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

Webinar Presentation

10/30/2015

Minnesota Department of Commerce
Division of Energy Resources

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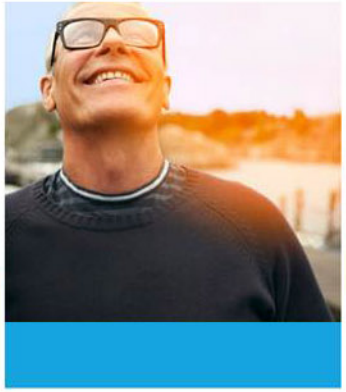

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Agenda

1. Background
2. Study Objective and Scope
3. Analysis Methods
4. Results
5. Conclusions

Section 1

BACKGROUND

Conservation Improvement Program

- Minnesota has been a national leader in promoting energy efficiency since the early 1980s
- In 2007, landmark bipartisan legislation passed that requires energy utilities to achieve energy savings of 1.5 percent of average annual retail sales each year
- CIP is a nationally-recognized program funded and administered by over 180 utilities
- CIP helps households and businesses reduce energy consumption

Conservation Improvement Program

- Utility Demand-Side Management (DSM) Programs
  - Residential offerings include energy audits and incentives for energy-related improvements, such as rebates for high-efficiency lighting and appliances, as well as insulation and air sealing
  - Commercial and industrial programs offer rebates for high-efficiency boilers, chillers, and rooftop units; lighting and lighting control systems; and motors. They also provide design assistance for energy-efficient buildings and technical assistance for reducing the energy intensity of manufacturing processes
- Investments in energy efficiency lead to positive economic effects in two ways:
  1. Spending on energy efficiency projects supports jobs and business for contractors and suppliers directly involved in the projects; and
  2. Money saved by program participants from lower utility bills is spent on other local goods and services.

Sneak Peak

- Study assesses the aggregate statewide economic impact of 2008-2013 CIP activities and resulting energy savings that accrue through 2032

- Study incorporates two types of analysis:
  1. A cost-effectiveness assessment, which estimated a total of $3.3 billion in net energy and environmental benefits
  2. An economic impact assessment, which estimated a total employment impact of 8,405 direct jobs and 54,777 total jobs, as well as a total impact on Minnesota's state domestic product of $3.0 to $3.6 billion

- Combining results from both analyses, the study shows that every dollar invested in CIP provides $4.00 to $4.30 in energy, environmental, and economic benefits

Section 2

STUDY OBJECTIVE AND SCOPE

Study Objective

- Assess the statewide impact of 2008-2013 CIP activities on:
  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 electric and natural gas rates.

Study Scope

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

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

Section 3

ANALYSIS METHODS

Summary of Analysis Methods

Cost-Effectiveness Assessment + **Economic Impact Assessment** = **Analysis of Aggregate Economic Impact of CIP**

- Benefits vs. Costs
- Multiple perspectives
- **Impact on utility rates**

- IMPLAN
- **Impacts on:**
  - **Employment**
  - **Earnings**
  - **Income & Savings**
  - **Revenue & Production**
  - **Investment & Innovation**
  - **State Domestic Product**

Analysis Data Sources

- California Standard Practice Manual
- "INPUTS TO BENCOST FOR NATURAL GAS CIPs" (BENCOST) guidance document
- Energy Savings Platform (ESP)
- New York Mercantile Exchange (NYMEX) annual average settlement prices
- Energy Information Administration (EIA) delivered coal prices in the West North Central Region
- EIA State Energy Data System (SEDS)
- IMPLAN Group LLC, IMPLAN System (data and software) www.IMPLAN.com

Cost-Effectiveness Analysis Summary

1. Identified and Described Cost-Effectiveness Tests

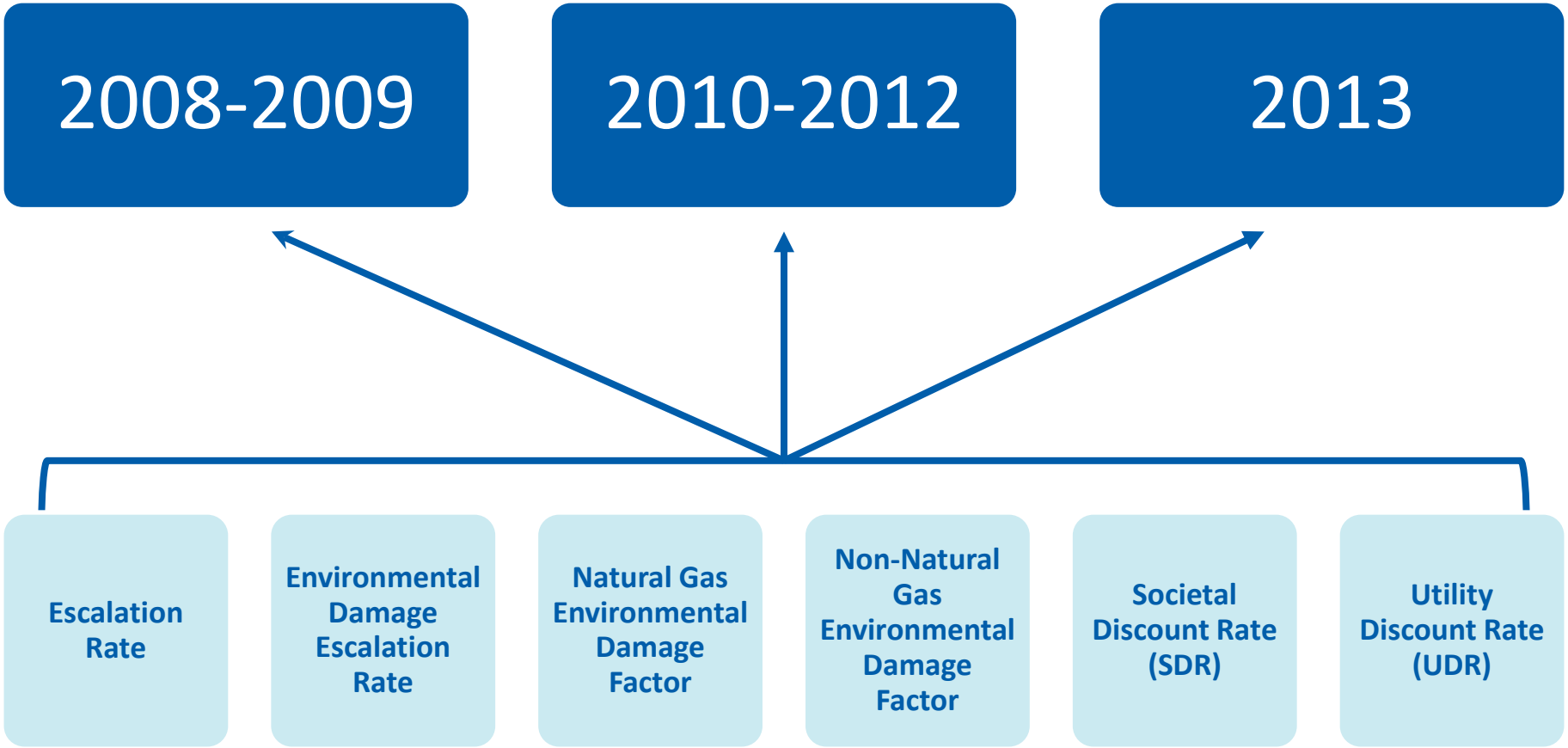
2. Determined Required Assumptions for Each Test

3. Collected Data and Calculated Test Inputs

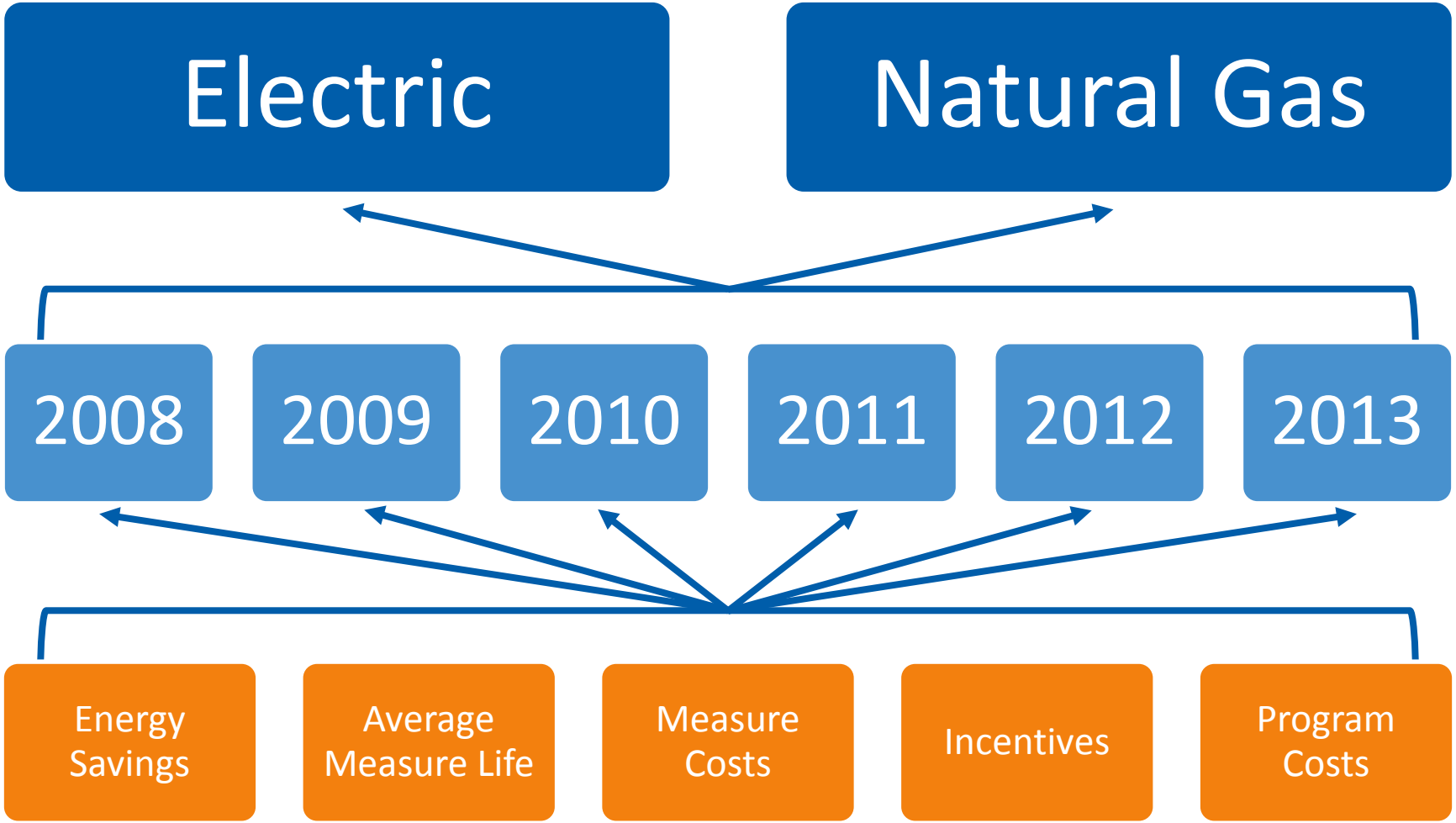
1. Cost-Effectiveness Tests

Test	Description
Societal Cost Test (SCT)	• A measure of net costs of CIP as a resource option from the perspective of society in general
Utility Cost Test (UCT)	• A measure of net costs of CIP as a resource option from the perspective of Minnesota utilities
Participant Cost Test (PCT)	• A measure of the quantifiable benefits and costs to participating customers
Ratepayer Impact Measure (RIM) test	• 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

2. Cost-Effectiveness Test Assumptions



3. Cost-Effectiveness Test Inputs



Economic Impact Analysis Summary

1. Identified and Described the IMPLAN Model

2. Developed Model Scenarios

3. Determined Cash Flows and Stakeholder Groups

4. Calculated Model Inputs by Cash Flow and Sector

1. The IMPLAN Model

- Static input-output model
- Assumptions are static and based on real annual Minnesota economic data
- Cash flow inputs drive the model

1. The IMPLAN Model

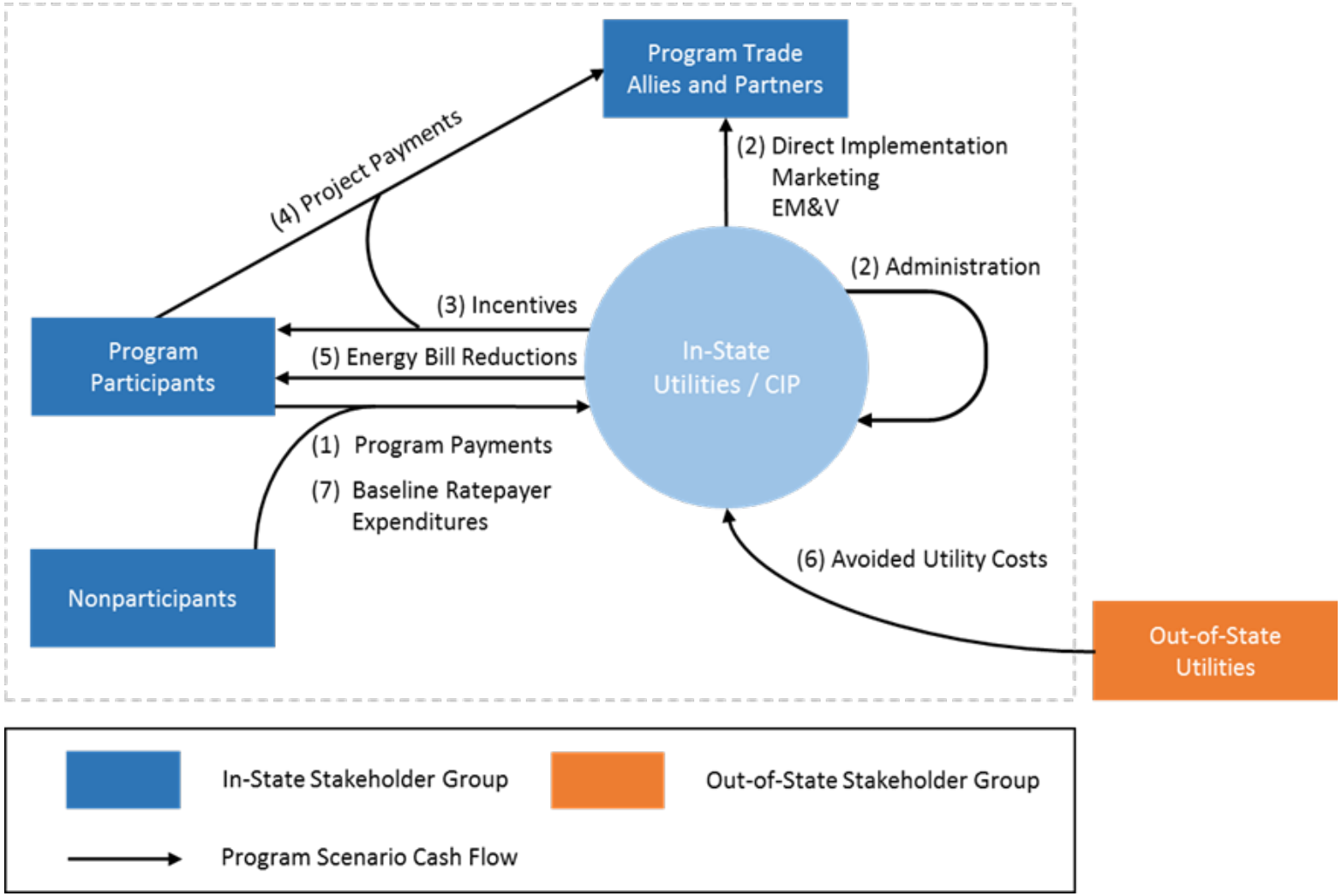
- Generates 3 types of economic effect:
  - (1) Direct + (2) Indirect + (3) Induced = Total Effect
- Provides 5 indicators of economic impact:

Indicator	Description
1. Employment	Represents the number of job-years created. 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 but not proprietor (i.e., owner) income
3. Labor income	Represents the sum of all employment income, including employee compensation (i.e., wages plus benefits) and proprietor income
4. Value added	Represents all profits, indirect business taxes, and employee compensation; approximately equivalent to state domestic product
5. Output	Equals value added plus intermediate expenditures, and represents the total value of industry production

2. Model Scenarios

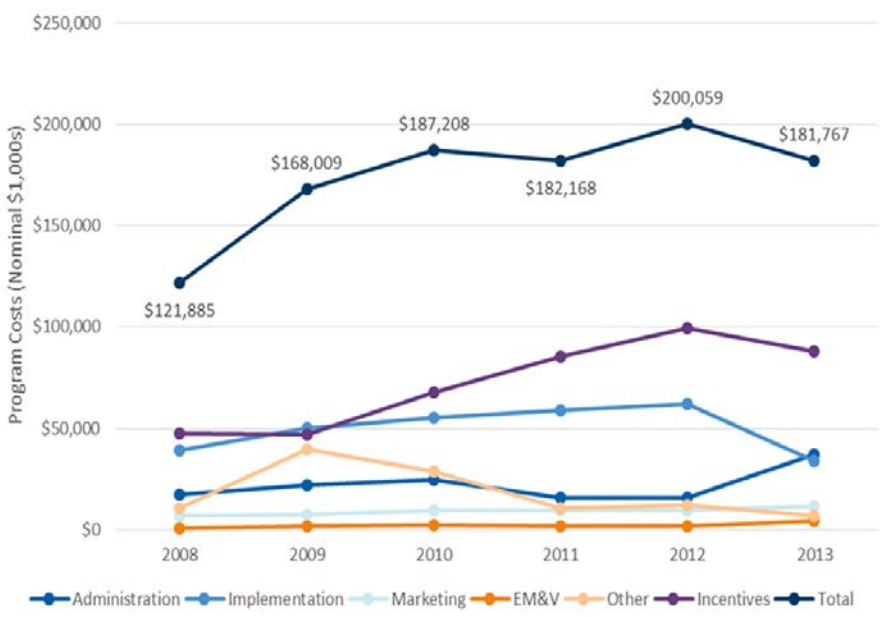
- Analysis yielded 12 IMPLAN models and 24 model scenarios
  - Developed 2 IMPLAN models for each CIP year:
    1. Societal Discount Rate (SDR) = upper-bound estimates
    2. Utility Discount Rate (UDR) = lower-bound estimates
  - Developed 2 model scenarios for each model:
    1. Program scenario = CIP-induced cash flows
    2. Hypothetical baseline scenario = cash flows that would have occurred in the absence of CIP
  - Difference between scenarios = net impacts

3. Modeled Cash Flows

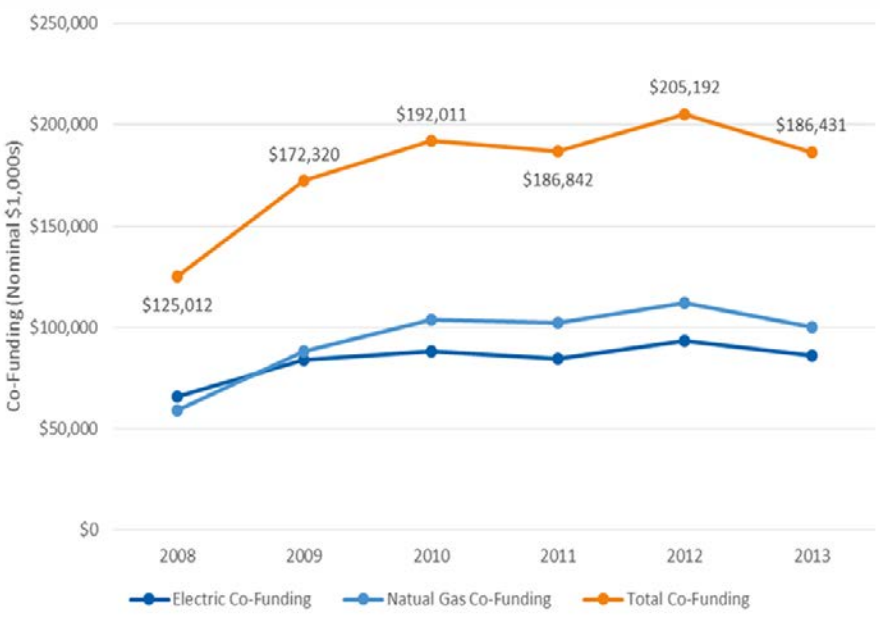


4. IMPLAN Model Inputs

Program Spending

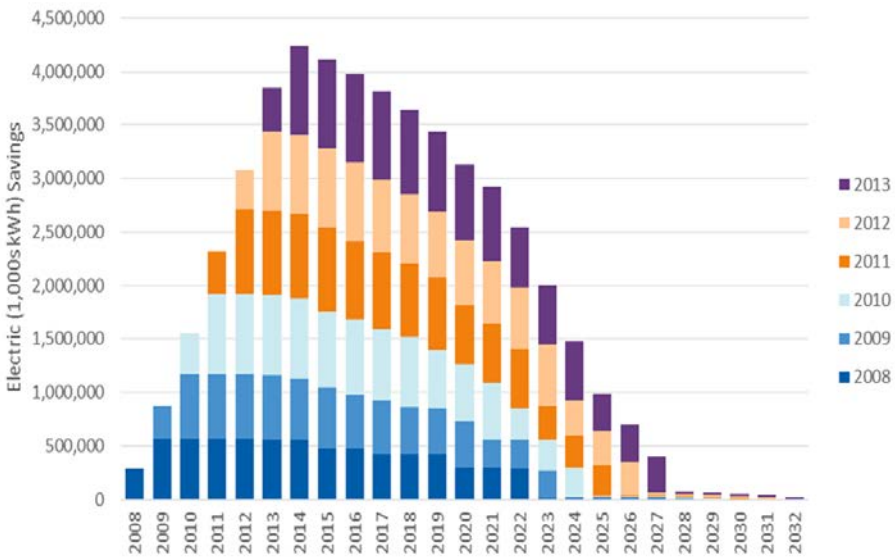


Participant Co-Funding

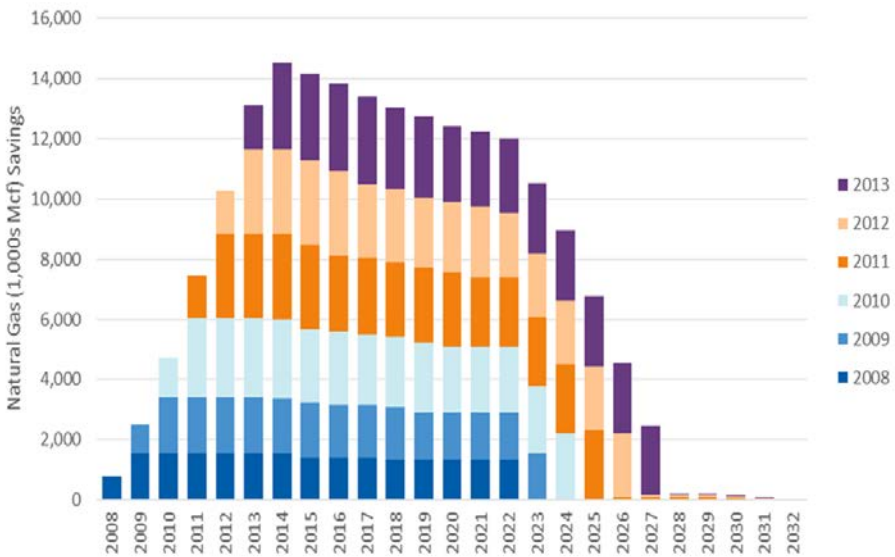


4. IMPLAN Model Inputs

Electric Savings



Natural Gas Savings



4. IMPLAN Model Inputs

Electric and Natural Gas Bill Reductions by Discount Rate

Discount Rate	Fuel	First-Year Reductions	Future-Year Reductions	Cumulative Reductions
Utility	Electric	$175,291	$2,714,621	$2,889,912
Utility	Natural Gas	$46,000	$752,921	$798,921
Utility	**Total**	**$221,291**	**$3,467,542**	**$3,688,833**
Societal	Electric	$175,291	$3,323,816	$3,499,107
Societal	Natural Gas	$46,000	$949,984	$995,983
Societal	**Total***	**$221,291**	**$4,273,799**	**$4,495,090**

*Values may not sum to total due to rounding.

4. IMPLAN Model Inputs

Electric and Natural Gas Avoided Utility Costs by Discount Rate

Discount Rate	Fuel	First-Year Reductions	Future-Year Reductions	Cumulative Reductions
Utility	Electric	$162,582	$2,857,628	$3,020,210
Utility	Natural Gas	$36,997	$577,788	$614,786
Utility	**Total***	**$199,580**	**$3,435,416**	**$3,634,996**
Societal	Electric	$162,582	$3,547,514	$3,710,096
Societal	Natural Gas	$36,997	$731,222	$768,219
Societal	**Total***	**$199,580**	**$4,278,735**	**$4,478,315**

*Values may not sum to total due to rounding.

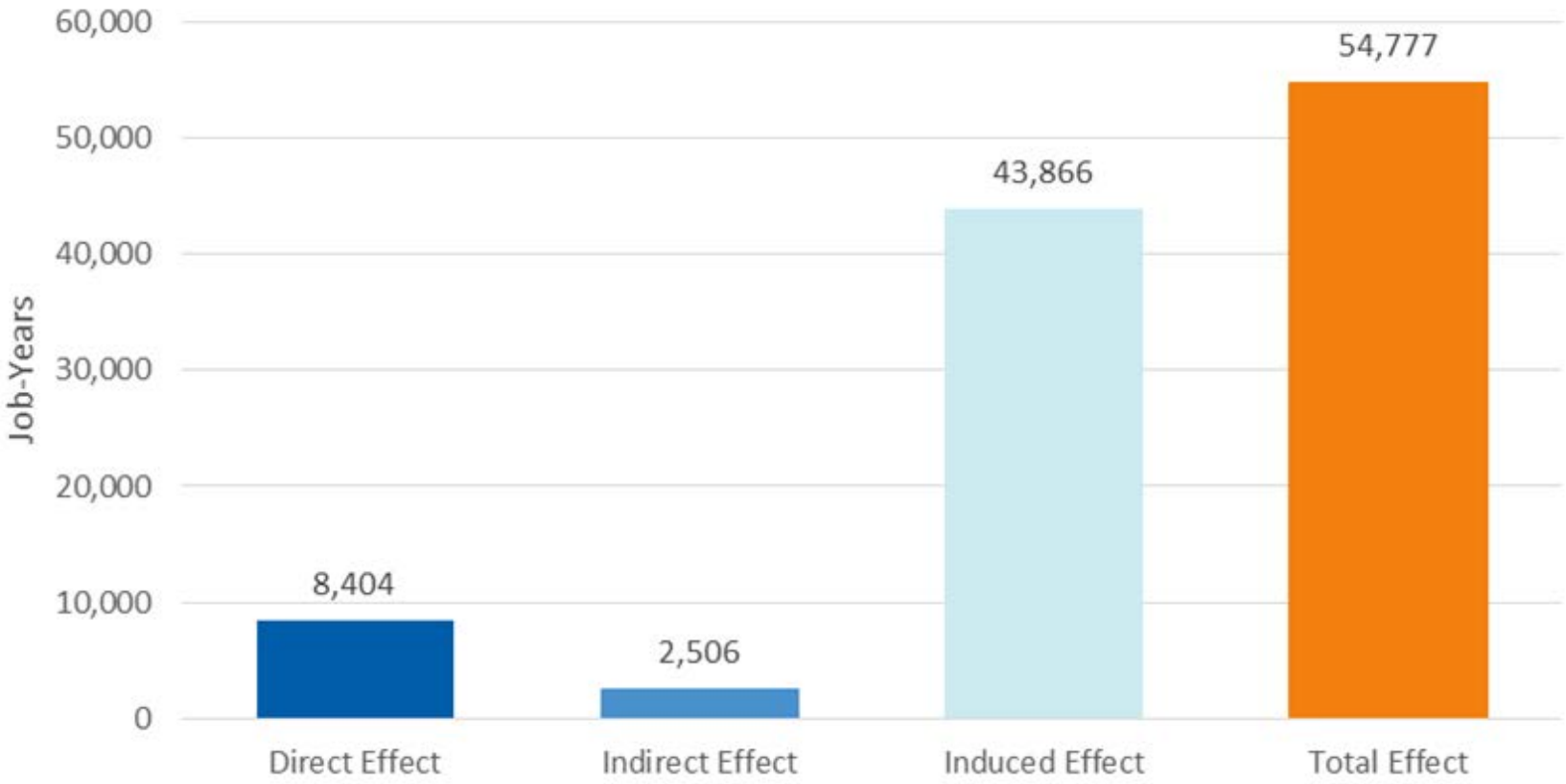
Section 4

RESULTS

Summary of Results by Variable

Economic Variable	2008-2032 Aggregate Impacts
1. Employment	• 8,404 direct and 54,777 net job-years
2. Employee Earnings	• Between $1.9B and $2.2B in net employee earnings
3. Household Income and Savings	• Between $2.2B and $2.6B in net household income
4. Business Revenue	• Between $4.9B and $5.9B in net revenue and production
5. Industry Production	
6. Capital Investment and Innovation	• Between $3.0B and $3.6B in net profit (i.e., state domestic product)
7. State Domestic Product	
8. Utility Electricity and Natural Gas Rates	• Upward pressure on future rates of about $0.000705/kWh and $0.00749/therm due to decreased sales (no estimate of impacts from supply-side investments) • Cost-effective total benefits to utilities, program participants, and society • "Enhanced" Societal Cost Test indicates that CIP provides $4.00 to $4.30 in benefits for every $1.00 invested

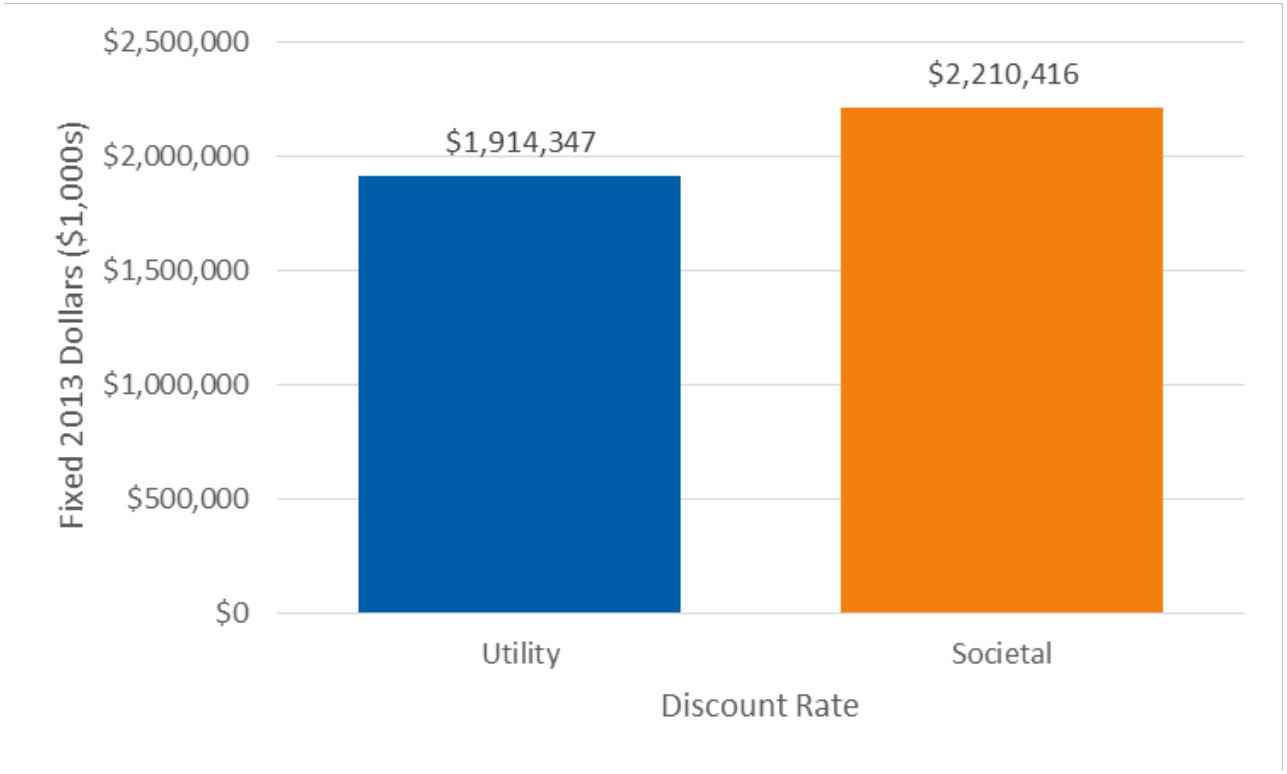
1. Employment



1. Employment

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

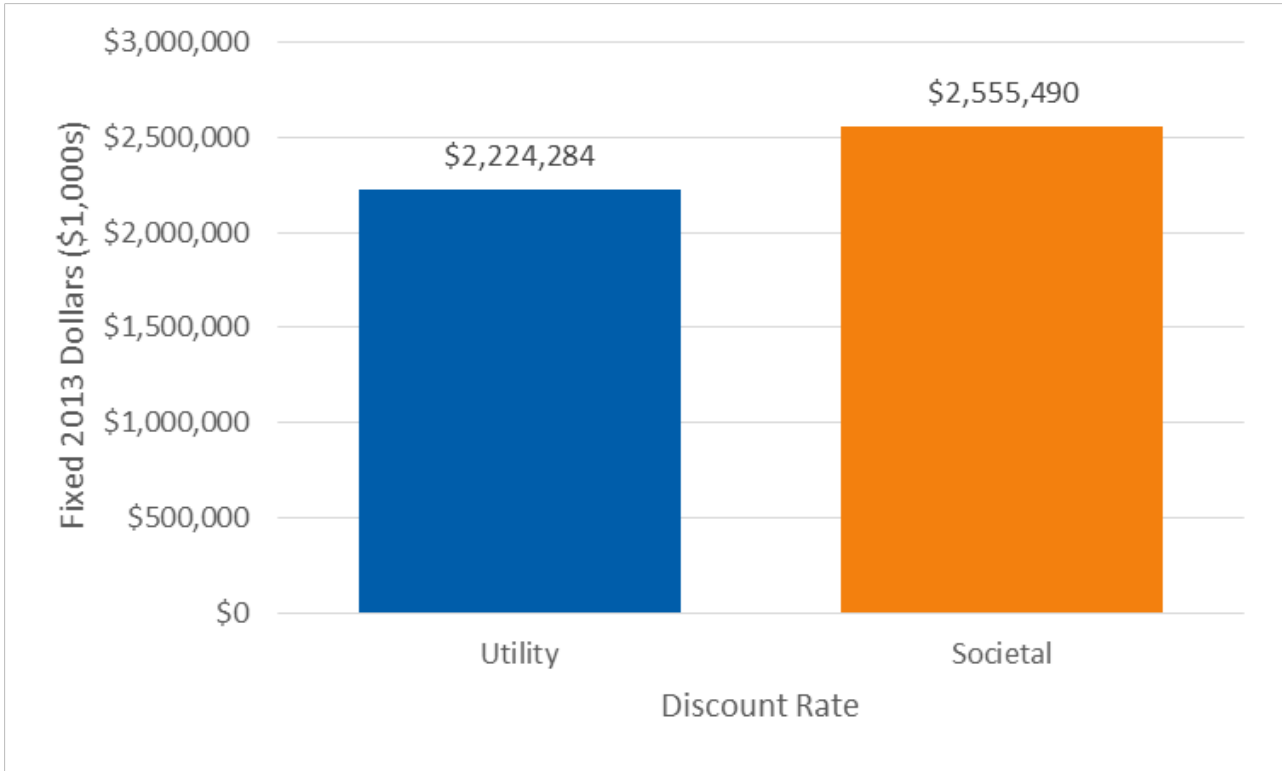
2. Employee Earnings



2. Employee Earnings

Sector Category	Employee Earnings ($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

3. Household Income and Savings



3. Household Income and Savings

Sector Category	Household Income and Savings ($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

4 & 5. Business Revenue and Industry Production

4 & 5. Business Revenue and Industry Production

Sector Category	Revenue and Production ($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

6 & 7. Capital Investment and Innovation & State Domestic Product

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Sector Category	Capital Investment and Innovation ($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

8. Utility Electricity and Natural Gas Rates

Test	Benefits ($1,000s)	Costs ($1,000s)	Net Benefits ($1,000s)	B/C Ratio
Societal Cost Test (SCT)	$5,431,812	$2,108,903	$3,322,908	2.58
Utility Cost Test (UCT)	$4,018,003	$1,041,096	$2,976,907	3.86
Participant Cost Test (PCT)	$4,710,377	$1,502,542	$3,207,836	3.13
Ratepayer Impact Measure (RIM) test	$4,018,003	$5,081,108	-$1,063,105	0.79

- RIM test findings suggest a slight upward pressure on future electric and natural gas retail rates of approximately $0.000705/kWh and $0.00749/therm.
- The RIM test does <u>not</u> 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).

8b. Rate of Return

- Benefits
  - SCT benefits ($1,000s) = $5,431,812
  - "Enhanced" SCT benefits ($1,000s)
    - Utility Discount Rate = $5,431,812 + $3,000,420 = $8,432,232
    - Societal Discount Rate = $5,431,812 + $3,604,442 = $9,036,254
- Costs
  - SCT costs ($1,000s) = $2,108,903
- Standard SCT
  - B/C ratio = $5,431,812 / $2,108,903 = 2.6
- "Enhanced" SCT, Utility Discount Rate
  - B/C ratio = $8,432,232 / $2,108,903 = 4.0
- "Enhanced" SCT, Societal Discount Rate
  - B/C ratio = $9,036,254 / $2,108,903 = 4.3

CIP provides $4.00 to $4.30 in benefits for every $1.00 invested

Section 5

CONCLUSIONS

Summary of Results by Variable

Economic Variable	2008-2032 Aggregate Impacts
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7. State Domestic Product	
8. Utility Electricity and Natural Gas Rates	• Upward pressure on future rates of about $0.000705/kWh and $0.00749/therm due to decreased sales (no estimate of impacts from supply-side investments) • Cost-effective total benefits to utilities, program participants, and society • "Enhanced" Societal Cost Test indicates that CIP provides $4.00 to $4.30 in benefits for every $1.00 invested

Full Report

To view “The Aggregate Economic Impact of the Conservation Improvement Program, 2008-2013” in full, click the link below.

View the Full Report

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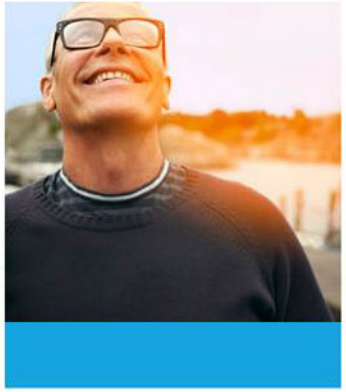

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