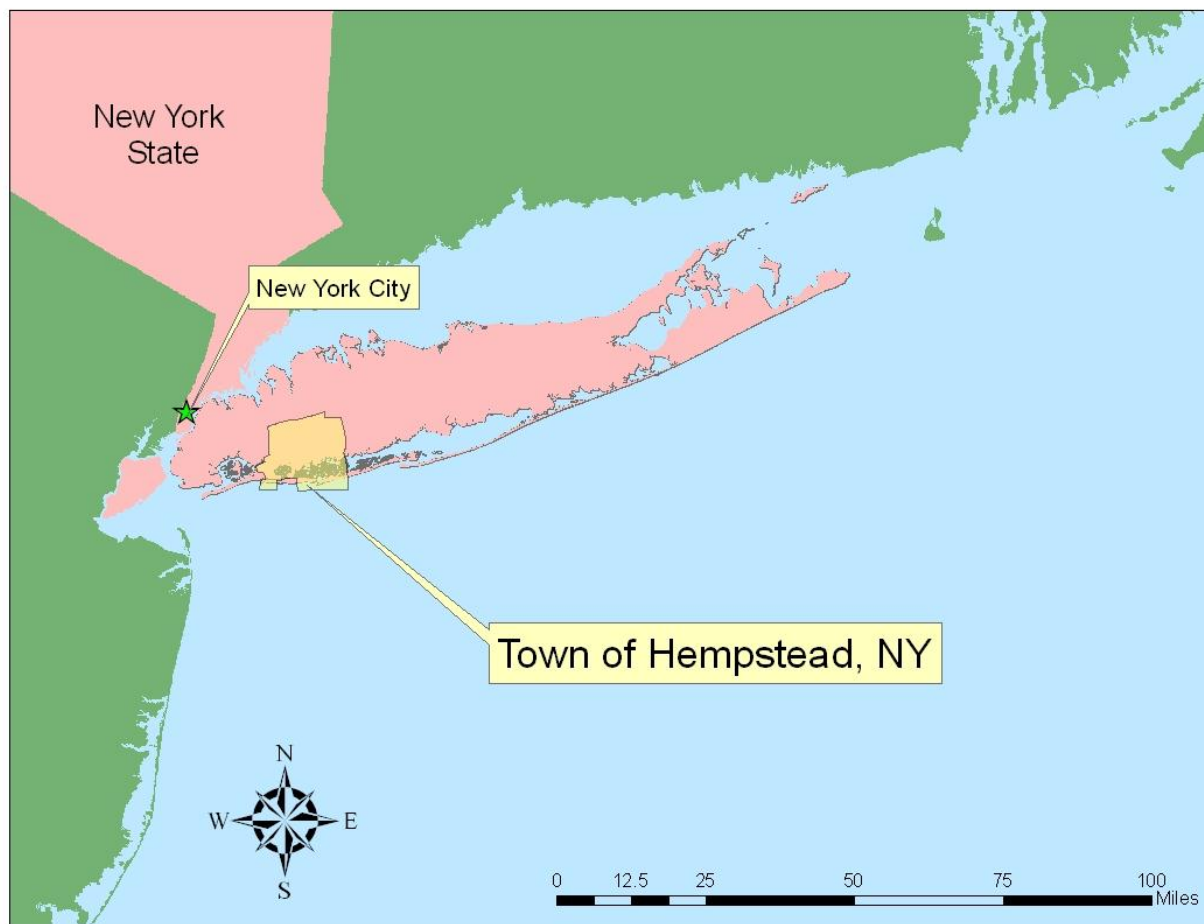




From
Project Execution
To
Outreach & Education

Town of Hempstead?



- Located in western Long Island, bordering Queens, NY
- Established 1644
- Population: 760,000



ENERGY PARK

Information Gathering

- Motivated by Conservation Commissioner Ron Masters
- LIPA Feasibility Study on Wind
- Installed Anemometer - Wind Data
- Informational Meetings:
 - Local Municipalities, Universities, Private Industry
 - Suffolk County, LIPA, National Grid, Merchant Marine Academy



ENERGY PARK

Location

Conservation & Waterways

- **Outreach for Community**

Environmental facility with an environmental message

- **Model for Others**

Data Collection and Monitoring



ENERGY PARK: Location



1ST SOLAR PV INSTALLATION



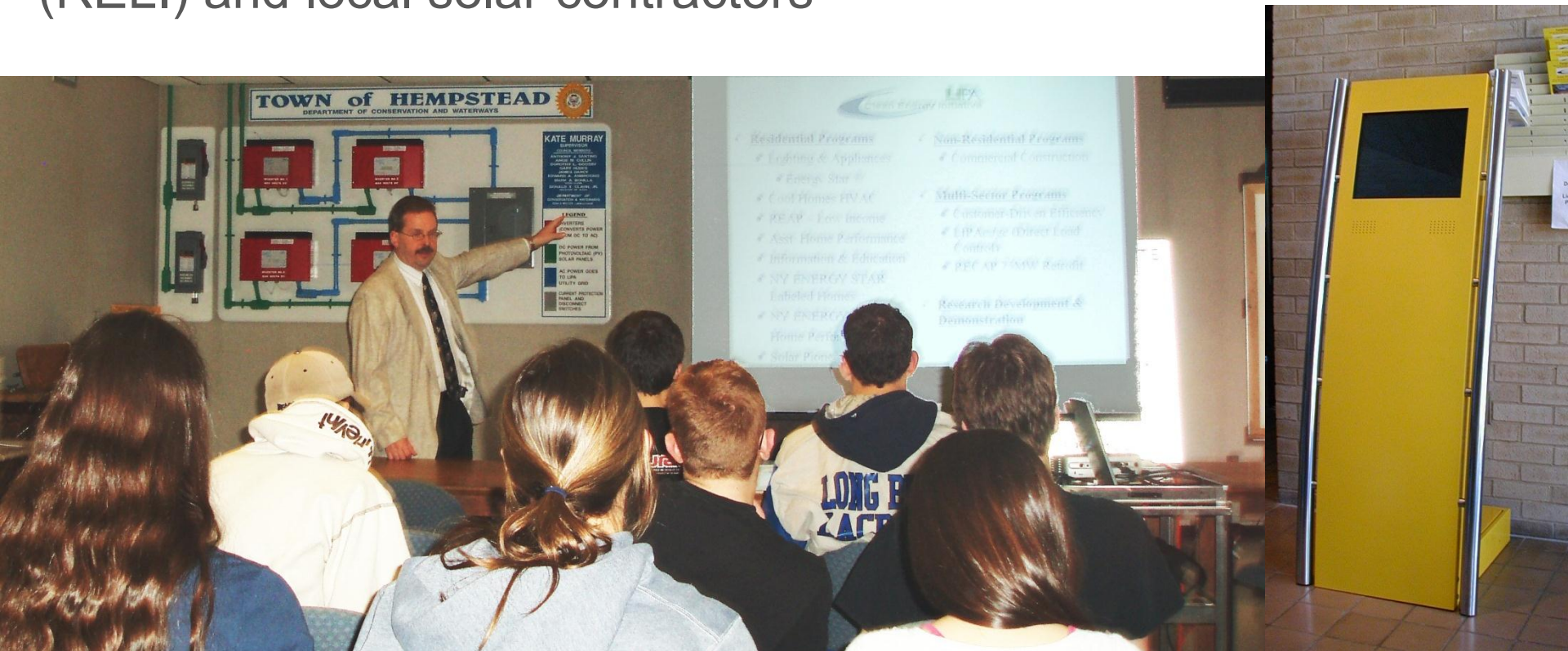
1ST SOLAR PV INSTALLATION

- **Long Island Power Authority Solar Pioneer Program** \$4.50/watt
- **RFP** process allowed us to consider both qualifications and price; conducted interviews with various solar contractors
- **Experience and Outreach** were key factors for contractor selection
- **Energy Audit** performed and lighting retrofitted



1ST SOLAR PV INSTALLATION

- Data Display and Inverter Display
- Public Solar Seminars - LIPA, Renewable Energy Long Island (RELI) and local solar contractors



SHELLFISH AQUACULTURE FACILITY



SHELLFISH AQUACULTURE FACILITY

Late 1970s - Growing Hard Clams to Re-Stock Hempstead Bay

- **Prevents over-harvesting** by local clamming industry
- Clams are filter feeders, can be **beneficial to water quality**

Old facility was **energy intensive**, required pumping large volumes of water of long distances

During growing system, **required 24/7 energy reliability**



SHELLFISH AQUACULTURE FACILITY

FINANCIAL

New York State Energy Research & Development Authority (NYSERDA) Grant - \$180,000

LIPA R&D Grant - Wind Turbine materials

Town Cost Share - hired master electrician with solar PV experience, data acquisition, wind turbine installation, pier/platform, electrical, plumbing, FLUPSY assembly

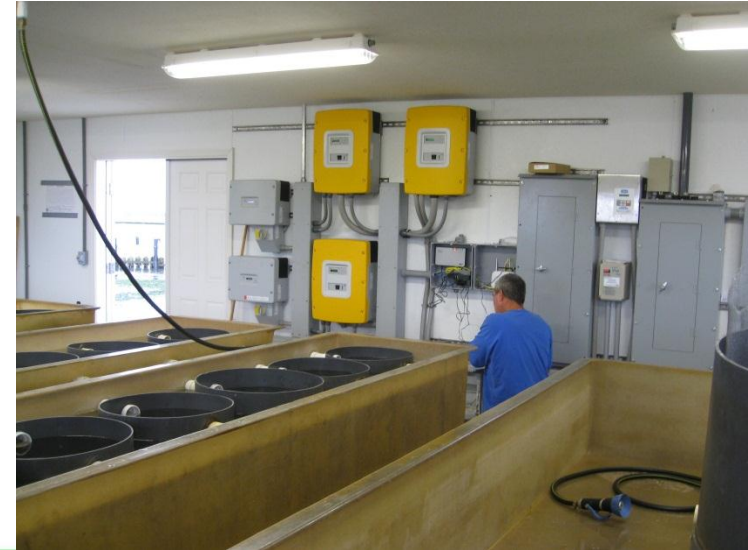
PROJECT DETAILS

Wind Power - Southwest Skystream - 2.4 kW

Solar PV - 10 kW

Battery Backup - SMA Sunny Island system

Energy Efficient - pumps with VFDs, lighting



SHELLFISH AQUACULTURE FACILITY



TOWN OF HEMPSTEAD
PROJECT ENERGY

H2, HCNG & CNG FUELING STATION



H2, HCNG & CNG FUELING STATION

Hydrogen

- **Produced on site** with an **Electrolyzer**, which splits water into hydrogen and oxygen - requires electricity and connection to potable water system.
- **Compressed, Stored at 6500psi & Dispensed at 5000psi**

Compressed Natural Gas (CNG)

- Tapped into **existing Natural Gas infrastructure**
- **Compressed, Stored and Dispensed**

Hydrogen Compressed Natural Gas (HCNG) Blend

- **20% Hydrogen, 80% CNG by Volume**
- **Blended on demand** through blending equipment
- Dispensed through **distinct dispenser**



H2, HCNG & CNG FUELING STATION

FUNDING & PARTNERSHIPS

NYSERDA Grant - \$900,000

National Grid - \$55,000 towards HCNG bus and 50% cost share through NYS tax credit

GLICCC - Funded CNG Pick-Up Truck conversions

Toyota - Fuel Cell Vehicles

Town Cost Share - Site Preparation (concrete slabs, pile driving, electrical, fence, paving)

Technical Support - General Motors, LIPA, US Merchant Marine Academy

Contractors - Air Products, EmPower, Proton, PW Grosser, BAF Technologies, Hythane, Clean Vehicle Solutions

Operation & Maintenance - Town is slowly transitioning to take over some components of O&M, but without eliminating the original installers.



H2, HCNG & CNG FUELING STATION



TOWN OF HEMPSTEAD
PROJECT ENERGY

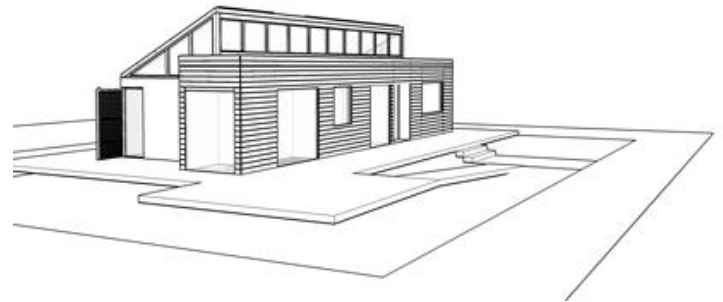
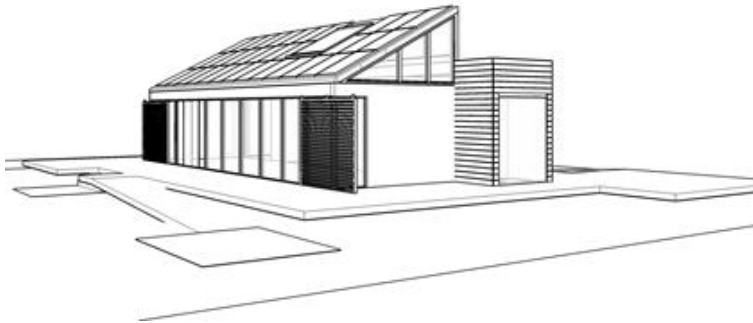
NYIT SOLAR HOUSE



NYIT SOLAR HOUSE

DOE Solar Decathlon - 2007 Entry

Town Labor - Moved from NYIT to Point Lookout,
Pile Foundation, Decking, Electrical, General Construction
Partnership w/ Local University, New York Institute of
Technology (NYIT) - opportunity for future outreach programs



NYIT SOLAR HOUSE

- Represents various technologies incorporated into one system
- Geothermal, Solar PV, Solar Thermal, Controls System (BMS), Sustainable Materials



EECBG!

Energy Efficiency & Conservation Block Grant (EECBG)

- **ARRA Funding** - Administered by DOE
- **\$4,577,700 grant** - Assigned to Conservation & Waterways

Project Activities

- Building Audits & Retrofits - Lighting/HVAC Upgrades, Geothermal, Energy Billing Database, Marina LED Dock Lighting
- Solar PV
- Transportation - Anti-Idling Demo Project
- Wind Turbine - 100kW
- Energy & Sustainability Master Plan
- Outreach & Education



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SOLAR PHOTOVOLTAICS (PV)



SOLAR PHOTOVOLTAICS (PV)

Demonstrate **Various Types of PV**

- Ground Mounted
- Roof Mounted (South facing and East/West facing)
- Bifacial Panels
- Trackers (Single-Axis, Dual-Axis)
- Electric Vehicle Solar Carports

Total PV at **Energy Park - 130 kW**

Total PV in Throughout **Town Facilities - 280 kW**



SOLAR PV TRACKERS



Single Axis Tracker

Follows location of the sun throughout the day



Dual Axis Tracker

Follows location AND changes pitch throughout the Day/Season

← Turning towards the West late in the day



Facing East in the Morning



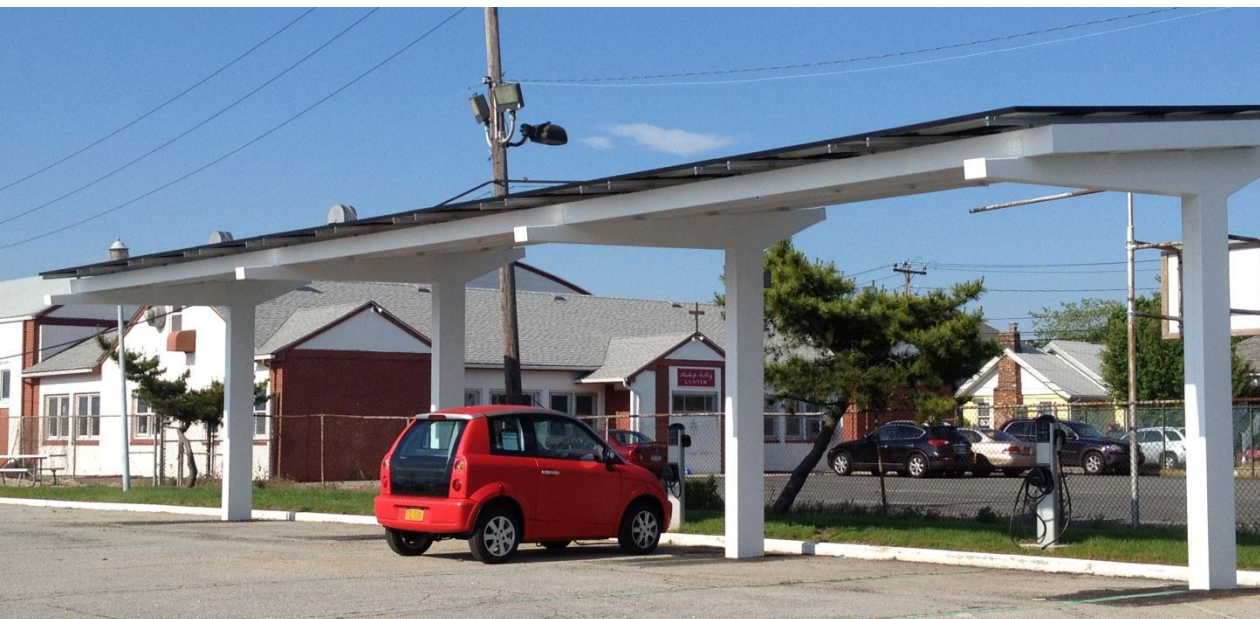
SOLAR PV BIFACIAL ARRAY

- Bifacial PV Panels - 23 kW
- PV cells on both sides of the panel
- Light passes through the panel, onto white surface below the structure, and reflects back underneath the panel
- Increases efficiency per square foot = more energy with less space



ELECTRIC VEHICLE SOLAR CARPORTS

- 2 Carports - one located at Energy Park, the other in Point Lookout East Marina
- Coulomb ChargePoint bollards - DOE Grant
- Charge two vehicles per bollard. 3 bollards at East Marina, 1 at Energy Park
- Free and open to public
- GLICCC Funding - Chevy Volt



100 KW WIND TURBINE



100 KW WIND TURBINE

Northern Power - located in Vermont

Tower Height - 120 feet

Blade Length - 35 feet

Grid Tied - Net Metering

Commissioned - December 2011

- generated **225,000 kWh** in first year (1 month down time due to Hurricane Sandy and other grid issues)
- Enough to power 25 Long Island homes for 1 year



100 KW WIND TURBINE



GEO THERMAL



GEO THERMAL

- Provides Heating & Cooling
 - Ground Source Heat Pump
 - Vertical Closed Loop
 - 55 degrees - Constant Temperature
-
- C&W Admin Building
 - 6 Loops @ 280 Feet
 - NYIT Solar House
 - 2 Wells @ 280 Feet



Energy Park Tours

NY Agricultural Women

Nassau County Bar Association

NYC Engineering Society

Utilities

Local Municipalities

Middle and High Schools

Universities

Science Summer Camps

International Visitors - Tokyo Gas, Korean manufacturing company,
Chinese Engineers, Engineers from Toyota HQ in Japan



Training Workshops

Hydrogen Safety Classes

- Provided by Air Products (fueling station installer), and Toyota (fuel cell division)
- Trained local fire departments, Fire Marshall

Hydrogen Curriculum for Teachers

- Provided by Nassau BOCES



NEXT STEPS FOR OUTREACH

Multimedia

- Website
- Social Media
- Videos
- Branding
- Brochures
- Signage (with Solar LED Lighting)

Formalize Curriculum and Tours

- Partner w/ local educational institutions
- Establish a team to give regular tours
- Develop Labs/Activities, Worksheets



FUTURE ENERGY PARK PROJECTS

- **Desalination** through Reverse Osmosis provide potable water to NYIT Solar House
- **Tidal Power**
- **Micro-grid** Demonstration
- Build out of **Data Monitoring & Acquisition**



TOWN OF HEMPSTEAD PROJECT ENERGY



THANK YOU!



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KATE MURRAY, SUPERVISOR