



SEP Comments
August 2009 State Energy Plan Draft

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I. Overview

To meet and exceed the objectives outlined in New York's State Energy Plan, this State must include progressive and detailed initiatives that harness the breadth and strength of all of New York's clean energy technologies.

Headquartered in Latham, New York, Plug Power Inc. is New York's largest manufacturer solely devoted to clean energy products. Currently employing 125 New York residents, Plug Power has invested more than \$94 million on vendors and suppliers in this State alone. Hundreds of existing green jobs in New York are dependent on Plug Power and the success of the fuel cell industry.

The economic and environmental benefits offered by fuel cell technology naturally align with the broad strategies articulated in the New York State Energy Plan. Fuel cell systems provide clean, reliable energy generation. These systems can be deployed to operate in parallel with the grid, as independent energy sources, as energy storage devices, or to complement solar and wind generating systems.

The current draft of the New York State Energy Plan, however, needs an implementation plan to optimize the benefits that fuel cell technologies offer as a clean energy solution. Without support of fuel cell research, development and purchases, customers will either use traditional energy sources or go out of state where the use of alternate clean energy technology is more affordable.

These comments first outline five separate policy initiatives that New York's State Energy Plan could recommend and encourage to strengthen and accelerate the adoption of this technology in our state. Next, this document discusses the nature and types of fuel cell systems available to New York State consumers as part of a clean energy strategy. Finally, these comments will conclude with some brief closing remarks.

II. Recommended Fuel Cell Energy Initiatives for New York State

As Section 2 of the New York State Energy Plan outlines, our State is aggressively pursuing programs to meet 45% of its electricity needs through improved energy efficiency and clean renewable energy by 2015. As discussed earlier, fuel cell technology is a viable and valuable tool to meet these aggressive goals.



With the Energy Plan's support, there are several policy priorities under consideration this year that impact Plug Power and the hydrogen and fuel cell industry's success in New York. The sections below outline five separate initiatives that directly impact a customer's decision to use clean technology and fuel cells in New York facilities. Absent these incentives, customers will select other states that offer more favorable incentives and a lower cost of doing business.

Purchase Incentives

Forty-six percent of all wasted energy in America is associated with the generation, transmission, and distribution of electricity. A typical New York home today experiences about forty-four percent overall efficiency when drawing electricity from the grid while burning gas or oil for home heating and hot water.

In contrast, combined heat and power (CHP) fuel cell systems produce high-quality, usable heat, hot water, and electricity in amounts well-suited for residential and light commercial applications and realize eighty-five percent or greater efficiency at the point of use creating significant savings for consumers.

Material handling fuel cell systems also reduce our carbon footprint and drive a significant decrease in overall demand for grid power and the pollution that it generates. Analysis of a global retail distribution center shows that a customer replacing lead-acid batteries with material handling fuel cell power units can reduce their electric forklift carbon footprint by eighty percent each year. For large fleet users, this could be equivalent to taking 20,000 passenger vehicles off the road annually.

While calling for the reduction of greenhouse gas emissions by eighty percent by 2050, the Energy Plan notes, "Achievement of the State's energy efficiency goals is dependent upon action by consumers to invest in energy efficiency equipment and infrastructure."

Accordingly, while continued investment in research and development programs remains necessary to facilitate critical long-term material cost reduction, Plug Power encourages New York to implement immediate financing programs to fund the retrofit of incumbent technologies with zero emission, clean fuel cell systems.

New York State Fuel Cell Tax Credit

Plug Power also encourages New York to reinstate a fuel cell tax credit that mirrors federal tax incentives on the purchase of fuel cell systems. This credit is necessary to attract New York residential and commercial customers, both small and large. Without a New York State Fuel Cell Tax Credit, this State risks significant delays in the market adoption of viable, clean power generation alternatives.

RPS Customer Sited Tier Allocation



Section 3 of the New York State Energy Plan also recommends deployment of distributed generation through improved net metering laws and funding of renewable technology through the RPS program.

Also as noted in the Energy Plan, the RPS Customer-Sited Tier Program is a source of renewable energy funding that targets the development of smaller, “behind-the-meter,” resources that produce electricity primarily for use on site. Plug Power urges that the current RPS allocation for fuel cell funding be maintained. Most of the funds for large fuel cell systems were used last year, and some of the funds for small systems were used. As commercial installations continue to increase in 2009 and 2010, RPS funding will become critical.

Net-Metering Legislation

Plug Power partnered with National Grid this year to begin field trials of our combined-heat and power fuel cell system for residential use. While the initial trials are sited in New York for proximity to headquarters, National Grid offered notable resistance, seeking to site in states such as Massachusetts that offered fuel cell net metering incentives that provide a greater economic case for doing business in that state.

Recently passed net-metering legislation incorporating CHP technology is a huge step in the right direction, but this legislation treats CHP technology differently, requiring that a net-metered CHP account be reconciled monthly, rather than annually as with wind or solar installations. Annual reconciliation leverages the long heating system of New York’s cold winters to produce more, highly efficient energy. Plug Power encourages New York to revisit this net-metering legislation and to place CHP technology on equal footing with other clean energy technologies.

Definition of Renewable Energy

Fuel cells produce clean energy with zero emission impact; it is crucial the statutory definition of renewable energy capture our technology. NYSERDA has invested millions of dollars in fuel cells and other clean energy technologies. These investments could be lost, and the fuel cell industry badly impacted, if the definition of renewable energy excludes fuel cell technology.

III. Fuel Cell Technologies

Fuel cell systems offer the potential for clean, reliable energy generation. These systems can be deployed to operate in parallel with the grid, as independent energy sources or to complement solar and wind generating systems. With a higher efficiency than conventional power generation, little or no pollution and greater flexibility in installation and operation, they offer commercially viable alternatives to existing power sources.

Hydrogen is the primary fuel source for fuel cells. The process of fuel reforming allows for the extraction of hydrogen from many widely available fuels such as natural gas and



propane or any other hydrogen-containing fuel. To produce a usable amount of electricity, multiple fuel cells, each producing up to about one volt, are combined into a fuel cell stack. The stack is designed to produce the desired electrical current and voltage for a specific application. The direct current electricity produced can be varied over a wide range by altering the area and number of cells in the stack.

Producing electrical power for a working application requires more than just the fuel cell stack. A fuel cell system may include fuel processing, thermal management, power conditioning, electric grid connection, and energy storage modules. The power conditioning system provides regulated DC or AC power appropriate for the application. The successful integration of an entire fuel cell system is critical to achieve optimal performance.

The four primary types of fuel cell systems include motive power, residential power, primary power and backup power:

Motive Power

Fuel cell systems designed for material handling and specialty vehicles supply the power requirements for pallet trucks, counterbalance rider trucks, narrow-aisle reach trucks and automated guided vehicles used in high-throughput warehousing, distribution and manufacturing operations.

With this technology, managers of large warehouses and distribution centers convert all or part of their entire lift truck fleets to fuel cell power, eliminating the need for operating a battery system. Field-tested and proven at customer sites across North America, motive power products have successfully demonstrated their key benefits with some of the world's largest material handling operations.

Compared with traditional battery technologies, motive power fuel cell systems offer increased productivity, lower operational costs, additional commercial space, zero emissions, and no handling or storing of toxic chemicals.

Residential Power

Residential power fuel cell systems utilize high-temperature technology to produce high-quality, usable heat, hot water, and electricity in amounts well suited for residential and light commercial applications. These systems work in parallel with the grid to support the electrical load of the home.

Generally operating at 160°–180°C, the production of heat, hot water, and electricity creates significant savings for the consumer, on average twenty to forty percent off the total yearly utility bill, ensuring a practical payback on the capital and operating expense of the system. Additionally, residential fuel cell systems are completely compatible with existing home heating systems, working seamlessly with radiant, forced air or baseboard hot water.



Residential fuel cell systems also offer compelling environmental benefits; the carbon footprint of a home powered by a residential fuel cell system is considerably less than that of a home powered by traditional furnaces and boilers. Moreover, the efficiency of the system drives a significant decrease in overall demand for grid power and the pollution that it generates.

Prime Power

The low-temperature prime power fuel cell systems provide remote, off-grid and primary power where grid power is unreliable or nonexistent and deliver continuous power through even the most extreme conditions. Coupled with high-efficiency ratings, low-temperature prime power fuel cell systems reduce operating costs making it an economical solution for prime power requirements.

Fuelled by liquid petroleum gas (LPG), prime power fuel cell systems produce power without combustion. As a result, the fuel cell stack produces virtually no emissions, creating only heat and clean water as by-products. These systems also require fewer preventive maintenance calls per year than traditional combustion technologies, lowering operating costs.

Prime power fuel cell systems designed specifically for the 1kW to 6kW telecommunication power range offer as high as three times an efficiency improvement over the diesel generator. The efficiency-driven operation expense savings presents a total payback period of approximately two years. Though the magnitude of the savings is dependent upon the site power draw and fuel costs, the typical five-year savings can range from 10% of diesel power generation expenses. Because the fuel cell is more efficient, the savings actually increase proportionally as the fuel prices increase.

Backup Power

Backup power fuel cell systems make networks more reliable, offering an economical, operational, and environmental solution.

Extensive field experience demonstrated backup power fuel cells systems unmatched availability, up to 99.9% uptime, equal to or better than rigorously maintained generators. Batteries degrade and are maintenance dependent; it's just a fact of battery life. But you don't know how much life there is until it's too late.

Many backup power systems offer lower first-time costs than generators and lower maintenance costs than batteries. In fact, some backup power fuel cell systems beat batteries and generators on total cost of ownership as well. Their robust design further reduces operating expenses by eliminating the need for costly facility modification and personnel callouts during outages. Enhanced reliability and lower costs also minimize maintenance expenses.



The only byproducts from the use of backup power fuel cell systems are heat and water. There are no emissions and no hazardous materials or acid spills. These systems are economically attractive, environmentally sound, and so much more reliable and user friendly than racks of batteries and diesel generators.

V. Summary

The current draft of the State Energy Plan suggests New York has strong intentions to remain competitive in the clean energy sector. The language in this draft, however, lacks the specificity necessary to position New York's fuel cell technology manufacturers and suppliers as leaders of New York's clean energy solution.

Plug Power has made great strides in the research, development and commercialization of fuel cells. As more energy consumers opt for clean energy alternatives, it is important that New York put in place a State Energy Plan that is comprehensive, that acknowledges the unique strengths of different clean energy technologies and that provides an implementation plan to optimize the benefits that fuel cell technologies offer as a clean energy solution.