

## **A few notes on the rough scale of generation technologies**

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Vermont used 147 Trillion BTUs of energy in 2010 (30% heating, 36% transportation, 35% electricity).

About **11%** of this (16 TBTU) came from **in-state renewable sources** (60/40 split between electricity and heating with biomass).

### **What would it take to generate 5% of all energy used in the state?**

*Neglect efficiency for now (changing the denominator), as the Commission is tasked to focus on supply.*

*5% of all energy is equivalent to about 14% of electricity.*

Using *large wind* only: 288 MW (e.g. 96 3MW turbines)

4.6 times the capacity of the Kingdom Community Wind project

*small wind*: lower capacity factor => more than 3,000 *Northwind 100*-scale turbines

Using *solar* only: 576 MW (5.4 square miles – ½ of Burlington or 1.3×Barre City)

262 2.2 MW standard-offer scale plants (slightly more than one per town, city, and gore in VT)

Using *small hydro* only: 173 MW

Almost twice the PSD estimated capacity available from powering 300 of the 1200 existing dams

Using *biomass* (electrical generator) only: 139 MW

Use addl. 1.1 million tons of fuel/year (state now uses 1.5 million tons/year total)

Add *CHP*: Use half the waste heat to displace fossil fuel heating =>

Get to 5% of state energy with 89 MW plant(s) using 750,000 tons/year

What about with efficient *natural gas combined cycle*?

Electrical generator only: 96 MW

Use 5 billion cubic feet of fuel/year (state now uses 8.6 bcf)

Emit 310,000 tons/year of CO<sub>2</sub>

Add *CHP*: Use half the waste heat to displace fossil fuel heating =>

Get to 5% of state energy with 81 MW plant(s) using 4.3 bcf/year  
(and emitting 260,000 tons/year of CO<sub>2</sub>)

What about more imports from *HydroQuebec*?

New HQ contract is only 16 hours/day of approx. 220 MW (down from 24 hrs.).

Expanding to 24 hours/day would be 4.2% of state energy use.