



# PROGRESS PRODUCTIVITY PROSPERITY

The Economic Impact of EE Investments in the Southeast

**ENERGYPRO<sup>3</sup>**  
PRODUCTIVITY PROGRESS PROSPERITY  
REPORT



## About the Southeast Energy Efficiency Alliance (SEEA)

The Southeast Energy Efficiency Alliance (SEEA) is one of six regional energy efficiency organizations in the United States working to transform the energy efficiency marketplace through collaborative public policy, thought leadership, outreach programs and technical advisory services. SEEA promotes energy efficiency as a catalyst for economic growth, workforce development and energy security across 11 southeastern states. These states include Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee and Virginia.

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## Energy Pro3: The Economic Impact of Energy Efficiency Investments in the Southeast

This report is titled “Energy Pro3: The Economic Impact of Energy Efficiency Investments in the Southeast.” It provides an independent analysis by the Cadmus Group of the economic performance of SEEA’s 16-city, U.S. Department of Energy-funded energy efficiency retrofit consortium from 2010 to 2013.

To create this analysis, the Cadmus Group applied SEEA’s program data to an economic modeling program known as Impact Analysis for Planning (IMPLAN) v3.1, a widely used and well known platform for predicting economic impacts. Cadmus then calculated the net impacts of SEEA’s energy efficiency programs on the economy of the southeast region as a whole, and on the economies of the states with participating programs.

This report provides a detailed description of the methodology used by the Cadmus Group, as well as regional and state-level findings. These are presented in the form of a total economic impact summary, employment impacts and return on investment, by region and by state. Participant states include Alabama, Florida, Georgia, Louisiana, North Carolina, South Carolina, Tennessee and Virginia.



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**- ELIZABETH GRIMES, ENERGY PROGRAM MANAGER, ALABAMA DEPARTMENT OF ECONOMIC AND COMMUNITY AFFAIRS**

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# INTRODUCTION

Cadmus performed macroeconomic analyses of the U.S. Department of Energy (DOE) Better Buildings Neighborhood Programs (BBNP) implemented by the Southeast Energy Efficiency Alliance (SEEA). These programs were supported by American Recovery and Reinvestment Act (ARRA) funds delivered through both DOE Energy Efficiency and Conservation Block Grants (EECGB) and DOE State Energy Programs (SEP).

Cadmus estimated net employment and other economic impacts resulting from the programs' operation. We conducted state- and region-level analyses with the Impact Analysis for Planning (IMPLAN) v3.1 modeling software, an input/output (I/O) tool that characterizes spending patterns and relationships between households and industries.<sup>1</sup> Table 1 presents the BBNP programs included in Cadmus' analyses.

**Table 1. BBNP Programs Implemented by SEEA, 2010-2013**

BBNP Program	State	City / Cities	Target Market
Alabama WISE	AL	Birmingham, Huntsville	Residential
Huntsville WISE	AL	Huntsville	Residential
ShopSmart/InvestSmart	FL	Jacksonville	Residential, Commercial
Atlanta SHINE Gold/Silver	GA	Atlanta	Residential, Multifamily
DecaturWISE	GA	Decatur	Residential
NOLA WISE	LA	New Orleans	Residential
CarrborroWISE	NC	Carrborro	Residential, Commercial, Multifamily
Chapel Hill WISE	NC	Chapel Hill	Residential, Multifamily
Charlotte Multifamily	NC	Charlotte	Multifamily
CharlestonWISE	SC	Charleston	Residential
Nashville Energy Works	TN	Nashville	Residential, Multifamily
CAFE2	VA	Blacksburg, Roanoke, Christiansburg	Residential
LEAP (SEP)	VA	Arlington, Charlottesville	Residential
LEAP (EECGB)	VA	Charlottesville	Residential, Commercial, Multifamily
NEXT STEP	VA	Hampton Roads	Residential
Richmond REA	VA	Richmond	Residential

In this report, we discuss our methodology and economic impact findings. We first review our analysis methods, including an overview of the IMPLAN model, a discussion of the types of economic impacts modeled, and details regarding the data used in this analysis. Findings are then presented in the following order: (1) Southeast Region, (2) Alabama, (3) Florida, (4) Georgia, (5) Louisiana, (6) North Carolina, (7) South Carolina, (8) Tennessee, and (9) Virginia. Finally, a summary analysis of returns on investment concludes the report.

<sup>1</sup>. <http://implan.com>



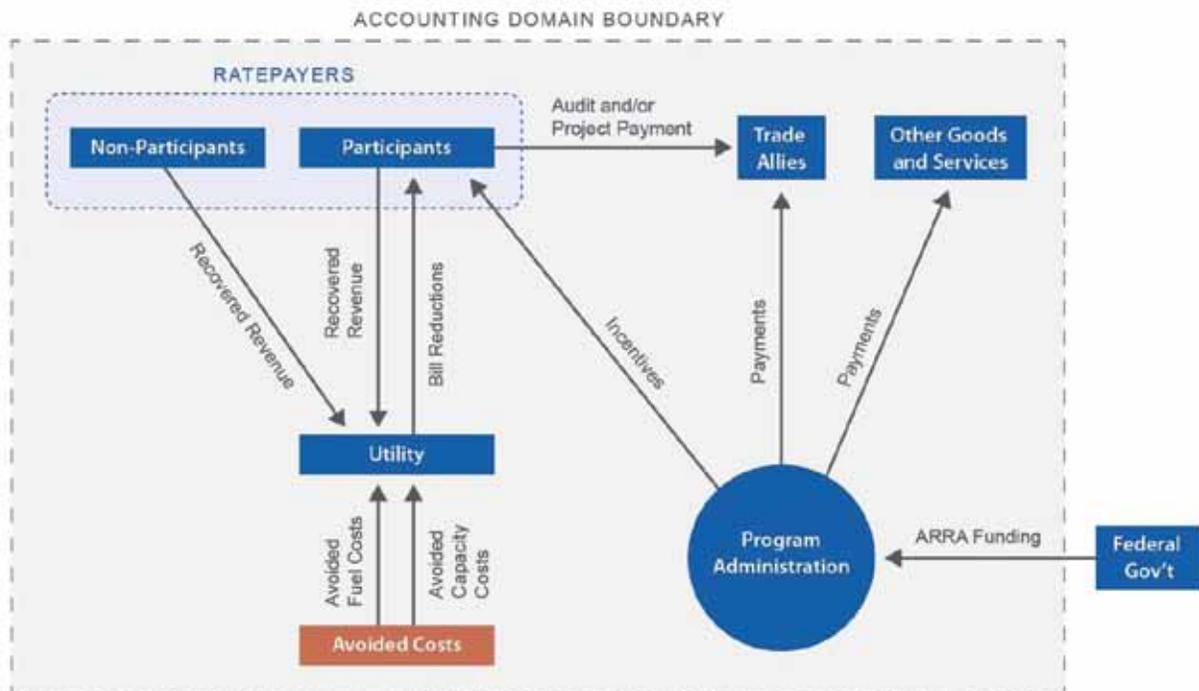
# METHODOLOGY

This section explains the methodology Cadmus used to analyze the economic impacts attributable to SEEA’s BBNP programs. It contains a description and overview of the IMPLAN model, a discussion of the types of economic impacts modeled, and details regarding the data used in this analysis.

BBNP programs that promote investments in energy efficiency impact local economies in various ways. Funding for BBNP programs comes from the American Recovery and Reinvestment Act (ARRA) and is delivered to states in SEEA territory through both DOE Energy Efficiency and Conservation Block Grants (EECBG) and DOE State Energy Programs (SEP). SEEA and its subcontractors, acting as administrators of local BBNP programs, then use that funding to support residential, multifamily, and commercial investments in energy-efficient retrofit projects. Funds move from program administrators to providers of goods and services as well as to program participants. These funds act to alter the flow of cash through the local economy.

The IMPLAN model utilizes built-in assumptions about the state-level economies within SEEA territory, including assumptions about industrial and household purchasing patterns. Cadmus customized IMPLAN so that it modeled the flow of program-related funds among stakeholders. Figure 1 depicts these cash flows for the BBNP programs in SEEA territory.

**Figure 1. BBNP Program Stakeholder Cash Flow**



# Modeling Economic Impacts with IMPLAN v3.1

Changes in final demand (e.g., purchases) drive the IMPLAN model. IMPLAN utilizes matrix math to capture the impacts that a change in final demand in one industry can have on other industries or sectors using built-in economic multipliers.<sup>2</sup> The program describes how a \$1.00 change in final demand would affect given industries' output.<sup>3</sup> In other words, an increase or decrease in production and employment within a local area has a "multiplier" effect as changes in local spending affect other sectors of the economy.

The model's underlying assumptions are based on real 2011 economic data relating local and regional industries to one another.<sup>4</sup> IMPLAN compares the effects of program-related spending on the economy to a hypothetical baseline picture of the economy in which the BBNP programs would not exist. IMPLAN then calculates the *net* impacts of the BBNP programs on the economy.

The IMPLAN I/O model takes user-specified inputs (see Appendix B. State-Level Model Input Values by IMPLAN Sector Code and Appendix C. Region-Level Model Input Values by IMPLAN Sector Code) and generates outputs of economic impact through matrices based on actual historical economic data. The outputs include three types of economic effects:

- **Direct effects** are perhaps the most intuitive type of economic impact. They are driven by program spending and represent production changes brought by increases in final demand. For example, program marketing expenditures increase final demand for advertising services.
- **Indirect effects** result from changes in the demand for "factor inputs" caused by program activities. Factor inputs are the main goods and services necessary for operation of any given program, such as equipment used to install energy-efficient retrofits. Indirect effects account for any additional materials purchased by the administrators and implementation contractors to run a program. IMPLAN's I/O matrices capture these changes in demand and model the effects on all related industries.
- **Induced effects** result from the ways households and workers spend newfound money on general consumer goods and services. The term "induced" refers to the fact that these effects reflect impacts on industries that were not directly involved with the program or in supplying a program's factor inputs. For example, a program participant may spend his or her energy bill savings on a concert ticket. In this case, dollars flow to a completely unrelated industry (the entertainment industry) but are still attributed as an effect of the program.

IMPLAN generates key indicators showing the economic impacts of the programs:

- **Jobs** include both full- and part-time employment for one year. A job in IMPLAN is equivalent to the annual average of monthly jobs in a given industry.<sup>5</sup> Thus, one job lasting 12 months equals two jobs lasting six months each and equals three jobs lasting four months each, etc. IMPLAN offers sector-specific conversion factors to convert jobs identified in model outputs to full-time jobs.<sup>6</sup> *All employment impacts presented in this report have been adjusted to represent full-time employee (FTE) jobs.*
- **Labor income** represents the total payroll cost of the employee paid by the employer. This includes wages and salary, all benefits (e.g., health and retirement), and payroll taxes (both sides of Social Security, unemployment taxes, etc.). Labor income also includes income earned by proprietors and self-employed professionals.
- **Total value added** represents all profits (operating surpluses), indirect business taxes, and payments to households that result from model inputs.
- **Output** represents the value of industry production. In IMPLAN, these are annual production estimates for the year of the dataset and are presented as producer prices. For manufacturers this would be sales plus or minus change in inventory. For service sectors, production equals sales. For retail and wholesale trade, output equals gross margin.

<sup>2</sup> "Matrix math" is the application of common mathematical functions (e.g., addition, subtraction, and multiplication) to rectangular arrays of numbers.

<sup>3</sup> Lindall, S., and Olson, D. *The IMPLAN Input-Output System*. MIG Inc. Available at: [ftp://199.141.121.35/Economics/NatImpact/implan\\_io\\_system\\_description.pdf](ftp://199.141.121.35/Economics/NatImpact/implan_io_system_description.pdf)

<sup>4</sup> Cadmus purchased 2011 state-level baseline economic data from IMPLAN Group LLC on September 5, 2013.

<sup>5</sup> This is the same definition used by the Quarterly Census of Employment and Wages (QCEW), the U.S. Bureau of Labor Statistics (BLS), and the Bureau of Economic Analysis (BEA).

<sup>6</sup> Conversions to full-time employee (FTE) jobs vary by economic sector; conversion factors are available from IMPLAN at [http://implan.com/V4/index.php?option=com\\_multicategories&view=article&id=628:628&Itemid=14](http://implan.com/V4/index.php?option=com_multicategories&view=article&id=628:628&Itemid=14).

# Economic Impacts Modeled

Cadmus organized IMPLAN model input data into four categories: (1) program spending; (2) utility avoided fuel and capacity costs; (3) spending by local, affiliated programs and lenders; and (4) customer contributions to project costs. Table 2 shows the BBNP-related positive and negative cash flows accounted for in the models.<sup>7</sup>

**Table 2. BBNP-Related Cash Flows**

Positive Impacts Modeled	Negative Impacts Modeled
Program Spending	Affiliated Program Spending (e.g., utility programs)
Utility Avoided Fuel and Capacity Costs	Customer Contributions to Project Costs

Each of these data inputs affects households or industries within the region, as described below:

- **Program Spending (Industries and Households):** Program spending refers to monies spent on all aspects of program implementation, including administration, marketing, support services, office supplies, field equipment, and financial incentives. Using available line item program budgets,<sup>8</sup> Cadmus allocated program expenditures to specific IMPLAN model industry codes.<sup>9</sup>
  - BBNP program expenditures are supported by ARRA funds, which are assumed to originate entirely outside of SEEA’s territory. These expenditures were therefore modeled as increases to household and local industry income; for households, Cadmus distributed incentive payments equally among the nine income categories recognized in the IMPLAN software.
- **Utility Avoided Fuel and Capacity Costs (Industries):** When program participants implement energy-saving retrofit projects, they use less energy from local electric and gas utilities. This decrease in energy consumption results in fewer fuel and capacity costs for local utilities. Using electric and gas utility information included in program data, Cadmus allocated avoided utility fuel and capacity costs to the following economic sectors:
  - Electric power generation, transmission, and distribution
  - Natural gas distribution
  - State and local government electric utilities
- **Affiliated Program Spending (Industries):** Depending on specific BBNP program designs and rules, participants also leveraged financial incentives from local utilities and lenders when paying for energy-saving retrofit projects. Since these incentives are not supported by ARRA funds, which are assumed to come entirely from outside SEEA territory, they are instead assumed to be supported locally. Cadmus modeled these payments as transfer payments from local programs to households. Again using electric and gas utility information included in program data, Cadmus allocated affiliated program spending to the following economic sectors:
  - Electric power generation, transmission, and distribution
  - Natural gas distribution
  - Local lending institutions
  - Grant making, giving, and social advocacy organizations
  - State and local government electric utilities

In some cases, affiliated program spending was supported by local government loan pools or federal grants and tax credits. Money from local government loan pools was assumed to originate from local households via local taxing mechanisms. Similar to the incentives supported by ARRA funds, federal grants and tax credits were assumed to originate entirely from outside SEEA territory and therefore are only modeled as positive cash flows to households.

<sup>7</sup> Cadmus also noted reductions in ratepayer utility bills and resulting utility revenue recovery efforts. We assumed that all revenue lost through reductions in ratepayer utility bills is eventually recouped by local utilities through revenue recovery mechanisms and/or future rate cases. For the sake of simplicity, these opposing positive and negative cash flows are assumed to be exactly equal, and Cadmus did not include them as model inputs.

<sup>8</sup> Line item program budgets were available only for the following four SEP programs: (1) LEAP (SEP) Arlington, (2) LEAP (SEP) Charlottesville, (3) CAFE2, and (4) Richmond REA. SEEA provided an aggregated line-item budget for all EECGB programs combined.

<sup>9</sup> Cadmus referenced RSMeans (<http://rsmeans.reedconstructiondata.com/>) when making decisions about which economic sectors were relevant to retrofit project costs. Cadmus staff used their best judgment when allocating other budget line items to various economic sectors.

- **Customer Contributions to Project Costs (Households):** Energy-saving retrofit projects require some level of customer contribution. Cadmus used known financial incentive data wherever possible to determine customer contributions to project costs. Where financial incentives were missing from project-level data, Cadmus used program descriptions and rules to make reasonable assumptions about the delivery of financial incentives. As with program spending cash flows, Cadmus distributed customer contributions to project costs equally among the nine income categories recognized in the IMPLAN software.

All economic impacts modeled at the state level are presented by IMPLAN sector code in Appendix B. State-Level Model Input Values by IMPLAN Sector Code.

All economic impacts modeled at the regional level are presented by IMPLAN sector code in Appendix C. Region-Level Model Input Values by IMPLAN Sector Code

For a complete list of IMPLAN sector codes and associated descriptions, see Appendix A. IMPLAN Sector Codes and Descriptions.

# Data Sources

## Program Spending Data

Cadmus completed two levels of analysis: (1) state and (2) regional. There were differences in the amount and granularity of program spending data available for these two levels of analysis. For the state-level analyses, Cadmus relied on available program-level budgets. A discussion of program spending data used for state-level analyses is presented in the following section.

## Program Spending Data Used for State-Level Analyses

To identify state-level program spending, Cadmus worked with SEEA staff to secure individual BBNP program budgets.<sup>10</sup> Table 3 presents the total budget for each BBNP program administered in SEEA territory, as well as total program spending in each state. SEP program administration budgets are also presented wherever possible.

**Table 3. BBNP Program and State Budget Totals**

State	BBNP Program or Spending Category	Program Budget (\$)	State-Level Program Spending (\$)
Alabama	Alabama WISE – Birmingham	481,000.00	3,222,803.07
Alabama	Alabama WISE – Huntsville	354,000.00	
Alabama	Huntsville WISE	1,007,005.00	
Alabama	SEP Program Administration	1,380,798.07	
Florida	ShopSmart with JEA	1,200,000.00	1,200,000.00
Georgia	Atlanta SHINE	1,200,000.00	1,382,010.00
Georgia	Decatur WISE	182,010.00	
Louisiana	NOLA WISE	1,633,327.00	1,633,327.00
North Carolina	Carrborro WISE	310,605.00	1,867,610.00
North Carolina	Chapel Hill WISE	950,000.00	
North Carolina	CBRetro	607,005.00	
South Carolina	CharlestonWISE	937,005.00	937,005.00
Tennessee	Nashville Energy Works (NEW)	887,005.00	887,005.00
Virginia	Arlington LEAP (SEP)	449,280.00	5,383,005.00
Virginia	CAFE2	485,913.00	
Virginia	Charlottesville LEAP (SEP)	224,350.00	
Virginia	Charlottesville LEAP (EECGB)	2,707,005.00	
Virginia	NEXT STEP Program	500,000.00	
Virginia	Richmond REA	486,000.71	
Virginia	SEP Program Administration	530,456.29	
<b>Total</b>		<b>16,512,765.07</b>	

<sup>10</sup> All program budget information was secured through e-mail correspondence with SEEA staff during August and September 2013.

For all BBNP programs receiving funding through the DOE SEP in Virginia,<sup>11</sup> budgets included line item breakouts. However, for all other BBNP programs included in the state-level analysis, budgets did not include line item breakouts. Cadmus therefore used aggregated line item totals from all Virginia SEP program budgets to calculate how much money from each program’s overall budget went to different economic sectors. See Appendix D. IMPLAN Code Breakouts for Program Budgets for the IMPLAN code breakouts developed from this analysis.

None of the EECGB program budgets used for the state-level analyses included program administration spending by SEEA. Program administration spending data for EECGB programs was available only at the regional level. As a result, Cadmus was able to account for *all* program administration spending only in the region-level analysis. A discussion of spending data used for the regional analysis is presented in the following section.

### Program Spending Data Used for Regional Analysis

Program administration spending data was available at the program level for these six SEP programs: (1) Alabama WISE – Birmingham, (2) Alabama WISE – Huntsville, (3) Arlington LEAP (SEP), (4) Charlottesville LEAP (SEP), (5) CAFE2, and (6) Richmond REA. Program administration spending attributable to the 12 EECGB programs was available only at the aggregated, regional level.

While Cadmus organized program spending data by state for each state-level analysis (Table 3), the lack of granularity in EECGB program administration spending data warranted a different organizational structure for the regional analysis. Table 4 presents regional program spending according to these segments: (1) the two SEP programs administered in Alabama, (2) the four SEP programs administered in Virginia, and (3) the 12 EECGB programs administered throughout the region.

**Table 4. Regional Spending**

Segment	Spending (\$)
Alabama SEP Programs	2,215,798.07
Virginia SEP Programs	2,176,000.00
EECGB Programs	15,820,869.49
<b>Total</b>	<b>20,212,667.56</b>

Again, the regional spending data presented above includes EECGB program administration spending that was not accounted for in the state-level analyses. The difference of approximately \$3.7 million between the regional spending total presented in Table 4 and the aggregated state-level spending total in Table 3 represents the EECGB program administration spending that was not accounted for in the state-level analyses due to a lack of granularity.

<sup>11</sup> BBNP programs receiving funding through the DOE SEP in Virginia include: (1) Arlington LEAP (SEP), (2) Charlottesville LEAP (SEP), (3) CAFE2, and (4) Richmond REA.

## Utility Avoided Fuel and Capacity Costs

Cadmus conducted a separate cost-effectiveness analysis for all BBNP programs that received funding through a DOE EECGB. As part of that analysis, Cadmus calculated avoided fuel and capacity costs. Data sources for each calculation are discussed below.

### Avoided Fuel Costs

Cadmus used natural gas delivered prices, collected from the 2013 Annual Energy Outlook report on the Energy Information Administration (EIA) web site,<sup>12</sup> as the basis for the avoided fuel costs associated with electric generation. Nominal prices were adjusted for on- and off-peak heat rates (also obtained from the EIA web site), monthly variations (using Henry Hub natural gas futures prices), and spark spreads.<sup>13</sup> Two sets of avoided costs were developed, one for South Atlantic states (all SEEA participating states except Alabama, Tennessee, and Louisiana) and one for East South Central states.

Natural gas avoided fuel costs were based on regional city gate prices from the EIA. The gas avoided fuel costs were split into the same regions, East South Central and South Atlantic, as they were for electric avoided fuel costs.

Electric avoided fuel costs were estimated by month and peak/off-peak hours, for a total of 24 unique values per year. Gas avoided costs were estimated monthly for a total of 12 unique values per year.

Table 5 shows the electric and gas avoided fuel costs for 2013 (avoided costs were developed for 2010 through 2040).

**Table 5. 2013 Avoided Fuel Costs**

Month	South Atlantic			East South Central		
	Electric (\$/MWh)		Gas (\$/therm)	Electric (\$/MWh)		Gas (\$/therm)
	Off-Peak	On-Peak		Off-Peak	On-Peak	
1	39.84	56.55	0.47	32.99	47.63	0.47
2	34.63	49.77	0.45	28.71	42.07	0.47
3	36.26	51.88	0.45	30.05	43.80	0.46
4	37.00	52.85	0.41	30.65	44.59	0.41
5	39.99	56.74	0.43	33.11	47.79	0.40
6	42.82	60.43	0.48	35.44	50.82	0.40
7	41.84	59.15	0.42	34.63	49.77	0.44
8	43.08	60.77	0.51	35.66	51.10	0.45
9	39.37	55.94	0.49	32.61	47.14	0.43
10	32.97	47.61	0.45	27.35	40.29	0.45
11	32.23	46.65	0.45	26.74	39.50	0.47
12	30.75	44.72	0.47	25.53	37.92	0.46

<sup>12</sup> www.eia.gov

<sup>13</sup> The spark spread is the theoretical gross margin of a gas-fired power plant from selling a unit of electricity, having bought the fuel required to produce that unit of electricity.

## Avoided Capacity Costs

Avoided capacity costs are multiplied by capacity savings. These costs represent the reduction in generation capacity needed to meet peak hour loads that results when BBNP program participants use less energy.

Cadmus used PJM residual auction capacity prices as the source for the avoided capacity prices. Table 6 shows the annual avoided capacity prices (\$/kW-year) for 2010 to 2026.<sup>14</sup>

**Table 6. Avoided Capacity Costs, 2010 – 2026**

Year	\$/kW-year
2010	63.62
2011	63.62
2012	40.15
2013	6.01
2014	10.12
2015	45.97
2016	49.14
2017	49.80
2018	50.43
2019	51.20
2020	51.93
2021	52.65
2022	53.39
2023	54.14
2024	54.91
2025	55.68
2026	56.47

## Load Shapes

In cost-effectiveness analysis, load shapes are used to allocate the annual energy savings to specific hours of the year. For example, heating measures produce energy savings mostly during winter peak and off-peak hours, while cooling measures produce energy savings mostly during summer on-peak hours. As shown in Table 4 above, the magnitude of the avoided cost benefits of the energy savings varies by season and hour, so utilizing load shapes allows for more accurate estimation of avoided cost benefits.

Cadmus developed 8760 load shapes (8760 representing the number of hours in a non-leap year) using building simulation software. The load shapes are unique by:

- Climate zone – Baltimore, Houston, Memphis, Miami
- Fuel type – electric, natural gas
- Sector – residential, commercial
- Building segment – single-family and multifamily for residential, various segments for commercial
- End use – varies by sector (heating, cooling, water heating, large appliances, etc.)

<sup>14</sup> In keeping with other cost-effectiveness analyses completed by Cadmus, all measure lives were capped at 16 years. As a result, all projected energy and cost savings last through the year 2026 at a maximum. All future costs and benefits in this analysis were discounted using the July 3, 2013, Long-Term Treasury rate of 3.19% (retrieved from <http://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/TextView.aspx?data=longtermrateYear&year=2013>).

## Modeling Avoided Fuel and Capacity Costs for Economic Impact Analysis

Again, Cadmus conducted a separate cost-effectiveness analysis for all BBNP programs in SEEA territory that received ARRA funding through an EECGB. Cadmus' cost-effectiveness analysis results were used as model inputs wherever possible. For BBNP programs that received funding through a DOE SEP, however, we needed to make assumptions about the avoided costs.

Having access to reported *ex ante* savings for all programs, regardless of ARRA funding stream, we were able to put all known avoided fuel and capacity costs into the following terms:

$$\text{Avoided Costs (\$) / ex ante savings (kWh or therms)} = \text{cost per unit energy}$$

Cadmus developed these ratios for three states where BBNP programs not included in the separate cost-effectiveness analysis were operating and applied those as estimates of avoided costs for SEP programs.<sup>15</sup> Table 7 presents the ratios that Cadmus developed for Alabama, North Carolina, and Virginia.

**Table 7. Ratios Used for Avoided Cost Assumptions**

State	\$ / kWh Ex Ante Savings	\$ / therm Ex Ante Savings
Alabama	\$0.64/kWh	\$4.71/therm
North Carolina	\$0.92/kWh	\$4.68/therm
Virginia	\$0.54/kWh	\$5.87/therm

## Affiliated Program Spending and Customer Contributions to Project Costs

Cadmus relied on two datasets, one for all EECGB programs and another for all SEP programs, when calculating state- and region-level figures for affiliated program spending and customer contribution inputs.<sup>16</sup> Each dataset was developed using a DOE reporting template; unfortunately, the DOE template does not require a level of data granularity that is appropriate for economic impact analysis. For example, while most projects included total audit and retrofit costs, there was rarely an indication as to how much of those costs were covered by customers, BBNP financial incentives, utility rebates, or tax credits.

In order to make reasonable assumptions about which of these sources contributed money to cover project costs, as well as how much each source contributed to each project, Cadmus researched the BBNP programs' design and incentive rules. In many cases, this research allowed Cadmus to make reasonable assumptions about project cost allocation. Whenever a program's design and incentive rules were unclear or lacked appropriate specificity, however, Cadmus assumed project costs were covered by customer contributions. *This assumption would tend to over-estimate customer contributions to project costs in multiple states where program incentive rules were not clear.*

<sup>15</sup> Again, programs not included in Cadmus' separate cost-effectiveness analysis received ARRA funds through the DOE SEP. Cadmus also did not evaluate the Charlotte, North Carolina, CBRetro program for cost-effectiveness. In total, two SEP programs in Alabama, four SEP programs in Virginia, and one multifamily program in North Carolina required the assumption discussed above.

<sup>16</sup> These datasets were obtained directly from SEEA staff, via email correspondence during August and September 2013.

# REGIONAL AND STATE-LEVEL MODEL FINDINGS

Cadmus modeled BBNP program economic impacts for each state in SEEA territory as well as the Southeast Region as a whole. In this section, we present findings from each model. The methodology section above provides a detailed summary of the types of economic effects and key indicators presented here.

## Southeast Region

Cadmus developed one regional model to identify the economic impacts attributable to all SEP and EECGB programs combined. Note that since this regional IMPLAN model includes built-in assumptions about *all eight* state-level economies within SEEA territory, including assumptions about industrial and household purchasing patterns and interactions, economic impacts presented here are not equal to the sum of individual state impacts presented below.



## Total Economic Impact Summary

Key indicators of economic impact identified by the IMPLAN model include employment, labor income, total value added, and output impacts. Table 8 summarizes these impacts for the entire Southeast region.

**Table 8. Economic Impact Summary, Southeast Region\***

Type of Effect	Key Indicator			
	Jobs (#)	Labor Income (\$)	Total Value Added (\$)	Output (\$)
Direct Effect	239.93	16,256,217.04	27,584,611.49	55,689,600.92
Indirect Effect	106.15	6,191,403.20	10,120,714.85	22,223,316.12
Induced Effect	3.24	131,923.28	265,597.87	366,471.30
<b>Total Effect</b>	<b>349.33</b>	<b>22,579,543.52</b>	<b>37,970,924.21</b>	<b>78,279,388.35</b>

\*Columns may not add up to totals due to rounding.



## Employment Impacts

Employment impacts identified by the IMPLAN model are presented by economic sector. Each job identified in the IMPLAN model's output represents the annual average of monthly jobs in a particular industry. Thus, one job lasting 12 months is equal to two jobs lasting six months each, which is equal to three jobs lasting four months each, and so on. A job can be either full-time or part-time. Conversions to full-time employee (FTE) jobs vary by economic sector; conversion factors are available from IMPLAN at [http://implan.com/V4/index.php?option=com\\_multicategories&view=article&id=628:628&Itemid=14](http://implan.com/V4/index.php?option=com_multicategories&view=article&id=628:628&Itemid=14).

All employment impacts presented in this report have been adjusted to represent full-time employee (FTE) jobs.

Table 9 presents the ten largest sector-level employment impacts for the entire Southeast region.

**Table 9. Ten Largest Employment Impacts by Sector, Southeast Region**

Rank	Sector	Description	Jobs (#)
1	40	Maintenance and repair construction of residential structures	88.0
2	98	Reconstituted wood product manufacturing	21.8
3	375	Environmental and other technical consulting services	19.6
4	374	Management, scientific, and technical consulting services	19.3
5	431	State and local government electric utilities	18.7
6	413	Food services and drinking places	10.0
7	216	Air conditioning, refrigeration, and warm air heating equipment manufacturing	9.6
8	368	Accounting, tax preparation, bookkeeping, and payroll services	8.8
9	215	Heating equipment (except warm air furnaces) manufacturing	6.9
10	39	Maintenance and repair construction of nonresidential structures	6.1

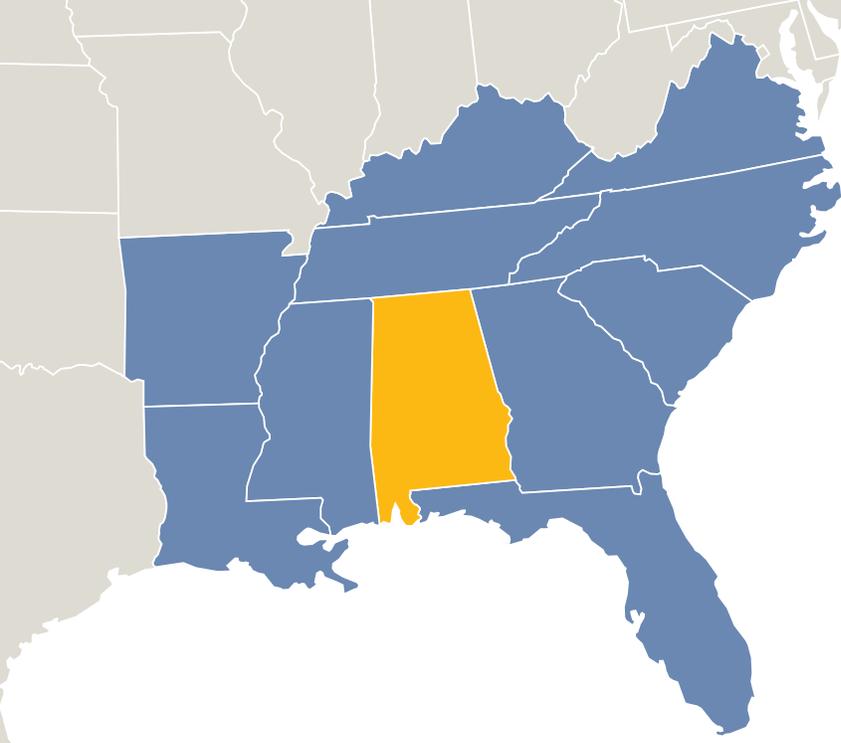


## Return on Investment

A total of \$20,212,667.56 was invested in the region. Cadmus calculated four different returns on this investment: (1) jobs per million dollars invested; (2) labor income per million dollars invested; (3) value added per million dollars invested; and (4) economic output per million dollars invested. Table 10 presents these four returns on investment for the entire Southeast Region.

**Table 10. Returns on Investment, Southeast Region**

	Return Per Million Dollars Invested
Jobs (#)	17.28
Labor Income (\$)	1,117,098.64
Value Added (\$)	1,878,570.66
Output (\$)	3,872,788.59



The following BBNP programs were delivered in Alabama: (1) Alabama WISE – Birmingham; (2) Alabama WISE – Huntsville; and (3) Huntsville WISE Gold Homes. Cadmus developed a state-level model to analyze the economic impacts resulting from these three programs in isolation from all others.



## Total Economic Impact Summary

Key indicators of economic impact identified by the IMPLAN model include employment, labor income, total value added, and output impacts. Table 11 summarizes these impacts for Alabama.

**Table 11. Economic Impact Summary, Alabama\***

Type of Effect	Key Indicator			
	Jobs (#)	Labor Income (\$)	Total Value Added (\$)	Output (\$)
Direct Effect	48.76	3,352,941.61	5,918,110.72	12,095,740.23
Indirect Effect	17.16	910,367.68	1,506,423.73	3,312,182.37
Induced Effect	-7.20	-304,704.33	-541,854.46	-973,072.70
<b>Total Effect</b>	<b>58.71</b>	<b>3,958,604.96</b>	<b>6,882,679.99</b>	<b>14,434,849.90</b>

\*Columns may not add up to totals due to rounding.



## Employment Impacts

Employment impacts identified by the IMPLAN model are presented by economic sector. Each job identified in the IMPLAN model's output represents the annual average of monthly jobs in a particular industry. Thus, one job lasting 12 months is equal to two jobs lasting six months each, which is equal to three jobs lasting four months each, and so on. A job can be either full-time or part-time. Jobs presented here are adjusted to represent full-time employee (FTE) jobs. Table 12 presents the ten largest sector-level employment impacts for Alabama.

**Table 12. Ten Largest Employment Impacts by Sector, Alabama**

Rank	Sector	Description	Jobs (#)
1	40	Maintenance and repair construction of residential structures	14.6
2	431	State and local government electric utilities	10.4
3	98	Reconstituted wood product manufacturing	4.4
4	368	Accounting, tax preparation, bookkeeping, and payroll services	2.2
5	375	Environmental and other technical consulting services	2.1
6	374	Management, scientific, and technical consulting services	2.0
7	216	Air conditioning, refrigeration, and warm air heating equipment manufacturing	2.0
8	388	Services to buildings and dwellings	1.6
9	367	Legal services	1.5
10	215	Heating equipment (except warm air furnaces) manufacturing	1.4



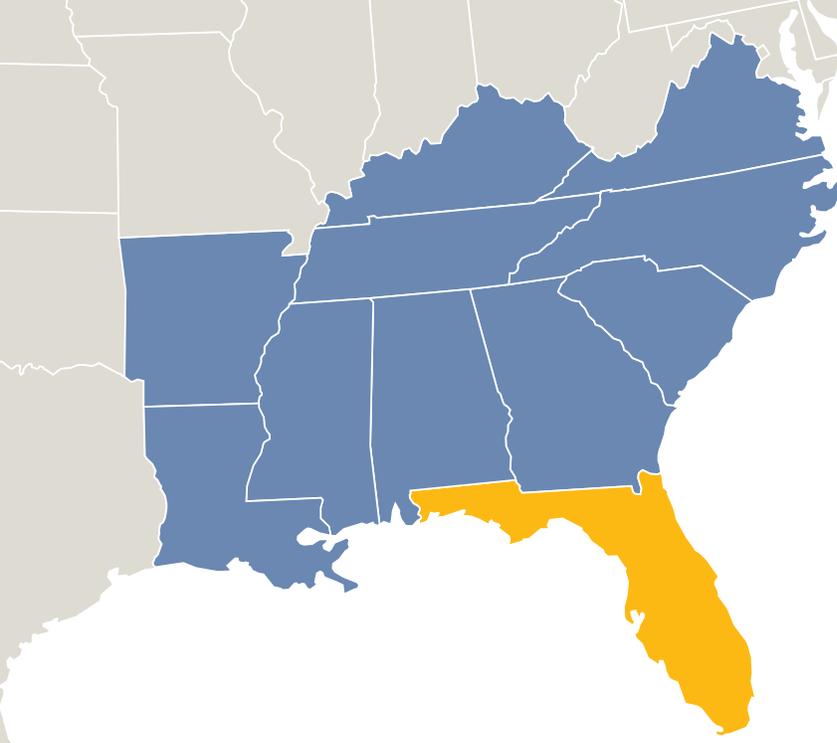
## Return on Investment

A total of \$3,222,803.07 was invested in Alabama. Cadmus calculated four different returns on this investment: (1) jobs per million dollars invested; (2) labor income per million dollars invested; (3) value added per million dollars invested; and (4) economic output per million dollars invested. Table 13 presents these four returns on investment for Alabama.

**Table 13. Returns on Investment, Alabama**

Type of Return	Return Per Million Dollars Invested
Jobs (#)	18.22
Labor Income (\$)	1,228,311.15
Value Added (\$)	2,135,619.16
Output (\$)	4,478,973.61

# FLORIDA



The following BBNP programs were delivered in Florida: (1) ShopSmart with JEA and (2) InvestSmart with JEA. Cadmus developed a state-level model to analyze the economic impacts resulting from these two programs in isolation from all others.



## Total Economic Impact Summary

Key indicators of economic impact identified by the IMPLAN model include employment, labor income, total value added, and output impacts. Table 14 summarizes these impacts for Florida.

**Table 14. Economic Impact Summary, Florida\***

Type of Effect	Key Indicator			
	Jobs (#)	Labor Income (\$)	Total Value Added (\$)	Output (\$)
Direct Effect	15.79	1,366,855.49	2,394,902.65	3,911,782.85
Indirect Effect	-2.46	-45,150.83	-20,160.22	-290,056.12
Induced Effect	9.11	430,008.07	775,815.33	1,302,640.90
<b>Total Effect</b>	<b>22.43</b>	<b>1,751,712.73</b>	<b>3,150,557.76</b>	<b>4,924,367.63</b>

\*Columns may not add up to totals due to rounding.



## Employment Impacts

Employment impacts identified by the IMPLAN model are presented by economic sector. Each job identified in the IMPLAN model's output represents the annual average of monthly jobs in a particular industry. Thus, one job lasting 12 months is equal to two jobs lasting six months each, which is equal to three jobs lasting four months each, and so on. A job can be either full-time or part-time. Jobs presented here are adjusted to represent full-time employee (FTE) jobs. Table 15 presents the ten largest sector-level employment impacts for Florida.

**Table 15. Ten Largest Employment Impacts by Sector, Florida**

Rank	Sector	Description	Jobs (#)
1	40	Maintenance and repair construction of residential structures	8.4
2	431	State and local government electric utilities	4.2
3	98	Reconstituted wood product manufacturing	2.2
4	375	Environmental and other technical consulting services	1.1
5	413	Food services and drinking places	0.9
6	216	Air conditioning, refrigeration, and warm air heating equipment manufacturing	0.8
7	319	Wholesale trade businesses	0.8
8	159	Glass product manufacturing made of purchased glass	0.6
9	388	Services to buildings and dwellings	0.6
10	215	Heating equipment (except warm air furnaces) manufacturing	0.6

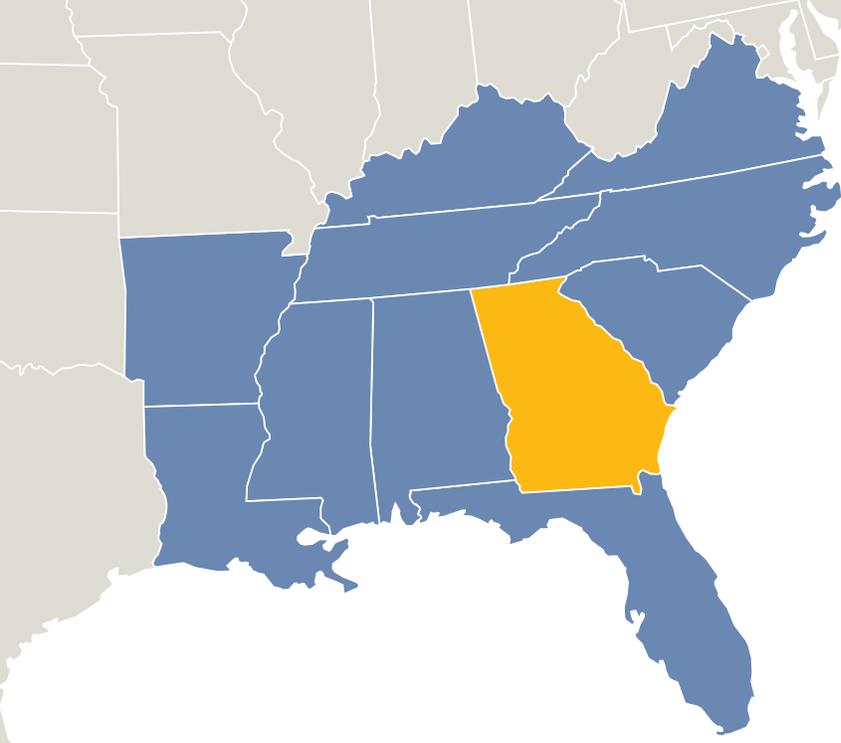


## Return on Investment

A total of \$1,200,000.00 was invested in Florida. Cadmus calculated four different returns on this investment: (1) jobs per million dollars invested; (2) labor income per million dollars invested; (3) value added per million dollars invested; and (4) economic output per million dollars invested. Table 16 presents these four returns on investment for Florida.

**Table 16. Returns on Investment, Florida**

Type of Return	Return Per Million Dollars Invested
Jobs (#)	18.69
Labor Income (\$)	1,459,760.61
Value Added (\$)	2,625,464.80
Output (\$)	4,103,639.69



The following BBNP programs were delivered in Georgia: (1) SHINE Gold/Silver and (2) DecaturWISE. Cadmus developed a state-level model to analyze the economic impacts resulting from these two programs in isolation from all others.



## Total Economic Impact Summary

Key indicators of economic impact identified by the IMPLAN model include employment, labor income, total value added, and output impacts. Table 17 summarizes these impacts for Georgia.

**Table 17. Economic Impact Summary, Georgia\***

Type of Effect	Key Indicator			
	Jobs (#)	Labor Income (\$)	Total Value Added (\$)	Output (\$)
Direct Effect	14.00	968,454.75	1,606,270.03	3,736,064.93
Indirect Effect	6.16	378,280.35	643,023.75	1,182,816.00
Induced Effect	5.36	256,444.80	471,382.24	781,434.11
<b>Total Effect</b>	<b>25.52</b>	<b>1,603,179.90</b>	<b>2,720,676.03</b>	<b>5,700,315.03</b>

\*Columns may not add up to totals due to rounding.



## Employment Impacts

Employment impacts identified by the IMPLAN model are presented by economic sector. Each job identified in the IMPLAN model's output represents the annual average of monthly jobs in a particular industry. Thus, one job lasting 12 months is equal to two jobs lasting six months each, which is equal to three jobs lasting four months each, and so on. A job can be either full-time or part-time. Jobs presented here are adjusted to represent full-time employee (FTE) jobs. Table 18 presents the ten largest sector-level employment impacts for Georgia.

**Table 18. Ten Largest Employment Impacts by Sector, Georgia**

Rank	Sector	Description	Jobs (#)
1	40	Maintenance and repair construction of residential structures	6.6
2	98	Reconstituted wood product manufacturing	1.9
3	375	Environmental and other technical consulting services	0.9
4	413	Food services and drinking places	0.8
5	216	Air conditioning, refrigeration, and warm air heating equipment manufacturing	0.7
6	388	Services to buildings and dwellings	0.6
7	319	Wholesale trade businesses	0.5
8	215	Heating equipment (except warm air furnaces) manufacturing	0.5
9	159	Glass product manufacturing made of purchased glass	0.5
10	360	Real estate establishments	0.4



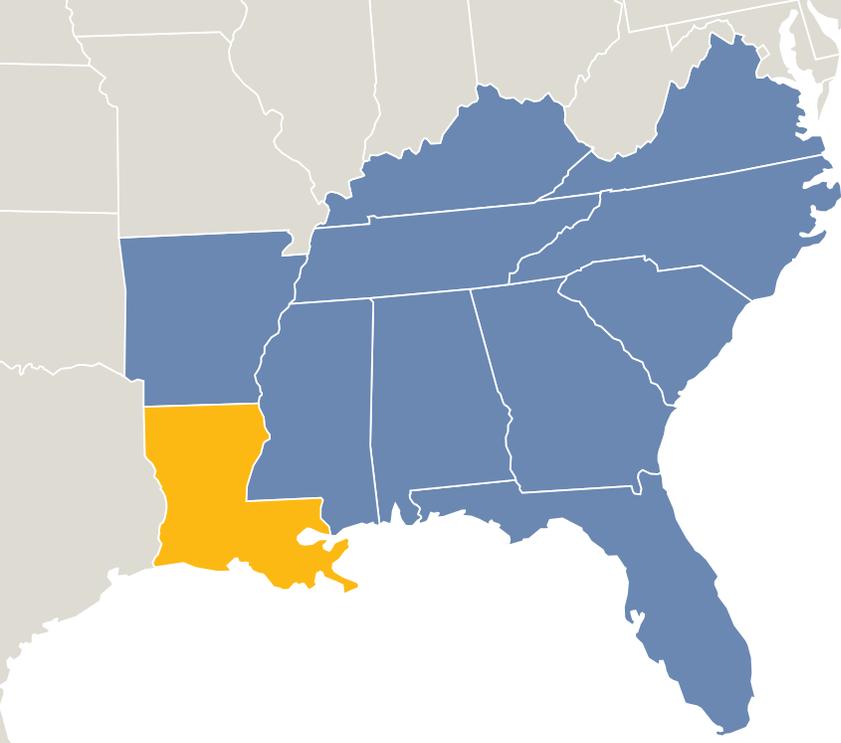
## Return on Investment

A total of \$1,382,010.00 was invested in Georgia. Cadmus calculated four different returns on this investment: (1) jobs per million dollars invested; (2) labor income per million dollars invested; (3) value added per million dollars invested; and (4) economic output per million dollars invested. Table 19 presents these four returns on investment for Georgia.

**Table 19. Returns on Investment, Georgia**

Type of Return	Return Per Million Dollars Invested
Jobs (#)	18.47
Labor Income (\$)	1,160,034.95
Value Added (\$)	1,968,637.01
Output (\$)	4,124,655.41

# LOUISIANA



The following BBNP program was delivered in Louisiana: (1) NOLA WISE. Cadmus developed a state-level model to analyze the economic impacts resulting from this program in isolation from all others.



## Total Economic Impact Summary

Key indicators of economic impact identified by the IMPLAN model include employment, labor income, total value added, and output impacts. Table 20 summarizes these impacts for Louisiana.

**Table 20. Economic Impact Summary, Louisiana\***

Type of Effect	Key Indicator			
	Jobs (#)	Labor Income (\$)	Total Value Added (\$)	Output (\$)
Direct Effect	8.66	551,020.07	974,874.50	1,982,550.26
Indirect Effect	3.08	166,674.09	273,930.18	626,833.98
Induced Effect	7.81	349,567.56	623,621.48	1,075,579.72
<b>Total Effect</b>	<b>19.54</b>	<b>1,067,261.72</b>	<b>1,872,426.16</b>	<b>3,684,963.96</b>

\*Columns may not add up to totals due to rounding.



## Employment Impacts

Employment impacts identified by the IMPLAN model are presented by economic sector. Each job identified in the IMPLAN model's output represents the annual average of monthly jobs in a particular industry. Thus, one job lasting 12 months is equal to two jobs lasting six months each, which is equal to three jobs lasting four months each, and so on. A job can be either full-time or part-time. Jobs presented here are adjusted to represent full-time employee (FTE) jobs. Table 21 presents the ten largest sector-level employment impacts for Louisiana.

**Table 21. Ten Largest Employment Impacts by Sector, Louisiana**

Rank	Sector	Description	Jobs (#)
1	40	Maintenance and repair construction of residential structures	2.8
2	375	Environmental and other technical consulting services	1.7
3	413	Food services and drinking places	1.0
4	388	Services to buildings and dwellings	0.7
5	98	Reconstituted wood product manufacturing	0.7
6	360	Real estate establishments	0.5
7	394	Offices of physicians, dentists, and other health practitioners	0.5
8	397	Private hospitals	0.5
9	31	Electric power generation, transmission, and distribution	0.5
10	319	Wholesale trade businesses	0.4



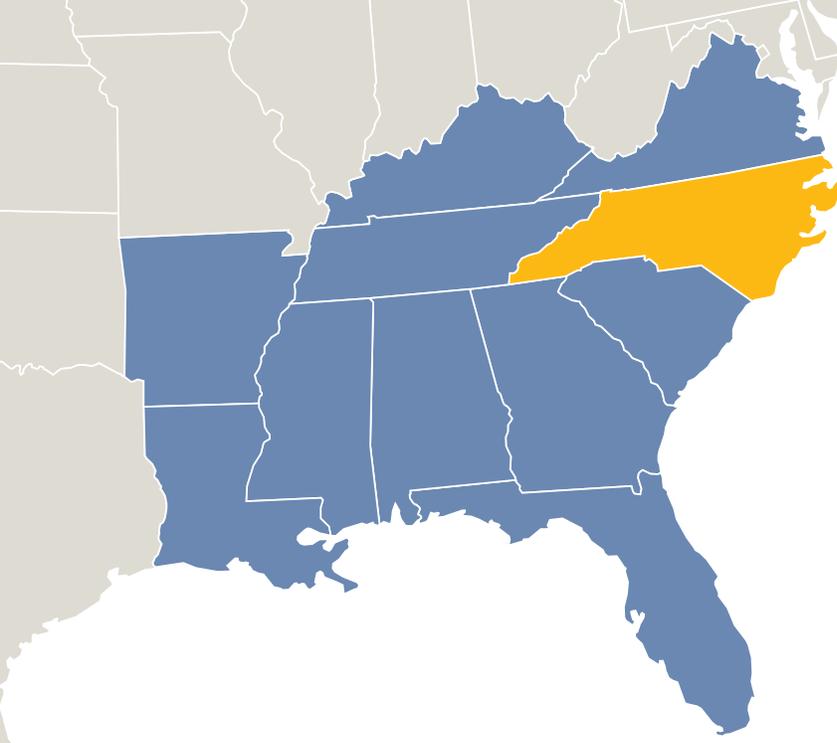
## Return on Investment

A total of \$1,633,327.00 was invested in Louisiana. Cadmus calculated four different returns on this investment: (1) jobs per million dollars invested; (2) labor income per million dollars invested; (3) value added per million dollars invested; and (4) economic output per million dollars invested. Table 22 presents these four returns on investment for Louisiana.

**Table 22. Returns on Investment, Louisiana**

Type of Return	Return Per Million Dollars Invested
Jobs (#)	11.96
Labor Income (\$)	653,428.08
Value Added (\$)	1,146,387.81
Output (\$)	2,256,109.13

# NORTH CAROLINA



The following BBNP programs were delivered in North Carolina: (1) CarrboroWISE; (2) Chapel Hill WISE; and (3) Charlotte – Multifamily. Cadmus developed a state-level model to analyze the economic impacts resulting from these three programs in isolation from all others.



## Total Economic Impact Summary

Key indicators of economic impact identified by the IMPLAN model include employment, labor income, total value added, and output impacts. Table 23 summarizes these impacts for North Carolina.

**Table 23. Economic Impact Summary, North Carolina\***

Type of Effect	Key Indicator			
	Jobs (#)	Labor Income (\$)	Total Value Added (\$)	Output (\$)
Direct Effect	12.56	884,997.81	1,894,028.85	3,818,150.40
Indirect Effect	6.33	322,792.21	504,343.11	1,050,505.39
Induced Effect	9.62	429,362.79	789,961.81	1,342,192.44
<b>Total Effect</b>	<b>28.51</b>	<b>1,637,152.81</b>	<b>3,188,333.77</b>	<b>6,210,848.23</b>

\*Columns may not add up to totals due to rounding.



## Employment Impacts

Employment impacts identified by the IMPLAN model are presented by economic sector. Each job identified in the IMPLAN model's output represents the annual average of monthly jobs in a particular industry. Thus, one job lasting 12 months is equal to two jobs lasting six months each, which is equal to three jobs lasting four months each, and so on. A job can be either full-time or part-time. Jobs presented here are adjusted to represent full-time employee (FTE) jobs. Table 24 presents the ten largest sector-level employment impacts for North Carolina.

**Table 24. Ten Largest Employment Impacts by Sector, North Carolina**

Rank	Sector	Description	Jobs (#)
1	40	Maintenance and repair construction of residential structures	4.6
2	31	Electric power generation, transmission, and distribution	1.7
3	413	Food services and drinking places	1.4
4	375	Environmental and other technical consulting services	1.3
5	98	Reconstituted wood product manufacturing	1.3
6	39	Maintenance and repair construction of nonresidential structures	0.9
7	388	Services to buildings and dwellings	0.8
8	360	Real estate establishments	0.8
9	319	Wholesale trade businesses	0.6
10	382	Employment services	0.5



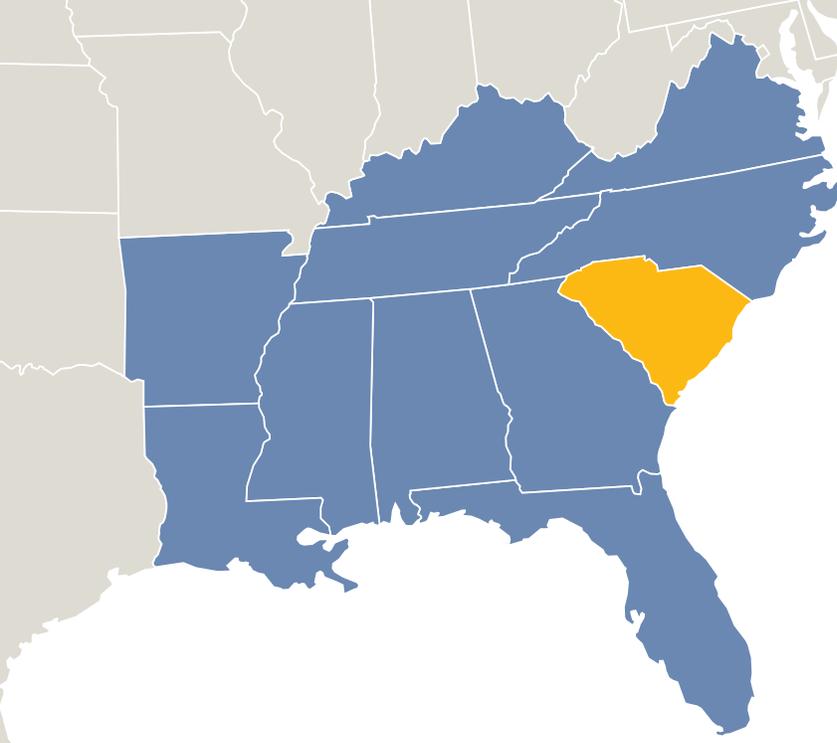
## Return on Investment

A total of \$1,867,610.00 was invested in North Carolina. Cadmus calculated four different returns on this investment: (1) jobs per million dollars invested; (2) labor income per million dollars invested; (3) value added per million dollars invested; and (4) economic output per million dollars invested. Table 25 presents these four returns on investment for North Carolina.

**Table 25. Returns on Investment, North Carolina**

Type of Return	Return Per Million Dollars Invested
Jobs (#)	15.27
Labor Income (\$)	876,603.15
Value Added (\$)	1,707,173.22
Output (\$)	3,325,559.53

# SOUTH CAROLINA



The following BBNP program was delivered in South Carolina: (1) CharlestonWISE. Cadmus developed a state-level model to analyze the economic impacts resulting from this program in isolation from all others.



## Total Economic Impact Summary

Key indicators of economic impact identified by the IMPLAN model include employment, labor income, total value added, and output impacts. Table 26 summarizes these impacts for South Carolina.

**Table 26. Economic Impact Summary, South Carolina\***

Type of Effect	Key Indicator			
	Jobs (#)	Labor Income (\$)	Total Value Added (\$)	Output (\$)
Direct Effect	4.86	306,974.68	619,238.13	1,349,611.77
Indirect Effect	2.10	112,072.07	178,678.76	347,270.40
Induced Effect	-1.71	-71,585.53	-132,762.98	-227,097.55
<b>Total Effect</b>	<b>5.25</b>	<b>347,461.22</b>	<b>665,153.92</b>	<b>1,469,784.62</b>

\*Columns may not add up to totals due to rounding.



## Employment Impacts

Employment impacts identified by the IMPLAN model are presented by economic sector. Each job identified in the IMPLAN model's output represents the annual average of monthly jobs in a particular industry. Thus, one job lasting 12 months is equal to two jobs lasting six months each, which is equal to three jobs lasting four months each, and so on. A job can be either full-time or part-time. Jobs presented here are adjusted to represent full-time employee (FTE) jobs. Table 27 presents the ten largest sector-level employment impacts for South Carolina.

**Table 27. Ten Largest Employment Impacts by Sector, South Carolina**

Rank	Sector	Description	Jobs (#)
1	40	Maintenance and repair construction of residential structures	2.2
2	98	Reconstituted wood product manufacturing	0.5
3	31	Electric power generation, transmission, and distribution	0.4
4	375	Environmental and other technical consulting services	0.3
5	216	Air conditioning, refrigeration, and warm air heating equipment manufacturing	0.3
6	39	Maintenance and repair construction of nonresidential structures	0.2
7	215	Heating equipment (except warm air furnaces) manufacturing	0.2
8	159	Glass product manufacturing made of purchased glass	0.1
9	388	Services to buildings and dwellings	0.1
10	137	Adhesive manufacturing	0.1



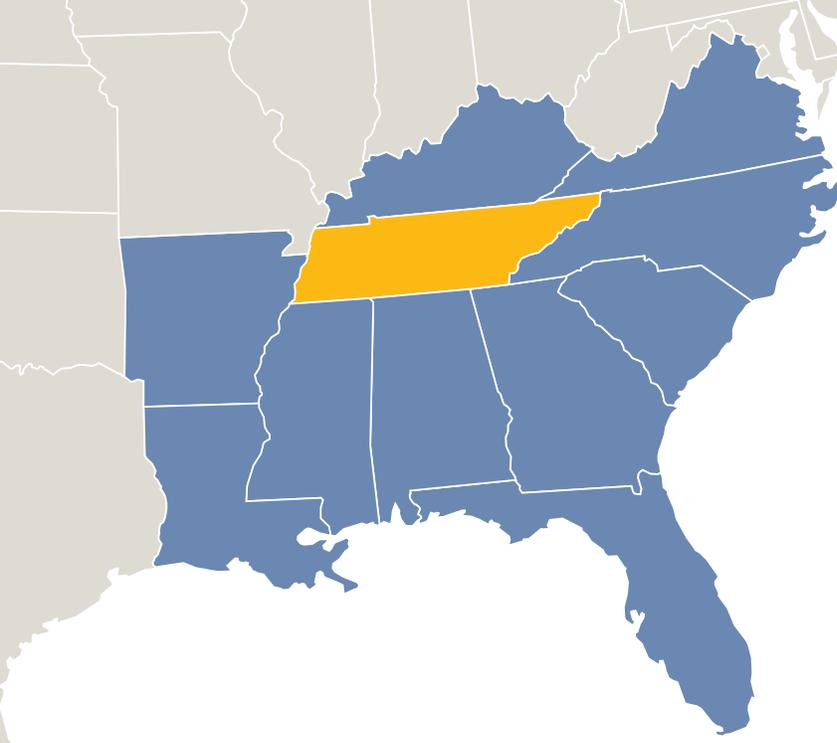
## Return on Investment

A total of \$937,005.00 was invested in South Carolina. Cadmus calculated four different returns on this investment: (1) jobs per million dollars invested; (2) labor income per million dollars invested; (3) value added per million dollars invested; and (4) economic output per million dollars invested. Table 28 presents these four returns on investment for South Carolina.

**Table 28. Returns on Investment, South Carolina**

Type of Return	Return Per Million Dollars Invested
Jobs (#)	5.60
Labor Income (\$)	370,821.09
Value Added (\$)	709,872.33
Output (\$)	1,568,598.48

# TENNESSEE



The following BBNP program was delivered in Tennessee: (1) Nashville Energy Works (NEW). Cadmus developed a state-level model to analyze the economic impacts resulting from this program in isolation from all others.



## Total Economic Impact Summary

Key indicators of economic impact identified by the IMPLAN model include employment, labor income, total value added, and output impacts. Table 29 summarizes these impacts for Tennessee.

**Table 29. Economic Impact Summary, Tennessee\***

Type of Effect	Key Indicator			
	Jobs (#)	Labor Income (\$)	Total Value Added (\$)	Output (\$)
Direct Effect	17.50	1,249,681.05	2,154,041.95	4,480,435.83
Indirect Effect	6.06	333,128.60	493,243.91	1,062,008.74
Induced Effect	-8.05	-405,089.06	-680,112.59	-1,160,821.94
<b>Total Effect</b>	<b>15.50</b>	<b>1,177,720.59</b>	<b>1,967,173.27</b>	<b>4,381,622.63</b>

\*Columns may not add up to totals due to rounding.



## Employment Impacts

Employment impacts identified by the IMPLAN model are presented by economic sector. Each job identified in the IMPLAN model's output represents the annual average of monthly jobs in a particular industry. Thus, one job lasting 12 months is equal to two jobs lasting six months each, which is equal to three jobs lasting four months each, and so on. A job can be either full-time or part-time. Jobs presented here are adjusted to represent full-time employee (FTE) jobs. Table 30 presents the ten largest sector-level employment impacts for Tennessee.

**Table 30. Ten Largest Employment Impacts by Sector, Tennessee**

Rank	Sector	Description	Jobs (#)
1	40	Maintenance and repair construction of residential structures	6.4
2	431	State and local government electric utilities	3.8
3	98	Reconstituted wood product manufacturing	2.2
4	216	Air conditioning, refrigeration, and warm air heating equipment manufacturing	0.9
5	375	Environmental and other technical consulting services	0.8
6	215	Heating equipment (except warm air furnaces) manufacturing	0.6
7	159	Glass product manufacturing made of purchased glass	0.5
8	137	Adhesive manufacturing	0.4
9	388	Services to buildings and dwellings	0.3
10	369	Architectural, engineering, and related services	0.3



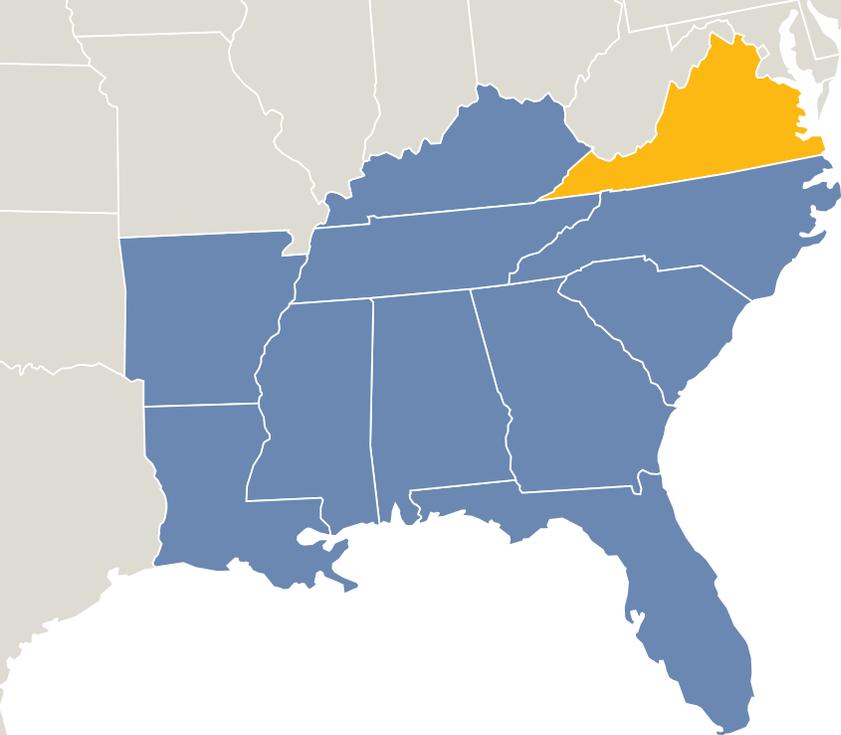
## Return on Investment

A total of \$887,005.00 was invested in Tennessee. Cadmus calculated four different returns on this investment: (1) jobs per million dollars invested; (2) labor income per million dollars invested; (3) value added per million dollars invested; and (4) economic output per million dollars invested. Table 31 presents these four returns on investment for Tennessee.

**Table 31. Returns on Investment, Tennessee**

Type of Return	Return Per Million Dollars Invested
Jobs (#)	17.47
Labor Income (\$)	1,327,749.66
Value Added (\$)	2,217,770.22
Output (\$)	4,939,794.74

# VIRGINIA



The following BBNP programs were delivered in Virginia: (1) Arlington LEAP; (2) CAFE2; (3) Charlottesville LEAP (SEP); (4) Charlottesville LEAP (EECGB); (5) NEXT STEP – Hampton Roads; and (6) Richmond Regional Energy Alliance (REA). Cadmus developed a state-level model to analyze the economic impacts resulting from these six programs in isolation from all others.



## Total Economic Impact Summary

Key indicators of economic impact identified by the IMPLAN model include employment, labor income, total value added, and output impacts. Table 32 summarizes these impacts for Virginia.

**Table 32. Economic Impact Summary, Virginia\***

Type of Effect	Key Indicator			
	Jobs (#)	Labor Income (\$)	Total Value Added (\$)	Output (\$)
Direct Effect	68.36	4,392,186.84	7,939,810.73	18,065,898.87
Indirect Effect	26.27	1,617,732.44	2,529,841.00	4,762,773.70
Induced Effect	-27.41	-1,347,211.83	-2,494,316.58	-4,067,186.57
<b>Total Effect</b>	<b>67.22</b>	<b>4,662,707.45</b>	<b>7,975,335.15</b>	<b>18,761,486.00</b>

\*Columns may not add up to totals due to rounding.



## Employment Impacts

Employment impacts identified by the IMPLAN model are presented by economic sector. Each job identified in the IMPLAN model's output represents the annual average of monthly jobs in a particular industry. Thus, one job lasting 12 months is equal to two jobs lasting six months each, which is equal to three jobs lasting four months each, and so on. A job can be either full-time or part-time. Jobs presented here are adjusted to represent full-time employee (FTE) jobs. Table 33 presents the ten largest sector-level employment impacts for Virginia.

**Table 33. Ten Largest Employment Impacts by Sector, Virginia**

Rank	Sector	Description	Jobs (#)
1	40	Maintenance and repair construction of residential structures	30.3
2	98	Reconstituted wood product manufacturing	8.8
3	216	Air conditioning, refrigeration, and warm air heating equipment manufacturing	4.1
4	375	Environmental and other technical consulting services	3.6
5	215	Heating equipment (except warm air furnaces) manufacturing	2.8
6	159	Glass product manufacturing made of purchased glass	2.4
7	388	Services to buildings and dwellings	2.3
8	31	Electric power generation, transmission, and distribution	2.2
9	39	Maintenance and repair construction of nonresidential structures	1.7
10	137	Adhesive manufacturing	1.6



## Return on Investment

A total of \$5,383,005.00 was invested in Virginia. Cadmus calculated four different returns on this investment: (1) jobs per million dollars invested; (2) labor income per million dollars invested; (3) value added per million dollars invested; and (4) economic output per million dollars invested. Table 34 presents these four returns on investment for Virginia.

**Table 34. Returns on Investment, Virginia**

Type of Return	Return Per Million Dollars Invested
Jobs (#)	12.49
Labor Income (\$)	866,190.44
Value Added (\$)	1,481,576.77
Output (\$)	3,485,318.33

# Economic Powerhouse:

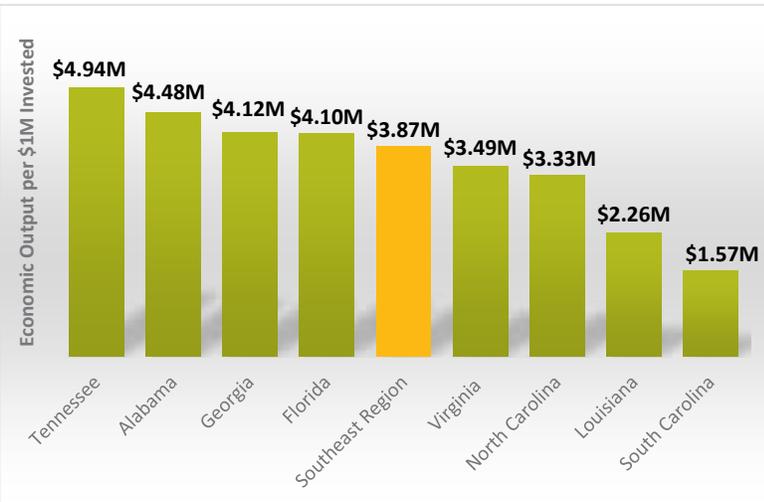
## The Economic Impact of Energy Efficiency Investing



FROM **2010 TO 2013**  
 THE U.S. DEPARTMENT OF ENERGY  
**INVESTED \$20.2M** IN  
 ENERGY EFFICIENCY PROGRAMS  
 IN **13 CITIES** ACROSS **8**  
 SOUTHEASTERN **STATES.**



### Economic Output per \$1M Invested in Energy Efficiency in the Southeast:



\*Achieved through direct, indirect and induced effects.

To read the full report, please go to:  
<http://seealliance.org/wp-content/uploads/SEEA-EPS-EE-Report.pdf>

### ECONOMIC OUTPUT:

**\$1M** INVESTED → **\$3.87M** GENERATED

### NEW JOBS CREATED:

**\$1M** INVESTED → **17.28** NEW JOBS





## Summary of Returns on Investment

The following figures present key return on investment findings. Findings from each of the nine models presented above are included in each figure. The return on investment figures for both Alabama and Virginia are based on spending totals that include program administration costs, which are not accounted for in any of the other six states' spending totals. As a result, return on investment figures for both Alabama and Virginia are diminished relative to the same figures presented for other states.

For a detailed discussion of the key indicators presented here, please refer to the Methodology section above. The key indicators are: jobs, labor income, value added, and output.

Figure 2 presents a summary of jobs created per million dollars of program investment.

**Figure 2. Jobs Created Per Million Dollars of Program Investment, by Model Region**

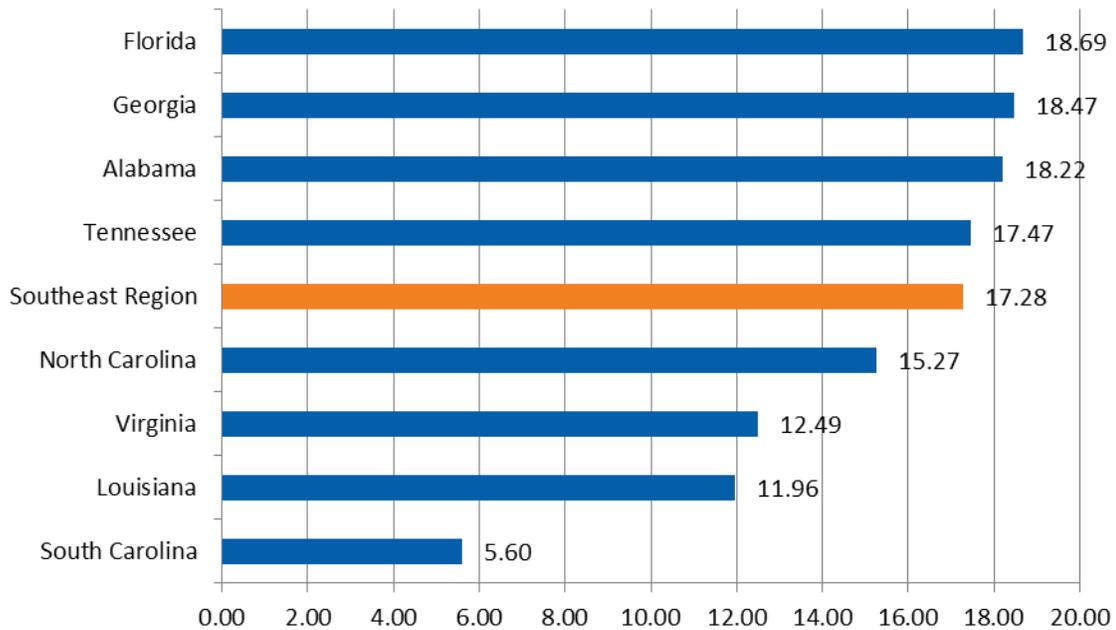


Figure 3 presents a summary of labor income generated per million dollars of program investment.

**Figure 3. Labor Income Generated Per Million Dollars of Program Investment, by Model Region**

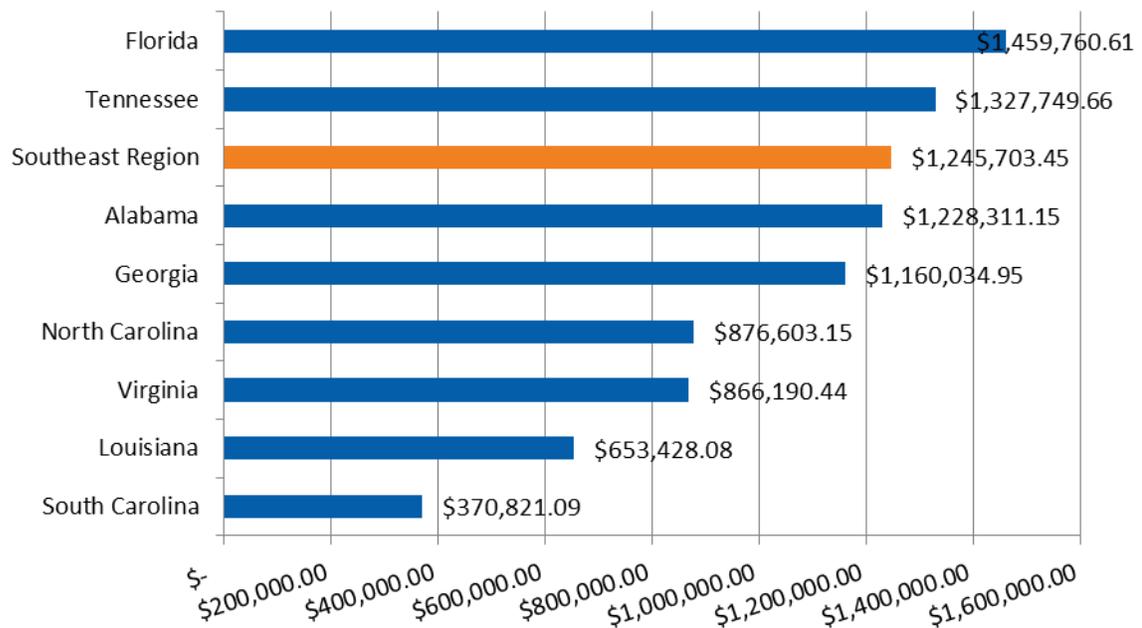


Figure 4 presents a summary of value added per million dollars of program investment.

**Figure 4. Value Added Per Million Dollars of Program Investment, by Model Region**

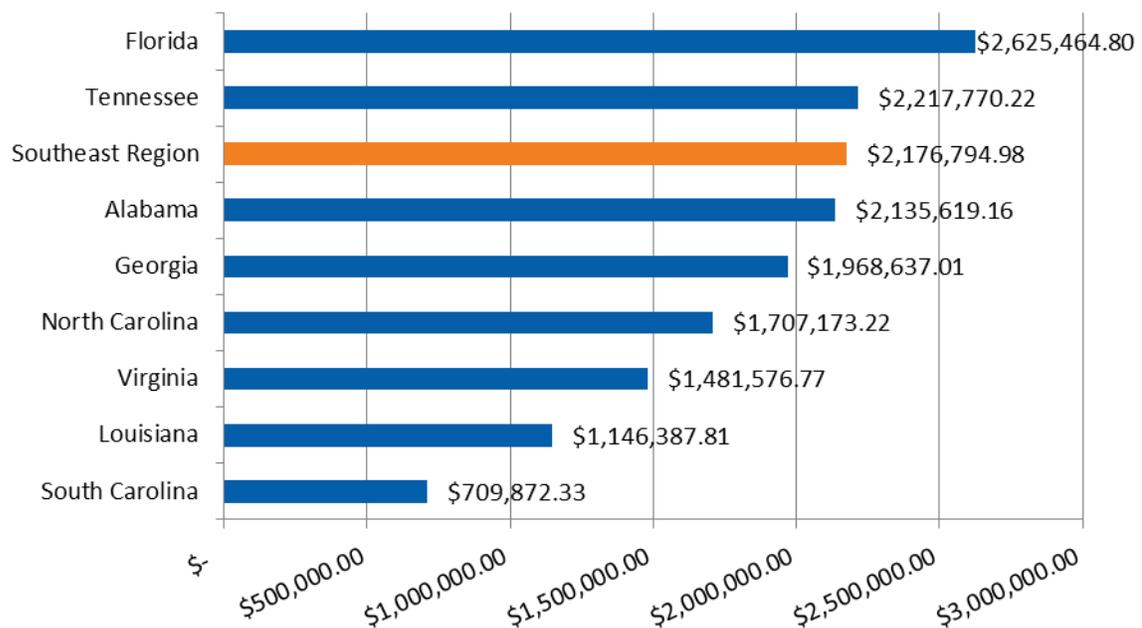
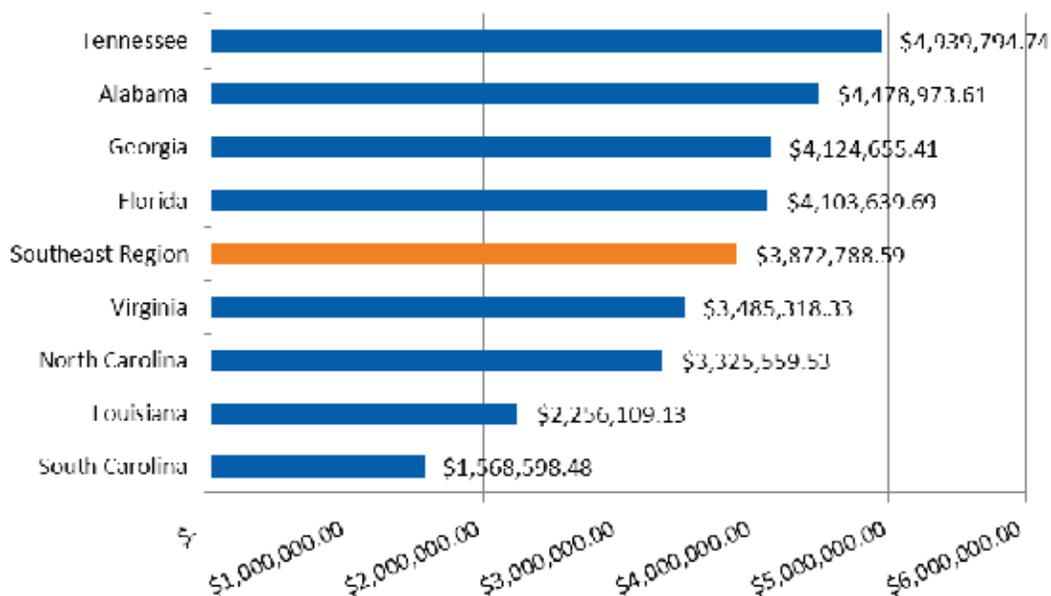


Figure 5 presents a summary of output generated per million dollars of program investment.

**Figure 5. Output Generated Per Million Dollars of Program Investment, by Model Region**



Economic impact analysis for this work was commissioned by SEEA from the Cadmus Group which used Impact Analysis for Planning (IMPLAN) v3.1 modeling software. The \$78.3M of economic impact achieved results from direct, indirect, and induced effects on total industry production throughout the southeast region. The full report can be found at [\(add link here\)](#).

## Conclusion

As this analysis indicates, investments in energy efficiency and related goods and services led to positive economic outcomes throughout the Southeast Region. Some model regions experienced greater returns on investment than others due to differences in state-level economies and individual program designs. Still, every model region experienced positive economic impacts resulting from the BBNP programs administered by SEEA and its affiliates.

Investments made by program administrators, participants, and sub-contractors positively affected other regional industries by creating jobs, generating new revenue, increasing profits, and enhancing the overall value of local industry production. However, the outcomes presented here are static and there is no suggestion that they can persist without sustained investment in energy efficiency and related goods and services.



## Appendix A. IMPLAN Sector Codes and Descriptions

Table A-1 summarizes all economic sector codes recognized by the IMPLAN modeling software, as well as a brief description of each.

**Table A-1. IMPLAN Sector Codes and Descriptions**

IMPLAN Sector Code	IMPLAN Description
1	Oilseed farming
2	Grain farming
3	Vegetable and melon farming
4	Fruit farming
5	Tree nut farming
6	Greenhouse, nursery, and floriculture production
7	Tobacco farming
8	Cotton farming
9	Sugarcane and sugar beet farming
10	All other crop farming
11	Cattle ranching and farming
12	Dairy cattle and milk production
13	Poultry and egg production
14	Animal production, except cattle and poultry and eggs
15	Forest nurseries, forest products, and timber tracts
16	Logging
17	Fishing
18	Hunting and trapping
19	Support activities for agriculture and forestry
20	Oil and gas extraction
21	Coal mining
22	Iron ore mining
23	Copper, nickel, lead, and zinc mining
24	Gold, silver, and other metal ore mining
25	Stone mining and quarrying
26	Sand, gravel, clay, and ceramic and refractory minerals mining and quarrying
27	Other nonmetallic mineral mining and quarrying
28	Drilling oil and gas wells
29	Support activities for oil and gas operations
30	Support activities for other mining
31	Electric power generation, transmission, and distribution
32	Natural gas distribution
33	Water, sewage and other systems
34	Construction of new nonresidential commercial and health care structures
35	Construction of new nonresidential manufacturing structures
36	Construction of other new nonresidential structures

IMPLAN Sector Code	IMPLAN Description
37	Construction of new residential permanent site single- and multi-family structures
38	Construction of other new residential structures
39	Maintenance and repair construction of nonresidential maintenance and repair
40	Maintenance and repair construction of residential structures
41	Dog and cat food manufacturing
42	Other animal food manufacturing
43	Flour milling and malt manufacturing
44	Wet corn milling
45	Soybean and other oilseed processing
46	Fats and oils refining and blending
47	Breakfast cereal manufacturing
48	Sugar cane mills and refining
49	Beet sugar manufacturing
50	Chocolate and confectionery manufacturing from cacao beans
51	Confectionery manufacturing from purchased chocolate
52	Non-chocolate confectionery manufacturing
53	Frozen food manufacturing
54	Fruit and vegetable canning, pickling, and drying
55	Fluid milk and butter manufacturing
56	Cheese manufacturing
57	Dry, condensed, and evaporated dairy product manufacturing
58	Ice cream and frozen dessert manufacturing
59	Animal (except poultry) slaughtering, rendering, and processing
60	Poultry processing
61	Seafood product preparation and packaging
62	Bread and bakery product manufacturing
63	Cookie, cracker, and pasta manufacturing
64	Tortilla manufacturing
65	Snack food manufacturing
66	Coffee and tea manufacturing
67	Flavoring syrup and concentrate manufacturing
68	Seasoning and dressing manufacturing
69	All other food manufacturing
70	Soft drink and ice manufacturing
71	Breweries
72	Wineries
73	Distilleries
74	Tobacco product manufacturing
75	Fiber, yarn, and thread mills
76	Broadwoven fabric mills
77	Narrow fabric mills and schiffli machine embroidery
78	Nonwoven fabric mills

IMPLAN Sector Code	IMPLAN Description
79	Knit fabric mills
80	Textile and fabric finishing mills
81	Fabric coating mills
82	Carpet and rug mills
83	Curtain and linen mills
84	Textile bag and canvas mills
85	All other textile product mills
86	Apparel knitting mills
87	Cut and sew apparel contractors
88	Men's and boys' cut and sew apparel manufacturing
89	Women's and girls' cut and sew apparel manufacturing
90	Other cut and sew apparel manufacturing
91	Apparel accessories and other apparel manufacturing
92	Leather and hide tanning and finishing
93	Footwear manufacturing
94	Other leather and allied product manufacturing
95	Sawmills and wood preservation
96	Veneer and plywood manufacturing
97	Engineered wood member and truss manufacturing
98	Reconstituted wood product manufacturing
99	Wood windows and doors and millwork
100	Wood container and pallet manufacturing
101	Manufactured home (mobile home) manufacturing
102	Prefabricated wood building manufacturing
103	All other miscellaneous wood product manufacturing
104	Pulp mills
105	Paper mills
106	Paperboard Mills
107	Paperboard container manufacturing
108	Coated and laminated paper, packaging paper and plastics film manufacturing
109	All other paper bag and coated and treated paper manufacturing
110	Stationery product manufacturing
111	Sanitary paper product manufacturing
112	All other converted paper product manufacturing
113	Printing
114	Support activities for printing
115	Petroleum refineries
116	Asphalt paving mixture and block manufacturing
117	Asphalt shingle and coating materials manufacturing
118	Petroleum lubricating oil and grease manufacturing
119	All other petroleum and coal products manufacturing
120	Petrochemical manufacturing

IMPLAN Sector Code	IMPLAN Description
121	Industrial gas manufacturing
122	Synthetic dye and pigment manufacturing
123	Alkalies and chlorine manufacturing
124	Carbon black manufacturing
125	All other basic inorganic chemical manufacturing
126	Other basic organic chemical manufacturing
127	Plastics material and resin manufacturing
128	Synthetic rubber manufacturing
129	Artificial and synthetic fibers and filaments manufacturing
130	Fertilizer manufacturing
131	Pesticide and other agricultural chemical manufacturing
132	Medicinal and botanical manufacturing
133	Pharmaceutical preparation manufacturing
134	In-vitro diagnostic substance manufacturing
135	Biological product (except diagnostic) manufacturing
136	Paint and coating manufacturing
137	Adhesive manufacturing
138	Soap and cleaning compound manufacturing
139	Toilet preparation manufacturing
140	Printing ink manufacturing
141	All other chemical product and preparation manufacturing
142	Plastics packaging materials and unlaminated film and sheet manufacturing
143	Unlaminated plastics profile shape manufacturing
144	Plastics pipe and pipe fitting manufacturing
145	Laminated plastics plate, sheet (except packaging), and shape manufacturing
146	Polystyrene foam product manufacturing
147	Urethane and other foam product (except polystyrene) manufacturing
148	Plastics bottle manufacturing
149	Other plastics product manufacturing
150	Tire manufacturing
151	Rubber and plastics hoses and belting manufacturing
152	Other rubber product manufacturing
153	Pottery, ceramics, and plumbing fixture manufacturing
154	Brick, tile, and other structural clay product manufacturing
155	Clay and nonclay refractory manufacturing
156	Flat glass manufacturing
157	Other pressed and blown glass and glassware manufacturing
158	Glass container manufacturing
159	Glass product manufacturing made of purchased glass
160	Cement manufacturing
161	Ready-mix concrete manufacturing
162	Concrete pipe, brick, and block manufacturing

IMPLAN Sector Code	IMPLAN Description
163	Other concrete product manufacturing
164	Lime and gypsum product manufacturing
165	Abrasive product manufacturing
166	Cut stone and stone product manufacturing
167	Ground or treated mineral and earth manufacturing
168	Mineral wool manufacturing
169	Miscellaneous nonmetallic mineral products
170	Iron and steel mills and ferroalloy manufacturing
171	Steel product manufacturing from purchased steel
172	Alumina refining and primary aluminum production
173	Secondary smelting and alloying of aluminum
174	Aluminum product manufacturing from purchased aluminum
175	Primary smelting and refining of copper
176	Primary smelting and refining of nonferrous metal (except copper and aluminum)
177	Copper rolling, drawing, extruding and alloying
178	Nonferrous metal (except copper and aluminum) rolling, drawing, extruding and alloying
179	Ferrous metal foundries
180	Nonferrous metal foundries
181	All other forging, stamping, and sintering
182	Custom roll forming
183	Crown and closure manufacturing and metal stamping
184	Cutlery, utensil, pot, and pan manufacturing
185	Hand tool manufacturing
186	Plate work and fabricated structural product manufacturing
187	Ornamental and architectural metal products manufacturing
188	Power boiler and heat exchanger manufacturing
189	Metal tank (heavy gauge) manufacturing
190	Metal can, box, and other metal container (light gauge) manufacturing
191	Ammunition manufacturing
192	Arms, ordnance, and accessories manufacturing
193	Hardware manufacturing
194	Spring and wire product manufacturing
195	Machine shops
196	Turned product and screw, nut, and bolt manufacturing
197	Coating, engraving, heat treating and allied activities
198	Valve and fittings other than plumbing
199	Plumbing fixture fitting and trim manufacturing
200	Ball and roller bearing manufacturing
201	Fabricated pipe and pipe fitting manufacturing
202	Other fabricated metal manufacturing
203	Farm machinery and equipment manufacturing
204	Lawn and garden equipment manufacturing

IMPLAN Sector Code	IMPLAN Description
205	Construction machinery manufacturing
206	Mining and oil and gas field machinery manufacturing
207	Other industrial machinery manufacturing
208	Plastics and rubber industry machinery manufacturing
209	Semiconductor machinery manufacturing
210	Vending, commercial, industrial, and office machinery manufacturing
211	Optical instrument and lens manufacturing
212	Photographic and photocopying equipment manufacturing
213	Other commercial and service industry machinery manufacturing
214	Air purification and ventilation equipment manufacturing
215	Heating equipment (except warm air furnaces) manufacturing
216	Air conditioning, refrigeration, and warm air heating equipment manufacturing
217	Industrial mold manufacturing
218	Metal cutting and forming machine tool manufacturing
219	Special tool, die, jig, and fixture manufacturing
220	Cutting tool and machine tool accessory manufacturing
221	Rolling mill and other metalworking machinery manufacturing
222	Turbine and turbine generator set units manufacturing
223	Speed changer, industrial high-speed drive, and gear manufacturing
224	Mechanical power transmission equipment manufacturing
225	Other engine equipment manufacturing
226	Pump and pumping equipment manufacturing
227	Air and gas compressor manufacturing
228	Material handling equipment manufacturing
229	Power-driven hand tool manufacturing
230	Other general purpose machinery manufacturing
231	Packaging machinery manufacturing
232	Industrial process furnace and oven manufacturing
233	Fluid power process machinery
234	Electronic computer manufacturing
235	Computer storage device manufacturing
236	Computer terminals and other computer peripheral equipment manufacturing
237	Telephone apparatus manufacturing
238	Broadcast and wireless communications equipment
239	Other communications equipment manufacturing
240	Audio and video equipment manufacturing
241	Electron tube manufacturing
242	Bare printed circuit board manufacturing
243	Semiconductor and related device manufacturing
244	Electronic capacitor, resistor, coil, transformer, and other inductor manufacturing
245	Electronic connector manufacturing
246	Printed circuit assembly (electronic assembly) manufacturing

IMPLAN Sector Code	IMPLAN Description
247	Other electronic component manufacturing
248	Electro-medical and electrotherapeutic apparatus manufacturing
249	Search, detection, and navigation instruments manufacturing
250	Automatic environmental control manufacturing
251	Industrial process variable instruments manufacturing
252	Totalizing fluid meters and counting devices manufacturing
253	Electricity and signal testing instruments manufacturing
254	Analytical laboratory instrument manufacturing
255	Irradiation apparatus manufacturing
256	Watch, clock, and other measuring and controlling device manufacturing
257	Software, audio, and video media reproducing
258	Magnetic and optical recording media manufacturing
259	Electric lamp bulb and part manufacturing
260	Lighting fixture manufacturing
261	Small electrical appliance manufacturing
262	Household cooking appliance manufacturing
263	Household refrigerator and home freezer manufacturing
264	Household laundry equipment manufacturing
265	Other major household appliance manufacturing
266	Power, distribution, and specialty transformer manufacturing
267	Motor and generator manufacturing
268	Switchgear and switchboard apparatus manufacturing
269	Relay and industrial control manufacturing
270	Storage battery manufacturing
271	Primary battery manufacturing
272	Communication and energy wire and cable manufacturing
273	Wiring device manufacturing
274	Carbon and graphite product manufacturing
275	All other miscellaneous electrical equipment and component manufacturing
276	Automobile manufacturing
277	Light truck and utility vehicle manufacturing
278	Heavy duty truck manufacturing
279	Motor vehicle body manufacturing
280	Truck trailer manufacturing
281	Motor home manufacturing
282	Travel trailer and camper manufacturing
283	Motor vehicle parts manufacturing
284	Aircraft manufacturing
285	Aircraft engine and engine parts manufacturing
286	Other aircraft parts and auxiliary equipment manufacturing
287	Guided missile and space vehicle manufacturing
288	Propulsion units and parts for space vehicles and guided missiles

IMPLAN Sector Code	IMPLAN Description
289	Railroad rolling stock manufacturing
290	Ship building and repairing
291	Boat building
292	Motorcycle, bicycle, and parts manufacturing
293	Military armored vehicle, tank, and tank component manufacturing
294	All other transportation equipment manufacturing
295	Wood kitchen cabinet and countertop manufacturing
296	Upholstered household furniture manufacturing
297	Non-upholstered wood household furniture manufacturing
298	Metal and other household furniture (except wood) manufacturing1
299	Institutional furniture manufacturing
300	Wood television, radio, and sewing machine cabinet manufacturing1
301	Office furniture and custom architectural woodwork and millwork manufacturing1
302	Showcase, partition, shelving, and locker manufacturing
303	Mattress manufacturing
304	Blind and shade manufacturing
305	Surgical and medical instrument manufacturing
306	Surgical appliance and supplies manufacturing
307	Dental equipment and supplies manufacturing
308	Ophthalmic goods manufacturing
309	Dental laboratories
310	Jewelry and silverware manufacturing
311	Sporting and athletic goods manufacturing
312	Doll, toy, and game manufacturing
313	Office supplies (except paper) manufacturing
314	Sign manufacturing
315	Gasket, packing, and sealing device manufacturing
316	Musical instrument manufacturing
317	All other miscellaneous manufacturing
318	Broom, brush, and mop manufacturing
319	Wholesale trade
320	Retail - Motor vehicle and parts
321	Retail - Furniture and home furnishings
322	Retail - Electronics and appliances
323	Retail - Building material and garden supply
324	Retail - Food and beverage
325	Retail - Health and personal care
326	Retail - Gasoline stations
327	Retail - Clothing and clothing accessories
328	Retail - Sporting goods, hobby, book and music
329	Retail - General merchandise
330	Retail - Miscellaneous

IMPLAN Sector Code	IMPLAN Description
331	Retail - Nonstore
332	Air transportation
333	Rail transportation
334	Water transportation
335	Truck transportation
336	Transit and ground passenger transportation
337	Pipeline transportation
338	Scenic and sightseeing transportation and support activities for transportation
339	Couriers and messengers
340	Warehousing and storage
341	Newspaper publishers
342	Periodical publishers
343	Book publishers
344	Directory, mailing list, and other publishers
345	Software publishers
346	Motion picture and video industries
347	Sound recording industries
348	Radio and television broadcasting
349	Cable and other subscription programming
350	Internet publishing and broadcasting
351	Telecommunications
352	Data processing, hosting, and related services
353	Other information services
354	Monetary authorities and depository credit intermediation
355	Non-depository credit intermediation and related activities
356	Securities, commodity contracts, investments, and related activities
357	Insurance carriers
358	Insurance agencies, brokerages, and related activities
359	Funds, trusts, and other financial vehicles
360	Real estate
361	Imputed rental value for owner-occupied dwellings
362	Automotive equipment rental and leasing
363	General and consumer goods rental except video tapes and discs
364	Video tape and disc rental
365	Commercial and industrial machinery and equipment rental and leasing
366	Lessors of nonfinancial intangible assets
367	Legal services
368	Accounting, tax preparation, bookkeeping, and payroll services
369	Architectural, engineering, and related services
370	Specialized design services
371	Custom computer programming services
372	Computer systems design services

IMPLAN Sector Code	IMPLAN Description
373	Other computer related services, including facilities management
374	Management, scientific, and technical consulting services
375	Environmental and other technical consulting services
376	Scientific research and development services
377	Advertising and related services
378	Photographic services
379	Veterinary services
380	All other miscellaneous professional, scientific, and technical services
381	Management of companies and enterprises
382	Employment services
383	Travel arrangement and reservation services
384	Office administrative services
385	Facilities support services
386	Business support services
387	Investigation and security services
388	Services to buildings and dwellings
389	Other support services
390	Waste management and remediation services
391	Elementary and secondary schools
392	Junior colleges, colleges, universities, and professional schools
393	Other educational services
394	Offices of physicians, dentists, and other health practitioners
395	Home health care services
396	Medical and diagnostic labs and outpatient and other ambulatory care services
397	Hospitals
398	Nursing and residential care facilities
399	Child day care services
400	Individual and family services
401	Community food, housing, and other relief services, including rehabilitation services
402	Performing arts companies
403	Spectator sports
404	Promoters of performing arts and sports and agents for public figures
405	Independent artists, writers, and performers
406	Museums, historical sites, zoos, and parks
407	Fitness and recreational sports centers
408	Bowling centers
409	Amusement parks, arcades, and gambling industries
410	Other amusement and recreation industries
411	Hotels and motels, including casino hotels
412	Other accommodations
413	Food services and drinking places
414	Automotive repair and maintenance, except car washes

IMPLAN Sector Code	IMPLAN Description
415	Car washes
416	Electronic and precision equipment repair and maintenance
417	Commercial and industrial machinery and equipment repair and maintenance
418	Personal and household goods repair and maintenance
419	Personal care services
420	Death care services
421	Dry-cleaning and laundry services
422	Other personal services
423	Religious organizations
424	Grantmaking, giving, and social advocacy organizations
425	Civic, social, professional, and similar organizations
426	Private households
427	Postal service
428	Federal electric utilities
429	Other Federal Government enterprises
430	State and local government passenger transit
431	State and local government electric utilities
432	Other state and local government enterprises
433	*Not an industry (Used and secondhand goods)
434	*Not an industry (Scrap)
435	*Not an industry (Rest of the world adjustment)
436	*Not an industry (Noncomparable imports)
437	Employment and payroll for SL Government Non-Education
438	Employment and payroll for SL Government Education
439	Employment and payroll for Federal Non-Military
440	Employment and payroll for Federal Military

B

# Appendix B. State-Level Model Input Values by IMPLAN Sector Code

Table B-1 presents the IMPLAN model codes and associated net input values used by Cadmus in each of the state-level economic models.

**Table B-1. Net Input Values for the Economic Impact Models by State and Sector Code\***

Code	State-Level Input (\$)										Total (\$)
	Alabama	Florida	Georgia	Louisiana	N. Carolina	S. Carolina	Tennessee	Virginia			
31	619,231.59	18,488.87	149,697.89	387,208.38	1,416,910.98	335,445.06	13,693.89	2,012,768.42			4,953,445.08
32	413,110.13	0.00	451,690.31	56,171.35	47,539.72	38,397.88	0.00	1,328,253.54			2,335,162.93
40	2,579,827.53	1,269,216.67	1,102,739.65	427,358.16	738,115.84	343,141.82	1,178,362.80	4,869,924.96			12,508,687.43
98	993,021.14	490,332.61	418,488.50	151,783.47	289,908.32	127,736.85	454,824.21	1,977,665.76			4,903,760.86
103	16,405.54	8,096.59	6,910.36	2,493.53	4,780.25	2,108.97	7,512.23	32,655.36			80,962.83
105	8,388.90	6,800.51	5,740.97	10,354.11	8,437.57	1,949.47	5,036.83	27,842.90			74,551.26
113	8,388.90	6,800.51	5,740.97	10,354.11	8,437.57	1,949.47	5,036.83	28,742.90			75,451.26
127	808,595.24	399,853.75	341,252.77	125,596.20	237,387.68	104,205.41	370,616.98	1,612,713.51			4,000,221.54
129	221,088.30	109,113.15	93,127.08	33,603.89	64,420.70	28,421.42	101,238.06	440,077.97			1,091,090.57
137	531,690.42	262,653.23	224,166.22	81,664.41	155,485.79	68,431.71	243,577.27	1,059,383.40			2,627,052.45
145	68,714.31	33,912.40	28,943.93	10,444.10	20,021.97	8,833.39	31,464.82	136,776.37			339,111.29
146	65,708.06	32,428.73	27,677.63	9,987.17	19,146.01	8,446.93	30,088.23	130,792.41			324,275.17
147	144,729.52	71,427.99	60,963.14	21,997.88	42,171.28	18,605.32	66,272.78	288,085.23			714,253.14
149	29,289.48	14,455.16	12,337.35	4,451.80	8,534.37	3,765.23	13,411.88	58,300.93			144,546.20
159	270,133.14	133,318.12	113,785.81	41,058.36	78,711.38	34,726.25	123,696.07	537,702.11			1,333,131.24
169	19,583.58	9,665.03	8,249.02	2,976.57	5,706.26	2,517.51	8,967.47	38,981.27			96,646.71
174	54,284.31	26,790.80	22,865.70	8,250.84	15,817.36	6,978.37	24,857.21	108,053.33			267,897.92
210	8,767.37	4,675.35	3,946.92	7,118.45	5,800.83	1,340.26	3,462.82	20,486.64			55,598.64
214	143,097.56	70,622.57	60,275.72	21,749.83	41,695.76	18,395.53	65,525.49	284,836.79			706,199.25
215	320,294.15	158,863.75	135,570.01	51,377.83	95,106.53	41,433.16	147,020.10	640,746.42			1,590,411.95
216	466,140.28	230,842.82	197,003.49	73,545.43	137,603.17	60,182.02	213,804.18	931,054.27			2,310,175.66
234	18,382.01	10,916.89	9,238.47	13,686.78	11,973.53	3,066.22	8,537.91	45,621.71			121,423.52
235	4,514.76	2,443.93	2,063.16	3,721.01	3,032.25	700.59	1,810.11	10,704.15			28,989.96
236	4,514.76	2,443.93	2,063.16	3,721.01	3,032.25	700.59	1,810.11	10,704.15			28,989.96
237	4,063.37	3,293.99	2,780.78	5,015.27	4,086.95	944.28	2,439.72	13,235.62			35,859.98
249	4,895.89	2,416.26	2,062.25	744.14	1,426.57	629.38	2,241.87	9,745.32			24,161.68
259	74,726.82	36,879.74	31,476.52	11,357.96	21,773.90	9,606.31	34,217.99	148,744.30			366,783.54

Code	State-Level Input (\$)										Total (\$)
261	10,636.41	6,579.54	5,583.98	6,156.19	6,095.85	1,802.87	5,468.24	26,519.23	68,842.31		
313	61,633.72	32,939.95	27,807.83	50,152.73	40,869.48	9,442.76	24,397.16	147,628.16	394,871.79		
322	3,705.42	1,828.73	1,560.80	563.20	1,079.68	476.34	1,696.74	7,375.67	18,286.58		
326	23,413.20	7,225.54	6,099.78	11,001.24	8,964.92	2,071.31	5,351.63	32,357.20	96,484.82		
332	14,074.14	4,356.57	3,677.81	6,633.10	5,405.32	1,248.88	3,226.72	16,926.49	55,549.03		
336	23,413.20	7,225.54	6,099.78	11,001.24	8,964.92	2,071.31	5,351.63	28,727.20	92,854.82		
359	0.00	-1,210,134.55	0.00	0.00	0.00	0.00	0.00	-169,385.40	-1,379,519.95		
362	23,413.20	7,225.54	6,099.78	11,001.24	8,964.92	2,071.31	5,351.63	28,727.20	92,854.82		
367	208,786.67	0.00	0.00	0.00	0.00	0.00	0.00	52,581.33	261,368.00		
368	208,786.67	0.00	0.00	0.00	0.00	0.00	0.00	52,581.33	261,368.00		
371	16,646.72	13,494.75	11,392.24	20,546.44	16,743.30	3,868.48	9,994.96	54,474.97	147,161.86		
374	208,786.67	0.00	0.00	0.00	0.00	0.00	0.00	52,581.33	261,368.00		
375	234,695.71	110,614.47	93,380.47	168,416.10	137,242.36	31,709.38	81,927.22	496,283.81	1,354,269.52		
377	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3,600.00	3,600.00		
385	60,472.11	18,488.87	15,608.26	28,150.24	22,939.64	5,300.13	13,693.89	106,570.72	271,223.86		
388	60,472.11	18,488.87	15,608.26	28,150.24	22,939.64	5,300.13	13,693.89	106,570.72	271,223.86		
390	60,472.11	18,488.87	15,608.26	28,150.24	22,939.64	5,300.13	13,693.89	106,570.72	271,223.86		
411	9,339.07	2,868.96	2,421.97	4,368.14	3,559.60	822.43	2,124.91	11,490.72	36,995.80		
412	2,883.68	2,337.67	1,973.46	3,559.23	2,900.41	670.13	1,731.41	9,388.18	25,444.17		
413	1,441.84	1,168.84	986.73	1,779.61	1,450.21	335.07	865.71	4,269.09	12,297.10		
416	60,472.11	18,488.87	15,608.26	28,150.24	22,939.64	5,300.13	13,693.89	106,570.72	271,223.86		
424	-10,179.79	4,462.83	3,767.51	6,794.89	5,537.16	1,279.34	3,305.42	11,924.71	26,892.07		
431	2,933,504.15	1,436,388.79	-11,726.45	0.00	0.00	0.00	1,121,149.95	310,389.66	5,789,706.10		
HH**	-4,517,165.23	64,652.31	-323,165.55	630,156.56	384,995.01	-603,626.71	-2,339,091.81	-8,869,240.03	-15,572,485.45		
<b>Total</b>	<b>7,601,290.95</b>	<b>3,983,944.34</b>	<b>3,419,250.98</b>	<b>2,622,522.93</b>	<b>4,211,596.50</b>	<b>748,102.81</b>	<b>2,147,154.95</b>	<b>9,540,083.50</b>	<b>34,273,946.85</b>		

\* Columns may not add up to totals due to rounding.

\*\* HH = Households. All other IMPLAN codes are industry codes. See Appendix A for a complete list of IMPLAN model code descriptions.



c

# Appendix C. Region-Level Model Input Values by IMPLAN Sector Code

Table C-1 presents the IMPLAN model codes and associated net input values used by Cadmus in the region-level economic model.

**Table C-1. Net Input Values for the Regional Economic Impact Model\***

Code	Region-Level Input (\$)						Total (\$)
	Alabama SEP	Virginia SEP	EECGB Programs	Project Spending and Earnings	Avoided Utility Fuel and Capacity Costs		
31	45,494.80	52,486.91	-	(516,711.91)	5,198,933.11	4,780,202.91	
32	-	-	-	(357,746.35)	2,692,909.29	2,335,162.94	
39	-	-	8,991.50	-	-	8,991.50	
40	15,615.00	40,907.81	1,953,915.93	12,106,675.94	-	14,117,114.69	
98	270.00	750.00	10,219.14	4,896,766.99	-	4,908,006.14	
103	-	-	-	80,962.82	-	80,962.82	
105	2,880.00	7,950.00	-	-	-	10,830.00	
113	2,880.00	8,850.00	2,420.73	-	-	14,150.73	
114	-	-	1,210.37	-	-	1,210.37	
127	855.00	2,250.00	30,657.43	3,978,199.29	-	4,011,961.72	
129	-	-	-	1,091,090.57	-	1,091,090.57	
137	270.00	750.00	10,219.14	2,620,058.59	-	2,631,297.73	
140	-	-	1,210.37	-	-	1,210.37	
145	-	-	-	339,111.29	-	339,111.29	
146	-	-	-	324,275.17	-	324,275.17	
147	-	-	-	714,253.15	-	714,253.15	
149	-	-	-	144,546.19	-	144,546.19	
159	-	-	-	1,333,131.25	-	1,333,131.25	
169	-	-	-	96,646.72	-	96,646.72	
174	-	-	-	267,897.92	-	267,897.92	
210	4,980.00	6,810.28	20,450.19	-	-	32,240.46	
212	-	-	1,254.14	-	-	1,254.14	
214	-	-	-	706,199.26	-	706,199.26	
215	855.00	2,250.00	30,657.43	1,568,389.71	-	1,602,152.13	
216	855.00	2,250.00	30,657.43	2,288,153.41	-	2,321,915.84	
234	6,600.00	11,010.28	61,904.51	24,161.68	-	103,676.46	

Code	Region-Level Input (\$)						Total (\$)
	Alabama SEP	Virginia SEP	EECGB Programs	Project Spending and Earnings	Avoided Utility Fuel and Capacity Costs		
235	2,535.00	3,555.14	10,303.26	-	-	-	16,393.40
236	2,535.00	3,555.14	10,303.26	-	-	-	16,393.40
237	1,395.00	3,600.00	11.90	-	-	-	5,006.90
240	-	-	306,586.18	-	-	-	306,586.18
247	-	-	11.90	-	-	-	11.90
249	-	-	-	24,161.68	-	-	24,161.68
250	-	-	11.90	-	-	-	11.90
253	-	-	11.90	-	-	-	11.90
259	-	-	-	368,783.53	-	-	368,783.53
261	1,440.00	3,750.00	51,095.71	31,791.68	-	-	88,077.40
301	-	-	3,573.72	-	-	-	3,573.72
313	34,950.00	51,271.95	158,792.27	-	-	-	245,014.21
321	-	-	3,573.72	-	-	-	3,573.72
322	-	-	-	18,286.58	-	-	18,286.58
326	17,560.00	11,221.00	59,225.53	-	-	-	88,006.53
332	10,545.00	4,182.60	99,095.76	-	-	-	113,823.36
336	17,560.00	7,591.00	60,192.44	-	-	-	85,343.44
342	-	-	670.00	-	-	-	670.00
345	-	-	2,323.19	-	-	-	2,323.19
350	-	-	5,621.75	-	-	-	5,621.75
351	-	-	5,626.24	-	-	-	5,626.24
359	-	-	-	(1,379,519.95)	-	-	(1,379,519.95)
362	17,560.00	7,591.00	67,786.45	-	-	-	92,937.45
367	208,786.67	52,581.33	362,330.59	-	-	-	623,698.59
368	208,786.67	52,581.33	471,189.40	-	-	-	732,557.40
371	5,715.00	15,000.00	-	-	-	-	20,715.00
374	208,786.67	52,581.33	2,019,977.72	-	-	-	2,281,345.72
375	145,090.07	172,713.42	1,881,651.69	-	-	-	2,199,455.18
376	-	-	24,662.44	-	-	-	24,662.44
377	-	3,600.00	391,432.58	-	-	-	395,032.58
378	-	-	3,726.73	-	-	-	3,726.73

Code	Region-Level Input (\$)						Total (\$)
	Alabama SEP	Virginia SEP	EECGB Programs	Project Spending and Earnings	Avoided Utility Fuel and Capacity Costs		
380	-	-	12,445.71	-	-	-	12,445.71
385	45,494.80	52,486.91	26,974.49	-	-	-	124,956.20
388	45,494.80	52,486.91	-	-	-	-	97,981.71
390	45,494.80	52,486.91	-	-	-	-	97,981.71
411	7,015.00	3,098.40	71,246.29	-	-	-	81,359.69
412	990.00	2,550.00	419,412.96	-	-	-	422,952.96
413	495.00	850.00	359,439.66	-	-	-	360,784.66
416	45,494.80	52,486.91	-	-	-	-	97,981.71
424	1,890.00	5,000.00	306,644.28	(21,815.00)	-	-	291,719.28
425	-	-	26,660.57	-	-	-	26,660.57
427	-	-	4,133.09	-	-	-	4,133.09
431	-	-	-	(33,900.95)	-	5,823,607.04	5,789,706.09
HH**	1,058,629.00	1,372,913.43	6,430,355.95	(25,998,111.80)	-	-	(17,136,213.42)
<b>Total</b>	<b>2,215,798.07</b>	<b>2,176,000.00</b>	<b>15,820,869.49</b>	<b>4,715,737.44</b>	<b>13,715,449.45</b>	<b>38,643,854.45</b>	

\* Columns may not add up to totals due to rounding.

\*\* HH = Households. All other IMPLAN codes are industry codes. See Appendix A for a complete list of IMPLAN model code descriptions.

D

## Appendix D. IMPLAN Code Breakouts for Program Budgets

Table D-1 presents IMPLAN sector code breakouts used for program budgets lacking any type of line item granularity.

**Table D-1. IMPLAN Code Breakouts for Program Budgets Lacking Any Line Item Breakouts\***

IMPLAN Code	% of Overall Program Budget
31	1.74%
40	3.47%
98	0.06%
105	0.64%
113	0.64%
127	0.19%
137	0.06%
210	0.44%
215	0.19%
216	0.19%
234	0.80%
235	0.23%
236	0.23%
237	0.31%
261	0.32%
313	3.10%
326	0.68%
332	0.41%
336	0.68%
362	0.68%
371	1.27%
375	10.41%
385	1.74%
388	1.74%
390	1.74%
411	0.27%
412	0.22%
413	0.11%
416	1.74%
424	0.42%
Households	65.28%
<b>Total</b>	<b>100.00%</b>

\* Used for EECGB programs in Alabama and Virginia as well as for all BBNP programs in Florida, Georgia, Louisiana, North Carolina, South Carolina, and Tennessee.

Table D-2 presents IMPLAN sector code breakouts used for program budgets including only a financial incentives line item.

**Table D-2. IMPLAN Code Breakouts for Program Budgets Including Only a Financial Incentives Line Item\***

<b>IMPLAN Code</b>	<b>% of Overall Program Budget**</b>
31	1.25%
40	2.49%
98	0.05%
105	0.46%
113	0.46%
127	0.14%
137	0.05%
210	0.32%
215	0.14%
216	0.14%
234	0.57%
235	0.17%
236	0.17%
237	0.22%
261	0.23%
313	2.22%
326	0.49%
332	0.29%
336	0.49%
362	0.49%
371	0.91%
375	7.46%
385	1.25%
388	1.25%
390	1.25%
411	0.20%
412	0.15%
413	0.05%
416	1.25%
424	0.30%
Households	75.12%
<b>Total</b>	<b>100.00%</b>

\* Used for SEP programs in Alabama.

\*\* Column does not add to total due to rounding.





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