Renewable Energy Potential in Billerica, Massachusetts

Analyzing wind and solar energy
Background

• Founded in 1655
• Middlesex County
• 26.4 square miles
• Population: 40,243
• 36.7% residential, 37.4% commercial
• 91% of buildings are residential
• Estimated kWh used in 2010: 510,882,980.75
Wind Potential
• Highest average wind speed: 6.0-6.5 m/s

• Limited area available, especially area with higher wind speeds

• Billerica owns several properties located on Fox Hill, which is one of the few areas with the moderate wind speeds
Proposal Positives

• Approximately 14 acres of Billerica property on Fox Hill is <20% slope and has an average wind speed between 6.0-6.5 m/s.

• There is potential to develop a small wind farm consisting of (7) 1-MW turbines.

• Enough output to provide energy to 1,323-2,205 households in Billerica based on various parameters (efficiency, turbine model, actual wind speeds). Roughly 9-15% of homes in Billerica

• Access via utility road and bordering neighborhood.
Proposal Negatives

• Site constraints: distance to residents, slope, relatively lower wind speeds than normal, cemetery boundary.

• Overall number of turbines subject to land use restrictions and available space after applicable buffers are applied.

• 3,062 (19%) residential homes in view of potential turbine

• Recent proposals rejected by local residents:
  Home Depot at the Billerica Mall
  Center Improvement Plan
  Cellular tower installation in Pinehurst
  Power Plant in North Billerica
Solar Potential
Current/New Solar Projects

**Shaffer Landfill**
- 40 Acres
- 19,700 panels
Part of Superfund cleanup

**41 Alexander Road (Verizon/MCI)**
- 2 Acres
- 3,120 panels
- Massive data farm facility
Shaffer Landfill Project
41 Alexander Road, Verizon
Solar Radiation
Solar Potential For Residential

• Approximately 15,624 residential structures in Billerica

• 769 structures used in Solar Zonal Statistic analysis

• 85,557 square meters of total rooftop area

• Using 25% of rooftop area and 13% efficiency, potentially 3,180,448 kWh/year can be generated with resident structures (less than 1% of total energy use)

• More optimal parameters: 50% of rooftop area and 30% efficiency, potential jumps to 2.6% of total energy use
Residential Buildings
Solar Potential For Commercial

- Approximately 720 commercial/industrial structures in Billerica

- 259 structures used in Solar Zonal Statistic analysis

- 971,828 square meters of total rooftop area

- Using 25% of rooftop area and 13% efficiency, potentially 36,136,263 kWh/year can be generated with commercial structures (7% of total energy use)

- More optimal parameters: 50% of rooftop area and 30% efficiency, potential jumps to 32% of total energy use
Commercial Buildings
Potential Sites for Solar Farms

• **90 Salem Road**
  15,663 square meters
  582,278 kWh per year (25% land cover, 13% efficiency)
  Owner: CH-Billerica LLC

• **High Street Pits**
  31,261 square meters
  1,171,510 kWh per year (25% land cover, 13% efficiency)
  Owner: General Latex

• **Locke Middle School Pits**
  49,657 square meters
  1,834,314 kWh per year (25% land cover, 13% efficiency)
  Owner: Cormier Yvon Construction

• **Iron Horse Park**
  321,972 square meters
  11,947,488 kWh per year (25% land cover, 13% efficiency)
  Owner: Mass Bay Transit Authority
90 Salem Road
High Street Pits
Locke Middle School Pits
Iron Horse Park
References


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