Report to the Senate Committees on Finance, Natural Resources, and Energy; and the House Committees on Commerce and Economic Development, Natural Resources, and Energy on the Savings Realized Through the Use of Smart Meters

Prepared by the Department of Public Service Pursuant to Section 15 of Act 170 of 2012

February 20, 2014

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I. Introduction

Section 15 of Public Act 170[1] directs the Department of Public Service to prepare and publish a report on the "savings realized through the use of smart meters, as well as the occurrence of any breaches to a company's cyber-security infrastructure." This report is submitted in fulfilment of that mandate and addresses the statutory considerations of the Act. As of September 30, 2013, utilities with advanced metering infrastructure have spent a cumulative $97,463,607 and have realized $11,351,881 in measured operational and energy savings. There have been no known breaches of any utility's cyber-security infrastructure to date.

A. Executive Summary

As our country has moved to upgrade the national electrical grid, the terms "smart meter" and "smart grid" have entered the lexicon of many Americans. These phrases generally refer to a network of electrical devices that record the consumption of electricity in intervals and transmit that data to an electric utility for billing and other purposes. In Vermont "smart meter" is defined in statute and is distinguished by whether the meter is "wireless" or "wired."[2] A wired meter is "an advanced metering infrastructure device using a fixed wire for two-way communication between the device and an electric company.[3] A wireless smart meter is an "advanced metering infrastructure device using radio or other wireless means for two-way communication between the device and an electric company."[4]

The full measurement and collection system, which includes meters at the customer site, communication networks between the customer and a service provider, and data reception and management systems that make the information available to the service provider, is commonly referred to as advanced metering infrastructure (AMI).[5] This report uses the term AMI to describe the smart meter programs in use by Vermont utilities.[6] AMI networks are promoted for their ability to help electric providers decrease costs, and enable greater participation from consumers in energy efficiency and conservation efforts. This report is intended to inform the Legislature and the public on the savings realized thus far through the use of smart meters.

As of September 30, 2013, participating utilities spent a cumulative total of $97,463,607 to implement their AMI plans. As of the same date, participating utilities have realized $11,351,881 in measured operational and energy savings. These figures cover periods from inception of each utility's AMI system through September 30, 2013. Vermont Utilities' AMI implementation plans estimated a total of $118 million in spending, which included $67 million in America Recovery and Reinvestment Act (ARRA) funding. The utilities initially estimated that total statewide program savings would be $228.33 million over 20 to 25 years.

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[1] Public Act 170, § 15 (Eff. May 18, 2012)
[2] See 30 V.S.A. § 2811(a) (1).
[3] 30 V.S.A. § 2811 (a) (2)
[4] 30 V.S.A. § 2811 (a) (3).
[5] *Advanced Metering Infrastructure (AMI)*, Electric Power Research Institute (2007). Available at http://www.ferc.gov/eventcalendar/Files/20070423091846-EPRI%20-%20Advanced%20Metering.pdf
[6] GMP's SmartPower program includes initiatives that go beyond the standard AMI definition, such as distribution automation. However, for purposes of this report, the SmartPower program is considered synonymous with AMI.

This report reflects a delay in the rate at which those anticipated savings will be achieved, but the utilities still expect to realize the planned level of savings and benefits over their respective project planning horizons. Thus, much of the savings expected from AMI networks is as yet unrealized and thus not included in this report. Because these AMI systems are fairly new, the Department expects a higher level of savings in 2016 when it files the follow up report required by Act 170.

The figures below reflect the costs and savings by utility. GMP accounted for 77 percent of statewide AMI expenditures, followed by Burlington Electric with 15 percent, VEC with 4.3 percent, WEC with 2.7 percent, and Stowe Electric with 1.4 percent.

Actual Costs to Date by Utility

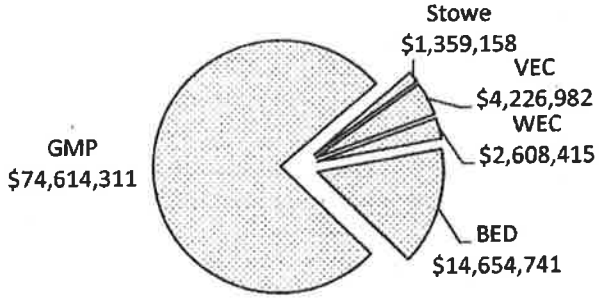

Figure 1

Cumulative Savings Achieved to Date by Utility

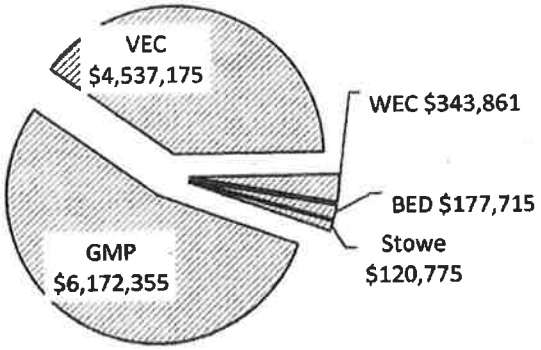

Figure 2

The cumulative savings realized and measured by Vermont utilities include operational savings as well as energy savings. As of September 30, 2013 these savings totaled $11,351,881. Green Mountain Power, the State's largest electric utility, accounted for 54.4 percent of realized savings. The Vermont Electric Cooperative (VEC), which initiated an AMI program five years earlier than other Vermont utilities, realized $4.5 million in savings, or 40 percent of the State total. Washington Electric Cooperative (WEC) with 3 percent, Burlington Electric Department (BED) with 1.6 percent, and Stowe Electric Department (SED) with 1.1, accounted for the remaining savings.

Act 170 also directs the Department to report on the occurrence of "any breaches to a company's cyber security infrastructure." Each participating utility reported on cyber security breaches. There were no confirmed breaches of any AMI network. In the interest of full disclosure, GMP reported on cyber security events that occurred on employee desktop computers. However, none of these events posed a threat to the AMI network. Each company has taken appropriate measures to protect their networks from cyber-security threats and their efforts appear to be in line with the industry.

B. Language of Section 15

30 V.S.A. § 2811 is added to read:

§ 2811. SMART METERS; CUSTOMER RIGHTS; REPORTS

* * *

(c) Reports. On January 1, 2014 and again on January 1, 2016, the commissioner of public service shall publish a report on the savings realized through the use of smart meters, as well as on the occurrence of any breaches to a company's cyber-security infrastructure. The reports shall be based on electric company data requested by and provided to the commissioner of public service and shall be in a form and in a manner the commissioner deems necessary to accomplish the purposes of this subsection. The reports shall be submitted to the senate committees on finance and on natural resources and energy and the house committees on commerce and economic development and on natural resources and energy.

C. Procedural and Drafting History of This Report

The Legislature provided the Public Service Department the authority to request any information from the utilities necessary for completion of this report. The Department sought and received

data from Burlington Electric Department (BED), Green Mountain Power (GMP)[7], Stowe Electric Department (SED), Vermont Electric Cooperative (VEC), and Washington Electric Cooperative (WEC). In an effort to streamline the data collection process, the utilities were required by the Department to use a standardized template to submit their data. This template is referred to as the Measurement and Verification template (or "M&V template") throughout this report.

The Department, in conjunction with Green Mountain Power Company and the former Central Vermont Public Service Company, initially developed the M&V template to capture information necessary for monitoring progress of the GMP and CVPS AMI implementation approved by the Public Service Board in dockets 7704 and 7612. The M&V template was based on a report required by the U.S. Department of Energy to report expenditures of federal grant money from the America Recovery and Reinvestment Act of 2009 (ARRA), which was awarded to the State of Vermont as the Smart Grid Investment Grant (SGIG). The template compares a utility's business plan for AMI implementation with actual expenditures. The Department concluded that the template would be a useful method for obtaining the data necessary for this report. A sample template is appended to this report.[8]

In general, the methodology employed by each utility to collect this information consisted of using the existing reporting practices and processes of each utility's financial systems to record, classify and summarize the cost and savings information included herein. The internal controls associated with those financial reporting processes are audited annually to ensure that the reported financial information is accurate. In preparing this report the Department has relied upon those reporting processes and internal controls to ensure the integrity of the financial data.

II. Actual Costs

Actual costs are the total capital expenditures and operating expenses actually incurred or spent from a program's inception through September 30, 2013. Program costs were further disaggregated into expenditure categories reflecting fixed asset investments, investments in software and information resources, and program support activities. The following table shows major categories of AMI related expenditures.

[7] GMPs submission to the Department includes data from Central Vermont Power Supply (CVPS), which GMP merged with in 2012. The data set included pre-merger CVPS data.
[8] See Appendix 1

Expenditures	Actual Costs (to date)	%
Field Systems	$68,002,320	69.8%
Utility Office Systems	$13,498,044	13.8%
Grid Automation	$ 7,985,814	8.2%
Customer Systems	$ 2,633,334	2.7%
Data Record, Analysis	$ 1,534,924	1.6%
Program Management	$ 1,470,149	1.5%
Information Access	$ 1,423,294	1.5%
Dynamic Pricing Programs	$ 627,094	0.6%
Operational Readiness	$ 288,634	0.3%
Total	$97,463,607	100.0%

Field Systems expenditures totaled $68,002,320, or almost 70 percent of the total AMI expenditures. The largest component under Field Systems was the $62 million purchase and installation of smart meters. Other Field Systems expenditures included investments in fiber optic infrastructure.

Utility Office Systems, which account for almost 14 percent of total expenditures, included outlays for smart meter service architecture and meter data management processes and systems. Grid automation, which accounts for 8 percent of the expenditures, was largely committed to expansion of supervisory control and data acquisition networks (SCADA), and program fault recovery systems. SCADA programs are used in industrial process control applications for centralized monitoring and recording of switches, meters, and the like.

Customer Systems expenses for outreach and consumer education activities accounted for 2.7 percent of the total. The remaining expenditure categories were related to program management, regulatory review, information programs, and contingencies.

AMI Costs to Date by Expenditure Category

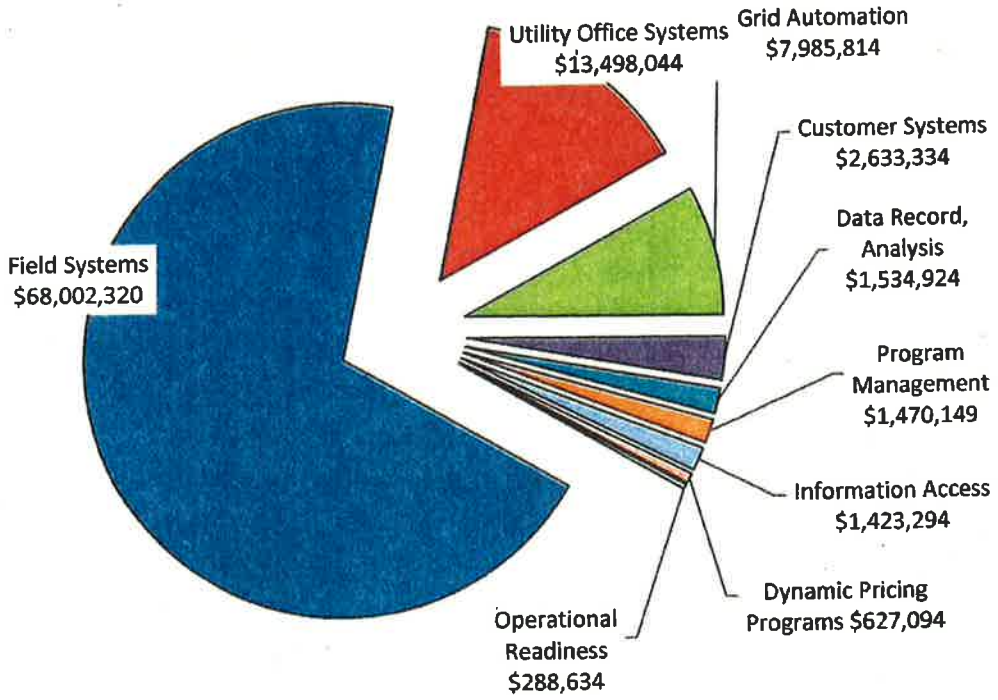

Figure 3

II. AMI Financial Plans and Variance

Each utility developed a AMI business case that included a 20 to 25 year financial plan with a forecast of its expenditures and the expected savings that would be realized. The forecasted expenditures included capital expenditures (acquisitions and installation costs), ongoing operation and maintenance (O&M) expenses, and costs of establishing dynamic pricing, smart grid enabled rate design and demand management programs. The financial plan also included a "contingency amount" that varied by utility as did the planning period covered by the forecast that ranges from 20 to 25 years, depending upon the utility.

For GMP South (former CVPS territory), the cumulative financial plan is based on the August 2011 update to the 2007/8 business case that was provided to the PSD as part of the 2012 base rate filing. For VEC, the financial plan data includes the expenditure of its own funds before and after the receipt of the Federal ARRA funding in 2009.

The difference between cumulative spending planned up to the current fiscal year quarter and actual costs incurred to date as of the current fiscal year quarter is referred to as the variance.

Utilities developed AMI implementation plans totaling $118 million. Through September 30, 2013, actual spending totaled $97.4 million, or 82.2 percent of planned outlays. The variance therefore, which is the difference between the financial plans and actual cumulative expenses, was $21 million.

Cumulative Financial Plan	-	Actual Costs to Date	=	Variance to Date
$ 118,548,699		$ 97,463,607		$ 21,085,093

A review of AMI cost components ranked by variance finds Field Systems to show the largest variance of all the AMI sub-accounts, making up 85% of planned spending. As the largest sub-account this is to be expected. Field Systems include the purchase and installation of smart meters. Utilities have yet to use any of the contingency funds. Spending on dynamic pricing programs was only 24% of the anticipated total in the AMI financial plans. Rate design and dynamic pricing spending have lagged because the initial deployment of the new technologies was only completed earlier this year. Dynamic pricing could not be implemented until after all of the technology was in place, fully tested, and operating properly.

	Cumulative Plan	Actual Costs to Date	Variance To Date	Actual Cost As % of Plan
Field Systems	$79,442,101	$68,002,320	$11,439,781	85.6%
Program Contingency	$ 6,642,503	$ 0	$ 6,642,503	0.0%
Dynamic Pricing	$ 2,574,215	$ 627,094	$ 1,947,121	24.4%
Grid Automation	$ 8,920,880	$ 7,985,814	$ 935,066	89.5%
Customer Systems	$ 3,241,427	$ 2,633,334	$ 608,093	81.2%
Data Record, Analysis	$ 1,874,106	$ 1,534,924	$ 339,182	81.9%
Operational Readiness	$ 230,514	$ 288,634	$ (57,120)	124.7%
Program Management	$ 1,302,036	$ 1,470,149	$ (158,113)	112.1%
UtilityOffice Systems	$13,217,201	$13,498,044	$ (280,843)	102.1%
Information Access	$ 1,092,716	$ 1,423,294	$ (330,578)	130.3%
Total Expenditures	$118,548,699	$97,463,607	$21,085,093	82.2%

III. Savings Realized Through the Use of Smart Meters

The measurement and verification templates describe three basic types of savings: operational savings, energy savings, and societal benefits. For AMI M & V reporting; operational and energy

savings were considered quantifiable in financial terms whereas the societal benefits were considered qualitative only. Operational savings are savings derived from new capabilities that allow utilities to more efficiently manage and operate the distribution grid. Energy savings are cost reductions attributable to better energy management. Societal benefits are the result of new technologies and energy-related programs, such as reductions in pollution emissions and improved outage management.

At this point in the AMI implementation process, savings realized have been primarily operational. Utilities have reported reduced metering costs, reduced vehicle miles, reduced carbon emissions, enhanced outage response, and more detailed information available to customers enabling better understanding and management of energy use.

In addition to the quantifiable savings, utilities have also reported additional savings that are more difficult to isolate and attribute to smart meters. First, the installation of smart meters, combined with an outage management system, has resulted in decreasing outage frequency (as reported by GMP and VEC). While the improved outage performance is attributable to many different factors, including capital improvements, vegetation management, and other system improvements, smart meter implementation is notable among those factors.

Operational and Energy Savings

Initial AMI implementation plans estimated total program savings of $228.33 million over 20 to 25 years. To date utilities have reported actual realized savings of $11.35 million. The realized savings are approximately 5 percent of expected savings. The variance, the difference between expected and actual realized savings, was $216.98 million. Future savings realization expectations are noted in the table below:

	Planned Savings	Actual Savings to Date	Variance (Savings Yet to be Realized)
Operational Savings	$ 186,219,341	$ 9,967,983	$ 176,251,358
Energy Savings	$ 42,110,983	$ 1,383,898	$ 40,727,085
Total Savings	$ 228,330,324	$ 11,351,881	$ 216,978,443

Total Planned Savings vs Actual Realized Savings To Date

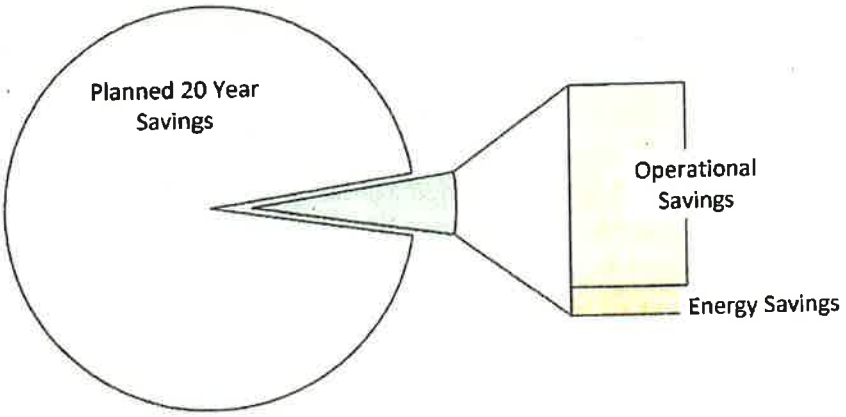

Figure 4

By savings category, operational savings realized to date totaled $9.9 million, which was 5 percent of total planned operational savings. Actual energy savings totaled $1.3 million, or approximately 3.3 percent of plan.

Operational and Energy Savings as a Percentage of AMI Implementation Plan

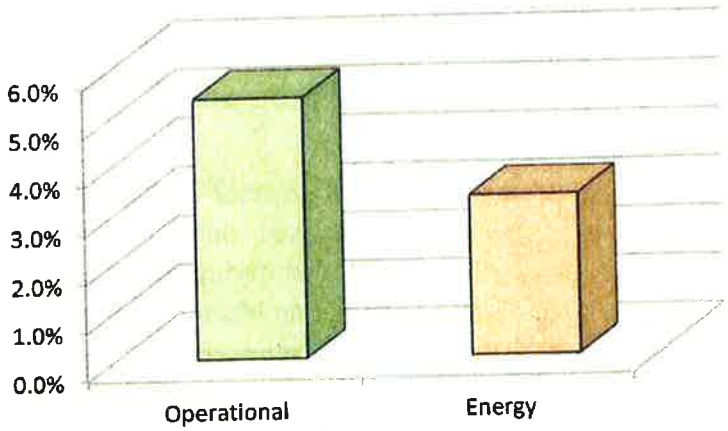

Figure 5

Societal Benefits

While utilities have reported qualitative evidence of societal benefits derived from the use of smart meters, the early stages of AMI investment and implementation have not generated sufficient quantifiable results to date. In addition utilities have reported that, although significant cost savings could be attributed to AMI projects, such savings are beyond the modeling capabilities at this time.

Furthermore, utilities have also reported savings, as well as opportunities to achieve additional unanticipated savings for customers, that were not included in the original business plans. For example, the integration of smart meter outage management capabilities with new mobility platforms decreases outage restoration time during inclement weather events. This leads directly to improved reliability and additional savings to customers.

Utilities cite several social benefits of using smart meters:

(1) Commercial and industrial customer outage cost reduction: Utilities estimate that enhanced outage management capabilities associated with AMI should result in shorter outages for utility customers. Shorter outages will mean a decrease in related production and output losses for Commercial and Industrial customers. The value of this increased productivity is considered a societal benefit.

(2) Carbon reduction: Carbon emission reductions result from fewer trips to customer premises due to the utilities' ability to provide remote support (meter reading, service switch, voltage reading, etc.) over the AMI network. In addition, AMI contributes to reduced carbon emissions through Customers' use of efficient technologies that replace or supplement fossil fuel technologies. Examples of these technologies include electric vehicles, and solar water heaters.

(3) Decreased energy costs: Another potential societal benefit of smart meters is lower wholesale energy costs due through demand management. Vermont's enhanced Demand Response program helps reduce load during peak and high demand periods. This in turn can have a price lowering effect on wholesale prices. With the use of AMI interval data, residential and small commercial customers can now participate in demand management programs that help reduce or stabilize the price of wholesale energy for the entire New England pool during peak demand hours.

(4) Customer conservation associated with AMI web presentment: AMI implementation plans assume that the more customers know about and understand their electricity use, the more likely they are to conserve energy. This includes conservation and change in usage patterns assuming that time-of-use pricing becomes available. Web presentment of hourly data for individual customers should cause customers to conserve electricity

(avoided power costs) and shift their usage (reduce power costs) to off-peak hours. Future Measurement & Verification Reports will explore methods for quantifying this benefit.

IV. AMI Cost and Savings Summaries by Utility

The following provides a utility by utility summary of actual costs versus actual realized savings to date, total 20-25 year planned costs and savings, and actual costs and benefits to date.

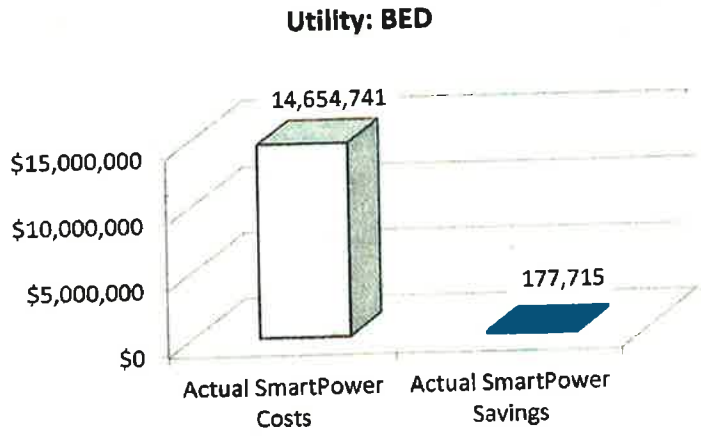

Figure 6

Utility: BED

Costs	Financial Plan	Actual Costs to date	Costs to be Incurred
Total	$15,237,104	$14,654,741	$582,363

Savings	Planned	Actual Savings to Date	Savings To Be Realized
Total	$16,847,098	$177,715	$16,669,383
Operational	$ 6,499,236	$177,715	$ 6,321,521
Energy	$10,347,862	$ 0	$10,347,862

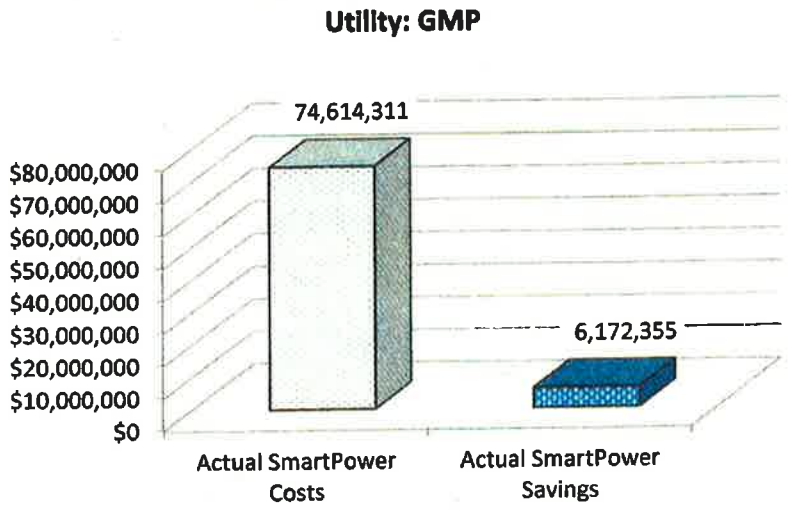

Figure 7

Utility: GMP

Costs	Financial Plan	Actual Costs to date	Costs to be Incurred
Total	$ 95,466,957	$ 74,614,301	$ 20,852,656

Savings	Planned	Actual Savings To Date	Savings To Be Realized
Total	$210,767,327	$ 6,172,355	$204,594,972
Operational	$179,004,206	$ 4,788,457	$174,215,749
Energy	$ 30,763,121	$ 1,383,898	$ 29,379,223

Utility: SED

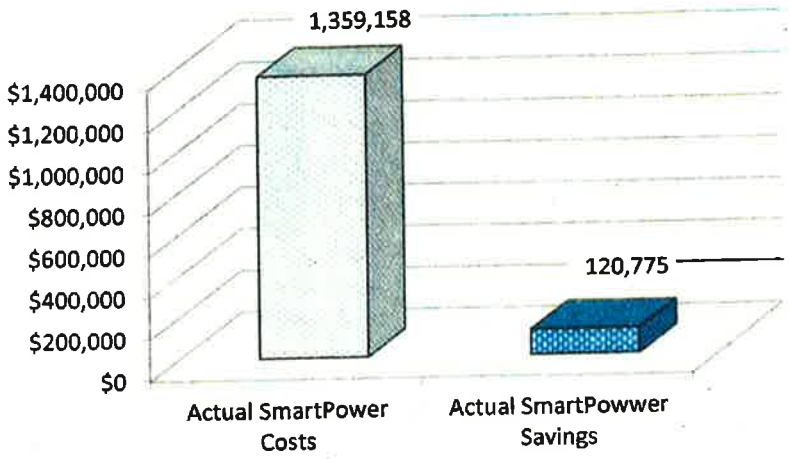

Figure 8

Utility: SED

Costs	Financial Plan	Actual Costs to Date	Costs to be Incurred
Total	$1,436,905	$1,359,158	$77,747

Savings	Planned	Actual Savings to Date	Savings to be Realized
Total	$265,304	$120,775	$144,529
Operational	$265,304	$120,775	$144,529
Energy	$0	$0	$0

Utility: VEC

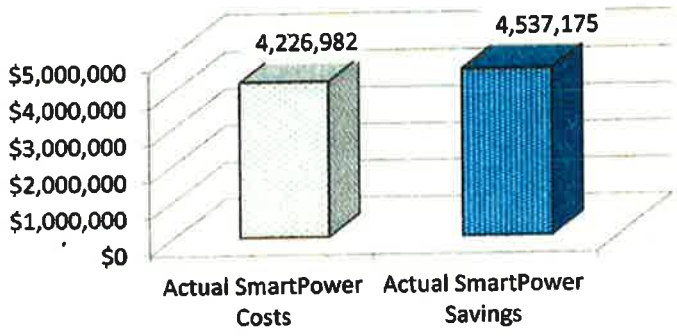

Figure 9

Utility: VEC

Costs	Financial Plan	Actual Costs to date	Costs to be Incurred
Total	$1,436,905	$1,359,158	$77,747

Savings	Planned	Actual Savings to Date	Savings to be Realized
Total	4,155,916	4,226,982	($71,066)
Operational		4,537,175	N/A
Energy		0	N/A

Utility: WEC

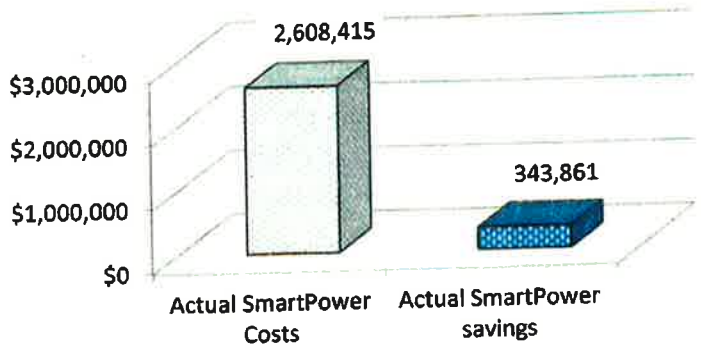

Figure 10

Utility: WEC

Costs	Planned	Actual Costs to date	Costs to be Incurred
Total	2,251,818	2,608,415	($356,597)

Savings	Planned	Actual Savings to Date	Savings to be Realized
Total	$450,585	$343,861	$106,724
Operational	$450,585	$343,861	$106,724
Energy	$0	$0	$0

V. Cyber Security Concerns

Section 15 directs the Department to brief the Legislature on "the occurrence of any breaches to a company's cyber security infrastructure." The Department has interpreted this language to mean security events affecting a utility company's AMI network. All five utilities filed reports with the Department detailing their security policies and history of security breaches. According to these reports, there have been no known breaches of any of the AMI networks' security. This section details the cyber security the Department collected in fulfilment of section 15 of Act 170. This section of the report summarizes the reports each utility filed the Department.

Burlington Electric Department

Burlington Electric Department reported that it has had no breaches of its AMI network to date.[9] BED's AMI network is a closed loop system utilizing BED's private fiber backhaul system. The AMI collection engine uses security appliances from Certicom that isolate and minimize the impact of any security breach. Meter data is encrypted using ANSI C12.22, the American National Standard for Protocol Specification for Interfacing to Data Communication Networks.

Green Mountain Power

Green Mountain Power reports that it has had no breaches to its AMI network. Using grant money from ARRA, GMP has developed a cyber-security plan that aims to protect the AMI network and GMP customers' data. GMP has an Enterprise Security Manager, who actively works to implement GMP's cyber security plan and coordinate with other Vermont utilities to identify potential risks and fortify GMP infrastructure. GMP has partnered with Sandia Labs to measure the strength of its security systems.

GMP reports that although there have been no compromises to its AMI network, it has experienced security events on GMP employees' desktop computers. GMP recounted six separate events that affected a work station computer. One event affected the computer of a GMP customer. However, none of these events compromised GMP's AMI system. A complete list of these events appears in Appendix 2.

Stowe Electric Department

Stowe Electric Department (SED) reported that it has had no breaches of its cyber security infrastructure. SED made this determination after conducting a review of alerts and log files generated by SED's network firewall. According to SED:

> The SED smart meter/AMI head end provides alerts related to unexpected events taking place on the AMI network. These alerts appear in the Elster [graphical user interface] and are reviewed at least daily during the work week. Reviews of these

[9] As of December 18, 2013

events are conducted by the system administrator often with input from the Operations team.[10]

SED staff is working on a comprehensive cyber-security policy that will incorporate security for both its smart meter/AMI infrastructure and its day to day office operations. SED anticipates a finalized security policy by the end of 2014. SED expressed support for the *Principles Relating to Cyber Security* proposed by the Department in Docket 7307.

Vermont Electric Cooperative

Vermont Electric Cooperative (VEC) reports that it is "not aware of any such cyber-attacks or attempts." VEC's report excludes "events which are external to our firewall, and which do not penetrate our security systems." VEC highlighted its partnership with Sandia National Laboratory in New Mexico, to evaluate and enhance its cyber security network and policies. In response to a report from Sandia Lab on this evaluation, VEC prepared a "Mitigation Action Plan" to implement the recommendations made by Sandia Laboratory. VEC also maintains close communication with the National Electric Sector Cyber Security Organization and the Department of Homeland Security to keep abreast of threats and cyber security events that may impact VEC's smart grid network.

Washington Electric Cooperative, Inc.

Washington Electric Cooperative (WEC) "has had no known or reported breaches of cyber security as of [November 25, 2013]" and reports having "implemented policies and plans that outline procedures, steps, and responsibilities to ensure adequate protections are taken by all WEC employees and service providers." In addition WEC has completed a Department of Energy approved Smart Grid Cyber Security Plan Assessment through an audit by SAIC, an engineering and IT services contractor. The audit provided an assessment of the AMI system's security and was used by WEC to develop and implement a "security risk register," which identifies risks and plans to protect software and systems that include AMI meters as well as other software systems.

WEC expressed support for the *Principles Relating to Cyber Security* proposed by the Department in Docket 7307and endeavors to implement best practices and industry standards for protecting its AMI system.

VI. Conclusion

Smart meters and AMI infrastructure have proven to provide quantifiable operational and energy savings to date. Although these savings amount to $11.35 million, many of the savings associated with the use of AMI have yet to be realized. Vermont's participating utilities plan to recover costs and realize operational and energy savings over a 20 to 25 year period. Future

[10] Email from Kevin Weishaar, controller with Stowe Electric Department, to Jeannie Elias, Department of Public Service on November 27, 2013.

reports on this subject are expected to show an increased amount of savings and benefit to utilities and consumers.

APPENDIX II

GMP Non-AMI Security Events by Date

12/7/2012: a user's system was infected with malware that was not detected by the installed Antivirus software. The malware attempted to spread to other systems and that activity was detected and alerted immediately. The infected system was removed from the network and reimaged.

12/18/2012: GMP was informed by a third party that one of our systems was sending out email spam. The system was removed from the network and scanned with a second antivirus product which detected an infection with spam bot malware. The system was reimaged as a precaution.

5/16/2013: a user's system was infected with malware that was not initially detected by the installed antivirus software. The malware tried to install additional components which were detected. The systems was removed from the network and reimaged.

8/28/2013: a routine review of ES-ISAC alert information against the firewall logs indicated a system that had been compromised and was part of a bot network. The system was a virtual windows environment running on a Mac and did not have Antivirus functioning correctly. The virtual system was deleted and reinstalled with appropriate software.

9/13/2013: a user's system was infected with malware that was not prevented by the installed Antivirus software. The malware attempted to propagate by renaming files and folders on shared drives which was detected and reacted to immediately. The system was removed from the network and reimaged.

10/4/2013: a routine review of firewall logs indicated a system that was attempting to send out email spam. This system was removed from the network and cleaned with a different antivirus product than the one installed on it.

Source: *GMP response to Department's inquiry regarding Breaches of Cyber Security*

Appendix I

Measurement Verification Report
Quarter Ending:

	Cost Type	Elements	Business Case Capital	Business Case O&M	Business Case Total	Total	2009 Q1	2009 Q2	2009 Q3	2009 Q4	2010 Q1	2010 Q2	2010 Q3	2010 Q4
CVPS SMARTPOWER			$47,852,885	$11,492,121	$56,946,000	$58,946,015	$67,811	$105,111	$105,311	$244,496	$878,420	$1,042,837	$844,998	$967,173
Service Oriented Architecture			$1,000,000	$423,320	$1,423,320	$1,423,320	$0	$0	$0	$0	$88,320	$88,320	$0	$0
	Capital	C15	$1,000,000		$1,000,000	$1,000,000								
	O&M	OM13		$323,320	$323,320	$323,320					$88,320	$88,320		
	On-Going O&M	OM13		$100,000	$100,000	$100,000								
Meter Data Management System			$3,387,224	$227,914	$3,615,138	$3,615,138	$35,583	$35,583	$35,583	$188,864	$313,191	$477,608	$277,608	$290,108
	Capital	C11 C13 C14	$3,387,224		$3,387,224	$3,387,224				$153,281	$177,608	$477,608	$277,608	$277,608
	O&M	OM9 OM12		$227,914	$227,914	$227,914	$35,583	$35,583	$35,583	$35,583	$35,583			$12,500
	On-Going O&M	OM1 OM2			$0									
VELCO Fiber			$4,805,634	$200,342	$5,005,976	$5,005,976	$0	$0	$0	$0	$366,667	$366,667	$366,667	$366,667
	Capital	C1 C2	$4,805,634		$4,805,634	$4,805,634					$366,667	$366,667	$366,667	$366,667
	On-Going O&M	OM6		$200,342	$200,342									
	(2009 - 2013)													
Intermediate Backhaul Phase 2			$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	Capital	C3			$0	$0								
	O&M	OM38, OM42			$0	$0								
AMI Meter Purchase and Installation			$31,096,650	$8,001,925	$39,098,575	$39,098,574	$32,229	$32,229	$32,229	$32,229	$74,479	$74,479	$74,479	$97,279
	Capital	C4 - C10	$31,096,650		$31,096,650	$31,096,650								
	O&M	OM9, OM10, OM31, OM36, OM43, OM46, OM47, OM48, OM49		$8,001,925	$8,001,925	$8,001,924	$32,229	$32,229	$32,229	$32,229	$74,479	$74,479	$74,479	$97,279
	On-Going O&M	OM3, OM4, OM5, OM7												
	(2010 - 2013)													
Customer Outreach & Education			$0	$2,528,005	$2,528,005	$2,528,005	$0	$0	$0	$0	$0	$0	$60,000	$60,000
	O&M (2010 - 2013)	OM19		$2,528,005	$2,528,005	$2,528,005							$60,000	$60,000
	On-Going O&M	OM17												
	(2010 - 2013)													
Customer Web Presentment			$180,000	$416,726	$596,726	$596,726	$0	$0	$0	$0	$0	$0	$0	$0
	Capital	C12	$180,000		$180,000	$180,000								
	O&M	OM43		$416,726	$416,726	$416,726								
Heat Pump Water Heater Pilot			$0	$175,000	$175,000	$175,000	$0	$0	$0	$0	$0	$0	$0	$21,875
	O&M	OM21		$175,000	$175,000	$175,000								$21,875
Consumer Behavior Study			$0	$1,609,000	$1,609,000	$1,609,000	$0	$0	$0	$0	$0	$0	$50,000	$75,000
	Capital				$0	$0								
	O&M	OM15, OM16 OM20, OM22, OM23, OM37		$1,609,000	$1,609,000	$1,609,000							$50,000	$75,000
Regulatory Review and Approvals			$0	$231,514	$231,514	$231,514	$0	$0	$0	$23,404	$13,514	$13,514	$13,514	$13,514
	O&M	OM29, OM30, OM32		$231,514	$231,514	$231,514				$23,404	$13,514	$13,514	$13,514	$13,514
Dynamic Pricing Programs			$0	$387,500	$387,500	$387,500	$0	$0	$0	$0	$0	$0	$0	$0
Explore Smart Rates	O&M	OM25		$350,000	$350,000	$350,000								
Rate 9 (17) with Opower Pilot	O&M	OM24		$37,500	$37,500	$37,500								
Rate 11/13 Rebate	O&M	OM45				$0								
	On-Going O&M	OM18				$0								
	(2009 - 2013)													
Grid Automation			$4,622,839	$0	$4,622,839	$4,622,839	$0	$0	$0	$0	$0	$0	$0	$0
SCADA Expansion	Capital	C16 C18, C22	$2,875,000		$2,875,000	$2,875,000								
Auto Fault Recovery Pilot	Capital	C21	$747,794		$747,794	$747,794								
Var Volt Optimization Pilot	Capital	C19	$780,009		$780,009	$780,009								
IV Fault Indicators	Capital	C20	$90,000		$90,000	$90,000								
SCADA Information Sharing	Capital	C17	$130,036		$130,036	$130,036								
	On-Going O&M	OM44				$0								
	(2011 - 2013)													
Program Management			$0	$790,875	$790,875	$790,875	$0	$37,500	$37,500	$0	$22,250	$22,250	$42,781	$42,781
O&M	O&M	OM11, OM26, OM28, OM40, OM50		$790,875		$790,875		$37,500	$37,500		$22,250	$22,250	$42,781	$42,781
Program Contingency			$2,361,538	$1,500,000	$3,861,538	$3,861,538	$0	$0	$0	$0	$0	$0	$0	$0
	Capital		$2,361,538		$2,361,538	$2,361,538								
	O&M	OM51		$1,500,000	$1,500,000	$1,500,000								

	2011 Q1	2011 Q2	2011 Q3	2011 Q4	2012 Q1	2012 Q2	2012 Q3	2012 Q4	2013 Q1	2013 Q2	2013 Q3	2013 Q4
CVPS SMARTPOWER	$1,471,204	$1,916,503	$1,924,713	$2,014,470	$9,920,182	$9,814,308	$9,680,521	$9,707,075	$5,824,905	$1,465,545	$565,424	$541,224
Service Oriented Architecture	$0	$0	$0	$0	$50,000	$0	$0	$146,680	$800,000	$250,000	$0	$0
									$750,000	$250,000		
								$146,680				
					$50,000				$50,000			
Meter Data Management System	$279,189	$279,189	$279,189	$266,589	$214,189	$214,189	$214,189	$214,189	$0	$0	$0	$0
	$266,689	$266,689	$266,689	$266,689	$214,189	$214,189	$214,189	$214,189				
	$12,500	$12,500	$12,500									
VELCO Fiber	$382,951	$382,951	$382,951	$382,951	$484,767	$484,767	$484,767	$484,767	$17,109	$17,109	$17,109	$17,109
	$366,667	$366,667	$366,667	$366,667	$468,076	$468,076	$468,076	$468,076				
	$16,285	$16,285	$16,285	$16,285	$16,692	$16,692	$16,692	$16,692	$17,109	$17,109	$17,109	$17,109
Intermediate Backhaul Phase 2	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
AMI Meter Purchase and Installation	$114,685	$559,984	$726,964	$726,964	$7,048,744	$7,048,744	$7,048,744	$7,048,744	$2,911,378	$137,979	$137,979	$137,979
		$936,968	$486,416	$466,414	$6,763,364	$6,763,364	$6,768,364	$6,768,364	$2,773,399			
	$114,685	$223,018	$280,578	$260,578	$285,980	$285,980	$285,380	$285,380	$137,979	$137,979	$137,979	$137,979
Customer Outreach & Education	$197,500	$197,500	$197,500	$197,500	$205,365	$205,365	$205,365	$205,365	$199,137	$199,137	$199,137	$199,137
	$197,500	$197,500	$197,500	$197,500	$205,365	$205,365	$205,365	$205,365	$199,137	$199,137	$199,137	$199,137
Customer Web Presentment	$0	$0	$60,000	$140,896	$229,841	$189,987	$0	$0	$0	$0	$0	$0
			$60,000	$80,000	$60,000							
				$60,896	$169,841	$189,987						
Heat Pump Water Heater Pilot	$21,875	$21,875	$21,875	$21,875	$21,875	$21,875	$21,875	$0	$0	$0	$0	$0
	$21,875	$21,875	$21,875	$21,875	$21,875	$21,875	$21,875					
Consumer Behavior Study	$317,500	$317,500	$62,500	$74,500	$87,500	$87,500	$87,500	$87,500	$87,500	$87,500	$87,500	$99,500
	$317,500	$317,500	$62,500	$74,500	$87,500	$87,500	$87,500	$87,500	$87,500	$87,500	$87,500	$99,500
Regulatory Review and Approvals	$26,014	$26,014	$26,014	$26,014	$12,500	$12,500	$12,500	$12,500	$0	$0	$0	$0
	$26,014	$26,014	$26,014	$26,014	$12,500	$12,500	$12,500	$12,500				
Dynamic Pricing Programs	$0	$0	$0	$0	$12,500	$12,500	$12,500	$0	$87,500	$87,500	$87,500	$87,500
Explore Smart Rates									$87,500	$87,500	$87,500	$87,500
Rate 9 (17) with Opower Pilot					$12,500	$12,500	$12,500					
Rate 11/13 Rebate												
Grid Automation	$88,759	$88,759	$88,759	$138,759	$458,061	$458,061	$458,061	$408,502	$835,561	$0	$0	$0
SCADA Expansion	$56,250	$56,250	$56,250	$56,250	$530,000	$530,000	$530,000	$530,000	$530,000			
Auto Fault Recovery Pilot				$49,559	$149,559	$149,559	$149,559	$100,000	$149,559			
Var Volt Optimization Pilot					$156,002	$156,002	$156,002	$156,002	$156,002			
IV Fault Indicators					$22,500	$22,500	$22,500	$22,500				
SCADA Information Sharing	$32,509	$32,509	$32,509	$32,509								
Program Management	$42,731	$42,731	$79,531	$42,731	$55,231	$55,231	$81,431	$55,231	$42,731	$42,731	$86,200	$0
O&M	$42,731	$42,731	$78,931	$42,731	$55,231	$55,231	$81,431	$55,231	$42,731	$42,731	$86,200	
Program Contingency	$0	$0	$0	$0	$643,590	$643,590	$643,590	$643,590	$643,590	$643,590	$0	$0
					$393,590	$393,590	$393,590	$393,590	$393,590	$393,590		
					$250,000	$250,000	$250,000	$250,000	$250,000	$250,000		