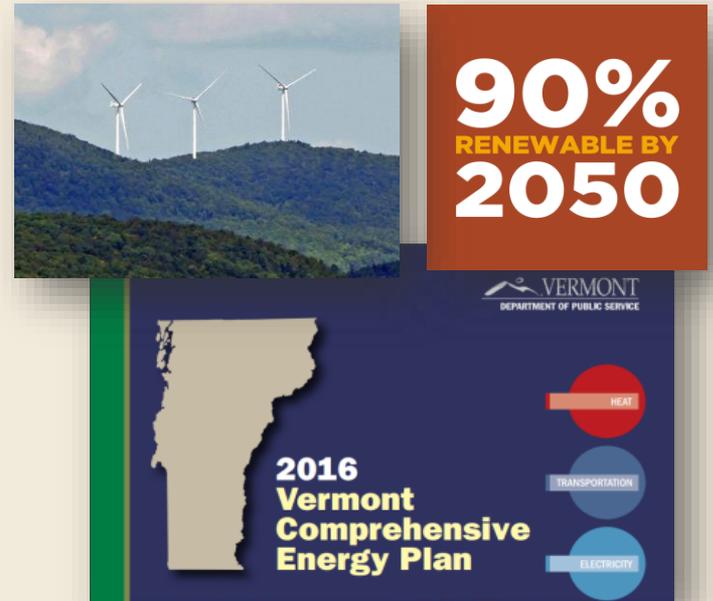


ENERGY PLANNING & ACT 174

Overview of
Municipal
Standards for
Determination of
Energy
Compliance

ACT 174 PRESENTATION OVERVIEW

1. Act 174 and State Energy Policy
2. Review of Municipal Energy Planning Standards
3. Municipal Energy Data Guide
4. Renewable Energy Generation Mapping



STATE ENERGY POLICY & ACT 174

Why and
how are
we here?

WHY PLAN?

- Environmental Reasons
- Economic Reasons
- Long-term Energy Security Reasons



STATE ENERGY GOALS

State energy policy—Vermont's 2016 Comprehensive Energy Plan

- Reduce total energy consumption per capita by 15% by 2025 & > 1/3 by 2050
- Meet 25% of remaining energy need from renewables by 2025, 40% by 2035 and **90% by 2050**
- Renewable end use sector goals for 2025: 10% transportation, 30% buildings, 67% electric power



- Pilot Project in 2015
 - Implement the CEP
 - Set regional targets for:
 - Energy conservation
 - Energy generation
 - Develop specific strategies for:
 - Conservation
 - Energy efficiency
 - Reduced fossil fuel use.
 - Identify energy resources and areas with the potential for renewable energy projects.

ACT 174 - SUMMARY

- Act 174 establishes a set of **optional** municipal and regional energy planning standards.
- Standards developed by DPS in November 2016
- Communities that meet the standards will receive a determination of energy compliance (DOEC).
 - “Substantial deference” under Section 248

SUBSTANTIAL DEFERENCE

Due Consideration

Statute calls for “due consideration.” Does not define what “due consideration is” or assign whether the PSB or the Courts are the ultimate arbiter.

The SCOV indicated that the PSB only has to give “due consideration to the recommendations of the municipal and regional planning commissions in deciding [if] the project will not unduly interfere with the orderly development of the region.”

Substantial Deference

Defined in Statute:

“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.”

STANDARD OF REVIEW

- “determination standards for energy compliance”
- Standard of review
 - Same as for “Regional Approval”
 - Outlined in §4302(f) - requires “substantial progress toward attainment of the goals.”
- All sections of plan will be considered
- Policies can't be conflicting policy between chapters.
- CCRPC will review town plans after July 1, 2018.

BASIC REQUIREMENTS

- Locally adopted and regionally approved Plan
- Energy Plan as defined in 24 V.S.A. §4348a(a)(3)
 - Plan must contain an analysis of resources, needs, scarcities, costs and problems for electricity, heating, and transportation
- Analysis and Targets
 - Municipalities can use data provided by CCRPC, or complete analysis themselves. Analysis must align with state energy policy and follow DPS standards.
- Pathways (Implementation Actions)
- Municipalities need to plan for all types of generation, but not all scales of generation.
- Mapping

POLICY AND IMPLEMENTATION

- Enhanced Energy Plans must:
 - Include “pathways” and recommended actions to achieve energy targets
 - Statements of policy
 - Conservation
 - Transportation
 - Land Use
 - Development and Siting of Renewables
- Some actions may not be applicable or relevant
 - Provide reasonable justification

ANY
QUESTIONS
?

OVERVIEW

Questions?

ANALYSIS AND TARGET STANDARDS



CCRPC HAS ALREADY PROVIDED DATA TO ALL MUNICIPALITIES

Communities can opt to collect and analyze data themselves, or they can utilize data provided by their RPC.

Those that use the RPC data will be presumed to have met the standards in this section.

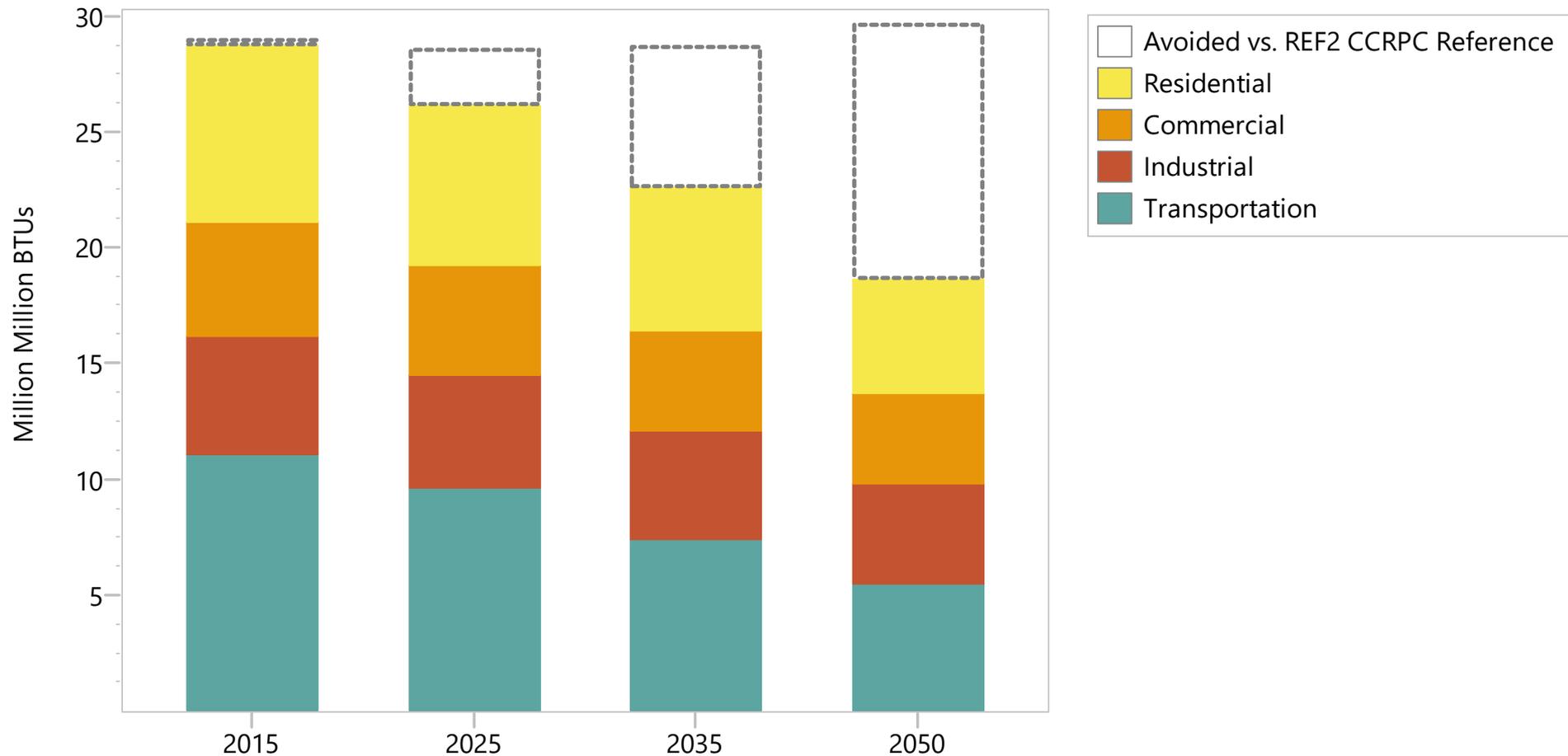
MUNICIPAL ENERGY DATA GUIDE

- On April 30, all Chittenden County municipalities received Municipal Energy Data Guides.
 - Available here: www.ccrpcvt.org/regional-energy-plan
- The Guides contained information about:
 - Current energy use in the transportation, thermal and electric sectors
 - Projected future energy use in those sectors
 - Potential pathways to meet the state's goals
 - local mapping constraints and energy generation (discussed later)

ANALYSIS AND TARGETS

Energy Demand Final Units

CCRPC 90 x 2050 Scenario Avoided vs. REF2 CCRPC Reference, All Fuels, Chittenden, All Tags



MUNICIPAL DATA: TRANSPORTATION

Current Municipal Transportation Energy Use	
Metric	Municipal Data
Fossil Fuel Burning Cars, 2015	6605
Fossil Fuel Energy Used for Transportation in 2015 (MMBtu)	466,343
Electric Vehicles in 2015 (#)	35
Electricity Used for Transportation in 2015 (MMBtu)	371
Sources: VTrans, American Community Survey, Drive Electric Vermont, DMV	

MMBTU = Million British Thermal Units = Unit of Energy

MUNICIPAL DATA: TRANSPORTATION

Transportation Energy Use, 2015-2050

	2015	2025	2035	2050
Total Light Duty Transportation Energy Use (MMBtu)	466,714	374,570	231,379	98,818
Electricity Used for Transportation (MMBtu)	371	5,006	33,557	69,463
Electric Vehicles (% of Vehicle Fleet)	1%	6%	41%	89%
Biofuel Blended* Energy Used for Transportation (MMBtu)	466,343	369,564	197,822	29,355
Biofuel Blend* Vehicles (% of Vehicle Fleet)	99%	94%	59%	11%
*This measures biofuels blended with fossil fuels. A common example is gasoline with ethanol mixed in.				
Sources: VTrans, LEAP Model				

MMBTU = Million British Thermal Units = Unit of Energy

MUNICIPAL DATA: THERMAL

Current Thermal Energy Use from Natural Gas, 2015	
Total Residential Natural Gas Consumption (Mcf)	202,627
Percentage of Municipal Natural Gas Consumption	35%
Total Commercial/Industrial Natural Gas Consumption (Mcf)	378,952
Percentage of Municipal Natural Gas Consumption	65%
Total Municipal Natural Gas Consumption	581,579
<i>Sources: Vermont Gas</i>	

Mcf = Million Cubic Feet of Natural Gas

MUNICIPAL DATA: THERMAL

Commercial and Industrial Thermal Energy Use, 2015-2050				
	2015	2025	2035	2050
Total Commercial and Industrial Thermal Energy Use (MMBtu)	383,901	345,817	298,185	226,829
Percent of Commercial and Industrial Establishments Weatherized by Target Year	10%	18%	20%	34%
Energy Saved by Weatherization by Target Year (MMBtu)	9,290	20,299	27,901	67,644
Commercial and Industrial Establishments Using Heat Pumps (%)	1%	19%	31%	35%
Commercial and Industrial Thermal Energy Use by Heat Pumps (MMBtu)	708	30,536	60,364	90,192
Commercial and Industrial Establishments Using Wood Heating (%)	6%	8%	9%	10%
Commercial and Industrial Thermal Energy Use Attributable to Wood Heating (MMBtu)	28,601	45,538	62,689	91,773
<i>Sources: LEAP Model, Department of Public Service, Department of Labor</i>				

MMBTU = Million British Thermal Units = Unit of Energy

MUNICIPAL DATA: THERMAL

Residential Thermal Energy Use, 2015-2050				
	2015	2025	2035	2050
Total Residential Thermal Energy Use (MMBtu)	376,860	335,820	286,320	202,920
Percent of Residences Weatherized by Target Year	2%	17%	37%	99%
Energy Saved by Weatherization by Target Year (MMBtu)	2,508	19,152	44,412	129,348
Percent of Residences Using Heat Pumps	3%	18%	37%	61%
Residential Thermal Energy Use from Heat Pumps (MMBtu)	3,720	21,720	45,000	67,560
Residences Using Wood Heating (%)	14%	14%	14%	14%
Residential Thermal Energy Use from Wood Heating (MMBtu)	58,920	61,740	62,100	55,860
<i>Sources: LEAP Model, Department of Public Service</i>				

MMBTU = Million British Thermal Units = Unit of Energy

MUNICIPAL DATA: ELECTRIC

Electrical Energy Use	
Residential Electric Energy Use (kWh)	26,998,768
Commercial and Industrial Electric Energy Use (kWh)	89,713,175
Total Electric Energy Use (kWh)	116,711,943
<i>Sources: Efficiency Vermont, 2013</i>	

kWh = Kilowatt Hour = Unit of Energy

MUNICIPAL DATA: ELECTRIC

Electrical Energy Use, 2015-2050				
	2015	2025	2035	2050
Total Electric Energy Saved (kWh)	540,000	6,420,000	12,960,000	24,240,000
Residences that have increased their Electric Efficiency	3%	30%	58%	98%
Commercial and Industrial Establishments that have Increased Their Electric Efficiency	3%	30%	58%	98%
<i>Sources: LEAP Model and Efficiency Vermont, 2013</i>				

kWh = Kilowatt Hour = Unit of Energy

MUNICIPAL DATA: ELECTRIC

Existing Renewable Electricity Generation

	Sites	Power (kW)	Energy (kWh)
Solar	416	5,927	6,812,070
Wind	4	24	57,606
Hydroelectric	0	0	0
Biomass	0	0	0
Other	0	0	0
Total	420	5,951	6,869,675

Source: Community Energy Dashboard, April 2017

Currently, this municipality is generating about 6% of its total electricity use from renewable sources sited locally.

We'll discuss energy generation targets in the next section.

kw = Kilowatt = Unit of Power
kWh = Kilowatt Hour = Unit of Energy



ANALYSIS AND TARGETS STANDARDS

Questions?

MAPPING STANDARDS AND GENERATION TARGETS

MAP POTENTIAL AREAS

- Identify potential areas for renewable energy development:



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.



Biomass resources



Hydro

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

BASIC REQUIREMENTS

- Mapping is required
 - Regional Maps; OR
 - Municipalities may choose to undertake their own mapping.
- Municipalities expected to work collaboratively with their regions and with neighboring municipalities to ensure compatibility

STATE CONSTRAINTS

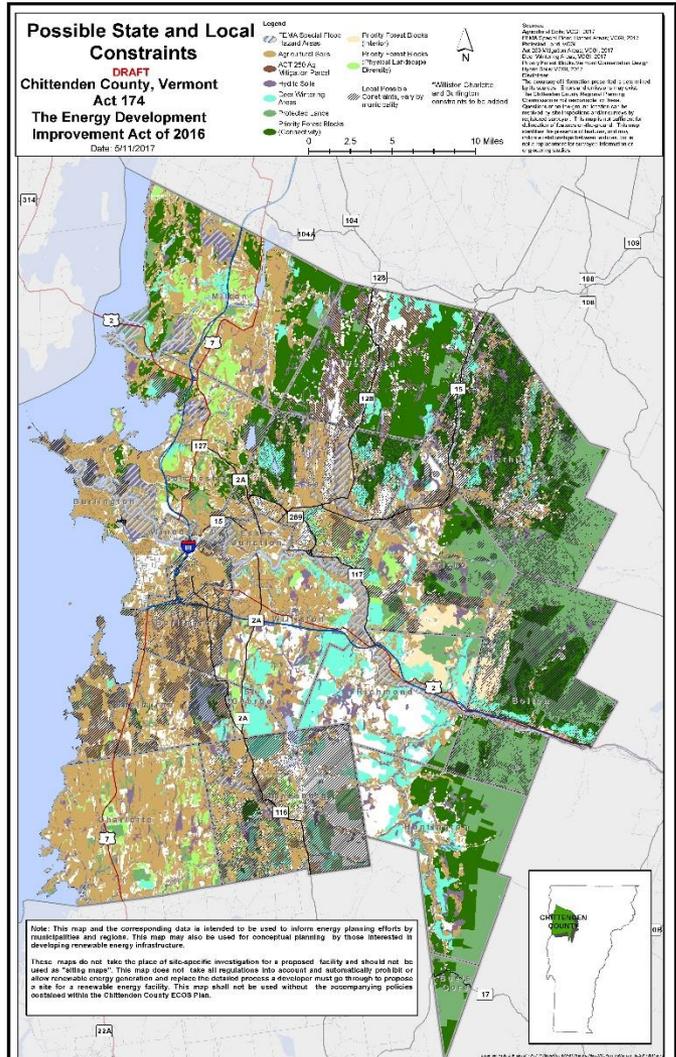
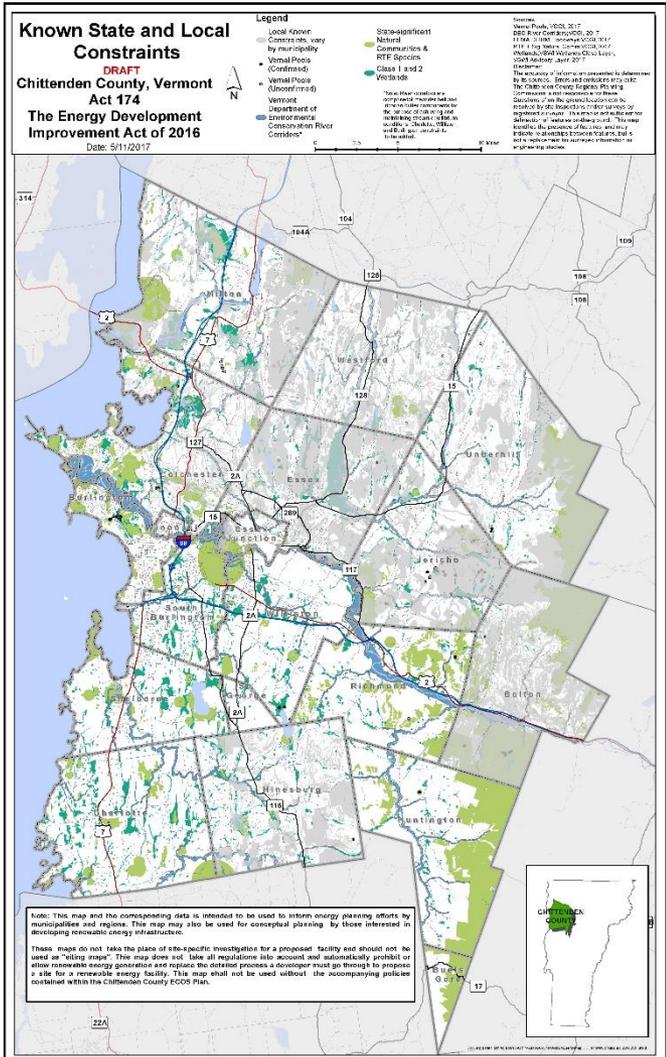
Known Constraints

- Floodways & River Corridors
- National Wilderness Areas
- State significant natural communities and rare, threatened and endangered species
- Vernal Pools
- Class 1 and 2 Wetlands

Possible Constraints

- Agricultural Soils (all aggregated soils)
- Conservation Design Highest Priority Habitat Blocks
- Hydric Soils
- Protected Lands
- Special Flood Hazard Areas
- Deer Wintering Areas
- Regionally or Locally Identified Resources
- Act 250 Agricultural Soil Mitigation Areas

MAPPED STATE KNOWN + POSSIBLE CONSTRAINTS

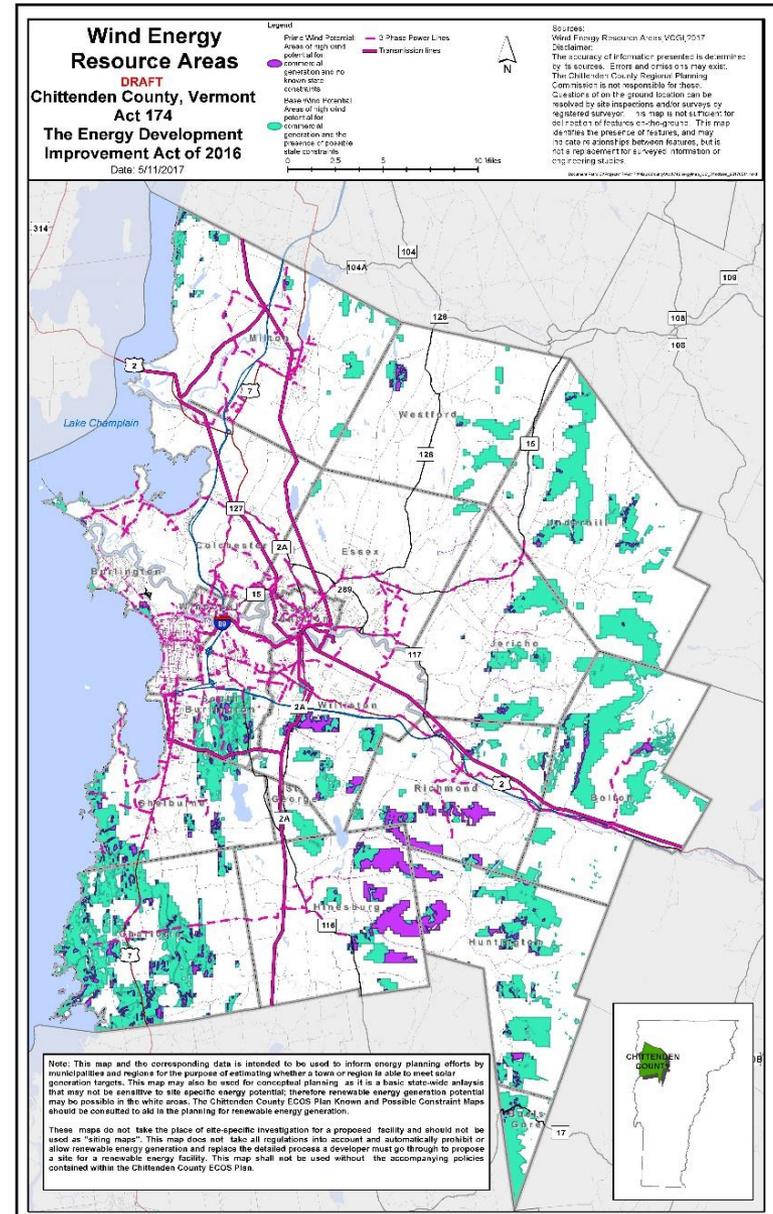
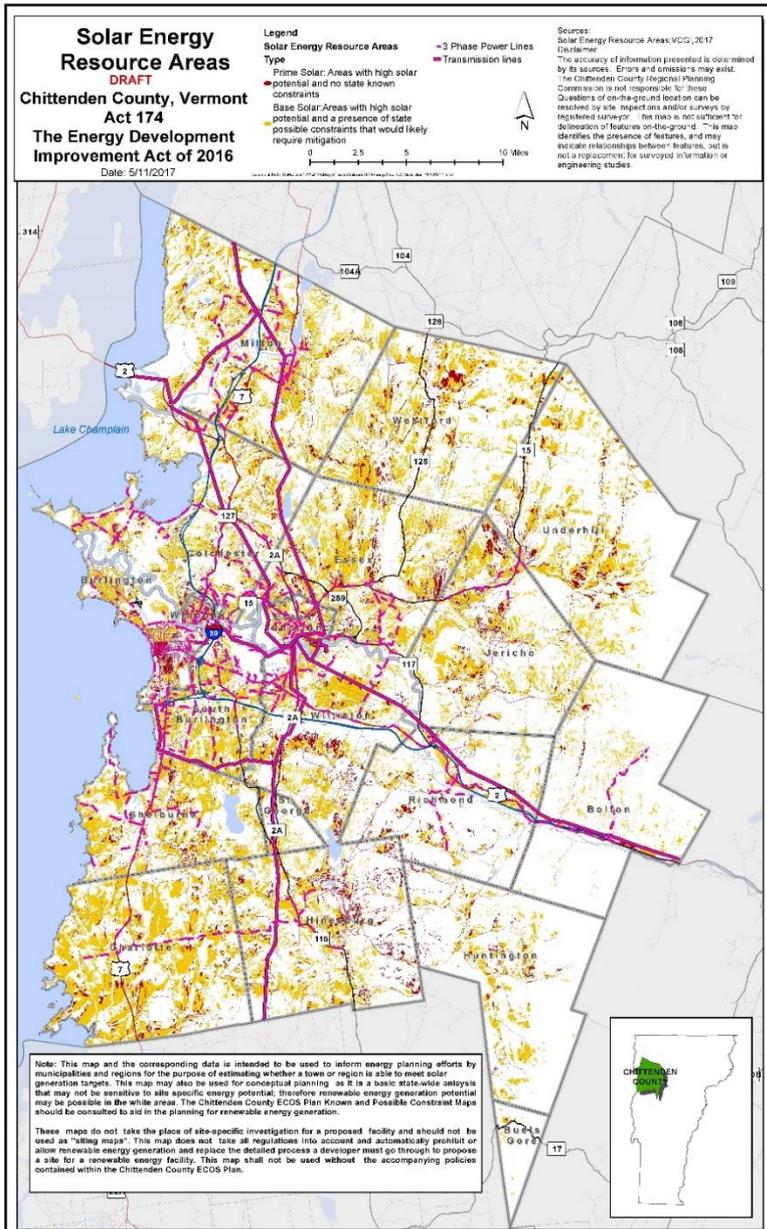


LOCAL KNOWN AND POSSIBLE CONSTRAINTS

- Local constraints must represent policies that are currently in effect in your town plan goals, policies or strategies, maps and/or zoning regulations

Bolton	
Conservation District	Very steep slopes (25% or greater)
Flood Hazard Overlay II	Wetland Buffers
Surface Water Buffers	Town-Owned Lands
Burlington	
Historic Districts	Mixed Use, Institutional Core Campus & Enterprise Zoning Districts
Historic Neighborhoods (Eligible for Listing)	Official Map Features and View Corridors
Charlotte	
	Shoreland Setback and Buffer Areas
	Special Natural Areas
	Surface Waters, Wetlands, and Buffers
	Wildlife Habitats
Colchester	
Gd4 Open Space Overlay District	Steep Slopes over 20%
Shore Land Overlay District	Water Protection Overlay District

ENERGY GENERATION AREAS



MUNICIPAL ENERGY GENERATION TARGETS

Land Available for Wind and Solar Generation

	Prime (acres)	Base (acres)
Solar	1,011	4,355
Wind	606	1,631

MUNICIPAL ENERGY GENERATION TARGETS

Renewable Electricity Generation Potential

	Power (MW)	Energy (MWh)
Rooftop Solar	9	20,527
Ground-Mounted Solar	126.38	154,990
Wind	2,425.60	7,436,890
Hydro	N/A	N/A
Biomass	See Biomass Map	See Biomass Map
Methane	Unknown	Unknown
Other	Unknown	Unknown

Source: CCRPC and the Department of Public Service

Renewable Electricity Generation Targets

	2025		2035		2050	
	Low	High	Low	High	Low	High
Solar Generation Target (MWh)	4,423	7,231	8,846	14,462	17,693	28,924

Sources: LEAP Model and CCRPC Modeling

Regional Wind Target: 68 MW to 305 MW or 207,295 MWh to 936,305 MWh

*Revision to rooftop solar will be made

PREFERRED SITES

- Preferred locations:
 - Locally preferred locations
 - Unused land near already developed infrastructure, locations suitable for large scale biomass district heat or thermal-led cogeneration, locations for biogas heaters and digesters
 - Statewide automatically designated preferred locations
 - Rooftops
 - Parking lots
 - Previously developed sites
 - Brownfields, quarries, and Superfund sites



MAPPING

Questions?

NEXT STEPS

- Review your data guide
 - Feedback by June 16th
- Preferred Site Identification
- Municipal Assistance
- CCRPC is submitting the draft ECOS Plan to the Department of Public Service at the end of the month

COMMENTS & QUESTIONS

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Thank You