

New York State Energy Research and Development Authority

Renewable Energy Programs

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NYSERDA Snapshot

Public Benefit Corporation

- 3 E's
- Market Driven
- Risk Reduction Investments

Research & Development, Energy Analysis,
Energy Efficiency Services Deployment,
Radioactive Waste Management

Steward of the New York State Systems Benefit
Charge Program for the PSC

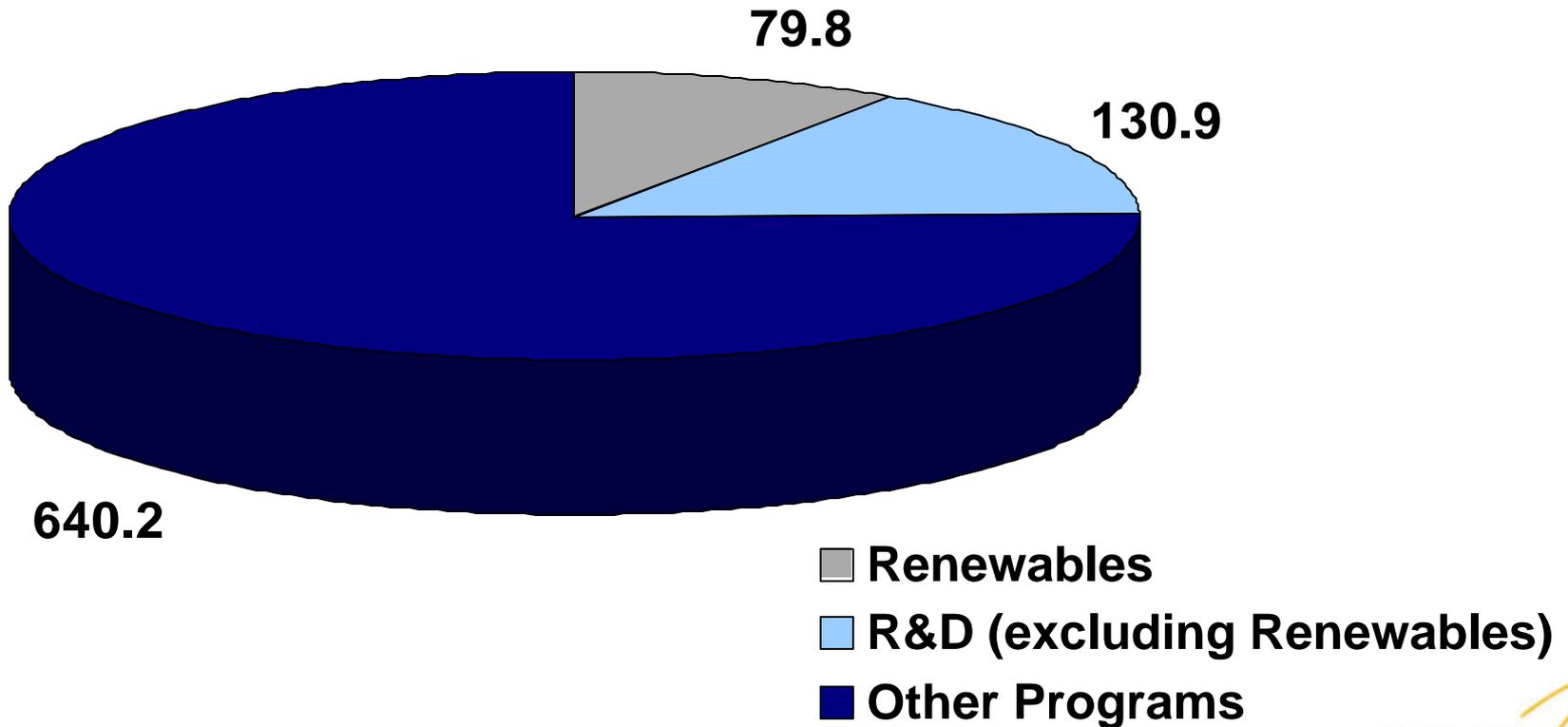
What Is Renewable Energy?

- Energy from a fuel source that can be replaced by natural ecological cycles with or without human management practices
- NYSEERDA focus: PV, wind power, biogas, biomass, biodiesel and tidal

Why an Interest in Renewable Energy?

- Reduce or avoid air pollution and other forms of waste
- “Free” fuel
- Diversify fuel supply
- Reduce use of imported fossil fuels and keep fuel dollars in-state
- Provide summer peak power
- Help reduce fuel price fluctuations in winter
- New business opportunities

Systems Benefit Charge Program Eight Year Total Budget *(in Millions of dollars)*



Systems Benefit Charge Renewable Energy Program

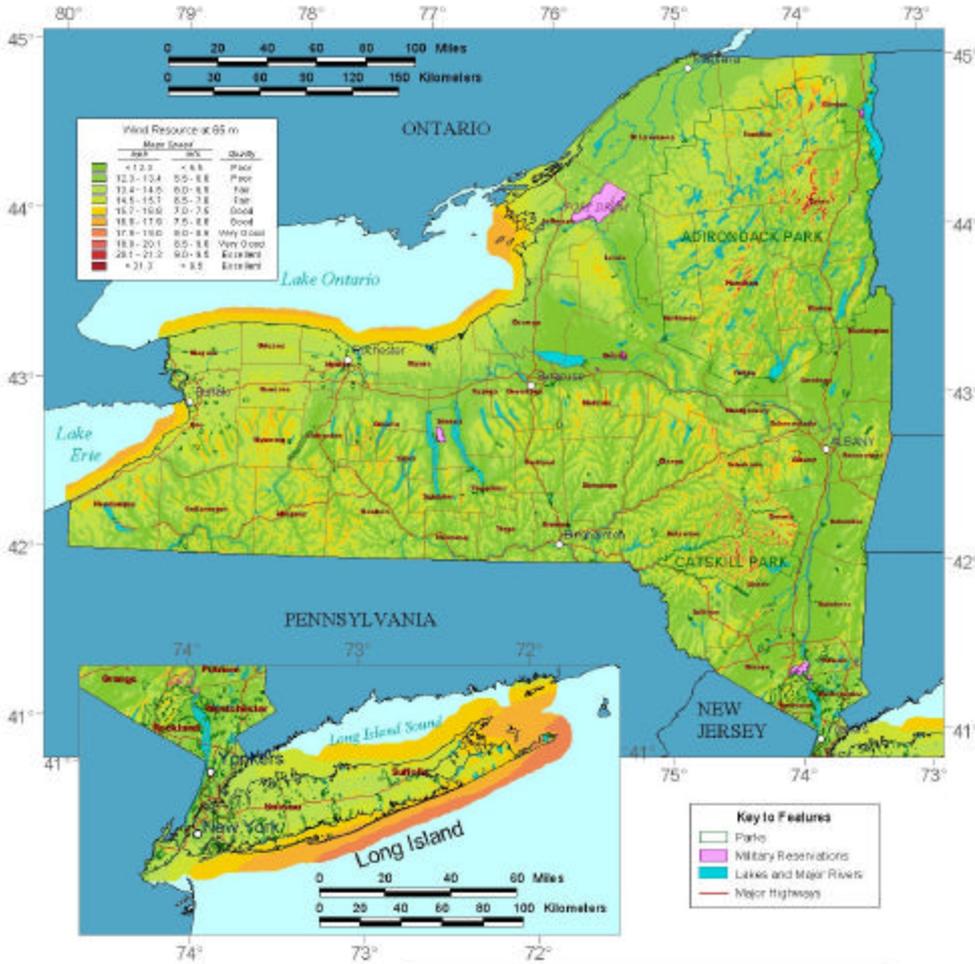
Program Budget is \$80 M over 8 years:

- End Use Sector \$28 M
 - Photovoltaics (PV) \$20 M
 - Small Wind \$4 M
 - Education and Training \$4 M
- Wholesale Sector \$52 M
 - Wind Project Development - \$34 M
 - Green Retail Marketing - \$18 M

Renewable Energy Program Goals

- Construct utility-scale power facilities
- Develop green power markets
- Develop business infrastructure
- Build end-user markets
- Demonstrate hardwood plantations and co-firing with coal
- Construct commercial-scale anaerobic biological waste treatment facilities
- Continue R&D to improve performance, lower costs, and develop new commercial products

Wind Resource Map of New York



Wind Potential in New York

- 5,000 MW of wind potential
- 48 MW of wind installed
- >400 MW of potential currently planned for construction

Main Map Scale: 1:3,700,000 (1 inch = 58 miles)
 Inset Map Scale: 1:2,800,000 (1 inch = 44 miles)
 Projection: Universal Transverse Mercator (Zone 18)
 Spatial Resolution of Wind Resource Data: 400 m

This wind resource map of New York was created using MesoMap, a dynamical atmospheric simulation model developed by TrueWind Solutions, and historical weather data. The wind resource map and searchable data base will be made available at this site in the near future.

The project was funded by the New York State Energy Research and Development Authority (NYSERDA).



New York's Wind Power Plants



Madison



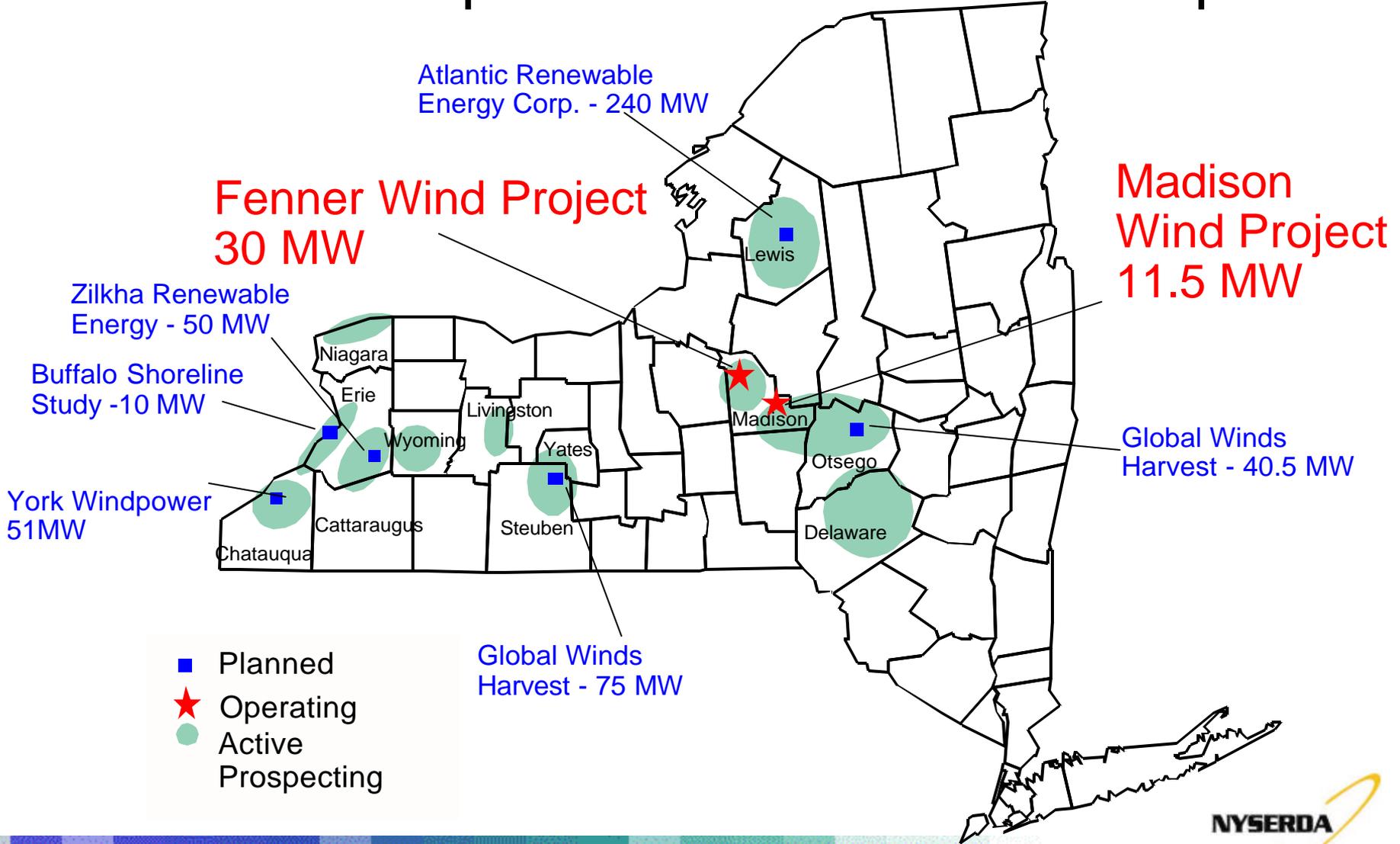
Fenner



Wethersfield

Photo courtesy CHI

NYSEERDA-Sponsored Wind Development



- Planned
- ★ Operating
- Active
- Prospecting



Potential Economic Impacts for a Hypothetical 45 MW Project:

- 30 wind turbines (15 acres of land committed to project use)
- 1500 acre spatial envelope is required (50 acres/turbine)
- annual landowner revenues of approx. \$2,500 per turbine/\$75,000 possible
- production-based royalties possible (small % of project revenues)
- additional revenues to community approximately in the 100's of thousands

Reduce the Cost of Wind Power

- Build larger facilities
- Long-term power purchase agreements
- Investment by credit-worthy companies
- Better technology
- More federal subsidy

NYSERDA Green Marketing Program

- Community Energy with NYSEG:
 - 100% wind energy product
 - **10 MW sold in year 1**; 80-90 MW to be sold by year 5
 - at least 75% of payments are performance based
- Contracts with 3 new marketers pending
 - 20-50 % wind energy product
 - 10 MW in year 1 growing to 190 MW by year 5
 - at least 75% of payments are performance based
- Expectation is about 275 MW of wind supported after 5 years

PV Market Development

- Stimulate market through installations that are:
 - High quality
 - Well designed
 - Reliable/warrantied
 - Grid-connected (buildings)
- Train and certify installer
- Train the trainers
- Develop supply and service infrastructure
- Demonstrate innovative designs
- Increase awareness and understanding of technology

NYS Department of Environmental Conservation



DEC Building 11kWac

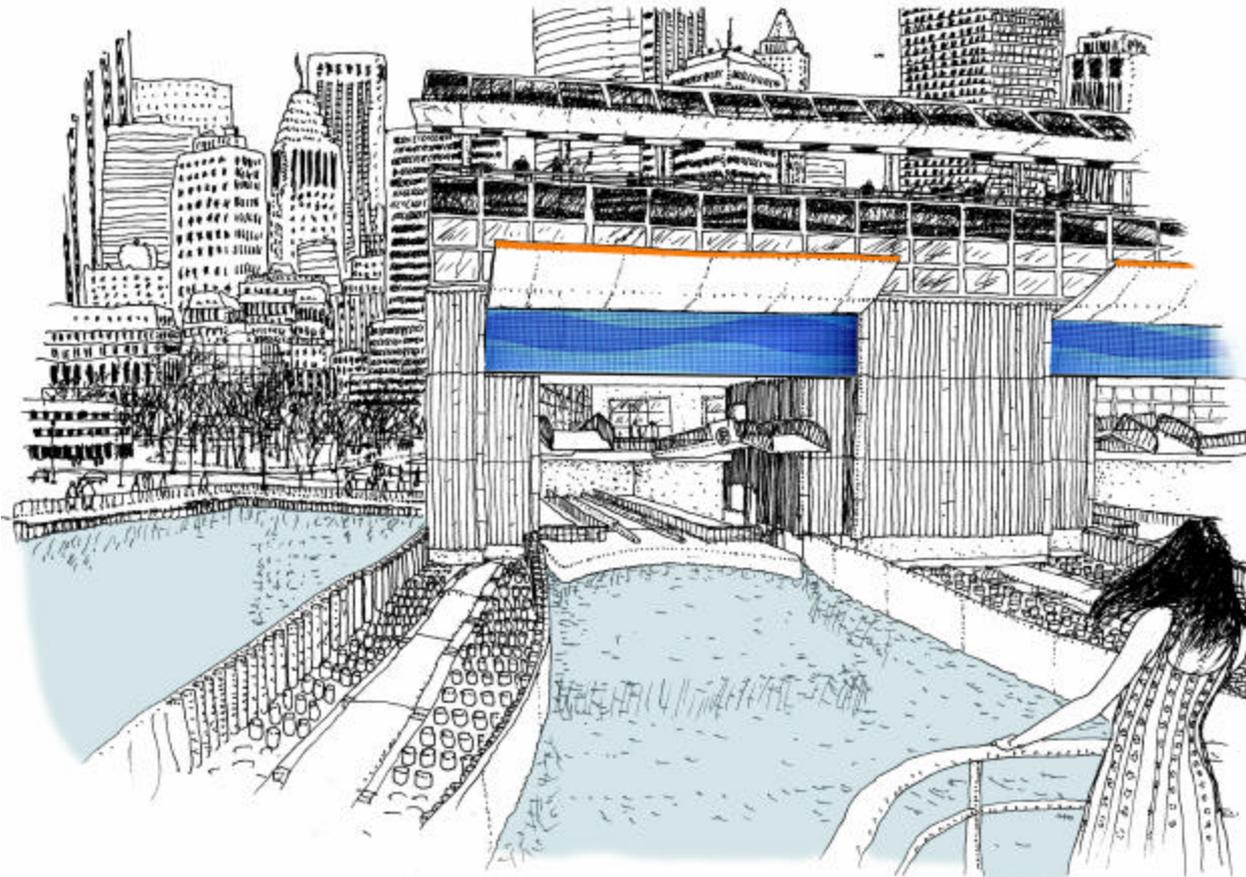


Tompkins County Library – 150 KW ac



Photo courtesy of Anthony O. Pereira, alternative POWER, Inc

White Hall Ferry Terminal – Staten Island Ferry - 60kW Total



New York State Solar Schools

A PV Demonstration and Teaching Initiative



- Install 2 kW PV at 50 schools – completed by October, 2003
- Multi-disciplinary lesson plans
- Web-based data collection and coordination across schools



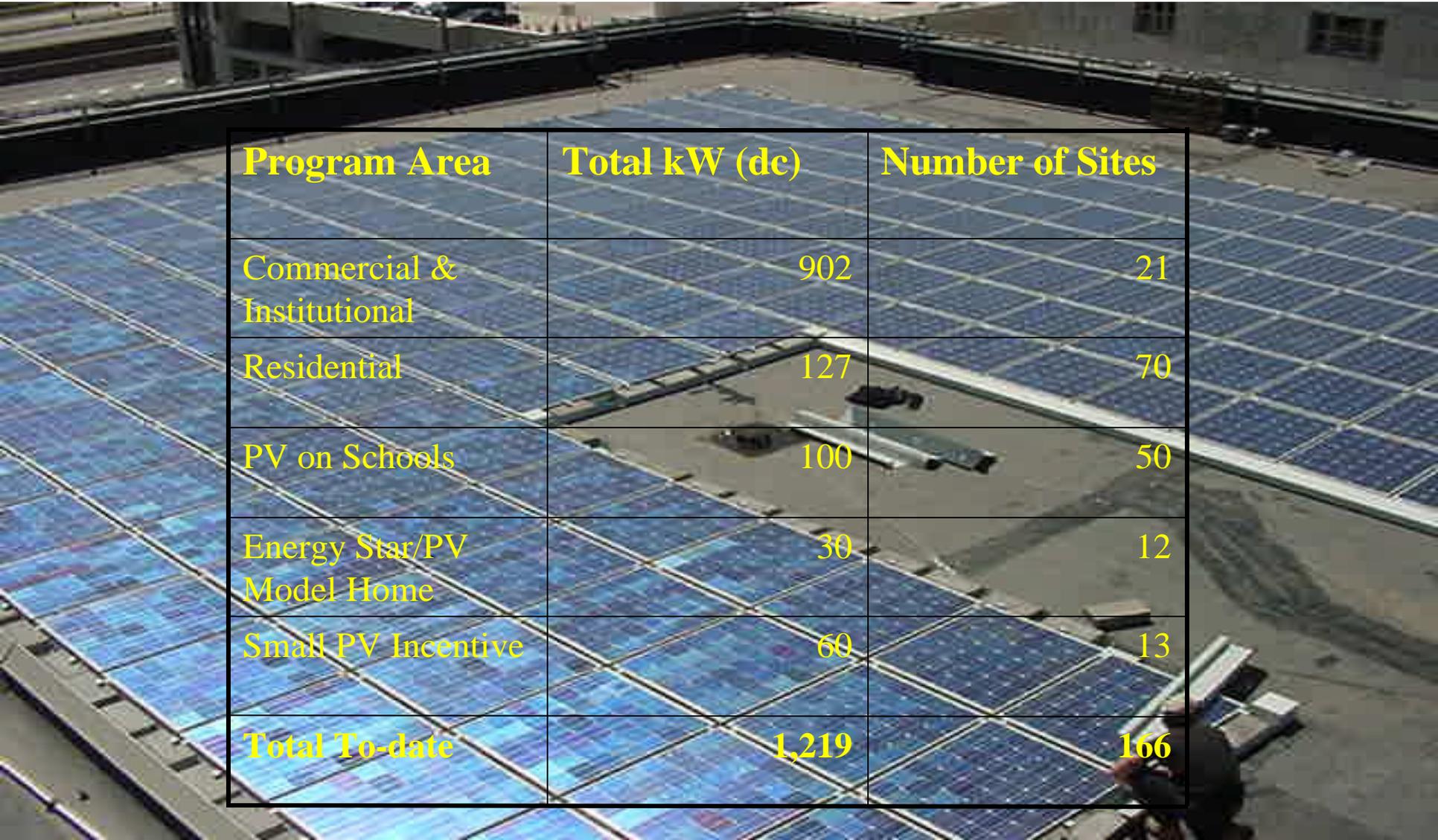
Photovoltaics & Energy Star® New Home Construction

- Construct 12 subdivisions



PV Installation Status

Completed or Contracted



Program Area	Total kW (dc)	Number of Sites
Commercial & Institutional	902	21
Residential	127	70
PV on Schools	100	50
Energy Star/PV Model Home	30	12
Small PV Incentive	60	13
Total To-date	1,219	166

Small Wind Program

Demonstrations

- Apple Pond Farm; 10kW
 - Callicoon Center
- Olde Chautauqua Farm; 10kW
 - Portland
- Wiemann Farm; 10kW
 - Locke
- Alfred State University; 10kW
 - Alfred
- Rensselaer Polytechnic Institute; 10kW
 - Troy



Direct Global Power



High Value PV Applications

- Telecommunications
- Water pumping
- Lighting
- Hybrid generators



Four Winds Renewable Energy



SunWize Technologies



SunWize Technologies

PV & Wind Product Development

- Canrom - Buffalo
- Custom Electronics - Oneonta
- Direct Global Power - Schenectady
- National Solar - Hamburg
- SunWize - Kingston
- Terra Solar - Brooklyn
- TrueWind - Albany



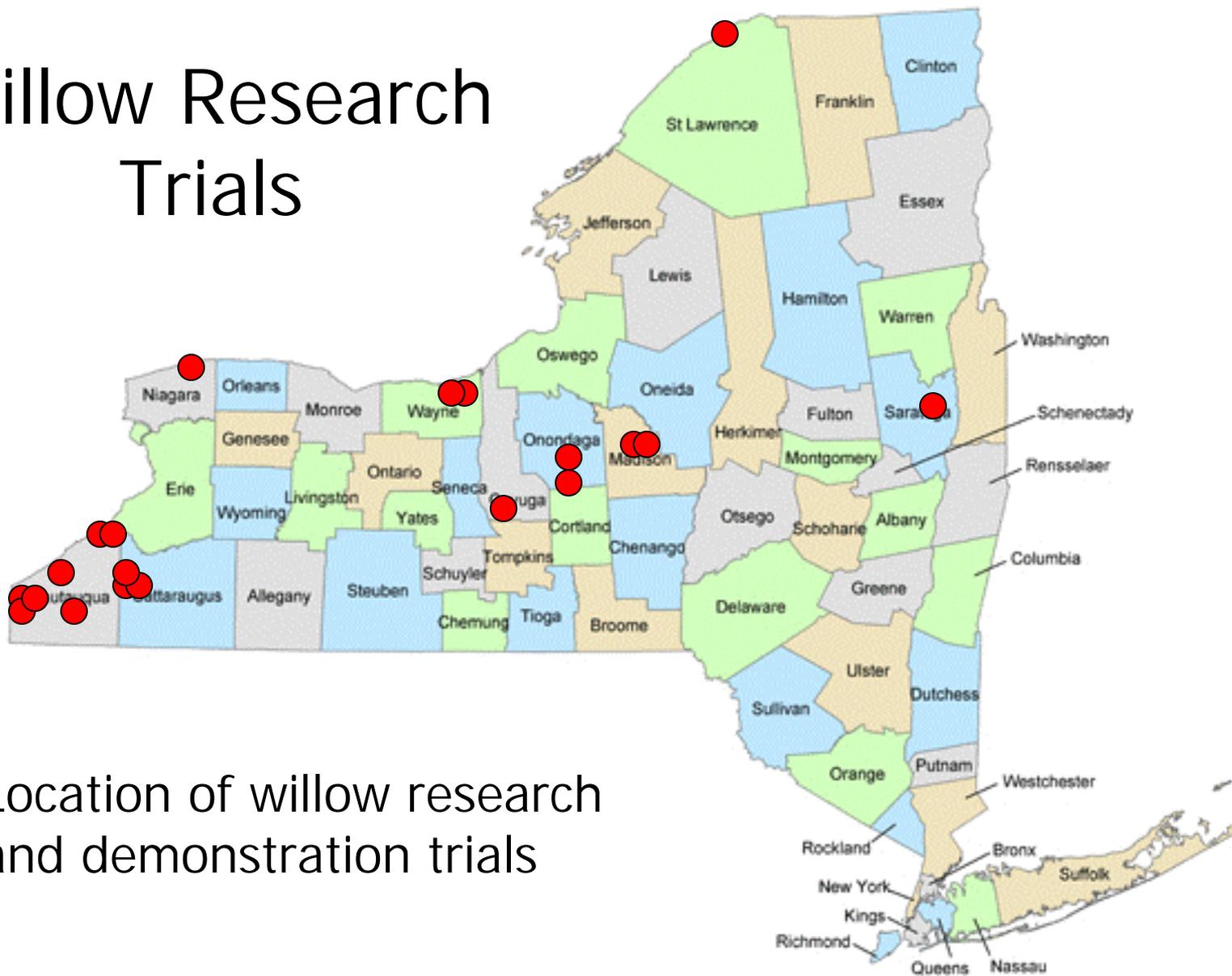
*Solar Charger
for Portable Electronics*

Willow Plantation

- 500 acres established to date in western and central NY
- Average yield over 7 dry tons per acre per year
- Commercial harvest expected in Fall, 2003



Willow Research Trials



- Location of willow research and demonstration trials



Wood Chip Co-Firing With Coal Dunkirk Plant



Recent Test Data

- Emissions tests confirmed biomass ability to cut NO_x and SO₂ emissions

The Salix Consortium

Private/Public collaboration -
NYSERDA, USDOE, USDA,
SUNY-ESF, Antares, NRG,
NMPC

Project Goals

- Demonstrate emissions reductions and economics of co-firing
- Lay the foundation for a commercial willow production enterprise

Manure Anaerobic Digesters

- Demonstrations at 20 different farms
- Evaluating technologies and optimization
- Transfer of results to other farms
- U.S. EPA AgStar program



Anaerobic Wastewater Treatment – Winery Wastes

- COD of 16,300 mg/L, 50,000 gallons/day or about 6800 lb. COD/day
- Avoids ~7,160 kwh/day
- Avoids ~450 tons/year of aerobic sludge production
- Produces ~34,000 cubic feet of methane per day
- Saved ~\$300,000/year for Canandaigua Winery



Growing Businesses in New York

Working with a NYS consortium, NYSERDA demonstrated an innovative anaerobic biological treatment system at Albany Airport to treat deicing fluids and runway runoff.



The airport purchased a full-scale system that will lower energy, sludge management, and other operating costs by \$750,000/year.