

ASERTTI
Winter Meeting
February 6-8, 2006

Mark Dougherty

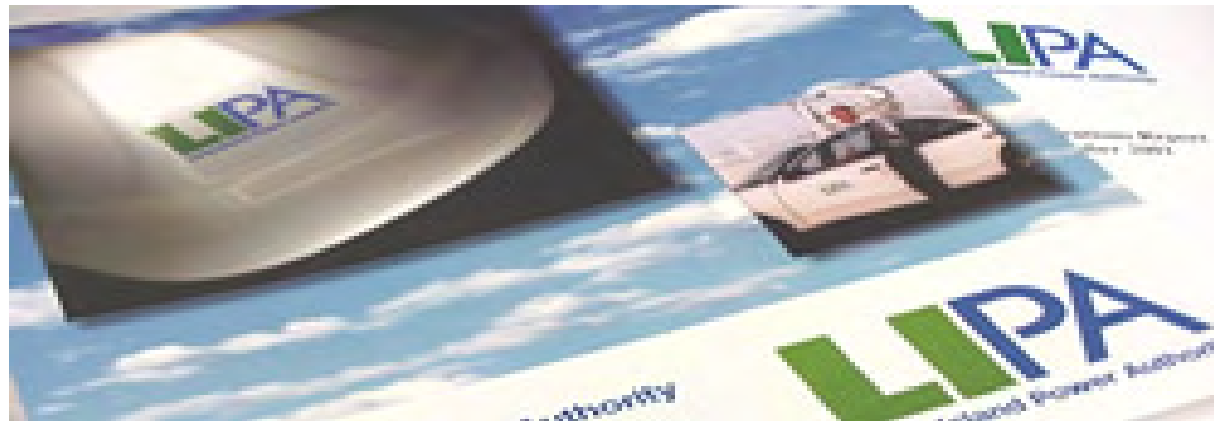
Manager of Distributed Generation & Renewable Programs

Long Island Power Authority

Clean Energy Initiative



- Ten year, \$355M effort proposed by Governor Pataki
- Achieve energy and capacity savings
- Reduce electric bills
- Provide environmental benefits
- Stimulate local economy



Clean Energy Initiative



Results:

- Through 2004 over \$200 million dollars on energy conservation
- Nearly (1) million megawatthours saved during the first six years
 - enough to power 105,000 average sized Long Island homes for one year
- Reduced Long Island's peak demand by 322 MW
- Avoided burning 775,000 barrels of oil and 3.4 million decatherms of natural gas for electrical generation
- CEI Program has avoided the following emissions:
 - 5,000 tons of sulfur dioxide
 - 1,900 tons of nitrogen oxides
 - 1.3 million tons of carbon dioxide
- Economic Stimulus
 - saved LIPA customers over \$206 million dollars
 - led to the creation of over 3,500 jobs on Long Island

CEI Program Mix



Residential

- Lighting and Appliances
- Cool Homes (HVAC)
- Energy Affordability (REAP)
- Solar Pioneer
- Information/Education
- New Construction (NY Energy Star)
- Home Performance with Energy Star

Commercial

- Commercial Construction
- Retrofit Energy and Capacity (RECAP)
- Peak Reduction
- Resource Conservation Manager

Multi-Sector

- Customer Demand Management (*LIPAE*edge)
- Customer Driven Efficiency

Research Development and Demonstration

- Development and demonstration of clean alternative generation technologies
- New energy efficient technologies

Clean Energy Initiative

Research Development & Demonstration



■ R&D Clean Energy Initiative program (through 2005)

- \$36 MM Dollars
- 6,604 MW-hrs
- Cumulative Emissions Savings
 - 39,085 lbs of SO₂;
 - 11,019 lbs of NO_x;
 - 7,386,980 lbs of CO₂
 - Equivalent to 6.6 million car miles
 - Equivalent to 10,624 bbls of oil or 66,040 decatherms of gas

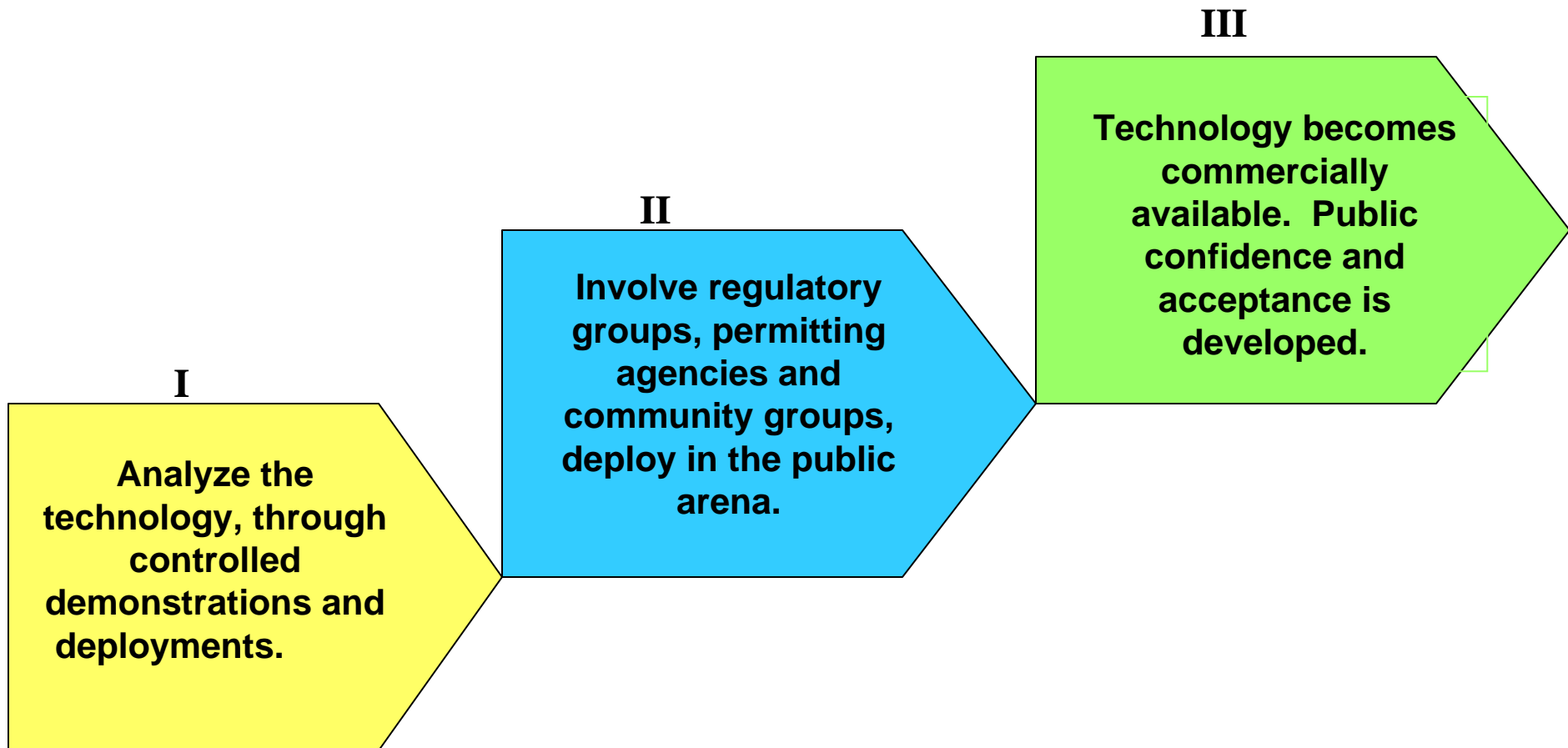


■ Summary- National leadership in Distributed Generation

- DOE/DOT- recognition, co-funding & interest
- Fuel Cells – 174 installations; 870 kw
- Wind – 5 units; 170KW;
- PV demo's– 4 sites, 1.051 MW
- 115 Alternate Fueled Vehicles
- Geothermal – new design; 2 test sites, 1 operating



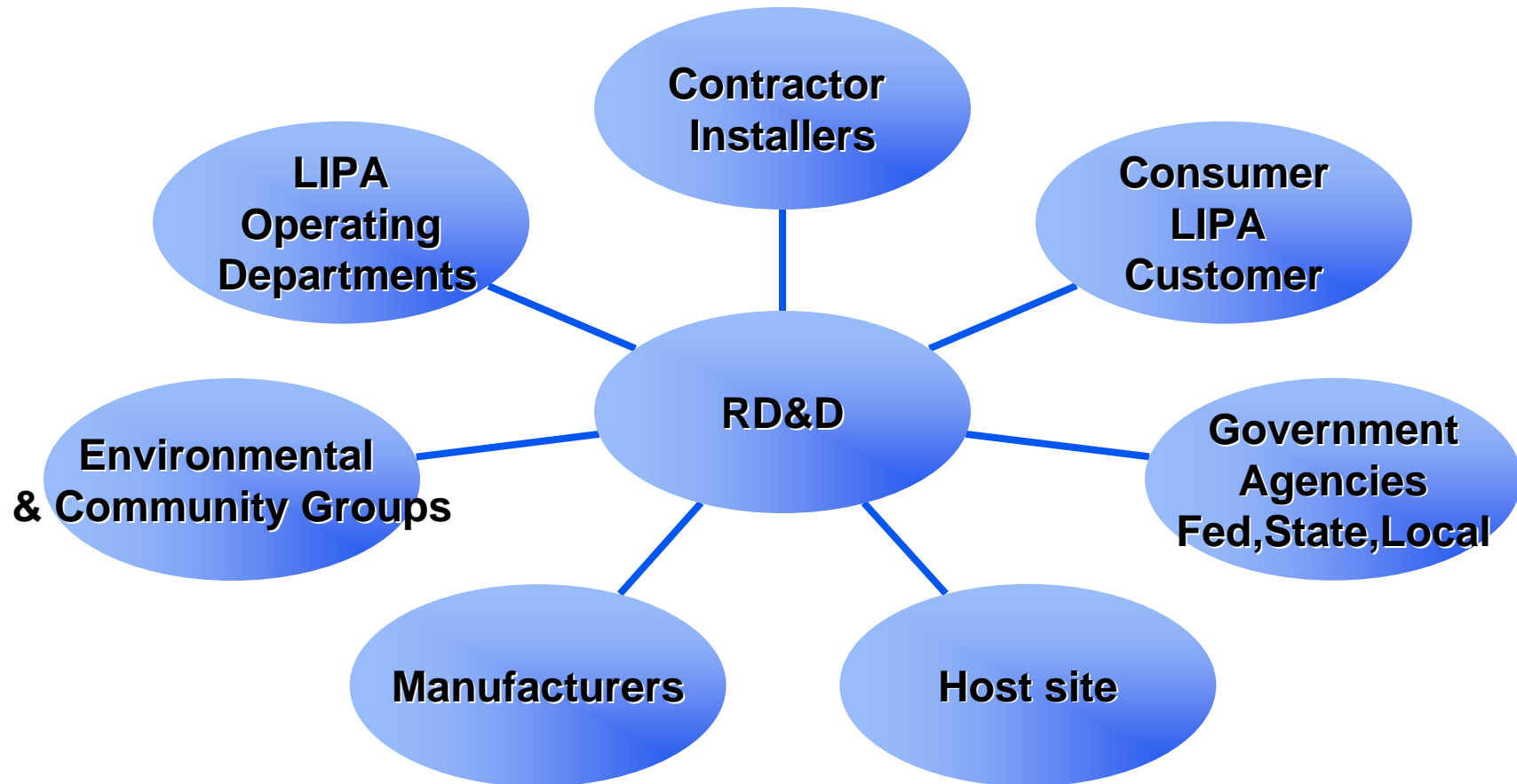
Market Transformation



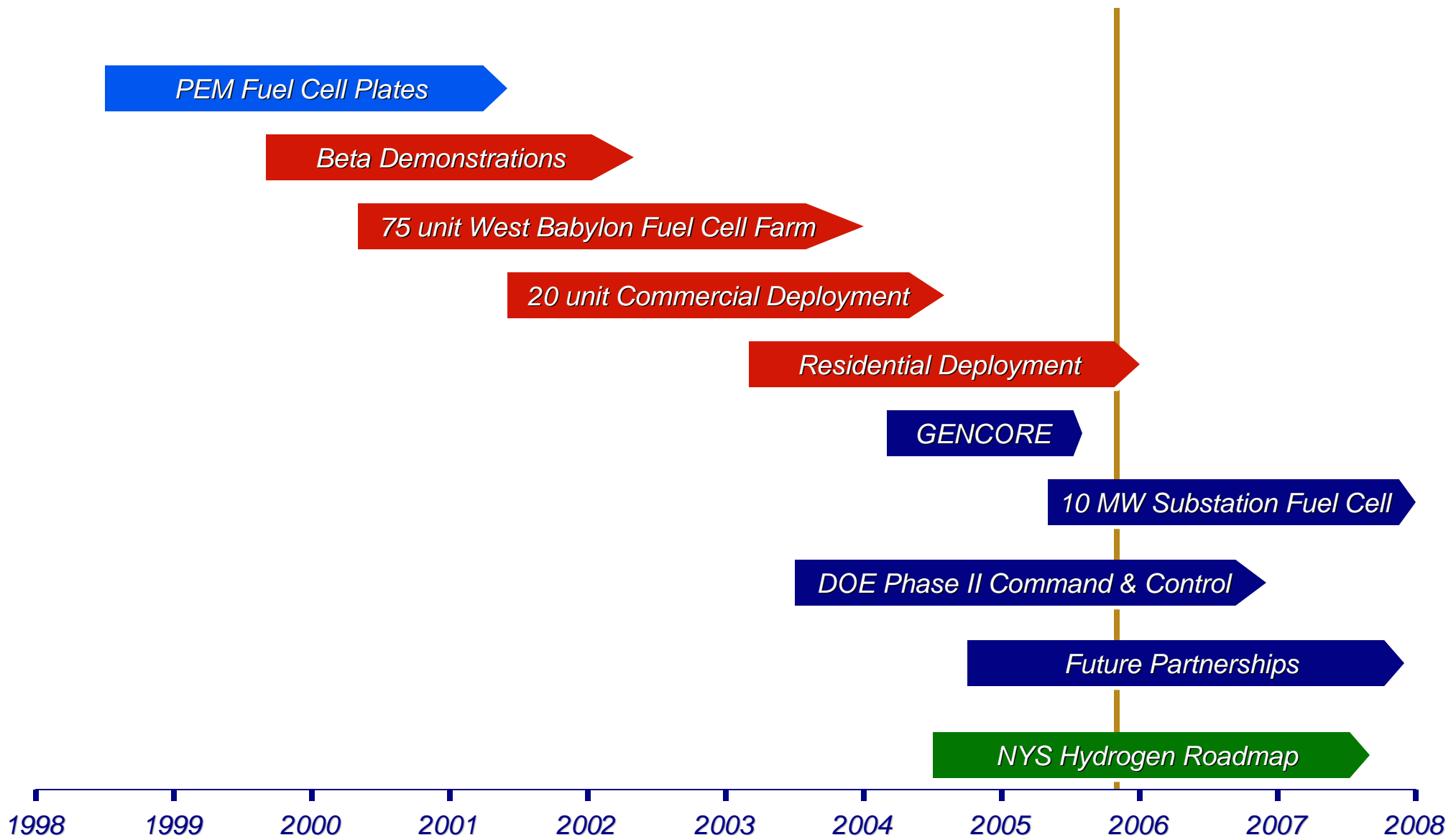
Market Participants



Research Development & Demonstration Market Transformation thru Demonstration to Commercialization



R&D – Fuel Cell Project Progression



Clean Energy Initiative

R&D – Fuel Cells



■ Overview

- Worlds largest Distributed Generation Test Facility (up to 75 fuel cells)
- Aggressive remote deployments- 22 fuel cells currently & anticipate agreements for future demonstrations units.
 - Universities & Colleges
 - Commercial
 - Residential
- Gencore installation at West Babylon as a UPS backup to substation batteries



■ Objective & Strategy

- Assess field performance and unit reliability
- Demonstrate current and future generation units
- Determine market barriers
- Educate consumers & regulators about the technology
- Assist manufacturers to make improvements to equipment
- Hydrogen Roadmap



Clean Energy Initiative

R&D – Fuel Cells



■ Successes & Lessons Learned

- Developed relationships with government entities, business and educational institutions that has facilitated deployment.
- Technology works in various modes (grid parallel, CHP, UPS)
- Permitting process is lengthy
- Latest product deployed requires less maintenance.
- Siting and construction process is better defined and less onerous.

■ Barriers to Implementation

- Permitting Process is lengthy
- Cost
- Industry Infrastructure
- Reliability of Units

■ Future Efforts

- Inroads to Commercialization (residential, micro grid)
- Work in partnership with manufacturers to develop an integrated design
- Implement Hydrogen Roadmap



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R&D – Fuel Cells



BETA INSTALLATION



FUEL CELL FARM



COMMERCIAL INSTALLATIONS

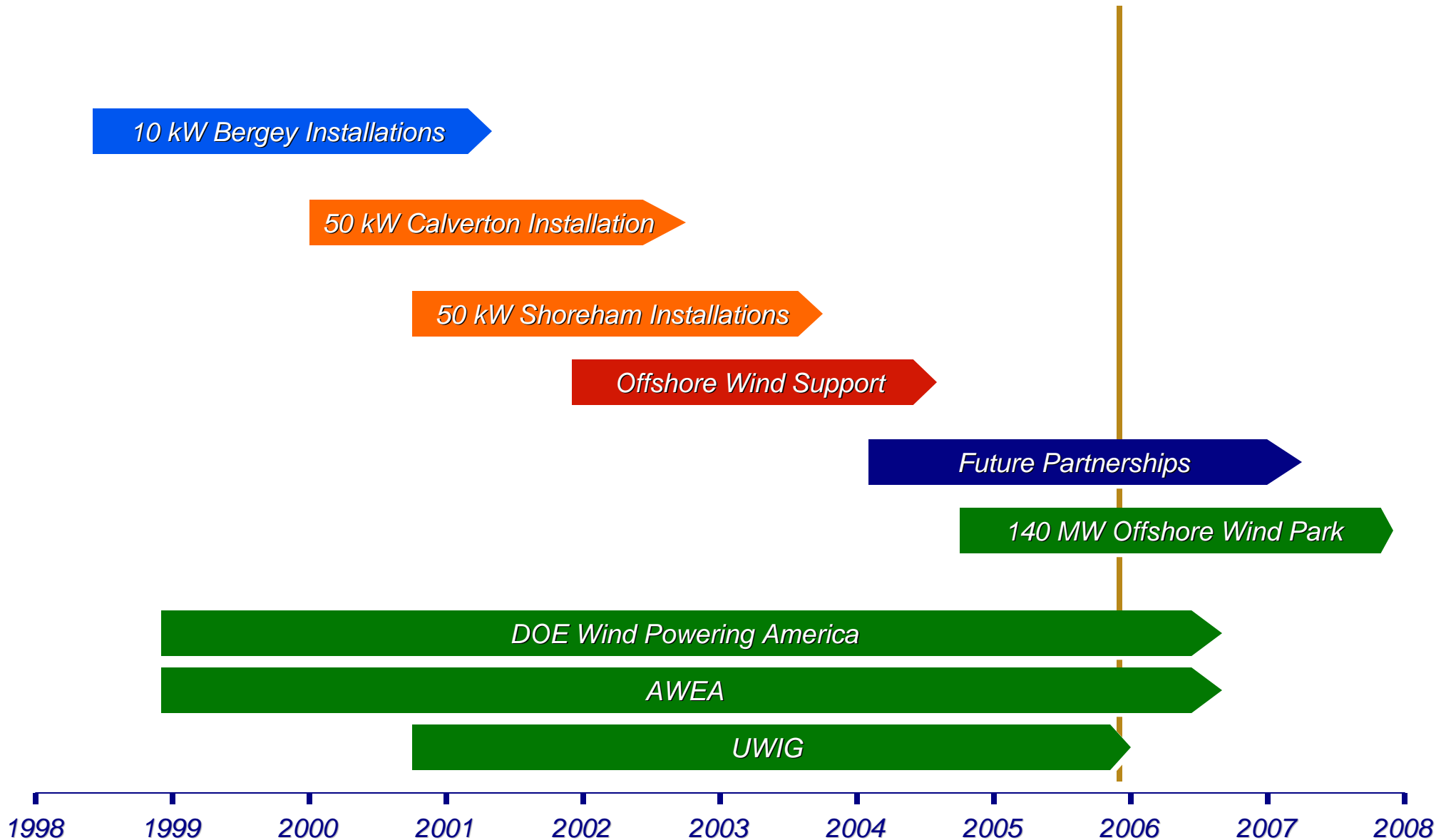


RESIDENTIAL INSTALLATIONS



GENCORE

R&D – Wind Project Progression



Clean Energy Initiative

R&D – Wind Power

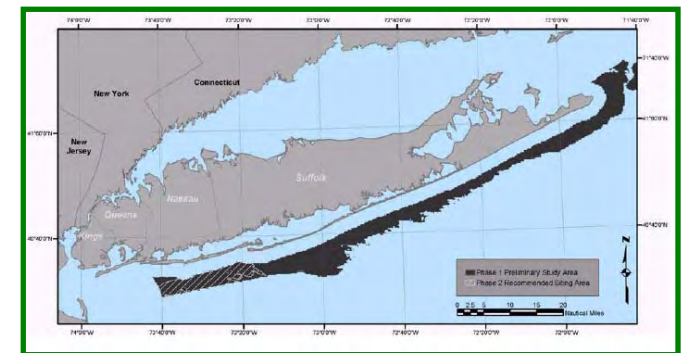


■ Overview

- Installations at Calverton, Shoreham, LIU Southampton, & Brookhaven
- Strategic collaborations with DOE, NYSERDA & LI Farm Bureau
- Turbine demonstrations range from 10kW – 50KW
- Facilitated Larger projects: land based study; offshore RFP

■ Objective & Strategy

- On Island renewable generation by leveraging LI wind potential
- Gain public acceptance through demonstration programs
- Determine impact of renewable wind generation on grid
- Experience with renewable resource and industry



Clean Energy Initiative

R&D – Wind Power



■ Successes & Lesson Learned

- Local zoning approval is time consuming
- Large vs. small turbine manufacturer financial & warranty issues
- Good public acceptance of LIPA's wind demonstrations

■ Barriers to Implementation

- Zoning Variances (>30 ft) and Permitting Process
- Critical Siting Issues
- Environmental
- Cost
- Competing Land Use

■ Future Efforts

- Install additional land-based wind turbines (100 KW)
- Low Wind Speed Turbine Technology Program (LWST)
- DOE/AWS lower cost barrier
- Anemometer loan program for siting studies
- Support NYS Wind Tariff
- Web-Based Wind Tools



Clean Energy Initiative

R&D – Wind Power



**SOUTHAMPTON &
BROOKHAVEN**



CALVERTON

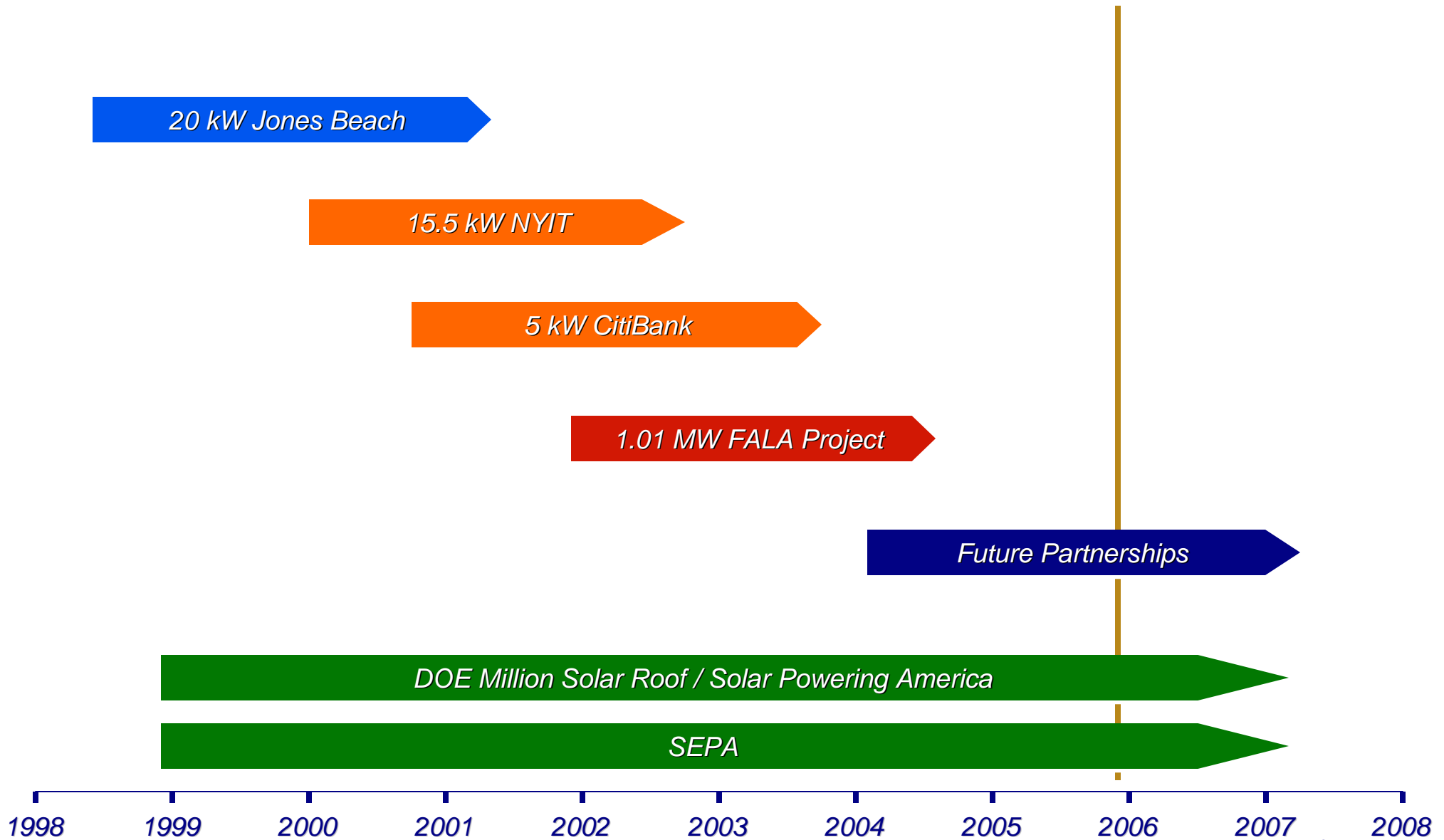


SHOREHAM



OFFSHORE WIND

R&D – Solar PV Project Progression



Clean Energy Initiative

R&D – Solar Photovoltaics



■ Overview

- Installations at FALA, NYIT, Jones Beach & Citibank Park
- FALA installation 1.01MW at three locations

■ Objective & Strategy

- Assess PV performance and inverter issues
- Investigate advances in solar technology
- Grid Impact Studies

■ Successes & Lessons Learned

- FALA – largest commercial PV site in US
- Over 600 Solar Pioneer participants
- PV technology & market mature

Future Efforts

- R&D will continue to assess new PV technology
- Examine interconnect Inverter issues
- Technical Support of Solar Pioneer Program



Clean Energy Initiative

R&D – Solar Photovoltaics



JONES BEACH



NYIT

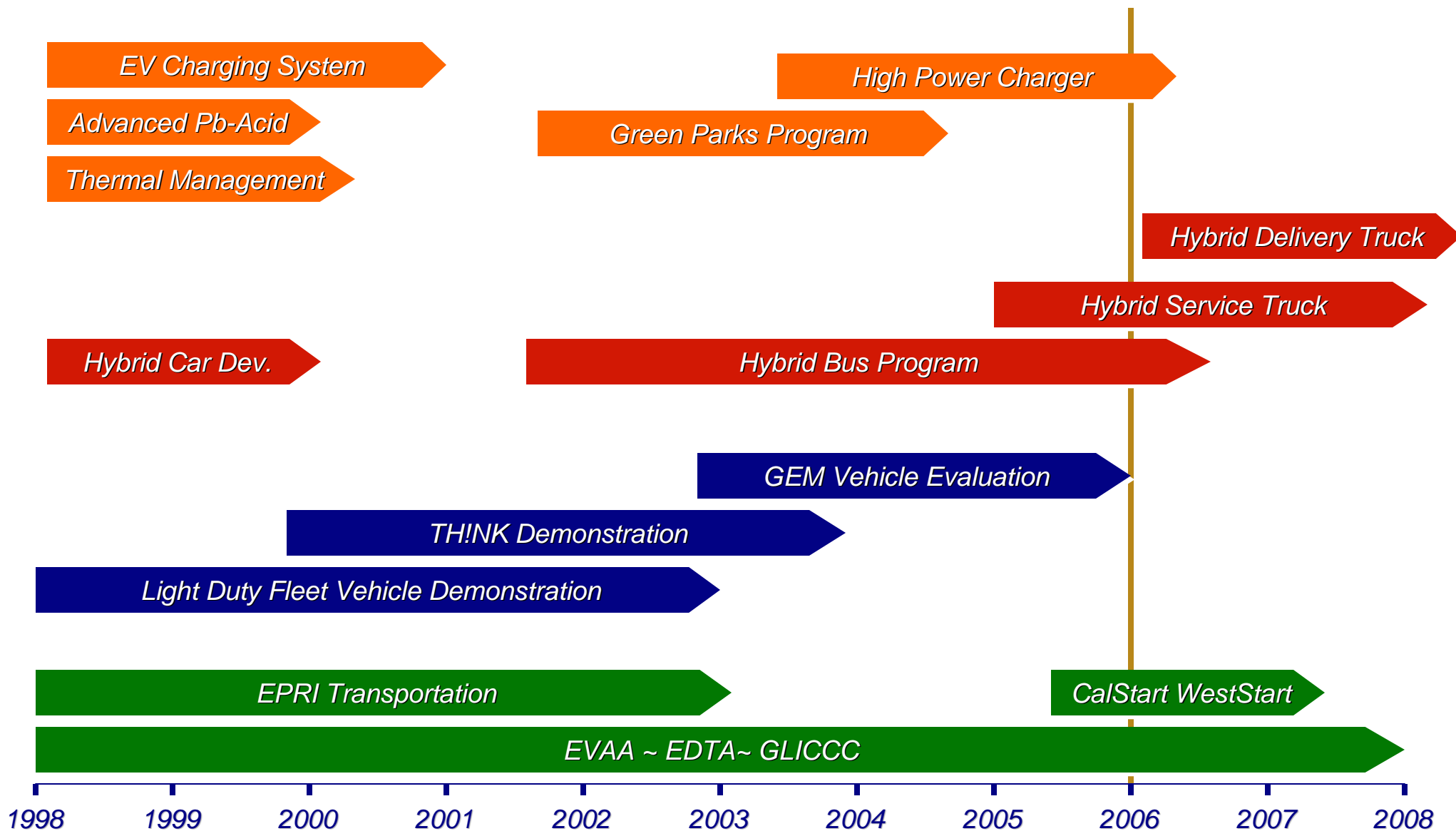


CITIBANK PARK



FALA DM

R&D – Alternate Fueled Vehicles Project Progression



Clean Energy Initiative

R&D – Alternate Fueled Vehicles



■ Overview

- 14 EVs assessed (Solectria, Rangers, EPICs, Hondas)
- Station Car/Neighborhood Vehicle Program (46 Ford Th!nk)
- Global Electric Motorcars (50 GEMs) donated to LIPA
- Plug-in Hybrid Bus - in development
- Hybrids (4 Prius' & Civics')
- Fast battery charging



■ Objective & Strategy

- Public Acceptance & Education
- Investigate Infrastructure Issues
- Partnership with Organizations



■ Successes & Lesson Learned

- Battery EV's serve niche market
- Range is key issue with consumers
- Market "driven" by technology
- Infrastructure



■ Future Efforts

- Hybrid bucket truck
- Plug-In Vehicles, Fuel Cell Car

Clean Energy Initiative

R&D – Alternate Fueled Vehicles



SOLECTRIA'S



FORD TH!NK



GEM VEHICLES



PLUG IN HYBRID BUS

Clean Energy Initiative

R&D – Geothermal (GeoColumn)



■ Overview

- Innovative Design and Small Footprint address major market barrier- installation costs
- Installed, beta tested, and removed at Hofstra
- Installed and tested at Nassau County Sands Point Preserve

■ Objective & Strategy

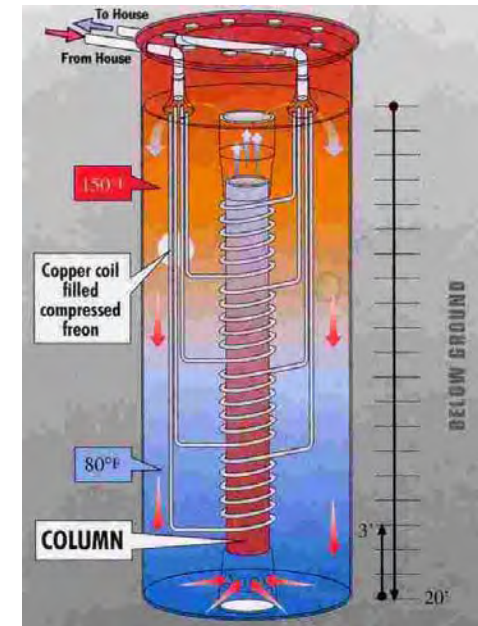
- Determine summer & winter performance
- Assess material and installation costs
- Commercialization potential

■ Successes & Lessons Learned

- Performing reliably
- Need site specific data for benchmark performance
- Containment design issues (leakage)
- Discussions/meetings on commercialization plans

■ Future Efforts

- Licensing; finalize commercial agreement
- Technology Transfer (R&D/ Marketing)
- Manufacturer rebate for LIPA customers
- Goal that this cost effective technology “sells itself”



Clean Energy Initiative

R&D – Other



■ Geothermal

■ Cooperative R&D for Advanced Communication and Control

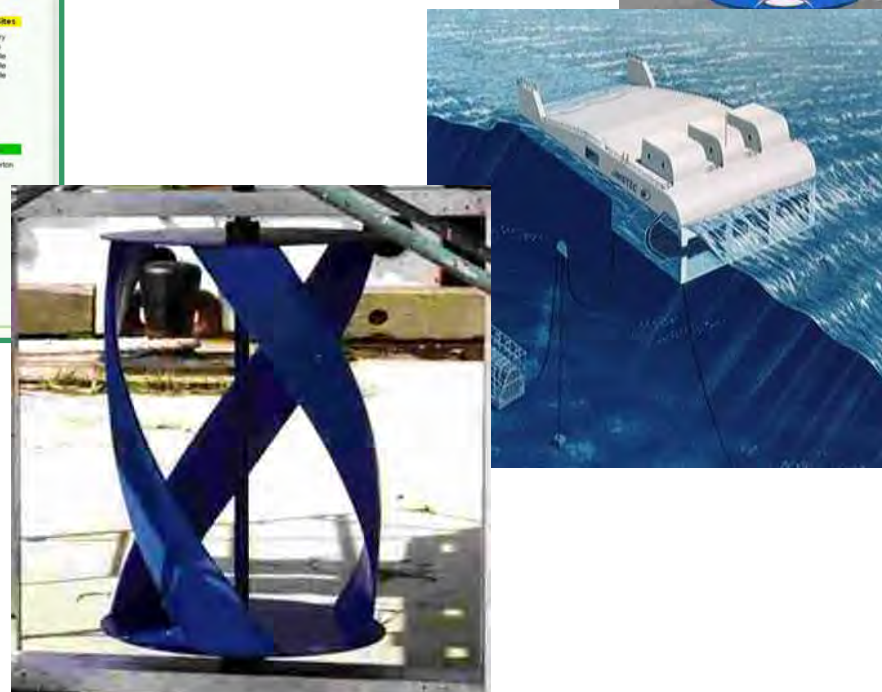
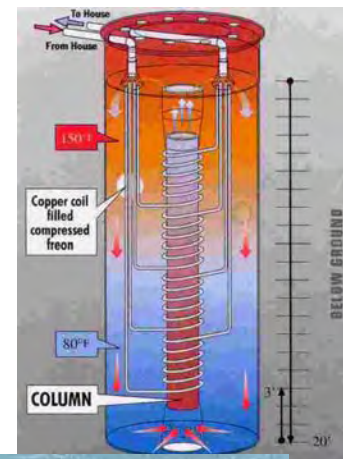
■ Tidal Power

■ Wave Power

■ Hybrid Lighting

■ High Power Batter Charger

■ Battery Storage



Questions?

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LIPA Clean Energy Initiative

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