Optimum location of wind turbine in Massachusetts

Introduction:

An increase in public awareness regarding the negative impact on the environment of traditional power generating methods, especially coal and oil-fired power stations, has created a demand for the developing and using environmentally friendly renewable energy. Wind power is a popular and safe form of renewable energy and in USA, the demand for wind energy is increasing. The study is conducted in order to know the optimum location of wind turbines in the state of Massachusetts

Purpose: Climate change is one of the greatest environmental, social and economic threats facing our planet. During the last century, the Earth's average surface temperature rose by around 0.6°C which is matter of grave concern Evidence is getting stronger that most of the global warming that has occurred over the last 50 years is attributable to human activities. Human activities that contribute to climate change is the no use of renewable energy resources which can be used in place of the fossil fuels.

Methodology:

The analysis required the various datasets of towns, wind power density, transmission lines, land use and major roads existing in Massachusetts. The locations are just the optimum sites for turbine installation depending on the spatial analysis using GIS (Geographic Information Systems). There was a lot of importance on the availability of existing transmission lines near the location of the wind turbines so as to send wind produced energy to major cities.

It is good practice to build wind farms, and especially single turbines (in case of expansion), away from current infrastructure. Specifically, building along roadways gives rise to potential problems in the future, when the land is developed.

It is important to construct the wind turbine in open land spaces so as to avoid the additional construction practices and to avoid the interference with the human population.

The wind turbines are heavy structures as well and have a high overturning moment which is another reason for constructing it in vacant open lands.

Importance of data:

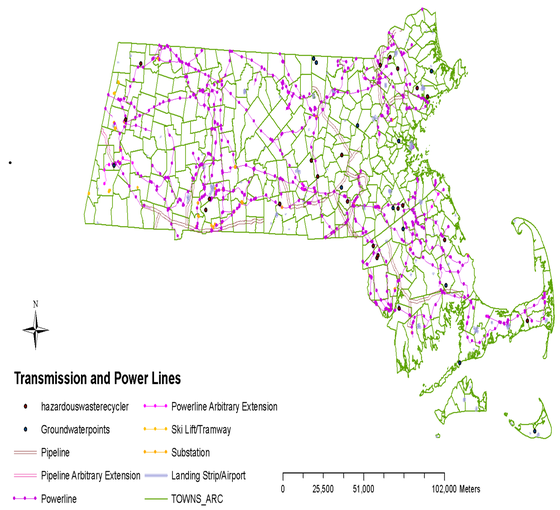
- Marine developments and operations involve the acquisition of large amounts of raw data
- This dataset is a valuable asset
- It is vital to the planning, design and operations that occur throughout the lifetime of a wind turbine.
- The data has to be processed well to give the right data sets and the optimum results.

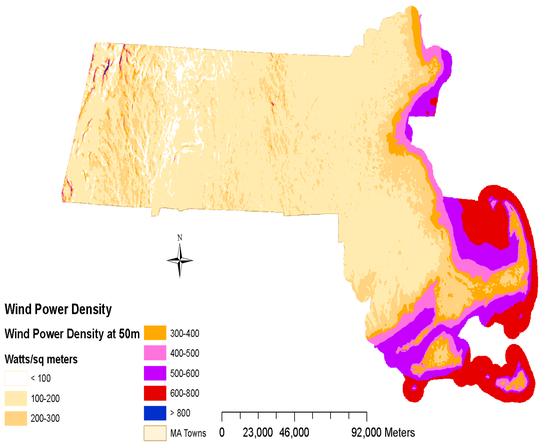
Conclusion:

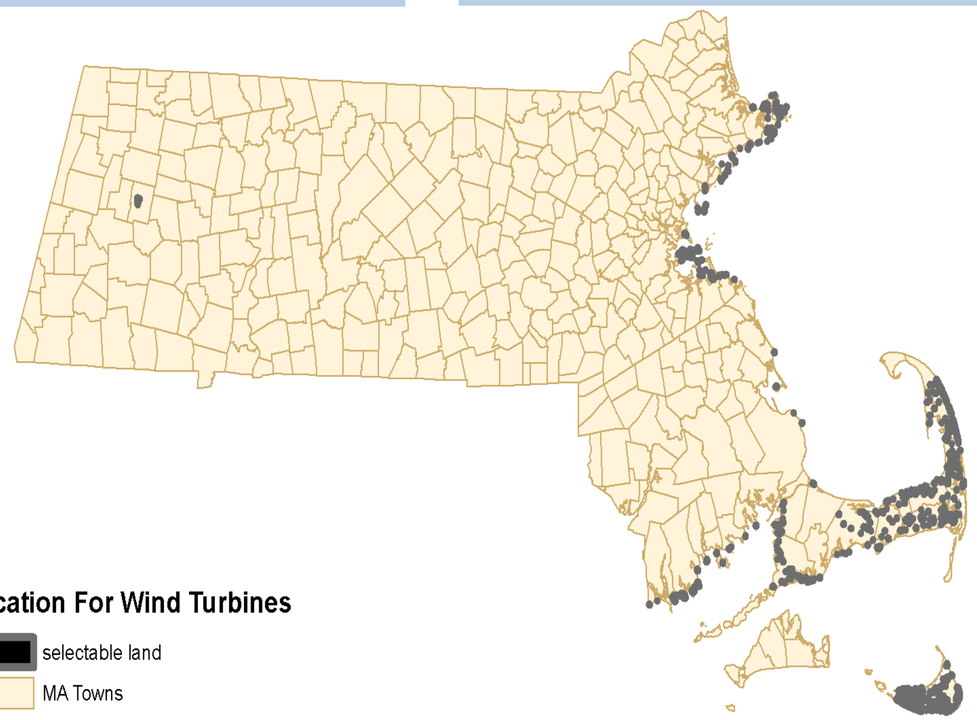
1)As is is shown in the below map the optimum locations of the wind turbines are along the shore of the state of Massachusetts and it is more dense in the Cape Cod area and Nantucket Islands.

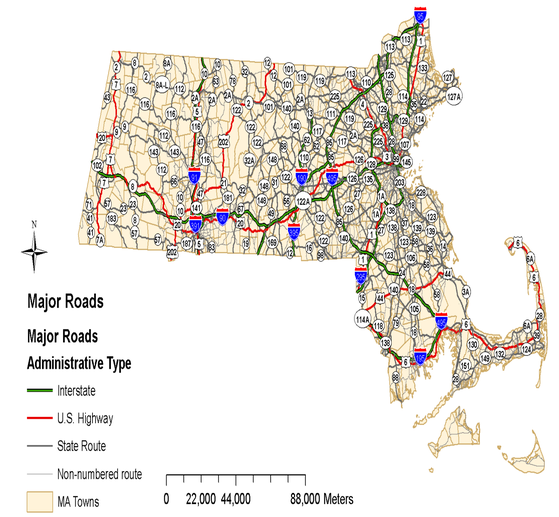
2) These regions are observed to have high wind density as observed from the wind density map.

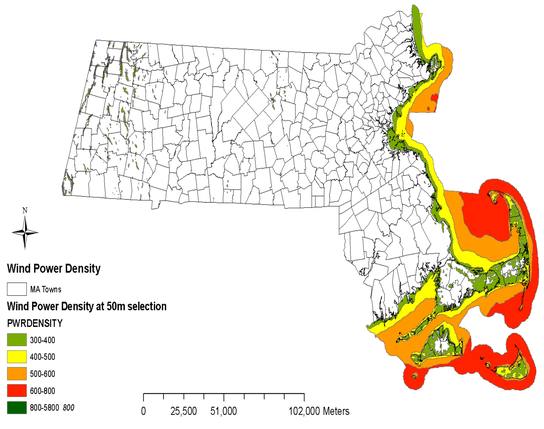
3) ArcGIS has high potential as a tool for siting and analyzing wind turbines.

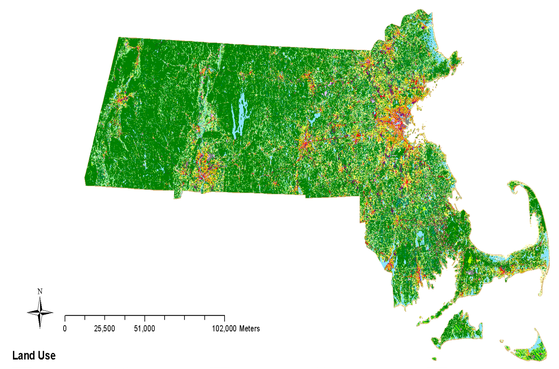












Cartographer: Sagar Shetty
For GIS-187,Fall 2011
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Source Data: MassGis
Projected Coordinate Frame: NAD 1983 State Plane

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