Evaluating Potential Renewable Energy Resources for Pelham, MA
Biomass
Biomass Energy Estimates

Forest
- Slope ≤ 20%
- 100m protected land buffer

- 70 odt/ha/yr Yield
- variable UF rates

Agricultural Land
- Slope ≤ 8%
- 100m protected land buffer
- Cropland, Pasture, Brushland / Successional

- Variable yield and UF rates
### Usable Fraction Annual Production

<table>
<thead>
<tr>
<th>%UF</th>
<th>0.01%</th>
<th>0.50%</th>
<th>1%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area (ha)</td>
<td>0.1</td>
<td>6.4</td>
<td>12.8</td>
</tr>
<tr>
<td>Mbtu</td>
<td>134.2</td>
<td>6707.7</td>
<td>13415.4</td>
</tr>
<tr>
<td>kWh</td>
<td>9820</td>
<td>491004</td>
<td>982007</td>
</tr>
</tbody>
</table>
The agricultural potential is calculated based on the area and yield. Here are the estimated annual yields for different fractions:

<table>
<thead>
<tr>
<th>Area (ha)</th>
<th>1% Usable Fraction</th>
<th>10% Usable Fraction</th>
<th>20% Usable Fraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mbtu: 9, 15, 20</td>
<td>Mbtu: 87, 147, 204</td>
<td>Mbtu: 175, 292, 408</td>
</tr>
<tr>
<td></td>
<td>kWh: 640, 1067, 1494</td>
<td>kWh: 6404, 10767, 14942</td>
<td>kWh: 12807, 21345, 29883</td>
</tr>
</tbody>
</table>
Wind farm location

- Four proposed turbines
- 350m turbine spacing
- 100m protected land buffer
- Slopes $< 30^\circ$
- Utilizes among the highest speeds in town
Average wind speed 6.5m/s
Each could produce up to 4 million kWh per year
Cut-in Speed, downtime
Estimating the Regional Visual Footprint
<table>
<thead>
<tr>
<th>Hub Height</th>
<th>Population In View</th>
<th>Increase From 75m</th>
<th>Percent Increase From 75m</th>
</tr>
</thead>
<tbody>
<tr>
<td>75m</td>
<td>121905</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>85m</td>
<td>130602</td>
<td>8697</td>
<td>6.89%</td>
</tr>
<tr>
<td>100m</td>
<td>143814</td>
<td>21909</td>
<td>16.49%</td>
</tr>
</tbody>
</table>
Estimating the Local Visual Footprint
Recommendations

- **Biomass**
  - No significant large scale potential
  - Cost

- **Wind**
  - High Cost
  - Moderate potential—Absolute minimum wind speeds
  - Potential resident opposition
References


