

## Municipal Analysis & Targets - Richford

The following is an explanation of the municipal energy data compiled by Northwest Regional Planning Commission (NRPC). The intent of the municipal energy data is to provide the municipalities with data required to ensure compliance with the requirements of Act 174 and “Enhanced Energy Planning” (24 V.S.A. 4352). The following tables contain data that estimates current energy use and provides targets for future energy use across all sectors (transportation, heating, and electricity). It also sets targets for renewable energy generation within the municipality.

This data is meant to be a starting point for the municipality to begin planning its energy future and to talk about the changes that may need to occur within the municipality to ensure that local, regional and state energy goals are met. This includes the State of Vermont’s goal to have 90% of all energy demand be met from renewable sources by 2050.

### Figure 1 - Data Sources

ACS – American Community Survey  
 DOL – Vermont Department of Labor  
 DPS – Vermont Department of Public Service  
 EIA – Energy Information Administration  
 EVT – Efficiency Vermont  
 LEAP – Long-Range Energy Alternatives Planning  
 VEIC – Vermont Energy Investment Corporation  
 VTrans – Vermont Agency of Transportation

### Data Sources

Estimates of current energy use consist primarily of data available from the American Community Survey (ACS), the Vermont Agency of Transportation (VTrans), the Vermont Department of Labor (DOL), and the Vermont Department of Public Service (DPS). Targets for future energy use are reliant upon the Long-range Energy Alternatives Planning (LEAP) analysis for the region completed the Vermont Energy Investment Corporation (VEIC). Targets for future energy generation have come from the regional planning commission and DPS. For more information on LEAP, see the Northwest Regional Energy Plan ([www.nrpcvt.com](http://www.nrpcvt.com)). Targets for both future energy use and energy generation have been generally developed using a “top down” method of disaggregating regional data to the municipal level.

It is possible to develop “bottom up” data. For those municipalities interested in that approach, please see the Department of Public Service’s Analysis and Targets Guidance (<http://publicservice.vermont.gov/content/act-174-recommendations-and-determination-standards>).

Please remember that the targets established by LEAP represent only one way to achieve energy goals. There may several other similar pathways that a municipality may choose to take in order to meet the 90x50 goal.

Below is a worksheet by worksheet explanation of the Municipal Template spreadsheet:

### 1. Municipal Data Summary

The following tables summarize all data that is required to be in a municipal plan if the plan is to meet the “determination” standards established by the Vermont Department of Public Service.

Table 1A: Current Municipal Transportation Energy Use

Transportation Data	Municipal Data
Total # of Passenger Vehicles (ACS 2011-2015)	1,549
Average Miles per Vehicle (Vtrans)	11,356
Total Miles Traveled	17,590,444
Realized MPG (2013 - VTrans 2015 Energy Profile)	18.6
Total Gallons Use per Year	945,723
Transportation BTUs (Billion)	114
Average Cost per Gallon of Gasoline (RPC)	2.31
Gasoline Cost per Year	2,184,620

This table uses data from the American Community Survey (ACS) and Vermont Agency of Transportation (VTrans) to calculate current transportation energy use and energy costs in the municipality.

Table 1B: Current Municipal Residential Heating Energy Use

Fuel Source	Municipal Households (ACS 2011-2015)	% of Municipal Households	Municipal Square Footage Heated	Municipal BTU (in Billions)
Natural Gas	2	0.2%	3,808	0
Propane	61	6.7%	109,808	7
Electricity	58	6.4%	75,936	5
Fuel Oil	571	62.7%	984,400	59
Coal	0	0.0%	0	0
Wood	215	23.6%	409,360	25
Solar	0	0.0%	0	0
Other	3	0.3%	5,712	0
No Fuel	0	0.0%	0	0
Total	910	100.0%	1,589,024	95

This table displays data from the ACS that estimates current municipal residential heating energy use.

**Table 1C: Current Municipal Commercial Energy Use**

	Commercial Establishments in Municipality (VT DOL)	Estimated Thermal Energy BTUs per Commercial Establishment (in Billions) (VDPS)	Estimated Thermal Energy BTUs by Commercial Establishments in Municipality (in Billions)
Municipal Commercial Energy Use	30	0.725	22

The table uses data available from the Vermont Department of Labor (VT DOL) and the Vermont Department of Public Service (DPS) to estimate current municipal commercial establishment energy use in the municipality.

**Table 1D: Current Electricity Use**

Use Sector	Current Electricity Use
Residential (kWh)	8,180,301
Commercial and Industrial (kWh)	7,697,197
Total (kWh)	15,877,498

This table displays current electricity use within the municipality. This data is available from Efficiency Vermont (EVT).

**Table 1E: Residential Thermal Efficiency Targets**

	2025	2035	2050
"Residential - Increased Efficiency and Conservation (% of municipal households to be weatherized)"	5%	16%	78%

This table displays targets for thermal efficiency of residential structures. The data is based on a methodology developed by DPS using data available from the regional Long-range Energy Alternatives Planning (LEAP) analysis and ACS. The data in this table represents the percentage of municipal households that will need to be weatherized in the target years. The target is cumulative.

**Table 1F: Commercial Thermal Efficiency Target**

	2025	2035	2050
"Commercial - Increased Efficiency and Conservation (% of commercial establishments to be weatherized)"	25%	25%	73%

This table shows the same information as Table 1E, but sets a target for commercial thermal efficiency and weatherization. Information from the VT DOL is required to complete this target. The target is cumulative.

**Table 1G: Thermal Fuel Switching  
(Residential and Commercial) – Wood Systems**

	2025	2035	2050
New Efficient Wood Heat Systems (in units)	-3	-12	2

This table provides a target for new wood heating systems for residential and commercial structures in the municipality for each target year. This target was calculated using data from LEAP and ACS. The target is cumulative.

**Table 1H: Thermal Fuel Switching  
(Residential and Commercial) – Heat Pumps**

	2025	2035	2050
New Heat Pumps (in units)	109	249	465

This table provides a target for new heat pump systems for residential and commercial structures in the municipality for each target year. This target was calculated using data from LEAP and ACS. The target is cumulative.

**Table 1I: Electricity Efficiency Targets**

	2025	2035	2050
Increase Efficiency and Conservation (BTUs)	25.2%	48.3%	100.7%

Data in this table displays a target for increased electricity efficiency and conservation during the target years. This target will be met through conversions to high efficiency appliances, electric heat pumps, and electric light-duty vehicles. These targets were developed using regional LEAP analysis. The target is cumulative.

**Table 1J: Use of Renewables – Transportation**

	2025	2035	2050
Renewable Energy Use - Transportation (BTUs)	8.4%	29.4%	89.6%

This data displays targets for the percentage of transportation energy use coming from renewable sources during each target year. This target will be met through conversions to electric light-duty vehicles and biodiesel heavy-duty vehicles. This data was developed using the LEAP analysis. The target is cumulative.

Table 1K: Use of Renewables – Heating

	2025	2035	2050
Renewable Energy Use - Heating (BTUs)	46.0%	59.5%	87.5%

This data displays targets for the percentage of heating energy use coming from renewable sources during each target year. This target will be met through conversions to electric heat pumps and high efficiency wood heating systems. This data was developed using information from the LEAP analysis. The target is cumulative.

Table 1L: Use of Renewables – Electricity

	2025	2035	2050
Renewable Energy Use - Electricity (MWh)	4,276.2	8,552.3	12,958.1

This data displays targets for MWh of electricity generation coming from renewable sources within the municipality during each target year. This data was developed using information from the regional planning commission and DPS. This data is the same as the data in Table 1Q. The target is cumulative.

Table 1M: Transportation Fuel Switching Targets – Electric Vehicles

	2025	2035	2050
Electric Vehicles	136	1015	2414

This tables displays a target for switching from fossil fuel based vehicles (gasoline and diesel) to electric vehicles. This target is calculated using LEAP and ACS data. The target is cumulative.

Table 1N: Transportation Fuel Switching Targets – Biodiesel

	2025	2035	2050
Biodiesel Vehicles	196	389	748

This tables displays a target for switching from fossil fuel based vehicles to biodiesel-powered vehicles. This target is calculated using LEAP and ACS data. The target is cumulative.

Table 1O: Existing Renewable Generation

Renewable Type	MW	MWh
Solar	0.13	159.43
Wind	0.01	29.13
Hydro	0.00	0.00
Biomass	0.00	0.00
Other	0.00	0.00
<b>Total Existing Generation</b>	<b>0.14</b>	<b>188.56</b>

Table 1O shows existing renewable generation in the municipality, in MW and MWh, based on information available from the Vermont Department of Public Service.

Table 1P: Renewable Generation Potential

Renewable Type	MW	MWh
Rooftop Solar	1	1,300
Ground-mounted Solar	406	497,515
Wind	133	408,499
Hydro	0	0
Biomass and Methane	0	0
Other	0	0
<b>Total Renewable Generation Potential</b>	<b>540</b>	<b>907,314</b>

Renewable generation potential is based on mapping completed by the regional planning commission that is based on the Municipal Determination Standards and associated guidance documents developed by DPS. The renewable generation potential is expressed in MW and MWh by the type of renewable resource (solar, wind, hydro, etc.).

Table 1Q: Renewable Generation Targets

	2025	2035	2050
<b>Total Renewable Generation Target (in MWh)</b>	<b>4,276.16</b>	<b>8,552.32</b>	<b>12,958.06</b>

This data displays targets for MWh of electricity generation coming from renewable sources within the municipality during each target year. This data was developed using information from the regional planning commission and DPS. This data is the same as the data in Table 1L.

Table 1R: Sufficient Land?

	Y/N
Solar	Y
Wind	Y

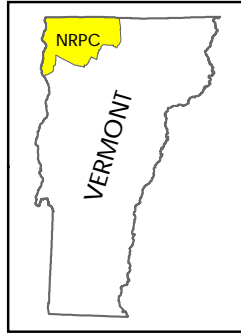
This table shows whether or not there is sufficient land in the municipality to meet the renewable generation targets based on the renewable generation potential in the municipality.

# Utility Service Areas

Richford, Vermont  
Act 174

The Energy Development  
Improvement Act of 2016

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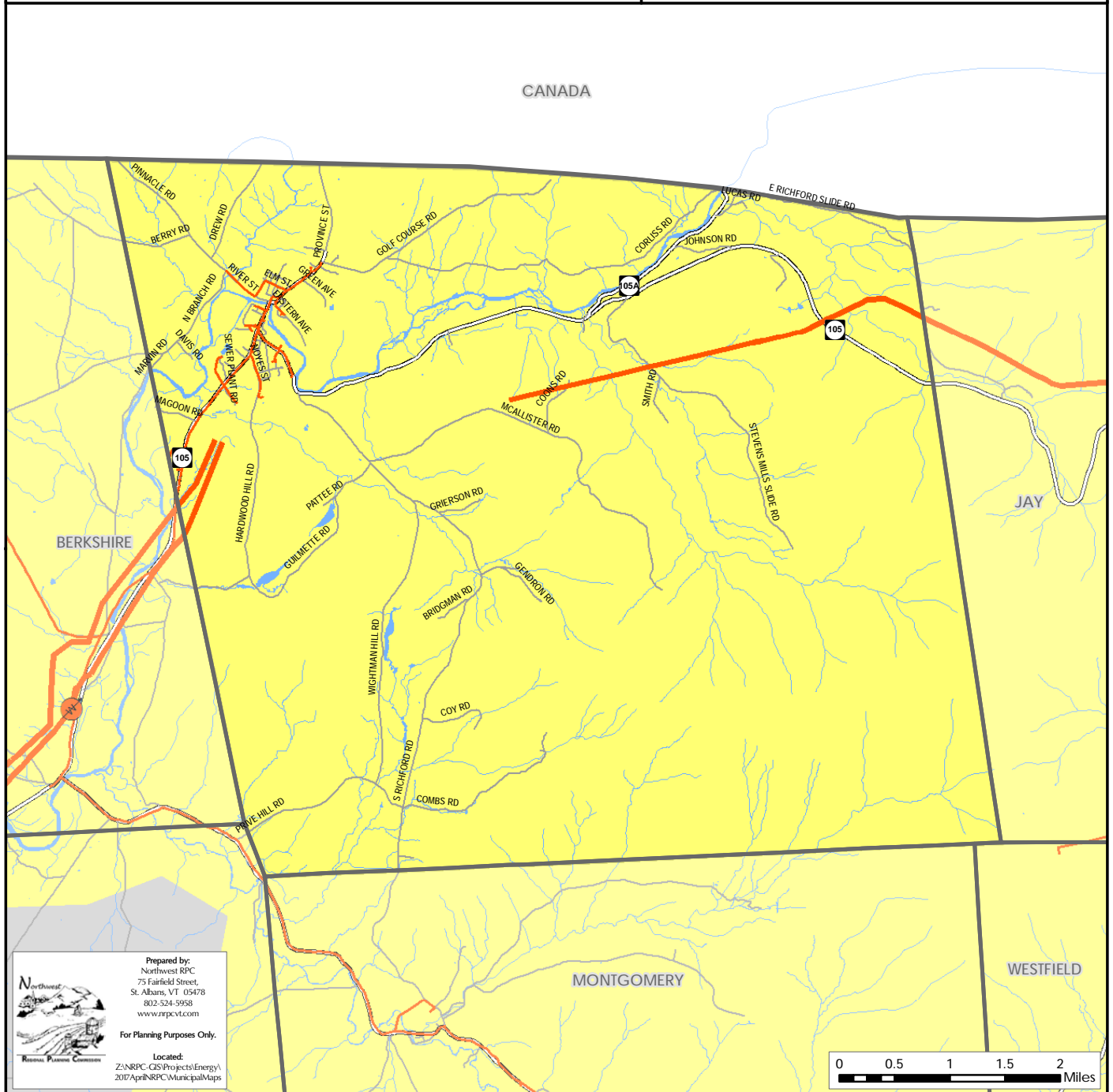


## Legend

### Utility Service Area Features

- Green Mountain Power
- Swanton Village Electric
- Vermont Electric Co-op
- Enosburg Falls Electric
- Substation
- 3 Phase Power Line
- Transmission Line

Sources: VCGI  
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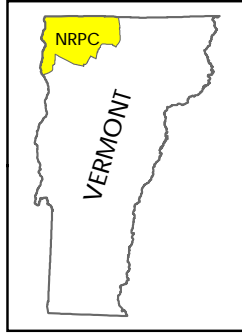
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# Transmission & 3 Phase Power Infrastructure

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Act 174

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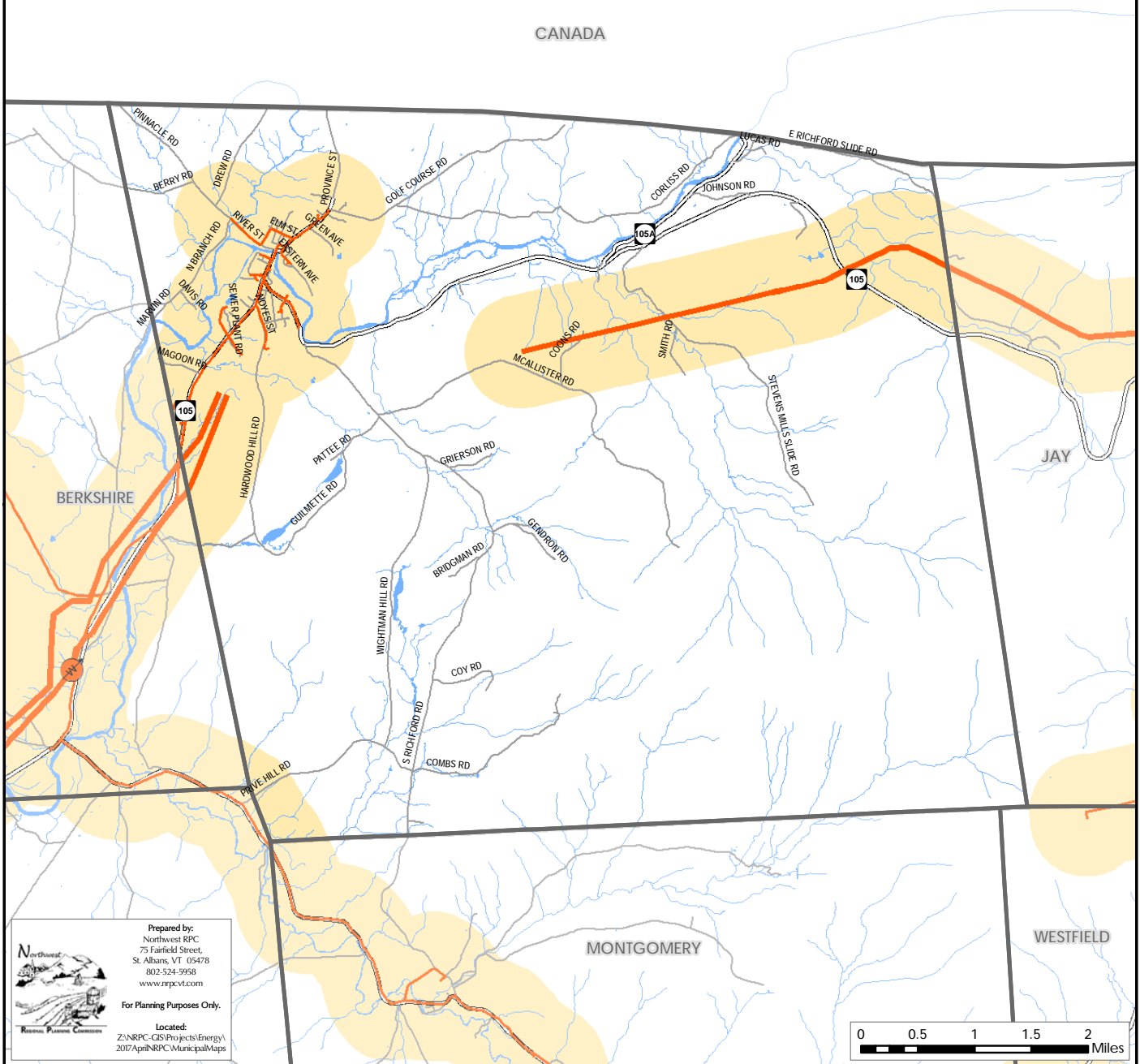
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## Legend

- Substation
- 3 Phase Power Line
- Transmission Line
- 1/2 Mile Buffer (3 Phase Power Line & Transmission Line)

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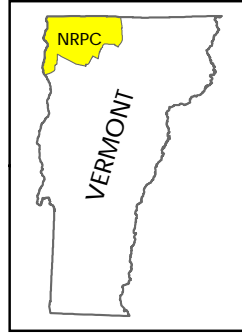




# Existing Generation Facilities

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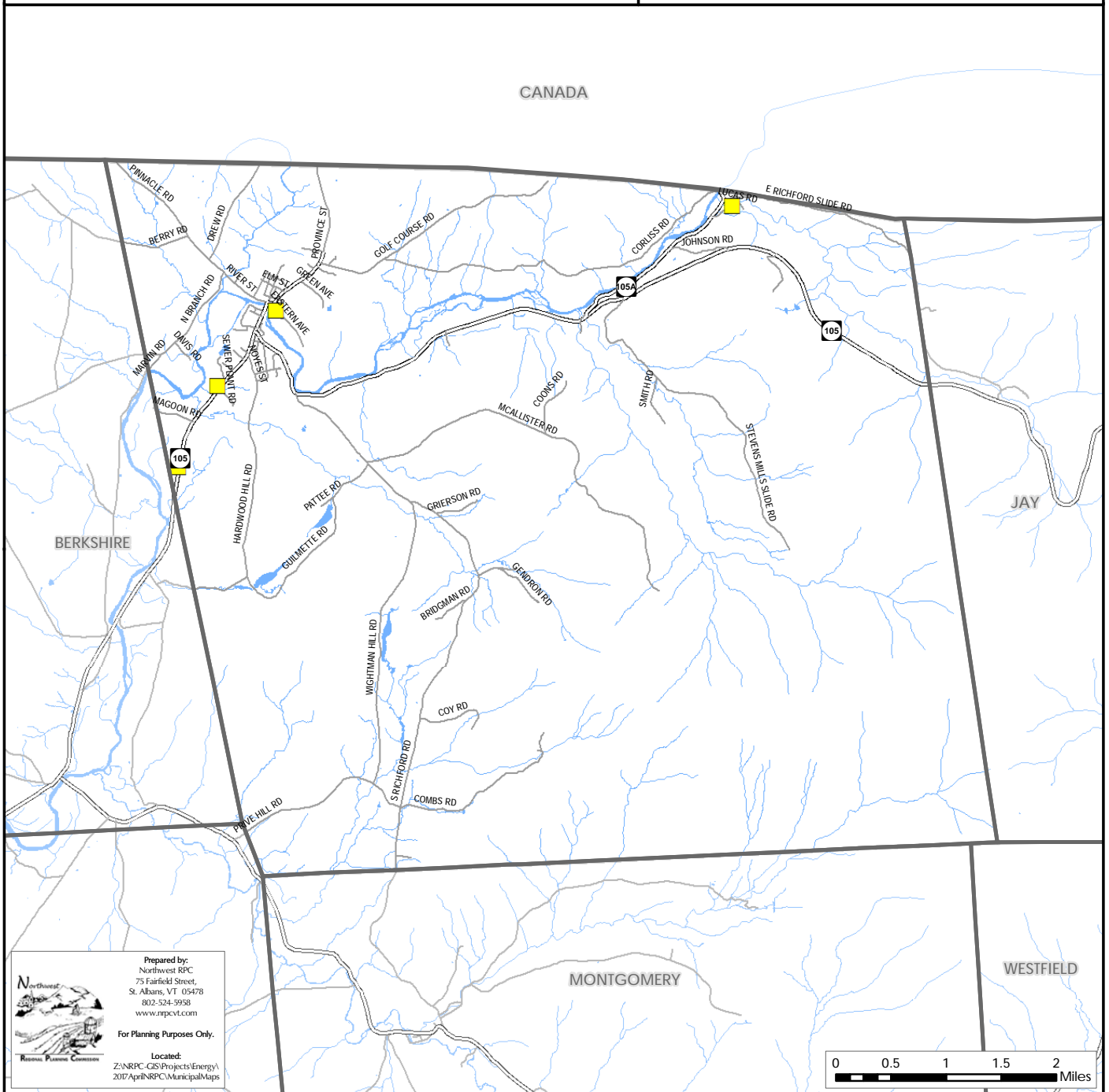
## Legend

- ★ Biomass Facility
- Hydro Facility
- Solar Facility
- ▲ Wind Facility

Note: Only generators 15kW are shown on the map. A full list of all generators is available.

Sources: VCGI

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# Hydro

Richford, Vermont  
Act 174

## The Energy Development Improvement Act of 2016

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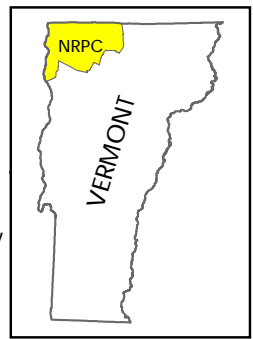


### Legend

- Substation
- 3 Phase Power Line
- Transmission Line
- Designated Outstanding Resource Water
- Known Constraint - Designated National Wild & Scenic River
- Possible Constraint - Stressed or Impaired Water
- Possible Constraint - RINAs

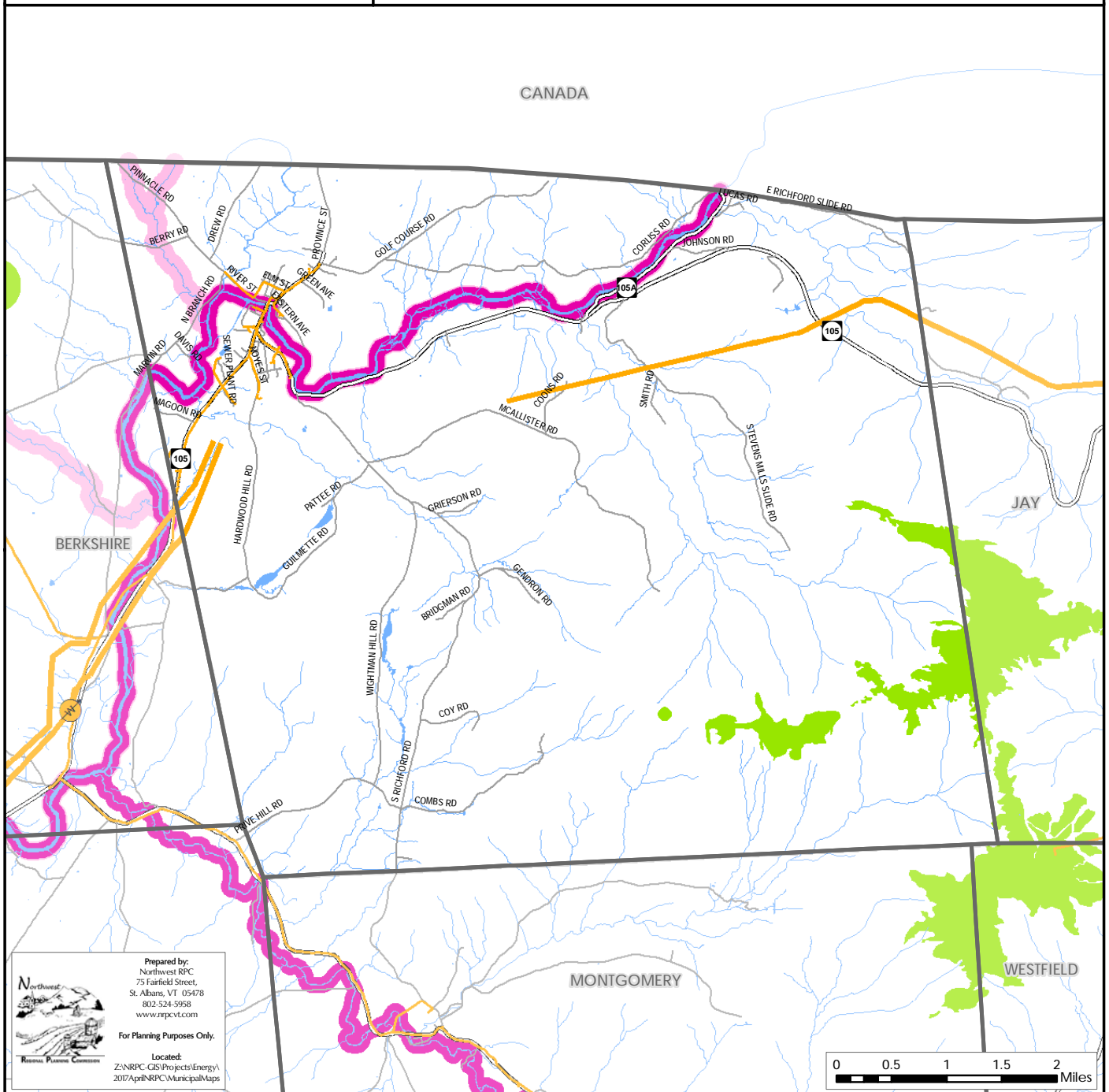
### Potential Hydroelectric Facility

- < 50 kW Capacity
  - > 50 kW Capacity
  - High Hazard with < 50 kW Capacity
  - High Hazard with > 50 kW Capacity
- Operating Hydroelectric Facility
- Dam not on National Wild and Scenic River
  - Dam on National Wild and Scenic River



Sources: VCGI

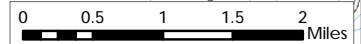
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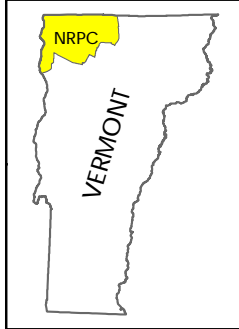


# Solar

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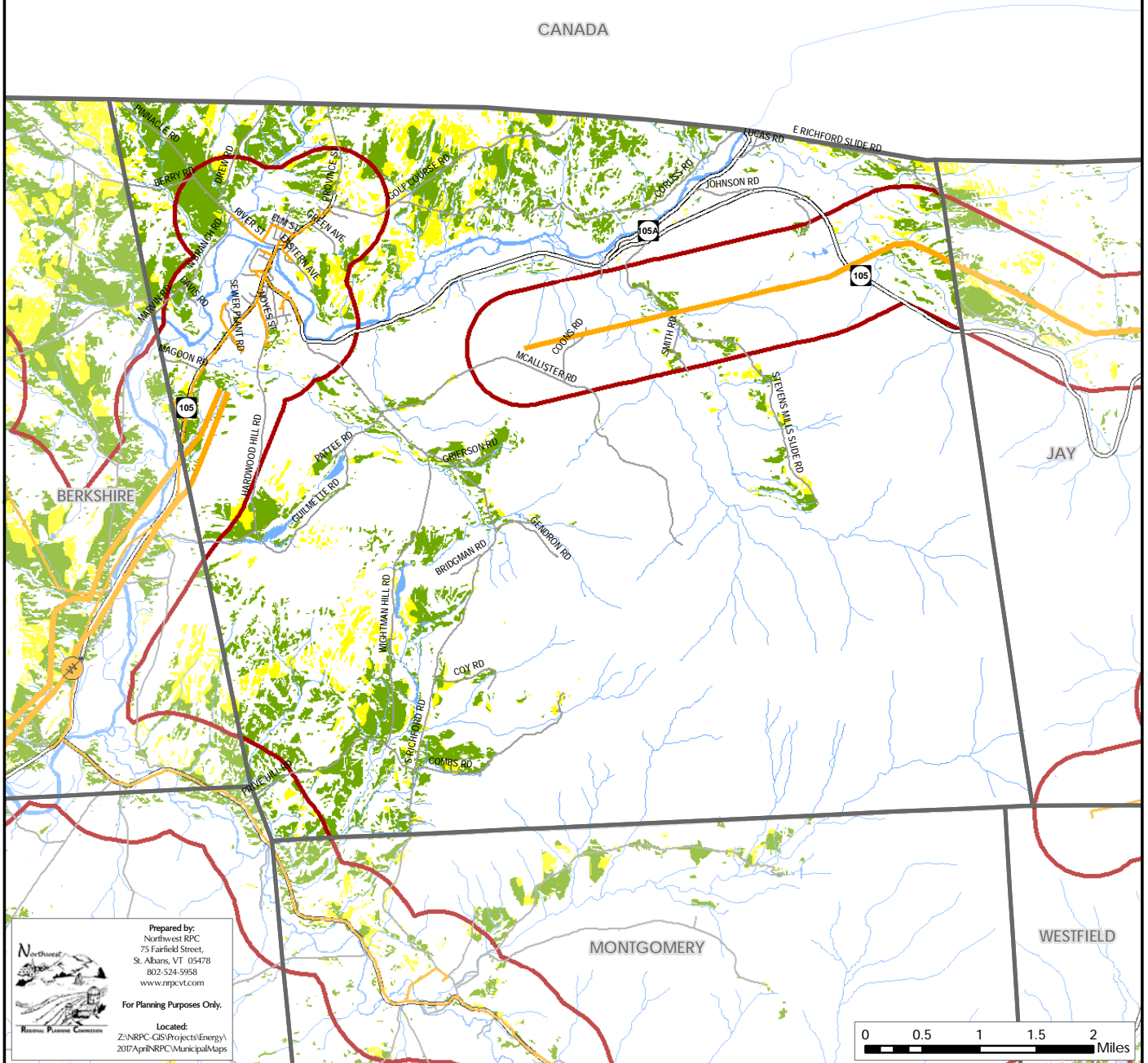
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## Legend

- Substation
- 3 Phase Power Line
- Transmission Line
- 1/2 Mile Buffer (3 Phase Power Line & Transmission Line)
- Prime Solar/No Known Constraints
- Base Solar/Possible Constraints

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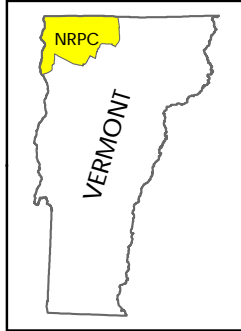
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# Wind

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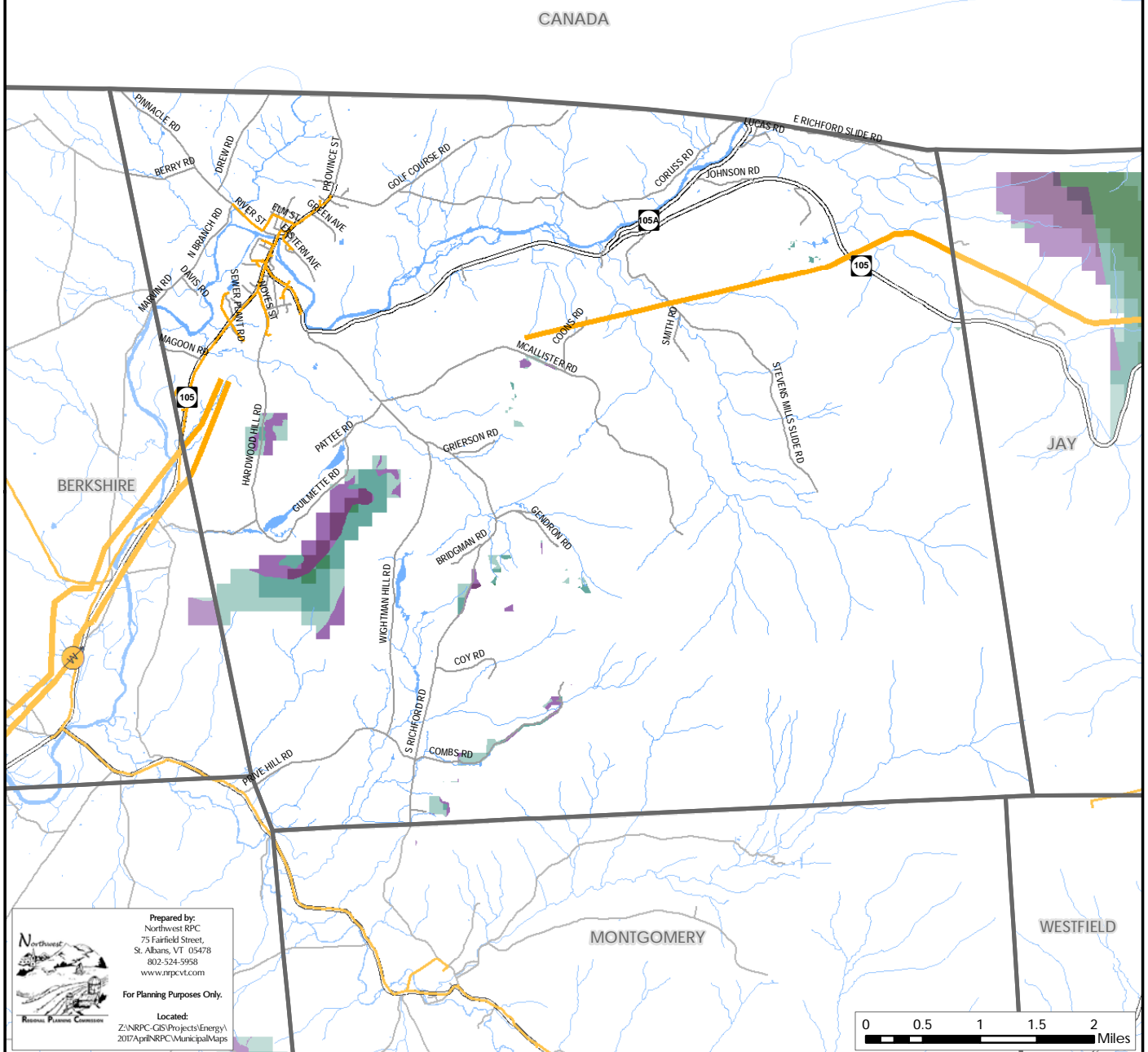
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### Legend

- Substation
- 3 Phase Power Line
- Transmission Line
- Prime Wind  
Areas of high wind potential and no known constraints.  
Darker areas have higher wind speeds.
- Base Wind  
Areas of high wind potential and a presence of possible constraints.  
Darker areas have higher wind speeds.

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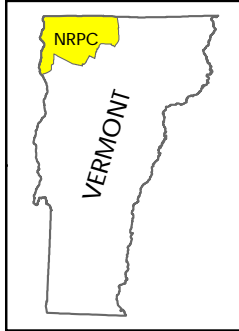
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# Woody Biomass

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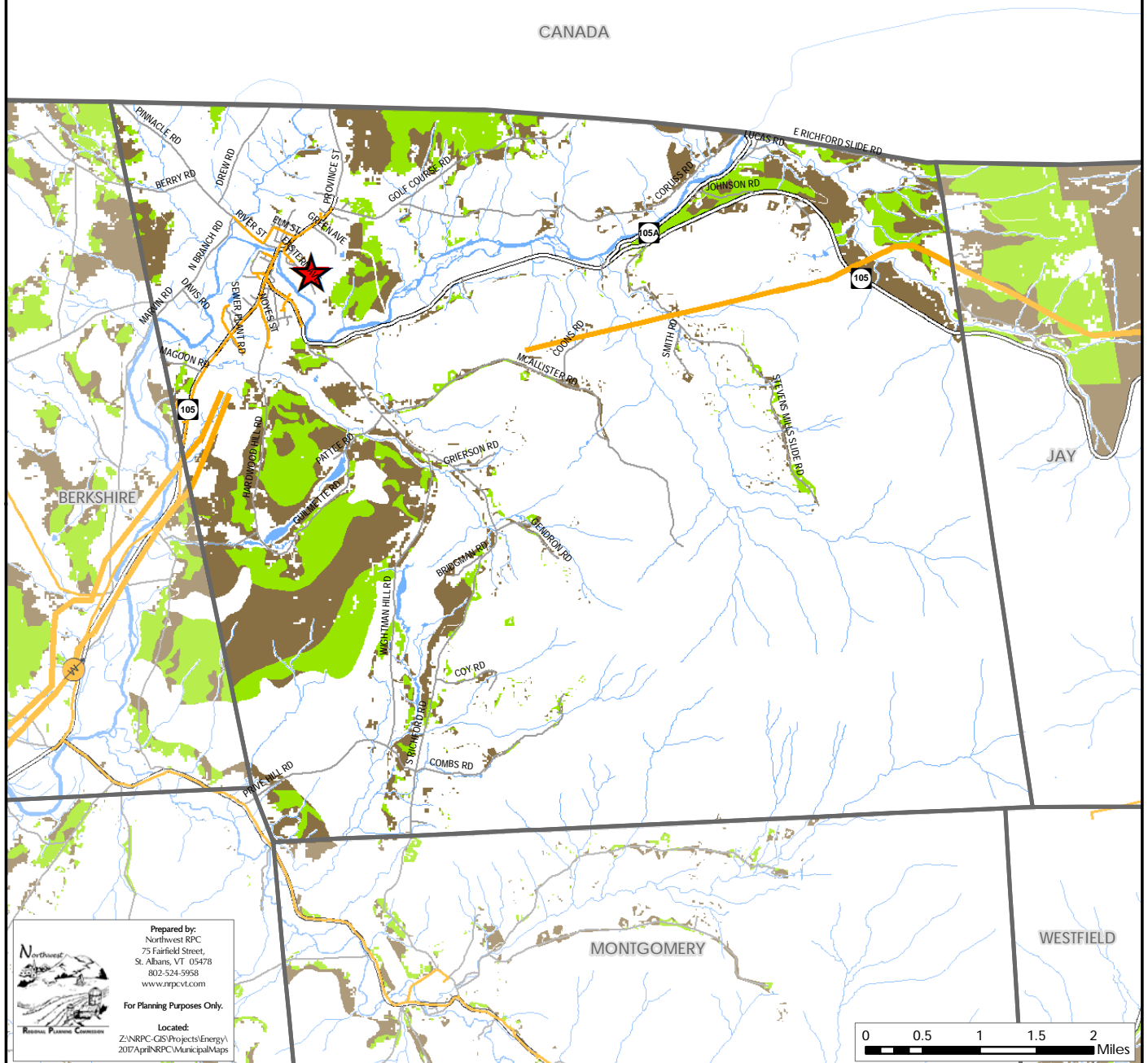
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## Legend

- Biomass System
- Cow Power
- Substation
- 3 Phase Power Line
- Transmission Line
- Prime Woody Biomass/No Known Constraints
- Base Woody Biomass/Possible Constraints

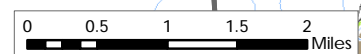
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## All Generators in Municipality

Category	Sub - Category	Organization Type	Address	City	CPG Number	Capacity kW
Solar	Ground-mounted PV: Fixed Rack	Residential	321 Prive Hill Road	Richford	1792	9.1
Solar	Ground-mounted PV: Fixed Rack	Residential	26 Lucas Road	Richford	7255	15
Solar	Ground-mounted PV: Pole	Residential	510 Stevens Mills Slide Rd	Richford	6605	4
Solar	Roof-Mounted PV	Residential	463 Hardwood Hill Rd	Richford	2822	4.9
Solar	Roof-Mounted PV	Residential	232 Hardwood Hill Rd	Richford	3030	4
Solar	Roof-Mounted PV	Institution	1 Corliss Heights	Richford	6009	50.7
Solar	Roof-Mounted PV	Business	328 S Main St	Richford	1136	28.8
Solar	Roof-Mounted PV	Business	1645 St. Albans Road	Richford	1146	15.7