



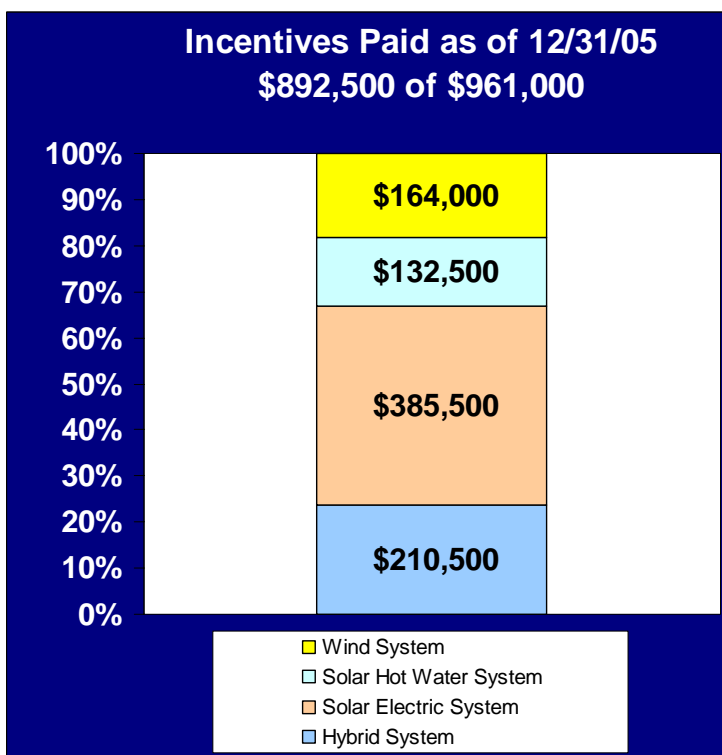
VERMONT SOLAR & SMALL WIND INCENTIVE PROGRAM Final Report – Round 1

Reporting Period: October 24, 2003 - December 31, 2005

The Vermont Solar and Small Wind Incentive Program was originally established by Act 69 of the State Legislature and launched on October 24, 2003. This report summarizes results from the first round of funding, highlights some unique features of Vermont’s program, and summarizes the current status of reservations in the second round of funding. The program offers direct incentives to residential, commercial, and local government projects to reduce the initial costs of solar electric, small wind, and solar hot water systems. The incentive program is overseen by the Vermont Department of Public Service and administered under contract by the Renewable Energy Resource Center, a project of the Vermont Energy Investment Corporation. Additional details including current program rules, incentive design, and participation steps can be found at www.erc-vt.org.

The first round of funding, which granted incentive reservations from October 2003 through August 2004, resulted in a total of 222 new installed systems. The distribution of incentive dollars by project type is illustrated in the graph on the right. Note that the “Hybrid Systems” category in the graph identifies incentive payments made to customers who installed more than one type of system, for example a solar electric and solar hot water system.

Solar electric (photovoltaic or PV) systems make up the largest number (117) of systems installed, for a total rated output of over 221 kilowatts. The expected annual output from these PV systems is 232 MWh, which will displace slightly more than 136 tons of CO₂ emissions each year. The average incentive received was \$4,588, or 25% of the overall average total installed cost of \$18,235. Average system size was 1.9 kW. The anticipated private investment leveraged by these incentives is roughly \$13,650 per system. Off-grid installations made up 55% of installed PV systems in Round I, with 45% of the installations being grid connected.



Thirty nine small wind systems were installed with support from the incentive program. The total rated installed capacity for these systems is more than 96 kilowatts. An initial estimate of the expected electric output (based on an estimated 18% capacity factor) from these turbines is 157 MWh/yr, which will displace close to 92 tons of greenhouse gas emissions annually. The average wind system incentive was \$5,500, or 26% of the overall average total installed cost of \$21,515. The average capacity for installed systems to date was 2.5 kW. The anticipated

private investment leveraged by these incentives is roughly \$16,015 per system. Off-grid installations make up 67% of installed wind systems in Round I, while 33% were grid connected.

Incentive payments also supported the installation of 66 solar hot water systems. These systems are estimated to replace more than 1,000 million Btu per year of hot water heating energy, and reduce greenhouse gas emissions by roughly 85 tons per year. The hot water systems received an average incentive of \$2,815, which is 30% of the overall average installed cost of \$9,400. The average rated heating capacity is 109 kBtu/day. The anticipated private investment leveraged by these incentives is roughly \$6,585 per system.

Incentive Program Round 1 Results

(10/24/03 to 12/31/05)

- ❖ **222 system installations complete**
- ❖ **\$2.57 million in private investment leveraged**
- ❖ **Expected Annual Impacts:**
 - ~389 MWh/yr annual output
 - ~ 313 tons of avoided CO₂ emissions
 - ~1,000 million Btus

Of the 211 incentive reservations initially approved in Round I, 185 incentive payments were made for a total of 222 installed systems. The completion rate, with 88% of the incentive reservations resulting in completed projects, compares favorably with the experience of renewable incentive programs from around the country and reflects well upon the capacity of Vermont's renewable energy professionals. Approximately \$70,000 of incentive funds from those incentive reservations that were not completed were carried forward to Round II of the program

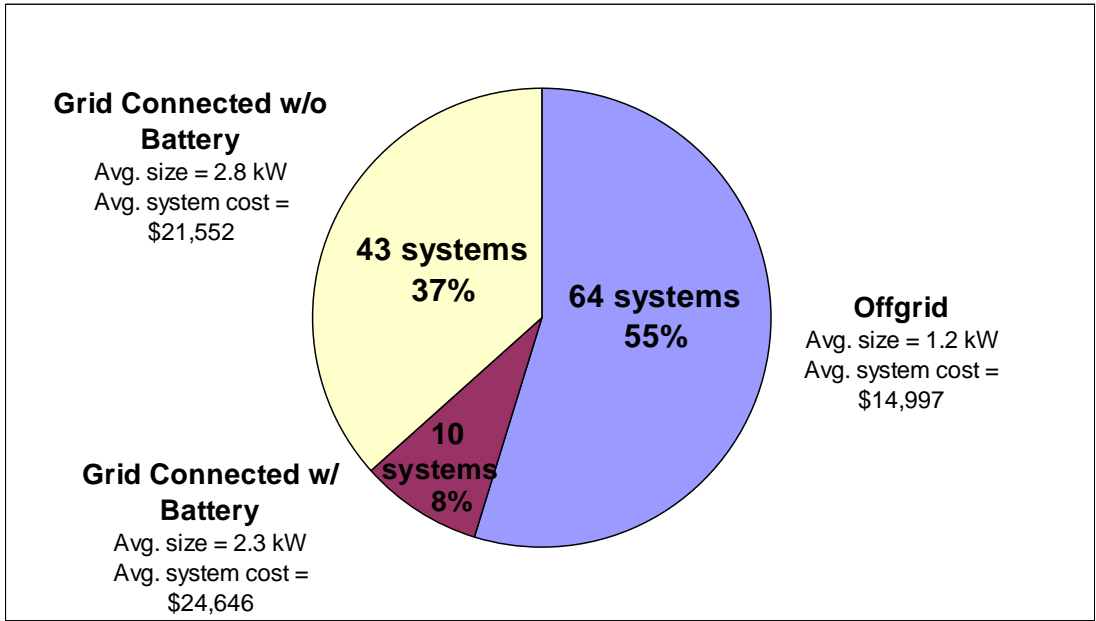
The second round of Vermont's Solar and Small Wind Incentive program started on September 1, 2005 with total new incentives of \$800,300. The funding for Round II has come from four different sources. The largest share is from a U.S. Department of Energy (DOE) FY 2004 Congressional Appropriation through the support of Vermont Senator James Jeffords. These DOE funds are routed through the Vermont Department of Public Service to support the development of small wind energy production in Vermont. Approximately \$454,600 in incentives will be available for qualifying small wind systems for individuals, businesses, schools, and municipalities. Additionally, a combined total of \$271,300 in incentive program financial support specifically for solar electric and solar hot water systems is being provided by Central Vermont Public Service and Green Mountain Power for customers in their service territories. These incentive dollars are part of the monies that the two utilities received through the Nuclear Electric Insurance Limited (NEIL) from the sale of their interests in the Vermont Yankee Nuclear power plant. Incentive levels for Round II were reduced by roughly 20% to encourage continued progress on sustained orderly market development.

By Oct. 24, 2005, only 6 weeks after the start of Round II, all of the incentives available to support investments in solar hot water and solar electric systems were reserved. The existing reservations for Round II funds are expected support sixty seven additional PV systems, thirty nine solar hot water systems, and four small wind systems. In addition to the results shown above, the systems installed with support from the Round II funding are expected to leverage an additional \$3 million of private investment, produce 182 MWh of electricity each year, avoid 500 million Btu/yr of water heating energy consumption, and avoid an additional 150 tons of greenhouse gas emissions.

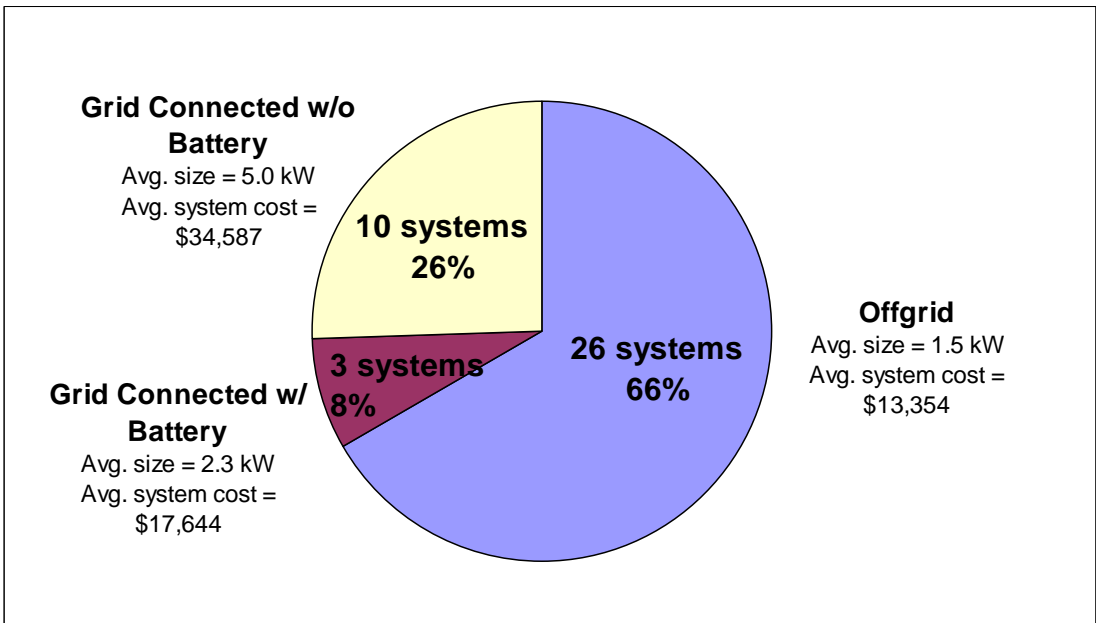
There are several notable features of Vermont's Solar and Small Wind Incentive Program. First, the participation rate and results achieved remain impressive. Second, the program has achieved these results with incentive levels that are significantly lower than similar programs nationwide. The robust activity has been maintained even with lower incentive levels in Round II. The lower incentives were designed and implemented in collaboration between the State and industry stakeholders. Our experience indicates that current market conditions in Vermont continue to provide a high return for the public incentive dollars invested in the program.

The Department of Public Service and the Renewable Energy Resource Center are working with the legislature and other parties to develop and examine options for continuing support and market development.

Solar Electric Systems
(Total: 117 Systems; Avg. Size 1.9kW; Avg. Cost \$18,235)



Small Wind Systems
(Total: 39 Systems; Avg. Size 2.5kW; Avg. Cost \$21,515)



Solar Hot Water		<u>1999</u>	<u>2000</u>	<u>2001</u>	<u>2002</u>	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>
Residential		10	6	12	9	8	47	36					
Commercial		2	2	2	1								
Pool													
State													
Federal													
Other													
Total SHW Annual		12	8	14	10	8	47	36	0	0	0	0	0
Total SHW Cumulative		12	20	34	44	52	99	135	135	135	135	135	135

YEAR

Photovoltaic		<u>1999</u>	<u>2000</u>	<u>2001</u>	<u>2002</u>	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>
Residential													
	Grid Tied	9	16	14	12	17	87	25					
	Off-Grid	8	8	10	2		45	26					
Commercial		0	4	1	0	7							
Solar on Schools		1	2				1	1					
State													
Federal													
Other													
Total PV Annual		18	30	25	14	24	133	52	0	0	0	0	0
Total PV Cumulative		18	48	73	87	111	244	296	296	296	296	296	296

Total Solar Roofs

Annual		30	38	39	24	32	180	88	0	0	0	0	0
Cumulative		30	68	107	131	163	343	431	431	431	431	431	431

Vermont Solar and Small Wind Program Incentive funding provided by:



Vermont Dept. of Public Service



U.S. Department of Energy with the
Support of Vermont Senator James Jeffords

Notes:

- 1) 1 kW of installed solar electric is projected to provide annually 1 MWh of production.
- 2) 1 MWh of solar electric or wind power is estimated to off-set 1,179 lbs of CO₂ or 0.586 tons of CO₂. (NEPOOL Marginal Emission Rate, December 2004)
- 3) 1 kW of installed small wind is projected to provide approximately 1.6 MWh of electric production based on an average 18% capacity factor.
- 4) Solar hot water annual output estimates are based on average solar annual radiation of 1363 Btu/sq.ft./day from NREL Solar Radiation Data Manual, and estimated average total system conversion efficiency of 30%.