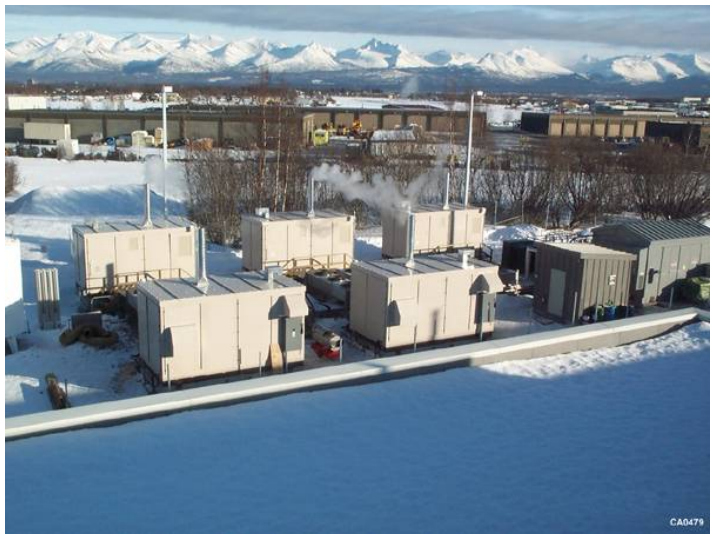
State and Regional Hydrogen and Fuel Cell Initiative
Sacramento Conference Center, Sacramento, CA
March 30, 2008



Policies to Advance the Development and Deployment of Fuel Cells: Case Studies in the Move to Mainstream Success

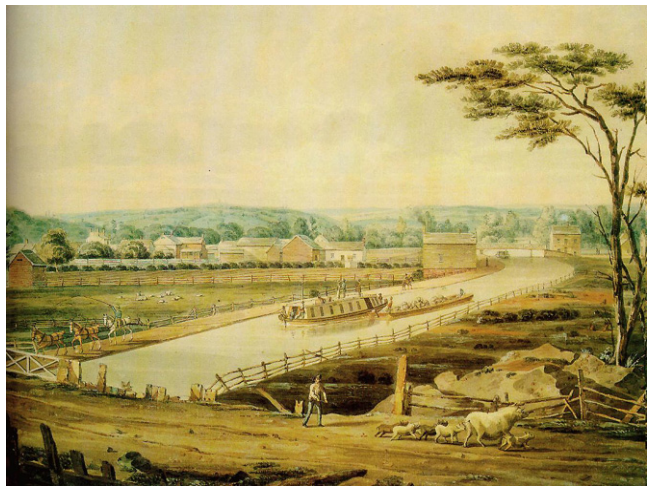
Daniel Dutcher
Clean Energy Group

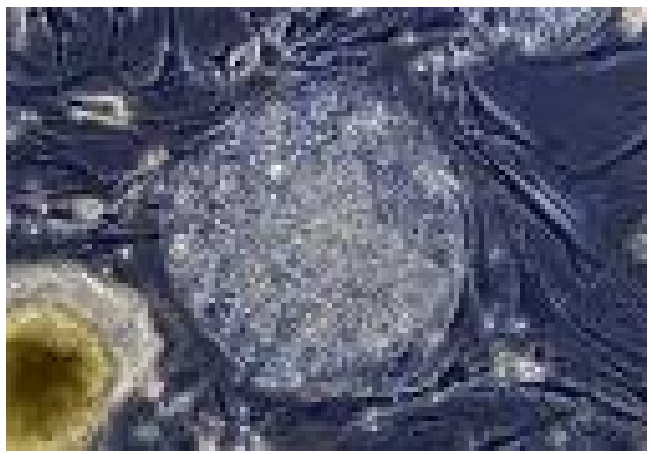
Presentation Overview

- Role of States
- Selected State Funding Programs:
  - New York State Energy Research and Development Authority (NYSERDA)—Subsidies for Commercially Available Fuel Cells and Non-Commercialized Fuel Cell Technologies.
  - Connecticut Clean Energy Fund—Required Long-Term Contracts for Utilities and Renewable Energy Buy-Down Programs.
  - Ohio Third Frontier Project—Manufacturing and Infrastructure Funding.
- Selected State and Federal Policy Issues:
  - Fuel Cells for Critical Infrastructure.
  - Performance Based Standards for Standby Power.
  - Policy Recommendations.

Role of States

- Federal-State Synergy:
  federal (redistributive)
  vs. state (developmental).
- Erie Canal to stem cells.
- States: historical locus for technology innovation.
- Clean energy resurgence consistent with American historical trends.





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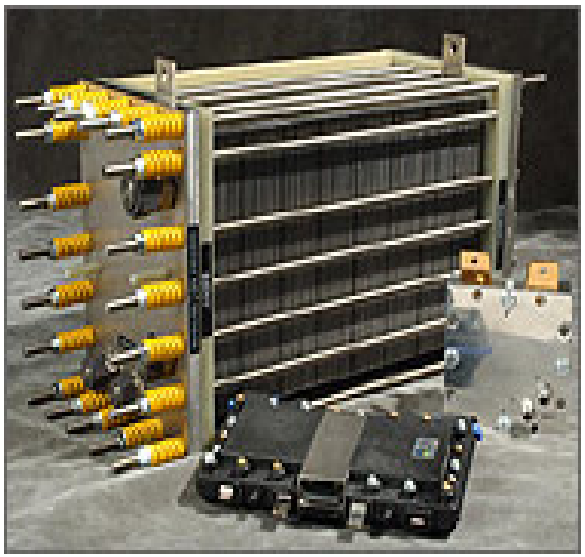
NYSERDA—Subsidy Model



- RPS behind-the-meter fuel cell program accepts open-enrollment proposals (first come, first served).
- Program aim is rapid installation (deployment) of commercially available fuel cells (not R&D or product testing).
- $11.2M available (beginning Dec. 2007 and ending no later than May 2009).
- Cap = $1M/Fuel Cell System.
- 2 types of incentive payments:
  - Capacity payments.
  - Performance payments.

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NYSERDA—Subsidy Model

- Environmentally preferred power systems technologies, including fuel cells.
  - Subsidies cover new product development, feasibility and tech transfer studies, and demo projects.
  - $12M scheduled for release by May 2008.
- Distributed generation as combined heat and power.

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Connecticut Project 150—Targeted Geographic Utility Model

- Electric restructuring legislation:
  - By 2008, local electric utilities must sign contracts approved by the Dep't of Publc Utility Control to supply at least 150 MW of CE.
  - Contract Length: Utilities enter into PPAs with RE generators for a minimum of 10 years and a maximum of 20 years.
  - Pricing includes wholesale and a premium up to 5.5¢ per kWh.
- DPUC has approved contracts for three fuel cell projects (2 hospitals and a natural gas gate station) to supply around 16 MWs.
- Managed by Connecticut Clean Energy Fund.

Connecticut On-Site Renewable Distributed Generation Program

- $32.75M support for behind-the-meter installations of RE at commercial buildings.
- Buys down the cost of renewable energy generating equipment to a level where such equipment provides a hedge against future electricity rate increases.
- Funding caps:
  - $4,700 per kW for projects of 1MW or less.
  - $3,200 per kW for projects over 1MW.

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Ohio Third Frontier Project—Economic Development Model

- Initiated in 2002, this ten-year, $1.6B initiative leverages federal and private support for a potential total commitment of $6B.
- "This project is the state's largest-ever commitment to expanding Ohio's high-tech research capabilities and promoting innovation and company formation that will create high-paying jobs…"
- The Project is administered by the Third Frontier Commission, legislatively created in 2003.
- The Commission allocates funds appropriated by the General Assembly.

Ohio Third Frontier Fuel Cell Program—Economic Development Model

- Provides grants that support the growth of Ohio's fuel cell industry through higher-education, nonprofit, and industry collaborations.
- Projects include research, development, technical and cost barriers to commercialization, and demonstration.
- From 2002 to 2007, this program awarded $62M to Ohio fuel cell projects.
- This project is administered by the Ohio Department of Development.

More Information About State Fuel Cell Funding

- NYSERDA
  http://www.nyserda.org/default.asp
- Connecticut Clean Energy Fund
  http://www.ctcleanenergy.com/news/65.php
- Ohio Third Frontier Fuel Cell Program
  http://www.ohiochannel.org/your_state/third_frontier_project/program.cfm?program_id=80264

State-By-State Analysis of Fuel Cell and Hydrogen Policies, Incentives, and Demonstrations

State Activities that Promote Fuel Cells and Hydrogen Infrastructure Development (October 2006).

by Sandra Curtin and Jennifer Gangi, Breakthrough Technologies Institute, Inc, Washington, D.C.

http://www.fuelcells.org/info/StateActivity.pdf

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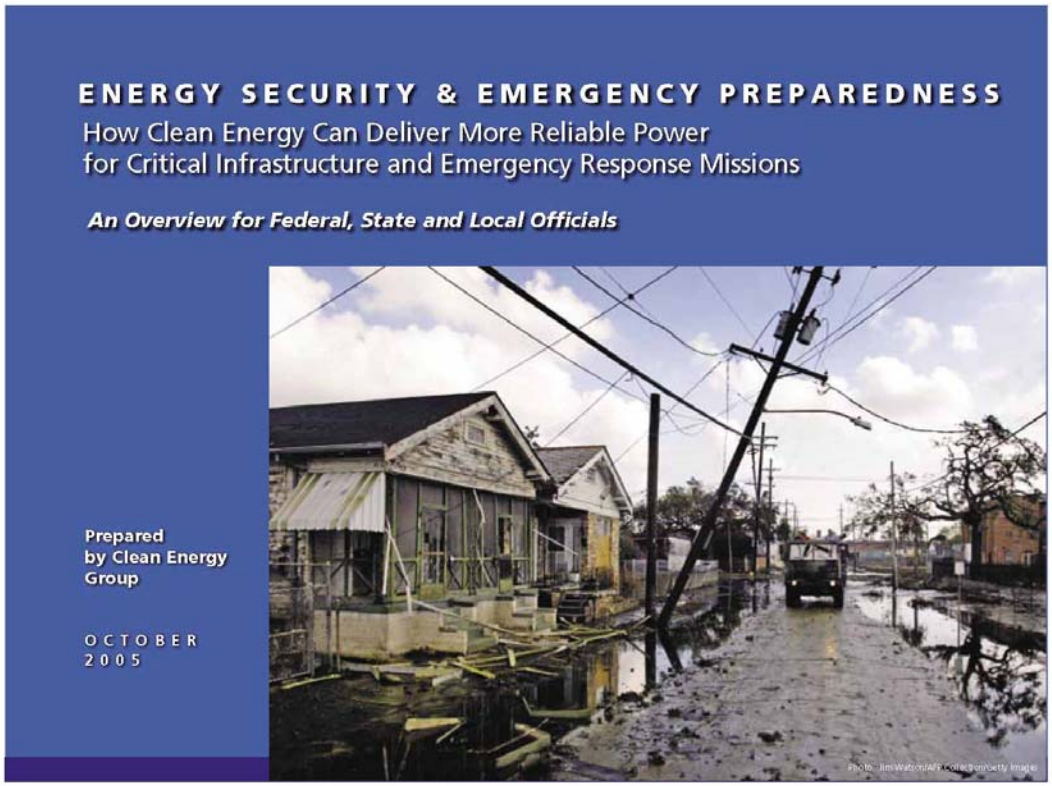
Fuel Cells for Critical Infrastructure



http://www.cleanegroup.org/Reports/CEG_Clean_Energy_Security_Oct05.pdf

- Important public benefits, including security and reliability, can be realized through aggressive targeting of critical power markets.
- Critical facilities = homeland security; 911; police, fire, and other emergency-management operation centers; hospitals and health centers; schools that serve as emergency shelters; telecommunications facilities; similar buildings and facilities that serve important public-safety functions in times of emergency and crisis.
- These niche applications merit early-market financial assistance.

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Case Example: Telecommunications

- FCC moving to require U.S. cell transmitter sites to have at least eight hours of backup power.
- Several phone companies have appealed the new FCC regulations, citing economic and bureaucratic burdens.

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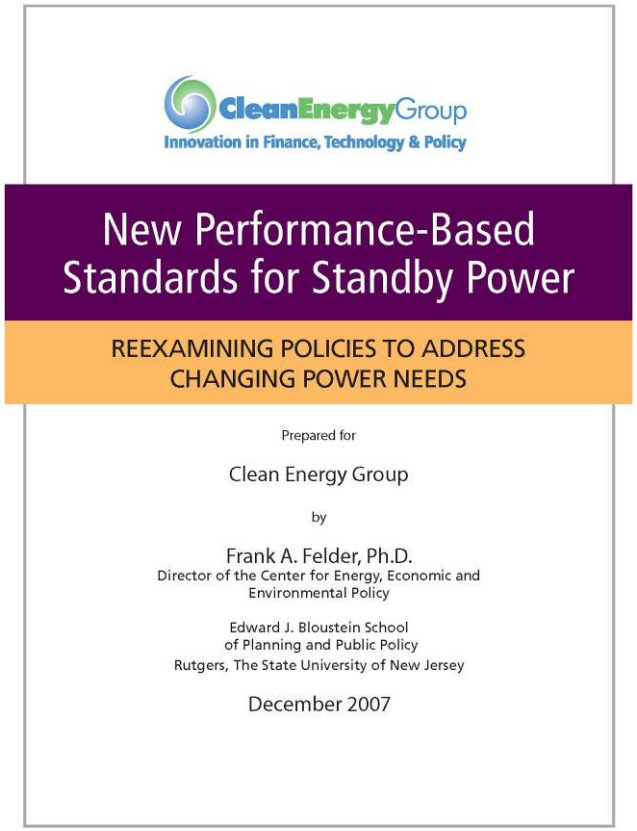
Performance Based Standards for Standby Power

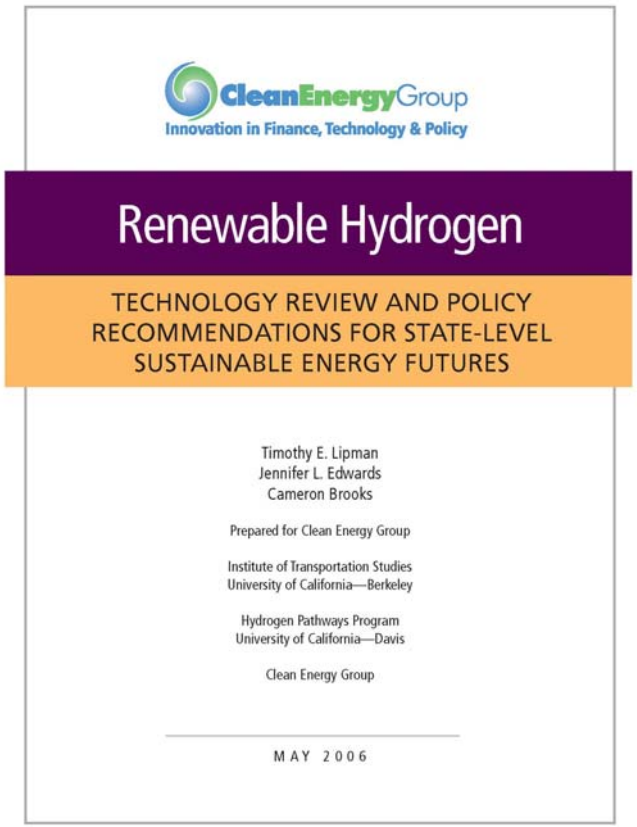
- Current performance-based standards may function as de-facto technology-based standards favoring diesel generators.
- History of failure of diesel generators in emergencies.
- Updated standards would account for advances in fuel-cell technologies, evolving security and technical demands for standby generation, and increasing environmental awareness.



http://www.cleanegroup.org/Reports/standby_power_rpt_Dec07_Final.pdf

Policy Recommendations for State Fuel Cell Programs

- In addition to transportation, efforts to incorporate hydrogen into stationary power and electricity infrastructure need greater attention.
- Renewably produced hydrogen is one of the few zero-carbon energy storage solutions.
- Natural gas may be an important part of a transition strategy.

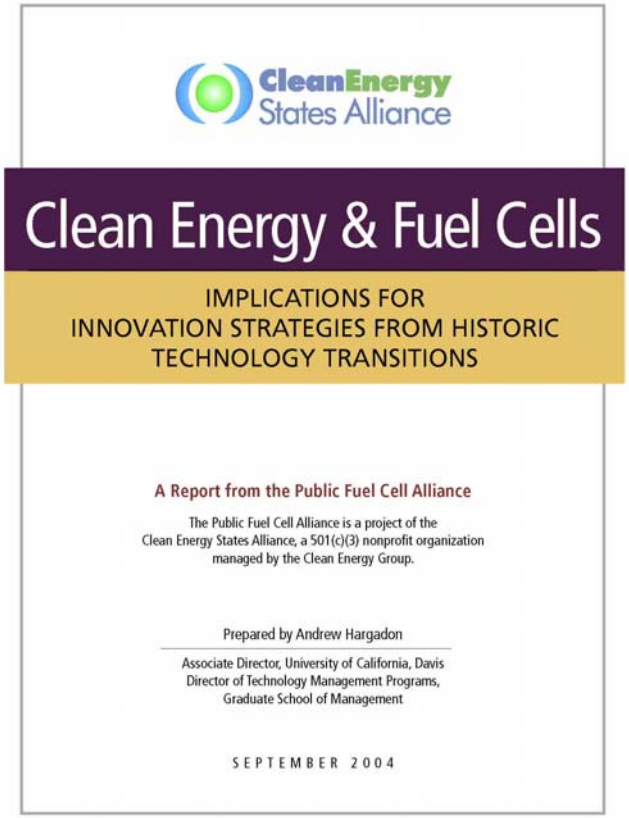


http://www.cleanegroup.org/Reports/CEG_Renewable_Hydrogen_May2006.pdf

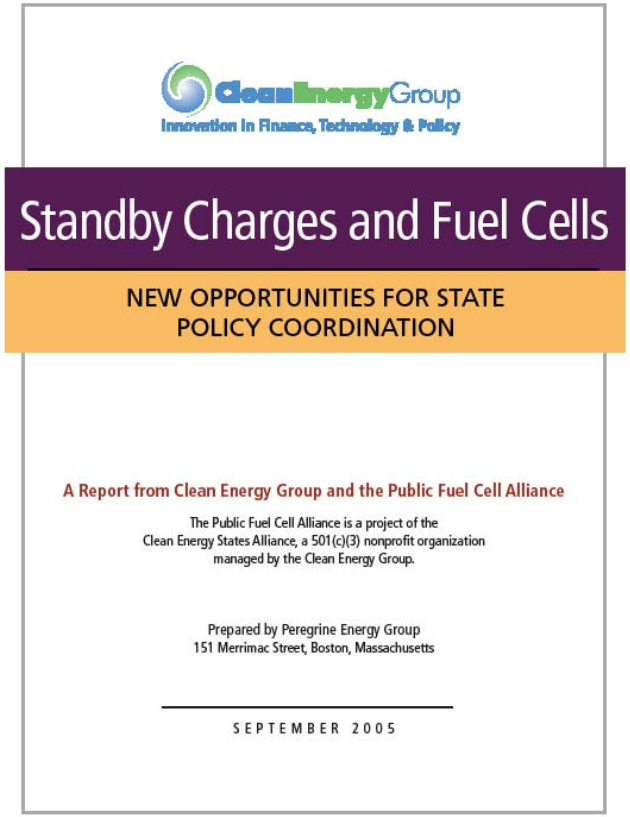
Opportunities for State Hydrogen Programs

- Link significant funding to commercialization pathways.
- Demonstrate the viability of hydrogen storage and production for critical applications.
- Visibly link hydrogen production and clean energy technologies.
- Establish incentives for high-value, on-site applications (e.g., backup power and battery replacement).
- Create regulatory incentives (e.g., standby-charge exemptions, net metering policies, distributed generation policies, renewable portfolio standards).
- Accelerate private investment (through tax incentives, risk sharing, etc.).
- Develop compelling public communications strategies (to raise awareness and address misperceptions).

Additional Resources



http://www.cleanenergystates.org/JointProjects/PFCA/Hargadon_Fuel_Cells_Sept2004.pdf



http://www.cleanenergystates.org/library/Reports/Standby_Charges_and_Fuel_Cells_Sept05.pdf

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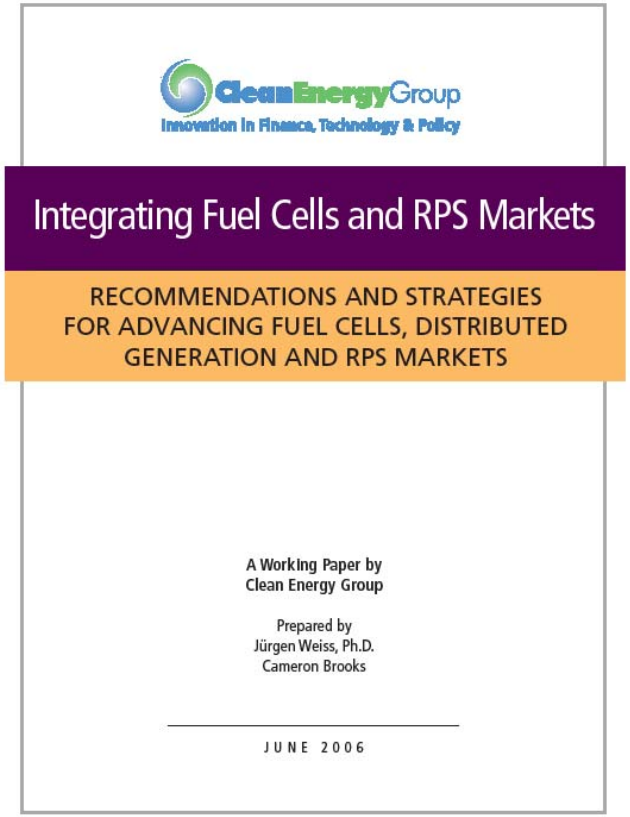
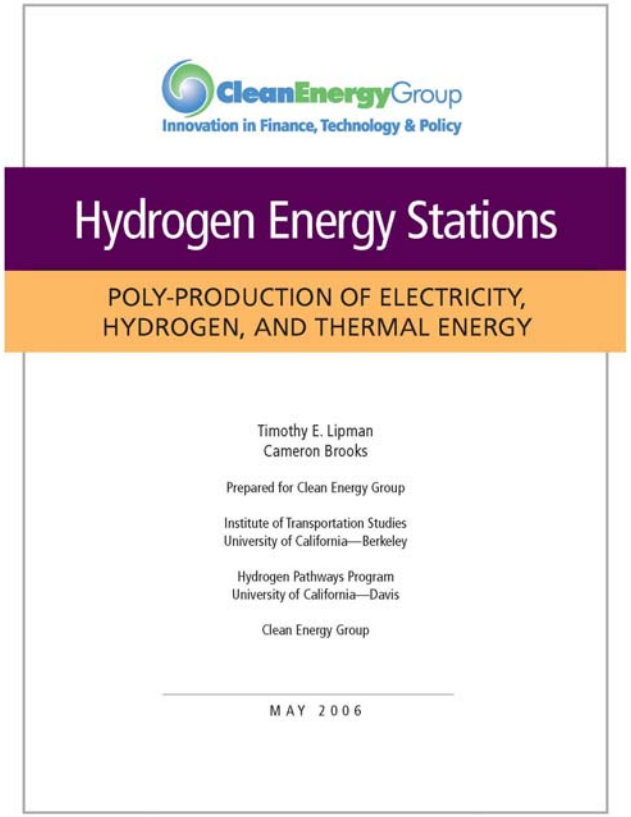
Additional Resources (Cont'd)



http://www.cleanegroup.org/Reports/CEG-Intergrating_Fuel_Cells_RPS_Markets_June2006.pdf



http://www.cleanegroup.org/Reports/CEG_Hydrogen_Energy_Stations-May2006.pdf

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