BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF COLORADO

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IN THE MATTER OF THE APPLICATION OF PUBLIC SERVICE COMPANY OF COLORADO FOR APPROVAL OF A NUMBER OF STRATEGIC ISSUES RELATING TO ITS DSM PLAN, INCLUDING MODIFIED ELECTRIC ENERGY SAVINGS AND DEMAND REDUCTION GOALS, AND REVISED INCENTIVES FOR THE PERIOD 2015 THROUGH TO 2020; FOR APPROVAL OF A DISTRIBUTION VOLTAGE OPTIMIZATION PROGRAM TOGETHER WITH COST RECOVERY AND INCENTIVES, AN LED STREET LIGHTING PRODUCT AND APPROVAL TO INCLUDE BEHAVIORAL CHANGE PRODUCTS IN THE COMPANY'S DSM PORTFOLIO AND OF THE METHODOLOGY TO BE USED TO MEASURE SAVINGS FROM SUCH PRODUCTS; AND FOR COMMISSION GUIDANCE REGARDING THE FACTORS TO BE CONSIDERED AND APPROPRIATE LEVEL OF THE COMPANY'S GAS DSM PROGRAM IN THE FUTURE.	)	**DOCKET NO. 13A-XXXEG**

DIRECT TESTIMONY OF DEBRA L. SUNDIN

ON

BEHALF OF

PUBLIC SERVICE COMPANY OF COLORADO

June 17, 2013

Corrected on April 11, 2014

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF COLORADO

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IN THE MATTER OF THE APPLICATION OF PUBLIC SERVICE COMPANY OF COLORADO FOR APPROVAL OF A NUMBER OF STRATEGIC ISSUES RELATING TO ITS DSM PLAN, INCLUDING MODIFIED ELECTRIC ENERGY SAVINGS AND DEMAND REDUCTION GOALS, AND REVISED INCENTIVES FOR THE PERIOD 2015 THROUGH TO 2020; FOR APPROVAL OF A DISTRIBUTION VOLTAGE OPTIMIZATION PROGRAM TOGETHER WITH COST RECOVERY AND INCENTIVES, AN LED STREET LIGHTING PRODUCT AND APPROVAL TO INCLUDE BEHAVIORAL CHANGE PRODUCTS IN THE COMPANY'S DSM PORTFOLIO AND OF THE METHODOLOGY TO BE USED TO MEASURE SAVINGS FROM SUCH PRODUCTS; AND FOR COMMISSION GUIDANCE REGARDING THE FACTORS TO BE CONSIDERED AND APPROPRIATE LEVEL OF THE COMPANY'S GAS DSM PROGRAM IN THE FUTURE.	)	**DOCKET NO. 13A-XXXEG**

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DIRECT TESTIMONY OF DEBRA L. SUNDIN

I. INTRODUCTION

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Debra L. Sundin. My business address is 414 Nicollet Mall, Minneapolis, Minnesota 55401.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT POSITION?

A. I am employed by Xcel Energy Services, Inc., a wholly-owned subsidiary of Xcel Energy Inc., the parent company of Public Service Company of Colorado. My job title is Director, DSM & Renewable Strategy & Planning.

Q. ON WHOSE BEHALF ARE YOU TESTIFYING IN THE PROCEEDING?

A. I am testifying on behalf of Public Service Company of Colorado ("Public Service" or the "Company").

Q. HAVE YOU INCLUDED A DESCRIPTION OF YOUR QUALIFICATIONS, DUTIES, AND RESPONSIBILITIES?

A. Yes. A description of my qualifications, duties, and responsibilities is included as Attachment A.

Q. WHAT IS THE PURPOSE OF YOUR DIRECT TESTIMONY?

A. The primary purpose of my testimony is to present and request approval of revised electric Demand Side Management ("DSM") (Energy Efficiency and Demand Response) Goals for 2015 through 2020. I will explain the history, background and context in which the Company developed its proposed new goals. I will explain the composition of the goals and I provide policy support for the Company's proposal to meet the revised energy savings goals through the offering of certain non-traditional products and programs, including Distribution Voltage Optimization ("DVO"), LED Street Lighting, and Behavioral products. After addressing our proposed new energy efficiency goals, I provide an overview of Demand Response ("DR") and present and explain the proposed goals for demand response based on the potential study for demand response that has recently been completed by the Brattle Group. Consistent with the

commitment we made in our 2012-2013 Biennial Plan settlement, I also discuss for informational purposes the potential for demand reduction from electric vehicles. I then explain, In response to comments from the Commission in the most recent electric resource plan docket, the Company's position and our request to the Commission regarding DSM bidding for both DR and energy efficiency. Finally, I will discuss and request guidance on future spending levels and other policy issues of the Company's gas DSM portfolio.

Q. WHAT SPECIFIC COMPLIANCE REQUIREMENTS ARE YOU ADDRESSING IN YOUR APPLICATION AND WHERE ARE THEY ADDRESSED?

A. Specific compliance requirements for this Strategic Issues Filing are:

1) In Ordering ¶ 7 of Decision No. C11-0442 issued in Docket No. 10A-554E, the Company's last Application to consider various strategic issues relating the Company's electric DSM program, the Commission wrote,

> *Public Service shall file an application opening a DSM strategic issues proceeding to examine potential adjustments to the Company's savings goals and commensurate changes to its financial incentive mechanism on or before September 1, 2014, consistent with the discussion above.*\

- The September 1, 2014 date was later changed to June 15 2013 by Decision No. C12-0442. Energy Efficiency and Demand Response savings goals are proposed within my testimony in Section II and the basis for those goals are explained in sections V through XI. A more complete technical discussion of the proposed goals is discussed in Mr. Jeremy A. Petersen's testimony.

- Changes to the DSM financial incentive mechanism are proposed and discussed in Mr. Scott Brockett's testimony in sections VI, VIII and IX.

2) In Section 6.d. of the Stipulation and Settlement Agreement approved by the Commission in Docket No. 11A-631EG, the docket initiated to consider our 2012-2013 DSM Biennial Plan proceeding, the Company committed to addressing a number of issues relating to electric vehicles as part of the demand response application expected to be filed in April 2012. (The deadline for filing the demand response application was later extended to June 15, 2013 by Decision No. C12-0442, issued on April 30, 2012). Section 6.d. is set forth in full below:

> *d.* ***Electric Vehicles****: As part of the application it will file in April 2012 for approval of demand response goals for 2014 to 2020, the Company agrees to address the following: (1) electric vehicles as a possible future source of demand, (2) possible demand savings or reduction options related to electric vehicles and (3) how the Electric Vehicle Charging Station Pilot is expected to contribute to the Company's understanding of demand impacts related to electric vehicle charging.*

In my testimony I address the issues concerning electric vehicles in section VII. The timing of the electric vehicles issues discussion is explained in the following Q/A.

3) At page Section II. J., ¶¶ 38-41 of Decision No. C13-0323 the Commission accepted the Company's proposal to address all issues related to the processes used to acquire energy efficiency and demand response within the context of this proceeding. Specifically in ¶ 41 the Commission wrote:

> *We find that it is more practical to address the acquisition of energy efficiency and demand response pursuant to a process separate from the ERP. We conclude that separate*

proceedings, including the Company's upcoming DSM strategic issues docket, will allow for the Commission to reexamine those energy savings goals, to establish demand response reduction goals, and to approve acquisition processes that best address the complexities surrounding energy efficiency and demand response.

In section XIII of my testimony, I present the process the Company proposes to use to acquire additional demand response and energy efficiency and propose the timing and the setting in which to conduct such acquisition.

4) In ¶ 104 of Decision No. C11-0442 issued in Docket 10A-554EG the Commission stated the following regarding Behavioral change products:

We decline to endorse in this Docket the Company's plans to implement a full-scale behavioral change program in the future. We concur with Public Service that significant questions concerning the persistence of savings over time and the required expenditures to maintain savings at claimed levels need to be answered before conclusions regarding the overall cost effectiveness of behavioral change activities can be drawn. We also do not expect the residential behavioral change pilot program that the Company intends to launch this year will provide answers to these questions in time to inform the Company's 2012-2013 DSM plan filing. Therefore, we direct Public Service to file an application seeking Commission approval of a full-scale behavioral change program if the Company seeks to begin implementing such a program before 2014.

In Section VIII of my testimony, I discuss the questions raised in the past Strategic Issues filing regarding behavioral products/programs and propose methods for the accounting of and measuring of savings, persistence, and how savings and net benefits are used in an incentive mechanism. In Sections III of Mr. Petersen's testimony, he provides the details behind the proposed methodologies.

Q. WHY HAS THE COMPANY FILED A STRATEGIC ISSUES APPLICATION AT THIS TIME?

A. As mentioned above, in Decision No. C11-0442, when the Commission approved the electric energy savings goals and incentives currently in effect it also recognized the potential need for re-examination of these goals and incentives and directed the Company to file another strategic issues application no later than September 1, 2014. *See,* Decision No. C11-0442, Ordering ¶ 7. However, on April 30, 2012, in Decision No. C12-0442, the Commission later advanced the deadline for the strategic issues application to June 15, 2013 and consolidated reconsideration of the Company's energy savings goals with the determination of demand reduction goals in one proceeding.

Q. WHO ARE THE OTHER WITESSES SUBMITTING TESTIMONY IN THIS CASE?

In addition to my testimony, we are submitting the testimony of Mr. Jeremy Petersen, Ms. Kelly Bloch, and Mr. Scott Brockett.

- Mr. Petersen addresses the future potential of energy efficiency and demand response products and programs identified through third-party potential studies and the description and application of associated cost effectiveness metrics to this future potential to determine proposed energy efficiency and demand response goals.
- Ms. Bloch presents the Company's proposal for initiating Distribution Voltage Optimization as a new energy efficiency product. She will explain how the technology works, how customers save energy, and how the Company will verify the energy savings achieved.

- Mr. Brockett addresses proposed revisions to the electric DSM incentive mechanism applicable to the Company's energy efficiency programs and Saver's Switch and sponsors revisions to the electric DSMCA tariff that follow from the relief requested by this application. His testimony also summarizes how the modifications to the existing mechanism align with financial impacts due to these programs and rate case treatment. Mr. Brockett also addresses cost recovery and a new incentive mechanism the Company is proposing specifically for Distribution Voltage Optimization within energy efficiency. Finally, Mr. Brockett discusses current environment for pricing programs.

II. APPROVALS REQUESTED

Q. DOES YOUR TESTIMONY REQUEST SPECIFIC APPROVALS FROM THE COMMISSION IN THIS DOCKET?

A. Yes, consistent with our practice of using DSM Strategic Issues filings to seek Commission guidance and confirmation of certain matters, in this Strategic Issues filing we seek approval of the following:

Table 1: Public Service Requests

#	Topic	Request Description	Policy Witness	Technical Witness
1	Energy Efficiency Goals	Approval of Company proposed electric energy and demand savings goals for 2015 through 2020 resulting from energy efficiency products	Sundin	Petersen
2	Demand Response Goals	Approval of proposed demand reduction levels from load management and demand response programs in each of the years 2015 through 2020	Sundin	Petersen
3	Distribution Voltage Optimization – Goals	Approval to include a five-year plan for Distribution Voltage Optimization (DVO) as a source of energy efficiency providing an estimated 506 giga-watt hour (GWh) of annual energy savings and 56 megawatt (MW) of demand savings by the end of 2020.	Sundin	Bloch
4	Distribution Voltage	Approval for the Company's proposed plan for cost recovery of capital and O&M expenses	Sundin	Brockett

#	Topic	Request Description	Policy Witness	Technical Witness
	Optimization - Cost Treatment and Incentive	associated with the DVO product; approval of a new incentive mechanism specific to DVO; and the Company's proposal to modify the demand side management cost adjustment (DSMCA) tariff to include DVO.		
5	Behavioral energy savings methodology	Approval to include behavioral products in our energy efficiency portfolio; and of the methodology for calculating the energy and demand savings from these products	Sundin	Petersen
6	LED Street Lighting	Approval to include a Light-emitting diode (LED) Street Lighting product for Company-owned street lights to be used as a source of energy efficiency energy savings including offering rebates to customers for LED street lighting to off-set customer capital costs	Sundin	Petersen
7	Energy Efficiency Incentive Mechanism	Approval of the Company's proposed electric DSM incentive mechanism for its energy efficiency portfolio, including Saver's Switch	Sundin, Brockett	Brockett
8	Energy Efficiency & Demand Response goals – Future Resource Plans	Approval for energy efficiency and demand response goals set through this docket to be utilized in the 2015 Public Service Electric Resource Plan (ERP) in place of ERP acquisition rule requirements for these portfolios	Sundin	N/A

Q. PLEASE SUMMARIZE THE ELECTRIC ENERGY AND DEMAND SAVINGS GOALS THE COMPANY IS PROPOSING FOR 2015 THROUGH 2020?

A. The following tables identify the electric energy savings goals the Company is requesting in this proceeding broken out by specific product category, including DVO. In addition the Company has separately identified the demand savings associated with its energy efficiency portfolio and DVO and demand reduction from controllable load. For reasons I explain later in this testimony, the energy savings goals associated with traditional energy efficiency are significantly reduced from what was approved in Docket No. 10A-554EG. To offset such reductions the Company is proposing to add DVO, LED street lighting and behavioral products to its energy efficiency activities, which, in combination, allow

us to propose total electric energy savings goals that are closer to the level of energy savings goals that are currently in effect.

Table 2: Energy Efficiency – Energy Savings Goals

Energy (GWh) Goal	2015	2016	2017	2018	2019	2020	Total
Traditional Energy Efficiency	309	280	282	276	250	242	1,639
Unidentified Emerging Technologies	-	-	-	-	25	34	59
Behavioral	28	28	28	-	-	-	85
LED Street Lighting	12	12	12	12	12	-	60
TOTAL	**349**	**321**	**322**	**288**	**288**	**276**	**1,842**

Table 3: Energy Efficiency – Demand Savings Goals

Demand (MW) Goal	2015	2016	2017	2018	2019	2020	Total
Traditional Energy Efficiency	66	62	60	58	54	52	361
Unidentified Emerging Technologies	-	-	-	-	4	6	10
Behavioral	7	7	7	-	-	-	21
LED Street Lighting	-	-	-	-	-	-	0
TOTAL	**73**	**69**	**67**	**58**	**58**	**58**	**382**

Table 4: DVO – Collective Energy & Demand Goals

2015-2020 Goal	Energy (GWh)	Demand (MW)
DVO	506	56

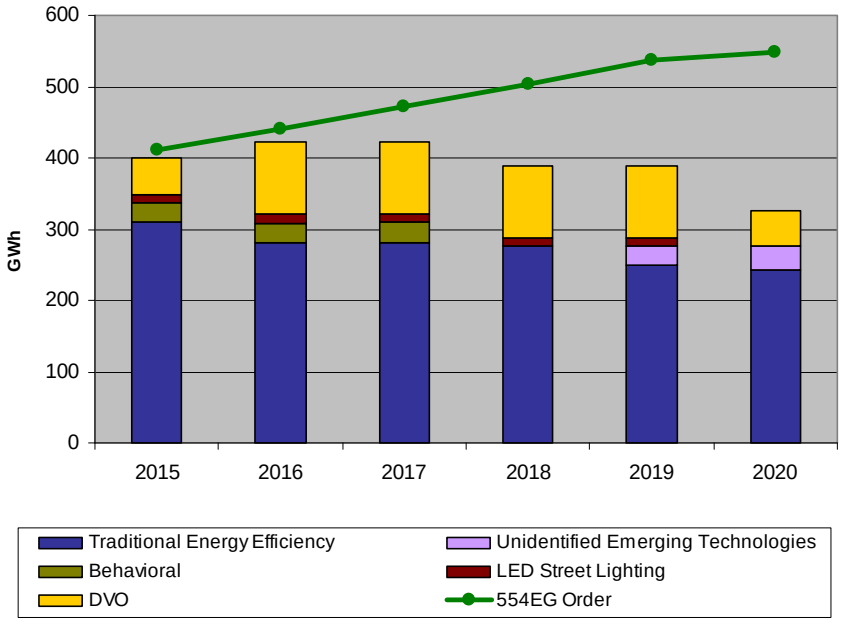
Table 5: Demand Response – Demand Savings Goals

MW	2015	2016	2017	2018	2019	2020
Total System Controllable Load per year (DR)	528	537	555	575	598	623

Q. HOW DO THE 2015 THROUGH 2020 PROPOSED ENERGY SAVINGS GOALS COMPARE WITH CURRENT GOALS APPROVED THROUGH DOCKET NO. 10A-554EG?

A. The graph below shows that the proposed energy savings goals for 2015 and 2016 are near the same level as were approved in Docket No. 10A-554EG but decline starting in 2017 due to lower DSM potential projections. The updated DSM Potential Study, which Mr. Petersen will detail in his testimony, shows the opportunity for energy savings is declining due to several factors such as increased energy savings standards for residential and business lighting. The Company is proposing new, non-traditional products such as DVO and LED Street Lighting to offset the reductions in energy savings targets from traditional energy efficiency through 2020. Please note the graph includes projected energy savings per year for DVO for illustrative purposes. In the case of DVO, the Company is seeking approval of a five-year total goal as opposed to annual goals to allow for flexibility with funding the initiative.

Graph 1: Proposed 2015-2020 Goals vs. Docket 10A-554EG Goals



Q. WHAT DO THE 2015 THROUGH 2020 ENERGY SAVINGS GOALS REPRESENT AS A PERCENT OF RETAIL SALES FOR THE COMPANY AND HOW DOES THAT COMPARE WITH XCEL ENERGY'S SAVINGS GOALS IN MINNESOTA?

A. The following table details the percent of retail sales for all energy efficiency products and programs, including the projected annual targets for Distribution Voltage Optimization for Public Service, based on forecasted future sales.

Table 6: Energy Efficiency – Percent of Sales Comparison

Percent of Retail Sales	2015	2016	2017	2018	2019	2020
Public Service of CO	1.31%	1.37%	1.37%	1.26%	1.26%	1.05%
Xcel Energy – Minnesota	1.5%	1.4%	1.4%	1.4%	1.4%	1.4%

There are a few important differences between Colorado and Minnesota that should be taken into account to better understand this data. Colorado is a Net-to-Gross state, which means utilities do not claim 100 percent of energy savings

from all approved energy efficiency projects. The intention of this policy is to remove estimated free-riders that would have made the same energy efficiency decision regardless of the utility product. Minnesota is a Gross state, which means state policy is that utilities claim 100 percent of all energy and demand savings from approved energy efficiency projects. I further explain this topic in Section III of my testimony.

Q. WHAT ADDITIONAL GUIDANCE IS THE COMPANY SEEKING FROM THE COMMISSION THROUGH THIS DOCKET?

A. In addition to the approvals listed above, we are seeking policy guidance regarding the future of our natural gas DSM portfolios. There are a number of current and upcoming issues we would like to discuss regarding gas DSM and look forward to understanding the Commission's direction. The specific topics for which the Company is seeking guidance are: (1) proposed gas DSM spending levels in the future, (2) what should be the principle objectives in designing the natural gas DSM portfolio, and (3) the appropriate cost effectiveness test(s) to be applied in the changing gas DSM environment

III. BACKGROUND & HISTORICAL PERFORMANCE

Q. CAN YOU PLEASE EXPLAIN WHAT DEMAND-SIDE MANAGEMENT IS AND WHAT TYPES OF PROGRAMS IT INCLUDES?

A. Demand-Side Management ("DSM") is the modification of consumer demand for energy through various methods such as financial incentives and education. Usually, the goal of demand side management is to encourage the consumer to

use less energy in total but especially during peak hours, or to move the time of energy use to off-peak times such as nights and weekends. Peak demand management does not necessarily decrease total energy consumption, but could be expected to reduce the need for investments in distribution and transmission networks and/or generation assets. DSM includes:

Energy Efficiency: Customers using less energy to perform the same tasks.

Demand Response (includes load management): Any reactive or preventative method to reduce, flatten or shift peak demand. Demand Response includes all intentional modifications to consumption patterns of electricity of end use customers that alter the timing or level of instantaneous demand. Demand response can be dispatchable or non-dispatchable as described below:

- Dispatchable: direct or physical control of electric demand reductions from retail customers, usually during specified time frames
- Non-Dispatchable: indirect or non-physical control of electric demand reductions from retail customers, often in reoccurring intervals

Q. CAN YOU EXPLAIN WHAT DSM PLANS ARE AND HOW OFTEN THE COMPANY SUBMITS PLANS?

A. A DSM Plan sets forth the goals and budgets for the individual energy efficiency and demand response programs and products we will offer during a specific time period. The DSM plan presents estimated measurements of the cost-effectiveness of each product proposed to be offered, as well as the means by which the savings attributable to these programs will be evaluated, measured and verified. Public Service submits combined gas and electric DSM Plans on a

biennial basis unless there are special circumstances. For instance, due to the timing of this Strategic Issues filing, the Company is planning to request permission to file a single year, 2014 DSM Plan on July 1, 2013.

Q. PLEASE BRIEFLY EXPLAIN WHEN THE COMPANY STARTED OFFERING ELECTRIC ENERGY EFFICIENCY AND DEMAND RESPONSE TO CUSTOMERS.

A. Electric energy efficiency customer offerings at Public Service date back to 1992. The most significant increases in achievements from energy efficiency programs have occurred since 2004 when the Company agreed to expand its efforts to acquire energy efficiency as part of the settlement of the 2003 electric resource plan. In 2004, the Company first proposed to restructure its interruptible tariff to provide a means of controlling peak demand as part of the Phase II electric rate case filed as Docket No. 04S-164E. The Interruptible Service Option Credit tariff was further refined in Docket No. 07S-521E to expand eligibility and provide greater options for eligible customers.

Q. WHAT WAS THE STIMULUS FOR THE MORE RECENT EXPANSION OF THE COMPANY'S DSM EFFORTS IN 2007?

A. In 2007, the Colorado legislature enacted House Bill 07-1037, codified in relevant part, at C.R.S. § 40-1-102(5) – (11) and 40-3.2-101 and 104, to encourage investor-owned utilities to offer greater levels of demand-side management. In addition to expanding electric energy efficiency and demand response goals, the law also allowed gas DSM programs for the first time other than the Public Service Low-Income Energy Savings Partners Program.

In response to the 2007 legislation, in October 2007 the Company filed its Application for Authorization to Implement an Enhanced Electric Demand Side Management (DSM) Program and to Revise its Demand Side Management Cost Adjustment Mechanism to Include Current Cost Recovery and Incentives ("Initial Application"), Docket No. 07A-420E. As relevant to this Application, as part of Decision No. C08-0560 issued in that docket, the Commission established electric energy savings and associated demand reduction goals for the period 2009 to 2020. It also approved 1) concurrent recovery of the Company's electric DSM expenditures through the electric DSMCA; 2) an electric DSM incentive mechanism, including both a disincentive offset and a performance component; and 3) specific DSM filing and reporting requirements, including approving the Company's request to file combined natural gas and electric DSM plans every two years and waiving the gas DSM rule requiring it to file its Gas DSM plans every three years.

Since the Commission first approved the Company's enhanced DSM program in 2008, the Company has, with one exception, filed combined gas and electric biennial DSM plans consistent with Decision No. C08-0560. In 2010, in Docket No. 10A-554EG, the Commission revisited a number of the strategic issues first decided in Docket No. 07A-420E, including the Company's energy savings goals and incentives, expanding further the Company's electric energy savings goals in particular. This application is the third application in which the Company asks the Commission to re-examine a number of the larger strategic

issues associated with its demand side management activities, including the appropriate energy savings and demand reduction goals and incentives.

There is a need for these strategic Issues proceedings because matters can change so rapidly in DSM that we need to regularly revisit key assumptions and seek guidance and approval from the Commission and stakeholders as to how to shape our biennial plans. Similar to Docket No. 10A-554EG, this filing is designed to seek Commission re-examination and approval of the overall objectives and structure of our DSM initiatives to guide us in the specific design of future biennial DSM plans.

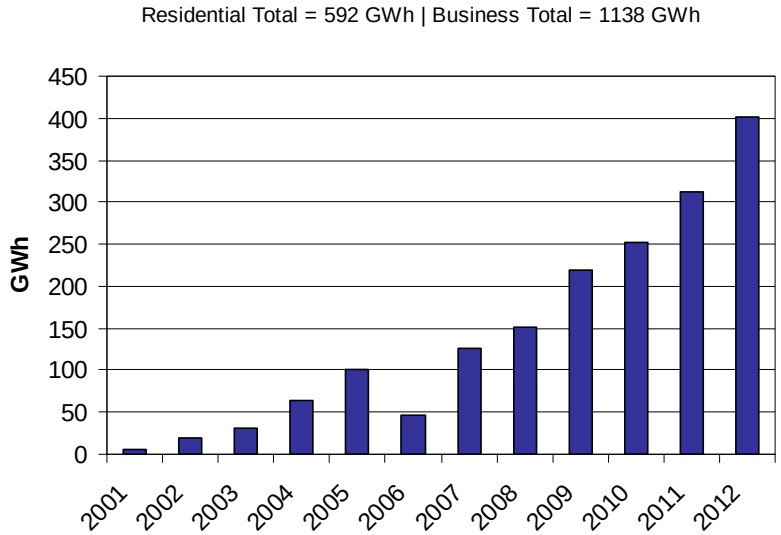
This DSM Strategic Issues filing is timely because we expect to file our next biennial plan for 2015 and 2016 in the summer of 2014, and we confront many issues and challenges with respect to our energy efficiency and demand response portfolio. The environment in Colorado and nationally for these products, especially energy efficiency, has changed since the Commission last examined the Company's goals and incentives in 2010. For example, increases to energy efficiency standards and building codes are significantly increasing our customers' energy savings, but not as a result of the Company's DSM initiatives. Importantly, however, the increasing standards greatly reduce the future energy savings potential for the Company's DSM. There has also been a flattening of electricity sales due to the sagging economy and the Company has experienced declines in its avoided energy and capacity costs. All of these factors reduce the impact that utility-sponsored DSM programs can have on energy usage and demand and make it more difficult for the Company to meet aggressive DSM

goals, such as those that were established by the Commission in Docket No. 10A-554EG. In addition, upward rate pressure continues to be a concern as the cost of pursuing aggressive energy savings goals increases.

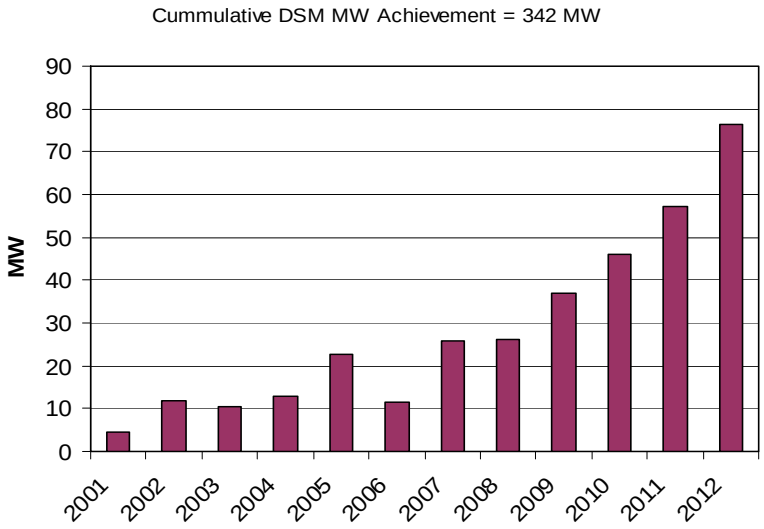
Q. PLEASE SUMMARIZE THE COMPANY'S RECENT PERFORMANCE IN ENERGY AND DEMAND SAVINGS.

The tables below summarize energy and demand savings from energy efficiency programs since 2001 and demand reduction from demand response programs since 2005. The demand savings data only goes back to 2005 because that is when the Company changed the structure of its interruptible tariff to explicitly encourage demand reduction on the part of its business customers with the introduction of its Interruptible Service Option Credit – ISOC tariff. All tables reflect energy (GWh) or demand (MW) savings at the Generator.

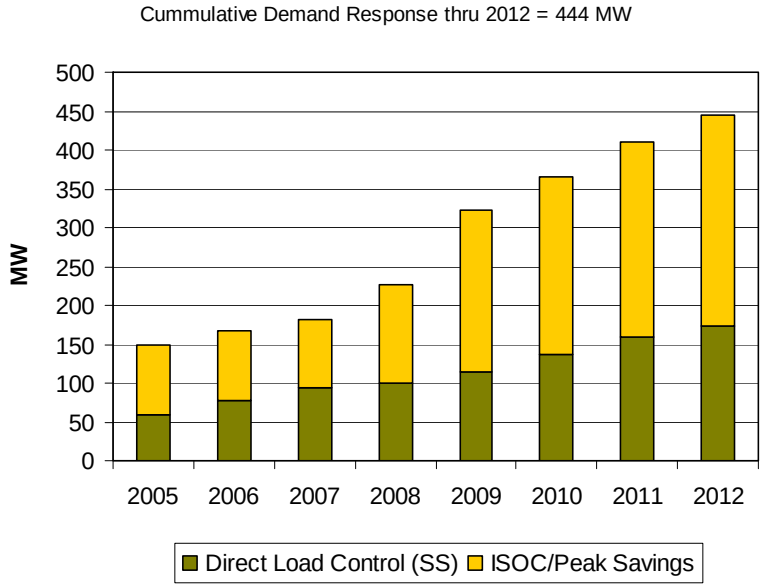
Graph 2: Historical Electric Energy Efficiency - Energy Savings Achieved



Graph 3: Historical Electric Energy Efficiency - Demand Savings Achieved



Graph 4: Historical Cumulative Demand Response - Demand Savings Achieved



Q. WHAT DOCKETS IN THIS TIME FRAME HAVE ADDRESSED THE COMPANY'S ELECTRIC DSM GOALS?

A. Several dockets have directly or indirectly addressed the Company's DSM goals going back to 1999. These include:

- **1999 IRP Stipulation:** 1999 Integrated Resource Plan DSM Stipulation and Settlement Agreement (Decision C00-1057, Docket No. 00A-008E);
- **2003 LCP Settlement:** 2003 Least-Cost Resource Plan Comprehensive Settlement Agreement (Decision C05-0049, Docket Nos. 04A-214E, 04A-215E, 04A-216E);
- **2007 Enhanced DSM Application:** Verified Application of Public Service Company of Colorado for Authorization to Implement an Enhanced Demand Side Management Program and to Revise its Demand Side Management Cost Adjustment to Include Current Cost Recovery and Incentives (Decision No. C08-0560, Docket No. 07A-420E);
- **2008 CPCN at Fort St. Vrain Generation Station:** Verified Application of Public Service Company of Colorado for a Certificate of Public Convenience and Necessity (CPCN) to Construct Two Combustion Turbines at the Fort St. Vrain Generating Stations, for an Amendment to its Contingency Plan, and for Expedited Treatment (Decision No. C08-0369, Docket No. 071-469E);
- **2010 DSM Strategic Issues:** Verified Application for Approval of a Number of Strategic Issues Relating to its DSM Plan, Including Long-Term Electric Energy Savings Goals and Incentives (Decision No. C11-0442, Docket No. 10A-554EG).
- **2011 Electric Resource Plan:** In the Matter of Public Service Company of Colorado for Approval of its 2011 Electric Resource Plan (Decision No. C13-0094, and Decision No. C13-0323, in Docket No. 11A-869E)

Q. PLEASE DESCRIBE THE GOALS SET IN EACH OF THESE ORDERS AND HOW HISTORICAL ACHIEVEMENTS COMPARED TO THE GOALS.

A. **1999 IRP Stipulation:** This stipulation authorized $75 million in spend (2000 dollars) to obtain 124MW of DSM by December 31, 2005. Achievements through December 31, 2005 totaled 127MW from DSM at a cost of $49 million in spend (2000 dollars).

2003 LCP Comprehensive Settlement: The Company agreed to obtain a cumulative level of 320MW of demand reduction and 800GWh of annual energy savings at a cost of $196 million (2005 dollars) between 2006 and January 1, 2014. From 2006 through 2012, the Company achieved 423MW of demand reduction and 1,510GWh of cost-effective energy savings through its DSM programs at a cost of $201 million (2005 dollars). It is difficult to specify precisely when, within a program year, the energy and demand savings thresholds agreed to in the 2003 LCP proceeding were exceeded. However, it can be estimated the 320 MW demand reduction threshold was met in early 2012 while the 800 GWh threshold was met early 2011 at a total cost of less than $196 million (2005 dollars).

2007 Enhanced DSM Application: This order sets energy goals equal to a percent of sales ranging from approximately 0.5 percent in 2009 to 1.20 percent by 2019, far above the statutory minimums established in HB07-1037. The table below shows the annual energy goals set in the order and the historical Public Service DSM achievements (2009-2012) and planned achievement (2013).

Table 7: Actual Results vs. 2007 Enhanced DSM

	2007 Enhanced DSM		Public Service Actual Results
	% of Retail Sales	*GWh*	*GWh*
2009	0.53%	150	220
2010	0.76%	220	252
2011	0.80%	235	312
2012	0.85%	254	401
2013	0.90%	274	356[1]
2014	0.95%	295	-
2015	1.00%	316	-
2016	1.05%	339	-
2017	1.10%	363	-
2018	1.15%	388	-
2019	1.20%	413	-
2020	1.20%	422	-

Decision No. C08-0560 also established demand savings goals associated with the Company's energy efficiency and Savers Switch products to be used in resource planning modeling, but it did not establish other demand reduction goals. These goals were expressed in terms of a range of cumulative demand savings, of 421MW to 449MW from 2009-2015 to be used for purposes of ERP modeling. Over the period 2009 through 2012 the Company has achieved demand savings of 217MW associated with its energy efficiency programs and Saver's Switch, with an additional 59MW planned in 2013.

[1]Although the 2012/2013 Plan was approved with 345 GWh as the goal, the Company agreed to issue a request for proposal for innovative programs that would fill the gap between the company's portfolio GWh projection of 345 GWh to the Commission goal of 356 GWh. Those RFP's were issued and three new programs have been added that we believe will produce actual results at or above the 356 GWh.

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2008 CPCN at Fort St. Vrain Generation Station: The Commission ordered general expansion of the Company's DSM programs to help meet a 123 MW capacity need for the summer 2009. Specific directives were to solicit one or more third-party demand response aggregators to obtain at least 20 MW of additional demand reduction by the summer of 2009. In addition, the Company was directed to expand its Saver's Switch product by 50 percent beyond the then current plans for summer 2009 both in terms of number of customers and amount of capacity available to be interrupted. Public Service contracted with a 3rd party demand response aggregator in 2008. The aggregator had at least 20 MW under control by shortly after the summer of 2009. In addition, the Saver's Switch product expanded their participation and amount of capacity that could be interrupted by 50 percent. Beginning in 2009, the Company began adding 19,500 new participants each year – up from the 13,000 that had been planned.

2010 DSM Strategic Issues: The Commission order increased the Company's energy savings goals to 130 percent of the goals set in the 2007 Enhanced DSM Application. The table below shows the annual goals set in the order and the historical Public Service DSM achievements (2009-2012) and planned achievement (2013).

Table 8: Actual Results vs. 2011 Strategic Issues

	2011 Strategic Issues		Public Service Actual Results
	% of Retail Sales	*GWh*	*GWh*
2012	1.14%	330	401
2013	1.21%	356	356
2014	1.28%	384	-
2015	1.35%	411	-
2016	1.42%	441	-
2017	1.51%	472	-
2018	1.59%	504	-
2019	1.66%	537	-
2020	1.68%	549	-

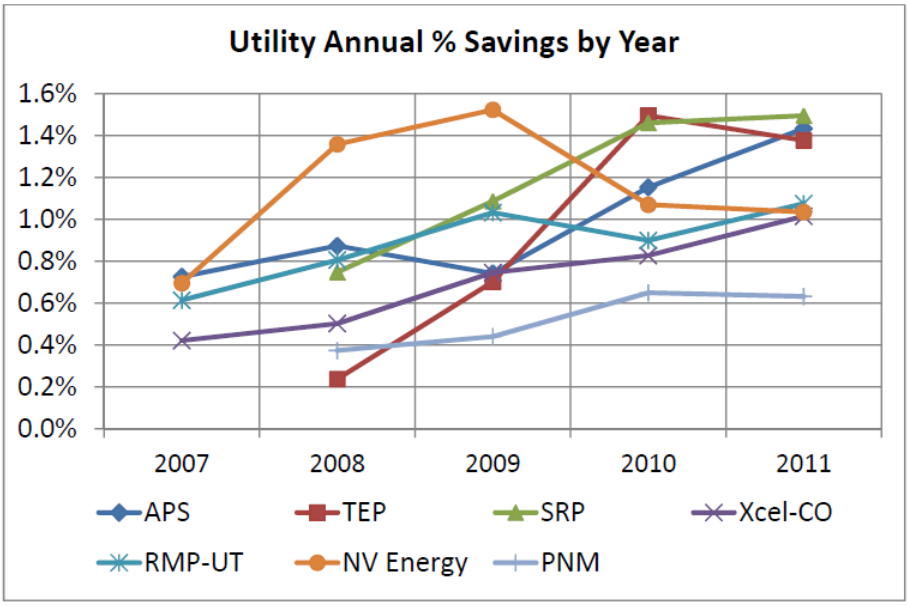
Q. HOW DOES THE COMPANY'S ENERGY SAVINGS PERFORMANCE COMPARE TO OTHERS NATIONALLY?

A. Public Service's energy savings achievements are reasonably comparable to the achievements of other leading utilities. The following graph from the ***"2012 Summer Study on Energy Efficiency in Buildings"***[2] 2012, Chapter 5, page 5-169, (American Council for an Energy Efficiency Economy) the performance of a number of southwestern utilities on a percent of retail sales basis instead of total energy savings (GWh) in attempt to standardize performance by utility. However, the table does not control for factors such as net-to-gross that result in differences in the way that performance is measured in different jurisdictions and which makes comparison between utilities challenging.

[2] http://www.aceee.org/files/proceedings/2012/start.htm; Table of Contents, Chapter 5; Utilities: Delivering Efficiency and Efficient Load Management; Utility Energy Efficient Programs in the Southwest: 2012 Update, Howard Geller and Jeff Schlegel.

For example, the three highest performers in the chart below, APS (Arizona Public Service), TEP (Tucson Electric Power) and SRP (Salt River Project) operate in a jurisdiction that measures energy savings without application of a Net-to-Gross ratio, which makes these utilities' energy savings high relative to states, such as Colorado, where a Net-to-Gross factor is applied before measuring the utility's achievements. Because of such differences in the way energy savings are measured, as well as other factors that can affect percent of sales comparisons, such as whether the retail sales used in the calculation are historical, weather normalized, forecasted, or actual, the chart below is useful only as a directional indicator. The graph shows Xcel Energy (CO) has steadily moved upward in achieving higher savings as a percent of retail sales since 2007. In 2012, which is not shown on this graph, Public Service achieved 401 GWh equaling 1.4 percent of its 2012 retail sales.

Graph 5: 1st Year Energy Savings as Percent of Retail Electric Sales



Q. PLEASE DEFINE THE TERM NET-TO-GROSS (“NTG”), THE FACTORS THAT MAKE UP NTG, AND THE IMPORTANCE THESE CONCEPTS HAVE IN COMPARING PUBLIC SERVICE WITH OTHER UTILITIES?

Net-to-Gross (“NTG”) is a ratio that typically reduces the energy and demand savings achieved mostly due to the estimates of free-riders that exist in the population of participants in DSM programs. A NTG ratio of 80 percent indicates that 20 percent of the participants’ energy and demand savings are considered to be the result of such free ridership and will not count towards the savings achievements reported. A "free rider" is a participant who would have implemented the program measure or practice in the absence of the program, but who nonetheless applies for a rebate. NTG may also include estimates of the effects of "free drivers" - non-participants who adopted an energy efficiency measure or practice as a result of a utility program but did not apply for a rebate. Another factor that may be included in the NTG ratio is the "rebound effect" which is a change in energy-using behavior that yields an increased level of energy usage as a result of taking an energy efficiency action. And finally, "Spillover" is additional reduction in energy or demand caused by the presence of the energy efficiency program. There can be both participant and non-participant spillover and rebound effects.

The makeup of NTG can vary widely among states and/or utilities making it difficult to make meaningful comparisons of the reported energy savings achievements of different utilities. In addition, as noted above, in some

jurisdictions, such as Arizona, achievements are measured without application of any NTG factor against savings.

Q. WHAT IS THE EXTENT TO WHICH STATE JURISDICTIONS APPLY A NTG RATIO IN MEASURING DSM ENERGY SAVINGS?

A. Treatment of net-to-gross differs substantially among states. A recent study by the American Council for an Energy Efficient Economy ("ACEEE"), ***A National Survey of State Policies and Practices for the Evaluation of Ratepayer-Funded Energy Efficiency Programs***[3], February 2012, page 25, showed that 71 percent of states surveyed used net savings or both net and gross for calculating savings, and 29 percent of states use gross only. And as explained in answer to the previous question, the components included in NTG varies considerably as well.

Q. WHAT HAS BEEN THE PRACTICE FOR APPLYING NTG TO DSM SAVINGS OBTAINED BY PUBLIC SERVICE?

A. In Colorado, although there is no statutory or other requirement that a NTG factor be applied in measuring the utility's savings, the practice has been to measure Public Service's achievements after taking into account appropriate NTG factors. This is in contrast to the way Xcel Energy's savings are measured in Minnesota where NSP-MN's achievement, expressed as a percent of retail sales, are determined without application of a NTG factor. Because in Minnesota utilities do not generally apply a NTG ratio to savings, a goal of 1.5 percent of sales in Minnesota equates to about 1.2 percent of sales in Colorado (assuming roughly

[3] http://www.aceee.org/research-report/u122

a NTG ratio in Colorado of 0.8). Similarly energy savings achievements in Minnesota of 400 gross GWh equate to ~320 net GWh achieved in Colorado using the same assumption.

Q. ARE THERE ANY OTHER IMPORTANT CHARACTERISTICS TO CONSIDER WHEN COMPARING GOALS AND PERFORMANCE BETWEEN UTILITIES?

A. Yes, other characteristics that make comparisons between states and utilities challenging include: whether the goals are expressed at the generator level (includes losses) or at the meter level, the service territory's mix of industrial versus commercial versus residential population and energy intensity per square foot, the climate differences, and the propensity of the population's acceptance and willingness to adopt energy efficiency opportunities. For instance, one factor contributing to differences in achievable savings by NSP-MN as compared to Public Service is the larger industrial manufacturing sector in Minnesota versus in Colorado Public Service's territory in Colorado has about 5,200 manufacturing customer accounts compared to Northern States Power territory in Minnesota which has about 5,900 accounts. While the number of accounts is only somewhat higher in Minnesota, the size of the accounts, and therefore the opportunity for large energy efficiency projects, is significantly larger, with 7,700 GWh in Minnesota versus 2,200 GWh in Colorado.

IV. <u>CURRENT SITUATION & INDUSTRY TRENDS</u>

Q. WHAT IS THE IMPORTANCE OF ENERGY EFFICIENCY AND DEMAND RESPONSE FOR PUBLIC SERVICE?

A. Energy Efficiency and Demand Response are significant components of the Company's environmental product offerings to customers. These environmentally-focused products, along with Renewable energy products, provide our customers with choices in how they use the energy we provide and the impact that their energy use has on the environment.

Environmentally-focused customer products also have a significant impact on our resource needs and affect how we plan to meet the long-term energy and demand needs of our customers. We will continue to support the expansion of these product offerings for so long as all stakeholders are benefiting from our ongoing investment.

Q. CAN YOU PLEASE DESCRIBE WHO THESE STAKEHOLDERS ARE AND HOW THE COMPANY KNOWS WHEN THEY BENEFIT BY INVESTING IN THESE PRODUCTS?

A. There are three key stakeholder groups for these products. The groups are customers who participate in one or more DSM product or program, the larger society within the Company's service territory, which can also be defined as non-participating customers, and Company shareholders. When all of these stakeholders are either financially neutral or benefit from our continued investment in environmentally-focused programs, then we consider our investment to be positive.

With regard to Energy Efficiency and Demand Response products, the Company uses four different cost effectiveness tests to understand if stakeholders are benefiting from these investments. Each test includes a

different combination of costs and benefits to determine cost effectiveness. The tests are the (modified) Total Resource Cost test, Utility Cost Test, Rate Impact test and Participant test.

Q. WHAT IS THE PURPOSE OF EACH OF THE TESTS YOU MENTIONED?

A. Public Service and most utilities across the country conduct these tests to determine if products and programs are cost effective. As in Colorado though, most states rely principally on only one of these tests to determine if a product or program passes cost effectiveness and can be included in its demand-side management portfolio. The modified Total Resource Cost test is the principal test relied upon to determine whether particular electric and natural gas DSM products and our overall DSM portfolios are cost-effective. A DSM product is considered to be cost-effective if its modified Total Resource Cost is greater than 1.0. While the Company and other utilities generally rely on only one test to determine the cost-effectiveness of our DSM product offerings in accordance with state-specific statutory or regulatory requirements, we also review the results of the other tests in order understand the broader impact of our programs on all stakeholders.

Mr. Petersen provides additional detail in section IV of his Direct Testimony regarding the cost-effectiveness of our products and portfolios as measured by the modified TRC and about the additional tests we use to understand the impact of our DSM activities.

Q. CAN YOU PLEASE EXPLAIN BEYOND COST EFFECTIVENESS WHAT OTHER OBJECTIVES DOES THE COMPANY HAVE IN OFFERING ENERGY EFFICIENCY AND DEMAND RESPONSE PRODUCTS?

A. Public Service assesses its DSM product offerings based on several criteria in addition to cost effectiveness, some of which though closely relate to cost effectiveness:

1. Ensure value to all stakeholders – Offer products that provide benefits to participants and the community at large while not harming the Company's shareholders.

2. Provide options to all customer segments to participate – Develop a broad portfolio of offerings so all customers have an opportunity to participate and benefit

4. Control costs and customer rate impacts – Act prudently on behalf of customers by ensuring that energy efficiency and demand response costs are appropriate and managed in order to maximize customer value.

5. Balance energy savings and demand savings – Offer a blend of products that collectively deliver solid energy savings and demand savings so all customers benefit regardless if it is through direct energy bill reductions or through lower revenue requirements due to the electric system benefits attributable to these products.

6. Develop products that provide long-term energy and demand savings in order to affect the Company's resource plan to meet future customer needs.

7. Manage consistency of products and associated regulatory treatment in DSM Plans, Resource Plans and Rate Cases – It is important to align energy efficiency and demand response goals and regulatory treatment in all the different regulatory contexts in which DSM has a role to play.

Q. HAS THE ENERGY EFFICIENCY AND DEMAND RESPONSE LANDSCAPE FOR UTILITIES CHANGED SINCE DOCKET NO 10A-554EG.

A. Yes, the environment for offering these products in Colorado and nationally, especially energy efficiency, has changed since Docket No. 10A-554EG in 2010.

Q. PLEASE EXPLAIN THE CHANGES THAT HAVE TAKEN PLACE AND WHAT IMPACT YOU BELIEVE THEY WILL HAVE TO THE COMPANY'S FUTURE ENERGY EFFICIENCY AND DEMAND RESPONSE PORTFOLIO.

A. There have been several significant changes regarding technologies, economics, and customer demand. The following summarizes the changes and provides background on its importance:

1. Increases in Energy Efficiency Standards and Building Codes

The federal government continues to increase energy efficiency standards for new technologies and equipment available for sale in the United States of America. Two recent and ongoing increases will lead to significant energy savings for customers, but also are severely reducing energy savings potential from utility-sponsored DSM products. Business lighting standards increased the baseline to T-8 energy efficient lighting in 2012 (*2009 Department of Energy rulemaking*) and new Residential lighting standards will take effect from 2012-14 to increase minimum efficiency of

45-100W bulbs by 30 percent *(2007 Energy Independence & Security Act).* The result is a large portion of DSM lighting products we have provided in recent years will no longer provide any incremental energy savings above the baseline standard. In addition, the incremental energy savings associated products that continue to provide savings in excess of the baseline will be greatly reduced due to the higher baseline (minimum efficiency). The result is energy savings is increasing naturally through higher standards but DSM potential, for what is typically the largest product/technology of a utility's DSM portfolio in most states, is sharply declining starting in 2013.

2. Declining Avoided Energy and Capacity Costs for utilities

Costs to procure or build new generation and the fuel to power the generation, which on the margin is commonly natural gas, has dropped in recent years and natural gas prices are forecasted to remain relatively low well into the future. Lower energy sales and the lack of need for new generation are driving decreases in avoided costs. The impact is the benefits of DSM are declining because the cost of what DSM is avoiding is lower.

3. Growing rate impacts for customers

The result of declining avoided costs paired with reduced incremental energy savings above efficiency baselines for these products is causing our customers' rates to go up even though the Company's electric revenue requirement is continuing to fall. Participating customers can

counteract the increased rate impact by lowering their overall energy use resulting in lower bills, but it is more difficult to obtain overall cost reductions from DSM that benefit non-participants as well.

V. ENERGY EFFICIENCY GOALS

Q. WHAT IS THE COMPANY REQUESTING OF THE COMMISSION REGARDING ENERGY EFFICIENCY GOALS?

A. The Company is seeking approval of revised energy savings goals for 2015 to 2020 associated with traditional DSM offerings that are considerably lower than goals approved in Docket No. 10A-554EG. To offset the decline in energy savings from traditional DSM, we are proposing to undertake certain non-traditional initiatives, including a LED Street Lighting product, behavioral change programs and a Distribution Voltage Optimization program that are expected to result in additional energy savings. Because the overall energy savings goals we have proposed here are comprised of four types of programs and depending upon whether the Commission approves each program type and proposed methodology, we ask that the overall energy savings goals approved by the Commission reflect only the specific components of our overall plan that are ultimately approved. For example, we are proposing to count the saving we realize from behavioral change programs and we have proposed a methodology for counting and verifying the savings from such programs. However, if the Commission does not approve our proposal to offer and count the savings associated with behavioral change programs or approves a different method for

measuring the savings associated with such programs, we request that the overall energy savings goal approved by the Commission be adjusted to reflect this.

Q. WHAT ARE THE FOUR PROGRAM TYPES THAT COMPRISE THE ENERGY EFFICIENCY GOALS?

A. The four energy efficiency program types discussed in this filing are: traditional programs including unidentified emerging technologies, behavioral products/programs, LED Street Lighting and Distribution Voltage Optimization (DVO). Each of these program types are defined and explained in more detail in the following sections.

Q. WHAT ARE THE COMPANY'S RECOMMENDED GOALS FOR ENERGY EFFICIENCY IN 2015-2020?

A. The following three tables, repeated from Section II (Approvals Requested) for convenience, show the proposed energy efficiency energy goals and demand savings associated with such energy efficiency activities for 2015 through 2020.

Table 2: Energy Efficiency – Energy Savings Goals

GWh Saved in Year	2015	2016	2017	2018	2019	2020	Total
Traditional Energy Efficiency	309	280	282	276	250	242	1,639
Unidentified Emerging Technologies	-	-	-	-	25	34	59
Behavioral	28	28	28	-	-	-	85
LED Street Lighting	12	12	12	12	12	-	60
EE Subtotal	**349**	**321**	**322**	**288**	**288**	**276**	**1,842**

Table 3: Energy Efficiency – Demand Savings Goals

MW Saved in Year	2015	2016	2017	2018	2019	2020	Total
Traditional Energy Efficiency	66	62	60	58	54	52	351
Unidentified Emerging Technologies					4	6	10
Behavioral	7	7	7				21
LED Street Lighting	0	0	0	0	0		0
EE Subtotal	**73**	**69**	**67**	**58**	**58**	**58**	**382**

Table 4: DVO – Collective Energy & Demand Goals

2015-2020 Goal	Energy (GWh)	Demand (MW)
DVO	506	56

Q. HOW DID THE COMPANY SET THE 2015-2020 GOALS?

A. Mr. Petersen describes the basis for setting the proposed goals. At a high-level, for traditional and behavioral-change products and programs, the Company relied on an updated DSM Market Potential Assessment Study conducted by DNV KEMA, Inc. For reasons detailed by Mr. Petersen, we used for the most part the 75 percent scenario for achievable DSM potential from the market potential assessment study. We then included an additional 10 percent of energy savings based on historical experience suggesting that our potential studies have tended to understate our actual achievement compared to the market potential to this extent. We then assumed we would achieve additional savings associated with not yet identified new or emerging technologies in 2019 and 2020 by maintaining the same level of total savings from 2018. Finally we have incorporated expected savings associated with our efforts to implement DVO and LED Street Lighting products.

Q. WHAT ARE THE ESTIMATED COSTS FOR THE COMPANY'S PROPOSED ENERGY EFFICIENCY PORTFOLIO?

A. The table below provides the projected utility costs (including rebates) in millions of dollars ($M) that were provided in the market potential study for the traditional and behavioral products/programs. We have incorporated our own estimates of projected costs. We have also calculated the $/kWh and $/kW based on first-year savings.

Table 9: Estimated 2015-2020 Energy Efficiency Budgets

Spend ($M) in Year	2015	2016	2017	2018	2019	2020	Total
Traditional Energy Efficiency	108	104	100	96	93	90	591
Unidentified Emerging Technologies	-	-	-	-	9	13	22
Behavioral	6	6	6	-	-	-	19
LED Street Lighting	6	6	6	6	6	-	32
Energy Efficiency Subtotal	**121**	**117**	**113**	**102**	**109**	**102**	**664**
DVO	9	18	18	18	18	9	90
Total Energy Efficiency	**$130**	**$134**	**$130**	**$120**	**$127**	**$112**	**$753**
Cost/First Year-kWh	$0.33	$0.32	$0.31	$0.31	$0.33	$0.34	**$0.32**
Cost/First Year-kW	$1,317	$1,421	$1,482	$1,526	$1,712	$1,632	**$1,499**

Q. HOW DO THESE COSTS COMPARE TO THE ACTUAL COSTS THE COMPANY HAS INCURRED FOR ENERGY EFFICIENCY OVER THE PAST FEW YEARS?

A. In 2012 as reported in the annual status report filed on 4/1/2013, Docket No.11A-631EG, energy savings from Energy Efficiency were 400.1 GWh, demand savings were 76 MW, and utility spend (including rebates) was $67 million. In the Company's 2013 DSM Plan, we expect to achieve energy savings of 345.2

GWh, demand savings of 60 MW, at a cost of $69 million. The $/kWh and $/kW for 2012 are $0.17/kWh and $879/kW. For 2013, the ratios are $0.20/KWh and $1,146/KW. As can be seen, for the period 2015 through 2020, the spend ratios are quite a bit larger at $0.32/kWh and $1,499/kW. The reasons why our costs are shown to increase so significantly are:

- The Potential Study assumes that every product pays 75 percent of the incremental capital cost in rebates. However, in reality, the Company would vary the rebates paid as percentage of incremental costs based on what we believe is necessary to move the market to participate. Our 2012 rebates as a percentage of incremental costs were 52 percent for energy efficiency products.
- Residential and Business lighting products, which have typically been less expensive than other products to deliver, are expected to make up a smaller portion of the 2015-2020 portfolios.
- The residential lighting NTG factor currently used in 2012 in the Company's portfolio is 85 percent. The NTG ratio is set at 50 percent in the DSM Market Potential Assessment beginning in the 2015/2016 time frame. When NTG factors are low, the net savings per dollar spent increases since the Company needs to pay for the gross savings.

Q. SHOULD THE COMMISSION BE CONCERNED ABOUT THESE COSTS IN THE FUTURE?

A. While the Company is not requesting approval in this docket of the estimated spend amounts for the 2015 through 2020 period, we believe that costs should

be reviewed for reasonableness and cost effectiveness. While the costs that are provided in a potential study are developed at a high level, when the Company files DSM Plans for the 2015 through 2020 period, we will provide individual product budgets that are developed from the bottom up. Each product manager, based on experience or external information, will develop unique budgets that fit the circumstances and needs of each product in terms of marketing and promotion, delivery and implementation, and size of rebates that will deliver the results. As we said, it is doubtful that we'd pay a 75 percent rebate for every product across the board. However, it is likely that the costs will go up if the residential and business lighting products are a smaller proportion of the portfolio as well as the effect of decreasing NTG ratios. Mr. Petersen has reviewed the cost effectiveness of the 2015 through 2020 portfolio (see Table 15 of his testimony) and although the costs are higher per first year kWh and kW, the portfolios are passing the Modified Total Resource Cost ("MTRC") Tests. The MTRC ratios range from 2.35 to 2.61. While we believe that the MTRC Test should still be used to determine which measures should be included in our energy efficiency portfolio, we believe other factors such as total bill savings and rate impacts should also be considered. We are watching the rate impact and total bill savings of these larger more expensive portfolios and believe the Commission as well as the Company would be remiss if we do not take these factors into account and try to minimize the effect of these costs on our customers. We believe it is prudent to keep DSM goals at a level that are not

only achievable, but are encouraging cost effective products and portfolios. We further believe that the proposed goals appropriately balance these factors.

Q. IN DEVELOPING DSM GOALS AND PROGRAMS, HAS THE COMPANY TAKEN INTO ACCOUNT THE CITY OF BOULDER'S EFFORTS WITH RESPECT TO THE CREATION OF A MUNICIPAL UTILITY?

A. In this filing the Company has not removed Boulder from its recommended energy efficiency, demand response or DSM goals, products or programs. We will continue to monitor the situation and, if and when circumstances warrant, we will file a request with the Commission seeking appropriate relief.

VI. TRADITIONAL ENERGY EFFICIENCY

Q. PLEASE EXPLAIN WHAT THE COMPANY MEANS BY "TRADITIONAL ENERGY EFFICIENCY".

A. The Company defines "traditional energy efficiency" products and programs as primarily customer offerings based on customer installation of higher efficiency technology or equipment compared to the standard efficiency technology that is in the market. The utility designs and implements programs that provide rebates or incentives to residential and business customers to install an "efficient" technology compared to a standard or less-efficient technology. Rebates are intended to lower the incremental cost between the efficient technology and the standard technology. The energy and demand savings that result are used by the utility towards meeting DSM goals approved by regulators. Examples of these products are lighting, motors, cooling equipment, and heating equipment.

Technology or equipment-based energy efficiency has for many years made up the largest component of utility DSM programs.

Q. CAN YOU PLEASE EXPLAIN HOW SIGNIFICANT THE CONTRIBUTION THAT TRADITIONAL ENERGY EFFICIENCY PROGRAMS HAVE HAD TOWARDS THE COMPANY'S RECENT ENERGY SAVINGS PERFORMANCE?

A. Yes, traditional energy efficiency programs have dominated the energy savings claimed by the Company since 2009. Most recently in 2012, the Company's DSM portfolio achieved 400.7 GWh in energy savings. Of that, traditional energy efficiency programs accounted for 384.4 GWh or 96.0 percent of the total savings. In contrast, our Energy Feedback behavioral pilot achieved 15.8 GWh or 3.9 percent. Residential Saver's Switch, a demand response product, has a very small amount of energy savings and accounted for .5 GWh or 0.1 percent of the total portfolio 400.7 GWh.

Q. ARE THERE CHANGES HAPPENING TO TRADITIONAL ENERGY EFFICIENCY PRODUCTS AND PROGRAMS THAT WILL IMPACT THE COMPANY'S FUTURE PERFORMANCE

A. Yes, we as well as industry experts agree that energy savings claimed by traditional energy efficiency products and programs will begin eroding starting in 2013/2014 timeframe. Up until recently, savings and goals for these type of products could be counted on to continually increase through the years. However, we are now seeing declining savings for the future.

Q. IN ADDITION TO THE EFFECT THAT CHANGES IN STANDARDS IS HAVING AS YOU DISCUSSED ABOVE, WHAT IS DRIVING THE EROSION OF ENERGY AND DEMAND SAVINGS FROM TRADITIONAL EQUIPMENT-BASED ENERGY EFFICIENCY?

A. Additional erosion of the potential for energy savings is caused by the length of time these products have been in the market – in some cases the market has been nearly or fully transformed and there is or will no longer be a need for utilities or program administrators to offer rebates to customers in order to incent them to pay the higher cost of a high efficiency option.

An additional market-based driver of the changing landscape for energy efficiency is the competitive pricing of high efficiency options with low efficiency options. This leads to an acceptance of higher efficiency products and technologies in the market. This market transformation leads to more naturally occurring energy efficiency in the market outside of utility products and programs. Customers purchase and install energy efficient measures on their own without the need for utility program incentives. Once markets are transformed, federal and state standards and codes often change to reflect the new standard for highly efficient equipment. In addition, if program administrators continue to rebate these measures, the savings that may be claimed dwindle due to the effect of free-ridership. As discussed earlier, free-ridership is a term that describes consumers who would choose energy efficient products even without a rebate or incentive because they are motivated by something else (perhaps a mandate, environmental concerns, or the return on investment associated with

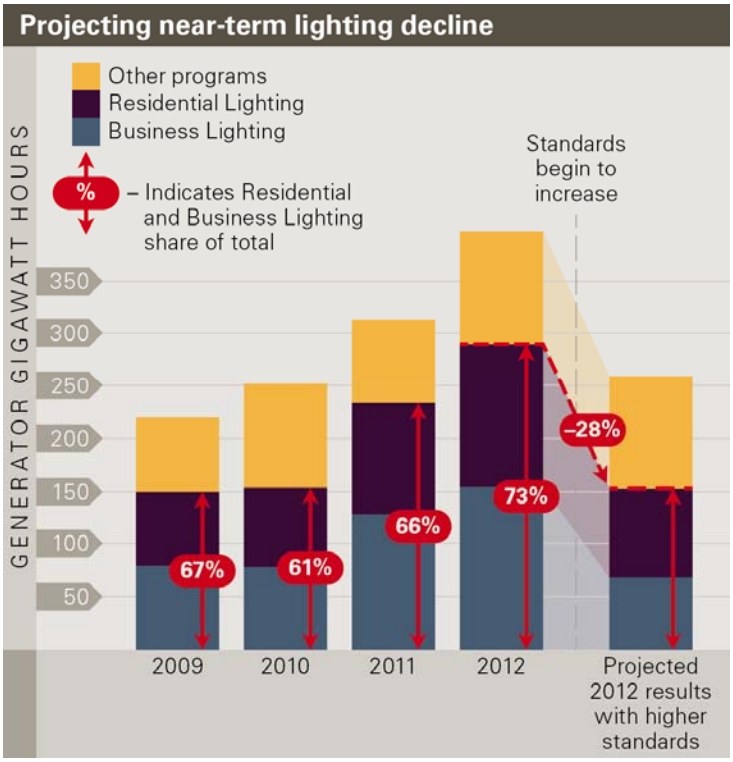
higher efficiency). At the same time, the utility's costs that are avoided have diminished due to declining gas prices which decreases on the electric side the marginal energy and capacity avoided costs. As avoided costs decline, system benefits and cost effectiveness of some of these technologies also decline.

Q. HOW ARE THE CHANGES IN STANDARDS EXPECTED TO AFFECT THE COMPANY'S DSM PORTFOLIOS IN PARTICULAR?

A. The effects of lighting standard changes are discussed at length in section II of Mr. Petersen's testimony. The Energy Independence and Security Act of 2007 included phased-in new standards that lower the potential for utility savings from residential lighting. The Department of Energy's increased lighting standards for business (commercial) lighting in 2010 and 2012 is having the same effect on the potential for business lighting. Utility residential and business lighting products have represented a high percentage of the savings from our DSM portfolio for a very long time. In conjunction with the market transformation (driving higher free-ridership and naturally occurring efficiency) that has occurred, the new standards mean that energy savings from lighting will become much smaller portion of our energy efficiency portfolio. In particular, in 2012, Public Service's the energy savings from all lighting projects comprised 73 percent of the total portfolio energy savings. Even with the addition of LED lighting, the energy savings potential from residential and business lighting is expected to decline substantially through 2020 and will have a profound impact on DSM performance.

The Company conducted analysis on all lighting projects approved 2009 through 2012 for illustrative purposes to gain an understanding of how our portfolio would generally be impacted by changes in future lighting technologies (Graph 5). The data behind the graph used assumptions of the loss of savings per technology as well as forecasts of how particular technologies impacted the lighting portfolio. As I referenced earlier, all lighting projects have historically contributed approximately 60 to 70 percent of total energy savings achieved per year since 2009. A key component of the analysis depicted in the graph is the projected impact new lighting standards scheduled for 2012-14 would have if they took effect for all of 2012. The energy savings from all 2012 lighting projects would decline by an estimated 28 percent. It is important to note that this lost 28 percent in energy savings will occur in the marketplace, for example incandescent light bulbs still exist in today's market; however they no longer count as DSM energy savings towards our energy goals

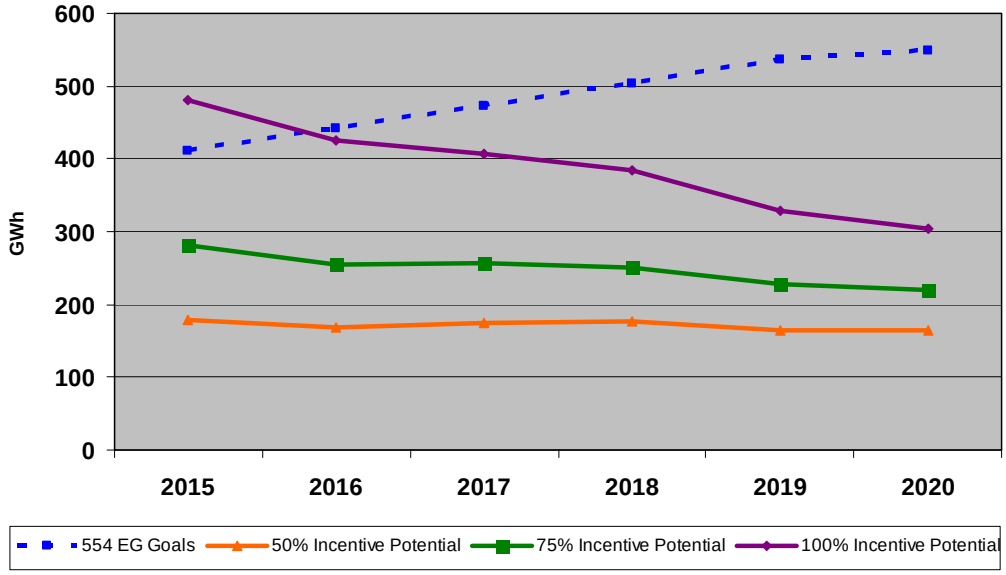
Graph 6: Example of Lighting Energy Standards Impact to DSM



Q. WHAT IS THE EVIDENCE THAT THERE IS LIKELY TO BE SIGNIFICANT EROSION OF ENERGY SAVINGS FROM TRADITIONAL EQUIPMENT-BASED ENERGY EFFICIENCY PRODUCTS AND PROGRAMS?

A. The market potential assessment study update that was recently completed for Public Service confirms the erosion of savings from traditional equipment-based energy efficiency products/programs and shows a general decline in savings potential between 2015 and 2020. The graph below, which is discussed in more detail and provided in Mr. Petersen's testimony, shows this decline for three achievable potential scenarios compared to the ordered goals in the last Strategic Issues Case, Docket No. 10A-554EG.

Graph 7: DSM Market Potential Assessment Study & Erosion of Energy Savings



Q. IS THE EROSION OF ENERGY SAVINGS POTENTIAL FOR UTILITY SPONSORED DSM INDICATIVE OF THE LACK OF SUCCESS OF UTILITY CONSERVATION EFFORTS?

A. No, quite the opposite is the case. While the utility's share of savings from energy efficiency appears to be declining going forward, there are substantial and growing amounts of energy efficiency happening outside of utility programs. This translates to significant amounts of energy efficiency that will exist above and beyond our programs. If the state of Colorado is interested in the level of energy efficiency occurring in total, the achievements claimed by the utilities represents only a portion of the savings being achieved. There has been significant growth in naturally-occurring energy efficiency. For example, the Department of Energy ("DOE") and the Environmental Protection Agency ("EPA") have had success in recent years through their Energy Star efforts working with

electronics manufacturers and retailers to produce and stock more efficient models. Energy efficiency is increasingly being driven by multiple influencers in the market, some of them benefiting by utility programs and others are more market driven**.**

Q. DOES THE POTENTIAL STUDY INCLUDE EMERGING TECHNOLOGIES IN THEIR SAVINGS POTENTIAL?

A. Yes, in the original assessment study from 2020, emerging technologies were identified for LED technologies and indirect evaporative cooling. In the recent update, these same technologies were identified but no others were found. Many of the LED technologies for lighting were included this time within the achievable potential scenarios. However, the indirect evaporative cooling was not included since it is now not expected to be available to the mass market before the end of the timeframe in the potential study. The Company believes there will be new emerging technologies in 2019-2020 that are not yet identifiable. Using this assumption, the Company increased the energy and demand goals for these two years to match the level of the 2018 goals to account for this unknown, but likely, emerging technologies. This added a total of 59 GWh and 10 MW from unidentified emerging technologies for 2019-2020.

Q. WHAT ARE OTHER STATES AND/OR UTILITIES DOING TO ADDRESS THE DECLINING SAVINGS FROM TRADITIONAL PRODUCTS AND PROGRAMS?

A. States are taking varying approaches to attempt to compensate for the decline in savings resulting from traditional energy efficiency measures.

A number of utilities and state regulators are taking multifaceted approaches by both lowering goals based upon the decreased technical potential and adjusting their approaches to savings. For example, many California utilities have been ordered to reduce goals while adjusting non-traditional program potential to allow for more savings from those. Southern California Edison reduced 2013 goals by about 17 percent while increasing total savings from Codes & Standards programs. Additionally, NYSERDA recently adjusted goals downward for 2014 by approximately 19 percent. Though the Company has not had the opportunity to thoroughly review the associated Market Potential studies from these areas, goal reduction appears to be a trend.

With respect to lighting, many are making the switch to advanced lighting technologies such as LEDs, which while considerably more expensive, have lower rates of free ridership and much longer lifetimes.

Other utilities are substantially increasing the proportion of their savings (particularly residential) that is derived from behavioral programs (Rhode Island, Arizona, Massachusetts, California, among others) while others are leaning more heavily on programs focused on implementation and enforcement of codes and standards (Pacific Northwest, California, Arizona, among others). Still others such as California are promoting research to facilitate the further development on emerging technologies that, to date, have not contributed appreciably to increasing the future energy savings potential.

Q. WHAT ARE SOME OF THE COMMON THEMES YOU HAVE SEEN IN NATIONAL ENERGY EFFICIENCY ORGANIZATIONS APPROACHES AND SUGGESTIONS TO ENERGY EFFICIENCY IN THE FUTURE?

A. In the Company's ongoing review of reports and news for the industry, there is a wide mix of opinions on challenges and ideas regarding the future of energy efficiency. In general, they recognize increasing standards and codes are significantly impacting core utility programs, but there is cautious optimism regarding new technologies, program models, and focusing on best practices which will allow increased energy savings from energy efficiency/DSM programs. The following are some common themes and concepts for increasing energy efficiency from the Company's review:

- Increases to energy efficiency standards for new equipment and technologies will remove significant energy savings opportunities for existing energy efficiency programs
- Increased energy standards will create even more energy savings without utility involvement, which means utilities subject to state policies requiring sustained or increasing goals will find future achievement difficult
- Expanded emphasis on automated metering infrastructure (AMI) to capitalize and the expected advances of smart appliances and in-home devices
- Expansion of behavioral change products and programs and reports to almost all customers to educate and influence customers to make choices to use less energy

- Focus on developing a successful model to grow participation in multi-family housing units
- Addition of Combined Heat & Power as eligible for energy efficiency/DSM projects
- Distribution voltage optimization and amorphous core transformers hold potential if energy savings can be verified and included as DSM
- Focus on whole-home retrofits to capture maximum energy savings per home
- Strengthening relationships with retailers by offering mid and upstream incentives
- Influencing adoption and further increases to building codes in order for utilities to capture a portion of the associated energy savings
- Expansion and simplification of financing opportunities for residential and small business customers making it easier for them to purchase equipment that qualify for utility programs
- Identification of ‘best practices’ programs nationally and incorporate into individual utilities program offerings

Organizations generally project spending for energy efficiency or DSM programs will double to triple over current levels by approximately 2025-2035 based on the current direction of increasing energy efficiency goals and evolving programs based on energy savings opportunities.

Q. WHAT IS THE COMPANY'S ASSESSMENT OF THESE APPROACHES AND SUGGESTIONS?

A. As we have discussed in previous questions, the Company agrees there are challenges to the future of energy efficiency, primarily due to higher energy standards. Many of the suggestions listed above are ones the Company has explored and incorporated in the goals that we are proposing in this application. We have concerns with how some of the more commonly discussed new programs or incentives will fill the void and allow even higher energy efficiency goals. The industry reports provide projections for possible energy savings that are lacking substantiated data, which creates uncertainty with the potential opportunities contributing toward future goals. There is also concern about the costs for these and other ideas both from a cost effectiveness standpoint as well as balancing the energy savings with higher rates impacts for customers in order to pay for the programs.

Public Service has tested several of the new models and concepts suggested. For example, the Company has piloted or launched products for central air conditioning tune-ups, early retirement of air conditioners, up-stream retail electronics incentives and deep whole-home retrofits that are often cited as opportunities for future growth in energy efficiency and DSM. The results have either been short-lived, struggled to meet expectations at this time, or have not been cost-effective.

Combined Heat and Power (CHP) has been a topic in the industry the past few years. Treatment of CHP has been inconsistent by states and utilities.

In Colorado, CHP is defined as a renewable energy source by rule and statute. Therefore, it is not included in our DSM goals as a possible product.

The Company is testing or expanding other products often cited as opportunities to increase energy savings. We are piloting a Codes and Standard product that should identify state-specific potential by the end of 2013. The Company is proposing in this application to add a Distributed Voltage Optimization product and an expansion of our Behavioral pilot. The addition of Distribution Voltage Optimization is largely possible due to piloting the technology in SmartGridCity and the actual energy savings we experienced as a result of that pilot.

The Company currently offers several programs that have been cited or are very similar to best practices. In fact, one report cited 18 best practice products for the future advancement of energy efficiency and Public Service offers 16 programs today that are very similar or the actual program(s) cited.

While there are opportunities to expand or add programs to further energy efficiency, which the Company is proposing in this application, we also continue to offer a broad mix of cost effective programs that allow all customers to participate while balancing the upfront costs as shown in customer rates with the long-term energy and bill savings.

Q. WHAT NEW PROGRAMS IS THE COMPANY OFFERING TO INCREASE ENERGY SAVINGS THAT WOULD IMPACT 2015-2020 GOALS?

A. The Company is offering the Distribution Voltage Optimization program, additional Behavioral Change product savings, an LED Street Lighting product,

and possible expansion of a Codes & Standards pilot. These additional categories of programs are described below.

Q. CAN YOU PROVIDE THE STATUS OF THE CODES AND STANDARDS PILOT AND IF THE COMPANY INCLUDED IT IN THE PROJECTED 2015-2020 GOALS?

A. The Company is currently conducting a Codes and Standards pilot that is scheduled to finish by December 2013. Because there is minimal data on the pilot available as of the filing of the DSM Strategic Issues, the Company did not include any energy or demand savings for Codes and Standards in the 2015 through 2020 goals. If final pilot results are favorable and demonstrate that it can be a cost effective product, the Company will likely file to include a product in the future.

VII. DISTRIBUTION VOLTAGE OPTIMIZATION ("DVO")

Q. WHAT IS THE COMPANY REQUESTING OF THE COMMISSION REGARDING DVO?

A. The Company is requesting approval of a DVO program to be included as part of its energy efficiency portfolio with the resulting energy savings included as part of its achievements toward the energy savings goals established in this proceeding. Contingent on approval of inclusion of DVO within the portfolio, the Company is proposing cumulative energy and demand goals for the period 2015 through 2020. In his Direct testimony, Mr. Brockett presents the Company's proposal for recovering the costs of DVO as well as incentive mechanism that will help the Company defray the lost revenues that result from DVO. Ms. Bloch provides

details on how the DVO technology works and provides energy savings for customers. She also describes the methodology the Company proposes for measuring and verifying savings associated with its DVO activities.

Q. WHY IS THE COMPANY REQUESTING APPROVAL OF A CUMULATIVE GOAL FOR DVO RATHER THAN ANNUAL GOALS?

A. Because at this time we are unsure of the exact roll-out schedule of DVO, we are requesting that the total GWh and MW goals over the years from 2015 through 2020 be approved. Below is a table that shows our estimates of the annual achievements but due to the scheduling concerns and limits on capital availability, we request that the total 506 GWh and 56 MW be approved. Annual progress will be reported each year as part of the Company's DSM Status Report filed on April 1.

Table 10 – DVO: Projected Energy & Demand Savings

GWh Saved/Year	2015	2016	2017	2018	2019	2020	Total
DVO	50	101	101	102	102	52	506

MW Saved/Year	2015	2016	2017	2018	2019	2020	Total
DVO	5	11	11	11	5	6	56

Q. WHAT DOES DVO STAND FOR?

A. DVO stands for Distribution Voltage Optimization; but it is also known by several other names in the industry including Conservation Voltage Reduction ("CVR") and Integrated Volt /VAR Optimization ("IVVO").

Q. WHAT IS DVO?

A. DVO is the practice of controlling distribution voltage levels resulting in increased efficiency. In practice, DVO utilizes centralized control and two way

communications to optimize the voltage along the feeder. The practice includes taking voltage readings from the end of the line at the customers' meters to ensure the voltage is as low as possible without violating the lowest ANSI allowable voltage. The primary result is reduced system demand, and increased energy savings at the customer meter. It is estimated that DVO technology can decrease customer energy usage by about 1.8 percent. DVO also provides system benefits from improved power factors and reduced system losses resulting in lower customer rates and decreased fuel consumption.

Q. WHY IS IT APPROPRIATE TO INCLUDE DVO AS PART OF THE ENERGY EFFICIENCY PORTFOLIO?

A. Although DVO would typically be considered a utility-side program if the technology only reduced system losses or improved power factors, it has the unique characteristic of providing direct energy savings on the customer side of the meter. The DVO model establishes an operating environment that optimizes the voltage which in turn allows devices, such as lighting, motors, air conditioners, furnace fans, refrigeration to run more efficiently or draw less voltage thus reducing customers' energy consumption and demand. This concept is explained in more detail in Ms. Bloch's testimony. The customer will directly benefit from these efficiency savings in the form of bill reductions, similar to if customers were rebated for installing high efficiency measures in their premises. In proposing to include DVO as part of our energy efficiency proposal, we would only take credit for the customer energy savings, not the savings from loss and power factor reductions.

Q. HOW DOES DVO DIFFER FROM "TRADITIONAL" ENERGY EFFICIENCY PROGRAMS?

A. DVO differs from "traditional" energy efficiency in that there is no direct rebate paid to the customers nor are they required to expend their own capital to purchase efficient equipment. Public Service will fund the DVO upgrade but the largest portion of benefits are directly seen on the customer side without their active participation.

Q. ARE THE ENERGY SAVINGS FROM DVO DIRECTLY MEASUREABLE?

A. Yes, Ms. Bloch describes how the energy savings are achieved and how the Company will measure and verify savings.

Q. WHAT IMPACT WILL DVO HAVE ON HELPING THE COMPANY REACH AGGRESSIVE DSM GOALS?

A. In the early years in combination with our traditional energy efficiency and behavioral programs, DVO will allow us to achieve savings closer to the goals approved in the last Strategic Issues filing, Docket No. 10A-554EG. As the traditional energy efficiency savings erode further, it will help the company fill the gap in savings that result from the erosion.

Q. DOES THE COMPANY RECOMMEND INCLUDING DVO IN THE DSM PORTFOLIO?

A. Yes, we recommend including DVO for the reasons stated above and ask that the Commission approve this inclusion.

VIII. BEHAVIORAL PRODUCTS

Q. WHAT IS THE COMPANY REQUESTING OF THE COMMISSION REGARDING BEHAVIOR PROGRAMS?

A. The Company is proposing to continue to pursue behavioral change programs over the period 2015 to 2020 and we have included additional savings of 85 GWh and 21 MW between 2015 and 2020 in our proposed goals. Mr. Petersen describes how we propose to count the energy savings associated with such behavioral change programs taking into account both the issues of persistence and measurement of those savings. We seek approval of the methodologies he presents of measuring and accounting for annual savings associated with our behavioral change initiatives.

As a result of our behavioral change pilot program and further experience with behavioral change programs by the industry as a whole, the issues regarding persistence, lifetime of behavioral programs, measurement and accounting for savings that were discussed in Docket No. 10A-554EG are now better understood and even though some issues are still being researched, reasonable methods of addressing these issues can now be proposed. With approval of a method of accounting for the savings from such programs, the Company would be in a position to introduce behavioral change programs, or expand or modify existing programs just like any other DSM program that may be a part of its energy efficiency portfolio.

Q. PLEASE DISCUSS THE ADDITIONAL BEHAVIORAL PROGRAM SAVINGS INCLUDED IN THE PROPOSED 2015-2020 GOALS.

A. The recently completed update to the Market Potential Assessment study included a total of 85 GWh and 21 MW of additional savings from Behavioral programs between 2015 and 2020. The Assessment assumed a gradual expansion of the behavioral programs from 2015 through 2020 reaching about 500,000 customers in 2020. However, the Company believes this expansion will occur more quickly and included the 85 GWh and 21 MW in the 2015-2017 time period. In accordance with the method for accounting for savings that Mr. Petersen describes in his testimony, we are proposing to include 1/3 of the total savings from behavioral programs each year during the three-year program period. Therefore, the annual goals for 2015 – 2017 are slightly more than 28 GWh and 7 MW of new savings from Behavioral programs for each of the years 2015, 2016, and 2017. The source for these behavioral savings is from the Market Assessment and a scenario called “High Users and Medium Electric/Gas Users”.

Q. WHAT ARE CURRENT ISSUES REGARDING BEHAVIORAL PROGRAM SAVINGS THAT REQUIRE COMMISSION GUIDANCE?

A. The method for accounting for behavioral program savings has been an issue for some time and has delayed utilities and commission’s from fully embracing these types of programs. Many pilots have been undertaken across the U.S. in the past few years. The issues include:

a) How long do savings persist once the behavioral feedback is ended;

b) How to account for annual savings during the program offering;

c) How to measure and verify (“M&V”) the actual savings;

d) How to count the net benefits in financial incentive mechanisms that use a shared-savings approach.

In Mr. Petersen's testimony, we are proposing specific ways to treat these issues which are summarized below:

a) Regarding persistence, we are proposing for the near-term not to take credit for savings that likely persist after the feedback pilot is ended. OPower has conducted studies that prove that after ending feedback reports to customers, some level of the energy and demand savings persist after the program support has ended. However, since the Company does not at this time know the exact timing of a full-blown program and when or if it would end, we are not proposing to take credit for these savings in this application but may take up the issue in a later application.

b) For accounting for savings, we are proposing a method that the State of Minnesota endorses for calculating annual savings by dividing the total expected savings by the # of years the program is expected to be in the market. This is a fair and conservative approach to estimating the savings attributable to behavioral change programs that require ongoing provision of energy feedback reports over each year of the three years of the program.

c) The methodology for M&V that is currently being used is one that compares the energy usage over a period of time of a control group who do not receive energy feedback reports to the treatment group who do

receive the reports. This method has been accepted by many states and we continue to believe this is an accurate method. Where we are looking at different M&V methods is in some of the newer delivery methods of providing feedback information, such as through the web. Since the web access to these reports is not easily constrained to only a specific group of customers, there are not clear control groups who do not receive the reports. Therefore, more sophisticated M&V methods are required. Again, Mr. Petersen has studied these methods and proposes one in his testimony that we believe will provide accurate savings measurements.

d) The net benefits that occur in each year of a behavioral program are the total savings (not divided by # of years of the program) that actually occurred and are treated in the calculation of benefits as a one-year lifetime. Mr. Petersen will discuss net benefits in further detail in his testimony.

Q. WHAT RECOMMENDATIONS DOES THE COMPANY HAVE FOR THE ISSUES DISCUSSED ABOVE REGARDING BEHAVIORAL PROGRAMS?

A. We recommend that the Commission approve our proposed methodologies for addressing the issues as specified in Mr. Petersen's testimony. As this type of program gets more mature and more universal consensus occurs regarding treatment of the issues, the Company may request re-consideration of the issues and changes in methodologies.

Q. DOES THE COMPANY CURRENTLY OFFER ANY BEHAVIOR PROGRAMS OR PILOTS?

A. Utilities have included behavioral programs for many years in their portfolios; however, for the most part they were considered strictly educational programs or audit programs that help customers understand energy efficiency, tips on how to decrease their energy usage such as turning down their thermostats. These programs also intentionally market their more traditional equipment-based programs and are known to drive increased participation in those programs. Public Service has a business energy analysis and a residential home energy audit program as well as a consumer education and business education program in our DSM portfolio. Most utilities to this point, including Public Service, have not had accurate or cost effective ways to measure these presumed savings and have not taken a direct savings credit for them nor are we including in this filing a request to begin crediting savings to these educational, indirect savings programs.

However, in 2011, the Company began a pilot called Energy Feedback which works with OPower to provide print reports to customers on a regular basis benchmarking their home against more efficient homes as well as providing information on how the consumer can reduce their energy usage by behavioral changes and/or participating in utility rebate programs. Due to sound methodologies for measuring and verifying the savings, we have claimed savings for this pilot.

Q. WHAT ARE THE COMPANY'S PLANS FOR FUTURE BEHAVIORAL PROGRAMS?

A. We propose to continue taking direct savings credit for our Energy Feedback pilot and are seeking authority here to expand it to a full-blown program in the near-future. We are exploring adding or replacing the print reports with web-based behavioral reports which will reduce the cost of the program. We are also exploring a new program that would be offered to our business customers along the same lines as the residential program. Mr. Petersen's testimony describes these efforts in more detail and provides methods for measuring and counting savings from these programs.

IX. LED STREET LIGHTING

Q. WHAT IS THE COMPANY REQUESTING OF THE COMMISSION REGARDING LIGHT-EMITTING DIODE (LED) LIGHTING?

A. Public Service is asking for Commission approval of an LED Street Lighting energy efficiency concept for Company-owned lights that customers are responsible for funding the majority of costs to upgrade and replace street lights. If approved, the Company will file a detailed plan including budget, energy savings, and evaluation and measurement verification along with other requirements either in a future DSM Plan or 60 Day Notice filing. All energy savings through LED upgrades in a future product will count towards Company energy savings goals. The Company will also make any necessary tariff

changes to its street lighting tariffs to reflect the effect of the Commission's decisions in this docket.

Q. PLEASE EXPLAIN THE LED STREET LIGHTING PRODUCT CONCEPT THE COMPANY WOULD DEVELOP AND FILE IN THE 2015-16 DSM PLAN IF THE COMMISSION APPROVES IT FOR DSM.

A. This product concept is specifically for street lights owned by Public Service but the customer, which in most cases are municipalities, are responsible for the majority of costs associated with upgrading and replacing the street lights. Based on the results of an LED pilot currently underway, Public Service may make LED lights available for purchase by customers to upgrade existing street lights. The Company would also install the LED lights or hire a lighting contractor to complete the work on behalf of the customer. The equipment will be specified and meet performance metrics outlined by the utility to assure a quality product with good reliability and performance. After installation is complete, customers will be able to receive a rebate from the energy efficiency product that is a portion of the incremental capital costs they used to pay for the upgrade.

Q. CAN YOU PLEASE SUMMARIZE THE LED STREET LIGHTING PILOT CURRENTLY UNDERWAY AT THE COMPANY?

A. Xcel Energy is conducting LED Street Lighting pilots in four cities throughout their service territory including Colorado. The locations are: West St. Paul, Minnesota; Denver, Colorado; Amarillo, Texas; and a yet to be determined location in Wisconsin.

Data collected during the testing will help the utility decide what sort of LED lighting products provide the most benefit to customers, how to price LED rate options, whether the equipment performs as specified, how much maintenance is required, and how frequently maintenance should be performed. The pilots will also document customers' perception of the LED fixtures. This data will be used in future product selection and rate design. Installation of the LED lights has been completed in Minnesota with plans for installation in other states in the near future.

Q. PLEASE EXPLAIN WHY YOU BELIEVE IT IS APPROPRIATE TO INCLUDE LED STREET LIGHTING AS AN ENERGY EFFICIENCY PRODUCT?

A. The LED Street Lighting product will be very similar to other traditional energy efficiency products. In a typical energy efficiency product, the owner/customer who pays the energy bill also makes the decision and pays for new energy efficient technology at their premise. In the case of this LED Street Lighting product, the Company owns and maintains the street light, and the customer is responsible for the monthly energy bills and funding the majority of costs to repair, replace or upgrade the lights. A customer participating in the LED Street Lighting product will pay the majority of the cost for the upgrade to LED lights and, therefore, would be eligible to receive a Company energy efficiency rebate for upgrading the lights.

I also want to clarify that customers are on a special street lighting rate for all of their lights. Customers do pay DSMCA charges on the street lighting rate,

which makes them eligible to participate in energy efficiency and DSM programs and products.

Q. WOULD YOU CHARACTERIZE THIS CONCEPT AS ELECTRIC UTILITY INFRASTRUCTURE ("EUI")?

A. No. Electric Utility Infrastructure projects are implemented to save energy on the utility side of a customer's meter. In the case of EUI, Customers do not experience any direct reduced energy usage that reduces their monthly energy bills; however, there would likely be indirect decreases from reduced fuel or rates as a result of the utility-side energy efficiency.. An example of a EUI energy efficiency project is installing efficient lighting throughout a utility's power plant facilities.

Q. DID THE COMPANY INCLUDE LED STREET LIGHTING IN SETTING THE 2015 THROUGH 2020 ENERGY AND DEMAND GOALS?

A. Yes. The Company included energy savings for LED street lighting potential in 2015 through 2020 energy savings goals. The Company did not include any demand savings because street lights are only used at night, which is not when there is peak demand for electricity.

Q. WHAT ENERGY SAVINGS POTENTIAL DOES THE COMPANY BELIEVE EXISTS WITH STREET LIGHTING?

A. The Company's proposed energy goals include 12 GWh of energy savings per year from LED Street Lighting for 2015 through 2019. This was developed based on evaluating the Company's street lighting network and discussions with local municipalities.

Q. WILL CUSTOMERS WHO OWN AND MAINTAIN THEIR OWN STREET LIGHTS BE ELIGIBLE TO PARTICIPATE IN THIS PROGRAM?

A. Customers who own their own street lights will not be eligible for this product, but the Company plans to develop a traditional energy efficiency product that would be launched at the same time that would be applicable to customers who own their own street lights. Customers' who own and maintain their own street lights are no different from customers who participate in the Company's other existing energy efficiency products. Therefore, we intend to develop a similar, if not identical, lighting rebate as to what would be developed for Company-owned and maintained systems that customers fund.

Q. HOW DO YOU BELIEVE LED STREET LIGHTING SHOULD BE TREATED REGARDING THE COMPANY'S DSM INCENTIVE MECHANISM?

A. Because customers are paying for and directly benefiting from upgrading to LED street lights, the Company believes this product would be treated the same as all existing energy efficiency products and programs. There is no reason to adjust the incentive mechanism because of this proposed product concept if added in the future.

X. OVERVIEW OF DEMAND RESPONSE

Q. PLEASE SUMMARIZE THE PURPOSE OF THIS SECTION.

A. I am providing background on demand response including an overview of the Company's activities and any recent industry developments prior to addressing the 2015 through 2020 demand goals.

Q. IS DEMAND RESPONSE DEFINED AS DSM ACCORDING TO COLORADO STATUTE?

A. Yes. House Bill 07-1037, codified in relevant part at 40-1-102(5). (6) and (7). C.R.S., as well as 40.3.2-101 and 104, C.R.S. 40-1-102 (6), defines Demand Side Management as follows: "Demand-Side Management Programs or DSM programs mean energy efficiency, conservation, load management, and demand response programs or any combination of these programs."

Q. PLEASE DESCRIBE THE DIFFERENT TYPES OF DEMAND RESPONSE PRODUCTS OR PROGRAMS?

A. Demand response programs fall into two main categories: Dispatchable and Non-Dispatchable resources.

Dispatchable resources involve direct or physical control of electric demand reductions from retail customers that often are utilized during specified time frames. A more common term is Interruptible resources. Demand Response offerings in this category include:

1) **Direct Load Control ("DLC")**: The utility directly controls a customer's load remotely during period of high demand. The Company's Saver's Switch product is a DLC product. A switch is installed on a central air conditioner which is remotely cycled during periods of peak demand during summer
2) **Interruptible Tariffs:** Customers agree with the utility to reduce consumption to a pre-specified level in return for an incentive, credit or

discount. The Company's Interruptible Service Option Credit ("ISOC") offering is the Company's interruptible tariff. .

3) **Other Demand Response offerings:** Examples include capacity bidding, demand bidding and other aggregator offerings. These resources can either be controllable as a customer obligation or as voluntary load reduction indicated by a trigger in demand price. The Peak Savings product is an example of this type of resource.

Non-Dispatchable Demand Response are indirect or non-physical control of electric demand reductions from retail customers often occurring during reoccurring intervals and are often referred to as pricing strategies. The most common non-dispatchable strategies are dynamic pricing such as time-of-use and real-time pricing rates.

Q. HOW DOES DEMAND RESPONSE FIT WITHIN THE COMPANY'S ENERGY EFFICIENCY OR DEMAND SIDE MANAGEMENT PORTFOLIO?

A. Dispatchable products offered by the Company (ISOC, Saver's Switch and Peak Savings programs) are filed and managed within DSM. Historically the Commission has approved only incremental demand reduction goals (typically stemming from increases in the Company's load management products) in conjunction with the approval of a DSM biennial plan.

Q. HOW DOES THE COMPANY INCORPORATE FORECASTED DEMAND REDUCTION INTO ITS GENERATION RESOURCE PLANS?

A. The Company considers the total forecasted contributions to demand reduction from energy efficiency, Savers Switch, the Interruptible Service Option Credit and

Third Party Demand Response programs in calculating the firm load obligation used for purposes of determining the Company's resource need. The forecast of summer peak load is reduced by the combined effects of the Company's energy efficiency and demand response programs. The resulting load is referred to as firm obligation load. The following table shows the impacts of Demand Response in our last Electric Resource Plan completed in 2011.

Table 11: 2011 Company Electric Resource Plan – Total System Controllable Load for Demand Response

MW	2011	2012	2013	2014	2015	2016	2017	2018
Total System Controllable Load (DR)	411	434	461	482	496	508	520	529

Q. HOW SHOULD THE RESOURCE PLANNING PROCESS INFORM THE COMMISSIONS APPROVAL OF DEMAND REDUCTION GOALS IN THIS PROCEEDING?

A. To the extent that the Company is able to achieve demand reduction through energy efficiency, load management or demand response initiatives, demand reduction can reduce the Company's need to build or acquire additional generation resources. On the other hand when the Company is in a position of having excess generation capacity, incremental demand reduction will not have the effect of enabling the Company to avoid generation capacity costs over the short term. It follows that the Commission may want to consider the Company's resource need over the period 2015 to 2020 in determining the appropriate level of demand reduction goals.

Q. CAN YOU PLEASE EXPLAIN WHAT A CUSTOMER SHOULD EXPECT BY PARTICIPATING IN A LOAD MANAGEMENT OR DEMAND RESPONSE PROGRAM OFFERED BY THE COMPANY OR THIRD-PARTY AGGREGATOR?

A. There are three types of interruptions that may be called by the Company under the Company's ISOC tariff or that may require the third-party aggregator to deliver load reduction to the Company. The first is a capacity interruption that occurs when the Company has insufficient generation resources on line to meet its resource requirements, including the maintenance of an adequate reserve. Contingency interruptions occur when the Company has insufficient generation resources on line to meet its obligation to maintain a certain level of Operating Reserves within the Western Electricity Coordination Council (WECC) Power Pool. Both capacity and contingency events are indicators of system concern, therefore, the Company calls on its interruptible resources to maintain system reliability.

ISOC subscribers may also have their demand for electricity controlled for economic reasons. The Company may call an economic interruption whenever it determines there is an opportunity to avoid high priced energy by reducing the demand for electricity. When an economic interruption is called an ISOC customer has the option to either control their demand as requested by the Company or buy-through the interruption at a price equal to the actual cost incurred by the Company for buy-through energy. Thus, regardless of whether the interruptible customer elects to interrupt or buys through in response to an

economic interruption, the Company's remaining customers are insulated from paying for the higher priced energy that triggered the interruption. Under the Company's ISOC tariff, customers who subscribe may specify the amount of their load to be interrupted and may limit the total number of hours of interruption the Company may call among other options. Over the past several years the majority of interruptions have been for economic reasons, however, we have called several capacity and/or contingency interruptions as well.

Q. WHAT ARE THE BENEFITS OF DEMAND RESPONSE TO CUSTOMERS AND TO THE COMPANY?

A. Weather, plant maintenance and unforeseen factors can impact the supply and demand for electricity. The utility tries to maintain an adequate generation reserve margin so as to be able to fulfill its obligation to deliver power to its customers at all times even when unforeseen factors impact generation supplies. Interruptible capacity, such as the capacity available to the Company through its ISOC tariff and through the third-party aggregator can provide the Company with a less costly way to meet its reserve requirements than acquiring additional generation capacity. Such load management and demand response programs provide customers that have the ability to curtail their load with an economic incentive or credit in return for their commitment to reduce their load when called upon by the utility to do so. In this way interruptible load adds reliability to the grid and allows the Company to better manage the electric system. Customers benefit from incentives provided for demand reduction and/or the ability to manage their energy consumption around times in which peak demand is low.

Q. WHAT DO YOU CONSIDER TO BE THE FUTURE OF DEMAND RESPONSE FOR PUBLIC SERVICE?

A. The future opportunities to grow demand response remain uncertain. Dispatchable demand response is a traditional methodology that will continue to be used as a resource to maintain system reliability. Demand reduction brought about through alternative pricing mechanisms entails significant investment in advanced metering technology and remains unproven in the market. While there have been significant progress in advanced metering and pricing options, it remains to be seen as to whether customers will continue to embrace these opportunities despite concerns regarding the high cost of such initiatives and with privacy (among others).

The Company views demand response as a particularly valuable means of ensuring the reliability of its service at reasonable cost. We will continue to watch the evolution of demand response in the marketplace, reviewing opportunities, changing our portfolio and programs based on opportunities that continue to provide cost-effective options for our ratepayers.

XI. DEMAND RESPONSE GOALS

Q. WHAT IS THE COMPANY REQUESTING OF THE COMMISSION REGARDING ITS DEMAND RESPONSE GOALS?

A. The Company is seeking approval of the total demand reduction goals set forth in the table below. This includes expected natural growth in demand reduction from the Company's existing ISOC program, the 40 MW of demand reduction currently committed by a third party aggregator, as well as additional potential found within

our medium commercial and industrial customer sector. The following table repeated from section II (Approvals Requested) for convenience, show the proposed energy and demand savings goals for the demand response portfolio.

Table 5: Cumulative Demand Response – Demand Savings Goals

MW	2015	2016	2017	2018	2019	2020
Total System Controllable Load (DR)	**528**	**537**	**555**	**575**	**598**	**623**

Q. HOW WERE THE DEMAND RESPONSE GOALS DETERMINED?

A. The 2015 through 2020 goals were primarily based on the recently completed demand response potential study. The Company also reviewed the committed demand response levels in the past electric resource plans as a comparison with the study. Mr. Petersen presents the demand response potential study and explains how we developed the demand reduction goals proposed in this proceeding.

Q. HOW DO THE GOALS COMPARE WITH THE LEVEL OF DEMAND REDUCTION ASSUMED FOR PURPOSES OF THE CURRENT RESOURCE PLAN (DOCKET NO. 11A-869E)?

A. The table below shows the level of cumulative demand reduction (MW per year) the Company is proposing here in comparison to the level of demand reduction assumed for purposes of the 2011 Resource Plan.

Table 12: Cumulative Demand Response Goal vs. 2011 Resource Plan

MW	2015	2016	2017	2018	2019	2020
Cumulative Demand Response Goal	528	537	555	575	598	623
2011 Resource Plan	496	508	520	529	NA	NA

It is not uncommon for a demand response portfolio to change as our interruptible customers' needs change and they change the choices they have made regarding their participation in our ISOC program or in the Peak Savings program offered by a third party aggregator. Part of maintaining a demand reduction portfolio is to understand that within the load pool there is normal loss that will need to be replaced. Accordingly, the increase in the demand reduction we are proposing here includes not only new incremental load, such as potential load identified within the demand response demand response market potential study, but also replacement of any load lost as a result of our customers making different choices regarding their participation in our demand reduction programs.

Q. WHY IS THE COMPANY GROWING DEMAND RESPONSE PRIOR TO THE 2019 RESOURCE NEED?

A. The goals proposed for 2015 and 2016 incorporate forecasted natural growth of our existing product. This includes additions to the ISOC product based on customer inquiries the Company has received and continuing minor growth in Saver's Switch based on customer interest.

The Company is proposing to increase goals and expand customer participation starting in 2017 in order to ramp up demand savings by 2019 to provide a sizeable benefit to the Company's current resource need.

Q. CAN YOU PLEASE EXPLAIN WHY THE COMPANY DEMAND RESPONSE GOAL FOR 2015 THORUGH 2020 IS NOT SET AT THE MAXIMUM ACHIEVEABLE LEVEL AS IDENTIFIED IN THE POTENTIAL STUDY?

A. We used the market potential identified within the study as a directional indicator in establishing demand reduction goals for purposes of this proceeding. The Company had to keep many other considerations in mind while determining future goals. These considerations are discussed within Mr. Petersen's testimony. However, I've outlined the top considerations below:

- **Market Potential:** The market potential study gave a range of potential opportunities, as such; we needed to choose the range that best matched where we thought participation may be best sought. We have also chosen to remove pricing strategies at this time for the reasons explained by Mr. Brockett.
- **Resource Needs:** Demand reduction serves to offset the need for generation capacity in the context of resource planning. As noted above, we are continuing to grow our portfolio above current obligated loads; however, we are limiting these resources until such time as there is a resource need.
- **Load Loss:** The market potential study identifies incremental load. What the study does not necessarily take into consideration is the load loss pool that exists in the course of time. Assumptions of load per customer will be adjusted and customers will choose to remove themselves from the program. This factor needed to be considered within our goals.
- **Program Adjustments:** Other adjustments were also needed to account for concerns within Savers Switch and Medium C&I. All adjustments are explained further in Mr. Petersen's testimony.

XII. ELECTRIC VEHICLES

Q. IS THE COMPANY MAKING ANY SPECIFIC PROPOSAL REGARDING ELECTRIC VEHICLES IN THIS PROCEEDING?

A. No. The Company is providing certain information regarding the future of electric vehicles to fulfill a commitment made as part of the settlement agreement reached in Docket No. 11A-631EG.

Q. WHAT TOPICS ARE YOU ADDRESSING AS REQUIRED IN THE 2012-2013 DSM BIENNIAL PLAN SETTLEMENT?

A. I will discuss: (1) electric vehicles as a possible future source of demand, (2) possible demand savings or reduction options related to electric vehicles and (3) how the Electric Vehicle Charging Station Pilot is expected to contribute to the Company's understanding of demand impacts related to electric vehicle charging.

Q. PLEASE EXPLAIN HOW THE COMPANY HAS APPROACHED THE QUESTION OF ELECTRIC VEHICLES AS A POSSIBLE FUTURE SOURCE OF DEMAND SAVINGS?

A. The company participated in the EEI PEV Readiness effort, and collaborated with the University of Colorado at Boulder's Renewable and Sustainable Energy Institute ("RASEI"), and Toyota Motor Sales U.S.A. Inc. in a field study of household experiences and the technical impacts of plug-in hybrid electric vehicles ("PHVs"), in a "smart grid" environment. The company also stays abreast of many national and local studies and pilot projects.

Q. WHAT IS THE POTENTIAL FOR DEMAND SAVINGS WITH ELECTRIC VEHICLES?

A. In the absence of any mechanism to modify charging behavior, electric vehicle charging tends to peak on weekdays at 8:00 pm, with an average demand from one EV of 600-700 Watts. [4] Based on the Project FEVER report referenced below, with 1,300 EVs in mid-2012 the peak demand was 845 kW. Based on the IEE study referenced below, the peak demand from electric vehicles could be as high as ~160 MW in 2035. The actual demand available for reduction would depend on the demand response mechanism.

Q. HOW MANY ELECTRIC VEHICLES ARE IN OUR COLORADO ELECTRIC SERVICE TERRITORY NOW AND WHAT ARE THE PREDICTIONS FOR THE FUTURE?

A. According to Project FEVER (Fostering Electric Vehicles Expansion in the Rockies), as of mid 2012 there were 1,300 registered plug-in electric vehicles in Colorado[5]. A recent white paper by Innovation Electricity Efficiency ("IEE"), an institute of the Edison Foundation, projects between five and 30 million electric vehicles (2-12 percent of all light duty vehicles) in the U.S. by 2035.[6] IEE created high, medium and low cases based on variations in oil prices, battery technology development and fuel economy standards. Scaling the medium case projections specifically for Public Service Company electric residential customers results in 250,000 EVs by 2035.

[4] A First Look at the Impact of Electric Vehicle Charging on the Electric Grid in The EV Project; Stephen Schey, et al; EVS26 Los Angeles, California, May 6–9, 2012

[5] Colorado Electric Vehicle and Infrastructure Readiness Plan http://denvercleancities.org/Colorado%20PEV%20Readiness%20Plan.pdf

Q. WHAT IMPACT COULD THESE AMOUNTS OF ELECTRIC VEHICLES HAVE ON THE UTILITY GRID NOW AND IN THE FUTURE?

A. Although generation and transmission capacity is sufficient, potential impacts to the distribution system exist. An EV charging at 6.6 kW (Level 2) is similar to the peak load of an entire home. Distribution transformers generally serve between 5-15 homes. Accordingly, one EV could increase the transformer load by 5 percent to 20 percent. Depending on the existing transformer load, multiple EVs on the same transformer could cause overloading. Consequences of overloading transformers include reducing the life of the transformer and unplanned outages due to melting of the protective fuse. While we expect EVs to represent a higher than normal load increase, we believe the load they will put on our system will still lie within our ability to manage.

Q. WHAT ARE THE CONSEQUENCES OF THIS INCREASE IN DEMAND AND ENERGY?

A. EV load impacts depend greatly on when charging occurs throughout the day. On-peak charging can raise system capacity needs, reduce load factors and increase costs. Conversely, off-peak charging can have no impact on system capacity, improve load factors and reduce costs. Assuming that EV owners will begin charging when they arrive home, unmanaged charging will likely coincide with our system peak.

Q. WHAT ARE SOME OPTIONS THAT COULD BE EMPLOYED TO PRODUCE DEMAND SAVINGS OR ENERGY REDUCTIONS WITH ELECTRIC VEHICLES?

[6] Forecast of On-Road Electric Transportation in the U.S. (2010-2035), IEE, April 2013

A. We believe there are options available and that it is important to investigate these options.

- One option is to offer a TOU tariff with a lower off-peak rate to EV owners, which could move charging off-peak, provide an opportunity to reduce the bill impact caused by charging their EV, while at the same time avoiding any significant level of cross-subsidies by other customers. Public Service has drafted a TOU rate for discussion purposes as part of Investigatory Docket No. 11I-704EG, and looks forward to continued discussion on such a rate. Under a TOU rate, EV owners will likely begin charging at the start of the off-peak time. One consequence could be that high penetration levels in the long-term then may create heavy demand on individual transformers and possibly a new peak. Data from several early EV deployments have indicated that most EVs are plugged in for ten hours per day, but only charge for two hours.[7] While many challenges exist, and the technology solution is currently uncertain, that idle time provides the opportunity to stagger EV charging throughout the night to spread charging more evenly.
- A second option involves direct load control, similar to an air-conditioner cycling program like Saver's Switch. Xcel Energy, in partnership with NREL, investigated this approach with a small number of vehicles able to communicate with the grid to modify charging based on signals relating to load-shifting, renewable resources, real-time prices and ancillary services.[8]

[7] A First Look at the Impact of Electric Vehicle Charging on the Electric Grid in The EV Project; Stephen Schey, et al; EVS26 Los Angeles, California, May 6–9, 2012

[8] Field Testing Plug-in Hybrid Electric Vehicles with Charge Control Technology in the Xcel Energy Territory; T. Markel et al; Technical Report NREL/TP-550-46345, August 2009

The technology, customer acceptance, and marketing of such a program require further study. We are currently studying some of these elements as part of a DSM pilot discussed below.

- A third approach in which vehicles play an active role by communicating with the grid to both modify charging and deliver energy to the grid, commonly referred to as vehicle-to-grid ("V2G"), is a developing technology that could offer further benefits. Current barriers to V2G implementation include efficiency losses, regulatory, financial, small number of vehicles, auto OEM risk tolerance, control technology deployment, and standards.[9]

Q. PLEASE EXPLAIN THE COMPANY'S ELECTRIC VEHICLE PILOT AND HOW IT IS EXPECTED TO CONTRIBUTE TO THE COMPANY'S UNDERSTANDING OF DEMAND IMPACTS RELATED TO ELECTRIC VEHICLE CHARGING?

A. Public Service has deployed the Electric Vehicle Charging Station Pilot ("EVSE"), a continuation of the pilot approved in the 2012 DSM plan. The goal of this pilot is to provide insights into customer electric vehicle charging patterns and behaviors, coincidence of charging load with Public Service's system peak and how vehicle charging may impact the distribution system. This pilot will determine when customers are charging, the typical duration of the charge and whether this load is available for Demand Response ("DR").

Through our development work in 2012 we discovered there were limited monitoring and control options available that would be suitable for deployment in this pilot. This led us to re-frame the pilot into a three-phased approach.

[9] Vehicle-to-Grid Power Flow Regulations and Building Codes Review by the AVTA; Briones et al; Idaho National Laboratory; September 2012

The first phase will deploy electric vehicle charging stations already available in the market, allowing for faster deployment and the beginning of data collection.

The second phase is to deploy load control relays ("LCR") as originally envisioned. These devices, though less expensive than a full charging station, were not immediately ready for deployment. The first installation of LCRs will occur later this year.

The final phase of the pilot will be to investigate how the Company can work directly with auto manufactures. Most electric vehicles come equipped with communications and charge control equipment from the manufacturer. Leveraging this existing capability appears to be the most efficient and economic approach to a long term, mass market strategy. Our investigation will look at the plausibility, advantages and hurdles of working with manufacturers to enable this DR strategy.

One of the primary pilot objectives is to analyze the demand savings establishing technical assumptions and cost effectiveness. This along with customer acceptance will determine whether the pilot is proposed in a broader, more permanent DSM program. The pilot will run through the summer of 2014.

To stay informed around electric vehicle purchases and system needs, we participate in the Electric Vehicle Information Exchange ("EVIX"), which helps us track vehicle sales throughout our service territory. We also receive monthly vehicle sales reports from Chevrolet on Volt purchases. We are using this data to perform distribution system analyses now, and plan to integrate the data into our

enterprise systems. As EV adoption grows, we expect the data to influence future planning decisions to ensure that we can continue to provide reliable, safe energy to fuel vehicles at a competitive cost.

XIII. ENERGY EFFICIENCY AND DEMAND RESPONSE GOALS – FUTURE RESOURCE PLAN

Q. WHY ARE YOU ADDRESSING THE ISSUE OF BIDDING WITHIN THIS DOCKET?

A. In Decision No. C13-0323, Docket 11A-869E page 14, the Commission expressed its intention to address any questions regarding the process used to acquire energy and demand reductions in the context of this proceeding rather than requiring competitive bidding of such resources as part of the All-Source Solicitation conducted in that docket.

Q. WHAT IS THE COMPANY REQUESTING OF THE COMMISSION IN REGARDS TO THE BIDDING OF ENERGY EFFICIENCY AND/OR DEMAND RESPONSE?

A. The Company is seeking authorization to continue to acquire energy and demand reductions through the established processes within our approved DSM plan, which includes energy efficiency and demand response. These efforts already involve the use of many third-party providers who partner with us to deliver DSM products to our customers. Accordingly, in this proceeding we ask the Commission to allow us to continue to be permitted to exercise our discretion regarding whether to solicit bids for aspects of our DSM portfolio.

Q. WHAT ARE YOUR CONCERNS ABOUT USING COMPETITIVE SOLICITATION FOR VENDORS WHO WOULD PROVIDE ENERGY EFFICIENCY OUTSIDE THE CONTEXT OF THE COMPANY'S APPROVED DSM PLANS?

A. As the Company has explained in prior proceedings, we have three principal objections to competitive solicitation undertaken outside the context of our approved DSM plan as follows:

- Competitive solicitation of DSM third-party bids would result in duplication of Public Service's already robust and successful energy efficiency and demand response programs;
- Past and current experience with DSM third-party bidders have not been successful; and
- The Company already contracts with a broad spectrum of third-party DSM vendors in the administration of its programs.

Q. WHY WOULD COMPETITIVE SOLICITATION RESULT IN DUPLICATION OF PUBLIC SERVICE'S DSM PROGRAMS?

A. The Commission has already approved separate processes for the acquisition of incremental cost-effective demand-side resources consistent with the requirements of C.R.S. 40-3.2-104, and in this proceeding will establish and approve new electric energy savings goals through the year 2020 that takes into account the economic and achievable potential throughout the Company's service territory. It follows that imposing the additional requirement that demand-side resources be bid as part of a competitive solicitation outside the context of

our approved DSM plan would result in duplication of Public Service's already robust and successful energy efficiency and demand response programs.

Q. PLEASE DESCRIBE PUBLIC SERVICE'S PAST EXPERIENCE WITH COMPETITIVE BIDDING.

A. In 2005, Public Service submitted an all-source RFP for DSM resources as part of the Comanche Settlement Agreement. The responders to this RFP were all for-profit vendors and contractors. We selected three winning DSM bids and attempted to negotiate with each of the bidders towards a contract to provide the DSM resources they proposed. However, after two years of working with each of the bidders, we were never able to reach final agreement. One of the bidders withdrew their bid part way through the negotiations when it became clear that the bidder would not be the exclusive provider of energy efficient lighting in our service territory. The two remaining bidders were unwilling or unable to provide the required legal and insurance assurances necessary to secure their performance and dropped out of the negotiations. This experience with soliciting competitive DSM bids in the context of all-source solicitation shows that these types of resources do not compete well "head to head" against other technologies in an all-source bidding process.

Q. HOW IS PUBLIC SERVICE'S DSM PORTFOLIO ADMINISTERED AT PRESENT AND DOES THE COMPANY MAKE USE OF THIRD-PARTY VENDORS AND COMPETITIVE BIDDING?

A. Public Service currently administers its DSM portfolio internally, as directed by the Commission. However, the Company employs a competitive Request-For-

Proposal process to hire many outside vendors to address needs within the individual programs. For instance, in the Residential and Low-Income programs, the Company conducted RFP's and hired third-parties to administer, implement, and/or provide various services for the following products between late 2008 through 2010: Home Energy Audits, Refrigerator Recycling, ENERGY STAR New Homes, and Low-Income Energy Savings Kits, Multi-Family Weatherization, Non-Profit Energy Efficiency, and Single-Family Weatherization. On the Business side, Public Service has conducted RFP's and hired third-parties to assist with the following programs: Energy Analysis, Energy Design Assistance, Energy Management Systems, and Small Business Lighting.

More recently, growing out of the settlement agreement reached in Docket No. 11A-631EG we conducted a competitive solicitation targeting new technologies and niche markets that are currently under-served based on the products in the Company's DSM portfolio. This targeted approach of soliciting vendors to partner with the Company in delivering new products or serving different market segments is far more likely to accomplish the objective of expanding the levels of energy efficiency acquired.

Q. ARE THERE OTHER CONCERNS ABOUT CONDUCTING BROAD-BASED SOLICITATION OF ENERGY EFFICIENCY RESOURCES OUTSIDE OF YOUR APPROVE PLAN?

A. Yes. We have heard loudly and strongly from our vendor and contractor community that they want to be able to participate in providing DSM products and services and that awarding exclusive contracts to single vendors jeopardizes

their businesses. Our policy is that the Company prefers to allow all third-party vendors to participate in its product offerings and will only contract for services where it will lower cost, increase efficiency, and/or increase value to our customers.

Q. PLEASE EXPLAIN IF YOU HAVE CONCERNS BIDDING DEMAND RESPONSE.

A. In 2008, the Commission approved revisions to the Company's Interruptible Service Option Credit ("ISOC") Program to ensure the continued acquisition of additional cost-effective demand response from our large commercial and industrial business customers. ISOC is a tariffed program with customer credits set at a level that ensures that demand response will be acquired at a price that is less than our avoided cost of generation assets. The Company does not have the flexibility to acquire demand response on terms that differ from this tariff and would be adversely impacted if the Commission were to require competitive solicitation of demand response focused on this market segment.

Q. SHOULD THE COMPANY BID ENERGY EFFICIENCY OR DEMAND RESPONSE IN FUTURE DSM FILINGS OR FUTURE RESOURCE PLANS?

A. As I indicated above, we believe targeted solicitations for energy efficiency and demand response products conducted within the context of our approved plan are in the best interest of our customers. These targeted solicitations should be focused on new technologies or under-served markets and should be based on projected shortfalls to our approved goals. The Company believes that conducting such solicitations within our DSM planning process rather than within

the 2015 ERP is also most appropriate because it ensures that such supplemental solicitations of energy efficiency or demand response are linked to the goals the Commission has determined based on its consideration of the market potential for these resources. The energy efficiency and demand reduction goals approved in this proceeding can then be factored into the Company's calculation of its firm load obligation in the context of the 2015 resource plan as it is now. In this way the Commission can ensure there is consistency between the Company's DSM and resource planning activities.

XIV. NATURAL GAS DSM POLICY

Q. WHAT IS THE COMPANY REQUESTING OF THE COMMISSION REGARDING NATURAL GAS DSM?

A. The Company is requesting Commission guidance on the following Gas DSM items:

- The Company's proposed gas spending levels moving forward;
- The Commission's opinions on what the primary objectives of offering Gas DSM programs should be today and in the future in Colorado; and
- The Commission's opinion on the appropriate cost-effectiveness test(s) for gas DSM considering the current situation.

Q. PLEASE DESCRIBE WHY THE COMPANY IS ADDRESSING GAS DSM IN THE DSM STRATEGIC ISSUES FILING.

A. While the Commission has not addressed goals for the Company's natural gas DSM as part of the strategic issues filings in the past, with growing concerns regarding

the long-term cost-effectiveness of Gas DSM, the Company believes bringing these issues forward within this DSM Strategic Issues application is the best method for introducing it to the Commission and interested stakeholders.

Public Service has offered some form of Gas DSM to its customers since 1992 (Low Income Energy Savings Partner program). Prior to 2009 the focus was low-income programs which continue to be a significant part of our current portfolio. Over the past two decades, the Gas DSM programs have provided customers opportunities to manage their gas energy bills through periods of high and low natural gas prices. Gas commodity prices have tended to be quite volatile during this period until recently settling on very low prices. The future direction of Gas DSM is more uncertain given projections that natural gas prices are likely to remain at currently low levels for several years. The latest estimates from the U.S. Energy Information Administration ("EIA") found in the publication ***Annual Energy Outlook 2013***[10]***,*** page 76, Figure 86, April 2013 shows Henry Hub spot natural gas prices decline below $4/MMBtu (2011 dollars) in 2009 and are not expected to exceed that level again until some time in 2020.

Q. HOW DO LOW NATURAL GAS PRICES AFFECT GAS DSM?

A. Low natural gas prices adversely impact our gas DSM programs by reducing the cost effectiveness of all of our existing Gas DSM programs, decreasing the potential for new technologies to be added as cost effective DSM programs, and the reducing overall value and benefit of Gas DSM for both participating customers and non-participating customers in the programs.

[10] http://www.eia.gov/forecasts/aeo/

The cost of natural gas is a major component in Gas DSM cost effectiveness tests. Specifically, it is the customer's *avoided use of gas* that has a major impact on the cost effectiveness of a product.

DSM cost effectiveness tests compare the "benefit" from offering a product or program with the "cost" of implementing it. The avoided use of gas by a customer is considered a "benefit" in the equation because using less energy (due to installation of an energy efficient DSM product) translates to lower energy bills, which benefits the customer. Gas price volatility over the past 5-10 years has resulted in similar volatility in the "benefit" side of the equation. At the same time, the "cost" side of the equation has not varied similarly because it includes components such as cost of equipment and installation, utility administration, and other supporting costs that do not vary as gas prices change. The end result is that when the benefit side of the equation is low because gas prices are low, gas DSM products have difficult passing cost-effectiveness.

The utility industry is at the beginning of a (forecasted) sustained period of low gas prices that the industry has not really experienced since the advent of Gas DSM. The existing rules and policies are not based on these conditions, and as such, the Company believes the future of Gas DSM needs to be discussed.

Q. WHAT IS THE CONCERN THE COMPANY HAS REGARDING GAS DSM?

A. The Company is concerned that the overall value from our Gas DSM portfolio has declined significantly as gas prices have fallen. While our overall gas DSM portfolio remains cost-effective, for some products and measures the cost

effectiveness is dropping close to the pass/fail level (cost effectiveness ratio of 1.0 is passing; below 1.0 fails) and occasionally falling below 1.0. While the Company can still offer rebates to customers for those products and measures because the overall portfolio is cost effective, it may not be in the best interest of all of our customers to continue to do so. This is because, unlike Electric DSM, Gas DSM provides very limited system benefits to non-participating customers. With electric DSM, the products and programs provide system benefits through deferring capacity additions and other savings on our transmission and distribution networks. These benefits translate into cost savings for all of our customers who face lower total revenue requirements on account of our electric DSM activities.

The system benefits from our gas DSM are much less than the system benefits derived from electric DSM. For instance, in the Company's 2012 *Demand-Side Management Annual Status Report* (Docket No. 11A-631EG, filed April 1, 2013) the system benefits totaled 44 percent[11] of the Electric DSM supply-side benefits, while the fraction for Gas DSM was only 7 percent.[12] This difference is due largely to the fact that electric DSM directly impacts the level of generation capacity needed to serve our customers, whereas the largest impact of Gas DSM is the gas that is avoided with reduced consumption. As a result, participants in our gas DSM programs experience benefits in direct proportion to

[11] Page 97, Table 17: Public Service's 2012 Electric DSM Portfolio Benefit-Cost Analysis (($123,256,268 Generation Capacity + $22,879,552 Transmission & Distribution Capacity)/($333,623,023 Subtotal Avoided Revenue Requirements).

[12] Page 98, Table 18: Public Service's 2012 Gas DSM Portfolio Benefit-Cost Analysis (($1,887,182 Demand Savings)/($27,505,556 Subtotal Avoided Revenue Requirements).

the extent to which their participation reduces the amount of gas that they consume. However non-participating customers experience minimal benefit, yet they must pay for the cost of our gas DSM programs through the Demand Side Management Cost Adjustment charges on their bill. Because the system benefits are insufficient to offset the cost gas DSM for non-participants, the Company believes it is important to discuss the appropriate spending levels for Gas DSM annually and the objective of Gas DSM in addition to cost effectiveness.

Q. HAS THE COMPANY CHANGED THE WAY IT REVIEWS ITS GAS PORTFOLIO FOR COST EFFECTIVENESS BASED ON THE LOWER GAS PRICE FORECASTS?

A. Yes. As we were developing our 2011 DSM plan, it became apparent that some of our gas DSM products no longer passed the cost-effectiveness test on account of the fall in gas prices that had occurred since our 2009-2010 gas DSM plan was approved by the Commission. The Commission's gas rules require that all gas DSM "programs", with the exception of low-income programs must have a modified TRC of greater than or equal to one. See Rule 4753(f)(6). Because we were concerned about the continuity of its gas DSM products and the potential adverse effects of discontinuing and then restarting measures that might later become cost-effective when gas prices rose, we approached interested parties to reach consensus regarding the parties' understanding of the term "program" as used in the Commission's gas DSM rules. Prior to 2011, the Company's operating definition of the term "program" was with reference to products at the

end-use level. An example of a residential "program" as used by the Company would be the Heating System Rebate program. This narrow view would have required the Company to discontinue offering certain of its gas DSM products in 2011 because they didn't pass cost-effectiveness.

However, in discussions with the interested parties, it was generally agreed that the definition of "DSM program" contained in Rule 4751(j) as "any combination of DSM measures, information and services" could be interpreted more broadly to apply to combinations of DSM measures and services offered at the customer segment level and with such an understanding the Company could avoid disruption of its then current gas DSM program offerings. For purposes of the 2011 DSM Plan, the term "DSM program" was understood as applying to the combination of DSM measures, information and services provided at the customer segment level resulting in three direct impact "DSM programs"; 1) Business Program, 2) Residential Program, and 3) Low-Income Program.

Q. WHAT WAS THE IMPACT OF THIS CHANGE TO THE 2011 DSM PLAN PORTFOLIO?

A. The Company was able to continue all of the existing rebate products in its portfolio even though certain individual products, such as Water Heating Rebates, did not pass cost-effectiveness. The products that had negative or cost-effectiveness ratios close to one were balanced out by products with ratios greater than 1.0 providing a cost-effective bundled program.

Q. DOES THE COMPANY EXPECT THESE CHALLENGES WILL IMPACT ITS GAS DSM PROGRAMS IN 2013 OR THOSE THAT WILL BE FILED FOR 2014?

A. The Company does not expect to eliminate any existing products due to low natural gas prices at this time, but there may continue to be some products or energy efficiency measures included within the overall portfolio that would not be cost-effective if offered on their own. The Company anticipates that the 2014 portfolio will include all of the 2013 products; however some of the measures may need to be eliminated or modified to keep the overall Gas Portfolio above 1.0 in cost-effectiveness.

Q. HOW ARE GAS DSM SPENDING LEVELS/BUDGET SET?

A. Gas DSM does not have long-term energy savings goals similar to Electric DSM. Instead, under Colorado statutes establishes an annual minimum spending level for gas DSM.

Currently, there are two spending requirements for Gas DSM in Colorado CCR 723-4-4753 § (g) (h). The requirement that sets the highest annual budget based on its calculation must be used as the minimum spending requirement by utilities.

Option 1: Two percent (2.0 percent) of gas base rate revenues

Option 2: Zero point five percent (0.5 percent) of total gas revenues

In recent years, Option 1 has been approximately $7 million dollars annually and Option 2 has been near $5 million per year. Therefore, Public Service has used Option 1 most often to set the minimum spending level.

Q. CAN YOU PLEASE SUMMARIZE THE COMPANY'S SPENDING ON GAS DSM IN RECENT YEARS COMPARED TO THE MINIMUM SPENDING REQUIREMENTS?

A. Since House Bill 07-1037 took effect in 2009, annual spending on gas DSM has averaged over $14 million per year, approximately twice the minimum spending level.

Annual expenditures have ranged from $11,587,286 in 2009 to as high as $17,091,491 in 2011. Spending increased significantly in 2010 and 2011 as a result of local communities and the State of Colorado received funding for energy efficiency initiatives from the American Recovery and Reinvestment Act of 2009. The extra funding spurred customer interest due to additional rebates and services that were parallel or overlapped the Company's gas DSM programs. The Company spent approximately $17 million in each of those years. In 2012, spending on Company gas DSM programs came in at $12,460,525. The budget for 2013 is just over $13 million. As a percent of gas revenues since 2009, the Company has spent between approximately 0.9 percent and 1.7 percent annually on gas DSM.

Q. WHAT SPENDING LEVEL IS THE COMPANY PROJECTING FOR GAS DSM IN THE NEXT FEW YEARS?

A. The Company is planning to budget approximately $12 million dollars per year on gas DSM starting with the 2014 DSM Plan to be filed July 1, 2013. We are projecting similar levels in the 2015-16 DSM Plan as well.

Q. WHY HAS THE COMPANY SETTLED ON APPROXIMATELY $12 MILLION ANNUALLY FOR GAS DSM?

A. The Company is attempting to balance spending and rate impact with the declining value of gas DSM in the current low gas cost environment. Our reasons for targeting $12 million, which is $5 million above the minimum spending requirement, is to provide continued support to the current portfolio of gas products. A $12 million budget will allow the support for improved efficiency of the basic end-uses and drivers of natural gas use. At this level of spend, the Company will be required to prioritize its support in the market for gas efficiency but it will not require us to eliminate the basic products our customers have come to expect.

It is also anticipated that customer interest in proactively implementing gas DSM measures will also decline. Installing energy efficient appliances or equipment will provide fewer bill savings when gas commodity prices are low. As a result, it takes longer for the customer's investment to be recovered through lower energy bills (payback).

At this time the Company does not intend to lower budgets below $12 million. Even with low gas commodity prices customers still value gas DSM in helping them manage their bills. In addition, residential and low income customers typically have more opportunity to benefit with gas DSM due to appliances and energy use within the home compared to limited cost effective opportunities with electric DSM.

Q. WHAT DO YOU BELIEVE ARE THE PRIMARY OBJECTIVES OF OFFERING GAS DSM PROGRAMS TO CUSTOMERS?

A. Even with low gas commodity prices we are experiencing, the primary objectives of gas DSM remain. The Company views the following as the primary objectives for offering gas to our customers:

- Managing historically volatile gas prices: Looking back at the past decade, there have been historical highs and very low prices for natural gas. During times of high prices, we have seen customers being unable to pay for their gas bills. Gas DSM helps customers' lower energy use during these periods.
- Providing energy choices for customers: The gas DSM portfolio has a broad selection of products that allow every customer to participate if interested. These choices give customers more control of how and when they use energy, which helps them proactively manage energy bills.
- Educating customers on their gas use: Gas and electricity is not a priority for most of our customers in their busy lives. It is typically an afterthought until they receive the energy bill and may be frustrated by its size. In addition to rebates to lower capital costs by customers, Gas DSM provides education, materials, and tips how to manage how they use energy.

Q. DOES REDUCING THE USE OF NATURAL GAS THROUGH DSM PROGRAMS HAVE AN ENVIRONMENTAL IMPACT?

A. Yes it does. Reducing the use of this fossil fuel does reduce carbon emissions. It is one of the options the Company employs as part of its environmental efforts. The DSM gas rules stipulate the value of avoided emissions and other

societal benefits be considered in the gas DSM plan by multiplying the supply-side benefits used in the Total Resource Cost ratio by 1.05. Since this 5 percent adder is part of the MTRC and the programs are still struggling with cost-effectiveness the Company believes moderating the gas DSM goals and spend is reasonable.

Q. WHAT COST EFFECTIVENESS TEST IS THE COMPANY CURENTLY USING FOR GAS DSM?

A. As required in House Bill 07-1037 and Gas DSM rule 4753, the Company is using the Modified Total Resource Cost test to evaluate all gas DSM programs, products, and/or energy efficiency measures.

Q. CAN YOU PLEASE SUMMARIZE HOW THE MODIFIED TOTAL RESOURCE COST TEST IS CALCULATED?

A. As discussed in Mr. Petersen's testimony, the Modified Total Resource Cost Test ("MTRC") measures the net costs of a DSM product/program as a resource option based on the total costs of the program, including both the participants' and the utility's costs.

The MTRC test represents the combination of the effects of a program on both the customers participating and those not participating in a program. In essence, it is the summation of the benefit and cost terms in the Participant and the Ratepayer Impact Measure tests, where the revenue (bill) change and the incentive terms cancel each other, with a small adder included to account for emissions and non-energy benefits.

Q. ARE YOU AWARE WHAT COST EFFECTIVENESS TESTS OTHER UTILITIES OR STATES ARE USING FOR GAS DSM?

A. The two predominant cost effectiveness tests used across the country for gas DSM are the Total Resource Cost test (modified) and the Utility Cost Test ("UCT"). According to the American Council for an Energy Efficient Economy report ***"A National Survey of State Policies and Practices for the Evaluation of Ratepayer-Funded Energy Efficiency Programs"***[13] February 2012, page 13, Figure 9; the Total Resource Cost test remains the primary test in the United States. The following table identifies the primary cost effectiveness test used of the 44 states surveyed:

Table 13: Primary Cost Effectiveness Test used for DSM

Primary Cost Effectiveness Test	Percent of States that use as primary DSM test
Total Resource Cost Test	71%
Societal Test	15%
Utility Cost Test	12%
Rate Impact Test	2%

Q. GIVEN THE CHALLENGES UTILTIES ARE FACING IN MAINTAINING THE COST EFFECTIVENESS OF GAS DSM, IS THERE PRESSURE TO CHANGE THE WAY THAT COST EFFECTIVENESS IS BEING MEASURED?

A. Yes. Some people have suggested that the cost effectiveness of Gas DSM be measured using the utility test rather than the modified TRC as we use today.

Q. PLEASE DESCRIBE HOW THE UTILITY COST TEST IS CALCULATED?

[13] http:// www.aceee.org/research-report/u122

A. The Utility Cost Test, sometimes referred to as the Administrator Cost Test, measures the net costs of a DSM program as a resource option based on the costs incurred by the program administrator (including incentive costs) and excluding any net costs incurred by the participant. The benefits are similar to the MTRC benefits. Costs are defined more narrowly but the benefits are mostly unchanged. By defining device costs exclusively in terms of costs incurred by the administrator, the UCT results reflect only a portion of the full costs of the resource.

Q. CAN YOU PLEASE SHARE AN EXAMPLE OF HOW A ENERGY EFFICIENCY MEASURE WOULD SCORE VERY DIFFERENTLY USING THE TOTAL RESOURCE COST TEST AND UTILITY COST TEST AS WELL AS ANY RAMIFICATIONS TO CUSTOMERS?

A. Solar Thermal water heating is one technology that scores materially different using the Modified Total Resource Cost test and Utility Cost test. The Company evaluated this technology in 2011 for possible addition to our DSM portfolio. We worked with industry advocates to gather data and assumptions necessary to design a program and conduct cost effectiveness tests to determine if it could be a DSM product.

The following table demonstrates how the technology* faired by each test in 2011. A test score of 1.0 is passing.

Table 14: Solar Thermal Cost Effectiveness results

Total Resource Cost Test	Utility Cost Test	Participant Test	Rate Impact Test
0.59	6.48	0.75	0.71

* Industry data and assumptions were used in cost effectiveness tests

The results demonstrate the technology only passes if the Utility Cost test is used. The reason it passes is because the Utility Cost Test removes all participant costs from the calculation while the benefits side of the calculation remains mostly unchanged. So for technologies such as Solar Thermal water heaters, with an installed cost between $7,000 and $10,000 (installed) compared to $1,000 to $2,000 for an efficient gas water heater, the Utility Cost test is the only alternative.

It could be stated the amount a customer is willing to spend on a new technology should not be factored into the test because it is their money. But if more products such as solar thermal water heating were added to gas DSM under the Utility Cost test, there will be financial consequences to all other ratepayers on their energy bills.

Utility DSM rebates are historically based on paying a portion of a customer's incremental cost to upgrade to an efficient technology compared to the standard technology on the market. For Public Service and most utilities, rebates are typically set at 20 percent to 60 percent of the incremental cost. Rebate levels are based on this because there will be limited participation if rebates are low or a utility will be paying more than necessary with high rebates to attract willing customers. Using this logic, an appropriate rebate for a Solar Thermal water heater is between $1,500 and $3,000 or more. Public Service currently offers rebates for energy efficient gas water heaters up to $100 per unit. While solar thermal water heaters save about seven times more energy than gas water heaters, rebates could cost 15 to 30 times. All non-participating customers

will see increases in the Demand Side Management Cost Adjustment charge on their bill because of higher cost technologies that do not save an equivalent amount of energy.

Q. DO YOU BELIEVE THE UTILITY COST TEST IS APPROPRIATE AND IN THE BEST INTEREST OF CUSTOMERS FOR GAS DSM?

A. No as Mr. Petersen explains in his Direct Testimony the Company does not support this approach. The Utility Cost Test by itself is not a good indicator of the value of the investment of gas DSM to participating customers, non-participating customers and the greater society. The test would lead to the Company supporting DSM measures and products that are not cost-effective to even the participants. It is important to remember that all customers contribute to gas DSM through the Demand Side Management Cost Adjustment charge on their bill. Switching to the UCT would allow for a much larger gas DSM portfolio but without commensurate societal benefits we question whether customers should be paying these costs through increased gas rates.

Q. DOES PUBLIC SERVICE SUPPORT DISCONTINUING USE OF THE MODIFIED TOTAL RESOURCE COST TEST IN FAVOR OF THE UTILITY COST TEST?

A. No.

Q. WHY NOT?

A. In the Company's view the Modified Total Resource Cost test continues to be the best method for evaluating the investment of gas DSM even during times when gas commodity prices are lowering test scores. In fact, using the MTRC demonstrates large investments in the current conditions for gas DSM are not in the best interest of all customers. The Company believes it is more appropriate in the near future to moderate spending to balance energy savings with bill impacts. Defining a 'program' at the bundled customer segment level allows flexibility to prioritize a basic mix of products that provide a reasonable level of support to the gas efficiency market. To the extent the full gas portfolio becomes non-cost-effective under the MTRC in the future, the State of Colorado should review what the objective of gas DSM is if it is not to provide cost-effective choices to improve efficiency and lower customer bills.

Q. COULD THE COMPANY BE MORE COMFORTABLE AND WILLING TO ACCEPT THE UTILITY COST TEST FOR GAS DSM?

A. The Company believes there should be another metric or governor in addition to the Utility Cost Test before it would consider supporting a change in tests. An example would be adding a maximum spending cap in addition to the UCT to control costs. Depending on the level of the cap, the Company would be able to prioritize the best product mix and ensure that gas DSM funding will be spent on energy efficiency measures that are the most cost effective and provide value to customers.

Q. WOULD THE COMPANY CONSIDER CHANGING TO THE UTILITY COST TEST FOR ELECTRIC DSM?

A. No, the Company would not support this approach. Public Service is already spending over $80 million on electric energy efficiency and demand response programs that pass the MTRC and provide value to our customers. Changing to the Utility Cost Test could increase spending by tens of millions of dollars compared to smaller increases with gas DSM. Adding a maximum spending cap in addition to the Utility Cost Test would be a difficult balance to ensure there is budget availability to pursue good efficiency opportunities and to prevent expansion of the portfolio to include opportunities with limited value. Due to the large budgets, we anticipate there would be urging by parties to create several new products for technologies that either would not pass using the MTRC or that we have evaluated and rejected in the past for this reason. This could result into relatively strong and successful electric DSM programs being reduced or squeezed because limited funding for all programs. It should also be noted that in both gas DSM and electric DSM that administration and implementation costs will rise as new products are added, which would likely reduce the amount of money going back to customers in the form of rebates or other benefits.

Q. WHAT GUIDANCE IS THE COMPANY ASKING FROM THE COMMISSION IN THIS CASE?

A. Here, we seeking the Commission's input and endorsement regarding the balance the Company has tried to strike between continuing to pursue gas DSM for the benefit of those customers who elect to participate and overall rate impacts in light of the minimal levels of system benefits.

Q. PLEASE SUMMARIZE YOUR TESTIMONY.

A. In summary, I have requested approval of a number of issues as shown in Table 1 of my testimony. Included in this request are the Company's proposed energy efficiency and demand response goals for 2015 – 2020 which were presented in Tables 2 through 5. I have discussed the history, background and context in which the Company developed these proposed goals. I also presented and discussed the components of the energy efficiency goals - traditional products including non-identified emerging technologies plus three non-traditional product types – Behavioral products, LED Street Lighting, and Distribution Voltage Optimization. These three product types are necessary to filling the gap left by eroding traditional products, which is due largely to market transformation and codes and standards changes. Next, I discuss on how we developed the proposed demand response goals for 2015 through 2020.

In addition, my testimony provided, for informational purposes, a discussion of the potential in the future for demand reduction from electric vehicles. Because, as we discuss, the demand response potential for electric vehicles needs more study, we have not included an electric vehicle product in our proposed goals.

Per the recent Resource Plan docket, I discussed the Company's position regarding the acquisition and bidding for DSM. We request that the Energy Efficiency and Demand Response goals that are approved in this docket be utilized in the 2015 Resource Plan and that if any acquisition from outside parties is required to meet goals, which it be done within DSM proceedings and not within the All-Source Solicitation conducted in the Resource Plan proceedings.

Finally, I discussed current and future issues regarding gas DSM, such as spending levels, objectives, and appropriate cost-effectiveness tests and asked the Commission for guidance on these topics.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

Attachment A

Statement of Qualifications

Debra L. Sundin

I graduated from Bemidji State University with a BS degree in Business Administration and an MBA degree from the University of St. Thomas.

I have been with Xcel Energy for 33 years involved in DSM through Product Management, Market Research and Regulatory Management. I am Director, DSM and Renewable Strategy and Planning for Xcel Energy Inc. I am currently responsible for the strategy, planning and regulatory filings for energy efficiency products and programs in Minnesota, Colorado, North Dakota, South Dakota, New Mexico and Texas.

From 1979 to 1991, I provided market research support to Northern States Power and was involved in conservation program design and evaluation work. I became the manager of Residential Marketing in 1992 implementing products and programs such as Saver's Switch, Appliance Rebates, Appliance Recycling and Lighting. In 1998 I transitioned to Manager, Energy Management where I was responsible for strategic market planning for business products as well as DSM regulatory strategy and filings. Since the merger that created Xcel Energy in August of

2000 through 2009, I managed energy efficiency and demand response efforts at Xcel Energy. Starting in 2009 I has been focusing my efforts on strategy and planning.