Westfield State University

Potential for Solar and Wind Energy
Located in Westfield, MA
Current Student Population: 5,548
In 2010, used 13,583,596 kilowatt hours of electricity which cost $1,744,866.73
To evaluate the potential for solar and wind energy at Westfield State University.
Evaluate efficiency of solar panels and/or wind turbines.
Westfield State University
Wind Potential Objectives

- Locate areas where a wind turbine could be placed
- Slope < 60 degrees
- Wind class of 2 or higher at 50 meters
- Not located in water, wetland, protected open space or conservation.
- Assume height of the turbine to be 80 meters.
  -(Van Hoesen, Letendre 2010)
- Analyze visual impact
Westfield State University is a level 1 wind class. 😞

BUT
Some math...

- Rating of the turbine $\times 8760 \times$ capacity factor $\times 1000$
  - $1.5\text{MW} \times 8760 \times 0.28 \times 1000 = \text{result}$
  - $1.5\text{MW} \times 8760 \times 0.20 \times 1000 = \text{result}$
  - $1.5\text{MW} \times 8760 \times 0.10 \times 1000 = \text{result}$

- $3,679,200 \text{kWh} / 13,583,596 \text{kWh} = 27\%$ energy saved
- $2,628,000 \text{kWh} / 13,583,596 \text{kWh} = 19\%$ energy saved
- $1,314,000 \text{kWh} / 13,583,596 \text{kWh} = 9.6\%$ energy saved

- $1,744,866.73 \times 27\% = \$471,114$ saved
- $1,744,866.73 \times 19\% = \$331,525$ saved
- $1,744,866.73 \times 9.6\% = \$167,507$ saved
And for the visual impact?

- Westfield Population: 41,703
- Estimated Population Affected: 40,059
Solar Potential Objectives

- Evaluate rooftop availability

- Note solar window: Westfield is located at 42.1265N Latitude

- Assess amount of energy that would be produced for each building.
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<tr>
<th>Name</th>
<th>RoofArea</th>
<th>HALFRoof</th>
<th>MEAN</th>
<th>Total_WH</th>
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4,139,016 kWh / 13,583,596 kWh = 28% energy saved

28% × $1,744,866.73 = $495,126 saved
Other considerations...

- Ease of utility interconnection
- Building structural integrity
- Economic payback
Resources

- David Dilts of Timeless Technology, Exeter, New Hampshire
- Dr. Curt Robie, Assistant Vice President of Administration for Facilities and Operations of Westfield State University
- The Wind Energy Center at UMASS. [www.mass.gov/dep/energy/windsite.ppt](http://www.mass.gov/dep/energy/windsite.ppt)
- Westfield State University. [www.wsc.ma.edu](http://www.wsc.ma.edu)