

WORLDLY INSIGHT + LOCAL KNOW-HOW

# Our Shifting Energy + Climate Landscape: Opportunities for *Change*

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# ***VERMONT'S CLEAN ENERGY GOALS***

Vermont's GHG reduction goals ([10. V.S.A. §578](#)) call for a 50% reduction in emissions from the 1990 level of 8.1 million tons by 2028 and a 75% reduction by 2050.

In May 2015, Vermont became a signatory to the [Under2° MOU](#), committing to attempt to limit emissions to less than 80-95% below 1990 levels by 2050

[- to limit global warming to less than 2°C by the end of this century.](#)

The 2016 Vermont [Comprehensive Energy Plan](#) – 25% renewable by 2025 and 90% renewable by 2050

Source:  
<http://climatechange.vermont.gov/climate-pollution-goals>

## Under 2° MOU

***“This is the most ambitious commitment made to date from States and provinces worldwide. It could be a game changer.”***

Ban Ki-moon, UN Secretary General

Source: <http://under2mou.org/>

The Subnational Global Climate Leadership MOU is nicknamed the Under 2° MOU in reference to:

- The goal of limiting warming to below 2°C, which the Intergovernmental Panel on Climate Change (IPCC) scientists say is needed ... .
- The Under 2 Coalition’s shared goal of limiting greenhouse gas emissions to 2 tons per capita, or 80-95% below 1990 level by 2050.

**Energy:**

***“The Parties agree*** to share information and experience on redesign of the power supply and grid, technical solutions and advances in ***promoting large-scale switch to renewable energy and the integration of renewable energy sources ... .***

# Vermont 2016 Comprehensive Energy Plan

**“We have a moral and economic imperative to take substantial and consistent action to reduce greenhouse gas emissions to mitigate global climate Disruption”**

**Source:** Vermont 2016 Comprehensive Energy Plan Executive Summary at 4

***HOW ARE WE DOING***

***??***

# **U.S. EPA: Sources of Greenhouse Gas Emissions**

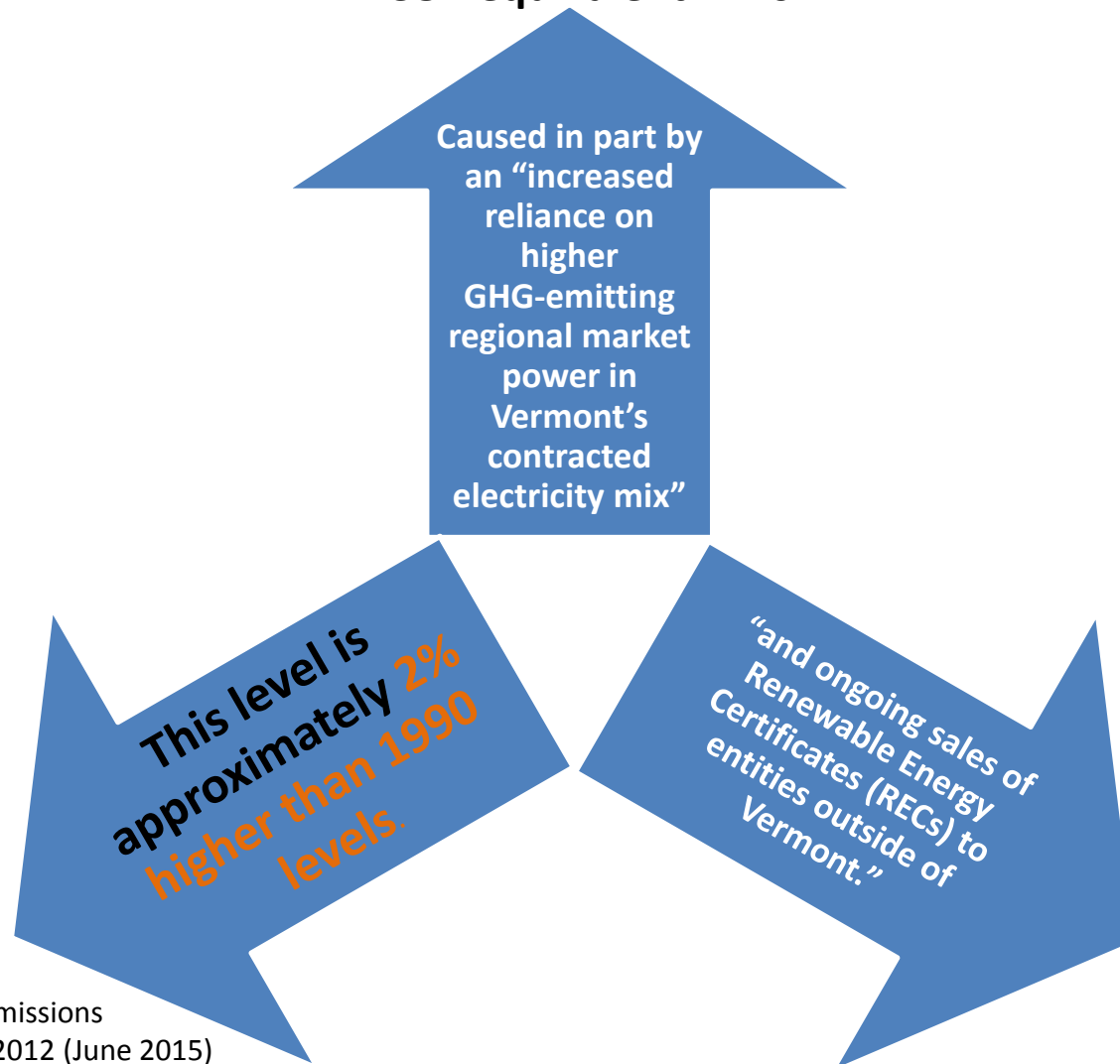
## **Emissions and Trends:**

**“In 2014, the electricity sector was the largest source of U.S. greenhouse gas emissions, accounting for about 30 percent of the U.S. total. Greenhouse gas emissions from electricity have increased by about 12 percent since 1990 as electricity demand has grown and fossil fuels have remained the dominant source for generation.”**

**Source:** <https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions#electricity>

# VERMONT'S CO2 EMISSIONS HAVE INCREASED ABOVE 1990 LEVELS

from 8.11 million metric tons CO2 equivalent in 2011 to 8.27 million metric tons  
CO2 equivalent in 2012



**Source:** Vermont GHG Emissions  
Inventory Update 1999-2012 (June 2015)



**Vermont had 18 federally-declared disasters in the past 10 years, up over 50% from the previous 10 years**

### **Tropical Storm Irene**

“2012 was the warmest year on record for Vermont and the continental United States.”



**Source:** Vermont Climate Change Adaptation Program -  
[http://uvaw.uvlsrpc.org/files/9014/5954/3461/Ulmer\\_Pres\\_UVAW\\_Forum\\_03302016.pdf](http://uvaw.uvlsrpc.org/files/9014/5954/3461/Ulmer_Pres_UVAW_Forum_03302016.pdf).

***“Grasping the extent of the losses  
in human terms is difficult.”***

**“Thirty-five hundred homes were damaged along with more than 500 miles of state roads and 200 bridges. Many farms and businesses were damaged and lost income from suspended operations. The staggering costs to federal and state taxpayers climbed above \$800 million.”**



**Source:** <http://climatechange.vermont.gov/our-changing-climate/what-it-means/flooding>

# VERMONT CLIMATE CHANGE ADAPTATION PROGRAM

## Key Message #1:

**“Climate Change is already happening, and is expected to continue”**

**Vermont Temperature Increase  
since 1965:**

**+ 2°F in summer**

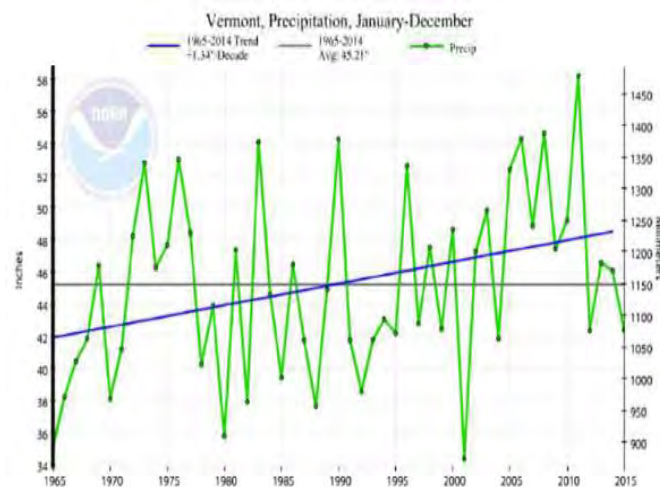
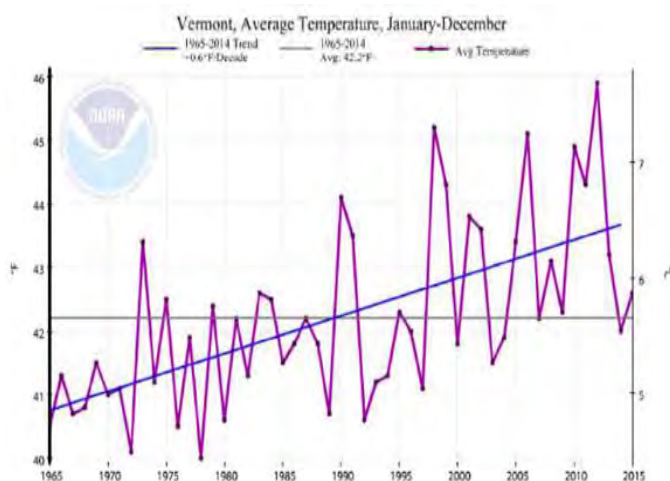
**+ 4°F in winter**

**4th largest rate of warming in U.S.**

**Vermont Precipitation Increase  
since 1965:**

**+ 7” rain per year**

**4th largest increase in precipitation  
in the U.S.**



**Source: Vermont Climate Change Adaptation Program -**

[http://uvaw.uvlsrpc.org/files/9014/5954/3461/Ulmer\\_Pres\\_UVAW\\_Forum\\_03302016.pdf](http://uvaw.uvlsrpc.org/files/9014/5954/3461/Ulmer_Pres_UVAW_Forum_03302016.pdf). Reference materials used - National Oceanic and Atmospheric Administration, *Climate at a Glance, Time Series data*

**OUR POWER GRID IS BECOMING MORE  
RELIANT ON FOSSIL FUELS**

# **The U.S. POWER GRID IS OVERLY DEPENDANT ON FOSSIL FUELS**

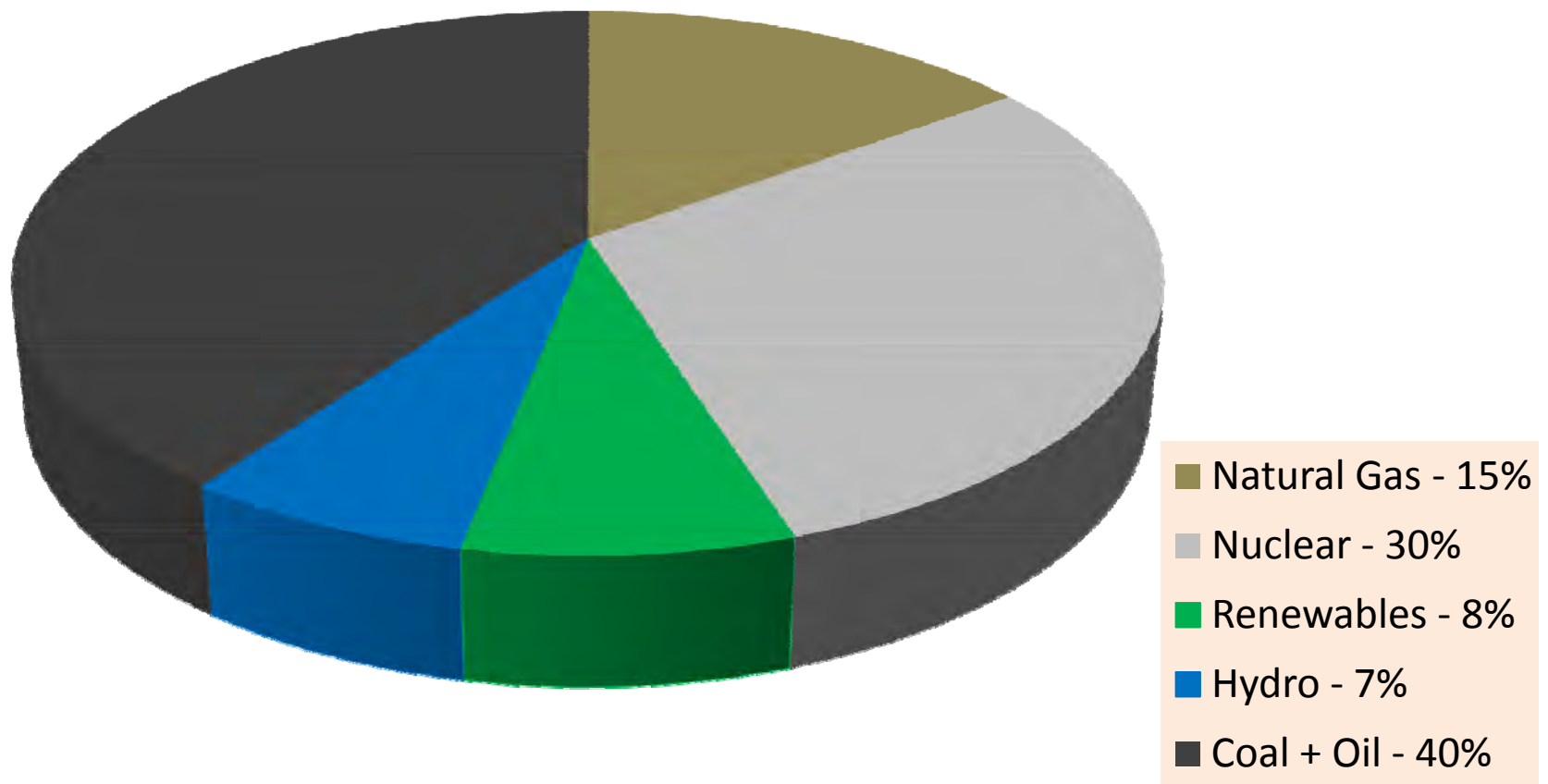
- **The primary source of greenhouse gas emissions in the U.S. is electric generation burning fossil fuels**
- **Approximately 67% of U.S. electricity comes from burning fossil fuels**
- **CO2 emissions in the U.S. increased about 9% between 1990 and 2014**

# THE NEW ENGLAND POWER GRID IS OVERLY DEPENDANT ON FOSSIL FUELS

**“About 80% of new capacity built in the NE region since 1997 runs on natural gas”**

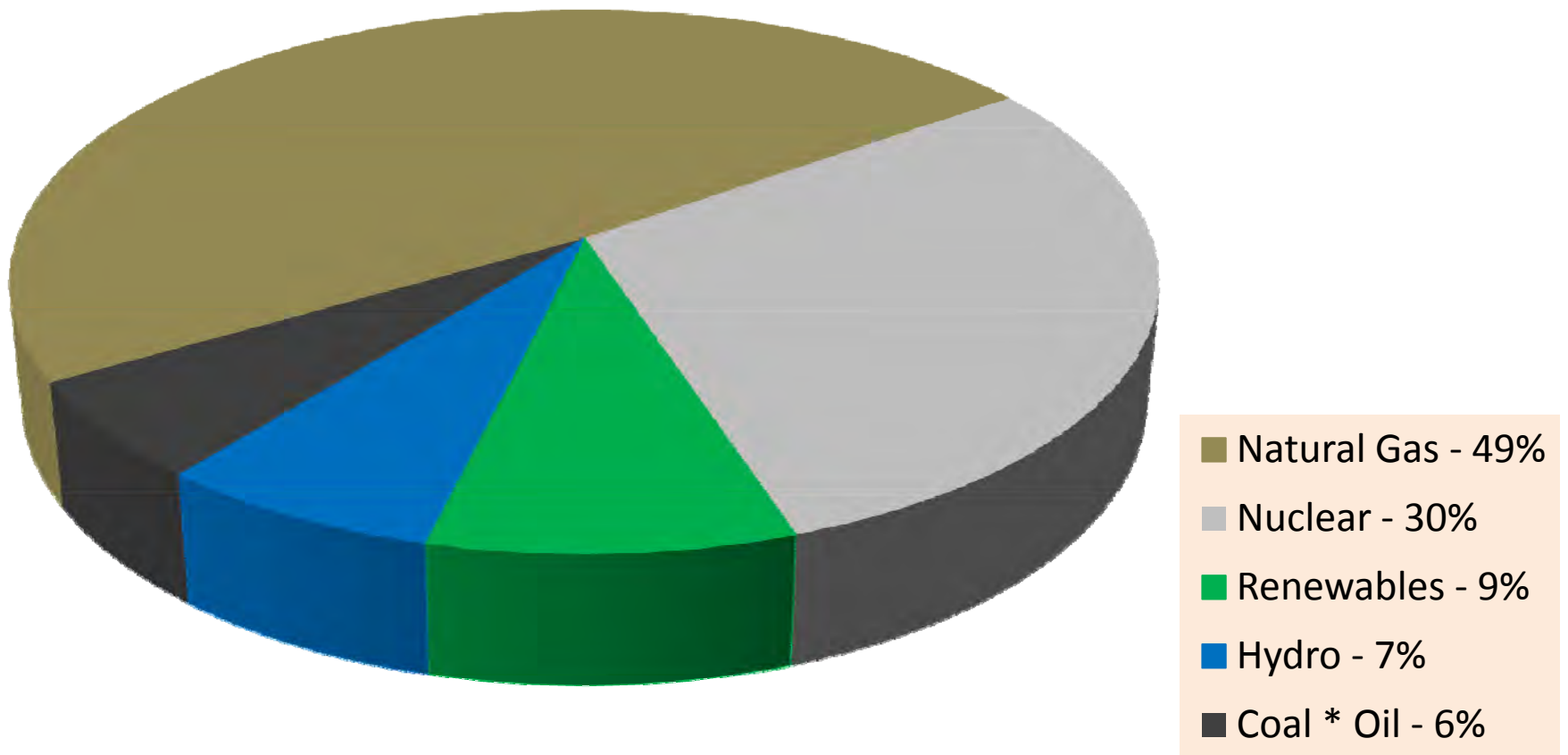
**“Gas-fired units remain the top choice for developers, representing more than 60%—about 8,200 megawatts (MW)—of all new generation currently proposed.”**

# New England Power Mix 2000



**Source:** ISO New England 2016 Regional Energy Outlook at 8

# New England Power Mix 2015



**Source:** ISO New England 2016 Regional Energy Outlook at 8



# Looking Ahead - % of FOSSIL FUELS will INCREASE RENEWABLES will DECREASE ??

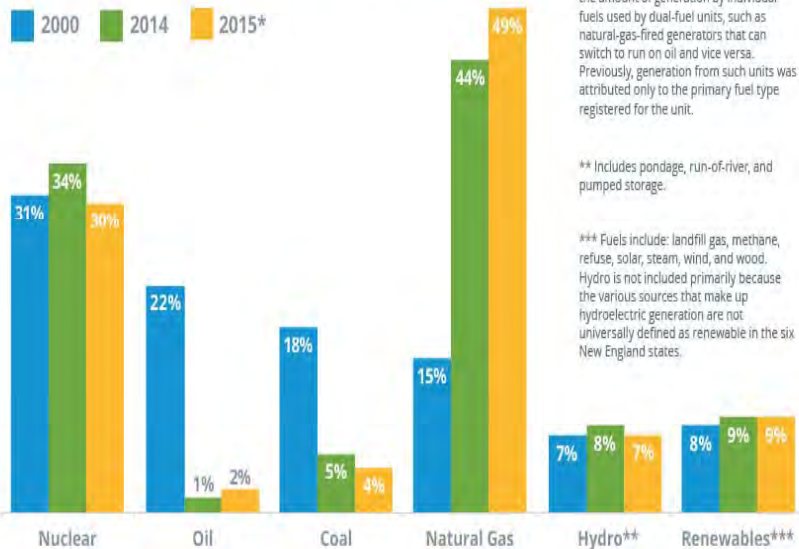
**2015**

Natural Gas	49%
Oil	2%
Renewables	9%

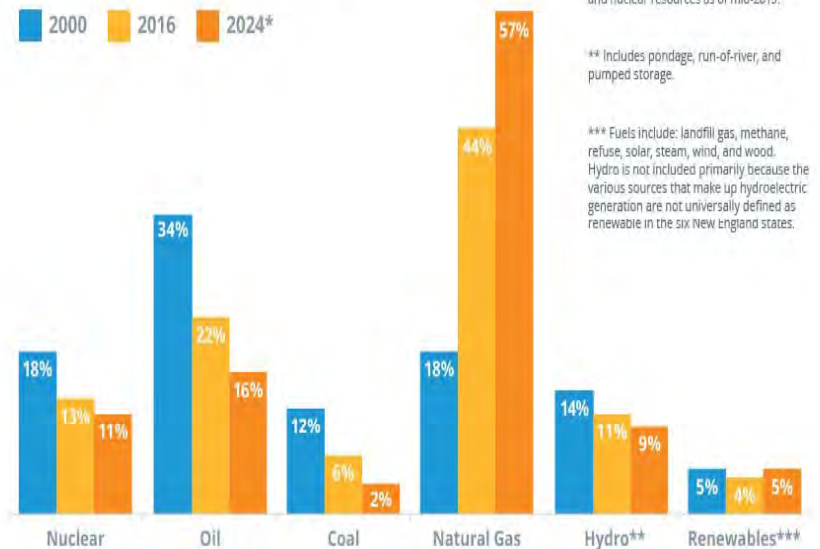
**2024**

Natural Gas	57%
Oil	16%
Renewables	5%

Percent of Total Electric Energy Production by Fuel Type



Percent of Total System Capacity by Fuel Type



Source: ISO New England 2016 Energy Outlook

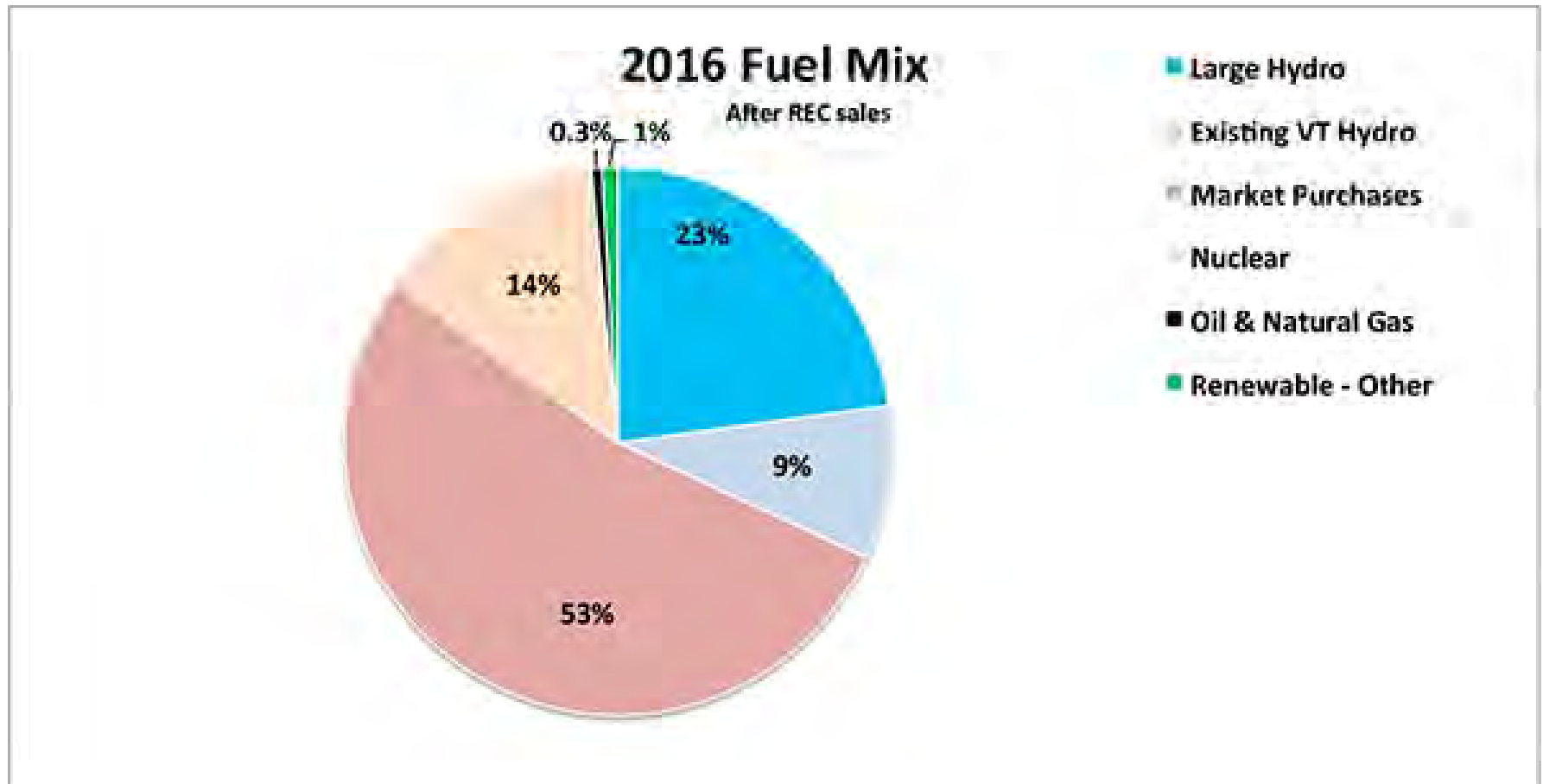
# Vermont's Reliance on the New England Grid Means Reliance on Natural Gas

**U.S. Energy Information Administration:**

**“Vermont has little in-state generation from natural gas, but more of the state’s electricity is coming from the New England grid, which is increasingly reliant on natural gas.”**

**Source:** EIA - Independent Statistics and Analysis\_cfm.mht (citing Institute for Energy Research (January 2016); Vermont Department of Public Service, Vermont Electric Utilities, accessed May 25, 2016)

# GMP Fuel Mix

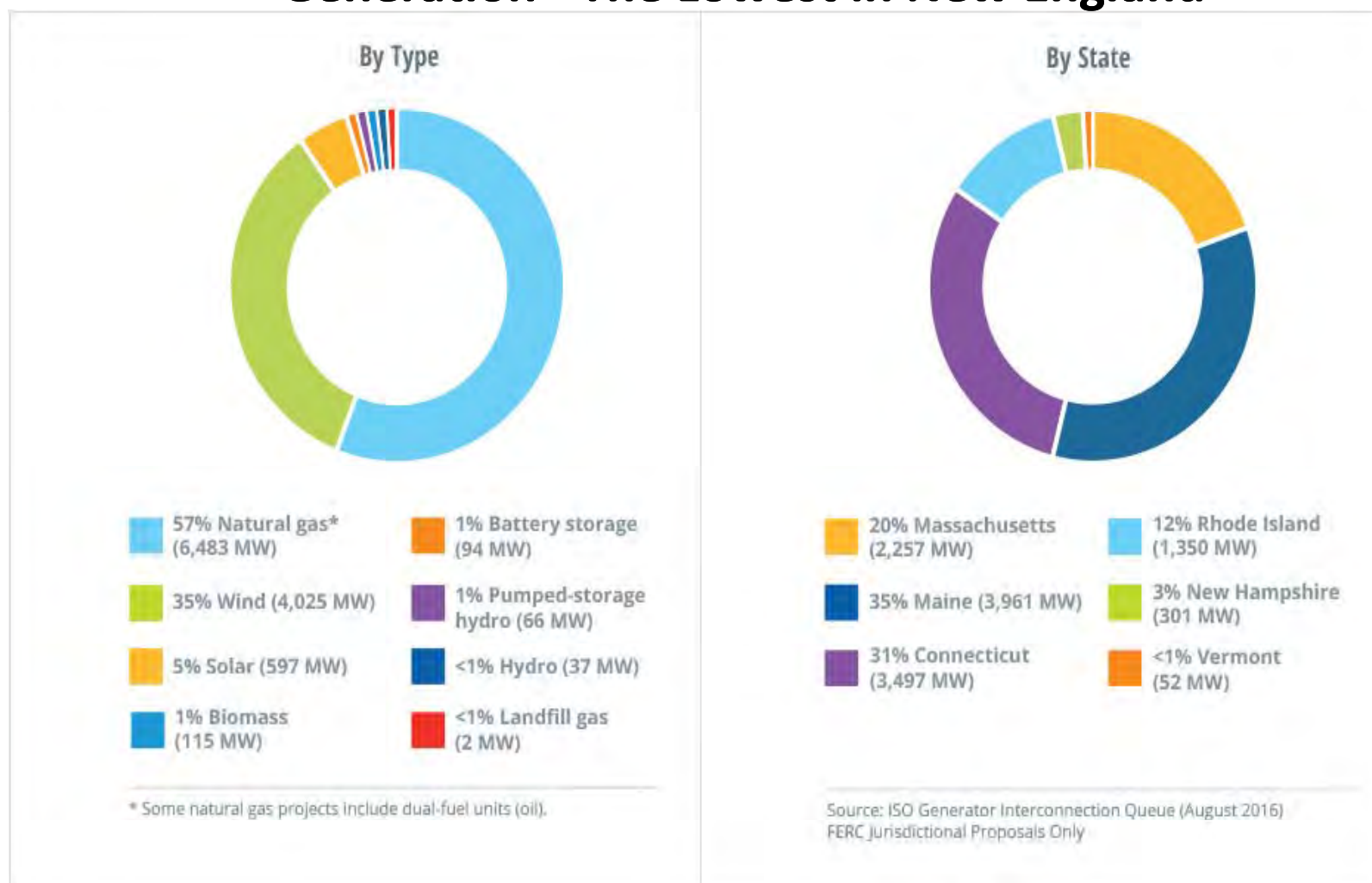


**Source:** GMP Website: <http://www.greenmountainpower.com/fuel-mix/>

# **VT Attorney/DPS Guidance on REC Sales**

- **“ Renewable energy certificates or renewable energy credits (“RECs”) are what make solar a “green” or renewable energy resource—they are certificates that track the source of the renewable energy and are the legal attribute of renewable energy.”**
- **“ The system of tracking attributes via RECs is the only legal way of characterizing the “renewability” of different sources of electricity.”**
- **“Electricity that has its RECs stripped away and sold is called “null electricity.” Null electricity is not renewable and is simply unspecified and undifferentiated power from the electric grid.”**

## ISO Generator Interconnection Queue as of August 2016: Vermont Represents Less Than 1% on New Generation - The Lowest in New England



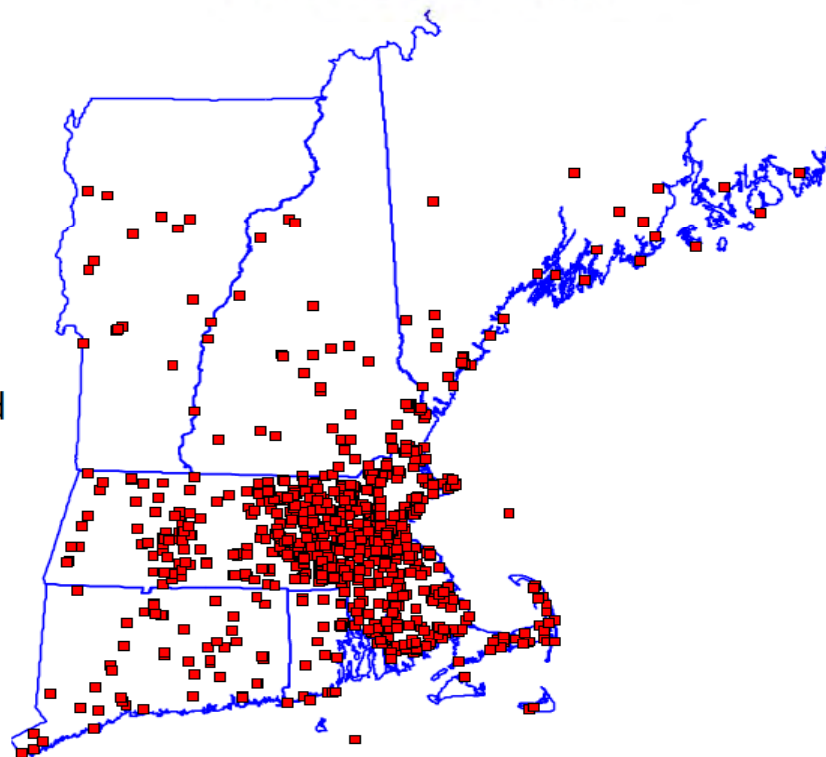
Source: <https://www.iso-ne.com/about/key-stats/resource-mix>

# VERMONT'S SHARE OF SOLAR PV: ROOM TO GROW

## Historical PV Profile Development and Analysis

- Hourly state PV profiles developed for four years (2012-2015) using production data using Yaskawa-Solectria Solar's web-based monitoring system, SolrenView\*
  - Represents PV generation at the inverter or at the revenue-grade meter
- A total of more than 1,200 individual sites representing more than 125 MW<sub>ac</sub> in nameplate capacity were used
  - Total nameplate capacity represents approximately 10% of installed PV capacity in the region as of 12/31/15
  - The site distribution throughout the region is sufficient for estimating profiles of all PV installations in New England
  - Site locations depicted on adjacent map

*Yaskawa-Solectria Sites*



\*Source: <http://www.solrenview.com/>





# VERMONT IS FORECASTED TO HOST LESS THAN 10% OF THE REGION'S SOLAR

## Final 2016 PV Forecast

*Nameplate, MW<sub>ac</sub>*

**Note:** Values in **red boldface** have changed relative to the draft forecast

States	Annual Total MW (AC nameplate rating)											Totals
	Thru 2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
CT	188.0	85.5	104.5	81.0	81.0	81.0	55.8	54.3	45.0	45.0	45.0	866.1
MA	947.1	<b>294.4</b>	122.7	<b>69.7</b>	<b>38.7</b>	<b>38.7</b>	<b>38.7</b>	<b>38.7</b>	<b>38.7</b>	<b>38.7</b>	<b>38.7</b>	<b>1,705.0</b>
ME	15.3	4.7	4.7	4.4	4.4	4.4	4.2	3.9	3.9	3.9	3.9	57.9
NH	26.4	13.3	7.6	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	79.3
RI	23.6	21.6	38.7	36.0	36.0	25.9	9.1	6.6	6.6	6.6	6.6	217.2
VT	124.6	30.2	<b>23.8</b>	22.5	22.5	22.5	21.3	20.0	20.0	20.0	20.0	347.3
Regional - Annual (MW)	1325.0	<b>449.6</b>	<b>301.9</b>	<b>217.7</b>	<b>186.7</b>	<b>176.5</b>	<b>133.2</b>	<b>127.5</b>	<b>118.2</b>	<b>118.2</b>	<b>118.2</b>	<b>3,272.8</b>
Regional - Cumulative (MW)	1325.0	<b>1774.7</b>	<b>2076.5</b>	<b>2294.2</b>	<b>2480.9</b>	<b>2657.4</b>	<b>2790.6</b>	<b>2918.1</b>	<b>3036.3</b>	<b>3154.6</b>	<b>3272.8</b>	<b>3,272.8</b>

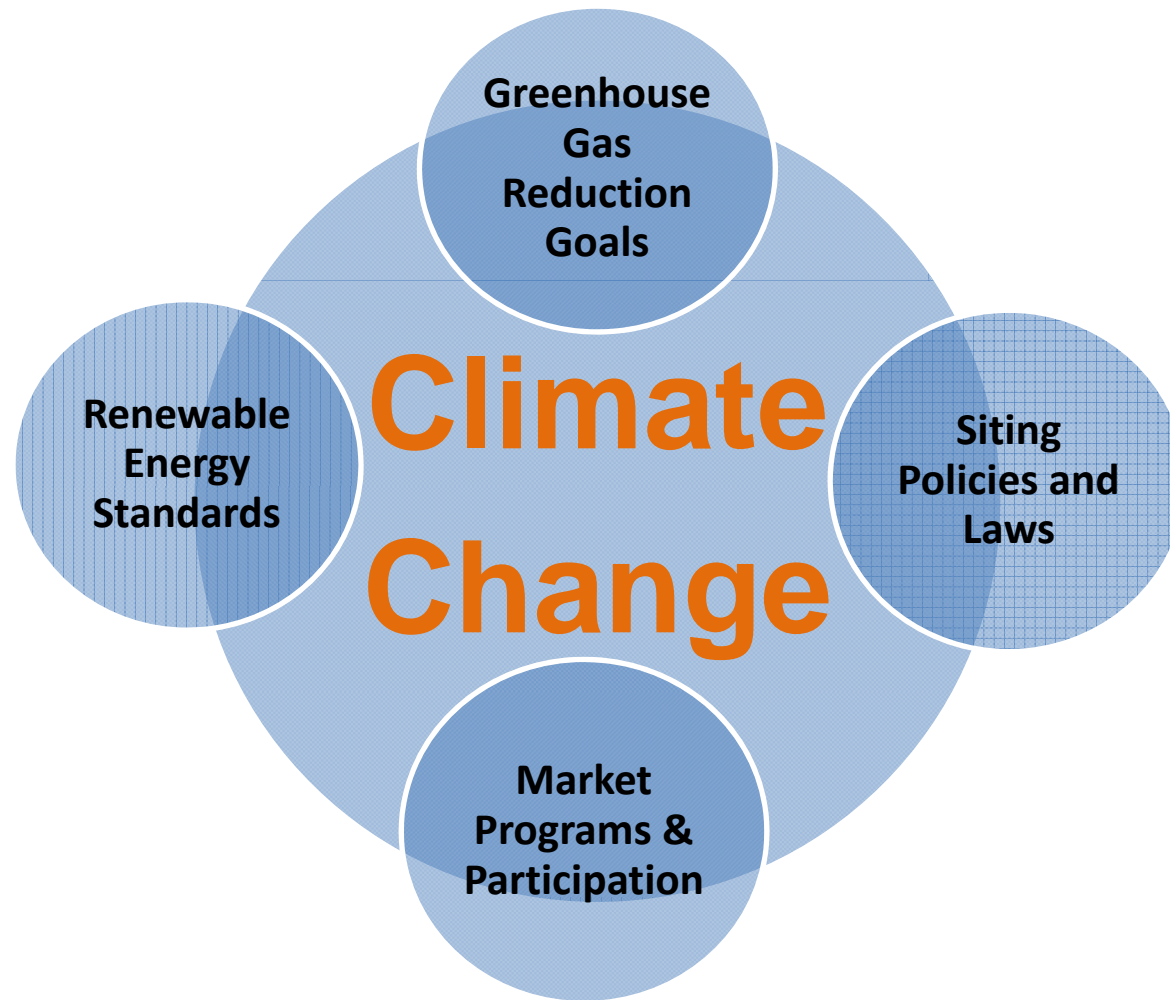
**Notes:**

- (1) Forecast values include FCM Resources, non-FCM Energy Only Generators, and behind-the-meter PV resources
- (2) The forecast reflects discount factors to account for uncertainty in meeting state policy goals
- (3) All values represent end-of-year installed capacities



Source: ISO New England Final 2016 PV Forecast , April 15, 2016

# Opportunities for Change in the Energy Landscape





# **OPPORTUNITIES to CHANGE THE VERMONT LANDSCAPE**

- **Vermont Supreme Court Decision *In re Rutland Renewable Energy, LLC*, 2016 VT 50**
- **The Vermont Renewable Energy Standard**
- **Act 174:**
- **PURPA**
- **DG**

**RECENT DECISIONS CLARIFY  
RENEWABLE ENERGY SITING  
AN OPPORTUNITY**

# ***In re Rutland Renewable Energy, LLC***

## **2016 VT 50**

- **Court Refused to Apply Rutland Town Solar Siting Setback Standards to a 2.3 MW Solar Facility**
- **Clarified Existing Law under 30 V.S.A. §§ 248(b)(1) & (b)(5)**

### **Section 248(b)(1):**

energy facilities “will not unduly interfere with the orderly development of the region with due consideration having been given to the recommendations of the municipal and regional planning commissions ... [and] the recommendations of the municipal legislative bodies.”

- **Held that “the statutory requirement [of Section 248(b)(1)] relates to the orderly development of the region, not to a particular municipality within the region.”**
- **Unlike Act 250, “Section 248(b)(1) requires ‘due consideration’ of the land conservation measures of the municipal plans, rather than a finding of conformance as requirement by Criterion 10.” *Petition of Vt. Elec. Power Co.*, Docket No. 6860, Order of 1/28/2005 at 202.**

# ***In re Rutland Renewable Energy, LLC***

## **cont'd**

### **Section 248(b)(5)-aesthetics criterion:**

**“The Town and neighbors argue that the solar siting standards are “clear written community standards” by any definition of those terms. We might adopt that view if we were dealing with Act 250, where state and local regulatory review coexist. Here, we are dealing with a situation where, under existing law, municipalities have a different role. *The effect of the solar siting standards under the theory of the Town and neighbors is to enable the Town to control solar generation siting through the Quechee test. We agree with the Board that a modification of the Quechee test is necessary to give the Board the necessary regulatory power.*”**

- **The PSB and Court , relied on 24 V.S.A. § 4413(b), which provides that zoning bylaws “shall not regulate public utility power generating plants and transmission facilities regulated under 30 V.S.A. § 248.”**
- **“held that the setback requirements were de facto zoning requirements.”**

# **Act No. 174 - The Energy Development Improvement Act**

# Act No. 174 – Enhanced Energy Planning

- o Modifies the “Energy Element” in the Vermont Planning and Development Act (Title 24 Chapter 117): Plans to identify “potential areas” for siting renewable energy and areas that are “unsuitable”
- o DPS to develop guidelines and decide in RPC Plans are “compliant” - If RPC Plan is compliant, municipal plan can receive determination from RPC
- o Compliant Enhanced Energy Plans would be entitled to “substantial deference” in a Section 248 siting proceeding. § 11(codified at 30 V.S.A. § 248(b)(1)(C (C).

**“Substantial Deference” means that a land conservation measure or specific policy shall be applied in accordance with its terms unless there is a *clear and convincing demonstration that other factors affecting the general good of the State outweigh the application of the measure or policy.***

**Appeals of compliance determinations go to the Natural Resources Board, not the PSB – de novo hearing contested case under the APA.**

# **Enhanced Energy Determination Standards of Act 174**

**Section 6 of Act 174 - regional and municipal plans must be consistent with the following state goals and policies:**

- GHG reduction goals under 10 V.S.A. § 578(a) (50% from 1990 levels by 2028; 75% by 2050)**
- The 25 x 25 goal for renewable energy under 10 V.S.A. § 580 (25% in-state renewables supply for all energy uses by 2025)**
- Building efficiency goals under 10 V.S.A. § 581 (25% of homes – or 80,000 units – made efficient by 2020)**
- Siting and development of renewable energy resources contained in the State energy plans adopted pursuant to 30 V.S.A. §§ 202 and 202b**
- The distributed renewable generation and energy transformation categories of resources to meet the requirements of the Renewable Energy Standard under 30 V.S.A. §§ 8004 and 8005**

## **Enhanced Energy Determination Standards, cont'd.**

**Per Section 9 of Act No. 174, in addition to the requirements of Sec. 6 of Act, the standards developed by DPS section shall address the following elements in a manner consistent with the State energy plans adopted pursuant to 30 V.S.A. §§ 202 and 202b:**

- (1) analysis of total current energy use across transportation, heating, and electric sectors; No. (2) identification and mapping of existing electric generation and renewable resources;**
- (3) establishment of 2025, 2035, and 2050 targets for energy conservation, efficiency, fuel-switching, and use of renewable energy for transportation, heating, and electricity;**
- (4) analysis of amount of thermal-sector conservation, efficiency, and conversion to alternative heating fuels needed to achieve these targets;**
- (5) analysis of transportation system changes and land use strategies needed to achieve these targets;**
- (6) analysis of electric-sector conservation and efficiency needed to achieve these targets;**
- (7) pathways and recommended actions to achieve these targets, informed by this analysis;**
- (8) identification of potential areas for the development and siting of renewable energy resources and of the potential electric generation from such resources in the identified areas, taking into account factors including resource availability, environmental constraints, and the location and capacity of electric grid infrastructure; and**
- (9) identification of areas, if any, that are unsuitable for siting those resources or particular categories or sizes of those resources.**



# **NEXT STEPS -DPS Determination Standards for Energy Compliance**

- **On September 26, 2016 the DPS issued draft determination standards for comment**
- **DPS Seeking feedback until October 20, 2016**
- **Final standards expected November 1, 2016**
- **The DPS-Regional Commission Mapping is that Started Last Year is Now Being Tied to the Act No. 74 Planning Effort –**
- **It has the Potential to Offer Significant Guidance or to Remove Substantial Land Area from Renewable Land Development**

Source:

[http://publicservice.vermont.gov/sites/dps/files/documents/Pubs\\_Plans\\_Reports/Act\\_174/Draft%20Determination%20Standards.pdf](http://publicservice.vermont.gov/sites/dps/files/documents/Pubs_Plans_Reports/Act_174/Draft%20Determination%20Standards.pdf)



## **REGIONAL ENERGY IMPLEMENTATION PLAN (DRAFT 9/7/16)**

### **PRE-ACT NO. 174:**

#### **“DPS/RPC Project**

**In 2015, the Vermont Department of Public Service (DPS), engaged three of Vermont’s eleven Regional Planning Commissions (Bennington Regional Planning Commission, Northwest Regional Planning Commission and the Two Rivers-Ottawaquechee Regional Commission) in a pilot project to advance a total energy approach to regional plans consistent with the goals and policies contained in the CEP.”**

**“Mapping Energy Generation Resources and Constraints – Energy generated by renewable resources is the cornerstone of the CEP. In order to achieve 90% renewable by 2050, we will need to identify where the potential for renewable energy generation exists and balance the need for increased capacity with Vermont’s landscape and the desires of our communities.”**

**Source:** Two Rivers-Ottawaquechee Regional commission Regional Energy Implementation Plan Draft 9/7/16 at 6, 12.

# ***“Map Constraints”***

## **Eliminate 97% of the TRORC Land Area for Solar**

“Solar is the most viable source of renewable energy generation in the TRORC region due to the nature of our topography and land cover. **Based on GIS mapping analysis**, there are roughly 27,000 acres of land in our region that have the potential of producing solar energy, **which is about 3% of the region’s total land area.**”

**Source:** Two Rivers Ottawaquechee Regional Energy Implementation Plan (9/1/16 Draft) at 36-37, 48.

Draft 9/7/16

### **How to Effectively Plan for Renewable Energy Generation Facilities**

#### **Consider CEP Generation Targets**

The process should begin with an understanding of how your community can work toward the goals of the CEP. Through modeling and data analysis, TRORC has developed renewable energy capacity targets that can be used to reach the goals of the CEP (Appendix C). Communities should review this information as a starting point to determine how much renewable energy generation should occur in their community to achieve the 90/50 goal.

It is important to understand that these targets are not exact. The LEAP model is based primarily on demand. If population is incorporated into the consideration, the targets will increase. The recommended approach is to utilize a target range for your community.

#### **Utilize Available Map Data**

TRORC has generated map data that indicates where energy generation potential exists for solar, wind and hydro<sup>54</sup>. This data should be the starting point for the identification of where renewable energy generation should be located within your community.

Communities should review the Level 1 and 2 constraints (see sidebar). If there are other constraints that your community feels should be included, or should be reclassified (for example, some communities may not view deeryards as a Level 2 constraint), TRORC may be able to assist with map revisions provided there is adequate funding available for the service.<sup>55</sup>

#### **Identify Preferred Locations**

The maps included as part of this guide were developed at the regional scale. As such, they do not include preferred locations. Communities should use their local knowledge to

#### **Map Constraints (Level 1 & 2)**

This data has been designed to exclude certain areas based on specific constraints (referred to as Level 1 constraints). Level one constraints include floodways and river corridors, federal wilderness area, rare and irreplaceable natural areas, vernal pools and class one and two wetlands. Any area with potential for energy generation that has a level one constraint, has been removed from the map layer.

Other areas that have generation potential, but require consideration in relation to their natural resources, are identified as Level 2 constraints. These areas include agricultural and hydric soils, conserved lands, special flood hazard areas, deer wintering areas and class 3 wetlands.

Areas with level two constraints appear on the maps, but are not identified as “Prime” areas (for the purposes of this project, “prime” is used to describe an area of renewable energy generation potential that is unencumbered by either Level 1 or Level 2 constraints).

<sup>54</sup> A map of biomass land cover is included as well, but it is not a representation of potential beyond identifying what could be harvested for biomass energy production.

<sup>55</sup> If funding through TRORC is unavailable, a Municipal Planning Grant could be used to fund this process.

# Regional Plan Map Constraints Are Not Part of Act 174, Yet ...

## TRORC Map Constraints (Level 1 & 2)

- “This data has been designed to exclude certain areas based on specific constraints (referred to as Level 1 constraints). Level one constraints include floodways and river corridors, federal wilderness area, rare and irreplaceable natural areas, vernal pools and class one and two wetlands. Any area with potential for energy generation that has a level one constraint, has been removed from the map layer.”
- Other areas that have generation potential, but require consideration in relation to their natural resources, are identified as Level 2 constraints. These areas include agricultural and hydric soils, conserved lands, special flood hazard areas, deer wintering areas and class 3 wetlands.
- Areas with level two constraints appear on the maps, but are not identified as “Prime” areas (for the purposes of this project, “prime” is used to describe an area of renewable energy generation potential that is unencumbered by either Level 1 or Level 2 constraints).”

# **The Energy Siting Map Constraints are Inconsistent with the Comprehensive Energy Plan**

## **“5.5 Siting and Land Use Principles**

- 1. Energy and non----energy land use planning should be integrated as much as possible at the local, regional, and state levels.***
- 2. Energy (30 V.S.A. 248) and non----energy (Act 250) land use regulatory processes should be complement each other to the extent practicable.***
- 3. Energy elements of Act 250 criteria, and land use elements of Section 248 criteria, should reflect the integrated planning and complementary regulatory review principles.***
- 4. Energy development that meets needs while avoiding or mitigating negative impacts on other state, regional, and local goals and priorities, including economic, environmental, and health priorities identified in Chapter 3, and that takes statewide land use goals into account, should be promoted.***
- 5. Energy development that enhances other state, regional, and local goals and priorities, including reduction in the state’s and region’s GHG footprint, improvement in air quality, and opportunities to develop local economies, should be prioritized.”***

**Source:** Comprehensive Energy Plan at 62-63.

# Act 174 Issues & Opportunities for Change

- Appeals re: Enhanced Energy Standards to NRB instead of PSB – how will this work?
- Does Act No. 174 Single Out Renewable Energy Siting for Different Treatment than other Land Use Development Activities?? – Compare 24 V.S.A. §3483a(2)(Land Use Element) to new 24 V.S.A. §3483a(3)(Energy Element)
- Act 174 Does not State or Imply More Restrictive Map Constraints Should be Applied to Renewable Energy – And its Inconsistent with Siting Policy in the CEP
- “Substantial Deference” ... unless there is a *clear and convincing demonstration that other factors affecting the general good of the State outweigh the application of the measure or policy*” – such as our GHG Goals
- Act No. 174 amends 30 V.S.A. § 202b(a)(3) – DPS CEP “*shall include*” “recommendations for regional and municipal energy planning and standards for issuing a determination of energy compliance pursuant to 24 V.S.A. § 4352.” This is Missing from the 2016 CEP ...
- Its Important to Weigh in on the DPS Determination Standards Due 11/1/16

# **VERMONT'S RENEWABLE ENERGY STANDARD**

# **VERMONT'S RENEWABLE ENERGY STANDARD:**

**Three Tiers (30 V.S.A. § 8005) :**

**TIER 1: Total (all)(Renewable Energy – 55% starting January 1, 2017, escalating at 4% every 3rd year thereafter until reaching 75% in 2032; includes existing and new renewable resources**

**TIER 2: Distributed Renewable Energy (5MW or less) – 1% of annual retail electric sales starting January 1, 2017, increasing by 3/5% each year until reaching 10% by January 1, 2032; new resources in service after 6/30/2105**

**TIER 3: Energy Transformation Projects**

**Alternative Compliance Payment (ACP):** Failure to meet requires payment into Vermont Clean Energy Development Fund at an Alternative Compliance Rate begins at \$0.01/kWh (\$10 MWh) in 2017 escalating at the Consumer Price Index.

**In the past 5 years Massachusetts and Connecticut RECs have traded in a range of approximately \$15.00 - \$60.00/REC.** Source: VEC July 2016 IRP at 27-28.

**Other states' ACPs are set at or above REC market prices.**



# AS A RESULT OF RES, ISO'S 2016 PV FORECAST

“Adjusted VT’s 2017  
forecast value  
downward to reflect  
the implementation  
of the Renewable  
Energy Standard  
goals.”

Reduced 2017 PV  
from 30 MW to 23.8  
MW

## Final 2016 PV Forecast

Nameplate,  $MW_{ac}$

Note: Values in **red boldface** have changed relative to the draft forecast

States	Annual Total MW (AC nameplate rating)											Totals
	Thru 2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
CT	188.0	85.5	104.5	81.0	81.0	81.0	55.8	54.3	45.0	45.0	45.0	866.1
MA	947.1	<b>294.4</b>	122.7	<b>69.7</b>	<b>38.7</b>	<b>38.7</b>	<b>38.7</b>	<b>38.7</b>	<b>38.7</b>	<b>38.7</b>	<b>38.7</b>	<b>1,705.0</b>
ME	15.3	4.7	4.7	4.4	4.4	4.4	4.2	3.9	3.9	3.9	3.9	57.9
NH	26.4	13.3	7.6	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	79.3
RI	23.6	21.6	38.7	36.0	36.0	25.9	9.1	6.6	6.6	6.6	6.6	217.2
VT	124.6	30.2	<b>23.8</b>	22.5	22.5	22.5	21.3	20.0	20.0	20.0	20.0	347.3
Regional - Annual (MW)	1325.0	<b>449.6</b>	<b>301.9</b>	<b>217.7</b>	<b>186.7</b>	<b>176.5</b>	<b>133.2</b>	<b>127.5</b>	<b>118.2</b>	<b>118.2</b>	<b>118.2</b>	<b>3,272.8</b>
Regional - Cumulative (MW)	1325.0	<b>1774.7</b>	<b>2076.5</b>	<b>2294.2</b>	<b>2480.9</b>	<b>2657.4</b>	<b>2790.6</b>	<b>2918.1</b>	<b>3036.3</b>	<b>3154.6</b>	<b>3272.8</b>	<b>3,272.8</b>

### Notes:

- (1) Forecast values include FCM Resources, non-FCM Energy Only Generators, and behind-the-meter PV resources
- (2) The forecast reflects discount factors to account for uncertainty in meeting state policy goals
- (3) All values represent end-of-year installed capacities



Source: ISO New England Final 2016 PV Forecast , April 15, 2016

# Vermont Electric Cooperative, Inc.

## 2016-2035 Integrated Resource Plan

**The \$10 ACP is below the REC market trading price and will incent VT utilities to pay the ACP instead of investing in renewable energy**

VEC purchases generation and RECs from facilities that qualify as Vermont Tier 1 resources and also as Class I resources in Massachusetts and Connecticut. *The Alternative Compliance Rate essentially sets a cap on Tier 1 compliance costs. As a result, if VEC can sell RECs from Tier 1 eligible resources as Class I RECs in other states at a price that is higher than the Vermont Alternative Compliance Rate, then its members are better off financially."*

In the past 5 years Massachusetts and Connecticut RECs have traded in a range of approximately \$15.00 - \$60.00/REC.

Source: VEC July 2016 IRP at 27-28.

**WE HAVE AN OPPORTUNITY TO  
MAKE THE RES CONSISTENT WITH  
THE**

**Under 2° MOU Energy Pact:  
*“promoting large-scale switch to  
renewable energy and the  
integration of  
renewable energy sources”***

**PURPA**

# Public Utility Regulatory Policies Act of 1978 ("PURPA")

Congress enacted PURPA in 1978 to reduce reliance on fossil fuels:

**"Because the traditional utilities controlled the transmission lines and were reluctant to purchase power from 'nontraditional facilities, PURPA directed [the FERC] to promulgate rules requiring utilities to purchase electricity from 'qualifying cogeneration ["QF"] and small power production facilities.'" *New York v. FERC*, 535 U.S. 1, 9 (2002).**

- A QF is a generating facility of 80 MW or less whose primary energy source is renewable (hydro, wind or solar), biomass, waste, or geothermal resources. 16 U.S.C. § 796(17)(A).
- Section 210(f) requires each state regulatory authority to implement FERC 's rules.
- Vermont PSB Rule 4.100 was added in 1983 to Implement PURPA

# Key Changes in the VT PURPA Rule

- **4.103 - Formation of the Legally Enforceable Obligation (“LEO”) - Rates become effective when a QF files a petition for a CPG, rather than after receiving a CPG.**
- **PSB Rule 4.104(E) as amended September 15, 2016, sets avoided costs using the ISO-New England locational marginal price (“LMP”).**
- **Rejects Tiered Rates: “Pursuant to 30 V.S.A. § 8005a, Vermont has adopted “multi-tiered” rates in its standard-offer program .... State law provides no other requirements for “multi-tiered” rates; accordingly the proposed rule does not include multitiered rates.”**
- **Section 4.104(B) (Contract Term) limits the PURPA contract term to 7-years, as well as the option for a QF to negotiate a longer-term contract with the interconnecting utility.**

# **VT PURPA AVOIDED COSTS**

- **Under PURPA, a QF is entitled to sell its output to an electric utility at the utility's avoided cost.” 18 C.F.R. § 292.303.**
- **Avoided cost means rates based upon the utility's costs to generate electricity itself or buy from another source.**
- **New VT Rule 4.100 Adopted September 15, 2016.**
- **Natural gas generation is the marginal unit that sets the LMP in New England – so we are pricing QF renewable energy in VT based on fossil fuel prices.**

# FERC Cases Suggest LMP Prices are Irrelevant to PURPA Avoided Costs

## FERC's 2010 Order in *Southern California Edison Co.*:

“[I]f a state required a utility to purchase 10 percent of its energy needs from renewable resources, then **a natural gas-fired unit, for example, would not be a** source "able to sell" to that utility for the specified renewable resources segment of the utility's energy needs, and thus **would not be relevant to determining avoided costs for that segment of the utility's energy needs.**” *S. Cal. Edison Co.*, 133 FERC ¶ 61,059 at P 27 (2010) (*emphasis added*).

Utilities and EEI argued on reconsideration that PURPA requires states to look at "all costs", including fossil fuel market prices. FERC disagreed:

***“Previously, states did not mandate particular purchases, e.g., from renewables, and so there was no need to differentiate among generation sources and no need for tiering; all generation sources were essentially fungible, and so our interpretation and the states' interpretation of our PURPA regulations reflected that fact. That is increasingly not the case; states are now looking to draw distinctions in what they will allow. The orders issued to date in this proceeding and this order, reflect this change in circumstances.*”**



# REGIONAL OPPORTUNITIES

# REGIONAL HIGHLIGHTS

- In 2016, Connecticut, Massachusetts, and Rhode Island issued a three state clean energy RFP. seeking large-scale clean energy projects – 20 MW to 400 MW.
- Over 30 responses including the proposed 60 mile “Green Line” project; response expected later this year.
- In 2016 Massachusetts passed new legislation authorizing the procurement of 9.45 annual TWh of hydro, and up to 1600 MW of off-shore wind resources – RFPs expected to be issued in the spring of 2017.
- In 2016 the Connecticut’s Department of Energy and Environmental Protection (DEEP) announced RFP for smaller scale – between 2 MW and 20 MW - clean energy resources and a Draft RFP for natural gas resources to help support electric generation.

**QUESTIONS?**