Is Your Town Energy Forward? Addressing Climate Change on the NH Seacoast through Local Energy Projects, Planning, & Policy

Charlie Forcey | Chair, Durham Energy Committee | June 9, 2016

Renewable Energy in Your Community

NH Coastal Adaptation Workgroup (nhcaw.org)

Durham: A College Town

- Population: 17, 625 in Fall 2015
  - 5,800 Residents
  - 11,825 UNH Students
- Small Town/Large Town
  - $14m Annual Budget
  - ~ 15 Municipal Buildings
  - Fire, Water, and Sewer (w/UNH)
- Cooperative School District (w/Lee & Madbury)

Durham Energy Committee

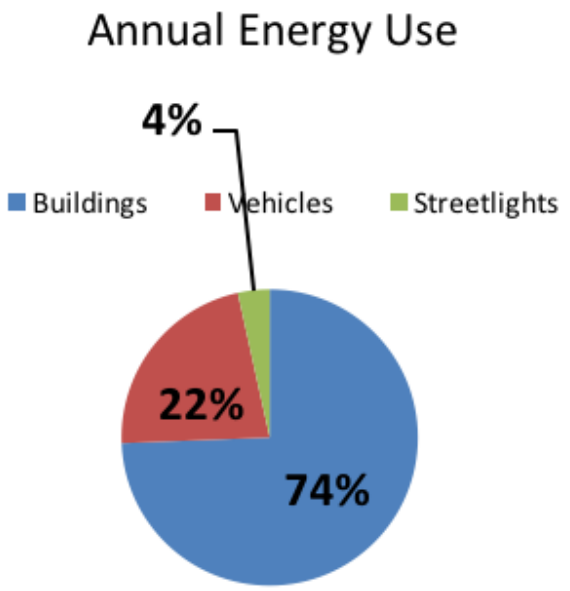
- Established in 2007 with mission to:
  - **Reduce the quantity** of energy consumed by the town and its residents
  - **Improve the quality** of the remaining energy in terms of cost, environmental impact, and local economic effects.
  - **Encourage efficiency and renewable energy** adoption in the larger community.

Addressing Climate Change w/ Local Energy Projects, Planning, & Policy

- Projects to Improve Municipal Energy Use
  - Inventory and track Durham's Energy Use and Impact
  - Reducing the Quantity of Energy Used
  - Improving the Quality of Energy Used
- Planning and Policy to Shape Community Energy Use
  - Step 1: Energy Planning
  - Step 2: Raise the Bar with Code
  - Step 3: Energy and the Planning Process
  - Step 4: Expedited Permits Exemptions

Baselining Durham's Energy Use

- 2008-2010: Small Town Carbon Calculator (STOCC, now UNH CarbonMap)
- 2011: Peregrine Inventory Tool (ETAP funded)
- 2012: Vehicle procurement studies on MPG, maintenance, and cost of ownership for Town vehicles
- 2015-present: EPA Portfolio Manager



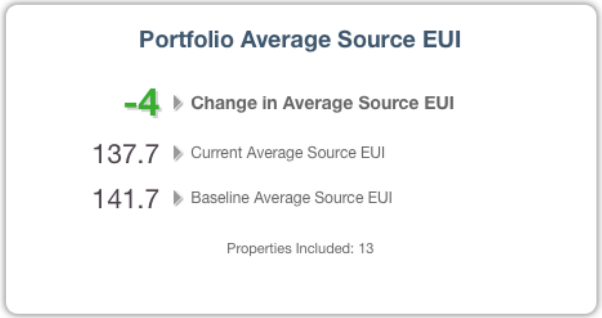
Inventory with STOCC

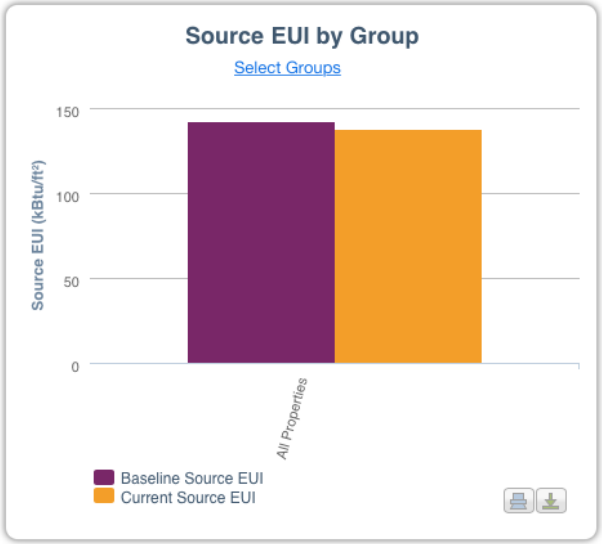
2010

	Buildings		Vehicles		Streetlights		
	#	% of total	#	% of total	#	% of total	Grand Total
Annual Fuel Expense	$359,988	64%	$129,508	23%	$74,793	13%	**$564,289**
Annual CO2 Emissions (lbs)	3844367	74%	1058041	20%	277694	5%	**5,180,101**
Annual Energy Use (MMBtu)	22441.2	74%	6683.0	22%	1045.8	3%	**30170.0**

Monitor with Portfolio Manager

- Avoid the four horseman of bad efficiency data (weather, square footage, comparisons, modifications, and energy types)
- Prioritize under performing buildings or large consumers of carbon intensive fuels
- Audit the effectiveness of new buildings and improvement projects
- Report annually or as needed a set of comparable figures to explain usage and cost changes over time.
- Lower Source EUI and GHG Emisions Trends





Reducing the Quantity of Energy Used

- ❑LED Light Conversions
- ❑Building Efficiency Updates and Button Up Workshops
- ❑LEED and LEED-like Standard for New Construction
- ❑Bicycle and Walkability Improvements
- ❑Electric Vehicle Chargers and Education

Improving the **Quality** of Energy Sources

- We favor fuels that:
  - Have lower greenhouse gas emissions
  - Are renewable (a.k.a. not fossil fuels)
  - Can be found locally to keep energy spending in state
  - Stimulate the local economy and provide living wages
  - Free of international security risks
  - Are safe to handle, transport, and use
- Best resources for Durham:
  - Solar Energy
  - Bio-mass (local heat pellets and wood chips)
  - Not sufficiently available: wind and small hydro resources

Churchill Rink – 99kW

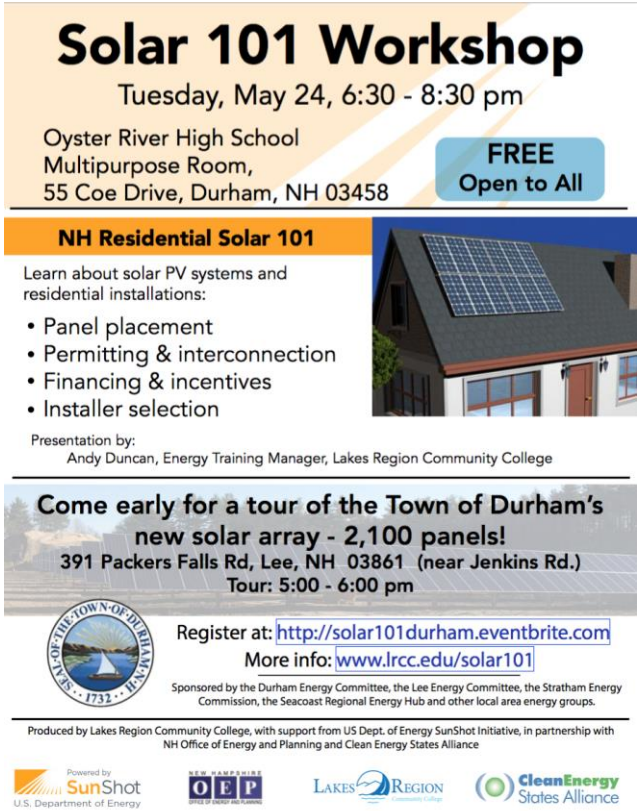
Durham Public Library 16kW

Durham Police Station 5kW

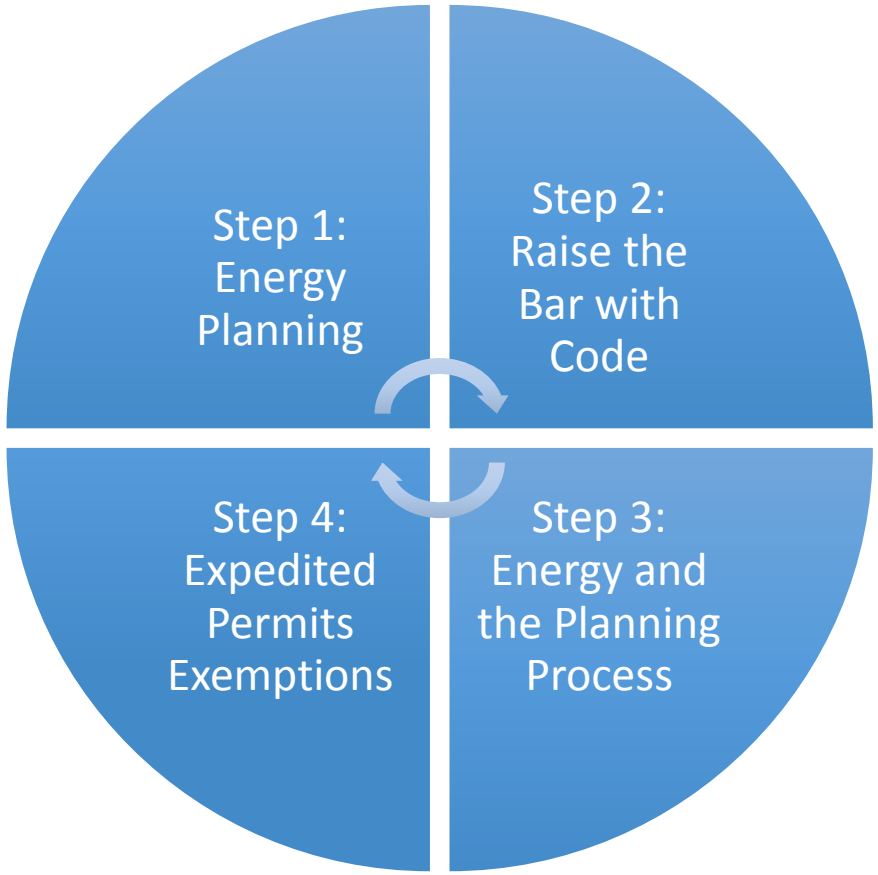
Oyster River Forest Array 640.5kW

Encouraging Renewables in the Wider Community

- Offer consultations for residents considering solar systems
- Host workshops like Solar 101 by Lakes Region Community College
- Join or organize a Solarize Campaign -- stay tuned for Seacoast Solarize in 2017

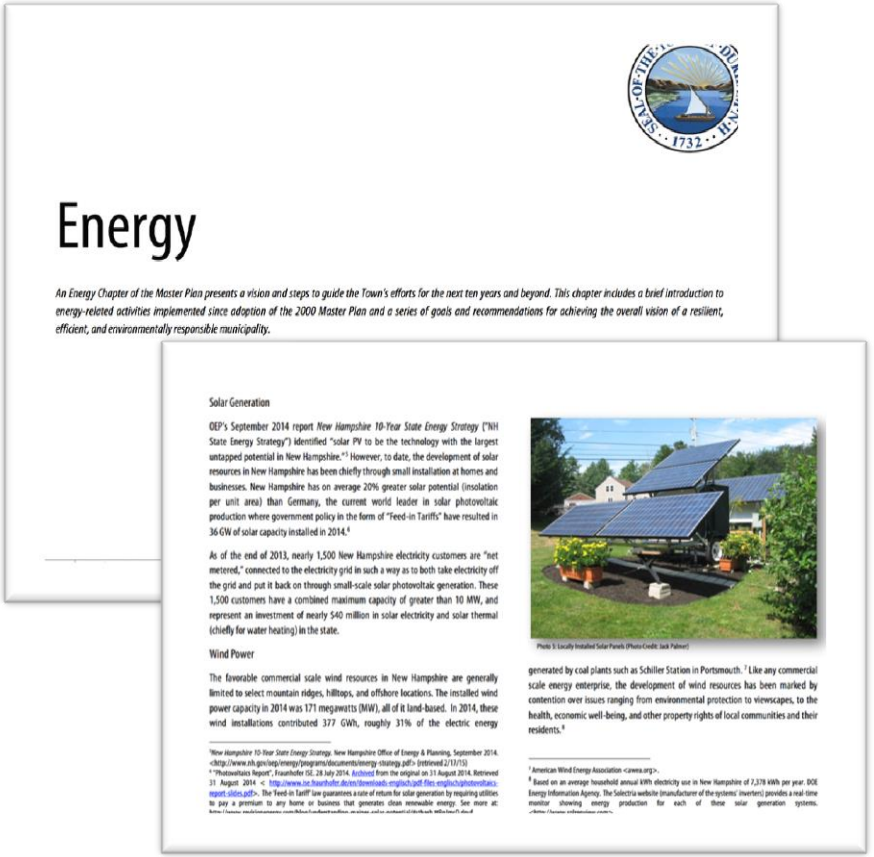


Raising the Bar through Policy, Zoning, Planning, and Code Enforcement



Step 1: Energy Planning

- Complete or update your energy master plan to include integration of energy considerations into building, transportation, and energy procurement processes of your town or city. (Durham Energy Chapter pdf)
- Update zoning regulations to follow solar siting best practices according to OEP guidelines.
- Create an energy considerations checklist that can remind home owners, developers, and municipal building teams of energy related considerations as they plan projects and renovations. (Energy Checklist pdf)



Energy

An Energy Chapter of the Master Plan presents a vision and steps to guide the Town's efforts for the next ten years and beyond. This chapter includes a brief introduction to energy-related activities implemented since adoption of the 2000 Master Plan and a series of goals and recommendations for achieving the overall vision of a resilient, efficient, and environmentally responsible municipality.

Solar Generation

OEP's September 2014 report *New Hampshire 10-Year State Energy Strategy* ("NH State Energy Strategy") identified "solar PV to be the technology with the largest untapped potential in New Hampshire."[5] However, to date, the development of solar resources in New Hampshire has been chiefly through small installation at homes and businesses. New Hampshire has on average 20% greater solar potential (insolation per unit area) than Germany, the current world leader in solar photovoltaic production where government policy in the form of "Feed-in Tariffs" have resulted in 36 GW of solar capacity installed in 2014.[6]

As of the end of 2013, nearly 1,500 New Hampshire electricity customers are "net metered," connected to the electricity grid in such a way as to both take electricity off the grid and put it back on through small-scale solar photovoltaic generation. These 1,500 customers have a combined maximum capacity of greater than 10 MW, and represent an investment of nearly $40 million in solar electricity and solar thermal (chiefly for water heating) in the state.

Wind Power

The favorable commercial scale wind resources in New Hampshire are generally limited to select mountain ridges, hilltops, and offshore locations. The installed wind power capacity in 2014 was 171 megawatts (MW), all of it land-based. In 2014, these wind installations contributed 377 GWh, roughly 31% of the electric energy generated by coal plants such as Schiller Station in Portsmouth.[7] Like any commercial scale energy enterprise, the development of wind resources has been marked by contention over issues ranging from environmental protection to viewscapes, to the health, economic well-being, and other property rights of local communities and their residents.[8]

[5] *New Hampshire 10-Year State Energy Strategy*. New Hampshire Office of Energy & Planning, September 2014. <http://www.nh.gov/oep/energy/programs/documents/energy-stategy.pdf> (retrieved 2/17/15).

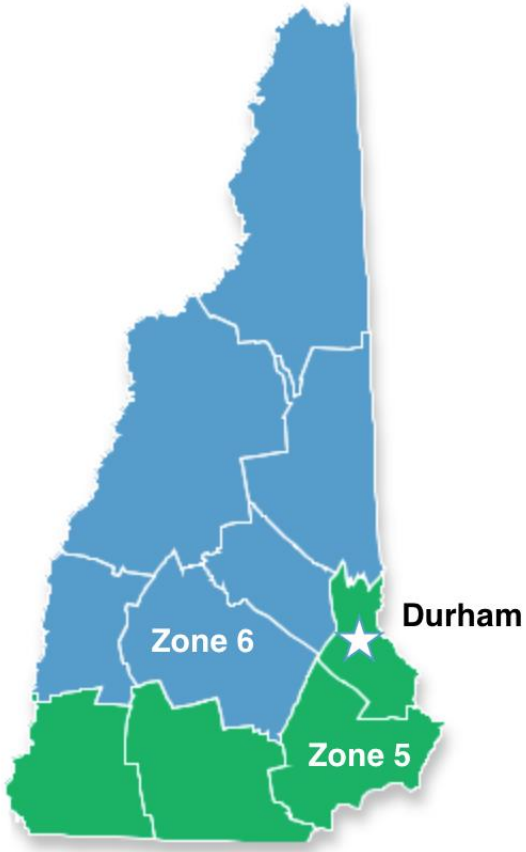
[6] "Photovoltaics Report", Fraunhofer ISE, 28 July 2014. Archived from the original on 31 August 2014. Retrieved 31 August 2014. < http://www.ise.fraunhofer.de/en/downloads-english-pdf-files-english/photovoltaics-report-slides.pdf>. The 'Feed-in Tariff' law guarantees a rate of return for solar generation by requiring utilities to pay a premium to any home or business that generates clean renewable energy. See more at:

[7] American Wind Energy Association <awea.org>.

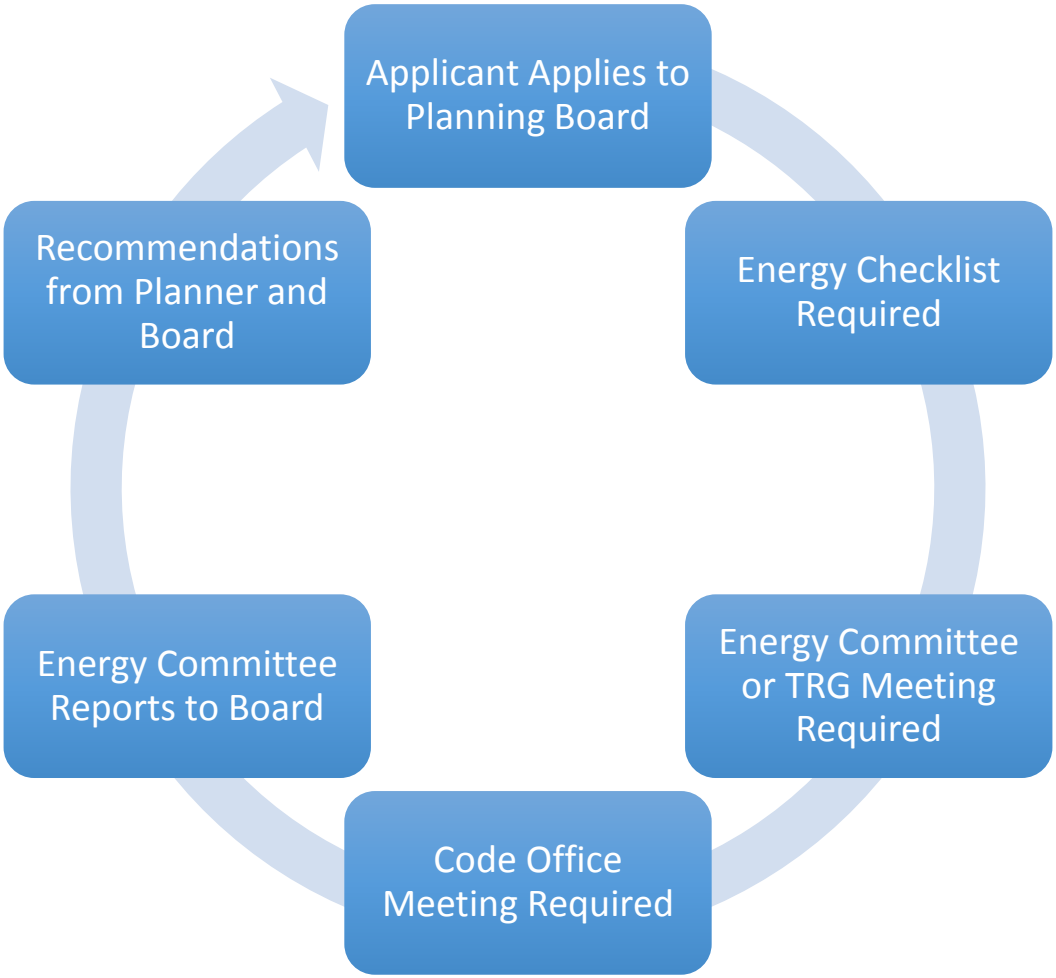
[8] Based on an average household annual kWh electricity use in New Hampshire of 7,378 kWh per year. DOE Energy Information Agency. The Selectria website (manufacturer of the systems' inverters) provides a real-time monitor showing energy production for each of these solar generation systems.

Step 2: Raise the Bar with Code

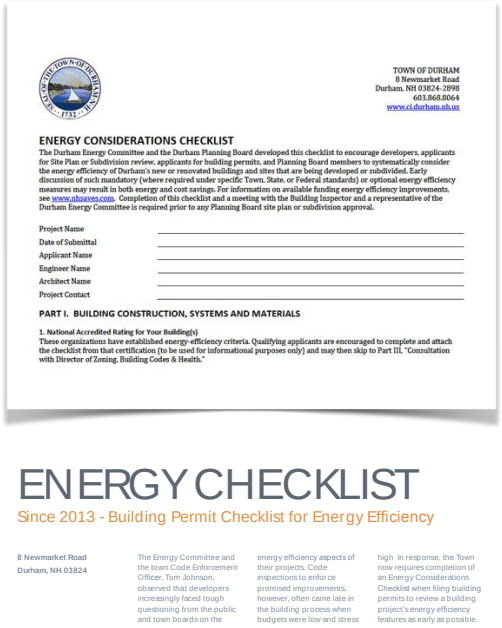
- Adopt the latest printed IECC Energy code (Durham Ordinance #2011-01 word pdf)
- Adjust your Climate Zone and declare a more restrictive zone if you are on close to the border (Durham Ordinance #2011-01)
- Code enforcement officers (perhaps shared with other towns) may be required for implementing more restrictive codes than the state standard.



Step 3: Energy and the Planning Process



Encouraging Efficiency with the Energy Considerations Checklist



TOWN OF DURHAM
8 Newmarket Road
Durham, NH 03824-2898
603.868.8064
www.ci.durham.nh.us

ENERGY CONSIDERATIONS CHECKLIST

The Durham Energy Committee and the Durham Planning Board developed this checklist to encourage developers, applicants for Site Plan or Subdivision review, applicants for building permits, and Planning Board members to systematically consider the energy efficiency of Durham's new or renovated buildings and sites that are being developed or subdivided. Early discussion of such mandatory (where required under specific Town, State, or Federal standards) or optional energy efficiency measures may result in both energy and cost savings. For information on available funding energy efficiency improvements, see www.nhsaves.com. Completion of this checklist and a meeting with the Building Inspector and a representative of the Durham Energy Committee is required prior to any Planning Board site plan or subdivision approval.

Project Name _____
Date of Submittal _____
Applicant Name _____
Engineer Name _____
Architect Name _____
Project Contact _____

PART I. BUILDING CONSTRUCTION, SYSTEMS AND MATERIALS

1. National Accredited Rating for Your Building(s)
These organizations have established energy-efficiency criteria. Qualifying applicants are encouraged to complete and attach the checklist from that certification (to be used for informational purposes only) and may then skip to Part III, "Consultation with Director of Zoning, Building Codes & Health."

ENERGY CHECKLIST

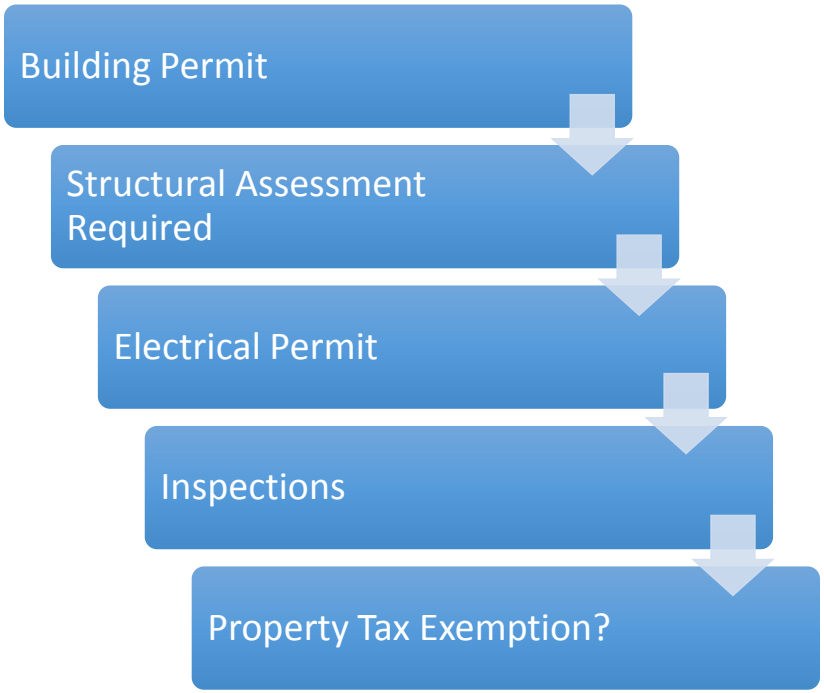
Since 2013 - Building Permit Checklist for Energy Efficiency

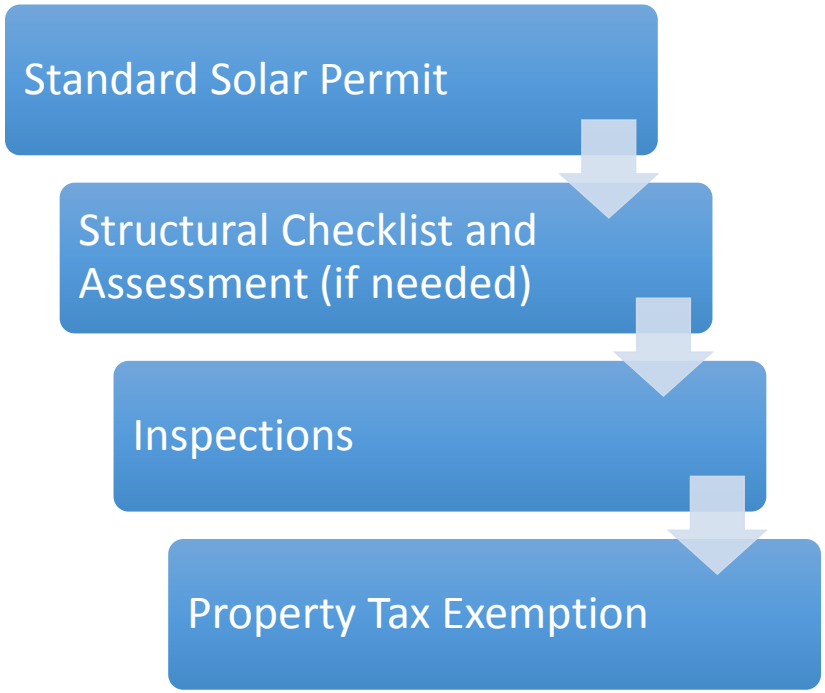
8 Newmarket Road
Durham, NH 03824

The Energy Committee and the town Code Enforcement Officer, Tom Johnson, observed that developers increasingly faced tough questioning from the public and town boards on the energy efficiency aspects of their projects. Code inspections to enforce promised improvements, however, often came late in the building process when budgets were low and stress high. In response, the Town now requires completion of an Energy Considerations Checklist when filing building permits to review a building project's energy efficiency features as early as possible.

- Checklist Included with Every Building Permit Application
- Optional for Homeowners and Projects within Code and Zoning Rules
- Mandatory for Projects Seeking Planning Board and Zoning Board
- Meeting with and Report from Committee = Small Wins
- Available online

Step 4: Expedited Permits and Tax Exemptions





Sources of Local Energy Action