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Worldwide Fuel Cell Installations



Fuel cell Manufacturer	Project Partners	Fuel cell	Location	Building	Start date	Status	Fuel used	Picture	Comments / Contact Information
Acumentrics Corporation	U.S. Department of Defense, the National Park Service, Electric Power Research Institute, First Energy	5 kW tubular SOFC beta unit	Cleveland, Ohio	Cuyahoga Valley National Park Environmental Education Center	May 2005	Ongoing			Will be operated in grid parallel mode with additional capability to operate in independent island mode to meet critical needs of the educational facility during power loss. Will add another 5 kW unit in the spring of 2006 to bring total installed capacity to 10 kW.
Acumentrics Corporation	Sumitomo Corporation, Nippon Steel Corporation	5 kW tubular SOFC	Japan	Nippon Steel Corporation's Yawata Laboratories	Shipped Jan. 2005		Natural gas		
Acumentrics Corporation	US Army Corp of Engineers Construction and Engineering Research Laboratory (CERL), Fuel Cell Test and Evaluation Center (FCTec), SOFCo EFS Holdings LLC	10 kW tubular SOFC CHP	Sheridan, Wyoming	Big Goose Ranger Station in Bighorn National Forest	Jul. 2005	Ongoing	Propane		Provides power to two cabins, an office/shop, five trailers and drinking and wastewater pumping systems. Recycled heat provides heat to one cabin. The fuel cell and station will be shut down for six months during cold weather.
Acumentrics	SOFCo EFS Holdings LLC	10 kW tubular SOFC			Announced Aug. 2005		Commercial 2007 Certified Diesel fuel		Completed a 500-hour demonstration using the SOFC along with a diesel reformer. Funded by Ohio's Third Frontier Program to demonstrate a sulfur-tolerant SOFC.
Acumentrics Corporation	US Department of Energy National Energy Technology Laboratory (NETL), University of Alaska-Fairbanks, Ohio Department of Development, SOFCo EFS Holdings LLC	5 kW tubular SOFC	Idaho Falls, Idaho	NETL's Idaho National Engineering and Environmental Laboratory	Jun. 2005		2007 Certified Diesel and Syntroleum diesel		Three-day demonstration using the SOFC with a catalytic partial oxidation (CPOX) diesel reformer. The fuel cell will be transferred to the US Department of Energy's Arctic Energy Technology Development Laboratory at the University of Alaska, Fairbanks for 18 months of testing using natural gas.
Acumentrics Corporation	National Park Service, University of Alaska-Fairbanks	5 kW tubular SOFC	Seward, Alaska	Exit Glacier Nature Center in Kenai Fjords National Park	May 2004		Propane		Provides power and heat to the nature center year-round.
Acumentrics Corporation	ChevronTexaco Technology Ventures	Five 2 kW tubular BB-SOFC 2000 units	Houston, Texas		Shipped Jan. 2003				
Acumentrics Corporation	ChevronTexaco Technology Ventures	2 kW tubular BB-SOFC 2000	Houston, Texas		Shipped Oct 2002				
Ansaldo Fuel Cells Spa	ENEL	100 kW MCFC	Milan, Italy	ENEL site	1998-1999	Completed	Natural gas		Proof of Concept

Ansaldo Fuel Cells Spa	IBERDROLA	100 kW MCFC	Guadalix, Spain	IBERDROLA stack test and conditioning facility	1999	Completed	Natural gas		
Apollo Energy Systems Inc.	Hydrolec, Inc	10 kW Apollo alkaline fuel cell w/ 12 kW lead-cobalt battery	Ft. Lauderdale, Florida		2002	In production			Contract to supply 2,000 Apollo power plants per month to Hydrolec, Inc. for power back up and elevator systems around the world; starting in 2002. Contract worth \$223 million.
Ballard	Government of Canada, National Research Council, MGE UPS Systems	NexaRM	Vancouver, Canada	National Research Council's Institute for Fuel Cell Innovation	Planned				Will serve as a backup power source for uninterruptible power supply (UPS). Part of Canada's h2 Early Adopters Program (h2EA)
Ballard	Government of Canada, Bell Canada	NexaRM	Canada	Bell Canada backup power site	Planned				Part of Canada's h2 Early Adopters Program (h2EA)
Ballard	Government of Canada, University of Toronto at Mississauga. MGE UPS Systems	NexaRM	Mississauga, Canada	University of Toronto at Mississauga	Planned				Will provide critical backup power for server room applications at the University. Part of Canada's h2 Early Adopters Program (h2EA)
Ballard	Tokyo Gas	1 kW MK1030 PEM fuel cell	Japan	Prime Minister's residence	Apr. 2005		Natural gas		Co-generation unit--provides electricity and reuses waste heat.
Ballard	Osaka Gas	Twenty-eight PEM units	Japan	Residential	Installations begin Aug. 2005				Part of the first stage of the "Large-Scale Demonstration Project of Stationary Fuel Cells"
Ballard	Nippon Oil	1 kW PEM	Yokohama, Japan	Nippon Oil's Yokohama Oil Refinery	Apr. 2004		Kerosene		
Ballard	Keiyo Gas	1 kW PEM	Chiba, Japan		2004				Field test.
Ballard	Osaka Gas	PEM-"semi commercial unit, type-2"	Japan		Shipped Jan. 2004				Cogeneration system for field testing.
Ballard	Tokyo Gas	1 kW PEM	Yokohama, Japan	Tokyo Gas employee's residence	Ten-month test operation	Mar. 2003			Cogeneration units.
Ballard	Japan Gas Association	1 kW PEM	Tobitakyu, Japan	Kajima Technical Research Institute	Feb. 2003				Japan Gas Assoc. Phase 2 test of residential PEM fuel cells of different manufacturers.
Ballard	EnBW	250 kW PEM	Mingolsheim, Germany	Spa bath	Sep. 2002	One-year demonstration	Natural gas		Logged 6,000 hours of operation at 75% efficiency with utilization of waste heat. Part of EDISON (Intelligent Energy Distribution System) program.
Ballard	EUS GmbH, AEG SVS Power Supply Systems GmbH, E.ON Engineering GmbH, MVV Energie AG, University of Dortmund	250 kW stationary PEM generator CHP with micro-turbine	Oberhausen, Germany	Fraunhofer Institute for Environmental Safety and Energy Engineering	Jun. 2002	Ongoing	Natural gas		"PEM-Oberhausen" project http://www.pem-oberhausen.de/englisch/index.html
Ballard	Japan Gas Association	1 kW PEM	Tokyo and Osaka, Japan		Phase 1: Dec. 2001	Phase I completed Feb. 2002			Japan Gas Assoc. test of residential PEM fuel cells from seven manufacturers (Ballard, Matsushita Electric, Toshiba, Toyota, Sanyo Electric, Mitsubishi Electric, Plug Power). Completed 1,000 hours of operation in Phase I

									testing, 8,000 hours scheduled in Phase 2 using fuel cells of different manufacturers.
Ballard		250 kW stationary PEM generator	Tomakomai, Japan	Nishimachi Sewage Treatment Center	Jul. 2001	Nov. 2002	Methane gas from anaerobic digester		
Ballard	Nippon Telegraph and Telephone (NTT)	250 kW PEM stationary generator	Tokyo, Japan	NTT's Musashino Research and Development Center	Mar. 2001	May 2003	Town gas		Cogeneration system incorporating an adsorption chiller for air conditioning. Operated for 5,026 hours.
Ballard	Promocell, University of Liege	220 kW PEM stationary generator	Liege, Belgium	University of Liege	2001	Ongoing	Natural gas	 	Provides power to the university campus and heats the university swimming pool.
Ballard		250 kW stationary PEM generator	Tomakomai, Japan	Nishimachi Sewage Treatment Center	2001	Ongoing	Methane gas from anaerobic digester		
Ballard	Bewag AG	250 kW PEM	Berlin, Germany	Bewag's Fuel Cell Innovation Park	Jun. 2000	Ongoing	Natural gas		Provides power to the park.
Ballard	Bewag, Hamburgische Elektrizitäts-Werke AG, EDF, PreussenElektra AG, VEAG Vereinigte Energiewerke AG	250 kW PEM stationary generator	Berlin, Germany	Bewag's Treptow heating plant	Jun. 2000	Ongoing	Natural gas		Five-year demonstration project. Being tested by a consortium of European electric companies led by Bewag, the largest supplier of power and heat in Berlin.
Ballard	Nippon Telegraph and Telephone (NTT)	250 kW PEM stationary generator	Tokyo, Japan	NTT research lab	Nov. 2000	Ended May 2003	Town gas		Cogeneration system incorporating an adsorption chiller for air conditioning. Operated for 5,026 hours.
Ballard	Elektra Birseck Muenchenstein (EBM)	250 kW PEM stationary generator	Basel, Switzerland	EBM corporate headquarters	2000		Natural gas		
Ballard	Cinergy Technology Inc.	250 kW PEM stationary generator	Crane, Indiana	Crane Naval Surface Warfare Center	Sept. 1999	Ended 2001	Natural gas	 	First 250 kW PEM fuel cell generator in the world to enter field testing. Provided heat and power during the two-year evaluation.
Bharat Heavy Electricals Ltd. (BHEL)		50 kW PAFC power plant (two 25 kW stacks)	India	BHEL testing facility		2000	By-product hydrogen from a chlor-alkali factory		In-house design, operated for 500 hours.
Brennstoffzellentechnik GmbH (ZBT)	VNG, Stadtwerke Chemnitz, DBI Gas und Umweltechnik, Bergakademie Freiberg, Schalt und Regeltechnik	4 kW Inhouse 4000 PEM CHP	Chemnitz, Germany	Chemnitz Botanical Garden	Jun. 2005		Natural gas		Part of DemoCell project conducted by German Company, VNG. Provides heat and power, with excess fed to the local utility grid.






Ceramic Fuel Cells Ltd. (CFCL)	EWE, VNG AG	1 kW Micro-CHP	Brandenburg, Germany		Installation planned in early 2006		Natural gas	 	Combined heat and power. CFCL and EWE have signed an agreement to develop a fuel cell-powered CHP unit for the residential market.
Ceramic Fuel Cells Ltd. (CFCL)	Powerco	1 kW Micro-CHP	New Zealand		Jun. 2005			 	Combined heat and power.
Ceramic Fuel Cells Ltd. (CFCL)	EWE	1 kW Micro-CHP	Oldenburg, Germany		Installation planned in late 2005		Natural gas	 	Combined heat and power. CFCL and EWE have signed an agreement to develop a fuel cell-powered CHP unit for the residential market.
Dais Analytic	Hamburg Gas Consult, Wingas, Technische Werke Ludwigshafen, European Fuel Cell GmbH,	Two 3 kW PEM Alpha units	Ludwigshafen, Germany	Test house	First unit installed Aug. 1999, second unit installed May 2000		Natural gas		Provided combined heat and power. Incorporated in "House of the Future, Prototype 1" demonstrator. Preliminary prototypes were installed at Verbundnetz AG in Machern, Germany, Mar. 1999.
Dais Analytic	Hamburg Gas Consult, European Fuel Cell GmbH	PEM	Kassel, Germany		2000				
Dais Analytic	Hamburg Gas Consult, European Fuel Cell GmbH	PEM	Hannover, Germany		2000				
Dais Analytic	Hamburg Gas Consult, European Fuel Cell GmbH	3 kW PEM	Hamburg, Germany		1999				
Dais Analytic	Hamburg Gas Consult, VNG	Alpha PEM CHP	Leipzig, Germany	Apartment	Aug. 1999				
DCH Technologies		5 kW PEM		Unspecified global natural gas utility	Shipped Mar. 2002		Natural gas		
DCH Technologies	Con Edison Co. of New York	5 kW Enable Fuel Cell system	New York	Con Edison	Shipped May 2002		Hydrogen or natural gas		Con Edison to test and validate the system, then place the fuel cell with targeted customers for evaluation as a power quality and/or peak shaving system. Company no longer in business.
European Fuel Cell GmbH	siGEN, Berwickshire Housing Association (BHA), Scottish Power, Scottish Enterprise, Baxi Group	1.5 kW PEM Home Energy Center Micro-CHP	Eymouth, UK (Scotland)	Residential	Sept. 2005	One year trial	Natural gas		First residential fuel cell micro-CHP unit demonstrated in the UK. Will supply power and heat. European Fuel Cell plans about 100 installations at various European locations.
European Fuel Cell GmbH	EnBW	1.5 kW PEM beta prototype	Germany	Residential					First European Fuel Cell GmbH unit to be tested at an operational site.
Fuel Cell Technologies (FCT)	University of Toronto	Four 5 kW SOFC units	Mississauga, Canada	12-unit student townhouse block at the University of Toronto-Mississauga	Jul. 2005		Natural gas		The four fuel cells will be connected to form a "mini-grid". The units will provide power and co-generated heat. Sponsored by Technology Partnerships Canada h2 Early Adopters Program.
Fuel Cell Technologies (FCT)	US Army Construction Engineering Research Laboratory (CERL), Fuel Cell Test and Evaluation Center (FCTec)	5 kW SOFC CHP	Ft. Meade, Maryland	Maintenance and repair facility at Fort Meade	To be delivered to Ft. Meade in Jun. 2005 after testing at FCTec in Apr.-May 2005	One-year demonstration	Natural gas		

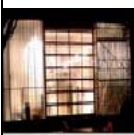





	Siemens Westinghouse								
Fuel Cell Technologies (FCT)	Canadian Centre for Housing Technology, Natural Resources Canada	5 kW SOFC	Kingston, Canada	Demonstration residential unit at the Canadian Centre for Housing Technology	Mar. 2005	Installed	Natural gas		Improved system with gas-powered heat-up to allow starting without an additional electrical power source. The inverter, which converts fuel cell energy to AC power used by most household appliances, was redesigned to satisfy residential standards.
Fuel Cell Technologies (FCT)	Federal University Itajuba	5 kW SOFC	Itajuba, Brazil	Federal University-Itajuba	Shipped Mar. 2005		Natural gas		First SOFC system tested in South America. The system will be evaluated for performance, to provide parameters to validate various SOFC modeling tools and serve as a demonstration system for Brazilian universities and energy companies.
Fuel Cell Technologies (FCT)	National Research Council	5 kW SOFC	Vancouver, Canada	Institute for Fuel Cell Innovation at National Research Council	Planned, shipped Mar. 2005		Natural gas, methanol		Will provide electricity to power a ground source heat pump to provide climate control for the NRC-IFCI building. Co-generated waste heat will be utilized for building services.
Fuel Cell Technologies (FCT)	Siemens Westinghouse Power Corporation (SWPD)	SOFC balance of plant assembly	Pittsburgh, Pennsylvania	Siemens Westinghouse Power Corporation	Planned, shipped Mar. 2005				Will be used to test SWPD's new High Power Density cells as part of a federal 10-year, US\$500 million program to develop innovative, low-cost ways to commercialize SOFCs that can be mass-produced at a target cost of US\$400/kW.
Fuel Cell Technologies (FCT)	University of Liege	5 kW tubular SOFC CHP	Liege, Belgium	University of Liege	Shipped Jun. 2005				For testing and validation.
Fuel Cell Technologies	Siemens Westinghouse Power Corporation, Penn State Energy Institute, Pennsylvania Department of Conservation and Natural Resources	5 kW SOFC	Parker Dam State Park, Pennsylvania	Parker Dam State Park Fuel Cell Pavilion	Received Dec. 2004	Operational	Natural gas from Pennsylvania forests		Heats cabins and administration buildings, and provides hot water for showers.
Fuel Cell Technologies (FCT)	University of Alaska, Fairbanks Natural Gas	5 kW SOFC Alpha unit	Fairbanks, Alaska	Fairbanks Natural Gas site	Aug. 2003	Operational	High pressure natural gas		By April 2004 the system had operated 6,158 hours.
Fuel Cell Technologies (FCT)	RWE	5 kW SOFC Alpha unit	Mechernich and Essen, Germany	RWE Fuel Cell Pavilion, Meteorit Park	Shipped to Mechernich In Aug. 2003, relocated to Essen in Nov. 2003	De-commissioned	Low pressure natural gas at Mechernich, high pressure natural gas at Essen		First tested at the RWE Lab in Mechernich, then installed at Fuel Cell Pavilion. Operated 3,541 hours. System degraded by over temperature and returned to FCT. RWE planned to upgrade to a Beta Unit.
Fuel Cell Technologies (FCT)	JFE Urban Development Corporation	5 kW SOFC Alpha unit	Yokohama, Japan	JFE	Sep. 2003	Operational	Low pressure natural gas		JFE will promote, sell, distribute and service FCT's SOFC products up to 50kW in the commercial and residential East Asian markets. By April 2004, had operated 1,700 hours.









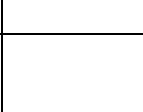
									JFE will upgrade to a Beta unit, which can be modified for different NG compositions.
Fuel Cell Technologies (FCT)	Ford, DTE Energy	5 kW SOFC Alpha unit	Dearborn, Michigan	Ford's Dearborn Assembly Plant	Jul. 2003	Testing completed	Low pressure natural gas, natural gas augmented with hydrogen gas derived from paint fume emissions		Part of Ford's 'Fumes-to-Fuel' System. The pilot system consumes emissions from Ford's vehicle paint shop and turns them into electrical energy and heat for the facility. By Apr. 2004 the fuel cell had operated 1,164 hours. A 50 kW system is being discussed. The 5 kW SOFC System may be relocated to Ford's Visitors center for demonstration.
Fuel Cell Technologies (FCT)	BC Research Inc, Methanex, NORAM Engineers & Constructors, QuestAir Technologies	5 kW SOFC	Vancouver, Canada	BC Research Inc.'s laboratory building	Agreement signed Jun. 2003		Natural gas of varying NGL compositions, methanol, hydrogen, propane and heavier hydrocarbons		Will provide an uninterruptible power supply to BC Research's bio-assay lab. The heat and hot water output from the SOFC will also be used by the BC Research Complex.
Fuel Cell Technologies (FCT)		5 kW SOFC	Kingston, Canada	FCT research facility		Operational	Natural gas		
Fuel Cell Technologies (FCT)	U.S. Department of Energy's National Energy Technology Laboratory (NETL), Electric Power Research Institute, U.S. Environmental Protection Agency	5 kW SOFC	Morgantown, West Virginia	NETL	Mid-2003				NETL will conduct tests and then deliver the unit to the EPA to install at an abandoned hardrock mine in Montana, where it will be used to provide electricity for operating instrumentation and communications equipment for environmental monitoring.
Fuel Cell Technologies (FCT)	Gas Technology Institute, Memphis Botanic Garden, Memphis Light, Gas and Power	5 kW Beta 1 SOFC	Memphis, Tennessee	Memphis Botanic Garden	Prototype unit was to be delivered by Apr. 2004	One-year demonstration project			Technical issues, including the inability to operate above 3 kW, arose during a 300 hour pre-delivery laboratory test. Field delivery was postponed until issues are resolved.
Fuel Cell Technologies (FCT)	The Presidio Trust	5 kW SOFC system	San Francisco, California	The Presidio Trust	2002				Buy Down Recipient FY2000 US Department of Defense Climate Change Fuel Cell Program.
Fuel Cell Technologies (FCT)	Hammarby Sjostad project	Two 5 kW SOFC CHP units	Stockholm, Sweden	Hammarby Sjostad project, residential units	Aug. 2002		Biogas		Progressive 8,000 unit residential development project focusing on environmental concerns, largely powered by renewable energies.
Fuel Cell Technologies (FCT)	South Coast Air Quality Management District (SCAQMD)	Ten 5 kW SOFC CHP units	Various locations, California	Two or three units to be located at LADWP, one or two units at Sempra Utilities and one to two units at the University of California-Irvine	First delivery in 2004				Contract to provide 10 residential fuel cell units. The contract is scheduled to run through the end of 2005, during which time FCT will install, then operate and maintain the residential fuel cells for two years.
FuelCell Energy	Alliance Power	Two 250 kW Direct FuelCell (DFC) power plants	Fontana, California	TST, Inc.	To be delivered first quarter 2006	Planned	Natural gas		Will replace a large burner that preheats air as part of TST's aluminum manufacturing process.

FuelCell Energy	South Coast Air Quality Management District (SCAQMD), California Cast Metals Association	Two 250 kW MCFC units	California	Metal foundry	To be delivered	Planned		
FuelCell Energy	Select Energy Services, Eastern Connecticut State University	Four 250 kW MCFC units	Willimantic, Connecticut	Eastern Connecticut State University's central heating plant	To be installed Feb. 2006	Planned	Natural gas	Grid parallel operation to displace existing facility electric demand. Thermal energy from the fuel cells will be captured and used to preheat water returning to the central heating plant. Buy Down Recipient FY2003 US Department of Defense Climate Change Fuel Cell Program.
FuelCell Energy	Chevron Energy Solutions, US.Postal Service San Francisco Processing and Distribution Center (P&DC), Bonneville Power Administration	250 kW DFC 300A MCFC	San Francisco, California	USPS Embarcadero Postal Center	To be installed Feb. 2006	Planned	Natural gas	Will provide base load heat and power (grid parallel, grid independent during an outage). Funding: up to \$625,000 from California's Self Generation Incentive Program .Buy Down Recipient FY2003 US Department of Defense Climate Change Fuel Cell Program.
FuelCell Energy	Alameda County, Chevron Energy Solutions	1 MW DFC1500 MCFC (Four 250 kW units)	Dublin, California	Alameda County's Santa Rita Jail	To be installed Nov. 2005	Planned		Will provide 90% of base load power, to be used in conjunction with an existing 1.18 MW solar power system. Funding: up to \$1.4 million from the California Public Utilities Commission's Self Generation Incentive Program, .Buy Down Recipient FY2003 US Department of Defense Climate Change Fuel Cell Program.
FuelCell Energy	MTU CFC Solutions GmbH, RWE Fuel Cells, Festo GmbH	225 kW Hot Module MCFC	St. Ingbert, Germany	Festo facility	2005			Provides heat, air conditioning and power.
FuelCell Energy	Alliance Power, Sierra Nevada Brewing Co.	1 MW DFC MCFC units (four 250 kW units)	Chico, California	Sierra Nevada Brewing Co. brewery	Installed Mar. 2005		Natural gas, possibly anaerobic digester gas	Will supply electric power and heat to the brewery's production processes. Funding: 40% of eligible costs from the California Public Utilities Commission's (CPUC) Self-Generation Incentive Program. Buy Down Recipient FY2003 US Department of Defense Climate Change Fuel Cell Program.
FuelCell Energy	Alliance Power, Starwood Hotels and Resorts Worldwide Inc.	Four 250 kW DFC MCFC units	San Diego, California	Sheraton San Diego Hotel & Marina	Fourth quarter 2005	Planned		Will supply base load electricity for the 1,044-room hotel, with heat byproduct used for the hotel's pool. Funding: up to \$2.5 million from the California Public Utilities Commission's (CPUC) Self-Generation Incentive Program.
FuelCell Energy	PPL EnergyPlus, Pepperidge Farm	Two 250 kW DFC 300A MCFC units	Bloomfield, Connecticut	Pepperidge Farm bakery	Third quarter 2005	Planned		Will provide about 20% of the facility's base load power, with the heat byproduct converted to process steam for the bakery. Funding:








Connecticut Clean Energy Fund and US Department of Defense Climate Change Fuel Cell Program grants.










FuelCell Energy	Salt River Project (SRP)	250kW DFC MCFC	Mesa, Arizona	Arizona State University East Campus	Shipped first quarter 2005	Planned			The unit will feed the electricity output into SRP's local grid.
FuelCell Energy	RWE, City Council Ahlen, MTU CFC Solutions GmbH	250 kW DFC HotModule MCFC	Ahlen, Germany	Municipal wastewater treatment facility	2005	Planned	Sewage gas		Will provide combined heat and power.
FuelCell Energy	Marubeni Corporation, Bioenergy Co.	250 kW DFC 300A MCFC	Tokyo, Japan	Food recycling facility at "Super Eco-Town"	Shipment expected in first half of 2005		Anaerobic digester gas		Will provide approximately 50% of the facility's base load electricity requirement. Heat will be converted to process steam for the recycling operations.
FuelCell Energy	State University of New York (SUNY), New York State Energy Research and Development Authority, New York Power Authority	250 kW MCFC CHP	Syracuse, New York	Walters Hall at SUNY's College Environmental Science and Forestry	Installed Apr. 2005	Operational	Natural gas		Providing electricity with waste heat used for campus hot water, space heating and/or cooling. Funding: over \$2.5 million from NYPA, \$1 million grant from NYSERDA.
FuelCell Energy	Marubeni Corp/Fuel Cell Japan Co., Mitsubishi Heavy Industries, Kawasaki	250 kW MCFC	Osaka, Japan	Kawasaki's Akashi Works	2005				Long-term testing and evaluation.
FuelCell Energy	Mitsubishi Heavy Industries, Bio Energy, Co.	250 kW MCFC power plant	Tokyo, Japan	Food waste treatment facility	Late 2004 or early 2005		Digester gas		Largest food waste treatment plant in Japan. The plant treats 110 tons of garbage/day to generate digester gas. Uses a fermentation reactor and the MCFC to generate and sell electric power.
FuelCell Energy	Marubeni Corporation, Epson, First Energy Service Company Ltd., Seiko Epson	Two 250 kW DFC 300A MCFC units	Ina, Japan	Seiko Epson's Quartz Devise Division facilities	Apr. 2004	Operational	Liquefied natural gas		Will supply power and steam. The plant also has a PAFC unit.
FuelCell Energy	Marubeni Corporation, City of Fukuoka	250 kW DFC 300A MCFC	Hukuoka, Japan	Seibu Water Treatment Center	Jan. 2004	Mar. 2005	Digester gas		Supplies electricity and steam.
FuelCell Energy	Caterpillar Inc, City of Santa Barbara, Alliance Power	Two 250 kW DFC MCFC units	Santa Barbara, California	El Estero Wastewater Treatment Facility	Sep. 2004	Operational	Anaerobic digester gas (methane)		Provides electricity and heat for the facility's wastewater treatment system. Funding: \$2.25 million from California Public Utilities Commission's (CPUC) Self-Generation Incentive Program. Buy Down Recipient FY2003 US Department of Defense Climate Change Fuel Cell Program
FuelCell Energy	Marubeni Corporation, Japan Petroleum Exploration Co. Ltd. (JAPEX)	250 kW DFC 300A MCFC	Nagaoka, Japan	JAPEX's Katakai natural gas gathering station	Fourth quarter 2004	Operational	Liquefied natural gas		Will supply power and steam.







FuelCell Energy	RWE, MTU CFC Solutions GmbH, Fernwärmeversorgung Niederrhein, Stadtwerke Dinslaken	Two 250 kW DFC HotModule MCFC units	Krefeld-Fischein, Germany	Residential units	Apr. 2004	Operational			Will provide residential supply of combined heat and power in the Dinslaken area (will supply 40 homes in the winter and up to 300 during the summer). Funded by the region of NordRhein Westphalia.
FuelCell Energy	Vattenfall/BeWag, MTU CFC Solutions GmbH	250 kW DFC HotModule MCFC	Berlin, Germany	Vattenfall Europe AG's Fuel Cell Innovation Park	Sep. 2004	Operational	Natural gas, methanol or both		Bi-fuel project: liquid fuel used is derived from wastes generated in the city of Berlin. Provides combined heat and power. Has logged over 4,000 operational hours.
FuelCell Energy	US Army Construction Engineering Research Laboratory (CERL), Fuel Cell Test and Evaluation Center (FCTec), Concurrent Technologies Corporation	250 kW DFC 300A MCFC	Johnstown, Pennsylvania	FCTec Environmental Technologies Facility	Cooperative agreement signed Aug. 2004	12-month demonstration planned	Natural gas		Will supply electricity to the facility.
FuelCell Energy	Ohio Cat/Caterpillar Inc., City of Westerville Electric Division, American Municipal Power Ohio	250 kW DFC MCFC	Westerville, Ohio	Electric substation	Nov. 2004	Operational			Will feed power to 180 homes from an electric substation. Funded in part through Ohio's Third Frontier Fuel Cell Initiative.
FuelCell Energy	Quinn Power Systems Associates/Caterpillar Inc., Los Angeles County Sanitation Districts	250 kW DFC 300A MCFC	Los Angeles, California	Palmdale Water Reclamation Plant	Nov. 2004	Operational	Digester gas		The Districts, which treat about 530 million gallons of wastewater daily, are industry leaders in recovering and utilizing biogas and biomass byproducts from waste to generate electricity. Funding: \$1,125,000 from the California Public Utilities Commission.
FuelCell Energy	Democratic National Committee	250 kW DFC 300A MCFC	Boston, Massachusetts	Democratic National Convention	Jul. 2004	Completed	Natural gas		Part of a distributed generation "micro-grid" that provided electricity to support the existing grid to meet the expected additional demand of the convention.
FuelCell Energy	Grand Valley State University	250 kW DFC 300A MCFC	Muskegon, Michigan	Michigan Alternative and Renewable Energy Center	Apr. 2004	Operational	Natural gas		Provides electricity, heating and cooling for research space, incubator facilities, conference center and classrooms. Funding for the project, including the building and fuel cells, is provided by a \$3 million grant from the Michigan Public Service Commission and bonding from the City of Muskegon.
FuelCell Energy	PPL EnergyPlus, Starwood Hotels & Resorts Worldwide, Inc.	250 kW DFC 300A MCFC	Manhattan, New York	Sheraton New York Hotel & Towers	Summer 2004	Operational			The fuel cell provides about 10% of the power and hot water requirements of the 1,750 room hotel. Funding: \$820,000 grant from the New York State Energy Research and Development Authority (NYSERDA).
FuelCell Energy	King County, CH2M Hill, Brown and	1 MW DFC MCFC (four 250 kW modules)	Renton, Washington	South Treatment Plant	Apr. 2004	Two-year demonstration	Wastewater digester gas		Provides power to the plant. EPA is providing federal funding estimated

	Caldwell, US Environmental Protection Agency								at \$12.5 million. The total value of the project is \$22 million.
FuelCell Energy	US Department of Energy, US Army Corp of Engineers	250 kW DFC 300A MCFC	Los Angeles, California	LADWP headquarters (John Ferraro Building)	2003			Natural gas 	Replaced a trial FuelCell Energy MCFC plant that ran from 2001-2002. Buy Down Program Recipient FY1999 US Department of Energy Climate Change Fuel Cell Program.
FuelCell Energy	RWE AG, MTU CFC Solutions GmbH	250 kW DFC HotModule MCFC	Essen, Germany	RWE Fuel Cell Pavilion, Meteorit Park	Jul. 2003	Operational			Has logged over 22,000 operating hours.
FuelCell Energy	E-on, Rhoen Klinikum AG, MTU CFC Solutions GmbH	250 kW DFC HotModule MCFC	Bad Berka, Germany	Hospital	Oct. 2003	Operational			Provides combined heat and power. Has logged over 1,500 operating hours.
FuelCell Energy	EnBW/Michelin, MTU CFC Solutions GmbH	250 kW DFC HotModule MCFC	Karlsruhe, Germany	Michelin tire plant	Feb. 2003	Operational			Provides power, heat and process steam for tire production. Has logged over 17,000 operating hours. Funded by the Federal Ministry of Economics and Labor which financed 50% as part of the Future Investment Program.
FuelCell Energy	Pfalzwerke, MTU CFC Solutions GmbH	250 kW DFC HotModule MCFC	Gruenstadt, Germany	Gruenstadt Hospital	Jul. 2003	Operational			Provides 100% of the hospital's energy needs, with excess capacity sent to the public utility system. Has logged over 14,000 operating hours. Funded by the Federal Ministry of Economics and Labor, which financed 50% as part of the Future Investment Program.
FuelCell Energy	PPL Energy Plus, Millennium Builders (a PPL subsidiary)	250 kW DFC 300A MCFC	Toms River, New Jersey	Ocean County College	Dec. 2003	Operational		Natural gas 	Provides 90% of the daily power requirements for the Instructional Building, Lecture Hall and Nursing Arts Building. 20% of heating needs are also provided to the above plus the Administration Building, Library and planetarium. Funding: \$827,000--New Jersey Clean Energy Program. Buy Down Recipient FY2002 US Department of Defense Climate Change Fuel Cell Program.
FuelCell Energy	PPL EnergyPlus, US Coast Guard	250 kW DFC MCFC	Bourne, Massachusetts	US Coast Guard Air Station	May 2003	Operational		Natural gas 	Provides electricity to the air station, including its hangars and administrative buildings, and supplies hot water for use in the air station's barracks. Funding project came from a variety of federal, state and private sources, including the Massachusetts Renewable Energy Trust Fund.
FuelCell Energy	Starwood Hotels, PPL Energy Plus	250 kW DFC 300A MCFC	Parsippany, New Jersey	Sheraton Hotel	Oct. 2003	Operational		Natural gas 	Provides 25% of the electric power and hot water requirements of the hotel. The New Jersey Clean Energy Program provided \$860,000 in funding.



FuelCell Energy	Starwood Hotels, PPL Energy Plus	250 kW DFC 300A MCFC	Edison, New Jersey	Sheraton Hotel	Aug. 2003	Operational	Natural gas		Provides 25% of the electric power and hot water requirements of the hotel. The New Jersey Clean Energy Program provided \$860,000 in funding. Buy Down Program Recipient FY2002 US Department of Energy Climate Change Fuel Cell Program.
FuelCell Energy	Zoot Enterprises, PPL EnergyPlus	250 kW DFC MCFC	Bozeman, Montana	Zoot Enterprises' business park	Aug. 2003	Operational	Natural gas		Supplies the primary electric requirements of the building. Zoot Enterprises is installing the necessary equipment for its DFC power plants to operate independent of the electric utility grid.
FuelCell Energy	Connecticut Clean Energy Fund, Yale University	250 kW DFC MCFC	New Haven, Connecticut	Yale University's archival storage facility for the Yale Peabody Museum and the Yale Environmental Science Center	Dec. 2003	Dedicated	Natural gas		Provides approximately 25% of the Peabody Museum's electricity needs, with the heat being used primarily to maintain tight temperature and humidity controls at the Environmental Science Center.
FuelCell Energy	Harrison Mining Corporation/ AEP Ohio Coal LLC, Northwest Fuel Development Inc.	200 kW DFC MCFC	Hopedale, Ohio	AEP Ohio Cole LLC site	Aug.-Dec. 2003	Completed	Coal mine methane		Achieved 1,456 operating hours. Successfully demonstrated that coalmine methane could be used at high efficiency to produce fuel cell power. Co-funded by the U.S. Department of Energy's National Energy Technology Laboratory.
FuelCell Energy	Caterpillar Inc.	250 kW DFC 300A MCFC	Peoria, Illinois	Caterpillar Technical Center	Oct. 2003	Operational			Connected to the Peoria area electricity grid, allowing Caterpillar to utilize the power plant as a demonstration unit for customers, Caterpillar dealers and development engineers.
FuelCell Energy	Los Angeles Department of Water and Power (LADWP), Los Angeles Department of Public Works/Bureau of Sanitation, US Army Corp of Engineers	250 kW DFC 300 MCFC	San Pedro, California	LADWP's Terminal Island Fuel Cell Power Plant	Sep. 2003	Operational	Natural gas, converting to sewage digester gas (methane) during Summer 2004		Provides electricity to serve about 250 households. Largely funded by LADWP's Public Benefits Program. The US Department of Defense also provided \$250,000 in grant funding. (Buy Down Program).
FuelCell Energy	Marubeni Corporation, Kirin	250 kW DFC 300A MCFC	Toride, Japan	Kirin Brewery	Jan. 2003	Operational	Wastewater treatment gas		Supplies electricity and steam.
FuelCell Energy	Marubeni Corporation, City of Fukuoka	250 kW DFC 300A MCFC	Fukuoka, Japan	Municipal wastewater treatment facility	Early 2003	Two-year demonstration project	Digester gas		Supplies electricity and steam.

FuelCell Energy	Marubeni Corporation, Nippon Metal	250 kW DFC 300A MCFC	Sagamihara, Japan	Nippon Metals Sagamihara Works	Fall 2003	Operational	Natural gas		Supplies electricity and steam.
FuelCell Energy	US Department of Energy's National Energy Technology Laboratory, Wabash River Energy Ltd., Global Energy Inc	2 MW DFC 3000 MCFC	Terre Haute, Indiana	Global Energy Wabash River Energy Ltd. facility	Fourth quarter 2003	Operational	Natural gas, coal-derived synthesis gas	 	Part of the federal Clean Coal Technology Program. Was the first plant to use a combination of coal and renewable fuels. Initial plan was to operate at the Kentucky Pioneer Energy IGCC site, but the site was moved to Wabash River to begin operation two years ahead of schedule. Funding provided by the US Department of Energy (Buy Down Program).
FuelCell Energy	IZAR, MTU CFC Solutions GmbH	250 kW DFC HotModule MCFC	Cartagena, Spain	IZAR shipyard facility	2003	Operational	Natural gas		Provides combined heat and power. Has logged over 18,000 operating hours.
FuelCell Energy	US Coast Guard Research and Development Center	3 kW DMFC MCFC	Virginia Beach, VA	Cape Henry Lighthouse at U.S. Army Fort Story	Mar. 2002	Completed	Methanol and water mixture		Six month evaluation. Total running time of 4,090 hours. Provided heat and lighting.
FuelCell Energy	MTU Friedrichshafen, VSE	250 kW MCFC	Ensdorf, Germany	Handicapped workshop	2003				Heat and power supply.
FuelCell Energy	De Te Immobilien/ Deutsche Telekom, MTU CFC Solutions GmbH	250 kW DFC HotModule MCFC	Munich, Germany	De Te Immobilien headquarters	Nov. 2002	Operational			Direct current backup application (telecom) and air conditioning. Has logged over 12,000 operating hours
FuelCell Energy	IPF KG, MTU Friedrichshafen, MTU CFC Solutions GmbH, Otto-von-guericke Clinic	250 kW DFC HotModule MCFC	Magdeberg, Germany	Otto-von-guericke Clinic	Oct. 2002	Operational			Combined heat and power. Has logged over 19,000 operating hours. Funded by the Federal Ministry of Economics and Labor which financed 50% as part of the Future Investment Program.
FuelCell Energy	MTU-CFC Solutions, RWE	250 kW MCFC HotModule	Essen, Germany	RWE Fuel Cell Pavilion, Meteorit Park	Jan. 2002				The system will be grid connected and will contribute to the electricity and heat supply of the adjacent Meteorit Park.
FuelCell Energy	Siemens Westinghouse, BP, Chugach Electric Association	200 kW DFC MCFC	Nikiski, Alaska	BP's gas-to-liquid test facility, powering administration building and warehouse	Aug. 2001	To be installed 2003	Natural gas		Funding: \$4 million from BP, \$2 million from the US. Department of Energy, \$450,000 grant from the Cooperative Research Network of the National Rural Electric Cooperative Association.
FuelCell Energy	Los Angeles Department of Water and Power (LADWP), US Department of Energy, US Army Corp of Engineers	250 kW Trial MCFC plant	Los Angeles, California	LADWP headquarters (John Ferraro Building)	Aug. 2001	Dec. 2002	Natural gas		The power plant sends electricity to the City's power grid. This trial plant was replaced with permanent model in 2003. Buy Down Program Recipient FY1999 US Department of Energy Climate Change Fuel Cell Program.
FuelCell Energy	Southern Company, Alabama Municipal Electric Authority	250 kW DFC MCFC	Tuscaloosa, Alabama	Mercedes Benz M-class production facility	2001	Completed	Natural gas		The plant fed the Mercedes-Benz production facility power distribution system. Also, the entire power plant was skid-mounted, making it easy to

	(AMEA), Mercedes Benz US								transport to different locations for demonstrations.
FuelCell Energy	State of Bavaria, Ferngas Nordbayern, E-on/Rhoen Klinikum AG, MTU Friedrichshafen	250 kW DFC HotModule MCFC	Bad Neustadt, Germany	Rhoen Klinikum (medical clinic)	May 2001	Operational	Natural gas		Emergency power supply and combined heat and power. Had logged over 21,000 operating hours by 2004.
FuelCell Energy	MTU Friedrichshafen, Stadwerke Bielefeld, BEB Erdgas-Erdol	250 kW DFC HotModule MCFC	Bielefeld, Germany	University of Bielefeld Hospital	Feb. 2000	2002	Natural gas		Field trial. Completed over 16,000 operating hours
FuelCell Energy	· MTU Friedrichshafen GmbH, Elkraft A.m.b.A, Ruhrgas AG, RWE-Energie AG	HotModule MCFC	Dorsten, Germany	Ruhrgas plant	1997	1998			First system demonstrator
FuelCell Energy	FuelCell Energy Facility Demonstration	250 kW DFC MCFC	Danbury, Connecticut	FuelCell Energy's Facility	Feb. 1999	Jun. 2000	Natural gas		Fuel cell was grid-connected and operated for 11,800 hours delivering 11.8 million kW/hr of electricity. Excess energy was sold to the local power grid.
FuelCell Energy	Los Angeles Department of Water and Power	2 MW DFC MCFC	Santa Clara, California	Scott Receiving Station	Apr. 1996	Mar. 1997			First full scale utility demonstration of a molten carbonate fuel cell system. Grid-connected. Operated for more than 3,600 hours.
Fuji Electric		1 kW PEM	Yokkaichi, Japan	FamilyMart convenience store	Announced May 2005				one of Mie Prefecture's demonstration program. Half of the installation cost subsidized by the local government. It will supply electric power to 1/3 of consumption by fluorescent lamps in the store.
Fuji Electric	Unspecified Japanese research association	5 MW PAFC	Japan	Unspecified Japanese research association	2004				
Fuji Electric	Toho Gas, Okazaki Shinkin Bank	100 kW PAFC	Okazaki, Japan	Okazaki Shinkin Bank headquarters	Feb. 2004				Fuel cell purchase.
Fuji Electric		100 kW PAFC	Japan	Fuji Electric Human Resources Development Center	2002				Provides power to the facility.
Fuji Electric	Yamagata City	Two 100 kW PAFC	Yamagata, Japan	Yamagata City Purification Center (sewage treatment facility)	May 2002	Operational	Methane digester gas		The fuel cells cover 40 % of power consumption at the center.
Fuji Electric	Kajima Corporation, New Energy and Industrial Technology Development Organization (NEDO)	100 kW PAFC	Kobe, Japan	Garbage anaerobic digestion facility	Jul. 2001		Methane biogas from anaerobic digestion of kitchen waste		Generates hydrogen fuel from 6 tons of garbage/day.
Fuji Electric		100 kW PAFC	Japan	Fuji Electric factory	Dec. 2001				
Fuji Electric	Toho Gas Co., Ltd	100 kW PAFC CHP	Nagoya, Japan	Nagoya Sakae Washington Hotel Plaza	Feb. 1999	Operational			The plant reduces the hotel's energy costs by 40%. Used for hot water and air conditioning.

Operated for over 40,000 hours. The fuel cell was overhauled in 2004, replacing cell stack and reformer.


										Operated for over 40,000 hours. The fuel cell was overhauled in 2004, replacing cell stack and reformer.
Fuji Electric	Vattenfall AB	50 kW PAFC	Varberg, Netherlands		Feb. 1993					
Fuji Electric	Enagas	50 kW PAFC	Madrid, Spain		Dec. 1991					
Fuji Electric	WNAM Eniricerche	50 kW PAFC	Milan, Italy		Nov. 1991					
Fuji Electric	Sydraft AB	50 kW PAFC	Astrop, Sweden		Dec. 1991					The Swedish utility company will test the unit.
Fuji Electric	Vattenfall	50 kW PAFC	Varberg, Sweden		Nov. 1992					
Fuji Electric	Tokyo Electric Power Co (TEPCO)	50 kW PAFC	Japan	TEPCO New Energy Park	Jun. 1993	Completed Dec. 1996				This unit accumulated 39,291 hours by 10/00.
Fuji Electric	Kansai Electric Power Co	5 MW PAFC	Japan	Kansai Electric's "Urban Energy Center"	Installed between 1993-1995					
Fuji Electric	Kansai Electric Power Co	Fourteen 50kW PAFC units	Japan	Kansai Electric Power Co.'s Rokko Island test center	1990's					
Fuji Electric	Kansai Electric Power Co	Twenty-one 50 and 200 kW PAFC units	Various locations, Japan		Installed between 1993-1995					Other Kansai Electric listings in this chart may be a part of this purchase.
Fuji Electric	Osaka Gas, Global Environment Centre Foundation	50 kW PAFC	Japan	Global Environment Centre Foundation office	Jul. 1993	Completed Oct. 2000				Operated for 50,358 hours.
Fuji Electric	Osaka Gas	Three 500 kW PAFC units	Japan							
Fuji Electric	Osaka Gas	Fifteen 50 and 100 kW PAFC units	Japan		Installed between 1993-1995					Other Osaka Gas listings in this chart may be a part of this purchase.
Fuji Electric	Tokyo Electric Power Co (TEPCO), Mitsubishi	200 kW PAFC	Japan		Installed between 1993-1995					
Fuji Electric	Toho Gas	50 kW PAFC	Japan		Mid-1990s					
Fuji Electric		100 kW PAFC power plant	Japan					Town gas, LP gas		
Fuji Electric		100 kW PAFC	Japan	Fuji Electric's Human Resources Development Center						Provides power to the facility.
Fuji Electric	Hokkaido Electric Power Co	200 kW PAFC	Japan		Installed between 1993-1995					
Fuji Electric	Tohoku Electric Power Co	Two 50 kW PAFC units	Japan		Installed between 1993-1995					
Fuji Electric	Tokyo Gas	Ten 50 and 100 kW PAFC units	Japan		Installed between 1993-1995					
Fuji Electric	Chubu Electric Power Co, Mitsubishi	Three 50 and 200 kW PAFC units	Japan		Installed between 1993-1995					
Fuji Electric	Hokuriku Electric Power Co	50 kW PAFC	Japan		Installed between 1993-1995					
Fuji Electric	Chugoku	Four 50, 100	Japan		Installed					




	Electric Power Co, Mitsubishi	and 200 kW PAFC units			between 1993-1995				
Fuji Electric	Toagosei Company, Shikoku Electric	100 kW PAFC	Japan	Toagosei Company's Toshima plant	1993	Mar. 1999			Cogeneration of waste heat for hot water. Operated 1,064 hours. Achieved power generating efficiency of 40.5% and an overall efficiency with cogeneration of 44.6%.
Fuji Electric	Shikoku Electric Power Co, Mitsubishi	50 kW PAFC	Japan		Installed between 1993-1995				
Fuji Electric	Kyushu Electric Power Co, Mitsubishi	One 50 and one 200 kW PAFC units	Japan		Installed between 1993-1995				
Fuji Electric	Saibu Gas	50 kW PAFC	Japan		Installed between 1993-1995				
Fuji Electric		1 kW PEM test stack	Japan						Exceeded 10,000 hours of test operation. Prototype PEM for residential use was to be ready by 2004. The goal is for 20,000-30,000 hours of operation, with market entry in 2007-2008. Fuji may develop a 5 kW version for restaurants or convenience stores.
GenCell		40 kW MCFC CHP	Storrs, Connecticut	Connecticut Global Fuel Cell Center	Delivered Jan. 2005			Natural gas	Grid-connected. Provides power and heat, with excess power delivered to the grid. Funded by Connecticut Conservation & Load Management Fund and the Connecticut Clean Energy Fund.
General Electric	Florida Power & Light Co. (FPL), Florida Department of Environmental Protection	5 kW PEM	Fort Lauderdale, Florida	Hugh Taylor Birch State Park Visitor Center	Dec. 2002	One-year demonstration		Natural gas	Located next to park manager's house. Provided power to FPL's electric grid.
Global Thermolectric	Bonneville Power Administration (BPA)	Three 2 to 5 kW SOFC systems	Various locations, USA	Field testing sites	2003	To be delivered		Natural gas or propane	
Global Thermolectric	Montana State University, Montana Dakota Utilities Co.	3 to 5 kW SOFC remote power system for light industrial applications	Billings, Montana	Montana State University	Agreement announced 2002	Planned		Methane	Two year testing and evaluation program. Partial funding from Montana-Dakota Utilities
Global Thermolectric	Montana State University, Montana Dakota Utilities Co.	2 kW SOFC	Billings, Montana	Montana State University	Agreement announced 2002	Planned		Natural gas	Two year testing and evaluation program. Partial funding from Montana-Dakota Utilities
Global Thermolectric	Enbridge Inc.	Two 2.3 kW SOFC systems	Calgary, Canada	Enbridge Inc. facility	Late 2001	2002			Six-month prototype testing.
GM		75 kW PEM	Manhattan, New York	General Motors Drive-In movie theater	May 2004	Completed		Hydrogen	Provided power to the movie screen for three days during the Tribeca Film Festival.
GM	Dow Chemical Company	75 kW PEM	Freeport, Texas	Dow Chemical Company plant	Feb. 2004	Phase I: 4-6 months			More fuel cells and electrical generating capacity to be added during the summer months. The initial GM fuel cell will generate 75 kW of power, enough electricity for 50 average homes. Dow and GM plan to install





up to 400 fuel cells to generate 35 megawatts of electricity, enough power for 25,000 average sized American homes.
 DOW Chemical
 Harold Nicoll
 989-636-5162
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 GM
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GM		75 kW PEM	Rochester, New York	GM's fuel cell research facility	2001	Ongoing	Natural gas, methanol, gasoline		Prototype testing
H Power Corp.	Gaz de France	4 kW PEM	Dunkerque, France	Dunkerque traffic control center	May 2003	Testing between 2002 and 2005	Natural gas		H Power was acquired by Plug Power in March 2003.
H Power Corp.	Gaz de France, The National Polytechnical Institute of Lorraine (INPL)	4 kW PEM	Nancy, France	The National Polytechnical Institute of Lorraine	Feb. 2003	Testing between 2002 and 2005	Natural gas		Produces heat and electricity for green-houses of the bio and agricultural department of INPL, outside the university buildings, and close to the greenhouses. H Power was acquired by Plug Power in March 2003.
H Power Corp.	Gaz de France	4 kW PEM	Limoges, France	City Hall of Feytiat	Apr. 2003	Testing between 2002 and 2005	Natural gas		H Power was acquired by Plug Power in March 2003.
H Power Corp.	Gaz de France	4 kW PEM	Sophia-Antipolis, France	Centre Scientifique et Technique du Bâtiment's computer rooms and science laboratory	Jun. 2003	Testing between 2002 and 2005	Natural gas		H Power was acquired by Plug Power in March 2003.
H Power Corp.	US National Park Service, Fall River Rural Electric Cooperative, Energy Co-Opportunity, Inc.	4.5 kW PEM CHP	Yellowstone National Park, Montana	West Entrance of Yellowstone National Park	Jun. 2002		Propane		Part of "Greening of Yellowstone" initiative. Powers lights, communication equipment and computers to ticket kiosks and an office. The system's byproduct heat is used for space heating. H Power was acquired by Plug Power in March 2003.
H Power Corp.	Mitsui & Co., Ltd., Osaka Gas	500 W PEM Alpha residential CHP	Kansai area of Japan		Jan. 2002	Completed	Natural gas		Osaka Gas's In-house and field beta testing for the Japanese residential market. H Power was acquired by Plug Power in March 2003.
H Power Corp.	Naps Systems Oy, Birka Energi, ABB	4 kW PEM CHP	Stockholm, Sweden	Environmental Information Centre in Hammarby Sjostad	Jun. 2002		Hydrogen produced through a photovoltaic solar cell system, biogas from municipal waste		Excess electricity generated by the fuel cell system to be fed back into the power grid. H Power Corp. was acquired by Plug Power in 2003.
H Power Corp.	Gaz de France	4 kW PEM	Dunkerque, France	City Hall of Petite Synthe	Nov. 2002	Testing between 2002 and 2005	Natural gas		Supplies electricity and space heating. H Power was acquired by Plug Power in March 2003.
H Power Corp.	US Department of Defense	Three 500 W PEM units	Fort Belvoir, Virginia	Fort Belvoir office building	2002		Hydrogen		H Power was acquired by Plug Power in March 2003.
H Power Corp.	Energy Co-Opportunity Inc, Rappahannock Electric	4.5 kW Beta PEM CHP	Bowling Green, Virginia	Rappahannock Electric Cooperative	2002		Propane		Provides stand-alone power and heat for the 2,000 square foot office facility with the grid




	Cooperative								available for back up. The cooperative also participated in alpha testing. H Power was acquired by Plug Power in March 2003.
H Power Corp	Energy Co-Opportunity Inc, Delta-Montrose Electric Association	4.5 kW Beta PEM CHP	Montrose, Colorado	Delta-Montrose Electric Association	2002		Propane		The cooperative also participated in alpha testing. H Power was acquired by Plug Power in March 2003.
H Power Corp	Energy Co-Opportunity Inc, Enerstar Power Corporation	4.5 kW Beta PEM CHP	Paris, Illinois	Enerstar Power Corporation	2002		Propane		The cooperative also participated in alpha testing. H Power was acquired by Plug Power in March 2003.
H Power Corp	Energy Co-Opportunity Inc, Platte-Clay Electric Cooperative	4.5 kW Beta PEM CHP	Kearney, Missouri	Platte-Clay Electric Cooperative	2002		Propane		The cooperative also participated in alpha testing. H Power was acquired by Plug Power in March 2003.
H Power Corp	US Department of Defense, Southern Maryland Electric Cooperative	4.5 kW PEM	Patuxent River, Maryland	Patuxent River Naval Air Station Natural Resources office	Oct. 2002	One-year demonstration	Propane		DOD Residential Fuel Cell Demonstration Program H Power was acquired by Plug Power in March 2003.
H Power Corp	US Department of Defense, Southern Maryland Electric Cooperative	4.5 kW PEM	Patuxent River, Maryland	Patuxent River Naval Air Station single-family home	Oct. 2002	One-year demonstration	Natural gas		DOD Residential Fuel Cell Demonstration Program H Power was acquired by Plug Power in March 2003.
H Power Corp	U.S. Army Corps of Engineers Construction Engineering Research Laboratory (CERL)	4.5 kW PEM	Herlong, California	Sierra Army Depot barracks	Installed Oct. 2002		Propane		H Power was acquired by Plug Power in March 2003.
H Power Corp.	Gaz de France	Beta PEM CHP	La Plaine Saint-Denise, France	Gaz de France's research and development campus, model house	2002				H Power was acquired by Plug Power in March 2003.
H Power Corp	Kamata Inc.	4.5 kW PEM CHP	Gotenba, Japan	Kamata's Gotenba employee facility	June 2002		Propane		The first field test of a propane-powered PEM for an actual load in the Japanese residential market. H Power was acquired by Plug Power in March 2003.
H Power Corp.	US Air Force Expeditionary Forces Battlelab (AEFB)	4 kW PEM	USA	US Air Force base	2001	Completed			Demonstrated under the Air Force's Common Core Power Production (C2P2) Initiative. The system powered an office suite, followed by a flight line lighting unit. H Power was acquired by Plug Power in March 2003.
H Power Corp.	US Air Force Expeditionary Forces Battlelab (AEFB)	Two 4 kW PEM units	USA	US Air Force base	2001	Completed			Demonstrated under the Air Force's Common Core Power Production (C2P2) Initiative. Supplied power to a simulated aircraft load on the ground. H Power was acquired by Plug Power in March 2003.
H Power Corp.	US Air Force Expeditionary Forces Battlelab (AEFB)	Three 4 kW PEM units	USA	US Air Force base	2001	Completed			Demonstrated under the Air Force's Common Core Power Production (C2P2) Initiative. Powered industrial shop equipment and various aircraft support equipment.

									H Power was acquired by Plug Power in March 2003.
H Power Corp	Fortum Oy, Finnish Chemicals Oy	PEM CHP	Aetsa, Finland	Test house	Mar. 2001		Hydrogen		Supplied all electricity and heat used by a typical household and was "net metered" to sell surplus electricity to the local electric utility. H Power was acquired by Plug Power in March 2003.
H Power Corp.	Gaz de France	Alpha PEM CHP	La Plaine Saint-Denise, France	Gaz de France's research and development campus model house	Jan. 2001	Jul. 2001	Natural gas		Five month evaluation. H Power was acquired by Plug Power in March 2003.
H Power Corp	US Department of Defense	4.5 kW PEM CHP	Various locations	ECO Fuel Cells, LLC facility	Mar. 2000				First H Power prototype stationary fuel cell. In 2001 ECO agreed to purchase 12,300 stationary fuel cell systems for an aggregate purchase price of \$81 million. The full delivery has not yet occurred. H Power was acquired by Plug Power in March 2003.
H Power Corp	Hydro-Quebec	Stationary PEM	Canada	Hydro-Quebec laboratory	Nov. 2000		Propane		Generates both electricity and hot water. H Power was acquired by Plug Power in March 2003.
Hydrogenics, Corp.	Florida Department of Environmental Protection, Progress Energy Florida	PEM	Homosassa,, Florida	Homosassa Springs State Wildlife Park's Wildlife Pavilion	Mar. 2005		Hydrogen gas generated by an electrolyser		Integrated fuel cell/solar photovoltaic system provides a portion of the Pavilion's electricity.
Hydrogenics, Corp.	Japan Automobile Research Institute (JARI)	10 kW HyPM PEM	Tsukuba, Japan	Japan Automobile Research Institute	Delivery during first quarter 2005				To be used as part of JARI's mandate to establish standards for fuel cell power module testing, a program sponsored by Japan's Ministry of Economy, Trade and Industry and the New Energy and Industrial Technology Development Organization.
Hydrogenics, Corp.	NASA	5 kW PEM	USA		Oct. 2004		Hydrogen-oxygen		To be used in NASA's research program for fuel cell operation in future aerospace applications. This was Hydrogenics' first hydrogen-oxygen PEM stack sale. The stack was designed to be very light, which is critical for this type of application.
Hydrogenics, Corp.	Unspecified power company	25 HyPM 10kW PEM			2004--2005				HyPM fuel cells will be incorporated into back-up power products for one of the world's largest suppliers of uninterruptible power.
Hydrogenics, Corp.	City of Toronto	HyLYZER PEM powered hydrogen refueler	Toronto, Canada	Exhibition Place at Hydrogen Village	Aug. 2004				The refueler will use electricity generated by a wind turbine, sited at Exhibition Place, to produce clean hydrogen.
Hydrogenics, Corp.	Itochu Corp, Hitachi Zosen Corporation	10 kiW HyPM	Yokkaichi, Japan	"Communal facilities"	Jul. 2004	One-year test	Hydrogen supplied by water electrolysis		Demonstration project. An electrolyzer will produce hydrogen on site using electricity from existing solar photovoltaic panels. The hydrogen will then be stored to fuel the power module during hours of peak electricity demand.
Hydrogenics,	US Navy	PEM-powered	Crane,	US Navy's	Mar. 2004				

Corp.		refueler	Indiana	Naval Surface Warfare Center-Crane Division					
Hydrogenics, Corp.	Science World	20 kW HyPM-LP2 PEM	Vancouver, Canada	Science World geodesic dome	Feb or Mar. 2003	Completed			Used to light the Science World geodesic dome.
Hydrogenics, Corp.	Nextel	25 kW HyUPS	Northern California	Nextel Communications remote cell tower site	Jul. 2002	Sept. 2003			Integrated with an electrolyser to charge the fuel storage module with hydrogen for use by the fuel cell in the event of a power outage. Test protocol was designed to compress the profile of a full year's intermittent outages into a two-month time period.
IdaTech	US Army Corps of Engineers, Construction Engineering Research Lab (CERL), Arizona State University, City of Mesa	5 kW PEM	Mesa, Arizona	Sgt. Herrera US Army Reserve Center	Planned start up Nov. 2004	Planned completion Nov. 2005	Natural gas		US Department of Defense Residential PEM Fuel Cell Demonstration Program. Two fuel cells, made by different manufacturers (Idatech and Plug Power), were operated in parallel during the demonstration.
IdaTech	US Army Corps of Engineers, Construction Engineering Research Lab (CERL), Omaha Public Power District	5 kW EtaGen5 PEM	Omaha, Nebraska	Offutt Air Force Base boiler plant	Planned start up Dec. 2004	Planned completion Nov. 2005	Natural gas		US Department of Defense Residential PEM Fuel Cell Demonstration Program
IdaTech	US Army Corps of Engineers, Construction Engineering Research Lab (CERL), Omaha Public Power District	5 kW EtaGen5 PEM	Omaha, Nebraska	Offutt Air Force Base communications building	Planned start up Dec. 2004	Planned completion Nov. 2005	Propane		US Department of Defense Residential PEM Fuel Cell Demonstration Program
IdaTech	US Army Corps of Engineers, Construction Engineering Research Lab (CERL), Rappahannock Electric Cooperative	5 kW EtaGen 5 PEM	Rappahannock, Virginia	Fort AP Hill Administrative Support building	Start up scheduled to occur Dec. 2004	Scheduled completion date Nov. 2005	Propane		US Department of Defense Residential PEM Fuel Cell Demonstration Program. Operating off-grid to provide security lighting.
Idatech	RWE Fuel Cells	Nine PEM units	Various locations, Europe			Ongoing in 2004			Being tested at RWE locations and partner sites
IdaTech	RWE Fuel Cells	Two 5 kW PEM CHP units	Berlin, Germany	Office of the representative of the State of the North Rhine-Westphalia	Mar. 2004	Operational	Natural gas		Used in conjunction with a micro gas turbine for the decentralized supply of power, heat and air conditioning for the innovative building.
IdaTech	RWE	4.6 kW EtaGen PEM	Essen, Germany	RWE Fuel Cell Pavilion, Meteorit Park		Ongoing			RWE is testing the fuel cells in a joint project with the municipal utilities and regional suppliers in 2005.
IdaTech	Portland General Electric, Bonneville Power Administration	5 kW PEM	Portland, Oregon	Portland General Electric Earth Advantage National Center	Jan. 2004	Operational			Part of BPA's Northwest demonstration program. First fuel cell in Oregon connected to a power grid. Mira Vowles 503.230.4796 mkvowles@bpa.gov
IdaTech	Propane Education & Research Council	3.6 kW PEM	Bend, Oregon	Remote telecommunications site	Aug. 2003		Propane		Off-grid telecom application for field test and evaluation in the Cascade mountain range.
IdaTech	Electricite de France	1.2 kW FCS 1200 PEM	France	Remote locations	2003				Will be used for integration with solar photovoltaic technology in a hybrid power system for remote locations. The fuel cell

									Washington, among others.
IdaTech	Bonneville Power Administration, Kootenai Electric Cooperative	PEM	Post Falls, Idaho	"Next House" showcase home	Jul. or Aug. 1999	Completed			
IdaTech	Sandia National Laboratories, University of Alaska-Fairbanks	Three PEM fuel cell units	Alaska		Nov. 1998				Initially tested at Sandia Labs before moving to the University of Alaska.
IdaTech	Bonneville Power Administration	5 kW PEM	Bend, Oregon	Private home	Nov. 1998	Completed	Methanol		Provided electricity to a residence. The home was disconnected from the electric power grid of Pacific Power & Light prior to testing and reconnected afterward.
Industrial Research Laboratory (IRL)	Australian Cooperative Research Center for Renewable Energy	6 kW alkaline fuel cell	Perth, Australia	Wind turbine at Murdoch University	Oct. 2002		Hydrogen		The proof-of-concept system is linked to a wind turbine powering an electrolyzer to generate hydrogen. The fuel cell stores energy generated by the turbine and serves as back up when the wind turbine is not capable of producing power. The AFC was replaced by a PEM unit in late 2004.
Intelligent Energy	Centre for Renewable Energy Systems Technology (CREST)	2 kW PEM CHP	Leicestershire, UK (England)	West Beacon farm	Installed Fall, 2003				Intelligent Energy is a spin-off company from Loughborough University. Part of the HARI (Hydrogen and Renewable Integration) Project. Incorporates a fuel cell, two wind turbines, electrolyzer and hydrogen storage and feeds commercial and domestic loads on a local mini-grid at West Beacon Farm.
Ishikawajima-Harima Heavy Industries (IHI)	Takagi Industry, Shizuoka Gas, Ishikawajima Shibaura Machinery	Several 1 kW PEM units	Various locations, Japan	Residential	Aug. 2005		Natural gas		Commercialization planned in 2006.
Ishikawajima-Harima Heavy Industries (IHI)	Idemitsu Kosan	5 kW PEM	Suzuka, Japan	Fire station	Mar. 2005	Oct. 2005	LP gas		Will operate 8 hours/day and provide 30% of the electric needs of the building and heat for hot water.
Ishikawajima-Harima Heavy Industries (IHI)	Idemitsu Kosan	5 kW PEM	Tomakomai, Japan	Hokkaido Oil Refinery dormitory	Mar. 2004				Provides one-sixth of the power and hot water requirements of the facility.
Ishikawajima-Harima Heavy Industries (IHI)	Chubu Electric	300 kW MCFC	Nagoya, Japan	Chubu Electric's Shin-Nagoya Thermal Power Station	Spring 2004		Waste gas		
Ishikawajima-Harima Heavy Industries (IHI)	Japan Gas Association	PEM	Japan		2003				Japan Gas Assoc. Phase 2 test of residential PEM fuel cells of different manufacturers.
Ishikawajima-Harima Heavy Industries (IHI)	Idemitsu Kosan	5 kW PEM	Japan	Anegasaki Service Station of Keiyo Apollo Co., Ltd. (subsidiary of Idemitsu Kosan)	Jul. 2003		Kerosene		Demonstration unit.
Ishikawajima-Harima Heavy Industries (IHI)	Chubu Electric Power Co., New Energy and Industrial Technology Development	Two 300 kW MCFC units	Nagoya, Japan	Chubu Electric's Kawagoe Thermal Power Station	Jan. 2003	Mid-2004			Verification of performance and durability for 10,000 h by the first half of 2004.

	Organization (NEDO), MCFC Research Association								
Ishikawajima-Harima Heavy Industries (IHI)	Chubu Electric Power Co., New Energy and Industrial Technology Development Organization (NEDO), MCFC Research Association	300 kW MCFC	Nagoya, Japan	Chubu Electric's Shin-Nagoya Thermal Power Plant	2002			Waste gas	
Ishikawajima-Harima Heavy Industries (IHI)	Toyota, New Energy and Industrial Technology Development Organization (NEDO)	300 kW MCFC-gas turbine hybrid system	Toyota City, Japan	Motomachi Environmental Center of Toyota Motor Corporation	Oct. 2002				Incorporated with a 50 kW gas turbine manufactured by Toyota Turbine and Systems.
Ishikawajima-Harima Heavy Industries (IHI)	Hitachi, Chubu Electric, New Energy and Industrial Technology Development Organization (NEDO), MCFC Research Association	(1 MW MCFC without internal reformer (Four 250 kW units)	Nagoya, Japan	Chubu Electric's Kawagoe Thermal Power Station	Jun. 1999	1999			5,000 hour demonstration.
Ishikawajima-Harima Heavy Industries (IHI)		40 kW MCFC	Japan		Apr. 1996	3,000-5,000 hours of operation were planned			Verification testing. World's first MCFC with external reforming. Plans for future commercialization.
Ishikawajima-Shibaura Machinery Co. (ISM)	Shizuoka Gas, Takagi Industry Co.	Multiple 1 kW PEM units	Japan	Residential	Aug. 2005			Natural gas	Demonstration of cogeneration system as part of a national large scale monitoring demonstration project. Commercialization planned in 2006.
M-C Power Corp.	San Diego Gas and Electric Co, Bechtel National Inc, Alternative Energy Systems Consulting, Stewart and Stevensen	75 kW MCFC	San Diego, California	Marine Corp Air Station -- Miramar	2002	Five-month test completed			Operated for 3,300 hours. The fuel cell generated 250 kW of electricity. Heat produced by the fuel cell was used in adjacent buildings at the site.
M-C Power Corp.	Electric Power Research Institute, Gas Research Institute, Institute of Gas Technology, Ishikawajima-Harima Heavy Industries Co., Ltd, San Diego Gas & Electric, U.S. Department of Energy	250 MCFC kW	San Diego, California	Marine Corp Air Station -- Miramar	1997	1998			This unit operated for 2,350 hours and delivered 158 MW/hr of direct current output and 296,500 pounds of 110 psig steam to the base.
M-C Power Corp.	San Diego Gas and Electric Co, Gas Research Institute, Bechtel Corp, Stewart and Stevenson, Electric Power Research Institute, Southern California Gas, Institute of Gas	250 MCFC kW	Brea, California	Unocal's research center	1995	Decommissioned			





Minaton (Russian Ministry of Atomic Energy)	International Science and Technology Centers (ISTC), Gaz-prom, Norelsk Nickel Company, Russian Academy of Sciences	1 kW SOFC	Snezhinsk, Russia	All Russia Research Institute of Technical Physics facility	Dec. 2003	Test system operated for several days	Natural gas		First SOFC tested in Russia, built at Minaton factory. Part of multinational ISTC fuel cell construction initiative. Plans to develop a 2.5 kW system.
Matsushita Electrical Industrial Co.	Osaka Gas, Ministry of Land, Infrastructure and Transport	1 kW PEM	Osaka, Japan		2004				Field test.
Matsushita Electrical Industrial Co.	Tokyo Gas	1.3 kW PEM	Saitama, Japan	Tokyo Gas employee's residence	Ten month test operation	Mar. 2003			Cogeneration units.
Matsushita Electrical Industrial Co.	Japan Gas Association	Two 1.3 kW PEM units	Japan		2002		Natural gas		Japan Gas Assoc. Phase 2 test of residential PEM fuel cells of different manufacturers.
Matsushita Electrical Industrial Co.	Japan Gas Association	1 kW PEM	Demonstration tests (7 companies) held in Tokyo, Osaka and Nagoya, Japan		Phase 1: Dec. 2001	Phase I completed Feb. 2002			Japan Gas Assoc. test of residential PEM fuel cells from seven manufacturers (Ballard, Matsushita Electric, Toshiba, Toyota, Sanyo Electric, Mitsubishi Electric, Plug Power). Completed 1,000 hours of operation in Phase I testing, 8,000 hours scheduled in Phase 2 using fuel cells of different manufacturers.
Mitsubishi Electric Corp.	Japan Gas Association	1 kW PEM	Japan		2002		Natural gas		Japan Gas Assoc. Phase 2 test of residential PEM fuel cells from nine manufacturers.
Mitsubishi Electric Corp.	Japan Gas Association	1 kW PEM	Demonstration tests (7 companies) held in Tokyo, Osaka and Nagoya, Japan		Phase 1: Dec. 2001	Phase I completed Feb. 2002			Japan Gas Assoc. test of residential PEM fuel cells from seven manufacturers (Ballard, Matsushita Electric, Toshiba, Toyota, Sanyo Electric, Mitsubishi Electric, Plug Power). Completed 1,000 hours of operation in Phase I testing, 8,000 hours scheduled in Phase 2 using fuel cells of different manufacturers.
Mitsubishi Heavy Industries (MHI)	Electric Power Development Co. (EPDC)	150-200 kW SOFC	Japan	EPDC's Technology Development Center	2006	Planned			10,000 hour test planned.
Mitsubishi Heavy Industries (MHI)	Iwatani	PEM CHP	Moriyama, Japan	Shiga technology center	Mar. 2005		LP gas		
Mitsubishi Heavy Industries (MHI)	Electric Power Development Co. (EPDC)	25 kW SOFC with internal reforming	Japan	EPDC's Technology Development Center	Apr. 2005				
Mitsubishi Heavy Industries (MHI)	Nippon Oil Corp.	10 kW PEM	Tokyo, Japan	Convenience store	Mar. 2004	One-year test	Kerosene		
Mitsubishi Heavy Industries (MHI)		Twelve 1 kW PEM units	Japan		Two units shipped Dec. 2002, ten units in 2003		City gas		Field testing to verify performance.
Mitsubishi Heavy Industries (MHI)	Electric Power Development Co. (EPDC)	SOFC	Japan	EPDC's Wakamatsu Works coal gasification pilot plant	Feb. 2002				
Mitsubishi Heavy	Chubu Electric	15 kW T-MOLB	Kobe,	MHI's Kobe	Jul. 2000		Natural gas		Test operated for 7,500





Industries (MHI)	Power	SOFC	Japan	dockyard				hours.
Mitsubishi Heavy Industries (MHI)	Electric Power Development Co.	Pressurized 1 kW SOFC	Nagasaki, Japan	MHI's Nagasaki Dockyard and Shipping Works	1996			
Mitsubishi Heavy Industries (MHI)	Electric Power Development Co.	1 kW SOFC	Japan	EPDC's Wakamatsu Power Station	1993			Operated continuously for 3,000 hours.
MOSAIC Energy	NiSource Inc., Ishikawajima-Harima Heavy Industries, Gas Technology Institute, Nippon Mitsubishi Oil Corp.	5 kW PEM	Yokohama, Japan	Nippon Mitsubishi Oil's Negishi retail gasoline service station	Jul. 2001	2002	Naphtha	World's first liquid fuel PEM fuel cell test.
MOSAIC Energy	NiSource Inc., Ishikawajima-Harima Heavy Industries, Gas Technology Institute	3 kW PEM	Chesterton, Indiana	Residential unit in new housing development	2000		Natural gas	9+ months of field testing during 2000-2001.
MTU CFC Solutions	MTU-CFC Solutions, IZAR, FhG Umsicht, CESP, Z.A.E., OVM	"MW-sized" MCFC fuel cell plant	Spain		Planned		Biogas	BICEPS project--Biogas Integrated Concepts. MTU-CFC-design fuel cell.
MTU CFC Solutions	MTU-CFC Solutions, Ansaldo, University Genova, ASM, Nitra, Technip, E.ON	"MW-sized" MCFC fuel cell plant	Italy		Planned		Biogas	BICEPS project--Biogas Integrated Concepts. Ansaldo-design fuel cell
MTU CFC Solutions	Seaborne GmbH	300 kW MCFC	Owschlag, Germany	Seaborne's industrial research center	May 2002	Completed six-month test	Industrial waste biogas	Part of the EFFECTIVE Project, which is testing biogas purification in combination with MCFC units. Co-funded by EU. Operated for 2,500 hours. Used a mobile test bed, with tests on this unit performed in Germany, Austria and Spain.
MTU CFC Solutions	Urbaser SA, CIEMAT	300 kW MCFC	Pinto, Spain	Urbaser waste treatment plant	Feb. 2004	Summer 2004	Landfill gas	Part of the EFFECTIVE Project, which is testing biogas purification in combination with MCFC units. Co-funded by EU. Operated for 2,000 hours. Used a mobile test bed, with tests on this unit performed in Germany, Austria and Spain.
MTU CFC Solutions	University of Nitra	300 kW MCFC	Nitra, Slovak Republic	University of Nitra's Agricultural Biogas plant		Two-year test	Agricultural biogas	Part of the EFFECTIVE Project, which is testing biogas purification in combination with MCFC units. Co-funded by EU. Operated for 2,400 hours in the first cycle, 3,300 hours in the second cycle and 3,600 hours in the third cycle. Achieved less than 10 ppm of H ₂ S in the outlet gas.
MTU CFC Solutions	Linz AG	300 kW MCFC	Linz, Austria	Asten waste water treatment plant	Mar. 2003	Two-month test	Wastewater treatment biogas	Part of the EFFECTIVE Project, which is testing biogas purification in combination with MCFC units. Co-funded by EU. Operated for 1,500 hours. Used a mobile test bed, with tests on this unit performed in Germany, Austria and Spain.
Nuvera	Deere & Co.	5.5 kW H ₂ e PEM		Deere & Co.	Sale completed Mar. 2005			Sold for testing and evaluation as a potential off-road equipment power

									source.
Nuvera	Toro Co.	H2e PEM		Toro Co.	Delivered Nov. 2004				For evaluation for potential use in professional grounds and turf care equipment.
Nuvera	Takagi Industrial Co., Ltd, Japan Gas Association, Mitsui & Co. Ltd	3.3 kW Avanti PEM	Japan	Japan Gas Association facility	Mar. 2004		Natural gas		Delivered under the Japanese government's Millennium Program – a five-year effort to examine PEM fuel cells to establish technical codes and standards for the Japanese market.
Nuvera	US Army Corps of Engineers, Construction Engineering Research Lab (CERL)	Two 3.7 kW Avanti PEM units	Bristol, Rhode Island	Coast Guard maintenance facility	Feb. 2004	One year demonstration	Natural gas		The systems are fully integrated and operate in parallel with the electric grid. Grant awarded by Connecticut Renewable Energy Trust's Green Power Fuel Cell Initiative.
Nuvera	Aventine Renewable Energy (formerly Williams Bioenergy)	15 kW PEM	Pekin, Illinois	Visitors Center at Aventine Renewable Energy's ethanol production facility	Announced in 2003		Corn-based ethanol		Six-month, 4,000 hour demonstration planned.
Nuvera	RWE	Twenty-five 5 kW CHP PEM units	Germany	Apartment buildings	Aug. 2002		Natural gas		Field test--part of joint venture between Nuvera and RWE Plus AG to develop and distribute fuel cell systems up to 50 kW (CHP) to Europe. Gianfranco.mora@denora.it
Nuvera	RWE	5 kW PEM	Essen, Germany	RWE Fuel Cell Pavilion, Meteorit Park	Aug. 2002	Completed			Field testing for use in residential energy sector.
Nuvera	Verizon	5 kW PEM	Cambridge, Massachusetts	Arthur D. Little's international headquarters	2001	Two-year demonstration	Natural gas		Powered a portion of the telecommunications infrastructure.
Nuvera	Massachusetts Technology Collaborative, SatCon Tech. Corp., KeySpan Energy Delivery, Verizon	5 kW PEM	Woburn, Massachusetts	Verizon's engineering facility	Dec. 2001	Completed 500-hour demonstration	Natural gas		US's first fuel cell powered telecommunications site. Grant awarded by Connecticut Renewable Energy Trust's Green Power Fuel Cell Initiative. Mark.a.marchand@verizon.com Derby.r@nuvera.com
Plug Power, Inc.	US Army Corps of Engineers Construction Engineering Research Lab (CERL), LOGANEnergy	5 kW GenCore PEM	Washington, DC	Administrative Center of the International Chancery Conclave	Planned		Hydrogen		US Department of Defense Residential PEM Fuel Cell Demonstration Program. Will provide grid parallel service to selected circuits in the administration building to simulate support of critical or emergency loads.
Plug Power, Inc.	US Army Corps of Engineers Construction Engineering Research Lab (CERL), Flint Energies	5 kW PEM	Georgia	Ft. Benning Sandhill Recreation Center	Planned		Natural gas		US Department of Defense Residential PEM Fuel Cell Demonstration Program. Will operate in grid parallel mode to provide supplemental on-site power and usable heat for heating and domestic hot water.
Plug Power, Inc.	US Army Corps of Engineers Construction Engineering Research Lab (CERL), LOGANEnergy	5 kW PEM	Herlong, California	Sierra Army Depot housing	Planned		Propane		US Department of Defense Residential PEM Fuel Cell Demonstration Program
Plug Power, Inc.	US Army Corps of Engineers	5 kW PEM	Keesler Air Force Base,	Keesler Air Force Base	Planned		Natural gas		US Department of Defense Residential PEM Fuel Cell

	Construction Engineering Research Lab (CERL), LOGANEnergy		Mississippi	housing					Demonstration Program
Plug Power, Inc.	US Army Corps of Engineers Construction Engineering Research Lab (CERL), LOGANEnergy	5 kW PEM	Austin, Texas	NGB Camp Mabry base housing	Planned			Natural gas	US Department of Defense Residential PEM Fuel Cell Demonstration Program
Plug Power, Inc.	US Army Corps of Engineers Construction Engineering Research Lab (CERL), LOGANEnergy	5 kW PEM	Honolulu, Hawaii	Schofield Barracks clinic	Planned			LP gas	US Department of Defense Residential PEM Fuel Cell Demonstration Program
Plug Power, Inc.	US Army Corps of Engineers Construction Engineering Research Lab (CERL), LOGANEnergy	5 kW PEM	Eastover, South Carolina	McEntire Air National Guard security center	Planned			Natural gas	US Department of Defense Residential PEM Fuel Cell Demonstration Program
Plug Power, Inc.	US Army Corps of Engineers Construction Engineering Research Lab (CERL), LOGANEnergy	5 kW PEM	UK	US Embassy housing	Planned			Natural gas	US Department of Defense Residential PEM Fuel Cell Demonstration Program
Plug Power, Inc.	US Army Corps of Engineers Construction Engineering Research Lab (CERL), LOGANEnergy	5 kW PEM	Champaign, Illinois	ERDC/CERL research facility	Planned			Propane	US Department of Defense Residential PEM Fuel Cell Demonstration Program
Plug Power, Inc.	Delaware County Electric Cooperative, State University of New York-Delhi, Gaia Power Technologies	PEM	Tompkins, New York	Residential	Jun. 2005	One-year demonstration		Propane	The fuel cell is integrated with a power electronics and battery storage system. Demonstration is part of a New York State Energy Research and Development Authority (NYSERDA) and US DOE Energy Storage Initiative. Funded by a \$300,000 grant under a US Congressional Earmark and \$175,000 NYSEDA grant.
Plug Power, Inc.	US Department of Defense	Ten 5 kW PEM units	Warner Robins, Georgia	Robins Air Force Base	Announced Jul. 2005	Planned		Liquefied petroleum gas	Part of the US Department of Defense Common Core Power Production Program.
Plug Power, Inc.	Vaillant, EnBW, Caritas, Stadtwerke Ettlingen GmbH	EURO 2 PEM CHP	Ettlingen, Germany	Caritas Nursing Home	Jun. 2005			Natural gas	Provides heat and power.
Plug Power, Inc.	Tyco Electronics Power Systems	Ninety-eight 5 kW GenCore 5T PEM units		Tele-communication sites	Sale announced July 2005				Purchased by Tyco Electronics Power Systems for resale to a US telecommunications company.
Plug Power, Inc.	Vaillant	4.6 kW PEM micro-CHP	Lievin, France		First quarter 2005			Natural gas	
Plug Power, Inc.	Florida Department of Environmental Protection	Twelve 5 kW GenCore PEM units	Florida	Florida Department of Environmental Protection field offices throughout the state	Sale announced June 2005			Hydrogen gas	Will provide back-up power.
Plug Power, Inc.	Yurtec Corporation of	5 kW PEM	Miyagi Prefecture,	Yurtec Corp's Development	Apr. 2005	One-year demonstration			

	Tohoku Electric Power Co., Inc		Japan	Center of Human Resources					
Plug Power, Inc.	Long Island Power Authority (LIPA), Local 25 International Brotherhood of Electrical Workers (IBEW)	5 kW PEM	Hauppauge, New York	Local 25 International Brotherhood of Electrical Workers headquarters	Apr. 2005	Installed			Will generate electricity and provide supplemental domestic hot water to the IBEW 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.
Plug Power, Inc.	The Stella Group Ltd.	5 kW GenCore PEM	Arlington, Virginia	The Stella Group Ltd. office	Leased May 2005		Hydrogen		
Plug Power, Inc.	Vaillant, Salzburg AG, Salzburg Wohnbau	EURO 2 PEM CHP	Salzburg, Austria	Apartment	Late 2004	Two-year project	Natural gas		Provides heat and power. Testing project for possible future introduction of a fuel cell CHP product by Salzburg AG and Salzburg Wohnbau.
Plug Power, Inc.	US Army Corps of Engineers Construction Engineering Research Lab (CERL), LOGANEnergy	5 kW GenSys PEM CHP	Kaneohe Bay, Hawaii	MCB Kaneohe Bay base housing	Dec. 2004	Ongoing	LP gas		US Department of Defense Residential PEM Fuel Cell Demonstration Program. Supplies power to kitchen appliances and outlets, and cogenerated heat is used for hot water.
Plug Power, Inc.	US Army Corps of Engineers, Construction Engineering Research Lab (CERL), Arizona State University, City of Mesa Gas Division	5 kW GenSys 5CS PEM	Mesa, Arizona	Sgt. Herrera US Army Reserve Center	Planned start up Nov. 2004	Planned completion Nov. 2005	Natural gas		US Department of Defense Residential PEM Fuel Cell Demonstration Program. Two fuel cells, made by different manufacturers (Idatech and Plug Power), will operate in parallel during the demonstration.
Plug Power, Inc.	Vaillant, Dalkia	4.6 kW PEM micro-CHP	Giromany, France		Dec. 2004	Ongoing			
Plug Power, Inc.	Vaillant	4.6 kW PEM micro-CHP	Orleans, France		Dec. 2004	Ongoing	Natural gas		
Plug Power, Inc.	Vaillant, EDF, Dalkia, OPHLM of Sarreguemines	Fifty-two 4.6 kW PEM micro-CHP, Euro 2 version	Sarreguemines, France	Various residences	Jun. 2004	Ongoing	Natural gas		Produces power, and heat for hot water. Vaillant is evaluating performance.
Plug Power, Inc.	US Army Corps of Engineers, Construction Engineering Research Lab (CERL), City of Mesa Gas Division, Arizona Army National Guard	5 kW GenSys 5CS PEM	Mesa, Arizona	Arizona Army National Guard Center	Contract awarded Feb. 2004	On- year demonstration planned	Natural gas		US Department of Defense Residential PEM Fuel Cell Demonstration Program. Will be grid connected in parallel mode. The thermal energy produced will be used to generate domestic hot water for the building.
Plug Power, Inc.	Montana State University, US Army Corp of Engineers Construction Engineering Research Laboratory (CERL)	5 kW GenSys 5CS PEM	Billings, Montana	Montana Army National Guard Armed Forces Reserve Center	Nov. 2004	One-year installation	Natural gas		US Department of Defense Residential PEM Fuel Cell Demonstration Program. The unit will operate at 50% capacity and configured to serve a portion of the base electrical load, operating in parallel with the existing grid-supplied power. The project is also configured for heat recovery.
Plug Power, Inc.	US Army Corps of Engineers Construction Engineering Research Lab (CERL), LOGANEnergy	5 kW GenSys 5C PEM	El Segundo, California	Los Angeles Air Force Base Civil Engineering Office	Planned start up Nov. 2004	Planned completion Nov. 2005	Natural gas		US Department of Defense Residential PEM Fuel Cell Demonstration Program
Plug Power, Inc.	US Army Corps of Engineers Construction	5 kW GenSys 5C PEM	Hill Air Force Base, Utah	Hill Air Force Base fire station	Planned start up Oct. 2004	Planned completion Oct. 2005	Natural gas		US Department of Defense Residential PEM Fuel Cell Demonstration Program










	Engineering Research Lab (CERL), LOGANEnergy								
Plug Power, Inc.	US Army Corps of Engineers Construction Engineering Research Lab (CERL), LOGANEnergy	5 kW GenSys 5C PEM	March Air Force Base, California	March Air Force Base airman's dormitory	Planned start up Oct. 2004	Planned completion Oct. 2005	Natural gas		US Department of Defense Residential PEM Fuel Cell Demonstration Program
Plug Power, Inc.	US Army Corps of Engineers Construction Engineering Research Lab (CERL), LOGANEnergy	Two 5 kW GenSys5C PEM units	Alexandria, Virginia	Fort Belvoir fire station	Start up planned Dec. 2004		Natural gas		US Department of Defense Residential PEM Fuel Cell Demonstration Program
Plug Power, Inc.	US Army Corps of Engineers Construction Engineering Research Lab (CERL), LOGANEnergy	5kW GenSys5P PEM	Cherry Point, North Carolina	Marine Corps Air Station Cherry Point maintenance facility	Planned installation Jun. 2004	Planned decommissioning Jun. 2005	Propane		US Department of Defense Residential PEM Fuel Cell Demonstration Program. Will operate in both grid parallel and grid independent configurations. To demonstrate the thermal energy capability of the fuel cell, a 22,000 BTU fan coil unit will be installed on the facility's ceiling to distribute waste heat from the fuel cell.
Plug Power, Inc.	US Army Corps of Engineers Construction Engineering Research Lab (CERL), LOGANEnergy, Georgia Tech, Energy Signature Associates	5 kW GenSys5C PEM	Atlanta, Georgia	Georgia Institute of Technology ROTC resource center	Feb. 2004	Ongoing	Natural gas		US Department of Defense Residential PEM Fuel Cell Demonstration Program
Plug Power, Inc.	US Army Corps of Engineers Construction Engineering Research Lab (CERL), LOGANEnergy, Energy Signature Associates.	5 kW GenSys 5C PEM	Fort Gordon, Georgia	Fort Gordon Army University of Technology Resource Center	Mar. 2004	Ongoing	Natural gas		US Department of Defense Residential PEM Fuel Cell Demonstration Program
Plug Power, Inc.	BOC Group plc, Johnson Matthey, Greater London Authority, London Hydrogen Partnership, siGEN.	5 kW PEM GenCore 5T	London, UK (England)	Trafalgar Square	Dec. 2004	Completed			Provided electricity for the holiday tree located in London at Trafalgar Square
Plug Power, Inc.	Oneida County Rural Telephone Company	5 kW PEM GenCore 5T	Oneida County, New York	Remote telecommunications hut	Jul. 2004	Ongoing	Natural gas		Has successfully provided backup power during storm-related power interruptions.
Plug Power, Inc.	HyRadix Inc, Department of Energy, Propane Education and Research Council, Texas Fuel Cell Partnership	5 kW PEM	San Antonio, Texas	Texas Department of Transportation TransGuide headquarters	Apr. 2004	Completed three month demonstration	Propane		Technical Contact: Dan Kelly dan.kelly@rrc.state.tx.us Partnership Contact: Ken Zarker kzarker@tceq.state.tx.us








Plug Power, Inc.	US Army Corps of Engineers Construction Engineering Research Lab (CERL), LOGANEnergy, Energy Signature Associates	5 kW GenSys5P PEM	Stennis Space Center, Mississippi	Mars Habitat at the Stennis Space Center's Visitors Facility	Feb. 2004	Ongoing	Natural gas		US Department of Defense Residential PEM Fuel Cell Demonstration Project
Plug Power, Inc.	Orange, BOC Group, FDT Associates	GenCore PEM	Elgin, UK (Scotland)	Remote cell tower at Huntly Nordic Ski Center	Jan. 2004		Hydrogen		The cell site is situated in a forest at the Huntly Nordic Ski Center, providing telecommunication coverage between Rhyndie and Elgin. The GenCore provides back-up power to a LPG generator.
Plug Power, Inc.	LP Gas, Logan Energy Corp, US Army Corp of Engineers Construction Engineering Research Lab (CERL)	5 kW PEM GenSys 5P	Yosemite National Park, California	Administration building at Yosemite Village	Apr. 2004	Operational	Liquid petroleum gas (LPG)		Yosemite National Park PEM Fuel Cell Demonstration Project. The fuel cell provides electricity to the Administration Building in Yosemite Village and fuel cell heat is used to provide hot water. A set of plug-ins added to the circuit from the cell to the building allows the park to recharge its electric car fleet. A second Plug Power fuel cell has been purchased and will be installed at a separate location in the park.
Plug Power, Inc.	Florida Power and Light Co., US Department of Energy, Florida Department of Environmental Protection	5 kW PEM	North Port, Florida	North Port High School	Apr. 2004	Installed			The first of 10 Hydrogen Education sites nationwide. DOE has supplied the school with a hydrogen curriculum and laboratory experiments.
Plug Power, Inc.	US Army Corps of Engineers Construction Engineering Research Lab (CERL), Southern Maryland Electric Cooperative	5 kW PEM	Patuxent River, Maryland	Patuxent Naval Air Station office building	Jan. 2004	Completed 12-month demonstration	Propane		Department of Defense Residential Fuel Cell Demonstration Program. Powered 9 desktop computers, office lighting, oil furnace, and life support systems for animals on display in environmental/conservation building. Grid connected. Excess power transferred to the grid. Cogenerated heat used to provide heat to the building during cold months.
Plug Power, Inc.	US Army Corps of Engineers Construction Engineering Research Lab (CERL), Southern Maryland Electric Cooperative	5 kW PEM	Patuxent River, Maryland	Patuxent Naval Air Station single-family residence	Jan. 2004	Completed 12-month demonstration	Natural gas		Department of Defense Residential Fuel Cell Demonstration Program. Powered lighting, boiler and pumps, refrigerator, kitchen counter receptacles and sump pump. Grid connected. Excess power transferred to the grid. Co-generated heat used the entire year for water heater.
Plug Power, Inc.	Long Island Power Authority (LIPA)	Two 5 kW GenSys 5C PEM CHP units	Garden City, New York	Nassau Community College	Installed Feb. 2004	Operating	Natural gas		
Plug Power, Inc.	VNG, Freiburger Erdgas	4.5 kW EURO 2 PEM CHP	Freiberg, Germany	Nursing home	Fall 2004	Operating	Natural gas		Part of the VNG DemoCell project. Provides power, heating, and heat for hot water.

Plug Power, Inc.	siGEN, Centre for Renewable Energy and Sustainable Technology (CREST)	5 kW Gencore PEM	UK	Beacon Energy	Summer, 2004				Part of CREST's HARI (Hydrogen and Renewables Integration) project.
Plug Power, Inc.	Vaillant, Erdgas, Energie AG	4.5 kW Euro 2 PEM CHP	Dietachdorf, Austria	Restaurant and hotel	Feb. 2004		Natural gas		Provides heat and power.
Plug Power, Inc.	Ichitaka Co., Mitsuuroko Co, Kamata Co., Sanwa	4 kW PEM	Tsukuba, Japan	House exhibition center	Aug. 2004	One-year demonstration	Liquefied petroleum gas (LPG)		Cogeneration system
Plug Power, Inc.	siGEN, Unst Partnership	5 kW Gencore PEM	Unst, UK (Scotland)	Hagdale Business Park	Contract signed Jan. 2004				Part of the Pure (Promoting Unst Renewable Energy) Project. Incorporates a fuel cell, two wind turbines, electrolyzer and hydrogen storage.
Plug Power, Inc.	Vaillant, EWE, E.ON Energie	4.6 kW Euro 2 (GenSys) PEM Fuel Cell Heating Appliance (FCHA)	Remscheid, Germany	Apartment building	Installed late 2003 or early 2004	Scheduled completion in 2006	Natural gas		Part of European Commission-funded project "European Virtual Fuel Cell Power Plant" to examine centrally controlled fuel cell heating systems connected to the electricity grid"
Plug Power, Inc.	Vaillant, EWE, E.ON Energie	Three 4.6 kW Euro 2 (GenSys) PEM Fuel Cell Heating Appliance (FCHA)	Oldenburg, Germany	Two units at apartment buildings, one unit at the Federal Technological Center for Electrical Engineering and Information Technology	Installed late 2003 or early 2004	Scheduled completion in 2006	Natural gas		Part of European Commission-funded project "European Virtual Fuel Cell Power Plant" to examine centrally controlled fuel cell heating systems connected to the electricity grid
Plug Power, Inc.	Vaillant, EWE, E.ON Energie	4.6 kW Euro 2 (GenSys) PEM Fuel Cell Heating Appliance (FCHA)	Aurich, Germany	Apartment building	Installed late 2003 or early 2004	Scheduled completion in 2006	Natural gas		Part of European Commission-funded project "European Virtual Fuel Cell Power Plant" to examine centrally controlled fuel cell heating systems connected to the electricity grid
Plug Power, Inc.	Vaillant, EWE, E.ON Energie	4.6 kW Euro 2 (GenSys) PEM Fuel Cell Heating Appliance (FCHA)	Cuxhaven, Germany	Apartment building	Installed late 2003 or early 2004	Scheduled completion in 2006	Natural gas		Part of European Commission-funded project "European Virtual Fuel Cell Power Plant" to examine centrally controlled fuel cell heating systems connected to the electricity grid
Plug Power, Inc.	Vaillant, Ruhrgas, EAM EnergiePlus	4.6 kW Euro 2 (GenSys) PEM Fuel Cell Heating Appliance (FCHA)	Wolfhagen, Germany	Apartment building	Installed late 2003 or early 2004	Scheduled completion in 2006	Natural gas		Part of European Commission-funded project "European Virtual Fuel Cell Power Plant" to examine centrally controlled fuel cell heating systems connected to the electricity grid
Plug Power, Inc.	Vaillant, Ruhrgas, EAM EnergiePlus	4.6 kW Euro 2 (GenSys) PEM Fuel Cell Heating Appliance (FCHA)	Volkmarsen, Germany	Apartment building	Installed late 2003 or early 2004	Scheduled completion in 2006	Natural gas		Part of European Commission-funded project "European Virtual Fuel Cell Power Plant" to examine centrally controlled fuel cell heating systems connected to the electricity grid
Plug Power, Inc.	Vaillant, Ruhrgas, EAM EnergiePlus	4.6 kW Euro 2 (GenSys) PEM Fuel Cell Heating Appliance (FCHA)	Baunatal, Germany		Installed late 2003 or early 2004	Scheduled completion in 2006	Natural gas		Part of European Commission-funded project "European Virtual Fuel Cell Power Plant" to examine centrally controlled fuel cell heating systems connected to the electricity grid






Plug Power, Inc.	Vaillant, Ruhrgas, Stadtwerke Hilden, E.ON Energie	4.6 kW Euro 2 (GenSys) PEM Fuel Cell Heating Appliance (FCHA)	Hilden, Germany	Apartment building	Installed late 2003 or early 2004	Scheduled completion in 2006	Natural gas		Part of European Commission-funded project "European Virtual Fuel Cell Power Plant" to examine centrally controlled fuel cell heating systems connected to the electricity grid
Plug Power, Inc.	Vaillant, ELE, Ruhrgas, E.ON Energie	4.6 kW Euro 2 (GenSys) PEM Fuel Cell Heating Appliance (FCHA)	Gelsenkirchen, Germany	Apartment building	Installed late 2003 or early 2004	Scheduled completion in 2006	Natural gas		Part of European Commission-funded project "European Virtual Fuel Cell Power Plant" to examine centrally controlled fuel cell heating systems connected to the electricity grid
Plug Power, Inc.	Vaillant, Gasunie, Vereniging van Eigenaren Minervaflat	4.6 kW Euro 2 (GenSys) PEM Fuel Cell Heating Appliance (FCHA)	Groningen, Netherlands	Apartment building	Installed late 2003 or early 2004	Scheduled completion in 2006	Natural gas		Part of European Commission-funded project "European Virtual Fuel Cell Power Plant" to examine centrally controlled fuel cell heating systems connected to the electricity grid
Plug Power, Inc.	Vaillant, Gasunie, Essent	Two 4.6 kW Euro 2 (GenSys) PEM Fuel Cell Heating Appliance (FCHA)	Hertogenbosch, Netherlands		Installed late 2003 or early 2004	Scheduled completion in 2006	Natural gas		Part of European Commission-funded project "European Virtual Fuel Cell Power Plant" to examine centrally controlled fuel cell heating systems connected to the electricity grid
Plug Power, Inc.	Vaillant, Gasunie, Inter Paris	4.6 kW Euro 2 (GenSys) PEM Fuel Cell Heating Appliance (FCHA)	Klazienaveen, Netherlands		Installed late 2003 or early 2004	Scheduled completion in 2006	Natural gas		Part of European Commission-funded project "European Virtual Fuel Cell Power Plant" to examine centrally controlled fuel cell heating systems connected to the electricity grid
Plug Power, Inc.	Vaillant, Gasunie, Woonstade Hookgerk-Noorddijk	4.6 kW Euro 2 (GenSys) PEM Fuel Cell Heating Appliance (FCHA)	Hoogkerk, Netherlands	Apartment building	Installed late 2003 or early 2004	Scheduled completion in 2006	Natural gas		Part of European Commission-funded project "European Virtual Fuel Cell Power Plant" to examine centrally controlled fuel cell heating systems connected to the electricity grid
Plug Power, Inc.	Vaillant, Gasunie, Vereniging van Eigenaren Hoogzandveld	4.6 kW Euro 2 (GenSys) PEM Fuel Cell Heating Appliance (FCHA)	Nieuwegein, Netherlands		Installed late 2003 or early 2004	Scheduled completion in 2006	Natural gas		Part of European Commission-funded project "European Virtual Fuel Cell Power Plant" to examine centrally controlled fuel cell heating systems connected to the electricity grid
Plug Power, Inc.	Vaillant, Gasunie, St. Elisabeth zorg en Verpleeghuis	4.6 kW Euro 2 (GenSys) PEM Fuel Cell Heating Appliance (FCHA)	Amersfoort, Netherlands		Installed late 2003 or early 2004	Scheduled completion in 2006	Natural gas		Part of European Commission-funded project "European Virtual Fuel Cell Power Plant" to examine centrally controlled fuel cell heating systems connected to the electricity grid
Plug Power, Inc.	Vaillant, Gasunie Wonen Breeburg	Two 4.6 kW Euro 2 (GenSys) PEM Fuel Cell Heating Appliance (FCHA)	Tilburg, Netherlands		Installed late 2003 or early 2004	Scheduled completion in 2006	Natural gas		Part of European Commission-funded project "European Virtual Fuel Cell Power Plant" to examine centrally controlled fuel cell heating systems connected to the electricity grid
Plug Power, Inc.	Vaillant, Gasunie Vidomes	4.6 kW Euro 2 (GenSys) PEM Fuel Cell Heating Appliance (FCHA)	Leidschendam, Netherlands		Installed late 2003 or early 2004	Scheduled completion in 2006	Natural gas		Part of European Commission-funded project "European Virtual Fuel Cell Power Plant" to examine centrally controlled fuel cell heating


									systems connected to the electricity grid
Plug Power, Inc.	DLR, Sistemas De Calor	4.6 kW Euro 2 (GenSys) PEM Fuel Cell Heating Appliance (FCHA)	Almeria, Spain		Late 2003	Scheduled completion in 2006	Natural gas		Part of European Commission-funded project "European Virtual Fuel Cell Power Plant" to examine centrally controlled fuel cell heating systems connected to the electricity grid
Plug Power, Inc.	IST	4.6 kW Euro 2 (GenSys) PEM Fuel Cell Heating Appliance (FCHA)	Lisbon, Portugal	Instituto Superior Tecnico at the University of Lisbon	Late 2003	Scheduled completion in 2006	Natural gas		Part of European Commission-funded project "European Virtual Fuel Cell Power Plant" to examine centrally controlled fuel cell heating systems connected to the electricity grid
Plug Power, Inc.	Vaillant, Gasunie, BMW Den Haag	4.6 kW Euro 2 (GenSys) PEM Fuel Cell Heating Appliance (FCHA)	The Hague, Netherlands	BMW dealership	2003	Scheduled completion in 2006	Natural gas		Part of European Commission-funded project "European Virtual Fuel Cell Power Plant" to examine centrally controlled fuel cell heating systems connected to the electricity grid. Also part of BMW's H2ague Project promoting the non-mobile use of fuel cells.
Plug Power, Inc.	Vaillant, SOTEG Luxembourg, town of Luxembourg	4.6 kW Euro 2 (Gensys) PEM Fuel Cell Heating Appliance (FCHA) CHP	Luxembourg City, Luxembourg	School and Sporting Center	Jun. 2003				
Plug Power, Inc.	Mitsui & Co. Ltd, Osaka Gas	Eight 500 W Beta PEM CHP units	Kansai, Japan	Osaka Gas facility and field locations	Apr. 2003		Natural gas		Technical venture to develop a 500W residential cogeneration fuel cell system for the Japanese market. Provides primary power and hot water for a residence. One unit has been installed in Osaka Gas' NEXT21, an experimental condominium complex located in Osaka.
Plug Power, Inc.	Marubeni, New Energy Foundation	Two 5 kW GenSys PEM units	Japan		Lease announced Sep. 2003		Town gas		
Plug Power, Inc.	Marubeni	5 kW GenSys PEM	Oga, Japan		Lease announced Sep. 2003		Propane		
Plug Power, Inc.	Long Island Power Authority (LIPA)	Three 5 kW CHP PEM units	Hauppauge, New York	Suffolk County William Rogers Legislative Building	Installed Aug. 2003		Natural gas		Will be interconnected to LIPA's grid and operate in a combined heat and power mode, providing electricity and heat on-site
Plug Power, Inc.	US Army Corps of Engineers Construction Engineering Research Lab (CERL), Gas Technology Institute, Southwest Research Institute	GenSys5CS 5 kW PEM	San Antonio, Texas	Brooks City Base Challenger Learning Center	Jan. 2003	Completed one-year demonstration	Natural gas		DOD Residential Fuel Cell Demonstration Program. Provided heat and power.
Plug Power, Inc.	US Department of Defense, LOGANEnergy, Energy Signatures Associates, Flint Energies	5 kW GenSys5C PEM	Warner Robins, Georgia	Robins Air Force Base fire station	Jun. 2003	Ongoing	Natural gas		US Department of Defense Residential PEM Fuel Cell Demonstration Program


Plug Power, Inc	US Army Corps of Engineers Construction Engineering Research Lab (CERL)	Eight 5 kW PEM units	Saratoga Springs, New York	Saratoga Springs Naval Support Unit base housing	Apr. 2003	Jul. 2004	Natural gas		US Department of Defense Residential PEM Fuel Cell Demonstration Program
Plug Power, Inc	US Army Corps of Engineers Construction Engineering Research Lab (CERL), LOGAN Energy, North Carolina State Agricultural and Technical University	5 kW GenSys 5CS PEM	Greensboro, North Carolina	North Carolina State Agricultural and Technical University's ROTC facility	Apr. 2003	Apr. 2004	Natural gas		US Department of Defense Residential PEM Fuel Cell Demonstration Program. Operates in both a grid parallel and grid independent configuration. Provides stand-by power to a critical circuit panel and is outfitted with a thermal recovery system to capture waste heat for a hot water storage tank to supplement the current hot water system.
Plug Power, Inc.	US Army Corps of Engineers Construction Engineering Research Lab (CERL), DTE Energy Technologies	Two 5 kW GenSysT5CS PEM units	Selfridge Air National Guard Base, Michigan	Selfridge Air National Guard Base fire station	Nov. 2003	Ongoing	Natural gas		US Department of Defense Residential PEM Fuel Cell Demonstration Program. Provides electricity and recovered waste heat for domestic hot water usage. The units operate in parallel with the base electrical grid and incorporate standby capability to allow the units to supply power to critical loads during grid outage.
Plug Power, Inc.	US Army Corps of Engineers Construction Engineering Research Lab (CERL), LOGAN Energy	5 kW GenSys5CS PEM	Sumpter, South Carolina	Shaw Air Force Base residence	May 2003	May 2004	Natural gas		US Department of Defense Residential PEM Fuel Cell Demonstration Program. Used to demonstrate the feasibility of obtaining a minimum of 90% availability over a one year period with a residential PEM
Plug Power, Inc.	US Army Corps of Engineers Construction Engineering Research Lab (CERL), Southwest Research Institute	Three GenSys5CS 5 kW PEM units	San Antonio, Texas	Brooks Air Force Base housing	Feb. 2003	Mar. 2004	Natural gas		US Department of Defense PEM Demonstration Program
Plug Power, Inc.	Verizon, NY State Energy Research and Development Authority (NYSERDA)	5 kW PEM GenCore	Albany, New York	Albany Airport	Jul. 2003	Demonstration completed in 2004 with subsequent purchase of the system	Natural gas	 	Prototype GenCore demonstration began in Jul. 2003, replaced by the GenCore 5T in Feb. 2004. At completion of the project, Verizon purchased several GenCore 5T systems, siting one at Albany Airport.
Plug Power, Inc.	Honda R&D Co., Ltd.	PEM Home Energy Station with reformer	Torrance, California and Latham, New York	Honda R&D facility in California and Plug Power facility in New York	Oct. 2003	Ongoing	Natural gas	 	Generates hydrogen from natural gas for use in fuel cell vehicles while supplying electricity and hot water to the home. 2003 Phase I demonstration in Torrance, CA; 2004 Phase II demonstration in Latham, NY
Plug Power, Inc.	Long Island Power Authority (LIPA), State University of New York (SUNY)	Three 5 kW GenSys™ 5C PEM CHP units	Farmingdale, New York	SUNY Farmingdale	2003	Operating	Natural gas		




Plug Power, Inc.	Orange (wireless provider-Europe)	5 kW PEM GenCore 5T PEM	Elgin, UK (Scotland)	Remote telecommunications site at Huntly Nordic Ski Center training site	Dec. 2003	Ongoing	Hydrogen		Provides telecommunication coverage between Rhynie and Elgin and is the UK's first hydrogen-fueled base station.
Plug Power, Inc.	Long Island Power Authority (LIPA)	5 kW GenSys 5C PEM CHP	Hempstead, New York	Wantagh Animal Shelter	Oct. 2003	Operating	Natural gas		
Plug Power, Inc.	Long Island Power Authority (LIPA)	Two 5 kW GenSys 5C PEM CHP units	Southampton, New York	Southampton College	2003	Operating	Natural gas		
Plug Power, Inc.	Bonneville Power Administration (BPA), Northwest Natural Inc.	5 kW GenSys PEM CHP	Hillsboro, Oregon	Harkins House Juvenile Detention Facility	Nov. 2003	Operational	Natural gas		Produces electricity, water and usable heat. Can generate 40,000 kw-hrs/yr, about 20% of the needs of the 14,000 sq. ft. facility. Surplus energy will be fed into the PGE power grid. Mira Vowles 503.230.4796 mkvowles@bpa.gov
Plug Power, Inc.	US Army Corps of Engineers Construction Engineering Research Lab (CERL), LOGANEnergy, Energy Signature Associates	GenSys 5CS 5kW PEM	New Orleans, Louisiana	Coast Guard Station Administration and Operations building	Nov. 2003	Completed one-year demonstration	Natural gas		US Department of Defense PEM Demonstration Program. Provided standby power to a dedicated load of the facility's freezers. Waste heat was captured to be a preheat source for the existing natural gas-fired hot water heaters.
Plug Power, Inc.	US Army Corps of Engineers Construction Engineering Research Lab (CERL)	Three 5 kW GenSys 5CS PEM units	West Point, New York	West Point Military Academy officer's quarters	May 2003	May 2004 (2 units), July 2004 (one unit)	Natural gas		Department of Defense Residential PEM Fuel Cell Demonstration Program. Provides electricity to the facilities. Waste heat will supplement the existing domestic hot water and space heating systems. Provided power during the 2003 Northeast US grid power outage.
Plug Power, Inc.	US Army Corps of Engineers Construction Engineering Research Lab (CERL), LOGANEnergy Corp.	5 kW PEM	Bossier City, Louisiana	Barksdale Air Force Base airmen's dormitory	Feb. 2003	Feb. 2004	Natural gas		One year demonstration. US Department of Defense PEM Demonstration Program
Plug Power, Inc.	US Army Corps of Engineers, Construction Engineering Research Lab (CERL), LOGANEnergy	5 kW PEM	Columbia, South Carolina	Fort Jackson officer's residence	Mar. 2003	Mar. 2004	Natural gas		US Department of Defense PEM Demonstration Program
Plug Power, Inc.	US Army Corps of Engineers, Construction Engineering Research Lab (CERL), LOGANEnergy	5kW GenSys 5CS PEM	Atlanta, Georgia	Fort McPherson single-family residence	Oct. 2003	2004	Natural gas		US Department of Defense PEM Demonstration Program. Provided standby power to a dedicated load. The waste heat of the fuel cell is captured and acts as a preheat source for the existing hot water heaters.
Plug Power, Inc.	Vaillant GMBH, Gaz de France	4.6 kW EURO 1 (GenSys) PEM	La Plaine Saint-Denis, France	Gaz de France test research center experimental building	Oct. 2003	Ongoing	Natural gas		Produces electricity used for building needs and provides heating and hot water accumulated in balloons for 7 experimental residences. Has operated over 3,146 hours.
Plug Power, Inc.	Vaillant, MVV Energie	4.1 kW EURO I PEM Fuel Cell	Mannheim, Germany	MVV headquarters	Early 2003		Natural gas		








		Heating Appliance CHP		factory					
Plug Power, Inc.	Long Island Power Authority/Central 03	Forty-five 5 kW GenSys 5CS PEM units	Long Island, New York	Twenty-five units to West Babylon Fuel Cell Test Site, twenty units to single- or multi-family residences on Long Island	Announced 2003				Buy Down Recipient FY2000 US Department of Defense Climate Change Fuel Cell Program.
Plug Power, Inc.	Vaillant, Ruhrgas, EAM EnergiePlus, E.ON Energie	Two 4.1 kW EURO 1 (GenSys) PEM Fuel Cell Heating Appliance CHP units	Baunatal, Germany	Two semi-detached apartment buildings	Installed Winter 2002/2003	Scheduled completion in Mar.2005	Natural gas		Part of European Commission-funded project "European Virtual Fuel Cell Power Plant" to examine centrally controlled fuel cell heating systems connected to the electricity grid
Plug Power, Inc.	Vaillant, EWE, E.ON Energie	4.1 kW EURO 1 (GenSys) PEM Fuel Cell Heating Appliance CHP	Oldenburg, Germany	Apartment building	Installed Winter 2002/2003	Scheduled completion in Mar.2005	Natural gas		Part of European Commission-funded project "European Virtual Fuel Cell Power Plant" to examine centrally controlled fuel cell heating systems connected to the electricity grid
Plug Power, Inc.	Vaillant, EWE, E.ON Energie	4.1 kW EURO 1 (GenSys) PEM Fuel Cell Heating Appliance CHP	Brake, Germany	Apartment building	Installed Winter 2002/2003	Scheduled completion in Mar.2005	Natural gas		Part of European Commission-funded project "European Virtual Fuel Cell Power Plant" to examine centrally controlled fuel cell heating systems connected to the electricity grid
Plug Power, Inc.	Vaillant, Gasunie	4.1 kW EURO 1 (GenSys) PEM Fuel Cell Heating Appliance CHP	Groningen, Netherlands	Workshop	Installed Winter 2002/2003	Scheduled completion in Mar.2005	Natural gas		Part of European Commission-funded project "European Virtual Fuel Cell Power Plant" to examine centrally controlled fuel cell heating systems connected to the electricity grid
Plug Power, Inc.	Vaillant, Ruhrgas, Stadwerke Remscheid, EWR, E.ON Energie	Two 4.1 kW EURO 1 (GenSys) PEM Fuel Cell Heating Appliance CHP units	Remscheid, Germany	Apartment building	Installed Winter 2002/2003	Scheduled completion in Mar.2005	Natural gas		Part of European Commission-funded project "European Virtual Fuel Cell Power Plant" to examine centrally controlled fuel cell heating systems connected to the electricity grid
Plug Power, Inc.	Vaillant GmbH	Fifty PEM units	Various locations in Germany, Netherlands, Austria, Luxembourg	Apartments and small businesses	2002/2003	Scheduled completion in Mar. 2005	Natural gas		Plug Power launched the European Union Fuel Cell Virtual Power Plant project with academic and industrial partners in Europe. Preproduction is planned in 2007, to be marketed by the end of the decade. A number of these installations are listed separately in this chart.
Plug Power, Inc.	Fuel Cell Test and Evaluation Center (FCTec)	5 kW PEM	Johnstown, Pennsylvania	FCTec test facility	Sale announced Sept. 2002		Natural gas		Combined heat and power unit purchased to develop a test protocol for residential fuel cells.
Plug Power, Inc.	Miller Burton Homes, Built Green Colorado, City and County of Denver, Governor's OEMC, IREA, Xcel Energy	5 kW PEM CHP	Denver, Colorado	Miller Burton Homes' Roaring Fork Parade Home	Aug. 2002	Oct. 2002	Natural gas		After the Parade of Homes, this unit will be stationed at the City and County of Denver's fire station at Washington Park.



Plug Power, Inc.	Governor's Office of Energy Management and Conservation, Xcel Energy, City and County of Denver, Alpha Technologies	5 kW PEM CHP	Denver, Colorado	Washington Park Fire Station	Dec. 2002	One-year demonstration	Natural gas		Provides a portion of the facilities' electricity and heat, to operate the fire station's computers, lights and garage doors. After the demonstration, Plug Power will replace the fire station's fuel cell with a future production model.
Plug Power, Inc.	Long Island Power Authority (LIPA), Hofstra University	Three 5 kW GenSys 5C PEM CHP units	Hempstead, New York	Hofstra University, dormitory	2002	Operating	Natural Gas		Providing power to the dormitory.
Plug Power, Inc.	Long Island Power Authority (LIPA)	5 kW GenSys 5C PEM CHP	Babylon, New York	Town Hall	Jul. 2002	Ongoing			Produces 5 kW of electricity.
Plug Power, Inc.	US Army Corps of Engineers Construction Engineering Research Lab (CERL), Watervliet Arsenal	Ten 5 kW PEM fuel cell units	Watervliet, New York	Watervliet Arsenal's R&D test lab (three units), telecommunications room (three units) and officer's quarters (four units)	Jan. 2002	Completed Jan. 2003	Natural gas		DOD Residential Fuel Cell Demonstration Program . Provided supplemental power to telecommunications facility and laboratory. Provided all power for four units of base housing. Operated for more than 80,000 hours and generated approximately 210,000 kWh of electricity.
Plug Power, Inc.	New York State Energy Research and Development Authority (NYSERDA), US Department of Energy	Two 5 kW SU-1 PEM units	Lewiston, and Colden, New York	Two single family homes	Apr. 2002	One-year demonstration	Natural gas		
Plug Power, Inc.	Long Island Power Authority (LIPA), US Army Corps of Engineers Construction Engineering Research Lab (CERL),	Three 5 kW GenSys 5C PEM units	Kings Point, New York	US Merchant Marine Academy	Planned installation Fall 2002		Hydrogen		The new system marks Plug Power's first shipment into the backup/UPS markets..
Plug Power, Inc.	US Army Corps of Engineers Construction Engineering Research Lab (CERL)	Eight 5 kW GenSys 5C CHP PEM units	San Diego, California	Naval Air Station North Island enlisted quarters, gymnasium and laundry	Sep. 2002	Ongoing	Natural gas		Will provide electricity and heat for hot water.
Plug Power, Inc.	US Army Corps of Engineers Construction Engineering Research Lab (CERL)	5 kW GenSys 5C CHP PEM	China Lake, California	Naval Air Weapons Station indoor pool	Sep. 2002		Natural gas		Will provide electricity and heat to the indoor pool.
Plug Power, Inc.	Long Island Power Authority (LIPA), Hunt Enterprises/McDonalds	5 kW GenSys 5C PEM CHP	Deer Park, New York	McDonalds	2002	2003	Natural gas		
Plug Power, Inc.	DTE Energy Technologies, Detroit Edison	Two 5 kW PEM units	Commerce Township, Michigan	Detroit Edison's Hancock Station	Jun. 2002	2003	Natural gas		Provided heat and electricity to the Center.
Plug Power, Inc.	Flint Energies and GE Fuel Cell Systems	5 kW PEM	Warner Robins, Georgia	Flint Energies Service Center facility	Jul. 2002	Ongoing	Natural gas		Generates electricity and heat. The heat will be used in water heaters in Flint's service center.
Plug Power, Inc.	US Army Corps of Engineers, Construction Engineering Research Lab (CERL), LOGANEnergy	5 kW PEM	Fort Bragg, North Carolina	Fort Bragg Environmental Center	Nov. 2002	Feb. 2004	Natural gas		US Department of Defense PEM Demonstration Program
Plug Power, Inc.	Osaka Gas Co.	500 W PEM	Osaka, Japan	NEXT21 experimental	Apr. 2002				Will provide power and heat.






				condominium					
Plug Power, Inc.	Japan Gas Association	4.5 kW PEM	Japan		2002				Japan Gas Assoc. Phase 2 test of residential PEM fuel cells of different manufacturers.
Plug Power, Inc.	Japan Gas Association	3 kW hybrid PEM/battery	Japan		2002				Japan Gas Assoc. Phase 2 test of residential PEM fuel cells of different manufacturers.
Plug Power, Inc.	Japan Gas Association	1 kW PEM	Demonstration tests (7 companies) held in Tokyo, Osaka and Nagoya, Japan		Phase 1: Dec. 2001	Phase I completed Feb. 2002			Japan Gas Assoc. test of residential PEM fuel cells from seven manufacturers (Ballard, Matsushita Electric, Toshiba, Toyota, Sanyo Electric, Mitsubishi Electric, Plug Power). Completed 1,000 hours of operation in Phase I testing, 8,000 hours scheduled in Phase 2 using fuel cells of different manufacturers.
Plug Power, Inc.	Gaz de France	Six 4.5 kW PEM beta CHP units	La Plaine Saint-Denise, France	Gaz de France	Dec. 2001 - Feb. 2002			Natural gas	
Plug Power, Inc.	Vaillant, E.ON, ELE, EUS, Ruhrgas	4 kW PEM Fuel Cell Heating Appliance (FCHA)	Gelsenkirchen, Germany	Multiple family home	Dec. 2001	Scheduled test completion at end of 2002		Natural gas	Supplies seven families with electricity, room heat, and hot water. Provides 80% of the home's electricity and nearly all of the hot water and room heating requirements. Supported by the North Rhine-Westphalia (NRW) Ministry of Economic Affairs as part of "Rational Energy Use" program
Plug Power, Inc.	Vaillant, Stadtwerke Duesseldorf, Ruhrgas AG, E.ON, ELE, EUS, German Gas Association, German Technical Surveillance Organization	4.1 kW GenSys PEM Fuel Cell Heating Appliance (FCHA)	Dusseldorf, Germany	Im Füchsen micro-brewery	Late 2001			Natural gas	Supplies about 80% of the electricity and heat to the traditional brewery, plus hot water for the brewing process, cleaning and dishwashing. Excess power is fed to the power network of the adjacent building complex. Supported by the North Rhine-Westphalia (NRW) Ministry of Economic Affairs as part of "Rational Energy Use" program
Plug Power, Inc.	German Gas Association, German Technical Surveillance Organization, Ruhrgas, Vaillant	PEM Fuel Cell Heating Appliance (FCHA)	Essen, Germany	Multiple family home	2001				Supported by the North Rhine-Westphalia (NRW) Ministry of Economic Affairs as part of "Rational Energy Use" program.
Plug Power, Inc.	Long Island Power Authority (LIPA), DOE, NY State Energy Research and Development Authority (NYSERDA)	75 PEM systems	West Babylon, New York	Long Island Fuel Cell Farm R&D at LIPA substation	2001				Forty-five of the original seventy-five units were in use as of 2003. The electricity is distributed to customers through LIPA's electric transmission and distribution system. Expected to produce more than 1 million kWh of electricity during the two-year project. Part of Gov. Pataki's Clean Energy Initiative.
Plug Power, Inc.		Fifty 5 kW SU-1 PEM units	Various residential locations, New York		Installed in 2001			Natural gas	Part of Gov. Pataki's Clean Energy Initiative.
Plug Power, Inc.	Long Island Power Authority	Six alpha 5 kW PEM CHP units	Four Long Island locations,	Homes	2000			Natural gas	



	(LIPA), DOE, NY State Energy Research and Development Authority (NYSERDA), Elemco Testing Company		New York						
Plug Power, Inc.	Long Island Power Authority (LIPA), DOE, NY State Energy Research and Development Authority (NYSERDA)	Twelve 5 kW PEM units	New York	Various New York public facilities	2000				
Plug Power, Inc.	Long Island Power Authority (LIPA), US Department of Energy, NY State Energy Research and Development Authority (NYSERDA)	Three 5 kW PEM units	Brookhaven, New York	DOE's Brookhaven National Lab	Mar. 2000				
Plug Power, Inc.	Hofstra University	Six PEM units	Hempstead, New York	Hofstra University	2000	Completed			These were among the first systems demonstrated outside of Plug Power's laboratory.
Plug Power, Inc.		PEM	Latham, New York	Plug Power's Demonstration Home	Jun. 1998		Hydrogen , natural gas		Four month demonstration using hydrogen fuel, followed by demonstration using natural gas.
Plug Power, Inc.	Long Island Power Authority/Central 02	Thirty-seven 5 kW PEM units	New York						Buy Down Recipient FY2000 US Department of Defense Climate Change Fuel Cell Program.
Plug Power, Inc.	Idaho State University	7 kW PEM	Idaho						Buy Down Recipient FY1999 US Department of Defense Climate Change Fuel Cell Program. Status
Plug Power, Inc.	NJR Power Services Group, GE	Twenty7 kW 7000 PEM units							Buy Down Recipient FY1999 US Department of Defense Climate Change Fuel Cell Program
Plug Power, Inc.	New York State Energy Research and Development Authority	Eighty 7 kW Plug Power 7000 PEM units	New York City metropolitan area, New York	New York State-owned facilities			Natural gas		24 units tested in Phase I. 6 units in Phase II, 50 units in Phase III.
Plug Power, Inc.	Town of East Hampton	PEM	East Hampton, New York	Town Hall					
Plug Power, Inc.	Vaillant	PEM	Delitzsch, Germany	Apartment building			Natural gas		
Plug Power, Inc.	Vaillant, Weingas	4.1 kW PEM Fuel Cell Heating Appliance (FCHA)	Vienna, Austria	Workshop			Natural gas		
Plug Power, Inc.	Vaillant, Stadtwerke Bielefeld	4.1 kW PEM Fuel Cell Heating Appliance (FCHA)	Bielefeld, Germany	Multi-family house			Natural gas		
Plug Power, Inc.	HEW	4.1 kW PEM Fuel Cell Heating Appliance (FCHA)	Hamburg, Germany	Workshop					
Plug Power, Inc.	Vaillant, Steirische Ferngas Austria, University of Graz, ESTAG	4.1 kW PEM Fuel Cell Heating Appliance (FCHA)	St. Ruppert, Austria	Hotel Ochsenberger	Jan. 2003	May 2004	Natural gas		
Plug Power, Inc.	Vaillant, SOTEG Luxembourg	4.1 kW PEM Fuel Cell Heating	Luxembourg, Belgium	School			Natural gas		

		Appliance (FCHA)							
Plug Power, Inc.	Vaillant, Weingas	Euro 1 PEM CHP	Wein, Austria	Residential	Feb. 2002	Dec. 2004	Natural gas		
Proton Energy Systems	Public Utilities Commission	15 kW regenerative fuel cell	Wallingford, Connecticut	Public Utilities Commission's Thorpe Avenue electric substation	Agreement announced May 2005	One-month demonstration			Will provide back-up power to a sub-station located next to Proton Energy Systems' office. \$500,000 is being provided by the Connecticut Clean Energy Fund.
ReliOn	US Army Corps of Engineers, Construction Engineering Research Lab (CERL)	Three 1 kW Independence 1000 PEM units	Westhampton, New York	Gabreski Air National Guard, Localizer and Glide Slope buildings (2 unites each) and base telephone exchange (1 unit)	Jul. 2004	Scheduled completion Aug. 2005	Hydrogen		US Department of Defense Residential PEM Fuel Cell Demonstration Program
ReliOn	US Army Corps of Engineers, Construction Engineering Research Lab (CERL)	Four 1 kW I-1000 PEM units	Tacoma, Washington	Fort Lewis Localizer and Glide Slope buildings, middle and outer marker beacons (1 unit each)	Jul. 2004		Industrial grade hydrogen		US Department of Defense Residential PEM Fuel Cell Demonstration Program
ReliOn	US Army Corps of Engineers, Construction Engineering Research Lab (CERL)	Four 1 kW PEM units	Fort Rucker, Alabama	Fort Rucker Localizer and Glide Slope buildings (1 unit each), middle beacon (1 unit) and outer marker beacon (2 units)	Planned start-up Jul. 2004	Planned completion Jul. 2005	Industrial grade hydrogen gas		US Department of Defense Residential PEM Fuel Cell Demonstration Program
ReliOn	US Army Corps of Engineers, Construction Engineering Research Lab (CERL), Industrial Research Ltd.	Two 1 kW Independence 1000 PEM units	Christchurch, New Zealand	US Antarctic Division Scientific Foundation Building	Planned		Hydrogen		US Department of Defense Residential PEM Fuel Cell Demonstration Program. Will supply security lighting at night and automatically switched off during daylight hours. During the day power output will be continually available for charging and other demonstration field instrumentation loads.
ReliOn	havePOWER, State of Washington	Independence 1000 PEM	Washington	Washington State Highway Patrol Emergency 911 system	Installed	Operational			
ReliOn	havePOWER, State of Washington	Independence 1000 PEM	Washington	Washington State Department of Transportation Emergency-911 system	Installed	Operational			
ReliOn	Bonneville Power Administration, havePOWER	Independence 1000 PEM	Vancouver, Washington	Bonneville Power Administration's Ross Substation	April 2004	Operational			
ReliOn	HavePOWER, Multi-Agency Radio Communications System (MARCS)	Four Independence 1000 PEM units	Washington Township, Ohio	MARCS microwave radio towers	Oct. 2004	Operational			Deployed at the MARCS installations--instead of lead acid based battery banks and engine generators--to provide long-term, emergency back-up power to critical digital communication infrastructure.

ReliOn	Bonneville Power Administration, Northwest Energy Technology Collaborative, Central Washington University	1 kW Independence 1000 PEM	Ellensburg, Washington	Central Washington University	Mar. 2004	Operational			A television and video player are powered by the fuel cell.
ReliOn	Maryland Department of Transportation, havePOWER	Independence 1000 PEM	Hancock, Maryland	Fiber optic repeater station	Feb. 2004	Operational	Hydrogen		World's first back-up for fiber optic repeater station.
ReliOn	Bahamas Telecommunications, Inc.	Independence 1000 PEM	Nassau, Bahamas	Back up telecommunications site	Aug. 2004	Operational			Successfully provided back up power during a Category 4 hurricane.
ReliOn	US Federal Aviation Administration	Independence 1000 PEM	Swin's Valley, Wisconsin	Radio communication-link repeaters	Jun. 2004	Operational			
ReliOn	US Federal Aviation Administration	Independence 1000 PEM	Wakeman, Ohio	Radio communication-link repeaters	Jun. 2004	Operational			
ReliOn	US Federal Aviation Administration	Independence 1000 PEM	Fargo, North Dakota	Radio communication-air to ground	Sep. 2004	Operational			
ReliOn	US Federal Aviation Administration	Independence 1000 PEM	Medical Lake, Washington	Radio communication-link repeaters		Operational			
ReliOn	Avista Labs/ReliOn	Two Independence 1000 PEM		Two Avista Corp/ReliOn substations	Sep. 2003 and Apr. 2004	Operational			Provides backup to substation protection and control equipment at two sites.
ReliOn	US Federal Aviation Administration	Independence 1000 PEM	Palwaukee, Illinois	Radio transmitter-repeaters	Dec. 2003	Operational			
ReliOn	US Bureau of Reclamation	Independence 1000 PEM	Loveland, Colorado	Bureau of Reclamation Pole Hill plant	Oct. 2003	Operational			Provides backup power to plant communication systems
ReliOn	havePOWER, State of Maryland	Independence 1000 PEM	Elk Neck State Park, Maryland	Emergency 911 (MIEMSS) system remote telecommunications site	Aug. 2003	Operational			Provides back-up power to a microwave radio site. Activated during Hurricane Isabel and provided continuous power until grid service was restored. Maryland has approved the fuel cell for primary back up power at other MIEMSS locations and the state's fiber optic network.
ReliOn (under former name-Avista Labs)	Army Corp of Engineers Construction Engineering Research Laboratory (CERL)	Six 500 W Independence 500 units (3 kW total power)	Tacoma, Washington	FAA radio transmitter-repeaters at McChord Air Force Base	Apr. 2003	Apr. 2004	Hydrogen		DOD Residential Fuel Cell Demonstration Program. Provided critical backup power for a radio transmitter receiver (RTR) site. No cogeneration.
ReliOn (under former name-Avista Labs)	Flash Technology, havePOWER	EPAC PEM	Outside Wilkes Barre, Pennsylvania	Cellular communication tower	Feb. 2002	Ongoing			World's first cellular communication's tower powered by hydrogen fuel cells. Powers Flash Technology beacon on cell phone tower and cell phone radio.
ReliOn (under former name-Avista Labs)	US Department of Defense, LOGANEnergy	5 kW PEM	Kaneohe Bay, Hawaii	Marine Corp Base housing	Dec. 2002		Propane		No cogeneration

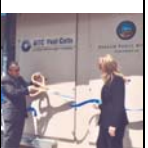
ReliOn (under former name-Avista Labs)	U.S. Army Corps of Engineers' Construction Engineering Research Laboratory (CERL)	3 kW SR-72 PEM	Spokane, Washington	Washington Air National Guard maintenance facility at Geiger Field	Mar. 2002	Mar. 2003	Industrial grade bottled hydrogen		DOD Residential Fuel Cell Demonstration Program. No cogeneration.
ReliOn (under former name-Avista Labs)	U.S. Army Corps of Engineers' Construction Engineering Research Laboratory (CERL)	5 kW PEM	Fayetteville, North Carolina	Fort Bragg base housing	Dec. 2002		Natural gas		DOD Residential Fuel Cell Demonstration Program
ReliOn (under former name-Avista Labs)	SGS Future srl	Ten Independence 1000 PEM units	Cavalese, Italy	Mountaintop alpine lodge	End of 2002				Installed in a parallel configuration providing 10kW of power.
ReliOn (under former name-Avista Labs)	Fuel Cell Test and Evaluation Center (FCTec)	SR 12 PEM	Johnstown, Pennsylvania	FCTec facility					Underwent testing and evaluation.
Sanyo Electric Co.	Urban Renaissance Agency (URA)	Forty-three 750 W PEM units	Osaka and Musashino, Japan	URA's rental condominiums	Mar. 2005		Town gas		PEMs are installed in 26 out of 252 homes in Osaka and 17 out of 85 homes in Musashino. Provides 74% of electric demand and 92% of hot water demand. There is no additional charge for the fuel cell-equipped homes.
Sanyo Electric Co.	Sumitomo Corporation, Nippon Steel Corporation	5 kW SOFC	Japan	Yahata Steel Works	Jun. 2004				Performance and demonstration test of unit designed by Sumitomo, Nippon Steel and Sanyo.
Sanyo Electric Co.	Daiwa House Industry Co., Ltd, Ministry of Land, Infrastructure and Transport	1 kW PEM	Nara prefecture, Japan		2004				Field test.
Sanyo Electric Co.	Osaka Gas Co.	1 kW PEM	Kyoto, Japan	Residential	Apr. 2002				
Sanyo Electric Co.	Coalition of the Kinki Bureau of Economy, Trade and Industry and 80 companies	Three 100 kW PEM units	Nishinomiya, Japan	Fire station	Apr. 2002				Will provide emergency power backup for lighting and rescue activity and emergency medical activity such as power for artificial respiration. The project was proposed after the Hanshin-Awaji Earthquake disaster.
Sanyo Electric Co.	Japan Gas Association	1 kW PEM	Demonstration tests (7 companies) held in Tokyo, Osaka and Nagoya, Japan		Phase 1: Dec. 2001	Phase I completed Feb. 2002			Japan Gas Assoc. test of residential PEM fuel cells from seven manufacturers (Ballard, Matsushita Electric, Toshiba, Toyota, Sanyo Electric, Mitsubishi Electric, Plug Power). Completed 1,000 hours of operation in Phase I testing, 8,000 hours scheduled in Phase 2 using fuel cells of different manufacturers.
Schatz Energy Research Center		100 W PEM	Redwood National Forest, California	Schoolhouse Peak	1999, refurbished 2001	2003	Hydrogen		Part of Yurok Indian telecommunications system providing cell phone service to a remote portion of the reservation. Links to Pacific Bell's telephone network. Logged 3,239 operating hours on the first stack, 3,836 hours

									on second stack.
Siemens Westinghouse	BP Alaska	125 kW SOFC	Alaska		Planned in 2006			Pipeline natural gas (PNG)	
Siemens Westinghouse	Stadtwerke Hanover AG, E.ON Energie AG	250 kW SOFC	Hannover, Germany	Herrenhausen power plant	Planned installation in 2004			Pipeline natural gas (PNG)	In normal operating mode will simultaneously feed 225 kW of electricity into the grid operated by Stadtwerke Hanover and 160 kW of heat for Hanover's district heating network
Siemens Westinghouse	Edison SpA	300 kW SOFC/gas turbine Pressurized Hybrid (PH) system	Sinetta Marengo, Italy	Edison thermo-electric power station	Early 2003	One-year demonstration		Natural gas	Electrical efficiency of 58%.
Siemens Westinghouse	BP America	250 kW SOFC CHP	Nikiski, Alaska	BP gas-to-liquids plant, administration building and warehouse	2003			Natural gas	 Excess power to be sold to local grid. Buy Down Recipient FY2000 US Department of Defense Climate Change Fuel Cell Program.
Siemens Westinghouse	Ontario Power Generation, US Department of Energy and National Resources Canada, Kinectrics Inc.	250 kW SOFC CHP	Toronto, Canada	Kinectrics (formerly Ontario Hydro) test facility	2003	Ongoing			 Proof-of-concept. By 2004 the system has operated for more than 1,100 hours. Buy Down Recipient FY1999 US Department of Defense Climate Change Fuel Cell Program
Siemens Westinghouse	University of Toronto, Kinectrics, Ontario Power Generation	250 kW SOFC	Mississauga, Canada	University of Toronto-Mississauga	2003				Will be connected to the internal grid and is expected to provide 8% of the electrical needs for the campus as well as hot water.
Siemens Westinghouse	Norske Shell	250 kW SOFC hybrid	Bergen, Norway	Kollsnes gas processing plant	2003			Natural gas	Demonstration of capture of fuel cell exhaust carbon dioxide gas for sequestration or for use in other industries.
Siemens Westinghouse	RWE	300 kW SOFC/gas turbine Pressurized Hybrid (PH) CHP system	Essen, Germany	RWE Fuel Cell Pavilion, Meteorit Park	Apr. 2002	One-year demonstration		Natural gas	 Provided power and heat to the RWE Meteorit Exhibition Pavilion. Electrical efficiency of 58%.
Siemens Westinghouse	Ontario Power Technologies	250 kW SOFC/gas turbine hybrid system	Toronto, Canada	Ontario Power Technologies facilities	2002	Completed		Pipeline natural gas (PNG)	Operated 1,000+ hours. Was to deliver 225 kW to the existing power grid and supply 145 kW of heat.
Siemens Westinghouse	EnbW, TIWAG, Gax de France	1 MW SOFC with micro-turbine generator	Austria		Jan. 2000	Dec. 2003			
Siemens Westinghouse	University of California, Edison Technology Solutions/Southern California Edison	220 kW SOFC/gas turbine hybrid system	Irvine, California	National Fuel Cell Research Center at the University of California-Irvine	Jun. 2000	Completed 2001		Natural gas	 Proof-of-concept Operated for nearly 3,400 hours and achieved an electrical efficiency of ~53%
Siemens Westinghouse	Southern California Edison, National Fuel Cell Research Center, Tokyo Gas, Osaka Gas	25 kW SOFC	Irvine, California	Highgrove Generation Station, (Southern California Edison), later relocated to the National Fuel Cell Research Center	1994		Will operate up to 20,000 hours. May be retired to the Smithsonian as the "world's first integrated solid oxide fuel cell system"	Jet fuel, diesel fuel, natural gas	 Installed in 1994 at the Highgrove Generating Station of Southern California Edison. Operated approximately 6,500 hours on first stack before being replaced in 1995 with a new stack. Was shut down in 1996 after 11,500 hours of testing (5,000 hours on the new stack). Relocated to NFCRC and restarted in

									1998. By 2002, the system has operated for a total of 19,750 hours (13,250 hours on the current stack).
Siemens Westinghouse	EDB/Elsam, Nuon	100 kW SOFC CHP	Westervoort, Netherlands; Essen, Germany	EDB/Elsam power plant; RWE Fuel Cell Pavilion, Meteorit Park	Dec. 1997	Completed	Natural gas, pipeline natural gas (PNG)		Operated for 16,667 hours at a peak power of ~140 kW. Electrical efficiency was 46%. In June 2001 was moved to RWE Fuel Cell Pavilion and tested for an additional 3,700 hours, for a total of over 20,000 hours.
Siemens Westinghouse	Joint Gas Utilities	25 kW SOFC/as turbine hybrid system	Japan		1995	Completed	Pipeline natural gas (PNG)		Logged 13,294 hours of operation.
Siemens Westinghouse	Unidentified utility company	20 kW SOFC/gas turbine hybrid system			1993	Completed	Pipeline natural gas (PNG)		Logged 7,064 hours of operation.
Siemens Westinghouse	Unidentified utility company	20 kW SOFC/gas turbine hybrid system			1992	Completed	Pipeline natural gas (PNG)		Logged 2,601 hours of operation.
Siemens Westinghouse	Unidentified utility company	20 kW SOFC/gas turbine hybrid system			1992	Completed	Pipeline natural gas (PNG)		Logged 1,579 hours of operation.
Siemens Westinghouse	Joint Gas Utilities	20 kW SOFC/gas turbine hybrid system	Japan		1992	Completed	Pipeline natural gas (PNG)		Logged 817 hours of operation.
Siemens Westinghouse	Osaka Gas	Two 3 kW SOFC/gas turbine hybrid systems	Japan		1987	Completed	H2+CO		Logged 3,012 and 3,683 hours of operation.
Siemens Westinghouse	Tokyo Gas	3 kW SOFC/gas turbine hybrid system	Japan		1987	Completed	H2+CO		Logged 4,882 hours of operation.
Siemens Westinghouse	Tennessee Valley Authority	400 W SOFC/gas turbine hybrid power system			1986	Completed	H2+CO		Logged 1,760 hours of operation.
Sulzer Hexis	HEAG	SOFC	Darmstadt, Germany	Residence	Mar. 2005		Natural gas		Provides electricity and heat.
Sulzer Hexis	VNG, DREWAG	1 kW HXS 1000 Premiere SOFC CHP	Dresden, Germany	Kindergarten	Jan. 2004		Natural gas		Part of the VNG DemoCell project.
Sulzer Hexis	Axpo Holding AG	Pre-series HXS 1000 Premiere SOFC CHP system	Zurich, Switzerland	Single-family test house	Oct. 2003	Two-year testing project	Natural gas		
Sulzer Hexis	Gasverbund Mittelland AG	Thirty SOFC units	Northwestern Switzerland	Customer-residential	2003		Natural gas		Swiss natural gas supplier. Units delivered to interested customers. Very high demand for the 30 pre-production units.
Sulzer Hexis	Gaz de France	HXS 1000 Premiere SOFC	La Plaine Saint-Denis, Paris, France	Test house at Gaz de France research and development facility	Jan. 2003	Completed Dec. 2003	Natural gas		One year testing project.
Sulzer Hexis	VNG, Berliner Gaswerke AG	HXS 1000 Premiere SOFC	Berlin-Buckow, Germany	One side of a two-family house	Aug. 2003	Three year test	Natural gas		Part of the VNG DemoCell project. When the fuel cell can't produce as much heat as necessary, the integrated gas-fired condensing boiler steps in to meet peak needs. Surplus electricity is fed into the network of the local electricity supplier.
Sulzer Hexis	HGW, eon Hanse Gas AG, VNG	1 kW HXS 1000 Premiere SOFC CHP	Gadebusch, Germany	Three-apartments in a multi-family dwelling	Nov. 2002		Natural gas		Part of the VNG DemoCell project.






Sulzer Hexis	VNG, Erdgas Mittelsachsen	1 kW HXS 1000 Premiere SOFC CHP	Barby, Germany	Training center	Jun. 2002		Natural gas		Part of the VNG DemoCell project.
Sulzer Hexis	VNG, Stadtwerke Weimar	1 kW HXS 1000 Premiere SOFC CHP	Weimar, Germany	Training center	Oct. 2002		Natural gas		Part of the VNG DemoCell project.
Sulzer Hexis	VNG	Sixteen 1 kW HXS 1000 Premiere SOFC CHP systems	Various locations, Germany	Customer-sited	Purchased over 2002-2003		Natural gas		East German gas utility. Purchase over the period 2002 -2003. Thermal output of 2.5 kW.
Sulzer Hexis	E.ON Energie AG	Fifty-six 1 kW HXS 1000 Premiere SOFC CHP systems	Various locations, Germany	Customer-sited	Purchased over 2002-2003		Natural gas		One of Europe's largest private electricity, gas and water utilities. Purchase over the period 2002 -03. Thermal output of 2.5 kW.
Sulzer Hexis	Thyssengas GmbH	Forty-two 1 kW HXS 1000 Premiere SOFC CHP systems	North Rhine-Westphalia area, Germany	Customer-sited	Purchased over 2002-2003		Natural gas		Natural gas importer and supplier. Purchase over the period 2002 -03. Thermal output of 2.5 kW.
Sulzer Hexis	RWE	1 kW HXS 1000 Premiere SOFC	Essen, Germany	RWE Fuel Cell Pavilion, Meteorit Park	Apr. 2002	Ongoing	Natural gas		Electrical output of 1 kW and thermal output of 2.5 kW. Designed exclusively for use in single-family homes. The SOFC achieves an electrical efficiency of approximately 25% and an overall efficiency of at least 80%.
Sulzer Hexis	Energie AG Oberösterreich, Oberösterreichischen Ferngas AG	1 kW HXS 1000 Premiere SOFC	Attnang Puchheim, Austria	Technology Center Salzkammergut	Mar. 2002	Mar. 2004	Natural gas		
Sulzer Hexis	Energy Research Centre of the Netherlands (ECN)	1 kW HXS 1000 Premiere SOFC	Petten, Netherlands	ECN test laboratory	Summer 2002	One-year testing and operation	Natural gas		Testing/analysis for usability in Dutch households.
Sulzer Hexis	EnBW	Forty 1 kW HXS 1000 Premiere SOFC CHP systems		Customer-sited	Purchased over 2001-2003, first installation in Dec. 2001		Natural gas		Over 6,000 persons responded to an advertisement placed by EnBW seeking 25 customers to test a fuel cell heating system. By 2006, about 55 customers will use this technology. The successor of the SOFC pre-series fuel cell system will be delivered in 2005.
Sulzer Hexis	EWE PLC	One hundred fifty-five 1 kW HXS 1000 Premiere SOFC CHP systems	Various locations, Germany	Customer-sited	Purchased over 2001-2003		Natural gas		Purchase over the period 2001 - 03. Thermal output of 2.5 kW. Unit 001 was tested at EWE's lab. The remainder were to be made available to customers for testing..
Sulzer Hexis	EWR	Sixty 1 kW HXS 1000 Premiere SOFC CHP systems	Various locations, Germany	Customer-sited	Purchased over 2001-2003		Natural gas		Sited with utility customers within the Rheinhessen/Ried. Region. Purchase over the period 2001 - 03. Thermal output of 2.5 kW.
Sulzer Hexis	EREP SA, Universite Lausanne, Herr Chabloz	1 kW SOFC	Lully, Switzerland	Chabloz biogas plant	Aug. 2001		Agricultural biogas		Operated for 5,000 hours at 35% efficiency.
Sulzer Hexis	Tokyo Gas	1 kW SOFC	Tokyo, Japan	Tokyo Gas Fundamental Technology Research Laboratory	Feb. 2000	2001	City gas		
Sulzer Hexis	Gasunie, Shell	1 kW SOFC	Groningen, Netherlands	Gasunie research facility	May 2000				Integrated into heating system.
Sulzer Hexis	Gas de Euskad,	1 kW SOFC	Bilbao,	Minano	Installed	2001	Natural gas		Combined heat and power.







	Ikerlan Energy, School of Engineers-Bilbao, EVE	CHP	Spain	technology park demonstration house	Oct. 1999				
Sulzer Hexis	City of Basel, AUE Basel	1 kW SOFC CHP	Basel, Switzerland	School	Installed Oct. 1998	2001			Produces power for the school. Excess energy sent to the grid. Operated for more than 8,000 hours.
Sulzer Hexis	Deutschland Überregionales Gasversorgungsunternehmen, Thyssengas	1 kW SOFC	Duisburg, Germany		Installed Nov. 1998	2001			
Sulzer Hexis	EWE, Deutschland Regionales Energieversorgungsunternehmen	1 kW SOFC	Oldenburg, Germany	EWE facility	Installed Nov. 1998	Sep. 2001			
Sulzer Hexis	Städtische Werke Winterthur	1 kW SOFC CHP	Winterthur, Switzerland		May 1997	1998	Natural gas		Field trial with Swiss utility company. Was controlled remotely by modem and telephone line. Was initially used to test various fuel cell developments under realistic conditions. Fed into the grid for the first time in Jul. 1998.
Sulzer Hexis	Dortmunder Energie- und Wasserversorgung GmbH	1 kW SOFC CHP	Dortmund, Germany		Sep. 1997	1998	Natural gas		Field trial with Germany utility company. Was remotely-controlled via modem and telephone line..
Sulzer Hexis		1 kW SOFC	Basel, Switzerland	Sulzer Hexis test lab	1997	1998	Hydrogen		Trial stack, operated over 12,000 hours. 35% energy efficiency.
Teledyne Energy Systems Inc. (formerly Energy Partners)	National Aeronautics and Space Administration (NASA)	12 kW PEM	Cleveland, Ohio	NASA's Glenn Research Center	Delivered Aug. 2005				Will undergo vibration and thermal vacuum testing to simulate conditions in space.
Teledyne Energy Systems Inc. (formerly Energy Partners)	National Aeronautics and Space Administration (NASA)	5 kW PEM	Houston, Texas	NASA's Johnson Space Center	Delivered Apr. 2003		Hydrogen		For system validation under simulated flight conditions.
Teledyne Energy Systems Inc. (formerly Energy Partners)	US Department of Energy (DOE)	7 kW PEM			Late 2002		Natural gas		For evaluation by DOE.
Tokyo Gas		SOFC	Japan	Tokyo Gas laboratory	Dec. 1998	Mar. 1999	City gas		World's first generation of power in the kilowatt range with a flat panel SOFC. The fuel cell was designed in-house.
Toshiba	Taiyo Oil Co., New Energy Foundation	Three PEM units	Matsuyama, Japan	Public facilities	Sep. 2005	Two-year demonstration	Liquefied petroleum gas (LPG)		
Toshiba	Taiyo Oil Co., New Energy Foundation	Four PEM units	Imabari, Japan	Residential	Sep. 2005	Two-year demonstration	Liquefied petroleum gas (LPG)		
Toshiba	Taiyo Oil Co., New Energy Foundation	PEM	Imabari, Japan	Nursing home	Sep. 2005	Two-year demonstration	Liquefied petroleum gas (LPG)		
Toshiba	Cosmo Oil Co Ltd	700 W PEM	Isakacho, Japan	Isaka Dam Cycle Park administrative office	Mar. 2005	Operational	Liquefied petroleum gas (LPG)		Provides power and exhaust heat used for hot water.
Toshiba	Ministry of Land, Infrastructure and Transport, Tokyo Gas	1 kW PEM	Yokohama, Japan		2004				Field test.
Toshiba	Chugoku Electric Power Co	PEM	Matsue, Japan	Research & Development Center for Energy Utilization	Jun. 2003		Biogas from garbage		






				Technology					
Toshiba		700 kW PEM	Kamo, Japan	Toshiba Home Technology factory	Sep. 2002				Cogeneration system.
Toshiba	Tohoku Electric	1 kW PEM	Japan	Tohoku Electric research and development center	Early 2002		Town gas		Grid connected. Produces power and the waste heat is used for hot water.
Toshiba	Japan Gas Association	1 kW PEM	Demonstration tests (7 companies) held in Tokyo, Osaka and Nagoya, Japan		Phase 1: Dec. 2001	Phase I completed Feb. 2002			Japan Gas Assoc. test of residential PEM fuel cells from seven manufacturers (Ballard, Matsushita Electric, Toshiba, Toyota, Sanyo Electric, Mitsubishi Electric, Plug Power). Completed 1,000 hours of operation in Phase I testing, 8,000 hours scheduled in Phase 2 using fuel cells of different manufacturers.
Toshiba	Kyushu Electric Power Co. (KEPCO)	700 kW PEM	Japan	KEPCO Research Institute	Dec. 2001	2003	Town gas		
Toyota	Japan Gas Association	1 kW PEM	Demonstration tests (7 companies) held in Tokyo, Osaka and Nagoya, Japan		Phase 1: Dec. 2001	Phase I completed Feb. 2002			Japan Gas Assoc. test of residential PEM fuel cells from seven manufacturers (Ballard, Matsushita Electric, Toshiba, Toyota, Sanyo Electric, Mitsubishi Electric, Plug Power). Completed 1,000 hours of operation in Phase I testing, 8,000 hours scheduled in Phase 2 with nine manufacturers..
UTC Fuel Cells	Verizon	1.4 MW PAFC system (seven 200 kW units)	Garden City, New York	Major call-routing center serving (40,000 phone lines)	Planned		Natural gas		Will be the largest fuel cell deployment project in the world, providing primary electrical power for the facility. Verizon plans to install four natural gas powered generators to operate in parallel with the fuel cells as a hybrid back up system that can generate up to 4.4 MW of electrical power. Buy Down Recipient FY1999 US Department of Defense Climate Change Fuel Cell Program).
UTC Fuel Cells	New York Power Authority, Wildlife Conservation Society	200 kW PAFC	Bronx, NY	Bronx Zoo's Old Lion House	Planned		Natural gas		Buy Down Recipient FY2002 US Department of Defense Climate Change Fuel Cell Program.
UTC Fuel Cells	New York Power Authority, New York City Transit	200 kW PAFC	New York City, New York	Corona Rail Car Maintenance Facility	Will be installed Apr. 2006		Natural gas		Will operate grid parallel to displace existing facility electric demand and can operate as stand alone generator during a power outage. Thermal energy will supplement the domestic hot water system. Buy Down Recipient FY2003 US Department of Defense Climate Change Fuel Cell Program.
UTC Fuel Cells	Anaheim Public Utilities	200 kW PAFC	Anaheim, California	East Anaheim Police Department and Community Center	Jan. 2005	Operational	Natural gas		Used for combined heat and power and back up power. Buy Down Recipient FY2002 US Department of Defense Climate Change Fuel Cell Program.
UTC Fuel Cells	Orgenergogaz	200 kW	Russia	Orgenergogaz		Operational			Operated successfully

	(oil and gas pipeline engineering company)	PureCell PAFC		facility					during May 2005 grid power outage in Russia.
UTC Fuel Cells	New York Power Authority, Grand Central Railroad	Two 200 kW PAFC	New York City, New York	Grand Central train station terminal	Installed Feb. 2005			Natural gas	Can operate in grid parallel and grid independent modes. Thermal energy will be used to produce domestic hot water for use in adjacent restaurants and hotels. Partial funding by New York State Energy Research and Development Authority. Buy Down Recipient FY2003 US Department of Defense Climate Change Fuel Cell Program.
UTC Fuel Cells	New York Power Authority, New York State Office of General Services	200 kW PAFC	Hauppauge, New York	Suffolk State Office Building, Regional Emergency Management Office	Installed May 2005				Can operate in grid parallel and grid independent modes. Will supply power to New York Regional Emergency Management Office w. Buy Down Recipient FY2003 US Department of Defense Climate Change Fuel Cell Program.
UTC Fuel Cells	Hilton New York	200 kW PAFC	New York City, New York	New York Hilton Hotel	Installed Feb. 2005			Natural gas	Prototype--may install at other hotel properties. Will provide power. 100% waste heat recovery for hot water in guest rooms, kitchens and laundry. Buy Down Recipient FY2003 US Department of Defense Climate Change Fuel Cell Program.
UTC Fuel Cells	LOGANEnergy, Camp Roberts Army National Guard	200 kW PC25 PAFC	Paso Robles, California	Camp Roberts Army National Guard Base SatCOM facility	Installed Feb. 2005	Operational		Natural gas	Grid parallel to reduce electric demand and provide power stabilization. A possible California grant may allow installation of heat cogeneration equipment. Buy Down Recipient FY2003 US Department of Defense Climate Change Fuel Cell Program.
UTC Fuel Cells	LOGANEnergy, Guaranty Savings	Three 200 kW PAFC units	Fresno, California	Guaranty Savings-owned office building housing federal offices	Installed May 2004	Operational		Natural gas	Grid parallel to reduce facility electric demand. Provides uninterruptible power supply for computer server rooms, communications, building security, emergency lighting, elevator motors and stairwell ventilation fans. Also provides cooling and space heating. Buy Down Recipient FY2003 US Department of Defense Climate Change Fuel Cell Program.
UTC Fuel Cells	RWE	200 kW PC25 PAFC	Essen, Germany	RWE Fuel Cell Pavilion, Meteorit Park	Early 2004	Completed			As the system is no longer in operation, it offers visitors an insight of its interior.
UTC Fuel Cells	The College of New Jersey	Three 200 kW PAFC units	Ewing Township, New Jersey	The College of New Jersey three building student housing facility	Planned start-up Sep. 2004			Natural gas	Combined heat and power operating cost savings are estimated to be \$259,000 per year. Buy Down Recipient FY2002 US Department of Defense Climate Change Fuel Cell Program.
UTC Fuel Cells	Toshiba, Nippon	200 kW PAFC	Japan	Nippon	May 2004	Two year test		Dimethyl	













	Petroleum Gas Co			Petroleum's Niigata LPG import terminal			esther		
UTC Fuel Cells	Northern Alberta Institute of Technology (NAIT)	200 kW PAFC	Edmonton, Canada	NAIT's main campus Interpretive Centre	2004	Operational			. Buy Down Recipient FY2002 US Department of Defense Climate Change Fuel Cell Program.
UTC Fuel Cells	US Environmental Protection Agency, NORESKO	200 kW PC25 PAFC	Ann Arbor, Michigan	EPA's National Vehicle Emissions Laboratory	Jan. 2004	Operational	Natural gas		Grid Parallel setup. Manufactured in 1996, had numerous upgrades prior to installation here.
UTC Fuel Cells	Erasto Gaertner children's cancer hospital, Sico S.A., Company Paranaense de Energia	200 kW PC25 PAFC	Curitiba, Brazil	Erasto Gaertner children's cancer hospital	2004		Natural gas		First fuel cell in Brazil. Supplies around 85% of the lighting, as well as well as energy for hot water for the kitchen and rooms.
UTC Fuel Cells	New Haven Water Pollution Control Authority (WPCA New Haven)	200 kW PC25 PAFC	New Haven, Connecticut	WPCA facility	2003		Natural gas		Partly funded by Connecticut Clean Energy Fund. Providing the heat for a unique fat/oil/grease disposal system.
UTC Fuel Cells	Johnson & Johnson	200 kW PAFC	New Brunswick, New Jersey	Johnson & Johnson World Headquarters administrative offices	Dec. 2003	Shut down Feb. 2005, experienced fuel reformer problems, anticipate restart summer 2006	Natural gas		Grid dependent to supplement incoming electrical service, displacing existing electric demand. Thermal energy from the fuel cell is used to provide hot water heating for the facility. Buy Down Recipient FY2003 US Department of Defense Climate Change Fuel Cell Program.
UTC Fuel Cells	New York Power Authority and New York State Energy Research and Development Authority	200 kW PC25 PAFC	New York City, New York	Oakwood Beach Water Pollution Control Plant	Dec. 2003	Ongoing	Digester gas		Grid Parallel
UTC Fuel Cells	New York Power Authority, New York Department of Environmental Protection	Two 200 kW PC25 units	New York City, New York	Ward 26 Water Pollution Control Plant	Dec. 2003	Ongoing	Digester gas		
UTC Fuel Cells	New York Power Authority, New York State Energy Research and Development Authority (NYSERDA)	Three 200 kW PC25 units	New York, New York	Hunts Point Water Pollution Control Plant	Dec. 2003	Ongoing	Digester gas		Operated in grid parallel mode.
UTC Fuel Cells	New York Power Authority, New York State Energy Research and Development Authority (NYSERDA)	Two 200 kW PC25C units	New York City, New York	Red Hook Water Pollution Control Plant	Dec. 2003	Ongoing	Digester gas		Operated in grid parallel mode.
UTC Fuel Cells	AB Parking Facility, LLC, Logan Energy	Three 200 kW PC25 PAFC units	Fresno, California	AB Parking Facilities	Installed Sep. 2003		Natural gas		Absorption chiller with fuel cells' waste heat will be used to provide 100 tons of cooling to 12 story commercial building. Buy Down Recipient FY1996-1997.
UTC Fuel Cells	St. Francis Hospital	200 kW PC25 PAFC	Hartford, Connecticut	St. Francis Hospital	2003	Operational	Natural gas		Provides power security to operating room and interconnected with




									hospital's distribution and air conditioning system.
UTC Fuel Cells	Richard Stockton College of New Jersey, South Jersey Industries	200 kW PureCell PAFC	Pomona, New Jersey	Richard Stockton College of New Jersey	May 2003	Operational	Natural gas		Buy Down Recipient FY2002 US Department of Defense Climate Change Fuel Cell Program. Officials anticipate the plant will cut energy costs by over \$81,000 annually, recovering the college's investment within four years.
UTC Fuel Cells	LOGANEnergy, Austin Energy Rebekah Baines Johnson Health Center	200 kW PC25 PAFC	Austin, Texas	Rebekah Baines Johnson Health Center	Jul. 2002	Ongoing	Natural gas		Electricity is fed into the Austin Energy electric grid, (the 1 st fuel cell in Texas to feed power to the grid). The health center is using the 900,000 BTUs of thermal energy to heat their water. Austin Energy plans to provide tours and educational programs. Funding: \$200,000 Department of Defense Climate Change Grant (Buy Down Recipient FY1996-1997)
UTC Fuel Cells	LOGANEnergy, Merck & Co.	200 kW PC25C PAFC	Rahway, New Jersey	Merck & Co. plant	Jun. 2002	Four-year demonstration	Natural gas		Funding: \$710,000 from New Jersey Board of Public Utilities' clean energy initiative , \$200,000 from US Department of Defense Climate Change Fuel Cell Program Buy Down Recipient FY1996-1997.
UTC Fuel Cells	Petrobras, Sieco S.A.	200 kW PC25 PAFC	Rio de Janeiro, Brazil	Petrobras research and development center (CENPES)	2002	Operational			Supplies electric power needs to the center.
UTC Fuel Cells	LACTEC, Sieco S.A., Polytechnical Center of the Federal University	200 kW PC25C PAFC	Curitiba, Brazil	LACTEC research and development facility	Apr. 2002	Operational	Natural gas		Buy Down Recipient FY2000 US Department of Defense Climate Change Fuel Cell Program
UTC Fuel Cells	Los Angeles Department of Water and Power (LADPW)	200 kW PC25C PAFC	Los Angeles, California	LADWP Main Street Service Testing Facility	Feb. 2002	Jul. 2003	Natural gas		Buy Down recipient FY2000 US Department of Defense Climate Change Fuel Cell Program
UTC Fuel Cells	New York Power Authority, New York State Energy Research and Development Authority	Two 200 kW PC25 PAFC	New York City, New York	Bowery Bay Waste Water Treatment Plant	2002	Ongoing	Digester gas		Grid Parallel
UTC Fuel Cells	Connecticut Clean Energy Fund	200 kW PC25 PAFC	South Windsor, Connecticut	South Windsor High School	Oct. 2002	Ongoing	Natural gas		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. The school also serves a regional emergency shelter. Funding was provided by the Connecticut Clean Energy Fund
UTC Fuel Cells	Japan Gas Association	6 kW PEM	Japan	Phase 2 demonstration test	2002				Japan Gas Assoc. Phase 2 test of residential PEM fuel cells of different manufacturers.
UTC Fuel Cells	Toshiba, Kawasaki	200 kW PAFC	Chiba, Japan	Chiba Works industrial waste	Late 2001				The fuel cell was installed as a test to improve the

				treatment plant					functioning of the plant's gasifier.
UTC Fuel Cells	Toshiba, Nippon Petroleum Gas Co	200 kW PAFC	Numazu, Japan	Nishijima Hospital	2001		Liquefied petroleum gas		
UTC Fuel Cells	Henry Doorly Zoo, Omaha Public Power District	200 kW PC25 PAFC	Omaha, Nebraska	Lied Jungle exhibit at Henry Doorly Zoo	Installed Aug. 2001	Ongoing	Natural gas		The PC25's waste heat is used to warm the water in a number of ponds and heat 5,000 gallons of water used for irrigation each night. Buy Down Recipient FY1999 US Department of Defense Climate Change Fuel Cell Program
UTC Fuel Cells	Woking Borough Council	200 kW PC25C PAFC	Woking, UK (England)	Woking Park	Dec. 2001		Natural gas		First commercial fuel cell operating in the UK. Provides electricity and heat for the recreational center and electricity to light the park. Waste heat will be used to meet the recreational center's summer cooling and dehumidification requirements via heat-fired absorption cooling. Buy Down Recipient FY1998 US Department of Defense Climate Change Fuel Cell Program
UTC Fuel Cells	Toshiba, Institute of Energy Economics, New Energy, Industrial Technology Development Organization (NEDO)	200 kW PC25	Guangzhou, China	Hog farm	Late 2001	Ongoing	Liquefied petroleum gas (LPG), waste methane gas produced at the farm		First commercial fuel cell power installation in China. Sold to Toshiba Corp. which was modified and sold to the customer. The unit is managed by the Industrial Technology Development Organization (NEDO) of Japan.
UTC Fuel Cells	Companhia Paranaense de Energia (COPEL), Sieco S.A.	200 kW PC25 PAFC	Curitiba, Brazil	Companhia Paranaense de Energia (COPEL), computer system center	Aug. 2001	Operational	Natural gas		First stationary fuel cell in Brazil. Supplies energy to the center (grid parallel). Buy Down Recipient FY2000 US Department of Defense Climate Change Fuel Cell Program
UTC Fuel Cells	Connecticut Juvenile Training School	1.2 MW PAFC (six 200 kW PAFC units)	Middletown, Connecticut	Connecticut Juvenile Training School	2001	Ongoing	Natural gas		Used in conjunction with traditional generators and the grid to provide primary power to the school. The heat produced by the fuel cells is used for heating and cooling the facility. Buy Down Recipient FY1996-1997.
UTC Fuel Cells	CTG Corporation, Mohegan Sun	Two 200 kW PAFC systems	Uncasville, Connecticut	Mohegan Sun Casino Hotel	Purchased Feb. 2001	Ongoing	Natural gas		Provides back-up power. Buy Down Recipient FY1996-1997 US Department of Defense Climate Change Fuel Cell Program
UTC Fuel Cells	LOGANEnergy, Motor Co.	200 kW PAFC	Irvine, California	Ford Motor Company's North American Premier Automotive Group headquarters	Dec. 2001	Ongoing	Natural gas		Provides 25% of the building's power and hot water needs. Buy Down Recipient FY1996-1997
UTC Fuel Cells	New York Power Authority (NYP), KeySpan Energy, New York City Wildlife Conservation Society	200 kW PC25	Coney Island, New York	New York Aquarium	Installed Dec. 2001	Operational	Natural gas		Provides 20% of the aquarium's power needs (grid parallel). 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, further reducing energy needs.




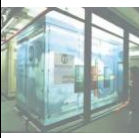



UTC Fuel Cells	US Department of Energy, BEW GmbH, Thyssengas GmbH, TBE	200 kW PC25C PAFC	Bocholt, Germany	St. Agnes Hospital	Jan. 2001	Ongoing	Natural gas		Provides electrical power, heat and air conditioning--8,000 hrs of uninterrupted operation in first year, setting a European record. The fuel cell saves roughly 500 tons of carbon dioxide per year. Buy Down Recipient FY1998 US Department of Defense Climate Change Fuel Cell Program.
UTC Fuel Cells	US Army Corp of Engineers	200 kW PC25A PAFC	Tucson, Arizona	Arizona Air National Guard Pinal Air Park	Mar. 2001	Operational	Natural gas		The power plant was moved from Vandenberg Air Force Base (see entry below) to Pinal Air Park . It is now operating at 175 kW to facilitate long-term operation of the power plant.
UTC Fuel Cells	Chevron	200 kW PAFC	San Ramon, California	Chevron Data Center	Oct. 2001	Ongoing	Natural gas		Supports critical data and retail transaction systems. During a power outage, special switching equipment ensures the fuel cell will continue to provide electricity to these systems without interruption.
UTC Fuel Cells	Hamburg Gas Consult	200 kW PAFC	Frankfurt, Germany	Frankfurt-Hoechst industrial park	Jul. 2001				Provides combined heat and power.
UTC Fuel Cells	Los Angeles Department of Water and Power	200 kW PAFC	Los Angeles, California	Playa Vista Project (commercial and residential development)	Sold in 2001				Initially connected to the electric grid, with plans to provide electricity and heat to tenants of the Playa Vista Project. Buy Down Recipient FY2000 US Department of Defense Climate Change Fuel Cell Program.
UTC Fuel Cells	Alcorn State University, Logan Energy	200 kW PC25C PAFC	Lorman, Mississippi	Arcorn State University	Oct. 2000	Oct. 2001	Natural gas		Supports campus electricity grid. Buy Down Recipient FY1995 US Department of Defense Climate Change Fuel Cell Program
UTC Fuel Cells	Energy 2000, Las Virgenes Waste Water Treatment	Two 200 kW PC25 PAFC	Calabasas, California	Las Virgenes Wastewater Treatment Plant	Nov. 2000	Completed	Methane		Provided 99% of on-site electricity. Buy Down Recipient FY1996-1997
UTC Fuel Cells	Chugach Electric Association	1 MW PAFC (five 200 kW PC25 200 PAFC units)	Anchorage, Alaska	US Postal Service headquarters	Aug. 2000	Ongoing	Natural gas		Was the largest commercial fuel cell system in the nation in 2000 and was the first time a fuel cell system was part of an electric utility's grid. Supplies all electrical power for the main postal sorting facility in Anchorage. Buy Down Recipient FY1998 US Department of Defense Climate Change Fuel Cell Program.
UTC Fuel Cells	TBE GmbH, GEW Koln AG	200 kW PC25C PAFC	Cologne, Germany	Cologne-Rodenkirchen sewage treatment plant	Installed Mar. 2000	Aug. 2001	Digester gas		Buy Down Recipient FY1998 US Department of Defense Climate Change Fuel Cell Program. The first time in Europe a fuel cell was used to utilize waste methanol produced from sewage to generate electricity and heat efficiency. Heat generated will be used in the sewage treatment process.











									Operated 9,000 hours..
UTC Fuel Cells	City of Mesa Utilities Department	200 kW PC25C PAFC	Mesa, Arizona	City of Mesa Utilities Department headquarters	Apr. 2000	Operational			Buy Down Program Recipient FY1995 US Department of Defense Climate Change Fuel Cell Program
UTC Fuel Cells	Logan Energy, Chevron Texaco	200 kW PC25C PAFC	Bellaire, Texas	Texaco Energy Systems Central Plant	May 2000	Operational			Combined heat and power production. Buy Down Recipient FY1996-1997 US Department of Defense Climate Change Fuel Cell Program
UTC Fuel Cells	McBride Energy, Ramapo College of New Jersey	Two 200 kW PAFC units	Mahwah, New Jersey	Ramapo College dormitory and computer center	Installed Nov. 2000		Natural gas		Grid parallel. Supplies power and thermal energy (hot water, space heating) to a student Dormitory and a core academic building complex (housing a computer center, telephone exchange and cable TV station). Buy Down Recipient FY1998 US Department of Defense Climate Change Fuel Cell Program.
UTC Fuel Cells	New York Power Authority, KepSpan Energy, New York City Health and Hospitals Corporation	200 kW PAFC	Bronx, New York	North Central Bronx Hospital	Installed Dec. 2000	Ongoing	Natural gas		Supplies supplemental power and back-up power. Buy Down Recipient FY1995 US Department of Defense Climate Change Fuel Cell Program.
UTC Fuel Cells	Niagara Mohawk/Plum Street Enterprises, Onondaga-Courtland-Madison Board of Cooperative Educational Services	200 kW PC25 PAFC	Liverpool, New York	Liverpool High School	Feb. 2000	Ongoing	Natural gas		Serves as an educational resource for science teachers. Grid-independent--will allow the high school to become an emergency shelter during community disasters. Buy Down Recipient in FY1995-1996-1997 US Department of Defense Climate Change Fuel Cell Program
UTC Fuel Cells	Durst Corporation	Two 200 kW PAFC systems	Manhattan, New York	4 th floor Conde Nast Building in Times Square	Feb. 2000	Ongoing	Natural gas		Provides power for the NASDAQ sign. Buy Down Recipient FY1996-1997 US Department of Defense Climate Change Fuel Cell Program
UTC Fuel Cells	Electricite de France, Gaz de France, GEPPAC	200 kW PC25C PAFC	Chelles, France	Council flats	Jan. 2000		Natural gas		Provides heat and supplements power to 200 homes.
UTC Fuel Cells	AEB	200 kW PC25 PAFC	Basel, Switzerland	AEB	2000				Provides electricity to the local grid and heat to a school.
UTC Fuel Cells	DBI Gas, Technische Universität Dresden, Gastec N.V., NVG, Hamburg Gas Consult	200 kW PC25C PAFC	Kamenz, Germany	Maltesser Hospital	Feb. 2000)	37-month project	Natural gas		Produces power, heat, and air-conditioning
UTC Fuel Cells	Oak Ridge National Laboratory	200 kW PC25 PAFC					Natural gas		Buy Down Recipient FY2000 US Department of Defense Climate Change Fuel Cell Program.
UTC Fuel Cells	Louisiana Gas Services, Citizens Utilities	200 kW PC25C PAFC	Harvey, Louisiana	Louisiana Gas Services Systems Operation Facility		Decommissioned	Natural gas		Project decommissioned after customer relocated. Buy Down Recipient FY1997 US Department of Defense Climate Change Fuel Cell Program
UTC Fuel Cells	Reliant Energy	200 kW PC25C	Gulfport,	Navy Combat	1999				Provides combined heat










	Company, US Department of Defense	PAFC	Mississippi	Construction Battalion Base					and power for mess hall. Buy Down Recipient FY1997 US Department of Defense Climate Change Fuel Cell Program
UTC Fuel Cells	CLC S.r.l. Italy Ansaldo , Sun Chemical Corporation, Keyspan Energy, Brooklyn Union Gas Company	Two 200 kW PC25 PAFC units	Staten Island, New York	Sun Chemical manufacturing facility	Installed Jun. 1996		Natural gas		By 2002, both units had operated 40,000 hours each. Buy Down Recipient FY1995 US Department of Defense Climate Change Fuel Cell Program
UTC Fuel Cells	CLC S.r.l. Italy Ansaldo/Vattenfall AB	Two 200 kW PC25C PAFC units	Varberg, Sweden	Hotel	Installed Jul. 1997		Natural gas		Buy Down Recipient FY1995 US Department of Defense Climate Change Fuel Cell Program
UTC Fuel Cells	CLC Srl Italy Ansaldo, Stadtwerke Oranienburg, Hamburg Gas Consult	200 kW PC25C PAFC	Oranienburg, Germany	Stadtwerke Oranienburg Power Generation Plant	Installed Jan. 1998		Natural gas		Buy Down Recipient FY1995 US Department of Defense Climate Change Fuel Cell Program.
UTC Fuel Cells	CLC Srl	200 kW PAFC	Italy				Natural gas		Buy Down Recipient FY1995 US Department of Defense Climate Change Fuel Cell Program
UTC Fuel Cells	CLC.r.l. Italy Ansaldo, GSA, Hamburg Gas Consult	200 kW PC25C PAFC	Halle, Germany		Installed Aug. 1997		Natural gas		Buy Down Recipient FY1995 US Department of Defense Climate Change Fuel Cell Program.
UTC Fuel Cells	Ansaldo	200 kW PAFC	Leipzig, Germany		1997				
UTC Fuel Cells	HEW, Hamburge Gas Consult	200 kW PC25C PAFC	Hamburg, Germany	Residential building at Lyserstrasse	Aug. 1997		Pure liquid hydrogen		The project is supported by the European Commission within the framework of the EQHPP. Focus on technical and operatino aspects of hydrogen-fueled fuel cell, as well as public acceptance of, and legal aspects involved, in transporting and storing liquid hydrogen in an urban area.
UTC Fuel Cells	Hamburg Gas Consult, HEW	200 kW PC25A PAFC	Hamburg, Germany	Residential building at Lyserstrasse	Jun. 1993		Natural gas		Buy Down Recipient FY1998 US Department of Defense Climate Change Fuel Cell Program
UTC Fuel Cells	CLC.r.l. Italy Ansaldo, Stadtwerke Saarbrucken AG, Erdgas Energie Systeme, ABB Energie Systeme, VVS	200 kW PC25C PAFC	Saarbrucken, Germany	Housing estate	Installed May 1997		Natural gas		Buy Down Recipient FY1995 US Department of Defense Climate Change Fuel Cell Program, supplying energy to the "Nachtweide" district. Supplies electricity to 400 dwellings and heat to 125.
UTC Fuel Cells	Ansaldo, Energie und Wasserversorg, Erdgas Energie Systeme, ABB Energie Systeme, Austria Ferngas, US Department of Defense	200 kW PC25C PAFC	Nuremberg, Germany		Installed Jan. 1998		Natural gas		Buy Down Recipient FY1995 US Department of Defense Climate Change Fuel Cell Program. Average electrical efficiency of the fuel cell plant was more than 39% in 1998. The total efficiency of the system was about 70% in this period
UTC Fuel Cells	Connecticut Natural Gas Corp.	200 kW PAFC	Hartford, Connecticut	Connecticut Natural Gas headquarters			Natural gas		Buy Down Recipient FY1995 US Department of Defense Climate Change Fuel Cell Program. Fuel cell provided power to Connecticut Natural Gas headquarters then was donated to the Department









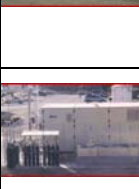
of Engineering at the University of Connecticut for research in 2001.






UTC Fuel Cells	Equitable Resources	200 kW PAFC	Oakmont, Pennsylvania	Presbyterian Medical Center			Natural gas		Buy Down Recipient FY1995
UTC Fuel Cells	Equitable Resources	200 kW PC25A PAFC	Squirrel Hill, Pennsylvania	Riverview Center for Jewish Seniors	1992		Natural gas		For demonstration purposes.
UTC Fuel Cells	Hamilton Sundstrand	200 kW PC25A PAFC	Windsor Locks, Connecticut	Hamilton Sundstrand Data Center	Installed Dec. 1997		Natural gas		Buy Down Recipient FY1995 US Department of Defense Climate Change Fuel Cell Program.
UTC Fuel Cells	US Department of Defense	200 kW PC25C PAFC	Pittsburgh, Pennsylvania	911 Air Lift Wing	Feb. 1997	Decommissioned Feb. 2001			
UTC Fuel Cells	Lord & Company	Two 200 kW PAFC units							Buy Down Recipient FY1998 US Department of Defense Climate Change Fuel Cell Program.
UTC Fuel Cells	Bharat Heavy Electricals Ltd., India's Department of Non-conventional Energy Sources	200 kW PC25C PAFC	India	Bharat Heavy Electricals test facility	1998	2000	Liquefied petroleum gas (LPG)		Was to be restarted late using natural gas as fuel.
UTC Fuel Cells	State of Alaska	Two 200 kW PAFC units	Anchorage, Alaska	Anchorage Readiness Center office-training facility			Natural gas		Buy Down Recipient FY1995 US Department of Defense Climate Change Fuel Cell Program.
UTC Fuel Cells	Toshiba Corporation, HEAG AG	200 kW PC25C PAFC	Endersbach, Germany		1997		Natural gas		Buy Down Recipient FY1995 US Department of Defense Climate Change Fuel Cell Program
UTC Fuel Cells	Toshiba Corporation	200 kW PAFC	Japan	Osaka Gas Fuel Cell Research and Development Center			Natural gas		Buy Down Recipient again FY1995 US Department of Defense Climate Change Fuel Cell Program
UTC Fuel Cells	Toshiba Corporation-Power Systems and Service Co.	200 kW PAFC	Japan	Toshiba Fuchu Works			Natural gas		Buy Down Recipient FY1998 US Department of Defense Climate Change Fuel Cell Program
UTC Fuel Cells	Ontario Hydro	200 kW PAFC	Markham, Canada	Ontario Hydro's Markham Centre	Installed between 1993-1995				Provides baseload heat and electricity.
UTC Fuel Cells	Washington Water and Power, Avista Corporation, Double Tree Inn	200 kW PC25C PAFC	Spokane, Washington	Double Tree Inn Hotel	Installed Jul. 1997		Natural gas		Buy Down Recipient FY1995 US Department of Defense Climate Change Fuel Cell Program. Provides the hotel's minimum electric load of 200 kW and supplements hot water requirements
UTC Fuel Cells	Sapporo Brewery	200 kW PC25 PAFC	Chiba, Japan	Sapporo Brewery	Jun. 1998	Ongoing	Digester gas		Estimated total energy savings at the Chiba brewery was about 4%.
UTC Fuel Cells	Asahi Brewery	200 kW PC25 PAFC	Shikoku, Japan	Asahi Brewery		Ongoing	Methane gas from brewing process		
UTC Fuel Cells	ABB Energie Systeme GmbH	200 kW PC25C PAFC	Kaltenkirchen, Germany	School	1999		Natural gas		Supplies power and heat.





UTC Fuel Cells	Massachusetts Water Resources Authority, New England Power Company	200 kW PC25C PAFC	Boston, Massachusetts	Deer Island Sewage Treatment Plant	1997	Decommissioned Jun. 2002	Digester gas		Buy Down Recipient FY1995 US Department of Defense Climate Change Fuel Cell Program.
UTC Fuel Cells	AEC South County Hospital	200 kW PC25 PAFC	Wakefield, Rhode Island	South County Hospital	1999		Natural gas		Provides electricity and heat. Produces one-third of hospital's electricity during peak hours, saving \$60,000-\$90,000/year. Also provides back up power to the hospital's critical loads. Buy Down Recipient FY1998 US Department of Defense Climate Change Fuel Cell Program.
UTC Fuel Cells	New York Power Authority, KeySpan Energy, New York City Police Department	200 kW PureCell PAFC	Manhattan, New York	Central Park police headquarters	Apr. 1999	Ongoing	Natural gas		Provides all electricity for the police station, independent of the electric grid.
UTC Fuel Cells	NORESCO, First National Bank of Omaha, Sure Power Corp.	Four 200 kW PC25 PAFC units	Omaha, Nebraska	First National Bank	Nov. 1999	Ongoing (purchase)	Natural gas		Provides the main power for a critical data processing facility. The bank is one of the largest credit card processors in the nation. Buy Down Recipient FY1995 US Department of Defense Climate Change Fuel Cell Program.
UTC Fuel Cells	Washington Water & Power, Avista, Double Tree Inn	200 kW PAFC	Spokane, Washington	Double Tree Inn hotel	Jul. 1997	Ongoing	Natural gas		Provides electricity and hot water for laundry.
UTC Fuel Cells	Onondaga-Courtland-Madison Board of Cooperative Educational Services (BOCES)	200 kW PC25C PAFC	Syracuse, New York	BOCES Regional Information Center	Jan. 1997		Natural gas		Has operated for more than 22,000 hours.
UTC Fuel Cells	Cape Cod Community College, NORESCO	200 kW PC25C PAFC	West Barnstable, Massachusetts	Cape Cod Community College library	Installed Apr. 1999		Natural gas		Non-critical baseload power, with limited cogeneration (library space heating). Provides 15% of peak and 46% of summer power demand. Buy Down Recipient FY1995 US Department of Defense Climate Change Fuel Cell Program.
UTC Fuel Cells	Town of Groton, International Fuel Cells, US Environmental Protection Agency	200 kW PC25 PAFC	Groton, Connecticut	Flanders Road Landfill	Jun. 1996		Anaerobic digester gas		Provided approximately 140 kW of electricity to the Connecticut Light and Power Company
UTC Fuel Cells	Northeast Utilities, International Fuel Cells, US Environmental Protection Agency	200 kW PC25 PAFC	Sun Valley, California	Penrose Landfill power plant	1993	Completed 6 - month demonstration	Landfill gas		Power generated during the project was sold to the Los Angeles Department of Water and Power to help offset costs Relocated to Flanders Road Landfill in Connecticut.
UTC Fuel Cells	Fuel Cell Test and Evaluation Center (FCTec)	200 kW PC25C PAFC	Johnstown, Pennsylvania	FCTec at National Defense Center for Environmental Excellence	Jan. 1999	Jan. 2003	Natural gas		http://www.fctec.com/main.html




UTC Fuel Cells	City of Portland	200 kW PAFC	Portland, Oregon	Columbia Blvd. Waste Water Treatment Plant	Jul. 1999	Operational	Methane digester gas		Provides heat and electricity to the facility. Portland's fuel cell generates as much as 1.6 million kW-hrs/yr. Buy Down Recipient FY1996-1997 US Department of Defense Climate Change Fuel Cell Program
UTC Fuel Cells	Australian Technology Park Sydney LTD	200 kW PAFC	Sydney, Australia	Australian Technology Park	Nov. 1998	Operational	Natural gas		Australia's First fuel cell. Buy Down Program Recipient FY1998 US Department of Defense Climate Change Fuel Cell Program.
UTC Fuel Cells	US Army Corp of Engineers	200 kW PC25B PAFC	Newport News, Virginia	Fort Eustis, gymnasium/ pool	Sept. 1995	Jan. 2002	Natural gas		US Department of Defense PAFC Demonstration Program. Thermal output to DHW and pool (~68% est. thermal utilization).
UTC Fuel Cells	US Army Corp of Engineers, Consolidated Natural Gas	200 kW PC25C PAFC	Pittsburgh, Pennsylvania	911th Airlift Wing Central Heating Plant	Feb. 1997	Off-line Sep. 2001	Natural gas		US Department of Defense PAFC Demonstration Program. Grid connected (no emergency back-up)
UTC Fuel Cells	US Army Corp of Engineers	200 kW PC25B PAFC	White Hall, Arkansas	Pine Bluff Arsenal Boiler Plant	Oct. 1997	Jan 2000	Natural gas		US Department of Defense PAFC Demonstration Program Grid connected at splice after pole mounted transformer. Grid independent terminals power the boiler plant. Thermal output heats boiler make-up water. Total estimated thermal utilization ~90%.
UTC Fuel Cells	US Army Corp of Engineers	200 kW PC25B PAFC	Minneapolis, Minnesota	934th Tactical Air Group Boiler Plant	Feb 1995	Sep. 2000	Natural gas		US Department of Defense PAFC Demonstration Program. Grid connected at new electrical transformer (fuel cell option). Thermal output to preheat boiler make-up water (~45% est. thermal utilization)
UTC Fuel Cells	US Department of Defense	200 kW PC25B PAFC	West Point, New York	West Point Military Academy Central Boiler Plant	Dec. 1995	Feb. 2001	Natural gas		US Department of Defense PAFC Demonstration Program . Grid connected at existing panel. Thermal output for boiler make-up water (~70% estimated thermal utilization).
UTC Fuel Cells	US Army Corp of Engineers	200 kW PC25B PAFC	Albany, New York	Watervliet Arsenal, Central Boiler Plant	Oct. 1997	Jul. 2002	Natural gas		US Department of Defense PAFC Demonstration Program . Grid connected at existing electrical panel. Emergency back-up for grid-independent operation. Thermal output to preheat boiler make-up (~58% est. thermal utilization).
UTC Fuel Cells	US Department of Defense	200 kW PC25C PAFC	Bossier City, Louisiana	Barksdale Air Force Base hospital	Jul. 1997	Oct. 2002	Natural gas		US Department of Defense PAFC Demonstration Program. Grid connected. Total estimated thermal utilization ~90%.
UTC Fuel Cells	US Army Corp of Engineers	200 kW PC25C PAFC	Tucson, Arizona	Davis-Monthan Air Force Base gymnasium	Dec. 1997	Apr. 2002	Natural gas		US Department of Defense PAFC Demonstration Program. Grid connected at new transformer (program option). High grade thermal output (program option) to absorption chillers. Low grade thermal output to hot water storage tank. Total


									estimated thermal utilization ~65%.
UTC Fuel Cells	US Department of Defense	200 kW PC25C PAFC	Palmdale, California	Edwards Air Force Base hospital	Jul. 1997	Jul. 2002	Natural gas		US Department of Defense PAFC Demonstration Program. Grid connected at existing Transformer. High grade thermal output. (Program option) to space heating loop. Total estimated thermal utilization ~23%.
UTC Fuel Cells	US Army Corp of Engineers	200 kW PC25B PAFC	Albuquerque, New Mexico	Kirtland Air Force Base Boiler Plant	Sep. 1995	Dec.-2001	Natural gas		US Department of Defense PAFC Demonstration Program. Grid connected at switch tied to electrical transformer/. Grid independent connection to entire boiler plant. Thermal output to deaerator tank (~55% est. thermal utilization).
UTC Fuel Cells	US Army Corp of Engineers	200 kW PC25C PAFC	Del Rio, Texas	Laughlin Air Force Base Hospital	Sep. 1997	Nov. 2002	Natural gas		US Department of Defense PAFC Demonstration Program. Grid connected at existing electrical transformer (no emergency back-up). Thermal output to space heat/cool reheat loop and DHW loop (~75% estimated thermal utilization)
UTC Fuel Cells	US Army Corp of Engineers	200 kW PC25C PAFC	Jacksonville, Arkansas	Little Rock Air Force Base hospital	Oct. 1997	Shut down Dec. 2000, was to be transferred to another facility	Natural gas		Department of Defense PAFC Demonstration Program. Grid connected at electrical panel. Thermal output heats space conditioning recirculation loop. Total estimated thermal utilization ~85%.
UTC Fuel Cells	US Army Corp of Engineers	200 kW PC25B PAFC	Las Vegas, Nevada	Nellis Air Force Base Central Plant for dormitory facility	Oct. 1995	Jun. 2001	Natural gas		Department of Defense PAFC Demonstration Program. Grid connected at main breaker panel .Thermal to make-up water and heat pump loop (~40% est. thermal utilization).
UTC Fuel Cells	US Army Corp of Engineers	200 kW PC25A PAFC	Lompoc, California	Vandenberg Air Force Base, Space Control Center	Mar. 1994	Feb. 2001	Natural gas		Department of Defense PAFC Demonstration Program. The power plant was moved to Pinal Air Park, Arizona Air National Guard in Tucson, Arizona.
UTC Fuel Cells	US Army Corp of Engineers	200 kW PC25C PAFC	Johnstown, Pennsylvania	Naval Defense Center for Environmental Excellence (NDCEE) Industrial Building	Aug. 1997	Operational	Natural gas		Department of Defense PAFC Demonstration Program. Grid connected in spare panel slot. High grade thermal output heats evaporator tank. Total estimated thermal utilization ~19%.
UTC Fuel Cells	US Army Corp of Engineers	200 kW PC25C PAFC	Annapolis, Maryland	Naval Academy galley	Sep. 1997	Sep. 2002	Natural gas		Department of Defense PAFC Demonstration Program. Grid connected in electrical room. Thermal output heats make-up water. Total estimated thermal utilization ~78%.
UTC Fuel Cells	US Army Corp of Engineers	200 kW PC25C PAFC	Groton, Connecticut	Navy Subase New London Boiler Plant	Oct. 1997	Operational	Natural gas		Department of Defense PAFC Demonstration Program. Grid connected at existing electrical panel. Thermal output heats boiler make-up water. Total estimated thermal utilization ~90%.

UTC Fuel Cells	US Army Corp of Engineers	200 kW PC25B PAFC	Twenty-nine Palms, California	Twenty-nine Palms Marine Corp Base Naval Hospital	Jun. 1996	May 2000	Natural gas		Department of Defense PAFC Demonstration Program. Grid connected at existing sub panel. Grid independent connection at new electrical sub panel. Thermal output to DHW loops (~60% est. thermal utilization).
UTC Fuel Cells	US Army Corp of Engineers	200 kW PC25B PAFC	Newport, Rhode Island	Naval Education Training Center Boiler Plant	Feb. 1995	Apr. 2001	Natural gas		Department of Defense PAFC Demonstration Program. Grid connected at boiler plant electrical transformer. Thermal output to preheat boiler make-up water (~60% est. thermal utilization).
UTC Fuel Cells	US Army Corp of Engineers	200 kW PC25B PAFC	Stennis Space Center, Mississippi	Naval Oceanic Center for NAVO support, Stennis Space Center	Sep. 1997	Oct. 2002	Natural gas		Department of Defense PAFC Demonstration Program. Grid connected at electrical panel. Grid independent load connected at new panel. Thermal output used for space heat/reheat loop Total estimated thermal utilization ~12%.
UTC Fuel Cells	US Army Corp of Engineers	200 kW PC25C PAFC	Fallon, Nevada	Naval Air Station galley	Mar. 1997	Mar. 2002	Natural gas		Department of Defense PAFC Demonstration Program. Grid connected at new electric transformer (fuel cell option). Grid independent connection at new electric transformer (fuel cell option). Thermal output to DHW loop (~10% est. thermal utilization).
UTC Fuel Cells	US Army Corp of Engineers	200 kW PC25C PAFC	Jacksonville, Florida	Naval Air Station Naval Hospital	Apr. 1997	Apr. 2002	Natural gas		Department of Defense PAFC Demonstration Program. Grid connected at existing electrical panel (no emergency back-up). Thermal output to DHW loop (~56% est. thermal utilization).
UTC Fuel Cells	US Army Corp of Engineers	200 kW PC25C PAFC	Natick, Massachusetts	US Army Soldier Systems Command Boiler Plant	Feb. 1995	Jan. 2003	Natural gas		US Department of Defense PAFC Demonstration Program. Grid connected at existing sub panel. Thermal output to storage tank. Thermal output to storage tank (~45% estimated thermal utilization).
UTC Fuel Cells	US Department of Defense	200 kW PC25B PAFC	Dover, New Jersey	Picatinny Arsenal, Boiler Plant	Oct. 1995	Jul. 2001	Natural gas		US Department of Defense PAFC Demonstration Program. Grid connected at panel Inside electric room. Thermal output preheats make-up water (~100% estimated thermal utilization).
UTC Fuel Cells	US Army Corp of Engineers	200 kW PC25C PAFC	Anchorage, Alaska	Fort Richardson National Guard Armory	Apr. 1997	Apr. 2001	Natural gas		US Department of Defense PAFC Demonstration Program. Grid connected at existing electrical panel (no emergency back-up). High grade thermal output (option) to space heating Loop. Thermal output to domestic hot water (total ~45% estimated thermal utilization).
UTC Fuel Cells	US Army Corp of Engineers	200 kW C25B PAFC	Oceanside, California	Marine Corp Base Camp Pendleton Naval Hospital	Oct. 1995	Jan. 2002	Natural gas		Department of Defense PAFC Demonstration Program. Grid connected at existing panel. Thermal output for DHW storage

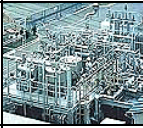
									(~75% est. thermal utilization).
UTC Fuel Cells	US Department of Defense	200 kW PC25B PAFC	Sierra Vista, Arizona	Fort Huachuca Riley Barracks	Jul. 1997	Operational	Natural gas		US Department of Defense PAFC Demonstration Program. Grid connected at existing Electrical transformer (no emergency back-up). High grade thermal output (option) to space heating loop. Thermal output to domestic hot water (total ~44% estimated thermal utilization).
UTC Fuel Cells	US Army Corp of Engineers	200 kW PC25B PAFC	West Point, New York	U.S. Military Academy Central Boiler Plant	Dec. 1995	Feb. 2001	Natural gas		Department of Defense PAFC Demonstration Program. Grid connected at existing panel. Thermal output for boiler make-up water (~70% estimated thermal utilization).
UTC Fuel Cells	US Army Corp of Engineers	200 kW PC25C PAFC	Chicopee, Massachusetts	Westover Air Reserve Bas, Boiler Plant	Sep. 1997	Jul. 2002	Natural gas		Department of Defense PAFC Demonstration Program. Grid connected at new electrical transformer (Program option). Low grade thermal output heats boiler make-up water. High grade thermal output (Program option) to condensate return loop. Total estimated thermal utilization ~45%.
UTC Fuel Cells	US Army Corp of Engineers	200 kW PC25B PAFC	Port Hueneme, California	CBC, Port Hueneme swimming pool	Aug. 1997	Dec 2001	Natural gas		Department of Defense PAFC Demonstration Program. Grid connected at new transformer. Thermal output heats swimming pool. Total estimated thermal utilization ~92%.
UTC Fuel Cells	US Army Corp of Engineers	200 kW PC25C PAFC	El Paso, Texas	Fort Bliss laundry	Sep.-1997	Jun. 2002	Natural gas		US Department of Defense PAFC Demonstration Program. Grid connected at new transformer. Thermal output heats laundry hot water storage tanks. Total estimated thermal utilization ~17%.
UTC Fuel Cells	New York Power Authority, KeySpan Energy, Westchester County Department of Environmental Facilities	200 kW PAFC	Yonkers, New York	Yonkers Wastewater Treatment Plant	Apr. 1997	Ongoing	Anaerobic digester gas		Supplies grid parallel supplemental power. World's first anaerobic digester gas-fueled fuel cell.
UTC Fuel Cells	Yankee Gas Services	Two 200 kW PAFC units	South Windsor, Connecticut	Yankee Corporation headquarters	Oct. 1997		Natural gas		Buy Down Recipient FY1996-1997 US Department of Defense Climate Change Fuel Cell Program.
UTC Fuel Cells	Braintree Electric Light Department	200 kW PC25C PAFC	Braintree, Massachusetts	Landfill	Sep. 1999		Landfill gas, natural gas		Baseload power serving town utility grid (less than 1% of peak load). Buy Down Recipient FY1995 US Department of Defense Climate Change Fuel Cell Program
UTC Fuel Cells	US Airways, Peoples' Natural Gas	200 kW PC25C PAFC	Pittsburgh, Pennsylvania	U.S. Air's hanger #2 at Pittsburgh International Airport			Natural gas		
UTC Fuel Cells	Toshiba	200 kW PAFC	Houston,		1995		Natural gas		Grid-independent

	Corporation		Texas						operation. Buy Down Recipient FY1995 US Department of Defense Climate Change Fuel Cell Program
UTC Fuel Cells	Brooklyn Union Gas Co., St. Vincent's Medical Center	200 kW PAFC	New York, New York	Saint Vincent's Medical Center laundry facility	Oct. 1992	Ongoing	Natural gas		1995 Cogeneration Project of the Year by the Cogeneration and Competitive Power Institute
UTC Fuel Cells	Toho Gas	200 kW PAFC	Japan		Installed between 1993-1995				
UTC Fuel Cells	Osaka Gas	Ten 200 kW PAFC units	Japan		Installed between 1993-1995				
UTC Fuel Cells	Tokyo Gas	Ten 200 kW PAFC units	Japan		Installed between 1993-1995				
UTC Fuel Cells	Kaiser Permanente, Southern California Gas CO, Gas Research Institute, US Department of Energy	Two 200 kW PC25A units	Riverside, California	Riverside Medical Center	Sep. 1994	Feb. 2000 + Mar. 2001	Natural gas		Provided power and cogeneration of waste heat. Won the 1994 Efficient Building Award for Energy and the Environment sponsored by Energy User News
UTC Fuel Cells	Southern California Gas Company	200 kW PC25A PAFC	Santa Barbara, California	Santa Barbara jail	Oct. 1994	Mar. 2001	Natural gas		Provides electricity and hot water.
UTC Fuel Cells	Mitsubishi Electric, Toshiba Corporation	200 kW PC25 PAFC	Japan	Kyobashi DHC	Feb. 1994	Oct. 2000			This unit accumulated 43,139 hours by Oct. 2000.
UTC Fuel Cells	Bharat Heavy Electricals Ltd. (BHEL), Toshiba	200 kW PAFC	India	BHEL testing facility	1998	2000	Liquefied propane gas (LPG)		Tested in grid-dependent and grid-independent modes.
UTC Fuel Cells	Tokyo Electric Power Co (TEPCO). Toshiba Corporation	200 kW PC25 PAFC	Japan	TEPCO Research and Development Center	Sep. 1994		City gas		This unit accumulated 44,011 hours by Oct. 2000
UTC Fuel Cells	Toshiba Corporation, Southern California Gas, Kaiser Permanente	200 kW PC25A PAFC	Anaheim, California	Anaheim Medical Center	May 1993	End of Life May 2000	Natural gas		Provided power and cogeneration of waste heat. Buy Down Recipient FY1995
UTC Fuel Cells	Sacramento Municipal Utility District, Kaiser Permanente	200 kW PAFC	Sacramento, California	South Sacramento Medical Center	Early 1990s				Provided power and cogeneration of waste heat.
UTC Fuel Cells	Southern California Gas	200 kW PC25A PAFC	Buena Park, California	Kraft Foods	Jul. 1993	Removed Jun. 1996	Natural gas		Sold to City of Mesa, AZ
UTC Fuel Cells	Southern California Gas	200 kW PC25A PAFC	Santa Barbara, California	University of California	Sep. 1993	Life ended Jun. 1998	Natural gas		
UTC Fuel Cells	Commonwealth Gas	200 kW PC25 PAFC	Natick, Massachusetts	U.S. Army Soldier Systems Command	FY 1993		Natural gas		
UTC Fuel Cells	Southern California Gas	200 kW PC25A PAFC	Irvine, California	Hyatt Hotel	Sep. 1992	Life ended Mar. 2002	Natural gas		
UTC Fuel Cells	Southern California Gas	200 kW PC25A PAFC	Los Angeles, California	SCAQMD Office Building	Apr. 1992		Natural gas		Had a lifetime of about 40,000 hours. Cell stack was replaced in 1998 and returned to service. Provides 20-25% of building power.
UTC Fuel Cells	Service du Gaz	200 kW PC25 PAFC	Geneva, Switzerland		Mar. 1993				Operated for 40,000 hours.

UTC Fuel Cells	Tokyo Gas, Toshiba Corporation	200 kW PC25A PAFC	Tokyo, Japan	Tokyo Gas Research & Development facility	Apr. 1992	2000			
UTC Fuel Cells	Tokyo Electric Power Co, Toshiba Corporation	11 MW PAFC unit (twenty 700 kW units)	Ichihara, Japan	Goi Station of Tokyo Electric Power Co	Mar. 1991	Completed Mar. 1997	Liquefied natural gas (LNG)		This unit accumulated 23,140 hours by Oct 2000.
UTC Fuel Cells	Toftlund Fjernvarmevaer, Naturgas Syd Sonderjyllands	200 kW PC25A PAFC	Toftlund, Denmark	District Heating System	Nov. 1992				Europe's first fuel cell.
UTC Fuel Cells	PreussenElektra, E.ON, MAINOVA AG, Hamburg Gas Consult	200 kW PC25C PAFC	Frankfurt, Germany	Bergen-Enkheim public swimming pool	Nov. 1998				Provides heat to the pool. The fuel cell contribution to peak thermal power is only 17 %, but makes up more than 50 % of all heat requirements over the year.
UTC Fuel Cells	Hamburg Gas Consult	200 kW PC25C PAFC	Bargtheide, Germany		1998		Natural gas		
UTC Fuel Cells	Ruhrigas AG, Stadtwerke Bochum	200 kW PC25A PAFC	Dorsten, Germany	Testing at Rohrgas, followed by two-year field test at Stadtwerke Bochum	Testing began Sep. 1992; field test started Feb. 1994	Completed			Tested over 40,000 hours.
UTC Fuel Cells	Thyssengas, Stadtwerke Duren	200 kW PC25A PAFC	Duren, Germany	Thyssengas facility--one year; Stadtwerke Duren--four years	Oct. 1992	Decommissioned after 5 years of operation	Natural gas		Tested at Thyssengas facility in Duisburg before moving to Duren.
UTC Fuel Cells	Sydskraft AB	200 kW PAFC	Bara, Sweden		Jun. 1992				
UTC Fuel Cells	Imatran Voima Oy	200 kW PC25A PAFC	Tavastehus, Finland	Vanaja Power Plant	Dec. 1992				
UTC Fuel Cells	Azienda Consortiale Servizi Reno, SEABO Spa, Ansaldo CLC	200 kW PC25A PAFC	Bologna, Italy	SEABO thermorefrigeration plant	Apr. 1993				Grid connected, operating concurrently with ENEL network electric network. Residual heat used in thermorefrigeration plant. Operated over 17,490 hours.
UTC Fuel Cells	Austria Ferngas, Wiengas, EVN	200 kW PC25A PAFC	Vienna, Austria	Tested at Austria Ferngas for 1.5 years, then moved to District Heating Plant of EVN	Installed Jan. 1993 by Austria Ferngas, transferred to EVN in 1994	1997			
UTC Fuel Cells	HEAG-AG	200 kW PC25A PAFC	Darmstadt, Germany		Jun. 1993		Natural gas		
UTC Fuel Cells	Equitable Resources	200 kW PC25 PAFC	Pittsburgh, Pennsylvania	Presbyterian Nursing Home			Natural gas		
UTC Fuel Cells	Peoples' Gas & Light	200 kW PC25 PAFC	Chicago, Illinois	Div. of Street & Meter Repair			Natural gas		
UTC Fuel Cells	Jersey Central Power & Light, GPU	200 kW PC25 PAFC	Morristown, New Jersey	AT&T Research Laboratory			Natural gas		
UTC Fuel Cells	National Fuel Gas	200 kW PC25 PAFC	Buffalo, New York	Riefler Concrete			Natural gas		
UTC Fuel Cells	Rochester Gas & Electric	200 kW PC25 PAFC	Rochester, New York	Rochester Institute of Technology			Natural gas		
UTC Fuel Cells		200 kW PC25 PAFC	Ulsan, South Korea	Hotel			Natural gas		
UTC Fuel Cells	Ansaldo Ricerche, ENEA, Milan Municipal Energy Co	1.3 MW PAFC with reformer	Milan, Italy				Natural gas		Located in Bicocca "technology zone". Hydrogen produced by the reformer is used for a hydrogen vehicle fueling station located on-site, with extra hydrogen used to fuel a 500 kW MCFC plant.

UTC Fuel Cells	Ruhrigas, Stadtwerke Bochum	200 kW	Bochum, Germany	Stadtwerke Bochum facility	1989				Tested for almost 40,000 hours.
UTC Fuel Cells	Tokyo Electric Power Co.	200 kW PC25 PAFC	Japan	Shibaura DHC	Mar. 1989	Completed March 1997			This unit accumulated 45,333 hours by Oct. 2000.
UTC Fuel Cells	Virginia Power, Virginia Natural Gas, Gas Research Institute	40 kW PAFC CHP	Norfolk, Virginia	Old Dominion University, 600 bed dormitory	1986	Concluded	Natural gas		Grid connected. Supplied hot water to the dormitory.
UTC Fuel Cells	Tokyo Electric Power Co, Toshiba Corporation	4.5 MW PAFC	Ichihara, Japan	Goi Station of Tokyo Electric Power Co	1983				
Zentrum für Sonnenenergie- und Wasserstoff-Forschung (ZSW) (Center for Solar Energy and Hydrogen Research)	Gaz de France, The National Polytechnical Institute of Lorraine (INPL)	500 W PEM	Nancy, France	Agronomy laboratory at the National Polytechnical Institute of Lorraine	Feb. 2003				ZSW is developing fuel cells in the 2 W - 20 kW range.
ZTEK Corp.	Black Country Housing and Community Services Group	4.4 kW Alkaline fuel cell	Telford, UK (England)	Black Country Housing and Community Services Group house	Announced Jan. 2005		Compressed hydrogen		UK's first fuel cell house.
ZTEK Corp.	Connecticut Clean Energy Fund, The Renewable Resources Group, LLC	25 kW SOFC	Rocky Hill, Connecticut	Dinosaur State Park	Installed	Two-year demonstration with possible extension	Natural gas		Provides some of the park's baseload power and heating/ air conditioning for the Visitor Center. This system was previously demonstrated at the Tennessee Valley Authority's Huntsville, AL site.
ZTEK Corp.	Tennessee Valley Authority	25 kW SOFC	Huntsville, Alabama	Huntsville Utilities	1998	2000	Natural gas		
ZTEK Corp.	Electric Power Research Institute	1 kW SOFC	Japan	EPRI facility	1994	1995	Laboratory gas mixture partially comprised of bottled hydrogen		Proof of concept. Operated for over 16,000 hours.
Unknown	U.S. Army Corps of Engineers Construction and Engineering Research Laboratory (CERL)	Fuel cell	Yellowstone National Park, Montana	Yellowstone National Park	Planned		Canola oil		
Unknown	RWE Fuel Cells, Ahaus	5 kW fuel cell with gas turbine	Germany	Ahaus facility	Planned				Ahaus utility will integrate the fuel cell/turbine hybrid unit into their local heating system.
Unknown	State of Florida, US Department of Defense	Three to five fuel cells	Florida	Tyndall Air Force Base tent city	Planned				
Unknown	State of Florida, unspecified investor-owned utility and college	Fuel cell	Florida	Unspecified college residential complex	Planned				
Unknown	Shizuoka Resources, Shizuoka Gas Co.	Fuel cell	Shizuoka, Japan	School lunch center	2006	Planned	Mixture of natural gas and garbage biogas		
Unknown	Kawasaki City	200 kW PAFC	Kawasaki, Japan	Tama Hospital	2005 or 2006	Planned	Town gas		Cogeneration system
Unknown	Osaka Gas Co. Takenaka Corp.	200 kW PAFC	Osaka, Japan	Umeda Center Building					Operated for over 40,000 hours. Provides 5% of the power requirements for the 80,000 square meter building. Co-generated

									waste heat is used to supply 70% of the hot water needs.
Unknown	Japan Energy Corp.	About one-hundred-fifty 700 W PEM units			Announced Jun. 2005			Liquefied petroleum gas (LPG)	About 30 fuel cells will be installed in the Kanto area in the first year. About 150 total will be installed within three years.
Unknown	Northern Alberta Institute of Technology (NAIT)	5 kW SOFC	Edmonton, Canada	NAIT Power Engineering Laboratory	Planned for early 2005				For demonstration, education and research.
Unknown	Arakawa Ward	PEM	Arakawa Ward, Japan	Haketa-daini Primary School	Sept. 2005			Kerosene	
Unknown	Tokuyama Corp, Yamaguchi Prefecture	1 kW fuel cell	Yamaguchi Prefecture, Japan	Tokuyama Works		Mar. 2005		Hydrogen produced at the factory	
Unknown	Idemitsu Kosan Co, Corona Co.	1 kW PEM	Sanjo, Japan	Corona Co.'s New Energy Research Center	Apr. 2005				Test system.
Unknown	Idemitsu Kosan Co, Corona Co.	1 kW PEM	Sanjo, Japan	Idemitsu Kosan's Central Research Laboratory	Apr. 2005				Test system.
Unknown	Osaka Gas, Urban Renaissance Agency (URA)	Twenty-one fuel cells	Japan		2005				Twenty-one fuel cells will be delivered to URA by Osaka Gas. URA will demonstrate 80-100 fuel cells by various manufacturers.
Unknown	Sharp Corp.	10 kW PEM/solar cell hybrid electric system	Japan	Yokkaichi Technical High school	Mar. 2005				Combined power capacity of 10 kW. Generated power is stored in a battery and used for emergency power. Exhaust heat is supplied to the greenhouse.
Unknown	Sekisui House Corporation, Tokyo Gas	Seven PEM units	Mosashino, Japan	Residential	Sales began Apr. 2005			Natural gas	Seven out of 31 homes will be equipped with stationary PEMs. The home price will be higher than other homes in the development, but heating and electric costs will be lower.
Unknown	Yamaguchi Prefecture	Three 1 kW and one 5 kW fuel cell CHP units	Syunan, Japan		Jan. 2005	One year test		Pipeline-supplied hydrogen	
Unknown		Fuel cell	Strasbourg, France		July 2004				Fuel cell operates in tandem with a photovoltaic unit.
Unknown	Kandenko	3.7 kW PEM	Saitama, Japan	Kandenko's Urawa dormitory	Oct. 2004				Cogeneration system (power and heat). Produces 25% of the facilities power.
Unknown	Nippon Oil, Sekisho	PEM	Tsukuba, Japan	Company residence	Plan announced Aug. 2004			Liquefied petroleum gas (LPG)	Cogeneration system
Unknown	New Energy Foundation	Two 1 kW PEM units	Tokyo and Oita Prefecture, Japan	Condominiums	Aug. 2004			Pipeline-supplied hydrogen	
Unknown	Tokyo Gas	1 kW PEM	Japan	Minami-Senju Techno Station model house	May 2004				The house is open to the public.
Unknown	Hokkaido University, Japan Steel Works. Ministry of Land, Infrastructure and Transport	Fuel cell	Hokkaido, Japan		Jun. 2004			Biogas from livestock waste	
Unknown	Mie Prefecture, Yuasa Corp, Cosmo Oil, Fuji Electric	PEM units of less than 10 kW	Yokkaichi, Kawagoe or Kusunoki, Japan	Residential	2004	2006		Liquefied petroleum gas (LPG)	This is the first step for "Establishment of the Center for FC Related Industries in Northern Part

	Advanced Technology Co, Showa Shell Sekiyu K.K. , Idemitsu Kosan Co, Mie Prefecture, Mie University								of the Prefecture". Three companies expressed their intention to participate and Toshiba IFC has been formally nominated.
Unknown	Nippon Oil Corp., Gas Bureau of city of Sendai	1 kW PEM	Sendai, Japan	"Gas Salon" of Gas Bureau	Feb. 2004				
Unknown	Nippon Oil, Matsumura Bussan Co.	5 kW PEM	Kanazawa, Japan	Osada gasoline service station	Apr. 2004				
Unknown	Niigata Prefecture	700 W PEM	Nagaoka, Japan		Mar. 2004	Dec. 2004			Data to be transmitted automatically to the Industrial Research Institute of Niigata Prefecture.
Unknown	Seiko Epson	400 kW PAFC	Ina, Japan	Seiko Epson's Quartz Devise Division facilities	2004				
Unknown	Nippon Oil Corp.	1 kW PEM	Shizuoka, Japan	Suzuyo Irie Dormitory	Aug. 2003	One-year test			Testing e simulated conditions of a ordinary home and to verify the energy savings.
Unknown	Nippon Oil Corp.	Multiple 1 kW PEM units	Various locations, Japan	Public and company residences	Beginning Jan. 2003		Liquefied petroleum gas (LPG)		At least 80 demonstration units will be installed at locations including Yokohama, Niigata prefecture, Shizuoka prefecture, Tokyu Construction Co, Mitsubishi Estate Co, official residence of the Yokohama mayor, and others. Nippon Oil will follow operating conditions at the a monitoring center in Yokohama Refinery and deal with troubles 24 hours
Unknown	Nippon Oil Corp.	PEM	Shimizu, Japan	Gas station	Dec. 2002		Naphtha		Demonstration unit of fuel cell cogeneration system operating on naphtha fuel.
Unknown	Nippon Oil Corp.	1 kW PEM	Kanagawa Prefecture, Japan	Kanagawa Dome Theater	Jul. 2002		Liquefied petroleum gas (LPG)		Fuel cell cogeneration system.
Unknown	Shikoku Electric Power Co.	PEM CHP	Japan	Shikoku Research Institute, Inc.	Feb. 2002	Mar. 2004			Verification testing.
Unknown	Tokyo Electric	Two 3 kW PEM units	Japan	Tokyo Electric Power Technology Development Center	Mar. 2001		Liquefied petroleum gas (LPG), town gas		Purchased for testing
Unknown	Mitsubishi, Kansai Electric Power Co.	Two 200 kW units	Japan		Installed between 1993-1995				
Unknown	Toshiba	50 kW fuel cell unit	Japan		1984				
Unknown	Hokkaido Gas, Hokkaido University	PEM	Japan	Hokkaido University					Demonstration and testing. This unit will be replaced by a newer model 1 kW unit.
Unknown	Hokkaido Gas, Japan Gas Association	PEM	Sapporo, Japan	Residence					
Unknown	MVV Energie	Fuel cell	Mannheim, Germany	Rehabilitated apartment complex					Provides heat and power. "Three liter home" project goal is to reduce the building's annual energy requirements for heat to an equivalent of just three liters of heating oil per

									square meter of living space.
Unknown	City of Mesa, AZ, Arizona National Guard	Two 200 kW fuel cell units	Marana, Arizona	Western Army National Guard Aviation Training Site	Installed				Power reliable supply to flight simulator. Fuel cells were donated by a military base and a research facility.
Unknown	Tokyo Gas, Toshiba	1 MW fuel cell cogeneration plant	Japan	Tokyo Gas site					Installed by Toshiba
Unknown	TKG Consulting, San Diego Gas and Electric	Fuel cell	San Diego, California	TKG Consulting office			Natural gas		The group is aiming for LEED certification and also has 5 kW photovoltaic power installation.
Unknown	Mulheim Hotel	3 kW PEM	Mulheim, Germany	Mulheim Hotel					
Unknown	Hartford Gas (now Connecticut Natural Gas)	Fuel cell	Connecticut	Experimental home powered by a fuel cell	1969	Completed	Natural gas		

Notice: For additional information or comments on Fuel Cells 2000's charts, contact Jennifer Gangi at: jennifer@fuelcells.org.