

Community Renewable Energy Focus

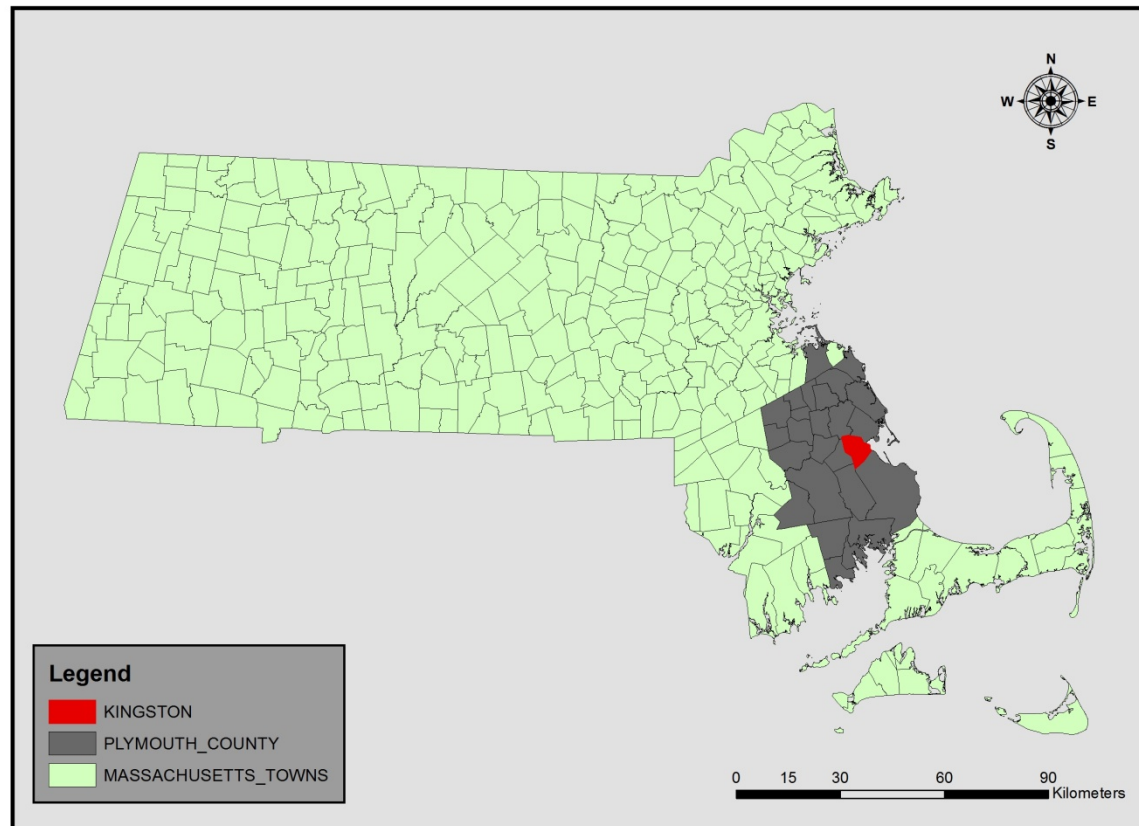
Kingston, Massachusetts



Town Geographic Overview

- Located in Plymouth County on the South Shore of the Commonwealth of Massachusetts.
 - Contained within the South Coastal Watershed.
- Shares borders with the towns of Pembroke, Duxbury, Plymouth, Carver and Plympton.
 - 52.8 sq km in area.

Plymouth County and the Town of Kingston



Notables

42nd Parallel



Silver Lake/ Jones River

Drinking water supply for
the city of Brockton





**Home to North America's oldest operational
boatyard.**

Colonial industries also included cordage, sail
making and fishing.

Political and Educational

- Part of the 10th U.S. Congressional District and the Massachusetts House 12th Plymouth District.
- Silver Lake Regional School District.
- Governed by Open Town Meeting, Board of Selectmen and Town Administrator.



Key Demographics

- Population 12,182 (2009 est.)
- Households 4,363
- Avg. HH size 2.73
- Avg. Family size 3.36
- Median Age 37
- Population Density 245.5/sq km

Kingston used 4,493,935 kWh of
electricity as a town in 2010

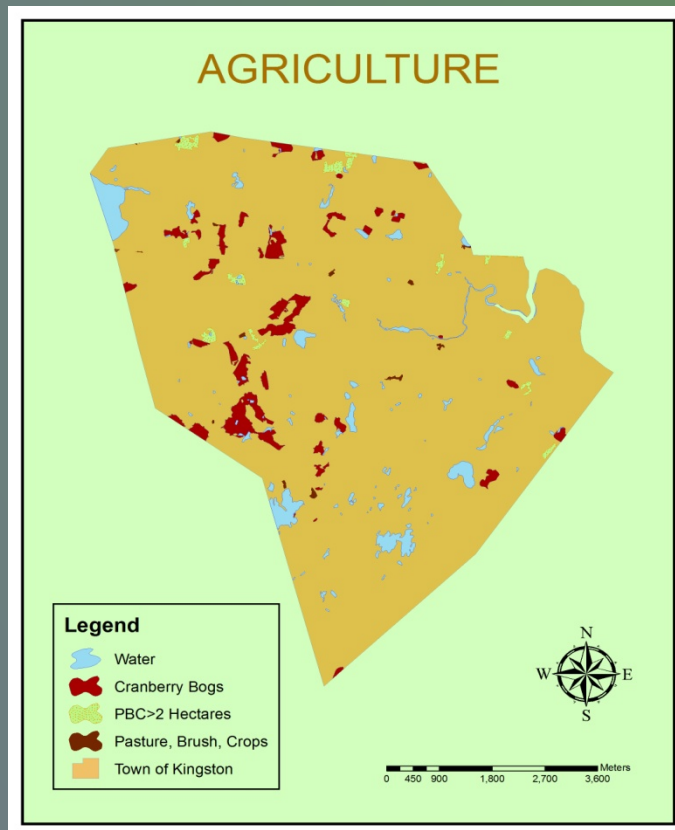
Would renewable energy projects help?

Which are best suited?

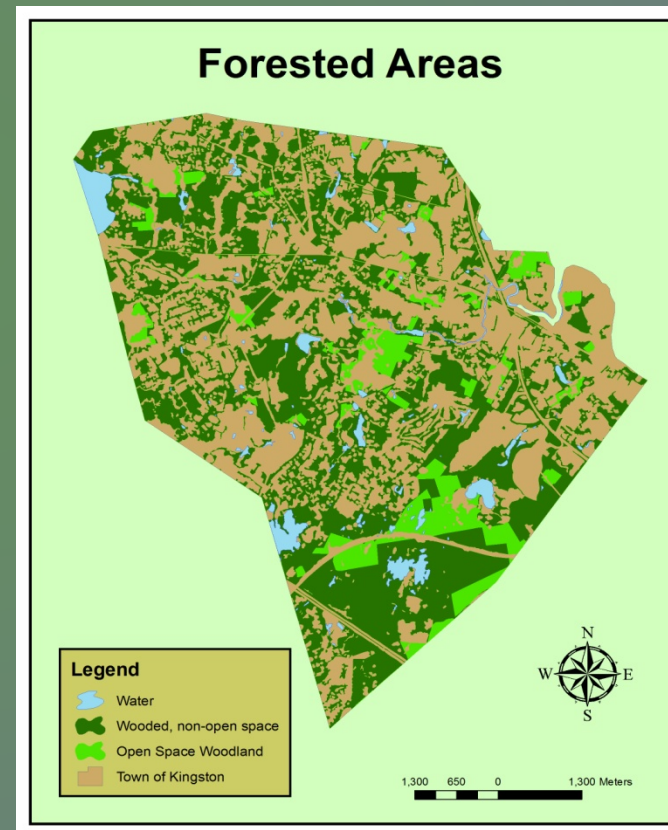
Biomass or Solar?

Biomass

Non- wooded



Woodlands



Development and land use change

- John Bradford House
- Modern Real Estate



Solar Opportunities

- Public Buildings
- Commercial

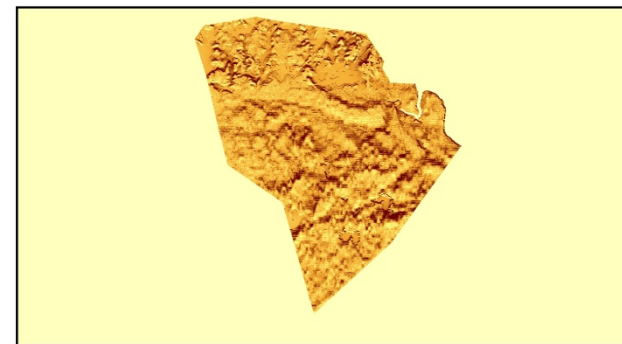
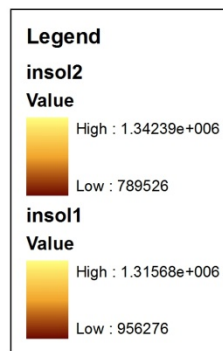
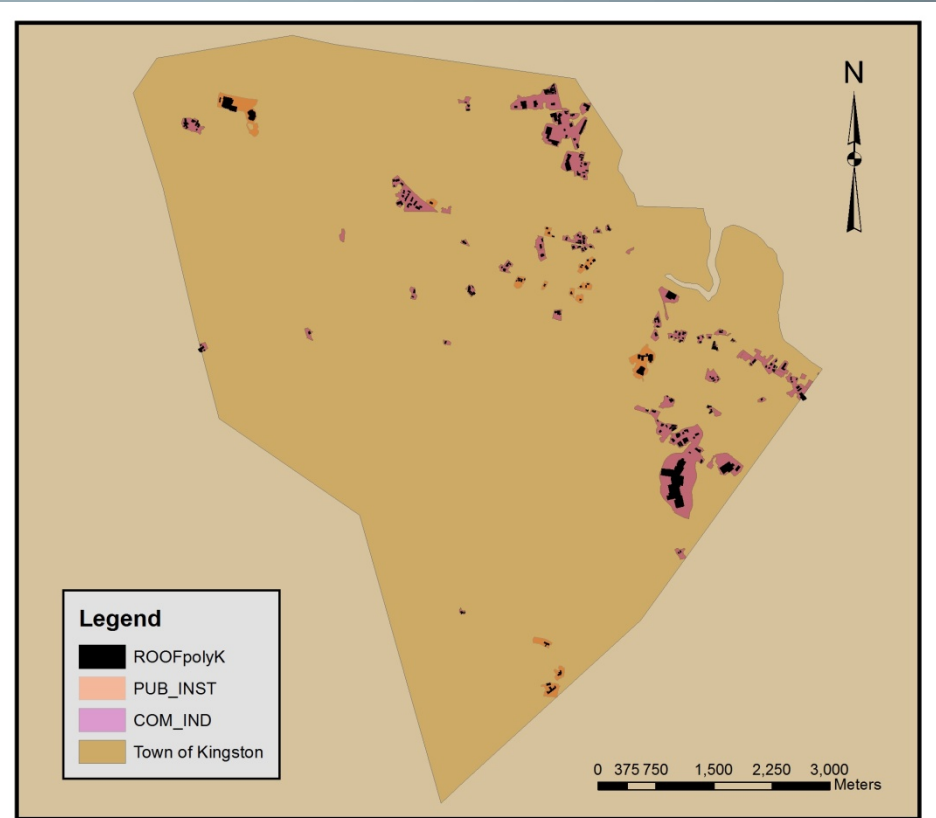


Rooftop Solar Applications

Solar insolation was calculated for the year 2010 with a tool in GIS through a digital elevation model provided by the USGS.

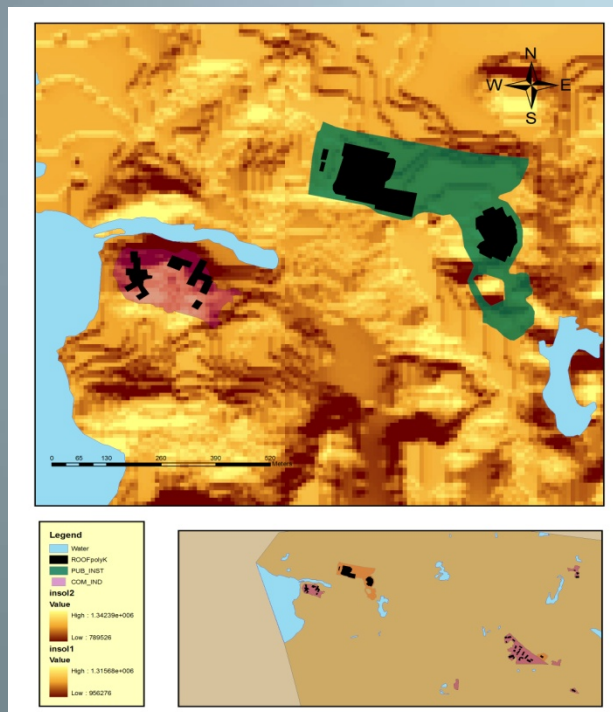
MassGIS provided a land use layer from which the areas zoned as PUBLIC, INDUSTRIAL, COMMERCIAL and INSTITUTIONAL were extracted.

Rooftop areas (non-residential) were then hand-digitized into a separate feature class if they were contained within the specific zones. A mosaic of 36 aerial orthophotos were used to make observations and accomplish rooftop trace outlines.

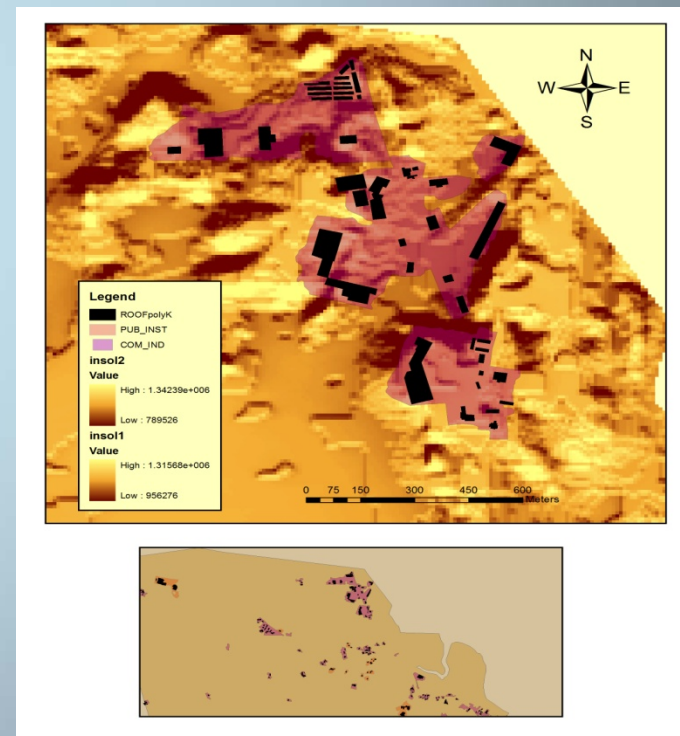


Detail Areas

- High School, Assisted Living



- Sports Complex, Shopping Center



Agricultural	
Low	12.84
Medium	211.91
High	597.01
Woodlands	
Low	70.32
Medium	3481.83
High	6963.66
Solar/Photovoltaic	
Low	16039.0
Medium	0
High	20049.0
High	0
High	25061.0
High	0

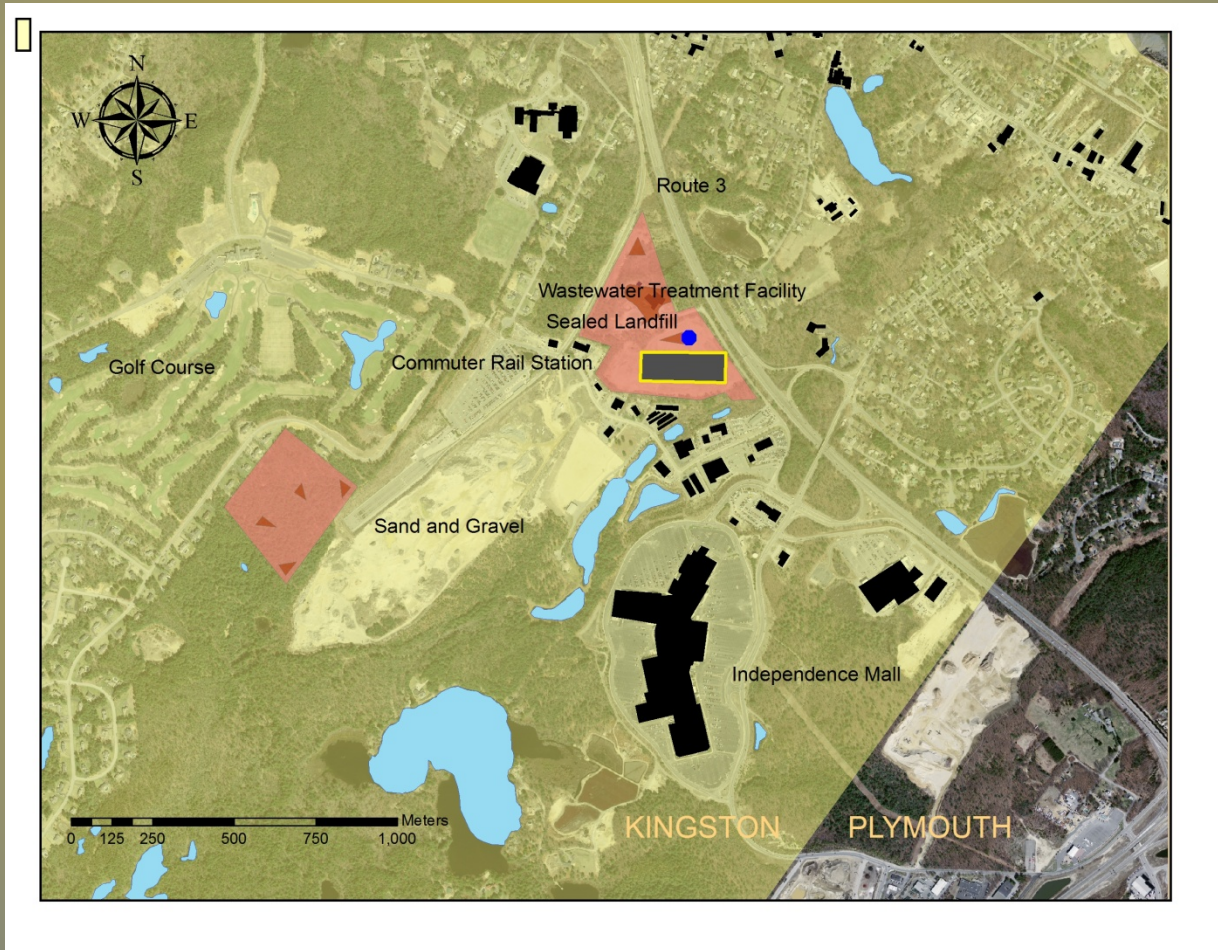
Annual Yields in MwHr s Solar panel rating at 18%

Yearly Yield MwHr from R. E. Sources

Kingston's Renewable Energy Plans

- Has been environmentally aware for decades.
- Green energy committee.
(Interview with Chair)
- 2010 Green Energy Community Award from Governor Patrick.
- Benefits and Retrofits.

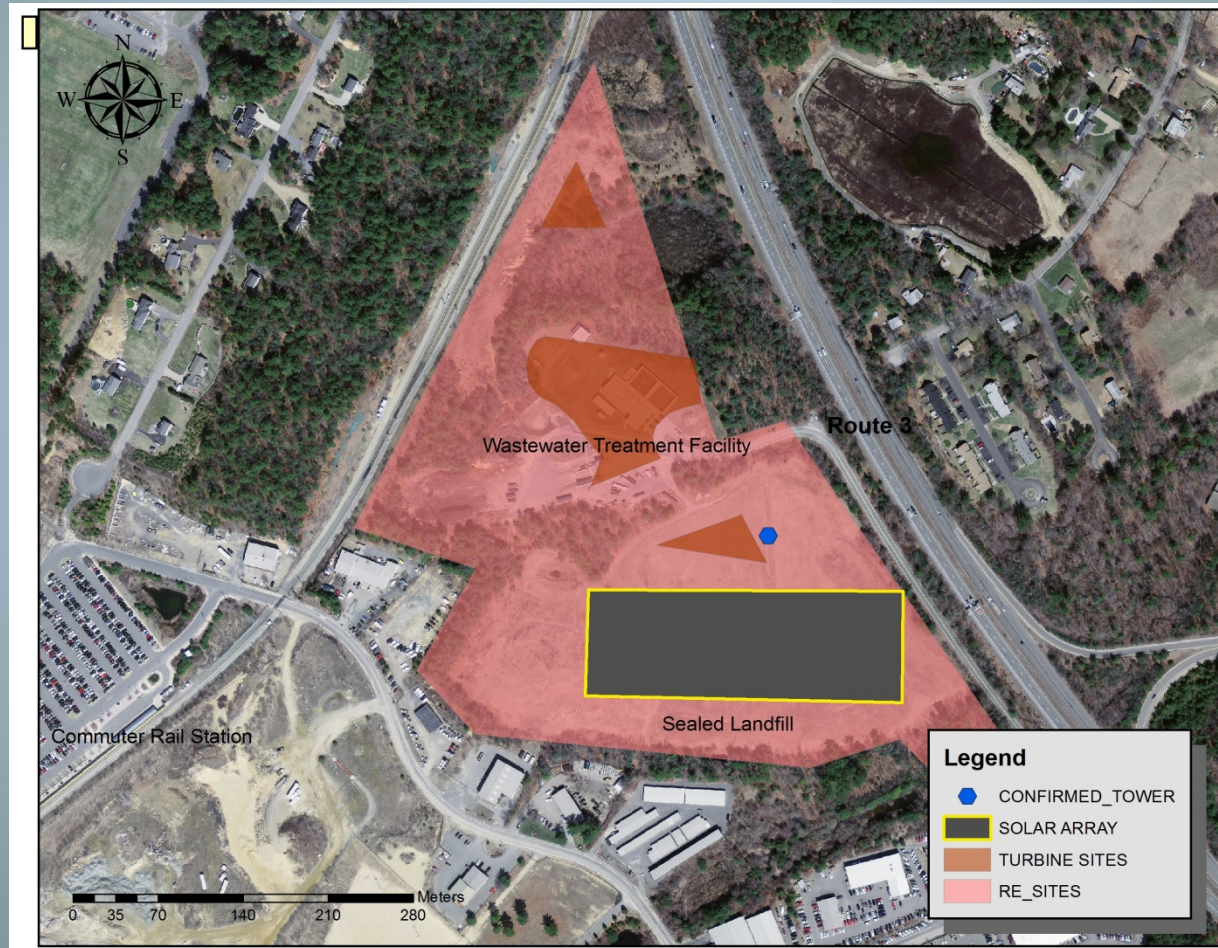
Renewable Energy Sites



2012 Construction

- 2 MW Hyundai Wind Turbine on the north end of the closed landfill
- 832 panel solar array on landfills south face

Landfill Conversion Project



Problems and issues encountered

- Primarily ... NIMBY!
- Viewshed
- Sound
- Flicker Effect
- Towers may not be raised within $\frac{1}{4}$ mile from housing, but building can take place UNDER them... once in place.

References

- **Journal Articles**

- **Castellano, P.J., T. A. Volk, and L.P. Herrington. 2009. Estimates of technically available woody biomass crops for two locations in New York State. *Biomass & Bioenergy* 33 (3): 393-406.**
- **Ristinen, Robert A., and Jack J. Kraushaar. 2006. *Energy and the Environment*. 2nd ed. Hoboken, NJ: John Wiley and Sons, Inc.**
- **Van Hoesen, John, and Steven Letendre. 2010. Evaluating potential renewable energy resources in Poultney, Vermont: A GIS-based approach to supporting rural community energy planning. *Renewable Energy: An International Journal* 35, no. 9: 2114-2122.**

- **Websites**

- **Census. <http://www.factfinder.census.gov>**
- American Community Survey 5-year estimates
- **MassGIS. <http://www.massgov/mgis>**
- **U.S. Geological Survey. <http://seamless.usgs.gov/ned>**
- National Elevation Dataset, 1/3 Arc-second, (NED 1/3)
- **Kingston, Massachusetts. <http://www.kingstonmass.org>**

Thanks to;

Mark Beaton
Judy Meyer
Peter Boncek
Kathy Bennassi
Kingston Green Energy Committee