

Renewable Energy Siting at Washington Electric Co-op

Presentation to Central Vermont Regional Planning
Commission

24 January 2019

Washington Electric Co-op



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The table below summarizes WEC's net metering program results through December 2017. We have also listed WEC's results as a percent of peak. WEC's peak in 2017 was 16,948 kW. There are currently 2,476 kW net metering system installed in WEC's service territory. This is 15% of WEC's 2017 peak.

Washington Electric Coop					2017 Peak kW
					16,948
	Net Metering Installations prior to 2016 kW	Net Metering Installations in 2016 kW	Net Metering Installations in 2017 kW	Total Net Metering Installed & Pending thru 12/2017 kW	Percent of last 12 month peak
CPGs Awarded	1,484.62	97.75	1,174.47	2,756.84	16%
Systems Connected	1,484.62	97.75	893.97	2,476.34	15%
Applications Pending	-		280.50	280.50	2%



Year	kW Installed by Year	Number of Members With Installations	Cumulative kW
1999	1.37	1	1.37
2000	2.80	2	4.17
2001	1.68	2	5.84
2003	1.43	1	7.27
2004	5.81	2	13.08
2005	46.75	10	59.83
2006	48.79	5	108.63
2007	21.32	6	129.95
2008	30.18	8	160.13
2009	35.67	6	195.79
2010	76.58	12	272.38
2011	137.22	32	409.60
2012	412.80	54	822.40
2013	389.62	59	1,212.02
2014	145.52	21	1,357.54
2015	127.08	20	1,484.62
2016	97.75	11	1,582.37
2017	893.97	129	2,476.34
Total	2,476.34	381	

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In 2018 some 93 new net metering installations were installed on WEC distribution system.

This raises the nameplate capacity of all net metering to 3,466 kilowatts (kw) or 3.466 MegaWatts (MW).

For a distribution system with a 2017 historic peak demand of 16.948 MW, the current installed generation under Vermont's net metering statute approximates 20% .

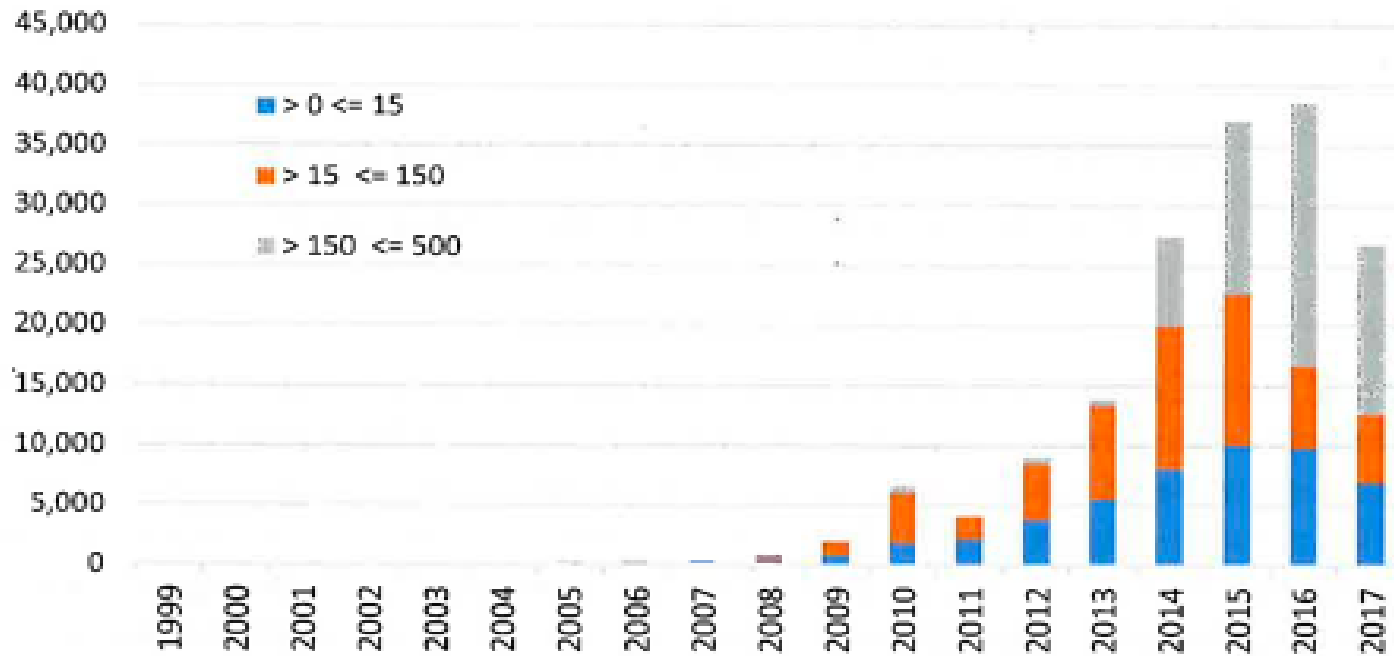
Our main concerns are the rates are causing rate pressure and the shifting of costs to other members. Act 99 explicitly notes that the net metering rules will take into account the pace of deployment and balance over time that pace while minimize cost shifting (see §8010 (c) (1)).

WEC assessed the cost and benefits of net metering systems and determined we are losing money. Solar installations save WEC \$0.0867 per kWh generated yet we are paying \$0.1890 in credits (\$0.1490 statewide blended rate + \$0.03 REC adder + \$0.01 siting adder).

This means WEC is losing money in the amount of \$0.10253 for every kWh installed under the new program. This loss of revenue is transferred to other WEC members which is creating a shift of cost. This cost shift we believe is not fair, not sustainable and is not consistent with the Act 99.



Figure 1. Permitted Solar Net Metered Capacity (kW) by Size Category, NEM 1.0 and 2.0 Combined, 1999–2017



Source: Vermont Department of Public Service Supplemental Information Request by the Department of Public Service, February 8, 2018. Case No. 18-0085-INV.

Source: Synapse Economics for REV; 15 March 2018



Active VT interconnection projects in ISO-NE Queue

Queue	Name	MW	County	Op Date	Sync Date	Interconnection Location	Serv	Project Status
783	150 kV HVDC Tie - Import Only	400	Addison	12/31/23	10/31/23	VELCO's 345 kV Substation at New Haven, Vermont.	CNI	Study not started
763	Solar	15	Rutland	08/01/20	05/15/20	Florence - S. Middlebury Jct. 46 kV line, approx. 4 miles from Florence	CNR	System impact study in progress
753	Solar	20	Franklin	12/31/20	08/31/20	VEC Sheldon Substation - 46 kV	CNR	Feasibility study in progress
751	Solar	20	Orange	08/01/20	05/15/20	GMP's Randolph Center substation 46 kV	CNR	System impact study in progress
750	Solar	20	Franklin	08/01/20	05/15/20	VEC's Highgate - Enosburg 46 kV line, 700 feet from Highgate	CNR	Feasibility study in progress
680	Solar	20	Rutland	07/01/20	06/01/20	GMP 46 kV between Carver Falls and Fair Haven Tap	CNR	System impact study in progress
674	Solar	20	Bennington	07/01/20	06/01/20	GMP 46 kV between East Arlington and S. Shaftsbury Tap	CNR	System impact study in progress
668	HVDC Tie - CNI only		Windsor	12/31/21	11/01/21	Coolidge Substation	CNI	IA in progress
660	Solar	20	Windham	07/01/20	06/01/20	National Grid 69 kV transmission line (D-4)	CNR	System impact study in progress
565	Solar	19.9	Windsor	12/20/18	12/12/18	115 kV Coolidge Substation	CNR	IA executed Under Construction
501	HVDC Tie - Import only	1000	Windsor	05/31/22	03/31/22	HQ 735 kV substation to VELCO 345 kV Coolidge substation	NI	IA in progress

Source: <https://irtt.iso-ne.com/reports/external>



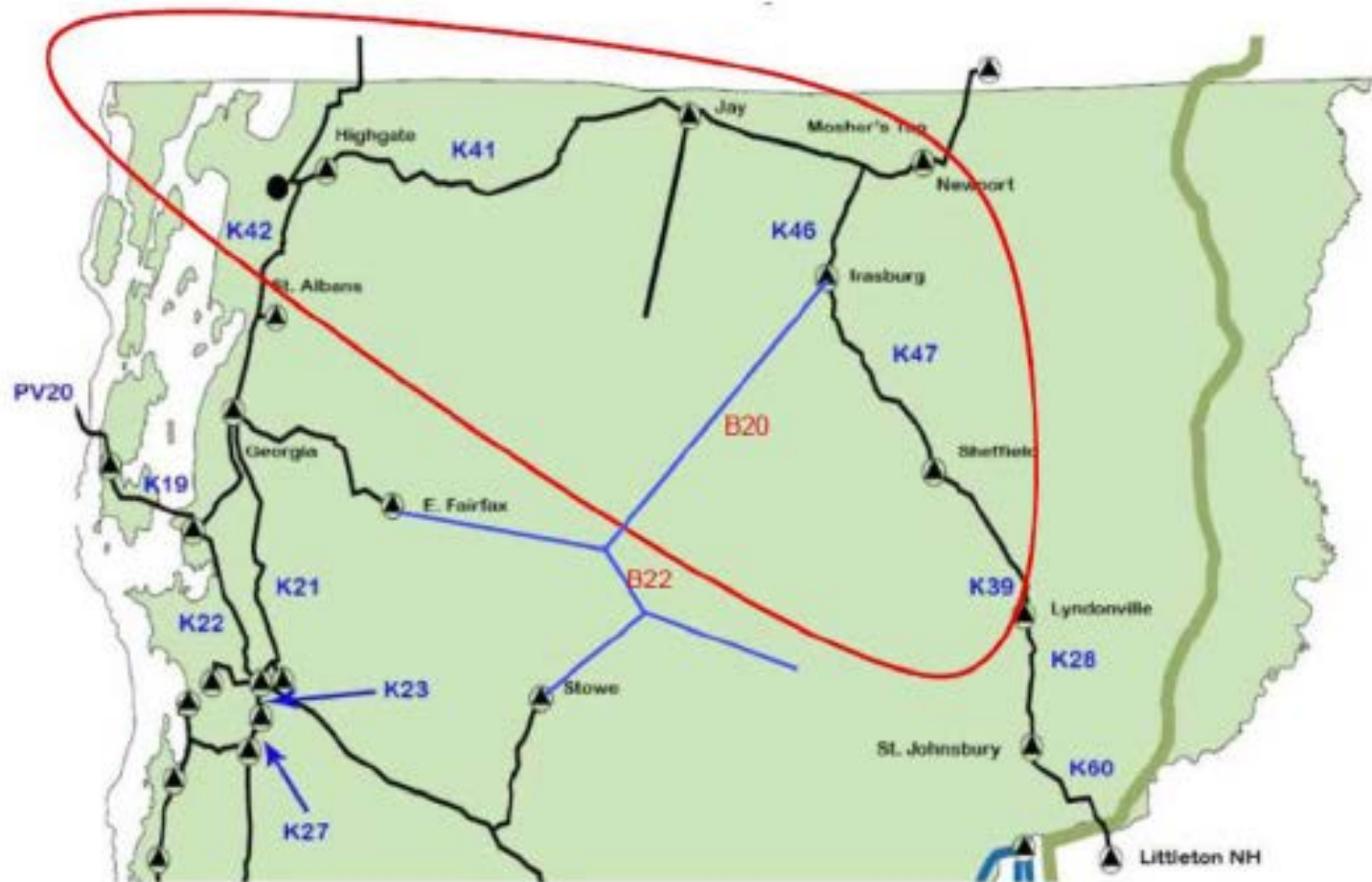


Figure 1: The Sheffield-Highgate Export Interface (SHEI)

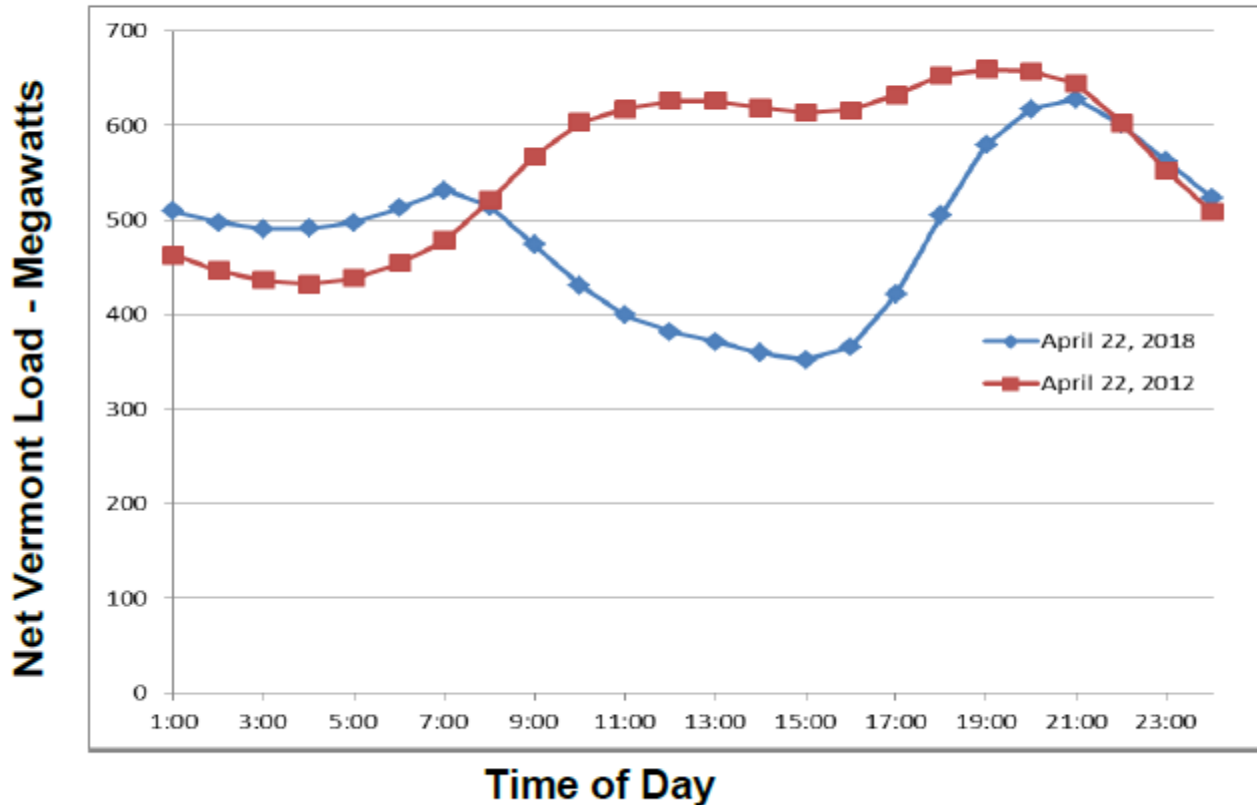
Source: VELCO operating committee

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Impact of PV on VT system

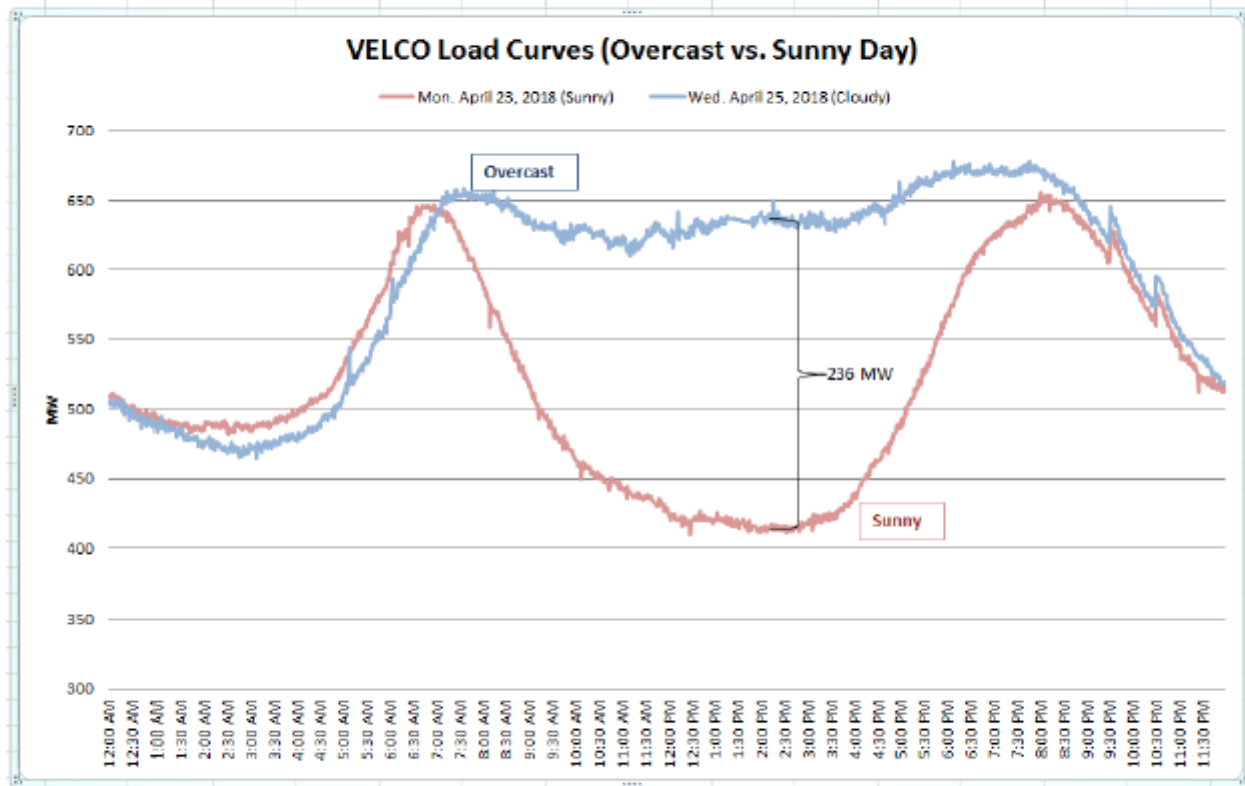
A Tale of Two Sundays



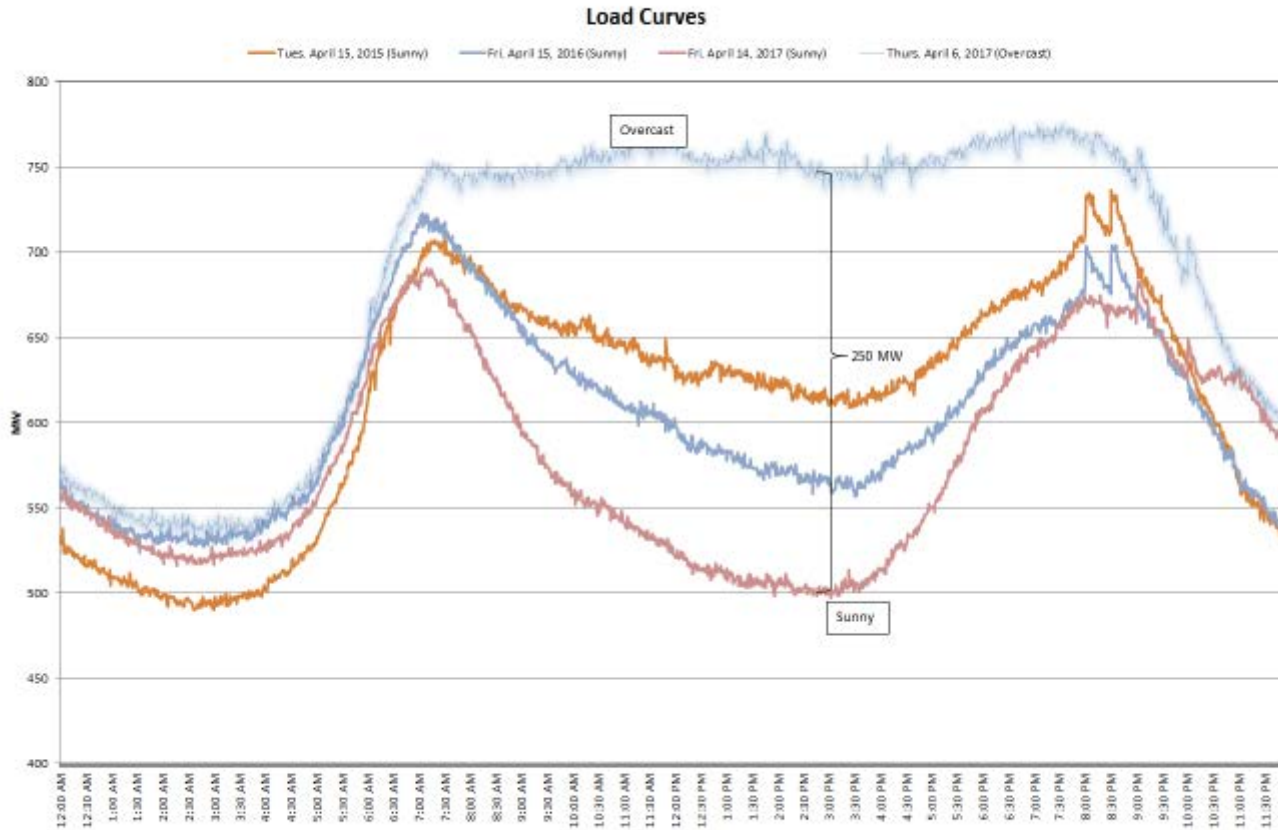
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April 2018 Load Comparison



April Load Comparison



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Bulk and predominantly bulk concerns in high solar scenario (2018 solar PV distribution)

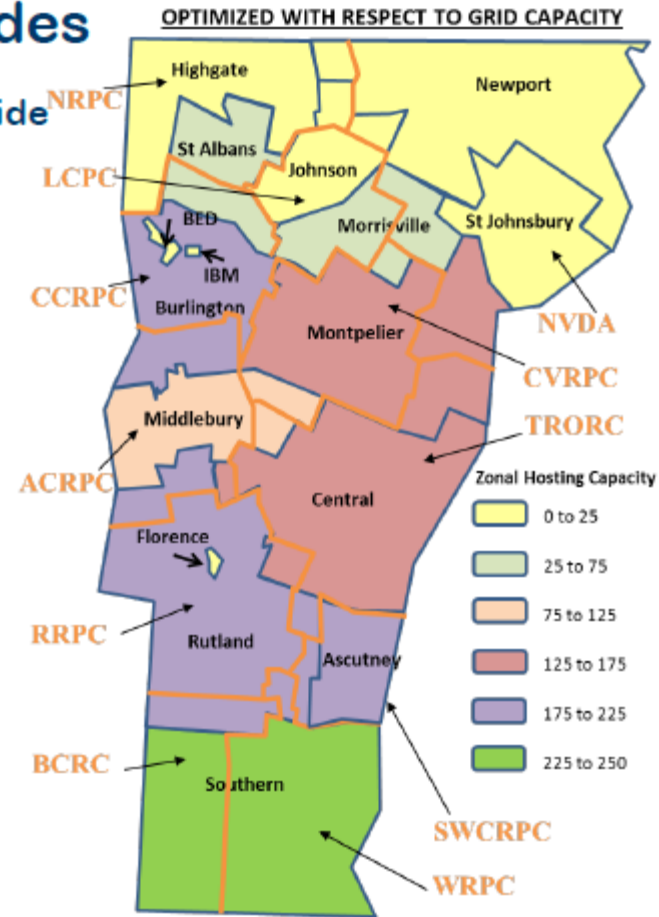


- SHEI is current constraint interface
- SHEI-1 to SHEI-5 are expansions of constraint
- Timing of expansion is unknown
 - Depends on how quickly solar PV is installed in individual zones
 - Not necessarily sequential—e.g., SHEI-3 could occur before SHEI-2
 - Optimal solar PV distribution analysis gives some insights

Maximum amount of solar PV that may be hosted with minimal system upgrades

Dependent on assumptions on previous slide

Zone names	Gross MW loads	MW AC solar PV capacity	Net MW loads
Newport	19.8	10.3	9.5
Highgate	23.8	15.5	8.3
St Albans	39.7	42.9	-3.2
Johnson	6.6	16.4	-9.8
Morrisville	24.3	50.7	-26.4
Montpelier	48.6	104.9	-56.3
St Johnsbury	14.7	12.1	2.6
BED	39.8	5.6	34.2
IBM	60.6	20.0	40.6
Burlington	94.1	107.4	-13.3
Middlebury	19.7	57.7	-38.0
Central	37.6	91.2	-53.6
Florence	22.6	21.2	1.4
Rutland	61.7	164.6	-102.9
Ascutney	39.5	112.8	-73.3
Southern	65.6	224.9	-159.3
Total	618.7	1058.2	-439.5
Losses	33.6	N/A	53.4



The bottom line

- Vermont is highly dependent on transmission
- No load growth for first ten years of forecast—many uncertainties and emerging trends: economic, technological, climatic, societal, state and federal policies
- No transmission upgrades needed to serve peak load
- Some subtransmission issues to be evaluated by DUs
- Upgrades may be needed to support renewable energy resources depending on amount, location and whether they provide grid support
- System may be unable to host 1000 MW without a drastic change in solar PV distribution, but would require enabling measures
 - Some combination of storage, curtailment, load management, grid upgrades, operational changes ...
 - Voltage control from solar PV inverters is necessary
 - A statewide conversation regarding a coordinated plan for solar PV growth should be considered



<https://publicservice.vermont.gov/sites/dps/files/documents/2019%20Act%20139%20Generation%20Constraints%20Report%20final.pdf>

IDENTIFYING AND ADDRESSING ELECTRIC GENERATION CONSTRAINTS IN VERMONT

A Report Submitted Pursuant to Act 139 of 2018

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However, Act 174 of 2016, which provides for comprehensive energy planning by municipalities and regional planning commissions, includes a mechanism for developers to identify areas that the municipalities have specifically indicated are preferred for development of energy resources. Developers could work collaboratively to identify such areas and enter into agreements to share the necessary costs of upgrading infrastructure. This mechanism is specifically contemplated in PUC Rule 5.500:

Grouping of Facilities. An Interconnecting Utility may propose to group facilities required for more than one Interconnection Requester in order to minimize facilities' costs through economies of scale, but any Interconnection Requester may require the installation of facilities required for its own Generation Resource if it is willing to pay the costs of those facilities.²²

The Department is not aware of this provision having been utilized to date and there are certain programmatic limitations to locating facilities in close proximity that may need to be re-examined. However, it is a mechanism that developers should be pursuing.