfurization and sulfur-tolerant, high-temperature membrane reactors. **Versa Power Systems, Littleton:** Versa is a developer of SOFCs and was recently selected as one of the key suppliers to Boeing in a U.S. Defense Advanced Research Projects Agency (DARPA) program to develop and fly a very long endurance unmanned aircraft.



Connecticut

New Policies and Funding

Connecticut Hydrogen and Fuel Cell Deployment Transportation Strategy: 2011-2050: The strategic plan outlined by the Connecticut Department of Transportation and the Connecticut Center for Advanced Technology (CCAT) to the General Assembly suggests that the deployment of zero-emission hydrogen fuel cell buses, state-wide, will increase transportation efficiency, improve environmental performance, increase economic development, and create new jobs. The plan also suggests that there are many specific locations sought for hydrogen refueling stations along highways or at locations that could potentially be utilized by state, public, or private-sector fleets. State, federal government and private industry will need to support the investment technically and financially, but this is considered a well-justified investment. The use of domestic fuel and technology manufactured in Connecticut will provide value to its economy and workers.

Connecticut Clean Energy Fund (CCEF): CCEF has recently offered two new funding opportunities for fuel cells.

- **The CCEF's On-Site Distributed Generation (OSDG) Program** is allocating $12.86 million to help finance the installation of systems that generate electricity from the sun, wind, fuel cells, biomass, landfill gas and river flows. The program also supports the installation of waste heat recovery/power generation equipment.
- **CCEF's Alpha Program** funds development and testing of emerging clean energy technologies to establish their technical viability and commercial potential. Connecticut companies undertaking early-stage clean energy technology development are encouraged to apply to the Alpha Program for funding of up to $200,000 per project. The funding is provided in two phases: Phase 1, which offers grants of up to $50,000 for Engineering Design and Development, and Phase 2, which offers loans of up to $150,000 for Prototype Construction and Testing. Applications will be reviewed and funded twice a year through a competitive judging and selection process.

Northeast Electrochemical Energy Storage Cluster program: The Connecticut Center for Advanced Technology (CCAT) and its Project Team are implementing a program to enhance and expand an emerging hydrogen and fuel cell regional cluster centered in the northeast United States.

The Project Team, which consists of the Connecticut Hydrogen-Fuel Cell Coalition/Cluster (CHFCC), the Massachusetts Hydrogen Coalition (MHC), Clean Energy States Alliance (CESA), New Energy New York (NENY), the Hydrogen Energy Center (HEC), Renewable Energy Strategies LLC, and Karter Capital Advisors, will implement a program to support the collective industry with a public-private partnership for counseling and assistance for technology deployment, business development, workforce training, development of guidance documents, and establishment of strategic market development activities.

Recent Connecticut Fuel Cell and Hydrogen Installations

Fuel Cell Buses, Hartford: CTTransit received four new UTC Power fuel cell-powered hybrid-electric transit buses as part of the FTA's national Fuel Cell Bus Program.

Roberto Clemente Leadership Academy and Hill Central School, New Haven: A 400-kW UTC Power fuel cell provides nearly all of the school's electric needs as well as thermal energy for space heating, and domestic hot water. When the power demand for the two buildings is less, the fuel cell will transfer energy back into the power grid system. The fuel cell will generate electricity independently from the electrical "grid" and therefore will be able to continue to power some areas of the schools even if the electrical power is lost because of a storm or other event. A $500,000 grant was awarded by the CCEF, with the remainder paid primarily by city bonds.

Sprint: Sprint has located 19 fuel cells at cell towers in Connecticut.

Stop & Shop, Torrington: A 400-kW UTC Power fuel cell is operating at a newly-constructed Stop & Shop grocery store. The fuel cell installation was supported with a grant of $882,000 from CCEF's On-Site Renewable Distributed Generation Program, which defrayed approximately 38 percent of the total project cost. The store will meet approximately 94 percent of total annual electric energy requirements and 70 percent of the facility's space heating needs annually with the fuel cell, as well as chilling 30 tons of water for refrigeration needs.

360 State Street, New Haven: A 400-kW UTC Power PureCell® fuel cell unit is powering the 500 residential units, common areas and retail spaces within the 700,000 square-foot building, meeting nearly 100 percent of the building's electric needs as well as providing thermal energy for space heating, domestic hot water and to heat the swimming pool.

Whole Foods, Fairfield: Opened in June 2011, this new Fairfield store installed a 400-kW UTC Power fuel cell that will provide 90 percent of the store's power and 100 percent of hot water. It also allows the store to qualify for LEED® points and will prevent the release of more than 847 metric tons of CO_2 annually.

SunHydro Hydrogen Station, Wallingford: A new SunHydro solar-powered hydrogen fueling station is located at Proton Onsite's headquarters in Wallingford. Toyota has delivered 10 Toyota FCHV-adv fuel cell vehicles that will fuel at this SunHydro station. The station generates hydrogen on-site, using Proton Onsite's PEM technology that derives hydrogen from water using a solar array. SunHydro is planning to locate hydrogen stations along the East Coast to create a hydrogen highway, starting with the northeastern U.S.

Planned Connecticut Fuel Cell and Hydrogen Installations

Coca-Cola Refreshments Bottling Plant, East Hartford: Coca-Cola Refreshments has signed an agreement with UTC Power to purchase two fuel cells for use in a CCR bottling facility located in East Hartford. The company already operates fuel cells at an Elmsford, New York production plant and is planning fuel cells for an Odwalla bottling plant and a Coca-Cola bottling facility in California. The company also uses fuel cell-powered forklifts at a North Carolina warehouse and operates a Nissan fuel cell vehicle in California.

Carla's Pasta, South Windsor: Carla's Pasta has purchased a 300-kW FuelCell Energy DFC300 fuel cell power plant and five year service contract. The fuel cell power plant is expected to provide 60 percent of the energy needs of the recently expanded Carla's Pasta facility. Byproduct heat will be used for facility heating and heating hot water for the production process.

Hamden High School: The school will install a 400-kW UTC Power fuel cell that will generate power and hot water.

New Haven City Hall and Hall of Records: The city of New Haven will install a fuel cell behind the City Hall that will to generate all the needed power and a portion of the heating and cooling required by both the City Hall and the Hall of Records.

Price Chopper, Middletown: Price Chopper plans on installing a 400-kW UTC Power fuel cell at a grocery store in Middletown. Price Chopper has two other stores powered by fuel cells in New York.

Project 150 fuel cells: The projects were approved by the Connecticut

	Department of Public Utility Control (DPUC) and are being installed as part of Connecticut's Project 150 program, an initiative aimed at increasing renewable energy supply in Connecticut by at least 150 MWs of installed capacity. Planned fuel cell projects under Round 2 of Project 150 funding include: • **Stamford Hospital:** A 4.8 MW project for Stamford Hospital will use two DFC3000 FuelCell Energy power plants in a CHP application providing lower cost thermal energy to the hospital as well as ultra-clean electricity to the utility grid. • **Waterbury Hospital:** As part of an overall 2.4 MW energy project for Waterbury Hospital, one FuelCell Energy DFC3000 power plant in a CHP application will be installed to provide lower cost thermal energy to the hospital as well as power to the local electric grid. Round 3 of funding supports five fuel cell projects, which are in various stages of development: • **Bridgeport Fuel Cell Park** • **DFC-Energy Recovery Generation (ERG) Bloomfield** • **DFC-ERG Glastonbury** • **DFC-ERG Trumbull** • **EPG Fuel Cell Danbury** **U.S. Naval Submarine Base New London, Groton:** Two FuelCell Energy DFC300 fuel cell power plants will provide reliable base load electricity to the Base. The byproduct heat generated by the fuel cell energy conversion process will be utilized for pre-heating the water used in the boiler at the existing energy plant, reducing fuel costs for the Base. FuelCell Energy's partner, LOGANEnergy will purchase, install and operate the fuel cell power plants, subcontracting maintenance services to FuelCell Energy under a three year service contract.
Recent Activity by Connecticut Industry and Universities	**CT Hydrogen-Fuel Cell Coalition, East Hartford:** Administered by the Connecticut Center for Advanced Technologies (CCAT), the coalition is comprised of representatives from Connecticut's fuel cell and hydrogen industry, labor, academia, government, and other stakeholders. CCAT and the Connecticut Hydrogen-Fuel Cell Coalition works to enhance economic growth through the development, manufacture, and deployment of fuel cell and hydrogen technologies and associated fueling systems in Connecticut. **Avālence, Milford:** Avālence offers electrolytic technology to produce high-pressure hydrogen gas for clean energy infrastructure applications. The company is providing its *Hydrofiller* hydrogen fueling station to fuel fuel cell buses housed at the Leibert Road headquarters of CTTransit in

Hartford. The on-site hydrogen producer will supply fuel to extend fuel cell bus routes and enable 7 day/week fuel cell bus service. A second fueling station is being provided to GNHTD (Greater New Haven Transit District) to fuel their hybrid hydrogen small transit fleet vehicles. Avālence also provided a *Hydrofiller* to Robins Air Force Base in Georgia to fuel fuel cell-powered forklifts.

FuelCell Energy, Danbury: FuelCell Energy manufactures Direct Fuel Cell© (DFC©) MCFC fuel cell systems that can run on natural gas or biogas. The company has sold more than 16 MW of power to California alone in the past year and most recently announced a sale of 70 MW to POSCO Power in Korea.

Proton Onsite, Wallingford: Proton Onsite (formerly Proton Energy Systems) designs and manufactures PEM electrochemical systems to make hydrogen from water. The company recently opened a SunHydro solar-hydrogen fueling station at its headquarters to support ten Toyota FCHV-adv fuel cell vehicles. Proton also recently was awarded $1.7 million in the Phase II of a contract from the U.S. Army's Tank Automotive Research Development an Engineering Center (TARDEC) to provide hydrogen fueling infrastructure in Hawaii.

UTC Power, South Windsor: UTC Power manufactures phosphoric acid fuel cells (PAFCs) for large-scale stationary power as well as PEM fuel cells for automotive and buses. In the past year, UTC has sold more than 2 MW of units, many to supermarkets.

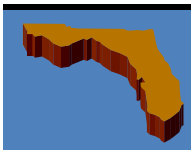
Yale University, New Haven: Engineers at the Yale School of Engineering & Applied Science have created a new fuel cell catalyst system using nanowires made of a novel material that boosts long-term performance by 2.4 times compared to today's technology.

Delaware

New Policies and Funding	**Net Metering:** The Delaware Public Service Commission issued net metering rules and regulations in 2008, under which fuel cells using renewable fuels are eligible. Legislation enacted in July 2010 expands the net metering policy and includes a provision to extend net metering to fuel cells using non-renewable fuels. The new law requires the Delaware Public Service Commission and appropriate local regulatory authorities to adopt rules to implement these changes by July 1, 2011.
Recent Fuel Cell and Hydrogen Activities	**Fuel Cell Hybrid Buses, Newark:** University of Delaware Department of Mechanical Engineering has a project underway to build and demonstrate battery dominant, plug- in hybrid fuel cell buses. The project is funded by the FTA. The University placed its first battery-fuel cell hybrid bus in service in 2007, the second in 2009.
Planned Fuel Cell and Hydrogen Activities	**Bloom Energy Manufacturing Facility, Newark:** Fuel cell manufacturer Bloom Energy recently announced it will open a manufacturing facility in Newark, estimating 900 jobs in five years, with predictions of at least 600 more from supply chain companies after that. Delmarva Power and Light has a proposal to buy 30 MW (300 fuel cells) from Bloom. **Fuel Cell Hybrid Buses, Newark:** Two additional buses are planned for the University of Delaware. **SunHydro Hydrogen Station, Claymont:** SunHydro is the world's first chain of privately funded fueling stations that provide hydrogen to fuel cell cars. The company's goal is to produce hydrogen on-site using solar energy and water. Most of the stations will be "self-service," open 24 hours a day and near major highways and major cities. A station is planned in Claymont in Phase 1 of the project's development, which will create an East Coast Hydrogen Highway. Station roll-out will begin in the northeastern U.S.
Recent Activity by Delaware Industry and Universities	**DuPont Fuel Cells, Wilmington:** Dupont Fuel Cells makes fuel cell components – membrane electrode assemblies (MEAs), membranes, dispersions, and resin solutions, including Nafion® membranes. **Gore Fuel Cell Technologies, Newark:** Gore produces MEA products for PEM fuel cells. The company recently received $600,000 from ARRA to retool a component manufacturing facility with next-generation equipment.

District of Columbia

New Policies and Funding	**District of Columbia Comprehensive Energy Plan:** Recommendations from the 2003-2007 edition of the Comprehensive Energy Plan endorses an increase in the development and application of renewable energy technologies, including fuel cell technology. The Comprehensive Plan Amendment Act of 2010 continues to recommend this action. **Net metering:** The D.C. Public Service Commission adopted final rules raising the maximum net metering capacity. Residential or commercial customers with systems powered by renewable energy sources, CHP, fuel cells and micro-turbines are eligible to net meter up to a maximum capacity of 1 megawatts (MW), raised from 100 kilowatts (kW).
Recent Fuel Cell and Hydrogen Installations	None found
Planned Fuel Cell and Hydrogen Installations	None found
Recent Activity by District of Columbia Industry and Universities	**Pepco:** Pepco, the electrical utility for Washington, DC, as well as parts of Maryland and Virginia, has worked with Microcell, a North Carolina fuel cell manufacturer on several fuel cell installations. Pepco was the lead sponsor of the National Zoo's first ZooLights holiday festival which brightened the Zoo's walkways with thousands of energy-saving lights, some powered by a Microcell fuel cell.



Florida

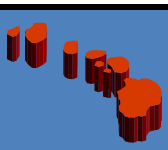
New Policies and Funding	**Agricultural Industry Alternative Fuel Economic Development:** Florida is encouraging diversification of existing rural agricultural industrial centers to encourage the creation and expansion of industries that use agricultural products in innovative ways. “Rural agricultural industrial center” is defined as an operating agricultural industrial facility, or any biomass material that could be used for the production of fuel, renewable energy, bioenergy, or alternative fuel as defined by law. The state defines “renewable energy” as electrical energy produced from a variety of methods, including hydrogen produced non-fossil fuel sources.
Recent Fuel Cell and Hydrogen Installations	**AT&T Mobility Network:** ReliOn, a fuel cell manufacturer, was awarded $8.6 million in ARRA/DOE Market Transformation funding to deploy fuel cells to 180 AT&T Mobility Network sites in multiple regions, including Florida. **United Natural Foods, Inc. (UNFI) Fuel Cell Lift Trucks and Hydrogen Fueling, Sarasota:** UNFI has deployed 65 Plug Power GenDrive fuel cells on lift trucks at its Sarasota distribution center, which serves as a regional distribution hub for customers in the southeastern U.S. 
Planned Fuel Cell and Hydrogen Installations	**SunHydro Hydrogen Station, Orlando and Miami:** SunHydro is the world's first chain of privately funded fueling stations that provide hydrogen to fuel cell cars. The company's goal is to produce hydrogen on-site using solar energy and water. Most of the stations will be "self-service," open 24 hours a day and near major highways and major cities. Stations are planned in Orlando and Miami in Phase 1 of the project’s development, which will create an East Coast Hydrogen Highway. Station roll-out will begin in the northeastern U.S.
Recent Activity by Florida Industry and Universities	**Bing Energy, Tallahassee:** Bing Energy, a PEM fuel cell components manufacturer, is relocating from California to Tallahassee. The company has been awarded a $1.9-million Qualified Target Industry (QTI) Tax Refund by the Governor’s Office of Tourism, Trade and Economic Development, and is also receiving support from the Tallahassee and Leon County governments (10 percent match on the QTI Award). The move is expected to create at least 244 jobs paying an average salary of $41,655.

Enerfuel, West Palm Beach: Enerfuel is developing high temperature PEM fuel cell systems in hybrid arrangement with lithium-ion batteries for extended range electric vehicles or for back-up power and point-of-use energy storage for homes and businesses.

University of North Florida, Jacksonville: In 2010, the University of North Florida's School of Engineering received a combined $9.4 million in federal contracts from the Army and DOE for a two-year fuel cell project. Researchers will develop and commercialize a direct methanol fuel cell power source for laptops for use by soldiers and for consumers. It's the highest-funded project in the school's history.

Georgia

New Policies and Funding	None found
Recent Fuel Cell and Hydrogen Installations	**DLA Distribution Warner Robins, Warner Robins Air Force Base:** DLA Distribution Warner Robins began a 2-year project in November of 2009 to test on-site hydrogen production through natural gas reformation. The site features a stationary hydrogen fueling dispenser, as well as a mobile refueler that can deliver hydrogen to the fuel cell forklifts operating at five different warehouse sites on the base. The site is also testing extended range fuel cell utility vehicles, using compressed gaseous hydrogen (Oct. 2010 – Oct. 2011) and solid hydrogen storage (demonstration is planned). 
Planned Fuel Cell and Hydrogen Installations	**SunHydro Hydrogen Station, Savannah:** SunHydro is the world's first chain of privately funded fueling stations that provide hydrogen to fuel cell cars. The company's goal is to produce hydrogen on-site using solar energy and water. Most of the stations will be "self-service," open 24 hours a day and near major highways and major cities. A station is planned in Savannah in Phase 1 of the project's development, which will create an East Coast Hydrogen Highway. Station roll-out will begin in the northeastern U.S.
Recent Activity by Georgia Industry and Universities	**LOGANEnergy, Sandy Springs:** LOGANEnergy has installed more than 140 fuel cell power plants exceeding 8 MW of capacity at more than 90 locations in the U.S. and UK. The company recently contracted with the U.S. Army Corps of Engineers to deploy 19 fuel cell back-up power systems at nine U.S. locations.



Hawaii

New Policies and Funding

Hawaii Hydrogen Initiative (H2I): Ten companies, agencies and universities have joined an initiative between The Gas Company (TGC), and General Motors to make hydrogen-powered vehicles and a fueling infrastructure a reality in Hawaii by 2015. The effort to reduce the state's 90 percent dependence on imported oil is expected to make hydrogen available to all of Oahu's one million residents by 2015. TGC today produces enough hydrogen to power up to 10,000 fuel cell vehicles and has the capacity to produce much more hydrogen.

Alternative Fuel Vehicle Requirements for the State Fleet: Beginning in 2010, all state and county entities, when purchasing new vehicles, are to seek vehicles with reduced dependence on petroleum-based fuels that meet the needs of the agency. Priority for selecting vehicles is as follows:

1. electric or plug-in hybrid electric vehicles;
2. hydrogen or fuel cell vehicles;
3. other alternative fuel vehicles;
4. hybrid electric vehicles; and
5. vehicles that are identified by the United States Environmental Protection Agency as being among the top fuel economy leaders.

Net Metering: In 2010, Hawaii's Public Utilities commission approved a feed-in tariff for the Hawaiian Electric Companies for renewable energy generators up to 500 kW. Systems must derive power from renewable energy sources, which include hydrogen fuels derived entirely from renewable energy, or fuel cells where the fuel is derived entirely from renewable sources.

Recent Fuel Cell and Hydrogen Installations

GM Fuel Cell Vehicle: The U.S. Navy took delivery of the first Hawaii Hydrogen Initiative fuel cell vehicle, a General Motors fuel cell Equinox, in December 2010.

Hickam Air Force Base, Honolulu: With support from the Hawaii Center for Advanced Transportation Technologies and the Air Force Advanced Power Technology Office, Hickam Air Force Base (AFB) has been operating a fuel cell hybrid electric shuttle bus since 2004. In 2006, the AFB added a fuel cell hybrid electric step van. A hydrogen fueling station was also constructed on the base in 2006 and in 2009, the station added solar panels to generate renewable hydrogen.

Planned Hawaii Fuel Cell and Hydrogen Installations	**Hydrogen buses and hydrogen fueling infrastructure, Hawaii Volcanoes National Park (HVNP):** HVNP plans to put two hydrogen shuttle buses in operation in 2011, using hydrogen as a range extender for electric motors. The buses will transport visitors from site to site within the park, relieving crowded parking spots at various attractions. The project has received funding from the FTA. The Park's theater will be powered by a 5 kW fuel cell. **Hydrogen Stations:** General Motors, in collaboration with TGC, Hawaii's major gas energy provider, plans to open 20-25 hydrogen fueling stations in Hawaii. TGC plans to tap into its 1,000-mile utility pipeline system at key locations and separate the hydrogen for use by local fueling stations for fuel cell vehicles.
Recent Activity by Hawaii Industry and Universities	**The Gas Company (TGC):** Hawaii's main gas energy provider. Working with General Motors and other partners on hydrogen fueling stations and is the first gas utility in the nation to provide hydrogen commercially for transportation. **Hawaii Natural Energy Institute (HNEI), University of Hawaii at Manoa:** runs several fuel cell research and development programs, including fuel cell testing, fuel cell systems and fabrication. A new pilot project, funded by a $2 million grant from DOE and led by HNEI, will test the conversion of electricity produced by the island's geothermal plant into hydrogen for use in buses. The Big Island's Department of Transportation will use the hydrogen buses in public transportation.

Illinois

New Policies and Funding

Executive Order to Reduce the Environmental Impact: State agencies are required to increase their purchase of energy certified by Green-e (an independent consumer protection program for the sale of renewable energy and carbon offsets) or generated from renewable energy sources in Illinois, including fuel cell energy, so that 50 percent of the overall annual electrical energy requirements of buildings will be met through renewable technologies by July 1, 2015, increasing to 100 percent by July 1, 2025.

Thermochemical Conversion Technology Demonstration: 2010 legislation amends the Illinois Environmental Protection Act, and includes the provision to test thermochemical conversion technology on a pilot-scale basis. The goal is to demonstrate that thermochemical conversion technology can reliably produce syngas that can be processed for use as a fuel for the production of electricity and process heat, for the production of ethanol or hydrogen to be used as transportation fuel, or for both purposes.

Interconnection Standards: In 2008, the Illinois Department of Commerce developed interconnection standards for renewable energy systems, as well as all distributed generation up to 10 MW, and subsequently developed rules for large distributed generation facilities (over 10 MW) in 2010. Fuel cells powered by renewable fuels are eligible renewable electrical generating facility.

Recent Fuel Cell and Hydrogen Installations

AT&T Mobility Network: ReliOn, a fuel cell manufacturer, was awarded $8.6 million in ARRA/DOE Market Transformation funding to deploy fuel cells to 180 AT&T Mobility Network sites in multiple regions, including Illinois.

Central Grocers Fuel Cell Lift Truck Fleet, Joliet: Central Grocers purchased 220 Plug Power GenDrive™ fuel cell units to power its entire lift truck fleet at a new distribution center in Joliet. In February 2011, Central Grocers purchased an additional 11 Plug Power GenDrive™ fuel cell units for its lift truck fleet.

Golden State Foods, Lemont: Oorja Protonics announced in February 2011 the installation of 20 OorjaPac Model III units at Golden State Foods' Lemont facility. This installation will convert the entire fleet of class three pallet jacks at the facility.

Planned Illinois Fuel Cell and Hydrogen Installations	**Chicago Transit Authority (CTA) Fuel Cell Bus and Hydrogen Station:** This project will demonstrate a fuel cell bus with the potential for larger fleets, as well as develop and demonstrate new technology that enables operation of fuel cell buses in cold climates. **Testa Produce, Chicago:** Oorja Protonics and Testa Produce announced in November 2010 the order of 20 OorjaPac Model III fuel cells. Testa Produce supplies all varieties of fresh fruits and vegetables (domestic and international), frozen, canned, and specialty products from their facility. Testa plans to use the fuel cells in its Chicago LEED certified distribution center.
Recent Activity by Illinois Industry and Universities	None found

Indiana

New Policies and Funding	None found
Recent Fuel Cell and Hydrogen Installations	**AT&T Mobility Network:** ReliOn, a fuel cell manufacturer, was awarded $8.6 million in ARRA/DOE Market Transformation funding to deploy fuel cells to 180 AT&T Mobility Network sites in multiple regions, including Indiana.
Planned Fuel Cell and Hydrogen Installations	None found
Recent Activity by Indiana Industry and Universities	**Purdue University, West Lafayette:** In 2010, chemical engineers at Purdue University announced that they had invented a new process for storing and generating hydrogen to run fuel cells in cars. The process, given the name hydrothermolysis, uses a powdered chemical called ammonia borane, which has one of the highest hydrogen contents of all solid materials. The research was funded through a DOE grant.

Kansas

New Policies and Funding	None found
Recent Fuel Cell and Hydrogen Installations	**EARP Distribution Fuel Cell Forklifts, Kansas City:** In December 2010, EARP deployed 24 fuel cell forklifts at their Kansas City distribution facility, using Oorja Protonics' direct methanol fuel cells.
Planned Fuel Cell and Hydrogen Installations	None found
Recent Activity by Kansas Industry and Universities	None found

Louisiana

New Policies and Funding	**Renewable Energy Pilot Program:** In early 2009, the Louisiana Public Service Commission decided to revisit the question of an RPS for Louisiana and decided to obtain more information prior to implementing a long-term RPS policy. In July 2010, a decision was made to implement the Renewable Energy Pilot Program. Fuel cells are eligible under the program's RFP Component for Larger Renewable Resources, which has allocated 350 MW to the four jurisdictional investor owned utilities and to jurisdictional Coops that have expiring contracts prior to 2014. Project terms are up to 20 years and a minimum project size of 2 MW. **Feed-in Tariff rules:** In 2010, Louisiana's Public Utility Commission issued feed-in tariff rules. The contract term is five years. The program cap is 30 MW per utility and cost recovery is permitted through a fuel adjustment charge. Project size may range between 25 kW and 5 MW, with fuel cell projects eligible to participate. Utilities may avoid offering any standard offer contracts by building three renewable energy projects themselves. After five years the tariff reverts to avoided cost.
Recent Fuel Cell and Hydrogen Installations	**Sprint Telecommunications Sites:** Sprint received ARRA funding to retrofit 70 sites with fuel cells in Louisiana and Texas.
Planned Fuel Cell and Hydrogen Installations	None found
Recent Activity by Louisiana Industry and Universities	None found

Maine

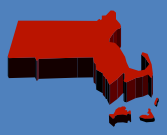
New Policies and Funding	**Transportation Efficiency Fund:** The non-lapsing fund, managed by the Department of Transportation (DOT) to increase energy efficiency and reduce reliance on fossil fuels within the state's transportation system, may be used for zero-emission vehicles (under which fuel cells would qualify). **Northeast Electrochemical Energy Storage Cluster program:** The Connecticut Center for Advanced Technology (CCAT) and its Project Team are implementing a program to enhance and expand an emerging hydrogen and fuel cell regional cluster centered in the northeast United States. The Project Team, which includes the Hydrogen Energy Center (Portland), will implement a program to support the collective industry with a public-private partnership for counseling and assistance for technology deployment, business development, workforce training, development of guidance documents, and establishment of strategic market development activities.
Recent Fuel Cell and Hydrogen Installations	None found
Planned Fuel Cell and Hydrogen Installations	**SunHydro Hydrogen Station, Scarborough:** SunHydro is the world's first chain of privately funded fueling stations that provide hydrogen to fuel cell cars. The company's goal is to produce hydrogen on-site using solar energy and water. Most of the stations will be "self-service," open 24 hours a day and near major highways and major cities. A station is planned in Scarborough, Maine in Phase 1 of the project's development, which will create an East Coast Hydrogen Highway. Station roll-out will begin in the northeastern U.S.
Recent Activity by Maine Industry and Universities	None found

Maryland

New Policies and Funding	**Net metering:** In 2010, fuel cells were added among the list of eligible customer–generators for net energy metering. System size is generally limited to 2 MW, except micro-CHP resources, which are limited to 30 kW.
Recent Fuel Cell and Hydrogen Installations	**Pepco Site, Takoma Park:** Pepco installed a Microcell MGEN 1000 unit at a telecommunications site as a replacement for lead acid battery backup. **Whole Foods Distribution Center Fuel Cell Pallet Jacks, Lift Trucks and Hydrogen Fueling, Landover:** Whole Foods has deployed 61 fuel cell powered forklifts, 45 class-3 pallet jack and 16 class-2 standup reach trucks powered by Plug Power's GenDrive fuel cells. The Linde hydrogen refueling system was installed in January 2011. The funding for the fuel cells is part of a $6.1 million ARRA award made to GENCO in April 2009.
Planned Fuel Cell and Hydrogen Installations	**Aberdeen Proving Ground, Aberdeen:** Selected under the U.S. Army Corps of Engineers' Engineer Research and Development Center, CERL PEM Fuel Cell Backup Demonstration Program to receive emergency fuel cell backup power units in June 2011. The fuel cells will operate for five years with an option for the host sites to fund an extension at that time. **Liberty Towers, LLC, Rockville:** Liberty Towers will receive the first commercial installation of a HydraStax® fuel cell from Hydra Fuel Cell Corporation, as part of an off-grid solutions program, to select back-up and primary power solutions to support tower operations during emergency conditions or as an overall grid replacement for remote tower sites that have no reasonable possibility of securing grid power.
Recent Activity by Maryland Industry and Universities	**SFC Energy, Inc., Rockville:** SFC Energy AG, based in Germany, opened its North American headquarters in Rockville. The company is now offering its products via the General Services Administration (GSA) schedule and is licensing an extensive portfolio of U.S. patents for direct methanol fuel cell technology from the University of Southern California and the California Institute of Technology for the U.S. market. **University of Maryland Energy Research Center, College Park:** The University of Maryland Energy Research Center joined with Ballard Power Systems, a fuel cell manufacturer, and the U.S. Department of Defense Army Research Laboratory to launch the Ballard Flex Fuel Center on its College Park campus. The Center has a mandate to develop

technologies enabling fuel cells to operate with fuels such as JP-8, diesel, natural gas as well as LPG. The university also runs the Center for Environmental Energy Engineering, an industry-sponsored consortium of public and private organizations collaborating on clean energy solutions for portable and distributed power.

Vehicle Systems Integration (VSI), College Park: Working on several fuel cell projects, including Ballard Fuel Cell Hybrid Battery Forklift Program with ARMY TARDEC; University of Maryland Fuel Cell Tactical Quiet Generator with U.S. Army Research Laboratory; and Georgetown University Fuel Cell Transit Bus Program with U.S. DOT and the FTA.



Massachusetts

New Policies and Funding	**Use of State Vehicles by Executive Agencies:** Effective January 1, 2010, all state agencies will be required to purchase the most economical, fuel efficient and low-emission vehicles appropriate to their mission. Unless a need is clearly demonstrated otherwise, the goal will be to have all new vehicles achieve a minimum of 20 mpg (estimated city) and to be Ultra Low Emission Vehicles (ULEV) or better. Fuel cells are considered a Zero Emission Vehicle (ZEV). **Northeast Electrochemical Energy Storage Cluster program:** The Connecticut Center for Advanced Technology (CCAT) and its Project Team are implementing a program to enhance and expand an emerging hydrogen and fuel cell regional cluster centered in the northeast United States. The Project Team, which includes the Massachusetts Hydrogen Coalition and the Clean Energy States Alliance (the Massachusetts Clean Energy Center is a member), will implement a program to support the collective industry with a public-private partnership for counseling and assistance for technology deployment, business development, workforce training, development of guidance documents, and establishment of strategic market development activities.
Recent Fuel Cell and Hydrogen Installations	None found
Planned Fuel Cell and Hydrogen Installations	**Logan Airport Fuel Cell Bus and Hydrogen Station, Boston:** A $4.875 million Federal Transit Authority grant is funding a hydrogen fuel cell bus and refueling demonstration project at Logan International Airport. Nuvera Fuel Cells, based in Billerica, will provide one 82 kW fuel cell power module, which will be integrated into a Massachusetts Port Authority shuttle bus. Additionally, Nuvera is providing a Powertap™ hydrogen generation system to provide an on-site hydrogen infrastructure to the fuel cell bus. **SunHydro Hydrogen Station, Braintree:** SunHydro is the world's first chain of privately funded fueling stations that provide hydrogen to fuel cell cars. The company's goal is to produce hydrogen on-site using solar energy and water. Most of the stations will be "self-service," open 24 hours a day and near major highways and major cities. A station is planned in Braintree in Phase 1 of the project's development.

	Unnamed Food Distributor, Boston: Plug Power sold 160 GenDrive units to an unnamed food distributor for fuel cell forklifts at its Boston facility. This was part of a larger 315 unit order.
Recent Activity by Massachusetts Industry and Universities	**Giner Electrochemical Systems, Inc., Newton:** Received $1,500,000 from DOE to to scale up its process for producing a more stable membrane for use in fuel cells. The process aims to make a membrane that is suitable for freeze/thaw cycling and also for relative humidity cycling during normal fuel cell operations **Harvard University, Cambridge:** Materials scientists at the Harvard School of Engineering and Applied Sciences and SiEnergy Systems LLC announced in April 2011 that they have demonstrated the first macro-scale thin-film SOFC. **Nuvera Fuel Cells, Billerica:** Nuvera Fuel Cells develops fuel processing and fuel cell systems, focusing on materials handling and its fueling infrastructure with its PowerEdge™ and PowerTap™ product lines. The company has delivered fuel cell forklifts to the Defense Logistics Agency (DLA) and to public customers, such as H-E-B Grocers. **Protonex, Southborough:** Protonex manufactures advanced PEM and SOFC fuel cell power solutions for portable, remote and mobile applications in the 100 to 1,000-watt range. In past year, Protonex has received more than $5 million in contracts from various military branches to develop portable soldier power and auxiliary power units (APUs).

Michigan

New Policies and Funding	None found
Recent Fuel Cell and Hydrogen Installations	**AT&T Mobility Network:** ReliOn, a fuel cell manufacturer, was awarded $8.6 million in ARRA/DOE Market Transformation funding to deploy fuel cells to 180 AT&T Mobility Network sites in multiple regions, including Michigan.
Planned Fuel Cell and Hydrogen Installations	**Georgetown University Phase III Fuel Cell Bus, Traverse City:** Georgetown University's next-generation methanol fuel cell system will be the basis for its Generation III fuel cell transit bus that will be demonstrated in revenue operations in Traverse City and Chattanooga, Tennessee. **Hydrogen Fuel Cell Bus and Hydrogen Station, Flint and Grand Blanc Township:** Kettering University is partnering with Flint Mass Transportation Authority (MTA) on a project to deploy a 40-foot hybrid electric fuel cell passenger bus, and to fund the cost of a hydrogen refueling station near Kettering's campus. The hydrogen station, which will be located in Grand Blanc Township, will open in April 2012. Air Products will supply its hydrogen compression, storage and dispensing technology to fuel the bus with hydrogen produced from an electrolyzer provided by Proton OnSite.
Recent Activity by Michigan Industry and Universities	**Global Energy Innovations (GEI), Flint:** GEI is a Kettering University-run spin off company and the first company to do fuel cell research in Kettering's Fuel Cell and Advanced Technologies Commercialization Incubator. The company is focused on portable and on-board fuel cell power generation applications in the 2kW to 10kW range, including commercial trucking, military and telecommunications. Has been awarded Ann Arbor SPARK/Ypsilanti SmartZone funding of $250,000.

Minnesota

New Policies and Funding	**Hydrogen Transition Act/Renewable Energy Objective:** In 2011, Minnesota established a policy that permits hydrogen production from renewables to count toward a utility's renewable energy objective.
Recent Fuel Cell and Hydrogen Installations	None found
Planned Fuel Cell and Hydrogen Installations	None found
Recent Activity by Minnesota Industry and Universities	**University of Minnesota:** A hybrid energy system that includes a fuel cell and geothermal heat pump has been developed at the University of Minnesota. The fuel cell provides electricity to the geothermal system and the digital control unit, allowing the system to operate off the grid, and can also provide electrical power to the building. Waste heat from the fuel cell is incorporated into the geothermal heat exchange system. This technology can improve the efficiency of the heating and cooling systems in the building and also has applications in remote or backup power generation systems for homes and commercial buildings.

Missouri

New Policies and Funding	None found
Recent Fuel Cell and Hydrogen Installations	**FedEx Freight East Fuel Cell Lift Trucks and Hydrogen Fueling, Springfield:** 35 fuel cell forklifts were placed in service in 2010 at a FedEx service center, partially funded through the ARRA. The forklifts are used in a cross-dock operation, unloading freight from a trailer and moving the freight to another location on the dock. The company had earlier demonstrated Hydrogenics' fuel cell-powered forklifts at a FedEx Canada logistics hub at the Toronto International Airport. **Missouri University of Science and Technology Hydrogen Station, Rolla:** Missouri University of Science and Technology's (S&T) E3 (E-cubed) Commons houses a hydrogen fueling station consisting of several technologies including an on-site steam methane reformer and electrolyzer, steel and carbon composite storage tanks, a 350 bar hydrogen dispenser and a PEM fuel cell. It also integrates on-site solar and wind energy to demonstrate renewable hydrogen generation. 
Planned Fuel Cell and Hydrogen Installations	None found
Recent Activity by Missouri Industry and Universities	**Missouri University of Science and Technology, Rolla:** A team from Missouri S&T captured the 2010 grand prize in the national Hydrogen Student Design Contest sponsored by the Hydrogen Education Foundation for the second time in three years. **University of Missouri, Columbia:** The Mizzou Hydrogen Car Team won $1,500 for the first prize in the Urban Concept hydrogen class at the 2011 Shell Eco-marathon.

Montana

New Policies and Funding	None found
Recent Fuel Cell and Hydrogen Installations	None found
Planned Fuel Cell and Hydrogen Installations	None found
Recent Activity by Montana Industry and Universities	**Montana Tech of The University of Montana (MTT), Fuel Cell Manufacturing Manhattan Project:** The Office of Naval Research (ONR) Benchmarking and Best Practices Center of Excellence (B2PCOE), ACI Technologies, Inc., and Montana Tech of The University of Montana (MTT), are working together on the Fuel Cell Manufacturing Manhattan Project. The project focuses on the affordability and manufacturability of fuel cells, including documentation of the best practices, identification of manufacturing technology gaps and issues as well as the development of a roadmap to address those gaps and issues. Objectives also include the examination of methods to increase fuel cell producibility and decrease manufacturing costs for the commercial industry in areas applicable for Navy and other DoD applications. The B2PCOE has initiated a multiple phase study on the current state of fuel cell manufacturing utilizing experts from industry, government and academia. The findings will be published and made available to the DoD and industry community in fall of 2011. **Zinc Air, Inc., Kalispell:** Zinc Air has licensed zinc air fuel cell technology from Lawrence Livermore National Laboratory for use in vehicles.

New Hampshire

New Policies and Funding	**Northeast Electrochemical Energy Storage Cluster program:** The The Connecticut Center for Advanced Technology (CCAT) and its Project Team are implementing a program to enhance and expand an emerging hydrogen and fuel cell regional cluster centered in the northeast United States. The Project Team, which includes the Clean Energy States Alliance (New Hampshire Public Utilities Commission and New Hampshire Department of Environmental Services are members), will implement a program to support the collective industry with a public-private partnership for counseling and assistance for technology deployment, business development, workforce training, development of guidance documents, and establishment of strategic market development activities.
Recent Fuel Cell and Hydrogen Installations	None found
Planned Fuel Cell and Hydrogen Installations	None found
Recent Activity by New Hampshire Industry and Universities	None found

New Jersey

New Policies and Funding	**Net Metering:** New Jersey's net metering rules apply to all residential, commercial and industrial customers of the state's investor-owned utilities. Systems that generate electricity using solar, wind, geothermal, wave, tidal, landfill gas or sustainable biomass resources, including fuel cells, are eligible. As of July 2010, there is no maximum individual system capacity limit on net-metered systems.
Recent Fuel Cell and Hydrogen Installations	None found
Planned Fuel Cell and Hydrogen Installations	**ACuPowder International, Union:** FuelCell Energy was awarded $2.8 million from DOE to install a DFC® 300-kW power plant at ACuPowder's metal processing facility to demonstrate the fuel cell can produce hydrogen for use by the metal processing industry along with clean electricity and high quality heat. **Picatinny Arsenal:** Selected under the U.S. Army Corps of Engineers' Engineer Research and Development Center, CERL PEM Fuel Cell Backup Demonstration Program to receive emergency fuel cell backup power units in June 2011. The fuel cells will operate for five years with an option for the host sites to fund an extension at that time. **Sprint:** Sprint has located 28 fuel cells at cell towers in New Jersey.
Recent Activity by New Jersey Industry and Universities	**Princeton University, Princeton:** In 2011, Princeton researchers announced that they have used graphene to make a new, stable material for building fuel cell catalysts. The material is comprised of three layers, with platinum placed between a sheet of graphene and indium tin oxide nanoparticles. The research was conducted by the university's Ceramic Materials Laboratory in collaboration with The Pacific Northwest National Laboratory.

New Mexico

New Policies and Funding	None found
Recent Fuel Cell and Hydrogen Installations	**AT&T Mobility Network:** ReliOn, a fuel cell manufacturer, was awarded $8.6 million in ARRA/DOE Market Transformation funding to deploy fuel cells to 180 AT&T Mobility Network sites in multiple regions, including New Mexico.
Planned Fuel Cell and Hydrogen Installations	None found
Recent Activity by New Mexico Industry and Universities	None found

New York

New Policies and Funding

Renewable Portfolio Standard Customer-Sited Tier Fuel Cell Program: New York State Energy Research and Development Authority (NYSERDA) offers financial incentives to support the installation and operation of continuous duty fuel cell systems in New York State, with up to $1 million available for fuel cell systems rated larger than 25 kW and $50,000 available for fuel cell systems rated at 25 kW or less. An additional incentive of $500 per kW (up to $100,000 per Project Site for large systems) will be paid for approved systems that provide secure power/standalone capability at sites of Essential Public Services, such as police and fire stations, emergency communication sites, hospitals and public utilities, or emergency shelter. Funding is on a first-come, first-served basis until December 31, 2015, or until all funding has been fully committed. $3.5 million is available per calendar year. In 2011, $21.6 million was made available to fund the program, directed towards fuel cell projects in and around the Hudson Valley and New York City.

Interconnection Standards: New York first adopted uniform interconnection standards in 1999. The Standard Interconnection Requirements have subsequently been amended several times since, most recently with the adoption of far reaching revisions in February 2009, and further minor revisions relating to net metered residential fuel cell and micro-CHP systems in February 2010 and farm-based anaerobic digesters in December 2010. The rules apply to systems up to two MW in capacity located in the service area of one of New York's six investor-owned local electric utilities: Central Hudson Gas and Electric, Consolidated Edison (Con Edison), New York State Electric & Gas, Niagara Mohawk (d/b/a National Grid), Orange and Rockland Utilities, and Rochester Gas and Electric. In response to 2009 changes in net metering regulations allowing micro-generation systems, including micro-CHP fuel cell systems, utility tariffs and interconnection standards were updated in 2010. Standard Interconnection Requirements (SIR), which already applied to distributed generation systems, including CHP and fuel cell systems, were updated, with several minor conforming amendments necessary to effectuate the changes.

Northeast Electrochemical Energy Storage Cluster program: The Connecticut Center for Advanced Technology (CCAT) and its Project Team are implementing a program to enhance and expand an emerging hydrogen and fuel cell regional cluster centered in the northeast United States. The Project Team, which includes New Energy New York and

the Clean Energy States Alliance (NYSERDA and the Long Island Power Authority are members) will implement a program to support the collective industry with a public-private partnership for counseling and assistance for technology deployment, business development, workforce training, development of guidance documents, and establishment of strategic market development activities.

Recent New York Fuel Cell Installations

1211 6th Avenue, Midtown Manhattan: The building, built in 1973 as part of the Rockefeller Center area complex and containing two million square feet of commercial office space, plus retail space on the lobby level, has installed a 400-kW UTC Power Pure Cell Model 400 fuel cell. The fuel cell is expected to produce an annual net electric output of 3,300 MWhs and 7,800 MMBtu of useful recovered thermal energy, using the high and low temperature hot water produced by the fuel cell for heating and domestic hot water heating. The building has a City approved Emergency Action Plan (Shelter-in-Place Plan) to provide refuge to the building occupants during a non-evacuation emergency.

Coca-Cola Refreshments Production Facility, Elmsford: Coca-Cola operates two 400 kW PureCell® Model 400 UTC Power fuel cell systems that provide on-site electricity and heat for Coca-Cola Enterprises‘ production facility. Together, the fuel cells generate enough energy and heat for 35 percent of the facility‘s overall operational needs and serve as a backup source of power in the case of a utility power outage. NYSERDA is providing $2 million for the project.

Price Chopper Supermarket, Colonie: Price Chopper Supermarkets has installed a UTC Power 400 kW PureCell® Model 400 fuel cell at a new store that is the first LEED certified supermarket in the state. The new 69,000 square foot store and pharmacy opened in January 2010 and will serve as a prototype for future Price Chopper supermarkets. The U.S. Environmental Protection Agency (EPA) also awarded the Colonie store with the highest level of GreenChill gold-level certification ever achieved by a supermarket retailer. At the time, only three other stores in the nation had achieved gold level certification and, of the four, Price Chopper's new Colonie store received the highest rating. The store was touted "best of the best" within this elite group.

Price Chopper Supermarket, Glenville: Price Chopper has installed a 200 kW UTC Power PAFC at their Glenville store. The fuel cell is expected to produce 1,680 MWh of electricity per year. Waste heat from the fuel cell will be used for space heating, domestic hot water production and dehumidification. The fuel cell will be operated utilizing its "Dual Mode" capability. This dual mode capability automatically transitions the unit to supply power to critical building loads during a failure of the power grid. The unit will be configured to power store refrigeration systems which keep perishable food products from spoiling.

NYPA Office Building, White Plains: The New York Power Authority (NYPA) has installed a 200-kW UTC Power fuel cell at its downtown White Plains office building to supply approximately 20 percent of the building's annual energy requirement. Waste heat from the unit will be used to heat and cool the office's lobby areas. This is the first fuel cell to be installed at an office building in Westchester County and its operation is expected to offset about 1,116 tons of carbon dioxide annually.

The Octagon, New York City: A 400-kW UTC Power PureCell® fuel cell is providing power and heat to The Octagon, a residential apartment building located on Roosevelt Island. This is a project by Becker + Becker, a firm that also developed a new fuel cell-powered apartment building in New Haven, Connecticut (360 State Street).

Sprint: Sprint has located 18 fuel cells at cell towers around New York.

Hydrogen Station, Hempstead: The station is located at the Department of Conservation and Waterways (Point Lookout) and will fuel two Toyota FCHV-adv fuel cell vehicles. NYSERDA provided $900,000 in funding for the project, National Grid contributed $55,000, and a state alternative fuel vehicle fueling infrastructure tax credit will cover 50 percent of the station's total cost. This is the fifth hydrogen station located in the New York Metropolitan area.

Planned New York Fuel Cell and Hydrogen

City Hall, New York City: City Hall, which is under renovation, will use a natural gas-powered SOFC for power that will save an anticipated $45,000 in energy bills annually. Original plans called for installation of

Installations	158 solar panels on the building's roof, but this was cancelled due to the high cost and the solar installation's ability to power just half of one floor at City Hall. CB1's Landmarks Committee has approved the fuel cell plan. The plan also requires approval by the Landmarks Preservation Commission, which will meet later in June. **CVS, Chemung:** After successfully piloting the use of fuel cell technology in forklift machinery in its North Smithfield, Rhode Island distribution center, CVS is adding fuel cell infrastructure to its Chemung, New York distribution center (presently under construction). **Freedom Tower, New York City:** The 4.8 MW of UTC Power PureCell® Model 400 fuel cells will provide heat and power for Freedom Tower, the rebuilt World Trade Center complex in New York City. In October 2010, six fuel cells were delivered to the World Trade Center construction site, for eventual use in Towers 3 and 4. The fuel cells will deliver 30 percent of the power to these buildings. Additional fuel cells will be delivered that will provide power in Towers 1 and 2. The project includes a collaboration of Port Authority, Silverstein Properties, and NYPA. NYPA provided $10.6 million to purchase the fuel cells. **Hornblower Hybrid, New York City:** Hydrogenics Corporation has received a contract from Statue Cruises, LLC, a subsidiary of Hornblower Cruises & Events, for the delivery of two HyPM HD 16 fuel cell power modules (33 kW) for a hybrid ferry in New York City. The 600 passenger Hornblower Hybrid will be propelled by hydrogen fuel cells in a compound hybrid arrangement along with wind turbines, solar panels and a tier 2 diesel engine for additional energy needs.  **Price Chopper Fuel Cell Fleet Demonstration Project, Eastern New York State:** A fleet demonstration project will be performed consisting of five fuel cell installations at five different stores. Each system will consist of a natural gas fueled, 400-kW, UTC Power PureCell Model 400 fuel cell system. This prepackaged system is capable of providing simultaneous hot and cold water in addition to electricity. The system will provide backup power to the site and an integrated uninterrupted power supply (UPS) will provide an uninterrupted transition between normal and backup operation for priority loads. The size of the system fits well with the electric and thermal loads of the site. The system will provide chilling during grid outages. The stores are distributed throughout Price Chopper's eastern New York State territory.

Toyota Fuel Cell Vehicle Deployments: Toyota Motor Sales, USA, Inc. announced that more than 100 Toyota Fuel Cell Hybrid Vehicle – Advanced (FCHV-adv) vehicles will be placed with universities, private companies and government agencies in both California and New York.

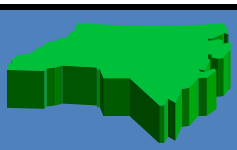
Sysco, Long Island: Sysco will add 42 fuel cell-powered forklifts to their Long Island warehouse.

U.S. Military Academy, West Point: Selected under the U.S. Army Corps of Engineers' Engineer Research and Development Center, CERL PEM Fuel Cell Backup Demonstration Program to receive emergency fuel cell backup power units in June 2011. The fuel cells will operate for five years with an option for the host sites to fund an extension at that time.

Recent Activity by New York Industry and Universities

MTI Micro Fuel Cells, Albany: Working on portable fuel cell chargers. Received a $1.2 million grant from DOE, broadening the cost-shared program fund that supports the manufacturing process of its Mobion® fuel cell systems and reducing the overall cost of micro fuel cell systems.

Plug Power, Latham: Manufacturing GenDrive™ fuel cell systems for materials handling market. Plug Power has sold units to customers in retail, grocery, institutional food distribution and manufacturing industries, including Walmart, Whole Foods, BMW, and Coca-Cola.



North Carolina

New Policies and Funding	None found
Recent Fuel Cell and Hydrogen Installations	**Piedmont Electric Membership Cooperative, Hillsborough:** Installed a Microcell MGEN 1000 unit for remote power generation. **Coca-Cola Lift Trucks and Hydrogen Fueling, Charlotte:** Third party logistics provider, GENCO, was awarded ARRA funding to demonstrate the economic benefits of large fleet conversions of lift trucks from batteries to fuel cell power at five locations. GENCO deployed 40 Class-1 sit down counterbalanced fuel cell-powered forklifts at the nation's second largest Coca-Cola bottler in Charlotte. The Linde hydrogen refueling system was completed in May 2011.
Planned Fuel Cell and Hydrogen Installations	**Fort Bragg, Fayetteville:** Selected under the U.S. Army Corps of Engineers' Engineer Research and Development Center, CERL PEM Fuel Cell Backup Demonstration Program to receive emergency fuel cell backup power units in June 2011. The fuel cells will operate for five years with an option for the host sites to fund an extension at that time. **SunHydro Hydrogen Station, Charlotte:** SunHydro is the world's first chain of privately funded fueling stations that provide hydrogen to fuel cell cars. The company's goal is to produce hydrogen on-site using solar energy and water. Most of the stations will be "self-service," open 24 hours a day and near major highways and major cities. A station is planned in Charlotte in Phase 1 of the project's development, which will create an East Coast Hydrogen Highway. Station roll-out will begin in the northeastern U.S.
Recent Activity by North Carolina Industry and Universities	**Microcell, Raleigh, Robersonville:** Manufacturer of PEM fuel cells for telecommunications and backup power. Working with several utilities to install fuel cells at remote power sites.

Ohio

New Policies and Funding

Qualified Energy Project Tax Exemption: The Qualified Energy Project Tax Exemption provides owners (or lessees) of renewable, clean coal, advanced nuclear, and cogeneration energy projects with an exemption from the public utility tangible personal property tax.

Per the Ohio Revised Code, renewable energy resources includes, but is not limited to, any fuel cell used in the generation of electricity, including, but not limited to, a proton exchange membrane fuel cell, phosphoric acid fuel cell, molten carbonate fuel cell, or solid oxide fuel cell.

Ohio Third Frontier Fuel Cell Program: The Ohio Third Frontier Fuel Cell Program aims to stimulate job creation in Ohio and position the state as a national leader in the growing fuel cell industry. The Program is an integral part of the Ohio Third Frontier, a technology-based economic development initiative designed to create jobs and bring new products to market. The Program provides direct financial support of up to $1 million to accelerate the development and growth of the fuel cell industry in Ohio. Eligible entities include companies and organizations seeking to investigate the discovery of new knowledge having specific commercial objectives with respect to products, processes, or services; commercialize new products, manufacturing processes, or technologies, or adapt or modify existing components or systems produced in Ohio that can reduce the cost of fuel cell systems or address technical and commercialization barriers; or demonstrate market readiness. The Ohio Third Frontier Fuel Cell Program awarded FY2011 funding to several fuel cell projects (see *Recent Activity by Ohio Industry and Universities* section below).

Recent Fuel Cell and Hydrogen Installations

American Electric Power's Dolan Technology Center, Columbus: Microcell installed a MGEN 1000 unit for backup power.

FirstEnergy Generation Corp. Eastlake Plant: Ohio's FirstEnergy Generation Corp utility installed a 1 MW fuel cell generator - known as CLEARgen™ using Ballard's PEM fuel cell technology – to provide power during periods of peak demand, taking strain off the power grid and ensuring uninterrupted power to customers during the summer when demand is highest. The fuel cell will operate for a five-year trial run.

Planned Ohio Fuel Cell and Hydrogen Installations	**Dull's Family Farm Hydrogen Station, Brookville:** A hydrogen station will open at the Dull Family Farm, being developed by entrepreneurs from Millennium Reign Energy. The Dull Family farm showcases alternative energy and energy efficiency, including six wind turbines and geothermal energy. The farm also hosts the Dull Homestead Future Energy and Conservation Visitor Center. An electrolyzer located at the visitor center shows visitors how hydrogen is produced, but the family would like to eventually use the hydrogen to power forklifts, heat the pig barns and corn dryers, and to power vehicles. Hydrogen for the fueling station will be generated from electrolysis. **ECO Saver IV Hybrid Electric Fuel Cell Bus – Ohio State University, Columbus:** Atlanta's Center for Transportation Excellence (CTE) is leading a development and demonstration project with DesignLine to adapt their current advanced hybrid electric bus, the EcoSaver IV, to utilize a Ballard fuel cell. Following the development work, the bus will be used in a 24-month demonstration in partnership with The Ohio State University.  **NASA Glenn Consortium Fuel Cell Bus, Cleveland:** A NASA consortium, which includes 12 partners, plans to deploy a fuel cell bus in Cleveland. Hydrogen will be derived from Lake Erie water via electrolysis. Electricity produced by the Science Center's wind turbine and large solar panel array will be used to power the electrolysis equipment. The fuel cell bus will be loaned to Greater Cleveland Regional Transit Authority (GCRTA) for two years. Seed funding will be provided by the Cleveland Foundation and project management by the Ohio Aerospace Institute. **Ohio National Guard, Columbus:** Selected under the U.S. Army Corps of Engineers' Engineer Research and Development Center, CERL PEM Fuel Cell Backup Demonstration Program to receive emergency fuel cell backup power units in June 2011. The fuel cells will operate for five years with an option for the host sites to fund an extension at that time.
Recent Activity by Ohio Industry and Universities	**American Trim, LLC**, **Lima**: Awarded $994,263 for the project *Low-cost Manufacturing System for Fuel Cell Components*, from the Ohio Third Frontier program, in collaboration with Ohio Northern University, The Ohio State University, and the Edison Materials Technology Center. The project is further developing low-cost manufacturing systems, utilizing high velocity metal forming technology to produce fuel cell components,

including plates for heat exchangers.

Battelle Memorial Institute, Columbus: Will receive $1 million, in collaboration with Energy Technologies Inc., UES, and Wright-Patterson Air Force Research Laboratory, for the project, *Improving the Manufacturing Readiness of a Solid Oxide Fuel Cell Military Power Generator*. The project is to improve the manufacturing readiness for its pallet-mounted, Advanced Power Generator system, which is a replacement for internal combustion power generators used by the military.

Faraday Technology, Inc., Clayton: Received $992,000 from DOE for electrodeposited manganese-cobalt alloy coating for SOFC interconnects.

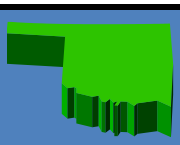
Lockheed Martin MS2, **Akron**: Awarded $1 million, from the Ohio Third Frontier program, in collaboration with Technology Management, Inc., Catacel Corporation, Energy Technologies Inc., Gorman-Rupp Industries, Refractory Specialties Inc., and Core Technology, Inc., for the project *Military Solid Oxide Fuel Cell Genset Demonstration*. The project is further developing a fuel cell-based generator set critical for supplying electrical power for military missions and to soldiers in the field.

NexTech Materials, Ltd., Lewis Center. In collaboration with Therm-O-Disc (a division of Emerson), was awarded $1 million from the Ohio Third Frontier Program for a project entitled *Hydrogen Sensor Manufacturing Technology*. This project is focused on a hydrogen sensor to be developed specifically for battery health monitoring in data centers and telecom sites, such as back-up power systems for the computer data storage industry, wireless base stations, and cell towers. NexTech was also awarded a $1 million project by DOE entitled, *Manufacturing Analysis of SOFC Interconnect Coating Processes*. In this effort, NexTech is performing a techno-economic analysis of oxide coating processes for the metallic interconnects of SOFC stacks. Leveraging proprietary materials and process technology established in Phase I of this project, ceramic protective coatings are now commercially available for a wide range of interconnect designs and materials.

Ohio Fuel Cell Coalition: The Ohio Fuel Cell Coalition is a united group of industry, academic, and government leaders working collectively to strengthen Ohio's fuel cell industry.

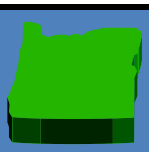
Rolls-Royce Fuel Cells Systems (US), Inc., North Canton: Awarded $999,875, from the Ohio Third Frontier program, in collaboration with RoviSys Company, for the project *Automation and Demonstration of Pilot-Scale Manufacturing for SOFCs*. The project is further developing a measurement system for assessing real-time print quality of fuel cell layers and implementing a system for automated process control and

	traceability from raw materials to finished products. **Stark State College, North Canton:** Awarded $1.7 million from the Army Communications-Electronics Research, Development and Engineering Center (CERDEC) to further advance the commercialization of SOFC technology and to develop a prototype system to reduce fuel consumption by DoD. Under the 15-month contract, Stark State will work with Lockheed Martin and Technology Management Inc. (TMI) to develop and demonstrate fuel cell components that can meet performance requirements for military generator sets or "gensets" which are major consumers of fuel in theater. Gensets provide warfighters with power for lighting, air conditioning, computers, radios and other command and control systems. The DoD has more than 100,000 gensets deployed around the world.



Oklahoma

New Policies and Funding	**Renewable Energy Goal:** In May 2010, Oklahoma established a renewable energy goal for electric utilities operating in the state. The goal calls for 15 percent of the total installed generation capacity in Oklahoma to be derived from renewable sources by 2015. Eligible renewable energy resources include wind, solar, hydropower, hydrogen, geothermal, biomass, and other renewable energy resources approved by the Oklahoma Corporation Commission. Energy efficiency may be used to meet up to 25 percent of the goal. **Alternative Fuel Vehicle (AFV) Tax Credit:** For tax years beginning before January 1, 2015, a one-time income tax credit is available for 50 percent of the incremental cost of purchasing a new original equipment manufacturer AFV or converting a vehicle to operate on an alternative fuel. The state also provides a tax credit for 10 percent of the total vehicle cost, up to $1,500, if the incremental cost of a new AFV cannot be determined or when an AFV is resold, as long as a tax credit has not been previously taken on the vehicle. Hydrogen fuel cell vehicles were eligible through December 31, 2010. Tax credits may be carried forward for up to five years. **Alternative Fueling Infrastructure Tax Credit**: For tax years before 2015, the state provides a tax credit for up to 75 percent of the cost of installing alternative fueling infrastructure. Infrastructure related to the delivery of hydrogen into the tank of a motor vehicle was eligible for the 2010 tax year only. The infrastructure must be new and must not have been previously installed or used to fuel alternative fuel vehicles**.**
Recent Fuel Cell and Hydrogen Installations	None found
Planned Fuel Cell and Hydrogen Installations	None found
Recent Activity by Oklahoma Industry and Universities	None found



Oregon

New Policies and Funding	None found
Recent Fuel Cell and Hydrogen Installations	**McDonald's, Portland:** A ClearEdge Power CE5 fuel cell system was installed in December 2009.
Planned Fuel Cell and Hydrogen Installations	None found
Recent Activity by Oregon Industry and Universities	**ClearEdge Power, Hillsboro:** ClearEdge Power offers the ClearEdge5 (CE5), a compact power and heat energy system for use in residential and small commercial buildings. The company has operations up and down the West Coast of the United States and has sold about 200 units in California, with more than half installed at 34 business sites. Since 2009, ClearEdge has grown from about 35 to 185 employees, and it plans on surpassing 300 employees by the end of 2012. **Hydra Fuel Cell Corporation, Beaverton:** Hydra Fuel Cell Corporation is a fully-owned subsidiary of American Security Resources Corporation. The company offers both air- and liquid-cooled 750 watt, rack-mounted PEM fuel cells. The HydraSTAX™ 5000 fuel cell system is currently in development. In recent news, Liberty Towers, LLC, based in Rockville, Maryland, will receive the first commercial installation of a HydraStax® fuel cell from Hydra, as part of an off-grid solutions program, to select back-up and primary power solutions to support tower operations during emergency conditions or as an overall grid replacement for remote tower sites that have no reasonable possibility of securing grid power **IdaTech, Bend:** IdaTech designs and manufactures fuel cell systems for telecommunications applications. Most recently, IdaTech received an order for 154 ElectraGen™ H2 fuel cell systems as part of its Phase III roll out on the Indonesian islands of Sumatra and Lombok, following on the success of installing more than 100 fuel cell systems across Indonesia with several of the wireless operators. IdaTech's ElectraGen™ H2 hydrogen fuel cell system also provided power to the floating Olympic Rings during the 2010 Winter Olympics in Vancouver.

Pennsylvania

New Policies and Funding

Alternative Fuels Incentive Grant Program: The program was created in 1992 to provide financial assistance and information on alternative fuels, AFVs, hybrid vehicles, anti-idling technologies that use alternatives to diesel fuel for heavy duty trucks, and advanced vehicle technology research, development, and demonstration. Hydrogen and electric vehicles qualify. 2010 funding included projects to research, develop and test advanced fuel cell engines. Hydrogen and fuel cell project awards have included a $100,000 grant to Pittsburgh Electric Engines Inc. to develop a SOFC for use in a turbo fuel cell engine targeted for the heavy-duty truck market; a $550,556 grant to Penn State University/PTI to continue a demonstration of hydrogen and CNG blends in Centre Area Transit buses and Penn State vans; and about $650,000 to Penn State's Pennsylvania Transportation Institute for the partial fuel conversion of seven Centre Area Transportation Authority buses to hydrogen and aid for a student competition.

Recent Fuel Cell and Hydrogen Installations

Wegmans Retail Service Center Fuel Cell Forklifts and Hydrogen Fueling, Pottsville: Third party logistics provider, GENCO, was awarded ARRA funding to demonstrate the economic benefits of large fleet conversions of lift trucks from batteries to fuel cell power. A Wegmans warehouse is one of five locations where GENCO is deploying the technology. The entire Wegmans lift truck fleet at the Pottsville warehouse has been converted to fuel cells, replacing units powered by lead-acid batteries, with some units already logging 5,000 hours. Two new Air Products hydrogen fueling systems have been installed at the facility. The project is being facilitated with a $1 million grant from the Pennsylvania Energy Development Authority (PEDA) that is offsetting a portion of the costs associated with the installation of an on-site hydrogen infrastructure. Fifty percent of fuel cell costs are being offset by the ARRA funding.

Sysco Fuel Cell Forklifts and Hydrogen Fueling, Philadelphia: GENCO is also using ARRA funding to deploy fuel cell forklifts at the Sysco Philadelphia distribution center. 34 class 3 power units were delivered in March 2011 and the remaining 36 class-3 and 25 class-2 units were scheduled for delivery in mid-April 2012. The hydrogen fueling

	system was installed by Linde. Fuel cell forklifts are also being demonstrated at Sysco Houston, Sysco Vancouver and Front Royal, Virginia. Sysco had earlier demonstrated fuel cell-powered Class 3 pallet trucks at distribution centers in Canton, Michigan (30 Class 3 forklifts) and Grand Rapids (11 Class 3 forklifts). The projects were part of a DoD-funded project.
Planned Pennsylvania Fuel Cell and Hydrogen Installations	None found
Recent Activity by State Industry and Universities	**Air Products and Chemicals, Allentown:** Air Products provides hydrogen fueling stations for hydrogen and fuel cell vehicle and bus deployments, as well as at many of the warehouses deploying fuel cell forklifts. The company's products provide more than 347,000 hydrogen fuelings per year. **Dynalene, Inc., Whitehall:** Received $1,000,000 from DOE for Large Scale Testing, Demonstration and Commercialization of the Nanoparticle-based Fuel Cell Coolant.

Rhode Island

New Policies and Funding	None found
Recent Fuel Cell and Hydrogen Installations	**CVS, North Smithfield:** CVS tested fuel cell-powered forklifts at a North Smithfield distribution center and from that success, is adding fuel cell infrastructure to its Chemung, New York distribution center (presently under construction).
Planned Fuel Cell and Hydrogen Installations	None found
Recent Activity by Rhode Island Industry and Universities	**Brown University, Providence:** Chemists at Brown University has demonstrated that a nanoparticle with a palladium core and an iron-platinum shell outperforms, and lasts longer, than commercially-available pure-platinum catalysts in fuel cells.

South Carolina

New Policies and Funding

South Carolina Hydrogen Permitting Act: South Carolina became the first state to uniformly permit hydrogen and fuel cells at the state level while using internationally recognized codes and standards with its South Carolina Hydrogen Permitting Act (Bill H3835). The act places the authority and responsibility of permitting hydrogen and fuel cell facilities in South Carolina in the jurisdiction of the Office of the State Fire Marshal.

South Carolina Hydrogen and Fuel Cell Economic Development Strategy 2011: The South Carolina Hydrogen and Fuel Cell Alliance (SCHFCA) gained funding from the U.S. Department of Commerce's Economic Development Administration for the South Carolina Hydrogen and Fuel Cell Economic Development Strategy 2011 project. The Project will contribute to the development of a green economy by laying out a Blueprint that will document and strategize the production and use of low/no carbon fuels such as hydrogen and the manufacture and use of power producing fuel cells within the South Carolina Hydrogen and Fuel Cell Economic Cluster. This is an update to the 2005 roadmap and will also include mapping the SC Fuel Cell Supply Chain.

Recent Fuel Cell and Hydrogen Installations

BMW Manufacturing Co. Fuel Cell Forklifts, Spartanburg: BMW purchased 86 fuel cell-powered forklifts, tuggers and stackers for use at its Spartanburg manufacturing plant that produces the new BMW X3 Sports Activity Vehicle®. BMW is also installing six Linde hydrogen dispensers that will use the hydrogen by-product of a sodium chlorate plant that is purified, compressed and liquefied by using electricity produced from renewable hydropower. The units were placed in service in October 2010.

Columbia Hydrogen Fueling Station: Opened in 2009 to support an FTA National Fuel Cell Bus Program demonstration project (see below) and a follow-on vehicle acquisition program.

Hydrogen Fueling Station at Industrial Park, Graniteville: Plug Power, GENCO and Kimberly-Clark Corporation opened the nation's first multi-use industrial park fueling station to supply hydrogen directly for industrial, commercial and government use. Kimberly-Clark's 450,000 square foot distribution facility has 25 fuel cell-powered forklifts that will fuel at the station.

Hydrogen Hybrid Bus, Columbia: The FTA "Hydrogen Hybrid Bus Project" successfully completed an 18-month deployment with the Central Midlands Regional Transit Authority (CMRTA) and the University of South Carolina.

University of South Carolina (USC) Baseball Scoreboard Fuel Cell, Columbia: USC is home to the world's first fuel cell-powered baseball scoreboard. The 5-kW fuel cell, which powers part of the scoreboard, was funded by a $33,000 grant from the South Carolina Research Authority. A university residence hall also uses a fuel cell.

Planned South Carolina Fuel Cell and Hydrogen Installations

Advanced Composite 35-ft. Fuel Cell Bus Demonstration, Columbia: Proterra's advanced 35-ft. fuel cell hybrid bus will be demonstrated at CMRTA in Columbia. The demonstration plan calls for operating the bus on both urban and commuter routes, and will feature expanded service that will support the transport of military and civilian passengers from the Savannah River National Lab to the Columbia Airport and various other locations within the city. The bus will be operated in a one-year demonstration and has been funded by a FTA grant. Bus service will begin in 2012.

Ford Hydrogen V-10 E-450 Shuttle Bus, University of South Carolina, Columbia: University of South Carolina, in partnership with the City of Columbia, announced a DOE funded "Hydrogen Internal Combustion Engine (ICE) Shuttle Bus" 12 month demonstration project with the University and City routes. The bus will start service in 2011.

Fort Sumter National Monument: The South Carolina Research Authority (SCRA) announced a partnership with DOE, DoD, and the Department of Interior to transition the Fort Sumter National Monument to an energy self-sufficient system utilizing solar energy generation and fuel cell backup power.

Recent Activity by South Carolina Industry and Universities	**South Carolina Hydrogen and Fuel Cell Alliance:** The South Carolina Hydrogen and Fuel Cell Alliance is a non-profit partnership of government, business, academia and citizens working together to facilitate the use of hydrogen and fuel cell technologies. **Trulite, Inc, Columbia:** Trulite located their corporate headquarters to Columbia in 2010. Trulite has installed HydroCell® fuel cartridge manufacturing infrastructure at their corporate headquarters located at the Midlands Technical College's (NE) Enterprise Campus. This will enable initial low volume production of their patented chemical hydride fuel cartridges to fuel Trulite's portable sub-500 watt PEM fuel cell/battery hybrid generators. **University of South Carolina (USC) - Columbia Fuel Cell Collaborative, Columbia** – The Columbia Fuel Cell Collaborative was formed by the USC, the City of Columbia, EngenuitySC and the South Carolina Research Authority (SCRA) to position Columbia as a leader in hydrogen and fuel cell innovation and technology. The USC-Columbia Fuel Cell Collaborative was recognized as a "Southern Innovator" in 2009 by the Southern Growth Policies Board and has, along with the USC-Columbia Fuel Cell Collaborative and the South Carolina Hydrogen and Fuel Cell Alliance, supported the creation of 10 new hydrogen and fuel cell startups in South Carolina since 2005. In 2010, the University announced that it had been awarded a $3.6 million grant from the Defense Advanced Research Projects Agency (DARPA), which is the research and development office for the DoD, to support research and commercialization of the next generation of fuel flexible fuel cells for portable applications. The project will be an industry/university collaboration involving applied research at the University, product development with private sector partners, and technical assistance through ATI, an affiliate of SCRA. The research will work to identify novel fuel cell applications for portable power applications within DoD that can be deployed into both the military and commercial marketplace.

Tennessee

New Policies and Funding	None found
Recent Fuel Cell and Hydrogen Installations	**Electric Power Board (EPB) Office Building, Chattanooga:** The 100-kW Bloom Energy fuel cell is installed atop the roof of the eight-story EPB headquarters in downtown Chattanooga. The project is in collaboration with the University of Tennessee, Chattanooga (UTC) Sim Center, which has also installed a Bloom Energy fuel cell.
Planned Fuel Cell and Hydrogen Installations	**Georgetown University Phase III fuel cell bus, Chattanooga:** Georgetown University's next-generation methanol fuel cell system will be the basis for its Generation III fuel cell transit bus that will be demonstrated in revenue operations in Chattanooga and Traverse City, Michigan.
Recent Activity by Tennessee Industry and Universities	None found

Texas

New Policies and Funding

None found

Recent Fuel Cell and Hydrogen Installations

University of Texas Fuel Cell Hybrid Bus: A new, 35-foot Proterra fuel cell/plug-in battery hybrid bus is being operated by CapMetro in Austin, after completing a similar year-long demonstration in Columbia, South Carolina. In December 2010, FTA awarded $133,774 to Atlanta's CTE to continue operation of Austin's fuel cell bus demonstration program with enhancements.

Sprint Telecommunications Sites: Sprint received ARRA funding to retrofit 70 sites with fuel cells in Louisiana and Texas.

Sysco Fuel Cell Pallet Trucks and Hydrogen Fueling, Houston: Sysco Houston received ARRA funding to deploy fuel cell systems as battery replacements for forklifts at a new distribution center in Houston. The entire warehouse fleet - 72 pallet trucks and 26 forklifts – is powered by Plug Power's GenDrive™ hydrogen fuel cell power units. Air Products provided the hydrogen refueling system. Fuel cell forklifts are also being demonstrated at Sysco Philadelphia, Sysco Vancouver and in Front Royal, Virginia. Sysco had earlier demonstrated fuel cell-powered Class 3 pallet trucks at distribution centers in Canton, Michigan (30 Class 3 forklifts) and Grand Rapids (11 Class 3 forklifts). The projects were part of a DoD-funded project.

Planned Fuel Cell and Hydrogen Installations

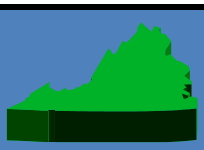
Fort Hood: Selected under the U.S. Army Corps of Engineers' Engineer Research and Development Center, CERL PEM Fuel Cell Backup Demonstration Program to receive emergency fuel cell backup power units in June 2011. The fuel cells will operate for five years with an option for the host sites to fund an extension at that time.

H-E-B Grocers: H-E-B, which already uses 14 Nuvera Fuel Cells' fuel cell-powered forklifts at its perishables distribution center in San Antonio, plans to add 16 more forklifts, with 12 more for their freezer operations as well as adding two more Nuvera PowerTap hydrogen dispensers in the

	near future. **Sysco, San Antonio:** Sysco will add 113 fuel cell-powered forklifts to their San Antonio warehouse.
Recent Activity by Texas Industry and Universities	 **University of Texas at Austin-Center for Electromechanics (UT-CEM):** UT-CEM worked with partners Gas Technology Institute (GTI), Hydrogenics, and Columbia ParCar, on a new hybrid fuel cell utility vehicle that was developed for DoD. The vehicle features an 8.5-kW hydrogen fuel cell, hydrogen storage, and ultracapacitors for load leveling and range extension to achieve a demonstrated driving range of more than 300 miles. The design, build, and demonstration project is being managed by CTE.

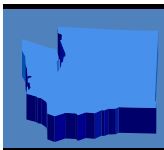
Utah

New Policies and Funding	None found
Recent Fuel Cell and Hydrogen Installations	**AT&T Sites: AT&T Mobility Network:** ReliOn, a fuel cell manufacturer, was awarded $8.6 million in ARRA/DOE Market Transformation funding to deploy fuel cells to 180 AT&T Mobility Network sites in multiple regions, including Utah.
Planned Fuel Cell and Hydrogen Installations	None found
Recent Activity by Utah Industry and Universities	None found



Virginia

New Policies and Funding	**Green Jobs Tax Credit:** Enacted in April 2010, this tax credit allows companies to earn a $500 income tax credit for five years for every green job created with a yearly salary of $50,000 or more. "Green jobs" are defined as jobs in the manufacturing and operation of renewable or alternative energy products and technologies used to generate electricity and energy. Hydrogen and fuel cell technology qualify as eligible alternative energy sources. Companies will be allowed up to 350 green jobs created.
Recent Fuel Cell and Hydrogen Installations	**Dominion Power, Richmond:** Dominion Power installed a Microcell MGEN 1000 unit at a site for the testing of substation battery charging. **Sysco Fuel Cell Forklifts and Hydrogen Fueling, Front Royal:** Sysco's Front Royal, Virginia, redistribution facility will deploy 100 fuel cell-powered forklifts. Plug Power delivered 19 class-3 GenDrive units to Sysco in December, 2010, with the remainder to be deployed in 2011. Fuel cell forklifts are also being demonstrated at Sysco Philadelphia and Sysco Vancouver. Sysco had earlier demonstrated fuel cell-powered Class 3 pallet trucks at distribution centers in Canton, Michigan (30 Class 3 forklifts) and Grand Rapids (11 Class 3 forklifts). The projects were part of a DoD-funded project.
Planned Fuel Cell and Hydrogen Installations	**SunHydro Hydrogen Station, Richmond:** SunHydro is the world's first chain of privately funded fueling stations that provide hydrogen to fuel cell cars. The company's goal is to produce hydrogen on-site using solar energy and water. Most of the stations will be "self-service," open 24 hours a day and near major highways and major cities. A station is planned in Richmond in Phase 1 of the project's development, which will create an East Coast Hydrogen Highway. Station roll-out will begin in the northeastern U.S.
Recent Activity by Virginia Industry and Universities	None found



Washington

New Policies and Funding	None found
Recent Fuel Cell and Hydrogen Installations	None found
Planned Fuel Cell and Hydrogen Installations	None found
Recent Activity by Washington Industry and Universities	**InnovaTek, Inc., Richland:** Received $2,200,000 from DOE to develop an integrated biomass reformer and solid oxide fuel cell. **Neah Power Systems, Bothell:** Neah Power Systems is developing micro fuel cells for portable electronic devices, including notebook PCs, military radios, battery chargers and other communications products. The company was named Popular Science 2010 Best of What's New Winner. **ReliOn, Spokane:** ReliOn produces fuel cells for critical backup power applications. ReliOn has installed more than 1,300 systems serving sites in 38 U.S. states and 21 countries, In March 2011, ReliOn's E-2500 fuel cell system was awarded third place in the Green Telecom & Smart Energy Solutions, Applications and Hardware category of CTIA's annual Emerging Technology (E-Tech) Awards competition.

West Virginia

New Policies and Funding

Net metering: West Virginia's Public Service Commission released net metering standards in June 2010. Net metering is available to all retail electricity customers. System capacity limits vary depending on the customer type and electric utility type, according to the following table.

Customer Type	IOUs with 30,000 customers or more	IOUs with fewer than 30,000 customers, municipal utilities, electric cooperatives
Residential	25 kW	25 kW
Commercial	500 kW	50 kW
Industrial	2 MW	50 kW

Systems that generate electricity using "alternative" or "renewable energy" resources are eligible for net metering, including photovoltaics, wind, geothermal, biomass, landfill gas, run of the river hydropower, biofuels, fuel cells, and CHP. Net excess generation may be carried over to a customer-generator's next bill as a kWh credit at retail rate and may be rolled over, indefinitely. The credits may only be applied to the energy portion of the bill.

Recent Fuel Cell and Hydrogen Installations

Yeager Airport, Charleston: Yeager Airport opened a hydrogen fueling station in August 2009. The station was designed and built by Parsons Engineering, and was a cooperative effort between the DOE's National Energy Technology Laboratory (NETL) and Yeager Airport. The airport is to receive three hydrogen-powered vehicles from DOE and will purchase a hydrogen-powered forklift.

Planned Fuel Cell and Hydrogen Installations

Hydrogen Fueling Station, Morgantown: West Virginia University's National Alternative Fuels Training Consortium will build a hydrogen fueling station in Morgantown. The project is funded with a $1.15 million grant from DOE.

Recent Activity by West Virginia Industry and Universities

National Energy Technology Laboratory, Morgantown: Part of DOE's national laboratory system. Conducts research and development (R&D) in technologies that can deliver affordable hydrogen produced from coal with near-zero environmental emissions. Also oversees the Solid State Energy Conversion Alliance (SECA) Program which focuses on the development of low-cost, modular, and fuel-flexible SOFC technology for power generation applications.

Wisconsin

New Policies and Funding	None found
Recent Fuel Cell and Hydrogen Installations	**Diversey, Sturtevant:** The 400-kW UTC Power fuel cell supplies about 45 percent of the electricity used at the Diversey headquarters and about 80 percent of the heat. The fuel cell was delivered and installed in December 2010 and is located at the company's main headquarters building in Sturtevant.
Planned Fuel Cell and Hydrogen Installations	None found
Recent Activity by Wisconsin Industry and Universities	None found

Wyoming

New Policies and Funding	The Clean Coal Task Force (CCTF), composed of the members of the Wyoming Energy Resources Council to the University of Wyoming School of Energy Resources, identifies and funds research projects that could lead to the development of technologies to reduce the environmental impact of coal-based electric generation in Wyoming and across the United States. CCTF approved 12 projects for funding in January 2011, including the following: • Laramie-based Western Research Institute (WRI) was awarded $1.1 million to build and test a metallic membrane-based hydrogen separation device to operate on simulated and coal-derived synthesis gas, and evaluate performance criteria of the device. • A $340,000 award to TDA Research, Inc. (Colorado), to demonstrate a process to make ultra-pure hydrogen from coal by using a system based on coal gasification, warm-gas desulfurization and sulfur-tolerant, high-temperature membrane reactors.
Recent Fuel Cell and Hydrogen Installations	None found
Planned Fuel Cell and Hydrogen Installations	None found
Recent Activity by Wyoming Industry and Universities	None found

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 a free monthly industry newsletter, the website includes:

- State Fuel Cell and Hydrogen Database, which includes all U.S. 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, Fuel Cell Forklifts, 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**
- 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**

Fuel Cell and Hydrogen Energy Association

The Fuel Cell and Hydrogen Energy Association (FCHEA) is the trade association for the fuel cell and hydrogen industry. FCHEA has brochures and industry information on its website, **http://www.fchea.org**.

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 U.S. Department of Energy, DSIRE is an ongoing project of the N.C. Solar Center and the Interstate Renewable Energy Council. **http://www.dsireusa.org**

State and Regional Fuel Cell and Hydrogen Associations/Coalitions

California Fuel Cell Partnership – http://www.cafcp.org
California Hydrogen Business Council - http://www.californiahydrogen.org
California Stationary Fuel Cell Collaborative - http://www.casfcc.org
CT Hydrogen-Fuel Cell Coalition - http://www.chfcc.org
Ohio Fuel Cell Coalition - http://www.fuelcellcorridor.com
South Carolina Hydrogen and Fuel Cell Alliance - http://www.schydrogen.org

U.S. Department of Energy's Energy Efficiency and Renewable Energy Fuel Cells Technologies Program

The U.S. 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.
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 - 2010 Policy Activity Wrapup – Fuel Cells & Hydrogen

This wrap-up includes 2010 legislation and policy only. Visit our free searchable State Fuel Cell and Hydrogen database (http://www.fuelcells.org/info/statedatabase.html) for a comprehensive compilation of all state fuel cell and hydrogen policies, initiatives and incentives as well as stationary fuel cell installations, fuel cell vehicle demonstrations and hydrogen fueling stations. A comprehensive list of acronyms used in this report is located at the end of this document.

CALIFORNIA

California Alternative Energy and Advanced Transportation Financing Authority (CAEATFA) formed – Senate Bill 1754 provides authority for CAEATFA to use bonds to finance power purchase agreement arrangements. This provides industry with an alternative method of financing to provide and promote: (1) facilities utilizing alternative methods and sources of energy; and (2) facilities needed for the development and commercialization of advanced transportation technologies. The definition of "advanced transportation technologies" includes fuel cells, while "renewable energy" includes ultra-low emission equipment for energy generation based on thermal energy systems such as natural gas turbines and fuel cells. As of late 2010, incentives include: sales tax exemptions for green manufacturing, reserve fund for Property Assessed Clean Energy (PACE) Bonds, Qualified Energy Conservation Bonds (QECBs), and private activity bonds for district heating and cooling.

New Clean Vehicle Rebate Project (CVRP) program offers electric vehicle rebates – The CVRP, a successor to California's Fueling Alternatives program, launched in 2010 offering rebates of up to $5,000 per light-duty vehicle for individuals and business owners that purchase or lease new, eligible, zero-emission or plug-in hybrid electric vehicles. A total of $9.1 million has been appropriated for fiscal years (FY) 2009-2011 to promote the production and use of zero-emission vehicles, including electric, plug-in hybrid electric, and fuel cell vehicles (FCVs). Honda's FCX Clarity hydrogen fuel cell vehicle qualifies for the $5,000 rebate incentive.

2010-2011 Investment Plan for the Alternative and Renewable Fuel and Vehicle Technology Program – In January 2010, the California Energy Commission (CEC) published the 2010-2011 Investment Plan for the Alternative and Renewable Fuel and Vehicle Technology Program. Several key hydrogen and fuel cell efforts and plans are discussed in the document:

- A strategic decision by the CEC to match federal stimulus funding has resulted in significant uncommitted Program funding from the first investment plan. CEC is releasing a series of focused solicitations for approximately $113 million that, among other efforts, further expands the state's hydrogen fueling network. $14 million was allotted to this effort in 2010.

- Since adoption of the first investment plan in 2009, CEC has committed funds to a variety of alternative fuel efforts, including the certification of hydrogen dispensing equipment for retail hydrogen fueling stations and establishment of specifications for hydrogen and biodiesel fuels.
- The Air Resources Board (ARB) is evaluating a number of approaches to provide policy incentives to energy companies who invest in ultra-low carbon fuels including hydrogen. This includes the use of credit multipliers under the Low Carbon Fuel Standard (LCFS) and changes to the Clean Fuels Outlets (CFO) program which requires energy companies to provide infrastructure once a certain number of vehicles have been sold. These regulatory tools have the potential to create a clear business model for private investment in hydrogen infrastructure as vehicle numbers grow.
- California's Zero Emission Vehicle (ZEV) program is the single most important driver in the introduction and commercialization of light-duty FCVs into the California market. The Energy Commission is not offering any vehicle incentives at this time; however, the ARB allocated $4.1 million for light-duty vehicle incentives in their Air Quality Improvement Program (AQIP) 2009-2010 Funding Plan. Under ARB's funding criteria, a fully-functioning FCV, such as the Honda Clarity FCX, is eligible for a $5,000 per vehicle rebate. At public workshops, ARB staff has indicated its intent to continue this CVRP as a multi-year program, though no allocations for the 2010-2011 AQIP Funding Plan have been approved.
- Since 2004, the ARB has helped co-fund fuel cell bus demonstration programs in the Bay area and Southern California. In a July 2009 ARB meeting, staff was permitted to delay the state's Zero Emission Bus (ZEB) purchase requirement, however, ARB staff has not changed the actual regulation. A two to three year delay is likely.
- CEC may consider funding for hydrogen trucks in fiscal year FY 2010-2011. If allotted, this will come from funds reserved for on-road medium- and heavy-duty electric drive vehicles.
- CEC does not intend to fund off-road applications in FY 2010-2011, but acknowledges their importance and potential. The ARB AQIP Funding Plan for FY 2009-2010 includes $2 million for non-road applications, for example agricultural and lawn/garden equipment, marine vessels, locomotives, and other off-road equipment. CEC proposes that the ARB continue to support these activities in the coming fiscal year.

CARB proposes new ZEV rules – CARB staff presented their proposal for how new post-2018 ZEV rules would work, if approved by the CARB in 2011. Overall the proposal is an affirmation of the importance California places on commercialization of fuel cell electric vehicles (FCEVs) in tandem with other electric drive vehicles as a means of achieving the state's air quality and climate change goals. CARB is acknowledging that to achieve 2050 air quality and climate change goals nearly 80% of the California fleet will need to be electric vehicles (fuel cell and battery, with an increasing percent fuel cell). This level of penetration requires about 23% of the new car fleet in California to be plug-in or fuel cell electric vehicles (EVs), including plug-in electric vehicles (PHEVs) by 2025. So the proposed ZEV rule will be written to produce that result, with about 8% pure ZEVs in the new vehicle fleet by 2025. Driving the proposed program is a credit scheme that is based entirely on range at the moment, with a 50-mile vehicle

earning one credit, and a 350-mile vehicle earning 4 credits. (This weights the program toward fuel cell EVs.) The regulatory scheme for 2018 and beyond will apply to Toyota, Honda, Ford, General Motors (GM), Chrysler and Nissan vehicles but also to BMW, Daimler, Volkswagen, Mazda, Hyundai and Kia; the last five have until now been required to meet less stringent ZEV regulations because of their relatively small level of sales in California. The Board decision is anticipated in April or May 2011.

Public Utilities Commission (PUC) Self-Generation Incentive Program (SGIP): SGIP provides rebates for qualifying distributed energy systems installed on the customer's side of the utility meter. Qualifying technologies include wind turbines, fuel cells, and corresponding energy storage systems. The program was to expire at the end of 2011, but PUC code was amended to enable continuation of incentives through the end of 2015. Additional program funding, however, may not be available after 2011.

COLORADO

Renewable Energy Standard increased – A new bill boosts Colorado's renewable portfolio standard percentages to achieve 30% renewable generation by 2020. It also requires that utility companies meet a portion of the renewable standard to be met through "distributed generation" (DG), with at least one-half of the DG generated on-site by customers facilities. A fuel cell using hydrogen derived from an eligible energy resource is an eligible electric generation technology.

CONNECTICUT

Connecticut Clean Energy Fund (CCEF) starts Alpha Program – CCEF's new Alpha Program will invest in technologies beyond the stage of basic research and development, but which require further testing and development of high risk, promising renewable energy/energy efficiency/energy independence in a laboratory or simulated environment. The program will provide incentives of up to $200,000. There will be two six-month funding cycles per year; and a competitive application evaluation and selection process. Successful Alpha Program participants will be encouraged to apply to the Operational Demonstration Program. Fuel cells are considered a renewable energy that is funded through various CCEF programs and initiatives and have been funded in the Operational Demonstration Program.

Northeast Electrochemical Energy Storage Cluster program: The Connecticut Center for Advanced Technology (CCAT) and its Project Team are implementing a program to enhance and expand an emerging hydrogen and fuel cell regional cluster centered in the northeast United States.

DELAWARE

Net metering expanded – Delaware legislation expands the state's net-metering policy net metering to include fuel cells using non-renewable fuels. The Delaware Public Service Commission is required to adopt rules to implement these changes by July 1, 2011.

DISTRICT OF COLUMBIA

Net metering cap is raised – The D.C. Public Service Commission adopted final rules raising the maximum net metering capacity. Residential or commercial customers with systems powered by renewable energy sources, combined heat and power (CHP), fuel cells and micro-turbines are eligible to net meter up to a maximum capacity of 1 megawatts (MW), raised from 100 kilowatts (kW).

FLORIDA

Agricultural industry: alternative fuel economic development encouraged – Florida is facilitating diversification of existing rural agricultural industrial centers to encourage the creation and expansion of industries that use agricultural products in innovative ways. This includes using biomass material, directly or indirectly, for the production of fuel, renewable energy, bio-energy, or alternative fuel. Florida defines renewable energy to include hydrogen produced from sources other than fossil fuels.

HAWAII

Hawaii Hydrogen Initiative (H2I) implemented – Ten companies, agencies and universities have joined an initiative between The Gas Company (TGC), and GM to make hydrogen-powered vehicles and a fueling infrastructure a reality in Hawaii by 2015. The plan, called the Hawaii Hydrogen Initiative, aims to integrate hydrogen as an essential building block for Hawaii's sustainable energy ecosystem. The effort to reduce the state's 90 percent dependence on imported oil is expected to make hydrogen available to all of Oahu's one million residents by 2015. The goal is for 20 to 25 hydrogen stations to be installed in strategic locations around the island. The plan builds on a May 2010 memorandum of understanding between TGC, one of Hawaii's major utilities, and GM. TGC today produces enough hydrogen to power up to 10,000 fuel cell vehicles and has the capacity to produce much more hydrogen. GM has fielded the world's largest fuel cell demonstration fleet – more than 100 vehicles – beginning in 2007.

The hydrogen initiative partners are evaluating methods to distribute hydrogen through existing natural gas pipelines, addressing the long-standing problem of how to cost effectively produce and distribute hydrogen. In addition to GM and TGC, the hydrogen initiative partners include the state Department of Business, Economic Development and Tourism (DBEDT); U.S. Department of Energy (DOE); FuelCell Energy; Aloha Petroleum Ltd; Louis Berger Group; U.S. Pacific Command, supported by the U.S. Pacific Fleet, U.S. Pacific Air Forces, U.S. Army Pacific, and U.S. Marine Forces, Pacific; National Renewable Energy Laboratory (NREL); the County of Hawaii; University of California – Irvine; and the University of Hawaii.

Light-duty vehicle procurement requirements for government fleets – Procurement policy for all Hawaii state agencies purchasing or leasing light-duty motor vehicles is to reduce dependence on petroleum for transportation energy. Beginning January 1, 2010, all state and county entities, when purchasing new vehicles, must seek vehicles with reduced dependence on petroleum-based fuels that meet the needs of the agency. Priority for selecting vehicles is as follows:

(1) Electric or plug-in hybrid electric vehicles;
(2) Hydrogen or fuel cell vehicles;

(3) Other alternative fuel vehicles;
(4) Hybrid electric vehicles; and
(5) Vehicles that are identified by the U. S. Environmental Protection Agency (EPA) in its annual "Fuel Economy Leaders" report as being among the top performers for fuel economy in their class.

ILLINOIS

Thermo-chemical conversion technology permitting – 2010 legislation amends the Illinois Environmental Protection Act, and includes provisions permitting issuance of thermo-chemical conversion technology on a pilot-scale basis to demonstrate that the technology can reliably produce syngas that can be processed for use as a fuel for the production of electricity and process heat, for the production of ethanol or hydrogen to be used as transportation fuel, or for both purposes.

LOUISIANA

Renewable Energy Pilot Program implemented – Louisiana is considering implementation of a statewide Renewable Portfolio Standard. In July 2010, the Louisiana Public Service Commission implemented the Renewable Energy Pilot (REP) Program to obtain more information about the availability and cost of renewable resources. The REP includes a research component and an request for proposals (RFP) component for larger renewable resources. Fuel cells are eligible for the program.

Feed-in Tariff rules issued – In 2010, Louisiana's Public Utility Commission issued feed-in tariff rules. Contract term is five years. The program cap is 30 MW per utility and cost recovery is permitted through a fuel adjustment charge. Project size may range between 25 kW and 5 MW, with fuel cell projects eligible to participate. Utilities may avoid offering any standard offer contracts by building three renewable energy projects themselves. After five years the tariff reverts to avoided cost.

MAINE

Transportation Efficiency Fund established – The Transportation Efficiency Fund is a non-lapsing fund managed by the state Department of Transportation to increase energy efficiency and reduce reliance on fossil fuels within the state's transportation system. Funding may be used for zero-emission vehicles (under which fuel cells would qualify), bio-fuel and other alternative fuel vehicles, congestion mitigation and air quality initiatives, rail, public transit, and car or van pooling.

MARYLAND

Legislation adds fuel cells as eligible net metering resource – House Bill 821 was passed in May 2010, adding fuel cells among the list of eligible customer-generators for net energy metering. Net metering is available until the aggregate capacity of all net-metered systems reaches 1,500 MW. System size is generally limited to 2 MW, except micro-combined heat and power (micro-CHP) resources, which are limited to 30 kW.

NEW JERSEY

Net Metering – As of July 2010, the net metering rules were amended to remove the cap of 2 MW of generating capacity, allowing the cost of compliance with the renewable portfolio standards to decrease. New Jersey's net-metering rules apply to all residential, commercial and industrial customers of the state's investor-owned utilities. Systems that generate electricity using solar, wind, geothermal, wave, tidal, landfill gas or sustainable biomass resources, including fuel cells, are eligible.

NEW YORK

NYPSC Clean Energy Project Funding (administered by NYSERDA) – To meet its goal of increasing the proportion of renewable generation to 30 percent of projected energy consumption by 2015, the NYPSC approved (March 2010) more than $279 million over a five-year period for customer-sited renewable energy projects as part of the state's RPS. The funding will enable thousands of homeowners and businesses to install solar panels, fuel cells, wind turbines and other renewable energy devices. In addition, NYPSC approved $150 million for large-scale solar photovoltaic, anaerobic digester and fuel cell projects in and around the lower Hudson Valley and the New York City metropolitan area.

The ratepayer-funded RPS initiative employs two programs to encourage the development of renewable energy. Both programs are administered by NYSERDA. The bulk of the electricity is obtained through competitive procurements for large-scale renewable resources, known as the main tier. The customer-sited tier promotes smaller, self-generation facilities located at residences and businesses. The NYPSC's new funding initiative is providing $21.6 million for fuel cells in the customer-sited tier.

Net metering and interconnection standards updated – The NYPSC approved tariff filings of the six investor-owned utilities in New York to encourage the installation of residential micro-CHP and fuel cell electric generating systems that will enable homeowners to sell excess power to the utility. With the Commission's decision, the tariffs that the utilities have filed will be updated to add to the list of eligible technologies than can be net metered.

New York's net metering rules permit residential fuel cell and CHP installations of up to 10 kW each. The limit on overall enrollment is one percent of 2005 demand per investor-owned utility (IOU) for solar, biogas, micro-CHP and fuel cells combined.

To further encourage development of net metering opportunities, the Standardized Interconnection Requirements (SIR) for distributed generation units operating in parallel with the electric utility distribution system that both utilities and customers are required to follow was revised to incorporate the net metering modifications for micro-CHP and fuel cell systems. Under Public Service Law, a residential applicant proposing to install a micro-CHP or a fuel cell electric generating system may not exceed 10 kW, and the installation must be located and used at the applicant's premises. Eligible micro-CHPs are an integrated, co-generating building heating and electrical power generation system, operating on any fuel and of any applicable engine, fuel cell, or other technology, with a rated capacity of at least 1 kW and not more than

10 kW electric and any thermal output that at full load has a design total fuel use efficiency in the production of heat and electricity of not less than 80 percent, and annually produces at least 2,000 kWh of useful energy in the form of electricity that may work in combination with supplemental or parallel conventional heating systems.

Eligible fuel cell electric generating equipment are solid oxide, molten carbonate, proton exchange membrane or phosphoric acid fuel cells with a combined rated capacity of not more than 10 kW that is manufactured, installed and operated in accordance with applicable government and industry standards, that is connected to the electric system and operated in parallel with an electric corporation's transmission and distribution facilities.

OHIO

Qualified Energy Project Tax Exemption offered – The Qualified Energy Project Tax Exemption provides owners (or lessees) of renewable, clean coal, advanced nuclear, and cogeneration energy projects with an exemption from the public utility tangible personal property tax (fuel cell projects qualify for this tax exemption). In order to qualify, the owner or lessee subject to sale leaseback transaction must apply to the Department of Development on or before December 31, 2011, for renewable energy projects and before December 31, 2013 for clean coal, advanced nuclear, and cogeneration projects. If the project meets the requirements of the exemption, then the Director of Development will certify the project as a "Qualify Energy Project." Qualified Energy Projects will remain exempt from taxation so long as the project is completed within the statutory deadlines, meets the "Ohio Jobs Requirement," and continues to meet several ongoing obligations including providing the Ohio Department of Development with project information on an annual basis.

OKLAHOMA

Renewable energy goal established – In May 2010, Oklahoma established a renewable energy goal for electric utilities operating in the state, calling for 15% of the total installed generation capacity to be derived from renewable sources by 2015. There are no interim targets, and the goal does not extend past 2015. Eligible renewable energy resources include wind, solar, hydropower, hydrogen, geothermal, biomass, and other renewable energy resources approved by the Oklahoma Corporation Commission.

Alternative fuel vehicle tax credit available – For tax years beginning before January 1, 2015, a one-time income tax credit is available for 50% of the incremental cost of purchasing a new original equipment manufacturer alternative fuel vehicle (AFV) or converting a vehicle to operate on an alternative fuel. The state also provides a tax credit for 10% of the total vehicle cost, up to $1,500. The alternative fuels eligible for the credit are compressed natural gas, liquefied natural gas, liquefied petroleum gas, hydrogen fuel cell, and electricity. Hydrogen fuel cell vehicles were eligible through December 31, 2010.

Alternative fueling infrastructure tax credit offered – For tax years beginning before January 1, 2015, the state provides a tax credit for up to 75 percent of the cost of installing alternative fueling infrastructure. Eligible alternative fuels include compressed natural gas, liquefied natural gas, liquefied petroleum gas, and electricity. Infrastructure related to the delivery of hydrogen

into the tank of a motor vehicle is eligible for the 2010 tax year only. The infrastructure must be new and must not have been previously installed or used to fuel alternative fuel vehicles.

SOUTH CAROLINA

State hydrogen permitting program created – House Bill 3835 establishes the South Carolina Hydrogen Permitting Program within the Office of the State Fire Marshal. The purposes of this program are to:

- make hydrogen fuel easily accessible to the general public for retail purchase from multiple, convenient locations throughout the State in a manner similar to that used for dispensing gasoline and other fuels sold to power motor vehicles;
- promote and protect public health, safety, and welfare;
- promote a positive business environment for the hydrogen and fuel cell industry; and
- demonstrate leadership as a progressive alternative energy state by ensuring that hydrogen and fuel cells are permitted on a consistent basis throughout the State and meet minimum standards of quality provided in the International Code Council's 2006 codes or the latest state-adopted version.

VIRGINIA

Green jobs tax credit supports renewable and alternative energy industries – In April, Virginia enacted the green jobs tax credit. For every green job created with a yearly salary of $50,000 or more, the company will earn a $500 income tax credit for five years. Jobs in the manufacturing and operation of renewable or alternative energy products and technologies used to generate electricity and energy are eligible. Alternative energy sources are defined as "hydrogen and fuel cell technology, landfill gas, geothermal heating systems, solar heating systems, hydropower systems, wind systems, and biomass and biofuel systems." Companies will be allowed tax credits for up to 350 green jobs created, and the credit can be carried forward up to 5 years if the taxpayer does not have enough liability to take the full credit.

WEST VIRGINIA

Net metering standards implemented – The Public Service Commission released net metering standards in June 2010. In West Virginia, net metering is available to all retail electricity customers. System capacity limits vary depending on the customer type and electric utility type, according to the following table.

Customer Type	IOUs with 30,000 customers or more	IOUs with fewer than 30,000 customers, municipal utilities, electric cooperatives
Residential	25 kW	25 kW
Commercial	500 kW	50 kW
Industrial	2 MW	50 kW

Systems that generate electricity using "alternative" or "renewable energy" resources are eligible for net metering, including photovoltaics, wind, geothermal, biomass, landfill gas, run of the river hydropower, biofuels, fuel cells, and CHP. Net excess generation may be carried over to a customer-generator's next bill as a kWh credit at retail rate and may be rolled over, indefinitely. The credits may only be applied to the energy portion of the bill.

Acronyms Used in this Report

AFV	*Alternative Fuel Vehicle*	*IOU*	*Investor-owned utility*
AQIP	*Air Quality Incentive Program (CA)*	*kW*	*Kilowatt*
CAEATFA	*California Alternative Energy and Advanced Transportation Financing Authority*	*kWh*	*Kilowatt-hour*
CARB	*California Air Resources Board*	*LCFS*	*Low carbon fuel standard*
CCAT	*Connecticut Center for Advanced Technology*	*micro-CHP*	*Micro-combined heat and power*
CCEF	*Connecticut Clean Energy Fund*	*MW*	*Megawatt*
CEC	*California Energy Commission*	*NREL*	*National Renewable Energy Laboratory (DOE)*
CFO	*Clean Fuels Outlet program (CA)*	*NYPSC*	*New York Public Service Commission*
CHP	*Combined heat and power*	*NYSERDA*	*New York State Energy Research and Development Authority*
CVRP	*Clean Vehicle Rebate Project (CA)*	*PACE*	*Property Assessed Clean Energy Bonds (CA)*
DBEDT	*Department of Business, Economic Development and Tourism (HI)*	*PHEV*	*Plug-in hybrid electric vehicle*
DG	*Distributed generation*	*QECBS*	*Qualified Energy Conservation Bonds (CA)*
DOE	*U.S. Department of Energy*	*REP*	*Renewable Energy Pilot program (LA)*
EPA	*U.S. Environmental Protection Agency*	*RFP*	*Request for proposals*
EV	*Electric vehicle*	*RPS*	*Renewable Portfolio Standard*
FCEV	*Fuel cell electric vehicle*	*TGC*	*The Gas Company (HI)*
FCV	*Fuel cell vehicle*	*ZEB*	*Zero Emission Bus rule (CA)*
FY	*Fiscal year*	*ZEV*	*Zero emission vehicle*
GM	*General Motors*		

Fuel Cell-Powered Forklifts in North America

BLUE SHADED ENTRIES = ENTIRE MATERIALS HANDLING FLEET IS FUEL CELL-POWERED AT THIS LOCATION
ARRA = AMERICAN RECOVERY AND REINVESTMENT ACT
N/a = INFORMATION UNAVAILABLE

Company	Location	Site	Year Deployed	Fuel cell manufacturer*	# of forklifts
Ace Hardware	N/a	N/a	N/a	Oorja Protonics	6
BMW Manufacturing Co.	Spartanburg, SC	Manufacturing plant	2010	Plug Power	86
Bridgestone-Firestone	Aiken County, SC	Manufacturing plant	2008, more added in 2009	Plug Power	43
	Warren County, TN	Manufacturing plant	N/a	Plug Power	N/a
Central Grocers	Joliet, IL	New distribution center	2009	Plug Power	220
Coca-Cola	San Leandro, CA	Bottling and distribution center	Planned in 2011	Plug Power	37
	Charlotte, NC	Bottling facility	2011	Plug Power	40
CVS Caremark	North Smithfield, RI	Distribution facility	N/a	N/a	N/a
	Chemung, NY	Distribution facility	Planned (under construction)	N/a	N/a
Defense Logistics Agency, U.S. Department of Defense	Susquehanna, PA	Distribution depot	2009, additional units in 2010	Nuvera, Plug Power	40, 15 additional units added
	Warner Robins, GA	Distribution depot	2010	Hydrogenics	20
	San Joaquin, CA	Distribution depot	Planned in 2011	Plug Power	20
	Fort Lewis, WA	Distribution depot	Planned in 2011	Plug Power	19
EARP Distribution	Kansas City, KS	Distribution center	2011	Oorja Protonics	24
East Penn Manufacturing	Topton, PA	Manufacturing facility	N/a	Nuvera	10
FedEx	Springfield, MO	Service center	2010, ARRA funding awarded to FedEx Freight East	Plug Power	35
	Toronto, ON, Canada	Logistics hub	N/a	Hydrogenics	N/a
GM	Oshawa, ON, Canada	Car assembly plant	N/a	Hydrogenics	19
	Oshawa, ON, Canada	Car assembly plant	2005	Hydrogenics	2
Golden State Foods	Lemont, IL	Distribution facility	2011	Oorja Protonics	20
H-E-B	San Antonio, TX	Perishables distribution center	2009, ARRA funding awarded to Nuvera	Nuvera	14
ISOLA Laminates	Ridgeway, SC	Warehouse	2007, 2-week demonstration	Hydrogenics	2*
Kimberly-Clark/GENCO	Graniteville, SC	Distribution center	Planned, ARRA funding awarded to GENCO	Plug Power	25
	Graniteville, SC	Distribution center	GENCO operating a fuel cell forklift pilot program	N/a	2*
Kroger Co.	Compton, CA	Distribution Center	2011	Plug Power	161
Leigh Fibers	Spartanburg, SC	Warehouse	2007, 2-week demonstration	Hydrogenics	2*
LPC	Lodi, CA	Warehouse	2009	Oorja Protonics	N/a (“entire fleet”)
Martin-Brower	Stockton, CA	Food distribution Center	2010, add-on order placed in 2011 converting entire Stockton pallet jack fleet to fuel cell power	Oorja Protonics	15, 2nd order converts remainder of fleet

Company	Location	Site	Year Deployed	Fuel cell manufacturer*	# of forklifts
Michelin	Columbia, SC	Manufacturing plant	2007, 2-week demonstration	Hydrogenics	2*
Nestlé Waters	Dallas, TX	Bottling facility	2009	Plug Power	32
New United Motor Manufacturing, Inc. (NUMMI) (joint-owned by GM and Toyota)	Fremont, CA	Manufacturing plant	2007	Oorja Protonics	N/a
Nissan North America	Smyrna, TN	Assembly plant	Purchase in 2009, 18-month field trial beforehand	Oorja Protonics	60
	Smyrna, TN	Assembly plant	2007, 5-month demonstration	Plug Power	N/a
Ozburn-Hessey Logistics	Smyrna, TN	Warehouse	2004	Ballard Power Systems	4
PBR	West Columbia, SC	Warehouse	2007, 2-week demonstration	Hydrogenics	2*
The Raymond Corp.	Greene, NY	Manufacturing facility	2007	Plug Power	N/a
Super Store Industries	Lathrop, CA	Warehouse freezer	2009	Oorja Protonics	N/a
Sysco	Front Royal, VA	Redistribution facility	Planned in 2011	Plug Power	100
	Houston, TX	Distribution center	2010, ARRA funding awarded to Sysco Houston	Plug Power	98
	Philadelphia, PA	Distribution center	2010, ARRA funding awarded to GENCO	Plug Power	95
	Vancouver, BC, Canada	Distribution center	N/a	Plug Power	N/a
	Canton, MI	Distribution center	N/a, completed	Plug Power	30
	Grand Rapids, MI	Distribution center	N/a, completed	Plug Power	11
Testa Produce	Chicago, IL	Distribution Center	Order placed Nov. 2010	Oorja Protonics	20
Unified Grocers	N/a	N/a	N/a	Oorja Protonics	N/a
United Natural Foods, Inc. (UNFI)	Sarasota, FL	Distribution center	2010	Plug Power	65
Unnamed Food Distributor	Boston, MA	N/a	Planned	Plug Power	160
	San Antonio, TX	N/a	Planned	Plug Power	113
	Long Island, NY	N/a	Planned	Plug Power	42
U.S. Foodservice	Livermore, CA	Distribution facility	Planned	Oorja Protonics	40
Walmart	Balzac, AL, Canada	New refrigerated distribution center	2010	Plug Power	More than 80
	Washington Court House, OH	Food distribution center	2007	Plug Power	55
	OH	Two distribution centers	2006	Plug Power	12
	MO	Distribution center	2005	Plug Power	4
Wegmans	Pottsville, PA	Warehouse	2010, ARRA funding awarded to GENCO	Plug Power	136
Whole Foods Market	Landover, MD	Distribution center	2010, ARRA funding awarded to GENCO	Plug Power	61
WinCo Foods, LLC	Modesto, CA	Distribution center	Planned	Plug Power	184

Fuel Cell Manufacturers – Materials Handling Market			
			
Nuvera	**Hydrogenics**	**Oorja Protonics**	**Plug Power**
** 2 FORKLIFTS DEPLOYED IN 2-WEEK TRIALS AT SEVERAL COMPANIES IN THE CHARLOTTE, SC AREA*			
Note: *IN 2008, PLUG POWER ENTERED INTO A TWO-YEAR AGREEMENT WITH BALLARD POWER SYSTEMS TO PURCHASE FUEL CELL STACKS FOR ITS ELECTRIC LIFT TRUCK APPLICATIONS*			

Many retail and grocery stores are also employing stationary fuel cells to deliver power and combined heat and power at their retail sites and distribution centers. See Fuel Cell 2000's Grocery-Retail chart at http://www.fuelcells.org/info/charts/Grocery-Retail.pdf

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Stationary Fuel Cells at Retail and Grocery Sites

Customer	Type	Location	Status	Fuel Cell Manuf.	Fuel Cell	Configuration	Benefits	Image
United States								
Albertsons	Grocery store	San Diego, CA	2010-present	UTC Power	PureCell® Model 400 PAFC (400 kW)	CHP - generates nearly 90% of the store's power; byproduct heat used to warm water, heat the store when necessary and power a chiller to help cool the refrigerated food; overall energy efficiency of approximately 60%; configured for grid-independent operation if the power fails.	The project is estimated to cut carbon dioxide emissions by 478 metric tons each year compared to California non-baseload power plants.	
Cabela's	Sporting goods retailer	East Hartford, CT	2008-present	UTC Power	PureCell® PAFC (800 kW)	Power - delivers approximately 100% of the required building power, running continuously in conjunction with the utility supply, also capable of providing emergency power to keep the store operational if the power grid fails.	N/a	
Chipotle Mexican Grill	Fast food	CA	N/a	ClearEdge Power	ClearEdge5 PEM (5 kW)	CHP - power, domestic hot water and space heating	CO_2 reduction of 37% (13 tons).	
McDonald's	Fast food	Deer Park, NY	2002-decommissioned	Plug Power	GenSys 5CS PEM (5 kW)	Power – delivered partial power to the restaurant.	N/a	
McDonald's	Fast food	Portland, OR	2009-present	ClearEdge Power	ClearEdge5 PEM (5 kW)	N/a	N/a	
Price Chopper	Grocery store	Colonie, NY	2010-present	UTC Power	PureCell® Model 400 PAFC (400 kW)	CHP - meets 60-70% of the store's energy needs in summer and 100% in winter, uses thermal energy for heating and cooling, configured for grid-independent operation if the power fails.	Reduces the building's carbon footprint by 71 tons, saves more than 4 million gallons of water/yr.	
Price Chopper	Grocery store	Glenville, NY	2011-present	UTC Power	PureCell® Model 400 PAFC (400 kW)	N/a	NOx emissions are being reduced Chopper by almost 3 metric tons per year.	
Price Chopper	Grocery store	Eastern New York	Planned	UTC Power	PureCell® Model 400 PAFC (400 kW)	A fleet demonstration project will be performed consisting of 5 fuel cell installations at 5 different stores. The fuel cells will operate in combined heat and power mode and will provide backup power to provide chilling during grid outages.	N/a	

Customer	Type	Location	Status	Fuel Cell Manuf.	Fuel Cell	Configuration	Benefits	Image
Price Chopper	Grocery store	Middletown, CT	Planned	UTC Power	PureCell® Model 400 PAFC (400 kW)	N/a	N/a	
Safeway	Grocery store	Santa Cruz, CA	2009-present	Bloom Energy	Bloom Energy Server SOFC (200 kW)	Power-- serves 20% of the building's energy load.	N/a	
Starbucks	Coffee shop	N/a	N/a	ClearEdge Power	ClearEdge5 PEM (5 kW)	N/a		
Staples	Retail distribution center	Ontario, CA	2008-present	Bloom Energy	Bloom Energy Server SOFC (300 kW)	Power - delivers electricity to the store (no further details available).	In the first year, the fuel cell generated over 2 million kWh of power, which resulted in a reduction of 2.5 million pounds of CO_2. Fuel cell availability has been above 99%.	
Star Market	Grocery store	Chestnut Hill, MA	2009-present	UTC Power	PureCell® Model 400 PAFC (400 kW)	CHP - provides electricity and thermal energy in the form of chilled water and hot water. The chilled water supplies refrigeration system sub-coolers, predominately for space conditioning and cold storage areas. The hot water produced is used for space conditioning, desiccant regeneration, and for making domestic hot water.	N/a	
Stop & Shop	Grocery store	East Torrington, CT	2010-present	UTC Power	PureCell® Model 400 PAFC (400 kW)	CHP - generates 95% of the store's total electric energy requirement, uses thermal energy for heating and cooling.	From Jun 2010-Jan 2011 the fuel cell produced over 1.7 million kWh of electricity and reduced the total electric and natural gas utility bills by roughly 50%.	
Wal-Mart	Retail store	Lancaster, CA	2009-present	Bloom Energy	Bloom Energy server SOFC (400 kW)	Power - delivers electricity to the store (no further details available).	N/a	
Wal-Mart	Retail store	Hemet, CA	2010-present	Bloom Energy	Bloom Energy Server SOFC (400 kW)	Power - delivers electricity to the store (no further details available).	N/a	
Whole Foods Market	Grocery store	Glastonbury, CT	2008-present	UTC Power	PureCell® Model 200 PAFC (200 kW)	CHP - generates 50% of store's electricity and nearly 100% of store's hot water, configured for grid-independent operation if the power fails.	Total electrical and heat energy costs were 30% lower after the first year than a comparable, conventionally powered store in West Hartford, CT.	
Whole Foods Market	Grocery store	Dedham, MA	2009-present	UTC Power	PureCell® Model 400 PAFC (400 kW)	CHP - generates approximately 90% of electricity and nearly 100 percent of store's hot water.	N/a	

Customer	Type	Location	Status	Fuel Cell Manuf.	Fuel Cell	Configuration	Benefits	Image
Whole Foods Market	Grocery store	San Jose, CA	2010-present	UTC Power	PureCell® Model 400 PAFC (400 kW)	CHP - generates 90% of electricity, byproduct thermal energy is used for heating, cooling and refrigeration	By generating most of its power on-site with a fuel cell, the store will prevent the release of more than 370 metric tons of carbon dioxide annually,	
Whole Foods Market	Grocery store	Fairfield, CT	2011-present	UTC Power	PureCell® Model 400 PAFC (400 kW)	CHP - will generate 90% of the power and meet all of the store's hot water needs.	Provides 90% of the store's power, byproduct thermal energy used for store heating, cooling and refrigeration, will prevent the release of more than 847 metric tons of CO2 annually	
International								
John Lewis	Department store	UK	Planned, may add to more John Lewis stores and to Waitrose super-markets	AFC Energy	Alkaline fuel cell (AFC)	N/a	N/a	
Many retail and grocery stores are also employing fuel cell-powered forklifts at their distribution centers. See Fuel Cell 2000's fuel cell forklift chart at http://www.fuelcells.org/info/charts/forklifts.pdf								

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Appendix 3 - Fuel Cell-Powered Forklifts in North America

Blue Shaded Entries = Entire Materials Handling Fleet is Fuel Cell-Powered at This Location *ARRA = American Recovery and Reinvestment Act* *N/a = information unavailable*					
Company	**Location**	**Site**	**Year Deployed**	**Fuel cell manufacturer***	**# of forklifts**
Ace Hardware	N/a	N/a	N/a	Oorja Protonics	6
BMW Manufacturing Co.	Spartanburg, SC	Manufacturing plant	2010	Plug Power	86
Bridgestone-Firestone	Aiken County, SC	Manufacturing plant	2008, more added in 2009	Plug Power	43
	Warren County, TN	Manufacturing plant	N/a	Plug Power	N/a
Central Grocers	Joliet, IL	New distribution center	2009	Plug Power	220
Coca-Cola	San Leandro, CA	Bottling and distribution center	Planned in 2011	Plug Power	37
	Charlotte, NC	Bottling facility	2011	Plug Power	40
CVS Caremark	North Smithfield, RI	Distribution facility	N/a	N/a	N/a
	Chemung, NY	Distribution facility	Planned (under construction)	N/a	N/a
Defense Logistics Agency, U.S. Department of Defense	Susquehanna, PA	Distribution depot	2009, additional units in 2010	Nuvera, Plug Power	40, 15 additional units added
	Warner Robins, GA	Distribution depot	2010	Hydrogenics	20
	San Joaquin, CA	Distribution depot	Planned in 2011	Plug Power	20
	Fort Lewis, WA	Distribution depot	Planned in 2011	Plug Power	19
EARP Distribution	Kansas City, KS	Distribution center	2011	Oorja Protonics	24
East Penn Manufacturing	Topton, PA	Manufacturing facility	N/a	Nuvera	10
FedEx	Springfield, MO	Service center	2010, ARRA funding awarded to FedEx Freight East	Plug Power	35
	Toronto, ON, Canada	Logistics hub	N/a	Hydrogenics	N/a
GM	Oshawa, ON, Canada	Car assembly plant	N/a	Hydrogenics	19
	Oshawa, ON, Canada	Car assembly plant	2005	Hydrogenics	2
Golden State Foods	Lemont, IL	Distribution facility	2011	Oorja Protonics	20
H-E-B	San Antonio, TX	Perishables distribution center	2009, ARRA funding awarded to Nuvera	Nuvera	14
ISOLA Laminates	Ridgeway, SC	Warehouse	2007, 2-week demonstration	Hydrogenics	2*
Kimberly-Clark/GENCO	Graniteville, SC	Distribution center	Planned, ARRA funding awarded to GENCO	Plug Power	25
	Graniteville, SC	Distribution center	GENCO operating a fuel cell forklift pilot program	N/a	2*
Kroger Co.	Compton, CA	Distribution Center	2011	Plug Power	161
Leigh Fibers	Spartanburg, SC	Warehouse	2007, 2-week demonstration	Hydrogenics	2*
Company	**Location**	**Site**	**Year Deployed**	**Fuel cell manufacturer***	**# of forklifts**

LPC	Lodi, CA	Warehouse	2009	Oorja Protonics	N/a ("entire fleet")
Martin-Brower	Stockton, CA	Food distribution Center	2010, add-on order placed in 2011 converting entire Stockton pallet jack fleet to fuel cell power	Oorja Protonics	15, 2nd order converts remainder of fleet
Michelin	Columbia, SC	Manufacturing plant	2007, 2-week demonstration	Hydrogenics	2*
Nestlé Waters	Dallas, TX	Bottling facility	2009	Plug Power	32
New United Motor Manufacturing, Inc. (NUMMI) (joint-owned by GM and Toyota)	Fremont, CA	Manufacturing plant	2007	Oorja Protonics	N/a
Nissan North America	Smyrna, TN	Assembly plant	Purchase in 2009, 18-month field trial beforehand	Oorja Protonics	60
	Smyrna, TN	Assembly plant	2007, 5-month demonstration	Plug Power	N/a
Ozburn-Hessey Logistics	Smyrna, TN	Warehouse	2004	Ballard Power Systems	4
PBR	West Columbia, SC	Warehouse	2007, 2-week demonstration	Hydrogenics	2*
The Raymond Corp.	Greene, NY	Manufacturing facility	2007	Plug Power	N/a
Super Store Industries	Lathrop, CA	Warehouse freezer	2009	Oorja Protonics	N/a
Sysco	Front Royal, VA	Redistribution facility	Planned in 2011	Plug Power	100
	Houston, TX	Distribution center	2010, ARRA funding awarded to Sysco Houston	Plug Power	98
	Philadelphia, PA	Distribution center	2010, ARRA funding awarded to GENCO	Plug Power	95
	Vancouver, BC, Canada	Distribution center	N/a	Plug Power	N/a
	Canton, MI	Distribution center	N/a, completed	Plug Power	30
	Grand Rapids, MI	Distribution center	N/a, completed	Plug Power	11
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Unnamed Food Distributor	Boston, MA	N/a	Planned	Plug Power	160
	San Antonio, TX	N/a	Planned	Plug Power	113
	Long Island, NY	N/a	Planned	Plug Power	42
U.S. Foodservice	Livermore, CA	Distribution facility	Planned	Oorja Protonics	40
Walmart	Balzac, AL, Canada	New refrigerated distribution center	2010	Plug Power	More than 80
	Washington Court House, OH	Food distribution center	2007	Plug Power	55
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Chipotle Mexican Grill	Fast food	CA	N/a	ClearEdge Power	ClearEdge5 PEM (5 kW)	CHP - power, domestic hot water and space heating	CO_2 reduction of 37% (13 tons).	
McDonald's	Fast food	Deer Park, NY	2002-decommissioned	Plug Power	GenSys 5CS PEM (5 kW)	Power – delivered partial power to the restaurant.	N/a	
McDonald's	Fast food	Portland, OR	2009-present	ClearEdge Power	ClearEdge5 PEM (5 kW)	N/a	N/a	
Price Chopper	Grocery store	Colonie, NY	2010-present	UTC Power	PureCell® Model 400 PAFC (400 kW)	CHP - meets 60-70% of the store's energy needs in summer and 100% in winter, uses thermal energy for heating and cooling, configured for grid-independent operation if the power fails.	Reduces the building's carbon footprint by 71 tons, saves more than 4 million gallons of water/yr.	
Price Chopper	Grocery store	Glenville, NY	2011-present	UTC Power	PureCell® Model 400 PAFC (400 kW)	N/a	NOx emissions are being reduced Chopper by almost 3 metric tons per year.	

Customer	Type	Location	Status	Fuel Cell Manuf.	Fuel Cell	Configuration	Benefits	Image
Price Chopper	Grocery store	Eastern New York	Planned	UTC Power	PureCell® Model 400 PAFC (400 kW)	A fleet demonstration project will be performed consisting of 5 fuel cell installations at 5 different stores. The fuel cells will operate in combined heat and power mode and will provide backup power to provide chilling during grid outages.	N/a	
Price Chopper	Grocery store	Middletown, CT	Planned	UTC Power	PureCell® Model 400 PAFC (400 kW)	N/a	N/a	
Safeway	Grocery store	Santa Cruz, CA	2009-present	Bloom Energy	Bloom Energy Server SOFC (200 kW)	Power-- serves 20% of the building's energy load.	N/a	
Starbucks	Coffee shop	N/a	N/a	ClearEdge Power	ClearEdge5 PEM (5 kW)	N/a		
Staples	Retail distribution center	Ontario, CA	2008-present	Bloom Energy	Bloom Energy Server SOFC (300 kW)	Power - delivers electricity to the store (no further details available).	In the first year, the fuel cell generated over 2 million kWh of power, which resulted in a reduction of 2.5 million pounds of CO_2. Fuel cell availability has been above 99%.	
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Wal-Mart	Retail store	Lancaster, CA	2009-present	Bloom Energy	Bloom Energy server SOFC (400 kW)	Power - delivers electricity to the store (no further details available).	N/a	
Wal-Mart	Retail store	Hemet, CA	2010-present	Bloom Energy	Bloom Energy Server SOFC (400 kW)	Power - delivers electricity to the store (no further details available).	N/a	

Customer	Type	Location	Status	Fuel Cell Manuf.	Fuel Cell	Configuration	Benefits	Image
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Whole Foods Market	Grocery store	Dedham, MA	2009-present	UTC Power	PureCell® Model 400 PAFC (400 kW)	CHP - generates approximately 90% of electricity and nearly 100 percent of store's hot water.	N/a	
Whole Foods Market	Grocery store	San Jose, CA	2010-present	UTC Power	PureCell® Model 400 PAFC (400 kW)	CHP - generates 90% of electricity, byproduct thermal energy is used for heating, cooling and refrigeration	By generating most of its power on-site with a fuel cell, the store will prevent the release of more than 370 metric tons of carbon dioxide annually,	
Whole Foods Market	Grocery store	Fairfield, CT	2011-present	UTC Power	PureCell® Model 400 PAFC (400 kW)	CHP - will generate 90% of the power and meet all of the store's hot water needs.	Provides 90% of the store's power, byproduct thermal energy used for store heating, cooling and refrigeration, will prevent the release of more than 847 metric tons of CO2 annually	
International								
John Lewis	Department store	UK	Planned, may add to more John Lewis stores and to Waitrose super-markets	AFC Energy	Alkaline fuel cell (AFC)	N/a	N/a	
Many retail and grocery stores are also employing fuel cell-powered forklifts at their distribution centers. See Fuel Cell 2000's fuel cell forklift chart at http://www.fuelcells.org/info/charts/forklifts.pdf								

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