Quantifying Wind Potential

**Electricity from Wind** = **Suitable Land Area** + **Energy Produced at Each Site**

Method of Analysis = Geographic Information Systems (GIS) + Wind speed distribution models
Large Wind: Choosing Sites

Siting Considerations

- Developer Preferences
  - Wind speed considerations
  - Financial considerations
  - Construction Challenges

- Municipal Concerns
  - Environmental Protection
  - Cultural resource protection
  - Avian Populations
  - Abutter protection
  - Public Safety

Model Parameters

- Weighted Variables
  - Wind Speed
  - Slope
  - Proximity to Transmission Line
  - Land Use

- Prohibited Areas
  - Property line setbacks
  - Critical Environmental Areas
  - Airports
  - Important Bird Areas
  - Scenic Viewsheds

Best Sites
Large Wind: Results

Enfield
- Parcels: 25
- Technical Potential: 35MW
- Likelihood of Development: High (currently under development)

Dryden
- Parcels: 3
- Technical Potential: 7MW
- Likelihood of Development: Low

Danby
- Parcels: 1
- Technical Potential: 5MW
- Likelihood of Development: Low

Total Output
- ~40MW installed capacity
- Electricity for up to 30% of county
Large Wind: Potential Vs. Reality

- Financial returns
  - Wind resource in Tompkins County is low, revenues might not meet hurdle rate for investors

- Local Regulations
  - Dryden limits development to under 10kW installed capacity
Small Wind: Choosing Parcels

Property-Line Setbacks

Protected Areas
- Public open space
- Critical Environmental Areas
- Important Bird Areas
- Unique Natural Areas
- Airport

Appropriate Slope

Sufficient Wind Speed

- 2,100 Residential parcels
- 1,600 Agricultural parcels
- Wind speeds range from 5.25m/s-6.6m/s
- 38MW installed capacity

Introduction Large Wind Small Wind Regulatory
Small Wind: Most Potential to Go Unrealized

Largest Barrier: Cost
- Wind turbines are a large investment
- Wind may not be cost-competitive with solar
- Most suitable parcels have low wind speeds

<table>
<thead>
<tr>
<th>Wind Speed</th>
<th>Parcel Count</th>
<th>Potential Installed Capacity</th>
<th>Household electricity provided by wind</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.3 m/s</td>
<td>2,319</td>
<td>23MW</td>
<td>32%</td>
</tr>
<tr>
<td>5.6 m/s</td>
<td>1,126</td>
<td>11MW</td>
<td>43%</td>
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<tr>
<td>5.9 m/s</td>
<td>366</td>
<td>3.6MW</td>
<td>57%</td>
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<tr>
<td>6.2 m/s</td>
<td>40</td>
<td>.4MW</td>
<td>74%</td>
</tr>
<tr>
<td>6.5 m/s</td>
<td>4</td>
<td>.04MW</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3,855</strong></td>
<td><strong>38.55MW</strong></td>
<td></td>
</tr>
</tbody>
</table>
Medium-Scale Wind: Specialized Application

- Parcels with large on-site demand
  - Large farms (particularly dairy farms)
  - Schools
  - Hospitals
  - Other institutions

- Greater cost, but greater generation potential
Regulatory Environment: State

- **Over 25MW: Article X**
  - Centralizes authority at state level
  - Facilities permitted through 7-member siting board
  - Streamlines SEQR by replacing many agencies with one agency

- **Under 25MW: SEQR**
  - Municipality retains final authority over project approval
  - Local government acts as lead agency on a multi-agency review
  - Process can be amorphous and difficult to navigate
Survey of Town Permitting and Zoning

- **No regulation:** Caroline, Danby, Ulysses, Newfield
  - Makes no mention of wind turbines in municipal code; some towns do not have zoning

- **Capacity regulation:** Dryden, Groton
  - Restricts installed capacity

- **Land-use regulation:** Ithaca, Lansing, Enfield
  - States provisions for wind turbines in town zoning, outline setbacks and permitting procedures

Introduction Large Wind Small Wind Regulatory
Impact of Non-Comprehensive Local Regulations

Increased cost to homeowners
- Height restrictions reduce revenue potential
- Complex permitting structures are burdensome and raise costs for installers

Increased transaction costs to town
- Without existing provisions, each turbine application is a new challenge for the town
- No efficiency gains

Reduced Morale
- Projects take long to develop, interest can wane
- One poor experience spreads to other interested community members

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Small Turbines in Tompkins County

<table>
<thead>
<tr>
<th>Tower height</th>
<th>kW</th>
<th>Installed</th>
</tr>
</thead>
<tbody>
<tr>
<td>120</td>
<td>2.5</td>
<td>2/8/07</td>
</tr>
<tr>
<td>100</td>
<td>10</td>
<td>8/4/04</td>
</tr>
<tr>
<td>80</td>
<td>1</td>
<td>9/6/06</td>
</tr>
<tr>
<td>80</td>
<td>10</td>
<td>7/11/05</td>
</tr>
<tr>
<td>120</td>
<td>2.5</td>
<td>2/1/07</td>
</tr>
</tbody>
</table>
Thank You

QUESTIONS AND COMMENTS