

Topic:	Green Buildings & Energy Efficiency
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State:	New Hampshire
Jurisdiction Type:	Municipal
Municipality:	Town of Epping
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Community Type - applicable to:	Suburban; Rural
Title:	Town of Epping Energy Efficiency & Sustainable Design Ordinance
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Abstract

The Town of Epping, New Hampshire, population 5,476, established a more stringent energy code than the state, which adopted the International Energy Conservation Code (IECC) 2006 Edition with amendments.¹ The town's energy efficiency and sustainable design code is based on a system that awards points for various sustainable elements and energy production practices. Epping's point system is similar to the U.S. Green Building Council's Leadership in Energy and Environmental Design rating system in establishing criteria to meet heightened energy efficiency standards of a building. The point score system is based on the square footage of a building, the larger the square footage the more points the building will need. Points are given based on a variety of energy efficiencies. Examples include HVAC efficiencies, building orientation, reduction in water usage, source of building materials, and the use of distributed generation. For instance, installation of a PV system that has a rating equal to a range of 10% - 50% of the estimated base load or as a full peak shaving installation will be awarded 10-15 points.

The town also allows for innovative techniques on a case-by-case basis to convey compliance in a specific effort to promote new technologies and flexibility. These technologies include: Fuel Cell based co-generation, Stirling engine co-generation (external combustion engines), and Small-scale biomass and biosynthetic oil co-generation installations. The Planning Board will promote the use of these technologies if there is sufficient evidence to show that is sufficient security in place to secure the operation and maintenance of the installation for a period of five years, that the rated output of electrical generation is larger than 2.5 kW in a continuous operational mode, and that there are sufficient environmental, economic, and experimental benefits to be gained from the installation. If the Planning Board finds the system is in compliance, then it will be awarded 10-15 points. Moreover, a building may be awarded a point if it is oriented to optimize passive solar heating and cooling opportunities, minimize wind loads on

¹ The State Building Code Review Board has adopted the IECC 2009 with amendments, which becomes effective April 1, 2010.

structures, or if its windows are placed to maximize solar penetration during the winter months and minimize solar penetration during the summer months.

Resource

ZONING ORDINANCE – TOWN OF EPPING, NEW HAMPSHIRE
ARTICLE 22: ENERGY EFFICIENCY & SUSTAINABLE DESIGN
§ 22.1 to § 22.3

§ 22.1 Purpose.

In accordance with the State of New Hampshire's policy on energy production and conservation, this section is adopted as in the public interest to provide for small scale and diversified sources of supplemental electrical power and to lessen the state's dependence upon other sources which may, from time to time, be uncertain and result in increased pollution and greenhouse gas emissions. It is also found to be in the public interest to encourage and support diversified electrical production that uses indigenous and renewable fuels that have beneficial impacts on the economy, the environment, and the public health. It is further found that this ordinance assists the Town of Epping citizens in providing a reasonable opportunity for small customers to choose interconnected self generation, encourage private investment in renewable energy resources, stimulate in-state commercialization of innovative and beneficial new technology, enhance the future diversification of the Town's and the state's energy resource mix, and encourage sustainable building design.

It is the intent of this ordinance to enhance and supplement existing federal and state incentives for tax treatment and other benefits related to alternative energy production, energy efficiency and sustainable design. Interpretations by the Planning Board shall be made so far as possible to preserve the intent of the ordinance and the developer and home owner's ability to benefit from these programs as well. This includes but is not limited to, NH RSA 362-A, the Internal Revenue Code Section 179(D), the Energy Policy Act of 2005, and the Energy Star program.

§ 22.2

Residential Development requirements for Energy Production shall be adopted by the Planning Board as part of the Subdivision Regulations in accordance with RSA 674:35 and 674:36(II)(k) and (III).

§ 22.3 Non-residential Development.

22.3.1

The Planning Board shall require that non-residential developments achieve EP & SD benchmarks in accordance with the following table:

Square footage in development.	Required EP & SD score
0-5,000	5
5,001-10,000	10
10,001-20,000	15
20,001-50,000	20
50,001 and up	25

22.3.2 Requirements for EP & SD.

Under this section, each development must meet one or both of the following subsections:

A) Energy Production Requirements.

1) Renewable Energy Production. For this requirement, eligible generation installations shall be limited to wind, PV (photovoltaic) solar, biomass.

a) Wind - The nameplate rated generation capacity of a wind generation system shall be equal to or greater than 5.0 kW at a rated wind speed of 20 mph and may be met by more than one turbine.

b) PV Solar – An installed PV system shall have a rating equal to a range of 10% - 50% of the estimated base load or as a full peak shaving installation.

(10 – 15 points). 10 points for minimum compliance and additional points for larger generation capabilities or shared/combined systems (points for shared systems shall be awarded to each unit connected to the system).

c) Identification and recording of height limitations and solar easements pursuant to 674:17(I)(j) and 674:36(II)(k) in conjunction with other lots that are subject to this ordinance and have achieved compliance through the installation of solar technologies or have existing solar installations.

(2 points per lot/structure affected).

2) Combined Heat and Power / Cogeneration.

a) The facility shall have a manufacturers certified electrical efficiency of 25% or greater and an overall efficiency of 65% or greater.

b) The nameplate installation shall be equal to a range of 30% - 100% of the estimated base load.
(10 – 15 points). 10 points for minimum compliance and additional points for larger generation capabilities or shared/combined systems (points for shared systems shall be awarded to each unit connected to the system).

3) Innovative Technologies.

a) The Planning Board may approve on a case-by-case basis the use of one of the following innovative technologies:

- Fuel Cell based co-generation (all kinds).
- Stirling engine co-generation (external combustion engines).
- Small-scale biomass and bio-synthetic oil co-generation installations.

b) The Planning Board shall make a finding based upon sufficient evidence presented to the Board that the following requirements are met. The Board may consider lower efficiency ratings to promote the use and exploration of innovative technologies:

- That sufficient security is in place to secure the operation and maintenance of the installation for a period of five years.
- That the rated output of electrical generation is larger than 2.5 kW in a continuous operational mode.
- That there are sufficient environmental, economic, and experimental benefits to be gained from the installation.

(10 – 15 points). 10 points for minimum compliance and additional points for larger generation capabilities or shared systems (points for shared systems shall be awarded to each unit connected to the system).

B) Sustainable Design Requirements.

1) Building Site and Materials.

a) Orientation

- Buildings shall be oriented on the site to optimize passive solar heating and cooling opportunities.
- Buildings shall be oriented so as to minimize wind loads on structures.

- Windows shall be placed to maximize solar penetration during the winter months and minimize solar penetration during the summer months.

(1 point). Lot layout shall be shown on an approved plan to insure that structures can comply with this requirement. Directions and orientations shall be noted on the recorded plan for the lot to alert the builder/lot owner of the optimal orientation.

b) Reuse of Existing Materials and Recycled Content

- Demonstration that the applicant will use recycled content materials in the site development and construction.
- The project must provide adequate storage and collection of recyclables both during and post construction. Post construction recyclable areas must be easily accessible to all building occupants/users and be sufficiently sized for storage and collection of non-hazardous materials including at a minimum paper, corrugated cardboard, glass, plastics, and metals.

(1 – 3 points). Increased points are for achieving multiple components as listed above and/or increased percentages related to the project cost. Prior to the issuance of the Certificate of Occupancy, the developer shall insure compliance with a filing to the Board listing the required elements.

c) Use of Local and Regional Materials

- In order to reduce the environmental impact of materials shipping, the project should use building materials that provide long-term durability and decreased maintenance costs; are extracted, processed and manufactured within New Hampshire; and are made from renewable resources or materials wherever possible.

(1 – 3 points). For local construction materials, the higher point value results from New Hampshire products; lower points are for other products from other states that are within 500 miles of the building site. Relative values of local materials to overall materials cost shall also be considered for assignment of values with the range. Prior to the issuance of the Certificate of Occupancy, the developer shall insure compliance with a filing to the Board listing the required elements

d) Construction Waste Management.

- Promote efficient use of solid waste by diverting construction, demolition and land clearing debris from landfill disposal, and by redirecting resources for recycling and reuse.
 - Develop and implement a construction waste management plan as part of the Planning Board approval process that quantifies material diversion goals and the procedures for achieving them. Such a plan shall indicate the required containers for the site and provide an inspection process to allow the Town to inspect the process and insure compliance (such as contracts and manifests for recycling materials and facilities).
 - Recycle and/or salvage, demolition, and land clearing waste generated through site preparation.
- (1 – 2 points). Points shall be assigned based on the completeness of the plan and the percentage amount of materials that are diverted, re-used, or recycled above the minimum requirements.

2) Construction Envelope Energy Conservation.

Increase the amount of energy saved through conservation programs to include but not limited to:

- Any mechanism for insulation that exceeds the NH Energy Code.
- Successful completion of air leakage tested to comply with Best Practices of Technical Standard 1 of the Air Tightness Testing and Measurement Association:

Type	Air Permeability	
	m ³ /(h.m ²) at 50 pascals	
	Best Practice	Normal
Offices		
<i>Naturally ventilated</i>	3	7
<i>Mixed mode</i>	2.5	5
<i>Air conditioned/low energy</i>	2	5
Factories/warehouses	2	6
Superstores	1	5
Schools	3	9
Hospitals	5	9
Museums and archival stores	1	1.5
Cold Stores	0.2	0.35
Dwellings		
<i>Naturally ventilated</i>	3	9
<i>Mechanically ventilated</i>	3	5

- Additional items may be considered provided they are also eligible for the federal tax credit for energy efficiency and exceeds the NH Energy Code.

(1 - 4 points). The Planning Board shall consider a range of points based on their impact to the estimated GHG emission reduction and life cycle cost reduction for energy usage. The maximum point value shall only be eligible for this section provided the air leakage criteria are met in conjunction with several other elements.

3) Heating and Cooling.

a) Installation of a solar water heating system rated at 1000 watts of thermal power per 450 gallons per day of usage projection as determined the NH DES rules for the facility.

b) Geothermal systems with a sufficient capacity and efficiency as projected by the manufacturer to save the average energy costs for conventional heating and cooling units by 30%.

c) Wood-pellet and other biomass heating systems in sufficient output to provide over 50% of the base heating load for the entire structure.

d) The installation of a hydronic radiant heating system for the structure.

e) Reduce the building's heat load by either using roofing materials with a minimum Solar Reflectance Index (SRI) of 78 for roof slopes less than or equal to 2:12 or a minimum SRI of 29 for slopes greater than 2:12; or install a vegetated roof for at least 50 percent of the roof area.

f) Ductwork insulated to a minimum of R-6 if located in an unconditioned space, including attics, basements, and exterior walls. Exceptions include insulation for exhaust air ducts or ducts within HVAC equipment.

g) HVAC piping in unconditioned spaces conveying fluids at temperatures above 120 degrees or chilled fluids at less than 55 degrees must be insulated to a minimum of R-5.

(1-5 points [up to 7 points only for a solar hot water or geothermal system]). The Planning Board shall consider the range of points based on the installation of one or more of the above elements. If solar, geothermal, or cogeneration systems are used in conjunction with a

hydronic radiant heating system, the project shall be eligible for 7 points.

4) Innovative Technologies.

a) The Planning Board may approve on a case-by-case basis the use of innovative building technologies.

b) The Planning Board shall make a finding based upon sufficient evidence presented to the Board that the following requirements are met.

- That sufficient security is in place to secure the operation and maintenance of the installation for a period of five years.
- The manufacturer's specifications and estimates for energy or design efficiency has been reviewed and found to be a reasonably accurate to a licensed professional engineer in the field of the equipment.
- That there are sufficient environmental, economic, and experimental benefits to be gained from the installation.

(1 - 3 points). The Planning Board shall consider a range of points based on their impact to the estimated GHG emission reduction and life cycle cost reduction for energy usage.

5) Operational Requirements

a) No idling policy

b) On-site fleet usage of B20 or above.

c) Reduced lighting after hours using LED light fixtures.

d) Smart Panels installed as a Demand Side Management program.

(1 - 3 points). The Planning Board shall consider a range of points based on their impact to the estimated GHG emission reduction and life-cycle cost reduction for energy usage for each element and its implementation.

6) Mandatory Requirement for Gasoline Stations. For any existing gasoline station that has more than 4 pumping stations (meaning one nozzle location), that adds additional uses to its existing site, or adds pumping stations shall insure that at least one pump on site provides one or more of the following.

a) E85 or other biosynthetic fuel that can be used in vehicles that is reasonably available.

b) Bio-diesel at B20 or above.