REGIONAL PLANNING INITIATIVE

The PSD is funding three of Vermont’s Regional Planning Commissions to create region-specific energy plans that sync with state goals. BCRC is the project lead. Initial plans will serve as pilots for all other regions.

First three plans will be completed in 2016.

Public Service Dpt.

NRPC  BCRC  TRORC
## REGIONAL THERMAL ENERGY USE

<table>
<thead>
<tr>
<th>Fuel Type: Space Heating</th>
<th>Number of Households</th>
<th>Avg. Use (Annual)</th>
<th>Percent of Use: Owner</th>
<th>Percent of Use: Renter</th>
<th>Percent of Cost (All HHs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tank/LP/etc. Gas</td>
<td>2261 HHs</td>
<td>2.3 Mil Gal</td>
<td>15%</td>
<td>12%</td>
<td>22%</td>
</tr>
<tr>
<td>Electricity</td>
<td>383 HHs</td>
<td>8.1 GWh</td>
<td>3%</td>
<td>1%</td>
<td>7%</td>
</tr>
<tr>
<td>Fuel Oil</td>
<td>9779 HHs</td>
<td>7.0 Mil Gal</td>
<td>67%</td>
<td>67%</td>
<td>65%</td>
</tr>
<tr>
<td>Wood</td>
<td>1993 HHs</td>
<td>12.9K Tons</td>
<td>14%</td>
<td>17%</td>
<td>6%</td>
</tr>
<tr>
<td>Other</td>
<td>269 HHs</td>
<td>-</td>
<td>2%</td>
<td>2%</td>
<td>0%</td>
</tr>
</tbody>
</table>

### ALL HOUSEHOLDS
Estimated percent of all households using each type of heating fuel in the region.

### OWNERS
Estimated percent of owner-occupied households using each type of fuel.

### RENTERS
Estimated percent of renter-occupied households using each type of fuel.
REGIONAL ELECTRICITY USE

2014 BCRC ELECTRICITY USE: ~ 300 GIGAWATT HOURS
TRANSPORTATION OIL USE
AS A PART OF OVERALL OIL USE

ENERGY CONSUMPTION
(IN MILLION BTUs)


OTHER PETROL/OIL USE
PETROL/OIL USE FOR TRANSPORTATION
Vermont Energy Demand
by Fuel Type: 2010 - 2050

**REFERENCE SCENARIO**

Electricity is not broken down into specific input fuels (such as solar, hydro, or nuclear) in this chart. The corresponding changes in projected electricity generation can be seen in Figure 4.X.

- **ELECTRICITY**
- **NONRENEWABLES**
  - NATURAL GAS
  - DIESEL
  - GASOLINE
  - LPG
  - OIL + FUEL OIL
  - OTHER NONRENEWABLES
- **RENEWABLES**
  - WOOD/BIOmass
  - ETHANOL
  - BIODIESEL
Bennington Region
Residential Energy Demand: 2010 - 2050

BCRC Total Residential Energy

BCRC Single-Family Heating Energy
Bennington Region
Transportation Energy Demand: 2010 - 2050
How do we get there?

Strategies developed considering existing resources and programs, ideas from stakeholders and experts in the field, and local input.

- **Thermal**: improving building stock, changing and improving heating systems and fuels.
  - *Example*: Work with fuel dealers to encourage them to become energy service providers (ESPs).
    - Work with Bennington College CAPA program to organize and hold a forum with fuel dealers that have become ESPs.

- **Transportation**: reducing the amount of driving and transforming the vehicle fleet.
  - *Example*: Expand the use of electric vehicles throughout the region by supporting education efforts, and availability of EVs and infrastructure.
    - Replace some municipal vehicles with EVs and provide charging stations at prominent locations in municipal parking lots.

- **Electricity**: continuing efforts at conservation and new in-region generation.
  - *Influence behavioral changes to reduce electricity consumption at the individual level.*
    - The Community Energy Dashboard should be widely publicized and used by the BCRC and local energy committees to illustrate case studies and statistics demonstrating energy savings.
# New In-State Electricity Generation

## 2010 – 2050

<table>
<thead>
<tr>
<th>YEAR</th>
<th>Electricity Consumption (GWh)</th>
<th>New Hydro (MW)</th>
<th>New Wind (MW)</th>
<th>New Solar (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>5,623</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2025</td>
<td>6,991</td>
<td>25</td>
<td>200</td>
<td>445</td>
</tr>
<tr>
<td>2035</td>
<td>8,073</td>
<td>50</td>
<td>400</td>
<td>926</td>
</tr>
<tr>
<td>2050</td>
<td>10,044</td>
<td>93</td>
<td>400</td>
<td>1,647</td>
</tr>
<tr>
<td></td>
<td>Vermont</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>318</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2025</td>
<td>381</td>
<td>1</td>
<td>16</td>
<td>24</td>
</tr>
<tr>
<td>2035</td>
<td>421</td>
<td>1</td>
<td>28</td>
<td>48</td>
</tr>
<tr>
<td>2050</td>
<td>473</td>
<td>1</td>
<td>28</td>
<td>85</td>
</tr>
<tr>
<td></td>
<td>BCRC Region</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SOLAR AND WIND GENERATION GOAL FOR ALL RPCS

The same methodology, applied to all regions:
## Deriving Estimates for New Solar Generating Capacity by Town

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Arlington</td>
<td>2,404</td>
<td>589</td>
<td>409</td>
<td>10</td>
<td>63.8</td>
<td>5.3</td>
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<tr>
<td>Bennington</td>
<td>15,633</td>
<td>2,009</td>
<td>1,624</td>
<td>46</td>
<td>425.4</td>
<td>28.4</td>
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<tr>
<td>Dorset</td>
<td>2,055</td>
<td>1,013</td>
<td>806</td>
<td>17</td>
<td>233.3</td>
<td>6.9</td>
</tr>
<tr>
<td>Glastenbury</td>
<td>7</td>
<td>12</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Landgrove</td>
<td>199</td>
<td>1,325</td>
<td>233</td>
<td>2</td>
<td>8.2</td>
<td>1.6</td>
</tr>
<tr>
<td>Manchester</td>
<td>4,356</td>
<td>1,380</td>
<td>1,348</td>
<td>23</td>
<td>478.9</td>
<td>12.7</td>
</tr>
<tr>
<td>Peru</td>
<td>363</td>
<td>1,343</td>
<td>991</td>
<td>4</td>
<td>29.7</td>
<td>6.1</td>
</tr>
<tr>
<td>Pownal</td>
<td>3,506</td>
<td>726</td>
<td>303</td>
<td>2</td>
<td>3.9</td>
<td>3.9</td>
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<tr>
<td>Rupert</td>
<td>640</td>
<td>596</td>
<td>327</td>
<td>5</td>
<td>55</td>
<td>2.6</td>
</tr>
<tr>
<td>Sandgate</td>
<td>528</td>
<td>153</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.7</td>
</tr>
<tr>
<td>Shaftsbury</td>
<td>3,580</td>
<td>1,943</td>
<td>538</td>
<td>17</td>
<td>114.3</td>
<td>7.4</td>
</tr>
<tr>
<td>Stamford</td>
<td>887</td>
<td>231</td>
<td>178</td>
<td>3</td>
<td>10.6</td>
<td>2.1</td>
</tr>
<tr>
<td>Sunderland</td>
<td>911</td>
<td>1,167</td>
<td>997</td>
<td>1</td>
<td>4.3</td>
<td>6.8</td>
</tr>
<tr>
<td>Woodford</td>
<td>300</td>
<td>126</td>
<td>22</td>
<td>1</td>
<td>3.2</td>
<td>0.5</td>
</tr>
</tbody>
</table>
Renewable Energy Resource Mapping

**Solar**
Topography of land analyzed based on slope and direction (azimuth) conducted in GIS for ground-mounted solar.

**Wind**
Digitally modeled wind speed (based on topography) analyzed at 3 hub heights.

**Hydro**
Existing dams analyzed for potential capacity based on Community Hydro report. No new dams considered.

**Biomass (wood)**
Land coverage used to determine location/area of harvestable wood.
2. Determined “constraints”, classified as Level 1 or Level 2

**Level 1 Constraints**
Conditions which would likely make development unfeasible.
*These were removed entirely.*

- Floodways & River Corridors
- Federal Wilderness
- Rare and Irreplaceable natural areas
- Vernal Pools
- Class 1 and 2 Wetlands

**Level 2 Constraints**
Conditions which could impact development, but which would not necessarily prevent it.
*These are shown on maps in color (where they overlap).*

- Agricultural Soils (all ag-rated soils)
- Habitat Blocks (ANR class 9 and 10)
- Hydric Soils
- Conserved Lands
- Special Flood Hazard Areas
- Deer Wintering Areas
- Class 3 Wetlands
SOLAR MAP

- Prime Solar = Yellow
- Includes Level 2 Constraints

Level 2 Constraints:
- Class 3 Wetlands
- Deer Wintering Areas
- Special Flood Hazard Areas
- Conserved Lands
- Hydric Soils
- Habitat Blocks *
- Agricultural Soils **

Legend:
- Substations
- 3 Phase Power Lines
- Transmission Lines
- Major Roads
- Secondary Roads
- Rivers/Streams
- Lakes/Ponds
- 2,500 Ft Elevation
- Prime Solar Potential - No Level 1 or Level 2 Constraints

Projects:
- PROJECT 1
- PROJECT 2
- PROJECT 3
- PROJECT 4
- PROJECT 5
- PROJECT X
SOLAR MAP

ADDITIONAL CONSIDERATIONS = REGIONAL CONSTRAINTS

FOR BCRC:

1. PRIME AGRICULTURAL SOILS SPECIFICALLY IDENTIFIED
   (all ag. soils are mapped as level 2 constraints)

2. SCENIC/HISTORIC DISTRICT AREA

3. LOCALLY IDENTIFIED CONSTRAINTS AND OPPORTUNITIES
WHAT ABOUT ROOFTOP SOLAR??

Residential structures in BCRC Region: 14,000
If 50% are oriented properly and structurally compatible, and 50% of those choose to install systems at an average of 4KW capacity, that’s...
14 MW

Small Commercial Structures (less than 40K sq ft): 2,000
If 50% are oriented properly and structurally compatible, and 50% of those choose to install systems at an average of 20KW capacity, that’s...
10 MW

Large Commercial Structures (greater than 40K sq ft): 100
If 50% overall choose to install systems at an average of 200KW capacity, that’s...
10 MW

ESTIMATE FOR TOTAL ROOFTOP POTENTIAL:
34 MW

44% of Total
THIS IS THE AMOUNT OF LAND AREA IN THE BCRC REGION
(about 370,000 acres, or 775 sq. miles)

THIS IS THE AMOUNT OF THAT AREA WHICH IS CONSIDERED "PRIME SOLAR."
(about 14,000 acres)

AND THIS IS ABOUT THE AMOUNT OF AREA THAT WOULD BE NEEDED TO REACH OUR 2050 GOAL OF 85 MW ADDITIONAL IN-REGION CAPACITY.
(about 800 acres)
Wind Energy

1. PRIME WIND
2. BASE WIND

Darker areas = higher potential
Wind Energy

1. PRIME WIND
2. BASE WIND

Darker areas = higher potential

1KM RESIDENTIAL BUFFER