State Activities That Promote Fuel Cells and Hydrogen Infrastructure Development

Breakthrough Technologies Institute, Inc.
Washington, DC

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Disclaimer

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INTRODUCTION

As concern for energy security grows in the United States, legislation and policy at the state-level becomes almost as important as at the federal level. Fuel cells and hydrogen are now being regarded as technologies that can alleviate the United States' dependence on foreign oil, reduce harmful emissions, and create thousands of new jobs. Many states have begun to implement initiatives, policy and partnerships to help bring fuel cells and hydrogen to commercialization while bringing economic prosperity and environmental relief to their towns.

To help sort through and track all of the activity, Breakthrough Technologies Institute has developed this comprehensive state-by-state analysis of fuel cell and hydrogen policy, incentives and demonstrations.

47 states and the District of Columbia have some sort of fuel cell or hydrogen legislation, demonstration or activism taking place today. Many are laying the groundwork in their regulations and energy standards for these technologies. This report compiles all the state-led activity; there are a lot of federally-supported demonstrations and research programs around the United States as well.

Please note that this report details only programs and incentives that specifically include hydrogen, fuel cells and zero emission vehicles. Additional support may be available under other state programs, with hydrogen and fuel cell technologies potentially eligible under general categories such as "renewably-powered", "clean energy" or "alternative fuels".

Report Format

Each state listing is divided into categories reflecting the type of incentive or support provided by state or municipal governments. These listings are further subdivided to reflect activities that support stationary fuel cell installations, hydrogen fuel cell vehicles or hydrogen infrastructure development. Since states vary by the degree and type of support offered, we have only included the categories that detail current activities. These categories are:

1. **Plans/Strategies** –This section includes hydrogen and fuel cell roadmaps and blueprints, "clean energy" or "green" initiatives that include hydrogen or fuel cells, and hydrogen and fuel cell educational activities.
2. **Standards/Regulations** – This section lists interconnection standards, net metering policies and detailed renewable portfolio standards.
3. **Public Agency Policies/Purchasing Programs** – This section details rules that promote the use of fuel cells or hydrogen technologies in state or municipal-owned facilities and vehicles.
4. **Incentives/ Market Stimulation** – This section lists grants, loans, rebates and tax incentives that are offered to either individuals or businesses for the purchase and installation of fuel cell equipment.
5. **Partnerships** – This section describes alliances of government, business and/or academia that are working together to develop hydrogen and fuel cell policy and are fostering research and demonstration activities.

6. **RD&D Support** – This section details grants, loans and facility space to support hydrogen and fuel cell research, development and demonstrations.
7. **Emerging Business Support** – This section discusses financial incentives and business incubators to attract and nurture start-up hydrogen and fuel cell businesses.
8. **State and Locally-Supported Demonstrations** – This section describes fuel cell demonstrations supported or funded by state or municipal governments.

This report is a work in progress. We have included links and contacts for most of the programs and organizations for further research. If we have overlooked activity in your state, please contact us at info@fuelcells.org.

Acronyms

AFV	Alternative Fuel Vehicle
ATPZEV	Advanced Technology Partial Zero Emissions Vehicle
CaFCP	California Fuel Cell Partnership
CCEF	Connecticut Clean Energy Fund
CHP	Combined Heat and Power
CNG	Compressed Natural Gas
DoD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
EPA	U.S. Environmental Protection Agency
H2	Hydrogen
HOV	High Occupancy Vehicle
ILEV	Inherently Low Emission Vehicle
kW	kilowatt
LEED	Leadership in Energy and Environmental Design Green Building Rating System®
LEV	Low Emission Vehicle
LIPA	Long Island Power Authority (New York)
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
MCFC	Molten carbonate fuel cell
MW	Megawatt
NOx	Nitrogen oxides
NYPA	New York Power Authority
NYSERDA	New York State Energy Research and Development Authority
PAFC	Phosphoric Acid Fuel Cell
PEM	Proton Exchange Membrane Fuel Cell
PZEV	Partial Zero Emissions Vehicle
RD&D	Research, Development and Demonstration
RPS	Renewable Portfolio Standard
SCAQMD	South Coast Air Quality Management District (California)
SOFC	Solid Oxide Fuel Cell
SULEV	Super Ultra Low Emissions Vehicle
ULEV	Ultra Low Emission Vehicle
W	Watt
ZEV	Zero Emissions Vehicle

Technical Terminology

Alternative Fuel Vehicle: Alternative fuel vehicles (AFVs) operate on fuels other than gasoline and diesel, such as biodiesel, electricity, ethanol, hydrogen, natural gas and propane.

Combined Heat and Power: Combined heat and power (CHP) technologies generate power and thermal energy from a single fuel source by recovering heat that normally would be wasted in an electricity generator. The recovered waste heat can be used to create high temperature hot water or steam for space heating, producing domestic hot water, or powering dehumidifiers and water chillers for air conditioning. These consumer-sited facilities achieve higher thermal efficiencies, lower energy costs and produce fewer greenhouse gas emissions than power delivered from centralized power plants. This technology is also referred to as cogeneration.

Distributed Generation: Distributed generation (DG) is the use of small-scale power generation technologies located close to the load being served. DG reduces a customer's reliance on large, centralized power plants and may be used to increase transmission and distribution system reliability.

Interconnection Standards: Standardized interconnection rules, usually developed and administered by a state's public utility commission, establish uniform processes and technical requirements for connecting small, renewable DG systems to the electric utility grid. The rules establish standards regarding performance, operation, testing, safety considerations and maintenance of the interconnection.

Net Metering: Net metering policy allows customers with small-scale DG equipment to feed excess electricity back to an electric utility's grid by running the customer's electric meter backwards. Any electricity generated in excess of the customer's consumption results in a financial offset, as the customer is billed only for the net energy consumed.

Vehicle Emission Standards:

- **LEV (Low Emission Vehicle):** A vehicle that meets tailpipe emissions reduction criteria. All new cars sold in California must have at least an LEV or better emissions rating.

- **ULEV (Ultra-Low Emission Vehicle):** The fourth most stringent California emissions category, ULEVs are 50% cleaner than the average new model year car (50% cleaner than LEVs).

- **SULEV (Super Ultra-Low Emission Vehicle):** The third most stringent California emissions category, SULEVs are 90% cleaner than the average new model year car (90% cleaner than LEVs).

- **PZEV (Partial Zero Emission Vehicle):** The second most stringent California emissions category, requiring vehicles to be 90% cleaner than the average new automobile (90% cleaner than LEVs). In addition, PZEV vehicles must have near-

zero evaporative emissions and emission control equipment must have a 15-year/150,000 mile warranty.

- **ATPZEV (Advanced Technology Partial Zero Emission Vehicle):** A sub-category of California's PZEV designation, ATPZEVs must meet all of the PZEV criteria and, in addition, must also make use of additional "ZEV-enabling clean" technology such as alternative fuel, electric drive, or other advanced technology system.

- **ZEV (Zero Emission Vehicle):** California's most stringent emissions category, ZEVs must have zero tailpipe emissions be 98% cleaner than the average new model year vehicle (98% cleaner than LEVs). These include battery electric vehicles and hydrogen fuel cell vehicles.

- **ILEV (Inherently Low Emission Vehicle):** A federal designation, ILEV exists between the LEV and ULEV categories. ILEV vehicles are clean-fueled with essentially no fuel vapor emissions and operate using single dedicated gaseous fuel systems. Vehicles that operate on more than one fuel and/or an alcohol fuel cannot be classified as an ILEV vehicle, nor can hybrid-electric vehicles because their engines use conventional gasoline. Since ZEVs are non-hybrid electric powered vehicles with no emissions, all certified ZEVs can be considered as ZEV-ILEVs.

ALABAMA

8. STATE AND LOCALLY-SUPPORTED DEMONSTRATIONS

POWER GENERATION

Mercedes-Benz M-class production facility: The FuelCell Energy 250-kW MCFC was installed in 2000 through a collaboration between Southern Company, Alabama Municipal Electric Authority and Mercedes- Benz. The fuel cell fed the Mercedes-Benz production facility power distribution system and the entire fuel cell power plant was skid-mounted to transport it to different locations for demonstrations. The project has been completed.

ALASKA

1. PLANS/STRATEGIES

Report: Long Term Energy Plan to Enhance Alaska's Economic Future
www.aidea.org/aea/EnergyPolicyTaskForce/EPTFreportPrintPerfect.pdf

The Alaska State Legislature established the Energy Policy Task Force to develop a long-term energy plan to efficiently enhance Alaska's economic future; review and analyze the state's current and long-term energy needs; consider how best to incorporate state-owned Railbelt energy assets as part of the solution for the Railbelt's current and long-term electrical needs; and address elements of Alaska's long-term energy needs that can be solved through action on the part of industry and/or government actions, such as pooling and integrated resource planning.

In 2003, the group issued a report, "Long Term Energy Plan to Enhance Alaska's Economic Future," focusing on goals and strategies related to energy infrastructure, transmission and distribution, and economic efficiency. In part, the plan discusses the opportunities to expand energy infrastructure through the use of hydrogen fuel cells and the long-range need for a hydrogen-based infrastructure to support fuel cell technologies. Recommendations included:

- Exploring utilization of Alaska's abundant renewable resources in the production of hydrogen by convening a workshop to discuss the potential for Alaska's leadership in hydrogen production and directing the University of Alaska and executive agencies to inventory ideal locations for future renewable energy generation sites that could be used as a source of hydrogen for in-state use and export.

- Examining the ability of public bodies, including the Alaska Energy Authority (AEA), to assist the private sector in efforts to develop adequate energy generation capacity funded through conduit bonds and grants to keep the energy costs low for all Alaskans.

Contact:

AIDEA/Alaska Energy Authority
813 W. Northern Lights
Anchorage, AK 99503
Phone: (888) 300-8534 or (907) 269-3000
Fax: (907) 269-3044
E-mail: bgay@aidea.org (Becky Gay) or bsmith@aidea.org (Bernie Smith)
Web: www.aidea.org/EnergyTaskForce.htm

6. RD&D SUPPORT

Alternative Energy and Efficiency Program
www.aidea.org/aea/programsalternative(2).html

The Alaska Energy Authority's Alternative Energy and Efficiency Program supports development efforts in the areas of CHP, fuel cells, and renewable energy to reduce the dependence of rural communities on diesel fuel. The state's fuel cell R&D has been conducted by the University of Alaska Fairbanks' Arctic Energy Technology Development Laboratory through a cooperative agreement between the Alaska Energy Authority, the University and the Arctic Energy Office of the National Energy Technology Laboratory. Funding is provided by DOE.

Contact:

Alaska Energy Authority
813 West Northern Lights Boulevard
Anchorage, AK 99503
Phone: (888) 300-853 or (907) 269-3000
Fax: (907) 269-3044
E-mail: info@aidea.org
Web: www.aidea.org/aea/index.html

8. STATE AND LOCALLY-SUPPORTED DEMONSTRATIONS

POWER GENERATION

Fairbanks Natural Gas office, Fairbanks: The Fuel Cell Technologies 5-kW SOFC was installed to study fuel cells for small scale power requirements in remote locations, such as those found throughout much of Alaska. The project was funded through the University of Alaska Fairbanks Arctic Energy Technology Development Laboratory in partnership with DOE. The fuel cell operated between 2003 and 2004.

ARIZONA

2. STANDARDS/REGULATIONS

POWER GENERATION

Interconnection Standards

www.cc.state.az.us/utility/electric/dg.htm

Arizona lacks state-wide interconnection standards but is currently working to develop requirements. In the meantime, the state's electric utilities operate under distributed-generation interconnection agreements. These agreements include fuel cells, CHP/cogeneration, microturbines, solar thermal electric, photovoltaics, landfill gas, wind, biomass, hydroelectric, geothermal electric, and other distributed generation technologies.

Contact:

Arizona Corporation Commission
Utilities Division
1200 West Washington
Phoenix, AZ 85007-2996
Phone: (800) 222-7000 or (602) 542-4251
E-mail: mailmaster@cc.state.az.us
Web: www.cc.state.az.us

VEHICLES

Alternative Fuel Vehicle Notification Requirement

www.azleg.state.az.us/FormatDocument.asp?inDoc=/ars/28/04414.htm&Title=28&DocType=ARS

Arizona statute requires that new motor vehicle dealers make available to the public information on AFVs and incentives in this state for purchasing or leasing AFVs. "Alternative fuel" is defined by Arizona statute as electricity, solar energy, LPG, natural gas, hydrogen or a blend of hydrogen with liquefied petroleum or natural gas that is certified to meet at a minimum the EPA's LEV standard.

Contact:

Arizona Department of Environmental Quality
Air Quality Division – General Information
1110 W. Washington Street
Phoenix, AZ 85007

Phone: (602) 771-2308 (Ira Domsky)
E-mail: domsky.ira@azdeq.gov
Web: www.azdeq.gov/environ/air/index.html

3. PUBLIC AGENCY POLICIES/PURCHASE PROGRAMS

VEHICLES

Local Government Vehicle Fleet Plan Requirement
www.azleg.state.az.us/FormatDocument.asp?inDoc=/ars/9/00500-04.htm&Title=9&DocType=ARS
www.azleg.state.az.us/FormatDocument.asp?inDoc=/ars/41/00803.htm&Title=41&DocType=ARS
www.azleg.state.az.us/FormatDocument.asp?inDoc=/ars/49/00571.htm&Title=49&DocType=ARS

State statute requires that cities or towns with a population of more than 1.2 million must develop and implement a vehicle fleet plan to encourage the use of alternative and clean burning fuels in city or town-owned vehicles, including bus fleets. Alternative and clean burning fuels must comprise 75% of the total fleet.

“Alternative fuel" is defined in the statute as electricity, solar energy, LPG, natural gas, hydrogen or a blend of hydrogen with liquefied petroleum or natural gas that is certified to meet at a minimum the EPA’s LEV standard.

Contact:

Arizona Department of Environmental Quality
Air Quality Division – General Information
1110 W. Washington Street
Phoenix, AZ 85007
Phone: (602) 771-2308 (Ira Domsky)
E-mail: domsky.ira@azdeq.gov
Web: www.azdeq.gov/environ/air/index.html

4. INCENTIVES/MARKET STIMULATION

VEHICLES

Emission Testing Exemption for Alternative Fuel Vehicles
www.azdeq.gov/environ/air/vei/alternat.html

Electric, solar and hydrogen-powered vehicles registered in or used to commute into metro Phoenix or metro Tucson, are exempt from required emissions testing.

Contact:

Arizona Department of Air Quality
1110 W. Washington Street
Phoenix, AZ 85007
Phone: Metro Phoenix – (602) 207-7013 (Thomas Cisco)
Metro Tucson – (520) 628-5651 (Russell Ledbetter)
Web: www.azdeq.gov

Reduced Registration Tax Rate for Alternative Fuel Vehicle Conversions

www.azleg.state.az.us/FormatDocument.asp?inDoc=/ars/28/05805.htm&Title=28&DocType=ARS

Arizona Department of Environmental Quality and the Motor Vehicle Division issues alternative fuel certificates for vehicles that have been converted to operate on an alternative fuel, allowing the vehicle owner to register the vehicle at reduced tax rate. The lower tax rate is intended to encourage the purchase or modification of vehicles to alternative fuels. The state's definition of alternative fuel includes hydrogen or a blend of hydrogen with liquefied petroleum or natural gas.

Contact:

Arizona Department of Air Quality
1110 W. Washington Street
Phoenix, AZ 85007
Phone: Metro Phoenix – (602) 207-7013 (Thomas Cisco)
Metro Tucson – (520) 628-5651 (Russell Ledbetter)
Web: www.azdeq.gov

Use Tax Exemption for Alternative Fuel and Alternative Fuel Vehicles

www.azleg.state.az.us/FormatDocument.asp?inDoc=/ars/42/05159.htm&Title=42&DocType=ARS

A "Use Tax" exemption is provided for AFVs if the vehicle was manufactured as a diesel fuel vehicle and converted to operate on alternative fuel. Additionally, the exemption applies to equipment that is installed in a conventional diesel fuel motor vehicle to convert the vehicle to operate on an alternative fuel. Arizona's definition of alternative fuel includes hydrogen or a blend of hydrogen with liquefied petroleum or natural gas.

Contact:

Arizona Department of Revenue
Office of Tax Policy
1600 W. Monroe
Phoenix, AZ 85007-2650
Phone: (800) 352-4090 (from 520 or 928 area code) or (602) 255-3381
E-mail: www.revenue.state.az.us/Contact/Emailus.htm
Web: www.revenue.state.az.us

Alternative Fuel Vehicle License Tax Fee Reduction

www.azleg.state.az.us/FormatDocument.asp?inDoc=/ars/28/05805.htm&Title=28&DocType=ARS

Arizona has established a separate classification of AFVs for taxation purposes. Vehicles classified as AFVs, which include hydrogen or a blend of hydrogen with liquefied petroleum or natural gas, are subject to a lower license fee than standard vehicles. At initial vehicle registration the AFV fee is $4 for each $100 of assessed value. Subsequent assessments are valued by the following formula:

- During the first 12 months of the life of the motor vehicle, as determined by its initial registration, the value is 1% of the manufacturer's base retail price of the motor vehicle.
- During each succeeding 12-month period the value of the motor vehicle is 15% less than the value of the preceding 12-month period.

The minimum amount of the license tax computed under this section is $5 per year for each motor vehicle subject to the tax.

Contact:

Arizona Department of Revenue
Office of Tax Policy
1600 W. Monroe
Phoenix, AZ 85007-2650
Phone: (800) 352-4090 (from 520 or 928 area code) or (602) 255-3381
E-mail: www.revenue.state.az.us/Contact/Emailus.htm
Web: www.revenue.state.az.us

HOV Access for Hybrid and Ultra Low Emission Vehicles

www.azleg.state.az.us/FormatDocument.asp?inDoc=/ars/28/00737.htm&Title=28&DocType=ARS
www.azleg.state.az.us/FormatDocument.asp?inDoc=/ars/28/02416.htm&Title=28&DocType=ARS

Hybrid vehicles may operate in HOV lanes at any time, regardless of occupancy level, without penalty. A special sticker or tag is required.

“Hybrid vehicle" is defined as a factory-manufactured vehicle that satisfies all of the following:

- Combines two or more power train technologies to produce a vehicle with significantly lower fuel consumption than the average of its class.
- Exhibits the storage of kinetic energy by use of regenerative braking and batteries or capacitors, and the stored energy is used to assist or provide full acceleration of the vehicle.
- Allows a portion of the energy to be supplied from an internal combustion engine or fuel cell for vehicle acceleration and to store electrical energy on board.
- Obtains all energy required to operate from storage fuel tanks placed on board the vehicle.
- Has been approved by the EPA as meeting, at a minimum, EPA’s ULEV standard.

Contact:

Arizona Department of Transportation
Motor Vehicle Division
P.O. Box 2100
Phoenix, AZ 85001-2100
Phone: (602) 712-7355
E-mail: www.azdot.gov/contact_adot
Web: www.azdot.gov

Alternative Fuel Vehicle Parking Exemption

www.azleg.state.az.us/FormatDocument.asp?inDoc=/ars/28/00877.htm&Title=28&DocType=ARS

Vehicles powered by an alternative fuel may park without penalty in parking areas that are designated for carpool operators. The definition of alternative fuel includes hydrogen or a blend of hydrogen with liquefied petroleum or natural gas.

Contact:

Arizona Department of Transportation
Motor Vehicle Division
P.O. Box 2100
Phoenix, AZ 85001-2100
Phone: (602) 712-7355
E-mail: www.azdot.gov/contact_adot
Web: www.azdot.gov

8. STATE AND LOCALLY-SUPPORTED DEMONSTRATIONS

POWER GENERATION

Arizona National Guard facility, Mesa: The 5-kW PEM Plug Power fuel cell provides supplemental power that is used in conjunction with the city's electrical power grid. The project is a partnership between the City of Mesa Utilities Department, Arizona Army National Guard and the U.S. Army Construction Engineering Research Laboratory.

Sgt. Herrera U.S. Army Reserve Center, Mesa: Two 5-kW PEM fuel cells, made by different manufacturers (Plug Power and Idatech), are being operated in parallel during the demonstration to evaluate the performance of each unit under the severe heat of Arizona summers. The project was developed through a partnership of the U.S. Army Corps of Engineers Construction Engineering Research Lab, Arizona State University and City of Mesa Gas Division.

Utilities Building Headquarters, Mesa: The city of Mesa Utilities Department has operated a UTC Power 200-kW PAFC in the department's Utilities Building since 2000. This project is funded through the DoD Climate Change Fuel Cell Program.

FUELING INFRASTRUCTURE

Hydrogen Power Park and fuel cell vehicle demonstration, Phoenix: The Arizona Public Service (APS) Hydrogen Power Park was the first commercial hydrogen motor vehicle refueling station in Arizona. Opened in 2002 in downtown Phoenix, more than 5,500 gge (gasoline gallon equivalent) of hydrogen has been produced from city water and delivered into motor vehicles (APS is demonstrating a Mercedes Sprinter fuel cell van and a Ford F150 50/50 hydrogen/CNG-fueled internal combustion engine truck). Project partners include the City of Phoenix fire department, State of Arizona Energy Office, Valley of the Sun Clean Cities Coalition, DOE and utility companies. Power to the facility is delivered by 5-kW Plug Power and Proton Energy Systems 1 kW PEM fuel cells, internal combustion engine gensets and photovoltaic panels. Future plans include evaluating hydrogen production from wind, biomass, biogas, bromine cell, solar metal oxide reduction and traditional fuels.

ARKANSAS

2. STANDARDS/REGULATIONS

POWER GENERATION

Interconnection Standards

http://www.dsireusa.org/documents/Incentives/AR03Ra1.pdf

The Arkansas Public Service Commission approved net-metering and interconnection rules in 2002. Installations must meet all applicable electric codes, including the National Electric Code, the Institute of Electrical and Electronic Engineers, the National Electrical Safety Code and Underwriters Laboratories. Eligible technologies include fuel cells, microturbines, solar, wind, hydro, geothermal and biomass.

Contact:

Arkansas Public Service Commission
P.O. Box 400
Little Rock, AR 72203-0400
Phone: (501) 682-2051
Fax: (501) 682-1717
Web: http://170.94.29.3/e-filings_interface.asp

Net Metering

www.arkleg.state.ar.us/ftproot/acts/2001/htm/act1781.pdf

The Arkansas Renewable Energy Development Act of 2001 makes fuel cells an eligible technology for net metering (other technologies include solar, wind, hydroelectric, geothermal and biomass systems and microturbines using renewable fuels). Residential

renewable energy systems may have a generating capacity of up to 25 kW and commercial systems up to 100 kW.

Contact:

Arkansas Department of Economic Development
Arkansas Energy Office
Attn: Chris Benson
One State Capitol Mall, Suite 4B/215
Little Rock, AR 72201
Phone: (501) 682-8065
Fax: (501) 682-2703
E-Mail: cbenson@1800arkansas.com
Web: www.1800arkansas.com

5. PARTNERSHIPS

Fuel Cell Energy Education Project

www.1800arkansas.com/Energy/index.cfm?page=education-fuel_cell

The Arkansas Department of Economic Development, an Energy Unit, the state Department of Environmental Quality, Entergy Arkansas and the University of Arkansas at Little Rock are offering a supplemental curriculum in environmental awareness and clean environment technologies that includes fuel cells and hydrogen technologies. The 20-hour course, Fuel Cell Energy Education Project, teaches key environmental issues facing Central Arkansas and features a hands-on curriculum that allows students to complete fuel cell experiments, including collecting data and implementing technology.

Contacts:

Ms. Markey Ford
Energy Education Coordinator
Arkansas Department of Economic Development
One State Capitol Mall
Little Rock, Arkansas 72201
Phone: (501) 682-1121
E-mail: mford@1-800-Arkansas.com
Web: www.1800arkansas.com

7. EMERGING BUSINESS SUPPORT

Emerging Energy Technology Income Tax Credit

www.sosweb.state.ar.us/elections/elections_pdfs/register/dec_reg/168.00.01-005.pdf

The credit was established under the Arkansas Emerging Energy Technology Development Act of 1999 and provides a state income tax credit of 50% of the cost of purchasing or constructing a facility that designs, develops, or produces photovoltaics,

electric powered vehicles or electrical vehicle equipment, microturbines, Stirling engines or fuel cells.

Contact:

Arkansas Department of Economic Development
Incentive Coordinator
One Capitol Mall
Little Rock, AR 72201
Phone: (501) 682-7675
Fax: (501) 682-7341
E-mail: INFO@1800ARKANSAS.com
Web: www.1800arkansas.com

CALIFORNIA

1. PLANS/STRATEGIES

California Hydrogen Highway Network (Ca H2 Net)

www.hydrogenhighway.ca.gov

In 2004, the California Hydrogen Highway Network (CA H2 Net) plan was introduced to promote the use of hydrogen to diversifying sources of transportation energy used while ensuring environmental and economic benefits. The Hydrogen Highway vision sets forth a blueprint for government and private agencies to work together in planning and building a hydrogen infrastructure. The Blueprint Plan (www.hydrogenhighway.ca.gov/plan/reports/bpplan_vol1.pdf) outlines a path to 250 hydrogen fueling stations and 20,000 hydrogen-fueled vehicles, which will help set the stage for full-scale commercialization of these technologies. CA H2 Net is also anticipated to generate new jobs and industries in the state and assist in restoring control over California's energy supply.

In June 2004, the California state legislature committed the state (Assembly Joint Resolution 50 - www.leginfo.ca.gov/pub/03-04/bill/asm/ab_0001-0050/ajr_50_bill_20040624_chaptered.html) to furthering hydrogen and fuel cell vehicle commercialization through the following actions and developments:

- Ensuring that commercially available hydrogen and fuel cell vehicles are offered on the retail market;
- Providing convenient access to hydrogen fueling stations for at least 60% of Californians;
- Phasing in the maximum feasible number of hydrogen and fuel cell vehicles in appropriate application in California's state vehicle fleet; and
- Providing a commitment to the development of renewable sources of energy for hydrogen production.

The state's 21 interstate freeways are now designated as the "California Hydrogen Highway Network". A three-phased approach is being used to implement CA H2 Net. In Phase 1, officials committed to working with legislators, energy providers, automakers, and others to achieve the following specific goals by 2010:

- Deploy 50 to 100 hydrogen stations and 2,000 hydrogen-powered vehicles;
- Build a network of hydrogen refueling stations;
- Ensure that hydrogen vehicles are commercially available for purchase;
- Incorporate hydrogen vehicles into the state fleet;
- Develop safety standards for hydrogen refueling stations and vehicles;
- Establish incentives to encourage the use of hydrogen vehicles; and
- Encourage the development of renewable sources of energy for hydrogen production.

Phases 2 and 3 will be implemented as appropriate through biennial technology and market reviews, which will examine technology readiness, the environment and the economy.

The initiative (Phases 1, 2 and 3) is anticipated cost to the state $53.4 million.

State Senate Bill 76 (www.hydrogenhighway.ca.gov/media/sb76fs.pdf), passed in July 2005, designates $6.5 million in funding for state-sponsored hydrogen demonstration projects until January 1, 2007. The bill also requires the Department of Food and Agriculture, by January 1, 2008, with the concurrence of the California Air Resources Board, to establish specifications for hydrogen fuels for use in internal combustion engines and fuel cells in motor vehicles until a standards development organization accredited by the American National Standards Institute (ANSI) formally adopts standards for hydrogen fuels for use in internal combustion engines and fuel cells in motor vehicles.

Contacts

Shannon Baxter-Clemmons
Special Advisor on Hydrogen and Renewable Energy Programs
California Air Resources Board
1001 "I" Street
P.O. Box 2815
Sacramento, CA 95812
Phone: (916) 327-5719
Fax: (916) 327-5748
E-mail: info@hydrogenhighway.ca.gov, sbaxter@arb.ca.gov
Web: www.arb.ca.gov

Alternative Transportation Fuel Plan

www.leginfo.ca.gov/pub/bill/asm/ab_1001-1050/ab_1007_bill_20050929_chaptered.html

Assembly Bill 1007, passed in 2005, requires that the California Energy Commission develop and adopt a state plan to increase the use of alternative fuels by June 30, 2007.

The plan must set goals for the years 2012, 2017, and 2022 for increased alternative fuel use in the state that accomplishes all of the following:

- Optimizes the environmental and public health benefits of alternative fuels, including, but not limited to, reductions in criteria air pollutants, greenhouse gases, and water pollutants consistent with existing or future state board regulations in the most cost-effective manner possible.
- Ensures that there is no net material increase in air pollution, water pollution, or any other substances that are known to damage human health.
- Minimizes the economic costs to the state, if any.
- Maximizes the economic benefits of producing alternative fuels in the state.
- Considers issues related to consumer acceptance and costs and identifies methods to overcome any barriers to alternative fuel use.

The plan must also recommend policies to ensure alternative fuel goals are attained, including, but not limited to:

- Standards on transportation fuels and vehicles.
- Requirements, financial incentives, and other policy mechanisms to ensure that vehicles capable of operating on alternative fuels use those fuels to the maximum extent feasible.
- Requirements, financial incentives, and other policy mechanisms to ensure that alternative fuel fueling stations are available to drivers of AFVs.
- Incentives, requirements, programs, or other mechanisms to encourage the research, development, demonstration, commercialization, manufacturing, or production of vehicles that use alternative fuels.

"Alternative fuel" is defined as a nonpetroleum fuel, including electricity, ethanol, biodiesel, hydrogen, methanol, or natural gas that, when used in vehicles, has demonstrated, to the satisfaction of the state board, to have the ability to meet applicable vehicular emission standards.

Contact:

California Energy Commission
Fuels and Transportation Division
Emerging Fuels and Technology Office
1516 Ninth Street, MS-29
Sacramento, CA 95814-5512
Phone: (916) 654-4201
E-mail: rtuvell@energy.state.ca.us
Web: http://energy.ca.gov

Executive Order S-06-06

http://www.governor.ca.gov/state/govsite/gov_htmldisplay.jsp?sCatTitle=Exec+Order&sFilePath=/govsite/executive_orders/20060425_S-6-06.html&sTitle=EXECUTIVE+ORDER+S-06-06&iOID=78063

Executive Order S-06-06 (May 2006) established targets to increase the production and use of bioenergy, including ethanol and bio-diesel fuels made from renewable resources

in California. Targets are set at a minimum of 20 percent by 2010, 40 percent by 2020, and 75 percent by 2050. The governor noted in the Order that biofuels can be a clean, renewable source for hydrogen and can help to support the state's planned network of more than 16 filling stations and a growing fleet of cars and buses that run on hydrogen.

Contact :

Governor's Office
State Capitol Building
Sacramento, CA 95814
Phone: (916) 445-2841
Fax: (916) 445-4633
E-mail : http://www.govmail.ca.gov/
Web: http://www.governor.ca.gov/state/govsite/gov_homepage.jsp

2. STANDARDS/REGULATIONS

POWER GENERATION

Renewable Portfolio Standard

www.cpuc.ca.gov/static/energy/electric/renewableenergy/
www.energy.ca.gov/portfolio/index.html

A 2002 statute established California's RPS, which requires annual increase in renewable generation by the utilities equivalent to at least 1% of sales, with an aggregate goal of 20% by 2017. The California Public Utilities Commission is working to accelerate the completion date to 2010 and is considering ways to achieve 33% renewable energy by 2020. Eligible technologies include fuel cells using renewable fuels.

Renewable energy generators may be eligible for production incentives (also called Supplemental Energy Payments or SEPs) from the California Energy Commission for above-market costs of procurement by California's utilities as they fulfill their obligations under the state's RPS. SEPs will not be available to a facility owned by an electrical corporation or a local publicly-owned electric utility. Approximately $70 million per year will be made available through this program.

Contacts:

California Energy Commission
Attn: Heather Raitt
1516 Ninth Street, MS-29
Sacramento, CA 95814-5512
Phone: (916) 654-4735
E-mail: hraitt@energy.state.ca.us
Web: http://energy.ca.gov

California Public Utilities Commission
505 Van Ness Avenue

San Francisco, CA 94102
Phone: (415) 703-2782
Fax: (415) 703-1758
E-mail: www.cpuc.ca.gov/static/contactus/index.htm
Web: www.cpuc.ca.gov

Interconnection Standards

http://energy.ca.gov/distgen/interconnection/california_requirements.html
http://energy.ca.gov/reports/2003-11-13_500-03-083F.PDF

The state's interconnection standards are outlined in "Rule 21," which outlines standards for:

- All distributed generation under 10 MW, including renewables; and
- Separate simplified rules for small renewables under 10 kW.

Eligible technologies for interconnection include fuel cells, microturbines, photovoltaic panels, solar-thermal engines, hydroelectric turbines, wind turbines, combustion turbines, steam turbines and internal combustion engines.

Contact:

California Energy Commission
Media and Public Communications Office
1516 Ninth Street, MS-29
Sacramento, CA 95814-5512
Phone: (800) 555-7794 or (916) 654-4058
E-mail: renewable@energy.state.ca.us
Web: http://energy.ca.gov

Net Metering

http://cacx.org/commission/legislation/2003_legislative-summary.html
www.leginfo.ca.gov/pub/bill/asm/ab_0051-0100/ab_67_bill_20051006_chaptered.pdf

A 2003 General Assembly bill requires every electrical corporation to provide net energy metering for eligible fuel cell-generator customers. Net metering is to be provided until the total cumulative rated generating capacity used by the eligible fuel cell customer-generators equals 45 MW within the service territory of an electrical corporation with a peak demand above 10,000 MW, or equals 22.5 MW within the service territory of an electrical corporation with a peak demand of 10,000 MW or less. The bill prohibits the combined statewide cumulative rated generating capacity used by the eligible fuel cell customer-generators in the service territories of all electrical corporations from exceeding 112.5 MW. 2005 legislation extended net metering of fuel cells through 2009.

Contact:

California Public Utilities Commission
505 Van Ness Avenue
San Francisco, CA 94102
Phone: (415) 703-2782

Fax: (415) 703-1758
E-mail: www.cpuc.ca.gov/static/contactus/index.htm
Web: www.cpuc.ca.gov

VEHICLES

Zero Emission Vehicle Sales Requirement
www.arb.ca.gov/msprog/zevprog/zevprog.htm

In 1990, the California Air Resources Board mandated that, by 1998, 2% of all major automaker's fleet sales in California be comprised of ZEVs (plug-in electric or fuel cell vehicles). By 2003, ZEVs were to comprise 10% of sales.

The California Air Resources Board has subsequently modified the rule to offer manufacturers partial credit for other qualifying near zero emission technologies, to include PZEVs (vehicles that meet the California Air Resources Board's SULEV standard) and ATPZEVs (such as electric hybrid vehicles), in order to meet the required ZEV goals.

The California Air Resources Board had offered incentives, but as of 2004 both the Zero Emission Vehicle Incentive Program 2 (ZIP 2) and Fleet ZIP have expired.

Contact:

California Air Resources Board
1001 "I" Street
P.O. Box 2815
Sacramento, CA 95812
Phone: (866) 808-0189
E-mail: helpline@arb.ca.gov
Web: www.arb.ca.gov

3. PUBLIC AGENCY POLICIES/PURCHASE PROGRAMS

POWER GENERATION

San Diego: Sustainable Building Policy
http://genesis.sannet.gov/infospc/templates/esd/sd_model.jsp

New San Diego city facilities and major building renovations must attain LEED "Silver" level certification for sustainability and new city building construction must also incorporate a minimum of 10% self-generation using renewable technologies. Eligible renewable technologies include fuel cells. In 2003 the city produced 18 MW of renewable power and by 2013 anticipates producing an additional 50 MW of renewable power at public and private buildings.

Contact:

Energy Conservation & Management Division
Energy Services Department
City of San Diego
9601 Ridgehaven Court
San Diego, CA 92123
Phone: (858) 694-7000
E-mail: energy@sandiego.gov
Web: http://genesis.sannet.gov/infospc/templates/esd/index.jsp

San Francisco: Renewable Energy Purchasing Program

http://sfwater.org/main.cfm/MC_ID/7/MSC_ID/64

In 2001, two voter propositions were approved to allow the city to sell $100 million in revenue bonds to fund the installation of renewable energy that will supply electricity to public property and schools. The bonds may be used for photovoltaic, solar thermal electric, wind, and fuel cell technology, but have so far been issued only to photovoltaic and wind projects. Eligible projects must produce electricity at a cost that does not exceed the expected cost of electricity from existing energy sources.

Contact:
San Francisco Public Utilities Commission
1155 Market St., 11th floor
San Francisco, CA 94103
Phone: (415) 554-3155
E-Mail: info@sfwater.org
Web: http://sfwater.org/home.cfm

VEHICLES

California Energy Efficient Vehicle Group Purchase Program

www.leginfo.ca.gov/pub/bill/asm/ab_1651-1700/ab_1660_bill_20051006_chaptered.html
www.pd.dgs.ca.gov/contracts/vehicles.htm

Assembly Bill 1660, passed in 2005, created the California Energy-Efficient Vehicle Group Purchase Program in the Department of General Services to encourage the purchase of energy-efficient vehicles by local and state agencies through a group-purchasing program. When awarding a vehicle procurement contract, every city, county, and special district, including a school district and a community college district, may now require that 75% of the passenger cars or light-duty trucks, or both, to be acquired be energy-efficient vehicles. “Energy-efficient vehicle" means either of the following:

- A vehicle that meets California's SULEV standard for exhaust emissions and the federal ILEV evaporative emission standard;; or
- A hybrid vehicle or an AFV that meets California's ATPZEV standard for criteria pollutant emissions.

Contact:

California Department of General Services

Procurement Division
707 Third Street, Third Floor
West Sacramento, CA 95605
Phone: (800) 559-5529 or (916) 375-4400
Fax: (916) 375-4613
E-mail: www.pd.dgs.ca.gov/contact/contactpd.htm
Web: www.pd.dgs.ca.gov/default.htm

Urban Bus Fleet Rule and Zero Emission Bus Requirement

http://www.arb.ca.gov/regact/bus04/bus04.htm
http://weblinks.westlaw.com/Find/Default.wl?DB=CA%2DADC%2DTOC%3BADCCATOC&DocName=13CAADCS2023%2E3&FindType=W&AP=&fn=_top&trailtype=26&vr=2.0&rs=WEBL6.03&spa=CCR-1000

The California Air Resources Board adopted the California Urban Bus Fleet Rule in 2000, requiring older diesel bus engine to be retrofitted or replaced with cleaner engine technologies. Two paths to compliance are available. Transit agencies on the alternative fuel path must meet alternative fuel purchasing and emissions requirements as well as zero emission bus purchase requirements beginning in model year 2010. Transit agencies on the diesel path shall must also meet specified emissions requirements, develop a zero emission bus demonstration and meet zero emission bus purchase requirements beginning in model year 2008.

Zero-Emission Bus Demonstration Project

Owners or operators of an urban bus fleet on the diesel path with more than 200 urban transit buses in its active fleet on January 31, 2001, must implement a zero-emission bus demonstration project. The following specifications and requirements must be met:

- Utilize a minimum of three zero-emission buses;
- Include any necessary site improvements;
- Locate fueling infrastructure onsite;
- Provide appropriate maintenance and storage facilities;
- Train bus operators and maintenance personnel;
- Place the buses in revenue service for a minimum duration of 12 calendar months;
- Retain operation and maintenance records; and
- Report on the demonstration program.

A zero emission bus is defined as a hydrogen fuel cell bus, an electric trolley bus with overhead twin-wire power supply and a battery electric bus.

Purchase Requirement for Zero-Emission Buses

The owner or operator of a transit agency with more than 200 urban buses in active service on January 1, 2007, for transit agencies on the diesel path, and January 1, 2009, for transit agencies on the alternative-fuel path, must purchase and/or lease zero-emission buses, in accordance with the following:

- For transit agencies on the diesel path, a minimum 15% of purchase and lease agreements, when aggregated annually, for model year 2008 through model year 2015 urban buses must be zero-emission buses.
- For transit agencies on the alternative-fuel path, a minimum 15% of purchase and lease agreements, when aggregated annually, for model year 2010 through model year 2015 urban buses shall be zero-emission buses.
- The two provisions above do not apply if the operator's urban bus fleet is composed of 15% or more zero-emission buses on January 1, 2008, for transit agencies on the diesel path, and on January 1, 2010, for transit agencies on the alternative-fuel path, or at any time thereafter.
- Transit agencies on either the diesel path or alternative-fuel path may earn credits for use in meeting the purchase requirements for zero-emission buses by placing zero-emission buses in service prior to the dates specified.

Contact:

California Air Resources Board
Public Information Office
1001 "I" Street
P.O. Box 2815
Sacramento, CA 95812
Phone: (800) 242-4450
E-mail: helpline@arb.ca.gov
Web: www.arb.ca.gov

4. INCENTIVES/MARKET STIMULATION

POWER GENERATION

Emerging Renewables Program Rebate

www.consumerenergycenter.org/erprebate/index.html
www.energy.ca.gov/renewables/emerging_renewables.html

The California Energy Commission's Emerging Renewables Program provides rebates to residential, institutional, commercial, agricultural and industrial consumers who install qualifying renewable energy systems. Financial incentives vary according to the system size, technology and installation method, with fuel cell installations eligible for a rebate of up to $3.20/Watt for projects under 30 kW. Fuel cells must be powered by sewer gas, landfill gas, or other renewable sources of hydrogen or hydrogen rich gases into electricity by a direct chemical process.

Contact:

Emerging Renewables Rebate Program
California Energy Commission
1516 9th Street, MS-45
Sacramento, CA 95814-5512
Phone: (800) 555-7794 (in Calif.) or (916) 654-4058 (outside Calif.)
E-mail: renewable@energy.state.ca.us

Web: http://energy.ca.gov

Industrial Development Bond (IDB) Financing Program

www.treasurer.ca.gov/cidfac/idb.asp?part=7
www.documents.dgs.ca.gov/CPA/IDB/EligibleEquipandTechnologies_2003.doc

The California Consumer Power and Conservation Financing Authority offers below-market rate loans to manufacturing companies to purchase and install renewable energy systems, energy-efficient equipment, or on-site clean distributed generation systems. Companies that install fuel cells and other eligible technologies are able to apply for $500,000 to $10 million in financing, with a limit of $40 million by any one company.

Contact:

California Industrial Development Financing Advisory Commission
Post Office Box 942809
915 Capitol Mall, C-15
Sacramento, CA 94209-0001
Phone: (916) 653-2995
Web: www.treasurer.ca.gov/cidfac

Self-Generation Incentive Program (SGIP)

www.cpuc.ca.gov/static/energy/electric/051005_sgip.htm

The California Public Utilities Commission operates the SGIP program, which is generally considered to be the most successful distributed generation program in the United States. The program provides rebates for purchases of advance power technologies, with the limited eligibility to system sizes of 1.5 MW, but the incentives only apply to the first 1 MW of system output. The Level 1 incentive is $4.50/Watt for up to 50% of the project costs for photovoltaic, wind and renewable fuel cells. Level 2 provides $2.50/Watt for up to 40% of the project costs for non-renewable fuel cells with CHP up to 1.5 MW. The SGIP program has been extended to 2008.

Contacts:

PG&E, SCE, and SoCal Gas administer the incentive program in their service territories and San Diego Regional Energy Office will administer the program in SDG&E's territory. Utility customers should contact their administrator with any questions:

Pacific Gas & Electric
Phone: (415) 973-6436
E-mail: selfgen@pge.com
Web: www.pge.com

San Diego Regional Energy Office (for SDG&E)
Phone: (619) 595-5634
E-mail: selfgen@sdenergy.org
Web: www.sdenergy.org/selfgen

Southern California Edison
Phone: (800) 736-4777 or (626) 302-8436

E-mail: greenh@sce.com
Web: www.sce.com

Southern California Gas Company
Phone: (800) GAS-2000
E-mail: selfgeneration@socalgas.com
Web: www.socalgas.com

VEHICLES

HOV Access by Ultra Low Emission Vehicles

www.arb.ca.gov/msprog/carpool/carpool.htm
www.dmv.ca.gov/pubs/vctop/d11/vc21655_9.htm

California Assembly Bill 2628, signed into law in 2004, allows single-occupant use of HOV lanes by the cleanest alternative fuel, hybrid, and full-electric vehicles. Use of these lanes with only one occupant requires an identification sticker issued by the California Department of Motor Vehicles. Not all hybrid vehicles meet the requirements of AB 2628. Eligible automotive makes and models are listed on the California Air Resources Board's web site. The following fuel cell vehicles, operating on hydrogen, were listed as eligible for the program as of early 2006:

- 2003 and 2004 Honda FCX
- 2003 through 2006 Toyota FCHV.

Additionally, in the nine-county Oakland/San Jose/San Francisco Bay Area, owners of qualifying hybrids will also have to prove that they own a "FasTrak" pass and transponder for their vehicle, which allows them to drive by toll booths without having to stop and pay--a process that adds to air emissions and pollution.

Contact:

California Air Resources Board
Public Information Office
1001 "I" Street
P.O. Box 2815
Sacramento, CA 95812
Phone: (800) 242-4450
E-mail: helpline@arb.ca.gov
Web: www.arb.ca.gov

Motor Vehicle License Fee Incremental Costs Exemption

www.leginfo.ca.gov/cgi-bin/waisgate?WAISdocID=3449442919+0+0+0&WAISaction=retrieve

California Revenue and Taxation Code exempts from the determination of market value the incremental costs of new light-duty motor vehicles propelled by alternative fuels. The vehicle must be certified by the California Air Resources Board as producing emissions that meet the emission standard for ULEVs or lower. This exemption applies to the subsequent payments of the vehicle license fee. "Incremental cost" means the

amount determined by the California Energy Commission as the reasonable difference between the cost of the motor vehicle and the cost of a comparable gasoline or diesel fuel vehicle.

Contact:

California Department of Motor Vehicles
Phone: (800) 777-0133
E-mail: www.dmv.ca.gov/online/email/esw_ogi.html
Web: www.dmv.ca.gov

Carl Moyer Air Quality Attainment Standards Program

http://arb.ca.gov/msprog/moyer/moyer.htm

The Carl Moyer Air Quality Attainment Program, administered by the California Air Resources Board, provides funds on an incentive-basis for the incremental cost of purchasing cleaner than required engines and equipment. The incentive program focuses on reducing emissions of smog-forming NOx, but will also reduce particulate emissions.

Fuel cells are eligible for funding under the 2005 program revisions, for the purchase of new heavy-duty hybrid electric vehicles (defined as one that combines two motive power sources: an energy storage system such as batteries or ultra-capacitors, and an internal combustion engine, turbine, or fuel cell functioning as an auxiliary power unit).

Contact:

California Air Resources Board
1001 "I" Street
P.O. Box 2815
Sacramento, CA 95812
Phone and e-mail are available by district. See
http://arb.ca.gov/msprog/moyer/contacts.htm for more information
Web: www.arb.ca.gov

Government Small Alternative Fuel Vehicle Purchase Incentive

www.baaqmd.gov/pln/grants_and_incentives/vip/index.htm

The Bay Area Air Quality Management District's Vehicle Incentive Program offers incentives to public agencies that purchase AFVs with a gross vehicle weight of no more than 10,000 lbs. Qualifying vehicles must be certified as SULEV, PZEV or ZEV and powered by a dedicated alternative fuel: natural gas, propane, hydrogen, electricity, or hybrid electric. Incentives range from $1,000 to $5,000 per vehicle.

Contact:

Andrea Gordon
Bay Area Air Quality Management District
District Office
939 Ellis Street

San Francisco, CA 94109
Phone: (415) 749-4940
E-mail: agordon@baaqmd.gov
Web: www.baaqmd.gov

Los Angeles: Free Meter Parking for Alternative Fuel Vehicles

www.lacity.org/ladot/freepark.htm

ZEVs or SULEVs may park without depositing coins at on- and off-street metered parking spaces throughout the City of Los Angeles. In order to qualify, drivers must purchase a California Clean Air Vehicle Decal from the California Department of Motor Vehicles. Eligible fuel cell vehicles, as of early 2006, are the 2003 and 2004 Honda FCX and the 2003 through 2006 Toyota FCHV.

Contact:

Los Angeles Department of Transportation
100 S. Main Street, 10th Floor
Los Angeles, CA 90012
Phone: (213) 972-8470
E-mail: ladot@dot.lacity.org
Web: www.lacity.org/ladot/index.htm

Sacramento: Emergency Clean Air and Transportation Program

www.4secat.com/index1.html

The Sacramento Emergency Clean Air and Transportation program is a voluntary project created as a way to help truck owners and fleet operators reduce their vehicles' NOx emissions. The program was originally created by California Assembly Bill (AB) 2511 to help assure that the Sacramento region meet its commitments under the State Implementation Plan (SIP) for air quality attainment. The program finances the incremental capital costs of emission control measures, operating costs, facility modifications and out-of-cycle replacement. Eligible types of projects include the following:

- Replacing older, higher polluting vehicles with newer, lower-emission vehicles;
- Purchasing new, low or zero-emitting vehicles;
- Retrofitting existing heavy-duty vehicles with after-treatment systems to reduce NOx;
- Repowering existing high-emitting diesel vehicles with new, lower-emitting engines;
- Using “cleaner” diesel fuel formulations and/or diesel emulsion fuels in place of California diesel fuel; and
- Implementing any other verifiable, enforceable, and cost-effective technology for reducing NOx emissions from heavy-duty on-road vehicles.

This program was originally created and funded by California Assembly Bill (AB) 2511 to help assure that the Sacramento region meet commitments under the SIP for air quality attainment. Additional funding has been provided by the Sacramento Area Council of Governments Air Quality Funding Program.

Contact:

Sacramento Metropolitan Air Quality Management District
Mobile Source Division
SECAT Program Application
777 12th Street, 3rd floor
Sacramento, CA 95814-1908
Phone: (916) 874-4890 (Sam Gregor), (916) 874-4892 (Kristian Damkier), (916) 874-4893 (Gary Bailey), (916) 874-4889 (Jerry Grauman) or (916) 874-4891(Freya Arick)
E-mail: sgregor@airquality.org, kdamkier@airquality.org, gbailey@airquality.org, ggrauman@airquality.org or farick@airquality.org
Web: www.4secat.com/index1.html

5. PARTNERSHIPS

California Fuel Cell Partnership (CaFCP)

www.cafcp.org

Formed in 1999, CaFCP is a collaborative of auto manufacturers, energy companies, fuel cell technology companies, and government agencies. Members of CaFCP have joined together to demonstrate fuel cell vehicles under day-to-day driving conditions. In addition to testing the fuel cell vehicles, the CaFCP is examining fuel infrastructure issues and beginning to prepare the California market for this new technology.

CaFCP goals for 2004 through 2007 are to:

- Facilitate members' placement of up to 300 fuel cell cars and buses into fleets;
- Promote fuel stations to support the vehicle fleets;
- Ensure 'common-fit' fueling protocols;
- Prepare communities and train first responders for vehicles and fueling;
- Promote practical codes and standards;
- Enhance public awareness; and
- Exchange information and resources worldwide.

To date, 21 hydrogen fueling stations are now operable and a number of fuel cell vehicles have been placed into fleet service within the state:

- Five Honda FCX vehicles leased to the city of Los Angeles;
- Two Honda FCX vehicles leased to the city of San Francisco;
- Two Honda FCX vehicles leased to the South Coast Air Quality Management District;
- One Honda FCX leased to the city of Chula Vista;
- Four Honda FCX vehicles based at the Honda America facility at Torrance;
- Two Toyota Highlander Fuel Cell Hybrid Vehicles provided to the University of California – Davis;
- Two Toyota Highlander Fuel Cell Hybrid Vehicles provided to the University of California – Irvine;

- Three Van Hool fuel cell hybrid buses serving in the AC Transit fleet and two Hyundai Tucson Fuel Cell Electric Vehicles employed as AC Transit fleet support vehicles.
- Three Gillig fuel Cell Buses in service in the Santa Clara Valley Transportation Valley Authority fleet.

A map showing the location of CaFCP car and bus vehicle demonstrations, as well as current and planned hydrogen fueling stations, can be viewed at www.cafcp.org/fuel-vehl_map.html. The Partnership has also made a number of technical information and studies available on their website (www.fuelcellpartnership.org/resource-ctr.html).

CAFCP full members include: DaimlerChrysler, Ford Motor Company, General Motors, Honda, Hyundai Motor Company, Nissan, Toyota, Volkswagen, BP, Chevron, ExxonMobil, Shell Hydrogen, Ballard Power Systems, UTC Power, California Air Resources Board, California Energy Commission, SCAQMD, National Automotive Center, DOE, DOT and EPA.

Additionally, there are 11 associate members who assist with specific areas of expertise to help meet the partnership's goals: bus transit agencies (AC Transit, Santa Clara VTA and SunLine Transit Agency), hydrogen gas suppliers (Air Products and Chemicals, Inc. and Praxair), hydrogen fueling stations (Pacific Gas & Electric, Proton Energy Systems, Inc., Stuart Energy and Ztek), ISE Corporation, and the Institute of Transportation Studies at the University of California-Davis.

Contact:

California Fuel Cell Partnership
3300 Industrial Boulevard, Suite 1000
West Sacramento, CA 95691
Phone: (916) 371-2870
Fax: (916) 375-2008
E-mail: info@cafcp.org
Web: www.cafcp.org

California Hydrogen Business Council

www.californiahydrogen.org

The California Hydrogen Business Council provides a link between hydrogen-technology developers, businesses, energy leaders, government, and infrastructure providers.

Organizational goals include:

- Promoting the conduct and growth of hydrogen business;
- Supporting access to hydrogen business information;
- Teaming of members;
- Identifying opportunities for hydrogen technology;
- Coordinating regional strengths to build needed hydrogen infrastructure; and
- Identifying, defining, and developing regional funding.

The Council membership includes business, academia and state government, including the California Air Resources Board and SCAQMD.

Contact:

California Hydrogen Business Council
Kathryn Rips, Managing Director
Phone: (760) 341-2924
E-mail: info@californiahydrogen.org

California Stationary Fuel Cell Collaborative

http://stationaryfuelcells.org

Members represent a group of key organizations interested in combining efforts and resources towards commercialization of stationary fuel cells in California. The Collaborative envisions fuel cell installations pursued by state, local and public organizations and private entities, and is planning specific actions to promote a wide variety of fuel cell technologies, sizes and applications for installation in California. These actions will include facilitating the installation of fuel cells in a variety of applications including: industrial, commercial, residential, premium, remote, backup, and base-load power applications - as the market dictates. The Collaborative will also provide leadership in facilitating the installation of fuel cells in state buildings as well as support the installation of fuel cells in other markets.

The California Stationary Fuel Cell Collaborative established a Strategic Plan (www.stationaryfuelcells.org/DOCUMENTS/PDFdocs/CaSFCC_Plan_Roadmap_0305.pdf) in March 2002 to address issues facing fuel cells, such as high capital costs of fuel cell product, the undemonstrated durability and reliability of fuel cell technology, and the regulatory and policy hurdles associated with distributed generation.

Special reports and studies are also available on the Collaborative's website.

The core group consists of: California Air Resources Board, California Department of General Services, California Department of Transportation, California Energy Commission, California Environmental Protection Agency, California Public Utilities Commission, Los Angeles Department of Water and Power, National Fuel Cell Research Center, Sacramento Municipal Utility District, South Coast Air Quality Management District, DoD, DOE, EPA and the U.S. Fuel Cell Council.

Contacts:

Ron Friesen
CaFCP Executive Director
Phone: (916) 323-1508
E-mail: rfriesen@arb.ca.gov
Web: http://stationaryfuelcells.org

6. RD&D SUPPORT

California Energy Commission

www.energy.ca.gov/research

The California Energy Commission's Research and Development Division supports the research, technology development and demonstration of new technologies for generation of electricity, electricity demand-side management, and natural gas. The division activities include providing contracts and grants to institutions for research and development of energy technologies and related scientific activities. Programs include:

California Public Interest Energy Research Program (PIER)
www.energy.ca.gov/pier/index.html

The PIER Program supports energy RD&D projects that will help improve the quality of life in California by bringing environmentally safe, affordable and reliable energy services and products to the marketplace. The program awards up to $62 million annually to conduct the most promising public interest energy research by partnering with RD&D organizations including individuals, businesses, utilities, and public or private research institutions. Approximately five to ten% of PIER's annual $62.5 million budget is allocated for stationary fuel cell activities.

Contact:

Martha Krebs, Deputy Director
Public Interest Energy Research (PIER) Program
California Energy Commission
Media and Public Communications Office
1516 Ninth Street, MS-29
Sacramento, CA 95814-5512
Phone: (916) 654-4878
E-mail: mkrebs@energy.state.ca.us
Web: www.energy.ca.gov

Energy Innovations Small Grant Program
www.energy.ca.gov/research/innovations/index.html

The Energy Innovations Small Grant Program provides up to $75,000 to small businesses, non-profits, individuals and academic institutions to conduct research that establishes the feasibility of new, innovative energy concepts, including fuel cells.

Contact:

Alec Jenkins
Energy Systems Integration and Environmental Research Office
California Energy Commission
Media and Public Communications Office
1516 Ninth Street, MS-29
Sacramento, CA 95814-5512
Phone: (916) 654-4597
E-mail: ajenkins@energy.state.ca.us
Web: www.energy.ca.gov

Clean Transportation Funding

www.cleantransportationfunding.org/index.php?fa=about

Clean Transportation funding grants are awarded to projects that result in direct and tangible reductions in air pollution from motor vehicles in the South Coast Air District area. The discretionary funds can also be used for related planning, monitoring, enforcement and technical studies. Historically, project categories have included:

- Clean fuel infrastructure and clean vehicle programs, such as AFVs and trucks, electric vehicles, and/or alternative fueling station.
- Transportation control measures, such as telecommuting, ridesharing, videoconferencing, parking management, and/or traffic synchronization research and development of new clean air technologies.
- Development of AFVs and parts, remote sensing, studies related to the regional air quality plan educational projects, land use projects and projects designed to reduce emissions by promoting behavioral changes.

Over the years, the Mobile Source Air Pollution Reduction Review Committee (MSRC) has refined the funding process to focus on projects that reduce emissions in the most cost-effective manner. Project funding has been awarded to fuel cell projects.

The funding is made available through the MSRC, whose sole mission is to fund projects that reduce air pollution from motor vehicles within the South Coast Air District in Southern California. Members include: SCAQMD, Southern California Association of Governments, San Bernardino Association of Governments, Los Angeles County Metropolitan Transportation Authority, Orange County Transportation Authority, Riverside County Transportation Commission, California Air Resources Board and a regional rideshare agency selected by the other members of the MSRC committee.

The MSRC was created in 1990 by the California State Legislature as part of AB 2766 that authorizes the Department of Motor Vehicles to collect a $4 surcharge on vehicle registration fees. Under AB 2766, 30% of the $4 is part of a "discretionary" fund overseen by the MSRC, 30% is distributed to the SCAQMD for activities necessary to reach the state's clean air goals, and 40% is distributed to local cities and counties in the South Coast Air District to be used for clean air projects.

Contact:

Mobile Source Air Pollution Reduction Review Committee
21865 Copley Drive
Diamond Bar, CA 91765
Phone: (909) 396-3269
Fax: (909) 396-3682
E-mail: ineedinfo@cleantransportationfunding.org
Web: www.cleantransportationfunding.org/index.php?fa=about

7. EMERGING BUSINESS SUPPORT

2006 California Clean Tech Open

www.cacleantechopen.com/index.shtml?page=categories&mode=1

The goal of California Clean Tech Open is to foster the development of new entrepreneurs and technologies that answer the growing global demand for resources with alternative products and services that prevent the destruction of the natural environment. The competition was initiated by the MIT Club of Northern California with partners, supporters and advisors from business, academia, non-profits, the city of San Francisco, the federal government and state government. Winners will be supplied with cash, office space, legal services, accounting services and public relations services in order to establish a start-up business to turn innovative ideas into real products and services.

The overall winner will be drawn from the category winners and will receive a total of $100,000 cash and a package of business services, including legal and accounting services, public relations consulting and one year of office space. Each of the category winners will receive $50,000 cash and a bundle of professional services, including legal and accounting services, public relations consulting and one year of office space. The competition categories include: Energy Efficiency, Smart Power, Renewable Energy (examples include technology that makes fuel cells and solar power applications), Transportation (such as more efficient batteries, affordable fuel cells or readily available flexible fuel vehicles) and Water Management.

Contact:

California Clean Tech Open 2006
c/o Acterra
3921 East Bayshore Road
Palo Alto, CA 94303-4303
Phone: (650) 618-2531
Fax: (650) 962-8234
E-mail: info@cacleantech.com
Web: www.cacleantechopen.com/index.shtml?page=index&mode=0

8. STATE AND LOCALLY-SUPPORTED DEMONSTRATIONS

POWER GENERATION

Sierra Nevada Brewing Company, Chico: Four 250-kW FuelCell Energy Direct Fuel Cell® units were installed in March 2005 to supply electric power and heat to brewery. $1.4 million of funding was provided by California's SGIP program.

Santa Rita Jail, Dublin: A 1-MW FuelCell Energy Direct Fuel Cell® 1500 MCFC system, consisting of four 250 kW units, was installed in November 2005 and provides 90% of base load power. California's SGIP program is providing funding of up to $1.4 million. The project is part of the DoD Climate Change Fuel Cell Program.

East Anaheim Policy Department and Community Center, East Anaheim: The UTC Power 200-kW PAFC installation is a project of Anaheim Public Utilities and provides

power and cogenerated heat to the combined police and community center facility. The DoD Climate Change Fuel Cell Program provided funding for the project.

TST, Inc. facility, Fontana: Two FuelCell Energy 250-kW Direct Fuel Cell® MCFC units will be installed in early 2006 to replace a larger burner that preheats air as part of TST's aluminum manufacturing process. Financial support of up to $1.25 million will be provided by California's SGIP program and an additional $500,000 from the SCAQMD.

Los Angeles Department of Water and Power (LADWP) facilities, Los Angeles:

- Two FuelCell Energy MCFC units have provided power to the LADWP John Ferraro headquarters building, the first operating from 2001-2002 and the second installed in 2003.
- A UTC Power 200-kW PAFC was operated at the Main Street facility from 2002-2003.
- A FuelCell Energy 250-kW MCFC unit was deployed in 2003 at LADWP's Terminal Island facility, utilizing digester gas from a nearby wastewater treatment plant.

These fuel cell installations were funded through the LADWP's Public Benefits Program and the DoD Climate Change Fuel Cell Program.

Los Angeles County Sanitation Districts, Palmdale: The FuelCell Energy 250-kW unit runs on digester gas. The fuel cell was installed in November 2004 at a cost of $1.9 million. Half of the funding was obtained from California's SGIP grant program.

California EPA building holiday light display, Sacramento: The IdaTech PEM fuel cell powered lights on a holiday tree in 2002. Project partners included the Governor's Office of Planning and Research, California EPA and the Sacramento Public Utility District.

US Postal Service Embarcadero Postal Center, San Francisco: The FuelCell Energy 250-kW Direct Fuel Cell® MCFC will be installed in early 2006 and will deliver base load heat and power to the facility. Funded by California's SGIP Program and the DoD Climate Change Fuel Cell Program.

Starwood Hotels & Resorts, San Diego and San Francisco: The largest commercial fuel cell installation in the U.S., the 1.5-MW FuelCell Energy MCFC system is located the Sheraton San Diego Hotel (a 1-MW system at the East Tower and 500 kW at the West Tower). A 500-kW FuelCell Energy installation is also planned at the Westin San Francisco Airport Hotel with up to $1.25 million in funding from California's SGIP program. The systems provide baseload power to the hotel and heat for the pool.

El Estero Wastewater Treatment Plant, Santa Barbara: Two 250-kW FuelCell Energy Direct Fuel Cell® MCFC units were installed in September 2004. $2.25 million of funding was made available through California's SGIP program.

Metal foundries, various locations: Four 250-kW FuelCell Energy fuel cells will be located at metal foundries in Fontana, Carson and Rancho Dominguez. Project partners include SCAQMD, California Cast Metals Association and Emergent Energy Group.

VEHICLES

Fuel cell car and bus demonstrations, Los Angeles, San Francisco, Oakland, San Jose, Redondo Beach, Chula Vista, Torrance, Diamond Bar, Davis, Irvine, Santa Monica and West Sacramento: Since 2000, CaFCP members have placed more than 120 light duty fuel cell vehicles on California roads. The group's goal is to facilitate members' placement of up to 300 fuel cell cars and buses into fleets and promoting hydrogen fueling stations to support them. Vehicles being demonstrated include the Honda FCX, DaimlerChrysler FCV, fuel cell versions of the Hyundai Tucson and the Kia Sportage, and fuel cell-hybrid versions of the Toyota Highlander and Ford Focus. CaFCP members include the California Energy Commission, California Air Resources Board and SCAQMD.

FUELING INFRASTRUCTURE

Hydrogen fueling stations, Richmond, Oxnard, Los Angeles, San Francisco, Auburn, Chino, Chula Vista, Torrance, San Jose, Diamond Bar, Thousand Palms, Davis, Irvine, West Sacramento, Santa Ana, Riverside, Burbank, Santa Monica, Oakland and Ontario: Twenty-one hydrogen refueling stations serve CaFCP's demonstration hydrogen fuel cell automotive and bus fleets within the state. Local communities were involved in the siting and permitting process. State agencies partnered in many of the processes, including the SCAQMD, Bay Area Air Quality Management District, California Energy Commission, California Environmental Protection Agency and California Air Resources Board. A total of 250 hydrogen fueling stations are planned by 2015 as part of California's Hydrogen Highway network.

PLANNED DEMONSTRATIONS

Hydrogen-fueled power plant, Southern California: Proposed by BP and Edison Mission Group, the $1 billion hydrogen-fueled power plant would produce about 500 MW of clean electricity—enough power to serve 325,000 customers--with minimal carbon dioxide emissions. The plant is to be located about 20 miles south of Los Angeles. Further progress on the project will depend on additional study by BP and Edison Mission Group, project review by SCAQMD and the California Energy Commission, progress on California Public Utilities Commission's electricity resource adequacy procurement policies and provision of incentives under the Federal Energy Policy Act.

COLORADO

1. PLANS/STRATEGIES

Office of Energy Management and Conservation Programs
www.state.co.us/oemc/programs/renewable/index.htm

The Office of Energy Management and Conservation (OEMC) educates citizens and businesses about current and near-term energy efficiency technologies and supports emerging technology demonstrations. OEMC also hosts the bi-annual Colorado Wind and Distributed Energy Conference which has featured speakers on hydrogen, fuel cells,

wind, anaerobic digestion, biofuels, biomass and microturbines. OEMC, together with the City and County of Denver, Denver Film Society, and the U.S. EPA, has also hosted "Hydrogen Rocks!," an environmental sustainability fair that included a band performing with a sound system powered by a 5-kW portable fuel cell.

Contact:

Governor's Office of Energy Management and Conservation
Drew Bolin, Director
225 E. 16th Avenue, Suite 650
Denver, CO 80203
Phone: (800) 632-6662 or (303) 866-2401
Fax: (303) 866-2930
E-mail: Drew.Bolin@state.co.us
Web: www.state.co.us/oemc

2. STANDARDS/REGULATIONS

POWER GENERATION

Renewable Energy Standard

www.dora.state.co.us/puc/rulemaking/Amendment37.htm

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 according to the following schedule:

- 3% from 2007 through 2010;
- 6% from 2011 through 2014; and
- 10% by 2015 and thereafter.

Eligible systems may be up to 2 MW in size and use renewable resources including photovoltaics, landfill gas, wind, biomass, geothermal electric, anaerobic digestion, small hydroelectric and fuel cells.

Contact:

Colorado Public Utilities Commission
1580 Logan Street, OL 2
Denver, CO 80203
Phone: (800) 888-0170 or (303) 894-2000
E-mail: puc@dora.state.co.us
Web: www.dora.state.co.us/puc

Interconnection Standards

www.dora.state.co.us/puc/decisions/2005/C05-1461A_05R-112E.doc

In October 2005, Colorado Public Utilities Commission adopted rules implementing the state's RPS. These rules created both interconnection standards and net metering

requirements for all qualifying retail utilities. Eligible renewable technologies include fuel cells using renewable resources, solar thermal electric, photovoltaics, landfill gas, wind, biomass, hydroelectric, geothermal electric, CHP/cogeneration, anaerobic digestion, microturbines, and other distributed generation technologies.

Contact:

Colorado Public Utilities Commission
1580 Logan Street, OL 2
Denver, CO 80203
Phone: (800) 888-0170 or (303) 894-2000
E-mail: puc@dora.state.co.us
Web: www.dora.state.co.us/puc

Net Metering

www.dora.state.co.us/puc/decisions/2005/C05-1461A_05R-112E.doc

In 2005, the Colorado Public Utilities Commission implemented rules for the state's RPS, allowing net metering for customer-generated electricity from all renewable energy resources of up to 2 MW capacity (includes fuel cells using hydrogen derived from renewable resources). This renewably-produced power may be applied to the utility's renewable generation requirement.

Contact:

Colorado Public Utilities Commission
1580 Logan Street, OL 2
Denver, CO 80203
Phone: (800) 888-0170 or (303) 894-2000
E-mail: puc@dora.state.co.us
Web: www.dora.state.co.us/puc

4. INCENTIVES/MARKET STIMULATION

VEHICLES

Alternative Fuel Vehicle Tax Credit

www.revenue.state.co.us/taxstatutesregs/3922reg39-22-516%202_5%202_7.html

An income tax credit is available for the incremental cost of purchasing an AFV or for the conversion of a vehicle to operate using an alternative fuel. Credits, through 2009, range from 50% for LEVs to 85% for ZEVs. Beyond 2009, credits range from 25% to 75%.

Contact:

Colorado Department of Revenue
1375 Sherman St.
Denver, CO 80261

Phone: (303) 238-7378
Web: www.revenue.state.co.us/main/home.asp

FUELING INFRASTRUCTURE

Alternative Fuel Refueling Facility Tax Credit

www.revenue.state.co.us/taxstatutesregs/3922reg39-22-516%202_5%202_7.html

Between January 1, 1998 and January 1, 2011, a tax credit is available for a percentage of the actual cost incurred for constructing, reconstructing, or acquiring an alternative fuel refueling facility that is directly attributable to the storage, compression, charging, or dispensing of alternative fuels to motor vehicles:

- 50% of the costs incurred on or after January 1, 1998, but prior to January 1, 2006;
- 35% of the costs incurred on or after January 1, 2006, but prior to January 1, 2009; and
- 20% of the costs incurred on or after January 1, 2009, but prior to July 1, 2011.

For an alternative fuel refueling facility that dispenses an alternative fuel derived from a renewable energy source, the percentage credit that may be claimed is multiplied by one and one-fourth.

Contact:

Colorado Department of Revenue
1375 Sherman St.
Denver, CO 80261
Phone: (303) 238-7378
Web: www.revenue.state.co.us/main/home.asp

5. PARTNERSHIPS

Colorado Fuel Cell Center

www.state.co.us/oemc/press/050406.pdf

In May 2006 the Colorado Office of Energy Management and Conservation announced the opening of the Colorado Fuel Cell Center (CFCC) with partners Colorado School of Mines (CSM), Gas Technology Institute (GTI), DOE's National Renewable Energy Laboratory (NREL) and Versa Power Systems, Inc. The Center will allow the State to expand fuel cell related research, development, education, and commercial application in Colorado. The CFCC is a cost share effort, funded by the partners ($1 million) and the state ($2 million).

CFCC is located at the Colorado School of Mines and GTI will manage its daily operations for the two-year period. GTI will also provide technical advice on fuel cell research, development, demonstration, and commercialization, as well as provide public education. An extensive amount of research on electrochemical technology, materials and fuel processing will be performed by the partners, as well as CSM students and

faculty. CSM will add fuel cell courses to the existing curriculum and oversee all student and faculty research programs.

Contacts:

Colorado School of Mines
Dr. Nigel Middleton
Phone: (303) 273-3327
E-mail: Nigel.Middleton@is.mines.edu

Colorado Office of Energy Management and Conservation
Rick Grice
Phone: (303) 866-2401
E-mail: Rick.Grice@state.co.us

8. STATE AND LOCALLY-SUPPORTED DEMONSTRATIONS

POWER GENERATION

General Services Administration's Denver Federal Center: The Governor's Office of Energy Management and Conservation (OEMC) partnered with the General Services Administration's Public Buildings Service to install a 5-kW Plug Power fuel cell that directly runs on hydrogen. The fuel cell is being utilized as a back-up generator for the Federal Center's telecommunications system. It is the largest fuel cell installed in Colorado in a commercial application. The fuel cell replaces an obsolete gasoline-powered generator that provided back-up power to GSA.

Washington Park Fire Station, Denver: The Plug Power 5-kW PEM fuel cell provides a portion of the facilities' electricity and heat, to operate the fire station's computers, lights and garage doors. The demonstration is a cooperative between the state's Office of Energy Management and Conservation, the City of Denver, Plug Power and Xcel Energy.

Parade of Homes demonstration, Denver: The project was planned cooperatively by Miller Burton Homes, Built Green Colorado, the City and County of Denver, Governor's Office of Energy Management and Conservation, Intermountain Rural Electric Association, Plug Power Inc., and Xcel Energy. The Plug Power PEM fuel cell provided 5 kW of power to the demonstration home for a two-month demonstration in 2002 and was subsequently moved to the Washington Park fire station for further demonstration.

CONNECTICUT

2. STANDARDS/REGULATIONS

POWER GENERATION

Renewable Portfolio Standard

www.cga.ct.gov/2003/act/Pa/2003PA-00135-R00SB-00733-PA.htm
www.cga.ct.gov/2005/ba/2005HB-07501-R00SS1-BA.htm

Connecticut's RPS was created in 1998 as part of the state's electric utility restructuring law. The Standard mandates that electricity suppliers and electric-distribution companies use Class I and Class II renewable resources to generate 4% of all retail electricity sales by January 1, 2004, increasing to 10% by 2010. Class I renewable resources include fuel cells. Class III resources include electricity produced from the waste heat produced by CHP units with an efficiency of at least 50%.

Contact:

Connecticut Department of Public Utility Control
Ten Franklin Square
New Britain, CT 06051
Phone: (800) 382-4586 or (860) 827-1553
E-mail: dpuc.information@po.state.ct.us
Web: www.state.ct.us/dpuc

Interconnection Standards

www.cl-p.com/clpcommon/pdfs/companyinfo/interconnection/Interconnection_Guidelines.pdf

Connecticut has finalized interconnection rules and procedures for all distributed generation technologies of up to 25 MW, including fuel cells. The standards were approved by the Connecticut Department of Public Utility Control in April 2004.

Contact:

Connecticut Department of Public Utility Control
Ten Franklin Square
New Britain, CT 06051
Phone: (800) 382-4586 or (860) 827-1553
E-mail: dpuc.information@po.state.ct.us
Web: www.state.ct.us/dpuc

Net Metering

www.cga.ct.gov/2003/act/Pa/2003PA-00135-R00SB-00733-PA.htm

Connecticut's 1998 Electric Restructuring Public Act requires investor-owned utilities to provide net metering to residential customers owning electrical generators of less than 100-kW capacity that operate using Class I renewable resources or hydropower. Class I renewables include fuel cell technologies.

Contact:

Connecticut Department of Public Utility Control

Ten Franklin Square
New Britain, CT 06051
Phone: (800) 382-4586 or (860) 827-1553
E-mail: dpuc.information@po.state.ct.us
Web: www.state.ct.us/dpuc

3. PUBLIC AGENCY POLICIES/PURCHASE PROGRAMS

POWER GENERATION

Government Green Power Purchase Plan

www.ctenergy.org/pdf/ExOrder32.pdf

A 2004 executive order directed state agencies and universities to purchase electricity generated by renewable resources. Class I renewable-energy purchases (which includes include solar, wind, new sustainable biomass, landfill gas and fuel cells) must comprise 20% of electricity supplied in 2010, 50% in 2020 and 100% in 2050.

Contact:

Connecticut Energy Advisory Board
c/o Gretchen Deans
CERC
805 Brook Street, Building 4
Rocky Hill, CT 06067
Phone: (860) 571-7147
Fax: (860) 571-7150
E-mail: gdeans@cerc.com
Web: www.ctenergy.org

4. INCENTIVES/MARKET STIMULATION

POWER GENERATION

Incentives for Customer-Side Distributed Resources

www.dpuc.state.ct.us/DPUCinfo.nsf/6388afa2e804605f852565f7004e9e87/6571b686757ae0798525713e00637ef3/$FILE/DGRelease.doc

In March 2006, the Connecticut Department of Public Utility Control announced new programs providing incentives to electric customers that install customer-side distributed resources. The programs were developed to fulfill goals of Energy Independence legislation, passed in 2005, that encourages development of new distributed resources in the state. The initiatives will assist individual business customers that participate by reducing and managing their energy costs; reduce electric costs (federally mandated congestion costs) for all Connecticut electric consumers; encourage investment in and deployment of important new technologies; and enhance electric system reliability by further diversifying the range of resources to meet electric needs. Several incentives are available to customers:

Capital Grants

Monetary grants will be awarded in proportion to the amount of electric load removed from the grid:

- $200/kW emergency generators
- $450/kW Base load generation including CHP
- Projects in Southwest Connecticut will receive an additional $50/kW.

Conservation and Load Management grants will be determined on a case by case basis. Renewable energy generation projects are eligible but may receive higher grants through programs offered by the Clean Energy Fund.

Contact:

Connecticut Department of Public Utility Control
Ten Franklin Square
New Britain, CT 06051
Mark Quinlan
Phone: (860) 827-2691
Web: www.state.ct.us/dpuc

Low Interest Loans

A low interest loan program will be available for customer side distributed resource projects of 50 kW or greater. The interest rate will be no more than the prime rate.

Contact:

Department of Public Utility Control
Ten Franklin Square
New Britain, CT 06051
Phone: (860) 827-1553
Fax: (860) 827-2613
Web: www.state.ct.us/dpuc

Gas Discount

Natural gas rates will be reduced for customer-side generation projects that use natural gas. Gas distribution charges will be waived.

Contacts:

Yankee Gas
John Ferrantino
Phone: (860) 665-6266

CNG/Southern
Greg Therrien
Phone: (860) 727-3184

Backup Rates

Lower back-up charges will be available for customers in the event that they need to take power from the electric company if their own system isn't operational. This will be done by eliminating backup rates and eliminating demand ratchets for these projects.

Contacts:

Yankee Gas
John Ferrantino
Phone: (860) 665-6266

UI
Tony Cortiglio
Phone: (203) 499-2298

Renewable Energy Credits

Legislation requires that a portion of Connecticut electricity is supplied from Class I, Class II or Class III fuel sources. (Class I renewable resources include fuel cells. Class III resources include electricity produced from the waste heat produced by CHP units with an efficiency of at least 50%.) Generators that use these fuel sources are awarded renewable energy credits that can be sold to electric suppliers to assist in offsetting a project's costs.

Contact:

Connecticut Department of Public Utility Control
David Goldberg
Ten Franklin Square
New Britain, CT 06051
Phone: (860) 827-2886
Web: www.state.ct.us/dpuc

Local Option for Property Tax

http://www.dsireusa.org/documents/Incentives/CT07F.htm

Connecticut municipalities may offer property tax exemptions for qualified renewable energy systems, including hydrogen fuel cells. Depending on the municipality, the exemption may apply for up to the full value of the system and may apply to residential, commercial and industrial properties.

VEHICLES:

Alternative Fuel Vehicle Tax Exemption

www.ct.gov/drs/cwp/view.asp?a=1477&q=269920

Prior to July 1, 2008, the following purchases are exempt from state sales tax:

- New dedicated CNG, LNG, LPG, hydrogen, or electric vehicles;
- Equipment used in dedicated or dual fuel CNG, LNG, LPG, or electric vehicle conversions; and
- Equipment associated with a CNG or hydrogen filling or electric recharging station.

Contact:

Connecticut Department of Revenue Services
Taxpayer Services Division
25 Sigourney Street
Hartford, CT 06106-5032
Phone: (800) 382-9463 or (860) 297-5962
E-mail: drs@po.state.ct.us
Web: www.ct.gov/drs/site/default.asp

Alternative Fuel Tax Exemption

www.ct.gov/drs/cwp/view.asp?a=1477&q=269920

Prior to July 1, 2008, petroleum products sold for use as fuel in fuel cells, as well as propane sold for use as a fuel in motor vehicles, are exempt from the petroleum gross earnings tax.

Contact:

Connecticut Department of Revenue Services
Taxpayer Services Division
25 Sigourney Street
Hartford, CT 06106-5032
Phone: (800) 382-9463 or (860) 297-5962
E-mail: drs@po.state.ct.us
Web: www.ct.gov/drs/site/default.asp

5. PARTNERSHIPS

Connecticut Global Fuel Cell Center

www.ctfuelcell.uconn.edu

The Connecticut Global Fuel Cell Center was started in 2001 as a partnership between the School of Engineering at the University of Connecticut, The Connecticut Clean Energy Fund and Connecticut industry. In the past few years, the Center has conducted more than $4.3 million of contract research for federal, state and industrial sponsors.

Contact:

Connecticut Global Fuel Cell Center
University of Connecticut
Kenneth Reifsnider, Director
44 Weaver Rd., Unit 5233

Storrs, CT 06269-5233
Phone: (860) 486-4270
Fax: (860) 486-8378
E-mail: reifsnider@engr.uconn.edu
Web: www.ctfuelcell.uconn.edu

Mohegan Nation Fuel Cell Education Program

www.cleanair-coolplanet.org/information/pdf/mohegan-tribe-of-ct.pdf

The Mohegan Nation's Fuel Cell Education Program was designed around three components:

- Installation and operation of at least two 200-kW fuel cells at the Mohegan Sun Casino in 2002;
- Purchase of carbon offsets to mitigate, for a period of 25 years, the carbon dioxide emissions associated with the operation of the fuel cells; and.
- Development of an educational program to share the lessons of this new technology with members of the Mohegan Tribe, other tribes and the general public.

The fuel cell team implementing the program is comprised of state and federal government agencies (Connecticut Department of Environmental Protection and U.S. EPA), tribal government departments (Planning, Development, Financial and Legal, and the Utility Authority), Mohegan Sun Engineering Department, energy and engineering consulting firms, universities and suppliers.

Contact:

Dr. Norman Richards
Administrator of the Mohegan Environmental Protection Department
Phone: (860) 862-6112
Web: www.mohegan.nsn.us

6. RD&D SUPPORT

Connecticut Clean Energy Fund

www.ctcleanenergy.com

The Connecticut Clean Energy Fund (CCEF) invests in enterprises and other initiatives that promote and develop sustainable markets for energy from clean energy sources. The fund focuses primarily on breakthrough developments in the core technology areas of fuel cells, solar energy, wind, landfill gas, biomass conversion, ocean thermal energy, wave or tidal energy, and emerging non-fossil technologies. CCEF funding is acquired by a charge assessed to electric customers.

CCEF's Fuel Cell Initiative has invested in technology, demonstration sites, deployment, as well as establishment of the Connecticut Global Fuel Cell Center at the University of Connecticut. $37.5 million was committed to the Fuel Cell Initiative over a 5-year period ending in 2005.

In 2003, the Energy Conservation and Load Management Fund (EC&LMF) (www.wattsnewct.com/text/detpages/infocenter238.html) agreed to consider proposals for a joint project with the Connecticut Clean Energy Fund. The project, for which EC&LMF will make available up to $800,000, integrates fuel cell applications with energy conservation and load management measures. The EC&LMF is administered by the Connecticut Light and Power Company.

CCEF projects include:

Project 100
www.ctcleanenergy.com/investment/Project100.html

Legislative mandate requires that Connecticut electric distribution companies' contract for no less than 100 MW of clean energy projects (wind, solar, fuel cells, wave or tidal power, ocean thermal, low emission advanced biomass conversion technologies, and landfill gas resources) by July 1, 2007. The minimum 10-year power purchase agreements must be made with companies receiving grants from the Connecticut Clean Energy Fund, employing energy technologies that are ready for deployment and of at least 1-MW capacity.

CCEF's role is to select projects for recommendation to the Connecticut electric distribution companies.

Pre-Development Program
www.ctcleanenergy.com/investment/Pre-DevelopmentProgram.html

CCEF will additionally provide financial support to projects in the pre-development stage, allowing the project to apply for inclusion into Project 100 once they have progressed to the point where they meet the eligibility requirements. Award amounts of up to $250,000 per project is available for projects less than or equal to 5 MW and up to $500,000 for projects greater than 5 MW.

On-site Renewable Distributed Generation Program
www.ctcleanenergy.com/investment/onsite_renewable_dg_program.html

Up to $2 million in grant funding may be available to support the installation of systems that generate electricity at commercial, industrial and institutional buildings. Systems utilizing solar, wind, fuel cells, landfill gas, low-emission advanced biomass-conversion technologies and hydropower are eligible. Most program support will target photovoltaic (solar-electric) and fuel cell projects. Funding limits $4.70/Watt with a 10-year evaluation time frame for fuel cells. A total of $21 million is available for overall project funding.

Operational Demonstration Initiative
www.ctcleanenergy.com/investment/renewable_demonstration.html

Funding of up to $750,000 is available to renewable energy technologies at the near-term commercialization stage (technologies that have already been successfully demonstrated in a research environment but not yet introduced into commercial sales).

Contacts:

Connecticut Clean Energy Fund
200 Corporate Place, 3rd Floor
Rocky Hill, CT 06067
Phone: (860) 563-0015
E-mail: www.ctcleanenergy.com/about/contact.html
Web: www.ctcleanenergy.com

New Energy Technology Grant Program
www.opm.state.ct.us/pdpd2/grants/net.htm

Grants of up to $10,000 may be awarded to individuals or small companies for fuel cell and other qualifying energy technologies that are in the prototype or pre-commercial stage of development.

Contact:

Connecticut Office of Policy and Management
Attn: John Ruckes
450 Capitol Avenue
Hartford, CT 06106-1308
Phone: (860) 418-6384
E-mail: john.ruckes@po.state.ct.us
Web: www.opm.state.ct.us

8. STATE AND LOCALLY-SUPPORTED DEMONSTRATIONS

POWER GENERATION

Pepperidge Farm bakery, Bloomfield: Two 250-kW FuelCell Energy MCFC units, to be installed in 2005, will provide about 20% of the facility's base load power with the heat byproduct converted to process steam for the bakery. Funded by CCEF and the DoD Climate Change Fuel Cell Program.

St. Francis Hospital, Hartford: A UTC Power 200-kW PAFC, installed in 2003, provides power security to operating room and interconnected with hospital's distribution and air conditioning system. Funded by CCEF.

Connecticut Juvenile Training School, Middletown: This 2002 UTC Power 1.2-MW PAFC installation, partially funded by CCEF, is used in conjunction with traditional generators and the grid to provide primary power to the school. The heat byproduct produced by the fuel cell is used to heat and cool the facility.

New Haven Water Pollution Control Authority facility, New Haven: Installed in 2003, the UTC Power 200-kW PAFC was partially funded by CCEF.

Yale University, New Haven: The FuelCell Energy 250-kW MCFC, installed in 2003, provides approximately 25% of the Peabody Museum's electricity needs with waste heat

used primarily to maintain temperature and humidity controls at the school's Environmental Science Center. Funding through CCEF.

Dinosaur State Park, Rocky Hill: A 25-kW ZTEK SOFC provides a portion of the park's base-load power and heating/air conditioning for the Visitors Center. Installed in 2005 with funding from CCEF.

South Windsor High School, South Windsor: First municipal facility to be powered and heated by a fuel cell in Connecticut. Also serves as a basis of a comprehensive fuel-cell curriculum. Funding for the UTC Power 200-kW PAFC was provided by CCEF. Installed in 2002.

Connecticut Global Fuel Cell Center, Storrs: Installed in 2005, the GenCell 40-kW MCFC provides power and heat to the facility. Funded by the Connecticut Conservation & Load Management Fund and CCEF.

Mohegan Sun Resort, Uncasville: The UTC Power 250-kW PAFC system provides up to 400 kW of electricity to the entertainment complex. Heat recovered from the fuel cell is used to preheat boiler feed water and generate domestic hot water. The project was funded by the Mohegan Tribe and DoD Climate Change Fuel Cell Program.

Public Utilities Commission's Thorpe Avenue electric substation, Wallingford: One-month demonstration (2005) of a Proton Energy Systems regenerative fuel cell to provide back-up power to an electric sub-station. Funding of $500,000 was provided by CCEF.

USCG Aids to Navigation Team maintenance facility, Bristol, Rhode Island: This Nuvera 10-kW fuel cell system operated in parallel to the electric grid. Installed in 2004, the project has been completed. The installation was funded by DoD's Residential PEM Fuel Cell Demonstration Program and the Connecticut Renewable Energy Trust's Green Power Fuel Cell Initiative.

DELAWARE

1. PLANS/STRATEGIES

New Economy Initiative

www.state.de.us/governor/new_economy_initiative.doc

In 2004, the New Economy Initiative was unveiled to diversify and fortify the Delaware economy. The initiative specifies capital investment in research, development and production of emerging clean energy technologies, including:

- Provision of venture capital and technology-based small business seed funds;

- Development of a Virtual Emerging Technologies Incubator;
- Establishment of a Clean Energy Research Center; and
- Provision of Clean Energy Performance Grants to attract manufacturers of clean energy technology, such as fuel cells, photovoltaic cells and wind energy components.

The Initiative is a comprehensive plan to put more than $46 million in state and matching private and federal funds to work bolstering the Delaware economy during 2005. Initial funding for these programs was approved in Delaware's FY05 budget.

Contact:

The Delaware Economic Development Office
99 Kings Highway
Dover, DE 19901
Phone: (302) 739-4271
Fax: (302) 739-2028
Web: www.state.de.us/dedo/default.shtml

2. STANDARDS/REGULATIONS

POWER GENERATION

Renewable Portfolio Standard

http://www.legis.state.de.us/LIS/LIS143.NSF/93487d394bc01014882569a4007a4cb7/f225535c161dfaa485256f9400609811?OpenDocument

Enacted in 2005, Delaware's Renewable Portfolio Standard requires that renewable energy be used to generate at least 1% of electricity sold in Delaware by June 2007 and 10% by June 2019. Industrial customers with a peak load of more than 1.5 MW are exempt from the requirements.

Electricity suppliers will receive a 300% credit towards compliance for energy generated by fuel cells using renewable fuels.

Contact:

Delaware Energy Office
146 South Governors Avenue
Dover, DE 19904
Phone:: (302) 739-1530
Fax: (302) 739-1527
E-mail: charlie.smisson@state.de.us
Web: www.delaware-energy.com

5. PARTNERSHIPS

Clean Energy Research Center

www.state.de.us/dedo/information/databook/financing.pdf

The state will establish a fuel cell research center in partnership with DuPont, W. L. Gore, the University of Delaware and Delaware State University. Objectives are to:

- Establish Delaware as a center of the evolving fuel cell industry; and
- Make Delaware competitive as major automakers look to introduce fuel cells in automobiles by 2007.

The center will require a commitment of $1 million over a period of five years. An initial allocation of $200,000 was provided for the Center in the state's FY05 budget.

Contact:

The Delaware Economic Development Office
99 Kings Highway
Dover, Delaware 19901
Phone: (302) 739-4271
Fax: (302) 739-2028
Web: www.state.de.us/dedo/default.shtml

6. RD&D SUPPORT

Green Energy Fund

www.delaware-energy.com/Download/Green%20Energy%20Fund%20Regulation%20Final.pdf
www.state.de.us/research/AdminCode/title7/100/104.shtml

The Green Energy Fund for renewable energy products is divided into three separate programs: Green Energy Program, Technology Demonstration Program and Research and Development Program.

Green Energy Program
www.delaware-energy.com/Download/Participating_Contractor_Guide___Application%5B1%5D.pdf

The Green Energy Program (formerly known as the Energy Alternatives Program) was established as part of the Electric Utility Restructuring Act of 1999. The purpose of the program is to introduce renewable energy technologies into the Delaware market by reducing the net system costs through the use of grants. Under the program, alternative energy grants are available for the installation of qualifying fuel cell, photovoltaic, solar water heating, wind turbine and geothermal heat pump systems. Fuel cell systems must be powered by a renewable fuel source.

To ensure that rebates are provided to both residential and non-residential applicants, 40% of rebate funding is available for residential customers and 60% of funding is available for nonresidential customers. The maximum individual grant amount is 50% of installation costs. Caps for fuel cell installations are $22,500 for residential and $250,000 for non-residential systems.

Contact:

Delaware Energy Office
Scott V. Lynch, Energy Program Planner II
146 South Governors Avenue
Dover, Delaware 19904
Phone: (302) 739-1530
Fax: (302) 739-1527
Web: www.delaware-energy.com

Technology Demonstration Program
www.delaware-energy.com/Download/Green%20Energy%20Fund%20Regulation%20Final.pdf

The Green Energy Fund's Technology Demonstration Program provides grants to projects that demonstrate the market potential for commercially available renewable technologies and accelerate the commercialization of these technologies in Delaware. Individual grants will cover up to 25% of eligible equipment costs and will not exceed $200,000 per project. Fuel cells installations may employ either a renewable or non-renewable fuel source.

Contact:

Delaware Energy Office
Charlie T Smisson, Jr., State Energy Coordinator
146 South Governors Avenue
Dover, DE 19904
Phone: (302) 739-1530
Fax: (302) 739-1527
E-mail: charlie.smisson@state.de.us
Web: www.delaware-energy.com

Research and Development Program
www.state.de.us/research/AdminCode/title7/100/104.shtml

The Green Energy Fund's Research and Development Program offers grants to projects that improve the engineering, adaptation, or development of products or processes that directly relate to renewable energy technology. Grants are offered for of up to 35% of the cost of qualifying projects, not to exceed $250,000 per project. The Department will consider multi-year projects.

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Email: scott.lynch@state.de.us

Web: www.delaware-energy.com

7. EMERGING BUSINESS SUPPORT

Technology-Based Seed Fund

www.state.de.us/dedo/information/databook/financing.pdf

The Technology-Based Seed Fund provides equity financing up to $50,000 per transaction for technology-based small business start-ups from Delaware-based entrepreneurial engineers, scientists and other technologists from regional companies and institutions of higher learning. Applicable technology fields include clean energy, biotechnology, advanced materials, information technology and new chemical applications. Financing is available for up to $50,000 for startup expenses such as laboratory equipment, working capital, lab and office space, patent filings or prototyping. The Fund also provides matching or leveraging investments in start-ups from other sources such as commercial lenders, non-profit organizations, or related federal grant or loan programs.

Contact:

The Delaware Economic Development Office
Capital Resources
99 Kings Highway
Dover, Delaware 19901
Phone: (302) 739-4271
Fax: (302) 739-2028
Web: www.state.de.us/dedo/default.shtml

Clean Energy Performance Grants

www.state.de.us/governor/new_economy_initiative.doc

Clean Energy Performance Grants will be used to attract manufacturers of clean energy technology, such as fuel cells, photovoltaic cells and wind energy components. The grants will be awarded to companies based on their sales of these components in order to attract clean manufacturing jobs and complement efforts to build a fuel cell industry in Delaware.

Contact:

The Delaware Economic Development Office
Capital Resources
99 Kings Highway
Dover, Delaware 19901
Phone: (302) 739-4271
Fax: (302) 739-2028
Web: www.state.de.us/dedo/default.shtml

Emerging Technologies Incubator

www.state.de.us/governor/new_economy_initiative.doc

As part of the Governor's New Economy Initiative, the Emerging Technologies Incubator will provide services needed by start-up high-technology based firms, to include general legal advice, accounting, marketing, financial, patent and trademark services. The Incubator will also provide services and education necessary to move an idea to commercialization, as well as assist spin-out efforts from existing companies and higher education research facilities.

Contact:

The Delaware Economic Development Office
Capital Resources
99 Kings Highway
Dover, Delaware 19901
Phone: (302) 739-4271
Fax: (302) 739-2028
Web: www.state.de.us/dedo/default.shtml

8. STATE AND LOCALLY-SUPPORTED DEMONSTRATIONS

POWER GENERATION

Ion Power headquarters, New Castle: In January 2006, a 5-kW Plug Power Gencore PEM fuel cell was integrated into the building heating system. Waste heat from the fuel cell used for the heating demand of the building. The installation is funded by a cooperative agreement between DOE and Delaware's Green Energy Fund.

DISTRICT OF COLUMBIA

1. PLANS/STRATEGIES

Comprehensive Energy Plan: 2003-2007
http://dceo.dc.gov/dceo/lib/dceo/DC_Comprehensive_Energy_Plan_III.pdf

This District of Columbia Comprehensive Energy Plan outlines steps the city may take to become more energy efficient. Recommendations include:

- Expansion of the use of alternative fuels, distributive generation and "green power".
- Support to increase the development and application of renewable energy technologies such as active, passive and photovoltaic solar energy, fuel cells, and other sustainable sources of energy.

Contact:

DC Energy Office
Government of the District of Columbia
2000 14th Street, NW, 300 East
Washington, DC 20009
Phone: (202) 673-6700
Fax: (202) 673-6725
E-mail: sharon.cooke@dc.gov
Web: www.dceo.dc.gov/dceo/site/default.asp

2. STANDARDS/REGULATIONS

Renewable Portfolio Standard

http://dceo.dc.gov/dceo/cwp/view,a,3,q,601870.asp

The City Council enacted an RPS in 2005 to provide increasing quantities of renewable power to the city's electricity supply. Beginning in 2007, 4% of the city's power must be derived from renewable resources and by 2022 the level rises to just over 11%. Fuel cell-derived power qualifies as a Tier One resource.

Contact:

DC Energy Office
Government of the District of Columbia
2000 14th Street, NW, 300 East
Washington, DC 20009
Phone: (202) 673-6750
Fax: (202) 673-6725
E-mail: emil.king@dc.gov
Web: www.dceo.dc.gov/dceo/site/default.asp

Interconnection Standards

http://dceo.dc.gov/dceo/cwp/view,a,3,q,603172.asp

In 2003, the DC Public Service Commission issued an order for Pepco, the electric utility that serves the city, to implement an interconnection tariff. Pepco also has a detailed interconnection service agreement in place.

DC permits net metering of systems up to 100 kW that are powered by renewable energy, including fuel cells operating on renewable fuels.

Contact:

DC Energy Office
Government of the District of Columbia
2000 14th Street, NW, 300 East
Washington, DC 20009
Phone: (202) 673-6750
Fax: (202) 673-6725

E-mail: tomaysa.sterling@dc.gov
Web: www.dceo.dc.gov/dceo/site/default.asp

Net Metering
http://dceo.dc.gov/dceo/cwp/view,a,3,q,601401,dceoNav,|32974|.asp

Residential and commercial customer with systems powered by renewable energy sources, CHP, fuel cells and microturbines, with a maximum capacity of 100 kW, may be eligible for net metering.

Contact:

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Government of the District of Columbia
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Fax: (202) 673-6725
E-mail: tomaysa.sterling@dc.gov
Web: www.dceo.dc.gov/dceo/site/default.asp

6. RD&D SUPPORT

Renewable Energy Demonstration Project
http://dceo.dc.gov/dceo/cwp/view,a,3,q,601863.asp

The DC Reliable Energy Trust Fund has allotted $320,000 in annual funding for renewable energy projects within the city for the 2006 request for proposals. Eligible technologies include fuel cells, photovoltaics, wind, biomass and hydro power. Recipients may apply for funding up to 50% of the cost to implement a project that produces electricity, using a renewable source of fuel. A third round of funding was made available for 2007.

Contact:

LaKeisha Estep
Energy Program Specialist
Sustainable Solutions Division
DC Energy Office
2000 14th Street, N.W.
Suite 300 East
Washington, DC 20009
Phone: (202) 671-1403
Web: www.dceo.dc.gov/dceo/site/default.asp

8. STATE AND LOCALLY-SUPPORTED DEMONSTRATIONS

FUELING INFRASTRUCTURE

Hydrogen fueling station: A Shell service station in N.E. Washington, D.C. has become the first retail facility in the eastern United States to offer hydrogen as a vehicle fuel. The facility will support a General Motors fleet of six HydroGen3 fuel cell vehicles used by the U.S. Postal Service and will be one of three stations in a DC-to-New York hydrogen corridor. The project is supported by the DC Energy Office.

FLORIDA

1. PLANS/STRATEGIES

H2 Florida

www.dep.state.fl.us/energy/fla_energy/hydrogen.htm

H2 Florida, a statewide program to accelerate the commercialization of hydrogen technologies, was launched in July 2003. The program partners the state with industry, local governments and universities.

Hydrogen Energy Technologies Act

www.dep.state.fl.us/energy/fla_energy/files/vision.pdf

Florida is developing the Hydrogen Energy Technologies Act to facilitate incubation of emerging technologies and increase government procurement of hydrogen technologies. Provisions of the Act will include:

- Targeted matching grants to attract corporate investment in demonstration projects;
- Financial incentives for hydrogen technology companies, including temporary sales tax exemptions on related equipment purchases and corporate tax credits for expenditures;
- Uniform standards to accelerate infrastructure siting;
- Establishment of academic-corporate consortia for targeted R&D;
- Geographically-focused infrastructure development, which will include hydrogen vehicles and fueling infrastructure (Orlando metropolitan Area in 2005-2006 and Tampa metropolitan Area in 2006-2007) and demonstration of stationary fuel cells statewide;
- Creation of “market pull” through state and local government procurement; and
- Cost-recovery incentives to utilities for establishment hydrogen electricity generation and power storage for use as emergency back-up power.

Allotted funding in 2005 was $6 million. In 2006 funding is $15 million, consisting of $12.9 million to test and demonstrate hydrogen technology and $2.1 million in new tax incentives. By early 2005, hydrogen technology companies had already received $3

million in state grants, $7.6 million in federal funding and are eligible for tax incentives under Florida's "Qualified Target Industry" designation.

Contact:

Florida Energy Office
Nicole Barber
Manager, Hydrogen Projects
Department of Environmental Protection
3900 Commonwealth Boulevard M.S. 19
Tallahassee, FL 32399
Phone: (850) 245-2004
E-mail: nicole.barber@dep.state.fl.us
Web: www.dep.state.fl.us

Florida Energy Plan 2006

http://www.dep.state.fl.us/energy/energyact/default.htm
http://www.dep.state.fl.us/secretary/news/2006/01/0117_01b.htm#energy_plan

In November 2005, Florid'a governor signed an executive order to develop a statewide comprehensive energy plan. The 2006 Florida Energy Plan evaluates the state's current and future energy needs and outlines proposals for reducing regulatory barriers, diversifying energy sources, encouraging conservation and providing economic incentives to develop alternative energy technology. The completed plan was issued to Governor Jeb Bush in January 2006 by the Department of Environmental Protection. The recommendations were submitted as Senate Bill 888 and passed by the 2006 Florida Legislature. The bill created the Florida Renewable Energy Technologies & Energy Efficiency Act and the Florida Energy Commission, establishes the Renewable Energy Technologies Grants Program, the Solar Energy System Incentives Program, and provides a sales tax holiday for energy efficient products. In addition, the bill amends the Florida Power Plant Siting Act to streamline permitting for new power plants and promote the use and development of biodiesel, ethanol, hydrogen and other renewable fuels.

Hydrogen and fuel cell-related measures in the plan:

- Provide grant funding for research and demonstration projects associated with the development and implementation of renewable energy systems. Expand solar, hydrogen, biomass, wind, ocean current and other emerging technologies. By 2007, the grant portfolio should realize an aggregate return on investment greater than two to one.
- Provide sales and corporate tax incentives for the manufacture, purchase and use of fuel cells for supplemental and backup power. Grow demand for hydrogen energy technologies by 100 percent over the next two years.
- Provide sales and corporate income tax credits for hydrogen vehicles and fueling infrastructure. By 2007, increase demand for mobile hydrogen technologies by 50 percent.

Contact:

Florida Department of Environmental Protection
3900 Commonwealth Boulevard M.S. 49
Tallahassee, FL 32399
Phone: (850) 245-2118
Fax: (850) 245-2128
Web: www.dep.state.fl.us

5. PARTNERSHIPS

The Florida Hydrogen Business Partnership

www.dep.state.fl.us/secretary/news/2005/03/files/hydrogen_bus_plan.pdf

Formed in 2004, the Florida Hydrogen Business Partnership is comprised of hydrogen technology developers, fuel and power producers, major energy consumers and state agencies. The group has developed a strategy for hydrogen business development in the State, "Florida's Accelerated Commercialization Strategy for Hydrogen Energy Technologies", which mirrors the proposed Florida Hydrogen Energy Technologies Act. Recommendations include development of public-private partnerships, a streamlined siting process, specific tax incentives and a diverse portfolio of demonstration projects.

Partnership members include: Air Products, Air Liquide America, Apollo Energy Systems, Ballard Power Systems, BP America, Chevron Texaco, Cummins Westport, Walt Disney World Company, DynEco, Ener1, Florida Power & Light, Fuel Cell Energy, Gulf Power, Hydrogenics, Plug Power, Praxair, Progress Energy Florida, Shell Hydrogen, Siemens Westinghouse Power Corp., Tampa Electric Company, Teledyne Energy Systems, Florida Energy Office, Florida Department of Environmental Protection, Enterprise Florida, Florida Department of Financial Services, Florida Department of Education and the Florida Office of Tourism, Trade & Economic Development.

Contact:

Florida Department of Environmental Protection
3900 Commonwealth Boulevard M.S. 49
Tallahassee, FL 32399
Phone: (850) 245-2118
Fax: (850) 245-2128
Web: www.dep.state.fl.us

Florida Hydrogen Initiative, Inc.

www.h2florida.org

The Florida Hydrogen Initiative, Inc. (FHI) is a non-profit organization that links environmental organizations, state universities, state government and the space programs. The group brokers partnerships for applied technology demonstration projects throughout the state, sponsors targeted research in the production, storage and use of hydrogen fuels and facilitates technology transfers between the public and private sectors to create, build and strengthen high-growth, high technology companies within the state.

In 2004, FHI received approximately $2 million in grant support from DOE for projects in Florida, and will again receive approximately $2 million from DOE in 2005. FHI awards grants to projects supporting the group's priorities.

Contact:

Florida Hydrogen Initiative, Inc.
422 Rehwinkel Road
Crawfordville, FL 32327
E-mail: boardchair@h2florida.org
Web: www.h2florida.org

7. EMERGING BUSINESS SUPPORT

Qualified Target Industry Tax Refunds
www.eflorida.com/financialadvantages/default.asp?level1=29&level2=145&region=ne#ti.

Florida has designated the hydrogen technology industry as a "Qualified Target Industry" (QTI), providing tax refunds for companies that create high wage jobs in the hydrogen industry. The QTI incentive provides tax refunds on corporate income, sales, ad valorem, intangible personal property and insurance premiums

Contact:

Enterprise Florida - Headquarters
390 North Orange Avenue, Suite 1300
Orlando FL 32801
Phone: (407) 316-4600
Fax: (407) 316-4599
E-mail: http://myeflorida.com/mk/get/paform
Web: www.eflorida.com

8. STATE AND LOCALLY-SUPPORTED DEMONSTRATIONS

POWER GENERATION

Hugh Taylor Birch State Park Visitors Center, Ft. Lauderdale: Florida Power & Light Co .and the Florida Department of Environmental Protection participated in this one-year demonstration of a General Electric 5-kW PEM fuel cell that was installed in 2002.

Homosassa Springs Wildlife State Park, Homosassa: Installed in 2005 through a partnership between the Florida Department of Environmental Protection and Progress Energy Florida, the Hydrogenics fuel cell and 5-kW photovoltaic solar system are supplementing a portion of the electricity used at the park's Wildlife Encounter Pavilion.

North Port High School, North Port: Installed in 2004, the Plug Power fuel cell provides 5 kW of power to the school and serves as a visual demonstration of hydrogen fuel cell technology for the school's hydrogen energy curriculum. The fuel cell was

provided through a partnership of the Florida Department of Environmental Protection, Florida Power and Light and Sarasota County.

Orlando International Airport, Orlando: Two tow tractors, which are used to transport passenger luggage to and from airplanes, have been modified to operate on hydrogen fuel. The project is a partnership between Florida DEP, Ford Motor Company, Tug Technologies and Delta Air Lines.

Florida Department of Environmental Protection (DEP) offices, various locations: DEP has purchased 12 Plug Power fuel cells to provide backup power for emergency operations in district and branch DEP offices statewide.

PLANNED H2 FLORIDA PROJECTS

- Hydrogen fuel cell fleet automobiles, hydrogen-fueled buses and fueling stations in Orlando.
- Entertainment park hydrogen visitor buses in Orlando.
- Tyndall Air Force Base fuel cells.
- College residential complex fuel cell.
- Electric golf cart charging with fuel cell.
- Emergency back-up power for a nursing home.
- Emergency back-up power for 12 state office buildings.
- Hydrogen-powered support vehicles and auxiliary power systems for military aircraft.
- Five-to-seven military mobile and stationary fuel cell and hydrogen-fueled internal combustion engine fleet projects.
- Residential and mobile power generation and storage integrated with electrical grid, involving 10 home hydrogen systems with 10 hydrogen-fueled internal combustion engine cars.
- "Orange Peels to Generate H2" project which will power a fuel cell installed at a rest stop.

GEORGIA

2. STANDARDS/REGULATIONS

POWER GENERATION

Interconnection Standards

www.legis.state.ga.us/legis/2001_ss/versions/sb93_SB93_APmat_10.htm

A 2001 legislative act permits residential customers with fuel cell, solar or wind systems, up to 10-kW capacity, or commercial customers with systems up to 100-kW capacity, to connect to the electric grid. Each utility is required to purchase cogenerated energy from

these renewable resources until the company has met 0.2% of the previous year's peak load.

Contact:

Georgia Public Service Commission
244 Washington Street, SW
Atlanta, GA 30334
Phone: (800) 282-5813 or (404) 656-4501
Fax: (404) 656-2341
E-mail: gapsc@psc.state.ga.us
Web: www.psc.state.ga.us

Net Metering

www.legis.state.ga.us/legis/2001_02/sum/sb93.htm

Net metering is available to electric utility customers generating power using qualifying renewable energy systems. Eligible systems include fuel cells, wind and photovoltaic systems up to 10 kW (residential) or 100 kW (commercial). The utilities must offer net metering until renewable energy capacity reaches 0.2% of the utility's peak demand. Systems either can either be connected on the customer side of the meter using a bi-directional meter to measure electricity flow in each direction, or all power can be directed to the grid by connecting ahead of the customer meter and selling all power (rather than selling excess generation).

Contact:

Georgia Public Service Commission
244 Washington Street, SW
Atlanta, GA 30334
Phone: (800) 282-5813 or (404) 656-4501
Fax: (404) 656-2341
E-mail: gapsc@psc.state.ga.us
Web: www.psc.state.ga.us

4. INCENTIVES/MARKET STIMULATION

VEHICLES

Zero Emission Vehicle Tax Credit

www.gaepd.org/Files_PDF/forms/apb/levzev_fs.pdf

Income tax credit of up to 20% is available for cost to purchase or lease a ZEV, or $5,000, whichever is less. ZEVs include battery-only electric vehicles and hydrogen fuel cell vehicles.

Contact:

Georgia Department of Natural Resources

Environmental Protection Division
Mobile and Area Source Program - Low Emissions Vehicle Certification
4244 International Parkway, Suite 136
Atlanta, GA 30354
Phone: (404) 363-7028
E-mail: michael_chadwell@dnr.state.ga.us
Web: www.gaepd.org

HOV Lane Exemption for Alternative Fuel Vehicles
www.legis.state.ga.us/cgi-bin/gl_codes_detail.pl?code=40-2-76
www.dot.state.ga.us/specialsubjects/hov/hov-afv.shtml
http://motor.etax.dor.ga.gov/motor/plates/plate.asp?ptitle=AF

Vehicles displaying an AFV tag may operate in HOV lanes and are not required to comply with the minimum passenger requirement.

Contact:

Georgia Department of Revenue
Attention: IRP Unit
Motor Vehicle Division
P O Box 16909
Atlanta, GA 30321
Phone: (404) 675-6135
Web: http://motor.etax.dor.ga.gov/motor

HAWAII

1. PLANS/STRATEGIES

Study: Nurturing a Clean Energy Future in Hawaii: Assessing the Feasibility of the Large-Scale Utilization of Hydrogen and Fuel Cells in Hawaii www.hawaii.gov/dbedt/ert//hydrogen02.pdf

In 2000, the Hawaii Legislature passed resolution tasking the Department of Business, Economic Development & Tourism (DBEDT) to conduct a feasibility study to assess the potential for large-scale use of hydrogen, fuel cells, and renewable energy in Hawaii. DBEDT commissioned the Hawaii Natural Energy Institute (HNEI) to prepare a hydrogen and fuel cell feasibility study, and the preliminary results were presented to the Legislature in January 2001. The final report, "Nurturing a Clean Energy Future in Hawaii: Assessing the Feasibility of the Large-Scale Utilization of Hydrogen and Fuel Cells in Hawaii", was completed in June 2001 and revised in July 2004. In addition to identifying areas where hydrogen and fuel cells have the potential to contribute to Hawaii's energy mix, the study recommended the development of public-private partnerships to develop the necessary hydrogen infrastructure.

Legislation in 2001 established a public/private partnership to support and promote hydrogen use in Hawaii and $200,000 was appropriated to the DBEDT for a workshop, policy study and assessments, and projects. HNEI, in collaboration DBEDT and other government and industrial partners, has made significant progress in identifying projects and partnerships to move forward with the development of hydrogen infrastructure in Hawaii. The partners are actively seeking several multimillion-dollar systems application projects in the areas of hydrogen, fuel cells and renewable energy.

Contacts:

Department of Business, Economic Development and Tourism
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Honolulu, HI 96804
Phone: (808) 586-2423
Fax: (808) 587-2790
E-mail: library@dbedt.hawaii.gov
Web: www.state.hi.us/dbedt

Hawaii Natural Energy Institute
1680 East West Road, POST 109
Honolulu, HI 96822
Phone: (808) 956-8890
Fax: (808) 956-2336
E-mail: hnei@hawaii.edu
Web: www.hnei.hawaii.edu

SB2957 "Energy for Tomorrow" – Renewable Energy Research and Development and Transition Into a Renewable Hydrogen Economy

www.capitol.hawaii.gov/sessioncurrent/bills/sb2957_cd1_.htm

The "Energy for Tomorrow" bill was signed into law in June 2006, promoting energy self-sufficiency by increasing incentives for residents and businesses to adopt renewable technologies. The bill also establishes a renewable hydrogen program and hydrogen investment capital special fund that will provide seed and venture capital for private and federal hydrogen R&D projects. DBEDT was tasked with designing, implementing and administering activities that include:

- Strategic partnerships for the research, development, testing, and deployment of renewable hydrogen technologies;
- Engineering and economic evaluations of Hawaii's potential for renewable hydrogen use and near-term project opportunities for the State's renewable energy resources;
- Electric grid reliability and security projects that will enable the integration of a substantial increase of electricity from renewable energy resources on the island of Hawaii;
- Hydrogen demonstration projects, including infrastructure for the production, storage, and refueling of hydrogen vehicles;

- A statewide hydrogen economy public education and outreach plan focusing on the island of Hawaii, to be developed in coordination with Hawaii's public education institutions;
- Promotion of Hawaii's renewable hydrogen resources to potential partners and investors;
- A plan, for implementation during the years 2007 to 2010, to more fully deploy hydrogen technologies and infrastructure capable of supporting the island of Hawaii's energy needs, including:
  - Expanded installation of hydrogen production facilities;
  - Development of integrated energy systems, including hydrogen vehicles;
  - Construction of additional hydrogen refueling stations; and
  - Promotion of building design and construction that fully incorporates clean energy assets, including reliance on hydrogen-fueled energy generation;
- A plan, for implementation during the years 2010 to 2020, to transition the island of Hawaii to a hydrogen-fueled economy and to extend the application of the plan throughout the State; and
- Evaluation of policy recommendations to:
  - Encourage the adoption of hydrogen-fueled vehicles;
  - Continually fund the hydrogen investment capital special fund; and
  - Support investment in hydrogen infrastructure, including production, storage, and dispensing facilities.

Contact:

Department of Business, Economic Development and Tourism
P.O. Box 2359
Honolulu, HI 96804
Phone: (808) 586-2423
Fax: (808) 587-2790
E-mail: library@dbedt.hawaii.gov
Web: www.state.hi.us/dbedt

2. STANDARDS/REGULATIONS

POWER GENERATION

Renewable Portfolio Standards
www.capitol.hawaii.gov/session2001/bills/hb173_cd1_.htm

Hawaii's RPS statute, enacted in 2001, requires that each electric utility company that sells electricity for consumption in the State establish a renewable portfolio standard of:

- 7% of its net electricity sales by December 31, 2003;
- 8% of its net electricity sales by December 31, 2005;
- 10% of its net electricity sales by December 31, 2010;
- 15% of its net electricity sales by December 31, 2015; and
- 20% of its net electricity sales by December 31, 2020.

Hydrogen fuels derived from renewable energy, or fuel cells where the fuel is derived from renewable sources, are eligible resources and technologies under the standard. Where biofuels, hydrogen, or fuel cell fuels are produced by a combination of renewable and nonrenewable means, the proportion attributable to the renewable means are to be credited as renewable energy. Where fossil and renewable fuels are co-fired in the same generating unit, the unit is considered to produce renewable electricity in direct proportion to the percentage of the total heat value represented by the heat value of the renewable fuels.

The RPS was enacted, in part, because of the state's extremely high dependence on imported fuels for energy, as about 90% of the state's oil and coal energy supplies are imported. Increased use of renewable energy would help to achieve energy security, reduce some of the environmental risk associated with fuel transport, and reduce the flow of money out of the state.

The state has not yet met these RPS goals and is currently producing only about 5% of its energy from renewable resources. Members of the University of Hawaii-based Energy Policy Forum, a group of about 40 representatives from business, government, and the community, have developed a Ten Point Plan (www.hawaiienergypolicy.hawaii.edu/tenpointplan.html) to increase development and use of Hawaii's indigenous renewable energy resources. Specific hydrogen and fuel cell-related actions recommended in the plan were to:

- Recognize Hawaii as a premier demonstration site for the deployment of the hydrogen economy;
- Invest in long term research and development of alternative renewable energy resources such as hydrogen fuel cell technology, wave energy, etc.;
- Seek funding for development of an ongoing energy strategy for renewables/hydrogen economy and match for the state's portion of grants; and
- Identify sites for demonstration of hydrogen production, distribution and use in both stationary and vehicle fuel cell applications.

Based on the Energy Policy Forum's Ten Point Plan, Governor Lingle has proposed strategies to encourage conservation and alternative fuel development (www.hawaii.gov/gov/headlines/headline_messages/2006.01-headlines/leg/2006/2006%20Book%2042MB.pdf). These recommendations include:

- Surveying applicable public and private lands that may lend themselves to alternative energy production, including biomass, wind, solar, wave, hydro, and hydrogen.
- Position Hawaii to be the United States and world leader in the hydrogen economy by providing $10 million to establish the Hydrogen Energy Renewable Energy Leadership program to encourage hydrogen fuel development and production in Hawaii.
- Establish a priority preference in the permitting process for renewable energy projects.

Contact:

Public Utilities Commission
465 South King Street, Room 103
Honolulu, Hawaii 96813
Phone: (808) 586-2020
E-mail: Hawaii.PUC@hawaii.gov
Web: www.hawaii.gov/budget/puc

Interconnection Standards and Net Metering

www.capitol.hawaii.gov/session2001/bills/hb173_cd1_.htm
www.dsireusa.org/documents/Incentives/HI04b.htm

In 2001, Hawaii's Renewable Portfolio Standard amended state statute to allow interconnection and net metering of solar, wind turbine, biomass, or hydroelectric energy generating facilities, or a hybrid system consisting of two or more of these facilities, with a capacity of not more than 10 kW owned and operated by residential or commercial customer of an electric utility. These systems must derive power by renewable energy sources (defined in the RPS as electrical energy produced by wind, solar energy, hydropower, landfill gas, waste-to-energy, geothermal resources, ocean thermal energy conversion, wave energy, biomass including municipal solid waste, biofuels or fuels derived entirely from organic sources, hydrogen fuels derived entirely from renewable energy, or fuel cells where the fuel is derived entirely from renewable sources. "Renewable energy" also means electrical energy savings brought about by the use of solar and heat pump water heating.) In 2005, the eligible facility generating capacity was raised to 50 kW. Interconnection standards for all distributed generation systems were issued in 2002.

Contact:

State of Hawaii
Department of Business, Economic Development and Tourism
Strategic Industries Division
PO Box 2359
Honolulu, HI 96804
Phone: (808) 587-3807
Fax: (808) 586-2536
Web: www.state.hi.us/dbedt

6. RD&D SUPPORT

Hawaii Center for Advanced Transportation Technologies

www.htdc.org/hcatt

The Hawaii Center for Advanced Transportation Technologies (HCATT), formerly known as the Hawaii Electric Vehicle Demonstration Project, was established in 1993 by the state agency, High Technology Development Corporation, to represent the Hawaii Consortium in the Defense Department's Electric and Hybrid Vehicle Technology Program. In addition to other electric vehicle technologies, HCATT has:

- Facilitated a fuel cell bus demonstration at Hickam Air Force Base.

- Partnered to establish National Demonstration Center at Hickam Air Force Base. Future projects at the Demonstration Center are anticipated to include on-site hydrogen generation and storage, fuel cell powered light carts, and step vans powered by fuel cells and/or lithium batteries.

Contact:

Thomas L. Quinn, Director
Hawaii Electric Vehicle Demonstration Project
531 Cooke Street
Honolulu, HI 96813
Phone: (808) 594-0100
Fax: (808) 594-0102
E-mail: tquinn@htdc.org
Web: www.htdc.org/hcatt

Hawaii Natural Energy Institute (HNEI)

www.hnei.hawaii.edu/default.asp

The Hawaii Natural Energy Institute (HNEI) was established by the Legislature in 1974 to seek new forms of energy that would supplant the nation's tremendous dependence on fossil fuels. A research unit of the University of Hawaii, HNEI's mandate is to undertake and coordinate research and development of the island's renewable energy resources. HNEI cooperates in these endeavors with faculty from the University of Hawaii; federal, state, and local governments; private industry; public utilities; foreign governments; community groups; and universities and research institutes throughout the world.

A member of the hydrogen research community since 1985, HNEI was designated a DOE Center of Excellence for Hydrogen Research and Education in 1996.

Hawaii Energy & Environmental Technology Initiative (HEET)

www.hnei.hawaii.edu/text/heet.asp

HNEI and the federal Naval Research Laboratory established the Hawaii Energy & Environmental Technology Initiative (HEET) in 2001 to address: 1) the development and testing of advanced fuel cell systems and biofuels process for commercial and military applications, and 2) the characterization and development of sea-floor based methane hydrates (vast marine-based reserves of hydrogen-rich fuel). Initiated in 2001, HEET is managed by HNEI and funded by the Office of Naval Research.

HEET was founded on the premise that it would serve as a hub for partnerships and serve as a vehicle to stimulate economic development in the state, while also serving critical DoD needs. Project successes include partnerships with UTC Power and Hawaiian Electric Company to develop the Hawaii Fuel Cell Test Facility. Expertise and partnerships developed under HEET have also led to other independently funded fuel cell and hydrogen related projects, including:

- The DOE-funded multipartner project to develop a Hydrogen Power Park incorporating a commercial hydrogen fuel cell;

- Potential pre-commercial demonstrations of fuel cell technology for stationary power plant and transportation applications; and
- A pending agreement with Lawrence Livermore National Laboratory for work on solid-oxide fuel cells.

Hawaii Fuel Cell Test Facility
www.hnei.hawaii.edu/fueltest.asp

The Hawaii Fuel Cell Test Facility (HFCTF) was developed through a partnership of HNEI, the Hawaiian Electric Company (the state's largest electric utility) and UTC Power to accelerate acceptance and deployment of fuel cells for commercial and military applications. Dedicated in 2003, the facility houses fuel cell test stands and a host of supporting equipment including on-site hydrogen generation and storage, extensive safety systems, and on-line high-resolution gas analysis. Capabilities include long-term life testing and cell performance characterization over a wide range of operating conditions. The Institute is seeking other commercial and public sector partners to participate in this program.

Hawaii Hydrogen Center for Development and Deployment of Distributed Energy Systems
www.hnei.hawaii.edu/heet.asp
www.eere.doe.gov/hydrogenandfuelcells/pdfs/review04/tv_p11_rocheleau.pdf
www.hydrogen.energy.gov/pdfs/progress05/viii_b_1_rocheleau.pdf

The Hawaii Hydrogen Center for Development and Deployment of Distributed Energy Systems was initiated in 2004 and is one of HNEI's largest projects. Funded through DOE, the Center's objectives are to develop an integrated program for the development and deployment of hydrogen based distributed energy systems and to advance key technologies, consistent with the DOE plan, to advance hydrogen production technologies and infrastructure research and testing. Specific activities will include augmentation of the Hydrogen Power Park demonstration, assessment of hydrogen fuels purity requirements for fuel cell applications, R&D of cost-effective renewable hydrogen production, and analysis of potential hydrogen and distributed energy systems for the Big Island grid system. Three million dollars was appropriated to the Center in the federal FY04 Omnibus Bill.

Contact:

Richard Rocheleau, Director
Hawaii Natural Energy Institute
1680 East West Road, POST 109
Honolulu, HI 96822
Phone: (808) 956-8890
Fax: (808) 956-2336
E-mail: hnei@hawaii.edu
Web: www.hnei.hawaii.edu

7. EMERGING BUSINESS SUPPORT

High Technology Business Investment Credit

www.hitechhawaii.com/taxincentives.asp

In order to stimulate investment in Hawaii high technology businesses and expand venture capital market, a nonrefundable high technology business investment tax credit of up to $2 million is available for each taxpayer that is subject to Hawaii income tax for an investment in a qualifying business. A credit is allowable for each year during a five-year period and declines from 35% to 10% from the date of the "investment" for investments made through the year 2005. The credit is capped at varying amounts ($700,000 in the year the investment is made to $200,000 in the last year).

A Qualifying High Technology Business (QHTB) is defined as a business that conducts more than 50% of its total activities in qualified research. For the investment credit, a QHTB must do more than 75% of its qualified research in Hawaii. Qualified research includes non fossil fuel energy-related technologies (fuel cell technology is eligible).

Contact:

Hitech Hawaii
High Technology Development Corporation
Manoa Innovation Center, Suite 100
2800 Woodlawn Drive
Honolulu, HI 96822
Phone: (888) 677-4292
E-mail: www.hitechhawaii.com/contactsubmit.asp
Web: www.hitechhawaii.com

NELHA Gateway Distributed Energy Resources Center

www.nelha.org/about/gateway.html

The National Energy Laboratory of Hawaii (NELHA), a state-operated science and technology park located on the Big Island, is in the process of developing the Gateway Distributed Energy Resources (DER) Center, a state-of-the-art alternative energy research, development, education and outreach facility and incubator for companies focused on renewable/distributed energy generation and hydrogen. The DER Center will also host the Hydrogen Power Park demonstration of hydrogen production and storage, and grid-connected fuel cells.

Contact:

National Energy Laboratory of Hawaii
73-4460 Queen Ka'ahumanu Highway, #101
Kailua-Kona, HI 96740-2637
Phone: (808) 329-7341
Fax: (808) 326-3262
E-mail: nelha@nelha.org
Web: www.nelha.org

8. STATE AND LOCALLY-SUPPORTED DEMONSTRATIONS

Fuel cell bus, Hickam Air Force Base: A 30-ft. shuttle bus, employing hybrid fuel cell/battery technology, was deployed in 2004 for a one-year demonstration at Hickam Air Force Base. The project was initiated and managed by the Hawaii Center for Advanced Transportation Technologies, with support from the University of Hawaii at Manoa. Participants also included DoD, DOE and DOT.

Planned demonstration

Hydrogen Power Park, Big Island: HNEI is developing the Hawaii Hydrogen Power Park, an effort to bring hydrogen systems into the marketplace by establishing a hydrogen infrastructure through deployment and demonstration of an integrated system comprising electrolysis for hydrogen production, hydrogen storage, and grid-connected fuel cells. DBEDT serves as the lead agency, with HNEI serving as the implementing partner and providing technical coordination and support. The project is funded by the Hawaii Energy Office through DOE's State Energy Partnership Program and will be located at the NELHA Gateway DER Center.

IDAHO

1. PLANS/STRATEGIES

Idaho Core Competencies
http://news.idaho.gov/pressdetail.aspx?pressid=335
http://technology.idaho.gov/Portals/33/documents/CoreDirectory.pdf

A report issued in 2005 by the Governor's Science & Technology Advisory Council outlines Idaho's four technology core competencies, which are areas where Idaho has both expertise and future opportunities for economic growth. Fuel cells are included under the state's "Power and Energy" core area, with a number of company listings n the state's Core Competency Directory having a hydrogen or fuel cell focus.

Contact:

Idaho Commerce & Labor
700 West State Street
P.O. Box 83720
Boise, ID 83720-0093
Phone: (800) 842-5858 or (208) 334-2470
E-mail: info@business.idaho.gov
Web: www.idahoworks.com

2. STANDARDS/REGULATIONS

POWER GENERATION

Net Metering and Interconnection Standards

Idaho does not have statewide net metering policies or interconnection standards in place. However, several utilities operating in the state have filed net metering tariffs with the state's Public Utilities Commission. Two of these utilities allow net metering of fuel cells and have issued interconnection guidelines.

Avista Utilities
www.avistautilities.com/assets/tariffs/id/ID_062.pdf
www.dsireusa.org/library/docs/additionaldocs/IDAvistaGenerationInterconnectionProcess.pdf

Avista Utilities allows interconnection and net metering of renewable energy systems generating up to 25 kW of electricity. Qualifying systems are those powered by solar energy, wind, biomass, hydropower or fuel cells. Net metering enrollment is limited to 0.1% of Avista's 1996 peak demand (1.52 MW).

Contact:

Avista Utilities
Customer Service, MSC-34
PO Box 3727
Spokane, WA 99220-3727
Phone: (800) 227-9187
E-mail: AskAvista@AvistaUtilities.com
Web: www.avistautilities.com/home.asp?view=res

Idaho Power
www.idahopower.com/aboutus/business/generationInterconnect

Idaho Power provides for interconnection and net metering of residential and small commercial systems generating up to 25 kW of electricity using wind, solar, biomass, hydroelectric systems or fuel cells. The company also allows net metering of large commercial systems, up to 100 kW, for customers other than residents and small businesses. Total net metering enrollment is limited to 2.9 MW, or 0.1% of Idaho Power's peak demand in 2000. Idaho Power's four-step interconnection process requires feasibility, system impact and facility studies prior to connecting to the system.

Contact:

Idaho Power
P.O. Box 70
Boise, ID 83707
Phone: (800) 488-6151 or (208) 388-2200
E-mail: https://www.idahopower.com/forms/customerservice/contactus.htm
Web: www.idahopower.com

4. INCENTIVES/MARKET STIMULATION

POWER GENERATION

Renewable Energy Equipment Sales Tax Refund

www3.state.id.us/oasis/2005/H0110.html

The sales or use of machinery and equipment used directly in generating electricity using fuel cells, low impact hydro, wind, geothermal resources, biomass, cogeneration, sun, or landfill gas as the principal source of power are exempt from sales tax. The equipment must be used in a facility capable of generating not less than 25 kW of electricity.

Sales and use tax must initially be made on the purchase. Once a utility or the Idaho Public Utilities Commission has certified the project, the taxpayer may file for a refund with the Idaho State Tax Commission.

Contact:

Idaho State Tax Commission
P.O. Box 36
Boise, ID 83722-0410
Phone: (800) 972-7660 or (208) 334-7660
E-mail: http://tax.idaho.gov/contactus.htm
Web: http://tax.idaho.gov

Idaho Energy Resources Authority

www3.state.id.us/oasis/2005/S1192.html

A 2005 state bill authorizes the Idaho Energy Resources Authority to undertake any renewable energy generation project for the benefit of one or more independent power producers and issue bonds to finance their costs. Renewable energy is defined in the bill as a source of energy that occurs naturally, is regenerated naturally or uses as a fuel source, a waste product or byproduct from a manufacturing process including, but not limited to, open or closed-loop biomass, fuel cells, geothermal energy, waste heat, cogeneration, solar energy, waterpower and wind.

Contact:

Ron Williams
Idaho Consumer Owned Utilities Association
1015 West Hayes Street
Boise, ID 83702
Phone: (208) 344-3783
Fax: (208) 344-0077

VEHICLES

Special Fuels Tax Refund

http://tax.idaho.gov/ifta_refunds.htm

Any person or entity that has purchased 50 gallons or more of tax-paid gasoline or any quantity of tax-paid special fuels (diesel, propane, natural gas or hydrogen) and used the fuel for a nontaxable purpose may file for a refund of the taxes. The refund is applicable when special fuels are used to power motor vehicles, aircraft, or when fuel from the main supply tank of a licensed motor vehicle is used to operate power take-off equipment or auxiliary engines. Refunds are not available for special fuels used in recreational vehicles or noncommercial motorboats.

Contact:

Idaho State Tax Commission
PO Box 36
Boise, ID 83722-0410
Phone: (800) 972-7660 ext. 7530 or (208) 334-7530 in Boise
Fax: (208) 334-7844
E-mail: fuelspolicy@tax.idaho.gov
Web: http://tax.idaho.gov

ILLINOIS

1. PLANS/STRATEGIES

Illinois Department of Commerce and Economic Opportunity Programs
www.illinoisbiz.biz/NR/rdonlyres/B9855A5D-157C-413E-9F39-8D4A8744DCF7/2197/04172003_2.pdf

Illinois fosters fuel cell commercialization through the state's Department of Commerce and Economic Opportunity (DCEO). Specific activities have included:

- Sponsoring a 2003 fuel cell industry meeting, "Building an Illinois Fuel Cell Industry", in conjunction with the Illinois Coalition. The meeting was the first of several meetings planned to foster fuel cell technology within the state.
- Forming partnerships with Argonne National Laboratory, the Illinois Institute of Technology and Gas Technology Institute as part of its commitment to fuel cell research.
- Funding fuel cell research, development and demonstration projects conducted by Caterpillar, Nuvera Fuel Cells, Williams Bio-Energy, the Renewable Fuel Association, the Illinois Corn Growers, HyRadix and two electric cooperatives.

DCEO renewable energy grants have provided $250,000 for research into ethanol reformers that convert ethanol or gasoline into hydrogen for fuel cells, and $550,000 in funding for the development of stationary fuel cells that can supply power to local grids.

Contact:

Department of Commerce and Economic Opportunity
Bureau of Energy & Recycling
620 East Adams Street
Springfield, IL 62701
Phone: (217) 785-3416
E-mail: www.commerce.state.il.us/dceo/Contact
Web: www.commerce.state.il.us/dceo

4. INCENTIVES/MARKET STIMULATION

POWER GENERATION

Renewable Energy Resources Trust Fund

www.dsireusa.org/documents/Incentives/IL01R.htm
www.commerce.state.il.us/dceo/Bureaus/Energy_Recycling/Energy/Clean+Energy/RERP.htm

In 1997, the Governor signed Public Act 90-561 establishing an electric utility deregulation plan for Illinois and creating a Renewable Energy Resources Trust Fund (RERTF) to provide funding for renewable energy, energy efficiency and low-income rate assistance and weatherization and programs. Assistance is offered through the provision of grants, loans and other incentives, with funding provided through a surcharge on electric bill and gas bills. The incentives are intended to target projects and programs that benefit the public by "improving energy efficiency, developing renewable energy resources, supporting other energy related projects that improve the state's environmental quality, and supporting projects and programs intended to preserve or enhance the natural habitat and wildlife areas of the State".

One of several programs administered through the RERTF is the Renewable Energy Resources Program (RERP) which provides rebates for qualifying small renewable energy systems and grants for qualifying large renewable energy systems. Technologies supported through the RERP program include solar water heat, solar space heat, solar thermal electric, photovoltaics, wind, biomass, municipal solid waste, dedicated energy crops, small hydroelectric and fuel cells. In order to be eligible for funding under this program, fuel cells must operate on a renewable fuel source (hydrogen produced from solar energy, ethanol or biogas to produce electricity). Funding is limited to 50% of the project costs, with a maximum grant of $550,000. Funding varies by technology but averages around $300,000. Grants are available on a request for proposal basis.

Contact:

Bryan Clow
Energy Division
Illinois Department of Commerce and Community Affairs
Bureau of Energy and Recycling
620 East Adams Street

Springfield, IL 62701-1615
Phone: (217) 785-3420
E-mail: bclow@ildceo.net
Web: www.commerce.state.il.us/dceo

Illinois Clean Energy Community Foundation

www.illinoiscleanenergy.org/programs.asp

The Illinois Clean Energy Community Foundation (ICECF) was established in December 1999 as an independent foundation with a $225 million endowment provided by Commonwealth Edison. ICECF provides financial support for projects that advance specific program priorities related to increasing energy efficiency, expanding the use of renewable energy resources, and preserving and enhancing natural areas and wildlife habitats throughout Illinois. ICECF will consider grants for fuel cell projects under its renewable energy program, which solicits demonstration projects and policy development leading to wider adoption of fuel cells, solar thermal, biomass or emerging renewable energy technologies.

Contact:

Illinois Clean Energy Community Foundation
2 North LaSalle Street, Suite 950
Chicago, IL 60602
Phone: (312) 372-5191
Fax: (312) 372-5190
Email: info@illinoiscleanenergy.org
Web: www.illinoiscleanenergy.org

VEHICLES

Illinois Alternative Fuel Vehicle and Alternative Fuel Rebate Program

www.illinoisgreenfleets.org/fuels

The Illinois Alternate Fuels Rebate Program started in 1998 and may be issued to any applicant for up to 300 vehicles.

There are three types of rebates from which applicants may choose one type of rebate per vehicle: (1) A rebate for the incremental cost of an alternate fuel vehicle purchased from a dealership or similar vendor (Vehicle Rebate), (2) a rebate for the cost of the conversion of an existing vehicle to operate with an alternate fuel (Conversion Rebate), and (3) a rebate for the incremental cost of purchasing alternate fuels (Fuel Rebate). For all rebates, the alternate fuel vehicle, conversion system, or alternate fuel must be purchased from an Illinois company or vendor.

Eligible fuels for the program include E-85, Biodiesel (at least 20% blend or B-20), natural gas, propane, electricity, and hydrogen.

Contact:

Illinois Environmental Protection Agency
Phone: (217) 557-1441 (Darwin Burkhart)

Web: www.epa.state.il.us

5. PARTNERSHIPS

Chicago Area Clean Cities Coalition

www.chicagocleancities.org/cleanfuel.shtml

Chicago Area Clean Cities (CACC) Coalition is a voluntary organization dedicated to encouraging the use of clean fuels and clean vehicle technologies in the Chicago metropolitan area. CACC members represent government (including Chicago's Transit Authority, Department of Environment and Department of Fleet Management; the cities of Aurora, Evanston, Naperville, Palos Heights and Rolling Meadows; and the Illinois Environmental Protection Agency), businesses, educational and research institutions, fuel providers, utilities and environmental organizations. The group has a demonstration hydrogen fuel cell car that produces its own hydrogen and oxygen using electricity, then runs on that hydrogen and oxygen.

Contact:

Chicago Area Clean Cities Coalition
E-mail: bethany.kraseman@chicagocleancities.org
Web: www.chicagocleancities.org/index.shtml

Illinois 2H2

http://releases.usnewswire.com/printing.asp?id=28056

The Illinois 2H2 Partnership was established by the Illinois Coalition and stakeholders in the hydrogen and fuel cell arena to create an industry cluster centered on the development of hydrogen as an energy carrier.

The Partnership released "The Hydrogen Highway: Illinois' Path to a Sustainable Economy and Environment" which serves to organize a statewide effort in creating a sustainable economic and environmental impact for Illinois through hydrogen and fuel cell technology advancement. The plan looks to establish a "Hydrogen Highway;" a corridor of hydrogen energy demonstration projects situated around Interstate-90.

There has been no recent activity by this organization and its current existence is uncertain.

Contact:

Illinois Coalition for Jobs, Growth & Prosperity
1301 West 22nd Street, Suite 610
Oak Brook, IL 60523
Phone: (217) 522-1257
Web: http://jobsillinois.us

8. STATE AND LOCALLY-SUPPORTED DEMONSTRATIONS

POWER GENERATION

Williams Bio-Energy, Pekin: Caterpillar, Nuvera Fuel Cells, Williams Bio-Energy, DOE, and the Illinois Department of Commerce and Economic Opportunity teamed to develop and demonstrate an ethanol-fueled PEM fuel cell system that will produce 13 kW of electric power. Anhydrous denatured ethanol was used in the project as the base fuel and used a fuel reformer to generate the hydrogen gas that was to be combined with oxygen to produce electricity. The project was slated for a 4,000 hour continuous stationary application demonstration under full load conditions to evaluate the use of ethanol as a base fuel for fuel cells.

VEHICLES AND FUELING INFRASTRUCTURE

Hydrogen Fueling Station and fuel cell bus demonstration, Chicago: A hydrogen fueling facility operated at Chicago Transit Authority's Chicago Avenue Garage to provide fuel for Chicago Transit Authority's three fuel cell demonstration buses. The two-year demonstration occurred between 1997 and 1999. Partial funding for the buses was provided by the Regional Transportation Authority.

INDIANA

1. PLANS/STRATEGIES

Utility Generation and Clean Coal Technology Program
www.in.gov/legislative/ic/code/title8/ar1/ch8.8.html
www.in.gov/legislative/bills/2002/HCCP/CC002901.001.html

The General Assembly passed Senate Bill 29 in 2002 to promote Indiana's energy generating capacity, including the use of renewable energy resources, to enhance Indiana's energy security and reliability and to attract new businesses and jobs. The project's goal is to use the vast and underutilized coal resources of the Illinois Basin as a fuel source for new energy generating facilities, using technology that allows high sulfur coal to be burned efficiently while meeting strict state and federal air quality limitations (e.g. coal gasification). The bill creates a Center for Coal Technology research to develop technologies to advance the use of Indiana coal, and also directs the Utility Regulatory Commission to offer financial incentives to eligible clean coal and energy projects. Fuel cells qualify for the program's incentives.

The state's Coal Gasification Investment Tax Credit became effective on January 1, 2006. The allowable credit amount is the sum of 10% of the taxpayer's qualified investment for the $500 million dollars invested and 5% of the amount of the taxpayer's qualified investment that exceeds $500 million dollars.

Contact:

Indiana Department of Revenue
100 N Senate Avenue
Indianapolis, IN 46204
Phone: (317) 233-4018
E-mail: tartis@dor.in.gov
Web: www.in.gov/dor

4. INCENTIVES/MARKET STIMULATION

POWER GENERATION

Indiana Clean Energy Credit Program

www.in.gov/idem/air/standard/Sip/guide.pdf
www.in.gov/idem/energycredit

The Indiana Clean Energy Credit Program is a state program that awards "credits" to companies for voluntary high-efficiency energy projects and renewable energy projects. Credits can be sold or traded on a national market, with recent credits valued in the range of $2,500 to $6,000. One credit is awarded for each ton of NOx emissions prevented.

Any individual, group, organization or business that uses electricity or other forms of energy or that produces electricity from renewable sources, and can initiate, finance, or carry out projects that reduce or displace electricity generation or reduce other energy may become a sponsor for projects that claim credits through the Indiana Clean Energy Credit Program. Eligible projects include:

- Highly efficient electricity generation for the predominant use of a single end user, such as combined cycle, CHP, microturbines and fuel cell systems;
- Zero emission renewable energy projects that displace electricity produced by a utility for the power grid. Projects in this category should involve energy resources that either cannot be depleted (e.g. wind and sun) or that can be rapidly replenished (such as biomass) and that do not emit NOx or other criteria pollutants during their operation. Examples could include photovoltaics, wind turbines, hydropower or ethanol-powered fuel cells;
- Energy efficiency projects generating electricity through the capture of methane gas from sanitary landfills, water treatment plants, sewage treatment plants or anaerobic digestion systems operating on animal and/or plant wastes; and
- The installation of highly efficient electricity generation equipment for the sale of power where such equipment replaces or displaces retired electrical generating units (combined cycle systems, combustion turbines or boilers serving greater than 25 MW).

In order to be considered as highly efficient electricity generation, fuel cell generating systems must meet or exceed the following thresholds: fuel cell systems must have a rated energy efficiency of 40%, whether or not the fuel cell system is part of a CHP energy system.

The program allows for several projects to be combined on a single application—a single company can earn credits for a single, large project, or for a number of projects they might complete over the course of a few years, or several businesses or organizations could form a group, submit a single application based on the combined total savings of their projects, and share the returns that the program offers.

Contacts:

Roger Letterman
Indiana Department of Environmental Management
Office of Air Quality
100 North Senate Avenue
Indianapolis, IN 46204-2551
Phone: (317) 232-8342
E-mail: rletterm@dem.state.in.us
Web: www.in.gov/idem

Indiana Energy Group Grant Program

www.in.gov/energy/technologies

The Indiana Department of Commerce, which had previously administered distributed and renewable energy demonstration project funding (including fuel cells), was dissolved in 2005 and energy-related activities were assumed by the office of the Lt. Governor through the Indiana Energy Group. The new division will introduce a new Alternative Power and Energy Grant Program in July 2006. Applications for fuel cells will be accepted under this program.

Contact:

Indiana Energy Group
Office of Lt. Governor Becky Skillman
1 N. Capitol, Suite 600
Indianapolis, IN 46204
Phone: (317) 232-8940
Fax: (317) 232-8995
E-mail: kburt@lg.in.gov
Web: www.in.gov/energy

VEHICLES

Alternative Fuel Vehicle Grant Program

www.in.gov/isda/harvesttimes/November_05.htm

The AFV Grant Program has made $1.1 million in funding available for the purchase of AFVs, conversion of conventionally fueled vehicles to operate on alternative fuels, installation of AFV refueling facilities, purchase and use of renewable transportation fuels, or combinations of these purposes. AFVs include vehicles capable of operating on electricity, ethanol, propane, hydrogen and natural gas, but the definition excludes hybrid-electric vehicles. Grant amounts range from $2,000 to $50,000.

Contact:

Indiana State Department of Agriculture
Alternative Fuels Grant Program Administrator
101 West Ohio Street, Suite 1200
Indianapolis, IN 46204
Phone: (317) 232-8770
Web: www.in.gov/isda

IOWA

1. PLANS/STRATEGIES

VEHICLES

Renewable Fuels Standard
http://coolice.legis.state.ia.us/Cool-ICE/default.asp?category=billinfo&Service=Billbook&menu=text&hbill=HF2754

HF 2754, signed by the Governor in May 2006, requires that all biofuel will replace 25 percent of all petroleum used in the formulation of gasoline by January 1, 2020.

In part, the bill requires that the Department of Natural Resources, conditioned upon the availability of funds, to award demonstration grants to persons who purchase vehicles which operate on alternative fuels, including but not limited to, high blend ethanol E=85 gasoline, biodiesel, compressed natural gas, electricity, solar energy, or hydrogen. Grants are to be awarded for the purpose of conducting research connected with the fuel or the vehicle, and not for the purchase of the vehicle itself.

Contact:

Iowa Department of Natural Resources
502 E. 9th Street
Des Moines, IA 50319-0034
Phone: (515) 281-5918
E-mail: webmaster@dnr.state.ia.us
Web: www.iowadnr.com

4. INCENTIVES/MARKET STIMULATION

POWER GENERATION

Renewable Energy Tax Credit

www.state.ia.us/government/com/util/TaxCredits.html
www.state.ia.us/tax/taxlaw/IDRTaxCreditReportDec2005.pdf

Beginning on July 1, 2006, a renewable energy tax credit is available for producers or purchasers of energy from an eligible renewable energy facility approved by the Iowa Utilities Board. A power-purchase agreement is signed between the purchaser and producer which sets forth which party will receive the tax credit. A renewable energy facility includes a wind energy conversion facility, a biogas recovery facility, a biomass conversion facility, a methane gas recovery facility or a solar energy conversion facility. The facility must be located in Iowa and placed in service between July 1, 2005, and January 1, 2011.

A producer or purchaser of renewable energy may receive renewable energy tax credit certificates for a 10-year period for each eligible renewable energy facility. Participants in the program receive renewable energy tax credits equal to $0.015 per kilowatt-hour of electricity, or $4.50 per million British thermal units of heat for a commercial purpose, or $4.50 per million British thermal units of methane gas or other biogas used to generate electricity, or $1.44 per one thousand standard cubic feet of hydrogen fuel generated by and purchased from an eligible renewable energy facility.

Contact:

Iowa Utilities Board
350 Maple Street
Des Moines, IA 50319-0069
Phone: (515) 242-0218 (Brenda Biddle) or (515) 281-5679 (John Pearce)
Fax: (515) 281-5329
E-mail: iub@max.state.ia.us
Web: www.state.ia.us/government/com/util

6. RD&D SUPPORT

Alternative Fuel Vehicle Research Grants

www.legis.state.ia.us/IACODE/1999SUPPLEMENT/214A/19.html

The Iowa Department of Natural Resources, conditioned upon the availability of funds, is authorized to award demonstration grants to persons who purchase vehicles which operate on alternative fuels, including but not limited to, high blend ethanol, CNG, electricity, solar energy, or hydrogen. A grant shall be for the purpose of conducting research connected with the fuel or the vehicle, and not for the purchase of the vehicle itself, except that the money may be used for the purchase of the vehicle if all of the following conditions are satisfied:

- The department retains the title to the vehicle;
- The vehicle is used for continuing research; or
- If the vehicle is sold or when the research related to the vehicle is completed, the proceeds of the sale of the vehicle shall be used for additional research.

Contact:

Iowa Department of Natural Resources
502 E. 9th Street
Des Moines, IA 50319-0034
Phone: (515) 281-5918
E-mail: webmaster@dnr.state.ia.us
Web: www.iowadnr.com

KANSAS

KENTUCKY

LOUISIANA

2. STANDARDS/REGULATIONS

POWER GENERATION

Interconnection Standards
www.legis.state.la.us/leg_docs/03RS/CVT7/OUT/0000KCCG.PDF

The Louisiana General Assembly passed the Louisiana Renewable Energy Development Act in 2003, which enabled net metering of renewable energy systems. Interconnection rules were issued by the Louisiana Public Service Commission in November 2005. Eligible systems include renewably fueled microturbines and fuel cells of residential systems up to 25 kW and commercial systems to 100 kW.

Contact:

Louisiana Public Service Commission
Galvez Building, 12th Floor
602 North Fifth Street
PO Box 91154
Baton Rouge, LA 70821-9154
Phone: (800) 256-2397 or (225) 342-4404
Fax: (225) 342-2831
Web: www.lpsc.org

Net Metering
www.legis.state.la.us/leg_docs/03RS/CVT5/OUT/0000KSN3.PDF

In 2005, the Louisiana Public Service Commission issued rules requiring publicly-owned utilities and rural electric cooperatives to offer net metering to customers with systems that generate electricity using solar, wind, hydropower, geothermal or biomass resources. Renewably-fueled micro-turbines and fuel cells are eligible. Residential systems of up to 25 kW and commercial systems of up to 100 kW qualify.

Contact:

Louisiana Public Service Commission
Galvez Building, 12th Floor
602 North Fifth Street
PO Box 91154
Baton Rouge, LA 70821-9154
Phone: (800) 256-2397 or (225) 342-4404
Fax: (225) 342-2831
Web: www.lpsc.org

8. STATE AND LOCALLY-SUPPORTED DEMONSTRATIONS

POWER GENERATION

University of Louisiana, Lafayette: A 5-kW PEM fuel cell was installed in the Department of Chemical Engineering laboratory and connected to Lafayette Utilities System electric grid. Funded by the Louisiana Department of Natural Resources and DOE.

MAINE

2. STANDARDS/REGULATIONS

POWER GENERATION

Renewable Resource Portfolio Requirement
http://janus.state.me.us/legis/statutes/35-A/title35-Asec3210.html
www.state.me.us/mpuc/doing_business/rules/part_3/ch-311.htm

Enacted in 1999, Maine's renewable portfolio standard requires each competitive electricity provider in the state to demonstrate that no less than 30% of the company's portfolio of supply sources for retail electricity sales in this State is accounted for by eligible resources. Renewable resources are defined as a source of electrical generation whose total power production capacity does not exceed 100 MW and that

relies on one or more of the following: fuel cells, tidal power, solar arrays and installations, wind power installations, geothermal installations, hydroelectric generators, biomass generators, or generators fueled by municipal solid waste in conjunction with recycling.

Contact:

Maine Public Utilities Commission
242 State Street, State House Station 18
Augusta, ME 04333
Phone: (207) 287-3831
Fax: (207) 287-1039
E-mail: maine.puc@maine.gov
Web: www.state.me.us/mpuc/index.html

Net Metering and Interconnection Standards

ftp://ftp.state.me.us/pub/sos/cec/rcn/apa/65/407/407c313.doc
www.maine.gov/mpuc/staying_informed/legislative/2004legislation/DG-Rpt.htm

Since 1987, Maine has permitted net metering of commercial, industrial and residential systems up to 100 kW, but subsequently issued new rules for the resources and technologies defined in the state's electricity restructuring legislation: fuel cells, tidal power, solar, wind, geothermal, hydroelectric, biomass, and generators fueled by municipal solid waste in conjunction with recycling.

While the state has not established interconnection standards, various small generator stakeholders have developed and agreed to less complex small generator interconnection procedures and a standard interconnection agreement for small generators (less than 5 MW) in the context of a Federal Energy Regulatory Commission ("FERC") proceeding.

Contact:

Maine Public Utilities Commission
242 State Street, State House Station 18
Augusta, ME 04333
Phone: (207) 287-3831
Fax: (207) 287-1039
E-mail: maine.puc@maine.gov
Web: www.state.me.us/mpuc/index.html

VEHICLES

Zero Emission Vehicle Requirements

www.maine.gov/sos/cec/rules/06/096/096c127.doc

Beginning with the 2009 model year, each manufacturer's sales fleet of passenger cars and light duty trucks produced and delivered for sale in the State of Maine must contain at least the same percentage of ZEVs subject to the requirements, including credit and banking provisions, set forth in the California Code of Regulations, Title 13, section 1962 using Maine specific vehicle numbers. As an alternative means of compliance with the

requirements, an automobile manufacturer may instead opt to utilize the Alternative Zero Emission Vehicle compliance mechanisms, allowing a manufacturer to earn Maine ZEV credits for the introduction into Maine of PZEVs, ATPZEVs, and ZEVs.

Contact:

Maine Department of Environmental Protection
17 State House Station
Augusta, ME 04333-0017
Phone: (800) 452-1942 or (207) 287-7688
E-mail: www.maine.gov/portal/contactus.html
Web: www.maine.gov/dep/index.shtml

5. PARTNERSHIPS

Chewonki Renewable Hydrogen Project

www.chewonkih2.org

The Chewonki Renewable Hydrogen Project is a joint venture between the Hydrogen Energy Center, The Chewonki Foundation and Maine Energy Investment Corporation to accelerate deployment of renewable energy systems using hydrogen generators, storage and fuel cells; stimulate hydrogen technology business development in Maine; and develop relationships among renewable energy interests, educational and research organizations, industry organizations, code enforcement officials, and renewable energy designers and contractors. The project consists of three major programs:

- Design, installation and operation of a hydrogen energy system fueled by renewable energy. This system will provide four days backup power for critical activities at Chewonki's Center for Environmental Education.
- Extensive public outreach that includes on-site displays, the expansion of Chewonki's existing Sustainable Energy Education Tour and several brochures and workshop outlines to introduce general audiences to hydrogen energy systems.
- A technical and business support program for Maine's renewable energy industry to embrace hydrogen technologies.

Chewonki Renewable Hydrogen Project partners include a broad range of organizations, businesses, and government, including the Maine Public Utilities Commission and DOE. The Maine Technology Institute is providing primary funding for the project.

Contact:

Chewonki Renewable Hydrogen Project
E-mail: info@chewonkih2.org
Web: www.chewonkih2.org

The Maine Hydrogen Energy Fuel Cell Partnership

http://www.maine.gov/tools/whatsnew/index.php?topic=Gov+News&id=23238&v=Article

In August 2006, Maine's Governor established by Executive Order a partnership to accelerate commercially viable hydrogen production and fuel cells in the state. The purpose and duties of the Partnership are to:

- Accelerate the development and deployment of commercially viable hydrogen production, storage and distribution technologies;
- Accelerate the development and deployment of commercially viable fuel cells;
- Support the growth and development of hydrogen energy and fuel cell-related businesses in the state;
- Coordinate the dissemination of information regarding renewable hydrogen and initiatives for its manufacture and use;
- Identify members of the hydrogen energy and fuel cell business cluster;
- Identify and analyze the technical, scientific, financial, legal, and regulatory obstacles to the development of commercially viable hydrogen energy, fuel cell and related enabling technologies;
- Analyze the opportunities to leverage federal research and development funding and improve the competitiveness of Maine entities to attract such federal and other funding sources and to work with the Maine Congressional delegation to that end;
- Identify and develop the parameters, mission, and a pro forma budget for establishing and operating a hydrogen energy and fuel cell research and testing center which may be located at a qualified Maine institution of higher education;
- Develop an action plan, including funding recommendations, to address the identified needs of Maine's hydrogen energy and fuel cell cluster and potential means to improve the global competitive position of the cluster; and
- Stimulate development of private firms that will build hydrogen energy and fuel cell technology products at facilities located in Maine with Maine labor, giving special attention to the efficiencies and other benefits of co-locating such hydrogen energy and fuel cell cluster industries within economic development facilities where research and development, manufacturing, testing, display and production can happen in a mutually-supportive way for maximum expansion of this industry cluster in Maine.

The Maine Hydrogen Energy Fuel Cell Partnership shall be composed of thirteen members appointed by the Governor, and will be comprised of the following:

- The Director of the University of Maine's School of Engineering Technology, and the Chair of the University of Maine's Department of Chemistry, or their designees;
- Two members nominated by the Maine Hydrogen Energy Center;
- Two members nominated by the Chewonki Foundation;
- Three for-profit Maine business entities;
- Three entities, from Maine or elsewhere, with strong experience in hydrogen energy or fuel cell development, to be nominated by the other members of the Partnership; and
- The chair of the Partnership.

Contact:

Office of the Governor

#1 State House Station
Augusta, ME 04333-0001
Phone: (207) 287-2531 or (207) 287-4315
Email: governor@maine.gov

6. RD&D SUPPORT

Renewable Resources Matching Fund
www.mainetechnology.com/?cat_id=278
ftp://ftp.state.me.us/pub/sos/cec/rcn/apa/65/407/407c312.doc

The Renewable Resources Matching Fund (RRMF) was created by the state's Public Benefits Fund and supports renewable resource research and development and community demonstration projects using renewable-energy technologies. The RRMF is administered by the Maine Technology Institute. Funding of up to $50,000 per project is available through the program.

The one project that has been funded through RRMF is the Chewonki Hydrogen Energy Center, which was approved for a demonstration project to accelerate deployment of renewable energy systems using hydrogen generators, storage and fuel cells.

Contact:

Maine Technology Institute
2E Mechanic Street
Gardiner, ME 04345
Phone: (207) 582-4790
Fax: (207) 582-4772
E-mail: info@mainetechnology.org
Web: www.mainetechnology.com

MARYLAND

2. STANDARDS/REGULATIONS

POWER GENERATION

Renewable Energy Portfolio Standard
www.psc.state.md.us/psc/electric/rps/home.htm

In 2005 the Maryland Public Service Commission of Maryland adopted final rules for implementation of the RPS Program. The program requires a percentage of retail electricity be supplied from renewable energy sources, ranging from 4% in 2006 and increasing to 7.5% in 2019. Eligible Tier 1 resources include wind, solar, landfill gas,

sustainable biomass, geothermal, ocean, and hydrogen produced by Tier 1 renewable resources.

Contact:

Maryland Public Service Commission
6 St. Paul Street, 16th Floor
Baltimore, MD 21202
Phone: (800) 492-0474
E-mail: mpsc@psc.state.md.us
Web: www.psc.state.md.us/psc/index.htm

3. PUBLIC AGENCY POLICIES/PURCHASE PROGRAMS

POWER GENERATION AND VEHICLES

"Green" Initiative

www.dsd.state.md.us/comar/01/01.01.2001.02.htm

A 2001 Executive Order set a goal of procuring at least 6% of the state's electric energy from "green" sources and reducing energy use in state buildings by 15% by 2010. Eligible "green" technologies include the use of fuel cell energy. The Executive Order also makes it easier for the State to purchase alternative-fuel and low-emission vehicles for its fleet.

Contact:

David Cronin
Maryland Energy Administration
1623 Forest Drive, Suite 300
Annapolis, MD 21403
Phone: (800) 723-3674
E-mail: dcronin@energy.state.md.us
Web: www.energy.state.md.us

4. INCENTIVES/MARKET STIMULATION

POWER GENERATION

Green Buildings Tax Credit

http://business.marylandtaxes.com/taxinfo/taxcredit/greenbldg/default.asp

The Green Buildings Tax Credit, enacted in 2001, applies to nonresidential and residential multifamily buildings, 20,000 square feet or greater, constructed or rehabilitated to meet U.S. Green Building Council or similar criteria. The tax credit is available for 30% of the costs, paid by the owner or tenant, to purchase and install a fuel cell in a whole building, base building or tenant space.

The credit cannot exceed $1,000/kW-hr of capacity and is reduced by non-taxable government grants when used to purchase and install the fuel cell. Other technologies eligible for Green Buildings credits include wind and photovoltaic energy.

Contacts:

Mike Li
Maryland Energy Administration
1623 Forest Drive, Suite 300
Annapolis, MD 21403
Phone: (410) 260-7655 Ext. 310
E-mail: mli@energy.state.md.us
Web: www.energy.state.md.us

Revenue Administration Division
Comptroller of Maryland
Annapolis, MD 2 1411-0001
Phone: (800) MD TAXES or (410) 260-7980
E-mail: taxhelp@comp.state.md.us
Web: www.comp.state.md.us

8. STATE AND LOCALLY-SUPPORTED DEMONSTRATIONS

POWER GENERATION

Emergency 911 (MIEMSS) System remote telecommunications site, Elk Neck State Park: Installed in 2003, the ReliOn 5-kW Independence 1000 PEM provides back-up power to a microwave radio site. The fuel cell activated during Hurricane Isabel and provided continuous power until grid service was restored. Maryland has approved the ReliOn Independence 1000 fuel cell for primary back up power at other MIEMSS locations and for the state's fiber optic network.

Maryland Department of Transportation fiber optic repeater station, Hancock: Maryland's Department of Transportation has purchased a ReliOn 5-kW Independence 1000 PEM fuel cell to provide back up power at a fiber optic repeater station. Installed in 2003.

PLANNED PROJECTS

- In 2004 the governor announced plans to lease a General Motors hydrogen fuel cell mini-van that will be assigned to a state agency and is reportedly pursuing development of a hydrogen fueling facility. (A hydrogen fueling station is currently operable in neighboring Washington, D.C.)
- The governor has also stated that state officials are considering development of an industrial park that would employ hydrogen power as the sole source of energy.

MASSACHUSETTS

2. STANDARDS/REGULATIONS

POWER GENERATION

Renewable Portfolio Standards

www.mass.gov/doer/rps

The RPS, created by Massachusetts electricity utility restructuring legislation, specifies that 1% of electricity be generated from renewable sources in 2003, with the percentage increasing by 0.5% per year thereafter through 2009. Thereafter, the annual percentage increase is 1% per year, until suspended by the Division of Energy Resources. Fuel cells using an Eligible New Renewable Fuel (hydrogen used in fuel cells must be derived from an Eligible Biomass Fuel or eligibly-generated electricity) comply with the RPS.

Contact:

Massachusetts Division of Energy Resources
100 Cambridge Street, Suite 1020
Boston, MA 02114
Phone: (617) 727-4732
Fax: (617) 727-0030
E-mail: DOER.Energy@State.MA.US
Web: www.mass.gov/doer

Interconnection Standards

www.mtpc.org/cleanenergy/howto/interconnection/tariffs.htm

The Massachusetts Department of Telecommunications and Energy (DTE) is the implementing body for electric utility regulation in Massachusetts. The DTE opened an investigation into distributed generation in 2002 and established the Massachusetts Distributed Generation Collaborative as a stakeholder group to develop uniform interconnection standards for the state. Order 02-38-B, released in February 2004, established interim interconnection standards that are used by each utility in Massachusetts. Fuel cells are eligible for interconnection.

Contact:

Massachusetts Department of Telecommunications and Energy
Electric Power Division
One South Station
Boston, MA 02110
Phone: (617) 305-3575
E-mail: EPD.Filing@state.ma.us
Web: www.mass.gov/dte/restruct/competition/index.htm

Net Metering

www.mass.gov/doer/pub_info/guidebook.pdf
www.mtpc.org/cleanenergy/howto/interconnection/netppa.htm

A renewable qualifying facility that is 60 kW or less, or an on-site generating facility can qualify for net metering in Massachusetts. Fuel cell technology is eligible.

Massachusetts's restructuring law specifically provides that distribution companies cannot charge exit fees to renewable or distributed generation facilities if certain conditions are met. If a customer provides the distribution company and the Department of Telecommunications and Energy with at least six months notice of its plans to install on-site cogeneration equipment, renewable energy technologies, or fuel cells, it will not be subject to an exit charge. For facilities that are eligible for net metering—for example, facilities with a design capacity of 60 kW or less—no such six-month notice is even required.

Contact:

Massachusetts Department of Telecommunications and Energy
Electric Power Division
One South Station
Boston, MA 02110
Phone: (617) 305-3575
E-mail: EPD.Filing@state.ma.us
Web: www.mass.gov/dte/restruct/competition/index.htm

VEHICLES

Fuel Source and Emissions Disclosure

www.mass.gov/dte/cmr/220cmr1100.pdf

In 2003, the Department of Telecommunications and Energy issued an order requiring that each competitive retail electric supplier provide its customers an information disclosure label containing the price, fuel source, emissions, and labor characteristics of the supplier's generation resource portfolio. Competitive suppliers are required to update the information presented on their disclosure labels on a quarterly basis, using market settlement data or equivalent data provided by the Independent System Operator – New England for the most recent one-year period. Fuel source characteristics must be separately identified on the label and listed in alphabetical order: biomass; coal; hydro-large; hydro-small; imports; municipal trash; natural gas; nuclear; oil; other Renewable Resources (including fuel cells utilizing renewable fuel sources, landfill gas, and ocean thermal); solar; and wind.

Contact:

Massachusetts Department of Telecommunications and Energy
Electric Power Division
One South Station
Boston, MA 02110
Phone: (617) 305-3575
E-mail: EPD.Filing@state.ma.us
Web: www.mass.gov/dte/restruct/competition/index.htm

3. PUBLIC AGENCY POLICIES/PURCHASE PROGRAMS

VEHICLES:

Promotion of Alternative Fuels and Hybrid Vehicles
www.mass.gov/legis/bills/senate/st02/st02220.htm

Passed in 2005, SB 2220 requires that 5% of all new state agency fleet vehicles be hybrids or run on alternative fuel (including hydrogen), with 50% of the state fleet reliant on alternative fuels by 2010.

Contact:

Executive Office for Administration & Finance
State House, Room 373
Boston, MA 02133
Phone: (617) 727-2040
Fax: (617) 727-2779
E-mail: contactanf@state.ma.us
Web: www.mass.gov/eoaf

4. INCENTIVES/MARKET STIMULATION

POWER GENERATION

Alternative Energy and Energy Conservation Patent Exemption
www.mass.gov/doer/programs/renew/renew.htm#taxcred

Massachusetts offers personal and corporate income tax deductions for any income received from the sale of or royalty income from a patent that is deemed beneficial for energy conservation or alternative energy development. The patent eligibility is determined by the Commissioner of Energy Resources. This deduction is unique among incentives in that it targets patents and not simply real property. Fuel cells are eligible.

Contact:

Massachusetts Department of Revenue
P.O. Box 701
Boston, MA 02204
Phone**:** (800) 392-6089
Web: /www.dor.state.ma.us

VEHICLES

Promotion of Alternative Fuels and Hybrid Vehicles
www.mass.gov/legis/bills/senate/st02/st02220.htm

SB 2220, passed in 2005, promotes the use of alternative fuels and vehicles among citizens and in state fleets.

For the years 2006-2010, individuals that purchase a hybrid or AFV, which can be powered by ethanol, low-sulfur diesel, CNG, LNG, and hydrogen will register for a special placard and receive a number of incentives, including: an income tax deduction of $2000; a waiver for the initial $27.50 application fee for the Fast Lane Transponder; waiver of emissions inspections for hybrids getting at least an EPA-estimated 50 mpg city; right to travel in HOV lanes regardless of passengers for three years following the enactment of the bill; discounts or free parking in municipalities which choose to participate.

Additionally, a $10 million bond would establish a fund controlled by the Division of Energy Resources to assist municipalities and regional transit authorities in building alternative fuel stations on public lands and acquiring AFVs or hybrids. State fleet requirements are also outlined in the bill.

Contact:

Massachusetts Department of Revenue
PO Box 7010
Boston, MA 02204
Phone: (800) 392-6089 or (617) 887-MDOR
Web: www.dor.state.ma.us

Massachusetts Registry of Motor Vehicles
Phone: (800) 858-3926 or (617) 351-4500
Web: www.mass.gov/rmv

Massachusetts Division of Energy Resources
100 Cambridge St., Suite 1020
Boston, MA 02114
Phone: (617) 727-4732
Fax: (617) 727-0030
E-mail: DOER.Energy@State.MA.US
Web: www.mass.gov/doer

5. PARTNERSHIPS

Massachusetts Hydrogen Coalition

www.massh2.org

The Massachusetts Hydrogen Coalition (MHC) was formed in 2004 with the express purpose of expanding the hydrogen, fuel cell and related industries in Massachusetts.

MHC is working with the Massachusetts Technology Collaborative and industry, university and government representatives to develop the Massachusetts Hydrogen and Fuel Cell Road Map. The Road Map process will be a collaborative process resulting in a set of recommendations to be submitted to the State Legislature on June 15, 2006,

detailing what steps ought to be taken to increase jobs and accelerate investment into this important industry cluster.

Contact:

Massachusetts Hydrogen Coalition, Inc.
Brad Bradshaw, President
100 Cummings Center, Suite 326J
Beverly, MA 01915
Phone: (978) 232-0080
E-mail: brad@velerity.com
Web: www.massh2.org

6. RD&D SUPPORT

POWER GENERATION

Massachusetts Technology Collaborative
http://masstech.org/index.asp

The Massachusetts Technology Collaborative (MTC) is the state's development agency for renewable energy and the innovation economy, which is responsible for one-quarter of all jobs in the state. MTC is working to enhance the state's economic competitiveness, strengthen its high-tech industry clusters, and harness local, clean energy resources by bringing together leaders from industry, academia, and government to advance technology-based solutions.

MTC administers the John Adams Innovation Institute, the economic development arm of the Massachusetts Technology Collaborative, and the Renewable Energy Trust to promote clean energy technologies and foster the emergence of sustainable markets for electricity generated from renewable sources.

Contact:

Karl Jessen
Phone: (508) 870-0312 ext. 1253
E-mail: Jessen@masstech.org

Massachusetts Renewable Energy Trust
www.masstech.org/renewableenergy/index.htm

The Massachusetts Renewable Energy Trust Fund (MRET) was formed to help Massachusetts shift toward greater reliance on renewable energy resources to meet its energy needs and to spur the development of the renewable energy sector as an important source of future economic growth in Massachusetts. Administered by MTC, MRET is supported through a system benefits charge with total funding of roughly $150 million over a five-year period, with approximately $25 million per year for an undefined period beyond 2002.

MRET had initiated a Fuel Cell Initiative (http://masstech.org/RenewableEnergy/fuel_cell.htm) to promote the use of commercially available fuel cells in applications requiring high reliability and/or and power quality. This initiative is no longer active; however, the Large Onsite Renewables Initiative extends feasibility and design and construction grants to expand the use of large renewable energy generation systems (more than 10 kW in size). The Trust's Fuel Cell Initiative funded a series of feasibility studies and installation of a 250 kW fuel cell at the U.S. Coast Guard Air Station on Cape Cod.

Current funding programs through MRET include:

Large Onsite Renewables Initiative (LORI)
www.masstech.org/renewableenergy/large_renewables.htm

MRET's Large Onsite Renewables Initiative (LORI) provides Feasibility Study and Design & Construction Grants on a competitive basis to expand the production and use of distributed renewable energy technologies in Massachusetts. Through LORI, $8.9 million in funding is available over the next three years to support renewable energy projects with greater than 10 kW of nameplate capacity located at commercial, industrial, institutional, and public facilities that will consume more than 50% of the renewable energy generated by the project on-site. Fuel cells (any fuel source) are eligible for funding. LORI applicants may request funding in two activity areas:

- Design & Construction Grants are calculated based on an incentive/Watt of renewable energy capacity Design grants are capped at the lesser of $75,000 or 75% of actual cost, and construction grants are capped at the lesser of $500,000 or 75% of actual costs.
- Feasibility Grants are capped at $40,000 with cost-share of 20% or $5000, whichever is less.

Contact:

Jon Abe, LORI Project Manager
Massachusetts Technology Collaborative
75 North Drive
Westborough, MA 01581
Phone: (508) 870-0312, Ext. 216
E-mail: LORI@masstech.org

Sustainable Energy Economic Development (SEED) Initiative
www.masstech.org/SEED

MRET's Sustainable Energy Economic Development (SEED) Initiative provides funding to businesses seeking capital for developing new products, testing and improvement, and commercialization activities for eligible renewable-energy technologies. Under the third SEED solicitation, issued in November 2005, convertible loans ranging from $50,000 to $500,000 were offered on a competitive basis. A total of $2 million in funding was available to support Massachusetts-based companies that provide products or services related to energy derived from biomass, fuel cells, photovoltaics, waves, tides, hydropower or wind.

Contact:

Karina Funk
Massachusetts Technology Collaborative
75 North Drive - Innovation Center
Westborough, MA 01581
Fax: (508) 898-9226
E-mail: SEED@masstech.org

Massachusetts Green Power Partnership
www.masstech.org/renewableenergy/mgpp.htm

MRET's Massachusetts Green Power Partnership (MGPP) provides financial assistance to stimulate private investment in the construction of new clean electric-generating facilities in Massachusetts and other New England states. Specifically, the MGPP aims to promote project stability by providing long-term contracts for the renewable-energy credits associated with the generation of electricity by renewable-energy resources. Fuel cells using renewable fuels are eligible.

Contact:

Nils Bolgen, Green Power Partnership Program Manager
Massachusetts Technology Collaborative
75 North Drive
Westborough, MA 01581
Phone: (508) 870-0312, Ext. 402
E-mail: bolgen@masstech.org

7. EMERGING BUSINESS SUPPORT

2006 Ignite Clean Energy
www.mitforumcambridge.org/EnergySIG/IgniteCleanEnergy.html

The Energy SIG of the MIT Enterprise Forum of Cambridge and event sponsors (which include the quasi-public agency, Massachusetts Technology Collaborative) are offering a $125,000 business presentation competition. Five winners will be selected in the final competitive round and each winner will share a portion of the $125,000 prize. The events are designed to help contestants clarify their strategic vision, vet their business plans, and boost their business communication skills.

Fuel cells projects are eligible to participate in the event under the renewable energy category.

Contact:

Ignite Clean Energy
Phone: (508) 698-6810
Web: www.IgniteCleanEnergy.com

8. STATE AND LOCALLY-SUPPORTED DEMONSTRATIONS

POWER GENERATION

Braintree Municipal Landfill, Braintree: A UTC Power 200-kW PAFC was installed at the Braintree Landfill, running on methane gas. Partially funded by the Massachusetts Division of Energy Resources.

U.S. Coast Guard Air Station, Cape Cod: FuelCell Energy 250-kW fuel cell CHP plant was installed with funding from the Green Power Initiative of the Renewable Energy Trust (administered by the Massachusetts Technology Collaborative), DoD's Climate Change Fuel Cell Program and KeySpan Energy.

Verizon Switching Station, Woburn: Verizon installed a Nuvera Fuel Cells' 5-kW proton exchange membrane (PEM) fuel cell to provide critical power to a remote switching station in Woburn, MA. Partially funded by the Massachusetts Technology Collaborative Premium Power Program (part of the Fuel Cell Initiative).

MICHIGAN

1. PLANS/STRATEGIES

Fuel Cell Report
www.michigan.org/medc/news/major/archive/combo.asp?ContentId=F202571C-CDD6-4060-A856-30F145925B72&QueueId=2&ContentTypeId=7

The Michigan Economic Development Corp. and Michigan Automotive Partnership study that identifies tactics to position Michigan as a leading candidate for potential fuel cell manufacturing facility investment.

Based on discussions with fuel cell manufacturers and suppliers, the study recommends five key areas that Michigan must address to better position itself as a leader in alternative powertrain technology and to become a viable candidate for fuel cell manufacturing:

- The creation of the Michigan Advanced Automotive Powertrain Technology Alliance.
- An investigation on the feasibility of creating a power electronics "Center of Excellence."
- Establish a Michigan Hydrogen Infrastructure Working Group to include the investigation of necessary changes and lead time requirements for service and repair of infrastructure related to fuel cell and alternative technology vehicles.

- Promote the demonstration and testing of prototype fuel cell vehicles and support the commercialization of fuel cells for vehicle and stationary power generation applications.
- Conduct an economic study to determine the most appropriate financial incentives for the development and commercialization of fuel cell and other advanced technology vehicles.

Contact:

Michigan Economic Development Corporation
300 N. Washington Square
Lansing, MI 48913
Phone: (888) 522-0103
E-mail: http://genweb.michigan.org/help/email.jsp?InitialURL=
Web: www.michigan.org/medc

2. STANDARDS/REGULATIONS

POWER GENERATION

Interconnection Standards

http://efile.mpsc.cis.state.mi.us/efile/docs/13745/0011.pdf
http://efile.mpsc.cis.state.mi.us/efile/docs/14085/0003.pdf
http://efile.mpsc.cis.state.mi.us/efile/docs/14085/0002.pdf

Michigan's interconnection rules were issued in September 2003 in an order from the Michigan Public Service Commission (PSC) in Case U-13745, which addresses the interconnection of independent power projects. Regulated utilities were required by the PSC order to file interconnection procedures that are in compliance with the Commission's own interconnection standards. The PSC's rules, included in Exhibit A of the September 2003 PSC order, cover definitions, utility interconnection procedures, technical criteria, project applications, filing fees, interconnection deadlines, additional services provided by electric utilities, pre-certified equipment and waivers. Xcel, AEP and a coalition of other utilities operating in Michigan filed interconnection rules with the PSC in March 2004, which includes fuel cells under the definition of "generation". The PSC approved each of these filings in August 2004.

Contact:

Michigan Public Service Commission
Competitive Energy Division
P.O. Box 30221
Lansing, MI 48909
Phone: (517) 241-6100
Fax: (517) 373-3113
Web: www.michigan.gov/mpsc

Net Metering

http://efile.mpsc.cis.state.mi.us/efile/docs/14085/0002.pdf

www.michigan.gov/mpsc/0,1607,7-159-16393_38274---,00.html

The maximum size generator that can be installed for net metering is less than 30 kW and systems must be sized not to exceed what is needed to serve the customer's self-service needs. Non-dispatchable generation systems (e.g., wind and solar) must be sized not to exceed the customer's annual energy needs, measured in kilowatt-hours. Dispatchable systems shall be sized not to exceed the customer's capacity needs, measured in kilowatts. The maximum program limit is either 0.1% of a utility's previous year's peak demand, or 100 kW, whichever is greater. Net metering is open to all renewable energy source electric generating technologies. In October 2005, the Public Service Commission approved a request by Detroit Edison to allow net metering to customers with fuel cells and Stirling engines "that have the potential of becoming hydrogen-enabling technologies, regardless of the fuel they use to generate electricity".

Contact:

Michigan Public Service Commission
Competitive Energy Division
P.O. Box 30221
Lansing, MI 48909
Phone: (517) 241-6100
Fax: (517) 373-3113
Web: www.michigan.gov/mpsc

4. INCENTIVES/MARKET STIMULATION

POWER GENERATION

Low-Income and Energy Efficiency Fund

www.michigan.gov/mpsc/0,1607,7-159-16370_27289---,00.html

The Michigan Public Service Commission (PSC) energy-efficiency grant program, funded by the state's Low-Income and Energy Efficiency Fund, supports the implementation of energy-efficiency projects and renewable-energy projects in the state. Businesses, non-profit organizations, government agencies and/or schools are eligible to apply. Grants are awarded in three categories: (1) energy efficiency for low-income clients, (2) energy financial assistance to low-income clients, and (3) energy efficiency for all customer classes. The PSC has emphasized that this program does not provide any direct funding to homeowners or renters

As a result of the most recent round of proposals, the PSC announced in June 2005 $6 million in awards to 11 organizations. Renewable-energy projects supported include solar, wind, anaerobic digesters, fuel cells and biofuel applications.

Contact:

Cheryl L. Rojas, Grant Administrator
Michigan Public Service Commission
Motor Carrier, Energy Grants & Information Division

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Web: www.michigan.gov/mpsc

6. RD&D SUPPORT

Michigan NextEnergy Authority

http://www.legislature.mi.gov/(qdr5daucjfelsb3cennphiyp)/documents/mcl/pdf/mcl-207-822.pdf
http://www.michigan.org/medc/cm/attach/F815CBED-04EB-4D6D-98C0-E0634C2536D0/MI%20NextEnergy%20Authority%20Fact%20Sheet.pdf
www.michigan.org/medc/cm/attach/F815CBED-04EB-4D6D-98C0-E0634C2536D0/GuidebookJune17.pdf

The Michigan NextEnergy Authority (MNEA) was created by the state legislature to promote the development of alternative energy technologies and to provide tax incentives for business activities and property related to the research, development, and manufacturing of those technologies.

The MNEA is a seven-member board, comprised of the State Treasurer, the directors of the state departments of Management and Budget and Transportation, and four private-sector members appointed by the Governor. The MNEA is responsible for certifying taxpayers and property as eligible for tax credits against the Michigan Single Business Tax or exemptions from the General Property Tax. Taxpayers engaged in research, development, or manufacturing of alternative energy technology and certified as eligible by the MNEA may claim a nonrefundable credit against their single business tax liability.

Personal property that is certified by the MNEA as “Alternative Energy Personal Property” (AEPP) is exempt from the collection of personal property taxes. The exemption applies only to personal property that is new to Michigan. To be eligible for the exemption, the property must not have been previously taxed and must not have been exempted from taxation under another law. The MNEA may certify any of the following as AEPP: an alternative energy system; an alternative energy vehicle; the personal property of an “alternative energy technology business”; or the personal property of a business which is not an alternative energy technology business that is used solely for the purpose of researching, developing, or manufacturing an “alternative energy technology”.

An Alternative Energy Zone (AEZ) has also been created within Wayne State University’s Research and Technology Park in Detroit to promote the research, development, and manufacturing of Alternative Energy Technologies. Businesses engaged in one of those qualifying activities and located within the AEZ are eligible for the full range of Renaissance Zone tax benefits.

Both hydrogen and fuel cell technologies qualify under MNEA’s definition of “alternative energy”.

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Hydrogen Technology Park

www.hydrogen.energy.gov/pdfs/progress05/viii_b_2_regan.pdf
www.dteenergyventures.com/initiatives.html#hydrogenTech

DTE Energy developed and operates a hydrogen-based power park capable of delivering approximately 500 kilowatt-hours/day of environmentally friendly electricity. This working prototype will:

- Produce hydrogen gas from tap water using a mix of solar power, biomass power and power from the electric grid;
- Compress and store the hydrogen on site; and
- Deliver enough electricity to power a small office complex, or approximately 20 homes, and produce enough compressed hydrogen gas to power about three fuel cell vehicles per day.

This cutting-edge facility is the result of a partnership between DOE and DTE Energy to develop, install and operate a multi-use renewable hydrogen station (Controlled Hydrogen Fleet and Infrastructure Demonstration and Validation Project). Project partners also include the State of Michigan, city of Southfield, Lawrence Technological University, DaimlerChrysler and BP America. Partial funding ($200,000) for the project was provided by the state's Energy Office.

The Hydrogen Technology Park is located in one of Michigan's SmartZones--a Michigan Economic Development Corporation initiative that provides distinct geographical locations where technology-based firms, entrepreneurs and researchers can locate in close proximity to all of the community assets that will assist in their endeavors.

Contact:

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Web: www.dteenergy.com

Next Energy

www.nextenergy.org

Michigan's NextEnergy program is a non-profit organization established in 2002 with state grant funding. NextEnergy has $52.5 million from the state for the next three years to fund projects related to its three-fold mandate:

- Serve as the primary economic development agency for the state for alternative energy technologies.
- Perform services related to the education of the workforce, consumer education and industry education.
- Accelerate and commercialize alternative energy technologies through grants and competitive research done in-state, with collaboration between industry and Michigan based universities on alternative energy technologies suited toward commercialization.

NextEnergy Center

The NextEnergy Center will be the a 45,000 sq. ft. business convergence facility located in TechTown (Detroit's Entrepreneurial High-Tech Village) with a 18,400 sq. ft. accelerator laboratory; State-of-the-art training rooms; 80-seat auditorium demonstration/exhibition space; flexible lab/education format accommodates diverse needs for research, development, engineering and prototyping. Services provided include:

- Business attraction and acceleration
- Collaborative research, development and technology validation support
- Technical consulting and program management
- Education programs
- Energy policy support

The Center will include a Microgrid Power Pavilion, which will enable AET system integration through a world class test and validation platform, for use by technology system developers, integrators and technicians. The Pavilion includes test bays for the application and integration of on-site electrical power and thermal energy generation technologies, including:

- Fuel cells, internal and external combustion engine generators and renewable power systems.
- Thermal recovery and distribution (hot and chilled water systems).
- Advanced communications and controls.
- Multiple fuel sources (natural gas, hydrogen, bio and synthetic fuels).
- Modular design and construction provides cost effective installation and operation.

The Center will also feature an Alternative Fuel Testing Platform for advancing the development and application of hydrogen, natural gas, bio and synthetic fuels:

- Test bays for validating and demonstrating emerging on-site hydrogen production systems in a real-world environment, from multiple feed stocks and end use applications.
- Fully integrated into the Microgrid to provide a comprehensive "system of systems" approach for the advancement of alternative fuel and power generation technologies.
- Separate fuel distribution and dispensing system for alternative fueled vehicle applications.

NextEnergy has signed an agreement with BP to establish a hydrogen refueling station. The station is expected to be completed in the summer of 2006, and will be located in the parking lot of the NextEnergy Center. It's BP's third hydrogen fueling station in Southeast Michigan. And it's supported by DOE's five-year fuel cell vehicle and infrastructure validation effort. The station will enable research and development partners to work on resolving barriers to offering hydrogen fuel commercially, including the creation of retail-compatible hydrogen refueling systems and the cost and feasibility of renewable hydrogen generation. Automotive industry partners such as DaimlerChrysler will use the station to evaluate which hydrogen fuel cell technologies will have the greatest potential to achieve DOE hydrogen cost targets. Also involved in the project is Air Products and Chemicals Inc.

Alternative Energy Lab Competition
www.nextenergy.org/nextenergycenter/LabCompetition.asp

In October 2006, NextEnergy announced a competition valued at over $100,000 of funding and services for emerging for emerging technology companies. Benefits include physical assets and funding ($25,000 seed investment, lab space and tax incentives), business strategy and technology development services (consulting, grant writing, technology testing); and market development services (public relations, market development, exposure through NextEnergy events and contacts).

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Michigan Alternative and Renewable Energy Center

www.gvsu.edu/marec/index.cfm?id=F3B6F2BA-D172-1569-F2B2803AE2CBD3C2

The Michigan Alternative and Renewable Energy Center (MAREC) is the culmination of a cooperative effort involving several organizations for the development of alternative and renewable energy sources. Partners include Grand Valley State University, Michigan Public Service Commission, City of Muskegon, Muskegon Area First, Muskegon Area Chamber of Commerce, Muskegon Area Community Foundation, Muskegon Community College and Michigan Economic Development Corporation.

The MAREC facility is a "distributed generation" energy center, or one which produces the energy it needs to heat, cool, light, and power the building. The 25,000-square-foot MAREC facility is powered, in part, by a fuel cell which turns natural gas into electricity.

One of the most far-reaching projects initiated by MAREC will be the development of a $1.3 million biomass-to-electricity demonstration plant in Muskegon County. The plant would convert dairy cow and swine manure to methane gas which would then be used to produce electricity. Methane would also be transported to MAREC for use as fuel for the facility's fuel cell.

Contact:

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200 Viridian Drive
Muskegon, MI 49440
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Web: www.gvsu.edu/marec/index.cfm?id=E03DCAA7-A103-CE64-D2D272610185DB03

Energy Office of Michigan

www.michigan.gov/energyoffice

The Michigan Department of Consumer & Industry Services (CIS) Energy Office promotes energy efficiency and renewable energy resource development to Michigan's residents, businesses, and public institutions. Program activities are designed to encourage the use of new technologies and alternative fuels in buildings, industrial processes, vehicles, and in power generation.

The CIS Energy Office has received federal energy grants funding that were allocated to support a variety of programs to help Michigan better use its energy resources at the local level. One grant award ($200,000) was made by the Energy Office to DTE Energy to develop and test a hydrogen-based power park and install and operate a compressed gas hydrogen site capable of delivering approximately 500 kilowatt-hours/day of environmentally friendly electricity. Starting with electricity from a combination of solar, municipal solid waste, and central station grid, the power park would produce, compress, and store hydrogen fuel for later use in a 25-75 kW fuel cell bank and 25 kW external combustion engine to generate electricity and heat for a commercial building complex.

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Michigan Department of Consumer & Industry Services
611 W. Ottawa
P.O. Box 30221
Lansing, MI 48909
Phone: (517) 241-6228
Fax: (517) 241-6229
Web: www.michigan.gov/cis/0,1607,7-154-25676---,00.html

7. EMERGING BUSINESS SUPPORT

Michigan Economic Development Corporation

www.michigan.org/medc

The Michigan Economic Development Corporation (MDEC) was formed in 1999 through an alliance between the State of Michigan and several local communities to serve as the successor to the Michigan Jobs Commission. MEDC has the ability, authority and reach to serve as a one-stop resource for business retention, expansion and relocation projects.

MEDC has a strong technology focus that includes alternative energy. Their hydrogen and fuel cell-related activities include:

Fuel Cell Report
www.michigan.org/medc/news/major/archive/combo.asp?ContentId=F202571C-CDD6-4060-A856-30F145925B72&QueueId=2&ContentTypeId=7

MEDC and the Michigan Automotive Partnership identified tactics to position Michigan as a leading candidate for potential fuel cell manufacturing facility investment.

Grant Funding
www.michigan.org/medc/news/major/archive/combo.asp?ContentId=5770978C-3578-4A7B-83FC-1042FCA64169&QueueId=2&ContentTypeId=7

$500,000 in grant funding was awarded by MEDC to Kettering University to establish the Center for Fuel Cell System and Power Integration.

21st Century Jobs Fund
www.michigan.org/medc/ttc/tricorridor/?m=14;1

MEDC's 21st Century Jobs Fund seeks to grow Michigan's high-tech economy by investing in basic research at universities and non-profit research institutions, applied research, university technology transfer, and the commercialization of products, processes, and services. Alternative energy and advanced automotive, manufacturing and materials are two of the four focus areas of the fund. Fuel cells and hydrogen-powered energy systems are eligible for grant funding under the program.

SmartZones
www.michigan.org/medc/ttc/Clusters/?m=14;3

Eleven SmartZones have been created throughout the state. Several of these high-technology clusters for research and commercialization are pioneering new approaches to alternative energy technology:

- On the campus of Wayne State University in the Detroit SmartZone, Next-Energy is building an R&D center and developing university courses in alternative energy education.
- In Southfield, the DTE Hydrogen Technology Park, located in the Automation Alley SmartZone, is developing, building and operating a project to power an office building by hydrogen fuel cells.
- The Michigan Alternative and Renewable Energy Center in the Muskegon Lakeshore SmartZone is conducting advanced energy research and incubating energy-related start-up companies.

- Alternative energy research is under way at Michigan Tech University in the Houghton/Hancock Smart Zone.

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E-mail: http://genweb.michigan.org/help/email.jsp?InitialURL=
Web: www.michigan.org/medc

MEGA High-Tech Job Creation Tax Credit

http://www.michigan.org/medc/common/book/topic.asp?BookId=1&BookName=Data+Book&ChapName=Business+Incentives&ChapId=22&TopicId=64&TopicContent={66B46752-A375-427E-A25E-784A2A437767}&From=BI

The Michigan Economic Growth Authority (MEGA) was created to promote high quality economic growth and job creation. Since their inception in 1995, MEGA tax credits have generated more than $11.5 billion in private investment and created nearly 120,000 jobs.

Employers in high technology fields, whose company devotes at least 25% of operating expenses to research and development and who wishes to expand or locate in Michigan rather than another state, may be eligible for a high-tech job creation tax credit against the state business tax. Each credit may be awarded for up to 20 years and for up to 100% of the tax related to the project. Fuel cell and hydrogen technology businesses are eligible for the credit.

Contact:

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300 N. Washington Square
Lansing, MI 48913
Phone: (888) 522-0103
Web: www.michigan.org/medc

8. STATE AND LOCALLY-SUPPORTED DEMONSTRATIONS

POWER GENERATION

Michigan Alternative and Renewable Energy Center at Grand Valley State University, Muskegon: Funding for the project, including the building and FuelCell Energy Direct Fuel Cell® 300A (MCFC) is provided by a $3 million grant from the Michigan Public Service Commission and bonding from the City of Muskegon. The fuel cell provides electricity, heating and cooling for research space, incubator facilities, conference center and classrooms.

VEHICLES

Ford Focus FCVs, Taylor: Four Ford Focus FCV fuel cell vehicles are being used by Taylor's fire marshal and fire inspectors, a meter reader, and the Department of Public Works personnel as part of a three-year demonstration program. BP will build a hydrogen refueling station on the grounds of Taylor's Department of Public Works.

FUELING INFRASTRUCTURE

BP Hydrogen Refueling Station, Southfield: In 2004, BP unveiled the first hydrogen refueling station as part of a DOE project designed to facilitate the field-testing of fuel cell vehicles and fueling infrastructure in the U.S. (Controlled Hydrogen Fleet and Infrastructure Demonstration and Validation Project). Located at the DTE Energy Hydrogen Technology Park in Southfield, the BP hydrogen station supplies fuel to DaimlerChrysler cars. The refueling station is the first in southeast Michigan to use renewable energy to produce hydrogen

DTE Energy Hydrogen Technology Park, Southfield: The DTE Energy Hydrogen Technology Park is a demonstration project designed to provide critical insight into the role of hydrogen in our nation's energy system. The Park will create hydrogen gas from tap water and use that gas in fuel cell generators and to refuel fuel cell vehicles. Project Partners include DOE, State of Michigan, City of Southfield, Lawrence Technological University, DaimlerChrysler and BP America.

PLANNED DEMONSTRATIONS

Ford Focus FCVs, NextEnergy facility, Detroit: BP will develop a hydrogen refueling station at NextEnergy Microgrid Power Pavilion Techtown facility in Detroit. The station will initially serve one Mercedes A-Class FCV, driven by Wayne State University campus patrol. Eventually, the station will use hydrogen produced on site by different technologies to refuel DaimlerChrysler fuel cell vehicles. The anticipated opening date is Summer 2006.

Ford Focus FCVs, University of Michigan, Ann Arbor: The University of Michigan will use Ford Focus FCV demonstration vehicles to support administrative services on campus. In addition, the Colleges of Engineering, Natural Sciences, and the Business School are all planning to integrate the vehicles into their advanced courses. The EPA has offered the use of the hydrogen refueling facility at its vehicle test laboratory in Ann Arbor to support the vehicles at the school's campus.

MINNESOTA

1. PLANS/STRATEGIES

Hydrogen Transition Act
www.nextstep.state.mn.us/res_detail.cfm?id=1998

The Hydrogen Transition Act, signed during the 2005 Minnesota legislative session, promotes hydrogen as a fuel source for transportation and distributed energy through the use of fuel cells. It includes a hydrogen energy economy goal, which states that "it is a goal of this state that Minnesota move to hydrogen as an increasing source of energy for its electrical power, heating, and transportation needs".

The Act also includes the following elements to promote hydrogen as a fuel source for transportation and distributed energy generation through the use of fuel cells:

- Early purchase & deployment by state government.
- State identification of the most promising and strategic demonstration opportunities outside of government.
- State encouragement of a regional hydrogen research & education partnership.
- $600,000 in matching funds for three multi-fuel hydrogen stations and fleet vehicle demonstrations in Moorhead, Alexandria and the Twin Cities.
- Development and implement of hydrogen and fuel cell curricula and training programs for incorporation into existing courses.

Minnesota has established a number of policies to support this goal, including the following:

- The Department of Employment and Economic Development is required to establish a program to attract hydrogen-related businesses, and establish energy enterprise zones for a hydrogen infrastructure.
- Hydrogen production from renewables may count toward a utility's renewable energy objective after 2010.
- The Department of Commerce will issue a Request for Proposals to build a wind-powered, electrolysis-to-hydrogen project that includes pipeline, storage, and fuel cell components.
- In 2003, The University of Minnesota Initiative for Renewable Energy and the Environment (IREE) will support basic and applied research and demonstration activities related to renewable energy, including hydrogen. To this end, IREE received $10 million from the Xcel Energy Renewable Development Fund in 2003 and will receive approximately $10 million in additional funding from the Xcel Energy Conservation Improvement Program.

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Minnesota State Energy Office Programs
http://www.state.mn.us/portal/mn/jsp/content.do?subchannel=-536881736&sc2=-536887792&id=-536881351&agency=Commerce&sp2=y

The Minnesota State Energy Office (SEO) works to promote the benefits of energy efficiency and renewable energy to consumers and businesses in Minnesota. The SEO accomplishes this via education, securing federal funding for projects and bringing together government, business, non-profit and higher education stakeholders on projects beneficial to Minnesota. In 2004, the SEO was responsible for winning over $700,000 in competitive grants for Minnesota businesses to deploy new energy saving technologies.

The SEO is one of the founding members of the Minnesota Renewable Hydrogen Initiative and has provided grants for fuel cell installations in Uninterruptible Power Systems applications in the telecommunications industry. This project will demonstrate fuel cells in a cost competitive application.

The SEO has also issued two hydrogen reports, “Minnesota Biomass - Hydrogen and Electricity Generation Potential” (www.moea.state.mn.us/p2/forum/MNbiomass-NREL.pdf) and “The Hydrogen Potential: Hydrogen Technology and Minnesota Opportunities” (www.state.mn.us/mn/externalDocs/Commerce/Hydrogen_Potential_090803021706_HydrogenReport4.pdf). Both reports were prepared in conjunction with the Minnesota Office of Environmental Assistance and the National Renewable Energy Laboratory.

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2. STANDARDS/REGULATIONS

Renewable Energy Objective
http://www.state.mn.us/mn/externalDocs/Commerce/Renewable_Energy_Objective_Report_020305041245_REOComplete-NoH1-13.pdf
www.puc.state.mn.us/docs/orders/06-0035.pdf

Minnesota has voluntary renewable energy goals (Renewable Portfolio Standard-type legislation) without enforcement provisions. The legislature passed a non-binding goal of 1% in 2005, increasing each year to 10% in 2015. No mechanism was established to require compliance towards the RPS goal, and the goal now operates on the good faith efforts of the investor-owned electric utilities, generation and transmission cooperatives, and municipal power agencies. Eligible energy technologies under the objective include electricity generated from the following renewable energy sources:

- Solar; wind; hydroelectric with a capacity of less than 60 MW;
- Hydrogen, provided that after January 1, 2010, the hydrogen must be generated from listed renewable resources; or
- Biomass, which includes an energy recovery facility used to capture the heat value of mixed municipal solid waste or refuse-derived fuel from mixed municipal solid waste as a primary fuel.

In 2003, the legislature amended the statute to require the Commission to supervise and facilitate these good faith efforts. Among other things, the 2003 amendments authorized the Commission to establish a program of tradable credits for electricity generated by eligible technologies; it also provided guidelines for any tradable credits system the Commission might establish.

In January 2006, a technical committee issued its final report providing a blueprint for a Midwest Renewable Energy Tracking System and recommending that a multi-state Governance Committee be formed to complete development of the system.

Contact:

Minnesota Public Utilities Commission
121 7th Place E., Suite 350
Saint Paul, MN 55101-2147
Phone: (800) 657-3782 or (651) 296-7124
Fax: (651) 297-7073
E-mail: consumer.puc@state.mn.us
Web: www.puc.state.mn.us/electric/index.htm

Interconnection Standards

http://www.puc.state.mn.us/docs/orders/04-0131.pdf

In 2004, the Minnesota Public Utilities Commission (PUC) issued an order establishing interconnection standards for the operation of distributed generation systems. The interconnection guidelines apply to all utilities in the state, not just investor-owned. The PUC has also created simplified interconnection procedures and standard application forms.

In the order establishing the Standards, the PUC adopted language requiring utilities to compensate customers producing electricity from renewable distributed generation at the utility's avoided cost of meeting its "green power" obligation (Minnesota's "renewable energy objective" directs each of Minnesota's investor-owned electric utilities, generation and transmission cooperatives, and municipal power agencies to make good faith efforts

to obtain enough electricity from qualifying renewable energy technologies—including hydrogen—to represent 10% of total retail electric sales by the year 2015). However, the PUC declined to incorporate other requirements into the guidelines at that time, choosing to address unresolved matters if parties choose to address them in the context of a utility's distributed generation tariff filing. Filings were due on January 1, 2006.

Contact:

Minnesota Public Utilities Commission
121 7th Place E., Suite 350
Saint Paul, MN 55101-2147

3. PUBLIC AGENCY POLICIES/PURCHASE PROGRAMS

Clean Fuel Vehicle Use and Purchasing Requirement

www.revisor.leg.state.mn.us/bin/getpub.php?pubtype=STAT_CHAP_SEC&year=current&section=16C.135

A 2004 Minnesota statute requires state agencies to use clean fuels in motor vehicles owned or leased by the agency if the clean fuels are reasonably available at similar costs to other fuels and are compatible with the intended use of the motor vehicle. Clean fuels are defined as biodiesel blends of 20% or greater by volume, CNG, ethanol blends of 70% or greater by volume, hydrogen, LNG, and LPG. Additionally, a state agency, when purchasing a motor vehicle for the central motor pool or for use by the agency, must purchase a motor vehicle that is capable of being powered by clean fuels, or a motor vehicle powered by electricity or by a combination of electricity and liquid fuel, if such a motor vehicle is reasonably available at similar costs to other vehicles and if the vehicle is capable of carrying out the purpose for which it is purchased.

Contact:

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Web: www.state.mn.us/portal/mn/jsp/home.do?agency=Administration

4. INCENTIVES/MARKET STIMULATION

POWER GENERATION

Xcel Energy Renewable Development Fund

http://www.xcelenergy.com/XLWEB/CDA/0,3080,1-1-1_27620_11838-801-0_0_0-0,00.html

Xcel Energy Renewable Development Fund (RDF) was created in 1999 as an outcome of 1994 Minnesota legislation concerning spent nuclear fuel at Xcel Energy's Prairie Island Nuclear Plant. The Xcel RDF provides grants periodically through a Request for Proposals process. Renewable energy technologies eligible for funding typically include wind, biomass, solar, hydroelectric generators and fuel cells. Funding is generally split between new development projects that result in the production of renewable energy, and research and development.

The first round of grants from the Xcel Energy RDF program, completed in 2001, supported 19 projects with nearly $16 million in funding. In 2005 the Minnesota Public Utilities Commission approved the second round of projects funded from the Xcel Energy RDF program - 29 projects totaling nearly $37 million.

A third round of funding is anticipated in 2006 or 2007.

Contact:

Xcel Energy
Renewable Development Fund
Phone: (800) 354-3060
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E-mail: mark.g.ritter@xcelenergy.com or michelle.m.swanson@xcelenergy.com

Agricultural Improvement Loan Program

www.mda.state.mn.us/AgFinance/improvement.html

This low-interest loan program, administered by the Minnesota Department of Agriculture through the Minnesota Rural Finance Authority (RFA), provides loans to farmers for improvements or additions to permanent agricultural facilities. This is a "participation loan," where loans are made by individual financial institutions working with the RFA, of which there are more than 400 in the state. RFA participation is limited to 45% of the principal amount of the loan, or $200,000, whichever is less. Technology using biomass or biogas qualifies for loan, includes fuel cells.

Contact:

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Web: www.mda.state.mn.us/AgFinance/default.htm

Anaerobic Digestion Production Incentive

www.revisor.leg.state.mn.us/bin/getpub.php?pubtype=STAT_CHAP_SEC&year=current&section=216C.41&image.x=39&image.y=5
www.mda.state.mn.us/feedlots/digester.htm

This statute offers a payment of 1.5 cents per kilowatt-hour for 10 years of generation for electricity generated by hydro facilities and on-farm anaerobic manure methane digesters. Fuel cells are eligible.

Contact:

Rural Finance Authority
Minnesota Department of Agriculture
625 Robert Street North
St. Paul, MN 55155-2538
Phone: (651) 201-6666 (Gary Blahosky)
Web: www.mda.state.mn.us/agfinance/default.htm

5. PARTNERSHIPS

Minnesota Renewable Hydrogen Initiative

www.moea.state.mn.us/p2/initiative.cfm

Minnesota Renewable Hydrogen Initiative (MRHI), formed in 2003, is a public-private partnership dedicated to establishing new innovative means of generating hydrogen using renewable energy technology.

MRHI has outlined a roadmap (www.moea.state.mn.us/publications/roadmap-screen.pdf) to identify and implement the most strategic opportunities that will best leverage resources to move the state to hydrogen as an increasing source of energy for its electrical power, heating, and transportation needs. In addition, this roadmap will structure and pursue the partnerships needed between industry, government, and institutions to functionally achieve the technological, policy, and product development steps necessary to achieve the initiative's goal and vision.

The Minnesota Renewable Hydrogen Initiative Forum meets quarterly, and is open to all parties interested in sharing information and opportunities for Minnesota to benefit from a hydrogen economy.

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8. STATE AND LOCALLY-SUPPORTED DEMONSTRATIONS

POWER GENERATION

FTTH Communications, Albertville: FTTH Communications installed a Plug Power GenCore® PEM fuel cell power backup technology its Albertville site. Funding was provided through a grant from the Minnesota Department of Commerce.

Eden Prairie Library, Eden Prairie: Funding from 3M, CenterPoint Energy and the Minnesota Office of Environmental Services went to install a Plug Power 5-kW fuel cell at the Eden Prairie Library.

Haubenschild Dairy Farm, Princeton: The 5-kW Plug Power PEM fuel cell demonstration project is the first of its kind and was a cooperative venture among the Minnesota Department of Agriculture (MDA), Haubenschild Farms, the University of Minnesota Department of Biosystems and Agricultural Engineering, and the Minnesota Project. Funding for the fuel cell project was provided by the Environmental and Natural Resources Trust Fund though the Legislative Commission on Minnesota's Resources. University of Minnesota researchers have been able to run the fuel cell on biogas intermittently and are working towards running the fuel cell on biogas continually.

MISSISSIPPI

6. RD&D SUPPORT

Energy Division Programs, Mississippi Development Authority
www.mississippi.org/content.aspx?url=/page/78&

The Energy Division's programs and activities promote the efficient and environmentally acceptable use of energy in all sectors of the state's economy. One focus of the Division's work involves alternative energy technologies, including a loan program that provides up to $300,000 in funding for fuel cell installations. The Division's programs and services are funded by DOE funds, oil overcharge restitution funds, and state funds.

Contact:

Mississippi Energy Division
Mississippi Development Authority
P.O. Box 849
Jackson, MS 39205
Phone: (601) 359-6600
Fax: (601) 359-6642
E-mail: energydiv@mississippi.org
Web: www.mississippi.org

8. STATE AND LOCALLY-SUPPORTED DEMONSTRATIONS

POWER GENERATION

Alcorn State University, Lorman: The Mississippi Department of Economic and Community Development awarded a grant to Alcorn State University for partial funding of the purchase and installation of a UTC Power fuel cell power plant at its Church Hill Swine Production Facility. The facility is in a remote location away from the main campus, so relies on the fuel cell to produce most, if not all, of its electrical power.

University of Mississippi, Oxford: An H-Power Corp. fuel cell was tested in 2002 in conjunction with Auburn University. Funding was received from the Mississippi Development Authority and the federal government.

MISSOURI

2. STANDARDS/REGULATIONS

POWER GENERATION

Interconnection Standards

www.dsireusa.org/library/docs/additionaldocs/MODraftStndInterconAgreement.pdf

Missouri's net metering rule implements the Consumer Clean Energy Act and establishes standards for interconnection of qualified net metering units generating 100 kW or less with retail electric power suppliers. Qualifying technologies for interconnection and net metering include hydrogen fuel cells.

Contact:

Missouri Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102
Phone: (800) 361-4827 or (573) 751-3443
E-mail: energy@dnr.mo.gov
Web: www.dnr.mo.gov

Net Metering

www.moga.mo.gov/statutes/c300-399/3860000887.htm
www.sos.mo.gov/adrules/csr/current/4csr/4c240-20.pdf

Each retail electric power supplier is required to offer net metering in the form of a credit for the net value of electric energy delivered to the electric supplier. The credit is calculated using the power supplier's avoided cost (time of use or non-time of use) and is applied on the customer's next bill. Suppliers must offer net metering until the total rated generating capacity used by customer-generators is equal the lesser of 10 MW or

0.1% of the capacity necessary to meet the retail electric power supplier's aggregate customer peak demand for the preceding calendar year. Eligible technologies include hydrogen fuel cells or units that are powered by sun, wind or biomass.

Contact:

Missouri Department of Natural Resources
P. O. Box 176
Jefferson City, MO 65102
Phone: (800) 361-4827 or (573) 751-3443
E-mail: energy@dnr.mo.gov
Web: www.dnr.mo.gov

4. INCENTIVES/MARKET STIMULATION

VEHICLES

Alternative Fuel Vehicle (AFV) Emission Inspection Exemption

www.moga.mo.gov/statutes/c600-699/6430000315.htm

Vehicles powered exclusively by electric or hydrogen power, or by fuels other than gasoline, are exempt from state motor vehicle emissions inspections.

Contact:

Gateway Clean Air Program
ESP Missouri Inc.
PO Box 1034
St. Charles, MO 63302-1034
Phone: (888) 748-1247
Web: www.gatewaycleanair.com

6. RD&D SUPPORT

Missouri Department of Natural Resources Funding

www.fuelcells.org/dc/dcboard.php?az=show_topic&forum=7&topic_id=1&mesg_id=1&listing_type=search

The Missouri Department of Natural Resources Energy Center announced in 2002 that limited funding was available for a fuel cell demonstration project. The Center expressed interest in demonstrating a beta, pre-commercial or commercial unit, 10 kW or smaller, for light commercial or residential electricity and heat applications. The unit would be tested in conjunction with interested partners (several Missouri rural electric cooperatives and/or municipal utilities have indicated interest in a fuel cell project). The Center also would also consider a vehicular fuel cell demonstration.

Samuel J. Orr
Energy Center

Missouri Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102-0176
Phone: (573) 751-8386
Fax: (573) 751-6860
Web: www.dnr.mo.gov

MONTANA

1. PLANS/STRATEGIES

Resolution: Support Necessary Steps to Move Montana Into a Hydrogen-Based Economy
http://data.opi.state.mt.us/bills/2003/billhtml/HJ0026.htm#About#About

The Montana legislature passed a joint resolution in 2003 supporting the implementation of a Montana hydrogen energy plan that will:

- Educate Montanans about the benefits of a hydrogen economy and promote a Montana hydrogen futures coalition;
- Establish the Montana Hydrogen Futures Project as the key economic development focus of the state;
- Institute necessary state policies and legislation to promote Montana Hydrogen Futures Project development and statewide involvement;
- Support the establishment of a focal point of the hydrogen economy at the Montana Hydrogen Futures Park at the University of Montana-Missoula;
- Support and encourage federal commitment and necessary matching funds to construct the Montana Hydrogen Futures Park and provide for development of the Montana energy products network to attract hydrogen-based business and industries to Montana;
- Establish alliances with energy producers and promote resource identification by Montana communities by identifying all existing and potential federal, state, tribal, and community resources for inclusion in the Montana energy products network;
- Develop a first-class education and training system that attracts and prepares high-quality hydrogen professionals for all levels of the hydrogen economy and replicate this system throughout the state;
- Expand the Montana energy products network by creating the statewide micro enterprise system that establishes business opportunities, incentives, and state business development marketing; and
- Pursue national prominence with other states and agencies in the supply of hydrogen to the national hydrogen distribution system.

Contact:

Montana Secretary of State
P.O. Box 202801
Helena, MT 59620-2801
Phone: (406) 444-2034
Fax: (406) 444-3976
E-mail: sosinfo@mt.gov
Web: http://sos.state.mt.us/css/index.asp

Montana's Hydrogen Futures Project
www.cte.umt.edu/MTFutures

The goals of Montana's Hydrogen Futures Project include:

- Establishment of a H2 Futures Park at The University of Montana;
- Establishment of statewide hydrogen production and distribution capabilities;
- Leveraging hydrogen investments that create new hydrogen products, businesses and jobs;
- Using hydrogen-generated resources that enhance Montana's infrastructure growth.

The project's goal is that by the year 2020, 50% of all vehicles and equipment and 100% of all state-run vehicles will be powered by alternative fuels; all intercity bus systems will use hydrogen; distribution of synthetic fuels and hydrogen will be provided for the trucking industry; a school bus retrofit and hydrogen power program will be established; and incentives will be provided for conversion of internal combustion engines to hydrogen.

Report – Montana Vision 20/20
www.cte.umt.edu/MTFutures/mv2020.doc

Montana Vision 2020 is a strategic initiative under the Hydrogen Futures Project to set in motion a plan that will establish Montana as an energy leader by setting target goals for the year 2020. The goals are intended to be comprehensive in scope. Goal areas include: (1) energy management and production; (2) air, water, land, and waste management; (3) transportation and vehicle development; and (4) energy-related economic development.

Contact:

R. Paul Williamson, Dean
University of Montana – Missoula College of Technology
909 South Ave. West
Missoula, MT 59801
E-mail: paul.williamson@umontana.edu.
Web: www.cte.umt.edu

4. INCENTIVES/MARKET STIMULATION

POWER GENERATION

Alternative Energy Production Credit

www.deq.state.mt.us/Energy/renewable/TaxIncentRenew.asp

Commercial and net metering alternative energy investments of $5,000 or more are eligible for a tax credit of up to 35% against individual or corporate tax on income generated by the investment. The credit may only be taken against net income produced by the eligible equipment or by associated new business activity, that is, it must be a commercial operation. Associated facilities, manufacturing plants producing the alternative energy equipment and industries using the energy generated may use the tax credit. The tax credit must be taken the year the equipment is placed in service; however, any portion of the tax credit that exceeds the amount of tax to be paid may be carried over and applied against state tax liability for the following 7 years. A project on a reservation may carry the credit over for 15 years, if it has an employment agreement with the tribal government. Taxpayers may not take this credit in conjunction with any other state energy or state investment tax benefits, or with the property tax exemption for nonfossil energy property 15-6-201(4). This credit is available to taxpayers purchasing an existing facility as well as to those building a new facility. The corporate tax rate is 6.75%. Fuel cells powered by non-hydrocarbon fuels are eligible.

Contact:

Montana Department of Revenue
P.O. Box 5805
Helena, MT 59604-5805
Phone: (406) 444-6900
E-mail: http://sos.state.mt.us/css/index.asp
Web site: www.state.mt.us/revenue

Residential Alternative Energy System Tax Credit

http://data.opi.state.mt.us/bills/mca_toc/15_32_2.htm
http://mt.gov/REVENUE/energyconservation.asp

Residential taxpayers who install an energy system using a recognized non-fossil form of energy on their home are eligible for a tax credit equal to the amount of the cost of the system and installation of the system, not to exceed $500. The tax credit may be carried over for the next four taxable years.

Recognized non-fossil forms of energy generation means a system that captures energy or converts energy sources into usable sources, including electricity, by using solar energy, including passive solar systems; wind; solid waste; decomposition of organic wastes; geothermal; fuel cells that do not require hydrocarbon fuel; or an alternative energy system.

Contact:

Montana Department of Revenue
P.O. Box 5805
Helena, MT 59604-5805
Phone: (406) 444-6900

E-mail: http://sos.state.mt.us/css/index.asp
Web site: www.state.mt.us/revenue

Alternative Energy Revolving Loan Program

www.deq.state.mt.us/Energy/renewable/TaxIncentRenew.asp

The Alternative Energy Revolving Loan Program (AERLP) provides loans to individuals, small businesses, local government agencies, units of the university system, and nonprofit organizations to install alternative energy systems that generate energy for their own use. Net metering is allowed. The program is funded by air quality penalties collected by the Department of Environmental Quality. The program is administered by the Department of Environmental Quality, which is responsible for developing the rules.

Alternative energy systems are defined in MCA 15-32-102 as "the generation system or equipment used to convert energy sources into usable sources." The code goes on to list "fuel cells that do not require hydrocarbon fuel, geothermal systems, low emission wood or biomass, wind, photovoltaic and small hydropower plants (under 1 MW) and other recognized nonfossil forms of energy generation." DEQ will provide technical review and approval of systems proposed for the loan program.

In 2005, SB 50 amended the loan program, increasing maximum loan amount to $40,000 (subject to available funds) and extending the repayment period to ten years. Additionally, SB 50 added local government agencies, units of the university system, and nonprofit organizations to the list of eligible sectors.

Contact:

Kathi Montgomery
Department of Environmental Quality
E-mail: kmontgomery@mt.gov
Phone: (406) 841-5243

VEHICLES

Alternative Fuel Vehicle Conversion Tax Credit

http://data.opi.state.mt.us/bills/1995/mca/15/30/15-30-164.htm

An income tax credit is available to businesses or individuals for up to 50% of the equipment and labor costs for converting vehicles to operate on alternative fuels. The maximum credit is $500 for the conversion of vehicles of 10,000 pounds (lbs.) or less Gross Vehicle Weight Rating (GVWR) and $1,000 for vehicles over 10,000 lbs. GVWR. The credit must be applied in the year the conversion is made, and the seller of an alternative fuel may not receive a credit for converting their own vehicles to operate on the alternative fuel they sell. Hydrogen is listed as an alternative fuel.

Contact:

Montana Department of Revenue
P.O. Box 5805
Helena, MT 59604-5805
Phone: (406) 444-6900

E-mail: http://sos.state.mt.us/css/index.asp
Web site: www.state.mt.us/revenue

NEBRASKA

8. STATE AND LOCALLY-SUPPORTED DEMONSTRATIONS

Offutt Air Force Base, Omaha: The propane-powered IdaTech 5-kW PEM fuel cell system, which was started up in 2005, runs off-grid and continuously powering 2-kW of security lighting. The Omaha Public Power District and Offutt Air Force Base are joint partners in the project.

Henry Doorly Zoo, Omaha: The fuel cell is located in the Lied Jungle, the world's largest indoor rainforest. Waste heat from the UTC Power 200-kW PAFC is used to warm the water in a number of ponds and heat 5,000 gallons of water used for irrigation each night. The unit was purchased in by the Omaha Public Power District and installed in 2001. Partial funding for the project was received under the DoD Climate Change Fuel Cell Program.

NEVADA

4. INCENTIVES/MARKET STIMULATION

VEHICLES

Vehicle Emissions Inspection Exemption
www.dmvnv.com/emission.htm

All AFVs are exempt from emissions inspection.

Contact:
Nevada Department of Motor Vehicles
Emissions Control Program
555 Wright Way
Carson City, NV 89711
Phone: (702) 486-4368 option 4, option 5 (Las Vegas Area)
(775) 684-4368 option 6 (Reno/Sparks/Carson City)
(877) 368-7828 option 6 (Rural Nevada/Out of state)
Fax: (775) 684-4992

E-mail: info@dmv.state.nv.us
Web: www.dmvnv.com

8. STATE AND LOCALLY-SUPPORTED DEMONSTRATIONS

FUELING INFRASTRUCTURE

Hydrogen fueling station, Las Vegas: The first U.S. hydrogen fueling station was opened in Las Vegas in 2002, developed through a cost-sharing project between Air Products, Plug Power, the City of Las Vegas and DOE. The hydrogen not used for fueling vehicles is directed to a 50-kW Plug Power PEM fuel cell that generates electric power, which supplies power to the Las Vegas electrical grid system for general consumer use. This electricity provides enough power on a daily basis for about 30 homes.

PLANNED DEMONSTRATIONS

Honda FCX vehicles, Las Vegas: The city of Las Vegas will lease two Honda FCX fuel cell vehicles for a two-year period. The FCX fuel cell vehicles will be refueled at the city-owned and operated hydrogen station.

NEW HAMPSHIRE

NEW JERSEY

1. PLANS/STRATEGIES

Report: New Jersey: Opportunities and Options in the Hydrogen Economy
http://policy.rutgers.edu/ceeep/images/ceeep_report7_04.pdf#search='new%20jersey%20hydrogen'

This July 2004 report was prepared by the Center for Energy, Economic and Environmental Policy; the Edward J. Bloustein School of Planning and Public Policy; and Rutgers, the State University of New Jersey. Funding was provided by the Fund for New Jersey and the New Jersey Board of Public Utilities. This report describes to policymakers and stakeholders the opportunities and options for state policy to facilitate the commercialization of hydrogen fuel and build out of related infrastructure with a particular focus in New Jersey.

Contact:

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Email: lsomma@rci.rutgers.edu
Web: http://policy.rutgers.edu/ceeep

2. STANDARDS/REGULATIONS

Renewable Portfolio Standard

www.bpu.state.nj.us/wwwroot/energy/portfoliostands.pdf

This RPS incorporates two tiers of renewables, Class I and Class II. The total renewable generation requirement begins at 3.0% on 2001 and ramps up to 6.5% in 2012 and beyond. Class II renewables comprise 2.5% of the portfolio for all years, while Class I renewables increase from 0.5% to 4.0% over the first ten years of the program. The policy is currently subject to interim Renewable Energy Portfolio Standards, which are intended to be in effect for 18 months from the commencement of the program.

Class 1 Renewable Energy includes fuel cells (hydrogen or hydrogen-rich fuel for fuel cells can be obtained from hydrocarbon-based fuel sources).

Contact:

New Jersey Board of Public Utilities
44 South Clinton Avenue (7th Floor)
Trenton, NJ 08625
Phone: (609) 777-3314
Fax: (609) 777-3336
E-mail: www.bpu.state.nj.us/home/contactsForm.shtml
Web: www.bpu.state.nj.us

Interconnection Standards and Net Metering

www.njcep.com/html/4_app_eforms2-interconnect.html

In September 2004, the New Jersey Board of Public Utilities (BPU) adopted final rules that substantially increased the types and size of systems eligible for interconnection. The final rules clarify and simplify interconnection for most residential and small commercial facilities.

The following provisions are included in the BPU's final rules:

- Systems up to 2 MW in capacity are eligible for net metering.

- There are three different levels of review procedures for applications, depending on size and certification. Level 1 applies to inverter-based systems with a capacity rating of 10 kW or less. Level 2 applies to systems with a maximum capacity of 2 MW that are certified by a nationally-recognized testing and certification laboratory as meeting IEEE 1547 and UL 1741 compliance standards. Level 3 applies to systems with a maximum capacity of 2 MW that do not qualify for either the Level 1 or Level 2 interconnection review procedures.
- Fees vary by level. There is no fee for Level 1 interconnection. Level 2 interconnection may include a fee of $50 plus $1 per kW of capacity (not to exceed $100). Level 3 may include a fee of $100 plus $2 per kW of capacity, as well as charges for actual time spent on any impact and/or facilities studies required by the standard.
- Utilities may not require Level 1 and Level 2 customer-generators to install additional controls or external disconnect switches not included in the equipment package, to perform or pay for additional tests, or to purchase additional liability insurance.
- An external disconnect switch is no longer required.
- Interconnection to networks is permitted.

Fuel cells powered by renewable fuels are eligible under these rules.

Contact:

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State of New Jersey Board of Public Utilities
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Fax: (609) 777-3330
E-Mail: benjamin.hunter@bpu.state.nj.us
Web: www.bpu.state.nj.us

3. PUBLIC AGENCY POLICIES/PURCHASE PROGRAMS

Low Emissions or Alternative Fuel Bus Acquisition Requirement

www.njleg.state.nj.us/2004/Bills/A3500/3414_U1.HTM

Beginning July 1, 2007, all buses purchased by the New Jersey Transit Corporation must have improved pollution controls and that reduce particulate emissions or buses powered by a fuel other than conventional diesel. Qualifying vehicles include CNG vehicles, hybrid electric vehicles, fuel cell vehicles, vehicles operating on ultra low sulfur fuel or biodiesel, or vehicles operating on any other bus fuel approved by EPA.

Contact:

New Jersey Transit Corporation
Phone: (800) 772-2222

4. INCENTIVES/MARKET STIMULATION

POWER GENERATION

Clean Energy Rebate Program

www.njcep.com/html/2_incent.html

New Jersey's 1999 electricity restructuring legislation provides for investments in energy efficiency and renewable energy through the "Societal Benefits Charge" collected from all electric public utility customers. In March 2001, the New Jersey Board of Public Utilities approved funding for renewable energy programs, including a customer-sited renewables rebate program for homes, businesses, institutions and non-profit facilities.

Eligible technologies include fuel cells, photovoltaic, small wind and or sustainable biomass technologies. Systems must include at least a five-year, all-inclusive warranty. Eligible systems should be sized to produce no more than 125% of the historical or expected (if new construction) amount of electricity consumed at a system's site. Financial incentives for systems larger than 1 MW are available through the state's Renewable Energy Project Grants and Financing Program.

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E-Mail: benjamin.hunter@bpu.state.nj.us
Web: www.bpu.state.nj.us

Combined Heat & Power 2006 Program

www.njcleanenergy.com/html/Combined/combined.html

This program offers qualifying customers, contractors, and energy service companies incentives to purchase and install various types of CHP units. To qualify, the customer's facility must be located in New Jersey, and the customer must purchase electricity from the utility grid. Incentives are paid out only up to 1MW of capacity. Any portion of a customer's load that is committed to an interruptible or peak load reduction program is not eligible for incentives. However, these customers can seek incentives for generation capacity to cover their uncommitted load.

Fuel cells not fueled by Class I renewable fuel qualifies for a $4.00/W incentive not to exceed $1 million per applicant.

Contact:

New Jersey Board of Public Utilities
Office of Clean Energy
44 South Clinton Avenue
Post Office Box 350
Trenton, NJ 08625-0350
Phone: (877) 786-5278 or (609) 777-3300
Fax: (609) 777-3330
E-mail: info@njcep.com
Web: www.NJCleanEnergy.com

The Renewable Energy Advanced Power Program

www.njcep.com/html/renew_enrgy_prjcts.html

The Renewable Energy Advanced Power Program provides a competitive incentive and financing program that substantially accelerates the deployment of distributive renewable electricity generation in New Jersey. Projects will be expected to supply electricity to the PJM Power Pool, or for large power users, to incorporate a minimum of 1 MW power generation at their facility or aggregate a minimum of 1 MW of renewable electricity generation systems into one proposal. The program is designed to provide seed grants and access to capital in order to make renewably-powered electricity cost-competitive with conventional power plants. It is designed to ensure that a diverse portfolio of renewable energy technologies are used to provide power and environmental benefits to the ratepayers in New Jersey; to accelerate the rate of deployment for large-scale renewable power plants and to encourage the development of a thriving renewable energy market in New Jersey.

Contact:

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New Jersey Board of Public Utilities
Office of Clean Energy
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Fax: (609) 777-3330
Email: ronald.jackson@bpu.state.nj.us
Web: www.NJCleanEnergy.com

VEHICLES

Alternative Fuel Vehicle Rebate Program

www.state.nj.us/treasury/purchase/AFVbrochure2005.pdf
www.state.nj.us/dep/dsr/bscit/sustainable-comm/other-programs.htm

New Jersey's AFV Rebate Program offers rebates of up to $12,000 to local government entities that either purchase AFVs or convert conventional fuel vehicles to AFVs. Hybrids also qualify for the rebates. Local and state government agencies, state colleges and universities, and school districts are eligible. The $500,000 initial funding

for this program was provided by a federal Congestion Mitigation and Air Quality (CMAQ) Improvement Program grant. Rebates totaling the full $500,000 have been awarded. Additional funding sources are being sought to continue the program.

Contact:

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New Jersey Clean Cities Coalition
New Jersey Board of Public Utilities
Division of Energy
44 South Clinton Avenue, Box 350
Trenton, NJ 08625
Phone: (609) 984-3058
Fax: (609) 777-3336
E-mail: ellen.bourbon@bpu.state.nj.us
Web: www.state.nj.us/dep/dsr/bscit/sustainable-comm/other-programs.htm

Zero Emissions Vehicle Tax Exemption

www.state.nj.us/treasury/taxation/index.html?zeroemission.htm~mainFrame

ZEVs sold, rented, or leased on or after May 1, 2004, are exempt from state sales and use tax. This exemption is not applicable to PZEVs, which includes hybrid electric vehicles.

Contact:

New Jersey Division of Taxation
Information and Publications Branch
PO Box 281
Trenton, NJ 08695-0281
Phone: (609) 292-6400
E-mail: www.state.nj.us/treasury/taxation/contactus_tyttaxa.html
Web: www.state.nj.us/treasury/taxation

FUELING INFRASTRUCTURE

Alternative Fuel Infrastructure Rebate

www.state.nj.us/bpu/cleanEnergy/AlternativeFuelInfrastructureProgram.pdf
www.state.nj.us/bpu/wwwroot/cleanEnergy/EX05100907_20051114.pdf

The Local Government Alternative Fuel Infrastructure Program currently has funding available to reimburse eligible local governments, state colleges and universities, school districts, and governmental authorities for 50% of the cost of purchasing and installing refueling infrastructure for alternative fuels. Up to $50,000 is available per applicant. Eligible fuels include natural gas, propane, electricity, ethanol (E85) and hydrogen.

Contact:

Ellen Bourbon, Clean Cities Coordinator
New Jersey Clean Cities Coalition
New Jersey Board of Public Utilities

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Phone: (609) 984-3058
Fax: (609) 777-3336
E-mail: ellen.bourbon@bpu.state.nj.us
Web: www.state.nj.us/dep/dsr/bscit/sustainable-comm/other-programs.htm

5. PARTNERSHIPS

New Jersey Hydrogen Learning Center

http://policy.rutgers.edu/ceeep/njh2lc.html

The New Jersey Hydrogen Learning Center (NJ H2LC) is comprised of university members that have fuel cell facilities on their campuses who have joined together to develop hydrogen and fuel cell educational modules and host networking meetings. NJ H2LC is funded by a grant from the New Jersey Board of Public Utilities and is administered by the Center for Energy, Economic & Environmental Policy (CEEEP) within the Bloustein School at Rutgers University.

Contact:

Center for Energy, Economic & Environmental Policy
33 Livingston Avenue
New Brunswick, New Jersey 08901
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Fax: 732-932-0934
E-mail: ceeep@policy.rutgers.edu or nlovrien@rci.rutgers.edu
Web: http://policy.rutgers.edu/ceeep/njh2lc.html

The New Jersey Genesis Project

www.state.nj.us/transportation/refdata/research/fuel_cell

New Jersey Department of Transportation, Millennium Cell, the Center for Advanced Infrastructure and Transportation at Rutgers University, and DOE participated in the NJ Genesis project. Using fuel cells to provide power to roadside variable message signs demonstrated the adaptability of this technology to transportation needs. The NJ Venturer utilized fuel cells to provide power to the vehicle by harnessing the power of hydrogen from sodium borohydride and participated in the 2000 Tour de Sol.

Contact:

New Jersey Department of Transportation
P.O. Box 600
Trenton, NJ 08625-0600
E-mail: www.state.nj.us/transportation/email.shtm
Web: www.state.nj.us/transportation

7. EMERGING BUSINESS SUPPORT

Renewable Energy Business Venture Assistance Program
www.njcleanenergy.com/media/REBVAP_FAQ_121205_1.pdf

New Jersey's Renewable Energy Business Venture Assistance Program provides grants and recoverable grants for the development of businesses, technologies, services and market infrastructure in support of the state's renewable energy industry. Eligible technologies include photovoltaics, wind energy, renewably-fueled fuel cells, wave energy, tidal energy, renewably-generated hydrogen, sustainably-harvested biomass, landfill gas and other technologies that can demonstrate their integral nature to the development of renewable-energy technologies, such as "Balance of System" technologies.* The program budget is approximately $5 million; individual awards range from $50,000 to $500,000. There is a 25% cost-share requirement.

Half of the program's funding supports a demonstration grant program that promotes the development, deployment and demonstration of renewable-energy projects. These projects should evaluate the scientific or technical merit and feasibility of ideas that appear to have commercial potential.

The remainder of the program budget supports a recoverable grant program for applicants with commercialization projects for renewable-energy products, services or systems. The recoverable grant program is designed to foster renewable energy businesses in New Jersey via seed capital for dynamic state-based expansion of this industry. These funds will be competitively awarded with provisions made for repayment. Companies receiving recoverable grants will be required to repay principal as they begin to generate revenues. Applications for the recoverable grant program will be evaluated on an ongoing basis, with no fixed deadline, throughout 2006 or until all funds are committed.

Contact:

New Jersey Board of Public Utilities
Office of Clean Energy
44 South Clinton Avenue
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Trenton, NJ 08625-0350
Phone: (877) 786-5278 or (609) 777-3300
Fax: (609) 777-3330
E-mail: info@njcep.com
Web: www.NJCleanEnergy.com

8. STATE AND LOCALLY-SUPPORTED DEMONSTRATIONS

POWER GENERATION

Sheraton Hotel, Edison: The New Jersey Clean Energy Program provided $860,000 in funding for this FuelCell Energy 250-kW Direct Fuel Cell® MCFC installed at the

Sheraton Hotel. The installation also received $250,000 from the DoD Climate Change Fuel Cell Program. The fuel cell provides 25% of the electric power and hot water requirements of the hotel.

Sheraton Hotel, Parsippany: The New Jersey Clean Energy Program provided $860,000 in funding for this FuelCell Energy 250-kW Direct Fuel Cell® MCFC installed at the Sheraton Hotel. The fuel cell provides 25% of the electric power and hot water requirements of the hotel.

Merck & Co., Rahway: $710,000 funded by New Jersey Board of Public Utilities' clean energy initiative. UTC Power 200-kW PAFC installed at Merck & Company headquarters.

Ocean County College, Toms River: This FuelCell Energy 250-kW Direct Fuel Cell® MCFC provides 90% of the daily power requirements for the Instructional Building, Lecture Hall and Nursing Arts Building. Twenty percent of heating needs are also provided to the above buildings plus the Administration Building, Library and planetarium. $827,000 was funded by the New Jersey Clean Energy Program.

NEW MEXICO

1. PLANS/STRATEGIES

Hydrogen and Fuel Cell Technologies Development Program
http://legis.state.nm.us/Sessions/04%20Regular/bills/house/HB0251.html
http://legis.state.nm.us:8080/lcsbillsearch/session.jsp?year=2003R&type=JM&chamber=H&number=6

In 2003, House Joint Memorial 6 requested that the legislature support state action to reinforce hydrogen and fuel cell research and the development of related fuel cell industry clusters in New Mexico. The New Mexico Economic Development Department was chartered to develop a statewide plan for fuel cell R&D.

In 2004, House Bill 251 (Advanced Energy Technologies Economic Development Act) was signed into law to provide funds to stimulate the market for and promote the statewide utilization of advanced energy technologies. Under the Act, a targeted program was outlined to foster the development of hydrogen and fuel cell-related commercialization and economic development in the state. This program includes:

- Establishment of a public-private partnership between the state, national laboratories, nonprofit organizations and the hydrogen and fuel cell technologies industry sector to provide guidance and support for hydrogen and fuel cell initiatives;
- Supporting activities to adopt uniform hydrogen safety codes and standards and provide education and training to communicate these codes and standards to the appropriate fire and regulatory entities;

- Development of demonstration projects by pursuing federal funds and other available funds to augment state resources, advancing public education about hydrogen and fuel cell technology and building the necessary infrastructure to support commercial use and adoption of hydrogen and fuel cell technologies; and
- Coordinating and supporting research and education activities in hydrogen and fuel cells between state universities and federally funded research and development organizations in the state to promote closer cooperation and advance the state's overall capabilities and programs in hydrogen and fuel cell technologies.

Five hundred thousand dollars was appropriated from the general fund to the Economic Development Department in fiscal years 2005 and 2006 to implement the hydrogen and fuel cell program.

A 2003 report, "New Mexico Hydrogen Cluster Opportunity Assessment" (www.energy.appstate.edu/fuelcells/docs/nm.pdf), was prepared by Los Alamos National Laboratory to provide an initial opportunity assessment that may be used as the basis for a state hydrogen-cluster strategic plan.

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Web: www.edd.state.nm.us

Albuquerque: Renewable Energy Policy

http://daystar2.cabq.gov:81/detailreport/Reports/Temp/315200671127.pdf

Albuquerque adopted a renewable energy policy in 2005, to join the state in advancing the development of hydrogen, fuel cell, renewable energy and energy efficiency technologies to protect the public health of its citizens and its economic future and energy stability. The city defines renewable energy as any energy resource that is naturally regenerated over a short time scale and is: generated by use of low- or zero-emissions generation technology with substantial long-term production potential; and generated by the use of renewable energy resources, that may include:

- Solar, wind, hydropower and geothermal resources;
- Fuel cells that are not fossil fueled; and
- Biomass resources, so long as they do not include electric energy generated by use of fossil fuel, waste products from fossil sources, waste products from inorganic sources or nuclear energy.

In part, the city's plan calls for:

- Equipping or retrofitting all city-owned buildings and developing energy procurement policies to secure 15% of the power for city-owned facilities from renewable sources by 2012. A minimum of 33% of the power acquired from renewable sources must come from on-site renewable energy.
- Requiring all new buildings and additions built for or by the city that are over 50,000 square feet to have 15% of the power to the building generated by on-site renewable energy.
- Requiring that the city fleet to be fueled with a minimum of 20% non-petroleum based fuels within 5 years.
- Developing a rebate program to encourage the use of renewable energy, including solar panels, by city residents.
- Lobbying for adoption of the Public Regulation Commission's net-metering measure that will provide the City with opportunities to sell back to utility companies any excess renewable energy and renewable energy credits produced by installations on city-owned facilities.

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2. STANDARDS/REGULATIONS

POWER GENERATION

Renewable Portfolio Standard

www.nmcpr.state.nm.us/nmac/parts/title17/17.009.0572.htm

The New Mexico Public Regulation Commission approved the state's renewable energy rule in 2002 requiring public utility companies to produce 5% of annual retail jurisdictional energy sales from solar, wind, hydropower, biomass, or geothermal sources by 2006. In subsequent years, the renewable portfolio standard will increase by 1% per year until the renewable portfolio standard of 10% is attained in 2011. Each public utility must establish its compliance annually with the renewable portfolio standard through the filing of renewable energy certificates with the commission. The certificates may be traded, sold or transferred by their owner to any other party so long as the renewable energy is contracted for delivery in New Mexico (unless the commission determines that there is a regional market for exchanging renewable energy certificates). Each public utility must offer a voluntary renewable energy tariff for those customers who want the option to purchase additional renewable energy.

New Mexico code defines "renewable energy" as electrical energy generated by means of a low- or zero-emissions generation technology that has substantial long-term production potential and may include, without limitation, solar, wind, hydropower, geothermal, biomass, including but not limited to agriculture or animal waste, small diameter timber, salt cedar and other phreatophyte or woody vegetation removed from river basins or watersheds in New Mexico, landfill gas, anaerobically digested waste biomass or fuel cells that are not fossil fueled, but does not include fossil fuel or nuclear energy. Each kilowatt-hour of electricity generated by biomass, geothermal, landfill gas, or fuel cell technologies, plants, or sources represents two kilowatt-hours toward compliance with the renewable portfolio standard.

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Phone: (505) 827-6940
Web: www.nmprc.state.nm.us/utility/utilitydivhome.htm

Interconnection Standards

http://www.dsireusa.org/documents/Incentives/NM01Ra.pdf

The New Mexico Public Regulation Commission issued rules in the late 1990s providing for interconnection and net metering of renewable energy cogeneration systems and small power facilities of up to 10 kW. Fuel cells powered by both renewable and non-renewable fuels are eligible for net metering and interconnection to the power grid.

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Net Metering

www.nmcpr.state.nm.us/nmac/parts/title17/17.009.0571.htm
www.dsireusa.org/documents/Incentives/NM01Ra.pdf

Rules issued in the late 1990s by the New Mexico Public Regulation Commission (PRC) require all utilities regulated by the PRC to offer net metering and interconnection to utilities for cogeneration facilities and small power producers with systems of 10 kW or less. The purpose of the rules is to actively promote the use of small scale, customer-owned and other renewable energy resources, distributed generation and alternative technology energy resources and facilities in recognition of the beneficial effects that the development of such facilities will have on the environment, economy, and distribution grid of New Mexico.

Under the rule, “Alternative Technology Generation Resources” means devices such as fuel cells that convert hydrogen rich fuels (including but not limited to natural gas), small microturbines, or other resources offering increased efficiencies.

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Web: www.nmprc.state.nm.us/utility/utilitydivhome.htm

3. PUBLIC AGENCY POLICIES/PURCHASE PROGRAMS

VEHICLES

Alternative Fuel Acquisition Act

http://nxt.ella.net/NXT/gateway.dll?f=templates$fn=default.htm$vid=nm:all

The Alternative Fuel Acquisition Act requires that 75% of vehicles acquired by the agencies and departments of state government and educational institutions must be capable of operating on alternative fuel or are gas-electric hybrid vehicles. The Act also creates an "Alternative Fuel Acquisition Loan Fund" to reimburse the expenses incurred in acquiring vehicles. The maximum amount loaned is not to exceed the actual cost of acquiring the vehicle or $3,000, whichever is less.

Contact:

New Mexico General Services Department
E-mail: webmaster@state.nm.us
Web: www.state.nm.us/gsd/gsd.html

4. INCENTIVES/MARKET STIMULATION

POWER GENERATION

Clean Energy Grants Program

http://legis.state.nm.us/Sessions/04%20Regular/bills/house/HB0251.html
www.emnrd.state.nm.us/emnrd/ecmd

The Clean Energy Grants Program, established under House Bill 251 (2004), was initiated in 2005 clean energy projects and hydrogen and fuel cell energy technology for municipalities and other eligible community, tribal, and state entities. Two million dollars in funding was made available to the program; requests for grants totaled nearly $7

million. The New Mexico legislature appropriated $3 million to the program for 2006. Renewably-powered hydrogen and fuel cell technologies are eligible for the grants.

Contact:

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Energy Conservation and Management Division
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Fax: (505) 476-3322
Web: www.emnrd.state.nm.us/emnrd/ecmd

Biomass-Related Equipment Tax Deduction

http://legis.state.nm.us/lcs/_session.asp?year=05&chamber=H&number=995&type=++&w=com

Tax deductions are allowed for the value of biomass boilers, gasifiers, furnaces, turbinegenerators, storage facilities, feedstock processing or drying equipment, feedstock trailers and interconnection transformers; and biomass materials used for processing into biopower, biofuels or bio-based products.

"Biofuels" is defined as biomass converted to liquid or gaseous fuels such as ethanol, methanol, methane and hydrogen.

Contact:

State of New Mexico Taxation and Revenue Department
1100 S. St. Francis Drive
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Web: www.state.nm.us/tax

5. PARTNERSHIPS

New Mexico Hydrogen Business Council

www.newmexicohydrogen.org

The New Mexico Hydrogen Business Council is a non-profit trade association dedicated to New Mexico's goal of implementating and deploying a hydrogen economy in the state. Honorary members include the U.S. Department of Energy's Energy Efficiency and Renewable Energy program, the New Mexico Economic Development Department; New Mexico Energy, Minerals and Natural Resources Department; and the New Mexico congressional delegation. NASA-White Sands and Sandia Labs, the University of Nevada, and several international groups and associations also participate in the organization.

In early 2006, the New Mexico state legislature directed the group to convene a task force to draft hydrogen energy liability insurance legislation as part of an initiative to remove commercialization barriers to hydrogen energy projects.

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460 St. Michaels Drive, Suite 1202
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E-mail: David Haberman, President at ifdhllc@aol.com or Michele Marean, Executive Director at mmarean@verizon.net
Web: www.newmexicohydrogen.org

New Mexico Hydrogen Technology Partnership (HyTeP)

www.hytep.org

HB251 and HJM6 directed the Secretary of Economic Development to establish a public-private partnership between the state, national laboratories, nonprofit organizations and the hydrogen and fuel cell technologies industry sector to provide guidance and support for hydrogen and fuel cell initiatives. To carry out this mandate, the the New Mexico Economic Development Department awarded a contract to the Regional Development Corporation (RDC) to manage this partnership, called the New Mexico Hydrogen Technology Partnership (HyTeP).

The HyTeP alliance represents industry, business, research laboratories, universities, and government and focuses on hydrogen and fuel cell research, development, demonstration, and commercialization. HyTeP aims to create a cluster of research, engineering, development, service, manufacturing, and business organizations in New Mexico. Members include the North Central New Mexico Economic Development District; New Mexico Economic Development Department; New Mexico Energy, Minerals and Natural Resources Department; Los Alamos County; Land of Enchantment Clean Cities Coalition; and Los Alamos National Laboratory.

In 2005, the New Mexico Economic Development Department awarded $200,000 to the RDC to advance hydrogen and fuel cell technologies. A portion of this funding will be used by HyTEP to develop a demonstration project at Albuquerque International Sunport, sponsored by the City of Albuquerque, Chevron and U.S. Army National Automotive Center, that will include a hydrogen refueling station to support a small fleet of hydrogen vehicles.

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6. RD&D SUPPORT

NM Energy, Minerals and Natural Resources Department and NM Economic Development Department Funding and New Mexico Technology Research Collaborative

www.emnrd.state.nm.us/emnrd/ecmd
http://ww1.edd.state.nm.us/index.php?/news/entry/new_mexico_to_fund_1_million_in_hydrogen_fuel_projects

In 2005, the New Mexico Energy, Minerals and Natural Resources Department's Energy Conservation and Management Division and the New Mexico Economic Development Department teamed to issue a request for proposals for hydrogen fuel projects to be conducted within the state. Project proposals were to be in the area of hydrogen research and development; production of hydrogen incorporating clean energy inputs; use of hydrogen in mobile or stationary end-use applications (such as fuel cells and internal combustion engines); or any combination of the above. The RFP was cancelled by the state before any proposals were submitted and the funds are being redirected to an effort now led by New Mexico Tech.

In Spring 2006, the New Mexico State Economic Development disbanded its Science and Technology Department, the unit responsible for hydrogen activities, and shifted the responsibility to the New Mexico Technology Research Collaborative (TRC). TRC was established by 2005 legislation (Senate Bill 169) and is a partnership among federal and state research institutions in New Mexico. The group is requesting an appropriation of $5,000,000 for New Mexico's continuing efforts in the generation of jobs, income and wealth in New Mexico. State funding from TRC will be leveraged with outside investments, including private, foreign, and other government sources to support projects with strong commercialization potential.

Also in 2006, $1 million in grant funding was awarded by the Energy, Minerals and Natural Resources Department to New Mexico Tech for hydrogen development and education projects within the state, including:

- A proposed Albuquerque project to extract hydrogen from landfill methane;
- A University of New Mexico project to install fuel cells and other renewable energy systems into 256 homes into Playas--an uninhabited town owned by the university and used for homeland security/defense research;
- Development of fuel cell undergraduate study and graduate research at the University of New Mexico.
- Private-public collaboration between New Mexico Tech, the University of New Mexico, Los Alamos National Laboratory and Cabot Superior Micropowders; and
- Educational outreach programs.

Contacts:

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Web: www.edd.state.nm.us

New Mexico Technology Research Collaborative
Web: www.nm-trc.org

NEW YORK

1. PLANS/STRATEGIES

Report: Hydrogen Energy Roadmap to Future Economic Development
www.nyserda.org/programs/Research_Development/hydrogen.asp

In October 2005, NYSERDA released The New York State Hydrogen Energy Roadmap, a survey of resources, and a strategy for developing them into a hydrogen-based fuel economy for New York. The strategy, drafted by three prominent research groups, was commissioned by NYSERDA, the New York Power Authority (NYPA) and the Long Island Power Authority (LIPA). The goal is for hydrogen, by 2020, to serve as a fuel for transportation and stationary power markets, displacing imported and polluting energy sources.

The New York roadmap presents a three-phase, market-based transition strategy. The state's phases are:

- Phase I – Demonstrate pre-commercial, high-profile hydrogen technologies;
- Phase II – Build the 3C's: Hydrogen Clusters, Cities, and Corridors (market entry); and
- Phase III – Link the Hydrogen Clusters (commercialization).

For example, the roadmap calls for the installation of hydrogen fueling stations from Buffalo to New York City over the next ten years. Their availability coincides with the planned development of commercially viable hydrogen-fueled vehicles for use in fleets and personal travel. Further, it suggests additional investments will be encouraged throughout the State to support the production, transportation, storage and use of hydrogen.

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New York State Energy Research and Development Authority (NYSERDA)
17 Columbia Circle
Albany, NY 12203-6399
Phone: (518) 862-1090, Ext. 3257 (Bill Reinhardt) or Ext. 3317 (John Love)
E-mail: www.nyserda.org/programs/Research_Development/hydrogen.asp
Web: www.nyserda.org

Hydropower-to-Hydrogen Project

http://www.ny.gov/governor/press/06/1004061.html

In October 2006, New York's governor announced plans for one of the world's largest hydrogen projects, using Western New York's hydropower resources to produce hydrogen for use in hydrogen-fueled work and passenger vehicles and transit buses. The effort will be coordinated by the New York Power Authority (NYPA), the New York State Energy Research and Development Authority (NYSERDA) and the Long Island Power Authority (LIPA). Various other state and federal government organizations and corporations are expected to partner in the project.

Hydrogen production is anticipated to begin by the end of 2007. Full implementation of the project is planned by the end of 2009 and will consist of two hydrogen generation stations, plus storage and fueling facilities. Production capacity will be 120 kg/day of hydrogen (equivalent to about 120 gallons of gasoline). The generation and fueling stations require up to 700 kw of hydropower.

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E-mail: http://161.11.121.121/govemail
Web: www.ny.gov/governor/index.html

2. STANDARDS/REGULATIONS

POWER GENERATION

Retail Renewable Portfolio Standard

www.dps.state.ny.us/03e0188.htm
www3.dps.state.ny.us/pscweb/WebFileRoom.nsf/Web/85D8CCC6A42DB86F85256F1900533518/$File/301.03e0188.RPS.pdf?OpenElement

The 2002 New York State Energy Plan required that the New York State Energy Research and Development Authority examine and report on the feasibility of establishing a renewable portfolio standard (RPS). An "Order Approving Renewable Portfolio Standard Policy" was issued by the New York Public Service Commission in 2004, calling for an increase in renewable energy used in the state from the then current

level of about 19% to 25% by the year 2013. Two approaches were identified to achieve that goal: a central procurement approach that would provide for increases to about 24% and a voluntary green market approach that would provide at least the other 1%.

Two tiers of eligible resources have been established. The first or "Main Tier" consists primarily of medium to large-scale electric generation facilities, and the second or "Customer-Sited Tier" consists of "behind-the-meter" facilities that are not generally economically competitive with the Main Tier technologies. Eligible resources in the Main Tier include biogas, biomass, liquid biofuel, fuel cells, hydroelectric, photovoltaics, ocean or tidal power, and wind. Eligibility in the Customer-Sited Tier includes fuel cells, photovoltaics, and wind resources.

Contact:

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Web: www.dps.state.ny.us/index.html

Interconnection Standards

www.dps.state.ny.us/distgen.htm

New York has developed standardized interconnection requirements for new distributed generators, 2 MW or less, to connect in parallel with utility distribution systems. The rules apply to New York's six investor-owned local electric utilities. Simplified application procedures are available for single phase attachment of parallel generation equipment to the electric system (15 kW or smaller). Certified interconnection equipment includes Plug Power's 6.5 kW, 240V Single Phase Fuel Cell Inverter.

Contact:

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Web: www.dps.state.ny.us/index.html

VEHICLES

Zero Emission Vehicle Sales Requirement

www.dec.state.ny.us/website/regs/subpart218_4.html

California's LEV standards for light- and medium-duty motor vehicles were adopted by New York in 1992. A modification of the standards in 2000 required auto manufacturers

to offer 10% of their sales fleets as ZEVs. An alternative compliance program was developed in 2002 under the ZEV mandate, providing several options for auto manufacturers to meet the new vehicle emissions requirements:

- By model year 2004, at least 10% of all vehicles sold must be partial ZEV or better;
- By model year 2005, 9% of vehicles would be partial ZEV and 1% would be ATPZEVs;
- By model year 2006, 7% of vehicles would be partial ZEV, 2% ATPZEV and 1% ZEV, which could be battery electric or fuel cell vehicles; and

Contact:

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Division of Air Resources, Mobile Sources & Technology Development
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Web: www.dec.state.ny.us/website

3. PUBLIC AGENCY POLICIES/PURCHASE PROGRAMS

POWER GENERATION

"Green and Clean" State Buildings

www.nyserda.org/programs/exorder111.asp

Executive Order 111, issued by the governor in 2001, declares that "State agencies and other affected entities with responsibility for purchasing energy shall increase their purchase of energy generated from the following technologies: wind, solar thermal, photovoltaics, sustainably managed biomass, tidal, geothermal, methane waste and fuel cells. State agencies and other affected entities shall seek to purchase sufficient quantities of energy from these technologies so that 10% of the overall annual electric energy requirements of buildings owned, leased or operated by State agencies and other affected entities will be met through these technologies by 2005, increasing to 20% by 2010." This program is administered by NYSERDA.

Contact:

New York State Energy Research and Development Authority (NYSERDA)
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Phone: (866) NYSERDA or (518) 862-1090
E-mail: info@nyserda.org
Web: www.nyserda.org

4. INCENTIVES/MARKET STIMULATION

POWER GENERATION

Fuel Cell Electric Generating Equipment Tax Credit

www.tax.state.ny.us/pdf/2005/inc/it259i_2005.pdf

The New York Tax Law allows a credit for the purchase and installation of eligible fuel cell electric generating equipment. The credit is 20% of the qualified fuel cell electric generating equipment expenditures for the purchase and installation of fuel cell electric generating equipment. However, the credit cannot exceed $1,500 for each unit purchased. The equipment must be installed and used in New York State and must be placed in service on or after July 1, 2005. A qualifying fuel cell is defined as an on-site electricity generation system that utilizes PEM technology with a rated system capacity between 1 kW and 100 kW.

Contact:

New York State Department of Taxation and Finance
Phone: (800) 225-5829 (individual taxpayer) or (800) 972-1233 (business taxpayer)
E-mail: http://tax.custhelp.com/cgi-bin/tax.cfg/php/enduser/ask.php?p_sid=tX6itU1i&p_lva=&p_sp=&p_li= (individual taxpayer) or http://nystax.custhelp.com/cgi-bin/nystax.cfg/php/enduser/ask.php?p_sid=4DUvtU1i&p_lva=&p_sp=&p_li= (business taxpayer)
Web: www.tax.state.ny.us

New York Green Building Tax Credit

http://www.dec.state.ny.us/website/ppu/grnbldg/index.html
http://www.dec.state.ny.us/website/ppu/grnbldg/legis.html

The Green Building Tax Credit program was signed into law in 2000, allowing a credit for a percentage of "Allowable Costs" (generally, those costs properly chargeable to capital account, other than for land) and paid or incurred by a taxpayer. The Department of Environmental Conservation (DEC) began accepting applications in 2002 and $25 million in Green Building Tax Credits were allocated to seven buildings.

New legislation was passed in 2005 to amend the Green Building Tax Credit Program to provide an additional $25 million in credits, with the aggregate amount of credit components permitted for each such building being $2 million. DEC has five years, from 2005 through 2009, to accept applications for and issue initial credit component certificates for the additional allocation. The existing Green Building Tax Credit regulations are being updated and applications for credit component certificates for Period Two will not be accepted until the updated regulations are promulgated.

The Green Building Tax Credit program is divided into six components:

- Green Whole Building credit component;
- Green Base Building credit component;
- Green Tenant Space credit component;

- Fuel Cell credit component;
- Photovoltaic credit component; and
- Green Refrigerant credit component.

The Fuel Cell Credit component requires that the fuel cell must be serving a green space and be a "qualifying alternate energy source". Thirty percent of the capitalized cost of each fuel cell (6% x 5 years) qualifies for the tax credit. The credit cap is $1,000/kw x DC-rated capacity.

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625 Broadway
Albany, NY 12233-1750
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Fax: (518) 402-9168
Web: www.dec.state.ny.us

Peak Load Reduction Program

www.nyserda.org/programs/peak-load.asp

The New York Energy $mart Peak Load Reduction Program, administered by NYSERDA, accepts applications from eligible contractors to identify and implement one or more project(s) that will result in reduced peak electric demand in New York State, particularly New York City. The program offers several components geared toward specific demand reduction strategies.

One component of the program, Permanent Demand Reduction, funds technologies that permanently reduce a facility's demand coincident with the system peak. Fuel cells, wind turbines, photovoltaic or other renewable energy resources are eligible for funding. The minimum Project size is 20 kW. Eligible project costs include engineering services, procurement and installation of capital equipment, or other NYSERDA approved expenses incurred to permanently reduce summer peak demand. Capital equipment includes facility improvements that result in reduced electric demand, such as heating, ventilation and air-conditioning (HVAC) equipment, lighting equipment, motors, PV, and other custom measures that reliably reduce demand coincident with the system peak.

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E-mail: www.nyserda.org/programs/peak-load.asp
Web: www.nyserda.org

VEHICLES AND FUELING INFRASTRUCTURE

New York State Clean Cities Challenge

www.nyserda.org/Programs/transportation/afv.asp

The New York State Clean Cities Challenge awards funds to members of New York's Clean City organizations to acquire AFVs and/or refueling infrastructure. Applicants include eligible Clean Cities stakeholders with fleets of 10 or more vehicles that will own, lease or otherwise operate the vehicles or equipment for which funds are requested and fuel providers with accompanying letters of support from at least two fleets that will be using the blended fuel. AFVs eligible for incremental cost funding must be fueled by natural gas, propane, methanol, hydrogen, ethanol, or use electricity either stored or generated on board, as the primary motive force. Funds are awarded on a competitive basis, and can be used to cost-share up to 75% of the proposed project, including incremental purchase costs of alternative-fuel vehicles and the cost of installing fueling and recharging equipment. The program is administered through NYSERDA's AFV Program.

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Web: www.nyserda.org

Clean Fuel Vehicle Refueling Property Installation Tax Credit

www.tax.state.ny.us/pdf/2004/inc/it253i_2004.pdf

Tax credits are currently available in New York State for 50% of the cost of installation of clean-fuel vehicle refueling property ("property" includes the engine, exhaust components, and fuel storage and delivery components that enable the motor vehicle to use clean fuel, either in the retrofit of an existing vehicle or in a manufacturer's original equipment vehicle). Eligible clean fuels include natural gas, LPG, hydrogen, electricity, and any other fuel which is a least 85%, singly or in combination, methanol, ethanol, any other alcohol, or ether. The credits are available for installation of property through 2007.

Contact:

New York State Department of Taxation and Finance
Phone: (800) 225-5829 (individual taxpayer) or (800) 972-1233 (business taxpayer)
E-mail: http://tax.custhelp.com/cgi-bin/tax.cfg/php/enduser/ask.php?p_sid=tX6itU1i&p_lva=&p_sp=&p_li= (individual taxpayer) or http://nystax.custhelp.com/cgi-bin/nystax.cfg/php/enduser/ask.php?p_sid=4DUvtU1i&p_lva=&p_sp=&p_li= (business taxpayer)
Web: www.tax.state.ny.us

Clean-Fueled Bus Program

http://www.nyserda.org/Programs/transportation/afv.asp

The Clean-Fueled Bus Program provides funds to state and local transit agencies, municipalities, and schools for up to 100% of the incremental cost of new alternative-fuel

buses, and a combination of a Clean Fuel Bus Project and a directly associated Clean Fuel Infrastructure project. Eligible Vehicles include any motor vehicle with a seating capacity of 15 or more passengers in addition to the driver and used for the transportation of persons on public highways that is powered by CNG including dual-fuel technology, propane, methanol, hydrogen, biodiesel or ethanol, or uses electricity, including electricity either stored or generated on board, as a primary motive force (e.g. hybrid-electric). The emissions reduction potential of alternative-fuel buses is evaluated for project selection. The program is administered through NYSERDA's AFV Program.

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5. PARTNERSHIPS

New York State Fuel Cell Network

www.neny.org/NYFCN/index.cfm

A newly established subgroup of New Energy New York (NENY), the New York Fuel Cell Network brings together NENY partners General Motors, Plug Power, MTI Micro, Delphi, Greater Rochester Enterprise and Albany NanoTech's Energy and Environmental Technology Applications Center to discuss collaborative fuel cell research and commercialization strategy.

NENY's New York Fuel Cell Network is committed to the development of the fuel cell industry within New York State, with the Rochester-based General Motors fuel cell division taking a key leadership role. Membership is open to all NENY members engaged in active fuel cell research and/or commercialization. The network will operate as a coalition to guide, recommend and suggest R&D priorities; establish supplier networks across the entire industry value chain; and solicit funding from federal and state sources.

Contact:

New York Fuel Cell Network
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6. RD&D SUPPORT

New York State Energy Research and Development Authority (NYSERDA)

www.nyserda.org

NYSERDA is a public benefit corporation created in 1975 by the New York State Legislature. NYSERDA funds research into energy supply and efficiency, as well as energy-related environmental issues. NYSERDA has been cited by DOE as being among the best government research organizations in the North America.

NYSERDA derives its basic research revenues from an assessment on the intrastate sales of New York State's investor-owned electric and gas utilities, and voluntary annual contributions by the New York Power Authority (NYPA) and the Long Island Power Authority (LIPA). Additional research dollars come from limited corporate funds. NYSERDA also administers Systems Benefit Charge (SBC) funds and programs under an agreement with the state's Public Service Commission. SBC funds are collected through a surcharge on customer bills of investor-owned electric utilities (about $150 million annually) for energy programs targeting efficiency measures, research and development and the low-income sector. Federal funding is used to implement NYSERDA's Energy Efficiency Services program, which identifies existing technologies and equipment to reduce energy costs at more than 540 businesses, schools, and municipalities.

More than 400 NYSERDA research projects help the State's businesses and municipalities with their energy and environmental problems. Since 1990, NYSERDA has successfully developed and brought into use more than 125 innovative, energy-efficient and environmentally beneficial products, processes and services. These contributions to the State's economic growth and environmental protection are made at a cost of about $.70 per New York resident per year.

NYSERDA's hydrogen and fuel cell-related activities include:

- Collaborating with the New York Power Authority (NYPA) and the Long Island Power Authority (LIPA) to develop a state Hydrogen Roadmap.
- Administering New York's "Green and Clean" program, which seeks to increase the amount energy produced from fuel cells and other renewable technologies for use in state buildings and vehicles.
- Developing hydrogen education and outreach activities and reviewing national and New York State codes and standards governing the use of fuel cells and hydrogen as a fuel.

NYSERDA also offers financial incentives to promote hydrogen and fuel cell technologies, and supports research, development and demonstrations within the state.

NYSERDA Research, Development and Demonstration Support

In addition to work on fuel cell and hydrogen-related policy and education, and provision of incentive funding, NYSERDA actively supports fuel cell research, development and demonstrations. Programs and projects include:

Hydrogen Technology Demonstration Projects

In 2004, NYSERDA and the New York Power Authority (NYPA) made available $1.5 million in funding for hydrogen technology demonstration projects in the areas of hydrogen production, storage, distribution, and utilization.

Power Systems Program

Through its Power Systems Program, NYSERDA addresses research, development and demonstration needs associated with emerging distributed generation technologies. These new technologies include electricity power storage; management, communication, and interface technologies that supply the electricity grid; and supplying building or industrial loads with reliable, high quality power. The program undertakes projects designed to improve technology performance and reduce non-technical impediments and regulatory barriers to the widespread deployment of these new technologies.

One initiative under this program involves evaluating and field demonstrating 80 Plug Power 7000 fuel cell power systems at various New York State-owned facilities and locations.

New York Energy $mart Programs

New York Energy $mart is designed to develop markets for energy efficiency products/services and renewable energy resources, fund research and development of innovative products that save energy and the environment, provide low-income services, and conduct research in environmental protection. Fuel cell project grants made under the Energy $mart program include:

- A demonstration of two 5-kW, grid-parallel fuel cell systems at a private homes located in the state. Co-funding for this project is provided through NYSERDA's New York Energy $mart program, which is designed to lower electricity costs by encouraging energy efficiency.
- $200,000 in funding to further develop the MTI Micro Fuel Cells, Inc. Mobion™ low temperature micro fuel cell that converts methanol to electric power.

Combined Heat and Power Demonstration Projects

In 2002, the governor committed $20 million to install 45 CHP systems throughout the State that would result in 35 MW in new electric generation. In addition $4 million was committed for 11 projects to further develop the kinds of distributed generation technologies used in CHP applications. In 2003, the governor committed a further $14.5 million to support 36 distributed generation and CHP projects.

A number of NYSERDA awards were made to fuel cell and hydrogen technologies under the CHP program, including more than $5.5 million in funding to fuel cell CHP demonstration projects and almost $3 million for fuel cell product development.

Contact:

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17 Columbia Circle

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Web: www.nyserda.org

Long Island Power Authority (LIPA)

www.lipower.org/cei/rd.fuel.html

The Long Island Power Authority (LIPA) Clean Energy Research, Development and Demonstration (RD&D) Program explores everything from wind energy to fuel cells to electric vehicles, and uses in-house expertise to conduct projects, as well as continuously review and analyze project results. The RD&D Program also provides information and education, encouraging the Long Island community to team up with LIPA on Clean Energy RD&D projects. Projects include:

- The Long Island Fuel Cell Farm R&D project at the West Babylon substation, which has been the focal point of LIPA's fuel cell program. In 2001, 75 Plug Power fuel cells were connected to the grid, producing enough energy to power about 100 average-sized homes. This project was the first grid connection of fuel cells of this size in the world.
- Remote site fuel cell installations, for which LIPA recruited government and commercial-industrial customers to demonstrate CHP 5-kW fuel cell systems. Demonstration sites include Babylon Town Hall, Hofstra University, East Hampton Town Hall, McDonalds, Farmingdale University, Nassau Community College, Southampton College and the Wantagh Animal Shelter.
- Three hydrogen-powered uninterruptible power supply (UPS) fuel cell units, installed at the U.S. Merchant Marine Academy at Kings Point for a one-year demonstration.

Contact:

Long Island Power Authority (LIPA)
333 Earle Ovington Boulevard, Suite 403
Uniondale, NY 11553
Phone: (800) 692-2626
Web: www.lipower.org

New York Power Authority (NYPA)

www.nypa.gov/services/fuel%20cells.htm

NYPA is America's largest state-owned power organization and a leader in promoting energy efficiency and the development of clean energy technologies and electric vehicles. NYPA conducts research directed at NYPA facilities, and also participates in institutional research at the state and national levels. Technology development efforts include transmission and generation of electricity, energy storage, distributed generation and equipment monitoring and diagnostics. Innovative technology development is conducted in the areas of fuel cells, solar photovoltaic systems and microturbines.

NYPA gained its first experience with fuel cells in 1997, when it installed a unit at the Westchester County Wastewater Treatment Facility in Yonkers. Subsequently, NYPA has installed:

- Eight fuel cells at four sewage treatment plants operated by the New York City Department of Environmental Protection;
- Three fuel cells in New York City, located at the Central Park Police Precinct, North Central Bronx Hospital and the Wildlife Conservation Society's New York Aquarium at Coney Island;
- A fuel cell at SUNY College of Environmental Science and Forestry; and
- Twelve fuel cells at various other state locations.

Contact:

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8. STATE AND LOCALLY-SUPPORTED DEMONSTRATIONS

POWER GENERATION

Albany International Airport, Albany: The demonstration, using a prototype 5-kW Plug Power PEM fuel cell, began in 2003, and the prototype was replaced by a newer model in 2004. At the completion of the project, Verizon purchased several of the fuel cell systems and sited one permanently at Albany Airport. Demonstration project funding was provided by NYSERDA.

North Central Bronx Hospital, Bronx: The UTC Power 200-kW PAFC supplies supplemental power and back-up power to the hospital. Installed by NYPA in 2000.

New York Aquarium, Brooklyn: The UTC Power 200-kW PAFC provides 20% of the aquarium's power needs. The installation will allow the Aquarium to decrease its demand on standard sources of electricity. It will also provide enough waste heat to warm domestic hot water and boiler supply water for buildings and tanks. The fuel cell was installed in 2001 by NYPA.

Verizon's Central Office, Garden City: Seven UTC Power 200-kW PAFC units, totaling 1.4 MW of power, were installed at Verizon's Garden City call center. The Center provides local, long-distance and data services over about 35,000 phone lines in the area. The project is unique because the existing commercial power grid, the new fuel cells and existing Verizon backup power work together to meet any set of operational needs required at the building. They include electrical backup for commercial power outages, natural disasters and periods of peak commercial power demands. By using electricity from the fuel cells and reclaiming the heat and water they produce to help heat and cool the building, Verizon is eliminating some 11.1 million pounds of

carbon dioxide that would have been emitted into the atmosphere by a similar-sized fossil-fuel based power plant during one year. The project is expected to save Verizon some $250,000 annually in commercial power costs. Project participants include NYPA and NYSERDA.

Local 25 International Brotherhood of Electrical Workers Headquarters, Hauppauge: First combined use of solar power and a fuel cell system on Long Island. The 15-kW solar power system and 5-kW Plug Power fuel cell unit provide electric power and domestic hot water to the facility. During an electrical outage the fuel cell is capable of operating independent of the electric grid, supplying electricity to critical loads and emergency lighting throughout the facility. Part of LIPA's Clean Energy Initiative. Installed in 2005.

Suffolk County William Rogers Legislative Building, Hauppauge: Installed by LIPA in 2003, the three, Plug Power 5-kW PEM units are interconnected to LIPA's grid and operate in a CHP mode, providing electricity and heat on-site.

Suffolk State Office Building, Hauppauge: Installed in 2005 as part of a partnership of the New York Power Authority and the New York State Office of General Services. The UTC Power 200-kW PAFC supplies power to the New York State Regional Emergency Management Office, located in the facility. The Regional Emergency Management Office coordinates emergency planning and response for the New York City and Long Island metropolitan areas. In the event of a utility interruption, the fuel cell will isolate from the grid parallel circuit and automatically reconnect to a backup circuit within five seconds. Upon utility startup, the fuel cell will automatically return to the grid parallel circuit.

BOCES Regional Information Center, Syracuse and Liverpool High School, Liverpool: The Board of Cooperative Educational Services (BOCES) Regional Information Center UTC 200-kW Power PAFC was installed in 1997 to provide emergency uninterruptible back-up power to the BOCES computer system which provides Internet for public schools and is used for administrative support, data and payroll processing. A 200-kW PAFC, installed in 2000, also serves Liverpool High School as an educational resource for science teachers and operates grid-independently to allow the high school to become an emergency shelter during community disasters. Both installations are projects of the Onondaga-Courtland-Madison BOCES.

Alpha fuel cell units, Long Island: LIPA has installed alpha Plug Power 5-kW PEM fuel cell systems at Hofstra University, Brookhaven National Laboratory, the United States Merchant Marine Academy and SUNY-Farmingdale. The installations began in 2002.

Commercial installations, Long Island: LIPA has placed Plug Power 5-kW PEM fuel cells at various commercial locations around Long Island, including a McDonalds in Deer Park, Hofstra University, Nassau Community College, Southampton College, Wantagh Animal Shelter. and Babylon and East Hampton Town Halls. The units were installed between 2002-2004.

Central Park Police Headquarters, Manhattan: Installed by NYPA in 1999, the UTC Power 200-kW PAFC provides all electricity for the police station, operating

independently of the electric grid. The police station was one of the few facilities with lights and power during the city's widespread power outage in 2003.

Grand Central Terminal, Manhattan: Two UTC Power 200-kW PAFC systems were installed by NYPA in 2005 to provide power for critical security loads even during a local power failure. Partially funded by NYSERDA.

New York Hilton Hotel, Manhattan: Installed in 2005, the UTC Power 200-kW PAFC provides power and 100% waste heat recovery for hot water in guest rooms, kitchens and laundry. Partial funding provided by NYSERDA under its Distributed Generation/Combined Heat and Power (distributed generation/CHP) program.

Sheraton Hotel New York Hotel & Towers, Manhattan: The FuelCell Energy 250-kW MCFC provides about 10% of the power and hot water requirements of the 1,750 room hotel. Partial funding provided by NYSERDA. The fuel cell was installed in 2004.

SUNY College of Environmental Science and Forestry, Syracuse: Installed by NYPA in 2005, the FuelCell Energy 250-kW MCFC provides electricity with waste heat used for hot water, space heating and/or cooling at Walters Hall. Partial funding by NYSERDA.

Rural residence, Tompkins: As an alternative to running wires to homes in remote locations, the Delaware County Electric Cooperative is demonstrating a Plug Power 5-kW fuel cell that is integrated with a power electronics and battery storage system to manage the electrical loads dynamically and provide the peak energy needs of the residence. The system is continually charged by the fuel cell during "off-peak" times. The project is funded by NYSERDA and through at grant provided under a U.S. Congressional Earmark to investigate the viability of fuel cells for rural applications.

West Babylon Fuel Cell farm, West Babylon: The Long Island Fuel Cell Farm R&D project at the West Babylon substation has been the focal point of LIPA's fuel cell program. In October 2001, LIPA announced that 75 Plug Power fuel cells were connected to the grid. This project was the first grid connection of fuel cells of this size in the world. As of November 2003, there are 45 units installed.

Yonkers Waste Water Treatment Plant, Yonkers: World's first anaerobic digester gas-fueled fuel cell. The UTC Power 200-kW PAFC was installed in 1997 by NYPA.

Water Pollution Control Plants (Ward 26, Red Hook, Oakwood Beach, Hunts Point) located at Brooklyn, Bronx and Staten Island: Two 200-kW UTC Power PAFC units are located at each plant, converting waste gas into energy to help power the facilities. The installations are a joint project of NYPA, NYSERDA and the New York City Department of Environmental Protection. The program reduces harmful greenhouse gas emissions and helps to eliminate the release of noxious gas into the air and this process is expected to eliminate nearly 170 tons of regulated emissions and more than 9,000 tons of the greenhouse gas carbon dioxide, and reduce fuel oil consumption by 3,000 barrels a year. The cost of the fuel cell program is $13 million. NYPA provided $10.5 million and NYSERDA and DOE provided more than $2.5 million to co-fund the initiative. The fuel cells were installed in 2003.

Single family homes, Colden and Lewiston: The two Plug Power fuel cells were installed in 2002 for one-year demonstrations, to show the viability of fuel cells as a source of clean, efficient electric power generation for residential applications connected to the grid. The project was implemented through a partnership of business and government entities, including NYSERDA.

VEHICLES

Honda FCX vehicles, Albany: The New York State government has leased two 2005 Honda FCX fuel cell vehicles for a period of two years. The cars, which were delivered in late 2004 and mid-2005, are being used in regular daily State operations. To fuel the vehicles, Honda and partner Plug Power have developed a Home Energy Station (HESII) that would allow customers to refuel their fuel cell vehicles at home while supplying supplemental electricity and heat for the home. The HESII prototype is located at Plug Power's headquarters in Latham and provides the state with refueling options while providing real-world data for further development of this technology. Honda also has agreed to provide an Air Products mobile refueling station at the Harriman State Office campus in Albany for use in refueling the state-leased vehicles.

PLANNED DEMONSTRATIONS

Old Lion House, Bronx Zoo: The restored Old Lion House historic building will re-open in 2006 and will be LEED-rated (a “green” certification). “Green” features will include a 200-kW PAFC gas-powered fuel cell, installed by NYPA; a graywater recycling system; geothermal wells; high-performance glass; and carbon-dioxide monitoring. The UTC Power system will provide power and hot water, and drive absorption chillers. Partial funding is being provided by NYSERDA.

East Rochester High School, East Rochester: East Rochester School District will install a 200-kW UTC Power PAFC at East Rochester High School in 2006. The fuel cell will provide 60-70% of the school energy needs and will provide continuous electricity and heat for the high school and onsite backup power for the community's emergency response program. The school district anticipates saving about $100,000/year in energy costs. Total cost of the project is $2.5 million, with $1 million provided by NYSERDA and $1.5 million from the district’s Capital Reserve Fund.

Hydrogen fueling station and GM fuel cell fleet, New York City: Shell Hydrogen anticipates opening a hydrogen fueling station in 2006 that will support a future fleet of 13 GM hydrogen fuel cell vehicles.

Corona Maintenance Facility, Queens: The 200-kW UTC Power PAFC will be installed at the Corona Maintenance Facility, one of New York City’s largest rail car maintenance yards. The fuel cell is intended to operate in parallel with the utility grid to displace existing facility electric demand. The fuel cell is also configured to operate as a stand alone generator in the event of a utility interruption. The thermal energy from the fuel cell supplements the domestic hot water system. Project partners include New York City Transit and NYPA. The fuel cell will be operational in 2006.

NORTH CAROLINA

1. PLANS/STRATEGIES

2003 North Carolina State Energy Plan

www.energync.net

In 2003, the North Carolina Energy Policy Council, staffed by the State Energy Office and charged with advising the legislature and Governor on energy policy, issued the first state energy plan since 1992. The Plan outlines programs and policies that build upon the state's energy strengths and encourages the development of new energy approaches—including the direct use of alternative energy sources for either providing electricity or other energy-related services, such as daylighting, hot water, space heating, or space cooling. Alternative energy sources discussed in the Plan include solar, wind, hydroelectric, biomass and fuel cells.

Fuel cell-related recommendations include:

- The North Carolina Department of Commerce and the State Energy Office should encourage and support economic development of energy-related enterprises whose products are intended to increase energy efficiency or use renewable resources, including the use of fuel cells.
- North Carolina should continue to monitor fuel cell technology development. Since fuel cell manufacturing companies have located in the state, it is especially important to attract and assist these industries for economic development reasons.

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1340 Mail Service Center
Raleigh, NC 27699-1340
Phone: (800) 662-7131 or (919) 733-2230
Fax: (919) 733-2953
E-mail: energyinfo@ncmail.net
Web: www.energync.net

North Carolina Energy Office Programs

www.energync.net

The North Carolina Energy Office has developed a series of programs to promote energy efficiency and is currently exploring investments in renewable technologies. To date, they have funded several demonstrations, including a fuel cell installation that runs on methane gas from animal waste. No larger scale fuel cell program has been developed yet, but the state is considering a fuel cell program. Other state-sponsored demos involve biomass, PV and wind technologies. The Energy Office also offers an educational program that provides technical training/background on different clean

energy technologies. The main focus of their public outreach is to promote energy efficiency and conservation among residents and businesses in North Carolina.

The Energy Office supports the North Carolina Solar Center at North Carolina State University efforts to develop and implement a program to provide middle school students across North Carolina with a hands-on opportunity to learn about transportation challenges. This program will be based on science, math, and chemistry skills combined with learning resources about renewable and sustainable energy while building a model fuel cell car with solar panel to compete in a statewide competition. This is a pilot program that will be developed for North Carolina students, implemented, evaluated, revised if necessary, and ready to be duplicated for future growth and expansion.

The North Carolina Solar Center has published two related reports on state-level incentives for which stationary fuel cells are eligible. State governments in the United States collectively offer scores of financial incentives and favorable regulatory policies that promote fuel cell deployment, according to the reports. State-level incentives for which stationary fuel cells are eligible include grants, rebates, loans, net metering and a variety of tax benefits. These reports can be accessed at:
www.irecusa.org/articles/static/1/binaries/Fuel_Cell_Incentives_2004_long.pdf
www.irecusa.org/articles/static/1/binaries/Fuel_Cell_Incentives_2004_short.pdf

Contact:

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1340 Mail Service Center
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Fax: (919) 733-2953
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Web: www.energync.net

2. STANDARDS/REGULATIONS

VEHICLES

Alternative Fuel Vehicle Requirement

www.ncleg.net/enactedlegislation/statutes/pdf/bysection/chapter_143/gs_143-215.107c.pdf

North Carolina statute requires that at least 75% of the new or replacement light duty cars and trucks purchased by the state must be alternative-fueled vehicles or LEVs. “Alternative-fueled vehicle” is defined as a motor vehicle capable of operating on electricity; natural gas; propane; hydrogen; reformulated gasoline; ethanol; other alcohol fuels, separately or in mixtures of 85% or more of alcohol by volume; or fuels, other than alcohol, derived from biological materials.

Contact:

North Carolina Department of Administration

1301 Mail Service Center
Raleigh, NC 27699-1301
Phone: (919) 807-2425
Web: www.doa.state.nc.us

5. PARTNERSHIPS

Hydrogen Economy and Advancement Team (HEAT)

www.energy.appstate.edu/fuelcells/docs/roadmap-thompson.pdf

Volunteers from 12 business and local government, working under the auspices the Mooresville / South Iredell Chamber of Commerce, have formed the Hydrogen Economy and Advancement Team (HEAT) to promote hydrogen technologies. Members include engineers, planners, systems integrators, engineers, planners, systems integrators and environmentalists.

HEAT projects have included:

- Promotion of hydrail (hydrogen fuel cell commuter rail), including sponsorship of the First International Hydrail Conference held in May 2005. Conference co-sponsors included EPA, NC Energy Office, NC Commerce, Charlotte and Mooresville Chambers of Commerce and Centralina Council of Governments, with presentations by groups from Japan, Canada, Denmark, North Carolina, as well as universities and businesses.
- Development of H2TEACH (Teaching Everyone About Clean Hydrogen), a hydrogen education program.

According to a HEAT presentation, volunteers from the Charlotte, NC area have also formed a hydrogen group--the **Charlotte Hydrogen Action Team (CHAT)**.

Contact:

Stan Thompson, Chairman
Hydrogen Economy Advancement Team (HEAT)
Mooresville/South Iredell Chamber of Commerce
Phone: (704) 664-5486
E-mail: hst2nd@aol.com

NC Fuel Cell Alliance

www.energy.appstate.edu/fuelcells

The NC Fuel Cell Alliance is dedicated to supporting economic development, research, and education efforts centered on fuel cells in North Carolina. The Alliance is composed of stakeholder groups including industry, academia, and policy makers from across the state.

Hydrogen/Fuel Cell Roadmap

The NC Fuel Cell Alliance has recently begun work on a Hydrogen/Fuel Cell Roadmap that will outline actions the state can take to support the growth of hydrogen and fuel cell technology.

Contact:

NC Fuel Cell Alliance
231 University Hall
Boone, NC 28608
Phone: (828) 262-7515
Web: www.energy.appstate.edu/fuelcells

6. RD&D SUPPORT

The Advanced Vehicle Research Center of North Carolina
www.avrnc.com/index.htm

The Advanced Vehicle Research Center of North Carolina (AVRC) will be a comprehensive center available for the development and testing of AFV's, including vehicles fueled by hydrogen. The Center will be built in several stages, with Phase One to include a 2.5 mile closed loop test track, available garages, refueling for AFVs, office space for members, and testing services on a contract basis.

The AVRC is being funded by Northampton County ($1.6 million), state of North Carolina ($7.5 million), federal government ($1.8 million) and Golden Leaf Foundation ($1 million).

Contact:

Advanced Vehicle Research Center of North Carolina
Phone: (919) 870-9494
E-mail: www.avrnc.com/contactus.htm
Web: www.avrnc.com/index.htm

8. STATE AND LOCALLY-SUPPORTED DEMONSTRATIONS

The NC Energy Office has funded a fuel cell installation that runs on methane gas derived from animal waste.

NORTH DAKOTA

4. INCENTIVES/MARKET STIMULATION

Hydrogen Tax Exemption

www.legis.nd.gov/assembly/59-2005/bill-text/FBJP0100.pdf

A new subsection to section of the North Dakota code, enacted in 2005, offers a sales and use tax exemption for the retail sale of hydrogen and equipment used in production, storage, and transportation of hydrogen by a hydrogen generation facility. The subsection also includes a special fuels tax exemption for sales of hydrogen for any purpose.

Contact:

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Web: www.nd.gov/tax

OHIO

1. PLANS/STRATEGIES

Ohio Fuel Cell Initiative

www.governor.ohio.gov/releases/051105FuelCell.htm

Introduced in 2002, the Ohio Fuel Cell Initiative is a $103 million effort to promote fuel cell technologies in the state. The Initiative is part of the Third Frontier Project, a $1.1 billion job creation program to create jobs and bring new products to market.

Core focus areas of the Fuel Cell Initiative are to:

- Expand the state's research capabilities;
- Participate in demonstration projects, including hydrogen infrastructure; and
- Expand the fuel cell industry in Ohio.

Funding:

Financing - $75 million

- $15 million from the Ohio Department of Development to help Ohio's fuel cell companies make new strategic capital investments that will create or retain jobs for Ohio citizens.
- Up to $60 million ($20 million per year) in federal volume cap for tax exempt financing of qualified, small issue projects over the next three years.
- Loan program to provide interest reduction up to 50% of the market rate on the eligible energy efficiency costs max $250,000 per project.

- General financing assistance to qualified projects.

Research, Development, & Demonstration - $25 million

- Up to $13 million over three years of oil overcharge monies to help with fuel cell research and development.
- $2 million public solicitation by the Ohio Coal Development Office for a three-year effort to further develop coal gasification and hot gas cleanup technologies that could provide a clean gas hydrogen supply for fuel cells.

Training - $3 million

- $3 million over three years to assist Ohio's fuel cell companies upgrade the skills of its workers

Initially planned as a three-year effort, the Fuel Cell Initiative has been extended through 2008. A major success of the program is October 2006 announcement that the world's first high-volume fuel cell production facility will be constructed in Dayton by fuel cell manufacturer Ultracell. The facility, which will produce small fuel cells for handheld devices, will bring an investment of $74 million and 360 new jobs to the state. The city, county and state will offer incentives in support of the projectand Ultracell has applied for an $8 million Ohio Research and Commericalization Grant.

Contact:

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77 South High Street, 25th Floor
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Phone: (614) 466-3887
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Web: www.odod.state.oh.us

Ohio Fuel Cell Roadmap

www.thirdfrontier.com/documents/OhiosFCRoadmapRpt-FINAL_000.pdf

In late 2004 Ohio released the Ohio Fuel Cell Roadmap, a five-year strategic guide to maximize the involvement of Ohio companies in the fuel cell industry. The Roadmap includes programs and activities that the State will focus on to create an environment that supports the fuel cell research, development and early commercialization. The Roadmap outlines the following strategies to accomplish these goals:

- Provide assistance to the Ohio Fuel Cell Coalition during the technology development and early commercialization periods of fuel cells;
- Identify Ohio manufacturers who have the potential to participate as suppliers;
- Encourage leading fuel cell companies to partner with Ohio manufacturers;
- Provide the necessary training for workers to support the fuel cell industry;
- Establish contact with out-of-state companies looking to expand and make them aware of the State's resources and commitment to fuel cells;
- Foster the fuel cell research by Ohio companies and academic institutions by facilitating the transfer of technology from universities to industry;
- Focus demonstration projects on technologies with a large Ohio content to enhance Ohio's image as fuel cell leader;

- Purchase and install commercial fuel cells at state facilities;
- Support early adoption of fuel cell technology through tax incentives; and
- Encourage the creation of standards for the fuel cell industry.

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77 South High Street, 25th Floor
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Web: www.odod.state.oh.us

Fuel Cell Supply Chain Database

www.emtec.org/fuelcells/fcsc/index.php

Edison Materials Technology Center Fuel Cell Group has developed a database describing the supply chain for fuel cells and the associated hydrogen infrastructure in Ohio. The intent is to establish an on-line forum where fuel cell developers, system integrators and prospective component manufacturers can assess their potential roles in the fuel cell supply chain, present their respective credentials, and be linked to possible consumers of their goods and services. The database was developed with funding support from an Ohio Department of Development grant and in affiliation with the Ohio Fuel Cell Coalition.

Contact:

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Fuel Cell Group
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2. STANDARDS/REGULATIONS

POWER GENERATION

Interconnection Standards

www.puco.ohio.gov/PUCO/Consumer/information.cfm?doc_id=115
www.puco.ohio.gov/emplibrary/files/legal/05-1500/05-1500-Entry.doc

A 1999 Ohio electric utility restructuring act established net metering for renewable-energy systems, including fuel cells. The Ohio Public Utilities Commission (PUC) subsequently issued interconnection standards for distributed generation in 2001.

In December 2005, the passage of the federal Energy Policy Act created an opportunity for the PUC to re-evaluate its existing regulatory structure. The Commission is currently examining any barriers to distributed generation from local installations using non-traditional energy sources.

Contact:

The Public Utilities Commission of Ohio
180 E. Broad St.
Columbus, OH 43215
Phone: (800) 686-7826
E-mail: www.puco.ohio.gov/PUCO/Contacts/index.cfm
Web: www.puco.ohio.gov

Net Metering

www.puco.ohio.gov/PUCO/Consumer/information.cfm?doc_id=346

Net metering is available to customers of investor-owned electric utilities who generate power using qualifying energy systems. Eligible systems include fuel cells, solar thermal electric, photovoltaics, landfill gas, wind, biomass, hydroelectric and microturbines. There are no limits on fuel cell system size, but electric utilities are not required to offer net metering after total generating capacity of all enrolled customer-generators equals one% of the supplier's aggregate customer peak demand.

Contact:

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E-mail: www.puco.ohio.gov/PUCO/Contacts/index.cfm
Web: www.puco.ohio.gov

Bowling Green Municipal Utilities: Net Metering

www.bgohio.org/utility-director/index.html

Although not an investor-owned utility and therefore exempt from the state's net metering rule, Bowling Green Municipal Utilities offers net metering to customers generating power using photovoltaic, wind, hydroelectric and fuel cell systems. System size is limited to 25 kW.

Contact:

City of Bowling Green Municipal Utilities
Attn: Daryl Stockburger
304 North Church Street
PO Box 388
Bowling Green, OH 43402
Phone: (419) 354-6246
Fax: (419) 353-4763
E-Mail: daryl.stockburger@bgohio.org

Web: www.bgohio.org

4. INCENTIVES/MARKET STIMULATION

POWER GENERATION

Energy Efficiency Revolving Loan Fund
www.odod.state.oh.us/cdd/oee/eerlf.htm

The Ohio Department of Development's Energy Efficiency Revolving Loan Fund promotes investment in energy efficient products, technologies or services that use clean, renewable energy resources by reducing the interest rate on standard bank loans for qualifying Ohio residents and businesses. Eligible projects include, but are not limited to, the purchase and installation of solar energy, wind energy, biomass and bio-energy, hydropower and fuel cells.

Contact:

Renewable Energy Loans
Judy Jones, Loan Fund Administrator
Ohio Department of Development
P.O. Box 1001
Columbus, Ohio 43216-1001
Phone: (614) 466-8139
E-mail: jsjones@odod.state.oh.us
Web: www.odod.state.ohio.us

Double Saving Loans for Energy Home Improvement
Judy Pacifico
Ohio Department of Development
P.O. Box 1001
Columbus, Ohio 43216-1001
Phone: (614) 387-2732
E-mail: jpacifico@odod.state.oh.us
Web: www.odod.state.ohio.us

Business and Institutional Loans or Rental Housing Linked Deposits
Carolyn Seward
Ohio Department of Development
P.O. Box 1001
Columbus, Ohio 43216-1001
Phone: (614) 466-4053
E-mail: cseward@odod.state.oh.us
Web: www.odod.state.ohio.us

5. PARTNERSHIPS

Ohio Fuel Cell Coalition

www.fuelcellsohio.org/pages/881775/index.htm

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

- Building upon existing industry and academic strengths for a coordinated, robust fuel cell infrastructure and supply chain;
- Promoting public awareness about the positive role fuel cell technology can play as an efficient, reliable and environmentally responsible source of energy in a wide variety of applications;
- Expanding networking and information sharing opportunities that lead to greater alliances, and understanding of the economic opportunities available to Ohio organizations; and
- Encouraging federal funding that will leverage state resources in the development of fuel cell technology and the locating of commercial development, manufacturing assets, and job creation in Ohio.

Members include NexTech Materials, Cinergy Ventures, Kent State, HydroGen LLC, FirstEnergy, Air Force Research Lab at WPAFB, Parker Hannifin, Plug Power, Logan Energy, Millennium Cell, Delphi Corp, Rolls Royce Fuel Cell Systems and others.

The Coalition is supported by grant contributions from Ohio Department of Development, the Northeast Ohio Technology Coalition (NorTech), the Generation Foundation, and by member dues.

Contact:

Ohio Fuel Cell Coalition
Ken Alfred, Executive Director
737 Bolivar Road Suite 2500
Cleveland, OH 44115
Phone: 216-363-6883
Fax 216-363-6893
E-mail: kalfred@nortech.org
Web: www.fuelcellsohio.org

Wright Fuel Cell Group

www.wrightfuelcellgroup.org

The Wright Fuel Cell Group, formerly named the Power Partnership for Ohio, was established by Ohio's Third Frontier Project to accelerate innovation and commercialization for the fuel cell industry across the state. The Group is headquartered at Case Western Reserve University, the lead institution of the academic/industry partnership. Case Western will house the anchor facility consolidating commercialization and research activity on or near the campus. In addition to laboratories and equipment for applied fuel cell research and testing, administrative space will be available to encourage industrial relations and incubator space for start-ups and expanding businesses. Each participating university will also establish facilities

for education, research and development that will stimulate innovation and commercialization by sharing applied research with the Group's industry collaborators.

Wright Group researchers and industry collaborators will also have access to a new fuel cell testing building at the NASA Glenn Research Center and Stark State College of Technology's new, $5.2 million Fuel Cell Prototyping Center.

Academic collaborators include Case Western Reserve University, Ohio State University, Stark State College of Technology, the University of Toledo and Cleveland State University. Industry partners include American Electric Power; Battelle Memorial Institute; Dana Corporation; HydroGen LLC; Keithley Instruments; NexTech Materials Ltd.; Parker Hannifin Corporation; and SOFCo-EFS LLC. Battelle also will support the Wright Group's commercialization efforts, along with EMTEC.

Another function of the partnership is to connect Ohio businesses to the national and international fuel cell industry through its Board of Directors, which includes Ballard Power Systems, Energizer Holdings, Plug Power and Republic Engineered Products.

In 2003 Case Western Reserve University received an $18 million grant from the State of Ohio to support the research, development and commercialization of fuel cells. The partnership also receives funding from public and private sectors.

Contact:

Wright Fuel Cell Group
Nord Hall 506
10900 Euclid Ave
Cleveland, OH 44106
Phone: 216-368–8784
Fax: 216-368–6939
E-mail: john.mcgrath@case.edu
Web: www.wrightfuelcellgroup.org

7. EMERGING BUSINESS SUPPORT

Third Frontier Project

www.thirdfrontier.com

The Third Frontier project is Ohio's 10-year, $1.6 billion endeavor to expand high-tech research capabilities, promote innovation, encourage company formation and create high-paying jobs in Ohio. Project goals are to:

- Build world-class research capacity;
- Support early stage capital formation and the development of new products;
- Finance advanced manufacturing technologies to help existing industries become more productive; and
- Attract additional federal and private sector support can boost the total investment to more than $6 billion.

By mid-2005, the program had invested more than $38 million in various fuel cell-related projects. Grant programs include:

Third Frontier Fuel Cell Program

The Third Frontier Fuel Cell Program provides grants to companies, not-for-profit organizations, educational institutions, government research institutes, or public body seeking to commercialize new products, manufacturing processes, technologies, or adopting or modifying existing components or systems that can reduce the cost of fuel cell systems or address technical and commercialization barriers

Pre-Seed Fund Initiative

The Pre-Seed Fund Initiative provides grants to Pre-Seed Investment Funds to increase the availability of professionally managed capital and associated services to accelerate the growth of Pre-Seed Ohio technology companies. The 10-year, $1.1 billion state initiative is designed to build world-class research facilities, support early stage capital formation and the development of new products, and to finance advanced manufacturing technologies to help existing industries become more productive.

Ohio Research and Commercialization Grant Program

The Ohio Research Commercialization Grant Program was created as part of the Ohio Third Frontier Project to promote the commercial viability of technologies originating from Small Business Innovation Research, Small Business Technology Transfer and Advanced Technology Program research and development projects. The intent is to support activities by small technology companies to realize the commercial potential of research projects and to promote the competitiveness of these companies through the augmentation of federal research and development funding.

Validation Fund & Seed Fund Initiative

The Validation Fund & Seed Fund Initiative provides grants to Validation Funds and Seed Funds to increase the availability of professionally managed capital and associated services to accelerate the growth of early stage Ohio technology companies.

Product Development Pilot Program

The Third Frontier Product Development Pilot Program is seen as a way for Ohio non-profit and academic institutions to deliver product development support and resources that will help small and medium sized manufacturers with the tasks needed to successfully develop and sell new products

Wright Centers of Innovation

The Wright Centers of Innovation program provides grants to support large-scale world-class research and technology development platforms designed to accelerate the pace of Ohio commercialization. Wright Centers are to be collaborations among Ohio higher education institutions, non-profit research organizations, and Ohio companies in the areas of advanced materials, bioscience, power and propulsion, information technology and instruments, controls and electronics.

Wright Capital Project Fund

The Wright Projects Program provides grants to support specifically defined near term commercialization projects requiring major capital acquisitions and improvements at Ohio higher education institutions and non-profit research organizations. Projects must involve one or more Ohio companies and be in the areas of advanced materials, power and propulsion, information technology and instruments, controls and electronics

The Wright Projects Program

The 2006 Wright Projects Program provides grants to support specifically defined near term commercialization projects requiring major capital acquisitions and improvements at Ohio higher education institutions and non-profit research organizations. Projects must involve one or more Ohio companies and be in the areas of advanced materials, power and propulsion, information technology and instruments, controls and electronics.

Innovation Ohio Loan Fund (IOF)

The Innovation Ohio Loan Fund (IOF) was created to assist existing Ohio companies develop next generation products and services within certain Targeted Industry Sectors (advanced materials, power and propulsion, information technology and instruments, controls and electronics) by financing the acquisition, construction, and related costs of technology, facilities, and equipment. The IOF is intended to supply capital to Ohio companies having difficulty securing funds from conventional sources due to technical and commercial risk factors associated with the development of the new product or service. The IOF can finance up to 75% of a project's allowable costs to a maximum of $5 million and a minimum of $250,000.

Third Frontier's open RFP's can be viewed at www.thirdfrontier.com/open_rfps.asp. Older RFP's are located at www.thirdfrontier.com/rfp_archive.asp.

Contact:

Ohio Department of Development
Norman Chagnon
Staff Director, Third Frontier Commission
Technology Division
PO Box 1001
Columbus, OH 43216-1001
Phone: (614) 466-3887
E-mail: nchagnon@odod.state.oh.us
Web: www.thirdfrontier.com

8. STATE AND LOCALLY-SUPPORTED DEMONSTRATIONS

POWER GENERATION

Acumentrics/SofCo Holdings, Alliance: In 2005 the 10-kW tubular Acumentrics SOFC completed a 500-hour demonstration using commercial 2007 Certified Diesel fuel with a diesel reformer. Funded by Ohio's Third Frontier Program to demonstrate a sulfur-tolerant SOFC.

Wright Fuel Cell Group headquarters, Cleveland: In 2005 the Ohio Department of Development funded a demonstration project using seven Ballard AirGen 1.2-kW Fuel Cell Generators to power Wright Fuel Cell Group offices and portions of the lab.

Electric Division, Westerville: Installed in 2004, the FuelCell Energy 10-kW MCFC system feeds power to 180 homes from an electric substation. Partial funding through the Third Frontier Project.

Multi-Agency Radio Communications System (MARCS) microwave radio towers, various locations: Four ReliOn Independence 1000 PEM units were installed in 2004 to provide long-term, emergency back-up power to Ohio's critical digital communication infrastructure. Units are located in Washington Township, Butler, Tiffin and Otway. Funded through an Ohio Fuel Cell Initiative Grant from the Ohio Department of Development.

INFRASTRUCTURE:

Ohio State University Hydrogen Refueling Station: Built by Ohio State's Center for Automotive Research, the station opened in May 2006. Funding was provided by the University and Honda.

OKLAHOMA

1. PLANS/STRATEGIES

Fuel Cell Initiative Task Force, Alternative Fuels Commission
www.okcommerce.gov/index.php?option=content&task=view&id=338&Itemid=424

State legislation (2004) created the Fuel Cell Initiative Task Force, a 12-member team to assess the fuel cell industry and develop a statewide plan to encourage commercialization efforts in the state. In November 2005, the Task Force released its findings, which include the following recommendations:

- Seek federal grants to advance the research of ethanol fuel cell technology and funding for an annual conference on ethanol fuel cells to facilitate information sharing.
- Establish a task force to study the feasibility of using an ethanol-based fuel cell to provide energy for a new state building.
- Establish a research center at Oklahoma State University's Sarkeys Energy Center to study the development of a transportation system for hydrogen.

- Pass a tax credit to encourage the commercialization of nanotube technology being developed by Oklahoma State University researchers.

Contact:

State Energy Office
Oklahoma Department of Commerce
Deidra D. Myers, Director of Programs
900 N. Stiles
P.O. Box 26980
Oklahoma City, OK 73126-0986
Phone: (405) 815-5307
E-mail: deidre_myers@odoc.state.ok.us
Web: www.okcommerce.gov

OREGON

1. PLANS/STRATEGIES

Oregon's Renewable Energy Action Plan
http://egov.oregon.gov/ENERGY/RENEW/docs/FinalREAP.pdf

The goal of Oregon's 2005 Renewable Energy Action Plan is to encourage and accelerate the sustainable production of energy from renewable sources, stimulate economic development, particularly in rural parts of the state. Fuel cell-related actions outlined in the plan include:

- Installing two hundred 5-kW fuel cells, powered by both renewable and non-renewable sources, during 2006.
- Providing support to Oregon companies in attracting funding from regionally targeted federal fuel cell and hydrogen generation programs.
- Encouraging the Oregon University System to explore fuel cell technology and to establish a fuel cell technology center.
- Modifying the Oregon Department of Energy web site and publications to identify more clearly how a fuel cell owner can apply for tax credits.

Contact:

Oregon Department of Energy
625 Marion St., N.E.
Salem, OR 97301-3737
Phone: (800) 221-8035 or (503) 378-4040
Fax: (503) 373-7806
E-mail: energyweb.incoming@state.or.us

Web: http://egov.oregon.gov/ENERGY/CONS/about_us.shtml

2. STANDARDS/REGULATIONS

POWER GENERATION

Net Metering
www.leg.state.or.us/05reg/measpdf/sb0001.dir/sb0084.en.pdf
http://egov.oregon.gov/ENERGY/RENEW/programs.shtml

Customer-generators producing electricity with qualifying systems are eligible for net metering. Net metering must be provided up to 0.5% of a utility's historic single-hour peak load. Generating capacity of the net metered unit must be less than 25 kW. Qualifying systems include: fuel cells.

Contact:

Oregon Department of Energy
625 Marion St., N.E.
Salem, OR 97301-3737
Phone: (800) 221-8035 or (503) 378-4040
Fax: (503) 373-7806
E-mail: energyweb.incoming@state.or.us
Web: http://egov.oregon.gov/ENERGY/CONS/about_us.shtml

4. INCENTIVES/MARKET STIMULATION

POWER GENERATION

Business Energy Tax Credit
http://egov.oregon.gov/ENERGY/CONS/BUS/BETC.shtml
http://egov.oregon.gov/ENERGY/CONS/BUS/docs/Pre-FuelCell.doc

The Oregon Department of Energy offers the Business Energy Tax Credit to those who invest in energy conservation, recycling or renewable energy resources. Trade, business or rental property owners who pay taxes for a business site in Oregon are eligible for the tax credit. Project owners can also be Oregon non-profit organizations, tribes or public entities that partner with an Oregon business or resident who has an Oregon tax liability. Fuel cell projects are eligible for the tax credit. The credit of 35% of eligible project costs includes all costs directly related to the project, including equipment cost, engineering and design fees, materials, supplies and installation costs.

Contact:

Oregon Department of Energy
625 Marion Street, N.E.
Salem, OR 97301-3737
Phone: (800) 221-8035 or (503) 378-4040

Fax: (503) 373-7806
E-mail: energyweb.incoming@state.or.us
Web: http://egov.oregon.gov/ENERGY/CONS/about_us.shtml

Residential Energy Tax Credit

http://egov.oregon.gov/ENERGY/CONS/RES/RETC.shtml
http://egov.oregon.gov/ENERGY/CONS/RES/tax/fuelcell.shtml
www.oregon.gov/ENERGY/TRANS/hybridcr.shtml

Oregon residents are offered a tax credit on Oregon income taxes for making homes more energy efficient. Fuel cells that provide power and/or cogenerated heat to the home are eligible for the credit, which is 60 cents per estimated kilowatt-hour saved during the first year, up to $1,500. The fuel cell system must have a minimum rated stack capacity of 0.5 kW and a maximum rated system capacity of 10 kW.

Contact:

Oregon Department of Energy
625 Marion Street, N.E.
Salem, OR 97301-3737
Phone: (800) 221-8035 or (503) 378-4040
Fax: (503) 373-7806
E-mail: energyweb.incoming@state.or.us
Web: http://egov.oregon.gov/ENERGY/CONS/about_us.shtml

Renewable Energy Systems Exemption

http://landru.leg.state.or.us/ors/307.html

Additional property value resulting from the installation of fuel cell, solar, geothermal, wind, water, or methane gas energy systems for heating, cooling or generating electricity is exempt from state property tax until Dec. 31, 2012. The exemption is for end users and does not apply to property owned by the energy industry.

Contact:

Oregon Department of Energy
625 Marion St., N.E.
Salem, OR 97301-3737
Phone: (800) 221-8035 or (503) 378-4040
Fax: (503) 373-7806
E-mail: energyweb.incoming@state.or.us
Web: http://egov.oregon.gov/ENERGY/CONS/about_us.shtml

Energy Loan Program

www.oregon.gov/ENERGY/LOANS/docs/Projects.pdf
http://oregon.gov/ENERGY/LOANS/selphm.shtml

The purpose of the Energy Loan Program (also known as SELP) is to promote energy conservation and renewable energy resource development. The program offers low-interest loans for projects that:

- Save energy;
- Produce energy from renewable resources such as water, wind, geothermal, solar, biomass, waste materials or waste heat;
- Use recycled materials to create products; or
- Use alternative fuels.

The Energy Loan Program can loan to individuals, businesses, schools, cities, counties, special districts, state and federal agencies, public corporations, cooperatives, tribes, and non-profits in the state. Fuel cell projects are eligible for SELP loans.

Contact:

Oregon Department of Energy
625 Marion St., N.E.
Salem, OR 97301-3737
Phone: (800) 221-8035 or (503) 378-4040
Fax: (503) 373-7806
E-mail: energyweb.incoming@state.or.us
Web: http://egov.oregon.gov/ENERGY/CONS/about_us.shtml

VEHICLES

Business Energy Tax Credit

http://egov.oregon.gov/ENERGY/TRANS/altfuels.shtml

The Oregon Department of Energy offers the Business Energy Tax Credit to those who invest in less-polluting transportation fuels. Hydrogen fuel is eligible.

Trade, business or rental property owners who pay taxes for a business site in Oregon are eligible for the tax credit. Project owners can also be Oregon non-profit organizations, tribes or public entities that partner with an Oregon business or resident who has an Oregon tax liability. The credit of 35% of eligible project costs includes all costs directly related to the project, including equipment cost, engineering and design fees, materials, supplies and installation costs. Loan fees and permit costs also may be claimed. Replacing equipment at the end of its useful life or equipment required to meet codes or other government regulations is not eligible. Maintenance costs are not eligible.

Contact:

Oregon Department of Energy
625 Marion Street, N.E.
Salem, OR 97301-3737
Phone: (800) 221-8035 or (503) 378-4040
Fax: (503) 373-7806
E-mail: energyweb.incoming@state.or.us
Web: http://egov.oregon.gov/ENERGY/CONS/about_us.shtml

Residential Energy Tax Credit

The Residential Energy Tax Credit provides tax credit incentives of up to $1,500 to encourage Oregonians to purchase hybrid electric vehicles. New vehicles that use electricity, natural gas, ethanol, methanol, propane, hythane, gasohol or hydrogen also qualify for a $750 tax credit. A tax credit is also awarded for converting a vehicle to use any of these fuels, with an allowance of 25% of the conversion cost up to $750.

In addition, the purchase of a fueling station for these vehicles also qualifies for a tax credit of 25% of the costs up to $750. The maximum tax credit is $1,500 for both the vehicle and the fueling station.

Contact:

Oregon Department of Energy
625 Marion Street NE
Salem, OR 97301
Phone: (800) 221-8035 or (503) 378-4040
Fax: (503) 373-7806
E-mail: energy.in.internet@state.or.us
Web: www.oregon.gov/ENERGY/index.shtml

5. PARTNERSHIPS

Combined Heat and Power Consortium

www.bpa.gov/Energy/N/Tech/DG_CHP

The Combined Heat and Power Consortium represents government agencies, utilities and companies that collaborate to install, study and publicize CHP projects in commercial applications. Key principles of CHP consortium projects include on-site electrical power generation, or distributed generation that is parallel and synchronous with the grid, and continuous on-site use of power generation waste heat. Consortium government members include the Bonneville Power Administration; the City of Portland; Oregon Department of Energy; Washington County, Oregon; and DOE.

The Consortium has developed a Fuel Cell Demonstration Program and sponsored a PEM fuel cell installation at Harkins House juvenile center in Hillsboro, Oregon.

Contact:

Combined Heat and Power Consortium
Phone: (503) 230-5491
E-mail: tmamundson@bpa.gov
Web: www.bpa.gov/Energy/N/Tech/DG_CHP

8. STATE AND LOCALLY-SUPPORTED DEMONSTRATIONS

POWER GENERATION

Harkins House juvenile shelter, Hillsboro: A natural gas-powered Plug Power PEM fuel cell was installed in 2003 to generate electric power and heat for hot water. The installation was a project of the Combined Heat and Power consortium.

Columbia Boulevard Wastewater Treatment Plant, Portland: Under Portland's Energy Challenge program, the City's Bureau of Environmental Services operated a UTC Power 200-kW methane-powered fuel cell at the Columbia Boulevard Wastewater Treatment Plant. The fuel cell provided power between 1999 and 2005 and saved the city about $58,000/year. Funding for this project included a $200,000 grant from DoD and a $224,000 tax credit from the Oregon Office of Energy.

LIFT facility at Powell Garage, Portland: A ReliOn 1-kW PEM fuel cell provides back up power to keep sensitive equipment running during power outages, replacing an oversized diesel generator that burns up to 10 gallons of fuel per hour. The project was sponsored by the Bonneville Power Administration and Tri-County Metropolitan Transportation District (TRIMET).

PENNSYLVANIA

2. STANDARDS/REGULATIONS

POWER GENERATION

Alternative Energy Portfolio Standard

www.puc.state.pa.us/electric/electric_alt_energy_port_stnds.aspx

The Alternative Energy Portfolio Standards Act was signed into law in 2004 and took effect in February 2005. The Act requires that a certain percentage of the electric energy sold to retail customers in Pennsylvania by electric distribution companies (EDCs) and electric generation suppliers (EGSs) be derived from alternative energy resources. This includes Tier 1 resources (solar photovoltaic energy, solar thermal energy, wind, low-impact hydro, geothermal, biomass, biologically derived methane gas, coal mine methane and fuel cells) and Tier II resources (waste coal, distributed generation systems, demand-side management, large-scale hydro, municipal solid waste, pulping process and wood manufacturing byproducts and integrated combined coal gasification technology).

EDCs and EGSs must provide retail electric customers electric energy derived from Tier I resources no later than February 28, 2007. While the Act does not specifically identify a start date for Tier II compliance, the PUC has decided that Tier II compliance will also commence on February 28, 2007. The percentage of energy derived from alternative sources will increase yearly until 2020:

- Tier I resources (except solar photovoltaic), which will start at 1.5% of retail energy sales by no later than the end of February 2007, will increase by 0.5%

per year between 2008 and 2020. By 2020, Tier 1 resources will comprise 8% of energy sales.

- Tier II resources, which will start at 4.2% of retail energy sales by no later than the end of February 2007, will increase by 2% in 2010 (6.2%) , by 2% in 2015 (8.2%), and will finally comprise 10% of energy sales in 2020.
- Solar photovoltaic, which will start at .00113% of retail energy sales by no later than the end of February 2007, will increase by .0019% in 2010 (0.0203%) , by .2297% in 2015 (0.2500%), and will finally comprise 0.5000% of energy sales in 2020.

Contact:

Pennsylvania Public Utilities Commission
P.O. Box 3265
Harrisburg , PA 17105-3265
Phone: (717) 783-1740
E-mail: www.puc.state.pa.us/general/feedback.aspx
Web: www.puc.state.pa.us

Interconnection Standards

www.puc.state.pa.us/electric/electric_aeps_working_groups.aspx

The Alternative Energy Portfolio Standards Act requires the Commission to promulgate net metering and interconnection rules for customer-generators intending to operate renewable onsite generators in parallel with the electric utility grid.

The Public Utilities Commission has issued separate proposed rulemaking orders on net metering and interconnection in November 2005. The interconnection procedures apply to customer-generators with small generator facilities that satisfy the following criteria:

- The electric nameplate capacity of the small generator facility is equal to or less than 2 MW;
- The small generator facility is not subject to the interconnection requirements of a regional transmission organization; and
- The small generator facility is designed to operate in parallel with the electric distribution system.

The procedures divide the process into four distinct review screens, Levels 1, 2, 3, and 4, depending on the size and nature of the interconnection equipment involved.

Contact:

Pennsylvania Public Utilities Commission
P.O. Box 3265
Harrisburg , PA 17105-3265
Phone: (717) 783-1740
E-mail: www.puc.state.pa.us/general/feedback.aspx
Web: www.puc.state.pa.us

Net Metering

www.puc.state.pa.us/electric/electric_aeps_working_groups.aspx

The Public Utilities Commission has issued proposed rulemaking orders on net metering in November 2005. The proposed rules will allow net metering to be offered to customer-generators that generate electricity on the customer-generator's side of the meter using Tier I or Tier II alternative energy sources, on a first come, first served basis. If a customer-generator supplies more electricity to the electric distribution system than the electric distribution company (EDC) delivers to the customer-generator in a given billing month, the EDC will credit the customer-generator for the excess on a kilowatt-hour for kilowatt-hour basis. Additionally, a customer-generator that is eligible for net metering owns the alternative energy credits of the electricity it generates, unless there is a contract with an express provision that assigns ownership of the alternative energy credits to another entity or the customer-generator expressly rejects any ownership interest in alternative energy credits.

Contact:

Pennsylvania Public Utilities Commission
P.O. Box 3265
Harrisburg , PA 17105-3265
Phone: (717) 783-1740
E-mail: www.puc.state.pa.us/general/feedback.aspx
Web: www.puc.state.pa.us

3. PUBLIC AGENCY POLICIES/PURCHASE PROGRAMS

VEHICLES

Alternative Fuel Vehicle Fleet Pilot Program

http://papress.state.pa.us/parelease/data/1050823.004.htm

Pennsylvania's governor launched a pilot project in August 2005 to explore the use of hybrid and AFVs among the state fleet to lessen air pollution and reduce the state's dependence on foreign oil. Alternative fuels include CNG, LNG, LPG, ethanol, methanol, hydrogen, coal-derived liquid fuels and fuels derived from biological materials. Details of the pilot program include:

- Adding 30 hybrid vehicles to the state fleet by 2006.
- Increasing the purchase amount to 50 vehicles for the 2008 model year, as long as the total cost of ownership does not exceed the average total cost of ownership of the rest of the conventional Department of General Services (DGS) fleet.
- Further increasing the state's purchase amount to 75 vehicles by the 2010 model year, as long as the total cost of ownership does not exceed the average total cost of ownership of the rest of the DGS fleet.
- By the 2011 model year, at least 25% of all new passenger vehicles purchased for the Commonwealth fleet will be hybrid vehicles as long as the total cost of ownership does not exceed the average total cost of ownership of the rest of the fleet.

DGS will prepare annual reports analyzing its fleet options, total cost of ownership and, in conjunction with the Department of Environmental Protection, environmental benefits of the program.

Contact:

Pennsylvania Department of General Services
Bureau of Procurement
555 Walnut Street, 6th Floor
Harrisburg, PA 17101
Phone: (717) 787-5733
Fax: (717) 783-6241
E-mail: gs-procure@state.pa.us
Web: www.dgs.state.pa.us

4. INCENTIVES/MARKET STIMULATION

POWER GENERATION

Energy Harvest Grant Program

www.dep.state.pa.us/dep/deputate/pollprev/ehg/default.htm

The Energy Harvest Grant funds projects that promote and build markets for advanced or renewable energy technologies. Eligible projects include renewable energy deployment; biomass energy projects; coal-mine methane, waste coal reclamation for energy; implementation of innovative energy efficiency technologies; or clean distributed generation infrastructure improvements. Hydrogen and fuel cell projects qualify for the program. The Department of Environmental Protection is particularly interested in supporting proposals that are market-driven, create jobs, and produce economic development within the Commonwealth.

Contact:

DEP Grants Center
Office of Technology and Energy Deployment
400 Market Street, 15th Floor
Harrisburg, PA 17101
Phone: (717) 705-5400
E-mail: RA-epcontactus@state.pa.us
Web: www.depweb.state.pa.us/energy/site/default.asp

Sustainable Energy Funds

Pennsylvania's electricity restructuring law took effect in 1996. Sustainable energy funding programs were later created through individual settlements with the state's five major electric utilities. The purpose of the funding programs is to promote the development and use of renewable energy and clean energy technologies; energy conservation and efficiency; sustainable energy businesses; and projects that improve

the environment in the companies' service territories. Each program provides grant or loan funding to qualifying fuel cell projects.

Metropolitan Edison Company Sustainable Energy Fund
www.bccf.org/pages/gr.energy.html

First Energy established the Metropolitan Edison Company Sustainable Energy Fund (Met Ed Region) within Berks County Community Foundation in 2000. The fund serves the entire Met Ed service territory in Pennsylvania and New Jersey. A companion fund was established to serve the company's Penelec service territory.

Contact:

Berks County Community Foundation
P.O. Box 212
Reading, PA 19603-0212
Phone: (610) 685-2223
Fax: (610) 685-2240
E-mail: info@bccf.org
Web: www.bccf.org

Sustainable Energy Fund of Central Eastern Pennsylvania
www.thesef.org/focusareas/index.asp

The Sustainable Energy Fund of Central-Eastern Pennsylvania was founded in 1999 and serves the PPL Energy service territory. Preferred projects include:

- Renewable Energy Sources – Wind, Solar, Anaerobic Digestion/Biomass.
- Clean Energy Technologies – Fuel Cells, Low-Impact HydroPower, BioFuels/Ethanol.
- Energy Conservation & Efficiency – LED and PV Lighting Technology.
- Energy Education – Feasibility studies or broad educational initiatives of significant impact.

Contact:

Sustainable Energy Fund of Central Eastern Pennsylvania
968 Postal Road, Suite 315
Allentown, PA 18109
Phone: (610) 264-4440
Fax: (610) 264-4949
E-mail: TheSEF@TheSEF.org
Web: www.thesef.org/index.asp

Penelac Sustainable Energy Fund
www.cfalleghenies.org/page17909.cfm

The Penelec Sustainable Energy Fund was funded in 2000. The program distributes loans and grants and make investments to eligible organizations that are located in or serve First Energy's Penelec service territory.

Penelac Sustainable Energy Fund
116 Market Street, Suite 4
Johnstown, PA 15901
Phone: (814) 536-7741
Fax: (814) 536-5859
E-mail: cfalleghenies@atlanticbb.net
Web: www.cfalleghenies.org/index.cfm

TRF Sustainable Development Fund
www.trfund.com/s df/index.htm

The TRF Sustainable Development Fund (SDF) was formed in 1998 to serve the PECO Energy service territory in southeastern Pennsylvania, which includes Bucks, Chester, Delaware, Montgomery and Philadelphia counties. SDF is managed by The Reinvestment Fund (TRF).

Contact:

TRF Sustainable Development Fund
718 Arch Street
Philadelphia, PA 19106
Phone: (215) 574-5800
E-mail: sdf@TRFund.com
Web: www.trfund.com

West Penn Power Sustainable Energy Fund
www.wppsef.org

The West Penn Power Sustainable Energy Fund serves the West Penn Power market area and is administered by The Energy Institute of Penn State University, in partnership with Energetics, Incorporated. The fund was formed in 1998.

Contact:

Mr. Joel L. Morrison
The Pennsylvania State University
The Energy Institute
WPPSEF Program Administrator
C-211 CUL
University Park, PA 16802-2323
Phone: (814) 865-4802
Fax: (814) 863-7432
E-mail: wppsef@ems.psu.edu
Web: www.wppsef.org

TRF Energy Fund
www.trfund.com/financing/energy.htm

TRF Energy Fund's financing offers a number of innovative products that provide financial incentives for nonprofit organizations, property owners, large institutions, and businesses to make sustainable energy investments. They include:

- New construction of residential properties or nonprofit-owned facilities that are built to an Energy Star or LEED standard;
- Energy efficiency retrofits for residential properties or nonprofit owned facilities that achieve at least a 25% reduction in energy consumption;
- Renewable energy projects; and
- Distributed generation projects such as CHP projects (co-generation), fuel cell installations and clean, efficient uninterruptible power systems.

Financing products include construction financing, term loans, lease and energy performance financing, pre-development loans, and grants for "green" building design or solar PV systems. The TRF Energy Fund's primary lending area is the 21-county region in the states of Pennsylvania, New Jersey, and Delaware.

Contact:

TRF Energy Fund
718 Arch Street
Philadelphia, PA 19106
Phone: (215) 574-5800
E-mail: SustainableEnergy@TRFund.com
Web: www.trfund.com

Pennsylvania Energy Development Authority

www.dep.state.pa.us/dep/deputate/pollprev/PA_Energy/PAENERGY/PEDA_about.htm

The Pennsylvania Energy Development Authority (PEDA) is an independent public financing authority that was created in 1982 by the Pennsylvania Energy Development Authority and Emergency Powers Act, and was revitalized by the governor through a 2004 Executive Order. The Authority's mission is to finance clean, advanced energy projects in Pennsylvania. Pennsylvania projects that could potentially qualify for funding from the Authority include solar energy, wind, low-impact hydropower, geothermal, biomass, landfill gas, fuel cells, integrated gasification combined cycle (IGCC), waste coal, coal-mine methane and demand management measures. The Authority awards grants, loans and loan guarantees and can develop a variety of other types of funding programs. Tax-exempt and taxable bond financing for energy projects also are available through PEDA's partnership with the Pennsylvania Economic Development Financing Authority (PEDFA).

PEDA is in the process of developing the Pennsylvania Energy Development Plan (http://www.depweb.state.pa.us/enintech/lib/enintech/The_Pennsylvania_Energy_Development_Plan1.pdf) that will serve as an articulation of its own energy policy goals and set out a plan for the allocation and distribution of financial and technical assistance.

In October 2006, the governor announced that PEDA would fund 16 new clean energy projects, including fuel cell development programs. Funding will include a $250,000 award to HydroGen for installation of a 2MW fuel cell at a US Steel plant and $391,548

to Kuchera Defense Systems to establish a Centre for Advanced Energy Systems Manufacturing that focuses on manufacturing of fuel cells.

Contact:

DEP-OETD-PEDA
RCSOB-15th Floor
P. O. Box 8772
Harrisburg, PA 17105-8772
Phone: (717) 783-8411
E-mail: eppaenergy@state.pa.us
Web:
www.dep.state.pa.us/dep/deputate/pollprev/PA_Energy/PAENERGY/PEDA_home.htm

VEHICLES

Alternative Fuels Incentive Grant Program

www.dep.state.pa.us/dep/deputate/pollprev/AFIG/afvafig1.htm

The Alternative Fuels Incentive Grant (AFIG) 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.

AFIG grant funding is available for:

- Expenses relative to converting gasoline powered vehicles to operate on an alternative fuel;
- Incremental cost to purchase bi-fuel, dual-fuel, hybrid or dedicated vehicles;
- The cost to purchase and install the necessary fleet fueling or home-refueling equipment;
- Cost to perform research, development, training, and demonstration of new applications or next phase technology related to AFVs or projects that incorporate a "new application" or "next phase technology" in the production of biofuels such as biodiesel and ethanol for use as a motor vehicle fuel;
- Expenses associated with the purchase and installation of equipment used by heavy duty trucks as an alternative to diesel fuel during engine idling; and
- Incremental cost to purchase biofuels, including, but not limited to, biodiesel and ethanol.

Eligible alternative motor fuels and fuel systems are CNG, LNG, LPG, ethanol (E85), methanol (M85), hydrogen, hythane, electricity, coal-derived liquid fuels, fuels derived from biological materials. Eligible applicants for incentive grants are schools and vocational school districts, municipal authorities, counties, cities, boroughs, incorporated towns, townships, county institution districts, corporations, partnerships, and nonprofit entities incorporated or registered in the Commonwealth of Pennsylvania.

Pennsylvania companies and research organizations that perform research, development, training and demonstration of new applications or next phase technology related to alternative and advanced vehicle technologies and improved storage and

dispensing of alternative fuels are eligible for an Incentive Grant. Research projects related to alternative fuel projects must be able to demonstrate commercial applicability and the potential to initiate Pennsylvania-based product development and manufacturing. Projects that result in product commercialization and the expansion of Pennsylvania companies are favored in the selection process.

Hydrogen and fuel cell project awards have included a $100,000 grant to Pittsburgh Electric Engines Inc. to develop a solid oxide fuel cell 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.

Contact:

Cleo Arp
Pennsylvania Department of Environmental Protection
Bureau of Energy, Innovations, and Technology Deployment
PO Box 8772
Harrisburg, PA 17105-8772
Phone: (717) 772-8912
E-mail: epafiginfo@state.pa.us
Web: http://www.dep.state.pa.us/dep/deputate/pollprev/AFIG/afvafig1.htm

Hybrid Electric/Alternative Fuel Vehicle Rebate Program

www.dep.state.pa.us/dep/deputate/pollprev/AFIG/HybridAFV_Rebate.htm

The Department of Environmental Protection offers an opportunity to Commonwealth residents to apply for a rebate to assist with the incremental cost for the purchase of a new hybrid, bi-fuel, dual-fuel or dedicated AFV. The rebate is offered throughout the calendar year as long as funds are available, on a “first come, first served” basis. Rebate requests must submitted no later than six months after the purchase. A new bi-fuel, dual-fuel, dedicated or hybrid vehicle that is purchased with a rebate must be registered in Pennsylvania at the time of purchase and operated primarily within the state. The rebate amount for calendar year 2006 is $500.

Contact:

Cleo Arp
Pennsylvania Department of Environmental Protection
Bureau of Energy, Innovations, and Technology Deployment
PO Box 8772
Harrisburg, PA 17105-8772
Phone: (717) 772-8912
E-mail: carp@state.pa.us
Web: www.dep.state.pa.us/dep/deputate/pollprev/AFIG/HybridAFV_Rebate.htm

5. PARTNERSHIPS

Pennsylvania Hydrogen and Fuel Cell Consortium

www.dep.state.pa.us/newsletter/default.asp?NewsletterArticleID=9152&SubjectID=

The Pennsylvania Hydrogen and Fuel Cell Consortium seeks to help build support for Pennsylvania's leadership in the hydrogen economy by encouraging and supporting partnerships among government, business and academia that are related to advanced energy technology. Consortium members include representatives from the Pennsylvania Department of Environmental Protection, the Pennsylvania Department of Community and Economic Development, DOE, the U.S. Army Construction Engineering Research Laboratory, Siemens Westinghouse Power Corp., Johnson Matthey Fuel Cells Inc., TRF's Sustainable Development Fund, PPL, Concurrent Technologies Corp., Franklin Fuel Cells Inc., Air Products and Chemicals Inc., Power and Energy, Penn State University Citizens for Pennsylvania's Future, Pennsylvania Environmental Council, Clean Energy Group and the Clean Air Council.

Contact:

Gary Obleski
Pennsylvania Department of Environmental Protection
Phone: (717) 772-3318
E-mail: gobleski@state.pa.us

7. EMERGING BUSINESS SUPPORT

New PA Venture Capital Investment Fund

www.newpa.com/programDetail.aspx?id=57
www.newpa.com/newsDetail.aspx?id=324

New PA Venture Capital Investment Fund is a $60 million component of the Governor's economic stimulus package. The program provides loans to Pennsylvania-focused venture capital companies working to make investments in technology businesses located in the state. The pool of money, leveraged by another $180 million in private equity, totals $240 million. Investments must be made in underserved areas of the state, defined as outside the Philadelphia MSA and those with populations below one million.

Fuel cell companies are eligible to receive investments by venture capital firms. One approved loan is being made to Draper Triangle Ventures, which will make investments in high-growth companies located in western and central Pennsylvania and Ohio focusing on the following industries: information technology, medical technology and devices, automation technology, nanotechnology, fuel cells, advanced software, educational technology and MEMS/semi-conductor/materials. Draper Triangle Ventures will invest in seed and early stage emerging technology companies.

Contact:

Pennsylvania Department of Community and Economic Development
Commonwealth Financing Authority – New PA Venture Capital Program
Commonwealth Keystone Building

400 North Street, 4th Floor
Harrisburg, PA 17120-0225
Phone: (717) 787-4147
Web: www.newpa.com/programDetail.aspx?id=57

8. STATE AND LOCALLY-SUPPORTED DEMONSTRATIONS

POWER GENERATION

Fuel Cell Pavilion, Parker Dam State Park: Installed in 2004, the Fuel Cell Technologies 5-kW SOFC provides heat to cabins and administration buildings and provides hot water for showers. A planned fuel source is natural gas derived from Pennsylvania forests. Project partners include Penn State Energy Institute and the Pennsylvania Department of Conservation and Natural Resources.

Radio tower, French Creek State Park:. The Relion 2-kW PEM fuel cell is the sole power source for the statewide radio system tower and served as a proof of concept demonstration.

Radio towers, Hyner Run State Park, McVeytown and Renovo: ReliOn 2-kW PEM fuel cells were installed in 2005 to provide primary power at three state-owned radio tower sites, where no grid power is available. The radio towers are part of a statewide radio system.

VEHICLES AND FUELING INFRASTRUCTURE

Penn State hydrogen fueling station and CATA hydrogen vehicle fleet: The Penn State hydrogen fueling station opened in 2004 and serves the Centre Area Transportation Authority (CATA) hydrogen vehicle fleet. CATA has one converted internal combustion engine (ICE) bus and one ICE van to operate on a mixture of 30% hydrogen and 70% CNG fuel. The conversions were funded by the Pennsylvania Department of Environmental Protection and the Pennsylvania Department of Community and Economic Development. The state has awarded additional funding to convert an additional seven CATA buses to operate on hydrogen/CNG fuel. Penn State's Pennsylvania Transportation Institute will also convert a vehicle to operate with a hydrogen-powered fuel cell.

RHODE ISLAND

2. STANDARDS/REGULATIONS

POWER GENERATION

Renewable Energy Standard

www.ripuc.org/eventsactions/docket/3659-RES-FinalRules(12-7-05).pdf

Enacted in 2004, Rhode Island's Renewable Energy Standard requires retail electricity providers to supply 3% of their retail electricity sales from renewable resources by the end of 2007, and escalates to 16% by the end of 2019. Eligible renewable technologies include fuel cells operating with renewable resources. The state's Public Utilities Commission has recently adopted regulations to implement the renewable standard. Incentives are available for New England renewable energy projects serving Rhode Island customers.

Contact:

RI Public Utilities Commission
89 Jefferson Boulevard
Warwick, RI 02888
Phone: (401) 941-4500
E-mail: mary.kent@ripuc.org
Web: www.ripuc.org

Net Metering

www.riseo.state.ri.us/riref/programs/supplysupport.html

A 1998 order by the Rhode Island Public Utility Commission requires investor-owned utilities to offer net metering to all customers generating electricity with renewable energy systems or fuel cells of 25 kW or less.

Contact:

RI Public Utilities Commission
89 Jefferson Boulevard
Warwick, RI 02888
Phone: (401) 941-4500
E-mail: mary.kent@ripuc.org
Web: www.ripuc.org

4. INCENTIVES/MARKET STIMULATION

POWER GENERATION

Rhode Island Renewable Energy Fund

www.riseo.state.ri.us/programs/rei.html

In 1996, Rhode Island legislation established the nation's first public benefits fund to support the development of renewable energy. The Fund is administered by the state's Energy Office through a renewable energy surcharge assessed on ratepayer's electric bills. The annual budget is roughly $3 million.

Following 2004 legislation mandating establishment of a renewable energy standard, state officials have begun a program review to determine the Fund's role in implementing the RES.

Subsequent legislation (2005) expanding the scope of renewable resources eligible for funding. Among other resources, the Fund may now subsidize fuel cells projects operating with renewable fuels. Funding programs include:

Incentive for the Purchase and Sale of Renewable Electricity to Large Electricity Customers
www.riseo.state.ri.us/riref/programs/supplysupport.html
www.riseo.state.ri.us/riref/programs/rfp/largecustrfp.pdf

In 2003, the Rhode Island Renewable Energy Fund made available approximately $370,000 to encourage the long-term purchase of renewable energy based retail electricity supply by large electricity consumers in Rhode Island, including business, government, and institutional customers. The Fund invites proposals by large electricity consumers and/or registered retail electricity suppliers for the purchase and sale of green power to large electricity customers in Rhode Island. Through this solicitation the Fund seeks to buy-down but not eliminate entirely the cost premium associated with purchasing green power.

Currently, the incentive program is undergoing revisions and will be re-designed to directly enhance the economics and creditworthiness of projects and help assure that renewable energy supply sources are available to the Rhode Island market. In the meantime, the Fund is accepting unsolicited proposals.

Renewable Energy Incentive Program for Residential and Small Commercial Customers
www.riseo.state.ri.us/riref/programs/rfp/small_customer_guidelines.pdf

The Rhode Island Renewable Energy Fund offers financial incentives for retail electricity suppliers registered in Rhode Island and that offer eligible green power supply to residential and small business consumers within the state. This incentive program is designed to directly reduce a retail green power suppliers' cost to provide Rhode Island consumers with green power. This incentive program is currently funded to reward electricity suppliers who enroll up to 15,000 new residential and small commercial customers in eligible green power products. This incentive will only be paid for customer enrollments through the end of June, 2008.

For residential customers, program incentives start at up to $125 per customer and, based on the total number of customers enrolled statewide, decline to a maximum of $75 per customer.

Contact:

Rhode Island State Energy Office
One Capitol Hill
Providence, RI 02908
Phone: (401) 222-3370
Fax: (401) 222-1260

Web: www.riseo.state.ri.us

8. STATE AND LOCALLY-SUPPORTED DEMONSTRATIONS

South County Hospital, Wakefield: Installed in 1999, this 200-kW UTC Power PAFC fuel cell continues to provide electricity and heat to the facility. Funding from the Rhode Island Renewable Energy Fund and the federal government.

SOUTH CAROLINA

1. PLANS/STRATEGIES

Report: SCH2 – The South Carolina Hydrogen Economy: Capitalizing on the State's R&D Assets
http://nextenergy.engenuitysc.com/client_resources/sch2finalreport7_28_05.pdf

In 2005, the South Carolina Energy Office and the South Carolina Hydrogen Coalition issued a hydrogen roadmap to better position the state in the developing hydrogen economy. The report, "SCH2 – The South Carolina Hydrogen Economy: Capitalizing on the State's R&D Assets", presents a short-term hydrogen economy plan that could be in a 24-36 month time frame. The report outlines initiatives that will:

- Leverage hydrogen and fuel cell capabilities of Savannah River National Laboratory and South Carolina's universities, institutions and industry;
- Secure near-term federal and industry funding; and
- Enhance economic development initiatives to position the state to take advantage of opportunities presented by a hydrogen economy.

Contact:

South Carolina Energy Office
1201 Main Street, Suite 430
Columbia, SC 29201
Phone: (800) 851-8899 or (803) 737-8030
Fax: (803) 737-9846
E-mail: www.energy.sc.gov/feedback/form.html
Web: www.energy.sc.gov

South Carolina Hydrogen Coalition
P.O. Box 3707
Aiken, SC 29802
Phone: (803) 643-6802
Web: www.sch2.org

Columbia: City Council Resolution Supporting Fuel Cells

www.fuelcellchallenge.com/client_resources/Fuel%20Cell%20Challenge%20Two%20Page%20Document.pdf

On March 1, 2006, the City of Columbia Council members unanimously passed a resolution supporting the city's objective to become a leader in fuel cell innovation. The city resolved to:

- Consider using fuel cell technology applications where appropriate and to explore opportunities for demonstrating fuel cell technology applications in city buildings and facilities, including, but not limited to, the Columbia Canal Hydroelectric Plant and the city's wastewater treatment facility;
- Explore opportunities to create and incorporate incentives for recruiting fuel cell related research teams and companies;
- Develop policies in order to encourage local businesses to implement hydrogen and fuel cell technologies and propose amendments to procurement codes in order to encourage the city to implement fuel cell applications; and
- Appropriate the resources necessary to train city staff in hydrogen and fuel cell technologies and applications including national and international building codes.

This resolution demonstrates Columbia's commitment to the Greater Columbia Fuel Cell Challenge and shows support to companies who become partners in this initiative.

Contact:

City of Columbia City Council
P.O. Box 147
Columbia, SC 29217
E-mail: MayorBob@columbiasc.net
Web: www.columbiasc.net/cofc_ccc.html

5. PARTNERSHIPS

EngenuitySC

www.engenuitysc.com

EngenuitySC is a strategic leadership council dedicated to guiding and coordinating initiatives that spur the creation and expansion of knowledge-oriented companies throughout the Columbia, S.C. (Midlands) region. As a nonprofit corporation, EngenuitySC receives funding from city and county governments, higher education, and private businesses located in Richland and Lexington County. The "core competency" of South Carolina's Midlands region is fuel cells.

National Institute of Hydrogen Fuel Cell Commercialization

EngenuitySC has been awarded $1 million in federal funding to create the National Institute of Hydrogen Fuel Cell Commercialization, a non-profit that will be tasked with finding commercial opportunities for the University of South Carolina and other state universities performing fuel cell research. The Center will become part of the University of South Carolina's unique new Innovista "innovation district" that will spread over 200 acres and combine 5 million square feet of research labs, office space, mixed-use retail and affordable residential housing.

In June 2006, EngenuitySC and the University of South Carolina announced plans to create a 2,000 square foot incubator for fuel cell research, and are working to establish a hydrogen refueling station at the upcoming facility. The incubator will be located at the university's Future Fuels building, which is under construction and slated for completion in 2008.

Contact:

EngenuitySC
P.O. Box. 50768
Columbia, SC 29250-0768
Phone: (803) 783-1507
E-mail: info@engenuitysc.com
Web: www.engenuitysc.com

South Carolina Hydrogen and Fuel Cell Alliance

www.schydrogen.org

South Carolina Department of Commerce has formed the South Carolina Hydrogen and Fuel Cell Alliance. The alliance is headed up by research directors of the state's preeminent research universities and the director of the DOE Savannah River National Laboratory and will serve as the primary facilitator of hydrogen initiatives in South Carolina.

The alliance brings together five regional organizations, each with a particular strength in the hydrogen economy:

- **Savannah River National Laboratory**, which has one of the largest concentrations of hydrogen researchers in the country and a dedicated Center for Hydrogen Research;
- **USC**, home to the National Science Foundation's Industry/University Cooperative Research Center for Fuel Cells;
- **Clemson University**, home to the International Center for Automotive Research, as well as hydrogen-related research into advanced materials and thermo-chemical hydrogen production;
- **S.C. State University**, home to the Clyburn Transportation Center, which conducts research on linking various modes of transportation using advanced technologies; and
- **The Center for Hydrogen Research**, a new 6,000-square-foot facility in Aiken designed for collaborative hydrogen research.

The goals of the alliance include:

- The development of a governing strategy for hydrogen initiatives and associated economies to enable long-term growth.
- The development of partnerships and collaborations for research initiatives.
- The support of viable hydrogen demonstrations and projects for the state.

Contact:

Fred Humes, Director, Economic Development Partnership
South Carolina Hydrogen and Fuel Cell Alliance
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E-mail: fhumes@schydrogen.org
Web: www.schydrogen.org/index.html

South Carolina Hydrogen Coalition (SCH2)

www.sch2.org

The South Carolina Hydrogen Coalition (SCH2) was established in 2002 as a non-profit corporation to bring together organizations interested in or currently working with fuel cell and hydrogen technology. Since that time the Coalition has fostered the promotion of hydrogen and fuel cells, brought together manufacturers, universities, federal laboratories and companies, and worked with elected officials in the accomplishment of its mission. The Hydrogen Coalition hydrogen and fuel cell plans include programs in education, policy development, enhancing in-state capabilities and fostering new and existing in-state economic development.

South Carolina's Department of Commerce is a member of the Hydrogen Coalition and the two entities work hand-in-hand in promoting the state's capabilities and recruiting new and developing research and development, industrial and service activity.

Contact:

South Carolina Hydrogen Coalition
P.O. Box 3707
Aiken, SC 29802
Phone: (803) 643-6802
Web: www.sch2.org

South Carolina Next Energy Initiative

http://nextenergy.engenuitysc.com/Default.aspx

The South Carolina Next Energy Initiative is a working group made up of business, higher education and political leaders from across the state that have come together to chart a course for the future. Sponsors include the University of South Carolina, Clemson University, City of Columbia, EngenuitySC and the Midlands Business Leadership Group. The goal of the initiative is to prepare South Carolina to take advantage of the economic opportunity that exists if we can become a center for hydrogen commercialization or other forms of alternative energy.

Report: South Carolina Hydrogen & Fuel Cell Economy Strategy
www.engenuitysc.com/client_resources/home/next%20energy%20strategy%209-29-05%20final_a.pdf

In 2005, Next Energy Initiative issued their hydrogen and fuel cell economy report outlining a four-step strategy for the state:

- Prepare and Engage Stakeholders: A "stewardship group" was formed representing major centers of hydrogen and fuel cell activity in South Carolina. Stewards included statewide leaders as well as regional and institutional representatives.
- Analyze and Benchmark South Carolina's Position: The consulting team conducted a national comparison of South Carolina at each level of the innovation pipeline which included benchmarking of hydrogen and fuel cell research, commercialization and industry supply chain as well as comparison of the range of state policies and programs for hydrogen and fuel cell economy development.
- Develop Collaborative, Bottom-Up Market-Driven Actions: The consulting team worked with three regional centers of hydrogen and fuel cell activity and completed three rounds of collaborative strategy with each center.
    - The first round focused on presenting South Carolina's current competitive position in hydrogen and fuel cell innovation and defined shared competitive challenges.
    - The second round brought examples of policies and programs from other states and defined priority actions to overcome South Carolina's challenges in hydrogen and fuel cells.
    - The third round of collaborative activity focused on articulating brief business plans for regionally-specific actions that might also become the basis for statewide efforts.
- Build an Integrated State Strategy: After each step the consulting team reviewed the achievements with the Stewardship group, seeking common needs for a statewide strategy, and defined two levels of strategic directions for consideration at the state level. Separately, there are also early stage regional strategies, representing interests and intentions of the three centers of hydrogen and fuel cell activity in South Carolina to establish nodes or hubs for ongoing growth.

Contact:

South Carolina Next Energy Initiative
Richard Begly
Phone: (803) 233-3672
E-mail: rtbegley@msn.com
Web: http://nextenergy.engenuitysc.com/Default.aspx

USC Columbia Fuel Cell Collaborative

www.fuelcellchallenge.com

The University of South Carolina, the City of Columbia, the South Carolina Research Authority (SCRA) and EngenuitySC joined together to form the USC Columbia Fuel Cell Collaborative in 2005. The collaborative has three principal goals:

- Position the Columbia, SC region as a leader in fuel cell innovation;
- Become world-class innovators for the hydrogen and fuel cell economy; and
- Recruit and retain fuel cell scientists, entrepreneurs and innovators to help make South Carolina a pre-eminent location for the hydrogen and fuel cell economy.

USC, the City of Columbia and their partners are committed to making Columbia home to the highest concentration and greatest diversity of fuel cell and other alternative energy applications in the world. In early 2006, the Collaborative announced the Greater Columbia Fuel Cell Challenge to create and execute a plan for how Columbia can set the standard for large scale use and implementation of fuel cell applications by partnering with industry from the entire supply chain around this technology.

Contact:

USC Columbia Fuel Cell Collaborative
P.O. Box 50768
Columbia, SC 29250-0768
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E-mail: info@fuelcellchallenge.com
Web: www.fuelcellchallenge.com

6. RD&D SUPPORT

Center for Hydrogen Research

www.srs.gov/general/news/top_news/main1.htm
www.edpsc.org/targ_ind.html

Opened in February 2006, the Center for Hydrogen Research is a 60,000 square foot located on the Savannah River National Laboratory (SRNL) campus. The facility houses researchers from various academic institutions and industry (including Toyota), as well as about 50 researchers from SRNL. The facility is managed by the Aiken and Edgefield Counties Economic Development Partnership and was constructed with $10 million in funding from Aiken County.

Contact:

Aiken and Edgefield Counties Economic Development Partnership
P.O. Box 1708
Aiken, SC 29802
Phone: (803) 641-3300
E-mail: info@edpsc.org
Web: www.edpsc.org

Greater Columbia Fuel Cell Challenge

www.fuelcellchallenge.com/client_resources/Fuel%20Cell%20Challenge%20Two%20Page%20Document.pdf

The USC Columbia Fuel Cell Collaborative has issued the Greater Columbia Fuel Cell Challenge, seeking to engage firms and service providers to partner with the City of Columbia and USC to complete the design and then implement a groundbreaking plan that involves unprecedented integration of hydrogen fuel cell technologies into multiple aspects of the City and University facilities and open spaces. USC, the City of Columbia, SCRA and EngenuitySC are soliciting ideas from companies and service providers that may expand how fuel cell applications can be incorporated into this multi-year, multi-million dollar project. Potential projects may include:

- Using hydrogen fuel cell technology to power lights along the trails and hydrogen fuel cell powered utility vehicles in Riverfront Park.
- Using hydrogen fuel cell trams and utility vehicles at Riverbanks Zoo and Garden.
- Installing stationary fuel cells in communication and utility systems as backup power sources.
- Use hydrogen fuel cell service/utility vehicles around the City and the USC campus. USC and the City of Columbia could also use hydrogen fuel cell buses for public and student transportation.
- Potentially leveraging an existing large wastewater treatment facility to produce hydrogen and use this hydrogen to power one or more loads at the treatment facility.

Contact:

USC Columbia Fuel Cell Collaborative
P.O. Box 50768
Columbia, SC 29250-0768
Phone: (803) 589-9037
E-mail: info@fuelcellchallenge.com
Web: www.fuelcellchallenge.com

7. EMERGING BUSINESS SUPPORT

South Carolina Council on Competitiveness

http://www.competesc.org/cluster.html
http://www.competesc.org/files/Fuel_Cells.pdf

The South Carolina Council on Competitiveness, a public-private partnership formed in 2004, focuses on the development of “clusters of innovation”--groups of interconnected companies in a similar line of business that collaborate to build and expand their products and services. South Carolina has several key clusters: apparel, automotive, aviation, distribution, hydrogen/fuel cells, textiles and travel/tourism. The Fuel Cells Cluster Committee is currently forming.

Contact:

Fred Humes
Economic Development Partnership
471 University Parkway
Aiken, SC 29801
Phone: (803) 641-3300
E-mail: www.competesc.org/contact.html
Web: www.competesc.org

SOUTH DAKOTA

1. PLANS/STRATEGIES

Resolution Urging the Development of Hydrogen as an Energy Source and for Other Purposes
http://legis.state.sd.us/sessions/2005/bills/SCR6enr.htm

In February 2005, the South Dakota legislature adopted Senate Concurrent Resolution No. 6 urging the state to pursue hydrogen development. Recommended measures include:

- Developing the state's capacity to produce, store, distribute, and use hydrogen made from South Dakota resources as an increasing source of transportation fuel, electricity, and energy for heating and cooling and for fertilizer production and other commercially productive uses;
- Encouraging the commercialization of hydrogen, fuel cells, and other clean energy technologies that would benefit the state; and
- Encouraging South Dakota's research and higher education institutions to work with similar institutions in the region to explore the creation of a Regional Energy Research Consortium.

TENNESSEE

1. PLANS/STRATEGIES

Resolution to Pursue the Use of Renewable Energy Sources
www.legislature.state.tn.us/bills/currentga/BILL/SJR0251.pdf

Senate Resolution 251 (2005) resolves that the use of bio-based renewable energy sources should be pursued by the State of Tennessee, all its political subdivisions, and by private industry. The resolution defines renewable energy as energy derived from

wind, the sun, geothermal sources, hydrogen derived from biomass or water, biomass or bio-based products, and recycled materials comprised primarily of cellulose.

TEXAS

1. PLANS/STRATEGIES

Fuel Cell Commercialization Initiative
www.energy.appstate.edu/fuelcells/docs/tx.pdf

In 2001, House Bill 2845 directed the State Energy Conservation Office (SECO) to develop a statewide plan for accelerating the commercialization of fuel cells in Texas. In addition, SECO was instructed to appoint a Fuel Cell Initiative Advisory Committee (FCIAC) to advise it on the development of the plan.

FCIAC estimated that fuel cell manufacturers would need to be able to produce and sell 1,000 MW of generation capacity in Texas to achieve competitive pricing and industry self-sufficiency. The attainment of FCIAC's 1,000 MW fuel cell generation goal would require state participation in and stimulation of the early market.

SECO identified initiatives that the state could use to encourage the commercial availability of fuel cells and the economic viability of a Texas-based fuel cell industry:

- Create public/private partnerships;
- Adopt concrete goals for fuel cell development within the state;
- Encourage and assist the formation of a Texas Consortium for Advanced Fuel Cell Research;
- Become an early adopter of fuel cell technology;
- Use "off-take" utility purchase contracts to acquire fuel cell-generated power;
- Develop and fund demonstration projects;
- Reserve a percentage of current research dollars for matching-grant or cost-share dollars for fuel cell projects;
- Assist in the development of fuel cell training and education at all levels;
- Provide financial incentives to support the FCIAC goal;
- Allow transmission and distribution companies to own fuel cells offering "distributed" (on-site) power generation;
- Amend state laws, regulations and permits to accommodate fuel cells in all applications;
- Continue efforts to ensure that fuel cells can generate both direct and indirect emission reduction credits;
- Support and pursue the adaptation of national codes and standards to accommodate the use of fuel cells;
- Participate in regional and national consortiums and partnerships; and
- Allow all fuel cell-powered vehicles to use HOV lanes on Texas highways.

Contact:

Texas State Energy Conservation Office
Mary-Jo Rowan, Alternative Fuels Program
111 East 17th Street, #1114
Austin, TX 78701
Phone: (800) 531-5441, ext 3-2637 or (512) 463-2637
E-mail: mary-jo.rowan@cpa.state.tx.us
Web: www.seco.cpa.state.tx.us/index.htm

Hydrogen-Fueled Vehicles and Refueling Stations Initiative

http://www.capitol.state.tx.us/cgi-bin/tlo/textframe.cmd?LEG=79&SESS=R&CHAMBER=H&BILLTYPE=B&BILLSUFFIX=02702&VERSION=5&TYPE=B

House Bill 2702, passed in May 2005, directs the Texas Department of Transportation (TxDOT) to seek funding from public and private sources to acquire and operate hydrogen-fueled vehicles, and to establish and operate hydrogen refueling stations. Specific provisions of the bill include:

- TxDOT may establish and operate at least five hydrogen refueling stations, which must be located in an urbanized area along a major state highway and be accessible to the public.
- The department may establish hydrogen refueling stations on the Trans-Texas Corridor.
- TxDOT may purchase to operate in an area in which a refueling station is established vehicles capable of operating using hydrogen, including, at a minimum:
    - Four vehicles with internal combustion engines that run on hydrogen; and
    - Three fuel cell vehicles, one internal combustion engine bus that runs on hydrogen, or one fuel cell bus.
- A hydrogen-powered vehicle, noted in the section above, purchased to meet the requirements of a state code regarding state agency automotive fleets, may be used to satisfy the alternative fuels percentage requirement.
- A mass transit hydrogen-fueled fleet vehicle may be used to satisfy the percentage requirement under state code requiring that a mass transit authority ensure that its vehicles can operate on alternative fuels.

The State has made available the first phase of funding for HB 2702 in the form of the creation of TxDOT Hydrogen Strategic Plan. In March 2006 a panel of national experts in hydrogen and fuel cells technology was convened to create this Strategic Plan. The plan will provide TxDOT with recommendations for siting hydrogen-fueled vehicles and hydrogen fueling infrastructure on their property.

Contact:

Texas Department of Transportation
125 E. 11th Street

Austin, Texas 78701-2483
Phone: (512) 463-8588
E-mail: www.dot.state.tx.us/cgi-bin/mailform.pl
Web: www.dot.state.tx.us

Industry Cluster Initiative

www.twc.state.tx.us/news/ticluster.html

In 2003, the Texas legislature passed S.B. 275 requiring the development of strategies to strengthen the competitiveness of key industry clusters. A focus on clusters will allow Texas to maximize limited resources, monitor specific regional workforce and economic conditions, and develop plans of action to bring new jobs to Texas. To launch this initiative, the Office of the Governor, Economic Development and Tourism division and the Texas Workforce Commission are forming state and regional partnerships to foster growth and development in the six target clusters. The Industry Clusters are: Advanced Technologies and Manufacturing, Aerospace and Defense, Biotechnology and Life Sciences, Information and Computer Technology, Petroleum Refining and Chemical Products, and Energy.

In August 2005 the State of Texas Energy Cluster Assessment was released. The report identifies three sectors for which specific recommendations were made: Oil and Gas, Renewable and Sustainable Energy Sources, and Electric/Coal/Nuclear. Of specific importance to the fuel cell and hydrogen industries was the Renewable and Sustainable Energy Sources recommendations to "increase state incentives for emerging sources in this area" and "to increase funding for research, as well as for commercialization". As hydrogen as an alternative fuel continues to develop, Texas' lead in the hydrogen production industry may be turned into a leadership role in hydrogen fuel by these measures (if implemented).

Contact:

Office of the Governor
Economic Development and Tourism
P.O. Box 12428
Austin, TX 78711-2428
Phone: (512) 463-2000
Fax: (512) 463-1849
E-mail: http://www.governor.state.tx.us/contact
Web: www.governor.state.tx.us

Report: Texas Energy Plan 2005: Energy Security for a Bright Tomorrow

www.rrc.state.tx.us/tepc/finalenergyplan.pdf

The Texas Energy Planning Council, created by the Governor to provide advice on an energy plan for the state, issued their report, "Texas Energy Plan 2005: Energy Security for a Bright Tomorrow" in late 2004. The report offers 10 recommendations, falling into four themes. Two of the themes focus on renewable and new energy technologies:

- Texas should look to emerging technologies for the future by encouraging new gasification technology, and increasing targets for renewable power sources.

- The state should provide incentives and new technologies to allow utilities and consumers to realize more energy efficiency and conservation.

The report further identifies high-priority energy opportunities that will require additional work before recommendations can be made, including determining how fuel cell technology should play a role in the Texas energy plan.

Contact:

Office of the Governor
P.O. Box 12428
Austin, TX 78711-2428
Phone: (512) 463-2000
Fax: (512) 463-1849
E-mail: http://www.governor.state.tx.us/contact
Web: www.governor.state.tx.us

State Energy Conservation Office (SECO) Alternative Fuels Program

www.seco.cpa.state.tx.us/alt.html

The State Energy Conservation Office's Alternative Fuels Program demonstrates the positive environmental impact, technical feasibility and energy efficiency of domestically produced alternative fuels. Originally this program was designed to assist state agencies operate more of their fleets on alternative fuels but, through SECO's innovative thinking and expanded initiatives, schools, local governments and private fleets are now involved.

An upcoming SECO project involves the provision of planning support to the Alamo Area Council of Governments for a Hydrogen Highway Project.

Contact:

Texas State Energy Conservation Office
Juline Gurasich, Alternative Fuels Program
111 East 17th Street, #1114
Austin, Texas 78701
Phone: (512) 936-9283 or (800) 531-5441, ext 6-9283
E-mail: juline.gurasich@cpa.state.tx.us
Web: www.seco.cpa.state.tx.us/index.htm

Fuel Cell Technology Curriculum

www.waco.tstc.edu/ecr/ecr_fuelcell/index.php

Texas State Technical College in Waco offers a Fuel Cell Technology Curriculum. The College developed the curriculum under the auspices of the Texas State Leadership Consortium for Curriculum Development and uses funding from the State Energy Conservation Office. The curriculum is posted on the Texas State Tech website and is available to interested Texas colleges.

Contact:

Texas State Energy Conservation Office
Juline Gurasich, Alternative Energy Curriculum
111 East 17th Street, #1114
Austin, TX 78701
Phone: (800) 531-5441, ext 6-9283 or (512) 936-9283
E-mail: juline.gurasich@cpa.state.tx.us
Web: www.seco.cpa.state.tx.us/index.htm

2. STANDARDS/REGULATIONS

POWER GENERATION

Interconnection Standards

www.puc.state.tx.us/electric/business/dg/dgmanual.pdf
www.puc.state.tx.us/rules/subrules/electric/25.211/25.211.pdf

The Texas Public Utility Regulatory Act of 1999 included in the list of customer rights and safeguards that "A customer is entitled to have access… to on-site distributed generation…" and in October 1999 the Public Utility Commission of Texas adopted Substantive Rules addressing technical and procedural aspects of interconnecting distributed generation. Fuel cells are an eligible distributed generation technology.

Distributed generation is limited to 10 MW at the point of interconnection, and the utility distribution system to which the distributed generation is interconnected is at a voltage of less than 60 kV. The total capacity of a facility's individual on-site distributed generation units may exceed 10 MW; however, no more than 10 MW of a facility's capacity may be interconnected at the point of common coupling.

Contact:

Public Utility Commission of Texas
1701 N. Congress Avenue
PO Box 13326
Austin, TX 78711-3326
Phone: (512) 936-7000
Email: customer@puc.state.tx.us
Web: www.puc.state.tx.us/index.cfm

4. INCENTIVES/MARKET STIMULATION

VEHICLES

Emissions Reduction Incentive Grants

http://www.tceq.state.tx.us/implementation/air/terp/erig_apps.html

This Emissions Reduction Incentive Grant program was established by the Texas Legislature to provide monetary incentives for projects to improve air quality by reducing NOx emissions in the state's nonattainment areas.

On-road heavy-duty vehicles with a gross vehicle weight rating (GVWR) of 8,500 lbs. or more are eligible for grants under this program Awards are made for the purchase or lease of reduced emission vehicles, replacement with newer LEVs, repowering or retrofitting engines to emit at least 25% less NOx, or add-on of emission-reduction technology. Fuel cells qualify for grants under "Demonstration of New Technology" category. Projects may include:

- Use of retrofit, repower, and add-on technologies to reduce NOx emissions from the existing stock of heavy-duty diesel vehicles and non-road diesel equipment; and
- Use of advanced technologies, including use of qualifying fuels, for new engines and vehicles that produce very-low or zero emissions of NOx—including stationary and mobile fuel cells—which could replace the use of higher-emitting diesels.

The grants are made through the Texas Emissions Reduction Plan (TERP).

Contact:

Texas Commission on Environmental Quality
Texas Emissions Reduction Plan
Phone: (800) 919-TERP (8377)
E-mail: terp@tceq.state.tx.us
Web: www.tceq.state.tx.us

5. PARTNERSHIPS:

Fuel Cells Texas

www.fuelcellstexas.org

Fuel Cells Texas is a non-profit trade association representing the fuel cell, hydrogen and supporting industries in Texas. The group plays an active role in identifying and promoting research and development and business development opportunities to advance the fuel cell and hydrogen industries within the state.

Fuel Cells Texas members have worked with the State Energy Conservation Office (SECO) and their Fuel Cell Initiative Advisory Committee in the development of a proposed statewide plan for accelerating the commercialization of fuel cells. The group has also provided information to the Public Utility Commission of Texas, which requested that the group craft a fuel cell development policy, and is investigating whether legislation enacted in 2005 (H.B. 2129, which authorized the issuance of emission reduction credits for energy efficiency in the Houston-Galveston nonattainment area) could enable the introduction of fuel cells or CHP technology.

Fuel Cells Texas is involved in the effort to bring one of the Federal DOT Fuel Cell Transit Bus Demonstration projects to Texas. Working in conjunction with the University of Texas and the Houston office of the Gas Technology Institute, this important technology demonstration will show that fuel cell buses are a near term technology solution.

Through a collaboration of industry and university research a project is moving forward to provide turn-key retrofits of 12-volt battery powered material handling equipment with fuel cell-based power systems. In addition to the fuel cell retrofit the project will provide fully integrated hydrogen fueling infrastructure and technical service of the balance of plant. Other systems associated with this project are fuel cell powered APUs for over-the-road and long-haul trucks and fuel cell powered ground support equipment in airports.

Another project FCTx supports is a Texas corporate effort to create an integrated hydrogen fueling supply solution for hydrogen vehicle applications. This project will offer a technically sound and commercially available hydrogen fueling infrastructure at the point of consumption (fueling stations) at a lower cost than current technologies.

Contact:

Fuel Cells Texas
816 Congress Avenue, Suite 1400
Austin, TX 78701
E-mail: www.fuelcellstexas.org/contact.php
Web: www.fuelcellstexas.org

Texas Fuel Cell Partnership

www.tceq.state.tx.us/assistance/P2Recycle/FuelCell/TexasFuelCellPartnership.html

In 2001, the Texas Fuel Cell Partnership was established with the public and private sectors to demonstrate the environmental and economic benefits of hydrogen fuel cells. The goal of the partnership is to increase the awareness of fuel cell technology and to demonstrate the benefits of fuel cells to air quality and energy conservation, and their reliability.

The Partnership has sponsored two fuel cell projects:

- 2001 Project: Demonstration using a 3-kW fuel cell to power all the equipment in a continuous-air-monitoring station. Phase I demonstrated the use of hydrogen fuel and. Phase II demonstrated the use of a reformer to convert propane–natural gas into electricity.
- 2004 Project: Demonstration of the first propane-to-hydrogen fuel processor integrated with a fuel cell to supply electrical power to the grid. This project, which operated January-April 2004, was geared to quantify the emissions and efficiency and gain experience in installing and running a fuel cell in a building.

Contact:

Technical contact:

Dan Kelly, Director
Alternative Fuels Research and Education Division
Railroad Commission of Texas
P.O. Box 12967
Austin, TX 78711-2967
Phone: (512) 463-7110
E-mail: dan.kelly@rrc.state.tx.us

Partnership contact:
Brian Christian, Manager
Pollution Prevention and Industry Assistance
Texas Commission on Environmental Quality
P.O. Box 13087, MC-112
Austin, TX 78711-3087
Phone: (512) 239-3145
Fax: (512) 239-3165
E-mail: ppc@tceq.state.tx.us

6. RD&D SUPPORT

New Technology Research and Development Grants

www.tceq.state.tx.us/implementation/air/terp/ntrd.html
www.capitol.state.tx.us/tlo/79R/billtext/HB02481F.HTM
http://www.tercairquality.org/NTRD

The New Technology Research and Development (NTRD) Program provides incentives to encourage and support research, development, and commercialization of technologies that reduce pollution in Texas. The primary objective of the NTRD program is to promote the development of commercialization for technologies that will support projects that may be funded under the TERP Emissions Reduction Incentive Grants Program, including advanced technologies such as fuel cells, catalysts, and fuel additives. An individual, business, governmental agency or educational organization may apply for a grant. Each proposed new technology applicant will need to demonstrate the projected potential for reduced emissions of NOx and the cost-effectiveness of the technology once it has been commercialized; the potential for the technology to contribute significantly to air quality goals; and a strong commercialization plan.

In 2005, the TCEQ and Gas Technology Institute signed an agreement for the development of hydrogen fueling station technology as part of the NTRD Program. Additionally, House Bill 2481 includes language specifying that the NTRD grants may be used for advanced technologies for new engines and vehicles that produce very-low or zero emissions of oxides of nitrogen, including stationary and mobile fuel cells.

Contact:
Texas Environmental Research Consortium (TERC)
John Hall, Executive Director
E-mail: jhallpa@aol.com
Web: http://www.tercairquality.org/NTRD

Emerging Technology Fund

www.governor.state.tx.us/divisions/ecodev/etf

House Bill 1765, passed in 2005, established the Texas Emerging Technology Fund (ETF) in order to provide funding for emerging technologies in the state. The ETF has three components: Regional Centers of Innovation and Commercialization project grants, Matching Emerging Technology research grants, and Acquisition of Research Superiority grants. Projects will be funded that may result in creation of high quality new jobs, immediately or over a longer period, in the state if tied to emerging technology; or projects that have the potential to result in a medical or scientific breakthrough.

Contact:

Office of the Governor
Economic Development and Tourism
Texas Business Development
P.O. Box 12428,
Austin, TX 78711
Phone: (512) 936-0101
E-mail: www.governor.state.tx.us/contact
Web: www.governor.state.tx.us/divisions/ecodev

7. EMERGING BUSINESS SUPPORT

Texas Enterprise Fund

www.governor.state.tx.us/divisions/press/pressreleases/PressRelease.2004-03-15.2551/view
http://www.governor.state.tx.us/divisions/ecodev/ed_bank/tefund

The Texas Enterprise Fund supports a variety of economic development projects, including infrastructure development, community development, job training programs and business incentives. These funds will be used primarily to attract new business to the state or assist with the substantial expansion of an existing business as part of a competitive recruitment situation.

In 2004, the Fund awarded a $3.6 million grant to the Texas Energy Center, a consortium of private companies and public sector entities advancing energy-related R&D and commerce including hydrogen and fuel cell technologies.

Contact:

Office of the Governor
Economic Development and Tourism
Texas Business Development
P.O. Box 12428
Austin, TX 78711
Phone: (512) 936-0101
E-mail: www.governor.state.tx.us/contact

Web: www.governor.state.tx.us/divisions/ecodev

Texas Energy Center
www.txec.org

The Texas Energy Center is a consortium of private companies and public sector entities working together to advance Texas's potential as a leader in energy-related innovation and commerce. Specific focus areas are ultra-deepwater, petroleum exploration and production applications; advanced natural gas technologies; clean coal, hydrogen and next generation "zero emissions" power plants; advanced automotive fuels and infrastructure (including low sulfur gasoline, clean diesel, biofuels, natural gas, hydrogen and hydrogen blends); fuel cells; and wind power. The Energy Center has been partially funded through the Texas Enterprise Fund. As a condition of the funding agreement, the Center has committed to creating 1,500 new jobs in Texas by 2009 and maintaining these jobs until 2019. Fort Bend County and the city of Sugar Land have also provided funding to the Energy Center.

Contact:

Texas Energy Center
Web: www.txec.org

8. STATE AND LOCALLY-SUPPORTED DEMONSTRATIONS

Dallas/Fort Worth International Airport: A 5-kW fuel cell-powered, uninterrupted power source (UPS) system was used to provide uninterrupted power at the Dallas/Fort Worth International Airport's (DFW) central plant. Phone lines downloaded all utility operational data, and the Texas State Energy Conservation Office has access to this database for real-time monitoring of natural gas, water and electric consumption production and consumption activity of the fuel cell.

CAM Station, Houston: In 2001, the Texas Commission on Environmental Quality conducted a project to power all the equipment in a continuous air monitoring station using fuel cell technology. Powered by a 3-kW fuel cell, Phase I demonstrated the use of hydrogen to power the CAM station and Phase II involved the use of a reformer to convert propane–natural gas into electricity. The fuel cell project was an effort among several organizations including the Port of Houston, the Texas Railroad Commission and the Texas State Energy Conservation Office.

Texas Department of Transportation, San Antonio: This Texas Commission on Environmental Quality project demonstrated the first propane-to-hydrogen fuel processor integrated with a fuel cell to supply electrical power to the grid. Using a Plug Power 5-kW PEM fuel cell, this project operated from January-April 2004, producing electricity to feed into the grid at the Texas Department of Transportation TransGuide Intelligent Transportation System in San Antonio. Project partners included City Public Service, San Antonio; Railroad Commission of Texas; State Energy Conservation Office; Texas Commission on Environmental Quality; Texas Department of Transportation; and DOE.

UTAH

2. STANDARDS/REGULATIONS

Net Metering and Interconnection
http://www.le.state.ut.us/~code/TITLE54/54_11.htm

Investor-owned utilities and cooperatives are required to offer net metering, up to 0.1% of their peak demand in 2001, to customers generating electricity using renewable energy systems. Eligible systems include fuel cells, solar, wind or small hydropower facilities with a generating capacity of up to 25 kW.

Contact:

Utah Geological Survey
State Energy Program
1594 W. North Temple, Suite 3110
PO Box 146100
Salt Lake City, UT 84114-6100
Phone: (801) 537-3300
E-mail: markmilligan@utah.gov
Web: www.energy.utah.gov

4. INCENTIVES/MARKET STIMULATION

Salt Lake City: Alternative Fuels Credit
www.slcairport.com

The Salt Lake City Department of Airports offers incentives to commercial ground transportation providers operating clean fuel vehicles. Eligible fuels include compressed hydrogen, natural gas, propane and electric or hybrid electric. Credit incentives against ground transportation fees are $2,500 for each Original Equipment Manufacturer or certified vehicle converted to operate on an alternative fuel.

Contact:

Salt Lake City Department of Airports
AMF Box 22084
Salt Lake City, UT 84122
Phone: (801) 575-2400
Fax: (801) 575-2679
E-mail: barbara.gann@slcgov.com
Web: www.slcairport.com

VERMONT

2. STANDARDS/REGULATIONS

Net Metering and Sales Tax Exemption
http://publicservice.vermont.gov/energy-efficiency/ee_netmetering.html

Vermont requires electric utilities to offer net metering to all customers with photovoltaic, wind, fuel cell or biomass systems until the cumulative generating capacity of net-metered systems equals 1% of a utility's peak demand. The maximum system size is 15 kW for most systems; farm-based systems may have a maximum capacity of 150 kW. A provision also allows for "group net metering," allowing on-farm systems to credit on-site generation against all meters designated to the farm system. Net metering is also available for up to 10 non-farm systems/year that are greater than 15 kW but less than 150 kW.

The total generating capacity under net metering for each electric utility company is limited to 1% of a company's peak demand during 1996, or the peak demand during the most recent full calendar year, whichever is less. Utilities and on-farm system owners may jointly petition to exceed the enrollment cap.

Additionally, all equipment purchased to construct and install a net metered renewable energy system is exempt from the state's five% sales tax. The 1999 renewable energy systems sales tax exemption originally applied only to net-metered systems. Amendments extended the exemption to residential and commercial renewable-energy systems not connected to the grid.

Contact:

Vermont Department of Public Service
112 State Street, Drawer 20
Montpelier, VT 05620-2601
Phone: (802) 828-2811
Fax: (802) 828-2342
E-mail: publicservice@vermont.gov
Web: http://publicservice.vermont.gov

3. PUBLIC AGENCY POLICIES/PURCHASE PROGRAMS

VEHICLES

State Agency Energy Plan for State Government
www.bgs.state.vt.us/pdf/VTStateEnergyPlan.pdf

The “State Agency Energy Plan for State Government" gives strategy and guidance to address energy resource consumption issues for state governmental operations. The plan encourages the use of alternatively-fueled vehicles, including those fueled by CNG, biodiesel, ethanol, electric and hybrid electric, propane, LNG, or uses a hydrogen fuel cell.

Contact:

Vermont Agency of Administration
109 State Street
Montpelier, VT 05609
Phone: (802) 828-3322
Web: www.adm.state.vt.us

7. EMERGING BUSINESS SUPPORT

High Technology Growth Credit

www.state.vt.us/tax/creditshightech.shtml

Vermont businesses that exclusively design, develop and manufacture electric vehicles, AFVs, or hybrid vehicles, as well as energy technology involving sources other than fossil fuels, qualify as a “high-tech business” and are eligible for up to three of the following income tax credits:

- A percentage of increased payroll costs;
- 10% of qualified research and development expenditures;
- A credit against export taxes;
- 5 to 10% of total investments in plants/facilities, machinery and equipment (small business investment tax credit);
- Up to 6% of investments in machinery and equipment ($100,000 per year maximum);
- Up to 6% of investments for renovation of existing facilities to provide cable, fiber or telecommunications access;
- 20% of qualified training, education and workforce development expenditures; sales and use tax exemption for approved personal computers and software.

Contact:

Vermont Economic Progress Council
National Life Building, Drawer 20
Montpelier, VT 05620
Phone: 802-828-5256
E-mail: www.thinkvermont.com/help/index.cfm
Web: www.thinkvermont.com/vepc/index.cfm

8. STATE AND LOCALLY-SUPPORTED DEMONSTRATIONS

PLANNED DEMONSTRATION

Hydrogen Fueling Station, Burlington: Northern Power Systems and Proton Energy Systems, in partnership with EVermont (a nonprofit research and development organization that includes state and municipal officials, among others) are constructing a hydrogen fueling station at the Department of Public Works in Burlington. The project is funded by DOE. The fueling station will serve a Toyota Prius that is to be converted to operate on hydrogen fuel.

VIRGINIA

1. PLANS/STRATEGIES

Virginia Hydrogen Energy Plan
http://leg1.state.va.us/cgi-bin/legp504.exe?051+ful+HJ711

In January 2005 the Virginia General Assembly expressed its support for development of a Virginia Hydrogen Energy Plan and directed the state's Secretary of Technology to devise a comprehensive hydrogen blueprint. The plan will address the following elements, as endorsed by the Assembly:

- Implement all necessary legislation to help nurture the hydrogen economy;
- Work with Virginia Clean Cities or other similar agencies and organizations to establish guidelines to form a statewide hydrogen taskforce.
- Promote a Virginia hydrogen alliance;
- Encourage Virginia colleges and universities to develop curricula to train engineers, managers, and workers in the field of hydrogen-based energy;
- Educate Virginians about the advantages and importance of a hydrogen economy; and
- Promote relationships with hydrogen producers and fuel cell and hydrogen reformer manufacturers.

Contact:

Virginia Secretary of Technology
P.O. Box 1475
Richmond, VA 23218
Phone: (804) 786-9579
Fax: (804) 786-9584
Web: www.technology.virginia.gov/index.cfm

4. INCENTIVES/MARKET STIMULATION

VEHICLES

Vehicle Emissions Testing Equipment, Clean-Fuel Vehicles and Refueling Property Tax Credit

http://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+58.1-438.1

Any corporation, individual or public service corporation is allowed a credit against the income or gross receipts taxes of:

- An amount equal to 10% of the deduction allowed to such corporation, individual or public service corporation for purchases of clean-fuel vehicles principally garaged in Virginia or certain refueling property placed in service in Virginia or 10% of the costs used to compute the credit; or
- An amount equal to 20% of the purchase or lease price paid during the taxable year for equipment.

Contact:

Virginia Department of Taxation
Office of Customer Services
P.O. Box 1115
Richmond, VA 23218-1115
Phone: (804) 786-2992 (Businesses) or (804) 367-8031 (Individuals)
Fax: (804) 254-6111 (Businesses) or (804) 254-6113 (Individuals)
Web: www.tax.virginia.gov

Clean Special Fuel Vehicles/Plates

www.dmv.state.va.us/webdoc/citizen/vehicles/cleanspecialfuel.asp

Clean Special Fuel license plates are available for certain hybrid vehicles and vehicles exclusively powered by clean special fuel. The following types of fuels qualify a vehicle for clean special fuel plates: CNG, electricity, ethane, hydrogen, hythane, LNG, LPG, methane, solar, or a combination of two types of clean special fuels.

Contact:

Virginia Department of Motor Vehicles
P.O. Box 27412
Richmond, VA 23269
Phone: (866) 368-5463) or (800) 435-5137
Fax: (804) 367-6631
Web: www.dmv.state.va.us/index.asp

5. PARTNERSHIPS

Hampton Roads Clean Cities Coalition

www.hrccc.org/todaysfuels.html

Sponsored by DOE, the focus of the Clean Cities Initiative is to displace petroleum products as a transportation fuel through the development of public/private partnerships to promote the use of alternative fuels and vehicles.

The hydrogen-related work of the Hampton Roads Clean Cities Coalition (HRCCC) includes hosting the quarterly Virginia Hydrogen Economy Roundtable forum, developing pro-hydrogen policies in Virginia, educating policymakers and stakeholders; and supporting various hydrogen-focused initiatives within the state. HRCCC is also developing proposals and searching for funding opportunities for a Hydrogen Power Park, a concept that involves generating hydrogen from for a stationary power generating fuel cell, and using this equipment to support a fleet of fuel cell vehicles.

HRCCC members include:

- Virginia Department of Mines, Minerals and Energy
- Virginia 's Center for Innovative Technology (state-chartered non-profit that reports to the Virginia Secretary for Technology)
- Virginia Department of Environmental Quality
- Virginia Economic Development Partnership
- City of Chesapeake/Tidewater Fleet Managers Association

Contact:

Hampton Roads Clean Cities Coalition
5100 E. Virginia Beach Boulevard
Norfolk, VA 23502
Phone: (757) 873-6239
E-mail: info@hrccc.org
Web: www.hrccc.org

7. EMERGING BUSINESS SUPPORT

Clean Fuel Vehicle Job Creation Tax Credit

http://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+58.1-439.1

For taxable years beginning on or after January 1, 1996, through December 31, 2006, a corporation is eligible for a tax credit equal to $700 for each job which is created in either:

- The manufacture of components for vehicles designed to operate on a clean special fuel;
- The manufacture of components used to convert vehicles designed to operate on gasoline or diesel fuel to operate on clean special fuel;
- The conversion of vehicles designed to operate on gasoline or diesel fuel to operate on clean special fuel, or
- The manufacture of vehicles designed to operate on clean special fuel.

The credit is allowed in the taxable year in which the job is created and in each of the two succeeding years in which the job is continued. "Clean special fuel" means any

product or energy source used to propel a highway vehicle, the use of which, compared to conventional gasoline or reformulated gasoline, results in lower emissions of oxides of nitrogen, volatile organic compounds, carbon monoxide or particulates or any combination thereof. The term includes CNG, LNG, LPG, hydrogen, hythane (a combination of CNG and hydrogen), and electricity.

Contact:

Virginia Department of Taxation
Office of Customer Services
P.O. Box 1115
Richmond, VA 23218-1115
Phone: (804) 786-2992
Fax: (804) 254-6111
Web: www.tax.virginia.gov

WASHINGTON

1. PLANS/STRATEGIES

Fuel Cell Education Program
www.bpa.gov/Energy/N/projects/fuel_cell/education

The Washington State Department of Community, Trade and Economic Development (CTED), in support of Northwest Energy Technology Collaborative programs, contracted with Bonneville Power Administration to manage fuel cell curriculum development and dissemination of the curricula through Teacher Workshops within the state. The Washington Office of Superintendent of Public Instruction is also a partner in the project. Funding for the Fuel Cell Education Program is provided through a DOE grant.

Contact:

Bonneville Power Administration
P.O. Box 3621
Portland, OR 97208-3621
Phone: (503) 230-4796
E-mail: fuelcells@bpa.gov
Web: www.bpa.gov/Energy/N/projects/fuel_cell/index.cfm

2. STANDARDS/REGULATIONS

POWER GENERATION

Interconnection Standards

www.wutc.wa.gov/rms2.nsf/177d98baa5918c7388256a550064a61e/bd8abed0f7e8ce09882570ff006416f2!OpenDocument

The state's Utilities and Transportation Commission is in the final phase of developing rules for interconnection of electric generators (solar, wind, hydropower and fuel cells) with a generating capacity of up to 25 kW.

Contact:

Washington Utilities and Transportation Commission
P.O. Box 47250
1300 S. Evergreen Park Dr. SW
Olympia, WA 98504-7250
Phone: (360) 664-1160
Fax: (360) 586-1150
E-mail: info@wutc.wa.gov
Web: www.wutc.wa.gov/home

Net Metering

http://www.wutc.wa.gov/webimage.nsf/0/bfaecd2bb328ba3a882567df0081bbfb?OpenDocument

Washington's 1998 net metering regulation defines an eligible system as a fuel cell or a facility for the production of electrical energy that:

- Uses as its fuel either solar, wind, or hydropower;
- Has a generating capacity of up to 25 kW;
- Is located on the customer-generator's premises;
- Operates in parallel with the electric utility's transmission and distribution facilities; and
- Is intended primarily to offset part or all of the customer-generator's requirements for electricity.

Utilities must provide net metering to customers until net metering capacity has reached 0.1% of the utility's peak demand in 1996.

Contact:

Washington Utilities and Transportation Commission
P.O. Box 47250
1300 S. Evergreen Park Dr. SW
Olympia, WA 98504-7250
Phone: (360) 664-1160
Fax: (360) 586-1150
E-mail: info@wutc.wa.gov
Web: www.wutc.wa.gov/home

Grays Harbor Public Utility District: Net Metering

www.ghpud.org/Alternative_Energy/Net_Metering/net_metering.html

The Grays Harbor Public Utility District (PUD) passed a formal net metering policy in 2002 that differs slightly from what is required by Washington State law, in that the PUD reimburses customers for net excess generation at the end of each year, at the rate of 50% of the retail rate. State law allows utilities to require customers to grant this excess generation to the utility without reimbursement. Grays Harbor PUD has voluntarily gone beyond the state requirement in order to further encourage customers to install renewable generation. Eligible net metering facilities include solar, wind, hydropower, or a fuel cell.

Contact:

Grays Harbor PUC District No. 1
Energy/Conservation Services Department
2720 Sumner Avenue
Aberdeen, WA 98520
Phone: (360) 538-6383
Web: www.ghpud.org/index.html

3. PUBLIC AGENCY POLICIES/PURCHASE PROGRAMS

POWER GENERATION

Fuel Cells at State Facilities

www.washingtonvotes.org/2003-HB-2172

This 2003 bill promotes the purchase of fuel cells for state buildings. The measure requires that:

- When planning for the capital construction or renovation of a state facility, state agencies shall consider the utilization of fuel cells and renewable or alternative energy sources as a primary source of power for applications that require an uninterruptible power source;
- When planning the purchase of back-up or emergency power systems and remote power systems, state agencies must consider the utilization of fuel cells and renewable or alternative energy sources instead of batteries or internal combustion engines; and
- The director of general administration shall develop criteria by which state agencies can identify, evaluate, and develop potential fuel cell applications at state facilities.

Contact:

Washington General Administration
P.O. Box 41000
Olympia, WA 98504-1000
Phone: (360) 902-7208
E-mail: (360) 902-7208
Web: www.ga.wa.gov/index.html

4. INCENTIVES/MARKET STIMULATION

POWER GENERATION

Sales and Use Tax Exemption

http://apps.leg.wa.gov/WAC/default.aspx?cite=458-20-263

The retail sales and use tax exemptions apply to the purchase, lease and/or use of machinery and equipment used directly in generating electricity using fuel cells, wind, landfill gas, or solar energy as the principal source of power. Minimum generating capacity must be at least 200 W.

Examples of qualifying fuel cell machinery and equipment used as the principal source of power include: fuel cell assemblies; fuel storage and delivery systems; power inverters; transmitters; transformers; power poles; power lines; and connectors to the utility grid system or point of use.

Contact:

Washington State Department of Revenue
Taxpayer Services
PO Box 47478
Olympia, WA 98504-7478
Phone: 1-800-647-7706
E-mail: https://dor.wa.gov/content/contactus/Email/TaxQuestions.aspx
Web: http://dor.wa.gov/Default.aspx

VEHICLES

Alternative Fuel Vehicle Retail Sales Tax Exemption

http://search.leg.wa.gov/pub/textsearch/ViewRoot.asp?Action=Html&Item=2&X=315110719&p=1

Washington's retail sales tax does not apply to sales of new passenger cars, light duty trucks, and medium duty passenger vehicles, which are exclusively powered by a clean alternative fuel. "Clean alternative fuel" means natural gas, propane, hydrogen, or electricity, when used as a fuel in a motor vehicle that meets the California motor vehicle emission standards in Title 13 of the California code of regulations, effective January 1, 2005, and the rules of the Washington state department of ecology. This exemption becomes effective on January 1, 2009 and expires on January 1, 2011.

Contact:

Washington State Department of Revenue
Phone: (800) 647-7706
E-mail: https://dor.wa.gov/content/contactus/Email/TaxQuestions.aspx
Web: http://dor.wa.gov/content/contactus

5. PARTNERSHIPS

Northwest Energy Technology Collaborative

The Northwest Energy Technology Collaborative is a joint, voluntary effort of business, government, non-profit, industry and educational institutions in the Pacific Northwest comprised of the Washington Technology Center, ReliOn, Bonneville Power Administration, INTEC, Pacific Northwest National Laboratory, Puget Sound Energy, Spokane Intercollegiate Research and Technology Institute, and Washington State Department of Community, Trade and Economic Development. The collaborative work focuses on three areas:

- The Research and Development Portfolio supports the collaborations between regional national laboratories, R&D operations and educational institutions and initiatives to attain research dollars for the Pacific Northwest.
- The Commercialization Services Portfolio provides resources for new energy technologies and technology businesses, in various stages of the business life cycle, who are selling to the energy industry, particularly in the Northwest region of the U.S. and Canada.
- The Regional Branding Portfolio advances the Pacific Northwest's new energy technology sector to the global market.

Fuel cell-related work includes:

- Providing funding for installation of a PEM fuel cell at Central Washington University;
- Developing fuel cell-related reports; and
- Supporting development of a fuel cell education program.

Contact:

Northwest Energy Technology Collaborative
c/o Washington Technology Center
Jeff Morris, Director
Box 352140
Seattle, WA 98195-2140
Phone: (206) 616-3098
E-mail: morrisje@u.washington.edu
Web: www.nwetc.com

8. STATE AND LOCALLY-SUPPORTED DEMONSTRATIONS

Central Washington University, Ellensburg: The ReliOn PEM fuel cell is installed in 2004 at the university's hydrogen learning center and was funded by the Northwest Energy Technology Collaborative and the Bonneville Power Administration.

South Treatment Plant, Renton: Using wastewater digester gas (methane) as fuel, the FuelCell Energy 1-MW MCFC fuel cell system supplies a portion of the power needs of

the wastewater treatment facility. Installed in 2004, the installation was funded by King County and EPA.

Washington State Highway Patrol Emergency-911 system and Washington State Department of Transportation Emergency-911 system: ReliOn PEM fuel cells provide back-up power to the state's critical communication systems.

WEST VIRGINIA

1. PLANS/STRATEGIES

West Virginia Energy Roadmap: 2001 - 2020

www.wvenergyroadmapworkshops.org/index.cfm

The Governor's Energy Task Force delivered an Energy Roadmap in 2002, outlining policy recommendations that would use of the state's abundant domestic fossil fuels and stimulate the development of advanced technologies, while also limiting pollution and generating employment opportunities.

One of the report's three "Energy Generation Action Items" focuses on hydrogen production: "It is recommended that West Virginia utilize its abundant coal and natural gas resources in the production of hydrogen, which is poised to have a major impact on the American economy through the development of hydrogen-powered fuel cells for automobiles and other applications."

The West Virginia Energy Roadmap Workshop on Hydrogen was held in November, 2003 and attended by government, industry, and academia. The workshop resulted in the development of several strategic objectives:

- Educate, network and establish plan for future opportunities between government, academia and private industry;
- Pursue coal-to-hydrogen technology through the federal FutureGen program focusing on gasification technology, with carbon sequestration to occur in coal seams or in saline formations that are abundant within the state; and
- Educate the public and identify regulatory barriers that may slow adaptation of hydrogen technologies.

Other action items include developing a hydrogen plan, streamlining or simplifying carbon dioxide injection permitting, charging the Economic Development Office to identify the best sites, providing tax incentives for a hydrogen research consortium, and developing a marketing strategy. Two Hydrogen Roadmap studies were subsequently commissioned, including:

- Carbon Sequestration Study –- The West Virginia Geological and Economic Survey is conducting site-specific carbon sequestration studies to identify

optimum carbon sequestration locations. Preliminary reports have been completed for six sites.

- Hydrogen Markets Study – Researchers at Marshall University are identifying markets and uses that currently exist for hydrogen in the Ohio Valley and the associated in-place hydrogen infrastructure.

Contact:

West Virginia Development Office
Capitol Complex, Building 6, Room 553
1900 Kanawha Blvd. E.
Charleston, WV 25305-0311
Phone: (800) 982-3386 or (304) 558-2234
Fax: (304) 558-0449
E-mail: jherholdt@wvdo.org
Web: www.wvdo.org

WISCONSIN

2. STANDARDS/REGULATIONS

Renewable Portfolio Standard
www.legis.state.wi.us/2005/data/SB-459eng.pdf
www.legis.state.wi.us/cr_final/00-065.pdf
http://psc.wi.gov/utilityinfo/electric/newsinfo/renewableresource.htm

Legislation passed in 1999 required Wisconsin's investor-owned electric utilities and rural electric cooperatives to provide to its retail electric customers or members renewable energy in increasing percentages of its total retail electric sales, either directly or through renewable resource credits from another electric provider. The percentage requirements began at 0.5% in 2002 and increased to 2.2% by 2012. Renewable resources are defined by the state as electricity derived from a fuel cell that uses, as determined by the commission, a renewable fuel; tidal or wave action; solar thermal electric or photovoltaic energy; wind power; geothermal technology; or biomass.

Subsequent legislation (Senate Bill 459), signed into law in March 2006, replaced the earlier RPS and stipulated the following requirements:

- By 2015, 10% of the state's electricity must be generated from renewable sources.
- By 2007, the state must leverage its buying power to purchase 10% of the energy for the six largest state agencies from renewable sources. By 2011 the renewable energy requirement for the largest state agencies increases to 20%.

- The state must update building codes to include higher energy efficiency standards, and create special energy standards for state building projects and purchases.
- The state must pursue additional funding for the research and development of agricultural digesters and must set up a pilot program to test the feasibility and cost-effectiveness of burning leftover corn plants to heat residential space.
- Wisconsin utilities must directly support energy efficiency programs, ensuring that $85 million a year is spent to promote energy efficiency.

Senate Bill 459 encourages the development of energy efficiency and renewable energy technologies and strengthens the state's energy efficiency programs. Additionally, the bill increases funding to local governments for energy efficiency projects, which will also provide relief to property taxpayers.

Contact:

Paul Helgeson
Public Service Commission of Wisconsin
610 North Whitney Way. P.O. Box 7854
Madison, WI 53707-7854
Phone: (608) 266-3905
E-mail: paul.helgeson@psc.state.wi.us
Web: http://psc.wi.gov

Interconnection Standards

www.wisconsinpublicservice.com/news/cells/interconnection.asp

The Wisconsin Department of Administration and Public Service Commission of Wisconsin (PSCW) are currently drafting standard statewide interconnection rules for fuel cells and other distributed generation devices.

Contact:

Paul Helgeson
Public Service Commission of Wisconsin
610 North Whitney Way. P.O. Box 7854
Madison, WI 53707-7854
Phone: (608) 266-3905
E-mail: paul.helgeson@psc.state.wi.us
Web: http://psc.wi.gov

5. PARTNERSHIPS

Focus on Energy

www.focusonenergy.com

Focus on Energy is a public-private partnership offering energy information and services to residential, business and industrial customers throughout Wisconsin. These services

are delivered by a group of firms contracted by the Wisconsin Department of Administration's Division of Energy.

Renewable Energy Grant Projects

The intent of this Focus on Energy grant is to provide cost-sharing assistance on a competitive basis for applied renewable energy technology research and development projects that will improve market conditions for renewable energy systems and services. All supported R&D projects are required to meet one or more of the following objectives:

- Create innovative renewable energy products and services
- Enhance renewable energy product reliability
- Reduce the costs of renewable energy products and services
- Accurately assess Wisconsin's renewable energy resources
- Provide renewable energy distributed benefits

Support for R&D projects is primarily directed toward assisting high-value, near-term (five years or less) commercialization of renewable energy applications in Wisconsin. Awards have been made to several fuel cell Research and Development projects as well as an Educational Scholarship award for a college-level fuel cell project.

Contact:

Renewable Energy Programs
Phone: (800) 762-7077
E-mail: Renewinfo@focusonenergy.com

WYOMING

4. INCENTIVES/MARKET STIMULATION

Sales Tax Exemption

http://legisweb.state.wy.us/statutes/titles/title39/chapter15.htm

Wyoming statute exempts sales of equipment used to generate electricity from renewable resources from excise tax. Renewable resources covered under the exemption include wind generation, solar, biomass, landfill gas, hydro, hydrogen and geothermal energy.

The exemption is limited to the acquisition of equipment used in a project to make it operational up to the point of interconnection with an existing transmission grid including wind turbines, generating equipment, control and monitoring systems, power lines, substation equipment, lighting, fencing, pipes and other equipment for locating power lines and poles. The exemption does not apply to tools and other equipment used in

construction of a new facility, contracted services required for construction and routine maintenance activities and equipment utilized or acquired after the project is operational.

Contact:

Wyoming Department of Revenue
Excise Tax Division
Herschler Bldg, 2nd Floor West
122 West 25th Street
Cheyenne, WY 82002-0110
Phone: (307) 777-5293
Fax: (307) 777-3632
E-mail: Dan.Noble@wy.gov
Web: http://revenue.state.wy.us

REGIONAL ACTIVITIES

ARRC/H2 Alliance

www.arrch2alliance.com

The objective of the ARRC/H2 Alliance is to design and build the first viable prototype Hydrogen Fueling Station / Information Center in key locations worldwide. The prototype will function as a demonstration project to heighten the public's awareness and acceptance of hydrogen as a clean, safe, renewable energy. The ARRC Design (The Advanced Refueling Retail Center), designed independently of energy companies, is a prototype design for a new generation of service stations that was awarded a U.S. Design Copyright. The original ARRC design drew on insights from consumer groups, municipal planning and design review boards, and oil company executives as well as AG/ENA's 25-year experience designing service stations for Mobil. Seven major manufacturers collaborated in its development. The ARRC/H2 Alliance members are AG/ENA Architects, Forum Lighting, Frey-Moss, Hydrogenics, Shell Hydrogen and Signstrut-Milwaukee. ARRC/H2 is actively seeking participation by National Hydrogen Association member automakers, energy providers, technology companies, government agencies, manufacturers of service station components and financial investors.

Contact:

Alan Goldberg, FAIA (goldberg-agena@msn.com)
ARRC/H2 Alliance
701 Laurel Road
New Canaan, CT 06840 USA
Phone: (203) 966-4910
Fax: (203) 966-5605
E-mail: goldberg-agena@msn.com
Web: www.arrch2alliance.com

FuelCellSouth

www.fuelcellsouth.com

FuelCellSouth was formed as an outgrowth of the collaborative work between industry and researchers in the Southeastern United States to identify opportunities for collaboration in the delivery of fuel cell-based solutions in the commercial and consumer markets. A key deliverable from this work has been the characterization of key barriers to market adoption and industry growth for fuel cell products and services. FuelCellSouth is also working with State Energy and Transportation Offices and the Clean City Program to identify opportunities for Public Transportation and Fleet Vehicle Demonstrations.

FuelCellSouth sponsors include: University of South Carolina Research Foundation; Showa Denko Carbon, Nelson Mullins Riley & Scarborough LLP, Center for Hydrogen Research, NSF I/UCRC for Fuel Cells at USC, Columbian Chemicals, Concurrent Technologies Corporation, Savannah River National Laboratory, Kemet Electronics, BellSouth, Fuel Cell Test Center, Logan Energy and the North Carolina Advanced Vehicle Research Center.

Contact:

FuelCellSouth
E-mail: info@fuelcellsouth.org
Web: www.fuelcellsouth.com

HUG (Hydrogen Utility Group)

No website available

The HUG partnership was founded by eight utility companies in October 2005 to accelerate utility integration of promising hydrogen energy-related business applications. Current research involves experimentation and testing of wind and solar power electrolysis systems for the production of hydrogen.

HUG members include Arizona Public Service, DTE Energy, Entergy, Fort Collins Utilities, Nebraska Public Power District, New York Power Authority, Sacramento Municipal Utility District, Southern Company and Xcel Energy. Significant support is also provided by the Department of Energy and National Renewable Energy Laboratory (NREL), Electric Power Research Institute and National Hydrogen Association.

Contact:

Xcel Energy,
Chair of Hydrogen Energy Group
414 Nicollet Mall
Minneapolis, MN 55401-1993
Phone: (800) 328-8226
Email: http://www1.xcelenergy.com/aboutus/contactus.asp
Web: www.xcelenergy.com

Hydrogen Energy Center

www.hydrogenenergycenter.org/index.shtml

The Hydrogen Energy is an all-volunteer nonprofit organization working toward a sustainable energy economy based on renewable hydrogen through public education, advocacy, technology demonstration and job creation. Membership is currently open to individuals with members derived primarily from the New England area. The Center is considering the addition of corporate members.

Projects include:

- The Chewonki Renewable Hydrogen Project, a joint venture with partners Chewonki Foundation and Maine Energy Investment Corporation. Project goals are to accelerate deployment of renewable energy systems using hydrogen generators, storage and fuel cells; stimulating hydrogen technology business development in Maine; and developing relationships among renewable energy interests, educational and research organizations, industry organizations, code enforcement officials, and renewable energy designers and contractors.
- The Wallace Avenue Sustainable Hydrogen (WASH) Project, which will study methods for hydrogen production.

Contact:

Hydrogen Energy Center
PO Box 40
Portland, ME 04112
E-mail: hecinfo@HydrogenEnergyCenter.org
Web: www.hydrogenenergycenter.org/index.shtml

H2TEC

www.stacenergy.org/projects/03-STAC-01/15-va_ma_hydrogen_technology.htm

The Virginia-Maryland Hydrogen Technology Education Center (H2TEC) is a three-year effort to:

- Establish a new undergraduate course in hydrogen technology;
- Expand graduate study in the hydrogen area;
- Provide kindergarten through 12th grade outreach;
- Develop short courses and seminars for professionals;
- Offer presentations for non-technical audiences; and
- Develop demonstration projects and activities.

The Virginia Polytechnic Institute & State University is the project lead and will focus on hydrogen issues related to distribution, storage, PEMFCs, and transportation applications. Partnered with Virginia Tech are the University of Maryland – College Park, who will focus on hydrogen generation, SOFCs, and application of hydrogen

technology in buildings; Hampton Roads Clean Cities Coalition, who will provide outreach in Virginia; and Breakthrough Technologies Institute, who will provide general public outreach activities.

Other participants include:

- Virginia Department of Mines, Minerals and Energy (providing an electrolyzer);
- Maryland State Energy Office (financial support);
- General Motors (providing fuel cell vehicles for ride and drive events);
- Teledyne Energy (supplying fuel cell for use in UMCP's building heat and power demonstration);
- H2GEN (contributing course content for hydrogen generation technology); and
- Institute for Connecting Science Research to the Classroom (coordinating hydrogen advocate program for K-12 teachers).

Contact:

Virginia Polytechnic Institute & State University
460 Turner Street, Suite 306
Blacksburg, VA 24060
(540) 231-8217
Contact: David Fuller
Email: defuller@vt.edu
Web: www.stacenergy.org/projects/03-STAC-01/15-va_ma_hydrogen_technology_sow.htm

H2USA Centers

www.h2usa.org

Four Hydrogen Technology Learning Centers (H2USA Centers) will be created in three states to educate students, government officials, industry members, the general public and others on the hydrogen economy, technology, and applications.

Project partners include the California Energy Commission, New York State Energy Research & Development Authority (NYSERDA) and University of Central Florida. The strategic location of the proposers covers the northeast, southeast, and western United States with a coordinated and integrated program to educate a wide variety of audiences on hydrogen and its applications. Each participating state will be part of the development of a variety of educational media to include interactive, hands-on exhibits, demonstrations, and general and technical information.

Contact:

University of Central Florida
Office of Research
12443 Research Parkway
Suite 207
Orlando, FL 32826-3252
Email: sheinkopf@fsec.ucf.edu

Web: www.h2usa.org

HyTEC

www.stacenergy.org/projects/03-STAC-01/16-regional_hydrogen_sow.htm

The Hydrogen Technology Education Consortium (HyTEC) was formed in 2004 by four state-chartered institutions – the University of South Carolina, University of Florida, University of Georgia and North Carolina A&T State University – in order to produce curriculum materials about hydrogen and fuel cells. Activities will include development of:

- Graduate and undergraduate level multi-media hydrogen and fuel cell courses;
- Multi-media one-day short course for high school students and science teachers to introduce hydrogen technology and fuel cells;
- One-day multi-media short courses for state and local officials and other audiences (continuing education of engineers and other professionals, civic clubs, adult education classes, and non-technical college classes) focusing on hydrogen production, storage and transportation, and safety codes and standards.
- Quarterly electronic newsletter; and
- Hydrogen technology demonstrations, to include a fuel cell bus, solar hydrogen production, and biomass hydrogen production.

DOE has recently discontinued funding to this project and HyTEC consortium members are actively seek new funding sources in order to continue their work.

Contact:

North Carolina A&T State University
Center for Energy Research & Training
1610 East Market Street
Greensboro, NC 27411
Phone: (336) 334-7955
E-mail: ilias@ncat.edu

Mid-Atlantic Hydrogen Coalition

www.h2-energy.org

The Mid-Atlantic Hydrogen Coalition is a multi-state group formed to promote the deployment of hydrogen energy and fuel cell technologies in the Mid-Atlantic region of the U.S. (Delaware, the District of Columbia, Maryland, New Jersey, Pennsylvania, Virginia and West Virginia). The group is working to facilitate a network of hydrogen refueling stations along highway I-95 between Richmond, Virginia and New York City.

Contact:

Andre Van Rest, Executive Director
John Spears, President

Mid-Atlantic Hydrogen Coalition
111 South Calvert Street, Suite 2201
Baltimore, MD 21202-6174
Phone: (410) 547-0033 (Andre Van Rest)
E-mail: avr1743@msn.com (Andre Van Rest) or johnspears@h2-energy.org

Northeast Hydrogen Alliance

www.ceepinc.org/programs.html#ppi

The Northeast Hydrogen Alliance (NeHA) is a project of the Center for Economic and Environmental Partnership, with a mission of advancing collaborative development and deployment of a clean, job-creating and secure hydrogen energy infrastructure in the Northeast United States. NeHA focuses its efforts on:

- Resource development – building financial and technical capacity and leadership expertise;
- Education and training – collaborating with academia, deployment programs, and others to cultivate early hydrogen adopters;
- Outreach – working to inform decision/policy makers, the media and the public;
- Public/private collaboration – facilitating demonstration and commercialization of hydrogen energy infrastructure and products;
- Public policy – integrating hydrogen development with other existing regional public policy initiatives; and
- Regional research and development – identifying and developing opportunities for hydrogen production from renewable resources.

Contact:

Northeast Hydrogen Alliance
Center for Economic and Environmental Partnership, Inc.
126 State Street, 3rd Floor
Albany, NY 12207
Phone: (518) 432-6400 Ext. 226
Fax: (518) 432-1383
E-mail: ceepinc@aol.com
Web: www.ceepinc.org

Public Fuel Cell Alliance

www.cleanenergystates.org/JointProjects/fuelcells.html

A joint project of the Clean Energy States Alliance (CESA), the Public Fuel Cell Alliance (PFCA) is comprised primarily of state and federal fuel cell program managers. The Group's mission is to accelerate the widespread adoption and commercialization of fuel cells and the necessary hydrogen infrastructure through greater cooperation among North American and European public funding agencies. PFCA issues reports and member surveys, which are downloadable from their website.

Working group members include state and federal fuel cell program managers from Texas, Delaware, New Jersey, Connecticut, Rhode Island, Massachusetts, Ohio and Pennsylvania, plus the U.S. Departments of Defense and Energy, and Concurrent Technologies Corporation

Signatories to the PFCA's 2003 Statement of Principles include:

Federal Agencies

- Bonneville Power Administration
- Federal Aviation Administration
- National Energy Technology Laboratory (Dept of Energy)
- Office of Energy Efficiency and Renewable Energy (Dept of Energy)
- Regional Offices (Dept of Energy)
- US Army Fuel Cell Program (Dept of Defense)
- Environmental Protection Agency

State Organizations

- California Energy Commission
- Connecticut Clean Energy Fund
- Delaware Economic Development Office
- Governor's Office of Energy Management and Conservation (Colorado)
- Hawaii Dept of Business, Economic Development and Tourism
- Illinois 2H2
- Illinois Clean Energy Community Foundation
- Indiana Department of Commerce, Energy and Recycling (Indiana)
- Long Island Power Authority Clean Energy Initiative (New York)
- Massachusetts Technology Collaborative Renewable Energy Trust
- Michigan NextEnergy
- Mississippi Energy Division
- Montana Hydrogen Futures
- New Jersey BPU
- New Mexico Energy, Minerals and Natural Resources Dept
- New Mexico Governor's Office
- New York State Energy Research and Development Authority
- North Carolina Solar Center
- North Carolina State Energy Office
- Ohio Fuel Cell Initiative
- Pennsylvania Sustainable Development Fund
- Rhode Island Renewable Energy Fund
- Texas State Energy Conservation Office
- University of Alaska-Fairbanks
- Upper Midwest Hydrogen Initiative
- Xcel Energy Renewable Development Fund (Minnesota)

Consultants

- Concurrent Technologies Corporation
- Prospero LLC

Contact:

Clean Energy States Alliance
c/o Clean Energy Group
Lewis Milford, Executive Director
50 State Street, Suite 1
Montpelier, VT 05602
Phone: 802-223-2554
Fax: 802-223-4967
E-mail: LMilford@cleanegroup.org
Web: www.cleanenergystates.org/JointProjects/fuelcells.html

Southern Fuel Cell Coalition

www.cte.tv/sfcc/sfccHome.html

The Southern Fuel Cell Coalition (SFCC) is a regional initiative of the Atlanta-based Center for Transportation and the Environment (CTE), a nonprofit organization that develops and promotes advancements in transportation technologies, vehicles, and fuels that reduce environmental pollution and fossil fuel dependency.

The projects and activities of the SFCC promote interstate cooperation and regional job growth to meet the needs of a hydrogen and fuel cell market that is expected to grow to $7.3 billion within the next 15 years.

SFCC membership includes southern universities, national laboratories, corporations, nonprofit organizations, and government agencies working in partnership to identify and act upon opportunities to bring hydrogen and fuel cell technologies to market. With funding from the Federal Transit Administration, the SFCC is organizing and expanding a regional network of stakeholders, providing seed funding for regional demonstration projects, and hosting national fuel cell conferences focusing on the southeast. Eight demonstration projects are to be seeded through 2009, with more expected.

Contacts:

Jason Hanlin, Director of Technology Research
Southern Fuel Cell Coalition
The Center for Transportation and the Environment
Phone: (678) 916-4948
E-mail: jason@cte.tv
Web : www.cte.tv/sfcc/sfccHome.html

Bruce A. Burney, Director of Development
The Center for Transportation and the Environment
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Atlanta, GA 30309
Phone: (678) 244-4159
E-mail : bruce@cte.tv
Web: www.cte.tv

Upper Midwest Hydrogen Initiative

www.gpisd.net/resource.html?Id=5

The Upper Midwest Hydrogen Initiative (UMHI) is a venture of the Great Plains Institute, dedicated to accelerating the commercialization of hydrogen and fuel cells. UMHI has four core areas of work: strategic demonstrations of hydrogen technology; policy reform; education and outreach; and identifying areas of applied research most critical to commercialization of hydrogen and fuel cells. UMHI membership is comprised of business, academia and utilities (3M, Agriculture Experiment Station - South Dakota State University, Broin Companies, Distributed Generation Solutions, Donaldson Company, Energy Center of Wisconsin, Entegris, ePower Synergies, Initiative on Renewable Energy & the Environment - University of Minnesota, Kraus Global, Manitoba Energy Development Initiative, Minnesota Corn Growers Association, Moorhead Public Service - municipal utility, New Flyer Industries, Padilla Speer Beardsley, R4 Energy, Virent Energy Systems, West Central Research and Outreach Center - University of Minnesota, Wisconsin Power Control, and Xcel Energy).

UMHI has helped to craft hydrogen policy, at the request of the Bipartisan Legislators Forum. UMHI-inspired legislation passed in 2005 includes the Iowa Renewable Energy bill, Minnesota Hydrogen Transition Act, North Dakota Hydrogen Tax Exemption, North Dakota Hydrogen Resolution and South Dakota Hydrogen Resolution.

A major goal of UMHI is to build a world-class multi-fuel hydrogen refueling network by 2010 that would establish as many as 10 flexible-fuel Energy Stations along key trade corridors across the Northern Plains by 2010, spanning Manitoba, the Dakotas, Minnesota, Iowa and Wisconsin, ultimately linking with Illinois' planned hydrogen projects along I-90.

Contact:

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Upper Midwest Hydrogen Initiative
Great Plains Institute
2801 21st Avenue, South, Suite 230
Minneapolis, MN 55407
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E-mail: Rnordstrom@gpisd.net
Web: www.gpisd.net/resource.html?Id=5

ACNOWLEDGEMENT

A number of websites were accessed repeatedly as a starting point for information regarding state-level incentives and programs. These were:

Clean Energy States Alliance

- **CESA Member Programs**
  http://www.cleanenergyfunds.org/Funds/programs.php

DOE - EERE

- **Alternative Fuels Data Center**
  www.eere.energy.gov/afdc/laws/incen_laws.html
- **State Energy Program**
  www.eere.energy.gov/state_energy_program/projects_all_topic.cfm

EPA - Combined Heat and Power Partnership

- **Funding Opportunities**
  www.epa.gov/chp/funding_opps.htm
- **EPA's State and Local Clean Energy Programs**
  http://epa.gov/cleanenergy/stateandlocal/guidetoaction.htm

HybridCenter.Org

- **State and Federal Hybrid Incentives**
  http://go.ucsusa.org/hybridcenter/incentives.cfm#MO

National Association of State Energy Officials

- **State Energy Program and Activity Update, Winter 2004**
  http://www.eesi.org/briefings/2004/Energy%20&%20Climate/2.19.04%20Energy%20Efficiency%20Review/Winter%202004%20State%20Energy%20Program%20Update.PDF
- **State Energy Program and Activity Update, Winter 2005**
  www.naseo.org/sep/SEPhandbook2005.pdf

North Carolina State University - North Carolina Solar Center

- **Database of State Incentives for Renewable Energy (DSIRE)**
  www.dsireusa.org/index.cfm?&CurrentPageID=3