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programs, only accepting applications for systems less than 150 kW, which are except from the utility cap.<sup>13,14</sup>

Vermont's electricity is provided by sixteen municipal or cooperative utilities and one investor-owned distribution utility. Figure 1 shows the coverage of Vermont's electric utilities. Vermont used 27.9% of its electricity from renewable sources in 2014 including: hydroelectric power, biomass, wind and solar. In 2014,



NEM in Vermont is organized into residential, commercial and industrial sectors. According to the U.S. Energy Information Administration, the residential sector is defined as “an energy-consuming sector that consists of living quarters for private households” excluding institutional living facilities.<sup>20</sup> The commercial sector of NEM is defined as “an energy-consuming sector that consists of service-providing facilities and equipment of businesses; Federal, State, and local governments; and other private and public organizations, such as religious, social, or fraternal groups.”<sup>21</sup> The commercial sector includes institutional living quarters and sewage treatment facilities. The industrial sector of





energy credits (RECs) and sold separately from the produced electricity.<sup>33</sup> Each State must recognize RECs as a tradable environmental attributes, currently 36 states and territories recognize RECs.<sup>34</sup> At the federal level, RECs are recognized as tradable attributes by the Department of Energy's Federal Management Energy Program.<sup>35</sup>

RECs are a method used to "label" and differentiate energy generated by renewable sources from conventional/non-renewable energy.<sup>36</sup> One REC certificate represents one megawatt-hour of renewable energy. This allows for the environmental benefits associated with renewable generation to be carried with the energy even after being blended with conventional energy by utility companies.<sup>37</sup> RECs can be included with the electricity they represent (bundled) or sold separately (unbundled).<sup>38</sup> With bundled RECs, the electricity customer receives both the electricity and related RECs. Under this arrangement, the consumer is utilizing renewable energy and retires the associated RECs on consumption. When RECs are unbundled from electricity, one consumer can purchase the electricity (now classified as non-renewable) and another customer can purchase the remaining RECs.<sup>39</sup> These RECs can be used by the customer to foster a "green" public image or to help them comply with a mandatory renewable standard.<sup>40</sup> Renewable Portfolio Standards (RPSs) are regulatory requirements, created by a legislature other state regulator, that force a utility to purchase a certain percentage of its energy from qualifying renewable sources by a certain date.<sup>41</sup> In New England, RECs are monitored by the New England Power Pool Generation Information System (GIS).



Under Vermont's NEM laws, there are several options for how renewable energy generators can utilize their RECs. The most common option used by small scale NEM (under 100kW) is to keep the RECs bundled with the produced electricity. When the customers use the energy, they can also claim the environmental benefits, such as greenhouse gas (GHG) reduction associated with RECs.<sup>44</sup> When NEM customers use and retire their own RECs, it increases the overall consumption of renewable energy statewide and contributes to GHG reduction initiatives.<sup>45</sup> Another option for NEM generators is to sell their RECs to their utility company.<sup>46</sup> This allows the generator to profit from the sale of RECs and the utility to insure that it is in compliance with the State's renewable energy standard.<sup>47</sup> Because the RECs and energy are unbundled, the generator cannot claim the environmental benefits associated with their energy production, as these benefits have been transferred to the utility.<sup>48</sup> Instead, the energy used by a consumer is considered to be the part of the utility's average fuel mix, which contains energy from conventional sources.<sup>49</sup> When a utility purchases RECs to comply with a renewable energy standard, it increases both the utility's and State's renewable energy consumption.<sup>50</sup> Act 56 sets the renewable energy standard for Vermont.<sup>51</sup> NEM customers can also sell their RECs to buyers other than their own utility. These other buyers are typically out of state utilities attempting to comply with their own state's renewable energy standard.

NEM agreements also known as Power Purchase Agreements (PPA) allow for a solar array's owner to sell generated power and RECs to a 3rd party power consumer.<sup>52</sup> Under these agreements the facility owner is granted permission to install and operate a solar system on the energy consumer's land.<sup>53</sup> In return, the energy consumer is guaranteed 100% of the produced energy at a long-term, reduced rate.<sup>54</sup> These programs are often utilized by towns or schools to obtain low-



***CEDF Awards for FY15***

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Data from: Vermont Clean Energy Development Fund Public Service Department, "Clean Energy Development Fund Annual Report to the Vermont Legislature," Montpelier, VT: Vermont Clean Energy Development Fund Public Service Department, 2016, accessed March 27, 2016, [http://publicservice.vermont.gov/sites/dps/files/documents/Renewable\\_Energy/CEDF/Reports/CEDF%20Annual%20Report\\_FY%202015.pdf](http://publicservice.vermont.gov/sites/dps/files/documents/Renewable_Energy/CEDF/Reports/CEDF%20Annual%20Report_FY%202015.pdf).

Vermont also offers a sales tax and property tax incentive for NEM systems. The Vermont Sales Tax Incentive originally introduced as part of the Miscellaneous Tax Reduction Act of 1999 (H.B. 0548) only applied to NEM systems, but now applies to systems up to 500 kilowatts (kW) in capacity that generate electricity using eligible renewable energy resources.<sup>64</sup> "Renewable energy" resources as defined under 30 V.S.A § 8002 include "energy produced using a technology that relies on a resource that is being consumed at a harvest rate at or below its natural regeneration rate" or micro-combined heat and power (CHP) systems up to 20 kW.<sup>65</sup> Under this definition, solar PV, wind, biomass, anaerobic digestion and fuel cells using renewable fuels are eligible to qualify for the 100% of sales tax for purchase. In addition to the Vermont sales tax, there is a Vermont Investment Tax Credit. According to the Database of State Incentives for Renewables and Efficiency, the investment tax credit for Vermont is equal to 7.2% for solar, fuel cells and small wind placed in service on or before December 31, 2016 and 2.4% for geothermal and microturbines.<sup>66</sup> Small wind includes systems up to 100 kW, fuel cells in systems .5 kW or greater and microturbines include systems 2 megawatts (MW) or less.<sup>67</sup>

The Vermont Uniform Capacity Tax offers a

The Sustainably Priced Energy Enterprise Development (SPEED) Program was Vermont's alternative to a RPS program. However, "In 2015, Act 56 established a Renewable Energy Standard (RES), repealing the SPEED program except for the standard offer program. The RES established a goal of 55% renewable by 2017."<sup>71</sup> The Standard Offer Program is a feed-in tariff (FIT), designed to provide a reasonable return on investment to renewable energy facility developers in order to increase the development of renewable energy. The Standard Offer Program is available to solar PV, wind, biomass, hydroelectric, and anaerobic digestion. The mini.024 596.26 Tm0 g0 G[Of)6(fer)5( Pro)-6(g)4(r)4(am is a)-3e e.00000912 0 612 792 r

City of Burlington Electric <sup>77</sup>	\$0.052265		Total Capacity .833 MW
Green Mountain Power <sup>78</sup>	\$0.053 (less than 15 kW) \$0.043 (greater than 15 kW)		Total Capacity 25.309 MW
Town of Hardwick Electric Company <sup>79</sup>	\$0.02115 (less than 15 kW) \$0.01115 (greater than 15 kW)		Residential Capacity .242 MW
Town of Stowe <sup>80</sup>	\$0.1564		



during the taxable year.”<sup>92</sup> For wind, the incentive is \$0.02/kWh (10 years), for biomass and hydroelectric the incentive is \$0.01/kWh (5 years).<sup>93</sup> In December 2015, the Consolidated Appropriations Act extended this tax credit for wind facilities until December 31, 2019 and for all other eligible renewable energy technologies until December 31, 2016.<sup>94</sup> Organizations that are tax exempt, including local governments and schools, can take advantage of Clean Renewable Energy Bonds (CREBs). CREBs are federal loans available to the same renewable technologies as the PTC.<sup>95</sup>

### Expiration dates for the ITC tax credit

Note: Solar and wind is based on when construction begins. For all other technologies the expiration date is based on when the system was placed in service (installed and being used for its intended purpose).

Data From:



The NEM program in Vermont is rapidly expanding. The majority of growth has occurred in the residential sector. Additionally, solar PV continues to grow at the fastest pace of all NEM renewable energy system types. Under the new NEM guidelines currently under review by the Vermont Public Service Board, RECs will be required to be retired in state with the exception of current Standard Offer Program contracts. Currently the majority of incentives are geared toward solar NEM at both the state and federal level. Furthermore, collaborations between private and public sectors such as PPAs allow for further savings through “combining” incentives available to each individual sector. Additionally as the State’s largest utilities reach the NEM cap, it is likely that new project development will slow as NEM programs are scaled back.<sup>96,97</sup>

Decomposition in the absence of oxygen, as in an anaerobic lagoon or digester, which produces CO<sub>2</sub> and CH<sub>4</sub>.<sup>98</sup>

Organic non-fossil material of biological origin constituting a renewable energy source.<sup>99</sup>

electricity generated from non-renewable sources such as coal, oil, natural gas, and nuclear.<sup>100</sup>

One thousand watts.<sup>101</sup>

A measure of electricity defined as a unit of work or energy, measured as 1 kilowatt (1,000watts) of power expended for 1 hour.<sup>102</sup>

One million watts of electricity.<sup>103</sup>

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<sup>96</sup> Kristin Carlson, “Green Mountain Power Proposes Strategic Extension of Net Metering for Vermont Homeowners & Businesses,” Colchester, VT: Green Mountain Power, 2015, accessed April 25, 2016, <http://news.greenmountainpower.com/manual-releases/Green-Mountain-Power-Proposes-Strategic-Extension-?feed=d51ec270-a483-4f6c-a55e-8e5fbe2238c2>.

<sup>97</sup> Vermont Electric Cooperative, “Statement about VEC’s Net Metering Program,” Johnson, VT: Vermont Electric Cooperative, 2015, accessed April 25, 2016, <http://www.vermontelectric.coop/important-notice/611-statement-about-vecs-net-metering-program>.

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STANDARD OFFER PROGRAM  
DEVELOPER PROJECTS WITH CONTRACTS  
10/19/09 - 4/12/16

TECHNOLOGY	CAPACITY (kW)	PROJECT NAME	PROJECT LOCATION	HOST UTILITY
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Farm Methane	450	Westminster Energy Group - EXISTING	Westminster	GMP
Hydroelectric	2200	Ball Mountain Hydroelectric Project	Jamaica	GMP
Hydroelectric	150	Factory Falls	Springfield	GMP
Hydroelectric	138	North Hartland	Hartland	GMP
Hydroelectric	960			

Solar PV	2200	Clarendon Solar Project	Clarendon	GMP
Solar PV	800	Clarke Solar Center, LLC	Rutland	GMP
Solar PV	2200	Coventry Solar Project	Coventry	VEC
Solar PV	2200	Cross Pollination One	New Haven	GMP
Solar PV	1000	Ferrisburgh Solar Farm Project	Ferrisburgh	GMP
Solar PV	37	IRA Rentals Solar	Newport	VEC
Solar PV	50	Kingsbury Solar	East Montpelier	GMP

