

Fuel Cells in the Mainstream

The Developer's Perspective

June 21, 2010

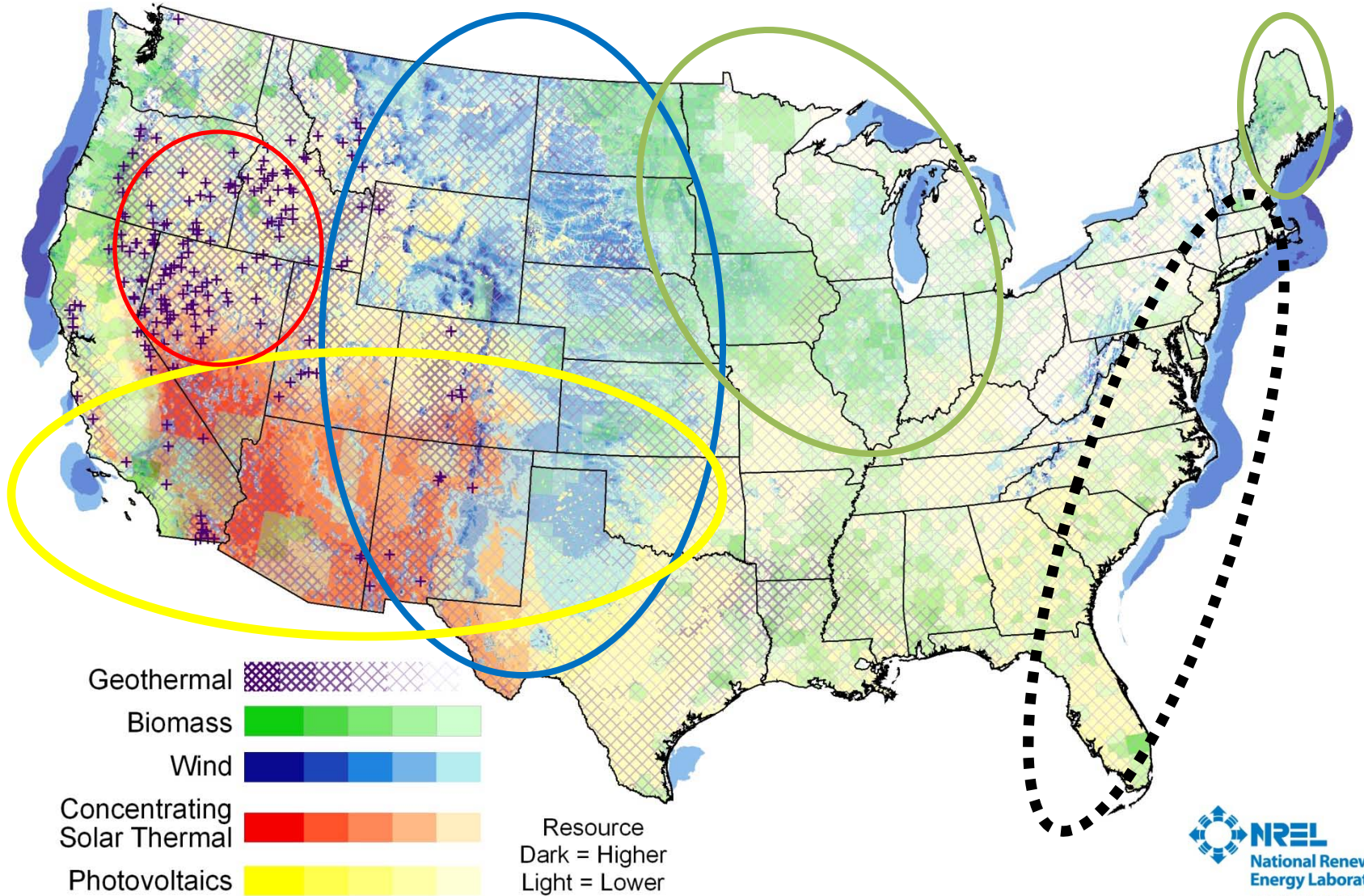
Cube Project Particulars

- 3.4 Megawatts Grid Interconnection
- ~60% electrical efficiency – best distributed generation available
- 20-Year PPA executed with CL&P
- Approval by PUC for “rate basing”
- Permitting accomplished
- Fixed-Price, turnkey EPC contract
- REC-eligible in CT
- Classified as a “Load Reducer”

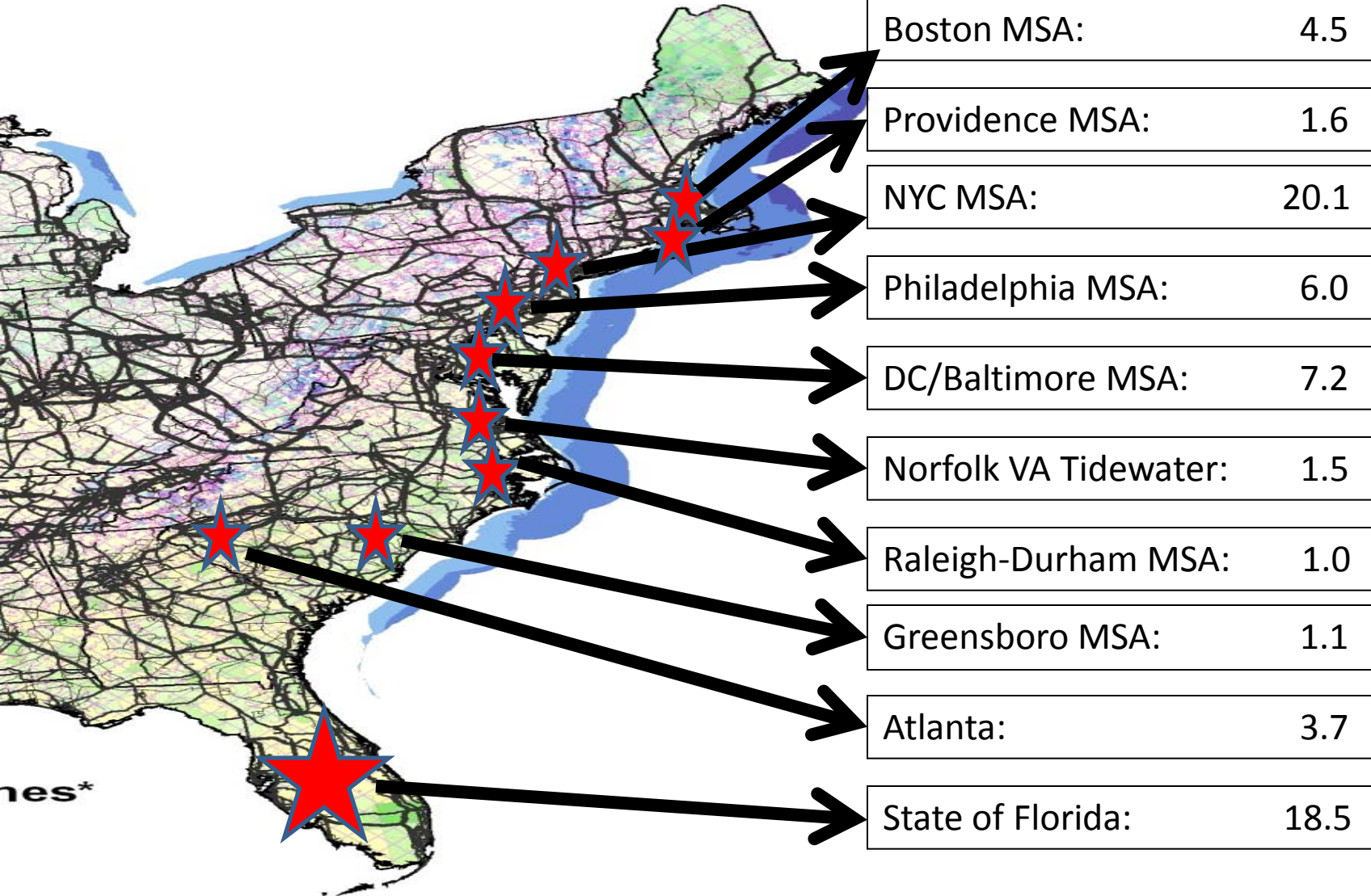
Alternative Energy Development

- Resource Driven
- Transmission
 - Availability
 - Constraints
 - Cost to construct
 - Impact to pricing
- Construction Constraints
 - Roads
 - Infrastructure
 - Terrain
- Permitting
- Pricing

U.S. Traditional Renewable Resources



Urban Center Population – 62 million



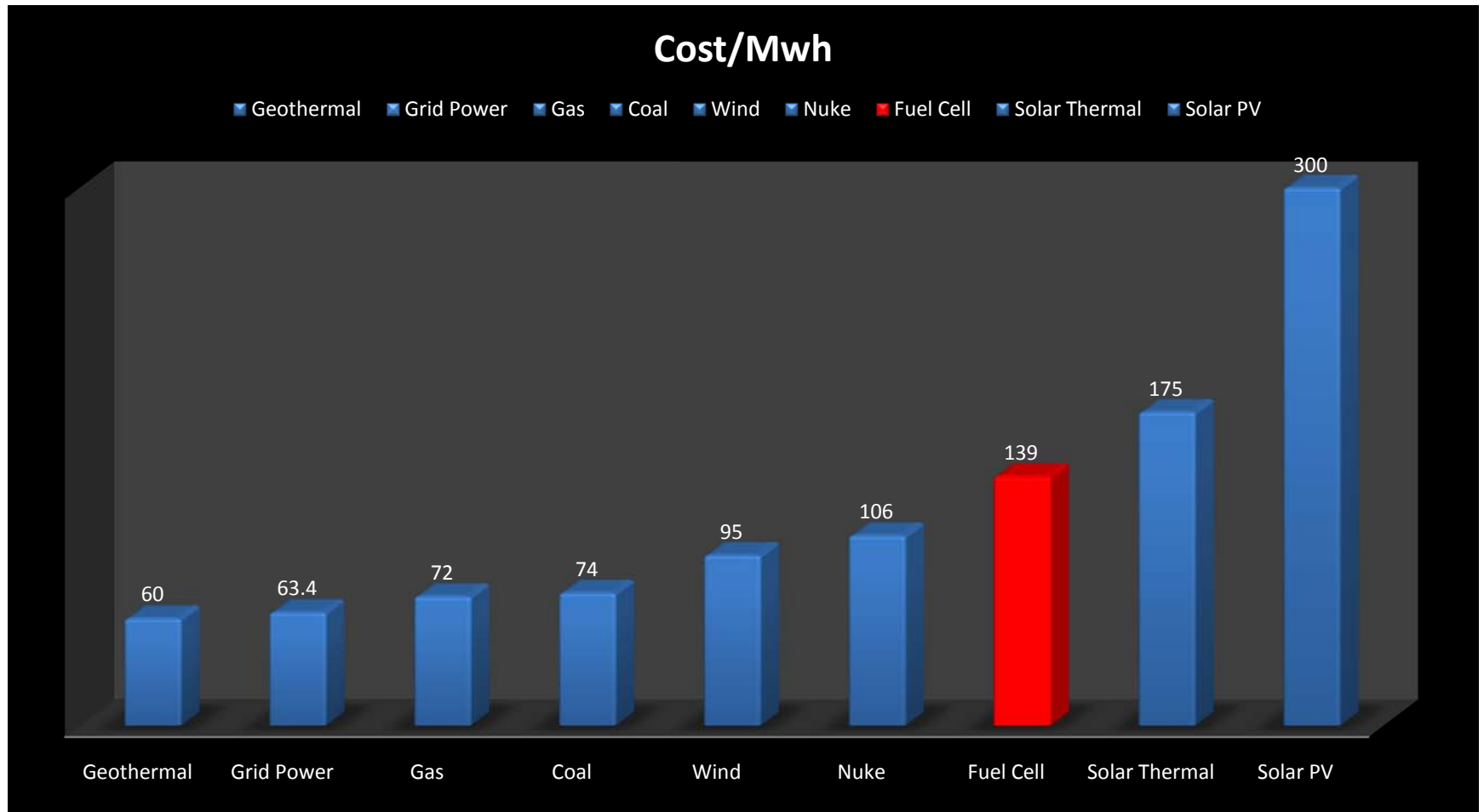
Fuel Cell Siting

- Locate anywhere – especially inside transmission constraints
- Easy to build and size – modular design
- Baseload
- No resource study – time to generation shorter
- Others
 - Ease of permitting (inside industrial zones)
 - Low water use
 - Low visual impacts

Urban Clean Energy Solution

- High energy output to physical footprint density
 - Wind: 1 acre disturbed land per 2 mw + 5 acres under control divided by 33% equals ~20 acres per megawatt hour.
 - Solar: Approximately 10 acres per megawatt divided by 20% equals about 50 acres per megawatt hour.
 - Fuel Cell: Approximately 10 megawatts per acre divided by 90% capacity factor makes them 180 times more dense than wind and 450 times more dense than solar
- No transmission lines
- Fits into the landscape
 - Low noise profile
 - Low visual profile
 - Low water use
- Base Load source of power

Comparative Cost of Power Sources



Subsidy “Parity”

- Compare government support for alternative clean energy technologies:
- Solar:
 - 30% ITC on \$4500 per kilowatt = \$1500
 - 20% capacity factor
 - Equals **\$7500** equivalent capacity subsidy
- Wind:
 - 30% ITC on \$2000 per kilowatt = \$600
 - 33% capacity factor
 - Equals **\$1,800** per equivalent capacity subsidy
- Fuel Cells
 - 30% ITC on \$4500 per kilowatt = \$1500
 - 95% capacity factor
 - **\$1,579** per equivalent capacity subsidy

Future Support

- Credit for localization
 - Ohio RPS good example
- Bulk purchases (example: Capitol Power Plant)
- Credit for transmission offsets
- Access to low cost capital
- Credit for low NOx
- Other Benefits
 - Low noise
 - Low water use
 - Smaller footprint