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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

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Action Plan Objectives

"…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"

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Project Scope of Work

- 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

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Why is Groton focusing on energy?

- Budget management
- Comfort and service quality
- Sustainability
- Climate change and sea level preparedness
- Leadership and community education

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Town Energy Expense FY2011

- $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%

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Town Energy Use FY2011

	Building Area (sq. feet)	Electricity		Natural Gas		#2 Distillate Fuel Oil		Propane		Unleaded Gasoline		Diesel		Total Energy Use (MMBtu)
		kWh	MMBtu	Therms	MMBtu	Gallons	MMBtu	Gallons	MMBtu	Gallons	MMBtu	Gallons	MMBtu	
BUILDIINGS														
Charles Barnum ES	43,500	210,000	717		0	7,800	1084		0		0		0	1,801
Claude Chester ES	43,600	221,000	754		0	13,900	1932		0		0		0	2,686
Cutler MS	73,700	318,000	1085		0	16,600	2307		0		0		0	3,392
Fitch HS	293,300	2,163,000	7380		0	67,500	9383		0		0		0	16,763
Mary Morrisson ES	42,200	239,000	815		0	7,800	1084		0		0		0	1,900
Pleasant Valley ES	33,700	266,000	908		0	9,800	1362		0		0		0	2,270
SB Butler ES	37,900	217,000	740		0	13,800	1918		0		0		0	2,659
West Side MS	76,000	409,000	1396		0	27,100	3767		0		0		0	5,162
SUBTOTAL PUBLIC SCHOOLS	643,900	4,043,000	13,795	-	-	164,300	22,838	-	-	-	-	-	-	36,632
Community Police Office		13,327	45		0		0	665.8	61		0		0	106
Animal Shelter		54,151	185		0	4,781.5	665		0		0		0	849
Highway Garage	21,300	131,760	450		0	6,186.9	860		0		0		0	1,310
Human Services Office (Comm Serv)	9,500	60,802	207		0	2,814.4	391		0		0		0	599
Human Services Office (security light)		504	2		0		0		0		0		0	2
Library	37,400	675,840	2306		0	5,779.2	803		0		0		0	3,109
MRF - Former Matl Recycling Facility		15,360	52		0		0		0		0		0	52
Mystic Restrooms/Community Policing		24,082	82		0		0	482.1	44		0		0	126
Parks Maint Bldg		33,318	114		0		0		0		0		0	114
Police Station	40,700	857,700	2926		0	14,821.4	2060		0		0		0	4,987
PW Barn/Bldg Maint Shop		22,441	77		0	624.7	87		0		0		0	163
PW Vehicle Storage Garage		3,928	13		0		0		0		0		0	13
Salt Shed		15,355	52		0		0	6449.4	587		0		0	639
Senior Center	30,000	388,380	1325	18200	1820		0		0		0		0	3,145
Spicer House		16,072	55		0	1,788.3	249		0		0		0	303
Town Hall	19,900	307,140	1048		0	6,089.9	846		0		0		0	1,894
Town Hall Annex	19,600	179,040	611		0	7,744.2	1076		0		0		0	1,687
Transfer Station - Offices		50,476	172		0	157.7	22		0		0		0	194
Transfer Station - Flare		42,144	144		0		0		0		0		0	144
Welles Rd Vehicle Storage		280	1		0		0	0	0		0		0	1
SUBTOTAL MUNICIPAL BUILDINGS		2,892,100	9,868	18,200	1,820	50,788	7,060	7,597	691	-	-	-	-	19,439
Burrows Field (Little League)		6,988	24				0		0		0		0	24
Burrows Field Concession			0				0		0		0		0	-
Esker Point Beach		12,401	42				0		0		0		0	42
Farquhar Park (basketball court)		2,320	8				0		0		0		0	8
Poq River Access (security light)		1,080	4				0		0		0		0	4
Poquonnock Plains Pk (concession)		13,225	45				0		0		0		0	45
Poquonnock Plains Pk (field)			0				0		0		0		0	-
Sutton Park (front shelter/pavilions)		13,163	45				0		0		0		0	45
Sutton Park (P.B. Little League)		115	0				0		0		0		0	0
Sutton Park (security light)		1,584	5				0		0		0		0	5
Sutton Park LL Pits & Concession			0				0		0		0		0	-
SUBTOTAL PARK FACILITIES		50,876	174	-	-	-	-	-	-	-	-	-	-	174
Colonel Ledyard		933	3			0.0	0		0		0		0	3
Groton Heights		13,971	48			3493.6	486		0		0		0	533
Noank Elementary		5,520	19		0	0.0	0		0		0		0	19
William Seely School *		28,680	98		0	6,000.0	834		0		0		0	932
SUBTOTAL VACATED SCHOOLS		49,104	168	-	-	9,494	1,320	-	-	-	-	-	-	1,487
TOTAL FOR BUILDINGS		7,035,080	24,004	18,200	1,820	224,582	31,217	7,597	691	-	-	-	-	57,732
Water Polution Control Facility		2,685,000	9161		0	18200	2530		0		0		0	11,691
Pumping Stations		1,413,268	4822		0		0		0		0		0	4,822
Vehicles in Aggregate			0		0		0		0	73,008	9053	27562	3831	12,884
Street and Traffic Lights		1,577,419	5382		0		0		0		0		0	5,382
TOTAL ENERGY USE		**12,710,767**	**43,369**	**18,200**	**1,820**	**242,782**	**33,747**	**7,597**	**691**	**73,008**	**9,053**	**27,562**	**3,831**	**92,511**
			47%		2%		36%		1%		10%		4%	

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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%

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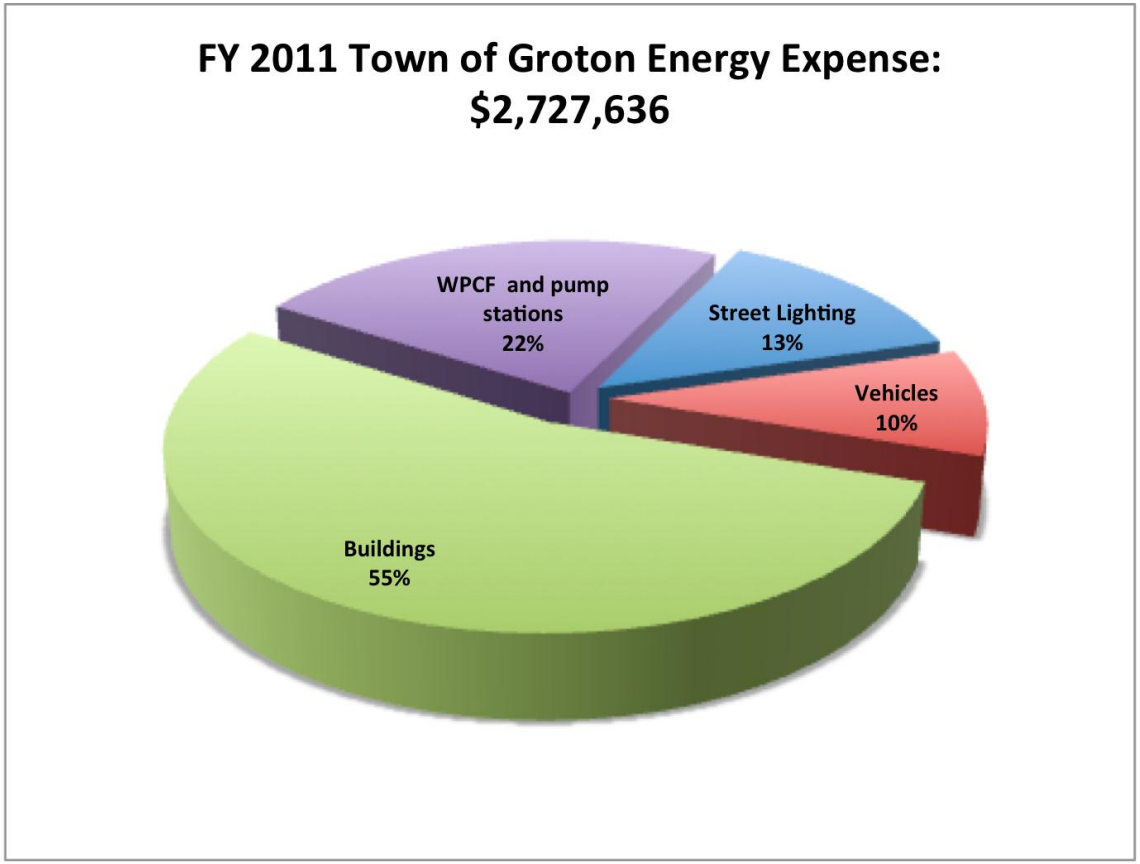
Town Energy Expense FY2011



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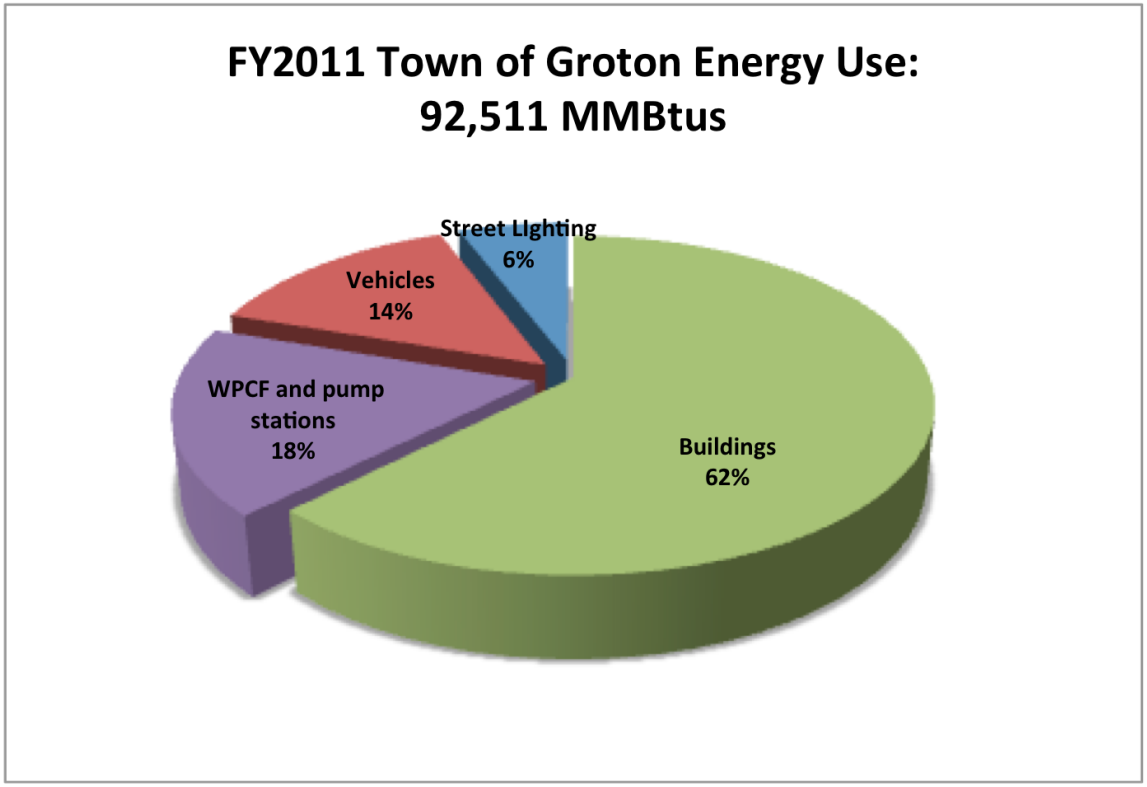
Town Energy Use FY2011



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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 <u>not</u> …
  - 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

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General Recommendations

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

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Town Policies: Findings

- ‘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

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Policy: Recommendations

Buildings and equipment:

- Tighten performance standards for Town building renovations, new construction, and new equipment
- Add life cycle cost & GHG impacts to criteria for requirements for evaluating purchases
- Require formal design reviews and commissioning for all building projects
- Establish operation & maintenance expectations for buildings / equipment, providing needed resources

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Policy: Recommendations (cont.)

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

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Groton Public Schools: Findings

- 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

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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.

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Buildings: Recommendations

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

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Buildings: Recommendations (cont.)

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

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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

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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

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Summary of Reduction Potentials

- 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)

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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

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