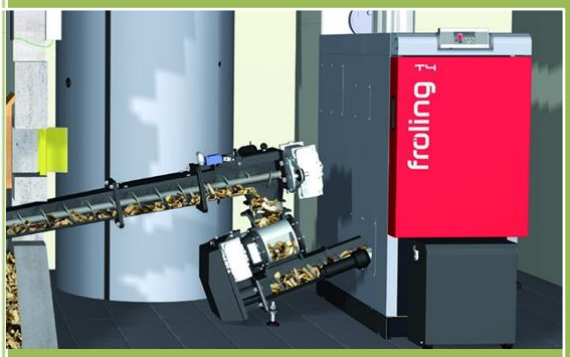
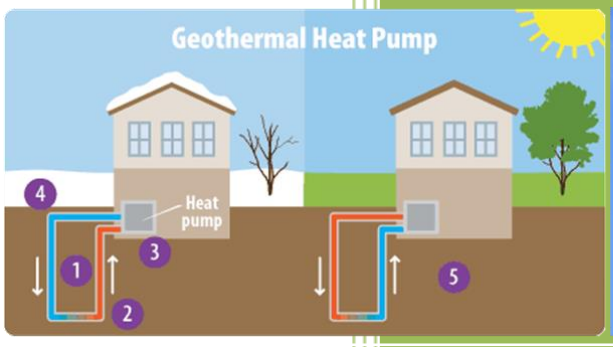
Renewable Energy Tool Belt





NASHUA REGIONAL PLANNING COMMISSION

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New Hampshire Charitable Foundation

Renewable Energy Tool Belt

Introduction

Community leaders representing municipalities and school districts across NH want to incorporate renewable energy into their operations for various reasons. Some wish to save money, others want more reliable energy, and others have goals of reducing their environmental impact. Yet while communities know they don't want fossil fuels, they are less clear about what type of renewable energy they do want. The Renewable Energy Tool Belt is designed to help community leaders evaluate potential renewable energy systems.

While the Tool Belt will not replace the work of an outside professional, it will give communities a starting point to compare renewable energy options. Communities will then enter into discussions with energy professionals having a better understanding of the benefits and drawbacks of each renewable energy type and will be able to make more informed decisions about which option is best for them.

In addition, the Renewable Energy Tool Belt will help communities to move renewable energy projects forward by providing guidance on how to develop a comprehensive public outreach strategy. Public outreach is an essential component of taking renewable energy projects from the planning phase to implementation.

Although not the topic of this Renewable Energy Tool Belt, communities are also looking to improve the energy efficiency of their buildings' operations and energy-using equipment. There are numerous, and well known options and opportunities for efficiency improvements that communities should also actively pursue – in fact, community leaders should always eat their energy efficiency vegetables before they have their renewable energy desserts.

What is in the Renewable Energy Tool Belt?

Step 1. Benchmark your Energy Usage— it is essential to measure and track how much energy your buildings use. Benchmarking is a critical first step regardless of whether you are making energy efficiency improvements or you are ready to tackle a renewable energy project. Focusing on energy efficiency first will help you to "Right Size" your renewable project, resulting in a less costly project. This section provides users with an overview of how to start benchmarking their facilities using the Environmental Protection Agency's Portfolio Manager.

Step 2. Identify Your Community's Current Needs—the Tool Belt does not have to be read cover-to-cover. This section is designed to help users determine which sections of the Tool Belt will be most relevant to their municipality or school district.

Step 3. Learn about Renewable Energy Options—you can't make an informed decision about which type of renewable energy is best for your community if you don't know what the options are. This section provides a brief overview about the different types of renewable energy sources that may be

available to your community, including solar PV, solar hot water, wind, heat pumps, wood, hydropower, landfill gas, and energy generated from wastewater treatment processes.

Step 4. Project Siting and Selection—this section consists of a series of checklists to help users determine which renewable energy source is feasible at their target location.

Step 5. Financing your Renewable Energy Project—this section discusses financial options and incentives available for renewable energy, reviews the pros and cons of owning vs leasing, and provides sample questions to ask when obtaining financing. It also includes a timeline for securing financing within the Town Meeting schedule.

Step 6. Conduct Public Outreach—this section helps users to develop a comprehensive public outreach strategy by examining why they should conduct outreach, who they are targeting, what their message is, when they should conduct outreach, and where they should disseminate their message.

Step 7. Case Studies and Technical Assistance—this section contains information on consultant selection, renewable energy case studies, and a renewable energy document library.

Tips for using the Renewable Energy Tool Belt

The Tool Belt is designed to start the conversation about renewable energy in communities, without being overly prescriptive. While the Renewable Energy Tool Belt is divided into sections labeled "Steps," the steps do not necessarily need to be taken sequentially. Furthermore, the Renewable Energy Tool Belt does not need to be read from cover to cover. Users are encouraged to focus on the sections that reflect the priorities for their community.

That said, every community is encouraged to begin at Step 1. Benchmarking Your Energy Usage, if you are not currently doing so. Measuring and tracking how much energy your buildings use is a critical first step, regardless of whether you are ready to pursue a renewable energy project or you are still working on energy efficiency improvements.

If you need help determining which sections of the Tool Belt are most relevant to your community after you have completed Step 1, proceed to Step 2 "Identify your community's current needs." If you already know where to focus, then jump directly to that section.

Incorporating the Tool Belt into Municipal and School District Planning

In general, please note that while this document may be useful for residential and business applications, it is designed for municipalities and school districts. Local energy committees or commissions are an obvious choice to facilitate usage of the Renewable Energy Tool Belt in communities where they exist. In communities without energy committees, other entities or individuals who could play a leading role in implementing the Renewable Energy Tool Belt include: facilities committees, conservation commissions, budget committees, school boards, facilities managers, town administrators, finance administrators, planning staff, and engaged residents and business leaders.

If you community needs guidance with energy planning in general, start with the Strategic Energy Action Toolkit. The Toolkit is an open-source resource developed by the New England Grassroots Environment Fund and Vital Communities, in collaboration with the Local Energy Solutions Work Group and New England Local Energy Network, and with funding from Jane's Trust Foundation, NH Charitable Foundation, and Barr Foundation. The Toolkit is comprised of tools and exercises that help local energy groups develop a list of projects that align with their vision, capitalize on their strengths, and maximize their community impact. The Renewable Energy Tool Belt is an add-on to the Strategic Energy Action Toolkit and should be used when a community prioritizes one or more renewable energy strategies. Both the Renewable Energy Tool Belt and the Strategic Energy Action Toolkit are available at www.nhenergy.org.

Step 1. Benchmark your energy usage

Overview

It is essential to measure and track how much energy your buildings use. This is a critical first step regardless of whether you making energy efficiency improvements or you are ready to tackle a renewable energy project. Benchmarking allows you to set a baseline for your community's energy usage, identify which buildings to target for energy efficiency and renewable energy projects, set goals for energy improvements, and track your progress.

Fortunately, benchmarking your energy usage is easy thanks to ENERGY STAR's Portfolio Manager, developed by the US Environmental Protection Agency (EPA). Portfolio Manager is a free, online tool that allows you to measure and track energy usage, water consumption, and greenhouse gas emissions. If your community already utilizes Portfolio Manager, congratulations on completing this important first step. If you have never used Portfolio Manager, here are a few tips to get you started.

Eligible Buildings

You can use Portfolio Manager to benchmark the energy performance of any building, regardless of what type it is. There are 18 broad categories and more than 80 primary building functions included in Portfolio Manager. Renewable Energy Tool Belt users will likely have buildings that fall under the "Public Services" category, which includes courthouse, drinking water treatment and distribution, fire station, library, mailing center/post office, police station, prison, social/meeting hall, transportation terminal/station, wastewater treatment plant, and other. There are 14 types of buildings that can get a 1-100 score that compares buildings to similar buildings across the country. Typical municipal buildings that can get a 1-100 score to indicate how energy efficient they are include town halls that can be considered office buildings, courthouses, and K-12 schools.

Required Data

All buildings utilizing Portfolio Manager must input the following data:

- Property name
- Property address
- Total gross floor area—total property square footage, measured between the outside surface of the exterior walls of the building. This includes all areas inside the building, such as lobbies, common areas, meeting rooms, break rooms, restrooms, stairwells, mechanical equipment areas, basements, and storage rooms.
- Year Built/Planned for Construction Completion—this is the year in which your property was constructed. If your property has undergone a complete renovation that included gutting and rebuilding the interior, then you can indicate the date of this renovation as the year built.

- Occupancy—the percentage of your property's gross floor area that is occupied and operational. If you have people working on all floors/areas of your building, then you are 100% occupied. You do not need to count empty cubicles for occupancy.
- 12 consecutive months of energy data

Portfolio Manager may require additional data depending on the type of building being benchmarked. You can learn more about what type of data is required here.

Fuel Types

Portfolio Manager allows you to track and measure energy usage from the following fuel types:

- Electric
- Natural gas
- Propane
- Fuel oil (No. 1, No. 2, No. 4, No. 5, and No. 6)
- Diesel
- District steam
- District chilled water
- Coal (anthracite and bituminous)
- Coke
- Wood
- Kerosene

In addition to tracking energy usage, you can also measure water consumption and waste/materials consumption and disposal.

Reporting Metrics

Once you have entered at least 12 months of energy usage data, Portfolio Manager will calculate the following metrics for your buildings:

- Energy STAR score (1-100)— or Weather normalized kBtu/ft2, a measure of how well your property is preforming relative to similar properties across the country, when normalized for climate and operational characteristics. All buildings can be compared to a national median of similar buildings regardless of whether they can receive a score.
- Source EUI (kBtu/ft^2)—source energy use is the total amount of raw fuel that is required to operate your property. In addition to what the property consumes on-site, source energy includes losses that take place during generation, transmission, and distribution of the energy.

- Site EUI (kBtu/ft^2) —site energy use is the annual amount of all the energy your property consumes onsite, as reported on your utility bills. Site Energy Use Intensity (EUI) is site energy use divided by the property's square footage.
- Energy cost ($)
- Total Greenhouse Gas Emissions (metric tons CO2e)—greenhouse gas emissions are the carbon dioxide (CO2), methane (CH4), and nitrous oxide N20) gases released into the atmosphere as a result of energy consumption at the property. Greenhouse gas emissions are expressed in carbon dioxide equivalent (CO2e), a universal unit of measure that combines the quantity and global warming potential of each greenhouse gas.

Tool #1. Benchmarking Starter Kit

EPA's Benchmarking Starter Kit includes resources to help first-time users with benchmarking.

- Portfolio Manager Quick Start Guide—this 3-page handout covers the basic steps involved in using Portfolio Manager. It is also included in the Renewable Energy Tool Belt for your reference.
- Data collection worksheet—tells you what data you'll need to collect to benchmark your properties.
- Trainings—offers how-to guides, short videos, and live and recorded training sessions to help with Portfolio Manager.

Step 2. Identify your community's current needs

Overview

This section is designed to help users determine what their current needs are and where they can find solutions to those needs within the Tool Belt. The surveys help users to focus on the areas of the Tool Belt that are most relevant to them. This allows users to skip to a particular section of the Tool Belt rather than moving through the document from cover-to-cover. Chapter 2 should be revisited each time a group makes progress on a project, as their needs and priorities will likely shift.

Instructions

1. Users should complete each of the four surveys included in this section to help establish a baseline of their current needs. Survey topics include Project Siting and Selection, Finance, Public Outreach, and Case Studies and Technical Assistance.
2. All survey questions are phrased to elicit a Yes or No response. Place a check mark in the appropriate column following each question.
3. After completing a survey, add up the number of Yes and No responses and note them in the "Total" row at the bottom of the table.
4. Once every survey has been completed, use the Summary Table to score your responses and prioritize which areas of the Tool Belt to focus on.

Tool #2. Project Siting and Selection Baseline Survey

QUESTION	YES	NO
Do you have a sound understand of…		
how to determine which existing building to focus on when considering a renewable energy project?		
how to determine which current energy source to focus on replacing when considering a renewable energy project?		
the various renewable energy options that exist and how each one works?		
the potential constraints or requirements associated with each renewable energy option?		
what non-renewable energy sources are replaced by each renewable energy source?		
the average cost per unit of energy generated by each renewable energy source?		
Are any municipally or school district-owned buildings or properties in the community already utilizing renewable energy?		
Has a target building already been identified for a renewable energy project?		
Has the most appropriate renewable energy source for the target location already been selected?		
TOTAL (sum the number of check marks in each column)		

Tool #3. Finance Baseline Survey

QUESTION	YES	NO
Do you have a sound understanding of…		
various financing mechanisms available for renewable energy projects, such as loans, leases, and power purchase agreements?		
pros and cons of a renewable energy lease?		
pros and cons of a renewable energy power purchase agreement?		
pros and cons of a renewable energy loan?		
questions you should ask when obtaining financing for a renewable energy project?		
timeline and important dates associated with funding a renewable energy project in a traditional town meeting or SB2 community?		
Do you know where you would go to fund a municipal or school district renewable energy project?		
Have you been successful in obtaining funding for municipal or school district renewable energy projects in the past?		
Do you know where to find information about renewable energy certificates, net metering, rebates, and incentives available for renewable energy projects?		
TOTAL (sum the number of check marks in each column)		

Tool #4. Public Outreach Baseline Survey

QUESTION	YES	NO
Do you have a…		
sound understanding of whether there is support or opposition for renewable energy projects in your community?		
sound understanding of where support or opposition to renewable energy projects in your community is coming from?		
Energy Master Plan or overarching planning document to provide guidance on how the community wishes to develop renewable energy?		
sound understanding of why you are conducting public outreach?		
sound understanding of who your target audience is?		
clearly defined message?		
sound understanding of when public outreach should take place?		
sound understanding of where you should conduct public outreach?		
Have you conducted a public outreach campaign for a renewable energy project in the past?		
TOTAL (sum the number of check marks in each column)		

Tool #5. Case Studies and Technical Assistance Baseline Survey

QUESTION	YES	NO
Are you familiar with the NH Local Energy Solutions Work Group?		
Do you know where to find case studies highlighting municipal or school district renewable energy projects that have been implemented in NH?		
Do you know how to find qualified renewable energy companies and consultants?		
Are you aware of individuals in your community who could offer advice on assessing and moving forward with renewable energy projects?		
Are you aware of individuals outside of your community who could offer advice on assessing and moving forward with renewable energy projects?		
Do you know how to craft a request for proposals for a renewable energy project that will meet your needs?		
Do you know what criteria to use when evaluating and screening renewable energy proposals and companies?		
Do you know where to find trusted technical specifications for each type of renewable energy?		
Do you know where to find New Hampshire specific resources and documents related to renewable energy?		
TOTAL (sum the number of check marks in each column)		

Tool #6. Baseline Survey Scorecard

SURVEY TOPIC	# OF NO responses
Project Siting and Selection	
Finance	
Public Outreach	
Case Studies and Technical Assistance	

Scoring

- 7-9 NO responses = focus on these sections of the Tool Belt first
- 4-6 NO responses = work on these sections after you have addressed top priority topic areas
- 1-3 NO responses = these are not priorities for your community at the moment, however, revisit the Tool Belt annually as they may become priorities in the future

1st Priority Topic = _____

2nd Priority Topic = _____

3rd Priority Topic =_____

4th Priority Topic = _____

Note

The baseline surveys are designed to help you determine what your current needs are and where you can find solutions to those needs within the Renewable Energy Tool Belt. However, if you disagree with what the baseline survey indicates is your priority topic, feel free to pick a new topic. You may have other reasons for selecting a particular topic to focus on. Where you start is less important than making forward progress.

Step 3. Learn about renewable energy options

Overview

You can't make an informed decision about which type of renewable energy is best for your community if you don't know what the options are. This section provides a very brief overview about the different types of renewable energy sources that may be available to your community, including solar PV, solar hot water, wind, heat pumps, wood, hydropower, landfill gas, and wastewater. More detailed guides on the technical specifications for each type of renewable energy are available online. Reputable sources of information include, but are not limited to, the NH Public Utilities Commission, US Environmental Protection Agency, US Dept. of Energy, National Renewable Energy Laboratory, and Database of State Incentives for Renewables and Efficiency.

Solar PV

- **How it works**—solar PV converts energy from sunlight into electricity using photovoltaics. The solar panels used to power solar PV systems can be roof-mounted or ground-mounted. Solar PV systems can be entirely off-grid or can be grid-connected. Net metering allows solar system owners to feed electricity produced by their system onto the utility grid when it is producing more than the system owner needs. When the solar system is not producing enough electricity the system owner can draw electricity back from the grid.
- **Potential constraints or requirements**—like many renewable technologies, the costs of solar PV systems are largely incurred up-front. In addition, local permitting, zoning and siting requirements may help or hinder system installation. Outreach to and interconnection with your local electric utility will also be important to initiate early in the planning process for solar PV system installation. It is important to note that solar PV panels need to be installed in unshaded locations, with proper orientation towards the sun.
- **What it replaces**—solar PV replaces electricity generated by oil, coal, natural gas, nuclear energy, or other fuels depending on your electricity supplier. Solar PV can also be used to power heat pumps, which can replace non-renewable energy used for heating and cooling.

Heat Pumps

- **How it works**—unlike most heating systems, heat pumps do not burn fuel to generate heat. Instead, they simply move already existing heat from one location to another. In the winter, heat is collected from the exterior air or the ground and moved indoors to heat the building. In the summer this process is reversed to provide air conditioning. Heat pumps do require electricity to run, however, they can deliver more energy than they use. They can also be combined with an electricity-generating renewable energy source, such as solar PV, to be completely fossil fuel free.

- **Ground-source or geothermal heat pumps** extract heat from the ground. This heat comes from the radioactive decay of minerals and continual heat loss from the earth's original formation. The production of geothermal energy for heating and cooling involves drilling wells into the Earth's crust where heat is transferred using a variety of methods, but most commonly with water. This is done either by directly circulating the hot water through buildings or by pumping it through a heat exchanger that transfers the heat to the building. Because of the Earth's constant temperature this process can also be used in summer months to cool buildings.
- **Air-source heat pumps** consist of a compressor and two coils made of copper tubing. One coil is indoors and the other is outside. Aluminum fins surround the heat pump to help with heat transfer. In heating mode, liquid refrigerant in the outside coils extracts heat from the air and evaporates into gas. The indoor coils release heat from the refrigerant as it condenses back to a liquid. A reversing value located can change the direction of the refrigerant flow for cooling and to defrost the outdoor coils in winter. Although air-source heat pumps do work in cold climates, they often require supplemental heat in subzero weather. One heat pump per room is typically needed to heat an entire building. They are also called mini-splits, cold-climate heat pumps, or ductless heat pumps.

- **Potential constraints or requirements** –like many renewable technologies the costs of heat pumps (particularly geothermal) are largely incurred up-front. There is also still a need for electricity to power the circulation and transfer within the building. Geothermal systems require suitable areas for the wells to be installed and some configurations require more space on site. Local permitting, zoning and siting requirements may help or hinder system installation.
- **What it replaces** –heat pumps replace heating and cooling loads otherwise generated by electricity, heating oil, natural gas, or wood.

Wood

- **How it works**—currently, in New Hampshire the most common forms of wood feedstock are woodchips and wood pellets.[1] Wood comes from local forests, which provides additional economic benefits. Wood systems work by utilizing an ignition element to light the wood feedstock as needed. Woodchips or wood pellets are delivered to the burner in measured quantities by an auger that is attached to a hopper or adjacent storage bin. Wood systems can work with hot water (hydronic) radiant systems, hydro-air, or forced hot air systems if a hydronic coil is added. They can provide domestic hot water and zoned space heating.
    - **Woodchip systems**—woodchip systems are typically used for heating more than 50,000 ft^2 of space. Woodchip systems burn green woodchips, which have a 25-50% moisture content. Woodchip systems can be fully automated or semi-automated. In a fully automated woodchip system, woodchips are stored in a below-grade concrete bin with

[1] https://www.studentenergy.org/topics/biomass?gclid=Cj0KCQjw--DLBRCNARIsAFIwR26BOuDJ1DP9t7NzZspz6-e3Vg1H64_D2fwnwd0Z3FWLEXAX9kTJytgaAmfKEALw_wcB

a minimum capacity of 3,000 ft^3. Fully automated woodchip systems draw woodchips directly from the storage bin to the boiler and do not require any labor to operate. Fully automated systems are generally reserved to heat spaces over 100,000 ft^2. They require anywhere from 1,000-15,000 ft^2 of space for the boiler and additional room to store woodchips. Semi-automated woodchip systems store woodchips in a slab on-grade building with an overhead door for delivery. In semi-automated systems, the operator must move chips from the main storage bin to a day bin 1-2 times per day. These systems are generally best for spaces between 50,000-100,000 ft^2. They require between 1,500-4.500 ft^2 of space for the boiler and additional room to store woodchips.

  - **Wood Pellet systems**—wood pellet systems are typically used to heat smaller spaces than woodchip systems, generally under 50,000 ft^2. As their name implies, wood pellet systems burn wood pellets, which are made by compacting low-grade wood and sawdust under high pressure. They require approximately 200ft^2 to house the boiler, which is significantly less square footage than woodchip systems. Pellets are typically stored in an outdoor silo (roughly 150 ft^2) and are automatically drawn into the boiler, requiring no operator labor. Pellet fuel is more expensive than woodchips, but pellet systems have a lower startup cost than woodchip systems.

- **Potential constraints or requirements** –like many renewable technologies, local permitting, zoning and siting requirements may help or hinder system installation. Siting is a challenge on when there are space constraints for fuel storage. One consideration related to wood facilities is the storage of feedstock to ensure that the fuel remains dry for combustion**.** Disposal of the ash after combustion must also be considered; wood boiler operators often make arrangements with local farmers or hire resource management firms to address ash disposal.
- **What it replaces** –wood can replace any other heating fuel, such as heating oil and natural gas. Wood can also replace existing electrical loads, however, in the Renewable Energy Tool Belt wood feasibility is only evaluated for the purposes of replacing heating fuels.

Wind

- **How it works**—wind turbines operate on a simple principle. The energy in the wind turns two or three propeller-like blades around a rotor. The rotor is connected to the main shaft, which spins a generator to create electricity. So how do wind turbines make electricity? Simply stated, a wind turbine works the opposite of a fan. Instead of using electricity to make wind, like a fan, wind turbines use wind to make electricity. The wind turns the blades, which spin a shaft, which connects to a generator and makes electricity.[2]
- **Potential constraints or requirements**—the feasibility of this technology is dependent on how energetic a wind site is. A wind facility might not be cost competitive in less windy areas of the state or region. Even though the cost of wind power has decreased dramatically in the past 10

[2] https://energy.gov/eere/wind/how-do-wind-turbines-work.

years, the technology requires a higher initial investment than fossil-fueled generators. Good wind sites are often located in remote locations, far from cities where the electricity is needed. Transmission lines must be built to bring the electricity from the wind facility to the users. Turbines might also cause noise, shed ice, and change the view-shed in the area. Concern exists over the sound sometimes produced by the turbine blades and visual impacts to the landscape. The location of wind turbines could damage local wildlife and this must be considered during the siting of wind turbines.[3] Also, local permitting, zoning and siting requirements may help or hinder system installation. Outreach to and interconnection with your local electric utility will also be important to initiate early in the planning process for wind turbine facility installation.

- **What it replaces** –wind power replaces electricity generated by oil, coal, natural gas, nuclear energy, or other fuels depending on your electricity supplier. Wind can also be used to power heat pumps, which can replace non-renewable energy used for heating and cooling.

Less Common Renewable Energy Options

Solar Hot Water

Solar hot water for municipal or school district buildings is becoming less cost-effective compared to installing a direct solar-to-electric, PV, system. It is more efficient to use electricity generated from a solar PV system to power an electric hot water heater than it is to run a fluid-filled solar hot water system.

Hydroelectric

Hydroelectric power is generated using the force from falling/flowing water to produce electricity. The most familiar type of hydroelectric power is produced by diverting water into a powerhouse that otherwise would flow over dams. Typically, hydroelectric projects are owned and operated by private companies that have long-term arrangements to sell the power back to a contracting utility. They might also sell power directly to an end-use customer (which could include the municipality where the hydro facility is located) and/or into the regional wholesale power market. Another revenue source involves renewable energy certificates issued by ISO-NE and used to meet individual state renewable energy portfolio requirements.

There are very limited opportunities for "new" hydro projects to be installed. Instead, a community might get involved if there is an existing (previously operating) hydroelectric facility in the community that is ripe for refurbishment or if there is a project in town that an owner wants to sell. There could

[3] https://energy.gov/eere/wind/advantages-and-challenges-wind-energy.

also be opportunities for micro-hydro (typically 25 kW or less) if reliable stream flows and head (sufficient water drop) exist. Micro-hydro could be located on town-owned property or on private residential or business-owned land. These projects could be candidates for net-metering.

There are substantial local, state and national permitting, licensing, utility interconnection, and power purchasing contracting requirements associated with hydroelectric power. Support from a qualified engineering firm and/or other professional design, construction, and environmental firms would be needed.

Landfill Gas

Landfill gas generation facilities use gas byproducts produced at landfills to generate electricity that can be connected to the grid as well as supplement or replace other fuels. Local landfills produce gases as the waste decomposes. These gases are typically composed of around 50% methane gas and 50% carbon dioxide with a small amount of non-methane organic compounds. Usually the methane gas would be vented directly to the air or could be destroyed through direct combustion. When used as a renewable energy source, collection wells are installed to extract the methane gas from the landfill. Special equipment can then be used to extract the gas from wells and "clean" it for reuse. In addition to creating usable energy, this reuse of the methane gas prevents it from otherwise escaping to the atmosphere as a greenhouse gas.

The clean methane gas can be used in many ways as a renewable resource including generating electricity, replacement of another fuel, and cogeneration. If the cleaned methane gas is used to create electricity, it will be produced next to the landfill using a gas turbine engine to generate the electricity. This system is typically connected directly to the grid. If the clean methane gas is used as a supplement or replacement for other fuels (for example, natural gas, coal, or fuel oil) then it will be distributed to a nearby facility. Cogeneration is the use of clean methane gas to generate both electricity and heat, usually in the form of steam or hot water.

There are many considerations when pursuing the use of landfill gas, including the technology used to clean the gases, location, end use of the gas, the cost and profit, regulations, utility interconnection and permitting. If your community is considering landfill gas, professional support should be procured from a qualified firm.

Wastewater Treatment

Wastewater contains energy that can be used in a few different ways including thermal, chemical and hydraulic. Heat from wastewater can be recovered using heat exchangers in order to redirect the heat to a new source such as hot water for space heating or another on-site process requiring hot water. The process of breaking down compounds in the wastewater during treatment can be used to generate electricity when using a microbial fuel cell. Another valuable chemical produced from treatment is hydrogen which can be used in various ways to create energy. Methane gas is produced during treatment (typically through anaerobic digestion) and can be used for cogeneration, generating electricity or replacing a fuel source. Additionally, the wastewater holds hydroelectric kinetic energy that can be captured with proper flow and water drop.

There are many technologies to consider when choosing a strategy to produce renewable energy from wastewater treatment facilities. Most often the energy produced is used on site to offset the high energy use of the facility. The size of the facility and strategy for producing energy usually drive how the energy will be used. Electricity generated from the wastewater treatment process is not typically tied into the grid. Considerations include the size and type of water recovery plant, energy usage of the facility that could be offset with renewables, infrastructure, regulations, and permitting. If your community is considering energy generated from your wastewater treatment plant, professional support should be procured from a qualified firm.

Step 4. Project Siting and Selection

Overview

It's a familiar scene. You are a Local Energy Committee member and you have been tasked with implementing the Energy chapter of your town's Master Plan. You'd like to focus on the recommendation to increase your town's renewable energy use. Where would you begin?

Imagine next that you are a Facilities Committee member. You are planning for a new Fire Station in town and you'd like it to incorporate renewable energy in order to reduce energy costs over the life of the building. Solar companies are interested in getting your business, but is solar really the best option to achieve your financial goals? Would wood heating save the town even more money? How would you start to compare the two?

These are questions municipalities and School Districts across NH face as they work to increase their use of renewable energy. This section is the first step towards answering them.

Energy Efficiency: an essential first step

Before focusing on project siting and selection, it is advisable to implement energy efficiency measures in any building you are considering for a renewable energy system. There are several reasons for this. Improving energy efficiency will reduce energy use and in turn may change which building you choose to focus on for a renewable energy installation. For example, after benchmarking your municipal buildings you determine that the Fire Station uses the most energy, followed by the Public Works Garage. However, upon closer investigation you identify a number of energy efficiency improvements that can be made to the Fire Station, while the Public Works Garage is running efficiently. After completing energy efficiency measures at the Fire Station it now uses less energy than the Public Works Garage. Therefore, you now prioritize the Public Works Garage for a renewable energy project rather than the Fire Station. In addition, reducing your energy usage by implementing energy efficiency measures before installing a renewable energy system may allow you to buy a smaller and less expensive system. Finally, the cost for energy efficiency improvements is typically much lower (2 to 3 times less) than the cost required for investing in traditional or renewable electric generating systems.[4]

[4] http://aceee.org/press/2014/03/new-report-finds-energy-efficiency-a - average of $0.028/kWh.

Project Siting & Selection Task 1—determine which building to focus on

If your community is building a new facility, it provides an excellent opportunity to incorporate a renewable energy system. New construction allows for features that accommodate renewable energy sources to be factored into the building's design. For example, a new building could be oriented with a south facing roof to allow for solar PV or designed with radiant floor heating to accommodate geothermal. Designing a building up-front to support renewable energy saves money in retrofitting costs and avoids some common barriers to renewable energy feasibility. That said, energy efficient design must always be incorporated into any new building construction before consideration of renewable energy options.

Tool #7. Target Building Selection

➢ If you are constructing a new facility or you already know which building to focus on for a renewable energy project, document it below and proceed to Task 2.

Our Target Building is:_____

➢ If your community is not constructing a new facility or if you are unsure about which building to focus on for a renewable energy project, follow the steps below.

1. Measure and track your community's energy consumption and costs using EPA's Portfolio Manager. If you are unfamiliar with how to use Portfolio Manager, refer to Step 1 of the Renewable Energy Tool Belt.
2. Portfolio Manager will provide you with each building's Site Energy Use Intensity (EUI). Site Energy Use is the annual amount of all energy your building consumes on-site, as reported on your utility bill. Site EUI is simply Site Energy Use divided by the building's square footage.
3. Portfolio Manager will also provide you with each building's Energy Cost. Use the table below to document each building's Site EUI and Energy Cost.
4. Determine which building has the highest Site EUI. This is the building you should focus on—your Target Building.
5. Alternatively, you can focus on the building with the highest Energy Cost as your Target Building.

COMMUNITY BUILDING	SITE EUI	ENERGY COST

Our Target Building is:_____

Project Siting & Selection Task 2—determine feasibility

Instructions:

1. Answer the checklist questions in Tool #8 on the following pages based on the constraints and requirements at your target building.
2. Checklists are divided into 2 groups: alternatives to non-renewable electricity and alternatives to non-renewable heating and cooling.
3. After completing each checklist, add up the number of "Yes" and "No" responses and note them in the "Total" row at the bottom of the table.

Please note—this exercise is designed to help identify renewable energy technologies that are potentially feasible at your location. It does not guarantee that a particular technology will or will not be feasible at your location.

Tool #8. Feasibility Checklists for Alternatives to Non-renewable Electricity

The following checklists will help you to determine whether renewable resources are a feasible alternative for the non-renewable electricity used at your target building. Potential renewable energy sources include solar PV and wind. Renewable electricity can also be used to power heat pumps to meet your building's heating and cooling needs. Don't forget that you should always complete energy efficiency work before determining whether renewable energy is feasible.

SOLAR PV CHECKLIST	YES	NO
Does your roof receive full sun, without shading from trees, nearby buildings, or structures?		
If your roof does not adequate sun exposure or surface area, could your location support ground mounted solar panels?		
If shading from trees in an issue, do you have the ability to trim these trees?		
Is your roof in good condition? Will it last as long as the solar panels? Solar panels can last 25-40 years.		
Is your roof or site big enough to support the size system you need? For each Kw of system size you will need roughly 100ft^2 of roof space.		
Is your roof either flat or sloped greater than 15 degrees but less than 40 degrees? 30-40 degrees is best.		
Does local code and zoning support a solar PV installation at your location?		
Are incentives available to offset the costs of solar installation or to reduce the payback period?		
TOTAL (sum the number of check marks in each column)		

WIND CHECKLIST	YES	NO
Are the wind conditions at your site suitable? A small wind power turbine requires annual wind speeds averaging 15 mph. You can find wind maps here: https://windexchange.energy.gov/maps-data?category=residential		
Do you have sufficient land to locate a tall wind turbine tower far enough from existing buildings or trees? A rule of thumb is that the bottom of the blade-swept area should be a minimum of 30 feet above any trees or buildings within 300-500 feet.		
Do local codes allow for the installation of a wind turbine on the proposed site?		
Can you locate the turbine such that the visual impact to neighboring properties is limited?		
Can you locate the turbine such that the acoustic impact to neighboring properties is limited?		
Do you have the expertise in-house to conduct annual maintenance such as checking for unusual wear, tightening bolts, lubricating moving parts, or the budget to contract with an installer to perform maintenance?		
Will your community's insurance policy cover the wind turbine or will additional insurance be needed?		
Are incentives available to offset the costs of wind installation or to reduce the payback period?		
TOTAL (sum the number of check marks in each column)		

Tool #9. Feasibility Checklists for Alternatives to Non-renewable Heating and Cooling

The following checklists will help you to determine whether renewable resources are a feasible alternative for your target building's heating and cooling needs. Potential renewable energy sources include heat pumps, woodchips, and wood pellets. Don't forget that you should always complete energy efficiency work before determining whether renewable energy is feasible.

AIR-SOURCE HEAT PUMP CHECKLIST	YES	NO
Have you conducted thermal energy efficiency measures already? This is an important first step for any renewable energy project, but it is critical for air-source heat pumps as the size and efficiency of the pumps is determined by how thermally efficient the building is.		
Does your target building have both heating and cooling needs?		
Can the current boiler or heat source be maintained to serve as a backup for an air-sourced heat pump when the outside temperatures are too low to operate a heat pump efficiently?		
Do you have an open floor plan with no walls or barriers? Small spaces with open floor plans may be able to heat with 1 or 2 heat pump units. Larger spaces or buildings with multiple enclosed rooms will need a heat pump unit in each room.		
Are you currently heating with a more expensive fuel source, such as electricity, propane, or oil? If so, you are likely to see more significant savings by switching to an air-sources heat pump than you would if you were switching from a less expensive fuel, such as natural gas.		
Do you have suitable location to place the outdoor unit of the system? The outdoor condenser makes noise when it runs and should be protected from debris and vandalism. There also needs to be a place to drain condensate water near the outdoor unit.		
Do you have existing construction? Ductless, mini-split heat pumps are well suited for buildings with non-ducted heating systems or for additions where it is not feasible to extend or install ductwork.		
Are incentives available to offset the costs of heat pump installation or to reduce the payback period?		
TOTAL (sum the number of check marks in each column)		

WOOD* CHECKLIST—WOODCHIP SYSTEM	**YES**	**NO**
Is your target building greater than 50,000 ft^2?		
Can the current boiler or heat source be maintained to serve as a backup for a wood boiler in an emergency or during the shoulder seasons when heat requirements are too low to operate a wood boiler efficiently?		
Is the existing heat piped through a hot water (hydronic) or steam system? This makes converting to wood much easier.		
Do you have the space required to accommodate the boiler? Fully automated woodchip systems require roughly 1,000-15,000 $ft^2$and semi-automated woodchip systems require 1,500-4,500 ft^2.		
Do you have the space to accommodate fuel storage? If you use a live bottom truck to deliver woodchips, you will need storage capacity of 3,300 ft^3 (roughly 10ft high, by 17ft wide, by 20ft tall).		
Will local regulations allow for the installation of a smoke stack? Stacks for woodchip systems average 60-75 feet tall.		
Do you have staff to operate the boiler? Fully automated wood chip systems typically require up to 30 minutes per day and semi-automated woodchip systems require up to 1 hour per day.		
Are incentives available to offset the costs of installation or to reduce the payback period?		
TOTAL (sum the number of check marks in each column)		

**Questions in the Wood Checklist were derived from "Community Roadmap to Renewable Woody Biomass Energy: a step-by-step decision-making tool for New Hampshire communities," Yellow Wood Associates and Biomass Energy Resource Center, 2010. A link to this document is available at nhenergy.org. In addition, the NH Wood Energy Council is an excellent resource for information about wood systems (https://www.nhwoodenergycouncil.org/).*

WOOD* CHECKLIST—WOOD PELLET SYSTEM	**YES**	**NO**
Is your target building less than 50,000 ft^2?		
Can the current boiler or heat source be maintained to serve as a backup for a wood boiler in an emergency or during the shoulder seasons when heat requirements are too low to operate a wood boiler efficiently?		
Is the existing heat piped through a hot water (hydronic) or steam system? This makes converting to wood much easier.		
Do you have the space required to accommodate the boiler? Wood pellet systems require anywhere from 25ft^2 to 200 ft^2 depending on the size of the building.		
Do you have the space to accommodate fuel storage? Pellets are most commonly stored in a silo outside the boiler building and augured automatically to the boiler. The silo will require a 10ft by 10ft slab and will be approximately 35 ft tall. Pellets can also be stored indoors in a hopper.		
Will local regulations allow for the installation of a smoke stack? Stacks for wood pellet systems range from 6 feet above the roof to 75 feet tall, depending on local regulations.		
Do you have staff to operate the boiler? Wood pellet systems require 15-20 minutes per day.		
Are incentives available to offset the costs of installation or to reduce the payback period?		
TOTAL (sum the number of check marks in each column)		

**Questions in the Wood Checklist were derived from "Community Roadmap to Renewable Woody Biomass Energy: a step-by-step decision-making tool for New Hampshire communities," Yellow Wood Associates and Biomass Energy Resource Center, 2010. A link to this document is available at nhenergy.org. In addition, the NH Wood Energy Council is an excellent resource for to help determine the feasibility of a wood system (https://www.nhwoodenergycouncil.org/).*

GROUND-SOURCE (GEOTHERMAL) HEAT PUMP CHECKLIST	YES	NO
Have you conducted thermal energy efficiency measures already? This is an important first step for any renewable energy project, but it is critical for geothermal as the size of the system is determined by how thermally efficient the building is.		
Is your target building new construction? Geothermal has a shorter payback period when installed in new construction rather than an existing building.		
If your target building is existing construction, does it have radiant floor heating or hot air heating?		
Does your target building have both heating and cooling needs?		
Do you maintain a consistent temperature in your target building? Geothermal is not appropriate for spaces that need to be heated quickly or for short periods of time.		
Does the site have enough space to accommodate a horizontal system? Trenches are typically 4-6 feet deep and up to 400 feet long. Approximately 500-600 feet of pipe is required per ton of system capacity. A well insulated 2,000 square foot building would need roughly a 3-ton system with 1,500-1,800 feet of pipe.		
Does your site have a location free from utilities to accommodate a vertical system? Holes are typically bored 125-150 feet per ton of heat pump capacity.		
Are incentives available to offset the costs of geothermal installation or to reduce the payback period?		
TOTAL (sum the number of check marks in each column)		

Project Siting & Selection Task 3—Summarize Results

Tool #10. Feasibility Scorecard

Instructions:

Document the number of Yes responses you received from each checklist in the table below.

- **7 to 9 YES responses = FEASIBLE:** this technology would likely be feasible at your target building
- **4 to 6 YES responses = MAYBE:** this technology may be feasible at your target building but would require additional work, costs, and/or planning
- **1 to 3 YES responses = NOT FEASIBLE:** this technology is not feasible at your target building

RENEWABLE ENERGY	# OF YES RESPONSES	FEASIBILITY (circle one)
Solar PV		Feasible | Maybe | Not Feasible
Wind		Feasible | Maybe | Not Feasible
Air-source Heat Pump		Feasible | Maybe | Not Feasible
Wood—Woodchip		Feasible | Maybe | Not Feasible
Wood—Wood Pellet		Feasible | Maybe | Not Feasible
Ground-source (geothermal) Heat Pump		Feasible | Maybe | Not Feasible

Project Siting & Selection Task 4—Take Action

If you identified a technology that scored "FEASIBLE"…

- Contact a local company to discuss installing this technology at your target building. A list of renewable energy companies and consultants in NH can be found at nhenergy.org. RFP templates and screening criteria for renewable energy installers can be found at nhenergy.org.

If you did not identify a technology that score scored FEASIBLE but did identify a technology that scored "MAYBE"…

- Review the checklist to see which questions you answered No to. Determine whether any of the constraints or requirements that led to a NO answer could easily be addressed.
- Contact another community that has pursued a similar project. They may have advice on how to overcome the constraints you face.

If you did not identify any technology that scored "FEASIBLE" or "MAYBE"…

- Consider whether you could achieve your goal by pursuing energy efficiency measures at your target building.
- Contact another community that has pursued a similar project. They may have advice on how to overcome the constraints you face.
- Consider contacting a local installer anyway. While this Tool Belt has been written to help communities identify feasible renewable energy sources, it is ultimately only a planning exercise. It does not guarantee the feasibility or infeasibility of any specific project. A local installer will be able to do a detailed site evaluation to ultimately determine project feasibility.

Step 5. Financing your renewable energy project

Overview

Selecting which building to target and which source of renewable energy to pursue are important steps towards implementing a renewable energy project. But another key consideration is determining how to fund it. The good news is that there are a variety of funding options available. The downside is that it can be complex to figure out which one is best for your community. Step 5. of the Renewable Energy Tool Belt is designed to help you make informed decisions about how to fund your community's renewable energy project.

In this Chapter

Show Me the Money: Financial Options and Incentives for Renewable Energy—this section outlines the various funding options available to communities that want to implement a renewable energy project, including Capital Improvement Plans, power purchase agreements, leases, loans, net metering, renewable energy certificates, and more.

Lease, PPA, or Loan: which option is right for you?—leases, Power Purchase Agreements (PPAs), and loans each have their advantages and disadvantages. This section outlines some of the pros and cons of each arrangement so you can determine which is best for your situation.

Good Question: sample questions you should ask when obtaining financing—this section provides sample questions you should consider asking when obtaining financing for a renewable energy project. Questions are organized by category, including payback and savings, contract terms, financing options and payments, and performance.

Timeline: financing and Town Meeting— timing is everything when it comes to the municipal budget cycle. This section features a calendar that is designed for municipalities that hold a traditional March Town Meeting. However, it can also be customized for May Town Meetings and SB2 communities.

Show Me the Money: Financial Options and Incentives for Renewable Energy

You don't need to pay for a renewable energy system upfront in order to start taking advantage of renewable energy right away. Municipalities and school districts have a number of financial options and incentives available to them too.

Municipal Capital Improvements Plans

Renewable energy projects may be included in a municipal Capital Improvements Plan (CIP). A CIP links local infrastructure investments with long-term planning. As authorized by RSA 674:5-8, it is the responsibility of the Planning Board or a formally appointed capital improvements program committee to prepare and amend a recommended program of municipal capital improvements projected over a period of at least six years. The following funding methods may be used:

- 1-Year Appropriation—refers to those projects that are to be funded by property tax revenues within a single fiscal year. Funds for projects that are financed using this method are most often included in the Town's operating budget, but can appear as warrant articles to be voted on individually.
- Capital Reserve—a capital reserve account is a non-lapsing savings account, separate from the General Fund. Voters can deposit funds into this account with approval of a warrant article, with the intent of withdrawing the funds for the specific purpose or purchase for which the account was established. This method requires appropriations over more than one year, with the actual project being accomplished only when the total appropriations meet the project cost.
- Lease Purchase—lease purchasing an item allows a municipality to spread the cost over a period of years, generally no more than 7. A municipal lease typically allows for Town ownership at the end of the lease term and usually enjoys lower tax-exempt interest rates. Unlike a bond or loan, a municipal lease has a "non-appropriation clause" that allows the town to cancel the lease if the annual payment is not appropriated. The town then loses the equipment that was financed.
- Bonding—bonding allows the municipality to negotiate the purchase of goods or services at a set price and then pay for that item or service over a period of time. Bonds, unlike capital reserve accounts, allow the town to utilize the item being purchased or constructed while payments are being made. The most important part of a bond transaction is the promise of the town to repay the debt with interest. There are two major types of bond: general obligation and special revenue. General obligation bonds typically have lower interest rates than other types of long-term debt. Revenue bonds rely on a set revenue source or sources as security for the bond.

Power Purchase Agreement

Under a Power Purchase Agreement (PPA), a renewable energy finance company buys, installs, and maintains a renewable energy system at your property. As the property owner, you purchase energy generated by the system on a per unit basis under a long-term contract. It is important to compare the energy rate offered by the PPA with the rate offered by your default utility or a competitive supplier. Most PPAs will include an escalating rate, so it also important to consider whether utility rates will likely

increase by that amount when determining long-term savings. As the system owner, the PPA company retains all available tax credits, rebates, and incentives. While PPAs are legal in New Hampshire, they are not legal in every state.

Lease

Under a lease agreement, a developer installs and owns a renewable energy system at your facility. As the facility owner, you are responsible for making regular payments to the developer, typically over a 15-20 year term. Lease agreements vary in terms of which party is responsible for maintenance, so it is important to make sure you are clear about this before proceeding with a contract. Many lease agreements come with an escalating payment schedule which must be considered when determining the economic desirability of the lease. Leases can be cash positive transactions if monthly lease payments are less than monthly energy bill savings. Additional benefits of a lease agreement include eliminating the upfront costs of a system and potentially transferring operations and maintenance responsibilities to the Lessor. Like a PPA, the Lessor retains all available tax credits, rebates, and incentives.

Loans

Renewable energy loans allow the facility owner to borrow money from a lender to install a renewable energy system. Lenders for renewable energy systems include banks, credit unions, state programs, utilities, solar developers, or other private solar financing companies. In New Hampshire, the Community Development Finance Authority also offers a loan program for municipal renewable energy and energy efficiency projects. Loans can be structured with longer terms so that monthly loan payments are less than estimated monthly energy savings. Conversely, loans with shorter terms may not have an immediate positive cash flow but will allow borrowers to more quickly achieve higher monthly savings in the post-loan period. The facility owner, not the financier, retains all available tax credits, rebates, incentives, and Renewable Energy Certificates (RECs). However, municipalities and schools are not eligible for tax credits, so this may be less of a consideration for this group. In addition, because the facility owner also owns the renewable energy system, they are responsible for its maintenance.

Energy Savings Performance Contracting (ESPC)

Energy Saving Performance Contracting (ESPC) is a budget-neutral approach to financing building improvements that reduce energy usage and increase efficiency. ESPCs allow municipalities to pay for upgrades to their facilities now by using future energy savings. Municipal tax-exempt lease-purchase agreements are commonly used to finance ESPCs. Communities can also use internal financing or bonds to fund an ESPC. ESPCs are often used by municipalities and schools for larger projects, which can include renewable energy. After competitively selecting an Energy Service Company (ESCO), the facility owner contracts with the ESCO to conduct an energy audit of the facility and develop and implement a proposal to identify and achieve energy efficiency measures. The ESCO will estimate the costs and

savings associated with each potential measure and will bundle projects so that those with a short payback period, such as lighting, can offset projects with a longer payback period, such as renewable energy systems. The size and scope of the overall project is determined by the savings opportunities, financing capability, and minimum project size the ESCO is willing to manage. The ESCO is responsible for measuring and verifying the energy savings outlined in the contract.

Net Metering

Net metering credits renewable energy system owners for electricity that they generate and put onto the grid. For example, if a municipal facility's rooftop solar PV system produces more electricity during the day than is demanded by the facility, the excess energy goes onto the grid and the facility's electric meter runs backwards. This provides a credit against periods when energy is drawn from the grid, such as at night or when the facility's demand exceeds the solar system's output. At the end of the month, the net amount of energy is used to calculate the electric bill from the municipality's default utility or competitive energy supplier.

In New Hampshire, net metering is available to Eversource, Liberty Utilities, NH Electric Cooperative, and Unitil customers. It does not matter if these customers take supply from the default utility or from a competitive supplier.

Renewable Energy Certificates

A Renewable Energy Certificate (REC) represents proof that 1 megawatt-hour of electricity was generated from an eligible renewable source and was provided to the utility grid. RECs are a market-based policy mechanism designed to support renewable energy generation and clean energy goals. RECs can provide addition income when they are generated and sold by the system's owner. In 2007, New Hampshire established a Renewable Portfolio Standard. It requires the state's electricity providers (with the exception of municipal utilities) to acquire RECs equivalent of 24.8% of retail electricity sold to end-use customers by 2025. Utilities that cannot or choose not to purchase sufficient RECs to comply with the renewable portfolio standard must make alternative compliance payments (ACPs) to the Renewable Energy Fund. Prices for RECs fluctuate based on the regional market and the state's ACP rate. In NH, REC prices are capped at $55 per Megawatt-hour (MWh). Additional information on renewable energy certificates is available through the NH Sustainable Energy Association: https://www.nhsea.org/renewable-energy-credits-recs, the NH Office of Energy and Planning: https://www.nh.gov/oep/energy/programs/documents/rps-rec-overview.pdf, and the NH Public Utilities Commission: http://www.puc.state.nh.us/Sustainable%20Energy/RPS_FAQs.htm.

Other State and Federal Rebates & Incentives

There are a number of rebates and incentives for renewable energy available at the state and federal level. Keep in mind that municipalities and schools may not be eligible for each one. State and Federal incentives should be reviewed regularly as they can come and go with legislative and budget changes.

The NH Office of Energy and Planning maintains a partial list of renewable energy incentives, which can be found here: https://www.nh.gov/oep/energy/saving-energy/incentives.htm.

The Database of State Incentives for Renewables and Efficiency (DSIRE) is another valuable tool that allows users to search by zip code for policies and incentives that they may be eligible for: http://www.dsireusa.org/.

Lease, PPA, or Loan: which option is right for you?

Leases, Power Purchase Agreements (PPAs), and Loans each have their advantages and disadvantages. We've outlined some of the pros and cons of each arrangement below so you can determine which is best for your situation. Start by considering whether your community can tolerate debt. If so, a loan may be right for you. If not, the project may be more likely to pass town meeting if its financing is structured using operating expenses, as is the case with PPAs and some leases.

Leases

PROS:

- You do not need a large sum of money upfront to pay for the capital costs of owning the system.
- It may be possible to structure the lease so there is zero down and monthly repayments are less than the amount you save on your utility bill.
- In some agreements the lessor is responsible for maintenance of the system.
- The Lessor retains the available tax credits, rebates, incentives, and Renewable Energy Certificates (RECs). Municipalities and schools are not eligible for tax credits, so if the Lessor is able to obtain and pass these savings onto the Lessee it is a positive.
- Leases and PPAs may be the best option if you are primarily interested in using energy generated from a renewable source rather than maximizing the financial benefits of installing a system.

CONS:

- Often long contract terms (15-25 years).
- Your monthly payment is fixed regardless of how much energy is generated by the system. So if the system is not working properly or is producing less power than quoted, your monthly payments do not fall accordingly.
- Lessors typically require that if you sell the building during the term of the lease the new owner must take over assignment of the lease.
- The Lessor retains the available tax credits, rebates, incentives, and Renewable Energy Certificates (RECs). This is a negative for Lessees who would otherwise be eligible for these benefits.
- The Lessor may control what size system you install and what brand of components you can use.

Power Purchase Agreement (PPA)

PROS:

- There is no upfront cost.
- You are not responsible for maintenance.
- Unlike a lease or a loan, there is no fixed monthly payment. You are simply purchasing power at a specific price that is produced by the system installed at your facility and owned by the PPA company. So if the system is not working properly or is producing less power than quoted, your monthly payments fall accordingly.
- The PPA company retains the available tax credits, rebates, incentives, and Renewable Energy Certificates (RECs). Municipalities and schools are not eligible for tax credits, so if the PPA is able to obtain and pass these savings onto the Lessee it is a positive.
- The price of energy is known for the entire term of the PPA, which makes long-term budgeting easier.
- PPAs and leases may be the best option if you are primarily interested in using energy generated from a renewable source rather than maximizing the financial benefits of installing a system.

CONS:

- Often long contract terms (20-25 years).
- PPA contracts typically need to be assigned to the new owner if you sell the building.
- PPAs often have an escalation clause so that the price of the energy you purchase from the system at your facility goes up each year.
- The PPA company retains the available tax credits, rebates, incentives, and Renewable Energy Certificates (RECs). This is a negative for facility owners who would otherwise be eligible for these benefits.
- The PPA company tends to control what size system is installed and what brand of components is used.

Loan/outright ownership

PROS:

- Loan terms are typically much shorter than leases or PPAs (10-20 years).
- Loan terms can sometimes be structured to require no upfront cost and to be immediately cash flow positive.
- You have complete freedom over what you do with your system.
- You have more freedom over the system size and the brand of components you wish to use.
- Purchasing a system with cash or financing with a loan is often the best option if you want to maximize the financial benefits of installing the system, rather than solely benefitting from its environmental advantages.
- You retain the available tax credits, rebates, and incentives.
- You can often utilize smaller, local companies that can provide more personalized service.

CONS:

- You have to pay for the system, which means having the cash to buy the system directly or obtaining a loan.
- You are responsible for maintenance of the system.
- You may not be eligible for the available tax credits, rebates, and incentives that could offset the cost of the system.

Good Question: sample questions you should ask when obtaining financing

The following are sample questions you should consider asking when obtaining financing for a renewable energy project. This list is not exhaustive and not all questions may be applicable to your situation. Additional resources are available at www.nhenergy.org.

Payback and Savings

1. What is the payback period?
2. How much money will we save over the next 20 years?
3. What assumptions do you make in the payback model? When calculating the projected savings, what utility inflation rate is used? What if a more conservative rate is used? What if net metering assumptions change? Does this change our decision to proceed with the project?
4. If we finance through a Power Purchase Agreement (PPA), is the energy rate we are being offered lower than what we are currently paying?

Contract Terms

1. What assumptions are made in the contract language?
2. What is the penalty for breaking the contract early?
3. If we finance through a PPA or lease, what happens at the end of the contract term? Are we required to buy the system? If so, how is the buyout amount determined?
4. Can we buy out our financing contract? Under what circumstances? At what rate? At what point? How is the rate calculated?
5. If we finance solar through a lease or PPA, what happens if we need to replace the roof during the contract term?
6. Could the system be removed or repossessed if the lender goes out of business or gets into financial trouble?
7. Can the lender sell the contract to a new entity? Will we be notified if this happens?
8. Is there an insurance policy that comes with the system or will we need to take out additional insurance?

Financing Options & Payments

1. What incentives and rebates are available to us? Can you help us to secure these cost savings and roll them into our financing package?
2. What is the interest rate and duration of the financing agreement? How does it compare to other financing packages?
3. Is a down payment factored into the cost? Is it possible to make a down payment to reduce the monthly fixed payments in the case of a lease or the kWh rate under a PPA?

4. How will our monthly loan payments compare to the savings on our energy bill?
5. Do payments remain level over the term of the financing or are there increases built in? Is there an escalation clause included in the finance agreement? If so, what is the annual escalation rate (most are about 2.9%)?

Performance

1. What is the minimum performance guarantee of the system? How will we be compensated if the system does not produce as much energy as guaranteed in the contract?
2. What happens if the system produces more power than we need? Do we still have to pay for it? Is there any scenario in which we would end up paying more than the quoted monthly price?

Tool #11. Timeline: financing and Town Meeting

Timing is everything when it comes to the municipal budget cycle. There are hard deadlines that must be met and a specific process that must be followed before your energy project can appear on the ballot at Town Meeting. This calendar is designed for municipalities that hold a traditional March Town Meetings, however, it can be customized for May Town Meetings and SB2 communities. The NH Municipal Association publishes calendars annually with important dates for each town meeting structure. These calendars are a valuable resource to supplement the information included below.

In a town, the budget process is run either by an official budget committee adopted under RSA 32:14, or (if no official budget committee) by the Board of Selectmen (RSA 32:5).

Remember to periodically check on costs and incentives, given the long timeframe associated with implementing a renewable energy project. A proposal may look quite different later in the year when rebates, material costs, and other items have changed.

April

Start in April so you will have 11 months to prepare before the next Town Meeting!

- Hold a Local Energy Commission (LEC) meeting to draft and/or update your energy project goals for the coming year.
- Review the NH Charitable Foundation's *Field Guide to New Hampshire's Municipal Buildings & Energy Audit Guidelines* to gain a greater understanding of energy use in municipal buildings and to inform future energy audit decisions.
- Begin developing a strategy for meeting with Town Selectmen and other local officials (i.e. budget committee members, municipal department directors) about your energy-related project goals.
- Engage in outreach to educate residents, encourage new members to join the LEC, and inform the community about your project ideas.

May

Collect town energy usage data. Begin energy use inventory.

- Share the LEC's intent to perform a basic energy use inventory of the community's municipal buildings and schools with the Town Selectmen and School Board.
- Start by measuring and tracking your community's energy consumption and costs using EPA's Portfolio Manager. You can learn more about Portfolio Manager and the importance of benchmarking at www.nhenergy.org. If you are an Eversource customer you can also take advantage of automated benchmarking.

June

Complete energy use inventory. Present findings to local officials.

- Complete the basic energy use inventory.
- Present the inventory's findings to officials of the local governing body and school board. Begin discussion of the LEC's recommendations with the goal of collaborating to determine the best energy-related project for your town to undertake in the following year.

July

Decide on an energy project. Consider a comprehensive approach to funding.

There are two options:

- The Energy Committee may make a recommendation to the Board of Selectmen and Budget Committee on an energy-related project to present to residents at Town Meeting. This is the recommended option. If the local governing body agrees to incorporate your energy project into their operating budget for the coming year, this support will improve your chances of gaining approval from residents and ultimately having the project funded through the town's operating budget.
- If the Energy Committee is working alone and is not an official board, citizens must file for a petition for a special warrant article [RSA 39:3].

August

Consider including energy project in CIP. Continue community outreach.

- Consider a Capital Improvements Plan (CIP) as an additional means to introduce and incorporate an energy-related project into the municipal budgeting process.
- Conduct continuous outreach to community members to obtain their feedback on the energy-related project (see Chapter 5. Public Outreach).

September

Call for quotes of project cost estimates. Draft educational materials.

- Call on professionals in the field (e.g. contractors, ESCOs) to provide cost estimates for your energy-related project and outline an initial action plan for implementation.
- Draft or update educational materials about the energy-related project for distribution at hearings and meetings.

- Continue meeting with Town Selectmen and other local officials (i.e. budget committee members, municipal department directors) about your energy-related project and discuss plans to present it to residents at Town Meeting.

October

Draft petitioned warrant article. Continue community outreach.

- If choosing to file a petitioned warrant article with the support of local governing officials, draft the petition this month [RSA 32:3 VI]. This approach may serve to inform and educate fellow citizens while ensuring the project's consideration at Town Meeting.
- Continue reaching out to community members about your energy-related project and incorporating feedback.

November

Review and finalize petitioned warrant article. Draft LEC report.

- In consultation with local governing officials and the NH Dept. of Revenue Administration, review the text of the petitioned warrant article.
- Finalize the petitioned warrant article language, and devise a plan for collecting signatures. Begin collecting signatures (See "December"). [RSA 39:3]
- Based on the inventory you conducted in May and June, draft a report from the LEC for inclusion in your town's Annual Report.

December

Gather signatures and build support for project. Consult with Town Clerk.

- Collect signatures for your petition to enable the petitioned warrant article's consideration in the town budget. [RSA 39:3]
- Meet with local groups, such as the Planning Board and Conservation Commission, to increase support for your project. Use town gatherings, such as library events, monthly meetings, and holiday celebrations, to continue educating residents and to build a phone or email list of supporters.
- Consult with the Town Clerk.

January

Incorporate cost estimates. Submit petitioned warrant article.

- Based on quotes received from professionals in the field (see "October"), incorporate cost estimates into project fact sheets and materials.
- Submit the petitioned warrant article for Town Meeting inclusion to the Town Clerk.
- If you have not already done so, meet with additional town leaders to help familiarize all significant parties with your proposal.
- 60 days before Town Meeting –last day for voters to present application to select board to call special town meeting prior to annual meeting. Number of petitioners required depends on size of town [RSA 39:3].
- Not more than 60 days before Town Meeting—1st day to hold public hearing on bond or note issue over $100,000. Notice of time, place and subject of hearing must be published in a newspaper in general circulation in the municipality at least 7 days before hearing. [RSA 33:8-a, I].

February

Don't miss the warrant article deadline. Attend public hearing on budget.

- Attend the public hearing on the annual budget that includes the petitioned warrant article pertaining to your energy-related project, if applicable. [RSA 32:5, I]
- 5th Tuesday before Town Meeting—last day for 25 or more voters or 2% of the total, whichever is less, but in no case fewer than 10 voters, to petition select board to include an article in the warrant [RSA 39:3].
- 25 days before Town Meeting - Last day to hold at least one public hearing on annual budget (can hold supplemental public hearings after this date provided the first public hearing is on or before this day with 7 days' notice—should schedule at least one public hearing after deadline to petition select board to include an article in the warrant) [RSA 32:5, I &V].
- 15 days before Town Meeting—last day to hold public hearing on bond or note issue over $100,000. Notice of time, place, and subject of hearing must be published at least 7 days before hearing [RSA 33:8-a, I].

March

Vote at Town Meeting.

- March is Town Meeting month. Mark your calendars well beforehand, and ensure that the LEC and other supporters of the project are well aware of the meeting logistics for your particular town.
- 2nd Tuesday of March - Town Meeting. Voters may register at the polls on Election Day.
- If your energy-related project is appropriated funding, congratulations!! If it is not, do not despair. View this effort as an education both for you and members of your town, and plan to build on it with an eye toward next year's budget process.

Step 6. Conduct Public Outreach

Overview

You've done your homework. You've picked the most appropriate renewable energy source for your site. You've calculated costs and know there will be a reasonable return on investment. You've found a bank that would be willing to make you a loan. You've found an installer with a great reputation who is willing to complete the project within your desired timeframe. But you've failed to communicate all of this with the public along the way. When it comes time for a vote at Town meeting your perfect project does not pass and a climate of opposition has been created.

Great projects are only great if they can be implemented. And projects will not likely be implemented if the public does not understand them. The good news is you can avoid this pitfall by conducting a comprehensive public outreach campaign. In this section, we'll show you how to do it using the 5 Ws—who, what, when, where, and why.

It is important to note that while Public Outreach is listed as Step 6 in the Renewable Energy Tool Belt it should not come last in the process. Public Outreach should occur throughout the course of a renewable energy project. It is simply listed as Step 6 for the purposes of organizing this document.

In this Chapter

Each W examined in this chapter features a "Things to Keep in Mind" discussion and a set of examples. The examples provided in each section can help users to populate the 5Ws Outreach Matrix found at the end of this chapter.

WHY should you conduct outreach?

Things to Keep in Mind

Before you can launch an effective public outreach campaign, you need to have a clear understanding of why you are conducting outreach in the first place. Are you trying to educate, obtain information, influence behavior, or perhaps all of the above?

Why you are conducting public outreach is closely related to who you are reaching out to. For the average resident, you might be conducting public outreach so that they support the project and vote to approve it at town meeting. For facilities managers, you might be conducting outreach because you want them to be part of the planning process and help identify the most appropriate technology for the site. For students, you might be conducting outreach because seeing a renewable energy project being implemented is a valuable educational opportunity.

Example Reasons for Conducting Public Outreach

- You are simply educating
    - Target audience—all residents, including students
- You are asking for input on the specific project being proposed
    - Target audience—facilities managers who know the building and will be working with the technology every day, users of the building (staff who work there, members of the public who utilize it frequently).
- You are asking for input on an overall vision for renewable energy in the community
    - Target audience—engaged residents who might want to serve on a steering committee
- You are asking for support in the form of an affirmative vote for the project
    - Target audience—residents who are eligible to vote
- You are asking for support in the form of volunteer time, expertise, or technical assistance
    - Target audience—specific stakeholders who have something valuable to offer the process

WHO are you targeting?

Things to Keep in Mind

In addition to knowing why you are conducting a public outreach campaign, you need to know who your target audience is. Having a clear understanding of who your target audience is will help you to craft a message that resonates with them and to identify outreach methods that are likely to reach them.

- Keep the planning process opened to all members of the community.
- Know where support is coming from
    - Build up this base of support and let these individuals be spokesmen for the project. You may have better luck converting skeptics if they hear about the benefits of a project directly from a friend or neighbor rather than from a committee they feel has a vested interest in seeing the project completed.
- Know where opposition is coming from
    - Engage these people early. Try to work with them and address their concerns as the project develops. Invite them to take part in the planning process and identify ways that a sound planning process can address their concerns.

Example Target Audiences

Residents

- Families
- Seniors
- Low income residents

Civic Groups

- Rotary Club
- Chamber of Commerce
- Boy Scouts/Girl Scouts
- High school science clubs/green teams

Municipal Officials, Boards, Committees

- Board of Selectmen
- Planning Board
- Zoning Board
- Facilities Committee
- Budget Committee
- Conservation Commission
- School District

Building Users

- Town staff
- Facilities managers
- Residents (for buildings where residents spend significant time, such as libraries)

Abutters

- Particularly for large, visible installations like wind or a ground mounted solar array

Critics

- Any individual or organization that has expressed significant opposition to the project

Media

- Local newspaper
- Public access TV
- Municipal website
- Municipal social media accounts

WHAT is your message?

Things to Keep in Mind

It's easy to think that projects will sell themselves. "Once everyone hears that the project will be paid off in 7 years and we'll get free electricity after that, who wouldn't vote for it?" But that isn't always the case. Having a clearly defined message is key to successful public outreach. When crafting your message, keep the following in mind:

- Articulate your goals and how the project will help to achieve them.
    - If you don't have a clear set of goals, now is the time to define them.
    - A community survey can help to define your goals. Survey results can also be used to demonstrate interest in renewable energy among residents, which will be helpful throughout the process.
- Be prepared to address common concerns in your messaging, such as:
    - It's not sunny enough in our community to support solar.
    - Renewable energy is too expensive.
    - Renewable energy technology is still improving, so it's better to wait before installing a system.
    - Our community has so many other needs. Renewable energy is not a priority for our limited dollars.
- Identify a local champion or a respected municipal official to deliver the message.
    - The person delivering the message is often as important as the message itself.
    - A local resident may have more credibility when delivering a message about renewable energy than an energy consultant, who residents may perceive as being biased and having a financial interested in the project.

Example Messages

- Solar is not just for states like California and Arizona. Do you think of Germany or Massachusetts as being sunny locations? Did you know that on a sunny afternoon, solar power can offset up to 50% of Germany's total electricity use? And a solar PV system in Massachusetts will produce 35% more annual electricity than the same system in Germany (NREL, 2012). Despite our sometimes cloudy weather, solar is a viable energy source in NH.
- There are costs associated with renewable energy systems, as there are with any energy source. However, thanks to improvements in manufacturing and increased demand, these costs are falling. In some cases, leases or power purchase agreements may be helpful to overcome initial up-front cost barriers. In addition, there are a range of financial incentives that make renewable energy more affordable.

- It is true that the price of renewable energy equipment will most likely continue to fall and efficiency will likely continue to increase. However, if it makes economic sense to install a renewable energy system today there is no reason to wait.
- A well-planned renewable energy system will save the town money over the long run. These savings can then be used to address other community needs, such as facilities upgrades.

WHEN should you conduct outreach?

Things to Keep in Mind

Public outreach for a renewable energy project is an ongoing task that must begin early in the planning process. It is a mistake to wait until your project is on the town meeting ballot to start a public outreach campaign. To help keep your public outreach efforts on track, establish an outreach timeline for your project. Make sure it is realistic and allows for enough time to obtain input from all aspects of the community.

Example Outreach Timeline

Before a Project is Even Being Considered

- Educate the public on the importance of renewable energy. This can be accomplished through a variety of methods, including roundtable discussions with residents, letters in the local newspaper, or information booths at local events.

1 Year Before Vote

- Conduct a public meeting to outline the project, gauge public support, solicit volunteers
- Seek a mandate to undertake a feasibility study, assemble a sub-committee, begin the planning process

6 Months Before Vote

- Report findings of assessments and feasibility studies
- Confirm preferred option
- Seek mandate to proceed with detailed development
- Confirm development plan priorities, timeline, ultimate project objectives

3 Months Before Vote

- Address outstanding issues
- Prepare for vote
- Meet with organizations or individuals who have expressed opposition to the project before public events.

During Project Construction

- Conduct site visits
- Provide updates on project progress as well as setbacks
- Engage students

Ongoing

- Consider conducting an ongoing outreach campaign so that residents hear about renewable energy even when there is not a project in-progress. Examples include a monthly renewable energy column in the local paper, quarterly tours of local homes and businesses that have installed renewable energy, or a speaker series.

WHERE should you disseminate your message?

Things to Keep in Mind

Where you conduct your public outreach depends on who your target audience is. When communicating with the public, it is important to remember that every community is different and education and outreach strategies that work in one municipality may not be appropriate for another. Furthermore, within a given community not every resident will prefer to receive information in the same manner. We've heard of successful outreach campaigns being conducted at local transfer stations because that is where residents congregate on the weekends. Others may prefer social media. Still others read the local newspaper. Talk to members of your community about how they learn of local initiatives and build off the experience of previous outreach campaigns.

Example Outreach Sources

- Newspaper
- Municipal website
- Cable access
- Social media
- Transfer station
- Workshop/open house—invite residents to learn about the project and provide informal feedback.
- Formal charrettes/visioning session—conduct a formal, facilitated meeting designed to obtain input on vision, goals, and priorities. Make sure these sessions stay focused on the specific need trying to be addressed; a good moderator/facilitator is necessary.
- Presentations to local civic groups (ex. Rotary Club)
- Targeted workshops—target audiences include youth, low-income residents, or senior citizens
- One-on-one meetings to solicit input from key stakeholders, including supports and detractors
- Municipal department staff meetings
- Announcement at other public events
- Surveys
- Public displays—posters, fliers, display board in town hall, post office, library

Tool #12. 5 Ws Outreach Matrix

The 5Ws Outreach Matrix is designed to help you organize the Why, Who, What, When, and Where components of your public outreach strategy. Begin each row by documenting Why you are conducting public outreach. Then complete the subsequent columns in that row by noting Who the specific target audience is, What message this target audience should receive, When this target audience should be engaged, and Where this target audience gets its information. An example has been provided to help you get started.

WHY	WHO	WHAT	WHEN	WHERE
We are conducting outreach to obtain input on the specific requirements of the renewable energy heating system being proposed at the Fire Station.	*Users of the Fire Station. This includes fire fighters, staff, and the facility manager. As direct users of the building, they are in the unique position to provide input based on first-hand experience.*	*We want to know what your needs are with regard to this particular building and its energy use. What issues do you have with your current energy source? Do you need a system that provides consistent heating? Do you need a system that requires minimal maintenance? Does your budget require a quick ROI? Are there anticipated changes in future energy usage at the building?*	*Engage with building users at the very outset of the project.*	*Attend a staff meeting at the Fire Station. Take a tour of the building to better understand the current energy system.*

Step 7. Case Studies and Technical Assistance

Tool #13. Case Studies

Implementing a renewable energy project can seem daunting, but it's helpful to know that many other New Hampshire communities have gone through the same process and have a successful project to show for it. The following is a sample of renewable energy case studies from across that state. Additional projects will be highlighted at http://www.nhenergy.org/local-energy-stories.html as they become available. Has your community completed a renewable energy project that is not listed here? If so, you can submit your own case study at the website listed above.

Solar Projects

Wastewater and Sewer District—Plymouth, NH

- https://www.revisionenergy.com/solar-projects/plymouth-wastewater-and-sewer-district-solar-plymouth-new-hampshire/

Durham Public Library—Durham, NH

- https://www.revisionenergy.com/solar-projects/durham-public-library-solar-durham-new-hampshire/

Durham Ice Rink—Durham, NH

- https://www.revisionenergy.com/solar-projects/durham-ice-rink-durham-nh/

Police Department—Durham, NH

- https://www.ci.durham.nh.us/boc_energy/solar-power-durham

Solar Array—Peterborough, NH

- http://www.townofpeterborough.com/index.asp?SEC=5AD98634-D0A6-4C89-9652-EA52A4337E9B&DE=4447A201-160D-4725-B84B-B8C5EE404379

Wood Projects

Merrimack Valley High School—Penacook, NH

- http://www.nhrcd.net/files/Biomass/Merrimack_Valley.pdf

DPW Garage—Henniker, NH

- http://www.frolingenergy.com/portfolio-item/new-dpw-garage-town-henniker-nh/

DPW Garage—Hopkinton, NH

- http://www.frolingenergy.com/portfolio-item/new-dpw-garage-town-hopkinton-nh/

Central Fire Station—Claremont, NH

- http://www.frolingenergy.com/portfolio-item/central-fire-station-claremont-nh/

Stevens High School—Claremont, NH

- http://www.frolingenergy.com/portfolio-item/stevens-high-school-in-claremont-nh/

Charlestown Elementary—Charlestown, NH (SAU 60)

- http://www.frolingenergy.com/portfolio-item/charlestown-elementary-school/

Boynton Elementary School—New Ipswich, NH

- http://www.frolingenergy.com/portfolio-item/boynton-elementary-school-new-ipswich-nh/

Mascoma Valley Regional High School—Canaan, NH (SAU 62)

- http://www.frolingenergy.com/portfolio-item/mascoma-valley-regional-high-school-sau-62/

Indian River Middle School—Canaan, NH (SAU 62)

- http://www.frolingenergy.com/portfolio-item/indian-river-middle-school-sau-62-mascoma-valley/

Canaan Elementary School—Canaan, NH (SAU 62)

- http://www.frolingenergy.com/portfolio-item/canaan-elementary-school-sau-62-mascoma-valley/

Enfield Elementary School—Enfield, NH (SAU 62)

- http://www.frolingenergy.com/portfolio-item/enfield-elementary-school-sau-62-mascoma-valley/

Cornish Elementary School—Cornish, NH

- http://www.frolingenergy.com/portfolio-item/cornish-elementary-school-cornish-nh-video/

Peterborough Town House—Peterborough, NH

- http://www.frolingenergy.com/portfolio-item/peterborough-town-house-peterborough-nh/

Police Department—Peterborough, NH

- http://www.frolingenergy.com/portfolio-item/police-department-peterborough-nh/

Other Renewable Energy Projects

Hydrokinetic turbine at Waste Water Treatment Plant—Dover, NH

- https://www.nhmunicipal.org/TownAndCity/Article/454

Tool #14. Consultant Selection Resources

Selecting a trusted consultant or energy company can be challenging. How do you craft a request for proposals that meets your needs? Once you have a well written RFP, who should you send it to? How should you evaluate the responses you receive? This section is designed to help answer these questions. In addition, you may find it helpful to talk with communities who have already been through the process (see Case Studies) or to contact members of the Local Energy Solutions Work Group who can provide technical assistance to projects like yours.

Renewable Energy Companies and Consultants in New Hampshire

Disclaimer—the authors of this document make no endorsements or claims about the companies and consultants listed here. Resources have been provided to help users of this document determine whether a company is qualified to complete the requested work. In addition, users may find it helpful to consult with other communities who have direct experience working with these companies.

NH Sustainable Energy Association—Members and Sponsors

- NH Sustainable Energy Association (NHSEA) is a statewide non-profit, member-based organization. NHSEA's mission is to strengthen NH's economy and conserve natural resources by promoting a transition to clean, efficient, and renewable energy. NHSEA's members include local and national consultants and energy service companies who are able to address a variety of renewable energy sources, from geothermal and solar, to wood and hydropower.
- http://www.nhsea.org/members-and-sponsors

NH Rural Renewables

- NH Rural Renewables provides free technical assistance to small business owners and agricultural producers in the rural regions of NH. This initiative is a provided by Lakes Region Community College, along with Plymouth Area Renewable Energy Initiative and NH Sustainable Energy Association. In November 2017, NH Rural Renewables published a NH Commercial Solar Installer Directory, which can be accessed through the link below.
- http://www.lrcc.edu/sites/default/files/content/documents/energy/NHRR_Commercial_Solar_Directory_Nov%2717.pdf

RFP Templates and Screening Criteria for Renewable Energy Installers

Installer Selection—Vital Communities, Solarize Toolkit

- Vital Communities has taken the lessons they've learned from implementing Solarize campaigns and put them into the Solarize Toolkit. The "Installer Selection" component of the Toolkit

features an Installer Selection Timeline and Monthly Checklist, Solar Campaign RFP Template, Solar Campaign Proposal Template, Installer Selection Criteria and Due Diligence, Installer Interview Kit, and Solar Energy Vocabulary handout.

- http://vitalcommunities.org/energy/solarizetoolkit-installer/

Solar PV RFP & Procurement Guidance Template and Solar PV Cost Proposal Template—US Dept. of Energy, Better Buildings

- The "Solar PV RFP & Procurement Guidance Template" is downloaded as a Word document. This customizable template allows users to develop their own Request for Proposals (RFP) to effectively communicate the specifications of their desired PV solar project to vendors. The "Solar PV Cost Proposal Template" is downloaded as an Excel file. This template is designed for use in conjunction with the Solar PV RFP & Procurement Guidance Template to develop a customized form for vendors to complete when responding to the user's RFP. Both documents can be found by visiting the Better Buildings website using the link below and entering "Solar RFP Template" into the search bar.
- https://betterbuildingssolutioncenter.energy.gov/

State & Local Government Solar Requests for Proposals— National Renewable Energy Laboratory

- This website discusses the procurement process for solar PV systems, direct buy versus power purchase agreement RPFs, solar RFP best practices, solar RFP elements, and proposal evaluation. It also provides a link to a webinar on the topic.
- http://www.nrel.gov/tech_deployment/state_local_governments/basics_solar_rfps.html

Solar RFP Issuance Checklist for Facilities Managers—US Environmental Protection Agency

- EPA developed a solar RFP document checklist to keep track of key components, such as scope and deliverables, specific requirements, and RFP submission process and key dates.
- https://www.epa.gov/sites/production/files/2016-01/documents/webinar_20140416_rfp_issuance_checklist.pdf

Solar Powering Your Community: Key Elements of Solar Requests for Proposals—US Dept. of Energy, SunShot Initiative

- This presentation covers the key elements of a solar RFP, including the solar project procurement and implementation process, how to submit a successful solar RFP, common pitfalls, a case study, and resources and sample RFPs.

- http://www.nrel.gov/tech_deployment/state_local_governments/pdfs/stat_webinar_050113_presentation.pdf

Procuring and Implementing Solar Projects on Public Buildings—Dept. of Energy, Technical Assistance Program

- This presentation outlines good practices and guidance for solar PV and solar water heating RFP processes. It also describes how to avoid five common PV and SWH pitfalls and illustrates these with a case study.
- https://www1.eere.energy.gov/wip/solutioncenter/pdfs/procuring_and_implementing_solar_projects_on_public_bldgs-how_to_avoid_common_pitfalls_12-8-10.pdf

Steps to a Success Solar Request for Proposals—The Solar Foundation

- This publication is designed for individuals overseeing procurement for local governments develop a successful RFP for solar energy systems. It discusses the essential elements of a solar RFP and provides guidance on how to evaluate proposals. It also directs users to tools, resources, and sample documents that can help maximize the effectiveness of solar procurement efforts.
- http://www.thesolarfoundation.org/steps-to-a-successful-solar-request-for-proposal/

Solar Power Purchase Agreement Template—National Renewable Energy Laboratory

- This solar PPA template document was created by a group of solar developers, law firms, and other interested parties in the solar energy community. It represents a consensus around one possible approach to solar finance, with a particular emphasis on access to broader capital markets.
- https://financere.nrel.gov/finance/content/terms-service-commercial-11

Tool #15. Document Library

Overview

The internet is filled with helpful documents and resources related to renewable energy. Reputable sources include, but are not limited to, the NH Public Utilities Commission, US Environmental Protection Agency, US Dept. of Energy, National Renewable Energy Laboratory, and Database of State Incentives for Renewables and Efficiency. Due to the abundance of existing resources and our desire to keep this document user friendly, we have only listed New Hampshire specific resources here.

Solar Documents

New Hampshire Residential Rooftop Solar PV Permitting, Zoning and Interconnection Guide

- by NH Office of Energy and Planning, GDS Associates, and Resilience Planning & Design; January 2015
- The guide covers current laws and regulations impacting residential solar PV, recommendations for permitting and zoning and information about utility interconnection.
- https://www.nh.gov/oep/energy/saving-energy/index.htm

Solar Friendly Best Planning Practices for New Hampshire Communities

- by Southern NH Planning Commission, January 2015
- This document provides useful guidance for municipal planners in checklist form.
- http://www.snhpc.org/pdf/FinalSolarResourceGuide2015.pdf

Wood Documents

Community Roadmap to Renewable Woody Biomass Energy: A Step-by-Step Decision-Making Tool for New Hampshire Communities

- by Yellow Wood Associates, Inc. and the Biomass Energy Resource Center, 2010
- This tool was created so that communities have the information they need, and a logical process to follow, to make informed decisions about the role wood may play in their energy future.
- http://www.nhrcd.net/1946/roadmap/

Planning Documents

Strategic Energy Action Toolkit

- by New England Grass Roots Environmental Fund and Vital Communities, 2015
- The Toolkit is made up of tools and exercises to help local energy groups through a strategic planning process. Each section has step-by-step instructions and a template for documenting work. Communities that utilize this process gain a list of projects that align with their vision, capitalize of their strengths, and maximize their potential for community impact. They also have a record of the process and rationale for prioritizing one project over another.
- http://www.nhenergy.org/strategic-energy-action.html

Incentives and Net Metering Documents

New Hampshire Group Net Metering Information and Guidelines

- by New Hampshire Sustainable Energy Association, 2014
- This document outlines how group net metering works, the challenges and opportunities it presents, and various structures for groups and financing options.
- *Note: as of November 2017, NHSEA is in the process of updating this document and it is temporarily unavailable. It will be reposted to the website below as soon as the updates have been completed.*
- http://www.nhsea.org/

NH Office of Energy and Planning, Renewable Energy Incentives

- Includes renewable energy property tax exemption listings, a web link to NH PUC solar rebates, and other incentives.
- https://www.nh.gov/oep/energy/saving-energy/incentives.htm

Other Documents

Energy Efficiency, Renewable Energy and Historic Preservation: A Guide for Historic District Commissions

- by Clean Air Cool Planet, 2009
- This guide explores the relationship between historic preservation and sustainable energy. It also includes "Frequently Asked Questions" regarding energy efficiency projects in historic homes as well as questions to ask contractors and historic district commissions.
- www.nh.gov/nhdhr/publications/documents/hdc_guide_cacp.pdf