Recommended Energy Action Plan for Groton, Connecticut
October 2012

Presentation of Findings and Recommendations by Peregrine Energy Group, Inc.
About Peregrine Energy Group

- Energy efficiency and clean energy specialists
- Business focus on towns and cities
  - Energy engineering and capital improvement planning
  - Action plan development and implementation
  - Energy information management services
  - Owner’s representative for energy-related construction
- Engaged by Groton in March 2012 through a competitive proposal process to develop Plan
- Funded by US DOE Energy Efficiency and Conservation Block Grant program
“...A succinct energy efficiency and conservation plan with clearly defined actions and a proposed priority sequence for [their] accomplishment”

“...Mitigation and adaptive strategies to reduce greenhouse gas emissions through efficiency use of energy and possible alternative energy sources”

“...Short and long term recommendations”
Create energy baseline using FY2011 data
Critique Groton policies that drive energy use by Town, residents, businesses
Conduct assessments of municipal / school buildings and identify opportunities for energy reduction
Quantify energy use reduction potential in Town buildings, streetlights, and vehicles
Prepare an Energy Action Plan based on findings with recommendations
Why is Groton focusing on energy?

• Budget management
• Comfort and service quality
• Sustainability
• Climate change and sea level preparedness
• Leadership and community education
$2.7 million in FY2011 for energy of all types: electricity (CL&P, GU), fuel oil, propane, natural gas, diesel fuel, gasoline

Cost by energy use:
- Buildings: 55%
- Water pollution control and pumping: 22%
- Street lighting and traffic signals: 13%
- Vehicles: 10%
## Town Energy Use FY2011

<table>
<thead>
<tr>
<th>BUILDINGS</th>
<th>Electric kWh</th>
<th>Natural Gas Therms</th>
<th>#2 Distillate Fuel Oil Gallons</th>
<th>Propane Gallons</th>
<th>Unleaded Gasoline Gallons</th>
<th>Diesel Gallons</th>
<th>Total Electricity Use (MMBtu)</th>
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<td><strong>TOTAL FOR BUILDINGS</strong></td>
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<td><strong>24,024</strong></td>
<td><strong>18,200</strong></td>
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<td><strong>-</strong></td>
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<td><strong>TOTAL ENERGY USE</strong></td>
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<td><strong>18,200</strong></td>
<td><strong>1,620</strong></td>
<td><strong>242,782</strong></td>
<td><strong>33,747</strong></td>
<td><strong>7,597</strong></td>
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</tbody>
</table>

**Total Energy Use FY2011:** 32,811 MMBtu

**Percentage Breakdown:**

- 47% Electric
- 21% Natural Gas
- 32% Propane
- 0% Diesel
Town Energy Use FY2011

- 92.5 MMBtus of energy use, combining all types
- Use by energy type (in MMBtus):
  - Electricity (buildings, WPCF, streetlights) 47%
  - Fuel oil (buildings, WPCF) 36%
  - Natural gas (buildings) 2%
  - Propane (buildings) 1%
  - Gasoline (vehicles) 10%
  - Diesel fuel (vehicles) 4%
FY 2011 Town of Groton Energy Expense:
$2,727,636

- Buildings 55%
- WPCF and pump stations 22%
- Street Lighting 13%
- Vehicles 10%
Town Energy Use FY2011

FY2011 Town of Groton Energy Use:
92,511 MMBtus

- Buildings: 62%
- WPCF and pump stations: 18%
- Vehicles: 14%
- Street Lighting: 6%
General Findings

• Groton has ...
  • shown leadership in addressing climate change and preparing for potential sea level rise
  • taken many actions to date that are reducing energy use, energy cost, and GHG emissions

• Groton is not ...
  • well organized to manage energy use across the Town
  • addressing energy matters in the context of a formal plan
  • measuring energy use year-to-year, building-to-building
The Town should

- Establish quantitative goals for energy use reduction
- Adopt an Energy Action Plan to achieve these goals
- Integrate these goals into Plan of Conservation and Development (POCD)
- Create a staff-based organization to coordinate all energy management activities
- Track energy use and performance for each building and vehicle over time
‘Sustainability’ and ‘environmental protection’ are strong themes in Town planning and operations, **BUT**

- Policies do not support long-term energy reduction
  - The CIP process encourages energy efficient design, but it is an option rather than a mandate
  - Equipment purchasing does not appear to require adherence to minimum performance standards (e.g. EPA Energy Star)
  - Life cycle cost is not a formal criterion for design review
  - Building standards meet state guidelines, but do not stretch building energy performance
Buildings and equipment:

- Tighten performance standards for Town building renovations, new construction, and new equipment.
- Add life cycle cost & GHG impacts to criteria for evaluating purchases.
- Require formal design reviews and commissioning for all building projects.
- Establish operation & maintenance expectations for buildings / equipment, providing needed resources.
Land use and regulations:
• Consider adopting a Town-wide “stretch code” for new building construction
• Pursue strategies that encourage, support, and result in energy reductions and more sustainable practices by residents and businesses, e.g.
  • Increased bus ridership
  • Less motorized transportation used
  • Investment in alternative energy sources
In aggregate, the energy efficiency of GPS is among the best we have seen in our practice.

Individual schools have room for improvement.

GPS has kept energy use low despite many older buildings by aggressive, hands-on O&M practices.

Additional 6.5% savings opportunities identified, spread evenly as low cost, mid-cost, infrastructure improvements, with combined 22 year payback.
Municipal Buildings: Findings

- Municipal building energy efficiency is typical for CT and what we see in our practice.
- Buildings’ age, size, history and adaptive reuse, and specific functions contribute to energy performance.
- While DPW has not had resources to manage energy for optimum performance, it has initiated many energy saving improvements and practices.
- Savings opportunities identified exceed 20% of energy use, primarily (85%) low-cost and mid-cost improvements that have a payback just over 9 years.
Immediate and short-term (3 years)

- Consider how Town can leverage GPS maintenance capabilities to service municipal buildings as well
- Implement all recommended no cost and low cost energy reduction strategies immediately
- Implement additional shorter payback building energy reduction strategies
- Convert building heating to natural gas as pipeline access expands across Town
Ongoing and Long-term

- Integrate energy goals into the capital improvement program, mandating efficiency standards
- Inventory alternative energy opportunities
- Make life cycle cost a central criterion for future construction planning and design
- Adopt criteria for measuring building performance
- Convert street lighting and parking lot lighting to proven LED technology
Vehicles: Recommendations

Purchasing
• The Town already has a policy in place to purchase fuel efficient hybrids to replace existing vehicles
• The Town should accelerate this process as practical

Operations and Maintenance (O&M)
• DPW’s O&M practices have raised fuel efficiency
• The Town should provide resources that support additional incremental efficiency improvement
Street Lighting: Recommendations

Streetlights
• Town-owned CL&P-powered lights should be converted to LED for 70% energy reduction
• GU-owned and powered lights should be acquired and similarly converted

Traffic signals
• Remainder of traffic signals should be converted to LED as soon as possible
• Buildings: 16% total savings vs. buildings use baseline
  • Municipal buildings – 20% from identified improvements
  • Schools – 6.5% from identified improvements
  • Schools – min. 5% addl. from replacing Butler, PV, Chester
• WPTF: 20% WPTF baseline savings from upgrades
• Vehicles: 20% savings from O&M and new purchases
• Street lighting: 70% savings from LED conversions
• TOTAL SAVINGS AGAINST FY2011 BASELINE – 20%
  (18,107 of 92,511 MMBtus)
Suggested Next Steps for Groton

- Create a Town energy management group with accountability for specific responsibilities
- Consider recommendations and confirm priorities
- Set measurable reduction goals and adopt strategies
- Align Town policies and practices with goals
- Initiate specific projects and report on progress