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The Energy Tax, Financing, and Utility Rebate Aspects of Fuel Cells

By Charles R. Goulding, Andressa Bonafe and Raymond Kumar

Fuel Cell system installation done in conjunction with energy efficiency projects can result in substantive energy cost reductions and tax savings.

On February 12th, 2013, ClearEdge Power, a manufacturer of scalable, distributed power systems, announced the acquisition of UTC Power. The former subsidiary of United Technologies Corporation is considered a leader in the fuel cell industry. According to ClearEdge, this major investment is a response to a growing market demand for clean, continuous, distributed power solutions. The company's commitment to innovation and to the constant expansion of its portfolio is an evidence of this market's dynamism.

Fuel cells emerge as a clean, efficient and reliable energy solution, particularly for energy intensive buildings, such as hospitals and food processing facilities. Even though investments are high, federal tax credits, favorable financing conditions as well as state and utility rebates are available to assist the transition to this revolutionary technology. Tax savings are also available for energy efficiency projects, such as lighting and HVAC, which are crucial for optimizing the use of energy generated by fuel cell systems.

Understanding Fuel Cells

Fuel cells are electrochemical devices that convert chemical energy into electricity. This is possible through the combination of a reactant (most commonly, hydrogen) and an oxidizing agent. Their functioning resembles that of the battery, on a relatively more complex level. Provided that there is a continuous source of fuel and oxygen, fuel cell systems can maintain a constant supply of electricity – meaning they can work through a blackout, for example. The chemical reactions involved in the power generation process have water and heat as their byproducts. These can be used to provide hot air and water, enabling fuel cell systems to also become heating solutions.

Differing from most energy sources, fuel cells have multiple potential applications. Not only can this technology be applied in different contexts, such as power generation, cogeneration, and transportation, but it is also flexible in its scale. They are equally capable of providing energy for hand-held electronic devices as to utility power stations.

Why Fuel Cells?

There are multiple benefits to using fuel cells. With regards to the environment, they stand out as a choice of low emissions of pollutants, and, particularly, low-to-zero emissions of carbon dioxide (CO2). This happens because the electrochemical process eliminates the necessity of combustion. Compared to conventional fuel combustion processes, the evolution is striking: data shows that "a stationary fuel cell power plant using natural gas as a source of hydrogen creates less than one ounce of pollution per 1,000 kilowatt-hours of electricity produced. Conventional combustion generating technologies create 25 pounds of pollutants for the same amount of electricity"[i]. Because of its outstanding environmental performance, fuel cell systems qualify for different certifications and programs, such as Leadership in Energy and Environmental Design (LEED) and Renewable Energy Standards (RES).

In addition to being a non-polluting energy source, fuel cells are highly efficient. While conventional combustion-based plants have an average efficiency of 33-35%, fuel cell systems average up to 60% (and up to 90% when the heat waste is used for cogeneration)[ii]. Fuel cells are also considerably reliable, as they operate independently from the grid and do not need a particular weather condition, such as solar and wind technologies, therefore the fear

Charles R. Goulding, Attorney/CPA, is the President of Energy Tax Savers, Inc., an interdisciplinary tax and engineering firm that specializes in the energy efficient aspects of buildings.

Andressa Bonafe is an Analyst with Energy Tax Savers, Inc.

Raymond Kumar, CPA is a Senior Analyst at Energy Tax Savers.

www.energytaxsavers.com

of losing power is virtually eliminated. Other benefits from fuel cells include fuel flexibility, ruggedness and durability, scalability and compatibility with other electricity generating technologies.

Fuel Cells in the U.S.

According to the most recent report from Fuel Cells 2000[iii], an activity of the Breakthrough Technologies Institute in Washington, D.C., more than 74 MW of stationary power from fuel cells was installed or purchased in the US between 2011 and 2012. The top five states that are home to the biggest number of installed stationary fuel cell systems include California, Connecticut, New York, Ohio, and Nebraska. Currently, a growing number of prominent companies take advantage of the economic and environmental benefits of fuel cells. Another report from the same organization[iv] presents the top four in the field: Wal-Mart, Coca-Cola, Sysco, and Whole Foods. The list also includes Apple, eBay, Bank of America, Google, AT&T, T-Mobile, and Time Warner Cable. The U.S. is not only a leader in the use of fuel cells, but it is also where the most important fuel cell manufacturers are located. The same report states that 45 Fortune 500 companies are engaged in the fuel cell industry.

An overview of three major fuel cell manufacturers in the U.S. can provide an idea of the variety of products available. Former UTC Power (now ClearEdge Power, headquartered in Hillsboro, Oregon), has a 50-year-long history of providing fuel cells to space missions, transit buses, and buildings. The company is currently present in 19 countries around the world. Its main stationary fuel cell product, PureCell®Model 400, is a combined fuel and heat power with up to a 90% system efficiency, 95% system availability, and around 20-year product life[v]. Using natural gas as input fuel, it generates 400 kW of electric power.

Similarly, Bloom Energy, founded in 2001, located in Sunnyvale, California, provides on-site power generation systems using fuel cell technology. Its Energy Server™ offers clean, reliable, and affordable energy. Each generator is able to provide 200kW of power, which is enough to meet the baseload needs of around 160 houses or an office building[vi].

Finally, FuelCell Energy, Inc., based in Danbury, Connecticut, has more than 30 years of experience in the production and commercialization of stationary electric power generation. Its line of Direct FuelCell® generators can run on biofuels, natural gas, coal gas, or propane. Its three main products – sub-megawatt DFC300®, 1.4 megawatt DFC1500®, and 2.8 megawatt DFC3000® - were qualified as "Ultra-Clean" under 2007 California Air Resources Board (CARB) standards.

Financing Fuel Cell Projects

Due to the initial investment cost, fuel cell projects are generally financed, and the financing vehicle most commonly used is a Project Finance structure. Project Finance is the long-term financer of infrastructure, and industrial projects based upon the projected cash flows of the project rather than the balance sheets of its sponsors. In recent years, many electricity generating assets such as Solar Photovoltaic Energy Systems and Fuel Cells have been financed and put into service using this structure.

Usually, a project financing structure involves an equity investor, or “sponsor”, as well as a bank or other lending institution that provides loans to the operation. Larger utility scale projects will typically engage multiple equity investors and perhaps a syndicate of lenders/banks. The structure is most typically a non-recourse loan, which is secured by the project assets and paid entirely from project cash flows, rather than from the general assets or creditworthiness of the project sponsors or the end-user customer (host), a decision that is supported by financial modeling. The financing is typically secured by all of the project assets, including the revenue-producing contracts. Project lenders are given a lien on all of these assets and are able to assume control of a project if the project company has difficulties complying with the loan terms or project performance.

Generally, a special purpose entity “SPE” is created for each project, thereby shielding other assets owned by a project sponsor from the detrimental effects of a project failure. As an SPE, the project company has no assets other than the project. Capital contribution commitments by the owners of the project company are sometimes necessary to ensure that the project is financially stable or to assure the lenders of the sponsors' commitment.

Project Finance is often more complicated than some alternative financing methods. Risk identification and allocation is a key component of project finance. A project may be subject to a number of technical, environmental, economic, and political risks. Financial institutions and project sponsors may conclude that the risks inherent in the project development and operation are unacceptable and therefore the project is unable to finance. To mitigate these risks, lenders may require project sponsors to provide additional security or require the engagement of other companies (i.e. equipment manufacturers, contractors) operating in a contractual network with each other, to allocate risks in a way that allows financing to take place. The financing of these projects must be distributed among multiple parties, so as to distribute the risk associated with the project while simultaneously ensuring profits for each party involved.

Incentives for Fuel Cells

Alternative Energy Tax Credits:

Pursuant to Internal Revenue Code Sec. 48[vii], tax credits are available to companies or individuals undertaking a variety of alternative energy measures. Through January 1st 2017, fuel cell systems can take a 30-percent federal tax credit for the total cost and installation. Along with credits, fuel cell systems benefit from very favorable 5-year MACRS tax depreciation.

State Programs:

In addition to the Federal Tax Credit Program, there are several incentives available on the State level. The Department of Energy Database of State Incentives for Renewables and Efficiency (DSIRE)[viii] lists 33 incentives currently available in 19 States. The programs range from grants and rebates to performance incentives and various other forms of tax incentives, regarding both personal and property taxes. In California, the Self-Generation Incentive Program[ix] offers a rebate of $2.25/W for CHP or electric only fuel cell systems (maximum of 60% of eligible project costs). From 2001 to 2011, the Program had rebated 38MW of installed fuel cell capacity. Fuel cells represent the highest incentive available and around 50% of the incentives paid, $145 million. The program contributed to a significant intensification of the use of this technology in the Bay Area, particularly by Silicon Valley firms, which take advantage of the high electrical efficiency.

Another example is the New York State Energy Research and Development Authority (NYSERDA)'s Customer-Sited Tier Fuel Cell Program. Launched in March 2011, the program "seeks to support the purchase, installation, and operation of continuous duty stationary fuel cell electric power generation equipment in New York State"[x]. As other Customer-Sited Tier initiatives, the incentive is dedicated to on-site power generation for customer use. The program focuses on large power consumers, such as businesses and hospitals and incentives can go as high as $1 million for systems larger than 25 kW.

Utility Programs:

Fuel cell projects can also take advantage of utility incentive programs. Eight different companies across five states currently offer rebates, grants, and performance-based incentives[xi]. These can cover 20 to 50% of installed costs. Delaware's Dover Public Utilities, for instance, offers 20% installed cost rebates with a cap of $7,500 for residential projects and $10,000 for non-residential projects[xii].

Fuel Cells for Energy Intensive Buildings

Healthcare Facilities:

Data from the US Department of Energy shows that healthcare facilities consume around 10% of the energy use of commercial buildings throughout the country, equivalent to more than $8 billion per year[xiii]. As result of their 24/7 operation, patient comfort, and other needs, hospitals use about 2.5 times the amount of energy as similar sized constructions. Energy costs are one of the larger controllable costs in these buildings, which is crucial in the context of rising energy costs and limited budgets[xiv].

In this context, fuel cells constitute a promising solution as they offer considerably more efficiency than conventional energy sources, particularly when used for cogeneration. According to Forbes Magazine[xv], clean heat and power (CHP) is becoming a trend among hospitals – UCLA Medical Center, Weill Cornell Medical Center, and Children's Hospital of Chicago are a few examples of the facilities that have adopted this technology.

In addition to an efficient energy source, hospitals need a highly reliable one. Such facilities are heavily dependent on a constant source of power, as interruptions of electricity supply can have severe consequences. On-site fuel cell power generation can reduce reliance on the grid and ensure an efficient primary power source.

Food Processing Facilities:

Fuel cells are also an interesting alternative for food processing facilities. Now more than ever, food processing plants are adopting sustainable practices, which go from reducing energy usage to producing healthier, more organic products. Both stiffer competition and demand-side pressures are contributing to a shift towards a new, holistic approach to sustainability[xvi]. Food processing facilities usually consume significant amounts of energy, both because of their size and particularly because of the necessity of constant refrigeration. Fuel cells can be of great assistance when pursuing energy efficiency, even more so when used for combined heat and power. Moreover, some fuel cell systems can operate on anaerobic digester gas, a byproduct of some food and beverage processing. One example is FuelCell Energy, Inc.'s special product to be used at breweries, which features "fuel blending"[xvii].

The adoption of more sustainable and efficient technologies, such as fuel cells, is also beneficial for businesses. Important buyers, such as Wal-Mart, are increasing their sustainability standards and establishing Suppliers' Sustainability Programs. In accordance with its own sustainability goals, Wal-Mart requires that its suppliers

meet specific sustainability criteria. In order to partner with them, the company assesses its suppliers on a fifteen point sustainability questionnaire with the goal of using 100% renewable energy across the board[xviii].

Getting Ready for Fuel Cells: EPAct Tax Opportunities:

Fuel cell systems are clearly a good solution for energy intensive buildings, such as hospitals and food processing facilities. However, investments in such technology can be undermined if buildings are inefficient. When considering fuel cells, it is fundamental to guarantee the optimization of energy use. Fortunately, tax savings are available to support this type of measure. Under Code Sec. 179(D), as enacted by the Energy Policy Act of 2005 (EPAct)[xix], building owners or tenants who make qualifying energy-reducing investments can obtain immediate tax deductions of up to $1.80-per-square-foot. If the building project doesn't qualify for the maximum deduction, there are tax deductions of up to $0.60-per-square-foot for each of the three major building subsystems: lighting, HVAC and the building envelope. The building envelope is every item on the building's exterior perimeter that "touches the outside world" including roof, walls, insulation, doors, windows and foundation.

Refrigerated distribution centers, which consume tremendous amounts of energy, can considerably improve energy performance by investing in energy-efficient lighting. Previously, both dry and refrigerated distribution centers used energy inefficient metal halide lighting. Although the dry warehouses have been able to upgrade to energy-efficient lighting, the refrigerated warehouses could not since fluorescents don't operate well in cold environments.

New LED technology is, for the first time, opening the door to lighting that is efficient, long-lasting, and unaffected by the cold. Though the new LED lighting is expensive, refrigerated distribution centers operators who consider energy savings, federal EPAct tax savings, custom utility rebates, cooling cost savings, lower maintenance costs, and increased supplier sustainability points are executing these projects. Very efficient low wattage LED lighting is enabling these facilities to save as much as 90% of their current lighting related electricity bill[xx].

Similarly, hospitals can increase energy efficiency by upgrading lighting systems. For-profit hospitals are eligible for up to $0.60-per-square-foot tax deductions under the Energy Policy Act (Section 179(D)), for energy efficient lighting. All government hospitals, including VA (Veterans Administration) hospitals, State and City hospitals, and County hospitals, can generate Section 179(D) tax deductions for the architects, engineers, lighting designers and electricians that design qualifying energy efficient lighting. For profit hospitals and designers of government hospitals, installing energy efficient HVAC can also generate large Section 179(D) tax deductions. To achieve Energy Star status, demonstrating energy efficiency accomplishment, the U.S. government recommends that hospitals address five energy items, including two HVAC items.

The five measures are:

1) Lighting
2) Right sized high efficient chillers
3) Air handling equipment
4) Commissioning
5) Supplemental load reduction.[xxi]

Exhibit 1 exemplifies potential EPAct tax deductions available to designers of VA Hospitals projects.

Department of Veterans Affairs

Property	Total Square Footage	Lighting Minimum Deduction	Lighting Maximum Deduction	HVAC Maximum Deduction	Building Envelope Maximum Deduction	Maximum Total
3801 Miranda Avenue, Palo Alto, CA	2,698,500	$ 809,550	$ 1,619,100	$ 1,619,100	$ 1,619,100	$ 4,857,300
John D. Dingell Medical Center, Detroit, MI	2,227,700	$ 668,310	$ 1,336,620	$ 1,336,620	$ 1,336,620	$ 4,009,860
Hunter Holmes McGuire Medical Center, Richmond, VA	2,056,000	$ 616,800	$ 1,233,600	$ 1,233,600	$ 1,233,600	$ 3,700,800
Puget Sound Health Care System, Seattle, WA	1,714,260	$ 514,278	$ 1,028,556	$ 1,028,556	$ 1,028,556	$ 3,085,668
3900 Woodland Avenue, Philadelphia, PA	1,591,659	$ 477,498	$ 954,995	$ 954,995	$ 954,995	$ 2,864,986
3710 SW U.S. Veterans Hospital Rd., Portland, OR	1,530,981	$ 459,294	$ 918,589	$ 918,589	$ 918,589	$ 2,755,766
Minneapolis Health Care System, Minneapolis, MN	1,500,000	$ 450,000	$ 900,000	$ 900,000	$ 900,000	$ 2,700,000
Totals:	**13,319,100**	**$3,995,730**	**$7,991,460**	**$7,991,460**	**$7,991,460**	**$23,974,380**

Conclusion

Fuel cells are undeniably an alternative for renewable and efficient energy. Installing fuel cell systems in inefficient buildings, however, can be a waste of money. When done simultaneously, fuel cells and energy efficiency projects result in substantive energy cost reductions and tax savings.

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[i] Fuel Cells 2000, *Benefits*, available online at http://www.fuelcells.org/fuel-cells-and-hydrogen/benefits/

[ii] U.S. Department of Energy, *Fuel Cells Technology Program*, available online at http://www1.eere.energy.gov/hydrogenandfuelcells/pdfs/fct_h2_fuelcell_factsheet.pdf

[iii] Fuel Cells 2000, *State of the States: Fuel Cells in America 2012*, available online at http://www.fuelcells.org/wp-content/uploads/2012/10/StateoftheStates2012.pdf

[iv] Fuel Cells 2000, *The Business Case for Fuel Cells 2011: Energizing America's Top Companies*, available online at http://www1.eere.energy.gov/hydrogenandfuelcells/pdfs/business_case_fuel_cells_2011.pdf

[v] More information available at http://www.utcpower.com/products/purecell400

[vi] More information available at http://www.bloomenergy.com/

[vii] See http://www.novoco.com/energy/resource_files/irs_guidance/irc/section_48.pdf

[viii] Database of State Incentives for Renewables & Efficiency, available online at http://www.dsireusa.org/

[ix] California Public Utilities Commission's Website, http://www.cpuc.ca.gov/PUC/energy/DistGen/sgip/index.htm

[x] More information available at http://www.nyserda.ny.gov/Funding-Opportunities/Current-Funding-Opportunities/~/media/Files/FO/Current%20Funding%20Opportunities/PON%202157/2157summary1.ashx

[xi] Database of State Incentives for Renewables & Efficiency, available online at http://www.dsireusa.org/

[xii] Complete Program's Description available at http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=DE22F&re=1&ee=1

[xiii] U.S. Department of Energy, *Energy Department's Hospital Energy Alliance Helps Partner Save Energy and Money*, Sept. 4, 2012. Available online at http://energy.gov/articles/energy-department-s-hospital-energy-alliance-helps-partner-save-energy-and-money

[xiv] Charles Goulding, Robert Goulding, and Raymond Kumar, *The Energy Tax Aspects of Hospitals*, CORP. Bus. TAX'N MONTHLY, November 2009, at 15.

[xv] Forbes Magazine, *Heal Thy Self: U.S. Hospitals Are Huge Energy Hogs*, Aug. 20, 2012. Available online at http://www.forbes.com/sites/williampentland/2012/08/20/u-s-hospitals-are-huge-energy-hogs-better-light-bulbs-are-not-the-solution/

[xvi] Charles R. Goulding, Charles G. Goulding and Jacob Goldman, *The EPAct Tax Aspects of the U.S. Food Processing Industry*, CORP. Bus. TAX'N MONTHLY, September 2012, at 19.

[xvii] More information available at http://www.fuelcellenergy.com/food-beverage-processing.php

[xviii] Charles Goulding, Jacob Goldman and Christofer Winslow, The EPAct and Alternative Energy Tax Aspects of Walmart's Supplier Sustainability Program, CORP. Bus. TAX'N MONTHLY, June 2011, at 13.

[xix] Energy Policy Act of 2005 (P.L. 109-58).

[xx] Charles R. Goulding, Charles G. Goulding and Jacob Goldman, *The EPAct Tax Aspects of the U.S. Food Processing Industry*, CORP. Bus. TAX'N MONTHLY, September 2012, at 19.

[xxi] Charles Goulding, Robert Goulding, and Raymond Kumar, *The Energy Tax Aspects of Hospitals*, CORP. Bus. TAX'N MONTHLY, November 2009, at 15.