



CADMUS

THE ECONOMIC IMPACTS
OF ENERGY EFFICIENCY
INVESTMENTS IN INDIANA

OCTOBER 2016



TABLE OF CONTENTS

EXECUTIVE SUMMARY1

INTRODUCTION2

ANALYSIS FINDINGS3

ANALYSIS METHOD8

CONCLUSION8

PREPARED BY:

Charles Bicknell
Tyler Browne
Alex Chamberlain
David Molner

The Cadmus Group, Inc.
100 Fifth Avenue, Suite 100
Waltham, MA 02451

PREPARED FOR:

Midwest Energy Efficiency Alliance
20 North Wacker Drive, Suite 1301
Chicago, IL 60606



E Source

Certain portions of these materials are © E Source Companies LLC 2016 (E Source) and were obtained from E Source. These materials are proprietary to E Source, and the recipient may not, without the consent of E Source: (1) sell or distribute copies of these materials outside the recipient's organization; or (2) create summaries, excerpts, restatements, or other derivative works based on these materials. All rights reserved.



ECONOMIC IMPACTS OF ENERGY EFFICIENCY

INDIANA

Multi-Year Impacts of 2014 Programs

6,238
JOBS CREATED



\$513 MILLION
BOOST TO
STATEWIDE
INCOME

6,894 GWh
ELECTRICITY SAVED



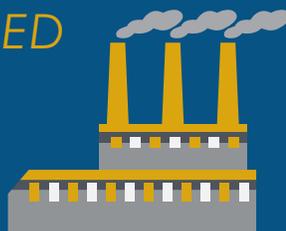
21.4 MILLION
THERMS GAS SAVED

EMISSIONS AVOIDED

7,481,057 TONS CO₂

23,282 TONS SO₂

7,266 TONS NO_x



ENERGY EFFICIENCY INVESTMENTS ARE CREATING JOBS AND INCREASING INCOMES IN INDIANA.

Analysis conducted by Cadmus concludes that 2014 energy efficiency investments in Indiana have yielded, and will continue to generate, net benefits for the Indiana state economy. In 2014 alone, these benefits included nearly **1,700 new jobs**, more than **\$85 million in increased statewide income**, about **\$147 million in total net economic value**, and over **\$250 million in net sales**.

The analysis also concludes that the economic impacts of energy efficiency investments persist, providing positive returns for Indiana residents and businesses long after the utilities' initial investments. Over the entire 25-year study period, the 2014 energy efficiency programs are estimated to **create over 6,200 jobs, increase net statewide income by more than \$510 million, add over \$800 million of total value to the state's economy, and generate nearly \$1.4 billion in net sales**.

In 2014, the Indiana State Legislature repealed the statewide energy efficiency mandate requiring utilities to meet minimum energy efficiency targets. Indiana efficiency programming is now accomplished through voluntary utility efforts within an integrated resource planning process. As of June 2016, the Indiana Utility Regulatory Board is in the process of rulemaking to create an integrated resource planning process.

In 2015, with reduced investment in energy efficiency under the new voluntary standard, program activity resulted in lower impacts. Modeling shows that between 2015 and 2039 the 2015 programs are likely to generate between around 3,500 and 5,500 jobs, \$300 to \$450 million in statewide income, \$490 to \$780 million in economic value, and \$820 million to \$1.3 billion in sales.



INTRODUCTION

This report describes the net statewide economic benefits of Indiana energy efficiency programs. As requested by MEEA, Cadmus determined the net economic impacts of four program scenarios. First, we compared the net benefits of (1) actual 2014 program spending and savings to those of (2) planned 2015 program spending and savings. Then, to assess the effects from potential increases or decreases to planned activities and outcomes, Cadmus also calculated the net benefits of (3) a one-third increase and (4) a one-third decrease to planned 2015 spending and savings.

Cadmus estimated annual statewide impacts on employment, personal income, value added, and sales over a 25-year study period for each program scenario. Table 1 summarizes the net study period impacts on each of these economic indicators by program spending and savings scenario.

As Figure 1 illustrates, energy efficiency investments affect the flow of money through the state and regional economies in three ways. **Direct economic effects** represent impacts on industries directly

Indiana investments in energy efficiency create jobs, generate new income, and increase in-state spending. For example, the 2014 programs alone are estimated to generate more than 6,000 jobs, increase statewide income by over \$500 million, add more than \$800 million of economic value, and generate over \$1.3 billion in sales between 2014 and 2038.

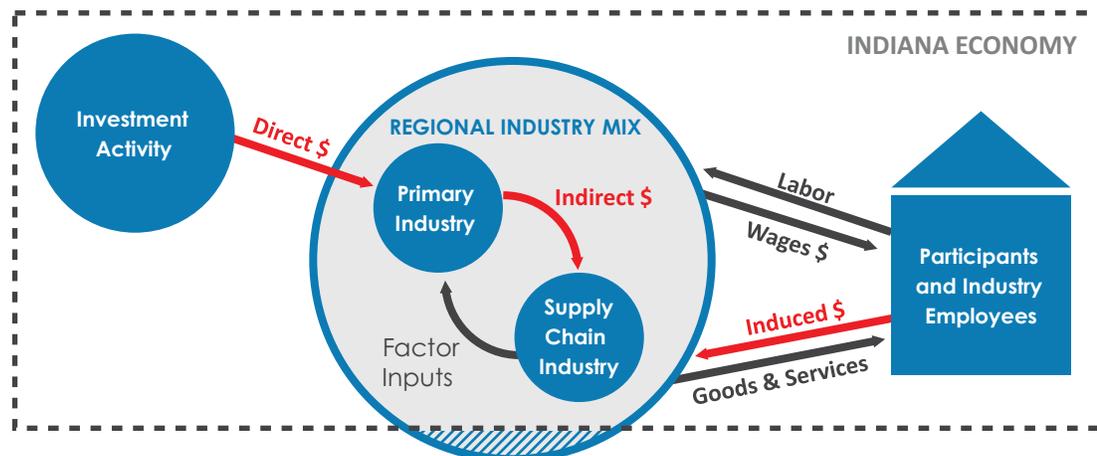
These economic impacts increase or decrease with the level of investment. For example, as the estimated impacts of planned 2015 programs reveal, positive economic effects will decrease if program spending and savings decrease.

involved with utility programs, such as firms that manufacture energy technologies or provide project services. **Indirect economic effects** account for impacts on industries in the energy efficiency supply chain, such as firms that supply raw manufacturing inputs to the directly affected industries. **Induced economic effects** lead to additional impacts on other industries as utility

Table 1. Summary Findings

Economic Indicator	Net Study Period Impacts			
	2014 Actual	2015 Plan	2015 High	2015 Low
Employment (jobs)	6,238	4,765	5,471	3,486
Personal Income (millions of 2015 dollars)	\$513	\$403	\$456	\$300
Value Added (millions of 2015 dollars)	\$804	\$661	\$781	\$492
Sales (millions of 2015 dollars)	\$1,348	\$1,107	\$1,316	\$822

Figure 1. How Energy Efficiency Investments Affect the Flow of Money Through the Economy



program participants and employees of directly and indirectly affected industries spend money in the economy.

Although the modeling analysis assumes total statewide spending is the same with or without programs, net impacts are positive because the *nature* of spending within the state economy changes as a result of direct, indirect, and induced program effects. In the example shown in Figure 1, efficiency investments result in positive net statewide economic impacts because funds that are directed to mainly local industries would otherwise have been spent primarily (but not exclusively) on energy resources, some of which are imported into Indiana.

In addition to the effects from program year expenditures, efficiency investments continue to generate positive net economic benefits as long as energy savings continue. Ongoing energy savings allow participants to spend less money on energy and more on other products and services, many of which have relatively localized supply chains. Furthermore, Indiana utilities benefit from reduced fuel and power purchases, transmission and distribution costs, emission allowance costs,

and supply capacity requirements. However, customers purchase less energy after participating in energy efficiency programs; therefore, utilities also forego revenues equal to sales reductions.¹

ANALYSIS FINDINGS

Cadmus compared the net impacts on the Indiana economy of actual 2014 program spending and energy savings to the net benefits of planned 2015 spending and savings. To approximate a range of benefits from *actual* 2015 program spending and energy savings, which may deviate from the plans, Cadmus also modeled the net economic benefits from a one-third increase and a one-third decrease to planned 2015 spending and savings. The following sections describe findings from our analyses.

2014 AND 2015 PROGRAM PORTFOLIO IMPACTS

As shown in Table 2, Indiana utilities changed their program portfolios from 2014 to 2015, including decreasing total investment and electric savings and increasing gas savings across the entire program portfolio. Compared to 2014, the 2015 planned portfolio reduced residential investment

Table 2. 2014 and 2015 Utility Spending and Lifetime Savings, by Program Customer Segment

Program Customer Segment	Spending (millions of \$2015)	GWh Savings	therm Savings	Avoided CO ₂ (tons)	Avoided SO ₂ (tons)	Avoided NO _x (tons)
2014 Actual						
Residential	\$58.9	1,673	14,404,210	2,084,114	6,486	2,024
Nonresidential	\$65.9	5,221	7,032,940	5,396,903	16,796	5,242
Cross-Cutting*	\$2.2	0	0	40	0	0
Total Portfolio	\$126.9	6,894	21,437,150	7,481,057	23,282	7,266
2015 Plan						
Residential	\$54.3	1,328	18,849,415	1,870,259	5,820	1,816
Nonresidential	\$51.6	4,677	18,270,000	5,183,813	16,133	5,035
Cross-Cutting	\$0.9	0	0	0	0	0
Total Portfolio	\$106.8	6,005	37,119,415	7,054,072	21,953	6,851

*2014 Cross-cutting programs saved 41,000 kWh, 0.13 tons of SO₂, and 0.04 tons of NO_x.

¹ The dollar value of these reductions represents a cost to the utilities, which we also considered in our analysis.

by nearly \$5 million, nonresidential investment by more than \$14 million, and cross-cutting (i.e., non-segment specific) investment by more than \$1 million for a total portfolio reduction of approximately \$20 million (16% change). The planned funding changes primarily affected electric programs, reducing total electric portfolio investment by 17%, particularly programs targeting commercial and industrial customers. However, investment shrank by only 1% for gas programs across the portfolio, as utilities diverted nearly all cross-cutting spending on gas-related initiatives to residential and nonresidential gas programs.

As a result of these spending changes, Indiana utilities expected increases in lifetime gas savings of over 4 million therms for residential programs and more than 11 million therms for nonresidential programs. Planned lifetime electric savings decreased by about 345 GWh for residential programs and 544 GWh for nonresidential programs. Cross-cutting programs did not record any therm savings in 2014, and the 2015 plans did not include electric or gas savings. Across the entire portfolio, Indiana utilities voluntarily planned for a total reduction in lifetime electric savings of approximately 889 GWh (13% change) and a total increase in

lifetime gas savings of nearly 16 million therms (73% change).

The economic impacts of energy efficiency portfolios depend partly on the total level of investment and energy savings, and partly on the mix of programs. This is mainly because a program's effect on industries in the state and regional economies depends on customer segment, the type of efficiency measure(s) promoted, and the incentive(s) offered.

As shown in Table 3, changes in Indiana utilities' program spending and savings led to nonlinear changes in statewide employment, personal income, value added, and sales impacts because the mix of programs in Indiana utilities' portfolios also changed. The significant decrease in 2015 portfolio investment led to decreases in employment that were larger than decreases to other economic indicators. Overall, net economic impacts declined more than total investment in percentage terms.

Details of the net statewide employment, personal income, value added, and sales benefits of the 2014 actual and 2015 planned program portfolios are outlined in the following sections.

Table 3. Changes in Net Economic Impacts from 2014 Actual to 2015 Plan

Economic Indicator	2014 Actual	2015 Plan	Change (%)
Program Year Employment (jobs)	1,662	1,039	-37%
Future Year Employment (jobs)	4,576	3,726	-19%
Total Study Period Employment (jobs)	6,238	4,765	-24%
Program Year Personal Income (\$2015 Millions)	\$86	\$49	-43%
Future Year Personal Income (\$2015 Millions)	\$427	\$354	-17%
Total Study Period Personal Income (\$2015 Millions)	\$513	\$403	-21%
Program Year Value Added (\$2015 Millions)	\$147	\$78	-47%
Future Year Value Added (\$2015 Millions)	\$657	\$582	-11%
Total Study Period Value Added (\$2015 Millions)	\$804	\$661	-18%
Program Year Sales (\$2015 Millions)	\$252	\$143	-43%
Future Year Sales (\$2015 Millions)	\$1,096	\$964	-12%
Total Study Period Sales (\$2015 Millions)	\$1,348	\$1,107	-18%

EMPLOYMENT

Program spending and energy savings generate positive net effects on statewide employment in the near term and over time. Figure 2 shows the net first-year and future-year job impacts by program year. Analysis findings suggest that actual 2014 programs created 1,662 net jobs in the first year and will help create another 4,576 net jobs—an average of 191 per year—through the end of the study period (2038). Planned 2015 programs created 1,039 net jobs in the first year and are expected to help create an additional 3,726 net jobs—an average of 155 per year—through the end of the study period (2039).

PERSONAL INCOME

Indiana efficiency programs also produce positive near-term and long-term statewide personal income effects. Figure 3 shows the net first-year and future-year statewide income impacts by program year. The model findings show that the 2014 programs generated about \$86 million of net income the first year and will generate about \$427 million—an average of \$18 million per year—through 2038. Planned 2015 programs provided \$49 million of net income in the first year and are predicted to generate about \$354 million of additional net income—about \$15 million per year—through 2039.

Figure 2. First-Year and Future-Year Employment Impacts (Jobs), by Program Year

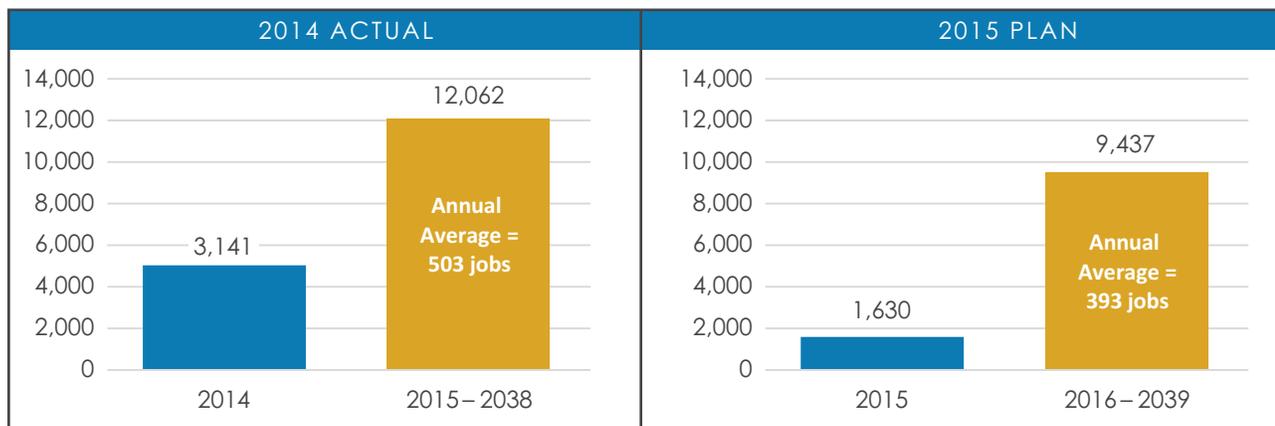


Figure 3. First-Year and Future-Year Personal Income Impacts (Millions of \$2015), by Program Year

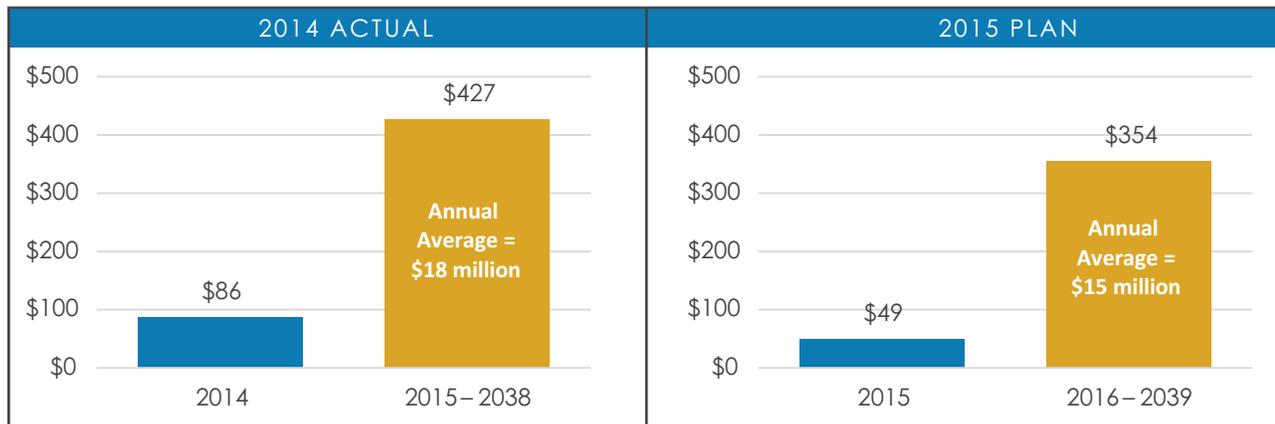
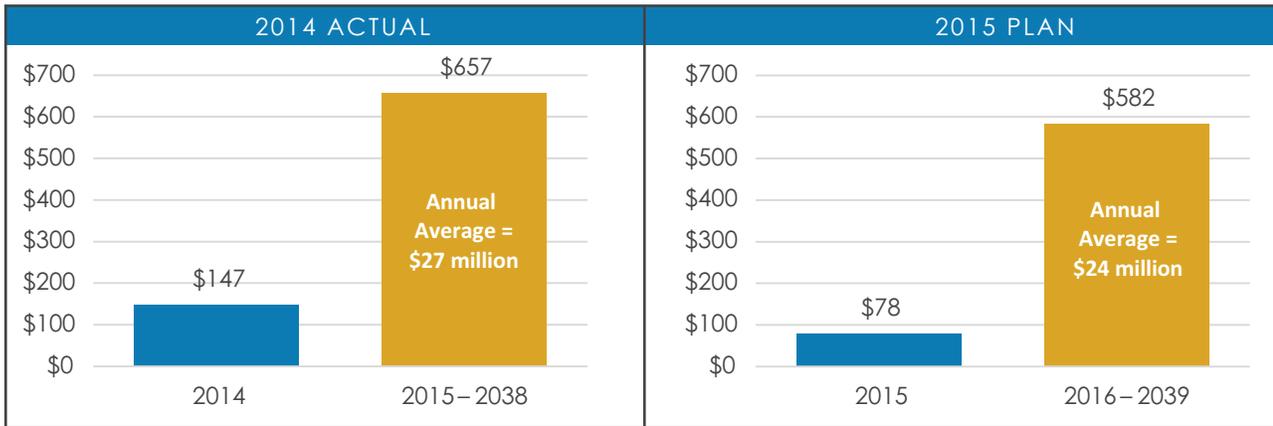


Figure 4. First-Year and Future-Year Value Added Impacts (Millions of \$2015), by Program Year



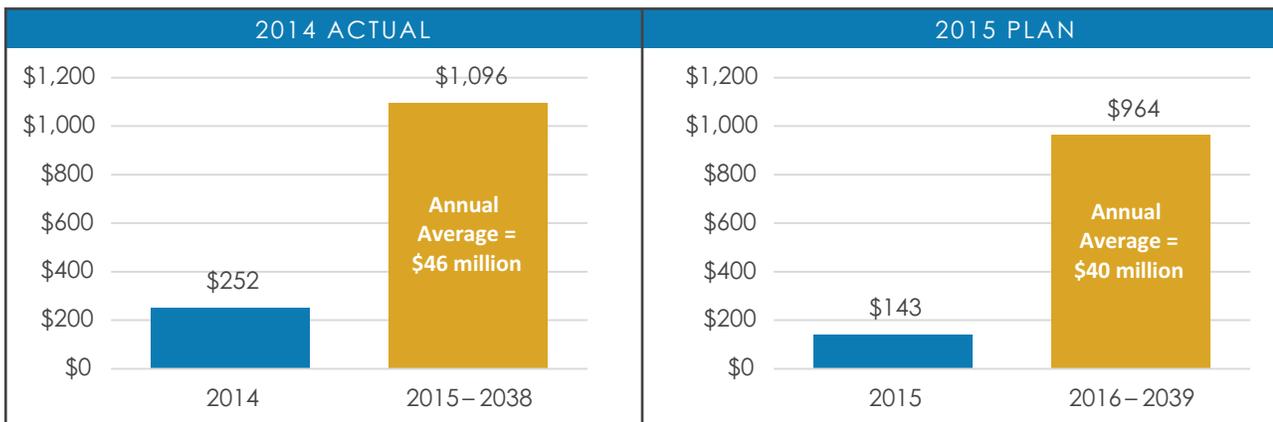
VALUE ADDED

Indiana efficiency investments and energy savings generate new demand for products and services that are produced by relatively local industries, which adds net value to the statewide economy. Figure 4 illustrates the net first-year and future-year value added impacts by program year. The analysis suggests that the 2014 program portfolio added about \$147 million of net economic value the first year and about \$657 million—an average of \$27 million per year—through the end of the study period. Planned 2015 programs created \$78 million of additional net economic value in the first year and are predicted to generate approximately \$582 million—an average of \$24 million per year—through 2039.

SALES

Efficiency program activities and resulting energy savings also lead to positive net sales impacts in Indiana. Figure 5 shows the net first-year and future-year sales impacts by program year. Model findings show that the 2014 programs generated about \$252 million of net sales the first year and a total of almost \$1.1 billion—an average of \$46 million per year—through the end of the study period. Planned 2015 programs generated \$143 million of net sales in the first year and are predicted to add almost \$1 billion of additional sales—an average of about \$40 million per year—through 2039.

Figure 5. First-Year and Future-Year Sales Impacts (Millions of \$2015), by Program Year



IMPACTS FROM CHANGES TO 2015 PROGRAM PORTFOLIO PLANS

Since actual program spending and savings may deviate from plans, Cadmus conducted a sensitivity analysis of just the planned 2015 program investments and resulting savings. Fixed percentage changes to spending and savings across the entire portfolio lead to nonlinear percentage changes to net economic benefits. More precisely, a one-third increase to planned 2015 program spending and savings results in a roughly one-sixth increase to all four economic indicators. Sales impacts would experience the largest growth (19%) from an increase to 2015 planned spending and savings, whereas personal income would experience the smallest growth (13%).

On the other hand, a one-third decrease to planned 2015 spending and savings results in an approximately one-fourth decrease to all four economic indicators. Compared to the effects expected from 2015 plans, employment

benefits from reduced spending and savings would decrease the most (-27%) and personal income benefits would decrease the least (-25%). Ultimately, the predicted effects from significant percentage increases or decreases to planned 2015 program investments and savings result in unequal but also significant percentage increases or decreases in economic benefits.

As shown in Figure 6, the findings suggest that a one-third increase to 2015 program spending and savings generates total employment impacts of 5,471 net jobs, representing a net increase of 706 jobs over the entire study period. Findings also suggest that a one-third decrease to planned spending and savings generates total employment impacts 3,486 net jobs, a total net decrease of 1,279 jobs through 2039.

As Figure 7 illustrates, analysis findings show that a one-third increase to 2015 spending and savings generates total study period income, value added, and sales impacts of approximately \$456 million,

Figure 6. Study Period Employment Impacts (Jobs), by 2015 Scenario

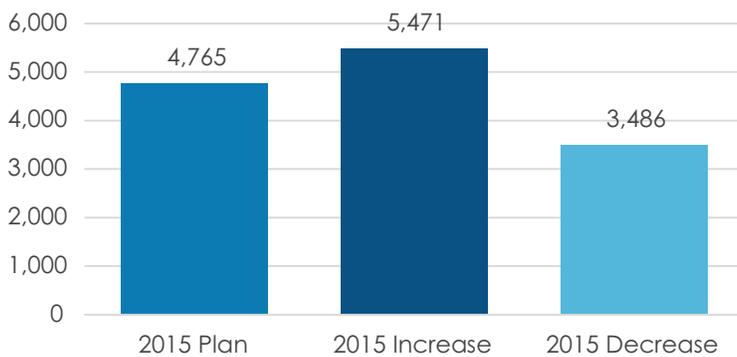


Figure 7. Study Period Income, Value Added, and Sales Impacts (\$2015 Million), by 2015 Scenario



\$781 million, and \$1.3 billion, respectively. A one-third decrease to planned spending and savings leads to total study period income, value added, and sales impacts of about \$300 million, \$492 million, and \$822 million, respectively.

ANALYSIS METHOD

Six Indiana utilities were included in this analysis: Duke Energy, Indiana Power & Light Company, the Indiana Municipal Power Agency, Indiana Michigan Power, Northern Indiana Public Service Company, and Vectren Corporation. Cadmus estimated the net economic impacts of annual program spending and resulting energy savings for each utility using the Regional Economic Models, Inc. Policy Insight+ (REMI PI+) model, a dynamic economic forecasting tool.²

For each program scenario analyzed, we determined net first-year and future-year impacts on four key economic indicators across a 25-year study period: (1) employment; (2) personal income; (3) value added; and (4) sales. To isolate the net statewide effects on these variables from each program scenario, Cadmus modeled six cash flows against the REMI PI+ model's built-in forecast of the baseline economy: (1) program payments; (2) program spending; (3) incentives; (4) participant payments; (5) bill reductions; and (6) avoided utility costs.³

CONCLUSION

Indiana utilities' energy efficiency programs create local jobs, boost statewide income, and increase in-state spending. The 2014 programs alone are estimated to create more than 6,000 jobs, increase statewide income by over \$500 million, add more than \$800 million of economic value, and generate over \$1.3 billion in sales between 2014 and 2038. Utilities plan to reduce investment and energy savings in 2015. As a result, the planned 2015 programs are estimated to generate lower—but still positive—impacts on the Indiana economy. Model findings suggest that depending on actual levels of investment and savings, the 2015 programs will create between 3,486 and 5,471 jobs, increase statewide income by \$300 to \$456 million, add between \$492 and \$781 million of economic value, and generate \$822 million to \$1.3 billion in sales between 2015 and 2039. In any case, energy efficiency investments generate positive impacts on the Indiana economy.

² <http://www.remi.com/>

³ A separate section of this report, "The Economic Impacts of Energy Efficiency Investments in the Midwest," includes a detailed description of each economic indicator and modeled cash flow analyzed in this study.

CADMUS

CADMUS
16 N. Carroll Street, Suite 900
Madison, WI 53703
Phone: 608.250.1920

www.cadmusgroup.com

Copyright © 2016 by The Cadmus Group, Inc.

All rights reserved. Any unauthorized use of this material is prohibited. This document or any portion thereof may not be reproduced or used in any manner whatsoever without the express written permission of The Cadmus Group, Inc.