

# REGIONAL ENERGY PLANNING

**BENNINGTON COUNTY  
REGIONAL COMMISSION**

Scenic Hudson  
Solar Smart Hudson Valley

March 27, 2018

# Vermont State Energy Goals

Some statutory, some from the State Comprehensive Energy Plan. A few examples:

- 25% of all energy consumed in the state through in-state renewables by 2025
- Reduce greenhouse gas emissions resulting from energy use in Vermont by 50% (of 1990 levels) by 2028 and 75% by 2050
- Weatherize 60,000 Vermont housing units by 2017 and 80,000 by 2025
- 90% of Vermont's total energy needs from renewable sources by 2050.

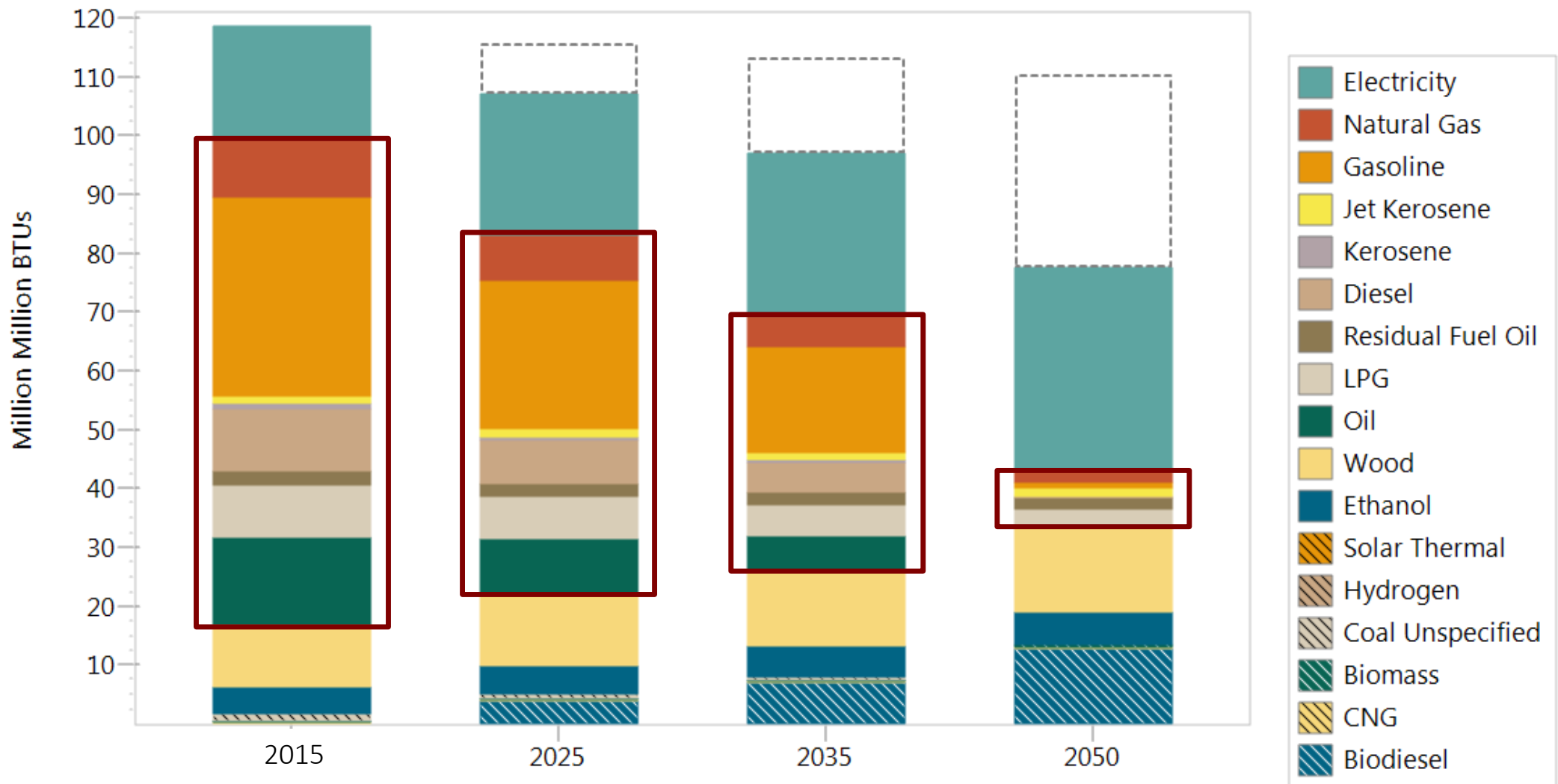
# ACT 174 (2016 VT Legislature)

## “Integrating Energy and Land Use Planning”

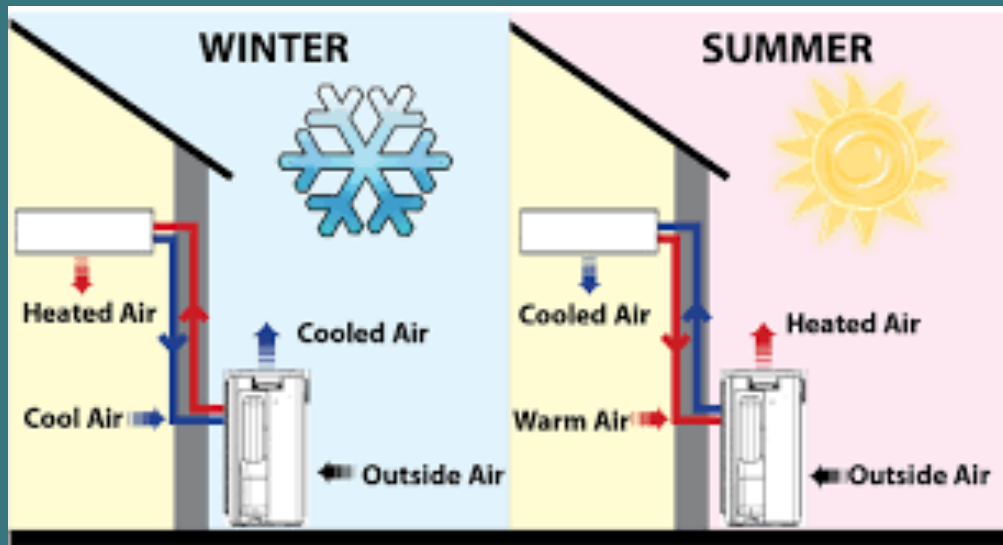
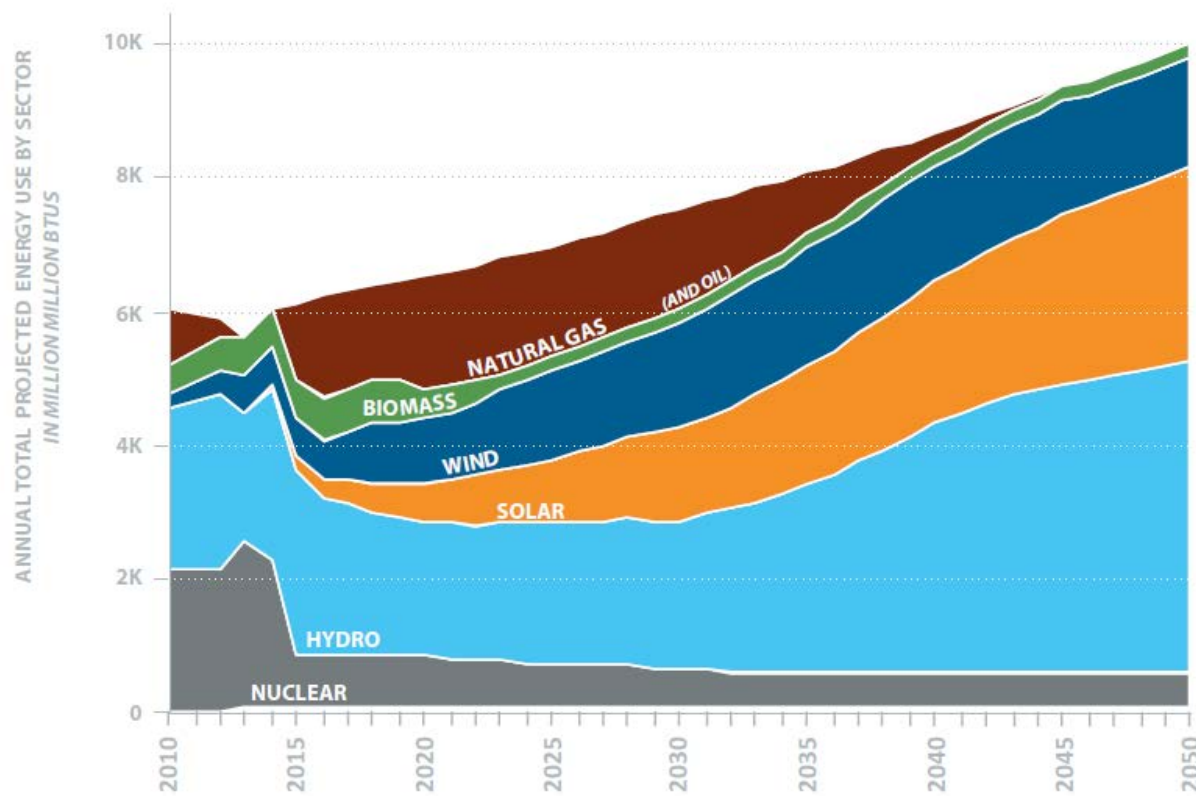
- All energy generation projects are reviewed by the Vermont Public Utility Commission (Section 248 process). No direct local review of projects, the PUC considers local and regional plans in their reviews.
- “Enhanced energy plans” are option for municipalities and regions: ACT 174 sets standards for regional and municipal Plans requiring COMPREHENSIVE consideration of energy issues across all elements of a plan: land use, transportation, community facilities and services, energy efficiency and generation....
- If certified as meeting the standards, the plans are afforded “substantial deference” (as opposed to “due consideration”) in the Section 248 process.
- The plans need to include current and projected energy use by source and sector, policies and strategies designed to encourage conservation and efficiency, and provide for local renewable energy generation (and map energy resource areas).

# LEAP Model - Projections

## Vermont Energy Demand by Fuel Type: 2015 - 2050



# Electricity Generation and Use: 2010 - 2050



|             | YEAR | ELECTRICITY CONSUMPTION (GWh) | NEW HYDRO (MW) | NEW WIND (MW) |      | NEW SOLAR (MW) |       |
|-------------|------|-------------------------------|----------------|---------------|------|----------------|-------|
|             |      |                               |                | Low           | High | Low            | High  |
| VERMONT     | 2010 | 5,623                         | -              | -             | -    | -              | -     |
|             | 2025 | 6,991                         | 25             | 65            | 122  | 405            | 608   |
|             | 2035 | 8,073                         | 50             | 260           | 488  | 840            | 1,260 |
|             | 2050 | 10,044                        | 93             | 260           | 488  | 1,500          | 2,250 |
| BCRC REGION | 2010 | 318                           | -              | -             | -    | -              | -     |
|             | 2025 | 381                           | 1              | 9             | 17   | 19             | 30    |
|             | 2035 | 421                           | 1              | 18            | 34   | 38             | 60    |
|             | 2050 | 473                           | 1              | 18            | 34   | 68             | 107   |
|             |      |                               | 1              | 26            |      | 85             |       |

# **REGIONAL ENERGY MAPPING ANALYSIS**

# ① VCGI/VSJF analysis from Renewable Energy Atlas



## 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 “Known” Constraints

Conditions which would likely make development unfeasible. *These were removed entirely:*

- Floodways & River Corridors
- Federal Wilderness
- State-significant natural communities and rare, threatened, and endangered species
- Vernal Pools
- Class 1 and 2 Wetlands
- Regionally or locally identified critical resources

### Level 2 “Possible” Constraints

Conditions which could impact development, but which would not necessarily prevent it. *These are shown on maps in color (where they overlap with areas having good energy resource potential):*

- Agricultural Soils (all ag-rated soils)
- Conservation Design Blocks (including unfragmented forests, habitat connecting corridors,...)
- Hydric Soils
- Conserved Lands
- Special Flood Hazard Areas
- Deer Wintering Areas
- Class 3 Wetlands
- Regionally or locally identified resources



## ③ Created Energy Maps

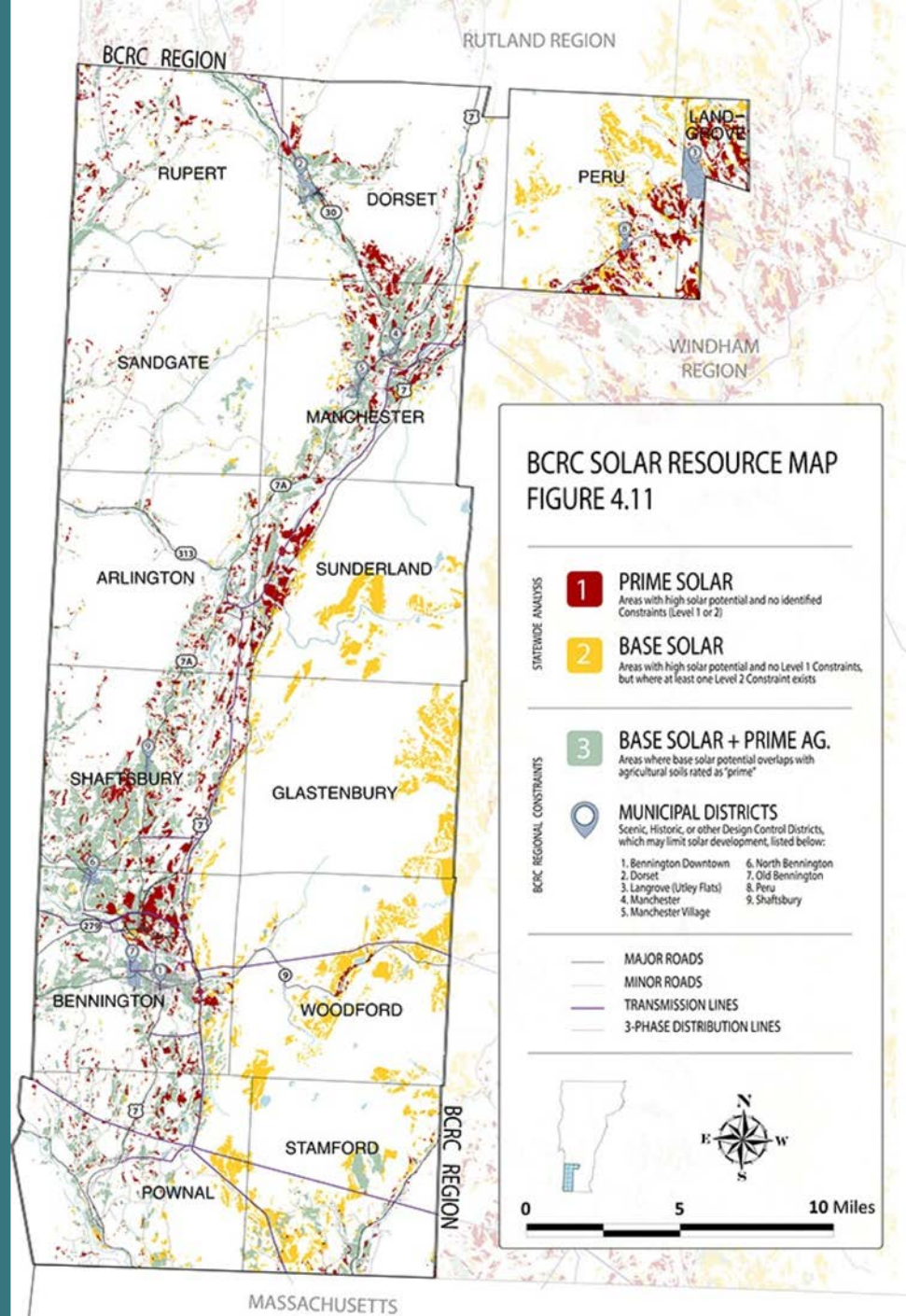
### **Base Resource**

Areas where resource development could be possible; i.e., where natural conditions are right, with Level 1 constraints removed.

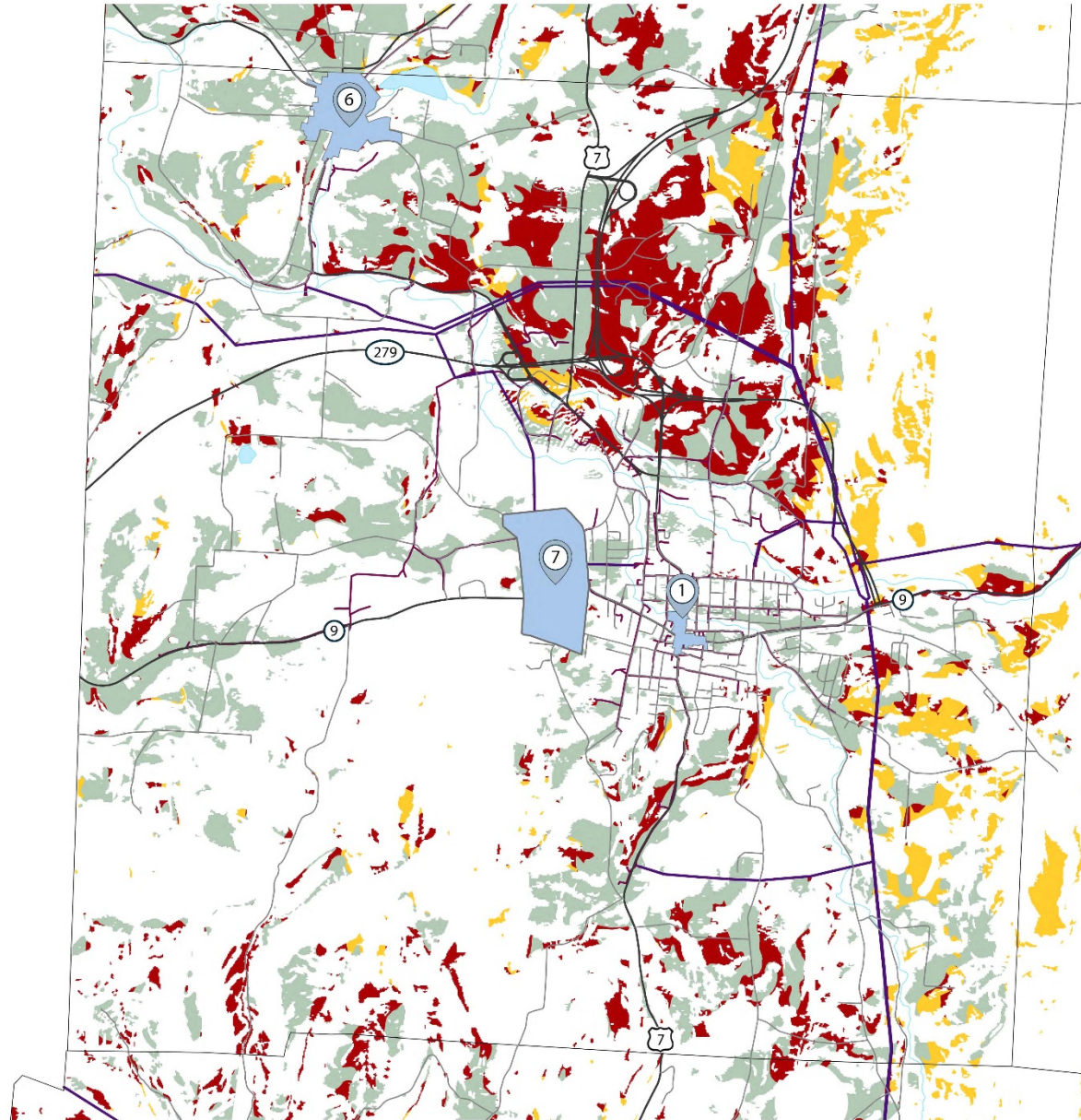
### **Prime Resource**

Areas where renewable energy production/generation appears feasible based on resource availability and lack of state-identified environmental constraints; does not incorporate locally identified constraints or opportunities.

Final Regional Plan Map  
also showing agricultural  
soils and locally enacted  
scenic and design  
review/historic districts



# Individual Town Level



## BENNINGTON SOLAR RESOURCE MAP

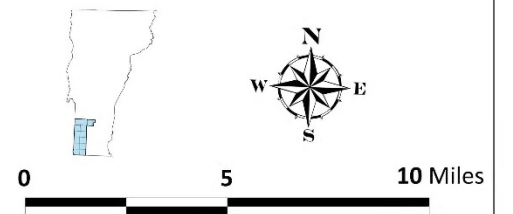
STATEWIDE ANALYSIS

- 1 PRIME SOLAR**  
Areas with high solar potential and no identified Constraints (Known or Possible)
- 2 SECONDARY SOLAR**  
Areas with high solar potential and no Known Constraints, but where at least one Possible Constraint exists

BCRC REGIONAL CONSTRAINTS

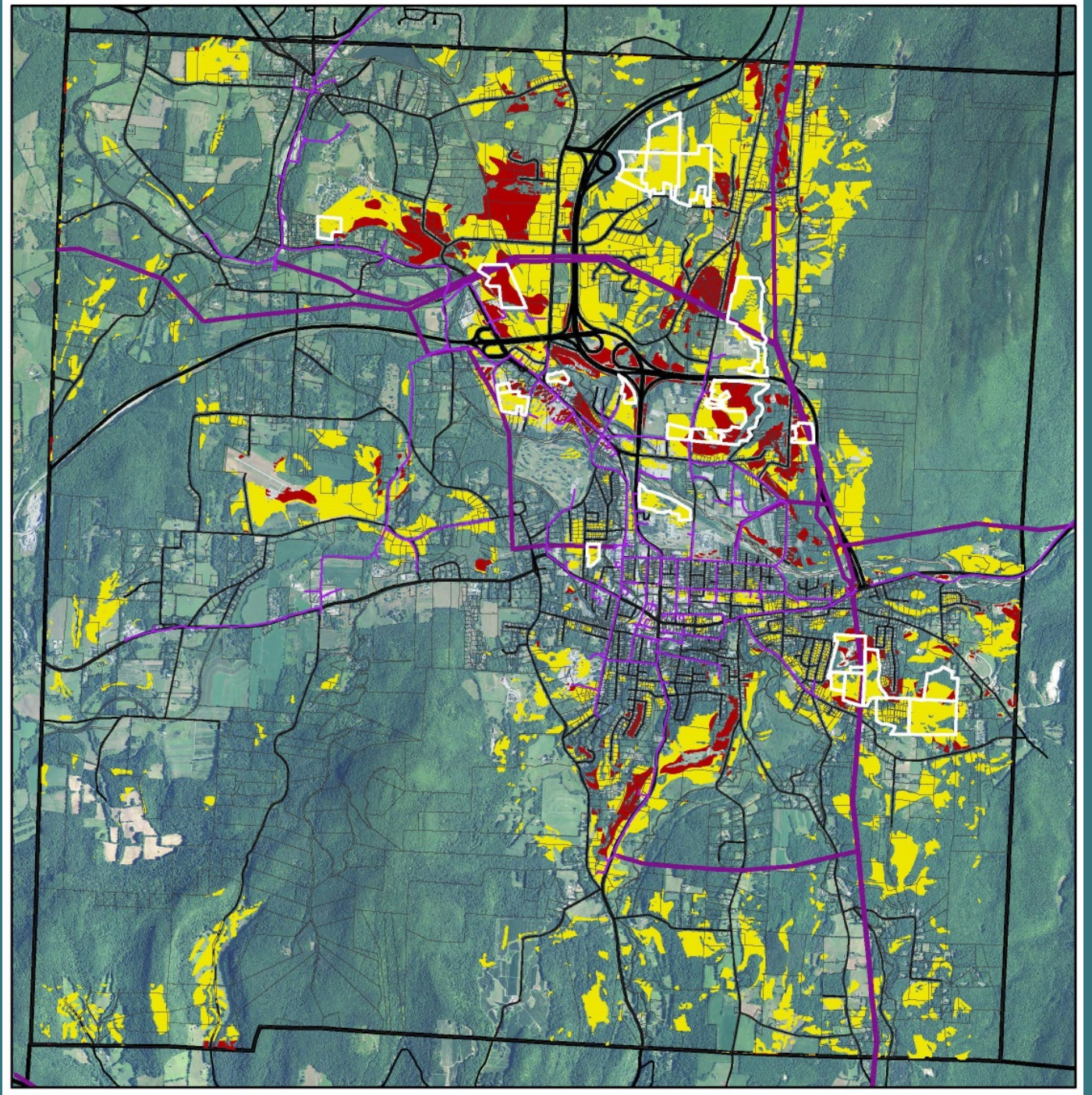
- 3 SECONDARY + PRIME AG.**  
Areas where secondary solar potential overlaps with agricultural soils rated as "prime"
- MUNICIPAL DISTRICTS**  
Scenic, Historic, or other Design Control Districts, which may limit solar development, listed below:
  - 1. Bennington Downtown
  - 2. Dorset
  - 3. Langrove (Utley Flats)
  - 4. Manchester
  - 5. Manchester Village
  - 6. North Bennington
  - 7. Old Bennington
  - 8. Peru
  - 9. Shaftsbury

- MAJOR ROADS
- MINOR ROADS
- TRANSMISSION LINES
- 3-PHASE DISTRIBUTION LINES





Applying local constraints  
and  
Identifying PREFERRED SITES





# One Way to Calculate Town-Level Solar Targets

|             | 2015 Pop | Prime Solar<br>(Acres) | Prime Solar in one<br>mile of 3-phase<br>(Acres) | Existing Solar<br>Capacity (kW,<br>2016) | Existing Solar<br>Capacity (MW,<br>2016) | PREVIOUS<br>2050 Goal, New<br>Capacity (MW) | Share of Resource<br>Capacity | NEW<br>2050 Goal, New<br>Capacity (MW) |
|-------------|----------|------------------------|--|--|--|---|-------------------------------|--|
| Arlington   | 2,453    | 493.05                 | 401.63   | 260.2                                    | 0.2602                                   | 5.3   | 0.050540998                   | 4.0                                    |
| Bennington  | 15,483   | 3034.24                | 2681.70  | 2,532.3                                  | 2.5323                                   | 28.4  | 0.324738838                   | 25.1                                   |
| Dorset      | 2,172    | 1113.48                | 994.65   | 683.6                                    | 0.6836                                   | 6.9   | 0.069726418                   | 5.2                                    |
| Glastenbury | 9        | 50.61                  | 0.00   | 0  | 0  | 0   | 0.000127841                   | 0.0                                    |
| Landgrove   | 111      | 1834.78                | 1728.99  | 3.4                                      | 0.0034                                   | 1.6   | 0.06915147                    | 5.9                                    |
| Manchester  | 4,339    | 1870.11                | 1856.36  | 1,017.3                                  | 1.0173                                   | 12.7  | 0.1341866                     | 10.4                                   |
| Peru        | 335      | 2338.11                | 1015.68  | 49.7                                     | 0.0497                                   | 6.1   | 0.044454685                   | 3.7                                    |
| Pownal      | 3,484    | 1083.37                | 585.66   | 4,538.7                                  | 4.5387                                   | 3.9   | 0.072378171                   | 1.6                                    |
| Rupert      | 595      | 602.52                 | 458.45   | 62.5                                     | 0.0625                                   | 2.6   | 0.026369691                   | 2.2                                    |
| Sandgate    | 481      | 205.82                 | 0.00   | 16.3                                     | 0.0163                                   | 0.7   | 0.006832386                   | 0.6                                    |
| Shaftsbury  | 3,535    | 2693.42                | 2045.03  | 603                                      | 0.603                                    | 7.4   | 0.130139978                   | 10.5                                   |
| Stamford    | 878      | 302.05                 | 253.98   | 30.2                                     | 0.0302                                   | 2.1   | 0.022397981                   | 1.9                                    |
| Sunderland  | 985      | 707.59                 | 696.38   | 110.8                                    | 0.1108                                   | 6.8   | 0.04120843                    | 3.4                                    |
| Woodford    | 340      | 184.95                 | 74.63  | 3.2                                      | 0.0032                                   | 0.5   | 0.007746513                   | 0.7                                    |
| Totals:     | 35,200   |                        | 12793.15   | 9911.2                                   | 9.9112                                   |   |                               |  |
|             |          |                        |  |  |  |   |                               |  |

# 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**



40% of Total



And  
One  
More  
Thing....



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