THE BUSINESS CASE FOR FUEL CELLS

Hydrogen for Local Leaders Webinar
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FUEL CELLS 2000

- U.S. nonprofit organization
- Leading non-aligned source for fuel cell information since 1993
- Award-winning services
- Education through outreach/publications/ website
- www.fuelcells.org
- www.fuelcellinsider.org

BUSINESS CASE FOR FUEL CELLS

Profiles 38 nationally-recognized companies, including Coca-Cola, Staples, Walmart, Whole Foods, Hilton Hotels, and Sysco.

Companies in report have ordered, installed or deployed:

- more than **1,000** fuel cell forklifts.
- **58** stationary fuel cell systems totaling almost **15** MW of power.
- more than **600** fuel cell units at telecom sites.

Download at
http://www.fuelcells.org/BusinessCaseforFuelCells.pdf

NOTABLE RESULTS

- >$2 million/year in electricity costs (6 companies, 4.2 MW)
- $700,000/year in labor and insurance cost savings (3 companies)
- 43,122 tons of carbon emissions per year (20 companies)
- Nissan: 35 staff hours/day recharging forklift batteries allowing reassignment of 6-7 employees to other work.

Will release a Business Case report follow-up this year.

WHY GO GREEN?

Fuel cells are providing lower operational and energy costs, increased productivity and reliability, greatly reduce emissions, and generate public, media and lawmaker interest.

- Companies save money
- Attract new customers
- Regulations, rules, laws are changing

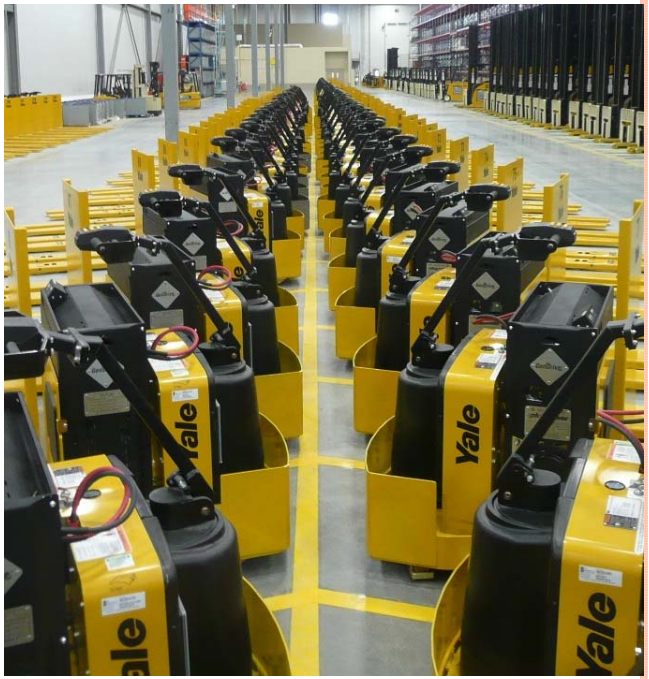
APPLICATIONS

- Materials Handling – estimate >2,000 forklifts. More on order, repeat customers
- Combined Heat and Power (CHP)
- Utilizing ADG for power
- Backup Power
- Primary Power
- Fuel cell vehicles (IKEA, Hilton, Coca-Cola, FedEx, UPS)

RECOVERY ACT FUEL CELL PROJECTS

In 2009, ARRA funding –

- ~ $42 million (+$51 million from industry)
- 12 Projects
- ~ 1,000 Fuel Cell Units
- Deploying forklifts, telecom units
- Big names – Sprint, AT&T, FedEx, Sysco, GENCO (Whole Foods, Wegmans, etc.)



After ARRA, customers buying on their own

MATERIALS HANDLING

- Warehouses and distribution centers
- Coca-Cola, Nissan, Sysco, many others
- Plug Power, Oorja Protonics, Hydrogenics, Nuvera

Oorja Protonics

Benefits:

- Saving time/man hours
- Reducing emissions
- Last longer/quicker refueling
- Freezer capable
- Either replaces battery or used as range extender (Oorja)
- Helping increase familiarity with hydrogen/building infrastructure

SINCE THE REPORT

- Coca-Cola purchased 37 additional forklifts for bottling and distribution center in CA
- Sysco purchased additional 100 fuel cells for distribution center in Virginia and plans to replace 1,000 batteries with 500+ fuel cells at seven sites in next 24 months.
- BMW purchased 86 fuel cell forklifts for SC manufacturing plant
- Martin-Brower ordered additional units from Oorja
- EARP Distribution purchased 24 fuel cell systems for pallet jacks
- WinCo Foods purchased 184 fuel cells for California distribution center

GROCERY STORES

- CHP - Safeway, Whole Foods (3), Star Market, Price Chopper
- Forklifts - Whole Foods, Wegmans
- Fuel Cell Manufacturer - UTC Power, Bloom Energy

Benefits :

- Excess heat used for heating, cooling, refrigeration, hot water (CHP)
- Reliability prevents food spoilage with blackouts

More sales since the report – Albertson's, Stop & Shop

FOOD/BEVERAGE PROCESSING

- Sierra Nevada, Gills Onions, Coca-Cola (Odwalla plant)
- ADG considered renewable fuel
- Achieve ~85% efficiency, much lower emissions
- Not profiled – Oakland Wine Co., Japanese and German breweries
- Fuel Cell Manufacturers - Bloom Energy, FuelCell Energy, UTC Power

Sales since the report – Olivera Egg Ranch

HOSPITALITY

- First one in 1992 (Hyatt)
- Starwoods – Sheraton (4),

Westin (1)

- Hilton – NY, also testing

vehicles in Europe

- Fuel Cell Manufacterers - FuelCell Energy, UTC Power

Benefits:

- CHP – excess heat used for

pools, laundry, heating

- Quiet – can site near building, Sheraton has near tennis courts

TELECOMMUNICATIONS

- Sprint – 250 currently in field, 260 more coming through ARRA
- Motorola – 100 in Denmark
- Verizon – 7 powering headquarters, units in field
- Not profiled – AT&T (180+), T-Mobile (35 in FL),
- FAA - installing at 26 sites at 3 service centers
- Powering 911 towers, emergency response
- Fuel Cell Manufacterers - ReliOn, Plug Power, IdaTech, Altergy Systems, Ballard, P21 GmbH, Microcell (working with utilities)

TELECOMMUNICATION BENEFITS

- Last much longer (72 hour refillable system)
- Can site anywhere
- Rugged, stand up to cold
- Reliable
- Quiet
- Zero emissions

DATA CENTERS/CORPORATE HEADQUARTERS

- Fujitsu – 3.3 year ROI
- First National Bank of Omaha – since 1999, fuel cell achieves 99.999995 reliability
- eBay, Google, Chevron, Cox
- Fuel Cell Manufactuers - UTC Power, Bloom Energy, FuelCell Energy

Benefits:

- Critical, high-quality power
- produces electricity at less cost than grid
- Extremely reliable –prevents voltage sages, loss of power

Since the report – Adobe Systems, Kaiser Permanente, additional Cox installation

MUNICIPAL FACILITIES

- **Wastewater Treatment Plants –**
  - **CA** – El Estero, Dublin San Ramon, Turlock, Tulare, Riverside, Eastern Municipal Water District, Rialto, Orange County, South Bay, San Jose/Santa Clara, Point Loma
  - **NY** – 8 fuel cells at four sewage treatment plants operated by the NYC Dept. of Env. Protection and a single fuel cell unit and solar PV system at Westchester wastewater plant

- **Santa Rita Jail (CA)**

EDUCATIONAL FACILITIES

- **High Schools –** CA , CT, NY, FL
- **Universities –**
  - Cal State (4 campuses) – 5.2 MW
  - U. of California (3 campuses)
  - San Francisco State
  - San Diego State
  - U. of Tennessee
  - Alcorn State
  - Eastern Connecticut State

RESIDENTIAL UNITS

- Becker + Becker (architects):
  - **360 State Street (New Haven, CT)**
    - 500-unit LEED Platinum-certified building. 1st large-scale mixed-use residential building to generate a majority of its own power on-site with a fuel cell.
  - **The Octagon (Roosevelt Island, NYC) –**
    - Fuel cell is generating power and thermal energy at the 500-unit LEED Silver-certified residential building.

FUNDING

- Federal ITC, grants in lieu of tax credits
- ARRA
- State incentives – SGIP (CA)
- State agencies – NYSERDA, NYPA, CPUC
- Public benefit funds – CCEF
- Power Purchase Agreements (FuelCell Energy, UTC, Bloom)

FEDERAL ITC

Hydrogen Fueling Facility Credit	30% up to $200,000
Investment Tax Credit for Fuel Cells	30% to $3,000 /kW
Grants in Lieu of Tax Credits	Allows grants for businesses with insufficient tax liability
Fuel Cell Vehicles	$4,000
Residential Energy Efficiency Credit	Up to $1,000, or $3,334 for multi-family

STATE INCENTIVES

Many states offer:

- **Tax Incentives**
- **Grants/Loans**
- Available for stationary and mobile fuel cell applications, hydrogen fueling infrastructure

- **California – CPUC's Self-Generation Incentive Program (SGIP)**
  - Rebates for qualifying distributed energy systems installed on the customer's side of the utility meter. Qualifying technologies include wind turbines, fuel cells, and corresponding energy storage systems.

STATE INCENTIVES

- **Connecticut – Clean Energy Fund**
  - Project 150: Large renewable energy projects
  - On-Site Renewable Distributed Generation (OSDG) Program : >10 kW

- **New York – NYSERDA**
  - Renewable Portfolio Standard Customer-Sited Tier Small Fuel Cell Program
  - Renewable Portfolio Standard Customer-Sited Tier Large Fuel Cell Program

EXAMPLE – SONOMA COUNTY, CA

- **Sonoma County Government:**
  - Determined ¾ of county's GHG emissions from government buildings.
  - Installed a 1.4 MW FuelCell Energy power plant at County's main administration campus in Santa Rosa, including the County Jail, plus other energy efficiency improvements.
  - FC to provide 11 million kWh of electricity annually
  - FC cost - $9 million
  - $20 million estimated savings from FC over 20 years
  - Received $3 million in SGIP funding

EXAMPLE – NEW HAVEN, CT

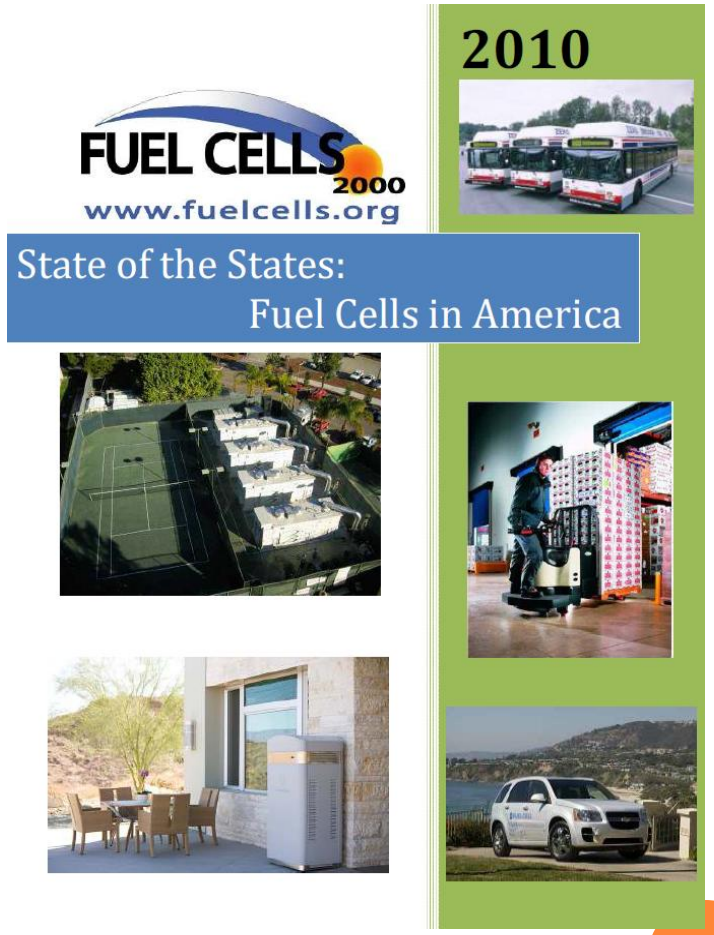
- Energy study, paid for using stimulus funds, found "substantial savings" by installing a fuel cell for the New Haven City Hall's heat, cooling, and power.
- Estimated that the fuel cell will save the city up to $3.3 million over 20 years.
- City issued a request for proposals last year, selected UTC Power / 400 kW fuel cell.

POWER PURCHASE AGREEMENTS

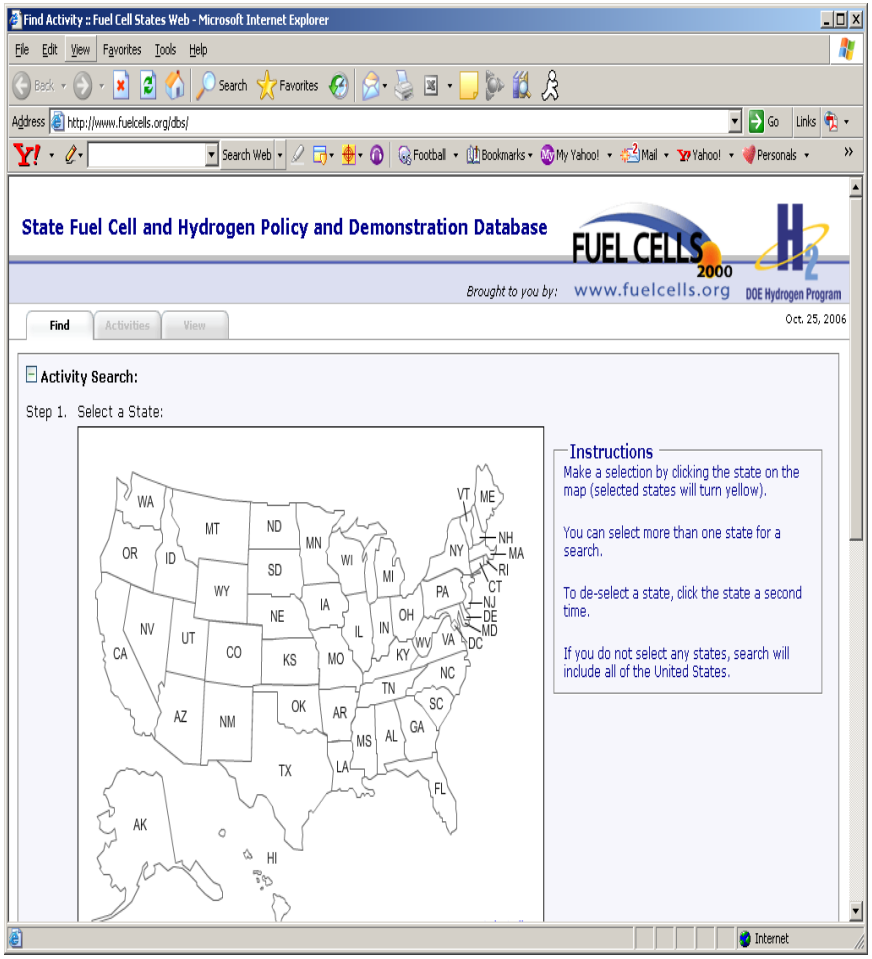
- **Bloom Energy: Bloom Electrons -** A service that will provide electricity created by Bloom Boxes to customers without the upfront cost of purchasing an entire energy server. Clients will lock in their rates for 10 years , and they will only pay for the electricity they use.
- **FuelCell Energy:** UTS Bioenergy LLC will purchase a FC power plant and sell the power generated to the San Jose/Santa Clara Water Pollution Control Plant under a 20-year power purchase agreement.
- **UTC Power: Zero Up Front Costs -** offers financing with zero up-front capital costs.

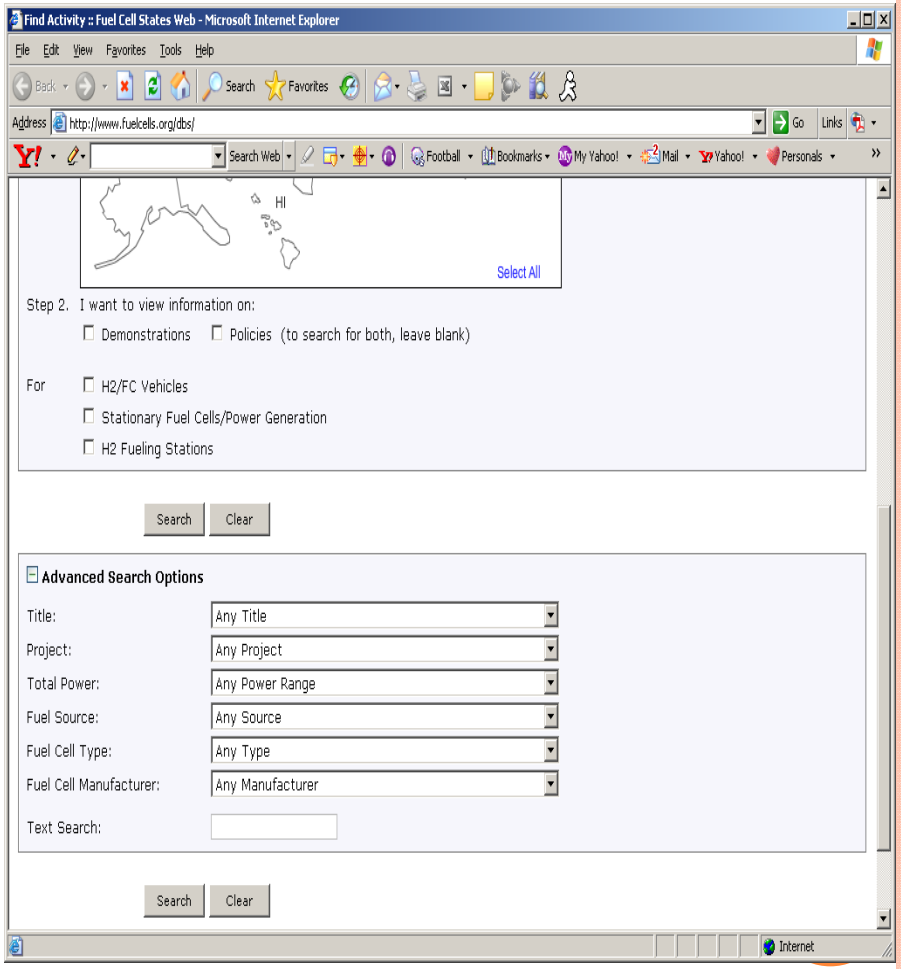
STATE OF THE STATES: FUEL CELLS IN AMERICA

- Original report released in 2010
- Highlights state policies and funding programs supporting FC & H2, details existing and planned FCs
- Top 5 FC states are CA, CT, NY, OH, SC
- Follow-up report to be released later in 2011 – new up and coming states!
- http://www.fuelcells.org/statereport.html



STATE FUEL CELL AND HYDROGEN POLICY AND DEMONSTRATION DATABASE





STATE FUEL CELL AND HYDROGEN POLICY AND DEMONSTRATION DATABASE

Searchable database includes:

- All state policy, incentives, tax credits, grants, RPS, interconnection standards, net metering
- Stationary fuel cell installations
- Hydrogen fueling stations
- Vehicle demonstrations (cars, buses, forklifts)
- Roadmaps, initiatives, state/regional groups

Available at www.fuelcells.org

THANK YOU

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