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# *Article 22*

## *What does it all mean?*

# Article 22: What it all means

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- **Applies to existing structures?** **NO**
- **Applies to new single-family and duplex structures?** **NO**
- **Prohibits use of fossil fuels?** **NO**
- **Severely limits future development?** **NO**

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## 22.1 Purpose

- To provide for small scale and diversified sources of supplemental electrical power
- To lessen the state's dependence upon other sources
- To encourage and support diversified electrical production that have beneficial impacts on the economy, the environment and the public health

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## 22.1 Purpose

- To provide the opportunity for interconnected self generation
- To encourage private investment in renewable energy resources
- To stimulate in-state commercialization of innovative new technology
- To diversify energy resources
- To encourage sustainable design



# Article 22: What it all means

- **22.3** Non-residential Development.
- **22.3.1** The Planning Board shall require that non-residential developments achieve AEP & 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

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## ■ 22.3.3 Requirements for EP & SD.

- Under this section, each development must meet one or both of the following subsections
  - A) Energy Production
  - B) Sustainable Design



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## ■ 22.3.2 A Energy Production Requirements

1) For this requirement, eligible generation installations shall be limited to:

- a) Wind
- b) Photovoltaic solar
- c) Biomass

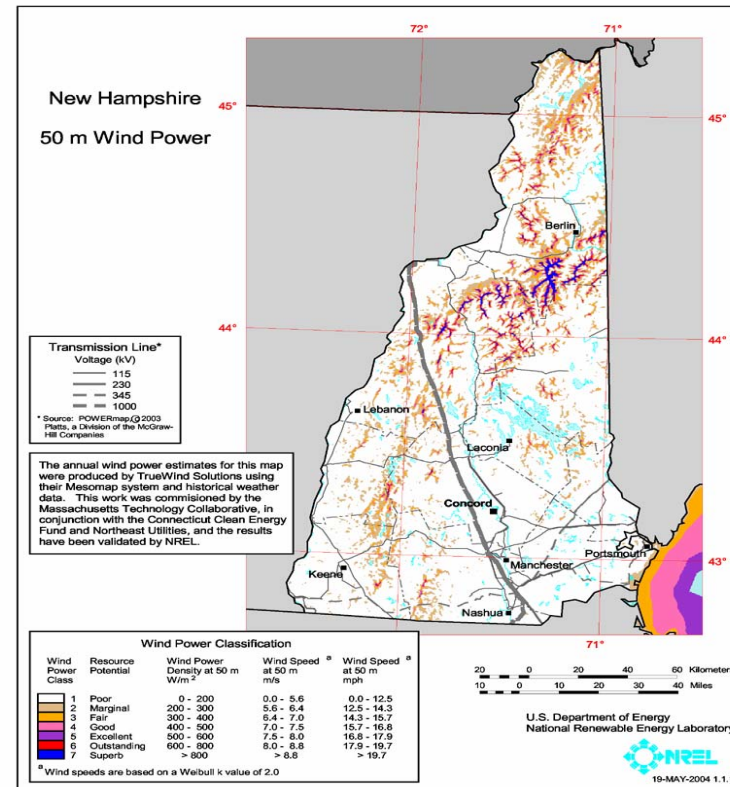


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## ■ 22.3.2:A:1

- 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



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MW

# Article 22: What it all means



## ■ 22.3.2:A:1

- 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.



*The earth receives more energy from the sun in just one hour than the world uses in a whole year.*

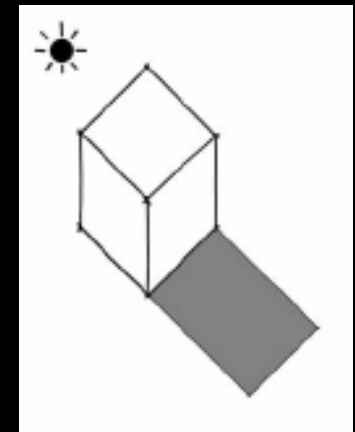
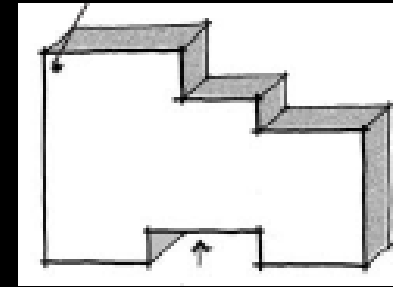


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## ■ 22.3.2:A:1

- 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.



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- 22.3.2:A: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).*

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## ■ 22.3.2:A:3 Innovative Technologies

- a) The Planning Board may approved on a case-by-case basis the use of one of the following innovative technologies:
  - Fuel Cell based cogeneration (all kinds)
  - Stirling engine cogeneration (external combustion engines)
  - Small-scale biomass and bio-synthetic oil cogeneration installations.

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- 22.3.2:A:3 Innovative Technologies
  - 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:

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## ■ 22.3.2:A:3:b 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 operation 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).***

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- 22.3.2:B Sustainable Design Requirements
  - 1) Building Site and Materials
    - a) Orientation
    - b) Reuse of Existing Materials and Recycled Content
    - c) Use of Local and Regional Materials
    - d) Construction Waste Management

# Article 22: What it all means



## ■ 22.3.2:B:1

### ■ 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.*

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## ■ 22.3.2:B:1

### ■ 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 the filing to the Board listing the required elements.*

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## ■ 22.3.2:B:1

### ■ 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 constructions 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.*

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- **22.3.2:B:1** 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.*

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## ■ 22.3.2:B

### ■ 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

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## ■ 22.3.2:B

### ■ 2) Construction Envelope Energy Conservation

- 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 <sup>3</sup> /(h.m <sup>2</sup> ) 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

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## ■ 22.3.2:B

### ■ 2) Construction Envelope Energy Conservation

- 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.*

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- 22.3.2:B
- 3) Heating and Cooling
  - a) Installation of solar water heating system rated at 1000 watts of thermal power per 450 gallons per day of usage projection as determined by 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 hydronic radiant heating system for the structure.

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- 22.3.2:B
- 3) Heating and Cooling
  - 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 minimum SRI of 29 for slopes greater than 2:12; or install a vegetated roof for at least 50% of the roof area.
  - f) Ductwork insulated to a minimum of R-16 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.

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- 22.3.2:B
- 3) Heating and Cooling
  - *(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 other cogeneration systems are used in conjunction with hydronic radiant heating system, the project shall be eligible for 7 points.*

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## ■ 22.3.2:B: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.*

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## ■ 22.3.2:B: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 of energy usage for each element and its implementation.*

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- 22.3.2:B:6 Mandatory Requirements 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 bio-synthetic fuel that can be used in vehicles that is reasonably available.
    - b) Bio-diesel at B20 or above