Impacts of Shadow Flicker
Scituate and Fairhaven Wind Projects

MWWG October 30, 2013
Sumul Shah, Solaya Energy
## Scituate and Fairhaven: At a Glance

<table>
<thead>
<tr>
<th></th>
<th>Scituate</th>
<th>Fairhaven</th>
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<tbody>
<tr>
<td><strong>Location</strong></td>
<td>Town owned waste water treatment plant</td>
<td>Town owned waste water treatment plant</td>
</tr>
<tr>
<td><strong>Construction Timeframe</strong></td>
<td>2011 to 2012</td>
<td>2011 to 2012</td>
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<tr>
<td><strong>Project Size</strong></td>
<td>One 1.5 MW Turbine</td>
<td>Two 1.5 MW turbines</td>
</tr>
<tr>
<td><strong>Turbine Make/ Model</strong></td>
<td>Sinovel SL1500</td>
<td>Sinovel SL1500</td>
</tr>
<tr>
<td><strong>Approved by Town Vote</strong></td>
<td>2005</td>
<td>2004</td>
</tr>
<tr>
<td><strong>Estimated Production</strong></td>
<td>4,295,200 kWh</td>
<td>7,227,000 kWh</td>
</tr>
<tr>
<td><strong>Lease Period</strong></td>
<td>15 Years with two 5 year Option Periods</td>
<td>20 Year Term with Extension Options</td>
</tr>
<tr>
<td><strong>PPA</strong></td>
<td>Starting at $89.00/ MWh</td>
<td>Starting at $74.30/ MWh</td>
</tr>
<tr>
<td><strong>Developers</strong></td>
<td>Palmer Capital &amp; Solaya Energy</td>
<td>CCI Energy, Palmer Capital, &amp; Solaya Energy</td>
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Fairhaven Flicker Study

• May 2007, Flicker Study was first performed by the University of Massachusetts, Renewable Energy Research Laboratory

• April 2008, Flicker Study was updated based on alternate locations

• October 2011, Fairhaven Wind commissioned Atlantic Design Engineers to study based on different turbine and based on final locations
Project Impacts – Flicker
Project Impacts – Flicker at School

• Concerns have been raised about flicker at the Leroy Wood Elementary School
  – School is west of the turbines, shadows will only occur in the morning
  – Most of the shadow flicker will occur in June and August
  – Shadow flicker will not occur after 7:00 am on any one day

Times of shadow flicker will occur from South turbine

Times of shadow flicker will occur from North turbine

Sunset

Sunrise
Fairhaven Concerns: Flicker

- Key Results

<table>
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<tr>
<th>Receptor</th>
<th>Location Description</th>
<th>Hours Per Year</th>
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<tbody>
<tr>
<td>B</td>
<td>Timothy Street</td>
<td>44:18</td>
</tr>
<tr>
<td>D</td>
<td>1 Teal Circle</td>
<td>23:35</td>
</tr>
<tr>
<td>F</td>
<td>Pierce's Point</td>
<td>33:37</td>
</tr>
<tr>
<td>Q</td>
<td>Wood School</td>
<td>13:13</td>
</tr>
</tbody>
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Fairhaven Reaction

• Through the Fairhaven Board of Health, the Town has set up a complaint process to document the self reported impacts of the wind turbines
  – Most complaints in Fairhaven have been about noise
  – 21 Complaints have been received from 13 households regarding flicker; however most of the complaints also included sound impacts
Flicker Comments:
- flicker early AM 5/7 & 5/8
- irritable; concentration; flicker + hobby
- light flicker very difficult all over house
- experiences sound & flicker issues
- strobe effect - awoke household
- Got home and was immediately annoyed by the horrible sound. Then while making dinner the flicker started from the south Tb which is the first time it has been fr that Tb. Got a little dizzy.
- Woke up from the light flicker, both my mother and I. With the sun rising at a different time the light flicker has appeared on our house and has begun to disrupt our sleep. Please up help us!
- only because it didn't last as long as in the spring get dizzy standing in my kitchen when the flicker comes across my eyes
- Sound-8 Flicker-10 Visual-9
Scituate

- March 2010 – Scituate Wind Commissioned Flicker Study
  - Study by Atlantic Design Engineers
  - No major concerns with the flicker study were presented at the permitting hearings
  - Flicker is not addressed in the Town’s bylaws
- Predicted flicker calculations accepted as part of the special permit approval process.
Scituate Flicker Study
Scituate Concerns: Flicker

Source: YouTube: “Child’s Birthday Disrupted by Scituate Turbine Flicker”
Key Results
Scituate Concerns: Flicker

• Scituate resident complains about shadow flicker at all public forums by looping the shadow flicker video

• The Town has engaged the MassCEC to conduct an independent review of Scituate Wind’s flicker study
Next Steps

• Both the Scituate and Fairhaven projects are public-private partnerships

• Any future steps involve further discussion with the Towns
Thank you!

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