The Aggregate Economic Impact of the Conservation Improvement Program 2008-2013

Assessing Impacts on Employment, Employee Earnings, Household Income and Savings, Business Revenue, Industry Production, Capital Investment and Innovation, and State Domestic Product

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FINAL REPORT

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Abstract

With regulatory oversight and technical assistance from the Minnesota Department of Commerce (Commerce) Division of Energy Resources (DER), the statewide Conservation Improvement Program (CIP) is administered by over 180 electricity and natural gas utilities and helps Minnesota households and businesses use electricity and natural gas more efficiently. By law, Minnesota utilities must achieve energy savings of at least 1.5% of retail electricity and natural gas sales each year.[1] To meet this requirement, utilities offer approved CIPs and provide customers with incentives for implementing energy-saving projects.

This report describes the methodology and findings from a Cadmus economic impact study of 2008-2013 statewide CIP-related activities and resulting energy savings that accrue through 2032. Specifically, the study findings quantify and describe aggregate impacts on eight economic variables:

1. Employment;
2. Employee earnings;
3. Household income and savings;
4. Business revenue;
5. Industry production;
6. Capital investment and innovation;
7. State domestic product; and
8. Utility electricity and natural gas rates.

To quantify and describe the aggregate statewide impact of 2008-2013 CIP activities and resulting energy savings on these eight variables, Cadmus developed economic models using IMpact analysis for PLANning (IMPLAN), an input-output model that uses real wage, labor productivity, and other economic data to characterize spending patterns and relationships between households and industries. Findings from an analysis based on a utility discount rate (UDR) of approximately 7% illustrate lower-bound estimates of the aggregate impact through 2032,[2] while findings from an analysis based on a societal discount rate (SDR) of approximately 3% to 5% illustrate upper-bound estimates. In both cases, analysis findings indicate that 2008-2013 CIP activities and resulting energy savings induced positive aggregate impacts across all eight economic variables.

To estimate the impact of CIP on utility electricity and natural gas costs, Cadmus conducted annual cost-effectiveness analyses of the CIP electric and natural gas program portfolios. Findings from these analyses suggest that CIP is cost-effective from the perspectives of utilities, program participants, and society as a whole. Cadmus also reviewed results from the Ratepayer Impact Measure (RIM) test to estimate whether CIP is likely to induce upward or downward pressure on statewide electricity and natural gas rates. Findings from this analysis indicate that while overall costs will decrease, CIP will likely induce slight upward pressure on future rates due to decreased sales. However, this analysis does not include the impact on electricity and natural gas rates should CIP not exist and if utilities met the increasing demand for energy with only supply-side resources (such as new infrastructure or increased purchases of out-of-state power and fuel).

[1] Minn. Laws 2013, Ch. 85, Art. 12, Sec. 2.

[2] CIP projects lead to ongoing energy savings for five to 20 years, depending on the measures installed.

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Definition of Acronyms and Terms

Acronym or Term	Definition
Aggregate Impact	The total impact of 2008-2013 CIP activities and resulting energy savings that accrue between 2008 and 2032.
Avoided Utility Costs	Avoided utility expenditures on fuel, purchased power, and infrastructure (e.g., new transmission lines, new power plants) due to reduced demand for energy resources from CIP activities and the resulting energy savings.
Baseline Ratepayer Expenditures	Ratepayer spending on energy resources that would have occurred in the hypothetical absence of CIP.
BENCOST	Commerce "Attachment A, INPUTS TO BENCOST FOR NATURAL GAS CIPs"
Business Revenue	The portion of aggregate CIP-induced economic output that affects the construction, service, agriculture and forestry, retail trade, and wholesale trade sectors.
Capital Investment and Innovation	The CIP impacts on sector-level profits (i.e., operating surpluses), which increase the capacity for further capital investment or future innovation.
CCS	The Center for Climate Strategies
CIA	Commercial, industrial, and/or agricultural
CIP	Conservation Improvement Program
Co-funding	The portion of total project costs paid for by participant expenditures.
Commerce	Minnesota Department of Commerce
DER	Division of Energy Resources
Direct Effects	The CIP impacts that represent regional production changes caused by increases or decreases in sector-level demand. These effects result from primary CIP-induced changes to the Minnesota economy, such as program and participant expenditures on goods and services from program trade allies or reduced demand for energy services from the utility sector.
Discount Rate	The rate used to discount future dollars to present day values.
DSM	Demand-side management
EERS	Energy Efficiency Resource Standard, which establishes electric and natural gas savings targets for utilities.
Employee Earnings	The total cost of employees paid by employers, including wages plus benefits, but not including proprietor (i.e., owner) income.
Employment	The number of jobs created due to CIP activities and resulting energy savings. Jobs are measured in job-years, with each job-year representing one job for one year.
EM&V	Evaluation, measurement, and verification
Energy Bill Reductions	The amount of money saved by program participants on energy bills as a direct result of CIP activities and ongoing energy savings through 2032.
ESP	Energy Savings Platform, a cloud-based IT platform that serves approximately 180 Minnesota utilities as a system of record for reporting energy efficiency program activities and results.
EUL	Effective useful life, representing the expected lifetime of installed energy efficiency measures.
GOR	Annual gross operating revenues
Household Income and Savings	The sum of all forms of employment income, including employee compensation (i.e., wages plus benefits) and proprietor (i.e., owner) income.

Acronym or Term	Definition
IO	Input-output
IMPLAN	IMpact analysis for PLANning, a static economic impact model.
Incentives	Direct financial and service-based rebates or buy downs that encourage investments in energy-saving technologies and behaviors.
Indirect Effects	Predicted CIP impacts that result from changes in demand for the intermediate factor inputs necessary for directly affected industries to provide their principal products. These impacts reflect secondary economic exchanges in supply chains that result from the primary changes being analyzed.
Induced Effects	Predicted CIP impacts that result from the ways households and employees of directly and indirectly affected industries spend money on regional goods and services. The additional economic activity from spending of increased income triggers further production in local industries attributable to CIP. These effects reflect the predicted impacts on Minnesota industries that are not directly involved with CIP, and are not supplying intermediate factor inputs.
Industry Production	The portion of aggregate CIP-induced economic output that affects the industrial, utilities, and manufacturing sectors.
IRP	Integrated Resource Planning, a process for determining the least cost mix of supply- and demand-side resources required to meet the needs of an energy utility's customers for 15 years.
NGEA	Next Generation Energy Act
O&M	Operation and maintenance
PCT	Participant Cost Test
Program Payments	The portion of utility revenues collected from ratepayers used to fund CIP.
Program Spending	CIP spending for program administration; implementation; marketing; evaluation, measurement, and verification; and participant incentives.
Project Payments	The combination of incentives and participant co-funding used to pay for CIP projects.
PY	Program year
RIM	Ratepayer Impact Measure test
SCT	Societal Cost Test
SDR	Societal Discount Rate, which represents the customers' opportunity cost of capital associated with participation in CIP.
State Domestic Product	The CIP impact on aggregate statewide value added, which represents all profits (i.e., operating surpluses), indirect business taxes, and employee compensations.
UCT	Utility Cost Test
UDR	Utility Discount Rate, which represents the utilities' after-tax, weighted cost of capital.
Utility Electricity and Natural Gas Rates	Utility retail charges to ratepayers per unit of electric ($/kWh) or natural gas ($/therm) energy. Rates are different from total energy costs in that reduced energy use leads to reduced costs, even as rates continue to rise.

Executive Summary

This report summarizes Cadmus' analysis of the aggregate statewide economic impact of Conservation Improvement Program (CIP) activities completed from 2008 through 2013 and resulting energy savings that accrue through 2032; examination of the statewide CIP portfolio's annual cost-effectiveness from multiple stakeholder perspectives to determine if program benefits exceeded costs; and estimation of the impact of CIP on statewide electricity and natural gas rates. This study does not include the impact on electricity and natural gas rates should CIP not exist.

Background

The following sections provide background information about CIP, as well as an overview of the study objective and scope.

Conservation Improvement Program

With regulatory oversight and technical assistance from the Minnesota Department of Commerce (Commerce) Division of Energy Resources (DER), CIP is a statewide program administered by over 180 energy utilities that helps Minnesota households and businesses use electricity and natural gas more efficiently. CIP helps to conserve energy resources while reducing harmful emissions, minimizing the need for new utility infrastructure, and generating positive economic value for Minnesota's citizens.

State law requires Minnesota electric and natural gas utilities to invest at least 1.5% and 0.5% of their gross operating revenues (GOR), respectively, in annual CIP activities.[3] As an owner of a nuclear generating plant, Xcel Energy is required to invest at least 2.0% of GOR annually in CIP. In 2007, the Next Generation Energy Act (NGEA) established a 1.5% Energy Efficiency Resource Standard (EERS) for utility CIPs, requiring utilities to develop plans to achieve savings of 1.5% of average annual retail sales each year, starting in 2010, unless adjusted by the Commissioner.[4] In 2013, additional legislation passed that strengthened Minnesota's commitment to energy efficiency and conservation such that utilities must achieve minimum energy savings of 1.5% of retail electricity and natural gas sales each year.[5] Minnesota's EERS remains one of the most aggressive standards in the country, and efficiency programs have been operating in Minnesota since the early 1980s.

Through CIPs, utilities promote energy-efficient technologies and practices to residential, commercial, industrial, and public customers throughout Minnesota. Utilities offer a variety of programs designed to help customers save energy, each tailoring their respective program

[3] Minnesota Statute §216B.241, subd. 1(a).

[4] In 2009, legislation passed that allowed the Commissioner to approve an interim annual savings goal of 0.75% for natural gas utilities, subject to completing a conservation potential study completed that year (Minn. Laws 2009, Ch. 110, Sec. 32). In 2011, legislation passed to modify the 1.0% minimum standard so it only applies to investor-owned utilities (Minn. Laws 2009, Ch. 97, Sec. 20).

[5] Minn. Laws 2013, Ch. 85, Art. 12, Sec. 2.

portfolio to meet the unique needs of customers in their service territories. Typical end uses in residential programs include lighting, furnaces, air conditioners, ground-source and air-source heat pumps, insulation, and air sealing. Typical end uses in commercial and industrial programs include lighting, HVAC, energy recovery ventilation equipment, food service equipment, and electric motors. Traditionally, utilities have offered prescriptive equipment incentives, but for some more advanced programs they use systems approaches to promote bundled efficiency measures or to achieve energy performance levels beyond minimum codes and standards. Many utilities offer robust industrial efficiency programs, striving to help manufacturers increase the energy efficiency of their Minnesota-based operations and more effectively compete in national and international markets.

A primary purpose of CIP is to serve as a low-cost (i.e., cost-effective) resource for meeting energy demand. In Minnesota, integrated resource planning (IRP) treats demand-side management (DSM) programs such as CIP as a resource alongside supply-side resources (including fossil fuel, nuclear, and renewable generation resources). IRP is a process for determining the least-cost mix of supply- and demand-side resources required to meet the expected needs of utility customers over 15 years. One reason high levels of DSM are often selected through the IRP process is because CIPs are a low-cost resource compared to supply-side options.

CIPs also lead to more localized economic benefits, such as the creation and retention of local jobs in a variety of market sectors. For example, utilities hire local HVAC contractors and other trade partners to promote and implement their programs. Retailers such as home improvement and hardware stores promote high-efficiency residential lighting and other efficient consumer products. For commercial and industrial programs, engineering firms identify, evaluate, and implement efficiency projects. The CIP incentives and marketing offered by utilities helps drive local business for partner organizations. Also, customers spend less money on energy and more on non-energy goods and services, many of which are produced and sold by local industries.

Meanwhile, if CIP did not exist, utility customers would not save energy, and their relatively higher demand for energy resources would require utilities to expand supply-side infrastructure, such as power plants and distribution lines, and increase purchases of out-of-state fuel and power.

Study Objective and Scope

For this study, Cadmus quantified and described aggregate in-state impacts from 2008-2013 CIP activities, as well as from energy bill reductions and avoided utility costs that accrue through 2032, on the following eight economic variables:

1. Employment;
2. Employee earnings;
3. Household income and savings;
4. Business revenue;
5. Industry production;
6. Capital investment and innovation;
7. State domestic product; and
8. Utility electricity and natural gas rates.

For each program year from 2008-2013, as well as for all six program years combined, Cadmus estimated the total present value of energy bill reductions and utility avoided costs, which accrue for as long as installed measures save energy. The estimated maximum effective useful life (EUL) for measures installed in each program year is 20 years.[6] Therefore, some measures installed in 2008 will continue to save energy through 2027; some measures installed in 2009 will continue to save energy through 2028; and so on.

Table ES-1 shows a summary of the study timeframe for each program year, as well as for all six program years combined.

Table ES-1. Study Timeframe, Overall and by Year

CIP Year	First Impact Year	Last Impact Year	Total Timeframe
2008	2008	2027	2008-2027
2009	2009	2028	2009-2028
2010	2010	2029	2010-2029
2011	2011	2030	2011-2030
2012	2012	2031	2012-2031
2013	2013	2032	2013-2032
Overall (2008-2013)	**2008**	**2032**	**2008-2032**

Analysis

The following sections provide a high-level overview of Cadmus' analytical methods for this study, as well as summary findings from Cadmus' cost-effectiveness and economic impact analyses.

Overview of Analysis Methods

For this study, Cadmus incorporated the following two analytical approaches:

1. **Annual cost-effectiveness assessments of the CIP statewide portfolio.** Cadmus analyzed the statewide CIP portfolio's annual cost-effectiveness to determine if program benefits exceeded costs. For the analysis, we conducted multiple tests to account for the perspectives of utilities, ratepayers, CIP participants, and society in general. For each test, Cadmus calculated benefit/cost ratios by year and by fuel type, which indicate via a single variable whether the programs' benefits exceeded costs.
2. **Economic impact assessments of annual statewide CIP activities and ongoing energy savings.** Cadmus conducted an economic impact analysis to determine the aggregate net economic benefits of CIP to Minnesota; specifically, we analyzed the summary- and sector-level net impacts on aggregate statewide employment, employee earnings, household income and savings, business revenue, industry production, capital investment and innovation, and state domestic product attributable to each CIP year, 2008-2013.

[6] CIP projects lead to ongoing energy savings for five to 20 years, depending on the measures installed.

Cost-Effectiveness Analysis

To determine the impact of CIP on utility electricity and natural gas costs and rates, Cadmus conducted annual cost-effectiveness analyses of the CIP electric and natural gas program portfolios. Program regulators, administrators, implementers, and evaluators use cost-effectiveness analyses to determine whether programs provide aggregate benefits that are greater than aggregate costs from multiple stakeholder perspectives. Specifically, Cadmus analyzed utility program costs and benefits following the methodologies described in the California Standard Practice Manual for these tests:

- **Societal Cost Test (SCT)**
  The SCT is a measurement of the net costs of CIP as a resource option. It represents the balance between costs from direct utility and participant expenditures and benefits from avoided energy and capacity costs that accrue over time, as well as from avoided environmental externalities. This test's primary strength is its expansive scope.
- **Utility Cost Test (UCT)**
  The UCT is a measurement of the net costs of CIP as a resource option from the perspective of Minnesota utilities. It is based on the direct costs incurred by the utilities, including incentive costs, but excluding any net costs and benefits incurred by CIP participants or society in general.
- **Participant Cost Test (PCT)**
  The PCT is a measurement of the quantifiable benefits and costs to participating customers. Benefits include direct incentives and ongoing bill savings, while costs account for direct participant project spending, or co-funding. The PCT provides a good general assessment of the benefit or desirability of CIP to customers.
- **Ratepayer Impact Measure (RIM) test**
  The RIM test is an estimate of what happens to future energy rates as a result of ongoing changes in utility revenues and operating costs caused by CIP. This test has a relatively narrow view of program benefits; therefore, most programs are not cost-effective from the RIM test perspective. Additionally, the RIM test does not include an estimate of what would happen to future energy rates in the absence of CIP, in which utilities meet growing demand only with supply-side resources (such as new power plants and increased purchases of out-of-state fuel and power).

None of these tests are intended for use in isolation. Each test has particular strengths and weaknesses. For example, the RIM test provides an indication of future rate impacts. However, it does not account for the environmental benefits that accrue to ratepayers, nor does it describe the total cost savings that accrue to participating utilities and ratepayers, which are a function of both rates and the amount of energy saved. Meanwhile, the SCT does include an assessment of those benefits. In general, it is best to review results from all the tests to fully understand the cost-effectiveness of the statewide CIP portfolio.

Programs are considered cost-effective when the benefit/cost ratio is greater than 1.0 (i.e., the present value of aggregate benefits is greater than the present value of aggregate costs). Table ES-2 lists the benefits and costs included in each test for this analysis.

Table ES-2. Cost-Effectiveness Test Components

Component	Societal Cost Test	Utility Cost Test	Participant Cost Test	Ratepayer Impact Measure
Avoided Energy and Capacity	Benefit	Benefit	--	Benefit
Natural Gas Environmental Damage Factor	Benefit	--	--	--
Non-Natural Gas Fuel Environmental Damage Factor	Benefit	--	--	--
Utility Administrative Costs	Cost	Cost	--	Cost
Utility Measure Incentive Payments	--	Cost	Benefit	Cost
Direct Participant Costs	Cost	--	Cost	--
Participant Bill Savings	--	--	Benefit	Cost

Findings from these analyses, summarized in Table ES-3, suggest that CIP is cost-effective from the perspectives of utilities, program participants, and society as a whole.

Table ES-3. CIP Benefit/Cost Ratios by Portfolio Fuel Type and Year

Fuel	Year	Benefit/Cost Ratio			
		Societal Cost Test	Utility Cost Test	Participant Cost Test	Ratepayer Impact Measure
Electric	2008	2.56	4.16	3.11	0.85
Electric	2009	1.92	3.13	2.54	0.79
Electric	2010	2.55	3.92	3.15	0.81
Electric	2011	2.89	4.45	3.30	0.86
Electric	2012	2.60	3.98	2.71	0.88
Electric	2013	4.01	5.17	3.59	0.92
Natural Gas	2008	2.12	3.41	3.82	0.58
Natural Gas	2009	1.97	3.10	4.50	0.53
Natural Gas	2010	1.87	2.75	3.65	0.54
Natural Gas	2011	1.89	2.77	3.28	0.54
Natural Gas	2012	1.78	2.62	3.03	0.56
Natural Gas	2013	1.99	2.84	3.22	0.57

CIP was cost-effective from the SCT, UCT, and PCT perspectives, reflecting that CIP leads to large net benefits for society, as well as for participants and utilities engaged in the program.

Based on the SCT, aggregate net benefits to society were approximately $3.3 billion, with each program year providing net electric and natural gas benefits to society ranging from $315 million to $919 million. In other words, the aggregate benefit to society from avoided utility costs and avoided environmental damage was $3.3 billion greater than the total costs from program administration and participant project spending.

Based on the PCT, aggregate net participant benefits were approximately $3.2 billion, with each program year contributing net electric and natural gas benefits ranging from $383 million to $685 million. In other words, the aggregate benefit to participants from incentives received and

ongoing bill savings was $3.2 billion greater than the total cost to participants from project spending.

Based on the UCT, utilities' aggregate net benefits were approximately $2.9 billion dollars, with net electric and natural gas benefits in each program year ranging from $357 million to $650 million. In other words, the aggregate benefit to utilities from avoided energy and capacity costs was $2.9 billion greater than the aggregate cost to utilities for program administration, participant incentives, and ongoing revenue losses.

Results from the RIM test show that while overall costs will be lower, CIP will likely induce slight upward pressure of approximately $0.000705 per kWh and $0.00749 per therm on future energy rates due to decreased sales. Many programs do not pass the RIM test because, while energy efficiency programs reduce overall costs, they also reduce energy sales. As a result, the average rate per unit of energy may increase. A passing RIM test indicates that rates, as well as costs, will go down as a result of the program. Typically, this only happens for demand response programs or programs targeted to the highest marginal cost hours (when marginal costs are greater than rates). The RIM test does not include an estimate of what happens to future energy rates in the hypothetical absence of CIP, in which utilities meet growing demand with only supply-side resources (such as new power plants and increased purchases of out-of-state fuel and power).

Economic Impact Analysis

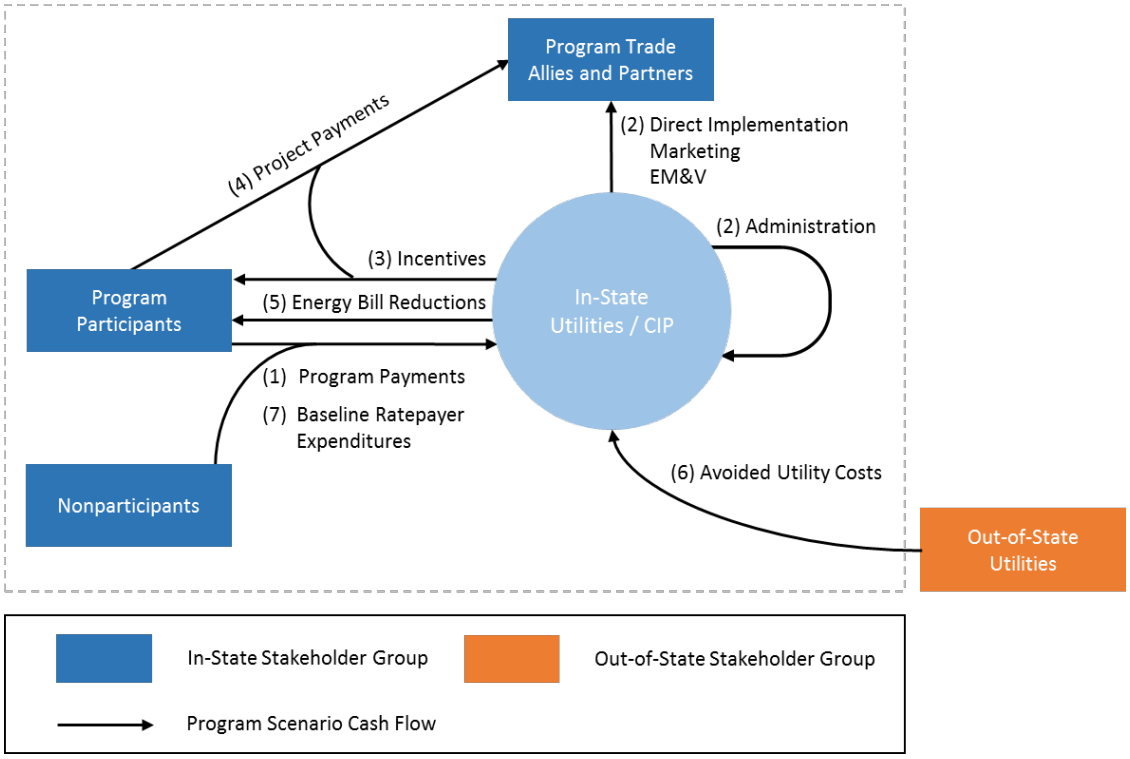
To quantify and describe the aggregate impact of CIP on Minnesota employment, employee earnings, household income and savings, business revenue, industry production, capital investment and innovation, and state domestic product, Cadmus developed economic models using IMpact analysis for PLANning (IMPLAN), an input-output (IO) tool that incorporates static assumptions about regional spending patterns, relationships between households and industries, labor productivity, and employee compensation. Cadmus used these models to estimate aggregate gross CIP impacts, hypothetical baseline impacts that would have occurred in the absence of CIP, and aggregate net CIP impacts that represent the difference between the program and hypothetical baseline scenarios. To develop model inputs that accurately account for relevant economic activities, Cadmus identified all CIP-related and hypothetical baseline economic exchanges (i.e., cash flows) connecting Minnesota stakeholder groups.

As shown in Figure ES-1, the modeled cash flows affect the Minnesota economy in multiple ways:

1. **Program Payments.** CIP funding comes from utility revenues, which are collected from ratepayers.
2. **Program Spending.** Funds are then spent on in-house program administration activities as well as implementation; marketing; and evaluation, measurement, and verification (EM&V) services provided by program trade allies and partners.
3. **Incentives.** Program funds are also spent on direct financial and service-based incentives that encourage investments in energy saving technologies and behaviors.
4. **Project Payments.** In addition to receiving incentives, program participants provide their own co-funding to cover the costs for project goods and services.

5. **Energy Bill Reductions.** Participants save energy as long as the installed measures remain operational, thus benefitting from energy bill reductions, while utilities forego those revenues.
6. **Avoided Utility Costs.** As a result of decreased demand for energy resources, Minnesota utilities benefit from avoided fuel and capacity costs.
7. **Baseline Ratepayer Expenditures.** In the absence of CIP, Minnesota ratepayers spend money on energy that otherwise would have been saved through CIP activities.

Figure ES-1. Modeled Program and Baseline Scenario Cash Flows



Cadmus analyzed the modeled cash flows in IMPLAN to generate outputs of aggregate gross, baseline, and net economic impact. These outputs include multiple types of economic effects:

1. ***Direct effects*** represent regional production changes caused by user-defined changes in regional final demand. These effects result from initial changes to the Minnesota economy that are being analyzed, including direct program and participant expenditures on goods and services from program trade allies and partners.
   For example, CIP marketing expenditures increase the overall demand for regional advertising services.
2. ***Indirect effects*** are predicted by the model and result from changes in demand for the intermediate factor inputs necessary for directly affected industries to provide their primary products. These effects reflect secondary economic exchanges in the supply chain that result from the initial changes being analyzed.
   For example, an increase in the final demand for regional advertising services may require marketing firms to purchase additional office equipment. In this case, the indirect effects predicted by IMPLAN represent impacts on the portions of the office equipment supply chain that operate within the study area.

3. ***Induced effects*** are predicted by the model and result from the ways households and employees of directly and indirectly affected industries spend money on regional goods and services. The additional economic activity from spending of increased income triggers further production in local industries attributable to CIP. These effects reflect the predicted impacts on Minnesota industries that are not directly involved with CIP or supplying intermediate factor inputs.
   For example, a program participant may spend some of their energy bill savings on a movie ticket or meal at a local restaurant. While dollars flow to a completely unrelated industry (the entertainment or food services industry), they are associated with CIP effects.
4. ***Total effects*** are the sum of direct, indirect, and induced effects and represent the full impact of near-term and long-term changes in local spending patterns caused by CIP.

Cadmus used IMPLAN to estimate aggregate direct, indirect, induced, and total effects on multiple key, interrelated economic indicators, including the following:

1. ***Employment*** represents the number of job-years created and is the only indicator variable unaffected by the discount rate. Each job-year represents one job for one year (i.e., 2,080 hours).
2. ***Employee compensation*** represents the total cost of employees paid by employers, including wages plus benefits; it does not include proprietor income, and serves as the best indicator for estimating wage impacts.
3. ***Labor income*** represents the sum of all forms of employment income, including employee compensation (i.e., wages plus benefits) and proprietor income; it serves as the best indicator for estimating total household income and savings impacts.
4. ***Value added*** represents all profits (i.e., operating surpluses), indirect business taxes, and employee compensation; it accounts for all non-commodity payments associated with industry production, and thus serves as the best indicator for estimating marginal impacts on state domestic product.
5. ***Output*** equals value added plus intermediate expenditures, and represents the total value of industry production; it serves as the best indicator for estimating sector-level impacts on business revenue and industry production.

Findings from IMPLAN analyses based on a utility discount rate (UDR) of approximately 7% illustrate lower-bound estimates of aggregate impacts that accrue through 2032, while findings from analyses based on a societal discount rate (SDR) of approximately 3% to 5% illustrate upper-bound estimates. Employment impacts are unaffected by the discount rate; for this study, Cadmus calculated conservative estimates of employment impacts using model inputs we generated using the UDR.

In both discount rate scenarios, findings indicate that 2008-2013 CIP activities and ongoing energy savings through 2032 led to positive aggregate direct, indirect, and induced net effects on statewide employment and income, as well as positive aggregate indirect and induced net effects on statewide value added and output. Positive direct gross effects on value added and output were larger in the hypothetical baseline scenario than in the program scenario, revealing that CIP led to negative direct net effects on those two variables. In the program scenario, statewide 2008-2013 CIP activities and ongoing energy savings resulted in a combination of positive direct effects on the service, trade, and manufacturing sectors, with negative direct

effects on the electric and natural gas utility sectors due to ongoing net losses in revenue. Meanwhile, in the absence of CIP, ratepayer demand for energy resulted only in positive direct effects on the electric and natural gas utility sectors. CIP led to positive total net effects across all variables, revealing that 2008-2013 CIP activities and ongoing energy savings led to positive aggregate economic impacts in Minnesota.

Through the combination of direct, indirect, and induced effects, 2008-2013 CIP activities and ongoing energy savings resulted in positive total net effects on all economic variables analyzed. In other words, CIP activities and ongoing energy savings induced positive aggregate net impacts on statewide employment, income, profit, and total production between 2008 and 2032.

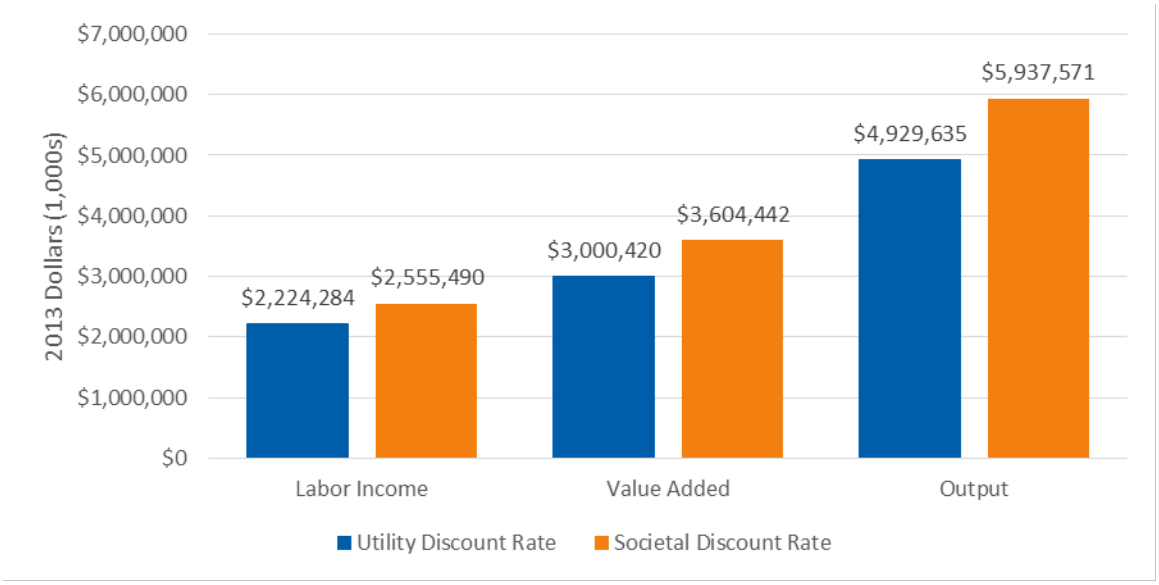
Table ES-4 summarizes all of these findings, while Figure ES-2 illustrates aggregate net impacts on all monetary output variables by discount rate. Employment impacts are presented in job-years, while all other impacts are presented in fixed 2013 dollars (1,000s).

Table ES-4. 2008-2013 Net CIP Effects on Key Economic Indicators, by Discount Rate

Discount Rate	Effect	Key Economic Indicator			
		Employment	Labor Income	Value Added	Output
Utility	Direct	8,404	$474,141	-$59,583	-$242,379
Utility	Indirect	2,506	$126,569	$187,900	$309,677
Utility	Induced	43,866	$1,623,575	$2,872,103	$4,862,337
Utility	**Total***	**54,777**	**$2,224,284**	**$3,000,420**	**$4,929,635**
Societal	Direct	8,404	$482,444	-$28,374	-$205,477
Societal	Indirect	2,506	$130,552	$198,114	$327,205
Societal	Induced	43,866	$1,942,493	$3,434,702	$5,815,843
Societal	**Total***	**54,777**	**$2,555,490**	**$3,604,442**	**$5,937,571**

* Values may not sum due to rounding.

Figure ES-2. 2008-2013 Aggregate Net CIP Impacts on Labor Income, Value Added, and Output, by Discount Rate



Summary of Conclusions

This report presents the analysis methods and findings from a Cadmus economic impact study of 2008-2013 statewide CIP-related activities and the resulting energy savings that accrue through 2032. Specifically, this study discloses the quantified aggregate statewide impacts on eight economic variables:

1. Employment;
2. Employee earnings;
3. Household income and savings;
4. Business revenue;
5. Industry production;
6. Capital investment and innovation;
7. State domestic product; and
8. Utility electricity and natural gas rates.

Findings from annual cost-effectiveness analyses of the CIP electric and natural gas program portfolios suggest that CIP is cost-effective from the perspectives of utilities, program participants, and society as a whole. Results from the RIM test indicate that although total costs go down, CIP will likely induce slight upward pressure on future energy rates of approximately $0.000705 per kWh and $0.00749 per therm. However, the RIM test does not include an estimate of the rate impacts in the hypothetical absence of CIP, in which utilities would meet increases in demand with ratepayer-funded, supply-side resources (such as new power plants or increased purchases of out-of-state fuel and power).

Economic impact analysis findings indicate that 2008-2013 CIP activities and ongoing energy savings through 2032 led to positive aggregate direct, indirect, induced, and total net effects on statewide employment and income, as well as positive aggregate indirect, induced, and total net effects on statewide value added and output.

Statewide 2008-2013 CIP activities and ongoing energy savings resulted in a combination of positive aggregate direct effects on service, trade, and manufacturing sectors and negative aggregate direct effects on the electric and natural gas utility sectors due to net losses in revenue. Meanwhile, in the absence of CIP, ratepayer demand for energy resulted in positive aggregate direct effects only on the electric and natural gas utility sectors. Through the combination of direct, indirect, and induced effects, 2008-2013 CIP activities and ongoing energy savings resulted in positive total net effects on all economic variables analyzed. In other words, CIP activities and ongoing energy savings induced positive aggregate net impacts on statewide employment, income, profit, and total production between 2008 and 2032.

Table ES-5 summarizes the study findings by economic variable investigated.

Table ES-5. Summary of Study Findings by Economic Variable

Economic Variable	Summary of Study Finding(s)*
Employment	• From 2008-2032, CIP activities and ongoing energy savings will result in 8,404 direct and 54,777 net job-years
Employee earnings	• From 2008-2032, CIP will generate between $1,914,347 and $2,210,416 in net employee earnings
Household income and savings	• From 2008-2032, CIP will create between $2,224,284 and $2,555,490 in net household income
Business revenue	• From 2008-2032, CIP will generate between $4,929,635 and $5,937,571 in net revenue and production
Industry production	
Capital investment and innovation	• From 2008-2032, CIP will generate between $3,000,420 and $3,604,442 in net profit
State domestic product	
Utility electricity and natural gas rates	• CIP will likely induce upward pressure on future rates of approximately $0.000705/kWh and $0.00749/therm due to decreased sales • CIP provides cost-effective total benefits to utilities, program participants, and society

*All monetary values are presented as fixed 2013 dollars (1,000s).

This study provides a robust analysis of aggregate CIP economic and energy rate impacts. However, like any large-scale research study, there were limitations related to available data and analysis tools. These limitations, along with recommendations for future research, are summarized below.

For this analysis, Cadmus relied on self-reported data from more than 180 Minnesota utilities. These data included gross energy savings and average EUL data at the measure category level and not the individual measure level (e.g., lighting is a measure category that includes individual measures such as CFLs). Also, the data did not include project-level expenditures (i.e., expenditures for equipment and installation labor). To improve the accuracy of model inputs, future analyses would benefit from more granular data, including energy savings and EUL data being available at the individual measure level, and project-level expenditure data being available.

Cadmus analyzed impacts on the Minnesota economy from hundreds of utility CIPs, which required assumed income bracket and sector-level breakouts for all IMPLAN model inputs. Future analyses would benefit from additional research that provides clear guidance for developing the model input breakouts. Also, while the IMPLAN model is a cost-effective tool for conducting robust impact analysis, it is useful primarily for estimating gross impacts. Therefore, to determine net CIP impacts, Cadmus manually constructed and incorporated a baseline model to analyze the hypothetical scenario where CIP does not operate. Since IMPLAN is a static model, this study does not account for future dynamic changes in the statewide economy. Future analyses might benefit from investigating first-year and future-year impacts separately, or from using a dynamic forecasting model that accounts for labor migration, price responses, and other dynamic economic variables that affect both the gross and baseline model scenarios. Finally, Cadmus used the RIM test to estimate CIP impacts on future energy rates.

The RIM test does not estimate what happens to future energy rates in the hypothetical absence of CIP, in which utilities meet growing demand only with supply-side resources (such as new power plants and increased purchases of out-of-state fuel and power). Future analyses might also include investigating the rate impacts from these hypothetical supply-side investments.

Background

The following sections provide background information about the Conservation Improvement Program (CIP), as well as an overview of the study objective and scope.

Conservation Improvement Program

With regulatory oversight and technical assistance from the Minnesota Department of Commerce (Commerce) Division of Energy Resources (DER), CIP is a statewide program administered by over 180 electricity and natural gas utilities that helps Minnesota households and businesses use electricity and natural gas more efficiently. Through CIP, utilities help to conserve energy resources while reducing harmful emissions, minimizing the need for new utility infrastructure and generating positive economic value for Minnesota citizens.

Enacted in 2007, the Minnesota Next Generation Energy Act (NGEA) provides a framework—based on increased efficiency, locally produced renewable fuels, and reduced carbon emissions—for creating a reliable and environmentally and economically sustainable state energy system. Beginning in 2010, the NGEA established an Energy Efficiency Resource Standard (EERS) for Minnesota utilities, in which CIPs are required to achieve savings of 1.5% of average retail sales each year. As an owner of a nuclear power plant, Xcel Energy is required to achieve savings of 2.0% of average retail sales annually. Electric utilities with conservation improvement plans that account for at least 1% savings can include savings from qualified generation, transmission, or distribution infrastructure improvements, or from conservation measures implemented at their own facilities, toward the overall 1.5% savings goal. Additional legislation was passed to establish an interim savings goal of 0.75% from 2010 to 2012 for qualifying natural gas utilities, and to allow natural gas utilities to include biomethane purchases toward their overall annual savings goal. The Minnesota EERS is one of the most aggressive standards in the country, and efficiency programs have been operating throughout the state since the early 1980s.

Commerce oversees utility CIPs to ensure that ratepayer dollars are used effectively and that energy savings are measureable and verifiable. There also are important conditions for how Minnesota electric and natural gas utilities can spend CIP funds:

- Minnesota Statute §216B.241, subd. 1(a) requires a utility that furnishes electric service to spend and invest 1.5% of its annual gross operating revenues (GOR) from service provided in the state on energy conservation improvements, excluding revenues from large customer facilities exempted by the Commissioner.
- The same statute requires a utility that furnishes natural gas service to spend and invest 0.5% of its GOR from service provided in the state on energy conservation improvements, excluding revenues from large customer facilities exempted by the Commissioner.

- Minnesota Statute §216B.241, subd. 7(a) establishes minimum low-income spending requirements for electric and natural gas utilities and associations. Legislation passed in 2013[7] raised the minimum low-income spending requirement for public (i.e., investor-owned) natural gas utilities from 0.2% to 0.4% of residential GOR and specified the use of a three-year average of residential GOR.
- Minnesota Statute §216B.241 subd. 2(c) specifies that public utilities spend no more than 10% of their minimum annual spending requirement on research and development projects.
- Minnesota Statute §216B.2411 subd. 1(a) allows utilities to spend up to 5% of their minimum annual spending requirements on distributed and renewable generation projects, and up to 10% of the annual minimum spending requirement on qualifying solar energy projects.
- Electric utilities must offer programs intended to encourage the use of energy-efficient lighting and the recycling of spent bulbs.

Electric and natural gas utilities file CIP Triennial Plans with Commerce at least once every three years. Utilities are also required to submit annual CIP Status Reports, assessing program portfolio cost-effectiveness and energy savings. Commerce staff review and approve each plan and report to ensure that programs are cost-effective and that they reach customers from all market segments.

Utilities offer a variety of programs designed to help customers save energy, each tailoring their respective program portfolio to meet the unique needs of customers in their service territories. Through CIPs, utilities have traditionally focused on providing incentives for the purchase and installation of products that are more energy efficient than standard products. Moving forward, utilities will also design programs to meet higher energy savings goals through new approaches, such as packaged services, operation and maintenance (O&M) improvements, or behavioral changes.

Typical programs for residential customers include:

- Energy audits, where trained energy consultants examine homes and offer specific advice on energy improvements;
- Rebates on high-efficiency heating, cooling, and water heating appliances;
- Air conditioner cycling that allows utilities to manage peak energy demand in return for discounting participating customers' electric bills;
- Compact fluorescent lighting rebates;
- Low-flow showerhead rebates, which serve the dual purpose of conserving water and energy; and
- Energy-efficient home construction guidelines for building shell measures, mechanical ventilation systems, and appliances.

[7] Minn. Laws 2013 Ch. 132 Sect. 2

Typical programs for commercial and industrial customers include:

- Rebates for high-efficiency boilers, chillers, and rooftop units;
- Rebates for high-efficiency lighting and lighting control systems;
- Rebates for high-efficiency motors and drives;
- Building recommissioning studies; and
- Manufacturing process improvements that reduce energy intensity and improve productivity.

One of the primary purposes of CIP is to serve as a low-cost resource for meeting future energy demand. In Minnesota integrated resource planning (IRP), demand-side management (DSM) programs such as CIP are treated as a resource alongside supply-side resources (including fossil fuel, nuclear, and renewable generation resources). IRP is a process for determining the least cost mix of supply- and demand-side resources required to meet the expected needs of an energy utility's customers over 15 years. One reason high levels of DSM are often selected through the IRP process is because CIPs are a low-cost resource compared to supply-side options.

CIPs lead to job creation and retention in a variety of market sectors. Aside from the utility employees that are directly involved in program administration and marketing, utilities generally partner with a variety of external companies to deliver and evaluate their programs. For example, utilities hire local HVAC contractors and other trade partners to promote and implement their programs. Retailers such as home improvement and local hardware stores promote high-efficiency residential lighting and other efficient consumer products. For commercial and industrial programs, utilities often partner with engineering firms to identify, evaluate, and implement efficiency projects. The incentives and marketing offered through CIPs helps drive business for these various partner organizations. In return, customers spend less money on energy, thus allowing for expenditures on non-energy goods and services, many of which are produced and sold by local industries.

This report summarizes Cadmus' analysis of the aggregate statewide economic impact of 2008-2013 CIP activities and resulting energy savings that accrue through 2032.

Study Objective

Commerce awarded Cadmus a Conservation Applied Research and Development grant to estimate the aggregate economic impact of 2008-2013 CIP activities and resulting energy savings that accrue through 2032. To meet this objective, Cadmus quantified the aggregate statewide impacts on eight economic variables, as described in this report:

1. Employment;
2. Employee earnings;
3. Household income and savings;
4. Business revenue;
5. Industry production;
6. Capital investment and innovation;
7. State domestic product; and
8. Utility electricity and natural gas rates.

To quantify and describe the aggregate economic impact of CIP activities and resulting energy savings by program year, Cadmus constructed economic models using IMPLAN. We reviewed summary- and sector-level impacts on employment, employee compensation, labor income (i.e., employee compensation plus proprietor income), output, and value added.

Additionally, to estimate the impact of 2008-2013 CIP activities on utility electricity and natural gas costs, Cadmus conducted annual cost-effectiveness analyses of the CIP electric and natural gas program portfolios. Cadmus analyzed results from the Societal Cost Test (SCT), Utility Cost Test (UCT), and Participant Cost Test (PCT) to determine whether the statewide CIP electric and natural gas program portfolios were cost-effective from the perspectives of multiple stakeholder groups, including Minnesota utilities, CIP participants, and society in general. Even though CIP activities lead to lower overall costs, Cadmus reviewed results from the Ratepayer Impact Measure (RIM) test to estimate whether 2008-2013 CIP activities are likely to induce upward or downward pressure on statewide electricity and natural gas rates due to decreased sales. Table 1 summarizes the analysis methods used to quantify and describe the impacts on each of the eight economic variables reviewed.

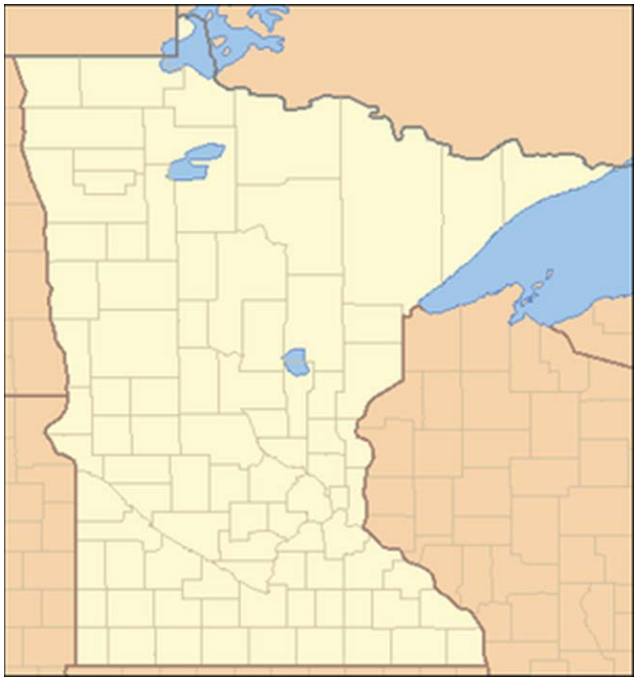
Table 1. Summary of Analysis Methods by Economic Variable Reviewed

Economic Variable	Analysis Method	Measure or Indicator Analyzed
Employment	IMPLAN	Employment
Employee earnings	IMPLAN	Employee compensation
Household income and savings	IMPLAN	Labor income
Business revenue	IMPLAN	Output
Industry production	IMPLAN	Output
Capital investment and innovation	IMPLAN	Value added
State domestic product	IMPLAN	Value added
Utility electricity and natural gas rates	Cost-effectiveness analysis	RIM test benefit/cost ratios

Study Region and Timeframe

Cadmus estimated aggregate statewide impacts in Minnesota for the economic variables outlined in Table 1. The study area was defined as the entire State of Minnesota. The economic impacts estimated in this study account for leakages out of the study area. These leakages occur when local demand is met in whole or in part via supply chain resources located outside of Minnesota. For example, Minnesota utilities meet a portion of local energy demand with fuel and power purchased from other states. In general, local demand for CIP-related services is met largely via in-state resources, while local demand for commodities and manufactured products is met via a combination of in-state and out-of-state resources, depending on regional industry clustering. A primary reason CIP activities generate net economic value in Minnesota is that CIP-related industries are more local than industries that generate and distribute supply-side energy resources. Figure 1 illustrates the study area used for this analysis.

Figure 1. Study Area



For each program year from 2008-2013, as well as for all six program years combined, Cadmus estimated the total present value of aggregate energy bill reductions and utility avoided costs, which accrue for as long as installed measures save energy. The estimated maximum effective useful life (EUL) for measures installed in each program year is 20 years. Therefore, some measures installed in 2008 will continue to save energy through 2027; some measures installed in 2009 will continue to save energy through 2028; and so on.

Table 2 summarizes the study timeframe for each CIP year, as well as for all six program years combined.

Table 2. Study Timeframe, Overall and by Year

CIP Year	First Impact Year	Last Impact Year	Total Timeframe
2008	2008	2027	2008-2027
2009	2009	2028	2009-2028
2010	2010	2029	2010-2029
2011	2011	2030	2011-2030
2012	2012	2031	2012-2031
2013	2013	2032	2013-2032
Overall (2008-2013)	**2008**	**2032**	**2008-2032**

Analysis Methods

For this study, Cadmus conducted the following two types of analysis:

1. **Annual cost-effectiveness assessments of the CIP statewide portfolio.** We analyzed the statewide CIP portfolio's annual cost-effectiveness to determine if program benefits exceeded costs. We incorporated multiple tests to account for the perspectives of Minnesota utilities, Minnesota ratepayers, CIP participants, and society in general. We calculated benefit/cost ratios for each test, year, and fuel type, which indicate via a single variable whether the programs' benefits exceeded costs.
2. **Economic impact assessments of annual statewide CIP activities and ongoing energy savings.** Cadmus conducted an economic impact analysis to calculate and describe the aggregate net economic value of CIP to Minnesota; specifically, we analyzed the summary- and sector-level net impacts on statewide employment, employee earnings, household income and savings, business revenue, industry production, capital investment and innovation, and state domestic product attributable to each CIP year, 2008-2013.

The following sections describe Cadmus' analytical approach to this study, including the cost-effectiveness and economic impact analyses.

Cost-Effectiveness Analysis

To determine the cost-effectiveness of annual 2008-2013 CIP electric and natural gas program portfolios, Cadmus conducted the following steps:

1. **Identified and described the cost-effectiveness tests.** First, we determined which tests were necessary to comprehensively assess the cost-effectiveness of the annual CIP electric and natural gas program portfolios from multiple stakeholder perspectives. We identified these as four tests included in the California Standard Practice Manual, which are the same tests used by Commerce and utilities for annual CIP evaluations: (1) Societal Cost Test; (2) Utility Cost Test; (3) Participant Cost Test; and (4) Ratepayer Impact Measure test. We developed descriptions and summaries of the components for each test, provided below.

2. **Determined required assumptions for each test.** Next, Cadmus worked with Commerce to develop test assumptions equivalent to those used by Minnesota utilities for conducting the cost-effectiveness analyses included in their annual CIP reports. We used the assumptions prescribed by Commerce in the "INPUTS TO BENCOST FOR NATURAL GAS CIPs" (BENCOST) guidance document, which are summarized below.

3. **Collected data and calculated test inputs.** Finally, Cadmus collected data and calculated test inputs. We reviewed data from the Energy Savings Platform (ESP)[8] to determine electricity and natural gas savings and to estimate participant project co-funding. To calculate ongoing bill reductions and avoided utility costs, we multiplied first-year and future-year energy savings by wholesale natural gas prices and forecasts from New York Mercantile Exchange (NYMEX) annual average settlement prices; electricity fuel wholesale prices and forecasts from delivered coal prices in the West North Central Region documented by the Energy Information Administration (EIA); and retail energy rates and forecasts from the EIA State Energy Data System (SEDS). A summary of collected data and cost-effectiveness test inputs is provided below.

Test Descriptions

To assess the cost-effectiveness of annual CIP electric and natural gas program portfolios, and to estimate the impact of 2008-2013 CIP activities on future utility electricity and natural gas rates, Cadmus analyzed utility program costs and benefits following the benefit and cost methodologies described in the California Standard Practice Manual for the following test perspectives:

- **Societal Cost Test (SCT)**
  The SCT is a measure of the net costs of CIP as a resource option. It represents the balance between costs from direct utility and participant expenditures and benefits from avoided energy and capacity costs that accrue over time, as well as from avoided environmental externalities. Participant bill savings and utility lost revenues are treated as transfer payments since both stakeholder groups are accounted for. This test's primary strength is its expansive scope.
- **Utility Cost Test (UCT)**
  The UCT is a measure of the net costs of CIP as a resource option from the perspective of Minnesota utilities. It is based on the direct costs incurred by the utilities, including incentive costs, but excludes any net costs and benefits incurred by CIP participants or society in general.
- **Participant Cost Test (PCT)**
  The PCT is a measure of the quantifiable benefits and costs to participating customers. Benefits include direct incentives and ongoing bill savings, while costs account for direct participant project spending or co-funding. It provides a good general assessment of the benefit or desirability of CIP to customers. However, since many customers also consider non-quantifiable benefits when deciding to participate, and since the PCT is unable to capture all the complexities and diversity of customer decision making, this test is not a complete measure of the benefits and costs of CIP to program participants.

[8] ESP is a cloud-based IT platform that serves approximately 180 Minnesota utilities as a system of record for reporting energy efficiency program activities and results.

- **Ratepayer Impact Measure (RIM) test**
  The RIM test is an estimate of what happens to future energy rates as a result of ongoing changes in utility revenues and operating costs caused by CIP. Rates will decrease if the revenues collected are more than the total net costs incurred by the utilities implementing CIPs, and vice versa. This test's relatively narrow view of program benefits leads most energy efficiency and renewable energy programs to not be cost-effective from the RIM test perspective. Additionally, the RIM test does not include an estimate of future energy rates in the absence of CIP, in which utilities meet growing demand with only supply-side resources (such as new power plants and increased purchases of out-of-state fuel and power).

None of these tests are intended for use in isolation. Each test has particular strengths and weaknesses. For example, the RIM test provides an indication of future rate impacts. However, it does not account for the environmental benefits that accrue to ratepayers, nor does it describe the total cost savings that accrue to participating utilities and ratepayers, which are a function of both rates and the amount of energy saved. Meanwhile, the SCT does include an assessment of those benefits. In general, it is best to review results from all the tests to fully understand the cost-effectiveness of the statewide CIP portfolio.

Programs are considered cost-effective from each stakeholder perspective when the benefit/cost ratio is greater than 1.0 (i.e., the present value of aggregate benefits is greater than the present value of aggregate costs). Table 3 lists the benefits and costs included in each test for this analysis.[9]

Table 3. Cost-Effectiveness Test Components

Component	Societal Cost Test	Utility Cost Test	Participant Cost Test	Ratepayer Impact Measure
Avoided Energy and Capacity	Benefit	Benefit	--	Benefit
Natural Gas Environmental Damage Factor	Benefit	--	--	--
Non-Natural Gas Fuel Environmental Damage Factor	Benefit	--	--	--
Utility Administrative Costs	Cost	Cost	--	Cost
Utility Measure Incentive Payments	--	Cost	Benefit	Cost
Direct Participant Costs	Cost	--	Cost	--
Participant Bill Savings	--	--	Benefit	Cost

[9] The program tracking data provided by Commerce did not include data on O&M cost savings associated with energy-efficient measures; therefore, Cadmus did not include this factor in the analysis.

Test Assumptions

To align our state-level analysis with the cost-effectiveness analyses included in Minnesota utilities' annual CIP reports, Cadmus analyzed each program year using cost-effectiveness assumptions from the Commerce "INPUTS TO BENCOST FOR NATURAL GAS CIPs" (BENCOST) guidance document. These values are specific to each range of years as shown in Table 4, and are described in BENCOST documents as follows:

- **Annual Escalation Rate:** an escalation factor for the annual retail rates beyond the base BENCOST year.
- **Environmental Damage Escalation Rate:** an escalation factor for the natural gas and non-natural gas environmental damage factors beyond the base year.
- **Natural Gas Environmental Damage Factor:** the long-term cost to society and the environment from burning natural gas.
- **Non-Natural Gas Fuel Environmental Damage Factor:** the long-term cost to society and the environment from generating electricity.
- **Societal Discount Rate (SDR):** the customers' opportunity cost of capital associated with participation in the CIP.
- **Utility Discount Rate (UDR):** the utilities' after-tax, weighted cost of capital.

The entire BENCOST guidance document is provided in Appendix C: Commerce Benefit Cost Guidance.

Table 4. Cost-Effectiveness Analysis Input Assumptions by Program Year

Analysis Input Assumption	2008-2009	2010-2012	2013
Annual Escalation Rate	1.90%	2.35%	4.28%
Environmental Damage Escalation Rate*	--	1.83%	1.73%
Natural Gas Environmental Damage Factor ($/Mcf)	$0.34	$0.33	$0.35
Non-Natural Gas Fuel Environmental Damage Factor ($/MWh)	$5.82	$6.00	$21.32
Societal Discount Rate (SDR)	4.58%	3.22%	2.67%
Utility Discount Rate (UDR)**	7.29%	6.99%	7.04%

* For 2008-2009, the BENCOST documentation did not include an environmental damage escalation rate, so Cadmus used the annual escalation rate for those years.
** This represents Xcel Energy's UDR as listed in their annual CIP reports. Cadmus used these rates to represent all utilities since Xcel Energy is the largest energy provider in Minnesota, having reported approximately 67% of all statewide gross operating revenues from 2008-2013.

Test Inputs

To determine utility avoided electric costs, utility avoided natural gas costs, and participant energy bill savings, Cadmus used self-reported energy savings and EUL data recorded at the measure category level in the ESP. We present total first-year, future-year, and cumulative energy-savings data by program year and fuel type in greater detail below (see Table 14 and Table 15).

We multiplied first-year and projected energy savings by energy wholesale cost and retail rate data from a Minnesota state-commissioned forecasting study by The Center for Climate Strategies (CCS), known as the Climate Solutions and Economic Opportunities Process.[10] Wholesale natural gas prices and forecasts came from NYMEX annual average settlement prices, while electricity fuel wholesale prices and forecasts came from delivered coal prices in the West North Central Region documented by the EIA. Retail rates and forecasts came from the EIA SEDS.

Electric Costs

Cadmus used 2012-2030 composite electric energy and capacity costs per the CCS study's *Composite Avoided Energy and Capacity Costs* ($/MWh at generation, CCS Scenario #1) as a basis for calculating utility avoided electric costs. We deflated values for years prior to 2012 using the annual escalation rates listed in Table 4. Measures installed in 2013 with a 20-year EUL provide energy savings and demand reduction through 2032; we determined avoided costs beyond 2030 by escalating the available 2030 values using the CCS calculated annual growth rate from 2015-2030.

To determine participant electric bill savings, we used retail electricity prices from the CCS common forecast data for power supply, *Electricity Retail Rates* ($/MWh), which are specific to the residential, commercial, and industrial sectors and originate from the EIA SEDS.

Natural Gas Costs

Cadmus used wholesale natural gas costs ($/Mcf) as a basis for calculating utility avoided natural gas costs. Additionally, we used sector-specific retail natural gas rates ($/Mcf) to determine participant natural gas bill savings. We escalated natural gas prices beyond 2030 using a three-year moving average per the CCS forecast data.

Sector Segmentation

To calculate participant bill savings using sector-specific retail rates, Cadmus segmented ESP energy savings data (kWh for electric and Mcf for natural gas) into residential, commercial, and industrial sectors. ESP classifies CIP energy savings data as residential; commercial, industrial, and/or agricultural (CIA); and other. To apportion CIA and other energy savings into the respective sectors, Cadmus allocated the "other" category to residential and CIA using a ratio of each sector's savings, then further segmented the CIA savings data into commercial and industrial sectors using the sector sales weights for those records. The final segmentation by fuel type and year is show in Table 5.

[10] For consistency, Commerce staff requested that Cadmus use data and model inputs from this similar state-commissioned forecasting study conducted by the CCS, which they provided on March 11, 2015.

Table 5. Electric and Natural Gas Savings by Segment and Year*

Fuel	Year	Residential	Commercial	Industrial
Electric	2008	31.4%	38.4%	30.2%
Electric	2009	33.5%	38.9%	27.6%
Electric	2010	33.4%	38.6%	28.0%
Electric	2011	32.9%	36.0%	31.0%
Electric	2012	32.8%	36.9%	30.3%
Electric	2013	33.0%	37.3%	29.8%
Natural Gas	2008	24.9%	42.8%	32.3%
Natural Gas	2009	33.4%	40.1%	26.5%
Natural Gas	2010	31.6%	36.5%	31.9%
Natural Gas	2011	40.0%	31.4%	28.6%
Natural Gas	2012	40.4%	26.0%	33.6%
Natural Gas	2013	38.6%	42.9%	18.5%

* Values may not sum due to rounding.

Summary of Cost-Effectiveness Test Inputs

Cost-effectiveness test inputs, including savings and costs by fuel type and year, are shown in Table 6. Cadmus collected energy savings, average EUL, incentive, and cost data from the ESP. Program costs are exclusive of incentives, and measure costs are full incremental measure costs.

Table 6. Cost-Effectiveness Test Inputs by Year and Fuel Type

Fuel	Year	Energy Savings (MWh or Mcf)	Average EUL (Years)	Measure Cost ($1,000s)	Incentives ($1,000s)	Program Costs ($1,000s)
Electric	2008	568,845	12.5	$145,241	$39,553	$63,491
Electric	2009	600,469	12.1	$192,961	$44,202	$100,835
Electric	2010	754,924	11.9	$212,567	$59,401	$89,934
Electric	2011	788,578	11.9	$209,803	$65,648	$74,901
Electric	2012	736,320	12.3	$239,633	$79,732	$76,169
Electric	2013	829,513	11.9	$205,638	$66,562	$69,034
Natural Gas	2008	1,559	14.0	$27,200	$7,876	$10,965
Natural Gas	2009	1,847	14.1	$26,342	$2,781	$20,191
Natural Gas	2010	2,629	13.7	$47,159	$8,315	$29,558
Natural Gas	2011	2,824	13.6	$62,260	$19,573	$22,045
Natural Gas	2012	2,805	13.2	$65,141	$19,850	$24,309
Natural Gas	2013	2,893	13.5	$68,597	$21,242	$24,928

Economic Impact Analysis

To determine the aggregate economic impact of 2008-2013 CIP activities and resulting energy savings that accrue through 2032, Cadmus conducted the following analysis steps:

1. **Identified and described the IMPLAN model.** We worked with Commerce to select IMpact analysis for PLANning (IMPLAN), a cost-effective economic model useful for estimating aggregate CIP impacts on Minnesota employment, employee earnings, household income and savings, business revenue, industry production, capital investment and innovation, and state domestic product. A summary of IMPLAN, including descriptions of key model assumptions, components, and outputs, is provided below.
2. **Developed model scenarios.** Next, Cadmus developed model scenarios to estimate gross program and hypothetical baseline impacts for each program year. We subtracted the hypothetical baseline impacts from the gross program impacts to determine the aggregate net impacts of CIP by year, 2008-2013. For each model scenario, we analyzed first-year and future-year impacts. We discounted future-year impacts from ongoing energy savings to each model's base year. To determine a reasonable range of aggregate impacts, we identified two discount rates for each scenario. Scenarios based on a UDR of approximately 7% illustrated lower-bound estimates of aggregate impact, while scenarios based on a SDR of approximately 3% to 5% illustrated upper-bound estimates. A summary of the model scenarios included in the economic impact analysis is provided below.
3. **Determined relevant cash flows and stakeholder groups.** We then determined relevant stakeholder groups and cash flows to construct comprehensive program and hypothetical baseline model scenarios. Stakeholder groups included program participants and nonparticipants (i.e., Minnesota ratepayers), utility and Commerce staff affiliated with CIP management, affected out-of-state utility sector entities (e.g., fuel extractors and transporters), and program trade allies and partners that assist with program delivery and project completion. Relevant program scenario cash flows included program funding payments, program-level expenditures, project expenditures, ongoing energy bill reductions, and ongoing avoided utility costs. Hypothetical baseline scenario cash flows reflect ratepayer energy expenditures in absence of CIP. A full discussion of the cash flows incorporated into each model is provided below.
4. **Calculated IMPLAN model inputs by cash flow and sector.** Finally, Cadmus calculated IMPLAN model inputs to describe each relevant cash flow, and selected household income brackets and industries to depict the relevant stakeholder groups. We used the same source data as for the cost-effectiveness analysis to calculate first-year and future-year energy savings, as well as resulting energy bill reductions and avoided utility costs. Descriptions of the data calculations we used to construct each modeled cash flow are provided below. A comprehensive list of model inputs by year, cash flow, and IMPLAN sector code is available in Appendix B: IMPLAN Model Inputs by Program Year.

Modeled Economic Impacts with IMPLAN

In the sections that follow, we describe the IMPLAN model and model scenarios we used to determine aggregate gross, baseline, and net impacts.

The IMPLAN Model

For each program year, 2008-2013, Cadmus constructed an IMPLAN model to estimate the aggregate net impacts of CIP activities and ongoing energy savings on statewide employment, employee earnings, household income and savings, business revenue, industry production, capital investment and innovation, and state domestic product.

IMPLAN is a static input-output (IO) model used to conduct region-specific economic analyses. IMPLAN model assumptions are static and based on annual state-level economic data, thus allowing users to construct static IO models based on real economic data from specific regions and timeframes. These real economic data include IO multiplier matrices, which allow IMPLAN to account for the spending patterns and relationships between Minnesota households and industries; regional purchasing coefficients, which allow IMPLAN to account for supply chain leakages out of the Minnesota economy; and sector-level productivity and wage data, which enable IMPLAN to calculate impacts on employment, income, and production variables such as value added and output.

Cash flow inputs describing changes in income and final demand drive the IMPLAN model. Using its static built-in economic data and multipliers, IMPLAN analyzes user-defined cash flow inputs to estimate impacts on statewide job creation, income, production, and taxes.[11] These estimates come from the modeled household and industry interactions, supply chain leakages, labor productivity, compensation rates, and other economic data specific to Minnesota by model base year. For the analysis of 2008-2013 CIP activities, the static IMPLAN assumptions were based on real, annual state-level economic data incorporated in IMPLAN.[12]

[11] IMPLAN is used to estimate economic impacts using static assumptions based on real, annual Minnesota economic data. These assumptions do not account for dynamic changes that occur over time, such as labor migration, price responses, or general equilibrium, which would likely diminish the positive impact of future- year energy savings benefits. For example, CIP-induced increases in demand for certain industries causes labor to migrate to Minnesota, but only to the point of saturation; then, ongoing impacts result largely in local job displacement and minimally in local job creation. As a static IO model, IMPLAN does not account for such dynamic changes. In effect, the results from this study are reasonable but possibly overstated estimates of the aggregate statewide impact from CIP.

[12] Cadmus used real 2008-2013 state-level baseline economic data provided by IMPLAN Group, LLC.

Model Scenarios

IMPLAN is a robust modeling tool that is useful primarily for analyzing gross impacts. Therefore, to determine net CIP impacts, Cadmus manually constructed and incorporated a baseline model to analyze the hypothetical scenario where CIP does not operate. We constructed 2008-2013 IMPLAN models to compare the effects of CIP-induced spending on the state economy to hypothetical baselines where CIP would not exist and ratepayer funds were instead spent on energy. Each IMPLAN model included two scenarios:

1. A program scenario, to analyze changes in household income and final demand; and
2. A hypothetical baseline scenario, to analyze economic activities such as out-of-state power and fuel purchases that would have occurred in the absence of CIP.

To estimate the aggregate net economic impacts of CIP activities completed from 2008-2013, we subtracted the estimated impacts of each baseline scenario from the estimated impacts of each correlated program scenario. Table 7 summarizes the models and modeling scenarios constructed for this analysis.

To determine a reasonable range of aggregate CIP monetary impacts, Cadmus constructed each program year's IMPLAN model twice:

1. Once with future-year bill reductions and avoided utility costs calculated using the societal discount rate (SDR) from the cost-effectiveness analysis; and
2. Once with future-year bill reductions and avoided utility costs calculated using the utility discount rate (UDR) from the cost-effectiveness analysis.

As shown in Table 7, our analysis yielded 12 IMPLAN models and 24 model scenarios. The UDR was greater than the SDR for each year; therefore, the future-year benefits and costs discounted to present value terms using the UDR were lower than those discounted using the SDR. Models with inputs calculated using the SDR consistently estimated greater aggregate impacts than models with inputs calculated using the UDR. The SDR model results represent upper-bound estimates of CIP impacts, and the UDR model results represent lower-bound estimates of CIP impacts.

Table 7. IMPLAN Models by Year, Scenario Name, and Discount Rate

CIP Year	Model Scenarios	Discount Rate
2008	2008 Societal Discount Rate, Program and Baseline	4.58%
	2008 Utility Discount Rate, Program and Baseline	7.29%
2009	2009 Societal Discount Rate, Program and Baseline	4.58%
	2009 Utility Discount Rate, Program and Baseline	7.29%
2010	2010 Societal Discount Rate, Program and Baseline	3.22%
	2010 Utility Discount Rate, Program and Baseline	6.99%
2011	2011 Societal Discount Rate, Program and Baseline	3.22%
	2011 Utility Discount Rate, Program and Baseline	6.99%
2012	2012 Societal Discount Rate, Program and Baseline	3.22%
	2012 Utility Discount Rate, Program and Baseline	6.99%
2013	2013 Societal Discount Rate, Program and Baseline	2.67%
	2013 Utility Discount Rate, Program and Baseline	7.04%

For each program and hypothetical baseline scenario, we used IMPLAN to generate outputs of aggregate economic impact through IO matrices, based on annual state-level economic data. The aggregate impacts include multiple types of economic effects:

1. ***Direct effects*** represent regional production changes brought by user-defined changes in regional final demand. These effects result from the initial changes to the Minnesota economy that are being analyzed, including direct program and participant expenditures on goods and services from program trade allies and partners.
   For example, CIP marketing expenditures increase the final demand for regional advertising services.
2. ***Indirect effects*** are predicted by the model and result from changes in demand for the intermediate factor inputs necessary for directly affected industries to provide their primary products. These effects reflect secondary economic exchanges in the supply chain that result from the initial changes being analyzed.
   For example, an increase in the final demand for regional advertising services may require marketing firms to purchase additional office equipment. In this case, the indirect effects predicted by IMPLAN represent impacts on the portions of the office equipment supply chain that operate within the study area.
3. ***Induced effects*** are predicted by the model and result from the ways households and employees of directly and indirectly affected industries spend money on regional goods and services. The spending of increased income triggers further production in local industries, thus leading to multiple iterations of additional economic activity. These effects reflect the predicted impacts on Minnesota industries that are not directly involved with CIP or supplying intermediate factor inputs.
   For example, a program participant may spend some of their energy bill savings on a movie ticket or a meal at a local restaurant. While dollars flow to a completely unrelated industry (the entertainment or food services industry), they are still associated with CIP effects.
4. ***Total effects*** are the sum of direct, indirect, and induced effects and describe the full impact of near-term and long-term changes in local spending patterns caused by CIP.

For each model scenario, Cadmus used IMPLAN to estimate aggregate direct, indirect, induced, and total effects on multiple key, interrelated economic indicators, including the following:

1. ***Employment*** represents the number of job-years created and is the only indicator variable unaffected by the discount rate. Each job-year represents one job for one year (i.e., 2,080 hours).
2. ***Employee compensation*** represents the total cost of employees paid by employers, including wages plus benefits; it does not include proprietor (i.e., owner) income and serves as the best indicator for estimating wage impacts.
3. ***Labor income*** represents the sum of all forms of employment income, including employee compensation (i.e., wages plus benefits) and proprietor income; it serves as the best indicator for estimating total household income and savings impacts.

4. ***Value added*** represents all profits (i.e., operating surpluses), indirect business taxes, and employee compensation; it accounts for all non-commodity payments associated with industry production and thus serves as the best indicator for estimating marginal impacts on state domestic product.
5. ***Output*** equals value added plus intermediate expenditures, and represents the total value of industry production; it serves as the best indicator for estimating sector-level impacts on business revenue and industry production.

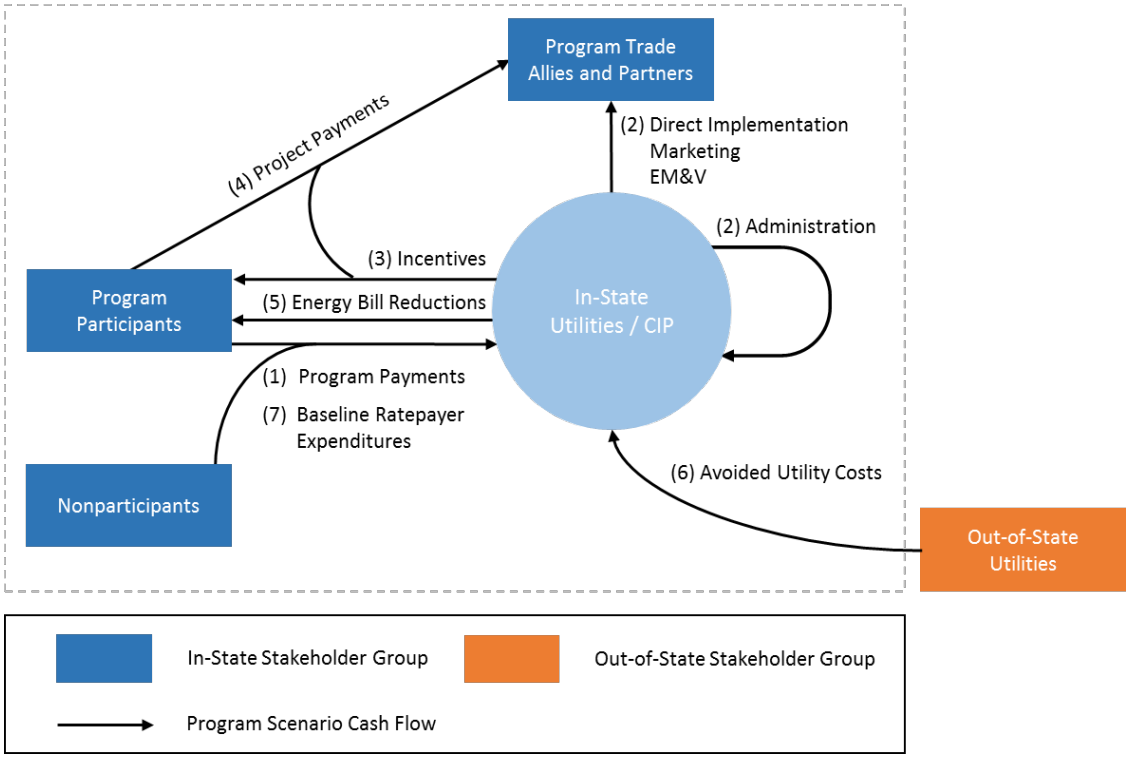
Modeled Cash Flows

To develop IMPLAN model inputs that comprehensively account for relevant economic activities, Cadmus identified all CIP-related and hypothetical baseline economic exchanges (i.e., cash flows) connecting regional stakeholder groups.

As shown in Figure 2, these cash flows affect the Minnesota economy in multiple ways:

1. **Program Payments.** Monies that fund utility CIPs come from revenues, which are collected from ratepayers.
2. **Program Spending.** Funds are then spent on in-house program administration activities as well as implementation; marketing; and EM&V services provided by program trade allies and partners.
3. **Incentives.** Program funds are also spent on direct financial and service-based incentives that encourage investments in energy saving technologies and behaviors.
4. **Project Payments.** In addition to receiving incentives, program participants provide their own co-funding to complete payments for project goods and services.
5. **Energy Bill Reductions.** Participants save energy as long as the installed measures remain operational, thus benefitting from energy bill reductions, while utilities forego those revenues.
6. **Avoided Utility Costs.** As a result of decreased demand for energy resources, Minnesota utilities benefit from avoided fuel and capacity costs.
7. **Baseline Ratepayer Expenditures.** In the absence of CIP, Minnesota ratepayers spend money on energy that otherwise would have been saved through CIP.

Figure 2. Modeled Program and Baseline Scenario Cash Flows



As shown in Table 8, Cadmus specified positive and negative fiscal inputs by relevant stakeholder group for each type of cash flow illustrated above. Negative inputs represent expenditures, while positive inputs represent receipts. Program payments represent ratepayer expenditures that result in payments to utility administration labor, program trade allies and partners, and program participants (via incentives). Baseline ratepayer expenditures represent a hypothetical scenario where Minnesota households spend a portion of income, equal to the sum of program payments and project co-funding, on electric and natural gas energy.

Table 8. Positive and Negative Impacts by Cash Flow Type and Stakeholder Group

Cash Flow	Stakeholder Group				
	Program Participants	Nonparticipants	In-State Utilities/CIP	Trade Allies and Partners	Out-of-State Utilities
1. Program Payments	Negative	Negative	--	--	--
2. Program Spending	--	--	Positive	Positive	--
3. Incentives	Positive	--	--	--	--
4. Project Payments	Negative	--	--	Positive	--
5. Energy Bill Reductions	Positive	--	Negative	--	--
6. Avoided Utility Costs	--	--	Positive	--	Negative
7. Baseline Ratepayer Expenditures	Negative	Negative	Positive	--	--

The following sections describe the inputs required for these modeled cash flows in greater detail. For this study, Cadmus analyzed impacts on the Minnesota economy from hundreds of utility CIPs, which required us to assume income bracket and sector-level breakouts for all IMPLAN model inputs describing statewide cash flows between stakeholder groups. Therefore, Appendix B: IMPLAN Model Inputs by Program Year provides tables of all model inputs by scenario, cash flow, and IMPLAN sector code.

Program Payments, Program Spending, and Project Payments

To develop accurate sector-level IMPLAN model inputs for relevant program spending cash flows, Cadmus collected annual program-level direct spending data according to six ESP tracking system categories: (1) administration, (2) implementation, (3) marketing, (4) EM&V, (5) other, and (6) incentives. Table 9 summarizes these spending categories, including the IMPLAN sector impacted by each. All of the program spending data used in this study were self-reported; Cadmus assumed that all program spending data were in nominal dollars.

Table 9. Program-Level Spending Categories

Category Name	Category Description	IMPLAN Sector Impacted
Administration	CIP spending on program administration staff and related administrative services	Office administrative services
Implementation	CIP spending on program implementation services	Management, scientific, and technical consulting services
Marketing	CIP spending on program marketing and outreach activities	Advertising and related services
EM&V	CIP spending on the EM&V of calculated savings	Environmental and other technical consulting services
Other	Unidentified CIP spending	Allocated evenly to the four sectors listed above
Incentives	Reimbursements to participating customers for energy saving technologies or behaviors	Minnesota households

These six categories encompass all the ways utilities spent annual CIP funds. Separating annual program-level CIP spending into multiple categories allowed Cadmus to assign the ESP spending data to specific IMPLAN sectors, thus maximizing the accuracy of the IMPLAN models.

Total CIP program-level spending increased annually from 2008 to 2010 before decreasing in 2011, then subsequently reached a maximum of more than $200 million (in nominal dollars) in 2012. There was another decrease in 2013, when utilities spent just over $180 million statewide. Table 10 shows total CIP program-level spending (nominal $1,000s) by year.

Table 10. Total CIP Program-Level Spending (Nominal $1,000s) by Year

CIP Year	Total Program-Level Spending
2008	$121,885
2009	$168,009
2010	$187,208
2011	$182,168
2012	$200,059
2013	$181,767
Total	**$1,041,096**

Using self-reported breakouts in the ESP spending data, Cadmus allocated total program-level CIP spending to the six categories described above in different ways each year. Table 11 summarizes annual program-level spending (nominal $1,000s) by category.

Table 11. CIP Annual Program-Level Spending (Nominal $1,000s) by Category

CIP Year	Program-Level Spending Category					
	Administration	Implementation	Marketing	EM&V	Other	Incentives
2008	$17,215	$38,934	$6,687	$910	$10,710	$47,428
2009	$22,078	$49,934	$7,638	$1,507	$39,869	$46,983
2010	$24,320	$55,003	$9,525	$2,094	$28,551	$67,715
2011	$15,946	$58,913	$9,736	$1,809	$10,542	$85,222
2012	$15,614	$61,723	$9,574	$1,584	$11,983	$99,581
2013	$36,852	$34,086	$11,770	$4,503	$6,752	$87,805
Total*	**$132,025**	**$298,593**	**$54,930**	**$12,408**	**$108,407**	**$434,734**

* Values may not sum due to rounding.

As shown in Figure 3, except for in 2009, participating utilities spent the largest portion of CIP funds on participant incentives. Across all years, participating utilities also spent large portions of CIP funds on program implementation. The percentage of expenditures for program administration decreased every year from 2008 to 2012, before increasing in 2013.

Figure 3. Categorical Shares of Total CIP Program-Level Spending by Year

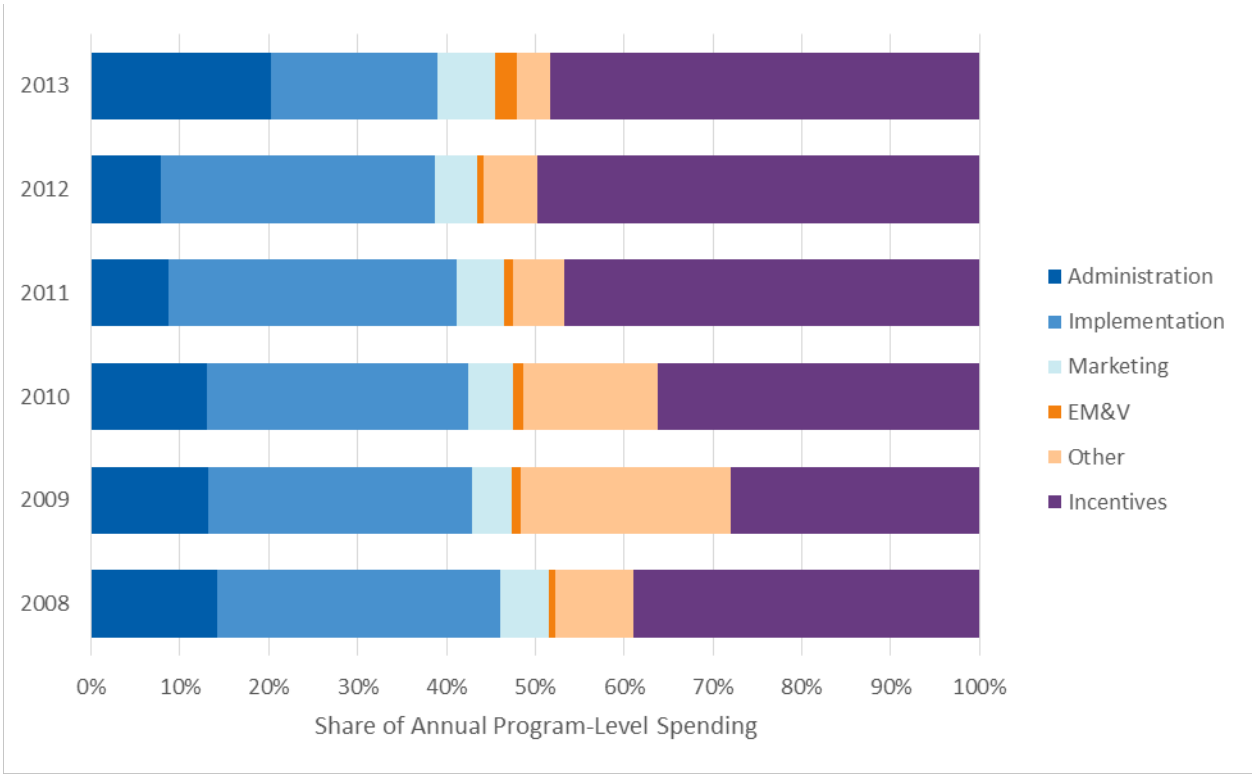
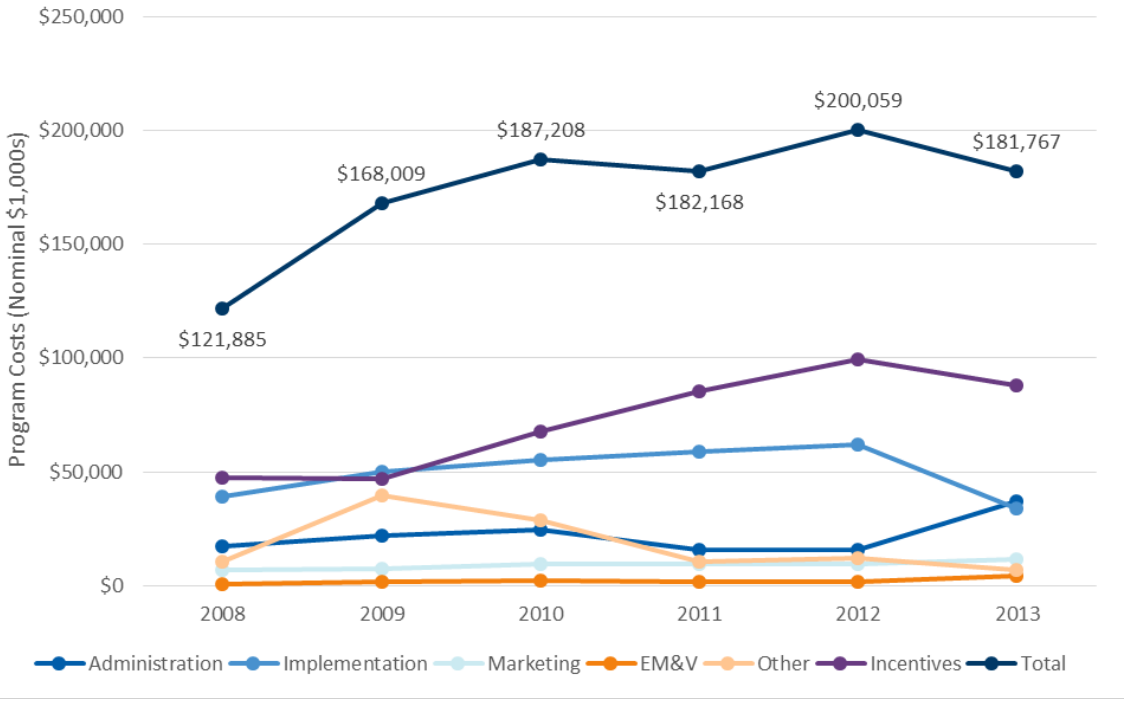


Figure 4 illustrates year-by-year changes in total and categorical program-level CIP spending (nominal $1,000s).

Figure 4. CIP Program-Level Spending (Nominal $1,000s) by Year and Category



Another major portion of annual direct CIP-related spending comes directly from program participants. Utilities provide incentives that cover a share of total project costs, but participants must provide their own funds to cover the remaining portion. This participant co-funding represents a notable economic activity induced by CIP projects.

Annual ESP reporting data did not include CIP project cost data or participant project co-funding data. Therefore, to develop accurate IMPLAN model inputs that account for participant project co-funding, Cadmus first collected annual energy savings (MMBtu), net participant cost, and total utility CIP spending data from 2010 to 2013 Xcel Energy CIP reports (earlier reports did not contain all necessary data). Cadmus then calculated an average annual percentage of total utility CIP spending by participants, weighted by energy savings, of 102.6%. Thus, based on this review of Xcel Energy as a representative utility, we determined that participant co-funding accounted for slightly more than half of the annual direct CIP-related spending. Table 12 summarizes these data.

Table 12. Annual Xcel Energy CIP Report Data

CIP Year	Energy Savings (MMBtu)	Net Participant Costs as Percentage of Total Xcel Energy CIP Spending
2010	1,407,012	108.1%
2011	1,585,699	96.1%
2012	1,398,816	105.8%
2013	1,645,826	101.3%
Total	**6,037,353**	**102.6%**

Total CIP participant co-funding increased annually from 2008 to 2010 before decreasing in 2011, then subsequently reached a maximum of more than $205 million (nominal dollars) in

2012. There was another decrease in 2013, when participants spent just over $186 million statewide. Table 13 summarizes the calculated participant co-funding (nominal $1,000s) by fuel type and year.

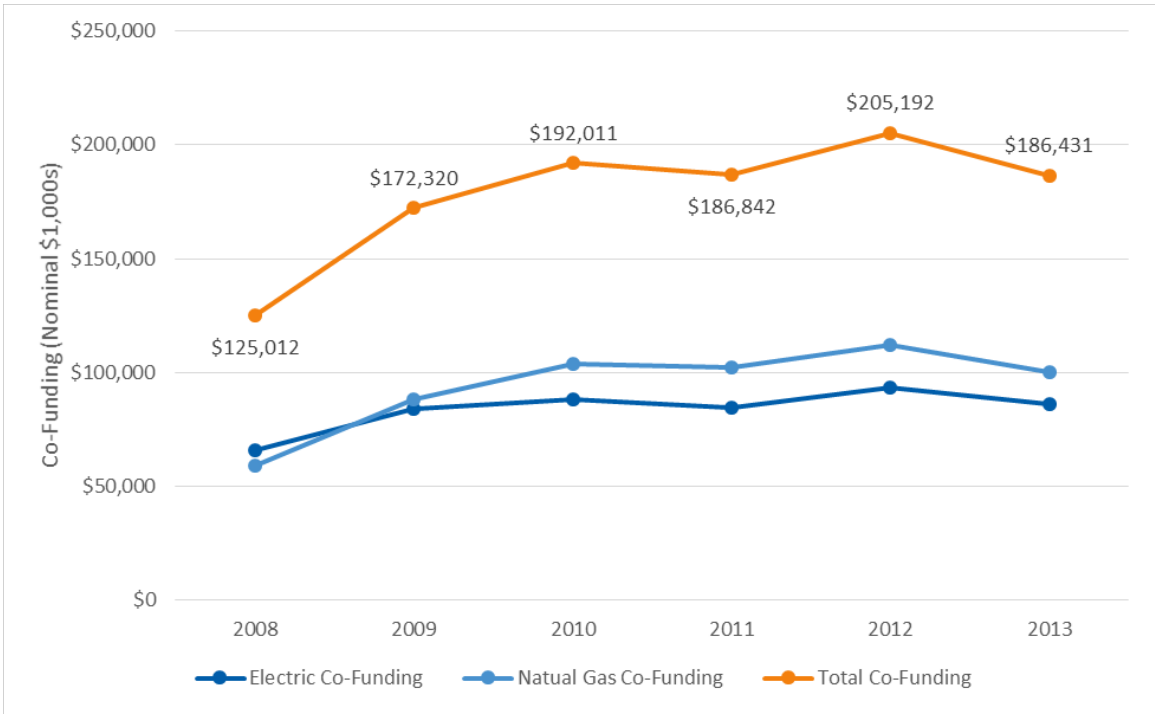
Table 13. Participant Co-Funding (Nominal $1,000s) by Fuel Type and Year

CIP Year	Electric Co-Funding	Natural Gas Co-Funding	Total Co-Funding
2008	$65,764	$59,248	$125,012
2009	$83,920	$88,400	$172,320
2010	$88,244	$103,767	$192,011
2011	$84,473	$102,368	$186,842
2012	$93,312	$111,880	$205,192
2013	$86,148	$100,283	$186,431
Total*	**$501,861**	**$565,947**	**$1,067,808**

* Values may not sum due to rounding.

Except in 2008, program participants contributed more funds to natural gas savings projects than to electricity savings projects. Figure 5 illustrates year-by-year changes in electric, natural gas, and total participant project co-funding (nominal $1,000s).

Figure 5. Participant Co-Funding (Nominal $1,000s) by Fuel Type and Year



Energy Savings

Electric and natural gas energy savings resulting from implemented program measures persist as long as those measures remain installed and operational (i.e., through the end of the measure EUL). To accurately account for all first-year and future-year energy savings attributable to CIP, Cadmus collected annual electric (kWh) and natural gas (Mcf) energy savings data, as well as

annual average EUL data, from the ESP tracking system. All EUL and energy savings data were self-reported by utilities.

Since measures are installed throughout the calendar year, Cadmus assumed that, on average, all measures installed in a given year began saving energy halfway through that year. In other words, we assumed that measures installed each year achieved 50% of annual savings in the first year and achieved 100% of annual savings in all subsequent years, through the maximum average EUL. Table 14 shows first-year, future-year, and cumulative electric (1,000s kWh) savings attributable to each CIP year from 2008-2013.

Table 14. First-Year, Future-Year, and Cumulative Electric Savings (1,000s kWh) by CIP Year

CIP Year	First-Year Savings	Future-Year Savings	Cumulative Savings
2008	284,423	6,547,144	6,831,567
2009	300,234	6,684,265	6,984,499
2010	377,462	8,270,218	8,647,680
2011	394,289	8,581,602	8,975,891
2012	368,160	8,317,029	8,685,189
2013	414,757	9,031,739	9,446,496
Total*	**2,139,325**	**47,431,996**	**49,571,321**

* Values may not sum due to rounding.

The amount of annual electric energy savings attributable to CIP activities accumulated as measures were implemented from 2008-2013, reaching a maximum of 4,234,293,493 kWh saved in 2014. Electric energy savings attributable to 2008-2013 CIP measures began to taper off thereafter, as some measures installed in 2008 reached their maximum EUL and stopped contributing to the aggregate, year-over-year savings.[13] Figure 6 shows each program years' marginal contribution to the total year-by-year electric savings persistent through 2032.

[13] All the energy savings presented in this report are attributable to CIP years 2008 through 2013; they do not include additional persistent savings attributable to earlier or later CIP years.

Figure 6. Electric Savings (1,000s kWh) Through 2032 by CIP Year

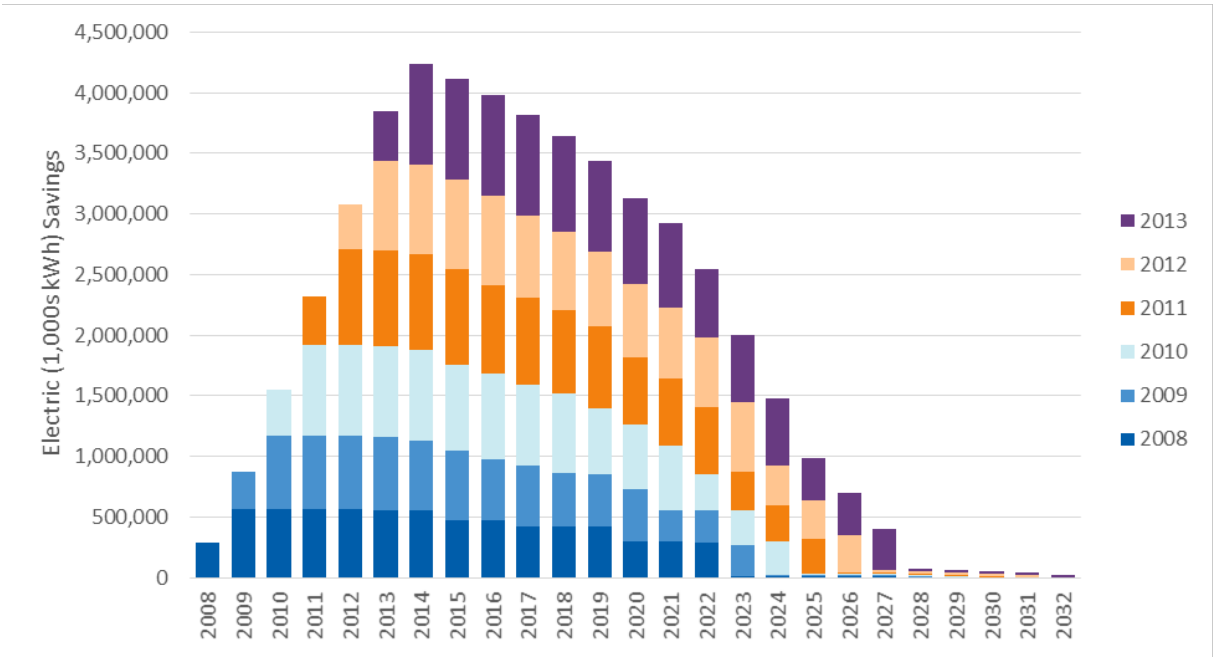


Table 15 shows first-year, future-year, and cumulative natural gas savings (1,000s Mcf) attributable to each CIP year, 2008-2013.

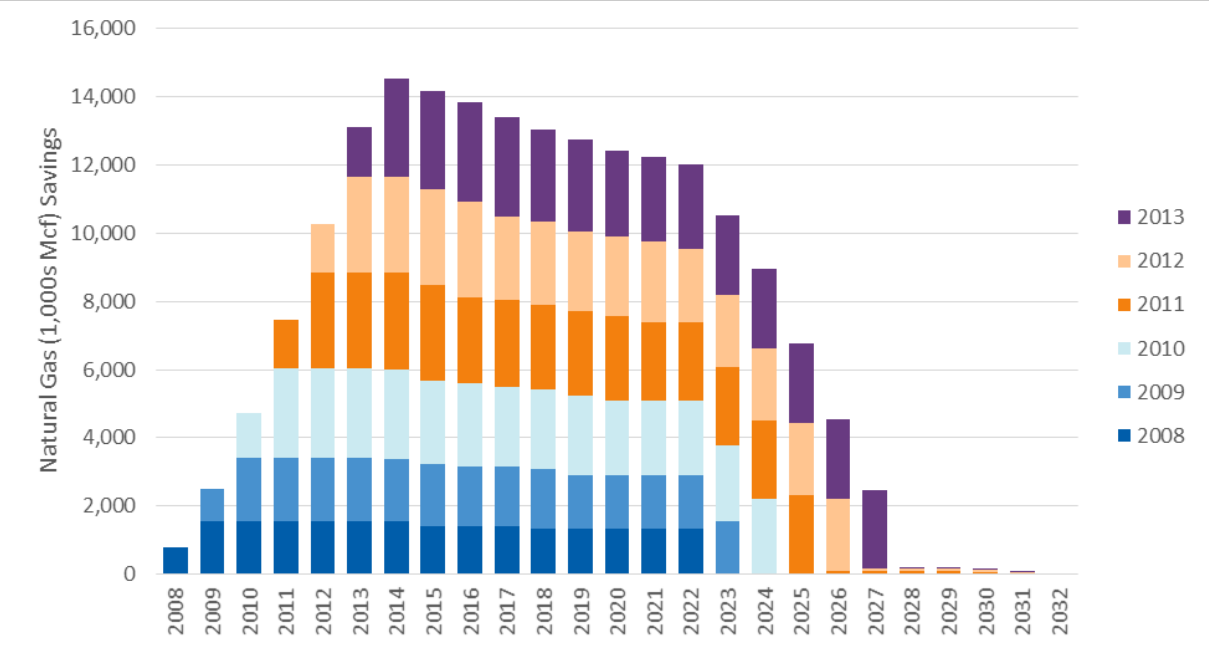
Table 15. First-Year, Future-Year, and Cumulative Natural Gas Savings (1,000s Mcf) by CIP Year

CIP Year	First-Year Savings	Future-Year Savings	Cumulative Savings
2008	779	20,221	21,001
2009	924	24,181	25,105
2010	1,315	33,383	34,698
2011	1,412	35,703	37,115
2012	1,402	34,130	35,532
2013	1,447	36,075	37,522
Total*	**7,279**	**183,693**	**190,972**

* Values may not sum due to rounding.

The amount of natural gas energy savings attributable to CIP activities accumulated as measures were implemented from 2008-2013, reaching a maximum of 14,532,647 Mcf saved in 2014, then tapering off thereafter; this tapering off effect is different for natural gas than electricity due to differences in average measure EUL. Figure 7 shows each program years' marginal contribution to the total year-by-year natural gas savings persistent through 2032.

Figure 7. Natural Gas Savings (1,000s Mcf) Through 2032 by CIP Year



Energy Bill Reductions

First-year and persistent energy savings lead to ongoing energy bill reductions, which allow CIP participants to spend less money on energy and more on other regional goods and services. Conversely, Minnesota utilities forego revenues from reduced energy sales for as long as the energy savings persist. For this analysis, Cadmus considered energy bill reductions as energy bill savings from the perspective of CIP participants, and as lost revenues from the perspective of utilities.

To accurately account for all first-year and future-year energy bill reductions, and to remain consistent with other analyses, we multiplied annual electric and natural gas energy savings by annual retail electricity (nominal dollars per kWh) and natural gas (nominal dollars per Mcf) rates used in the cost-effectiveness and CCS studies outlined above. Table 16 summarizes the annual retail electricity and natural gas rates Cadmus used for this analysis.

Table 16. Annual Retail Electricity ($/kWh) and Natural Gas ($/Mcf) Rates

Year	Retail Electricity Rate ($/kWh)	Retail Natural Gas Rate ($/Mcf)
2008	$0.0761	$8.74
2009	$0.0771	$6.34
2010	$0.0819	$6.26
2011	$0.0833	$6.22
2012	$0.0850	$5.29
2013	$0.0855	$6.15
2014	$0.0859	$6.11
2015	$0.0863	$6.08
2016	$0.0868	$6.35

Year	Retail Electricity Rate ($/kWh)	Retail Natural Gas Rate ($/Mcf)
2017	$0.0872	$6.42
2018	$0.0877	$6.52
2019	$0.0881	$6.68
2020	$0.0885	$6.79
2021	$0.0890	$6.92
2022	$0.0895	$7.06
2023	$0.0899	$7.19
2024	$0.0904	$7.33
2025	$0.0908	$7.47
2026	$0.0913	$7.62
2027	$0.0918	$7.77
2028	$0.0922	$7.92
2029	$0.0927	$8.07
2030	$0.0932	$8.22
2031	$0.0937	$8.38
2032	$0.0941	$8.55

Table 17 summarizes first-year, future-year, and cumulative electric bill reductions calculated with the UDR and SDR, presented in real program year (PY) dollars (1,000s) and attributable to each CIP year. First-year reductions are unaffected by the discount rate, but both future-year and cumulative reductions are lower when calculated with the UDR than with the SDR.

Table 17. First-Year, Future-Year, and Cumulative Electric Energy Bill Reductions (PY $1,000s) by Discount Rate and CIP Year

Discount Rate	CIP Year	First-Year Reductions	Future-Year Reductions	Cumulative Reductions
Utility	2008	$21,641	$357,670	$379,310
Utility	2009	$23,144	$374,155	$397,299
Utility	2010	$30,922	$477,047	$507,969
Utility	2011	$32,835	$498,934	$531,769
Utility	2012	$31,304	$479,272	$510,577
Utility	2013	$35,445	$527,543	$562,988
Utility	**Total***	**$175,291**	**$2,714,621**	**$2,889,912**
Societal	2008	$21,641	$417,122	$438,762
Societal	2009	$23,144	$434,359	$457,503
Societal	2010	$30,922	$588,258	$619,180
Societal	2011	$32,835	$614,748	$647,582
Societal	2012	$31,304	$594,945	$626,249
Societal	2013	$35,445	$674,384	$709,830
Societal	**Total***	**$175,291**	**$3,323,816**	**$3,499,107**

* Values may not sum due to rounding.

Similar to energy savings, the annual electric bill reductions attributable to CIP activities accumulated as electric saving measures were implemented from 2008-2013, reaching a

maximum in 2014 of $292,301,202 (as calculated with the UDR) and of $323,047,375 (as calculated with the SDR), then tapering off thereafter. Figure 8 shows each program years' marginal contribution to the total year-by-year electric bill reductions calculated with the UDR and SDR.

Figure 8. Electric Energy Bill Reductions (PY $1,000s) Through 2032 by Discount Rate and CIP Year

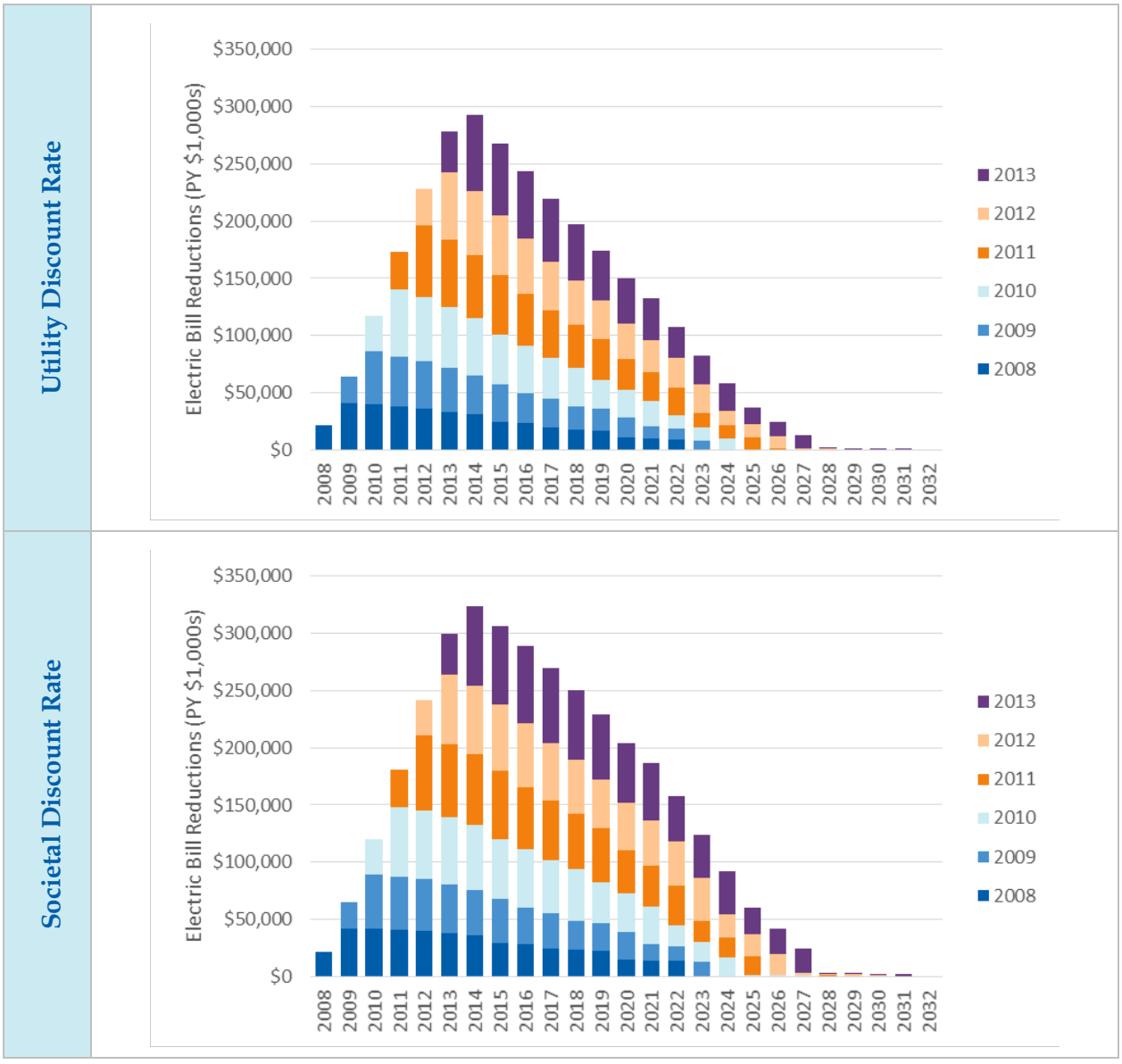


Table 18 summarizes first-year, future-year, and cumulative natural gas bill reductions calculated with the UDR and SDR, presented in real PY dollars (1,000s) and attributable to each CIP year. First-year reductions are unchanged by the discount rate, but future-year and cumulative reductions calculated with the UDR are lower than when calculated with the SDR.

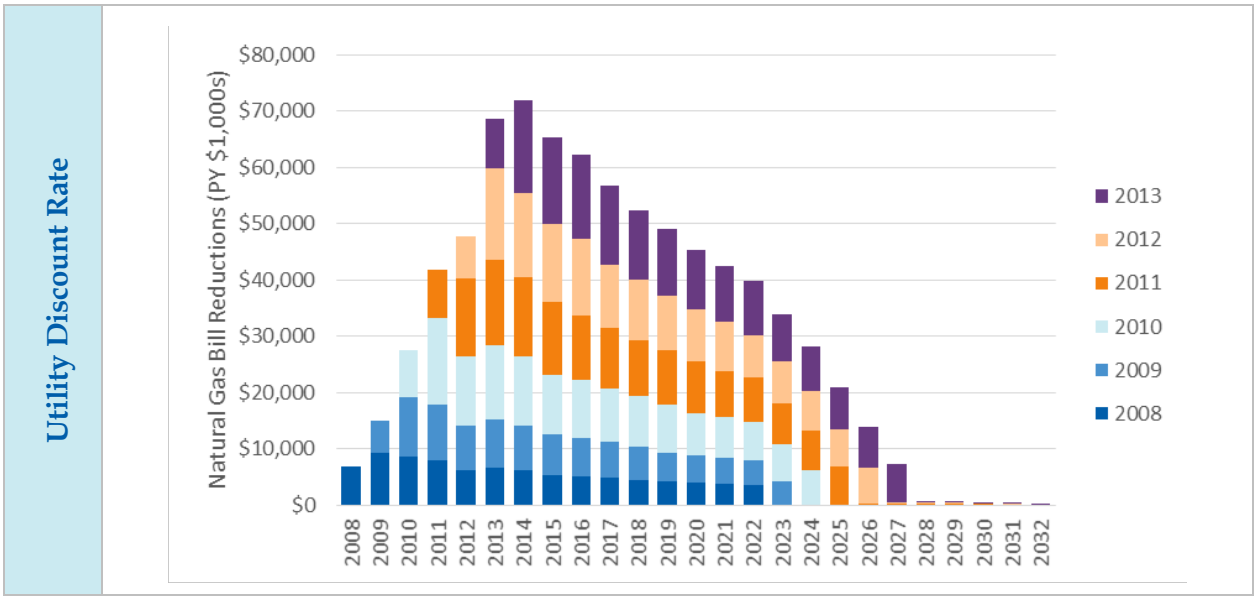
Table 18. First-Year, Future-Year, and Cumulative Natural Gas Energy Bill Reductions (PY $1,000s) by Discount Rate and CIP Year

Discount Rate	CIP Year	First-Year Reductions	Future-Year Reductions	Cumulative Reductions
Utility	2008	$6,812	$79,303	$86,115
Utility	2009	$5,857	$95,215	$101,072
Utility	2010	$8,227	$134,947	$143,174
Utility	2011	$8,784	$145,462	$154,246
Utility	2012	$7,421	$144,010	$151,431
Utility	2013	$8,898	$153,985	$162,883
Utility	**Total***	**$46,000**	**$752,921**	**$798,921**
Societal	2008	$6,812	$93,609	$100,422
Societal	2009	$5,857	$112,593	$118,449
Societal	2010	$8,227	$171,738	$179,965
Societal	2011	$8,784	$185,685	$194,469
Societal	2012	$7,421	$182,683	$190,105
Societal	2013	$8,898	$203,676	$212,574
Societal	**Total***	**$46,000**	**$949,984**	**$995,983**

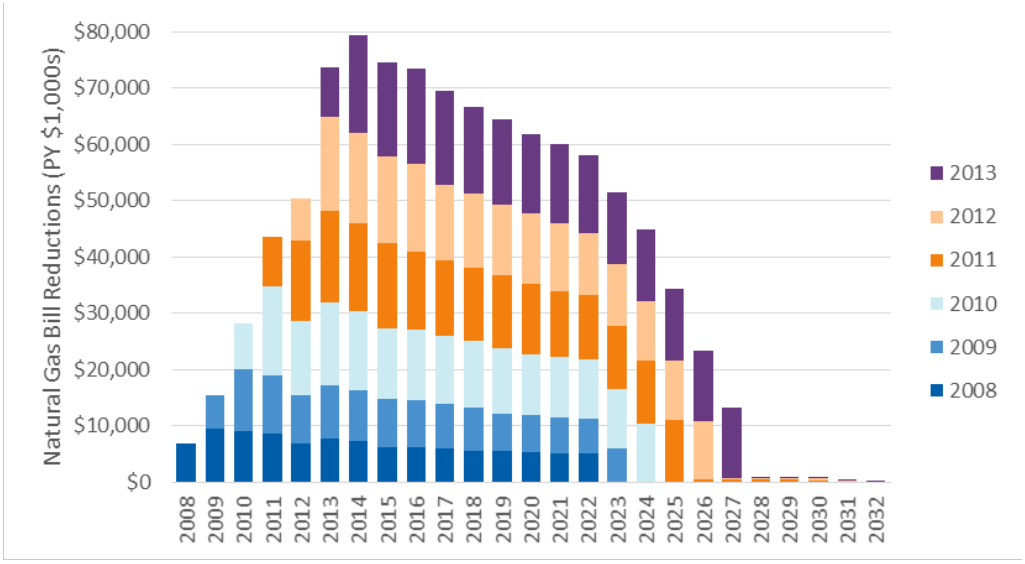
* Values may not sum due to rounding.

Similar to energy savings, the annual natural gas bill reductions attributable to CIP activities accumulated as natural gas saving measures were implemented from 2008-2013, reaching a maximum in 2014 of $71,962,483 (as calculated with the UDR) and of $79,380,499 (as calculated with the SDR), then declining thereafter (gradually at first, then at an increased rate from 2022 onward). Figure 9 shows each program years' marginal contribution to the total year-by-year natural gas energy bill reductions calculated with the UDR and SDR.

Figure 9. Natural Gas Energy Bill Reductions (PY $1,000s) Through 2032 by Discount Rate and CIP Year



Societal Discount Rate



Cadmus combined electric and natural gas bill reductions to determine total energy bill reductions. Table 19 summarizes first-year, future-year, and cumulative total energy bill reductions calculated with the UDR and SDR, presented in real PY dollars (1,000s) and attributable to each CIP year. Once again, first-year reductions are unaffected by the discount rate, but future-year and cumulative reductions are lower when calculated with the UDR than with the SDR.

Table 19. First-Year, Future-Year, and Cumulative Total Energy Bill Reductions (PY $1,000s) by Discount Rate and CIP Year

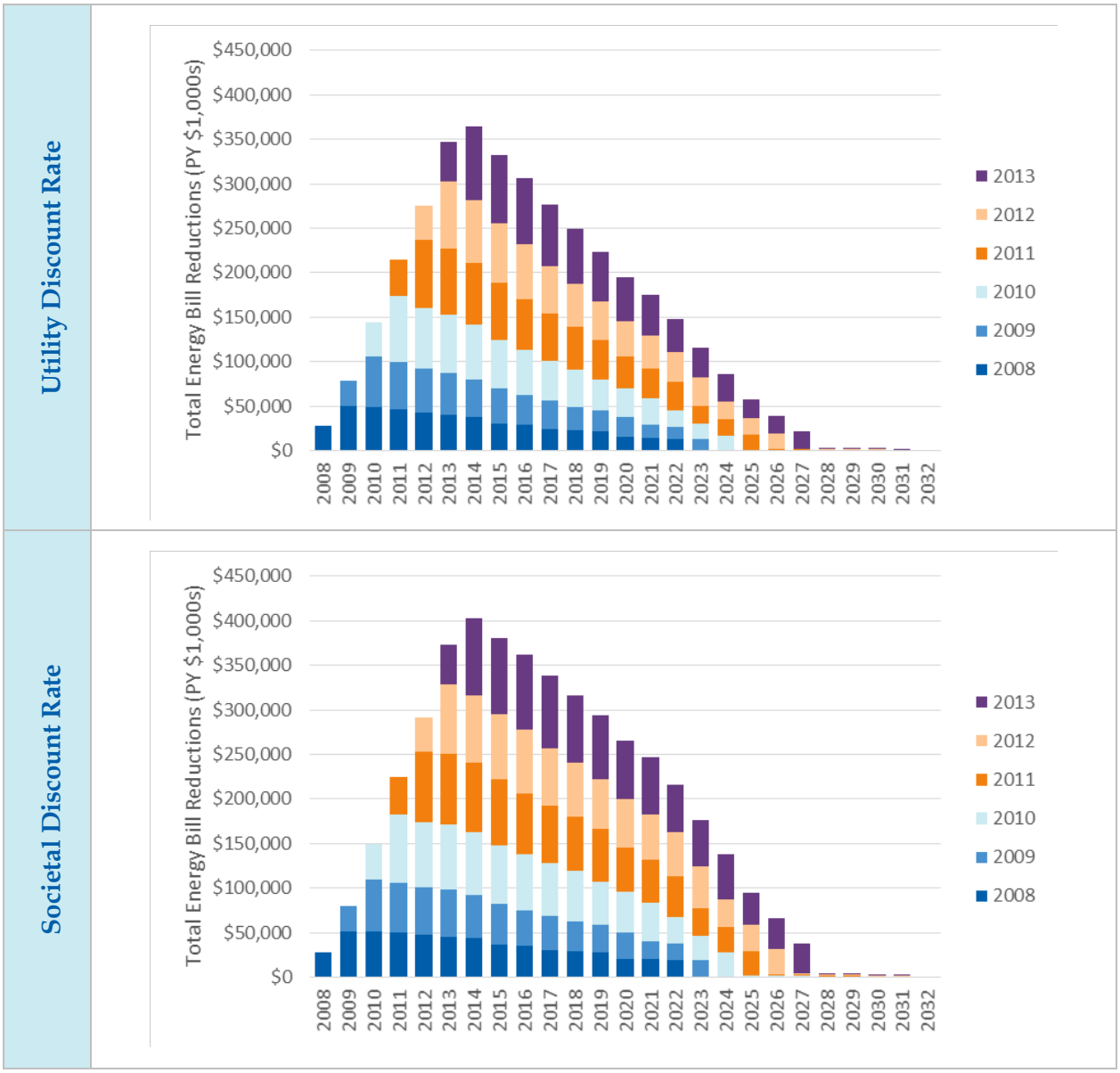
Discount Rate	CIP Year	First-Year Reductions	Future-Year Reductions	Cumulative Reductions
Utility	2008	$28,453	$436,972	$465,426
Utility	2009	$29,001	$469,370	$498,371
Utility	2010	$39,149	$611,994	$651,143
Utility	2011	$41,619	$644,396	$686,015
Utility	2012	$38,726	$623,282	$662,008
Utility	2013	$44,344	$681,528	$725,872
Utility	**Total***	**$221,291**	**$3,467,542**	**$3,688,833**
Societal	2008	$28,453	$510,731	$539,184
Societal	2009	$29,001	$546,952	$575,952
Societal	2010	$39,149	$759,996	$799,145
Societal	2011	$41,619	$800,433	$842,052
Societal	2012	$38,726	$777,628	$816,354
Societal	2013	$44,344	$878,060	$922,404
Societal	**Total***	**$221,291**	**$4,273,799**	**$4,495,090**

* Values may not sum due to rounding.

The amount of total energy bill reductions attributable to CIP activities accumulated as both electric and natural gas saving measures were implemented from 2008-2013, reaching a maximum in 2014 of $364,263,685 (as calculated with the UDR) and of $402,427,874 (as

calculated with the SDR), then diminishing annually thereafter. Figure 10 shows each program years' marginal contribution to the total year-by-year energy bill reductions (in real PY dollars) calculated with the UDR and SDR.

Figure 10. Total Energy Bill Reductions (PY $1,000s) Through 2032 by Discount Rate and CIP Year



Avoided Utility Costs

First-year and future-year energy savings also lead to ongoing avoided utility costs. As CIP participants save and therefore demand less energy and capacity, Minnesota utilities benefit from reduced fuel, purchased power, and capacity costs.

To accurately account for all first-year and future-year avoided utility costs, and to remain consistent with other analyses, Cadmus multiplied annual electric and natural gas energy

savings by composite electric energy and capacity (nominal dollars per kWh) and wholesale natural gas (nominal dollars per Mcf) costs used in the cost-effectiveness and CCS studies described above. Table 20 summarizes the annual electric and natural gas costs used in our analysis.

Table 20. Annual Composite Electric ($/kWh) and Wholesale Natural Gas ($/Mcf) Costs

Year	Composite Electric Costs ($/kWh)	Wholesale Natural Gas Costs ($/Mcf)
2008	$0.0761	$7.96
2009	$0.0730	$5.67
2010	$0.0744	$5.21
2011	$0.0761	$5.14
2012	$0.0779	$3.24
2013	$0.0809	$4.77
2014	$0.0855	$4.62
2015	$0.0875	$4.43
2016	$0.0897	$4.85
2017	$0.0924	$4.88
2018	$0.0952	$4.97
2019	$0.0987	$5.16
2020	$0.1020	$5.27
2021	$0.1045	$5.41
2022	$0.1080	$5.56
2023	$0.1120	$5.70
2024	$0.1156	$5.85
2025	$0.1182	$6.01
2026	$0.1224	$6.17
2027	$0.1265	$6.33
2028	$0.1307	$6.50
2029	$0.1352	$6.67
2030	$0.1400	$6.84
2031	$0.1445	$7.02
2032	$0.1491	$7.21

Table 21 summarizes first-year, future-year, and cumulative electric avoided costs calculated with the UDR and SDR, presented in real PY dollars (1,000s) and attributable to each CIP year. First-year avoided costs are unaffected by the discount rate adjustment, but future-year and cumulative avoided costs calculated with the UDR are lower than those calculated with the SDR.

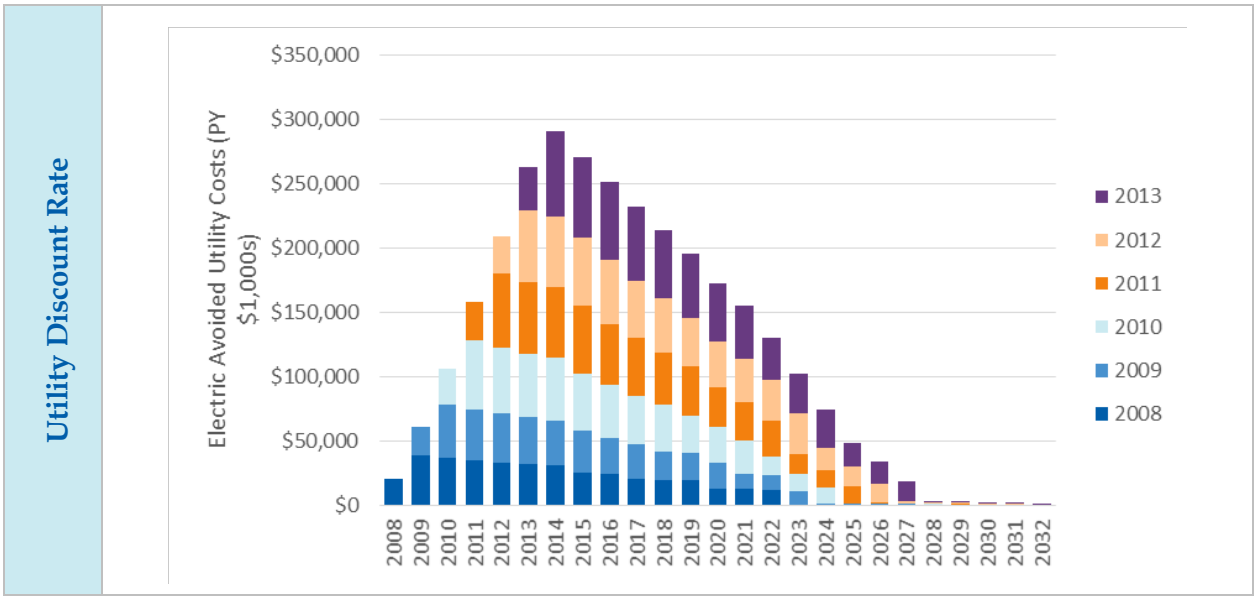
Table 21. First-Year, Future-Year, and Cumulative Electric Avoided Utility Costs (PY $1,000s) by Discount Rate and CIP Year

Discount Rate	CIP Year	First-Year Avoided Costs	Future-Year Avoided Costs	Cumulative Avoided Costs
Utility	2008	$20,367	$355,482	$375,849
Utility	2009	$21,908	$376,315	$398,223
Utility	2010	$28,066	$490,343	$518,409
Utility	2011	$30,007	$525,624	$555,631
Utility	2012	$28,676	$522,015	$550,691
Utility	2013	$33,558	$587,850	$621,407
Utility	**Total***	**$162,582**	**$2,857,628**	**$3,020,210**
Societal	2008	$20,367	$417,986	$438,353
Societal	2009	$21,908	$440,834	$462,742
Societal	2010	$28,066	$612,509	$640,575
Societal	2011	$30,007	$656,141	$686,148
Societal	2012	$28,676	$657,013	$685,689
Societal	2013	$33,558	$763,031	$796,589
Societal	**Total***	**$162,582**	**$3,547,514**	**$3,710,096**

* Values may not sum due to rounding.

Similar to both energy and bill savings, the amount of ongoing electric avoided costs attributable to CIP activities accumulated as electric saving measures were implemented from 2008-2013, reaching a maximum in 2014 of $291,011,185 (as calculated with the UDR) and of $321,621,666 (as calculated with the SDR), then decreasing each year thereafter. Figure 11 shows each program years' marginal contribution to the total year-by-year electric avoided costs calculated with the UDR and SDR.

Figure 11. Electric Avoided Utility Costs (PY $1,000s) Through 2032 by Discount Rate and CIP Year



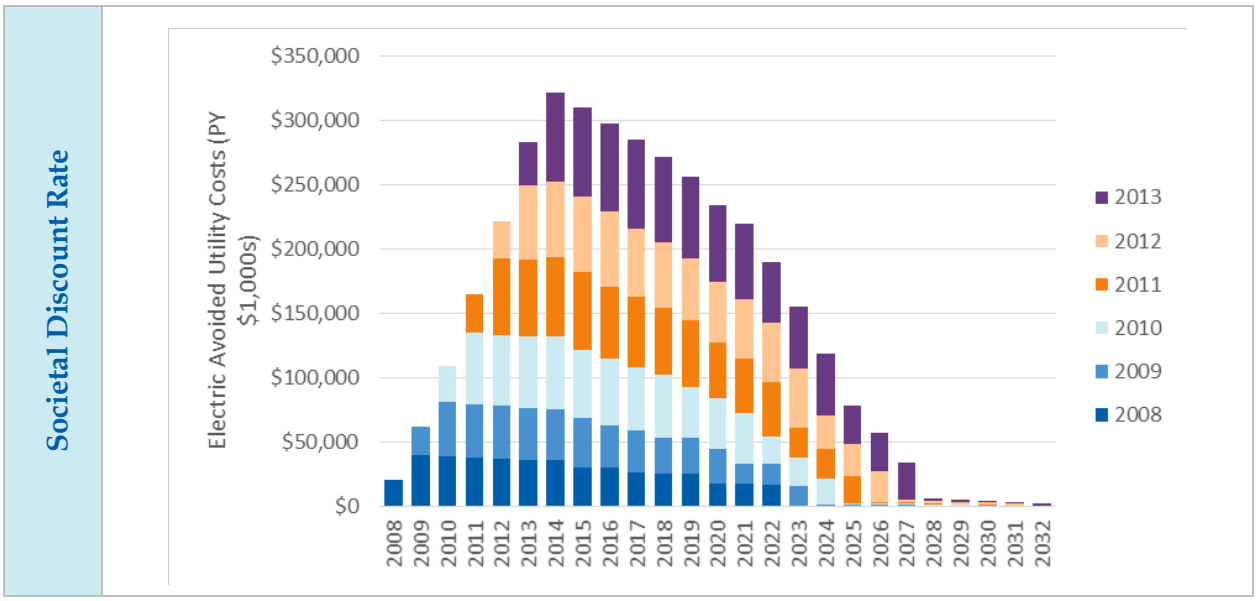


Table 22 summarizes first-year, future-year, and cumulative natural gas avoided costs calculated with the UDR and SDR, presented in real PY dollars (1,000s) and attributable to each CIP year. First-year avoided costs are not affected by the discount rate; however, both future-year and cumulative avoided costs are lower when calculated with the UDR than with the SDR.

Table 22. First-Year, Future-Year, and Cumulative Natural Gas Avoided Utility Costs (PY $1,000s) by Discount Rate and CIP Year

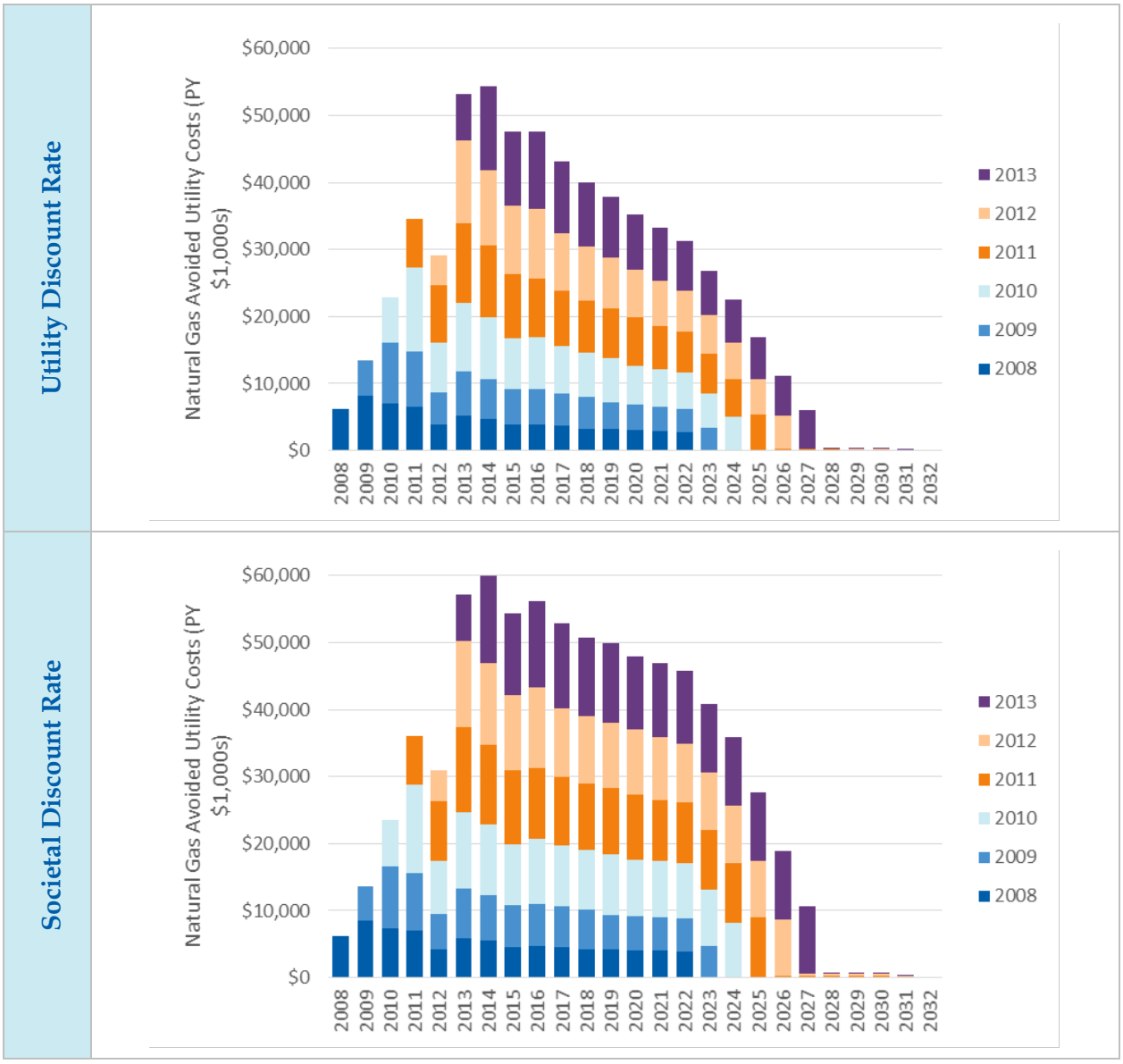
Discount Rate	CIP Year	First-Year Avoided Costs	Future-Year Avoided Costs	Cumulative Avoided Costs
Utility	2008	$6,205	$61,966	$68,171
Utility	2009	$5,239	$73,064	$78,302
Utility	2010	$6,848	$102,716	$109,564
Utility	2011	$7,257	$109,859	$117,116
Utility	2012	$4,547	$111,126	$115,673
Utility	2013	$6,902	$119,058	$125,960
Utility	**Total***	**$36,997**	**$577,788**	**$614,786**
Societal	2008	$6,205	$72,945	$79,150
Societal	2009	$5,239	$86,404	$91,642
Societal	2010	$6,848	$131,114	$137,962
Societal	2011	$7,257	$141,124	$148,381
Societal	2012	$4,547	$141,418	$145,965
Societal	2013	$6,902	$158,218	$165,119
Societal	**Total***	**$36,997**	**$731,222**	**$768,219**

* Values may not sum due to rounding.

Similar to both energy and bill savings, ongoing natural gas avoided utility costs attributable to CIP activities accumulated as natural gas saving measures were implemented from 2008-2013, reaching a maximum in 2014 of $54,342,704 (as calculated with the UDR) and of $59,944,442 (as calculated with the SDR), then declining thereafter (gradually at first, then at an increased rate from 2022 onward). The sharp decline in 2012 is attributable to relatively low wholesale natural

gas costs in that year. Figure 12 shows each program years' marginal contribution to the total year-by-year natural gas avoided costs calculated with the UDR and SDR.

Figure 12. Natural Gas Avoided Utility Costs (PY $1,000s) Through 2032 by Discount Rate and CIP Year



Cadmus combined electric and natural gas avoided utility costs to determine total avoided utility costs. Table 23 summarizes first-year, future-year, and cumulative total avoided costs calculated with the UDR and SDR, presented in real PY dollars (1,000s) and attributable to each CIP year.

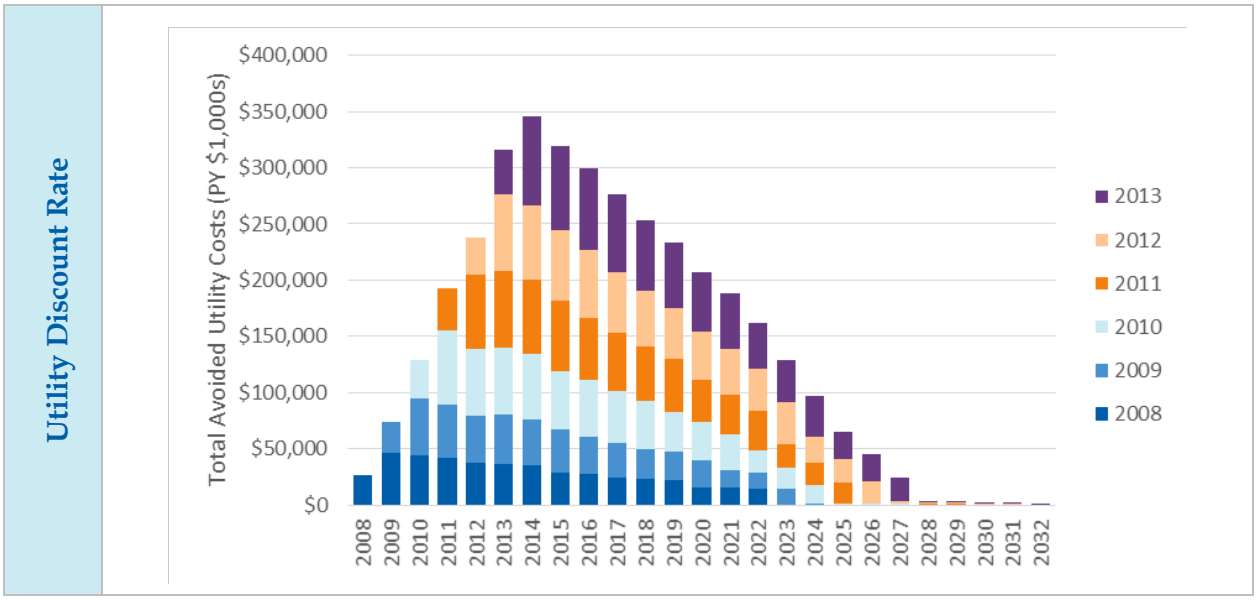
Table 23. First-Year, Future-Year, and Cumulative Total Avoided Utility Costs (PY $1,000s) by Discount Rate and CIP Year

Discount Rate	CIP Year	First-Year Avoided Costs	Future-Year Avoided Costs	Cumulative Avoided Costs
Utility	2008	$26,572	$417,447	$444,020
Utility	2009	$27,147	$449,379	$476,525
Utility	2010	$34,914	$593,058	$627,973
Utility	2011	$37,264	$635,483	$672,747
Utility	2012	$33,224	$633,141	$666,365
Utility	2013	$40,459	$706,908	$747,367
Utility	**Total***	**$199,580**	**$3,435,416**	**$3,634,996**
Societal	2008	$26,572	$490,931	$517,503
Societal	2009	$27,147	$527,237	$554,384
Societal	2010	$34,914	$743,623	$778,537
Societal	2011	$37,264	$797,265	$834,528
Societal	2012	$33,224	$798,431	$831,654
Societal	2013	$40,459	$921,249	$961,708
Societal	**Total***	**$199,580**	**$4,278,735**	**$4,478,315**

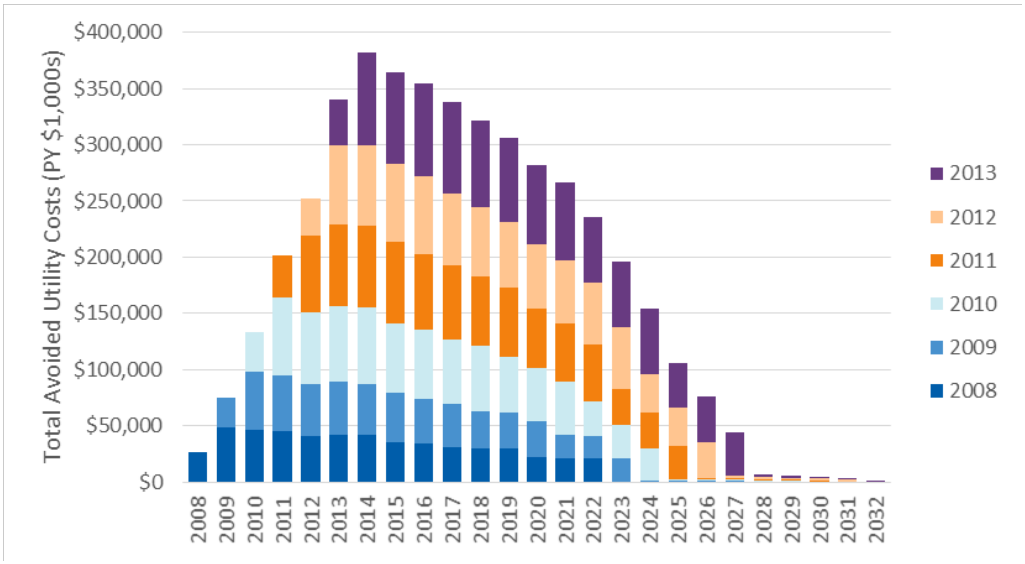
* Values may not sum due to rounding.

The amount of total avoided utility costs attributable to CIP activities accumulated as both electric and natural gas saving measures were implemented from 2008-2013, reaching a maximum in 2014 of $345,353,889 (as calculated with the UDR) and of $381,566,108 (as calculated with the SDR), then decreasing each year thereafter. Figure 13 shows each program years' marginal contribution to the total year-by-year avoided utility costs (in real PY dollars) calculated with the UDR and SDR.

Figure 13. Total Avoided Utility Costs (PY $1,000s) Through 2032 by Discount Rate and CIP Year



Societal Discount Rate



Baseline Ratepayer Expenditures

To estimate the aggregate net impacts from 2008-2013 CIP activities and ongoing energy savings, Cadmus subtracted impacts associated with hypothetical baseline cash flows from impacts associated with gross CIP-induced cash flows. We constructed the hypothetical baseline scenarios to analyze economic exchanges that would have occurred in the absence of CIP.

Without CIP, utility ratepayers would not have provided program funding through bill tariffs, and would not have provided co-funding for incented projects. Instead, Minnesota ratepayers would have spent those dollars on electric and natural gas energy. Cadmus constructed each annual baseline model scenario to estimate impacts from hypothetical household expenditures in the electric and natural gas utility sectors equivalent to the sum of program payments and participant co-funding.

As with all household income changes modeled in this study, Cadmus divided ratepayer expenditure model inputs across nine income categories based on annual population data inherent in the IMPLAN model assumptions. The annual income breakouts we used for baseline ratepayer expenditures and all other modeled changes to household income are presented in Table 24.

Table 24. Household Income Distribution by Model Year*

Income Category	2008	2009	2010	2011	2012	2013
Less than $10,000	6.8%	6.8%	6.8%	5.9%	5.9%	5.7%
$10,000 - $14,999	5.4%	5.4%	5.4%	5.1%	5.1%	4.6%
$15,000 - $24,999	11.4%	11.4%	11.4%	10.1%	10.1%	9.2%
$25,000 - $34,999	12.3%	12.3%	12.3%	10.0%	10.1%	9.5%
$35,000 - $49,999	17.0%	17.0%	17.0%	13.9%	13.9%	13.4%
$50,000 - $74,999	22.4%	22.4%	22.4%	19.7%	19.7%	19.4%
$75,000 - $99,999	12.1%	12.1%	12.1%	13.9%	13.9%	14.2%
$100,000 - $149,999	8.3%	8.3%	8.3%	13.3%	13.3%	14.6%
$150,000+	4.4%	4.4%	4.4%	8.1%	8.1%	9.4%

* Values may not sum due to rounding.

Results and Discussion of Results

In the following sections, Cadmus presents the aggregate economic impacts of combined 2008-2013 CIP-induced activities and resulting energy savings. First, we discuss the directional impacts from CIP on future electricity and natural gas rates. Then, we present gross and baseline economic impacts estimated with the IMPLAN model. Finally, we discuss the aggregate net impacts of CIP on statewide employment (i.e., job-years), employee earnings, household income and savings, business revenue, industry production, capital investment and innovation, and state domestic product.

Utility Electricity and Natural Gas Rate Impacts

Cadmus conducted a cost-effectiveness analysis of the CIP electric and natural gas program portfolios, which is outlined below along with a discussion about the directional impacts of CIP on future Minnesota electricity and natural gas retail rates.

As shown in Table 25, CIP was cost-effective each year from all test perspectives except for the RIM test, which measures the impact of programs on customer rates. Many programs do not pass the RIM test because, while energy efficiency programs lower overall costs, they also reduce the amount of energy sold (and therefore the average rates per unit of energy may rise). Also, the RIM test does not include an analysis of rate impacts from supply-side investments that would have occurred in the absence of CIP, such as building new power plants or increasing purchases of out-of-state fuel and power.

The natural gas CIP cost-effectiveness results are lower than the electric results. This is a typical industry-wide result, driven primarily by low natural gas costs. The electric CIP cost-effectiveness results are significantly higher for the 2013 portfolio than previous years for multiple reasons, including lower program and participant expenditures; increased first-year, future-year, and cumulative electric savings; and updated Commerce BENCOST guidance.

Table 25. CIP Benefit/Cost Ratios by Portfolio Fuel Type and Year

Fuel	Year	Benefit/Cost Ratio			
		Societal Cost Test	Utility Cost Test	Participant Cost Test	Ratepayer Impact Measure
Electric	2008	2.56	4.16	3.11	0.85
Electric	2009	1.92	3.13	2.54	0.79
Electric	2010	2.55	3.92	3.15	0.81
Electric	2011	2.89	4.45	3.30	0.86
Electric	2012	2.60	3.98	2.71	0.88
Electric	2013	4.01	5.17	3.59	0.92
Natural Gas	2008	2.12	3.41	3.82	0.58
Natural Gas	2009	1.97	3.10	4.50	0.53
Natural Gas	2010	1.87	2.75	3.65	0.54
Natural Gas	2011	1.89	2.77	3.28	0.54
Natural Gas	2012	1.78	2.62	3.03	0.56
Natural Gas	2013	1.99	2.84	3.22	0.57

Results from the four individual test perspectives, including program benefits, costs, and net benefits, are shown by fuel type and program year in Table 26 through Table 29. As shown in Table 26, CIP provided approximately $3.3 billion of net benefits from 2008-2013 from the SCT perspective. The overall SCT benefit/cost ratio was 2.58.

Table 26. Societal Cost Test Results

Fuel	Year	Benefits (1,000s)	Costs (1,000s)	Net Benefits (1,000s)	B/C Ratio
Electric	2008	$534,513	$208,732	$325,781	2.56
Electric	2009	$563,574	$293,796	$269,778	1.92
Electric	2010	$770,283	$302,501	$467,782	2.55
Electric	2011	$822,101	$284,704	$537,397	2.89
Electric	2012	$820,126	$315,802	$504,323	2.60
Electric	2013	$1,101,198	$274,672	$826,525	4.01
Natural Gas	2008	$80,816	$38,165	$42,651	2.12
Natural Gas	2009	$91,602	$46,533	$45,070	1.97
Natural Gas	2010	$143,498	$76,718	$66,781	1.87
Natural Gas	2011	$159,132	$84,306	$74,826	1.89
Natural Gas	2012	$159,010	$89,449	$69,561	1.78
Natural Gas	2013	$185,959	$93,526	$92,433	1.99
Total*		**$5,431,812**	**$2,108,903**	**$3,322,908**	**2.58**

* Values may not sum due to rounding.

As shown in Table 27, CIP provided approximately $3.0 billion in net benefits from 2008-2013 from the UCT perspective. The overall UCT benefit/cost ratio was 3.86.

Table 27. Utility Cost Test Results

Fuel	Year	Benefits (1,000s)	Costs (1,000s)	Net Benefits (1,000s)	B/C Ratio
Electric	2008	$429,168	$103,044	$326,124	4.16
Electric	2009	$454,422	$145,038	$309,385	3.13
Electric	2010	$585,779	$149,335	$436,444	3.92
Electric	2011	$626,142	$140,549	$485,593	4.45
Electric	2012	$620,180	$155,901	$464,279	3.98
Electric	2013	$700,723	$135,597	$565,126	5.17
Natural Gas	2008	$64,333	$18,841	$45,492	3.41
Natural Gas	2009	$71,147	$22,972	$48,175	3.10
Natural Gas	2010	$104,131	$37,873	$66,258	2.75
Natural Gas	2011	$115,094	$41,619	$73,475	2.77
Natural Gas	2012	$115,646	$44,158	$71,488	2.62
Natural Gas	2013	$131,238	$46,171	$85,068	2.84
Total*		**$4,018,003**	**$1,041,096**	**$2,976,907**	**3.86**

* Values may not sum due to rounding.

As shown in Table 28, CIP provided approximately $3.2 billion in net benefits from 2008-2013 from the PCT perspective. The overall PCT benefit/cost ratio was 3.13.

Table 28. Participant Cost Test Results

Fuel	Year	Benefits (1,000s)	Costs (1,000s)	Net Benefits (1,000s)	B/C Ratio
Electric	2008	$451,621	$145,241	$306,381	3.11
Electric	2009	$490,995	$192,961	$298,034	2.54
Electric	2010	$670,406	$212,567	$457,839	3.15
Electric	2011	$692,705	$209,803	$482,901	3.30
Electric	2012	$648,287	$239,633	$408,654	2.71
Electric	2013	$738,449	$205,638	$532,811	3.59
Natural Gas	2008	$104,010	$27,200	$76,810	3.82
Natural Gas	2009	$118,646	$26,342	$92,304	4.50
Natural Gas	2010	$172,293	$47,159	$125,134	3.65
Natural Gas	2011	$204,152	$62,260	$141,892	3.28
Natural Gas	2012	$197,671	$65,141	$132,530	3.03
Natural Gas	2013	$221,141	$68,597	$152,544	3.22
Total*		**$4,710,377**	**$1,502,542**	**$3,207,836**	**3.13**

* Values may not sum due to rounding.

Finally, as shown in Table 29, CIPs resulted in approximately $1 billion dollars of net revenue decline for the utilities due to the 2008-2013 programs, as measured by the RIM test perspective. This translates to an upward pressure on rates of approximately $0.000705/kWh and $0.00749/therm. The RIM test does not include an estimate of impacts on rates that would have occurred in the absence of CIP, in which utilities would invest ratepayer funds in supply-side resources (such as new power plants or increased purchases of out-of-state power and fuel). The overall RIM test benefit/cost ratio was 0.79.

Table 29. Ratepayer Impact Measure Results

Fuel	Year	Benefits (1,000s)	Costs (1,000s)	Net Benefits (1,000s)	B/C Ratio
Electric	2008	$429,168	$503,963	-$74,795	0.85
Electric	2009	$454,422	$576,788	-$122,366	0.79
Electric	2010	$585,779	$721,830	-$136,051	0.81
Electric	2011	$626,142	$731,168	-$105,026	0.86
Electric	2012	$620,180	$700,981	-$80,801	0.88
Electric	2013	$700,723	$762,543	-$61,820	0.92
Natural Gas	2008	$64,333	$111,768	-$47,435	0.58
Natural Gas	2009	$71,147	$133,318	-$62,171	0.53
Natural Gas	2010	$104,131	$191,492	-$87,361	0.54
Natural Gas	2011	$115,094	$211,270	-$96,176	0.54
Natural Gas	2012	$115,646	$207,658	-$92,012	0.56
Natural Gas	2013	$131,238	$228,328	-$97,090	0.57
Total*		**$4,018,003**	**$5,081,108**	**-$1,063,105**	**0.79**

* Values may not sum due to rounding.

CIP was cost-effective from all test perspectives except for the RIM test for all years from 2008 through 2013. The findings from the RIM test perspective suggest a slight upward pressure on future electric and natural gas retail rates of approximately $0.000705 per kWh and $0.00749 per

therm. Many programs do not pass the RIM test because, while energy efficiency programs reduce costs, they also reduce energy sales. As a result, the average rate per unit of energy may increase. A passing RIM test indicates that rates, as well as costs, will go down as a result of the program. Typically, this only happens for demand response programs or programs that are targeted to the highest marginal cost hours (when marginal costs are greater than rates).

CIP was cost-effective from all other test perspectives, reflecting that large net benefits accrue to society, as well as to participants and utilities engaged in the program.

Based on the SCT, total net benefits to society were approximately $3.3 billion, with each program year providing net electric and natural gas benefits to society ranging from $315 million to $919 million. In other words, the total benefit to society from avoided utility costs and avoided environmental damage was $3.3 billion greater than the total costs from program administration and participant project spending.

Based on the PCT, total net participant benefits were approximately $3.2 billion, with each program year contributing net electric and natural gas benefits ranging from $383 million to $685 million. The total benefit to participants from incentives received and ongoing bill savings was $3.2 billion greater than the total cost to participants from project spending.

Finally, based on the UCT, utilities' total net benefits were approximately $2.9 billion dollars, with net electric and natural gas benefits in each program year ranging from $357 million to $650 million. The total benefit to utilities from avoided energy and capacity costs was $2.9 billion greater than the total cost to utilities from program administration, participant incentives, and ongoing revenue losses.

Aggregate Economic Impacts

The following sections present the aggregate gross, baseline, and net statewide economic impacts attributable to CIP and hypothetical baseline ratepayer expenditures. Cadmus calculated all monetary impacts with both the SDR and UDR to illustrate upper- and lower-bound estimates, respectively.

Aggregate gross, baseline, and net statewide impacts attributable to individual program years are presented by discount rate (i.e., societal and utility) in Appendix A: Total Economic Impact of CIP Activities by Program Year.

Aggregate Gross Economic Impacts

This section's text, tables, and figures summarize aggregate statewide gross impacts from 2008-2013 CIP activities, as well as from resulting energy bill reductions and avoided utility costs that persist through 2032. All employment impacts are presented as job-years, and all other impacts are presented in fixed 2013 dollars (1,000s).

Table 30 shows the aggregate gross direct, indirect, induced, and total effect on statewide employment, labor income, value added, and output attributable to CIP, by discount rate.

Table 30. 2008-2013 Aggregate Gross CIP Impact on Key Economic Indicators, by Discount Rate

Discount Rate	Effect	Key Economic Indicator			
		Employment	Labor Income	Value Added	Output
Utility	Direct	11,141	$806,535	$980,876	$1,778,666
Utility	Indirect	4,513	$241,231	$389,473	$690,083
Utility	Induced	28,548	$943,970	$1,668,504	$2,826,523
Utility	**Total***	**44,202**	**$1,991,736**	**$3,038,853**	**$5,295,272**
Societal	Direct	11,141	$814,838	$1,012,085	$1,815,568
Societal	Indirect	4,513	$245,214	$399,687	$707,612
Societal	Induced	28,548	$1,262,889	$2,231,103	$3,780,029
Societal	**Total***	**44,202**	**$2,322,941**	**$3,642,875**	**$6,303,208**

* Values may not sum due to rounding.

As shown in Figure 14, Cadmus determined an aggregate gross CIP impact on statewide employment of 44,202 job-years. The discount rate has no effect on estimated employment impacts; thus, there is no difference in employment effects between discount rate scenarios. Approximately 11,141 job-years—about 25% of the total, gross CIP impact on Minnesota employment—come from direct effects. The remaining 75% come from predicted indirect (4,513 job-years) and induced (28,548 job-years) effects.

Figure 14. 2008-2013 Aggregate Gross CIP Impact on Employment (Job-Years)

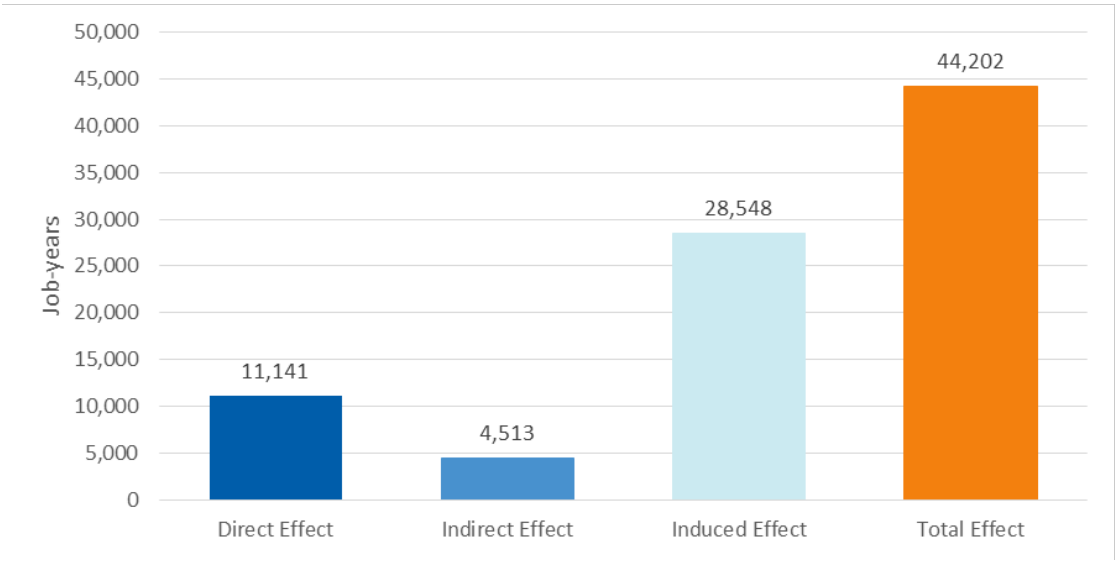


Table 31 presents the aggregate gross direct, indirect, induced, and total effects attributable to CIP on statewide employee compensation and proprietor income, which together equal labor income, by discount rate.

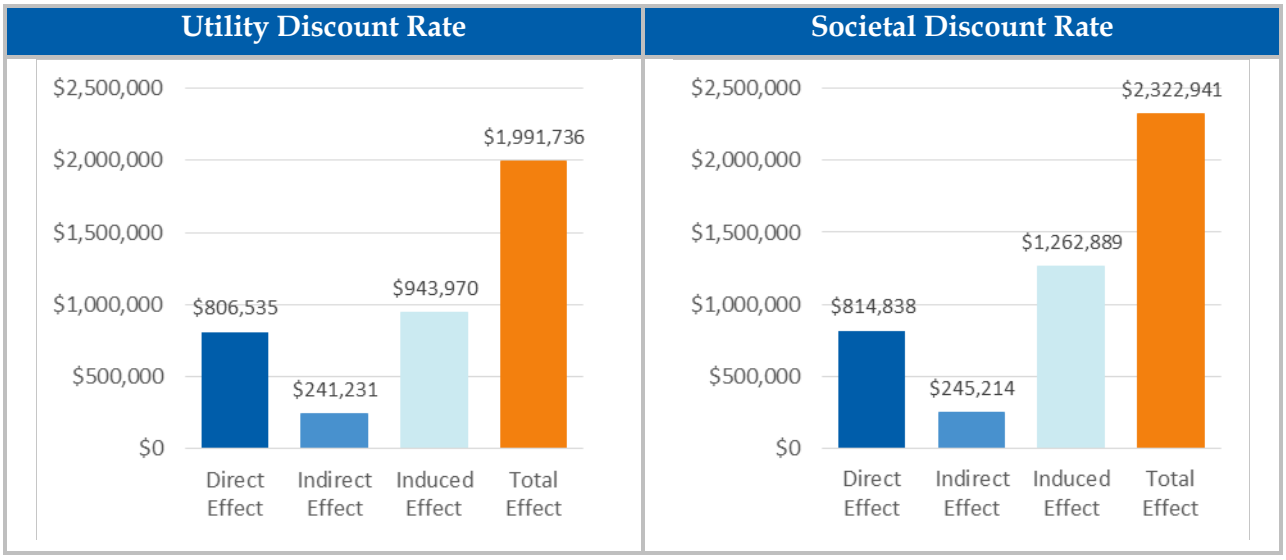
Table 31. 2008-2013 Aggregate Gross CIP Impact on Employee Compensation and Proprietor Income (2013 $1,000s), by Discount Rate

Discount Rate	Effect	Employee Compensation	Proprietor Income	Labor Income
Utility	Direct	$667,797	$138,738	$806,535
Utility	Indirect	$210,142	$31,089	$241,231
Utility	Induced	$843,268	$100,702	$943,970
Utility	**Total***	**$1,721,207**	**$270,529**	**$1,991,736**
Societal	Direct	$675,658	$139,179	$814,838
Societal	Indirect	$213,669	$31,546	$245,214
Societal	Induced	$1,127,949	$134,940	$1,262,889
Societal	**Total***	**$2,017,276**	**$305,665**	**$2,322,941**

* Values may not sum due to rounding.

As illustrated in Figure 15, Cadmus determined an aggregate gross CIP impact on statewide labor income of $1,992 million to $2,323 million (2013 dollars). The discount rate has little influence on direct and indirect effects. Induced effects, which are predicted by the model and differ mainly as a result of discount rates applied to future-year energy bill and utility cost impacts, primarily cause the difference in total effects on statewide labor income between discount rate scenarios. The UDR scenario led to an estimated $807 million (2013 dollars) direct effect on statewide labor income. The UDR scenario led to predicted indirect and induced effects of about $241 million and $944 million, respectively. Approximately $814 million—or about 35% of the SDR scenario's total, gross CIP effect on aggregate statewide labor income—comes from direct effects. The remaining 65% comes from predicted indirect ($245 million) and induced ($1,263 million) effects.

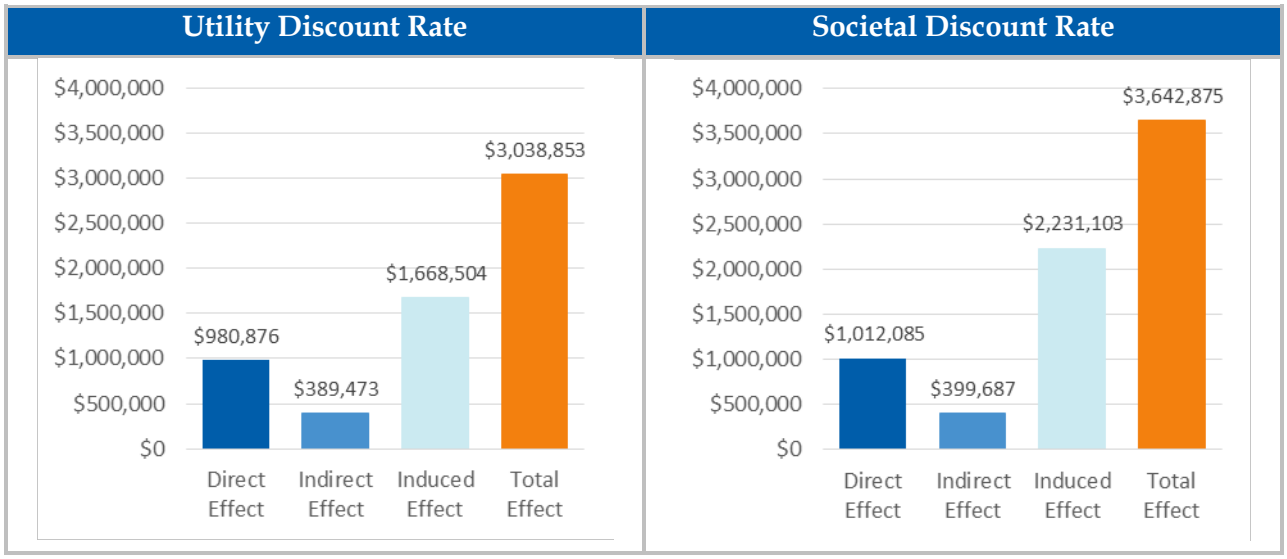
Figure 15. 2008-2013 Aggregate Gross CIP Impact on Labor Income (2013 $1,000s), by Discount Rate



As Figure 16 shows, Cadmus determined an aggregate gross CIP impact on statewide value added of $3,039 million to $3,643 million (2013 dollars). The selected discount rate has some minor influence on direct and indirect effects. Induced effects, which are predicted by the model

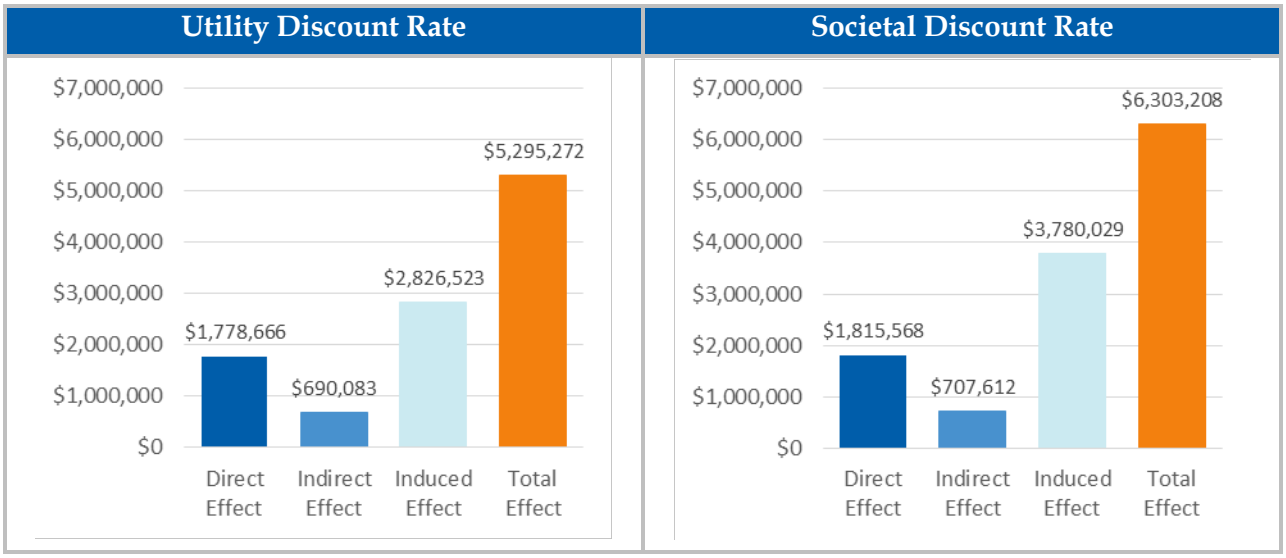
and differ mostly as a result of how future-year bill reductions and avoided utility costs are discounted, largely define the difference in total effects between discount rate scenarios. Approximately $981 million—or about 32% of the UDR scenario's aggregate gross CIP impact on statewide value added—results from direct effects. The remaining 68% comes from predicted indirect ($389 million) and induced ($1,669 million) effects. Meanwhile, around $1,012 million—or roughly 28% of the SDR scenario's aggregate gross CIP impact on Minnesota value added—results from direct effects. The remaining 72% comes from predicted indirect ($400 million) and induced ($2,231 million) effects.

Figure 16. 2008-2013 Aggregate Gross CIP Impact on Value Added (2013 $1,000s), by Discount Rate



As shown in Figure 17, Cadmus determined an aggregate gross CIP impact on statewide output of $5,295 million to $6,303 million (2013 dollars). The chosen discount rate has a minor influence on direct and indirect effects. Induced effects, which are predicted by the model and differ mainly as a result of discounted future-year impacts, predominantly determine the difference in total effects between discount rate scenarios. Approximately $1,779 million—or about 34% of the UDR scenario's aggregate gross CIP impact on Minnesota output—comes from direct effects. The remaining 66% comes from predicted indirect ($690 million) and induced ($2,827 million) effects. Meanwhile, $1,816 million—only about 29% of the SDR scenario's aggregate gross CIP impact on statewide output—comes from direct effects. The remaining 71% comes from predicted indirect ($708 million) and induced ($3,780 million) effects.

Figure 17. 2008-2013 Aggregate Gross CIP Impact on Output (2013 $1,000s), by Discount Rate



Aggregate Baseline Economic Impacts

The tables below present the effects attributable to combined 2008-2013 baseline ratepayer expenditures. Cadmus modeled the hypothetical baseline ratepayer expenditures as first-year impacts, which are therefore unaffected by the selected discount rate. All employment impacts are presented as job-years, and all monetary impacts are presented in fixed 2013 dollars (1,000s).

Table 32 shows the aggregate direct, indirect, induced, and total effects on statewide employment, labor income, value added, and output attributable to combined 2008-2013 baseline ratepayer expenditures. Since we modeled hypothetical baseline ratepayer expenditures as Minnesota household payments for energy, IMPLAN predicted positive direct and indirect effects attributable to increased demand for local utility services and factor inputs from the utility sector supply chain. IMPLAN also predicted negative induced effects attributable mainly to decreased spending of household income on non-energy goods and services. Non-energy goods and services are typically produced locally relative to the goods and services produced by the utility sector supply chain, such as extracted and transmitted power or fuel, that are located outside Minnesota.

When estimating these effects, IMPLAN accounted for leakages out of the Minnesota economy; these leakages occur due to the location of utility sector supply chain resources and because Minnesota utilities meet a portion of local energy demand with fuel and power purchased from other states. Aggregate baseline scenario impacts on employment and labor income were negative, while aggregate baseline scenario impacts on value added and output were positive.

Table 32. 2008-2013 Aggregate Baseline Ratepayer Expenditure Impact on Key Economic Indicators

Impact Type	Key Economic Indicator			
	Employment	Labor Income	Value Added	Output
Direct Effect	2,737	$332,394	$1,040,459	$2,021,046
Indirect Effect	2,007	$114,662	$201,573	$380,407
Induced Effect	-15,318	-$679,604	-$1,203,599	-$2,035,815
Total Effect*	**-10,574**	**-$232,548**	**$38,433**	**$365,637**

* Values may not sum due to rounding.

Table 33 presents the aggregate direct, indirect, induced, and total effects on Minnesota employee compensation and proprietor income, which together equal labor income, attributable to combined 2008-2013 baseline ratepayer expenditures. IMPLAN predicted induced effects mainly from modeled decreases in household income.

Table 33. 2008-2013 Aggregate Baseline Ratepayer Expenditure Impact on Employee Compensation and Proprietor Income

Impact Type	Employee Compensation	Proprietor Income	Labor Income
Direct Effect	$316,662	$15,732	$332,394
Indirect Effect	$97,721	$16,941	$114,662
Induced Effect	-$607,522	-$72,082	-$679,604
Total Effect*	**-$193,140**	**-$39,409**	**-$232,548**

* Values may not sum due to rounding.

Aggregate Net Economic Impacts

Cadmus determined the aggregate net statewide economic impact from CIP by subtracting hypothetical baseline scenario effects from gross program scenario effects. The hypothetical baseline scenario estimated positive direct and indirect effects from the increased demand for energy, and negative induced effects mainly attributable to ratepayer expenditures of household income. As a result, all net direct and indirect effects are lower than gross direct and indirect effects; conversely, all net induced effects are greater than gross induced effects. Since IMPLAN is a static model, the findings presented in this section do not account for future dynamic changes in the Minnesota economy.

The tables and figures in this section present the summary- and sector-level aggregate net impact from 2008-2013 CIP activities, as well as from resulting energy bill reductions and avoided utility costs that persist through 2032. The aggregate net impact of CIP is presented according to direct, indirect, induced, and total effects. All employment effects are presented as job-years, and all other effects are presented in 2013 dollars (1,000s).

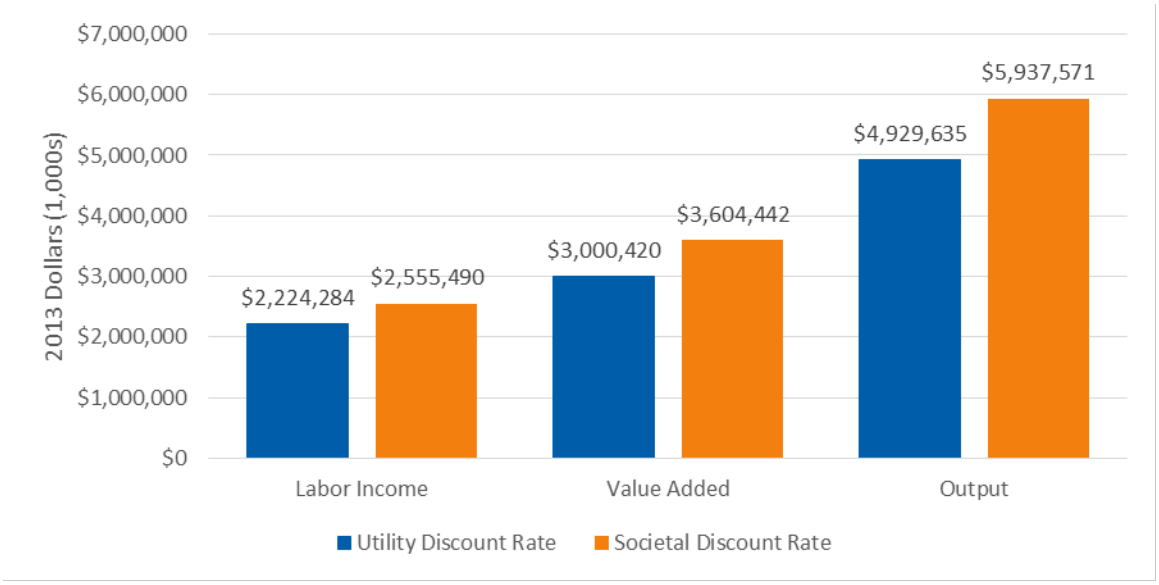
Table 34 shows the net direct, indirect, induced, and total effects on employment, labor income, value added, and output attributable to CIP, by discount rate. Employment effects are unaffected by the discount rate. Figure 18 illustrates the aggregate net impact on all monetary variables, by discount rate. The UDR scenario illustrates a lower-bound estimate of the aggregate impact accruing from 2008 to 2032, while the SDR scenario demonstrates an upper-bound estimate.

Table 34. 2008-2013 Aggregate Net CIP Impact on Key Economic Indicators, by Discount Rate

Discount Rate	Effect	Key Economic Indicator			
		Employment	Labor Income	Value Added	Output
Utility	Direct	8,404	$474,141	-$59,583	-$242,379
Utility	Indirect	2,506	$126,569	$187,900	$309,677
Utility	Induced	43,866	$1,623,575	$2,872,103	$4,862,337
Utility	**Total***	**54,777**	**$2,224,284**	**$3,000,420**	**$4,929,635**
Societal	Direct	8,404	$482,444	-$28,374	-$205,477
Societal	Indirect	2,506	$130,552	$198,114	$327,205
Societal	Induced	43,866	$1,942,493	$3,434,702	$5,815,843
Societal	**Total***	**54,777**	**$2,555,490**	**$3,604,442**	**$5,937,571**

* Values may not sum due to rounding.

Figure 18. 2008-2013 Aggregate Net CIP Impact on Labor Income, Value Added, and Output by Discount Rate

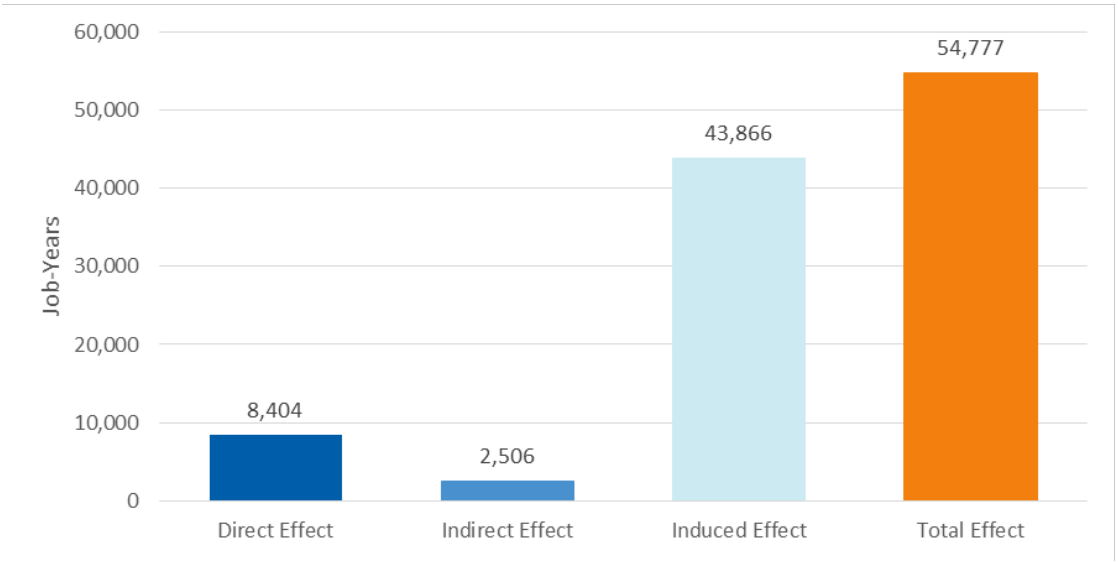


Aggregate Net Impact on Employment

To determine the aggregate net CIP impact on Minnesota job creation, Cadmus analyzed summary- and sector-level effects on IMPLAN's employment indicator variable, which represents job-year impacts.

As shown in Figure 19, Cadmus determined an aggregate net impact on statewide job creation of 54,777 job-years. We estimated a net direct effect of 8,404 job-years, a net indirect effect of 2,506 job-years, and a net induced effect of 43,866 job-years. The discount rate has no influence on employment effects.

Figure 19. 2008-2013 Aggregate Net CIP Impact on Employment (Job-Years)



Cadmus further analyzed the aggregate net job creation impact at the sector level. Specifically, Cadmus determined employment effects according to nine sector categories: (1) agriculture or forestry; (2) construction; (3) government; (4) industrial; (5) manufacturing; (6) retail trade; (7) service; (8) utilities; and (9) wholesale trade. As shown in Table 35, the service, retail trade, manufacturing, construction, and wholesale trade sector categories benefit substantially from aggregate net CIP-induced job creation. These positive employment effects result from direct CIP spending, as well as employee and household expenditures of newfound money.

Meanwhile, CIP had a negative aggregate net impact on statewide employment in the industrial and utility sector categories, primarily because CIP incented households to spend less on local energy services and energy supply chain resources. Specific sectors that experienced negative net employment impacts include electric and natural gas utilities, turbine manufacturing, engine parts manufacturing, fossil fuel extraction, commercial rail transportation, pipeline transportation, and commercial railroad stock manufacturing. In aggregate, the positive statewide employment effects outweigh the negative effects, and thus catalyze additional positive economic activity within Minnesota.

Table 35. 2008-2013 Aggregate Net CIP Impact on Employment (Job-Years), by Sector Category and Discount Rate

Sector Category	Employment (Job-Years)
Agriculture or Forestry	198
Construction	2,228
Government	605
Industrial	-56
Manufacturing	2,865
Retail Trade	8,077
Service	41,823
Utilities	-2,527
Wholesale Trade	1,565

Aggregate Net Impact on Household Income and Employee Earnings

To determine the aggregate net impact on Minnesota household income, which encompasses employee earnings and proprietor income, Cadmus analyzed modeled effects on IMPLAN's labor income indicator variable. To determine the aggregate net impact on statewide employee earnings, Cadmus separately investigated summary- and sector-level effects only on the employee compensation variable.

Table 36 presents the aggregate net direct, indirect, induced, and total effects on Minnesota employee compensation and proprietor income, which together equal labor income, by discount rate.

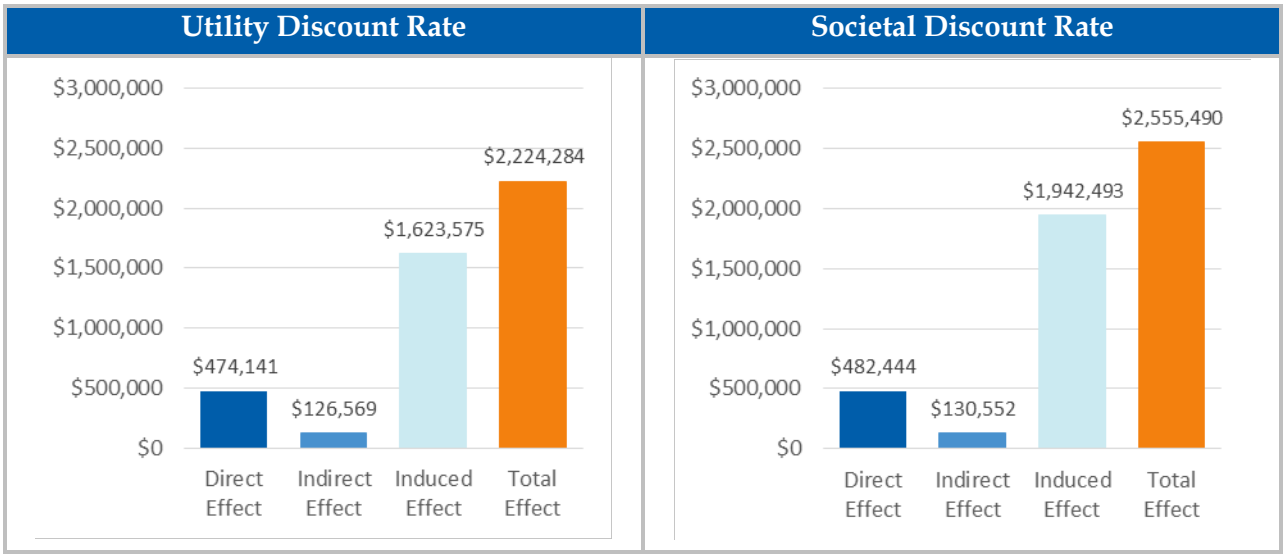
Table 36. 2008-2013 Aggregate Net CIP Impact on Employee Compensation and Proprietor Income (2013 $1,000s), by Discount Rate

Discount Rate	Effect	Employee Compensation	Proprietor Income	Labor Income
Utility	Direct	$351,135	$123,006	$474,141
Utility	Indirect	$112,421	$14,147	$126,569
Utility	Induced	$1,450,791	$172,784	$1,623,575
Utility	**Total***	**$1,914,347**	**$309,937**	**$2,224,284**
Societal	Direct	$358,997	$123,447	$482,444
Societal	Indirect	$115,948	$14,605	$130,552
Societal	Induced	$1,735,472	$207,022	$1,942,493
Societal	**Total***	**$2,210,416**	**$345,074**	**$2,555,490**

* Values may not sum due to rounding.

As shown in Figure 20, Cadmus determined an aggregate net CIP impact on statewide household income of $2,224,284,368 to $2,555,489,711. We estimated a direct net CIP effect of $474,140,907 to $482,444,022. The discount rate has a minimal influence on direct and indirect effects. Induced effects, which are predicted by the model and differ mainly as a result of discounted future-year energy bill savings, primarily create the difference in total effects on statewide household income between discount rate scenarios. Using the UDR, Cadmus estimated an induced net effect of $1,623,574,665, while the SDR scenario led to an estimated induced net effect of $1,942,493,308.

Figure 20. 2008-2013 Aggregate Net CIP Impact on Household Income (2013 $1,000s), by Discount Rate



Cadmus further analyzed aggregate net household income effects according to the nine sector categories listed above. As shown in Table 37, regardless of the selected discount rate, the service, retail trade, manufacturing, construction, and wholesale trade sector categories benefit substantially from CIP-induced changes in household income. CIP had a smaller negative net impact on statewide household income in the utility and industrial sector categories, which directly reflects the fewer number of jobs in utility and related industrial sectors resulting from decreases in local energy demand. Sectors that experienced negative net household income impacts include electric and natural gas utilities, turbine and engine parts manufacturing, fossil fuel extraction, commercial rail and pipeline transportation, and commercial railroad stock manufacturing.

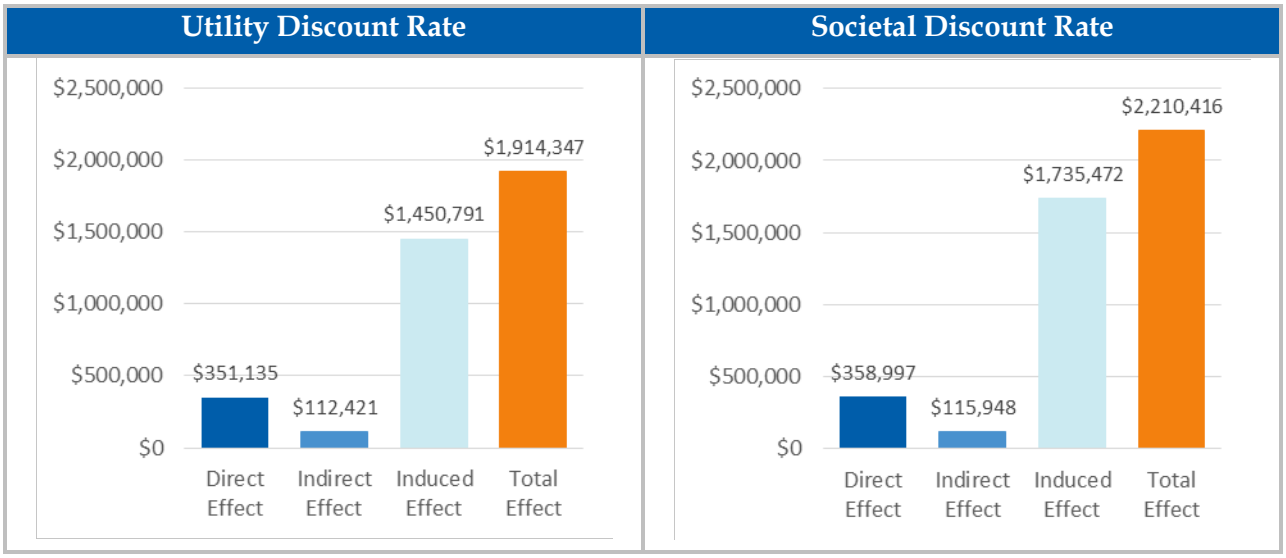
Table 37. 2008-2013 Aggregate Net CIP Impact on Household Income (2013 $1,000s), by Sector Category and Discount Rate

Sector Category	Household Income (2013 $1,000s)	
	Utility Discount Rate	Societal Discount Rate
Agriculture or Forestry	$10,597	$12,696
Construction	$135,958	$140,651
Government	$38,397	$44,920
Industrial	-$1,087	-$979
Manufacturing	$197,457	$207,045
Retail Trade	$197,748	$234,513
Service	$1,836,270	$2,075,058
Utilities	-$311,152	-$297,309
Wholesale Trade	$120,279	$139,105

As shown in Figure 21, Cadmus determined an aggregate net CIP impact on employee earnings of $1,914,346,935 to $2,210,416,023. We estimated a direct net CIP effect—resulting mainly from 2008-2013 expenditures on trade ally goods and services and future-year changes in the demand for energy supply—of $351,135,102 to $358,996,830 (2013 dollars). The UDR scenario led to an

estimated induced net effect of $1,450,790,503, while the SDR scenario led to an estimated induced net effect of $1,735,471,608.

Figure 21. 2008-2013 Aggregate Net CIP Impact on Employee Earnings (2013 $1,000s), by Discount Rate



Cadmus also analyzed the aggregate net impact on statewide employee earnings by sector category. As shown in Table 38, for both discount rate scenarios, the service, retail trade, manufacturing, and wholesale trade sector categories benefit the most from CIP-induced changes in household income. The construction, government, agriculture or forestry, and industrial sector categories also benefit from increased employee earnings. However, CIP negatively impacted statewide employee earnings in the utility sector category; again, this negative impact is primarily due to the decreased local demand for energy resulting from CIP activities and impacts specific sectors such as electricity and natural gas utilities and fossil fuel extraction.

Table 38. 2008-2013 Aggregate Net CIP Impact on Employee Earnings (2013 $1,000s), by Sector Category and Discount Rate

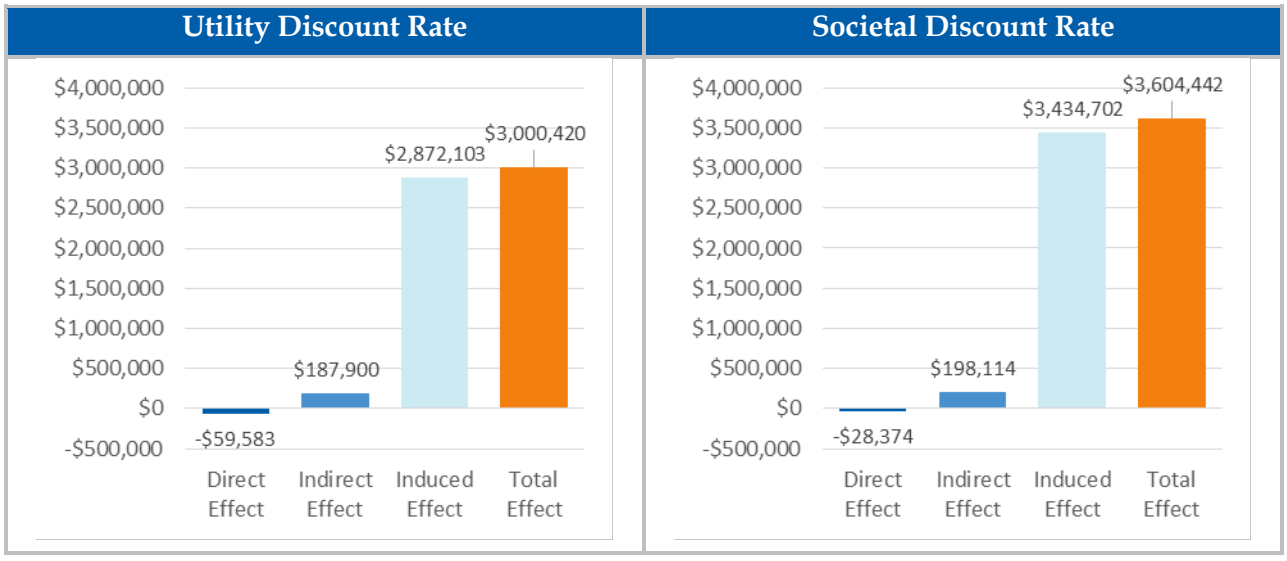
Sector Category	Employee Earnings (2013 $1,000s)	
	Utility Discount Rate	Societal Discount Rate
Agriculture or Forestry	$2,398	$2,862
Construction	$88,351	$91,955
Government	$38,397	$44,920
Industrial	$260	$337
Manufacturing	$188,512	$197,057
Retail Trade	$177,085	$210,002
Service	$1,606,322	$1,819,977
Utilities	-$296,566	-$283,423
Wholesale Trade	$109,766	$126,933

Aggregate Net Impact on State Domestic Product, Capital Investment, and Innovation

To determine the aggregate net impact of CIP on state domestic product, Cadmus analyzed summary direct, indirect, induced, and total effects on IMPLAN's value added indicator variable. To determine net impacts on the potential for capital investments and innovation, Cadmus analyzed sector-level effects on the same variable, which represents operating surpluses, or profits, that might be diverted to those activities.

As shown in Figure 22, Cadmus determined an aggregate net CIP impact on state domestic product of $3,000,420,079 to $3,604,442,291 (2013 dollars). We estimated a direct net CIP effect—resulting primarily from 2008-2013 program and participant expenditures, as well as future-year changes in demand for energy supply resources—of -$59,583,212 to -$28,374,494. The selected discount rate has some influence on direct and—to a lesser extent—indirect effects. However, induced effects, which are predicted by the model and differ mainly as a result of how future-year energy bill savings are discounted, are the main cause of differences in total effects between discount rate scenarios. Using the UDR, Cadmus estimated an induced effect of $2,872,103,149, while the SDR scenario led to an estimated induced effect of $3,434,702,444.

Figure 22. 2008-2013 Aggregate Net CIP Impact on State Domestic Product (2013 $1,000s), by Discount Rate



To investigate sector-level impacts on capital investment and innovation, Cadmus further analyzed the aggregate net impact on value added by sector category. As shown in Table 39, for both discount rate scenarios, the service, retail trade, manufacturing, construction, and wholesale trade sector categories benefit substantially from direct CIP-induced value added effects. The agriculture or forestry and government sector categories also benefit from positive total effects on value added. Organizations in these sectors benefit from total CIP-induced increases in profit margins, which may allow for potential future investments in capital and innovation.

Meanwhile, CIP had a negative aggregate impact on value added in the industrial and utility sector categories, largely as a result of CIP-induced reductions in demand for utility services

and, by extension, for industrial products required for various energy extraction, generation, transmission, and distribution activities. As determined through the cost-effectiveness analyses described above, utilities have opportunities in future years to adjust rates and thus maintain revenue. In aggregate, the positive effects on statewide value added greatly outweigh the negatives, reflecting a large positive impact from CIP on Minnesota companies' capacity for future investment in capital and innovation.

Table 39. 2008-2013 Aggregate Net CIP Impact on Capital Investment and Innovation (2013 $1,000s), by Sector Category and Discount Rate

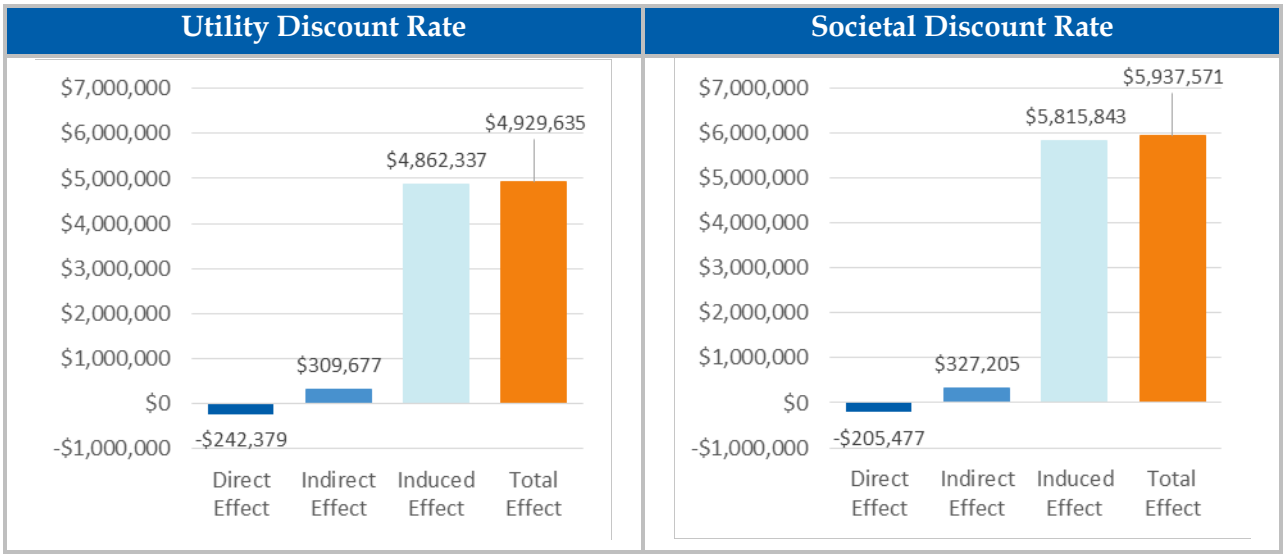
Sector Category	Capital Investment and Innovation (2013 $1,000s)	
	Utility Discount Rate	Societal Discount Rate
Agriculture or Forestry	$14,310	$17,113
Construction	$159,715	$165,012
Government	$34,545	$40,488
Industrial	-$7,759	-$7,171
Manufacturing	$329,233	$346,733
Retail trade	$305,648	$362,032
Service	$2,921,826	$3,354,378
Utilities	-$960,649	-$909,496
Wholesale trade	$203,796	$235,633

Aggregate Net Impact on Business Revenues and Industrial Production

To determine the aggregate net impact of CIP on statewide revenue and production, Cadmus analyzed summary direct, indirect, induced, and total effects on IMPLAN's output indicator variable. To determine the net impact on sector-level revenues and production, Cadmus analyzed sector-level effects on the same variable.

As shown in Figure 23, Cadmus determined an aggregate net CIP impact on revenue and production of $4,929,634,938 to $5,937,570,933. The discount rate has some influence on direct and indirect net effects. Cadmus estimated a direct net CIP effect—resulting primarily from first-year program and participant expenditures, as well as future-year changes in the demand for energy supply resources—of negative $242,379,310 to negative $205,477,365. However, induced effects, which are predicted by the model and differ mainly as a result of discounted future-year energy bill savings, predominantly cause the difference in total net effects between discount rate scenarios. Cadmus estimated an induced effect of $4,862,337,479 using the UDR, and of $5,815,843,330 using the SDR.

Figure 23. 2008-2013 Aggregate Net CIP Impact on Revenue and Production (2013 $1,000s), by Discount Rate



To investigate sector-level impacts on business revenues and industry production, Cadmus further analyzed the net impact on output by sector category. The IMPLAN output variable represents changes in gross revenue in the service, construction, and government sectors; changes in gross margin in the retail and wholesale trade sectors; and changes in sales plus or minus inventory in the manufacturing sectors. As shown in Table 40, the service, manufacturing, and construction sectors benefit the most from the aggregate net impact on revenue and production. The retail trade, wholesale trade, and government sectors benefit from indirect and induced effects. Thus, organizations in these sectors also benefit from the aggregate net impact on revenue and production.

Meanwhile, CIP had a negative aggregate impact on revenues in the utility and industrial sectors resulting from reduced demand for utility services and energy extraction, generation, transmission, and distribution resources. Utilities have opportunities in future years to adjust revenue requirements and increase electricity and natural gas rates, thus maintaining long-term guarantees of revenue generation.

Table 40. 2008-2013 Aggregate Net CIP Impact on Revenue and Production (2013 $1,000s), by Sector Category and Discount Rate

Sector Category	Revenue and Production (2013 $1,000s)	
	Utility Discount Rate	Societal Discount Rate
Agriculture or Forestry	$35,232	$42,073
Construction	$307,496	$318,246
Government	$91,184	$107,784
Industrial	-$18,923	-$18,039
Manufacturing	$1,038,479	$1,113,983
Retail trade	$444,097	$527,068
Service	$4,695,595	$5,395,114
Utilities	-$1,939,961	-$1,868,532
Wholesale trade	$277,258	$320,824

Conclusions

This report presented the analysis methods and findings from a Cadmus economic impact study of 2008-2013 statewide CIP-related activities and the resulting energy savings that accrue through 2032. Specifically, this study discloses the quantified aggregate CIP impact on eight economic variables:

1. Employment;
2. Employee earnings;
3. Household income and savings;
4. Business revenue;
5. Industry production;
6. Capital investment and innovation;
7. State domestic product; and
8. Utility electricity and natural gas rates.

Findings from annual cost-effectiveness analyses of the CIP electric and natural gas program portfolios suggest that CIP is cost-effective from the perspectives of utilities, program participants, and society as a whole. Results from the UCT indicate that the total benefit to utilities from avoided energy and capacity costs was $2.9 billion greater than the total cost to utilities from program administration, participant incentives, and ongoing revenue losses. Results from the PCT indicate that the total benefit to participants from received incentives and ongoing bill savings was $3.2 billion greater than the total cost to participants from project spending. Results from the SCT indicate that the total benefit to society from avoided utility costs and avoided environmental damage was $3.3 billion greater than the total costs from program administration and participant project spending. Finally, results from the RIM test indicate that although total costs go down, CIP will likely induce slight upward pressure on future energy rates of approximately $0.000705 per kWh and $0.00749 per therm. The RIM test does not include an estimate of rate impacts in the absence of CIP, in which utilities would meet increases in energy demand with ratepayer-funded supply-side resources (such as new power plants or increased purchases of out-of-state fuel and power).

To quantify and describe the aggregate impact of CIP on statewide employment, employee earnings, household income and savings, business revenue, industry production, capital investment and innovation, and state domestic product, Cadmus developed annual economic models in IMPLAN, a static IO model that characterizes spending patterns and relationships between households and industries.

Findings from IMPLAN analyses based on a UDR of approximately 7% illustrate a lower-bound estimate of aggregate impact, while findings from analyses based on a SDR of approximately 3% to 5% illustrate an upper-bound estimate. The employment impact is unaffected by the discount rate; for this study, conservative estimates of employment effects were calculated with model inputs generated using the UDR. In both discount rate scenarios, analysis findings indicate that 2008-2013 CIP activities and ongoing energy savings led to positive aggregate direct, indirect, and induced net effects on employment and income, as well as positive aggregate indirect and induced net effects on value added and output.

Statewide 2008-2013 CIP activities and ongoing energy savings resulted in a combination of positive direct effects on service, trade, and manufacturing sectors and negative direct effects on the electric and natural gas utility sectors due to net losses in revenue; meanwhile, in the absence of CIP, ratepayer demand for energy resulted only in positive direct effects on the electric and natural gas utility sectors. Through the combination of direct, indirect, and induced effects, 2008-2013 CIP activities and ongoing energy savings resulted in a positive aggregate net effect on all economic variables analyzed. In other words, CIP activities and ongoing energy savings induced positive aggregate net impacts on statewide employment, income, profit, and total production between 2008 and 2032.

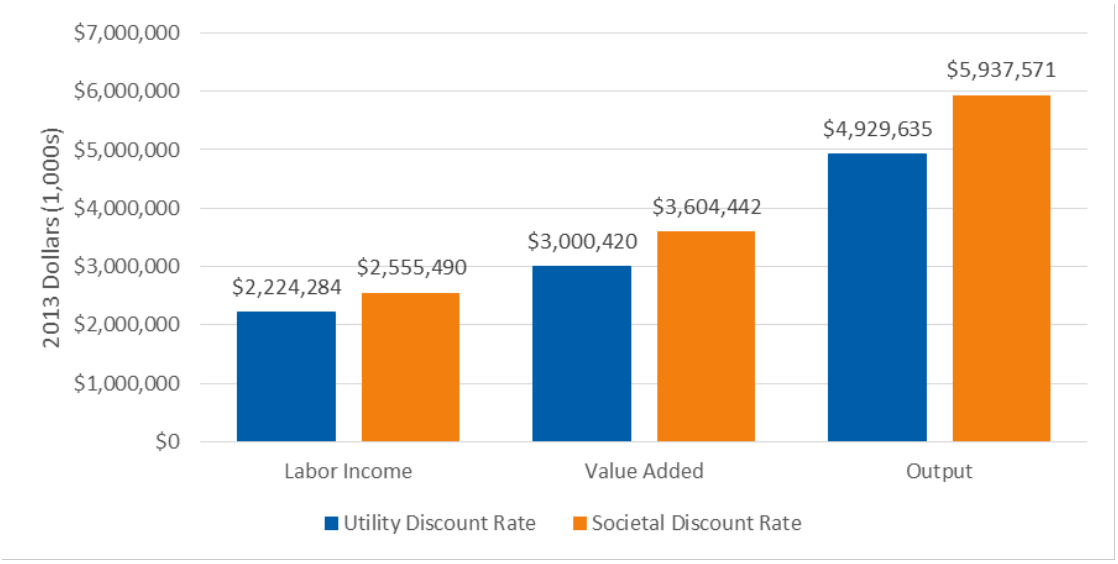
Table 41 summarizes these findings, while Figure 24 illustrates aggregate net impacts on monetary indicator variables by discount rate. Employment impacts are presented in job-years, while all monetary impacts are presented in fixed 2013 dollars (1,000s).

Table 41. 2008-2013 Aggregate Net CIP Impact on Key Economic Indicators, by Discount Rate

Discount Rate	Effect	Key Economic Indicator			
		Employment	Labor Income	Value Added	Output
Utility	Direct	8,404	$474,141	-$59,583	-$242,379
Utility	Indirect	2,506	$126,569	$187,900	$309,677
Utility	Induced	43,866	$1,623,575	$2,872,103	$4,862,337
Utility	**Total***	**54,777**	**$2,224,284**	**$3,000,420**	**$4,929,635**
Societal	Direct	8,404	$482,444	-$28,374	-$205,477
Societal	Indirect	2,506	$130,552	$198,114	$327,205
Societal	Induced	43,866	$1,942,493	$3,434,702	$5,815,843
Societal	**Total***	**54,777**	**$2,555,490**	**$3,604,442**	**$5,937,571**

* Values may not sum due to rounding.

Figure 24. 2008-2013 Aggregate Net CIP Impact on Labor Income, Value Added, and Output, by Discount Rate



This study provides a robust analysis of aggregate CIP economic and energy rate impacts. However, like any large-scale research study, there were limitations related to available data and analysis tools. These limitations, along with recommendations for future research, are summarized below.

For this analysis, Cadmus relied on self-reported data from more than 180 Minnesota utilities. These data included gross energy savings and average effective useful life (EUL) data at the measure category level and not the individual measure level (e.g., lighting is a measure category that includes individual measures such as CFLs). Also, the data did not include project-level expenditures (i.e., expenditures for equipment and installation labor). To improve the accuracy of model inputs, future analyses would benefit from more granular data, including energy savings and EUL data being available at the individual measure level, and project-level expenditure data being available.

Cadmus analyzed impacts on the Minnesota economy from hundreds of utility CIPs, which required assumed income bracket and sector-level breakouts for all IMPLAN model inputs. Future analyses would benefit from additional research that provides clear guidance for developing the model input breakouts. Also, while the IMPLAN model is a cost-effective tool for conducting robust impact analysis, it is useful primarily for estimating gross impacts. Therefore, to determine net CIP impacts, Cadmus manually constructed and incorporated a baseline model to analyze the hypothetical scenario where CIP does not operate. Since IMPLAN is a static model, this study does not account for future dynamic changes in the statewide economy. Future analyses might benefit from investigating first-year and future-year impacts separately, or from using a dynamic forecasting model that accounts for labor migration, price responses, and other dynamic economic variables that affect both the gross and baseline model scenarios. Finally, Cadmus used the Ratepayer Impact Measure (RIM) test to estimate CIP impacts on future energy rates. The RIM test does not estimate what happens to future energy rates in the hypothetical absence of CIP, in which utilities meet growing demand only with supply-side resources (such as new power plants and increased purchases of out-of-state fuel and power). Future analyses might also include investigating the rate impacts from these hypothetical supply-side investments.

Appendix A: Total Economic Impact of CIP Activities by Program Year

This appendix presents the summary-level gross, baseline, and net total impacts attributable to each program year, estimated separately with the societal and utility discount rates.

There are sets of three tables for each year's SDR and UDR modeling scenarios. The first set presents the gross, baseline, and net summary-level impacts on employment, labor income, value added, and output estimated with the societal discount rate (SDR). The second set presents the same impacts estimated with the utility discount rate (UDR).

Total Economic Impact of 2008 CIP Activities

Table 42, Table 43, and Table 44 show the SDR gross, baseline, and net summary impacts, respectively, attributable to 2008 CIP and counterfactual cash flows.

Table 42. 2008 SDR Gross Summary Impacts

Impact Type	Key Economic Indicator			
	Employment	Labor Income	Value Added	Output
Direct Effect	1,041	$76,476,533	$97,536,032	$190,689,619
Indirect Effect	478	$27,403,529	$43,252,371	$81,241,001
Induced Effect	3,021	$135,227,191	$243,473,555	$423,588,285
Total Effect*	**4,540**	**$239,107,253**	**$384,261,958**	**$695,518,904**

* Values may not sum due to rounding.

Table 43. 2008 SDR Baseline Summary Impacts

Impact Type	Key Economic Indicator			
	Employment	Labor Income	Value Added	Output
Direct Effect	298	$41,707,405	$133,445,436	$239,517,559
Indirect Effect	127	$8,029,614	$13,865,236	$29,043,434
Induced Effect	-1,617	-$72,668,218	-$130,507,180	-$227,401,308
Total Effect*	**-1,193**	**-$22,931,199**	**$16,803,491**	**$41,159,685**

* Values may not sum due to rounding.

Table 44. 2008 SDR Net Summary Impacts

Impact Type	Key Economic Indicator			
	Employment	Labor Income	Value Added	Output
Direct Effect	743	$34,769,127	-$35,909,404	-$48,827,940
Indirect Effect	351	$19,373,916	$29,387,135	$52,197,566
Induced Effect	4,639	$207,895,410	$373,980,735	$650,989,593
Total Effect*	**5,733**	**$262,038,453**	**$367,458,467**	**$654,359,219**

* Values may not sum due to rounding.

Table 45, Table 46, and Table 47 show the UDR gross, baseline, and net summary impacts, respectively, attributable to 2008 CIP and counterfactual cash flows.

Table 45. 2008 UDR Gross Summary Impacts

Impact Type	Key Economic Indicator			
	Employment	Labor Income	Value Added	Output
Direct Effect	1,041	$76,163,122	$95,910,077	$190,821,902
Indirect Effect	478	$27,400,503	$43,257,503	$81,284,225
Induced Effect	3,021	$108,932,240	$196,192,702	$341,264,535
Total Effect*	**4,540**	**$212,495,865**	**$335,360,281**	**$613,370,663**

* Values may not sum due to rounding.

Table 46. 2008 UDR Baseline Summary Impacts

Impact Type	Key Economic Indicator			
	Employment	Labor Income	Value Added	Output
Direct Effect	298	$41,707,405	$133,445,436	$239,517,559
Indirect Effect	127	$8,029,614	$13,865,236	$29,043,434
Induced Effect	-1,617	-$72,668,218	-$130,507,180	-$227,401,308
Total Effect*	**-1,193**	**-$22,931,199**	**$16,803,491**	**$41,159,685**

* Values may not sum due to rounding.

Table 47. 2008 UDR Net Summary Impacts

Impact Type	Key Economic Indicator			
	Employment	Labor Income	Value Added	Output
Direct Effect	743	$34,455,717	-$37,535,358	-$48,695,657
Indirect Effect	351	$19,370,889	$29,392,267	$52,240,791
Induced Effect	4,639	$181,600,458	$326,699,882	$568,665,843
Total Effect*	**5,733**	**$235,427,064**	**$318,556,790**	**$572,210,977**

* Values may not sum due to rounding.

Total Economic Impact of 2009 CIP Activities

Table 48, Table 49, and Table 50 show the SDR gross, baseline, and net summary impacts, respectively, attributable to 2009 CIP and counterfactual cash flows.

Table 48. 2009 SDR Gross Summary Impacts

Impact Type	Key Economic Indicator			
	Employment	Labor Income	Value Added	Output
Direct Effect	1,819	$124,318,596	$153,543,068	$276,099,620
Indirect Effect	708	$37,091,396	$60,313,594	$106,015,384
Induced Effect	3,229	$141,991,787	$253,233,133	$425,250,990
Total Effect*	**5,755**	**$303,401,780**	**$467,089,795**	**$807,365,995**

* Values may not sum due to rounding.

Table 49. 2009 SDR Baseline Summary Impacts

Impact Type	Key Economic Indicator			
	Employment	Labor Income	Value Added	Output
Direct Effect	385	$46,658,184	$169,258,013	$327,464,880
Indirect Effect	489	$26,557,640	$43,496,586	$84,265,334
Induced Effect	-2,408	-$106,409,181	-$188,779,595	-$318,715,708
Total Effect*	**-1,534**	**-$33,193,357**	**$23,975,003**	**$93,014,506**

* Values may not sum due to rounding.

Table 50. 2009 SDR Net Summary Impacts

Impact Type	Key Economic Indicator			
	Employment	Labor Income	Value Added	Output
Direct Effect	1,434	$77,660,412	-$15,714,945	-$51,365,260
Indirect Effect	219	$10,533,757	$16,817,008	$21,750,050
Induced Effect	5,636	$248,400,968	$442,012,729	$743,966,699
Total Effect	**7,289**	**$336,595,137**	**$443,114,792**	**$714,351,489**

Table 51, Table 52, and Table 53 show the UDR gross, baseline, and net summary impacts, respectively, attributable to 2009 CIP and counterfactual cash flows.

Table 51. 2009 UDR Gross Summary Impacts

Impact Type	Key Economic Indicator			
	Employment	Labor Income	Value Added	Output
Direct Effect	1,819	$123,629,303	$151,377,810	$275,585,448
Indirect Effect	708	$37,043,425	$60,241,271	$105,817,555
Induced Effect	3,229	$112,133,481	$200,155,973	$335,823,677
Total Effect*	**5,755**	**$272,806,210**	**$411,775,053**	**$717,226,680**

* Values may not sum due to rounding.

Table 52. 2009 UDR Baseline Summary Impacts

Impact Type	Key Economic Indicator			
	Employment	Labor Income	Value Added	Output
Direct Effect	385	$46,658,184	$169,258,013	$327,464,880
Indirect Effect	489	$26,557,640	$43,496,586	$84,265,334
Induced Effect	-2,408	-$106,409,181	-$188,779,595	-$318,715,708
Total Effect*	**-1,534**	**-$33,193,357**	**$23,975,003**	**$93,014,506**

* Values may not sum due to rounding.

Table 53. 2009 UDR Net Summary Impacts

Impact Type	Key Economic Indicator			
	Employment	Labor Income	Value Added	Output
Direct Effect	1,434	$76,971,119	-$17,880,203	-$51,879,432
Indirect Effect	219	$10,485,786	$16,744,685	$21,552,221
Induced Effect	5,636	$218,542,663	$388,935,568	$654,539,386
Total Effect*	**7,289**	**$305,999,567**	**$387,800,051**	**$624,212,175**

* Values may not sum due to rounding.

Total Economic Impact of 2010 CIP Activities

Table 54, Table 55, and Table 56 show the SDR gross, baseline, and net summary impacts, respectively, attributable to 2010 CIP and counterfactual cash flows.

Table 54. 2010 SDR Gross Summary Impacts

Impact Type	Key Economic Indicator			
	Employment	Labor Income	Value Added	Output
Direct Effect	2,048	$149,191,282	$186,681,172	$310,177,630
Indirect Effect	756	$40,305,900	$65,229,889	$109,354,433
Induced Effect	5,494	$241,159,387	$434,007,532	$706,316,510
Total Effect*	**8,298**	**$430,656,569**	**$685,918,592**	**$1,125,848,573**

* Values may not sum due to rounding.

Table 55. 2010 SDR Baseline Summary Impacts

Impact Type	Key Economic Indicator			
	Employment	Labor Income	Value Added	Output
Direct Effect	522	$63,780,233	$235,923,320	$365,604,702
Indirect Effect	225	$12,395,751	$19,683,867	$38,659,428
Induced Effect	-2,948	-$129,911,623	-$233,065,729	-$380,373,634
Total Effect*	**-2,201**	**-$53,735,638**	**$22,541,458**	**$23,890,495**

* Values may not sum due to rounding.

Table 56. 2010 SDR Net Summary Impacts

Impact Type	Key Economic Indicator			
	Employment	Labor Income	Value Added	Output
Direct Effect	1,526	$85,411,049	-$49,242,148	-$55,427,072
Indirect Effect	530	$27,910,148	$45,546,022	$70,695,005
Induced Effect	8,442	$371,071,010	$667,073,261	$1,086,690,144
Total Effect*	**10,498**	**$484,392,207**	**$663,377,134**	**$1,101,958,078**

* Values may not sum due to rounding.

Table 57, Table 58, and Table 59 show the UDR gross, baseline, and net summary impacts, respectively, attributable to 2010 CIP and counterfactual cash flows.

Table 57. 2010 UDR Gross Summary Impacts

Impact Type	Key Economic Indicator			
	Employment	Labor Income	Value Added	Output
Direct Effect	2,048	$147,524,620	$179,515,311	$307,137,217
Indirect Effect	756	$40,347,648	$65,290,364	$109,566,123
Induced Effect	5,494	$179,334,340	$322,941,785	$525,272,873
Total Effect	**8,298**	**$367,206,608**	**$567,747,460**	**$941,976,213**

Table 58. 2010 UDR Baseline Summary Impacts

Impact Type	Key Economic Indicator			
	Employment	Labor Income	Value Added	Output
Direct Effect	522	$63,780,233	$235,923,320	$365,604,702
Indirect Effect	225	$12,395,751	$19,683,867	$38,659,428
Induced Effect	-2,948	-$129,911,623	-$233,065,729	-$380,373,634
Total Effect*	**-2,201**	**-$53,735,638**	**$22,541,458**	**$23,890,495**

* Values may not sum due to rounding.

Table 59. 2010 UDR Net Summary Impacts

Impact Type	Key Economic Indicator			
	Employment	Labor Income	Value Added	Output
Direct Effect	1,526	$83,744,387	-$56,408,009	-$58,467,485
Indirect Effect	530	$27,951,897	$45,606,497	$70,906,696
Induced Effect	8,442	$309,245,962	$556,007,513	$905,646,508
Total Effect*	**10,498**	**$420,942,247**	**$545,206,002**	**$918,085,719**

* Values may not sum due to rounding.

Total Economic Impact of 2011 CIP Activities

Table 60, Table 61, and Table 62 show the SDR gross, baseline, and net summary impacts, respectively, attributable to 2011 CIP and counterfactual cash flows.

Table 60. 2011 SDR Gross Summary Impacts

Impact Type	Key Economic Indicator			
	Employment	Labor Income	Value Added	Output
Direct Effect	2,096	$146,747,001	$185,806,805	$313,511,862
Indirect Effect	758	$40,039,053	$63,736,429	$114,420,300
Induced Effect	5,540	$239,948,194	$430,761,843	$735,108,573
Total Effect	**8,394**	**$426,734,248**	**$680,305,077**	**$1,163,040,735**

Table 61. 2011 SDR Baseline Summary Impacts

Impact Type	Key Economic Indicator			
	Employment	Labor Income	Value Added	Output
Direct Effect	421	$49,820,502	$134,616,427	$354,387,227
Indirect Effect	451	$24,521,472	$43,891,018	$81,939,286
Induced Effect	-2,756	-$119,401,700	-$214,901,365	-$366,472,401
Total Effect*	**-1,884**	**-$45,059,725**	**-$36,393,920**	**$69,854,112**

* Values may not sum due to rounding.

Table 62. 2011 SDR Net Summary Impacts

Impact Type	Key Economic Indicator			
	Employment	Labor Income	Value Added	Output
Direct Effect	1,675	$96,926,499	$51,190,378	-$40,875,365
Indirect Effect	307	$15,517,581	$19,845,411	$32,481,014
Induced Effect	8,296	$359,349,894	$645,663,208	$1,101,580,973
Total Effect*	**10,279**	**$471,793,973**	**$716,698,997**	**$1,093,186,623**

* Values may not sum due to rounding.

Table 63, Table 64, and Table 65 show the UDR gross, baseline, and net summary impacts, respectively, attributable to 2011 CIP and counterfactual cash flows.

Table 63. 2011 UDR Gross Summary Impacts

Impact Type	Key Economic Indicator			
	Employment	Labor Income	Value Added	Output
Direct Effect	2,096	$145,218,399	$180,106,970	$307,996,306
Indirect Effect	758	$39,166,563	$62,323,537	$111,802,580
Induced Effect	5,540	$179,000,802	$321,195,219	$548,202,286
Total Effect*	**8,394**	**$363,385,764**	**$563,625,726**	**$968,001,171**

* Values may not sum due to rounding.

Table 64. 2011 UDR Baseline Summary Impacts

Impact Type	Key Economic Indicator			
	Employment	Labor Income	Value Added	Output
Direct Effect	421	$49,820,502	$134,616,427	$354,387,227
Indirect Effect	451	$24,521,472	$43,891,018	$81,939,286
Induced Effect	-2,756	-$119,401,700	-$214,901,365	-$366,472,401
Total Effect*	**-1,884**	**-$45,059,725**	**-$36,393,920**	**$69,854,112**

* Values may not sum due to rounding.

Table 65. 2011 UDR Net Summary Impacts

Impact Type	Key Economic Indicator			
	Employment	Labor Income	Value Added	Output
Direct Effect	1,675	$95,397,897	$45,490,543	-$46,390,921
Indirect Effect	307	$14,645,091	$18,432,519	$29,863,294
Induced Effect	8,296	$298,402,501	$536,096,584	$914,674,686
Total Effect*	**10,279**	**$408,445,489**	**$600,019,645**	**$898,147,059**

* Values may not sum due to rounding.

Total Economic Impact of 2012 CIP Activities

Table 66, Table 67, and Table 68 show the SDR gross, baseline, and net summary impacts, respectively, attributable to 2012 CIP and counterfactual cash flows.

Table 66. 2012 SDR Gross Summary Impacts

Impact Type	Key Economic Indicator			
	Employment	Labor Income	Value Added	Output
Direct Effect	2,150	$174,046,115	$222,954,344	$365,919,671
Indirect Effect	851	$48,013,888	$75,751,790	$130,688,502
Induced Effect	4,954	$225,498,420	$399,301,160	$663,407,720
Total Effect*	**7,955**	**$447,558,423**	**$698,007,295**	**$1,160,015,894**

* Values may not sum due to rounding.

Table 67. 2012 SDR Baseline Summary Impacts

Impact Type	Key Economic Indicator			
	Employment	Labor Income	Value Added	Output
Direct Effect	488	$61,459,235	$170,459,400	$389,191,466
Indirect Effect	359	$20,620,667	$29,851,607	$62,404,348
Induced Effect	-2,892	-$131,739,171	-$234,297,523	-$388,434,715
Total Effect*	**-2,044**	**-$49,659,268**	**-$33,986,516**	**$63,161,098**

* Values may not sum due to rounding.

Table 68. 2012 SDR Net Summary Impacts

Impact Type	Key Economic Indicator			
	Employment	Labor Income	Value Added	Output
Direct Effect	1,662	$112,586,880	$52,494,945	-$23,271,794
Indirect Effect	492	$27,393,221	$45,900,184	$68,284,155
Induced Effect	7,846	$357,237,591	$633,598,683	$1,051,842,435
Total Effect*	**10,000**	**$497,217,691**	**$731,993,811**	**$1,096,854,795**

* Values may not sum due to rounding.

Table 69, Table 70, and Table 71 show the UDR gross, baseline, and net summary impacts, respectively, attributable to 2012 CIP and counterfactual cash flows.

Table 69. 2012 UDR Gross Summary Impacts

Impact Type	Key Economic Indicator			
	Employment	Labor Income	Value Added	Output
Direct Effect	2,150	$171,298,195	$213,367,332	$355,411,183
Indirect Effect	851	$47,032,133	$74,256,059	$127,965,673
Induced Effect	4,954	$164,778,667	$291,506,936	$484,539,105
Total Effect*	**7,955**	**$383,108,995**	**$579,130,327**	**$967,915,960**

* Values may not sum due to rounding.

Table 70. 2012 UDR Baseline Summary Impacts

Impact Type	Key Economic Indicator			
	Employment	Labor Income	Value Added	Output
Direct Effect	488	$61,459,235	$170,459,400	$389,191,466
Indirect Effect	359	$20,620,667	$29,851,607	$62,404,348
Induced Effect	-2,892	-$131,739,171	-$234,297,523	-$388,434,715
Total Effect*	**-2,044**	**-$49,659,268**	**-$33,986,516**	**$63,161,098**

* Values may not sum due to rounding.

Table 71. 2012 UDR Net Summary Impacts

Impact Type	Key Economic Indicator			
	Employment	Labor Income	Value Added	Output
Direct Effect	1,662	$109,838,959	$42,907,932	-$33,780,283
Indirect Effect	492	$26,411,466	$44,404,453	$65,561,325
Induced Effect	7,846	$296,517,839	$525,804,458	$872,973,820
Total Effect*	**10,000**	**$432,768,264**	**$613,116,843**	**$904,754,862**

* Values may not sum due to rounding.

Total Economic Impact of 2013 CIP Activities

Table 72, Table 73, and Table 74 show the SDR gross, baseline, and net summary impacts, respectively, attributable to 2013 CIP and counterfactual cash flows.

Table 72. 2013 SDR Gross Summary Impacts

Impact Type	Key Economic Indicator			
	Employment	Labor Income	Value Added	Output
Direct Effect	1,987	$144,058,196	$165,563,302	$359,169,765
Indirect Effect	962	$52,360,695	$91,402,883	$165,892,048
Induced Effect	6,311	$279,064,123	$470,326,223	$826,356,519
Total Effect*	**9,260**	**$475,483,013**	**$727,292,408**	**$1,351,418,332**

* Values may not sum due to rounding.

Table 73. 2013 SDR Baseline Summary Impacts

Impact Type	Key Economic Indicator			
	Employment	Labor Income	Value Added	Output
Direct Effect	623	$68,968,140	$196,756,622	$344,879,699
Indirect Effect	356	$22,536,936	$50,784,303	$84,094,871
Induced Effect	-2,696	-$119,474,313	-$202,047,607	-$354,416,966
Total Effect*	**-1,718**	**-$27,969,236**	**$45,493,318**	**$74,557,603**

* Values may not sum due to rounding.

Table 74. 2013 SDR Net Summary Impacts

Impact Type	Key Economic Indicator			
	Employment	Labor Income	Value Added	Output
Direct Effect	1,364	$75,090,055	-$31,193,320	$14,290,066
Indirect Effect	607	$29,823,759	$40,618,581	$81,797,177
Induced Effect	9,007	$398,538,435	$672,373,829	$1,180,773,486
Total Effect	**10,978**	**$503,452,249**	**$681,799,090**	**$1,276,860,729**

Table 75, Table 76, and Table 77 show the UDR gross, baseline, and net summary impacts, respectively, attributable to 2013 CIP and counterfactual cash flows.

Table 75. 2013 UDR Gross Summary Impact

Impact Type	Key Economic Indicator			
	Employment	Labor Income	Value Added	Output
Direct Effect	1,987	$142,700,969	$160,598,504	$341,714,165
Indirect Effect	962	$50,240,603	$84,104,024	$153,647,314
Induced Effect	6,311	$199,790,930	$336,511,538	$591,420,270
Total Effect*	**9,260**	**$392,732,502**	**$581,214,066**	**$1,086,781,749**

* Values may not sum due to rounding.

Table 76. 2013 UDR Baseline Summary Impact

Impact Type	Key Economic Indicator			
	Employment	Labor Income	Value Added	Output
Direct Effect	623	$68,968,140	$196,756,622	$344,879,699
Indirect Effect	356	$22,536,936	$50,784,303	$84,094,871
Induced Effect	-2,696	-$119,474,313	-$202,047,607	-$354,416,966
Total Effect*	**-1,718**	**-$27,969,236**	**$45,493,318**	**$74,557,603**

* Values may not sum due to rounding.

Table 77. 2013 UDR Net Summary Impact

Impact Type	Key Economic Indicator			
	Employment	Labor Income	Value Added	Output
Direct Effect	1,364	$73,732,829	-$36,158,118	-$3,165,533
Indirect Effect	607	$27,703,667	$33,319,722	$69,552,443
Induced Effect	9,007	$319,265,242	$538,559,144	$945,837,237
Total Effect*	**10,978**	**$420,701,738**	**$535,720,748**	**$1,012,224,146**

* Values may not sum due to rounding.

Appendix B: IMPLAN Model Inputs by Program Year

This appendix presents the annual IMPLAN model inputs included in Cadmus' analysis. Positive values represent increases in demand or household income, while negative values represent decreases in demand or household income. Cadmus divided the inputs into seven categories designed to cover all relevant cash flows: (1) participant incentives; (2) first-year energy bill reductions; (3) future-year energy bill reductions; (4) program payments and CIP spending; (5) project spending; (6) first-year and future-year avoided utility costs; and (7) baseline ratepayer expenditures.

2008 Model Inputs

Societal Discount Rate Inputs

Table 78 through Table 84 show the 2008 model inputs calculated with the SDR.

Table 78. 2008 SDR Incentives Received by Ratepayers

Category Name	Sector Code	Sector Description	Amount
Incentives Received	10001	HH income less than 10k	$3,205,016.32
Incentives Received	10002	HH income 10-15k	$2,557,512.76
Incentives Received	10003	HH income 15-25k	$5,394,129.07
Incentives Received	10004	HH income 25-35k	$5,845,196.94
Incentives Received	10005	HH income 35-50k	$8,050,190.01
Incentives Received	10006	HH income 50-75k	$10,624,783.89
Incentives Received	10007	HH income 75-100k	$5,735,439.03
Incentives Received	10008	HH income 100-150k	$3,932,304.51
Incentives Received	10009	HH income over 150k	$2,083,642.19

Table 79. 2008 SDR First-Year Energy Bill Reductions

Category Name	Sector Code	Sector Description	Amount
Electric Revenue Loss	31	Electric power generation, transmission, and distribution	-$21,640,766.54
Natural Gas Revenue Loss	32	Natural gas distribution	-$6,812,242.43
Electric Ratepayer Bill Savings	10001	HH income less than 10k	$1,462,399.76
Electric Ratepayer Bill Savings	10002	HH income 10-15k	$1,166,953.82
Electric Ratepayer Bill Savings	10003	HH income 15-25k	$2,461,258.32
Electric Ratepayer Bill Savings	10004	HH income 25-35k	$2,667,073.67

Category Name	Sector Code	Sector Description	Amount
Electric Ratepayer Bill Savings	10005	HH income 35-50k	$3,673,178.16
Electric Ratepayer Bill Savings	10006	HH income 50-75k	$4,847,925.84
Electric Ratepayer Bill Savings	10007	HH income 75-100k	$2,616,992.81
Electric Ratepayer Bill Savings	10008	HH income 100-150k	$1,794,250.20
Electric Ratepayer Bill Savings	10009	HH income over 150k	$950,733.96
Natural Gas Ratepayer Bill Savings	10001	HH income less than 10k	$460,345.14
Natural Gas Ratepayer Bill Savings	10002	HH income 10-15k	$367,342.46
Natural Gas Ratepayer Bill Savings	10003	HH income 15-25k	$774,773.31
Natural Gas Ratepayer Bill Savings	10004	HH income 25-35k	$839,561.41
Natural Gas Ratepayer Bill Savings	10005	HH income 35-50k	$1,156,270.51
Natural Gas Ratepayer Bill Savings	10006	HH income 50-75k	$1,526,066.37
Natural Gas Ratepayer Bill Savings	10007	HH income 75-100k	$823,796.58
Natural Gas Ratepayer Bill Savings	10008	HH income 100-150k	$564,807.51
Natural Gas Ratepayer Bill Savings	10009	HH income over 150k	$299,279.15

Table 80. 2008 SDR Future-Year Energy Bill Reductions

Category Name	Sector Code	Sector Description	Amount
Future Electric Revenue Loss	31	Electric power generation, transmission, and distribution	-$417,121,547.01
Future Natural Gas Revenue Loss	32	Natural gas distribution	-$93,609,259.34
Future Electric Ratepayer Bill Savings	10001	HH income less than 10k	$28,187,469.67
Future Electric Ratepayer Bill Savings	10002	HH income 10-15k	$22,492,806.95
Future Electric Ratepayer Bill Savings	10003	HH income 15-25k	$47,440,273.15
Future Electric Ratepayer Bill Savings	10004	HH income 25-35k	$51,407,323.82

Category Name	Sector Code	Sector Description	Amount
Future Electric Ratepayer Bill Savings	10005	HH income 35-50k	$70,799,791.45
Future Electric Ratepayer Bill Savings	10006	HH income 50-75k	$93,442,823.37
Future Electric Ratepayer Bill Savings	10007	HH income 75-100k	$50,442,025.21
Future Electric Ratepayer Bill Savings	10008	HH income 100-150k	$34,583,822.13
Future Electric Ratepayer Bill Savings	10009	HH income over 150k	$18,325,211.27
Future Natural Gas Ratepayer Bill Savings	10001	HH income less than 10k	$6,325,753.67
Future Natural Gas Ratepayer Bill Savings	10002	HH income 10-15k	$5,047,773.28
Future Natural Gas Ratepayer Bill Savings	10003	HH income 15-25k	$10,646,414.37
Future Natural Gas Ratepayer Bill Savings	10004	HH income 25-35k	$11,536,688.87
Future Natural Gas Ratepayer Bill Savings	10005	HH income 35-50k	$15,888,692.60
Future Natural Gas Ratepayer Bill Savings	10006	HH income 50-75k	$20,970,178.95
Future Natural Gas Ratepayer Bill Savings	10007	HH income 75-100k	$11,320,059.23
Future Natural Gas Ratepayer Bill Savings	10008	HH income 100-150k	$7,761,205.33
Future Natural Gas Ratepayer Bill Savings	10009	HH income over 150k	$4,112,493.03

Table 81. 2008 SDR Ratepayer Program Payments and Utility Program Spending

Category Name	Sector Code	Sector Description	Amount
Ratepayer Program Payments	10001	HH income less than 10k	-$8,236,509.44
Ratepayer Program Payments	10002	HH income 10-15k	-$6,572,502.57
Ratepayer Program Payments	10003	HH income 15-25k	-$13,862,267.97
Ratepayer Program Payments	10004	HH income 25-35k	-$15,021,458.58
Ratepayer Program Payments	10005	HH income 35-50k	-$20,688,027.62
Ratepayer Program Payments	10006	HH income 50-75k	-$27,304,426.62

Category Name	Sector Code	Sector Description	Amount
Ratepayer Program Payments	10007	HH income 75-100k	-$14,739,393.85
Ratepayer Program Payments	10008	HH income 100-150k	-$10,105,553.32
Ratepayer Program Payments	10009	HH income over 150k	-$5,354,711.77
Utility Program Spending	384	Office administrative services	$19,892,595.13
Utility Program Spending	374	Management, scientific, and technical consulting services	$41,611,736.90
Utility Program Spending	377	Advertising and related services	$9,364,580.83
Utility Program Spending	375	Environmental and other technical consulting services	$3,587,724.15

Table 82. 2008 SDR Project Spending

Category Name	Sector Code	Sector Description	Amount
Participant Electric Project Expenses	10001	HH income less than 10k	-$4,444,090.01
Participant Electric Project Expenses	10002	HH income 10-15k	-$3,546,258.67
Participant Electric Project Expenses	10003	HH income 15-25k	-$7,479,523.57
Participant Electric Project Expenses	10004	HH income 25-35k	-$8,104,976.32
Participant Electric Project Expenses	10005	HH income 35-50k	-$11,162,429.60
Participant Electric Project Expenses	10006	HH income 50-75k	-$14,732,373.02
Participant Electric Project Expenses	10007	HH income 75-100k	-$7,952,785.50
Participant Electric Project Expenses	10008	HH income 100-150k	-$5,452,551.08
Participant Electric Project Expenses	10009	HH income over 150k	-$2,889,187.61
Participant Natural Gas Project Expenses	10001	HH income less than 10k	-$4,003,747.90
Participant Natural Gas Project Expenses	10002	HH income 10-15k	-$3,194,878.06
Participant Natural Gas Project Expenses	10003	HH income 15-25k	-$6,738,415.90
Participant Natural Gas Project Expenses	10004	HH income 25-35k	-$7,301,895.74
Participant Natural Gas Project Expenses	10005	HH income 35-50k	-$10,056,401.64

Category Name	Sector Code	Sector Description	Amount
Participant Natural Gas Project Expenses	10006	HH income 50-75k	-$13,272,617.65
Participant Natural Gas Project Expenses	10007	HH income 75-100k	-$7,164,784.73
Participant Natural Gas Project Expenses	10008	HH income 100-150k	-$4,912,285.73
Participant Natural Gas Project Expenses	10009	HH income over 150k	-$2,602,912.82
Participant Incentives Spent	10001	HH income less than 10k	-$3,205,016.32
Participant Incentives Spent	10002	HH income 10-15k	-$2,557,512.76
Participant Incentives Spent	10003	HH income 15-25k	-$5,394,129.07
Participant Incentives Spent	10004	HH income 25-35k	-$5,845,196.94
Participant Incentives Spent	10005	HH income 35-50k	-$8,050,190.01
Participant Incentives Spent	10006	HH income 50-75k	-$10,624,783.89
Participant Incentives Spent	10007	HH income 75-100k	-$5,735,439.03
Participant Incentives Spent	10008	HH income 100-150k	-$3,932,304.51
Participant Incentives Spent	10009	HH income over 150k	-$2,083,642.19
Industry Project Revenue	374	Management, scientific, and technical consulting services	$17,244,033.33
Industry Project Revenue	375	Environmental and other technical consulting services	$17,244,033.33
Industry Project Revenue	40	Maintenance and repair construction of residential structures	$17,244,033.33
Industry Project Revenue	39	Maintenance and repair construction of nonresidential structures	$17,244,033.33
Industry Project Revenue	319	Wholesale trade	$17,244,033.33
Industry Project Revenue	216	Air conditioning, refrigeration, and warm air heating equipment manufacturing	$8,622,016.51
Industry Project Revenue	215	Heating equipment (except warm air furnaces) manufacturing	$8,622,016.51

Category Name	Sector Code	Sector Description	Amount
Industry Project Revenue	250	Automatic environmental control manufacturing	$8,622,016.51
Industry Project Revenue	199	Plumbing fixture fitting and trim manufacturing	$8,622,016.51
Industry Project Revenue	264	Household laundry equipment manufacturing	$8,622,016.51
Industry Project Revenue	265	Other major household appliance manufacturing	$8,622,016.51
Industry Project Revenue	168	Mineral wool manufacturing	$8,622,016.51
Industry Project Revenue	147	Urethane and other foam product (except polystyrene) manufacturing	$8,622,016.51
Industry Project Revenue	149	Other plastics product manufacturing	$8,622,016.51
Industry Project Revenue	390	Waste management and remediation services	$8,622,016.51

Table 83. 2008 SDR First-Year and Future-Year Avoided Utility Costs

Category Name	Sector Code	Sector Description	Amount
Avoided Utility Electric Costs	31	Electric power generation, transmission, and distribution	$20,367,123.61
Avoided Utility Natural Gas Costs	32	Natural gas distribution	$6,204,941.45
Future Avoided Utility Electric Costs	31	Electric power generation, transmission, and distribution	$417,985,831.25
Future Avoided Natural Utility Gas Costs	32	Natural gas distribution	$72,944,762.73

Table 84. 2008 SDR Baseline Ratepayer Expenses

Category Name	Sector Code	Sector Description	Amount
Baseline Ratepayer Expenditures	10001	HH income less than 10k	-$16,684,347.35
Baseline Ratepayer Expenditures	10002	HH income 10-15k	-$13,313,639.30
Baseline Ratepayer Expenditures	10003	HH income 15-25k	-$28,080,207.44
Baseline Ratepayer Expenditures	10004	HH income 25-35k	-$30,428,330.63
Baseline Ratepayer Expenditures	10005	HH income 35-50k	-$41,906,858.85
Baseline Ratepayer Expenditures	10006	HH income 50-75k	-$55,309,417.29
Baseline Ratepayer Expenditures	10007	HH income 75-100k	-$29,856,964.08

Category Name	Sector Code	Sector Description	Amount
Baseline Ratepayer Expenditures	10008	HH income 100-150k	-$20,470,390.13
Baseline Ratepayer Expenditures	10009	HH income over 150k	-$10,846,812.20

Table 85. 2008 SDR Baseline Ratepayer Expenses Received

Category Name	Sector Code	Sector Description	Amount
Electric Ratepayer Expenses Received	31	Electric power generation, transmission, and distribution	$123,150,157.86
Natural Gas Ratepayer Expenses Received	32	Natural gas distribution	$123,746,809.41

Utility Discount Rate Inputs

Table 86 through Table 92 show the 2008 model inputs calculated with the UDR.

Table 86. 2008 UDR Incentives Received by Ratepayers

Category Name	Sector Code	Sector Description	Amount
Incentives Received	10001	HH income less than 10k	$3,205,016.32
Incentives Received	10002	HH income 10-15k	$2,557,512.76
Incentives Received	10003	HH income 15-25k	$5,394,129.07
Incentives Received	10004	HH income 25-35k	$5,845,196.94
Incentives Received	10005	HH income 35-50k	$8,050,190.01
Incentives Received	10006	HH income 50-75k	$10,624,783.89
Incentives Received	10007	HH income 75-100k	$5,735,439.03
Incentives Received	10008	HH income 100-150k	$3,932,304.51
Incentives Received	10009	HH income over 150k	$2,083,642.19

Table 87. 2008 UDR First-Year Energy Bill Reductions

Category Name	Sector Code	Sector Description	Amount
Electric Revenue Loss	31	Electric power generation, transmission, and distribution	-$21,640,766.54
Natural Gas Revenue Loss	32	Natural gas distribution	-$6,812,242.43
Electric Ratepayer Bill Savings	10001	HH income less than 10k	$1,462,399.76
Electric Ratepayer Bill Savings	10002	HH income 10-15k	$1,166,953.82
Electric Ratepayer Bill Savings	10003	HH income 15-25k	$2,461,258.32
Electric Ratepayer Bill Savings	10004	HH income 25-35k	$2,667,073.67
Electric Ratepayer Bill Savings	10005	HH income 35-50k	$3,673,178.16

Category Name	Sector Code	Sector Description	Amount
Electric Ratepayer Bill Savings	10006	HH income 50-75k	$4,847,925.84
Electric Ratepayer Bill Savings	10007	HH income 75-100k	$2,616,992.81
Electric Ratepayer Bill Savings	10008	HH income 100-150k	$1,794,250.20
Electric Ratepayer Bill Savings	10009	HH income over 150k	$950,733.96
Natural Gas Ratepayer Bill Savings	10001	HH income less than 10k	$460,345.14
Natural Gas Ratepayer Bill Savings	10002	HH income 10-15k	$367,342.46
Natural Gas Ratepayer Bill Savings	10003	HH income 15-25k	$774,773.31
Natural Gas Ratepayer Bill Savings	10004	HH income 25-35k	$839,561.41
Natural Gas Ratepayer Bill Savings	10005	HH income 35-50k	$1,156,270.51
Natural Gas Ratepayer Bill Savings	10006	HH income 50-75k	$1,526,066.37
Natural Gas Ratepayer Bill Savings	10007	HH income 75-100k	$823,796.58
Natural Gas Ratepayer Bill Savings	10008	HH income 100-150k	$564,807.51
Natural Gas Ratepayer Bill Savings	10009	HH income over 150k	$299,279.15

Table 88. 2008 UDR Future-Year Energy Bill Reductions

Category Name	Sector Code	Sector Description	Amount
Future Electric Revenue Loss	31	Electric power generation, transmission, and distribution	-$357,669,577.78
Future Natural Gas Revenue Loss	32	Natural gas distribution	-$79,302,919.46
Future Electric Ratepayer Bill Savings	10001	HH income less than 10k	$24,169,934.27
Future Electric Ratepayer Bill Savings	10002	HH income 10-15k	$19,286,926.85
Future Electric Ratepayer Bill Savings	10003	HH income 15-25k	$40,678,652.52
Future Electric Ratepayer Bill Savings	10004	HH income 25-35k	$44,080,282.92
Future Electric Ratepayer Bill Savings	10005	HH income 35-50k	$60,708,759.11

Category Name	Sector Code	Sector Description	Amount
Future Electric Ratepayer Bill Savings	10006	HH income 50-75k	$80,124,499.49
Future Electric Ratepayer Bill Savings	10007	HH income 75-100k	$43,252,567.48
Future Electric Ratepayer Bill Savings	10008	HH income 100-150k	$29,654,620.21
Future Electric Ratepayer Bill Savings	10009	HH income over 150k	$15,713,334.93
Future Natural Gas Ratepayer Bill Savings	10001	HH income less than 10k	$5,358,986.25
Future Natural Gas Ratepayer Bill Savings	10002	HH income 10-15k	$4,276,320.11
Future Natural Gas Ratepayer Bill Savings	10003	HH income 15-25k	$9,019,318,68
Future Natural Gas Ratepayer Bill Savings	10004	HH income 25-35k	$9,773,532.17
Future Natural Gas Ratepayer Bill Savings	10005	HH income 35-50k	$13,460,417.47
Future Natural Gas Ratepayer Bill Savings	10006	HH income 50-75k	$17,765,298.27
Future Natural Gas Ratepayer Bill Savings	10007	HH income 75-100k	$9,590,010.13
Future Natural Gas Ratepayer Bill Savings	10008	HH income 100-150k	$6,575,057.27
Future Natural Gas Ratepayer Bill Savings	10009	HH income over 150k	$3,483,979.10

Table 89. 2008 UDR Ratepayer Program Payments and Utility Program Spending

Category Name	Sector Code	Sector Description	Amount
Ratepayer Program Payments	10001	HH income less than 10k	-$8,236,509.44
Ratepayer Program Payments	10002	HH income 10-15k	-$6,572,502.57
Ratepayer Program Payments	10003	HH income 15-25k	-$13,862,267.97
Ratepayer Program Payments	10004	HH income 25-35k	-$15,021,458.58
Ratepayer Program Payments	10005	HH income 35-50k	-$20,688,027.62
Ratepayer Program Payments	10006	HH income 50-75k	-$27,304,426.62
Ratepayer Program Payments	10007	HH income 75-100k	-$14,739,393.85

Category Name	Sector Code	Sector Description	Amount
Ratepayer Program Payments	10008	HH income 100-150k	-$10,105,553.32
Ratepayer Program Payments	10009	HH income over 150k	-$5,354,711.77
Utility Program Spending	384	Office administrative services	$19,892,595.13
Utility Program Spending	374	Management, scientific, and technical consulting services	$41,611,736.90
Utility Program Spending	377	Advertising and related services	$9,364,580.83
Utility Program Spending	375	Environmental and other technical consulting services	$3,587,724.15

Table 90. 2008 UDR Project Spending

Category Name	Sector Code	Sector Description	Amount
Participant Electric Project Expenses	10001	HH income less than 10k	-$4,444,090.01
Participant Electric Project Expenses	10002	HH income 10-15k	-$3,546,258.67
Participant Electric Project Expenses	10003	HH income 15-25k	-$7,479,523.57
Participant Electric Project Expenses	10004	HH income 25-35k	-$8,104,976.32
Participant Electric Project Expenses	10005	HH income 35-50k	-$11,162,429.60
Participant Electric Project Expenses	10006	HH income 50-75k	-$14,732,373.02
Participant Electric Project Expenses	10007	HH income 75-100k	-$7,952,785.50
Participant Electric Project Expenses	10008	HH income 100-150k	-$5,452,551.08
Participant Electric Project Expenses	10009	HH income over 150k	-$2,889,187.61
Participant Natural Gas Project Expenses	10001	HH income less than 10k	-$4,003,747.90
Participant Natural Gas Project Expenses	10002	HH income 10-15k	-$3,194,878.06
Participant Natural Gas Project Expenses	10003	HH income 15-25k	-$6,738,415.90
Participant Natural Gas Project Expenses	10004	HH income 25-35k	-$7,301,895.74
Participant Natural Gas Project Expenses	10005	HH income 35-50k	-$10,056,401.64
Participant Natural Gas Project Expenses	10006	HH income 50-75k	-$13,272,617.65

Category Name	Sector Code	Sector Description	Amount
Participant Natural Gas Project Expenses	10007	HH income 75-100k	-$7,164,784.73
Participant Natural Gas Project Expenses	10008	HH income 100-150k	-$4,912,285.73
Participant Natural Gas Project Expenses	10009	HH income over 150k	-$2,602,912.82
Participant Incentives Spent	10001	HH income less than 10k	-$3,205,016.32
Participant Incentives Spent	10002	HH income 10-15k	-$2,557,512.76
Participant Incentives Spent	10003	HH income 15-25k	-$5,394,129.07
Participant Incentives Spent	10004	HH income 25-35k	-$5,845,196.94
Participant Incentives Spent	10005	HH income 35-50k	-$8,050,190.01
Participant Incentives Spent	10006	HH income 50-75k	-$10,624,783.89
Participant Incentives Spent	10007	HH income 75-100k	-$5,735,439.03
Participant Incentives Spent	10008	HH income 100-150k	-$3,932,304.51
Participant Incentives Spent	10009	HH income over 150k	-$2,083,642.19
Industry Project Revenue	374	Management, scientific, and technical consulting services	$17,244,033.33
Industry Project Revenue	375	Environmental and other technical consulting services	$17,244,033.33
Industry Project Revenue	40	Maintenance and repair construction of residential structures	$17,244,033.33
Industry Project Revenue	39	Maintenance and repair construction of nonresidential structures	$17,244,033.33
Industry Project Revenue	319	Wholesale trade	$17,244,033.33
Industry Project Revenue	216	Air conditioning, refrigeration, and warm air heating equipment manufacturing	$8,622,016.51
Industry Project Revenue	215	Heating equipment (except warm air furnaces) manufacturing	$8,622,016.51
Industry Project Revenue	250	Automatic environmental control manufacturing	$8,622,016.51

Category Name	Sector Code	Sector Description	Amount
Industry Project Revenue	199	Plumbing fixture fitting and trim manufacturing	$8,622,016.51
Industry Project Revenue	264	Household laundry equipment manufacturing	$8,622,016.51
Industry Project Revenue	265	Other major household appliance manufacturing	$8,622,016.51
Industry Project Revenue	168	Mineral wool manufacturing	$8,622,016.51
Industry Project Revenue	147	Urethane and other foam product (except polystyrene) manufacturing	$8,622,016.51
Industry Project Revenue	149	Other plastics product manufacturing	$8,622,016.51
Industry Project Revenue	390	Waste management and remediation services	$8,622,016.51

Table 91. 2008 UDR First-Year and Future-Year Avoided Utility Costs

Category Name	Sector Code	Sector Description	Amount
Avoided Utility Electric Costs	31	Electric power generation, transmission, and distribution	$20,367,123.61
Avoided Utility Natural Gas Costs	32	Natural gas distribution	$6,204,941.45
Future Avoided Utility Electric Costs	31	Electric power generation, transmission, and distribution	$355,481,692.64
Future Avoided Natural Utility Gas Costs	32	Natural gas distribution	$61,965,764.58

Table 92. 2008 UDR Baseline Ratepayer Expenses

Category Name	Sector Code	Sector Description	Amount
Baseline Ratepayer Expenditures	10001	HH income less than 10k	-$16,684,347.35
Baseline Ratepayer Expenditures	10002	HH income 10-15k	-$13,313,639.30
Baseline Ratepayer Expenditures	10003	HH income 15-25k	-$28,080,207.44
Baseline Ratepayer Expenditures	10004	HH income 25-35k	-$30,428,330.63
Baseline Ratepayer Expenditures	10005	HH income 35-50k	-$41,906,858.85
Baseline Ratepayer Expenditures	10006	HH income 50-75k	-$55,309,417.29
Baseline Ratepayer Expenditures	10007	HH income 75-100k	-$29,856,964.08

Category Name	Sector Code	Sector Description	Amount
Baseline Ratepayer Expenditures	10008	HH income 100-150k	-$20,470,390.13
Baseline Ratepayer Expenditures	10009	HH income over 150k	-$10,846,812.20

Table 93. 2008 UDR Baseline Ratepayers Expenses Received

Category Name	Sector Code	Sector Description	Amount
Electric Ratepayer Expenses Received	31	Electric power generation, transmission, and distribution	$123,150,157.86
Natural Gas Ratepayer Expenses Received	32	Natural gas distribution	$123,746,809.41

2009 Model Inputs

Societal Discount Rate Inputs

Table 94 through Table 100 show the 2009 model inputs calculated with the SDR.

Table 94. 2009 SDR Incentives Received by Ratepayers

Category Name	Sector Code	Sector Description	Amount
Incentives Received	10001	HH income less than 10k	$3,174,662.08
Incentives Received	10002	HH income 10-15k	$2,533,397.90
Incentives Received	10003	HH income 15-25k	$5,345,936.49
Incentives Received	10004	HH income 25-35k	$5,792,741.44
Incentives Received	10005	HH income 35-50k	$7,976,485.97
Incentives Received	10006	HH income 50-75k	$10,523,481.22
Incentives Received	10007	HH income 75-100k	$5,679,262.32
Incentives Received	10008	HH income 100-150k	$3,893,631.58
Incentives Received	10009	HH income over 150k	$2,063,417.02

Table 95. 2009 SDR First-Year Energy Bill Reductions

Category Name	Sector Code	Sector Description	Amount
Electric Revenue Loss	31	Electric power generation, transmission, and distribution	-$23,144,071.02
Natural Gas Revenue Loss	32	Natural gas distribution	-$5,856,512.33
Electric Ratepayer Bill Savings	10001	HH income less than 10k	$1,563,854.58
Electric Ratepayer Bill Savings	10002	HH income 10-15k	$1,247,964.60
Electric Ratepayer Bill Savings	10003	HH income 15-25k	$2,633,435.32
Electric Ratepayer Bill Savings	10004	HH income 25-35k	$2,853,533.69

Category Name	Sector Code	Sector Description	Amount
Electric Ratepayer Bill Savings	10005	HH income 35-50k	$3,929,257.28
Electric Ratepayer Bill Savings	10006	HH income 50-75k	$5,183,920.01
Electric Ratepayer Bill Savings	10007	HH income 75-100k	$2,797,633.31
Electric Ratepayer Bill Savings	10008	HH income 100-150k	$1,918,022.58
Electric Ratepayer Bill Savings	10009	HH income over 150k	$1,016,449.65
Natural Gas Ratepayer Bill Savings	10001	HH income less than 10k	$395,726.99
Natural Gas Ratepayer Bill Savings	10002	HH income 10-15k	$315,792.33
Natural Gas Ratepayer Bill Savings	10003	HH income 15-25k	$666,380.02
Natural Gas Ratepayer Bill Savings	10004	HH income 25-35k	$722,075.01
Natural Gas Ratepayer Bill Savings	10005	HH income 35-50k	$994,282.45
Natural Gas Ratepayer Bill Savings	10006	HH income 50-75k	$1,311,769.71
Natural Gas Ratepayer Bill Savings	10007	HH income 75-100k	$707,929.64
Natural Gas Ratepayer Bill Savings	10008	HH income 100-150k	$485,347.76
Natural Gas Ratepayer Bill Savings	10009	HH income over 150k	$257,208.42

Table 96. 2009 SDR Future-Year Energy Bill Reductions

Category Name	Sector Code	Sector Description	Amount
Future Electric Revenue Loss	31	Electric power generation, transmission, and distribution	-$434,359,074.17
Future Natural Gas Revenue Loss	32	Natural gas distribution	-$112,592,635.14
Future Electric Ratepayer Bill Savings	10001	HH income less than 10k	$29,349,824.70
Future Electric Ratepayer Bill Savings	10002	HH income 10-15k	$23,421,322.42
Future Electric Ratepayer Bill Savings	10003	HH income 15-25k	$49,423,307.01
Future Electric Ratepayer Bill Savings	10004	HH income 25-35k	$53,554,029.12

Category Name	Sector Code	Sector Description	Amount
Future Electric Ratepayer Bill Savings	10005	HH income 35-50k	$73,742,797.99
Future Electric Ratepayer Bill Savings	10006	HH income 50-75k	$97,289,828.25
Future Electric Ratepayer Bill Savings	10007	HH income 75-100k	$52,504,912.02
Future Electric Ratepayer Bill Savings	10008	HH income 100-150k	$35,996,714.38
Future Electric Ratepayer Bill Savings	10009	HH income over 150k	$19,076,338.28
Future Natural Gas Ratepayer Bill Savings	10001	HH income less than 10k	$7,607,931.55
Future Natural Gas Ratepayer Bill Savings	10002	HH income 10-15k	$6,071,171.45
Future Natural Gas Ratepayer Bill Savings	10003	HH income 15-25k	$12,811,290.71
Future Natural Gas Ratepayer Bill Savings	10004	HH income 25-35k	$13,882,038.20
Future Natural Gas Ratepayer Bill Savings	10005	HH income 35-50k	$19,115,281.44
Future Natural Gas Ratepayer Bill Savings	10006	HH income 50-75k	$25,219,038.32
Future Natural Gas Ratepayer Bill Savings	10007	HH income 75-100k	$13,610,090.72
Future Natural Gas Ratepayer Bill Savings	10008	HH income 100-150k	$9,330,908.85
Future Natural Gas Ratepayer Bill Savings	10009	HH income over 150k	$4,944,883.91

Table 97. 2009 SDR Ratepayer Program Payments and Utility Program Spending

Category Name	Sector Code	Sector Description	Amount
Ratepayer Program Payments	10001	HH income less than 10k	-$11,352,455.01
Ratepayer Program Payments	10002	HH income 10-15k	-$9,059,321.88
Ratepayer Program Payments	10003	HH income 15-25k	-$19,116,838.86
Ratepayer Program Payments	10004	HH income 25-35k	-$20,714,594.13
Ratepayer Program Payments	10005	HH income 35-50k	-$28,523,570.60
Ratepayer Program Payments	10006	HH income 50-75k	-$37,631,516.03

Category Name	Sector Code	Sector Description	Amount
Ratepayer Program Payments	10007	HH income 75-100k	-$20,308,797.68
Ratepayer Program Payments	10008	HH income 100-150k	-$13,923,458.99
Ratepayer Program Payments	10009	HH income over 150k	-$7,378,690.48
Utility Program Spending	384	Office administrative services	$32,045,655.31
Utility Program Spending	374	Management, scientific, and technical consulting services	$59,900,750.68
Utility Program Spending	377	Advertising and related services	$17,605,335.82
Utility Program Spending	375	Environmental and other technical consulting services	$11,474,485.84

Table 98. 2009 SDR Project Spending

Category Name	Sector Code	Sector Description	Amount
Participant Electric Project Expenses	10001	HH income less than 10k	-$5,670,487.89
Participant Electric Project Expenses	10002	HH income 10-15k	-$4,525,080.70
Participant Electric Project Expenses	10003	HH income 15-25k	-$9,548,754.28
Participant Electric Project Expenses	10004	HH income 25-35k	-$10,346,824.11
Participant Electric Project Expenses	10005	HH income 35-50k	-$14,247,364.26
Participant Electric Project Expenses	10006	HH income 50-75k	-$18,796,732.15
Participant Electric Project Expenses	10007	HH income 75-100k	-$10,144,131.05
Participant Electric Project Expenses	10008	HH income 100-150k	-$6,954,690.03
Participant Electric Project Expenses	10009	HH income over 150k	-$3,685,614.70
Participant Natural Gas Project Expenses	10001	HH income less than 10k	-$5,973,243.03
Participant Natural Gas Project Expenses	10002	HH income 10-15k	-$4,766,680.97
Participant Natural Gas Project Expenses	10003	HH income 15-25k	-$10,058,575.39
Participant Natural Gas Project Expenses	10004	HH income 25-35k	-$10,899,255.27
Participant Natural Gas Project Expenses	10005	HH income 35-50k	-$15,008,050.61

Category Name	Sector Code	Sector Description	Amount
Participant Natural Gas Project Expenses	10006	HH income 50-75k	-$19,800,315.50
Participant Natural Gas Project Expenses	10007	HH income 75-100k	-$10,685,740.14
Participant Natural Gas Project Expenses	10008	HH income 100-150k	-$7,326,010.48
Participant Natural Gas Project Expenses	10009	HH income over 150k	-$3,882,394.73
Participant Incentives Spent	10001	HH income less than 10k	-$3,174,662.08
Participant Incentives Spent	10002	HH income 10-15k	-$2,533,397.90
Participant Incentives Spent	10003	HH income 15-25k	-$5,345,936.49
Participant Incentives Spent	10004	HH income 25-35k	-$5,792,741.44
Participant Incentives Spent	10005	HH income 35-50k	-$7,976,485.97
Participant Incentives Spent	10006	HH income 50-75k	-$10,523,481.22
Participant Incentives Spent	10007	HH income 75-100k	-$5,679,262.32
Participant Incentives Spent	10008	HH income 100-150k	-$3,893,631.58
Participant Incentives Spent	10009	HH income over 150k	-$2,063,417.02
Industry Project Revenue	374	Management, scientific, and technical consulting services	$21,930,296.13
Industry Project Revenue	375	Environmental and other technical consulting services	$21,930,296.13
Industry Project Revenue	40	Maintenance and repair construction of residential structures	$21,930,296.13
Industry Project Revenue	39	Maintenance and repair construction of nonresidential structures	$21,930,296.13
Industry Project Revenue	319	Wholesale trade	$21,930,296.13
Industry Project Revenue	216	Air conditioning, refrigeration, and warm air heating equipment manufacturing	$10,965,148.07
Industry Project Revenue	215	Heating equipment (except warm air furnaces) manufacturing	$10,965,148.07

Category Name	Sector Code	Sector Description	Amount
Industry Project Revenue	250	Automatic environmental control manufacturing	$10,965,148.07
Industry Project Revenue	199	Plumbing fixture fitting and trim manufacturing	$10,965,148.07
Industry Project Revenue	264	Household laundry equipment manufacturing	$10,965,148.07
Industry Project Revenue	265	Other major household appliance manufacturing	$10,965,148.07
Industry Project Revenue	168	Mineral wool manufacturing	$10,965,148.07
Industry Project Revenue	147	Urethane and other foam product (except polystyrene) manufacturing	$10,965,148.07
Industry Project Revenue	149	Other plastics product manufacturing	$10,965,148.07
Industry Project Revenue	390	Waste management and remediation services	$10,965,148.07

Table 99. 2009 SDR First-Year and Future-Year Avoided Utility Costs

Category Name	Sector Code	Sector Description	Amount
Avoided Utility Electric Costs	31	Electric power generation, transmission, and distribution	$21,907,871.51
Avoided Utility Natural Gas Costs	32	Natural gas distribution	$5,238,628.60
Future Avoided Utility Electric Costs	31	Electric power generation, transmission, and distribution	$440,833,652.89
Future Avoided Utility Natural Gas Costs	32	Natural gas distribution	$86,403,552.81

Table 100. 2009 SDR Baseline Ratepayer Expenses

Category Name	Sector Code	Sector Description	Amount
Baseline Ratepayer Expenditures	10001	HH income less than 10k	-$22,996,185.94
Baseline Ratepayer Expenditures	10002	HH income 10-15k	-$18,351,083.56
Baseline Ratepayer Expenditures	10003	HH income 15-25k	-$38,724,168.53
Baseline Ratepayer Expenditures	10004	HH income 25-35k	-$41,960,673.51
Baseline Ratepayer Expenditures	10005	HH income 35-50k	-$57,778,985.46
Baseline Ratepayer Expenditures	10006	HH income 50-75k	-$76,228,563.67
Baseline Ratepayer Expenditures	10007	HH income 75-100k	-$41,138,668.87

Category Name	Sector Code	Sector Description	Amount
Baseline Ratepayer Expenditures	10008	HH income 100-150k	-$28,204,159.51
Baseline Ratepayer Expenditures	10009	HH income over 150k	-$14,946,699.91

Table 101. 2009 SDR Baseline Ratepayers Expenses Received

Category Name	Sector Code	Sector Description	Amount
Electric Ratepayer Expenses Received	31	Electric power generation, transmission, and distribution	$165,624,679.85
Natural Gas Ratepayer Expenses Received	32	Natural gas distribution	$174,704,509.10

Utility Discount Rate Inputs

Table 102 through Table 108 show the 2009 model inputs calculated with the UDR.

Table 102. 2009 UDR Incentives Received by Ratepayers

Category Name	Sector Code	Sector Description	Amount
Incentives Received	10001	HH income less than 10k	$3,174,662.08
Incentives Received	10002	HH income 10-15k	$2,533,397.90
Incentives Received	10003	HH income 15-25k	$5,345,936.49
Incentives Received	10004	HH income 25-35k	$5,792,741.44
Incentives Received	10005	HH income 35-50k	$7,976,485.97
Incentives Received	10006	HH income 50-75k	$10,523,481.22
Incentives Received	10007	HH income 75-100k	$5,679,262.32
Incentives Received	10008	HH income 100-150k	$3,893,631.58
Incentives Received	10009	HH income over 150k	$2,063,417.02

Table 103. 2009 UDR First-Year Energy Bill Reductions

Category Name	Sector Code	Sector Description	Amount
Electric Revenue Loss	31	Electric power generation, transmission, and distribution	-$23,144,071.02
Natural Gas Revenue Loss	32	Natural gas distribution	-$5,856,512.33
Electric Ratepayer Bill Savings	10001	HH income less than 10k	$1,563,854.58
Electric Ratepayer Bill Savings	10002	HH income 10-15k	$1,247,964.60
Electric Ratepayer Bill Savings	10003	HH income 15-25k	$2,633,435.32
Electric Ratepayer Bill Savings	10004	HH income 25-35k	$2,853,533.69
Electric Ratepayer Bill Savings	10005	HH income 35-50k	$3,929,257.28

Category Name	Sector Code	Sector Description	Amount
Electric Ratepayer Bill Savings	10006	HH income 50-75k	$5,183,920.01
Electric Ratepayer Bill Savings	10007	HH income 75-100k	$2,797,633.31
Electric Ratepayer Bill Savings	10008	HH income 100-150k	$1,918,022.58
Electric Ratepayer Bill Savings	10009	HH income over 150k	$1,016,449.65
Natural Gas Ratepayer Bill Savings	10001	HH income less than 10k	$395,726.99
Natural Gas Ratepayer Bill Savings	10002	HH income 10-15k	$315,792.33
Natural Gas Ratepayer Bill Savings	10003	HH income 15-25k	$666,380.02
Natural Gas Ratepayer Bill Savings	10004	HH income 25-35k	$722,075.01
Natural Gas Ratepayer Bill Savings	10005	HH income 35-50k	$994,282.45
Natural Gas Ratepayer Bill Savings	10006	HH income 50-75k	$1,311,769.71
Natural Gas Ratepayer Bill Savings	10007	HH income 75-100k	$707,929.64
Natural Gas Ratepayer Bill Savings	10008	HH income 100-150k	$485,347.76
Natural Gas Ratepayer Bill Savings	10009	HH income over 150k	$257,208.42

Table 104. 2009 UDR Future-Year Energy Bill Reductions

Category Name	Sector Code	Sector Description	Amount
Future Electric Revenue Loss	31	Electric power generation, transmission, and distribution	-$374,155,020.47
Future Natural Gas Revenue Loss	32	Natural gas distribution	-$95,215,444.61
Future Electric Ratepayer Bill Savings	10001	HH income less than 10k	$25,281,811.55
Future Electric Ratepayer Bill Savings	10002	HH income 10-15k	$20,175,025.43
Future Electric Ratepayer Bill Savings	10003	HH income 15-25k	$42,573,022.06
Future Electric Ratepayer Bill Savings	10004	HH income 25-35k	$46,131,208.15
Future Electric Ratepayer Bill Savings	10005	HH income 35-50k	$63,521,725.99

Category Name	Sector Code	Sector Description	Amount
Future Electric Ratepayer Bill Savings	10006	HH income 50-75k	$83,805,035.61
Future Electric Ratepayer Bill Savings	10007	HH income 75-100k	$45,227,503.24
Future Electric Ratepayer Bill Savings	10008	HH income 100-150k	$31,007,413.47
Future Electric Ratepayer Bill Savings	10009	HH income over 150k	$16,432,274.96
Future Natural Gas Ratepayer Bill Savings	10001	HH income less than 10k	$6,433,747.50
Future Natural Gas Ratepayer Bill Savings	10002	HH income 10-15k	$5,134,166.09
Future Natural Gas Ratepayer Bill Savings	10003	HH income 15-25k	$10,834,036.70
Future Natural Gas Ratepayer Bill Savings	10004	HH income 25-35k	$11,739,528.41
Future Natural Gas Ratepayer Bill Savings	10005	HH income 35-50k	$16,165,089.47
Future Natural Gas Ratepayer Bill Savings	10006	HH income 50-75k	$21,326,811.85
Future Natural Gas Ratepayer Bill Savings	10007	HH income 75-100k	$11,509,552.44
Future Natural Gas Ratepayer Bill Savings	10008	HH income 100-150k	$7,890,805.94
Future Natural Gas Ratepayer Bill Savings	10009	HH income over 150k	$4,181,706.19

Table 105. 2009 UDR Ratepayer Program Payments and Utility Program Spending

Category Name	Sector Code	Sector Description	Amount
Ratepayer Program Payments	10001	HH income less than 10k	-$11,352,455.01
Ratepayer Program Payments	10002	HH income 10-15k	-$9,059,321.88
Ratepayer Program Payments	10003	HH income 15-25k	-$19,116,838.86
Ratepayer Program Payments	10004	HH income 25-35k	-$20,714,594.13
Ratepayer Program Payments	10005	HH income 35-50k	-$28,523,570.60
Ratepayer Program Payments	10006	HH income 50-75k	-$37,631,516.03
Ratepayer Program Payments	10007	HH income 75-100k	-$20,308,797.68

Category Name	Sector Code	Sector Description	Amount
Ratepayer Program Payments	10008	HH income 100-150k	-$13,923,458.99
Ratepayer Program Payments	10009	HH income over 150k	-$7,378,690.48
Utility Program Spending	384	Office administrative services	$32,045,655.31
Utility Program Spending	374	Management, scientific, and technical consulting services	$59,900,750.68
Utility Program Spending	377	Advertising and related services	$17,605,335.82
Utility Program Spending	375	Environmental and other technical consulting services	$11,474,485.84

Table 106. 2009 UDR Project Spending

Category Name	Sector Code	Sector Description	Amount
Participant Electric Project Expenses	10001	HH income less than 10k	-$5,670,487.89
Participant Electric Project Expenses	10002	HH income 10-15k	-$4,525,080.70
Participant Electric Project Expenses	10003	HH income 15-25k	-$9,548,754.28
Participant Electric Project Expenses	10004	HH income 25-35k	-$10,346,824.11
Participant Electric Project Expenses	10005	HH income 35-50k	-$14,247,364.26
Participant Electric Project Expenses	10006	HH income 50-75k	-$18,796,732.15
Participant Electric Project Expenses	10007	HH income 75-100k	-$10,144,131.05
Participant Electric Project Expenses	10008	HH income 100-150k	-$6,954,690.03
Participant Electric Project Expenses	10009	HH income over 150k	-$3,685,614.70
Participant Natural Gas Project Expenses	10001	HH income less than 10k	-$5,973,243.03
Participant Natural Gas Project Expenses	10002	HH income 10-15k	-$4,766,680.97
Participant Natural Gas Project Expenses	10003	HH income 15-25k	-$10,058,575.39
Participant Natural Gas Project Expenses	10004	HH income 25-35k	-$10,899,255.27
Participant Natural Gas Project Expenses	10005	HH income 35-50k	-$15,008,050.61
Participant Natural Gas Project Expenses	10006	HH income 50-75k	-$19,800,315.50

Category Name	Sector Code	Sector Description	Amount
Participant Natural Gas Project Expenses	10007	HH income 75-100k	-$10,685,740.14
Participant Natural Gas Project Expenses	10008	HH income 100-150k	-$7,326,010.48
Participant Natural Gas Project Expenses	10009	HH income over 150k	-$3,882,394.73
Participant Incentives Spent	10001	HH income less than 10k	-$3,174,662.08
Participant Incentives Spent	10002	HH income 10-15k	-$2,533,397.90
Participant Incentives Spent	10003	HH income 15-25k	-$5,345,936.49
Participant Incentives Spent	10004	HH income 25-35k	-$5,792,741.44
Participant Incentives Spent	10005	HH income 35-50k	-$7,976,485.97
Participant Incentives Spent	10006	HH income 50-75k	-$10,523,481.22
Participant Incentives Spent	10007	HH income 75-100k	-$5,679,262.32
Participant Incentives Spent	10008	HH income 100-150k	-$3,893,631.58
Participant Incentives Spent	10009	HH income over 150k	-$2,063,417.02
Industry Project Revenue	374	Management, scientific, and technical consulting services	$21,930,296.13
Industry Project Revenue	375	Environmental and other technical consulting services	$21,930,296.13
Industry Project Revenue	40	Maintenance and repair construction of residential structures	$21,930,296.13
Industry Project Revenue	39	Maintenance and repair construction of nonresidential structures	$21,930,296.13
Industry Project Revenue	319	Wholesale trade	$21,930,296.13
Industry Project Revenue	216	Air conditioning, refrigeration, and warm air heating equipment manufacturing	$10,965,148.07
Industry Project Revenue	215	Heating equipment (except warm air furnaces) manufacturing	$10,965,148.07
Industry Project Revenue	250	Automatic environmental control manufacturing	$10,965,148.07

Category Name	Sector Code	Sector Description	Amount
Industry Project Revenue	199	Plumbing fixture fitting and trim manufacturing	$10,965,148.07
Industry Project Revenue	264	Household laundry equipment manufacturing	$10,965,148.07
Industry Project Revenue	265	Other major household appliance manufacturing	$10,965,148.07
Industry Project Revenue	168	Mineral wool manufacturing	$10,965,148.07
Industry Project Revenue	147	Urethane and other foam product (except polystyrene) manufacturing	$10,965,148.07
Industry Project Revenue	149	Other plastics product manufacturing	$10,965,148.07
Industry Project Revenue	390	Waste management and remediation services	$10,965,148.07

Table 107. 2009 UDR First-Year and Future-Year Avoided Utility Costs

Category Name	Sector Code	Sector Description	Amount
Avoided Utility Electric Costs	31	Electric power generation, transmission, and distribution	$21,907,871.51
Avoided Utility Natural Gas Costs	32	Natural gas distribution	$5,238,628.60
Future Avoided Utility Electric Costs	31	Electric power generation, transmission, and distribution	$376,315,140.44
Future Avoided Utility Natural Gas Costs	32	Natural gas distribution	$73,063,800.52

Table 108. 2009 UDR Baseline Ratepayer Expenses

Category Name	Sector Code	Sector Description	Amount
Baseline Ratepayer Expenditures	10001	HH income less than 10k	-$22,996,185.94
Baseline Ratepayer Expenditures	10002	HH income 10-15k	-$18,351,083.56
Baseline Ratepayer Expenditures	10003	HH income 15-25k	-$38,724,168.53
Baseline Ratepayer Expenditures	10004	HH income 25-35k	-$41,960,673.51
Baseline Ratepayer Expenditures	10005	HH income 35-50k	-$57,778,985.46
Baseline Ratepayer Expenditures	10006	HH income 50-75k	-$76,228,563.67
Baseline Ratepayer Expenditures	10007	HH income 75-100k	-$41,138,668.87

Category Name	Sector Code	Sector Description	Amount
Baseline Ratepayer Expenditures	10008	HH income 100-150k	-$28,204,159.51
Baseline Ratepayer Expenditures	10009	HH income over 150k	-$14,946,699.91

Table 109. 2009 UDR Baseline Ratepayers Expenses Received

Category Name	Sector Code	Sector Description	Amount
Electric Ratepayer Expenses Received	31	Electric power generation, transmission, and distribution	$165,624,679.85
Natural Gas Ratepayer Expenses Received	32	Natural gas distribution	$174,704,509.10

2010 Model Inputs

Societal Discount Rate Inputs

Table 110 through Table 116 show the 2010 model inputs calculated with the SDR.

Table 110. 2010 SDR Incentives Received by Ratepayers

Category Name	Sector Code	Sector Description	Amount
Incentives Received	10001	HH income less than 10k	$4,572,468.68
Incentives Received	10002	HH income 10-15k	$3,650,278.41
Incentives Received	10003	HH income 15-25k	$7,704,195.84
Incentives Received	10004	HH income 25-35k	$8,348,842.77
Incentives Received	10005	HH income 35-50k	$11,497,256.54
Incentives Received	10006	HH income 50-75k	$15,169,386.65
Incentives Received	10007	HH income 75-100k	$8,186,582.18
Incentives Received	10008	HH income 100-150k	$5,612,207.36
Incentives Received	10009	HH income over 150k	$2,974,002.75

Table 111. 2010 SDR First-Year Energy Bill Reductions

Category Name	Sector Code	Sector Description	Amount
Electric Revenue Loss	31	Electric power generation, transmission, and distribution	-$30,921,788.28
Natural Gas Revenue Loss	32	Natural gas distribution	-$8,227,165.48
Electric Ratepayer Bill Savings	10001	HH income less than 10k	$2,087,993.01
Electric Ratepayer Bill Savings	10002	HH income 10-15k	$1,666,879.83
Electric Ratepayer Bill Savings	10003	HH income 15-25k	$3,518,079.22
Electric Ratepayer Bill Savings	10004	HH income 25-35k	$3,812,453.74
Electric Ratepayer Bill Savings	10005	HH income 35-50k	$5,250,159.81
Electric Ratepayer Bill Savings	10006	HH income 50-75k	$6,927,018.09
Electric Ratepayer Bill Savings	10007	HH income 75-100k	$3,738,358.32
Electric Ratepayer Bill Savings	10008	HH income 100-150k	$2,562,784.03
Electric Ratepayer Bill Savings	10009	HH income over 150k	$1,358,062.22
Natural Gas Ratepayer Bill Savings	10001	HH income less than 10k	$555,539.15

Category Name	Sector Code	Sector Description	Amount
Natural Gas Ratepayer Bill Savings	10002	HH income 10-15k	$443,496.22
Natural Gas Ratepayer Bill Savings	10003	HH income 15-25k	$936,033.18
Natural Gas Ratepayer Bill Savings	10004	HH income 25-35k	$1,014,355.56
Natural Gas Ratepayer Bill Savings	10005	HH income 35-50k	$1,396,876.96
Natural Gas Ratepayer Bill Savings	10006	HH income 50-75k	$1,843,028.08
Natural Gas Ratepayer Bill Savings	10007	HH income 75-100k	$994,641.46
Natural Gas Ratepayer Bill Savings	10008	HH income 100-150k	$681,863.81
Natural Gas Ratepayer Bill Savings	10009	HH income over 150k	$361,331.06

Table 112. 2010 SDR Future-Year Energy Bill Reductions

Category Name	Sector Code	Sector Description	Amount
Future Electric Revenue Loss	31	Electric power generation, transmission, and distribution	-$588,258,234.87
Future Natural Gas Revenue Loss	32	Natural gas distribution	-$171,737,876.71
Future Electric Ratepayer Bill Savings	10001	HH income less than 10k	$39,722,123.19
Future Electric Ratepayer Bill Savings	10002	HH income 10-15k	$31,710,836.87
Future Electric Ratepayer Bill Savings	10003	HH income 15-25k	$66,928,182.03
Future Electric Ratepayer Bill Savings	10004	HH income 25-35k	$72,528,383.20
Future Electric Ratepayer Bill Savings	10005	HH income 35-50k	$99,879,402.63
Future Electric Ratepayer Bill Savings	10006	HH income 50-75k	$131,780,070.38
Future Electric Ratepayer Bill Savings	10007	HH income 75-100k	$71,118,786.86
Future Electric Ratepayer Bill Savings	10008	HH income 100-150k	$48,754,580.36
Future Electric Ratepayer Bill Savings	10009	HH income over 150k	$25,835,869.35
Future Natural Gas Ratepayer Bill Savings	10001	HH income less than 10k	$11,596,596.00

Category Name	Sector Code	Sector Description	Amount
Future Natural Gas Ratepayer Bill Savings	10002	HH income 10-15k	$9,257,757.00
Future Natural Gas Ratepayer Bill Savings	10003	HH income 15-25k	$19,539,214.57
Future Natural Gas Ratepayer Bill Savings	10004	HH income 25-35k	$21,174,154.13
Future Natural Gas Ratepayer Bill Savings	10005	HH income 35-50k	$29,159,092.93
Future Natural Gas Ratepayer Bill Savings	10006	HH income 50-75k	$38,472,269.73
Future Natural Gas Ratepayer Bill Savings	10007	HH income 75-100k	$20,762,632.33
Future Natural Gas Ratepayer Bill Savings	10008	HH income 100-150k	$14,233,558.69
Future Natural Gas Ratepayer Bill Savings	10009	HH income over 150k	$7,542,601.33

Table 113. 2010 SDR Ratepayer Program Payments and Utility Program Spending

Category Name	Sector Code	Sector Description	Amount
Ratepayer Program Payments	10001	HH income less than 10k	-$12,641,188.27
Ratepayer Program Payments	10002	HH income 10-15k	-$10,091,672.53
Ratepayer Program Payments	10003	HH income 15-25k	-$21,299,258.00
Ratepayer Program Payments	10004	HH income 25-35k	-$23,081,468.81
Ratepayer Program Payments	10005	HH income 35-50k	-$31,785,670.86
Ratepayer Program Payments	10006	HH income 50-75k	-$41,937,755.26
Ratepayer Program Payments	10007	HH income 75-100k	-$22,632,878.16
Ratepayer Program Payments	10008	HH income 100-150k	-$15,515,681.95
Ratepayer Program Payments	10009	HH income over 150k	-$8,222,019.93
Utility Program Spending	384	Office administrative services	$31,457,416.22
Utility Program Spending	374	Management, scientific, and technical consulting services	$62,140,265.14
Utility Program Spending	377	Advertising and related services	$16,662,650.72
Utility Program Spending	375	Environmental and other technical consulting services	$9,232,040.51

Table 114. 2010 SDR Project Spending

Category Name	Sector Code	Sector Description	Amount
Participant Electric Project Expenses	10001	HH income less than 10k	-$5,958,648.70
Participant Electric Project Expenses	10002	HH income 10-15k	-$4,756,889.15
Participant Electric Project Expenses	10003	HH income 15-25k	-$10,039,783.70
Participant Electric Project Expenses	10004	HH income 25-35k	-$10,879,860.43
Participant Electric Project Expenses	10005	HH income 35-50k	-$14,982,740.73
Participant Electric Project Expenses	10006	HH income 50-75k	-$19,768,106.09
Participant Electric Project Expenses	10007	HH income 75-100k	-$10,668,409.26
Participant Electric Project Expenses	10008	HH income 100-150k	-$7,313,592.37
Participant Electric Project Expenses	10009	HH income over 150k	-$3,875,595.18
Participant Natural Gas Project Expenses	10001	HH income less than 10k	-$7,006,881.20
Participant Natural Gas Project Expenses	10002	HH income 10-15k	-$5,593,710.73
Participant Natural Gas Project Expenses	10003	HH income 15-25k	-$11,805,960.57
Participant Natural Gas Project Expenses	10004	HH income 25-35k	-$12,793,821.77
Participant Natural Gas Project Expenses	10005	HH income 35-50k	-$17,618,471.82
Participant Natural Gas Project Expenses	10006	HH income 50-75k	-$23,245,668.23
Participant Natural Gas Project Expenses	10007	HH income 75-100k	-$12,545,172.57
Participant Natural Gas Project Expenses	10008	HH income 100-150k	-$8,600,183.60
Participant Natural Gas Project Expenses	10009	HH income over 150k	-$4,557,381.44
Participant Incentives Spent	10001	HH income less than 10k	-$4,572,468.68
Participant Incentives Spent	10002	HH income 10-15k	-$3,650,278.41
Participant Incentives Spent	10003	HH income 15-25k	-$7,704,195.84

Category Name	Sector Code	Sector Description	Amount
Participant Incentives Spent	10004	HH income 25-35k	-$8,348,842.77
Participant Incentives Spent	10005	HH income 35-50k	-$11,497,256.54
Participant Incentives Spent	10006	HH income 50-75k	-$15,169,386.65
Participant Incentives Spent	10007	HH income 75-100k	-$8,186,582.18
Participant Incentives Spent	10008	HH income 100-150k	-$5,612,207.36
Participant Incentives Spent	10009	HH income over 150k	-$2,974,002.75
Industry Project Revenue	374	Management, scientific, and technical consulting services	$25,972,609.87
Industry Project Revenue	375	Environmental and other technical consulting services	$25,972,609.87
Industry Project Revenue	40	Maintenance and repair construction of residential structures	$25,972,609.87
Industry Project Revenue	39	Maintenance and repair construction of nonresidential structures	$25,972,609.87
Industry Project Revenue	319	Wholesale trade	$25,972,609.87
Industry Project Revenue	216	Air conditioning, refrigeration, and warm air heating equipment manufacturing	$12,986,304.94
Industry Project Revenue	215	Heating equipment (except warm air furnaces) manufacturing	$12,986,304.94
Industry Project Revenue	250	Automatic environmental control manufacturing	$12,986,304.94
Industry Project Revenue	199	Plumbing fixture fitting and trim manufacturing	$12,986,304.94
Industry Project Revenue	264	Household laundry equipment manufacturing	$12,986,304.94
Industry Project Revenue	265	Other major household appliance manufacturing	$12,986,304.94
Industry Project Revenue	168	Mineral wool manufacturing	$12,986,304.94
Industry Project Revenue	147	Urethane and other foam product (except polystyrene) manufacturing	$12,986,304.94

Category Name	Sector Code	Sector Description	Amount
Industry Project Revenue	149	Other plastics product manufacturing	$12,986,304.94
Industry Project Revenue	390	Waste management and remediation services	$12,986,304.94

Table 115. 2010 SDR First-Year and Future-Year Avoided Utility Costs

Category Name	Sector Code	Sector Description	Amount
Avoided Utility Electric Costs	31	Electric power generation, transmission, and distribution	$28,066,427.37
Avoided Utility Natural Gas Costs	32	Natural gas distribution	$6,847,976.18
Future Avoided Utility Electric Costs	31	Electric power generation, transmission, and distribution	$612,509,015.21
Future Avoided Utility Natural Gas Costs	32	Natural gas distribution	$131,113,783.48

Table 116. 2010 SDR Baseline Ratepayer Expenses

Category Name	Sector Code	Sector Description	Amount
Baseline Ratepayer Expenditures	10001	HH income less than 10k	-$25,606,718.17
Baseline Ratepayer Expenditures	10002	HH income 10-15k	-$20,442,272.41
Baseline Ratepayer Expenditures	10003	HH income 15-25k	-$43,145,002.27
Baseline Ratepayer Expenditures	10004	HH income 25-35k	-$46,755,151.01
Baseline Ratepayer Expenditures	10005	HH income 35-50k	-$64,386,883.41
Baseline Ratepayer Expenditures	10006	HH income 50-75k	-$84,951,529.58
Baseline Ratepayer Expenditures	10007	HH income 75-100k	-$45,846,460.00
Baseline Ratepayer Expenditures	10008	HH income 100-150k	-$31,429,457.91
Baseline Ratepayer Expenditures	10009	HH income over 150k	-$16,654,996.56

Table 117. 2010 SDR Baseline Ratepayers Expenses Received

Category Name	Sector Code	Sector Description	Amount
Electric Ratepayer Expenses Received	31	Electric power generation, transmission, and distribution	$196,713,118.75
Natural Gas Ratepayer Expenses Received	32	Natural gas distribution	$182,505,352.57

Utility Discount Rate Inputs

Table 118 through Table 124 show the 2010 model inputs calculated with the UDR.

Table 118. 2010 UDR Incentives Received by Ratepayers

Category Name	Sector Code	Sector Description	Amount
Incentives Received	10001	HH income less than 10k	$4,572,468.68
Incentives Received	10002	HH income 10-15k	$3,650,278.41
Incentives Received	10003	HH income 15-25k	$7,704,195.84
Incentives Received	10004	HH income 25-35k	$8,348,842.77
Incentives Received	10005	HH income 35-50k	$11,497,256.54
Incentives Received	10006	HH income 50-75k	$15,169,386.65
Incentives Received	10007	HH income 75-100k	$8,186,582.18
Incentives Received	10008	HH income 100-150k	$5,612,207.36
Incentives Received	10009	HH income over 150k	$2,974,002.75

Table 119. 2010 UDR First-Year Energy Bill Reductions

Category Name	Sector Code	Sector Description	Amount
Electric Revenue Loss	31	Electric power generation, transmission, and distribution	-$30,921,788.28
Natural Gas Revenue Loss	32	Natural gas distribution	-$8,227,165.48
Electric Ratepayer Bill Savings	10001	HH income less than 10k	$2,087,993.01
Electric Ratepayer Bill Savings	10002	HH income 10-15k	$1,666,879.83
Electric Ratepayer Bill Savings	10003	HH income 15-25k	$3,518,079.22
Electric Ratepayer Bill Savings	10004	HH income 25-35k	$3,812,453.74
Electric Ratepayer Bill Savings	10005	HH income 35-50k	$5,250,159.81
Electric Ratepayer Bill Savings	10006	HH income 50-75k	$6,927,018.09
Electric Ratepayer Bill Savings	10007	HH income 75-100k	$3,738,358.32
Electric Ratepayer Bill Savings	10008	HH income 100-150k	$2,562,784.03
Electric Ratepayer Bill Savings	10009	HH income over 150k	$1,358,062.22
Natural Gas Ratepayer Bill Savings	10001	HH income less than 10k	$555,539.15
Natural Gas Ratepayer Bill Savings	10002	HH income 10-15k	$443,496.22
Natural Gas Ratepayer Bill Savings	10003	HH income 15-25k	$936,033.18

Category Name	Sector Code	Sector Description	Amount
Natural Gas Ratepayer Bill Savings	10004	HH income 25-35k	$1,014,355.56
Natural Gas Ratepayer Bill Savings	10005	HH income 35-50k	$1,396,876.96
Natural Gas Ratepayer Bill Savings	10006	HH income 50-75k	$1,843,028.08
Natural Gas Ratepayer Bill Savings	10007	HH income 75-100k	$994,641.46
Natural Gas Ratepayer Bill Savings	10008	HH income 100-150k	$681,863.81
Natural Gas Ratepayer Bill Savings	10009	HH income over 150k	$361,331.06

Table 120. 2010 UDR Future-Year Energy Bill Reductions

Category Name	Sector Code	Sector Description	Amount
Future Electric Revenue Loss	31	Electric power generation, transmission, and distribution	-$477,046,793.48
Future Natural Gas Revenue Loss	32	Natural gas distribution	-$134,946,755.87
Future Electric Ratepayer Bill Savings	10001	HH income less than 10k	$32,212,573.28
Future Electric Ratepayer Bill Savings	10002	HH income 10-15k	$25,715,837.28
Future Electric Ratepayer Bill Savings	10003	HH income 15-25k	$54,275,270.18
Future Electric Ratepayer Bill Savings	10004	HH income 25-35k	$58,816,741.68
Future Electric Ratepayer Bill Savings	10005	HH income 35-50k	$80,996,994.07
Future Electric Ratepayer Bill Savings	10006	HH income 50-75k	$106,866,774.31
Future Electric Ratepayer Bill Savings	10007	HH income 75-100k	$57,673,632.45
Future Electric Ratepayer Bill Savings	10008	HH income 100-150k	$39,537,425.66
Future Electric Ratepayer Bill Savings	10009	HH income over 150k	$20,951,544.57
Future Natural Gas Ratepayer Bill Savings	10001	HH income less than 10k	$9,112,276.45
Future Natural Gas Ratepayer Bill Savings	10002	HH income 10-15k	$7,274,483.06
Future Natural Gas Ratepayer Bill Savings	10003	HH income 15-25k	$15,353,361.00

Category Name	Sector Code	Sector Description	Amount
Future Natural Gas Ratepayer Bill Savings	10004	HH income 25-35k	$16,638,050.16
Future Natural Gas Ratepayer Bill Savings	10005	HH income 35-50k	$22,912,388.75
Future Natural Gas Ratepayer Bill Savings	10006	HH income 50-75k	$30,230,419.11
Future Natural Gas Ratepayer Bill Savings	10007	HH income 75-100k	$16,314,688.00
Future Natural Gas Ratepayer Bill Savings	10008	HH income 100-150k	$11,184,326.99
Future Natural Gas Ratepayer Bill Savings	10009	HH income over 150k	$5,926,762.34

Table 121. 2010 UDR Ratepayer Program Payments and Utility Program Spending

Category Name	Sector Code	Sector Description	Amount
Ratepayer Program Payments	10001	HH income less than 10k	-$12,641,188.27
Ratepayer Program Payments	10002	HH income 10-15k	-$10,091,672.53
Ratepayer Program Payments	10003	HH income 15-25k	-$21,299,258.00
Ratepayer Program Payments	10004	HH income 25-35k	-$23,081,468.81
Ratepayer Program Payments	10005	HH income 35-50k	-$31,785,670.86
Ratepayer Program Payments	10006	HH income 50-75k	-$41,937,755.26
Ratepayer Program Payments	10007	HH income 75-100k	-$22,632,878.16
Ratepayer Program Payments	10008	HH income 100-150k	-$15,515,681.95
Ratepayer Program Payments	10009	HH income over 150k	-$8,222,019.93
Utility Program Spending	384	Office administrative services	$31,457,416.22
Utility Program Spending	374	Management, scientific, and technical consulting services	$62,140,265.14
Utility Program Spending	377	Advertising and related services	$16,662,650.72
Utility Program Spending	375	Environmental and other technical consulting services	$9,232,040.51

Table 122. 2010 UDR Project Spending

Category Name	Sector Code	Sector Description	Amount
Participant Electric Project Expenses	10001	HH income less than 10k	-$5,958,648.70
Participant Electric Project Expenses	10002	HH income 10-15k	-$4,756,889.15
Participant Electric Project Expenses	10003	HH income 15-25k	-$10,039,783.70
Participant Electric Project Expenses	10004	HH income 25-35k	-$10,879,860.43
Participant Electric Project Expenses	10005	HH income 35-50k	-$14,982,740.73
Participant Electric Project Expenses	10006	HH income 50-75k	-$19,768,106.09
Participant Electric Project Expenses	10007	HH income 75-100k	-$10,668,409.26
Participant Electric Project Expenses	10008	HH income 100-150k	-$7,313,592.37
Participant Electric Project Expenses	10009	HH income over 150k	-$3,875,595.18
Participant Natural Gas Project Expenses	10001	HH income less than 10k	-$7,006,881.20
Participant Natural Gas Project Expenses	10002	HH income 10-15k	-$5,593,710.73
Participant Natural Gas Project Expenses	10003	HH income 15-25k	-$11,805,960.57
Participant Natural Gas Project Expenses	10004	HH income 25-35k	-$12,793,821.77
Participant Natural Gas Project Expenses	10005	HH income 35-50k	-$17,618,471.82
Participant Natural Gas Project Expenses	10006	HH income 50-75k	-$23,245,668.23
Participant Natural Gas Project Expenses	10007	HH income 75-100k	-$12,545,172.57
Participant Natural Gas Project Expenses	10008	HH income 100-150k	-$8,600,183.60
Participant Natural Gas Project Expenses	10009	HH income over 150k	-$4,557,381.44
Participant Incentives Spent	10001	HH income less than 10k	-$4,572,468.68
Participant Incentives Spent	10002	HH income 10-15k	-$3,650,278.41
Participant Incentives Spent	10003	HH income 15-25k	-$7,704,195.84

Category Name	Sector Code	Sector Description	Amount
Participant Incentives Spent	10004	HH income 25-35k	-$8,348,842.77
Participant Incentives Spent	10005	HH income 35-50k	-$11,497,256.54
Participant Incentives Spent	10006	HH income 50-75k	-$15,169,386.65
Participant Incentives Spent	10007	HH income 75-100k	-$8,186,582.18
Participant Incentives Spent	10008	HH income 100-150k	-$5,612,207.36
Participant Incentives Spent	10009	HH income over 150k	-$2,974,002.75
Industry Project Revenue	374	Management, scientific, and technical consulting services	$25,972,609.87
Industry Project Revenue	375	Environmental and other technical consulting services	$25,972,609.87
Industry Project Revenue	40	Maintenance and repair construction of residential structures	$25,972,609.87
Industry Project Revenue	39	Maintenance and repair construction of nonresidential structures	$25,972,609.87
Industry Project Revenue	319	Wholesale trade	$25,972,609.87
Industry Project Revenue	216	Air conditioning, refrigeration, and warm air heating equipment manufacturing	$12,986,304.94
Industry Project Revenue	215	Heating equipment (except warm air furnaces) manufacturing	$12,986,304.94
Industry Project Revenue	250	Automatic environmental control manufacturing	$12,986,304.94
Industry Project Revenue	199	Plumbing fixture fitting and trim manufacturing	$12,986,304.94
Industry Project Revenue	264	Household laundry equipment manufacturing	$12,986,304.94
Industry Project Revenue	265	Other major household appliance manufacturing	$12,986,304.94
Industry Project Revenue	168	Mineral wool manufacturing	$12,986,304.94
Industry Project Revenue	147	Urethane and other foam product (except polystyrene) manufacturing	$12,986,304.94

Category Name	Sector Code	Sector Description	Amount
Industry Project Revenue	149	Other plastics product manufacturing	$12,986,304.94
Industry Project Revenue	390	Waste management and remediation services	$12,986,304.94

Table 123. 2010 UDR First-Year and Future-Year Avoided Utility Costs

Category Name	Sector Code	Sector Description	Amount
Avoided Utility Electric Costs	31	Electric power generation, transmission, and distribution	$28,066,427.37
Avoided Utility Natural Gas Costs	32	Natural gas distribution	$6,847,976.18
Future Avoided Utility Electric Costs	31	Electric power generation, transmission, and distribution	$490,342,586.54
Future Avoided Utility Natural Gas Costs	32	Natural gas distribution	$102,715,547.12

Table 124. 2010 UDR Baseline Ratepayer Expenses

Category Name	Sector Code	Sector Description	Amount
Baseline Ratepayer Expenditures	10001	HH income less than 10k	-$25,606,718.17
Baseline Ratepayer Expenditures	10002	HH income 10-15k	-$20,442,272.41
Baseline Ratepayer Expenditures	10003	HH income 15-25k	-$43,145,002.27
Baseline Ratepayer Expenditures	10004	HH income 25-35k	-$46,755,151.01
Baseline Ratepayer Expenditures	10005	HH income 35-50k	-$64,386,883.41
Baseline Ratepayer Expenditures	10006	HH income 50-75k	-$84,951,529.58
Baseline Ratepayer Expenditures	10007	HH income 75-100k	-$45,846,460.00
Baseline Ratepayer Expenditures	10008	HH income 100-150k	-$31,429,457.91
Baseline Ratepayer Expenditures	10009	HH income over 150k	-$16,654,996.56

Table 125. 2010 UDR Baseline Ratepayers Expenses Received

Category Name	Sector Code	Sector Description	Amount
Electric Ratepayer Expenses Received	31	Electric power generation, transmission, and distribution	$196,713,118.75
Natural Gas Ratepayer Expenses Received	32	Natural gas distribution	$182,505,352.57

2011 Model Inputs

Societal Discount Rate Inputs

Table 126 through Table 132 show the 2011 model inputs calculated with the SDR.

Table 126. 2011 SDR Incentives Received by Ratepayers

Category Name	Sector Code	Sector Description	Amount
Incentives Received	10001	HH income less than 10k	$5,012,069.20
Incentives Received	10002	HH income 10-15k	$4,355,329.94
Incentives Received	10003	HH income 15-25k	$8,609,779.63
Incentives Received	10004	HH income 25-35k	$8,562,013.48
Incentives Received	10005	HH income 35-50k	$11,818,100.18
Incentives Received	10006	HH income 50-75k	$16,817,856.34
Incentives Received	10007	HH income 75-100k	$11,809,744.31
Incentives Received	10008	HH income 100-150k	$11,337,803.05
Incentives Received	10009	HH income over 150k	$6,899,030.92

Table 127. 2011 SDR First-Year Energy Bill Reductions

Category Name	Sector Code	Sector Description	Amount
Electric Revenue Loss	31	Electric power generation, transmission, and distribution	-$32,834,573.72
Natural Gas Revenue Loss	32	Natural gas distribution	-$8,784,206.72
Electric Ratepayer Bill Savings	10001	HH income less than 10k	$1,931,070.41
Electric Ratepayer Bill Savings	10002	HH income 10-15k	$1,678,039.24
Electric Ratepayer Bill Savings	10003	HH income 15-25k	$3,317,210.92
Electric Ratepayer Bill Savings	10004	HH income 25-35k	$3,298,807.39
Electric Ratepayer Bill Savings	10005	HH income 35-50k	$4,553,325.72
Electric Ratepayer Bill Savings	10006	HH income 50-75k	$6,479,652.11
Electric Ratepayer Bill Savings	10007	HH income 75-100k	$4,550,106.33
Electric Ratepayer Bill Savings	10008	HH income 100-150k	$4,368,274.89
Electric Ratepayer Bill Savings	10009	HH income over 150k	$2,658,086.70
Natural Gas Ratepayer Bill Savings	10001	HH income less than 10k	$516,617.69

Category Name	Sector Code	Sector Description	Amount
Natural Gas Ratepayer Bill Savings	10002	HH income 10-15k	$448,924.47
Natural Gas Ratepayer Bill Savings	10003	HH income 15-25k	$887,450.73
Natural Gas Ratepayer Bill Savings	10004	HH income 25-35k	$882,527.25
Natural Gas Ratepayer Bill Savings	10005	HH income 35-50k	$1,218,147.52
Natural Gas Ratepayer Bill Savings	10006	HH income 50-75k	$1,733,496.04
Natural Gas Ratepayer Bill Savings	10007	HH income 75-100k	$1,217,286.24
Natural Gas Ratepayer Bill Savings	10008	HH income 100-150k	$1,168,641.02
Natural Gas Ratepayer Bill Savings	10009	HH income over 150k	$711,115.77

Table 128. 2011 SDR Future-Year Energy Bill Reductions

Category Name	Sector Code	Sector Description	Amount
Future Electric Revenue Loss	31	Electric power generation, transmission, and distribution	-$614,747,855.75
Future Natural Gas Revenue Loss	32	Natural gas distribution	-$185,684,922.16
Future Electric Ratepayer Bill Savings	10001	HH income less than 10k	$36,154,615.73
Future Electric Ratepayer Bill Savings	10002	HH income 10-15k	$31,417,219.96
Future Electric Ratepayer Bill Savings	10003	HH income 15-25k	$62,106,739.08
Future Electric Ratepayer Bill Savings	10004	HH income 25-35k	$61,762,177.44
Future Electric Ratepayer Bill Savings	10005	HH income 35-50k	$85,249,994.31
Future Electric Ratepayer Bill Savings	10006	HH income 50-75k	$121,315,789.77
Future Electric Ratepayer Bill Savings	10007	HH income 75-100k	$85,189,719.11
Future Electric Ratepayer Bill Savings	10008	HH income 100-150k	$81,785,365.72
Future Electric Ratepayer Bill Savings	10009	HH income over 150k	$49,766,234.62
Future Natural Gas Ratepayer Bill Savings	10001	HH income less than 10k	$10,920,521.23

Category Name	Sector Code	Sector Description	Amount
Future Natural Gas Ratepayer Bill Savings	10002	HH income 10-15k	$9,489,588.27
Future Natural Gas Ratepayer Bill Savings	10003	HH income 15-25k	$18,759,374.11
Future Natural Gas Ratepayer Bill Savings	10004	HH income 25-35k	$18,655,299.08
Future Natural Gas Ratepayer Bill Savings	10005	HH income 35-50k	$25,749,806.87
Future Natural Gas Ratepayer Bill Savings	10006	HH income 50-75k	$36,643,499.88
Future Natural Gas Ratepayer Bill Savings	10007	HH income 75-100k	$25,731,600.71
Future Natural Gas Ratepayer Bill Savings	10008	HH income 100-150k	$24,703,313.93
Future Natural Gas Ratepayer Bill Savings	10009	HH income over 150k	$15,031,918.07

Table 129. 2011 SDR Ratepayer Program Payments and Utility Program Spending

Category Name	Sector Code	Sector Description	Amount
Ratepayer Program Payments	10001	HH income less than 10k	-$10,713,667.09
Ratepayer Program Payments	10002	HH income 10-15k	-$9,309,838.56
Ratepayer Program Payments	10003	HH income 15-25k	-$18,404,038.14
Ratepayer Program Payments	10004	HH income 25-35k	-$18,301,934.48
Ratepayer Program Payments	10005	HH income 35-50k	-$25,262,059.64
Ratepayer Program Payments	10006	HH income 50-75k	-$35,949,406.70
Ratepayer Program Payments	10007	HH income 75-100k	-$25,244,198.34
Ratepayer Program Payments	10008	HH income 100-150k	-$24,235,389.14
Ratepayer Program Payments	10009	HH income over 150k	-$14,747,186.76
Utility Program Spending	384	Office administrative services	$18,581,193.93
Utility Program Spending	374	Management, scientific, and technical consulting services	$61,548,545.73
Utility Program Spending	377	Advertising and related services	$12,371,865.16
Utility Program Spending	375	Environmental and other technical consulting services	$4,444,386.99

Table 130. 2011 SDR Project Spending

Category Name	Sector Code	Sector Description	Amount
Participant Electric Project Expenses	10001	HH income less than 10k	-$4,968,049.59
Participant Electric Project Expenses	10002	HH income 10-15k	-$4,317,078.29
Participant Electric Project Expenses	10003	HH income 15-25k	-$8,534,162.33
Participant Electric Project Expenses	10004	HH income 25-35k	-$8,486,815.70
Participant Electric Project Expenses	10005	HH income 35-50k	-$11,714,305.10
Participant Electric Project Expenses	10006	HH income 50-75k	-$16,670,149.79
Participant Electric Project Expenses	10007	HH income 75-100k	-$11,706,022.61
Participant Electric Project Expenses	10008	HH income 100-150k	-$11,238,226.29
Participant Electric Project Expenses	10009	HH income over 150k	-$6,838,438.65
Participant Natural Gas Project Expenses	10001	HH income less than 10k	-$6,020,503.70
Participant Natural Gas Project Expenses	10002	HH income 10-15k	-$5,231,627.70
Participant Natural Gas Project Expenses	10003	HH income 15-25k	-$10,342,077.90
Participant Natural Gas Project Expenses	10004	HH income 25-35k	-$10,284,701.14
Participant Natural Gas Project Expenses	10005	HH income 35-50k	-$14,195,916.50
Participant Natural Gas Project Expenses	10006	HH income 50-75k	-$20,201,629.76
Participant Natural Gas Project Expenses	10007	HH income 75-100k	-$14,185,879.41
Participant Natural Gas Project Expenses	10008	HH income 100-150k	-$13,618,983.00
Participant Natural Gas Project Expenses	10009	HH income over 150k	-$8,287,124.44
Participant Incentives Spent	10001	HH income less than 10k	-$5,012,069.20
Participant Incentives Spent	10002	HH income 10-15k	-$4,355,329.94
Participant Incentives Spent	10003	HH income 15-25k	-$8,609,779.63

Category Name	Sector Code	Sector Description	Amount
Participant Incentives Spent	10004	HH income 25-35k	-$8,562,013.48
Participant Incentives Spent	10005	HH income 35-50k	-$11,818,100.18
Participant Incentives Spent	10006	HH income 50-75k	-$16,817,856.34
Participant Incentives Spent	10007	HH income 75-100k	-$11,809,744.31
Participant Incentives Spent	10008	HH income 100-150k	-$11,337,803.05
Participant Incentives Spent	10009	HH income over 150k	-$6,899,030.92
Industry Project Revenue	374	Management, scientific, and technical consulting services	$27,206,341.90
Industry Project Revenue	375	Environmental and other technical consulting services	$27,206,341.90
Industry Project Revenue	40	Maintenance and repair construction of residential structures	$27,206,341.90
Industry Project Revenue	39	Maintenance and repair construction of nonresidential structures	$27,206,341.90
Industry Project Revenue	319	Wholesale trade	$27,206,341.90
Industry Project Revenue	216	Air conditioning, refrigeration, and warm air heating equipment manufacturing	$13,603,170.95
Industry Project Revenue	215	Heating equipment (except warm air furnaces) manufacturing	$13,603,170.95
Industry Project Revenue	250	Automatic environmental control manufacturing	$13,603,170.95
Industry Project Revenue	199	Plumbing fixture fitting and trim manufacturing	$13,603,170.95
Industry Project Revenue	264	Household laundry equipment manufacturing	$13,603,170.95
Industry Project Revenue	265	Other major household appliance manufacturing	$13,603,170.95
Industry Project Revenue	168	Mineral wool manufacturing	$13,603,170.95
Industry Project Revenue	147	Urethane and other foam product (except polystyrene) manufacturing	$13,603,170.95

Category Name	Sector Code	Sector Description	Amount
Industry Project Revenue	149	Other plastics product manufacturing	$13,603,170.95
Industry Project Revenue	390	Waste management and remediation services	$13,603,170.95

Table 131. 2011 SDR First-Year and Future-Year Avoided Utility Costs

Category Name	Sector Code	Sector Description	Amount
Avoided Utility Electric Costs	31	Electric power generation, transmission, and distribution	$30,006,572.28
Avoided Utility Natural Gas Costs	32	Natural gas distribution	$7,256,992.41
Future Avoided Utility Electric Costs	31	Electric power generation, transmission, and distribution	$656,140,994.18
Future Avoided Utility Natural Gas Costs	32	Natural gas distribution	$141,123,700.03

Table 132. 2011 SDR Baseline Ratepayer Expenses

Category Name	Sector Code	Sector Description	Amount
Baseline Ratepayer Expenditures	10001	HH income less than 10k	-$21,702,220.38
Baseline Ratepayer Expenditures	10002	HH income 10-15k	-$18,858,544.55
Baseline Ratepayer Expenditures	10003	HH income 15-25k	-$37,280,278.37
Baseline Ratepayer Expenditures	10004	HH income 25-35k	-$37,073,451.32
Baseline Ratepayer Expenditures	10005	HH income 35-50k	-$51,172,281.24
Baseline Ratepayer Expenditures	10006	HH income 50-75k	-$72,821,186.25
Baseline Ratepayer Expenditures	10007	HH income 75-100k	-$51,136,100.37
Baseline Ratepayer Expenditures	10008	HH income 100-150k	-$49,092,598.42
Baseline Ratepayer Expenditures	10009	HH income over 150k	-$29,872,749.85

Table 133. 2011 SDR Baseline Ratepayers Expenses Received

Category Name	Sector Code	Sector Description	Amount
Electric Ratepayer Expenses Received	31	Electric power generation, transmission, and distribution	$184,953,850.89
Natural Gas Ratepayer Expenses Received	32	Natural gas distribution	$184,055,559.87

Utility Discount Rate Inputs

Table 134 through Table 140 show the 2011 model inputs calculated with the UDR.

Table 134. 2011 UDR Incentives Received by Ratepayers

Category Name	Sector Code	Sector Description	Amount
Incentives Received	10001	HH income less than 10k	$5,012,069.20
Incentives Received	10002	HH income 10-15k	$4,355,329.94
Incentives Received	10003	HH income 15-25k	$8,609,779.63
Incentives Received	10004	HH income 25-35k	$8,562,013.48
Incentives Received	10005	HH income 35-50k	$11,818,100.18
Incentives Received	10006	HH income 50-75k	$16,817,856.34
Incentives Received	10007	HH income 75-100k	$11,809,744.31
Incentives Received	10008	HH income 100-150k	$11,337,803.05
Incentives Received	10009	HH income over 150k	$6,899,030.92

Table 135. 2011 UDR First-Year Energy Bill Reductions

Category Name	Sector Code	Sector Description	Amount
Electric Revenue Loss	31	Electric power generation, transmission, and distribution	-$32,834,573.72
Natural Gas Revenue Loss	32	Natural gas distribution	-$8,784,206.72
Electric Ratepayer Bill Savings	10001	HH income less than 10k	$1,931,070.41
Electric Ratepayer Bill Savings	10002	HH income 10-15k	$1,678,039.24
Electric Ratepayer Bill Savings	10003	HH income 15-25k	$3,317,210.92
Electric Ratepayer Bill Savings	10004	HH income 25-35k	$3,298,807.39
Electric Ratepayer Bill Savings	10005	HH income 35-50k	$4,553,325.72
Electric Ratepayer Bill Savings	10006	HH income 50-75k	$6,479,652.11
Electric Ratepayer Bill Savings	10007	HH income 75-100k	$4,550,106.33
Electric Ratepayer Bill Savings	10008	HH income 100-150k	$4,368,274.89
Electric Ratepayer Bill Savings	10009	HH income over 150k	$2,658,086.70
Natural Gas Ratepayer Bill Savings	10001	HH income less than 10k	$516,617.69
Natural Gas Ratepayer Bill Savings	10002	HH income 10-15k	$448,924.47
Natural Gas Ratepayer Bill Savings	10003	HH income 15-25k	$887,450.73

Category Name	Sector Code	Sector Description	Amount
Natural Gas Ratepayer Bill Savings	10004	HH income 25-35k	$882,527.25
Natural Gas Ratepayer Bill Savings	10005	HH income 35-50k	$1,218,147.52
Natural Gas Ratepayer Bill Savings	10006	HH income 50-75k	$1,733,496.04
Natural Gas Ratepayer Bill Savings	10007	HH income 75-100k	$1,217,286.24
Natural Gas Ratepayer Bill Savings	10008	HH income 100-150k	$1,168,641.02
Natural Gas Ratepayer Bill Savings	10009	HH income over 150k	$711,115.77

Table 136. 2011 UDR Future-Year Energy Bill Reductions

Category Name	Sector Code	Sector Description	Amount
Future Electric Revenue Loss	31	Electric power generation, transmission, and distribution	-$498,934,346.02
Future Natural Gas Revenue Loss	32	Natural gas distribution	-$145,461,506.34
Future Electric Ratepayer Bill Savings	10001	HH income less than 10k	$29,343,379.38
Future Electric Ratepayer Bill Savings	10002	HH income 10-15k	$25,498,470.55
Future Electric Ratepayer Bill Savings	10003	HH income 15-25k	$50,406,333.19
Future Electric Ratepayer Bill Savings	10004	HH income 25-35k	$50,126,684.17
Future Electric Ratepayer Bill Savings	10005	HH income 35-50k	$69,189,586.86
Future Electric Ratepayer Bill Savings	10006	HH income 50-75k	$98,460,878.98
Future Electric Ratepayer Bill Savings	10007	HH income 75-100k	$69,140,667.02
Future Electric Ratepayer Bill Savings	10008	HH income 100-150k	$66,377,666.19
Future Electric Ratepayer Bill Savings	10009	HH income over 150k	$40,390,679.68
Future Natural Gas Ratepayer Bill Savings	10001	HH income less than 10k	$8,554,897.45
Future Natural Gas Ratepayer Bill Savings	10002	HH income 10-15k	$7,433,935.88
Future Natural Gas Ratepayer Bill Savings	10003	HH income 15-25k	$14,695,683.34

Category Name	Sector Code	Sector Description	Amount
Future Natural Gas Ratepayer Bill Savings	10004	HH income 25-35k	$14,614,153.24
Future Natural Gas Ratepayer Bill Savings	10005	HH income 35-50k	$20,171,835.45
Future Natural Gas Ratepayer Bill Savings	10006	HH income 50-75k	$28,705,716.27
Future Natural Gas Ratepayer Bill Savings	10007	HH income 75-100k	$20,157,573.14
Future Natural Gas Ratepayer Bill Savings	10008	HH income 100-150k	$19,352,035.77
Future Natural Gas Ratepayer Bill Savings	10009	HH income over 150k	$11,775,675.81

Table 137. 2011 UDR Ratepayer Program Payments and Utility Program Spending

Category Name	Sector Code	Sector Description	Amount
Ratepayer Program Payments	10001	HH income less than 10k	-$10,713,667.09
Ratepayer Program Payments	10002	HH income 10-15k	-$9,309,838.56
Ratepayer Program Payments	10003	HH income 15-25k	-$18,404,038.14
Ratepayer Program Payments	10004	HH income 25-35k	-$18,301,934.48
Ratepayer Program Payments	10005	HH income 35-50k	-$25,262,059.64
Ratepayer Program Payments	10006	HH income 50-75k	-$35,949,406.70
Ratepayer Program Payments	10007	HH income 75-100k	-$25,244,198.34
Ratepayer Program Payments	10008	HH income 100-150k	-$24,235,389.14
Ratepayer Program Payments	10009	HH income over 150k	-$14,747,186.76
Utility Program Spending	384	Office administrative services	$18,581,193.93
Utility Program Spending	374	Management, scientific, and technical consulting services	$61,548,545.73
Utility Program Spending	377	Advertising and related services	$12,371,865.16
Utility Program Spending	375	Environmental and other technical consulting services	$4,444,386.99

Table 138. 2011 UDR Project Spending

Category Name	Sector Code	Sector Description	Amount
Participant Electric Project Expenses	10001	HH income less than 10k	-$4,968,049.59
Participant Electric Project Expenses	10002	HH income 10-15k	-$4,317,078.29
Participant Electric Project Expenses	10003	HH income 15-25k	-$8,534,162.33
Participant Electric Project Expenses	10004	HH income 25-35k	-$8,486,815.70
Participant Electric Project Expenses	10005	HH income 35-50k	-$11,714,305.10
Participant Electric Project Expenses	10006	HH income 50-75k	-$16,670,149.79
Participant Electric Project Expenses	10007	HH income 75-100k	-$11,706,022.61
Participant Electric Project Expenses	10008	HH income 100-150k	-$11,238,226.29
Participant Electric Project Expenses	10009	HH income over 150k	-$6,838,438.65
Participant Natural Gas Project Expenses	10001	HH income less than 10k	-$6,020,503.70
Participant Natural Gas Project Expenses	10002	HH income 10-15k	-$5,231,627.70
Participant Natural Gas Project Expenses	10003	HH income 15-25k	-$10,342,077.90
Participant Natural Gas Project Expenses	10004	HH income 25-35k	-$10,284,701.14
Participant Natural Gas Project Expenses	10005	HH income 35-50k	-$14,195,916.50
Participant Natural Gas Project Expenses	10006	HH income 50-75k	-$20,201,629.76
Participant Natural Gas Project Expenses	10007	HH income 75-100k	-$14,185,879.41
Participant Natural Gas Project Expenses	10008	HH income 100-150k	-$13,618,983.00
Participant Natural Gas Project Expenses	10009	HH income over 150k	-$8,287,124.44
Participant Incentives Spent	10001	HH income less than 10k	-$5,012,069.20
Participant Incentives Spent	10002	HH income 10-15k	-$4,355,329.94
Participant Incentives Spent	10003	HH income 15-25k	-$8,609,779.63

Category Name	Sector Code	Sector Description	Amount
Participant Incentives Spent	10004	HH income 25-35k	-$8,562,013.48
Participant Incentives Spent	10005	HH income 35-50k	-$11,818,100.18
Participant Incentives Spent	10006	HH income 50-75k	-$16,817,856.34
Participant Incentives Spent	10007	HH income 75-100k	-$11,809,744.31
Participant Incentives Spent	10008	HH income 100-150k	-$11,337,803.05
Participant Incentives Spent	10009	HH income over 150k	-$6,899,030.92
Industry Project Revenue	374	Management, scientific, and technical consulting services	$27,206,341.90
Industry Project Revenue	375	Environmental and other technical consulting services	$27,206,341.90
Industry Project Revenue	40	Maintenance and repair construction of residential structures	$27,206,341.90
Industry Project Revenue	39	Maintenance and repair construction of nonresidential structures	$27,206,341.90
Industry Project Revenue	319	Wholesale trade	$27,206,341.90
Industry Project Revenue	216	Air conditioning, refrigeration, and warm air heating equipment manufacturing	$13,603,170.95
Industry Project Revenue	215	Heating equipment (except warm air furnaces) manufacturing	$13,603,170.95
Industry Project Revenue	250	Automatic environmental control manufacturing	$13,603,170.95
Industry Project Revenue	199	Plumbing fixture fitting and trim manufacturing	$13,603,170.95
Industry Project Revenue	264	Household laundry equipment manufacturing	$13,603,170.95
Industry Project Revenue	265	Other major household appliance manufacturing	$13,603,170.95
Industry Project Revenue	168	Mineral wool manufacturing	$13,603,170.95
Industry Project Revenue	147	Urethane and other foam product (except polystyrene) manufacturing	$13,603,170.95

Category Name	Sector Code	Sector Description	Amount
Industry Project Revenue	149	Other plastics product manufacturing	$13,603,170.95
Industry Project Revenue	390	Waste management and remediation services	$13,603,170.95

Table 139. 2011 UDR First-Year and Future-Year Avoided Utility Costs

Category Name	Sector Code	Sector Description	Amount
Avoided Utility Electric Costs	31	Electric power generation, transmission, and distribution	$30,006,572.28
Avoided Utility Natural Gas Costs	32	Natural gas distribution	$7,256,992.41
Future Avoided Utility Electric Costs	31	Electric power generation, transmission, and distribution	$525,624,087.13
Future Avoided Utility Natural Gas Costs	32	Natural gas distribution	$109,859,065.69

Table 140. 2011 UDR Baseline Ratepayer Expenses

Category Name	Sector Code	Sector Description	Amount
Baseline Ratepayer Expenditures	10001	HH income less than 10k	-$21,702,220.38
Baseline Ratepayer Expenditures	10002	HH income 10-15k	-$18,858,544.55
Baseline Ratepayer Expenditures	10003	HH income 15-25k	-$37,280,278.37
Baseline Ratepayer Expenditures	10004	HH income 25-35k	-$37,073,451.32
Baseline Ratepayer Expenditures	10005	HH income 35-50k	-$51,172,281.24
Baseline Ratepayer Expenditures	10006	HH income 50-75k	-$72,821,186.25
Baseline Ratepayer Expenditures	10007	HH income 75-100k	-$51,136,100.37
Baseline Ratepayer Expenditures	10008	HH income 100-150k	-$49,092,598.42
Baseline Ratepayer Expenditures	10009	HH income over 150k	-$29,872,749.85

Table 141. 2011 UDR Baseline Ratepayers Expenses Received

Category Name	Sector Code	Sector Description	Amount
Electric Ratepayer Expenses Received	31	Electric power generation, transmission, and distribution	$184,953,850.89
Natural Gas Ratepayer Expenses Received	32	Natural gas distribution	$184,055,559.87

2012 Model Inputs

Societal Discount Rate Inputs

Table 142 through Table 148 show the 2012 model inputs calculated with the SDR.

Table 142. 2012 SDR Incentives Received by Ratepayers

Category Name	Sector Code	Sector Description	Amount
Incentives Received	10001	HH income less than 10k	$5,862,940.11
Incentives Received	10002	HH income 10-15k	$5,093,029.95
Incentives Received	10003	HH income 15-25k	$10,068,401.92
Incentives Received	10004	HH income 25-35k	$10,010,791.05
Incentives Received	10005	HH income 35-50k	$13,814,623.01
Incentives Received	10006	HH income 50-75k	$19,649,595.68
Incentives Received	10007	HH income 75-100k	$13,792,556.13
Incentives Received	10008	HH income 100-150k	$13,236,702.99
Incentives Received	10009	HH income over 150k	$8,052,662.56

Table 143. 2012 SDR First-Year Energy Bill Reductions

Category Name	Sector Code	Sector Description	Amount
Electric Revenue Loss	31	Electric power generation, transmission, and distribution	-$31,304,492.17
Natural Gas Revenue Loss	32	Natural gas distribution	-$7,421,415.66
Electric Ratepayer Bill Savings	10001	HH income less than 10k	$1,843,080.54
Electric Ratepayer Bill Savings	10002	HH income 10-15k	$1,601,050.71
Electric Ratepayer Bill Savings	10003	HH income 15-25k	$3,165,114.32
Electric Ratepayer Bill Savings	10004	HH income 25-35k	$3,147,003.70
Electric Ratepayer Bill Savings	10005	HH income 35-50k	$4,342,780.65
Electric Ratepayer Bill Savings	10006	HH income 50-75k	$6,177,069.32
Electric Ratepayer Bill Savings	10007	HH income 75-100k	$4,335,843.68
Electric Ratepayer Bill Savings	10008	HH income 100-150k	$4,161,105.06
Electric Ratepayer Bill Savings	10009	HH income over 150k	$2,531,444.19
Natural Gas Ratepayer Bill Savings	10001	HH income less than 10k	$436,942.62

Category Name	Sector Code	Sector Description	Amount
Natural Gas Ratepayer Bill Savings	10002	HH income 10-15k	$379,564.14
Natural Gas Ratepayer Bill Savings	10003	HH income 15-25k	$750,359.69
Natural Gas Ratepayer Bill Savings	10004	HH income 25-35k	$746,066.17
Natural Gas Ratepayer Bill Savings	10005	HH income 35-50k	$1,029,551.29
Natural Gas Ratepayer Bill Savings	10006	HH income 50-75k	$1,464,409.60
Natural Gas Ratepayer Bill Savings	10007	HH income 75-100k	$1,027,906.73
Natural Gas Ratepayer Bill Savings	10008	HH income 100-150k	$986,481.11
Natural Gas Ratepayer Bill Savings	10009	HH income over 150k	$600,134.30

Table 144. 2012 SDR Future-Year Energy Bill Reductions

Category Name	Sector Code	Sector Description	Amount
Future Electric Revenue Loss	31	Electric power generation, transmission, and distribution	-$594,944,640.26
Future Natural Gas Revenue Loss	32	Natural gas distribution	-$182,683,237.95
Future Electric Ratepayer Bill Savings	10001	HH income less than 10k	$35,027,908.58
Future Electric Ratepayer Bill Savings	10002	HH income 10-15k	$30,428,110.20
Future Electric Ratepayer Bill Savings	10003	HH income 15-25k	$60,153,277.30
Future Electric Ratepayer Bill Savings	10004	HH income 25-35k	$59,809,083.37
Future Electric Ratepayer Bill Savings	10005	HH income 35-50k	$82,534,930.10
Future Electric Ratepayer Bill Savings	10006	HH income 50-75k	$117,395,748.36
Future Electric Ratepayer Bill Savings	10007	HH income 75-100k	$82,403,092.40
Future Electric Ratepayer Bill Savings	10008	HH income 100-150k	$79,082,169.35
Future Electric Ratepayer Bill Savings	10009	HH income over 150k	$48,110,320.60
Future Natural Gas Ratepayer Bill Savings	10001	HH income less than 10k	$10,755,642.33

Category Name	Sector Code	Sector Description	Amount
Future Natural Gas Ratepayer Bill Savings	10002	HH income 10-15k	$9,343,231.82
Future Natural Gas Ratepayer Bill Savings	10003	HH income 15-25k	$18,470,618.49
Future Natural Gas Ratepayer Bill Savings	10004	HH income 25-35k	$18,364,930.57
Future Natural Gas Ratepayer Bill Savings	10005	HH income 35-50k	$25,343,111.36
Future Natural Gas Ratepayer Bill Savings	10006	HH income 50-75k	$36,047,447.07
Future Natural Gas Ratepayer Bill Savings	10007	HH income 75-100k	$25,302,629.39
Future Natural Gas Ratepayer Bill Savings	10008	HH income 100-150k	$24,282,909.34
Future Natural Gas Ratepayer Bill Savings	10009	HH income over 150k	$14,772,717.58

Table 145. 2012 SDR Ratepayer Program Payments and Utility Program Spending

Category Name	Sector Code	Sector Description	Amount
Ratepayer Program Payments	10001	HH income less than 10k	-$11,778,663.06
Ratepayer Program Payments	10002	HH income 10-15k	-$10,231,911.41
Ratepayer Program Payments	10003	HH income 15-25k	-$20,227,447.59
Ratepayer Program Payments	10004	HH income 25-35k	-$20,111,707.19
Ratepayer Program Payments	10005	HH income 35-50k	-$27,753,616.23
Ratepayer Program Payments	10006	HH income 50-75k	-$39,476,092.64
Ratepayer Program Payments	10007	HH income 75-100k	-$27,709,283.81
Ratepayer Program Payments	10008	HH income 100-150k	-$26,592,573.30
Ratepayer Program Payments	10009	HH income over 150k	-$16,177,821.59
Utility Program Spending	384	Office administrative services	$18,610,017.22
Utility Program Spending	374	Management, scientific, and technical consulting services	$64,718,992.91
Utility Program Spending	377	Advertising and related services	$12,569,319.93
Utility Program Spending	375	Environmental and other technical consulting services	$4,579,483.35

Table 146. 2012 SDR Project Spending

Category Name	Sector Code	Sector Description	Amount
Participant Electric Project Expenses	10001	HH income less than 10k	-$5,493,832.86
Participant Electric Project Expenses	10002	HH income 10-15k	-$4,772,393.17
Participant Electric Project Expenses	10003	HH income 15-25k	-$9,434,535.62
Participant Electric Project Expenses	10004	HH income 25-35k	-$9,380,551.70
Participant Electric Project Expenses	10005	HH income 35-50k	-$12,944,909.62
Participant Electric Project Expenses	10006	HH income 50-75k	-$18,412,535.77
Participant Electric Project Expenses	10007	HH income 75-100k	-$12,924,231.99
Participant Electric Project Expenses	10008	HH income 100-150k	-$12,403,373.14
Participant Electric Project Expenses	10009	HH income over 150k	-$7,545,699.15
Participant Natural Gas Project Expenses	10001	HH income less than 10k	-$6,587,041.56
Participant Natural Gas Project Expenses	10002	HH income 10-15k	-$5,722,043.78
Participant Natural Gas Project Expenses	10003	HH income 15-25k	-$11,311,898.24
Participant Natural Gas Project Expenses	10004	HH income 25-35k	-$11,247,172.15
Participant Natural Gas Project Expenses	10005	HH income 35-50k	-$15,520,795.75
Participant Natural Gas Project Expenses	10006	HH income 50-75k	-$22,076,415.77
Participant Natural Gas Project Expenses	10007	HH income 75-100k	-$15,496,003.51
Participant Natural Gas Project Expenses	10008	HH income 100-150k	-$14,871,499.82
Participant Natural Gas Project Expenses	10009	HH income over 150k	-$9,047,205.33
Participant Incentives Spent	10001	HH income less than 10k	-$5,862,940.11
Participant Incentives Spent	10002	HH income 10-15k	-$5,093,029.95
Participant Incentives Spent	10003	HH income 15-25k	-$10,068,401.92

Category Name	Sector Code	Sector Description	Amount
Participant Incentives Spent	10004	HH income 25-35k	-$10,010,791.05
Participant Incentives Spent	10005	HH income 35-50k	-$13,814,623.01
Participant Incentives Spent	10006	HH income 50-75k	-$19,649,595.68
Participant Incentives Spent	10007	HH income 75-100k	-$13,792,556.13
Participant Incentives Spent	10008	HH income 100-150k	-$13,236,702.99
Participant Incentives Spent	10009	HH income over 150k	-$8,052,662.56
Industry Project Revenue	374	Management, scientific, and technical consulting services	$30,477,344.23
Industry Project Revenue	375	Environmental and other technical consulting services	$30,477,344.23
Industry Project Revenue	40	Maintenance and repair construction of residential structures	$30,477,344.23
Industry Project Revenue	39	Maintenance and repair construction of nonresidential structures	$30,477,344.23
Industry Project Revenue	319	Wholesale trade	$30,477,344.23
Industry Project Revenue	216	Air conditioning, refrigeration, and warm air heating equipment manufacturing	$15,238,672.11
Industry Project Revenue	215	Heating equipment (except warm air furnaces) manufacturing	$15,238,672.11
Industry Project Revenue	250	Automatic environmental control manufacturing	$15,238,672.11
Industry Project Revenue	199	Plumbing fixture fitting and trim manufacturing	$15,238,672.11
Industry Project Revenue	264	Household laundry equipment manufacturing	$15,238,672.11
Industry Project Revenue	265	Other major household appliance manufacturing	$15,238,672.11
Industry Project Revenue	168	Mineral wool manufacturing	$15,238,672.11
Industry Project Revenue	147	Urethane and other foam product (except polystyrene) manufacturing	$15,238,672.11

Category Name	Sector Code	Sector Description	Amount
Industry Project Revenue	149	Other plastics product manufacturing	$15,238,672.11
Industry Project Revenue	390	Waste management and remediation services	$15,238,672.11

Table 147. 2012 SDR First-Year and Future-Year Avoided Utility Costs

Category Name	Sector Code	Sector Description	Amount
Avoided Utility Electric Costs	31	Electric power generation, transmission, and distribution	$28,676,499.58
Avoided Utility Natural Gas Costs	32	Natural gas distribution	$4,547,128.15
Future Avoided Utility Electric Costs	31	Electric power generation, transmission, and distribution	$657,012,690.81
Future Avoided Utility Natural Gas Costs	32	Natural gas distribution	$141,418,090.44

Table 148. 2012 SDR Baseline Ratepayer Expenses

Category Name	Sector Code	Sector Description	Amount
Baseline Ratepayer Expenditures	10001	HH income less than 10k	-$23,859,537.47
Baseline Ratepayer Expenditures	10002	HH income 10-15k	-$20,726,348.36
Baseline Ratepayer Expenditures	10003	HH income 15-25k	-$40,973,881.45
Baseline Ratepayer Expenditures	10004	HH income 25-35k	-$40,739,431.03
Baseline Ratepayer Expenditures	10005	HH income 35-50k	-$56,219,321.59
Baseline Ratepayer Expenditures	10006	HH income 50-75k	-$79,965,044.17
Baseline Ratepayer Expenditures	10007	HH income 75-100k	-$56,129,519.30
Baseline Ratepayer Expenditures	10008	HH income 100-150k	-$53,867,446.26
Baseline Ratepayer Expenditures	10009	HH income over 150k	-$32,770,726.07

Table 149. 2012 SDR Baseline Ratepayers Expenses Received

Category Name	Sector Code	Sector Description	Amount
Electric Ratepayer Expenses Received	31	Electric power generation, transmission, and distribution	$215,478,389.47
Natural Gas Ratepayer Expenses Received	32	Natural gas distribution	$189,772,866.24

Utility Discount Rate Inputs

Table 150 through Table 156 show the 2012 model inputs calculated with the UDR.

Table 150. 2012 UDR Incentives Received by Ratepayers

Category Name	Sector Code	Sector Description	Amount
Incentives Received	10001	HH income less than 10k	$5,862,940.11
Incentives Received	10002	HH income 10-15k	$5,093,029.95
Incentives Received	10003	HH income 15-25k	$10,068,401.92
Incentives Received	10004	HH income 25-35k	$10,010,791.05
Incentives Received	10005	HH income 35-50k	$13,814,623.01
Incentives Received	10006	HH income 50-75k	$19,649,595.68
Incentives Received	10007	HH income 75-100k	$13,792,556.13
Incentives Received	10008	HH income 100-150k	$13,236,702.99
Incentives Received	10009	HH income over 150k	$8,052,662.56

Table 151. 2012 UDR First-Year Energy Bill Reductions

Category Name	Sector Code	Sector Description	Amount
Electric Revenue Loss	31	Electric power generation, transmission, and distribution	-$31,304,492.17
Natural Gas Revenue Loss	32	Natural gas distribution	-$7,421,415.66
Electric Ratepayer Bill Savings	10001	HH income less than 10k	$1,843,080.54
Electric Ratepayer Bill Savings	10002	HH income 10-15k	$1,601,050.71
Electric Ratepayer Bill Savings	10003	HH income 15-25k	$3,165,114.32
Electric Ratepayer Bill Savings	10004	HH income 25-35k	$3,147,003.70
Electric Ratepayer Bill Savings	10005	HH income 35-50k	$4,342,780.65
Electric Ratepayer Bill Savings	10006	HH income 50-75k	$6,177,069.32
Electric Ratepayer Bill Savings	10007	HH income 75-100k	$4,335,843.68
Electric Ratepayer Bill Savings	10008	HH income 100-150k	$4,161,105.06
Electric Ratepayer Bill Savings	10009	HH income over 150k	$2,531,444.19
Natural Gas Ratepayer Bill Savings	10001	HH income less than 10k	$436,942.62
Natural Gas Ratepayer Bill Savings	10002	HH income 10-15k	$379,564.14
Natural Gas Ratepayer Bill Savings	10003	HH income 15-25k	$750,359.69

Category Name	Sector Code	Sector Description	Amount
Natural Gas Ratepayer Bill Savings	10004	HH income 25-35k	$746,066.17
Natural Gas Ratepayer Bill Savings	10005	HH income 35-50k	$1,029,551.29
Natural Gas Ratepayer Bill Savings	10006	HH income 50-75k	$1,464,409.60
Natural Gas Ratepayer Bill Savings	10007	HH income 75-100k	$1,027,906.73
Natural Gas Ratepayer Bill Savings	10008	HH income 100-150k	$986,481.11
Natural Gas Ratepayer Bill Savings	10009	HH income over 150k	$600,134.30

Table 152. 2012 UDR Future-Year Energy Bill Reductions

Category Name	Sector Code	Sector Description	Amount
Future Electric Revenue Loss	31	Electric power generation, transmission, and distribution	-$479,272,234.38
Future Natural Gas Revenue Loss	32	Natural gas distribution	-$144,009,586.78
Future Electric Ratepayer Bill Savings	10001	HH income less than 10k	$28,217,590.13
Future Electric Ratepayer Bill Savings	10002	HH income 10-15k	$24,512,109.83
Future Electric Ratepayer Bill Savings	10003	HH income 15-25k	$48,457,946.61
Future Electric Ratepayer Bill Savings	10004	HH income 25-35k	$48,180,672.76
Future Electric Ratepayer Bill Savings	10005	HH income 35-50k	$66,488,035.50
Future Electric Ratepayer Bill Savings	10006	HH income 50-75k	$94,571,021.93
Future Electric Ratepayer Bill Savings	10007	HH income 75-100k	$66,381,830.41
Future Electric Ratepayer Bill Savings	10008	HH income 100-150k	$63,706,579.47
Future Electric Ratepayer Bill Savings	10009	HH income over 150k	$38,756,447.72
Future Natural Gas Ratepayer Bill Savings	10001	HH income less than 10k	$8,478,695.83
Future Natural Gas Ratepayer Bill Savings	10002	HH income 10-15k	$7,365,289.61
Future Natural Gas Ratepayer Bill Savings	10003	HH income 15-25k	$14,560,428.01

Category Name	Sector Code	Sector Description	Amount
Future Natural Gas Ratepayer Bill Savings	10004	HH income 25-35k	$14,477,114.00
Future Natural Gas Ratepayer Bill Savings	10005	HH income 35-50k	$19,978,028.83
Future Natural Gas Ratepayer Bill Savings	10006	HH income 50-75k	$28,416,116.80
Future Natural Gas Ratepayer Bill Savings	10007	HH income 75-100k	$19,946,116.80
Future Natural Gas Ratepayer Bill Savings	10008	HH income 100-150k	$19,142,269.31
Future Natural Gas Ratepayer Bill Savings	10009	HH income over 150k	$11,645,364.83

Table 153. 2012 UDR Ratepayer Program Payments and Utility Program Spending

Category Name	Sector Code	Sector Description	Amount
Ratepayer Program Payments	10001	HH income less than 10k	-$11,778,663.06
Ratepayer Program Payments	10002	HH income 10-15k	-$10,231,911.41
Ratepayer Program Payments	10003	HH income 15-25k	-$20,227,447.59
Ratepayer Program Payments	10004	HH income 25-35k	-$20,111,707.19
Ratepayer Program Payments	10005	HH income 35-50k	-$27,753,616.23
Ratepayer Program Payments	10006	HH income 50-75k	-$39,476,092.64
Ratepayer Program Payments	10007	HH income 75-100k	-$27,709,283.81
Ratepayer Program Payments	10008	HH income 100-150k	-$26,592,573.30
Ratepayer Program Payments	10009	HH income over 150k	-$16,177,821.59
Utility Program Spending	384	Office administrative services	$18,610,017.22
Utility Program Spending	374	Management, scientific, and technical consulting services	$64,718,992.91
Utility Program Spending	377	Advertising and related services	$12,569,319.93
Utility Program Spending	375	Environmental and other technical consulting services	$4,579,483.35

Table 154. 2012 UDR Project Spending

Category Name	Sector Code	Sector Description	Amount
Participant Electric Project Expenses	10001	HH income less than 10k	-$5,493,832.86
Participant Electric Project Expenses	10002	HH income 10-15k	-$4,772,393.17
Participant Electric Project Expenses	10003	HH income 15-25k	-$9,434,535.62
Participant Electric Project Expenses	10004	HH income 25-35k	-$9,380,551.70
Participant Electric Project Expenses	10005	HH income 35-50k	-$12,944,909.62
Participant Electric Project Expenses	10006	HH income 50-75k	-$18,412,535.77
Participant Electric Project Expenses	10007	HH income 75-100k	-$12,924,231.99
Participant Electric Project Expenses	10008	HH income 100-150k	-$12,403,373.14
Participant Electric Project Expenses	10009	HH income over 150k	-$7,545,699.15
Participant Natural Gas Project Expenses	10001	HH income less than 10k	-$6,587,041.56
Participant Natural Gas Project Expenses	10002	HH income 10-15k	-$5,722,043.78
Participant Natural Gas Project Expenses	10003	HH income 15-25k	-$11,311,898.24
Participant Natural Gas Project Expenses	10004	HH income 25-35k	-$11,247,172.15
Participant Natural Gas Project Expenses	10005	HH income 35-50k	-$15,520,795.75
Participant Natural Gas Project Expenses	10006	HH income 50-75k	-$22,076,415.77
Participant Natural Gas Project Expenses	10007	HH income 75-100k	-$15,496,003.51
Participant Natural Gas Project Expenses	10008	HH income 100-150k	-$14,871,499.82
Participant Natural Gas Project Expenses	10009	HH income over 150k	-$9,047,205.33
Participant Incentives Spent	10001	HH income less than 10k	-$5,862,940.11
Participant Incentives Spent	10002	HH income 10-15k	-$5,093,029.95
Participant Incentives Spent	10003	HH income 15-25k	-$10,068,401.92

Category Name	Sector Code	Sector Description	Amount
Participant Incentives Spent	10004	HH income 25-35k	-$10,010,791.05
Participant Incentives Spent	10005	HH income 35-50k	-$13,814,623.01
Participant Incentives Spent	10006	HH income 50-75k	-$19,649,595.68
Participant Incentives Spent	10007	HH income 75-100k	-$13,792,556.13
Participant Incentives Spent	10008	HH income 100-150k	-$13,236,702.99
Participant Incentives Spent	10009	HH income over 150k	-$8,052,662.56
Industry Project Revenue	374	Management, scientific, and technical consulting services	$30,477,344.23
Industry Project Revenue	375	Environmental and other technical consulting services	$30,477,344.23
Industry Project Revenue	40	Maintenance and repair construction of residential structures	$30,477,344.23
Industry Project Revenue	39	Maintenance and repair construction of nonresidential structures	$30,477,344.23
Industry Project Revenue	319	Wholesale trade	$30,477,344.23
Industry Project Revenue	216	Air conditioning, refrigeration, and warm air heating equipment manufacturing	$15,238,672.11
Industry Project Revenue	215	Heating equipment (except warm air furnaces) manufacturing	$15,238,672.11
Industry Project Revenue	250	Automatic environmental control manufacturing	$15,238,672.11
Industry Project Revenue	199	Plumbing fixture fitting and trim manufacturing	$15,238,672.11
Industry Project Revenue	264	Household laundry equipment manufacturing	$15,238,672.11
Industry Project Revenue	265	Other major household appliance manufacturing	$15,238,672.11
Industry Project Revenue	168	Mineral wool manufacturing	$15,238,672.11
Industry Project Revenue	147	Urethane and other foam product (except polystyrene) manufacturing	$15,238,672.11

Category Name	Sector Code	Sector Description	Amount
Industry Project Revenue	149	Other plastics product manufacturing	$15,238,672.11
Industry Project Revenue	390	Waste management and remediation services	$15,238,672.11

Table 155. 2012 UDR First-Year and Future-Year Avoided Utility Costs

Category Name	Sector Code	Sector Description	Amount
Avoided Utility Electric Costs	31	Electric power generation, transmission, and distribution	$28,676,499.58
Avoided Utility Natural Gas Costs	32	Natural gas distribution	$4,547,128.15
Future Avoided Utility Electric Costs	31	Electric power generation, transmission, and distribution	$522,014,838.75
Future Avoided Utility Natural Gas Costs	32	Natural gas distribution	$111,126,073.29

Table 156. 2012 UDR Baseline Ratepayer Expenses

Category Name	Sector Code	Sector Description	Amount
Baseline Ratepayer Expenditures	10001	HH income less than 10k	-$23,859,537.47
Baseline Ratepayer Expenditures	10002	HH income 10-15k	-$20,726,348.36
Baseline Ratepayer Expenditures	10003	HH income 15-25k	-$40,973,881.45
Baseline Ratepayer Expenditures	10004	HH income 25-35k	-$40,739,431.03
Baseline Ratepayer Expenditures	10005	HH income 35-50k	-$56,219,321.59
Baseline Ratepayer Expenditures	10006	HH income 50-75k	-$79,965,044.17
Baseline Ratepayer Expenditures	10007	HH income 75-100k	-$56,129,519.30
Baseline Ratepayer Expenditures	10008	HH income 100-150k	-$53,867,446.26
Baseline Ratepayer Expenditures	10009	HH income over 150k	-$32,770,726.07

Table 157. 2012 UDR Baseline Ratepayers Expenses Received

Category Name	Sector Code	Sector Description	Amount
Electric Ratepayer Expenses Received	31	Electric power generation, transmission, and distribution	$215,478,389.47
Natural Gas Ratepayer Expenses Received	32	Natural gas distribution	$189,772,866.24

2013 Model Inputs

Societal Discount Rate Inputs

Table 158 through Table 164 show the 2013 model inputs calculated with the SDR.

Table 158. 2013 SDR Incentives Received by Ratepayers

Category Name	Sector Code	Sector Description	Amount
Incentives Received	10001	HH income less than 10k	$4,973,212.66
Incentives Received	10002	HH income 10-15k	$4,019,559.60
Incentives Received	10003	HH income 15-25k	$8,105,156.38
Incentives Received	10004	HH income 25-35k	$8,304,847.29
Incentives Received	10005	HH income 35-50k	$11,766,960.54
Incentives Received	10006	HH income 50-75k	$17,046,972.93
Incentives Received	10007	HH income 75-100k	$12,489,627.04
Incentives Received	10008	HH income 100-150k	$12,806,195.86
Incentives Received	10009	HH income over 150k	$8,291,996.69

Table 159. 2013 SDR First-Year Energy Bill Reductions

Category Name	Sector Code	Sector Description	Amount
Electric Revenue Loss	41	Electric power generation - hydroelectric	-$594,262.03
Electric Revenue Loss	42	Electric power generation - fossil fuel	-$9,060,776.41
Electric Revenue Loss	43	Electric power generation - nuclear	-$5,592,323.30
Electric Revenue Loss	44	Electric power generation - solar	-$67,478.90
Electric Revenue Loss	45	Electric power generation - wind	-$278,713.68
Electric Revenue Loss	46	Electric power generation - geothermal	-$97,801.32
Electric Revenue Loss	47	Electric power generation - biomass	-$96,548.02
Electric Revenue Loss	48	Electric power generation - all other	-$88,659.02
Electric Revenue Loss	49	Electric power transmission and distribution	-$19,568,767.50
Natural Gas Revenue Loss	50	Natural gas distribution	-$8,898,313.31
Electric Ratepayer Bill Savings	10001	HH income less than 10k	$2,007,609.02
Electric Ratepayer Bill Savings	10002	HH income 10-15k	$1,622,634.04

Category Name	Sector Code	Sector Description	Amount
Electric Ratepayer Bill Savings	10003	HH income 15-25k	$3,271,926.26
Electric Ratepayer Bill Savings	10004	HH income 25-35k	$3,352,538.39
Electric Ratepayer Bill Savings	10005	HH income 35-50k	$4,750,139.95
Electric Ratepayer Bill Savings	10006	HH income 50-75k	$6,881,599.28
Electric Ratepayer Bill Savings	10007	HH income 75-100k	$5,041,869.24
Electric Ratepayer Bill Savings	10008	HH income 100-150k	$5,169,663.18
Electric Ratepayer Bill Savings	10009	HH income over 150k	$3,347,350.80
Natural Gas Ratepayer Bill Savings	10001	HH income less than 10k	$503,996.83
Natural Gas Ratepayer Bill Savings	10002	HH income 10-15k	$407,351.43
Natural Gas Ratepayer Bill Savings	10003	HH income 15-25k	$821,395.23
Natural Gas Ratepayer Bill Savings	10004	HH income 25-35k	$841,632.36
Natural Gas Ratepayer Bill Savings	10005	HH income 35-50k	$1,192,490.90
Natural Gas Ratepayer Bill Savings	10006	HH income 50-75k	$1,727,579.52
Natural Gas Ratepayer Bill Savings	10007	HH income 75-100k	$1,265,727.59
Natural Gas Ratepayer Bill Savings	10008	HH income 100-150k	$1,297,809.40
Natural Gas Ratepayer Bill Savings	10009	HH income over 150k	$840,330.05

Table 160. 2013 SDR Future-Year Energy Bill Reductions

Category Name	Sector Code	Sector Description	Amount
Future Electric Revenue Loss	41	Electric power generation - hydroelectric	-$11,306,452.70
Future Electric Revenue Loss	42	Electric power generation - fossil fuel	-$172,390,687.94
Future Electric Revenue Loss	43	Electric power generation - nuclear	-$106,399,762.74
Future Electric Revenue Loss	44	Electric power generation - solar	-$1,283,856.20

Category Name	Sector Code	Sector Description	Amount
Future Electric Revenue Loss	45	Electric power generation - wind	-$5,302,817.34
Future Electric Revenue Loss	46	Electric power generation - geothermal	-$1,860,771.79
Future Electric Revenue Loss	47	Electric power generation - biomass	-$1,836,926.43
Future Electric Revenue Loss	48	Electric power generation - all other	-$1,686,829.96
Future Electric Revenue Loss	49	Electric power transmission and distribution	-$372,316,139.27
Future Natural Gas Revenue Loss	50	Natural gas distribution	-$203,675,696.64
Future Electric Ratepayer Bill Savings	10001	HH income less than 10k	$38,196,848.15
Future Electric Ratepayer Bill Savings	10002	HH income 10-15k	$30,872,298.91
Future Electric Ratepayer Bill Savings	10003	HH income 15-25k	$62,251,797.50
Future Electric Ratepayer Bill Savings	10004	HH income 25-35k	$63,785,527.09
Future Electric Ratepayer Bill Savings	10005	HH income 35-50k	$90,376,349.41
Future Electric Ratepayer Bill Savings	10006	HH income 50-75k	$130,929,578.35
Future Electric Ratepayer Bill Savings	10007	HH income 75-100k	$95,926,802.31
Future Electric Ratepayer Bill Savings	10008	HH income 100-150k	$98,358,214.78
Future Electric Ratepayer Bill Savings	10009	HH income over 150k	$63,686,827.86
Future Natural Gas Ratepayer Bill Savings	10001	HH income less than 10k	$11,536,108.27
Future Natural Gas Ratepayer Bill Savings	10002	HH income 10-15k	$9,323,967.81
Future Natural Gas Ratepayer Bill Savings	10003	HH income 15-25k	$18,801,118.69
Future Natural Gas Ratepayer Bill Savings	10004	HH income 25-35k	$19,264,331.53
Future Natural Gas Ratepayer Bill Savings	10005	HH income 35-50k	$27,295,219.42
Future Natural Gas Ratepayer Bill Savings	10006	HH income 50-75k	$39,542,995.41
Future Natural Gas Ratepayer Bill Savings	10007	HH income 75-100k	$28,971,552.12

Category Name	Sector Code	Sector Description	Amount
Future Natural Gas Ratepayer Bill Savings	10008	HH income 100-150k	$29,705,880.71
Future Natural Gas Ratepayer Bill Savings	10009	HH income over 150k	$19,234,522.66

Table 161. 2013 SDR Ratepayer Program Payments and Utility Program Spending

Category Name	Sector Code	Sector Description	Amount
Ratepayer Program Payments	10001	HH income less than 10k	-$10,295,217.26
Ratepayer Program Payments	10002	HH income 10-15k	-$8,321,027.52
Ratepayer Program Payments	10003	HH income 15-25k	-$16,778,760.85
Ratepayer Program Payments	10004	HH income 25-35k	-$17,192,147.81
Ratepayer Program Payments	10005	HH income 35-50k	-$24,359,186.62
Ratepayer Program Payments	10006	HH income 50-75k	-$35,289,520.48
Ratepayer Program Payments	10007	HH income 75-100k	-$25,855,203.21
Ratepayer Program Payments	10008	HH income 100-150k	-$26,510,543.14
Ratepayer Program Payments	10009	HH income over 150k	-$17,165,545.36
Utility Program Spending	462	Office administrative services	$38,539,524.13
Utility Program Spending	454	Management, scientific, and technical consulting services	$35,773,982.55
Utility Program Spending	457	Advertising and related services	$13,457,901.03
Utility Program Spending	455	Environmental and other technical consulting services	$6,191,215.55

Table 162. 2013 SDR Project Spending

Category Name	Sector Code	Sector Description	Amount
Participant Electric Project Expenses	10001	HH income less than 10k	-$4,879,380.84
Participant Electric Project Expenses	10002	HH income 10-15k	-$3,943,720.78
Participant Electric Project Expenses	10003	HH income 15-25k	-$7,952,232.78
Participant Electric Project Expenses	10004	HH income 25-35k	-$8,148,156.03

Category Name	Sector Code	Sector Description	Amount
Participant Electric Project Expenses	10005	HH income 35-50k	-$11,544,948.05
Participant Electric Project Expenses	10006	HH income 50-75k	-$16,725,340.09
Participant Electric Project Expenses	10007	HH income 75-100k	-$12,253,979.68
Participant Electric Project Expenses	10008	HH income 100-150k	-$12,564,575.66
Participant Electric Project Expenses	10009	HH income over 150k	-$8,135,547.89
Participant Natural Gas Project Expenses	10001	HH income less than 10k	-$5,679,986.23
Participant Natural Gas Project Expenses	10002	HH income 10-15k	-$4,590,803.73
Participant Natural Gas Project Expenses	10003	HH income 15-25k	-$9,257,029.57
Participant Natural Gas Project Expenses	10004	HH income 25-35k	-$9,485,099.77
Participant Natural Gas Project Expenses	10005	HH income 35-50k	-$13,439,235.05
Participant Natural Gas Project Expenses	10006	HH income 50-75k	-$19,469,622.20
Participant Natural Gas Project Expenses	10007	HH income 75-100k	-$14,264,604.09
Participant Natural Gas Project Expenses	10008	HH income 100-150k	-$14,626,162.44
Participant Natural Gas Project Expenses	10009	HH income over 150k	-$9,470,422.90
Participant Incentives Spent	10001	HH income less than 10k	-$4,973,212.66
Participant Incentives Spent	10002	HH income 10-15k	-$4,019,559.60
Participant Incentives Spent	10003	HH income 15-25k	-$8,105,156.38
Participant Incentives Spent	10004	HH income 25-35k	-$8,304,847.29
Participant Incentives Spent	10005	HH income 35-50k	-$11,766,960.54
Participant Incentives Spent	10006	HH income 50-75k	-$17,046,972.93
Participant Incentives Spent	10007	HH income 75-100k	-$12,489,627.04
Participant Incentives Spent	10008	HH income 100-150k	-$12,806,195.86

Category Name	Sector Code	Sector Description	Amount
Participant Incentives Spent	10009	HH income over 150k	-$8,291,996.69
Industry Project Revenue	454	Management, scientific, and technical consulting services	$27,423,537.68
Industry Project Revenue	455	Environmental and other technical consulting services	$27,423,537.68
Industry Project Revenue	63	Maintenance and repair construction of residential structures	$27,423,537.68
Industry Project Revenue	62	Maintenance and repair construction of nonresidential structures	$23,463,324.96
Industry Project Revenue	64	Maintenance and repair construction of highways, streets, bridges, and tunnels	$3,960,212.72
Industry Project Revenue	395	Wholesale trade	$27,423,537.68
Industry Project Revenue	277	Air conditioning, refrigeration, and warm air heating equipment manufacturing	$13,711,768.84
Industry Project Revenue	276	Heating equipment (except warm air furnaces) manufacturing	$13,711,768.84
Industry Project Revenue	316	Automatic environmental control manufacturing	$13,711,768.84
Industry Project Revenue	255	Plumbing fixture fitting and trim manufacturing	$13,711,768.84
Industry Project Revenue	330	Household laundry equipment manufacturing	$13,711,768.84
Industry Project Revenue	331	Other major household appliance manufacturing	$13,711,768.84
Industry Project Revenue	215	Mineral wool manufacturing	$13,711,768.84
Industry Project Revenue	193	Urethane and other foam product (except polystyrene) manufacturing	$13,711,768.84
Industry Project Revenue	195	Other plastics product manufacturing	$13,711,768.84
Industry Project Revenue	471	Waste management and remediation services	$13,711,768.84

Table 163. 2013 SDR First-Year and Future-Year Avoided Utility Costs

Category Name	Sector Code	Sector Description	Amount
Avoided Utility Electric Costs	41	Electric power generation – hydroelectric	$562,616.48
Avoided Utility Electric Costs	42	Electric power generation - fossil fuel	$8,578,273.41
Avoided Utility Electric Costs	43	Electric power generation – nuclear	$5,294,521.80
Avoided Utility Electric Costs	44	Electric power generation – solar	$63,885.52
Avoided Utility Electric Costs	45	Electric power generation – wind	$263,871.66
Avoided Utility Electric Costs	46	Electric power generation – geothermal	$92,593.22
Avoided Utility Electric Costs	47	Electric power generation – biomass	$91,406.66
Avoided Utility Electric Costs	48	Electric power generation - all other	$83,937.76
Avoided Utility Electric Costs	49	Electric power transmission and distribution	$18,526,694.66
Avoided Utility Natural Gas Costs	50	Natural gas distribution	$6,901,568.25
Future Avoided Utility Electric Costs	41	Electric power generation – hydroelectric	$12,792,675.47
Future Avoided Utility Electric Costs	42	Electric power generation - fossil fuel	$195,051,284.83
Future Avoided Utility Electric Costs	43	Electric power generation - nuclear	$120,385,913.39
Future Avoided Utility Electric Costs	44	Electric power generation - solar	$1,452,617.91
Future Avoided Utility Electric Costs	45	Electric power generation - wind	$5,999,867.78
Future Avoided Utility Electric Costs	46	Electric power generation - geothermal	$2,105,368.52
Future Avoided Utility Electric Costs	47	Electric power generation - biomass	$2,078,388.71
Future Avoided Utility Electric Costs	48	Electric power generation - all other	$1,908,562.20
Future Avoided Utility Electric Costs	49	Electric power transmission and distribution	$421,156,752.29
Future Avoided Utility Natural Gas Costs	50	Natural gas distribution	$158,217,656.35

Table 164. 2013 SDR Baseline Ratepayer Expenses

Category Name	Sector Code	Sector Description	Amount
Baseline Ratepayer Expenditures	10001	HH income less than 10k	-$20,854,584.33
Baseline Ratepayer Expenditures	10002	HH income 10-15k	-$16,855,552.02
Baseline Ratepayer Expenditures	10003	HH income 15-25k	-$33,988,023.19
Baseline Ratepayer Expenditures	10004	HH income 25-35k	-$34,825,403.62
Baseline Ratepayer Expenditures	10005	HH income 35-50k	-$49,343,369.72
Baseline Ratepayer Expenditures	10006	HH income 50-75k	-$71,484,482.77
Baseline Ratepayer Expenditures	10007	HH income 75-100k	-$52,373,786.98
Baseline Ratepayer Expenditures	10008	HH income 100-150k	-$53,701,281.24
Baseline Ratepayer Expenditures	10009	HH income over 150k	-$34,771,516.15

Table 165. 2013 SDR Baseline Ratepayers Expenses Received

Category Name	Sector Code	Sector Description	Amount
Avoided Utility Electric Costs	41	Electric power generation - hydroelectric	$1,572,864.66
Avoided Utility Electric Costs	42	Electric power generation - fossil fuel	$23,981,634.83
Avoided Utility Electric Costs	43	Electric power generation - nuclear	$14,801,497.10
Avoided Utility Electric Costs	44	Electric power generation - solar	$178,599.96
Avoided Utility Electric Costs	45	Electric power generation - wind	$737,686.19
Avoided Utility Electric Costs	46	Electric power generation - geothermal	$258,855.92
Avoided Utility Electric Costs	47	Electric power generation - biomass	$255,538.74
Avoided Utility Electric Costs	48	Electric power generation - all other	$234,658.50
Avoided Utility Electric Costs	49	Electric power transmission and distribution	$51,793,689.34
Avoided Utility Natural Gas Costs	50	Natural gas distribution	$5,226,574.81

Utility Discount Rate Inputs

Table 166 through Table 172 show the 2013 model inputs calculated with the UDR.

Table 166. 2013 UDR Incentives Received by Ratepayers

Category Name	Sector Code	Sector Description	Amount
Incentives Received	10001	HH income less than 10k	$4,973,212.66
Incentives Received	10002	HH income 10-15k	$4,019,559.60
Incentives Received	10003	HH income 15-25k	$8,105,156.38
Incentives Received	10004	HH income 25-35k	$8,304,847.29
Incentives Received	10005	HH income 35-50k	$11,766,960.54
Incentives Received	10006	HH income 50-75k	$17,046,972.93
Incentives Received	10007	HH income 75-100k	$12,489,627.04
Incentives Received	10008	HH income 100-150k	$12,806,195.86
Incentives Received	10009	HH income over 150k	$8,291,996.69

Table 167. 2013 UDR First-Year Energy Bill Reductions

Category Name	Sector Code	Sector Description	Amount
Electric Revenue Loss	41	Electric power generation - hydroelectric	-$594,262.03
Electric Revenue Loss	42	Electric power generation - fossil fuel	-$9,060,776.41
Electric Revenue Loss	43	Electric power generation - nuclear	-$5,592,323.30
Electric Revenue Loss	44	Electric power generation - solar	-$67,478.90
Electric Revenue Loss	45	Electric power generation - wind	-$278,713.68
Electric Revenue Loss	46	Electric power generation - geothermal	-$97,801.32
Electric Revenue Loss	47	Electric power generation - biomass	-$96,548.02
Electric Revenue Loss	48	Electric power generation - all other	-$88,659.02
Electric Revenue Loss	49	Electric power transmission and distribution	-$19,568,767.50
Natural Gas Revenue Loss	50	Natural gas distribution	-$8,898,313.31
Electric Ratepayer Bill Savings	10001	HH income less than 10k	$2,007,609.02
Electric Ratepayer Bill Savings	10002	HH income 10-15k	$1,622,634.04
Electric Ratepayer Bill Savings	10003	HH income 15-25k	$3,271,926.26
Electric Ratepayer Bill Savings	10004	HH income 25-35k	$3,352,538.39

Category Name	Sector Code	Sector Description	Amount
Electric Ratepayer Bill Savings	10005	HH income 35-50k	$4,750,139.95
Electric Ratepayer Bill Savings	10006	HH income 50-75k	$6,881,599.28
Electric Ratepayer Bill Savings	10007	HH income 75-100k	$5,041,869.24
Electric Ratepayer Bill Savings	10008	HH income 100-150k	$5,169,663.18
Electric Ratepayer Bill Savings	10009	HH income over 150k	$3,347,350.80
Natural Gas Ratepayer Bill Savings	10001	HH income less than 10k	$503,996.83
Natural Gas Ratepayer Bill Savings	10002	HH income 10-15k	$407,351.43
Natural Gas Ratepayer Bill Savings	10003	HH income 15-25k	$821,395.23
Natural Gas Ratepayer Bill Savings	10004	HH income 25-35k	$841,632.36
Natural Gas Ratepayer Bill Savings	10005	HH income 35-50k	$1,192,490.90
Natural Gas Ratepayer Bill Savings	10006	HH income 50-75k	$1,727,579.52
Natural Gas Ratepayer Bill Savings	10007	HH income 75-100k	$1,265,727.59
Natural Gas Ratepayer Bill Savings	10008	HH income 100-150k	$1,297,809.40
Natural Gas Ratepayer Bill Savings	10009	HH income over 150k	$840,330.05

Table 168. 2013 UDR Future-Year Energy Bill Reductions

Category Name	Sector Code	Sector Description	Amount
Future Electric Revenue Loss	41	Electric power generation - hydroelectric	-$8,844,571.79
Future Electric Revenue Loss	42	Electric power generation - fossil fuel	-$134,854,127.71
Future Electric Revenue Loss	43	Electric power generation - nuclear	-$83,232,147.65
Future Electric Revenue Loss	44	Electric power generation - solar	-$1,004,307.77
Future Electric Revenue Loss	45	Electric power generation - wind	-$4,148,175.37
Future Electric Revenue Loss	46	Electric power generation - geothermal	-$1,455,605.05

Category Name	Sector Code	Sector Description	Amount
Future Electric Revenue Loss	47	Electric power generation - biomass	-$1,436,951.81
Future Electric Revenue Loss	48	Electric power generation - all other	-$1,319,537.53
Future Electric Revenue Loss	49	Electric power transmission and distribution	-$291,247,565.59
Future Natural Gas Revenue Loss	50	Natural gas distribution	-$153,985,069.02
Future Electric Ratepayer Bill Savings	10001	HH income less than 10k	$29,879,819.50
Future Electric Ratepayer Bill Savings	10002	HH income 10-15k	$24,150,126.61
Future Electric Ratepayer Bill Savings	10003	HH income 15-25k	$48,697,014.62
Future Electric Ratepayer Bill Savings	10004	HH income 25-35k	$49,896,788.04
Future Electric Ratepayer Bill Savings	10005	HH income 35-50k	$70,697,692.03
Future Electric Ratepayer Bill Savings	10006	HH income 50-75k	$102,420,811.07
Future Electric Ratepayer Bill Savings	10007	HH income 75-100k	$75,039,582.50
Future Electric Ratepayer Bill Savings	10008	HH income 100-150k	$76,941,576.23
Future Electric Ratepayer Bill Savings	10009	HH income over 150k	$49,819,579.70
Future Natural Gas Ratepayer Bill Savings	10001	HH income less than 10k	$8,721,651.44
Future Natural Gas Ratepayer Bill Savings	10002	HH income 10-15k	$7,049,205.46
Future Natural Gas Ratepayer Bill Savings	10003	HH income 15-25k	$14,214,222.01
Future Natural Gas Ratepayer Bill Savings	10004	HH income 25-35k	$14,564,425.11
Future Natural Gas Ratepayer Bill Savings	10005	HH income 35-50k	$20,636,022.51
Future Natural Gas Ratepayer Bill Savings	10006	HH income 50-75k	$29,895,716.57
Future Natural Gas Ratepayer Bill Savings	10007	HH income 75-100k	$21,903,381.41
Future Natural Gas Ratepayer Bill Savings	10008	HH income 100-150k	$22,458,556.33
Future Natural Gas Ratepayer Bill Savings	10009	HH income over 150k	$14,541,888.69

Table 169. 2013 UDR Ratepayer Program Payments and Utility Program Spending

Category Name	Sector Code	Sector Description	Amount
Ratepayer Program Payments	10001	HH income less than 10k	-$10,295,217.26
Ratepayer Program Payments	10002	HH income 10-15k	-$8,321,027.52
Ratepayer Program Payments	10003	HH income 15-25k	-$16,778,760.85
Ratepayer Program Payments	10004	HH income 25-35k	-$17,192,147.81
Ratepayer Program Payments	10005	HH income 35-50k	-$24,359,186.62
Ratepayer Program Payments	10006	HH income 50-75k	-$35,289,520.48
Ratepayer Program Payments	10007	HH income 75-100k	-$25,855,203.21
Ratepayer Program Payments	10008	HH income 100-150k	-$26,510,543.14
Ratepayer Program Payments	10009	HH income over 150k	-$17,165,545.36
Utility Program Spending	462	Office administrative services	$38,539,524.13
Utility Program Spending	454	Management, scientific, and technical consulting services	$35,773,982.55
Utility Program Spending	457	Advertising and related services	$13,457,901.03
Utility Program Spending	455	Environmental and other technical consulting services	$6,191,215.55

Table 170. 2013 UDR Project Spending

Category Name	Sector Code	Sector Description	Amount
Participant Electric Project Expenses	10001	HH income less than 10k	-$4,879,380.84
Participant Electric Project Expenses	10002	HH income 10-15k	-$3,943,720.78
Participant Electric Project Expenses	10003	HH income 15-25k	-$7,952,232.78
Participant Electric Project Expenses	10004	HH income 25-35k	-$8,148,156.03
Participant Electric Project Expenses	10005	HH income 35-50k	-$11,544,948.05
Participant Electric Project Expenses	10006	HH income 50-75k	-$16,725,340.09
Participant Electric Project Expenses	10007	HH income 75-100k	-$12,253,979.68

Category Name	Sector Code	Sector Description	Amount
Participant Electric Project Expenses	10008	HH income 100-150k	-$12,564,575.66
Participant Electric Project Expenses	10009	HH income over 150k	-$8,135,547.89
Participant Natural Gas Project Expenses	10001	HH income less than 10k	-$5,679,986.23
Participant Natural Gas Project Expenses	10002	HH income 10-15k	-$4,590,803.73
Participant Natural Gas Project Expenses	10003	HH income 15-25k	-$9,257,029.57
Participant Natural Gas Project Expenses	10004	HH income 25-35k	-$9,485,099.77
Participant Natural Gas Project Expenses	10005	HH income 35-50k	-$13,439,235.05
Participant Natural Gas Project Expenses	10006	HH income 50-75k	-$19,469,622.20
Participant Natural Gas Project Expenses	10007	HH income 75-100k	-$14,264,604.09
Participant Natural Gas Project Expenses	10008	HH income 100-150k	-$14,626,162.44
Participant Natural Gas Project Expenses	10009	HH income over 150k	-$9,470,422.90
Participant Incentives Spent	10001	HH income less than 10k	-$4,973,212.66
Participant Incentives Spent	10002	HH income 10-15k	-$4,019,559.60
Participant Incentives Spent	10003	HH income 15-25k	-$8,105,156.38
Participant Incentives Spent	10004	HH income 25-35k	-$8,304,847.29
Participant Incentives Spent	10005	HH income 35-50k	-$11,766,960.54
Participant Incentives Spent	10006	HH income 50-75k	-$17,046,972.93
Participant Incentives Spent	10007	HH income 75-100k	-$12,489,627.04
Participant Incentives Spent	10008	HH income 100-150k	-$12,806,195.86
Participant Incentives Spent	10009	HH income over 150k	-$8,291,996.69
Industry Project Revenue	454	Management, scientific, and technical consulting services	$27,423,537.68
Industry Project Revenue	455	Environmental and other technical consulting services	$27,423,537.68

Category Name	Sector Code	Sector Description	Amount
Industry Project Revenue	63	Maintenance and repair construction of residential structures	$27,423,537.68
Industry Project Revenue	62	Maintenance and repair construction of nonresidential structures	$23,463,324.96
Industry Project Revenue	64	Maintenance and repair construction of highways, streets, bridges, and tunnels	$3,960,212.72
Industry Project Revenue	395	Wholesale trade	$27,423,537.68
Industry Project Revenue	277	Air conditioning, refrigeration, and warm air heating equipment manufacturing	$13,711,768.84
Industry Project Revenue	276	Heating equipment (except warm air furnaces) manufacturing	$13,711,768.84
Industry Project Revenue	316	Automatic environmental control manufacturing	$13,711,768.84
Industry Project Revenue	255	Plumbing fixture fitting and trim manufacturing	$13,711,768.84
Industry Project Revenue	330	Household laundry equipment manufacturing	$13,711,768.84
Industry Project Revenue	331	Other major household appliance manufacturing	$13,711,768.84
Industry Project Revenue	215	Mineral wool manufacturing	$13,711,768.84
Industry Project Revenue	193	Urethane and other foam product (except polystyrene) manufacturing	$13,711,768.84
Industry Project Revenue	195	Other plastics product manufacturing	$13,711,768.84
Industry Project Revenue	471	Waste management and remediation services	$13,711,768.84

Table 171. 2013 UDR First-Year and Future-Year Avoided Utility Costs

Category Name	Sector Code	Sector Description	Amount
Avoided Utility Electric Costs	41	Electric power generation - hydroelectric	$562,616.48
Avoided Utility Electric Costs	42	Electric power generation - fossil fuel	$8,578,273.41
Avoided Utility Electric Costs	43	Electric power generation - nuclear	$5,294,521.80
Avoided Utility Electric Costs	44	Electric power generation - solar	$63,885.52

Category Name	Sector Code	Sector Description	Amount
Avoided Utility Electric Costs	45	Electric power generation - wind	$263,871.66
Avoided Utility Electric Costs	46	Electric power generation - geothermal	$92,593.22
Avoided Utility Electric Costs	47	Electric power generation - biomass	$91,406.66
Avoided Utility Electric Costs	48	Electric power generation - all other	$83,937.76
Avoided Utility Electric Costs	49	Electric power transmission and distribution	$18,526,694.66
Avoided Utility Natural Gas Costs	50	Natural gas distribution	$6,901,568.25
Future Avoided Utility Electric Costs	41	Electric power generation - hydroelectric	$9,855,648.81
Future Avoided Utility Electric Costs	42	Electric power generation - fossil fuel	$150,270,126.62
Future Avoided Utility Electric Costs	43	Electric power generation - nuclear	$92,746,922.76
Future Avoided Utility Electric Costs	44	Electric power generation - solar	$1,119,116.33
Future Avoided Utility Electric Costs	45	Electric power generation - wind	$4,622,378.63
Future Avoided Utility Electric Costs	46	Electric power generation - geothermal	$1,622,004.15
Future Avoided Utility Electric Costs	47	Electric power generation - biomass	$1,601,218.55
Future Avoided Utility Electric Costs	48	Electric power generation - all other	$1,470,381.92
Future Avoided Utility Electric Costs	49	Electric power transmission and distribution	$324,541,853.50
Future Avoided Utility Natural Gas Costs	50	Natural gas distribution	$119,058,061.02

Table 172. 2013 UDR Baseline Ratepayer Expenses

Category Name	Sector Code	Sector Description	Amount
Baseline Ratepayer Expenditures	10001	HH income less than 10k	-$20,854,584.33
Baseline Ratepayer Expenditures	10002	HH income 10-15k	-$16,855,552.02
Baseline Ratepayer Expenditures	10003	HH income 15-25k	-$33,988,023.19
Baseline Ratepayer Expenditures	10004	HH income 25-35k	-$34,825,403.62
Baseline Ratepayer Expenditures	10005	HH income 35-50k	-$49,343,369.72
Baseline Ratepayer Expenditures	10006	HH income 50-75k	-$71,484,482.77
Baseline Ratepayer Expenditures	10007	HH income 75-100k	-$52,373,786.98
Baseline Ratepayer Expenditures	10008	HH income 100-150k	-$53,701,281.24
Baseline Ratepayer Expenditures	10009	HH income over 150k	-$34,771,516.15

Table 173. 2013 UDR Baseline Ratepayers Expenses Received

Category Name	Sector Code	Sector Description	Amount
Avoided Utility Electric Costs	41	Electric power generation - hydroelectric	$1,572,864.66
Avoided Utility Electric Costs	42	Electric power generation - fossil fuel	$23,981,634.83
Avoided Utility Electric Costs	43	Electric power generation - nuclear	$14,801,497.10
Avoided Utility Electric Costs	44	Electric power generation - solar	$178,599.96
Avoided Utility Electric Costs	45	Electric power generation - wind	$737,686.19
Avoided Utility Electric Costs	46	Electric power generation - geothermal	$258,855.92
Avoided Utility Electric Costs	47	Electric power generation - biomass	$255,538.74
Avoided Utility Electric Costs	48	Electric power generation - all other	$234,658.50
Avoided Utility Electric Costs	49	Electric power transmission and distribution	$51,793,689.34
Avoided Utility Natural Gas Costs	50	Natural gas distribution	$5,226,574.81

Appendix C: Commerce Benefit Cost Guidance

The Commerce "INPUTS TO BENCOST FOR NATURAL GAS CIPs FOR THE 2013-2015 CONSERVATION IMPROVEMENT PROGRAM TRIENNIUM" guidance document is provided below.

The inputs necessary to run the BENCOST FOR GAS CIPs (BENCOST) model are listed below. Following this list, Staff of the Minnesota Division of Energy Resources (DER Staff) provide a description and the source(s) for each of the inputs.

General Inputs	Specific Project Inputs
Retail Rate ($/Mcf)	Utility Project Costs ($)
Non-Gas Fuel Retail Rate ($/Fuel Unit)	Administrative Costs ($)
Commodity Cost ($/Mcf)	Incentive Costs ($)
Demand Cost ($/Mcf/Yr)	Total Utility Project Costs ($)
Peak Reduction Factor (%)	Direct Participant Project Costs ($/Participant)
Variable O&M ($/Mcf)	Participant Non-Energy Costs (Annual $/Part)
Non-Gas Fuel Cost ($/Fuel Unit)	Participant Non-Energy Savings (Annual $/Part)
Non-Gas Fuel Loss Factor	Project Life (Years)
Gas Environmental Damage Factor ($/Mcf)	Avg. Mcf/Participant Saved
Non-Gas Fuel Environmental Damage Factor	Avg. Non-Gas Fuel Units/Part. Saved
Participant Discount Rate (%)	Avg. Additional Non-Gas Fuel Units/Part. Used
Utility Discount Rate (%)	Number of Participants
Societal Discount Rate (%)	Total Annual Mcf Saved
General Input Data Year	Incentive/Participant
Project Analysis Year	
Project Analysis Year	
Growth and Escalation Factors (%)	

General data inputs are either directly specified by DER Staff or are utility specific; they are used in analyzing all direct impact CIP projects. By contrast the specific project data inputs may vary from project to project. A description of the data for each BENCOST input is as follows:

Input 1: The *Retail Rate* ($/Mcf) is the natural gas rate for the specific customer class or classes (i.e., commercial, industrial, or residential) that are expected to participate in the project. The *Retail Rate* is calculated by adding the following:

- the utility's currently approved tariffed non-natural gas margin in the customer class that is expected to participate in a project (or a weighted average non-natural gas margin if more than one customer class is expected to participate in the project), which is on file with the DER;
- the *Commodity Cost* of $4.34/Mcf, which is described below in Input No. 3; and
- the per Mcf *Demand Cost* from the utility's March 2012 Purchased Gas Adjustment (PGA) filing, as described below in Input No. 4.

The *Retail Rate* does not include the annual true-up adjustment or the annual Conservation Cost Recovery Adjustment, if applicable. Each utility must identify and fully explain in its CIP filing all calculations and underlying assumptions (including references to any supporting documents) used in determining the non-gas margin and demand cost components of this input. The *Retail Rate* is multiplied by the *Annual Escalation Rate* of 4.28 percent.

DER Staff calculated the *Annual Escalation Rate* of 4.28 percent from the average of the following five sources for natural gas price projections, applying an exponential fit to each data series to determine an escalation rate:

- Wood Mackenzie, "Natural Gas Monthly Market Update", December 2011
- Cambridge Energy Research Associates, "IHS CERA Monthly Briefing", December 21, 2011
- ICF International, "Q4 2011 Gas Market Compass", October 24, 2011
- Energy Information Administration, Short-Term Energy Outlook, January 2012
- Global Insights, "Chained Price Index-Household Natural Gas", November 2011

This analysis yielded escalation rates of 5.06 percent, 2.95 percent, 5.38 percent, 5.07 percent, and 2.92 percent, respectively, for an average escalation rate of 4.28 percent. Each of the above sources is widely accepted as a primary source of economic, industrial, and financial information, and is frequently used by financial and industrial experts to analyze trends and cycles in the market.

Input 2: The *Non-Gas Fuel Retail Rate* ($/Fuel Unit) is the estimated non-natural gas (e.g., electricity) retail rate for the specific customer class or classes (i.e., commercial, industrial, or residential) that is or are expected to participate in a project, if applicable. If this input is an electric retail rate, it should be based on a tariffed rate for the customer class that is expected to participate in a project (or a weighted average retail rate if more than one customer class is expected to participate in a project). Each utility that chooses to use this input must identify and fully explain in its CIP filing all calculations and underlying assumptions (including references to any supporting documents) used to calculate the *Non-Gas Fuel Retail Rate*. In addition, the *Non-Gas Fuel Retail Rate* is multiplied by an Annual Escalation Rate of 2.80 percent. This rate was developed using a projected price index entitled "Chained price index--household electricity" for the period 2013 to 2034, which was provided by Global Insight via the Minnesota Department of Finance (Finance).

Input 3: The *Commodity Cost* ($/Mcf) is $4.34/Mcf, which is the weighted average of CenterPoint Energy, Minnesota Energy Resources Corporation-PNG, and Northern States Power Company (Xcel Energy) purchased gas adjustments (PGAs) from April 2010 through March 2012, weighted by each utility's gas sales to non-exempt customers. The *Commodity Cost* input is also multiplied by the *Annual Escalation Rate* of 4.28 percent, which is described above in Input No. 1.

Input 4: The *Demand Cost* ($/Mcf/Year) is the estimated annual fixed demand costs that the utility would save from buying one fewer Mcf of demand services. The source for this figure is the utility's March 2012 PGA, which reflects the demand costs from that peaking season. Each utility must identify and fully explain in its CIP filing all calculations and underlying assumptions used in determining this input. The *Demand Cost* is multiplied by the *Annual Escalation Rate* of 4.28 percent, which is described above in Input No. 1.

Input 5: The *Peak Reduction Factor* (1 percent) is the estimated average annual effect of the project on system peak. The factor is presented as the percent of energy savings occurring on peak, which is estimated at one percent for most projects.

Input 6: *Variable O&M* ($/Mcf) is the variable costs, other than fuel and purchased energy costs, that are included as expenses in delivering energy to the end use consumer. For utilities that have flexible rate tariffs, *Variable O&M* is the minimum transportation flexible rate, which is generally based on the utility's best estimate of variable costs. Each utility must fully explain how it determines the *Variable O&M* input. This cost is multiplied by the *Annual Escalation Rate* of 4.28 percent, which is described above in Input No. 1.

Input 7: The *Non-Gas Fuel Cost* ($/Fuel Unit) is used to project society's avoided or increased costs of non-natural gas fuels (e.g., electricity) associated with participation in a natural gas CIP project, if applicable. DER Staff calculated an average cost of $26.82/MWh, equal to the average of daily average locational marginal prices (LMP) at the Minnesota Hub from June 24, 2010 to June 23, 2011 using data from Midwest Independent System Operator (MISO). This cost is multiplied by the *Annual Escalation Rate* of 2.80 percent, which is described above in Input No. 2. At this time, DER Staff are not issuing a proxy for electric transmission and distribution costs. If a utility wishes to propose such costs, or if a utility wishes to propose non-natural gas fuel costs other than those associated with electricity, it must identify and fully explain in its CIP filing all calculations and underlying assumptions (including references to any supporting documents) used in determining such a proposed cost amount.

Input 8: The *Non-Gas Fuel Loss Factor* (5.8 percent) reflects line losses associated with electric transmission and electric distribution line losses associated with participating in a natural gas CIP project, if applicable. DER Staff used the weighted average of the loss factors reported by IPL, MP, Xcel Energy, and OTP in 2009, weighted by 2009 retail kWh sales, to arrive at a *Non-Gas Fuel Loss Factor* of 5.8 percent.

Input 9: The *Gas Environmental Damage Factor* ($0.35**/**Mcf) is the long-term "external" cost to society and the environment of burning natural gas. This factor is based on using the upper range of the final urban environmental cost values for certain natural gas emissions that were approved by the Minnesota Public Utilities Commission (Commission) in its July 2, 1997 *Order Affirming in Part and Modifying in Part Order Establishing Environmental Cost Values* (Docket No. E999/CI-93-583), along with the estimated natural gas emission factor or factors for each emission provided by the United States Environmental Protection Agency in its *AP-42, Fifth Edition, Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources*. In its May 3, 2001 *Order Updating Externality Values and Authorizing Comment Period on* CO_2, $PM_{2.5}$, *and Application of Externality Values to Power Purchases*, Docket No. E999/CI-00-1636, the Commission required that externality values be updated using the Gross National Product Price Deflator Index as much as possible. Consistent with this directive, the *Environmental Damage Factor* has been updated to 2012 dollars by including the use of externality values from the Commission's June 10, 2011 *Notice of Updated Environmental Externality Values* in Docket Nos. E999/CI-93-583 and E999/CI-00-1636, which inflated the environmental externality values to 2010 dollars, and further inflating to 2012 dollars using the *Annual Esclation Rate* of 1.73 percent, which is described below.

The Commission's final environmental cost values include costs for the following emissions: sulfur dioxide, particulate matter, carbon monoxide, nitrogen oxides, lead, and carbon dioxide.

However, the Commission's final environmental cost values do not assign costs for all emissions resulting from the combustion of natural gas, such as methane, propane, and volatile organic compounds. In addition, the Commission's final environmental cost values do not include emissions from natural gas production at the wellhead, transmission of natural gas from the wellhead to the consumer, or the environmental effects of laying and maintaining pipes and pumping stations. For these reasons, DER Staff conclude that it is reasonable to use the upper range of the Commission's final environmental cost values to calculate the inflation-adjusted *Gas Environmental Damage Factor* of $0.35/Mcf.

The *Gas Environmental Factor* is multiplied by an *Annual Escalation Rate* of 1.73 percent. DER calculated an *Annual Escalation Rate* of 1.73 percent by applying an exponential fit to a projected price index entitled "Chained Price Index-Gross Domestic Product," as provided to DER by Global Insight via Finance.

Input 10: The *Non-Gas Fuel Environmental Damage Factor* is an environmental damage factor based on the long-term "external" cost to society and the environment of generating electricity. DER Staff calculated a *Non-Gas Fuel Environmental Damage Factor* of $21.32/MWh using the upper range of the Commission's final urban environmental cost values reported in Docket Nos. E999/CI-93-583 and E999/CI-00-1636 for particulate matter (PM10), carbon monoxide (CO), and lead (Pb), inflation-adjusted to 2012 dollars. Internal environmental cost values used by Xcel Energy for sulfur dioxide (SO2) and nitrous oxides (NOx) were used in place of the Commission values for these emissions, consistent with the current practice in integrated resource plans (IRP) to use utility-specific values for these emissions. A cost of $21.50 per ton of carbon dioxide (CO2) emissions was used in place of the Commission's updated environmental externality value of $4.22/ton in Docket Nos. E999/CI-93-583 and E999/CI-00-1636, consistent with a February 9, 2012 Commission Order pertaining to Otter Tail Power Company's 2011-2025 Integrated Resource Plan (Docket No. E017/RP-10-623), in which the Commission ordered the company to include in its base case carbon dioxide costs equal to the mid-point of the Commission-approved range of likely future carbon dioxide regulatory costs. A cost of $21.50 per ton of carbon dioxide is equal to the mid-point of the range of $9 to $34 per ton of carbon dioxide approved by the Commission in its June 3, 2011 Order Establishing 2011 Estimate of Future Carbon Dioxide Regulation Costs, pursuant to Minn. Stat. § 216H.06. If a utility proposes to use an environmental damage factor associated with a type of fuel other than electricity, it must identify and fully explain in its CIP filing all calculations and underlying assumptions (including references to supporting documents) used in determining this input. This input is multiplied by the Annual Escalation Rate of 1.73 percent, which is described above in Input No. 9.

Input 11: The *Participant Discount Rate* (%) for residential customers is the *Societal Discount Rate* of 2.67 percent, as discussed below in Input No. 13. Such a discount rate would reflect a residential customer's likely opportunity costs (i.e., the return on investment that a residential customer would likely give up in order to invest in CIP). The *Participant Discount Rate* for commercial and industrial customers is the *Utility Discount Rate*, as discussed below in Input No. 12. Although this discount rate may be lower than the actual discount rate for a particular commercial/industrial customer, it represents an attempt to reflect in a simple manner a reasonable estimate of a business customer's opportunity costs.

Input 12: The *Utility Discount Rate* (percent) is the utility's after-tax weighted cost of capital approved in the utility's most recent rate case. This rate is used to value, in current dollars, the

future stream of internal benefits and costs (excluding benefits resulting from avoided environmental damage, as discussed above in Input No. 9) resulting from a utility conservation investment. Since the *Utility Discount Rate* is the utility's cost for its capital, it is a reasonable measure of the value society places on a utility investment.

Input 13: The *Societal Discount Rate* (2.67 percent) is the rate used to discount the future stream of benefits resulting from avoided environmental damage. Since environmental costs are not captured and reflected in market prices, it is necessary to impute and impose a societal discount rate for these costs. The *Societal Discount Rate* is to equal the United States Department of the Treasury's (Treasury) 20-year Constant Maturity (CMT) Rate, which was 2.67 percent as of January 3, 2012. The Treasury's 20-year Daily CMT Rate captures the market's expectations regarding inflation, along with a small risk factor. At this time, DER Staff conclude that a rate including inflation expectations and a small risk factor is a reasonable method for estimating a social discount rate for externalities. DER Staff note that the future stream of benefits resulting from avoided environmental damage is also escalated by the *Annual Escalation Rate* of 1.73 percent described above in Input No. 9.

Input 14: The *General Input Data Year* for the 2013-2015 benefit/cost analysis is 2012.

Input 15a: Project Analysis Year 1 is 2013.

Input 15b: Project Analysis Year 2 is 2014

Input 15c: Project Analysis Year 3 is 2015.

Input 16: The *Utility Project Costs* is the sum of all of the utility's estimated project costs. Examples of these costs include administrative and operating costs and incentive costs paid to the participant.

Input 17: *Direct Participant Costs* ($/Participant) is incremental "out-of-pocket" expenses that the participant would pay to install the conservation measure. For example, the cost to a customer to install a high efficiency furnace is the difference in installation costs between high efficiency equipment and equipment that meets code. This input is not reduced by the amount of any rebate that the utility will provide to the participant through the CIP project. Each utility must identify and fully explain in its CIP filing all calculations and underlying assumptions used in determining this input.

Input 18: *Participant Non-Energy Costs* (Annual $/Participant). Each utility must identify and fully explain in its CIP filing all calculations and underlying assumptions used in determining this input. This figure is entered as an annual cost and is escalated at the *Annual Escalation Rate* of 1.73 percent described in Input No. 1 above.

Input 19: *Participant Non-Energy Savings* (Annual $/Participant). This figure is entered as an annual benefit and is escalated by the *Annual Escalation Rate* of 1.73 percent described above in Input No. 1.

Input 20: The *Project Life* is the expected lifetime of a particular energy conservation measure, expressed in number of years. The project life used in the BenCost model is based on specific energy conservation measures. Projects with expected lives shorter than 20 years use lower figures. Each utility must show the reasonableness of its expected lifetime for a particular

energy conservation measure or project. In most cases, the maximum life used is limited to 20 years for the following reasons:

a) benefits are more uncertain the further out in time the model is extended;
b) benefit streams diminish further out in time and have lesser effects on cost-effectiveness than more current years;
c) the further out in time the model is extended, the more uncertain it becomes that current ratepayers, who are funding CIP, receive the full benefits of CIP; and
d) if a project cannot pay for itself within 20 years, ratepayers should instead be funding other, more cost effective projects.

Input 21: The *Average Mcf/Participant Saved* is the estimated annual amount of Mcfs saved from the energy conservation measure. Each utility must identify and fully explain in its CIP filing all calculations and underlying assumptions used in determining this input.

Input 22: The *Average Non-Gas Fuel Units/Participant Saved* is the estimated amount of non-natural gas fuel (e.g., electricity) saved per participant in a project. Each utility that includes such fuel savings must identify and fully explain in its CIP filing all calculations and underlying assumptions (including references to any supporting documents) used in determining this input.

Input 22a: The *Average Additional Non-Gas Fuel Units/Participant Saved* is the amount of non-natural gas fuel (e.g., electricity) used per participant in a project. Each utility that includes such fuel usage must identify and fully explain in its CIP filing all calculations and underlying assumptions (including references to any supporting documents) used in determining this input.

Input 23: The *Number of Participants* is the estimated number of participants based on the utility's expected market penetration levels, on past experience in a similar project, or on marketing penetration studies for similar projects.

Input 24: The *Total Annual Mcf Saved* is the total amount of savings projected for a year. The savings are computed by the model by multiplying Input No. 23 by Input No. 21.

Input 25: The *Incentive per Participant* is the utility incentive costs identified in Input No. 16 divided by the *Number of Participants* identified in Input No. 23. This figure is computed within the model.