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**Pacific Northwest  
National Laboratory**

Operated by Battelle for the  
U.S. Department of Energy

**Impact of the FY 2005 Weatherization  
and Intergovernmental Program on  
United States Employment and  
Earned Income**

M. J. Scott                      J.A. Dirks  
D.M. Anderson                D. B. Elliott  
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August 2004

Prepared for the U.S. Department of Energy  
under Contract DE-AC06-76RL01830



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## **Abstract**

The Department of Energy (DOE) Office of Energy Efficiency and Renewable Energy (EERE) is interested in assessing the potential economic impacts of its portfolio of subprograms on national employment and income. A special purpose version of the IMPLAN input-output model called ImBuild II is used in this study of 20 subprograms of the Weatherization and Intergovernmental Program contained in the EERE final FY 2005 budget request to the Office of Management and Budget on February 2, 2004. Energy savings, investments, and impacts on U.S. national employment and earned income are reported by subprogram for selected years to the year 2030. Energy savings and investments from these subprograms have the potential of creating a total of 228,000 jobs and about \$3.1 billion in earned income (2003\$) by the year 2030.

## Summary

As part of measuring the impact of government programs for improving the energy efficiency of the nation's building stock, the Department of Energy (DOE) Office of Energy Efficiency and Renewable Energy (EERE) is interested in assessing the economic impacts of its portfolio of its buildings-related subprograms, specifically the potential impact on national employment and income. This assessment was done for the first time in FY 1999 as a supplement to the Government Performance and Results Act (GPRA—formerly, Quality Metrics) analysis for EERE. The GPRA analysis provides estimates of primary energy savings and environmental and direct financial benefits of the EERE Weatherization and Intergovernmental Program buildings-related subprograms. The current analysis performs this assessment on the FY2005 budget request from EERE.

The programmatic needs of EERE suggest that a simple, flexible, user-friendly method is needed to derive national employment and income impacts of individual EERE programs. Therefore, EERE funded Pacific Northwest National Laboratory (PNNL) to develop a special-purpose national input-output model called ImBuild, the latest version of which is ImBuild II (Scott et al. 2002). In this report, we use the ImBuild II model to calculate the impact of 20 EERE Weatherization and Intergovernmental Program (WIP) subprograms, based on the final Weatherization and Intergovernmental Program budget submitted February 2, 2004.

A few of the WIP subprograms could not be evaluated in this report. The excluded subprograms either did not produce U.S. domestic energy savings or else did not have sufficient program data available to allow economic analysis to be performed. The excluded WIP subprograms are:

- Clean Cities
- Renewable Energy Production Initiative (REPI)
- International Programs
- Tribal Energy Program

EERE subprograms affect the economy through three primary mechanisms. First, if the incremental capital costs of the new technology per installed unit are different from those of the conventional technology, the level of purchases will change in the sectors involved in manufacturing, distribution, and installation for both technologies, changing the level of overall economic activity. Second, the efficiency investment may crowd out other domestic investment and consumer spending, offsetting some positive impact on the economy caused by the new efficiency investment. Third, energy expenditures are reduced, lowering final sales in the electric and gas utility sectors, as well as in the trade and services sectors that provide related maintenance, parts, and services. However, these savings are equivalent to increased income to households that, in turn, leads to increased spending across all sectors of the economy.

Energy efficient technology is expected to have a measurable effect on the activity level of the U.S. economy. EERE subprograms generally are characterized by significant investment requirements and delivered energy cost savings. The impacts of the WIP subprograms are summarized in Figure S.1 and Table S.1.<sup>a</sup> Figure S.1 and Table S.1 show the energy savings expected to be created by market penetration of these subprograms have the potential of creating nearly 235,000 jobs and about \$2.9 billion in earned income (2003\$) by the year 2030. However, the net gains would be affected by the intensive investment in new energy technology and new building practices would be required during the first 30 years of the 21<sup>st</sup> century. These effects are incorporated in the full investment scenario shown in the lower half of Table S.1. Because the WIP subprogram investments tend to be concentrated in capital-intensive, high-wage industries, there is a slight net negative impact on employment and positive impact on earnings from this group of investments. Many of the capital investments required to achieve these savings begin early in the 30-year period.

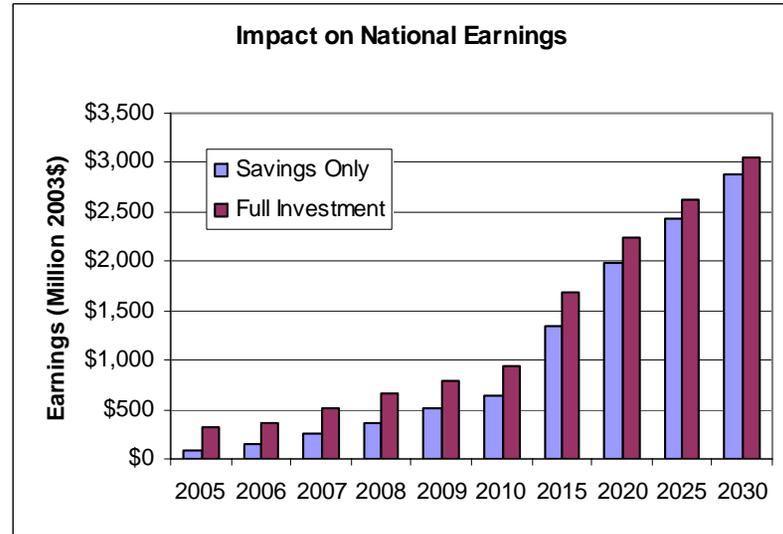
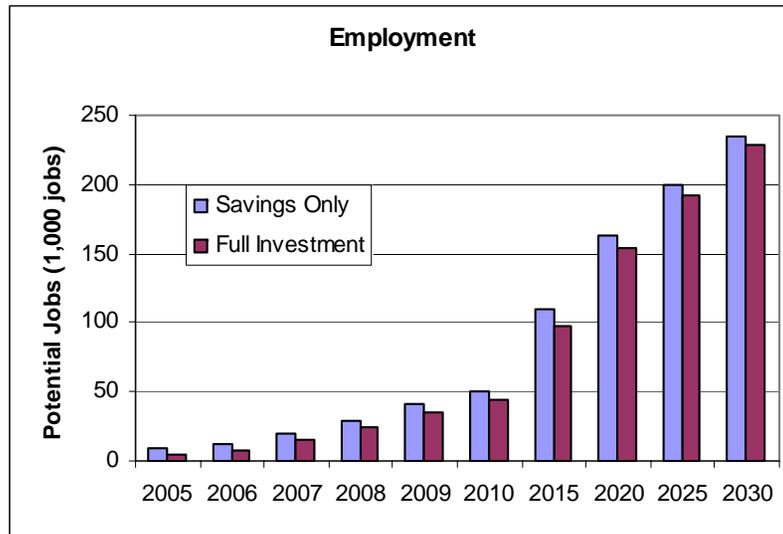
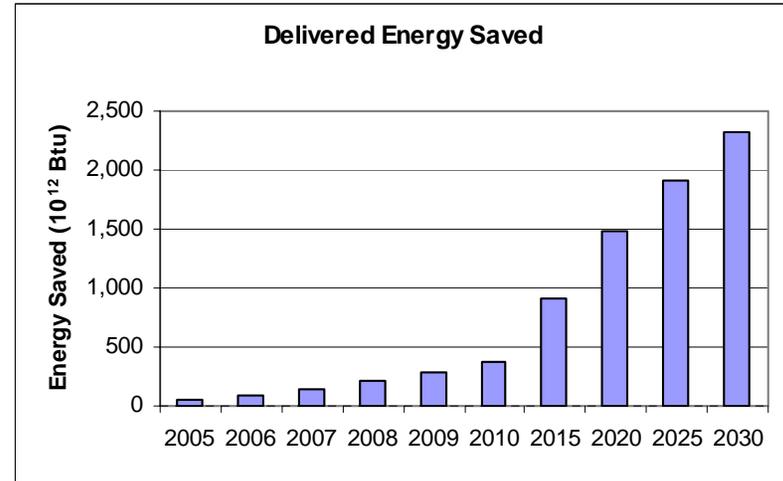
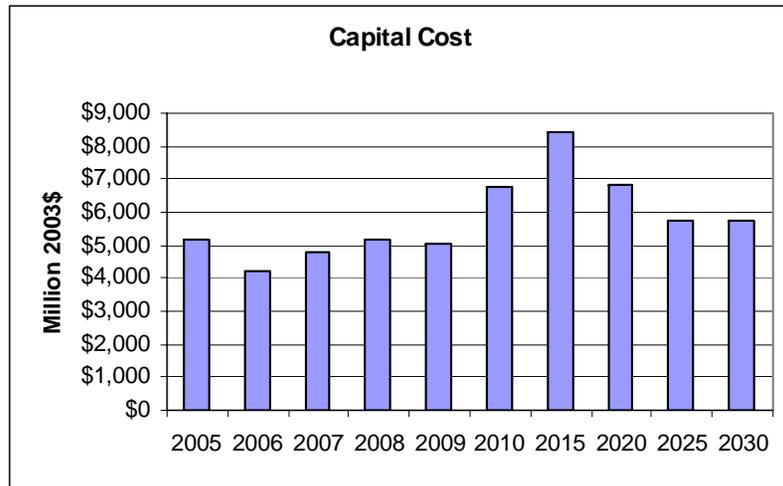
To be in concert with a recent analysis of the Department of Energy's Energy Research and Development program by the National Research Council (NRC) of the National Academy of Sciences (NAS), the analysis in some cases only takes credit for the first three to ten years of market impact. The NRC used a simplifying assumption that government R&D programs do no more than accelerate the technology, bringing it to market five years before the private sector would have without government intervention. The net effect of this assumption is that incremental investments due to the Weatherization and Intergovernmental Program are offset by investments and savings expected to occur without the program, which reduces the long-term impacts attributable to the WIP subprograms. However, the analysis of the WIP subprograms performed for this report shows that the impacts on investment and energy savings result from the interaction of four factors: 1) the size of the (usually growing) market at each point in time, 2) the penetration rate for the EERE-developed technologies and practices, based on lifetime cost savings vis-à-vis conventional technology and the associated payback period for the investment, 3) increases in the efficiency per dollar of incremental investment, based in turn on the sales-volume based rate of decline in the price of the technology and the higher durability of the Weatherization and Intergovernmental Program technology, and 4) the market-transformation, crowding-out effects of one technology on market prospects of all of its potential competitors. This results in a "hill-like" pattern of subprogram-related efficiency investments shown in the upper left-hand panel of Figure S.1, and in Table S.1.

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<sup>a</sup> In this analysis, we used subprogram information developed as described in Elliott et al. (2004) that PNNL prepared in cooperation with EERE subprogram managers. Delivered energy is used to calculate potential savings resulting from reduced demand for electrical generating capacity and natural gas pipeline capacity. See Scott et al. (2002).

**Table S.1.** Impact of the Weatherization and Intergovernmental Program on the U.S. Economy

	Incremental Investment Cost (Million 2003\$)	Delivered Energy Saved (10 <sup>12</sup> Btu)	Potential Jobs Created (Thousand)	Impact on National Earnings (Million 2003\$)
Impact of Energy Savings Alone				
2005	0	45	9	\$95
2006	0	91	12	\$150
2007	0	145	20	\$247
2008	0	213	30	\$372
2009	0	290	40	\$508
2010	0	372	51	\$636
2015	0	907	109	\$1,344
2020	0	1,486	162	\$1,984
2025	0	1,903	199	\$2,440
2030	0	2,318	235	\$2,881
Impact of Full Investment Scenario				
2005	\$5,142	45	5	\$326
2006	\$4,205	91	8	\$372
2007	\$4,760	145	15	\$505
2008	\$5,159	213	24	\$655
2009	\$5,067	290	35	\$784
2010	\$6,765	372	44	\$929
2015	\$8,444	907	98	\$1,684
2020	\$6,838	1,486	154	\$2,234
2025	\$5,718	1,903	193	\$2,629
2030	\$5,753	2,318	228	\$3,053



**Figure S.1.** Impact of the Weatherization and Intergovernmental Program on the U.S. Economy

Only when the energy benefits of cumulative efficiency investments have grown large, relative to the costs of current investment, would the full impacts on employment and income become visible. Thus, in the full investment scenario, as the energy technologies and practices associated with the WIP subprograms penetrate the U.S. marketplace over the next 25 years, the required capital investments are significant and increasing over most of the period, reaching a peak of about \$8.5 billion *per year* in 2015. These required investments divert national spending into capital-intensive sectors and initially reduce employment below what it otherwise would have been. However, the energy savings associated with these same investments (2.3 quadrillion Btus per year by the year 2030, worth about \$33.1 billion) are true economic savings that provide new economic opportunities, generate ever-increasing numbers of jobs and higher income, and eventually become the dominant economic result of the WIP subprograms.

Over 70 percent of the net jobs and net earned income benefits of the Weatherization and Intergovernmental Program come from only three of the subprograms: Training and Technical Assistance, Energy Star Compact Fluorescent Lights (CFLs), and Inventions and Innovations (I&I). These subprograms are not large scale in terms of incremental investment requirements, but all are extremely cost-effective subprograms that are expected to produce large energy savings relative to the investments required. By the year 2030, these three subprograms together are projected to produce net annual savings to the U.S. economy (*after* investment costs) over \$20.0 billion per year and 164,000 net total jobs (after investment effects). The impacts of most of the other WIP subprograms are on a much smaller scale.

## Acronyms

AC	air conditioning
CFL	compact fluorescent lamp
DOE	Department of Energy
EERE	Office of Energy Efficiency and Renewable Energy
EIA	Energy Information Administration
FY	fiscal year
GDP	Gross Domestic Product
GPRA	Government Performance and Results Act (formerly, Quality Metrics)
I&I	Inventions and Innovation
HPWH	heat pump water heater
HUD	Housing and Urban Development
HVAC	Heating, Ventilating and Air Conditioning
ImBuild	Special purpose version of IMPLAN (PNNL)
IMPLAN	Impact Analysis for Planning
NAS	National Academy of Sciences
NRC	National Research Council
PNNL	Pacific Northwest National Laboratory
R&D	Research and Development
REPI	Renewable Energy Production Initiative (REPI)
RIMS II	Regional Input-Output Modeling System
SIC	Standard Industrial Classification
WIP	Weatherization and Intergovernmental Program

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The authors would like to acknowledge Jerry Dion, formerly of the Department of Energy Office of Planning, Budget and Analysis, and now with the Building Technologies Program, for support of the work discussed in this report. We would also like to acknowledge the assistance of several colleagues who reviewed and commented on the methodology and this report: A. K. Nicholls, S. C. McDonald, J. M. Roop, and S. A. Shankle.

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# 1.0 Methods

## 1.1 Introduction

A primary goal of the Department of Energy (DOE) Office of Energy Efficiency and Renewable Energy (EERE) is to save energy. However, EERE subprograms also have economic impacts as energy investments, and the resultant energy savings play out in the national economy. As part of measuring the impact of government subprograms on improving the nation's energy efficiency, EERE is interested in assessing the economic impacts of these subprograms, specifically the impact on national employment and earned income. As a consequence, EERE funded Pacific Northwest National Laboratory (PNNL) to develop a simple-to-use method that could be used in-house to estimate economic impacts of individual subprograms.

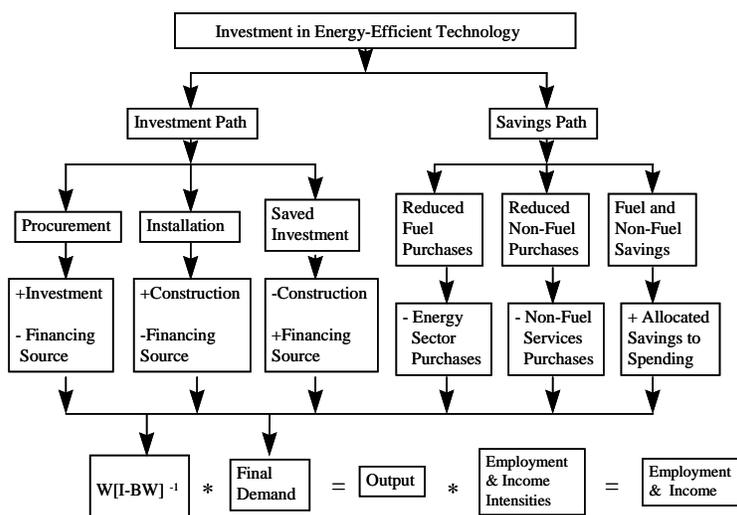
Three fundamental methods are available to estimate employment and earned income impacts for selected energy efficiency improvements in the U.S. economy: multipliers, input-output models, and macroeconomic simulation models. PNNL staff reviewed the EERE programmatic needs and available methods and, based on this assessment and on realistic resource constraints, designed and developed a special-purpose version of the IMImpact Analysis for PLANning (IMPLAN) national input-output model (Minnesota IMPLAN Group, Inc. 1997) specifically to estimate the employment and income effects of building energy technologies. IMPLAN was developed originally by the U.S. Forest Service in cooperation with the Federal Emergency Management Agency and the Bureau of Land Management to assist the Forest Service in land and resource management planning. Since 1979, it has been used by a wide variety of government and private agencies to assess economic impacts. The special-purpose version of the IMPLAN model developed by PNNL was called ImBuild. The version used in this study is called ImBuild II. Extensive documentation and a user's guide are provided in Scott et al. (2002), which discusses the methods, structure of the ImBuild II model, its testing and performance. For a detailed discussion of the methodology used in this study, refer to that report.

Compared with simple economic multiplier approaches, such as the published multipliers from the Department of Commerce Regional Input-Output Modeling System (RIMS II) (Bureau of Economic Analysis 1992), ImBuild II allows for more complete and automated analysis of the economic impacts of energy efficiency investments in buildings. ImBuild II is also easier to use than extant macroeconomic simulation models. It does not include the ability to model certain dynamic features of markets for labor and other factors of production featured in these more complex models, but for most purposes these excluded features are not critical. Such impacts can be handled well by an input-output model and the analysis should be credible, as long as the assumption can be made that relative prices in the economy would not be substantially affected by energy efficiency investments. The expected scale of these investments is small enough in most cases that neither labor markets nor production cost relationships will seriously affect national prices as the investments are made. The exact timing of impacts on gross product, employment, and national earned income from energy efficiency investments is not well enough understood that much special insight can be gained from the additional dynamic sophistication of a macroeconomic simulation model. Thus, ImBuild II is a cost-effective compromise.

## 1.2 Calculation of Impact Using ImBuild

As energy-efficient technologies penetrate the marketplace, EERE subprograms will affect national employment and earned income. To analyze these effects, the ImBuild II model requires certain information on the subprograms: the size of the incremental investment in the technology over time compared with the conventional technology it replaces, corresponding energy savings by fuel in physical and monetary terms (which may include additional use of some fuels when one type of fuel replaces another), and non-energy operations savings (if any) in comparison with the current technology (Figure 1.1).

ImBuild II calculates changes in the use of energy, labor, and materials due to incremental investments and economic savings associated with EERE-supported technologies and practices, as shown in Figure 1.1. As the figure illustrates, new investments in these technologies affect the level of employment and earned income in the economy by multiple pathways. First, the manufacture and installation of this equipment creates jobs and income in some industries, while diverting funds that otherwise would have been spent for other goods and services by businesses and households. At the same time, the investment in energy-efficient technologies or practices may make other investments in energy supply technologies (for example, power plants) unnecessary, directly and indirectly affecting jobs and income.



**Figure 1.1.** Detailed Calculations of the ImBuild II Model

The issue is discussed in more detail in Scott et al. (2002).<sup>a</sup> For this report, we assumed that financing for the energy-efficient investments is drawn proportionately from the rest of the U.S.

<sup>a</sup> For this report, we estimated electric power plant construction savings at about \$590/kW of delivered electric energy, based on data in EIA (2002) and the equivalent value for natural gas, about \$1.20/cubic foot/day capacity, based on EIA (1996) and EIA (1999). These values have not changed significantly in recent years.

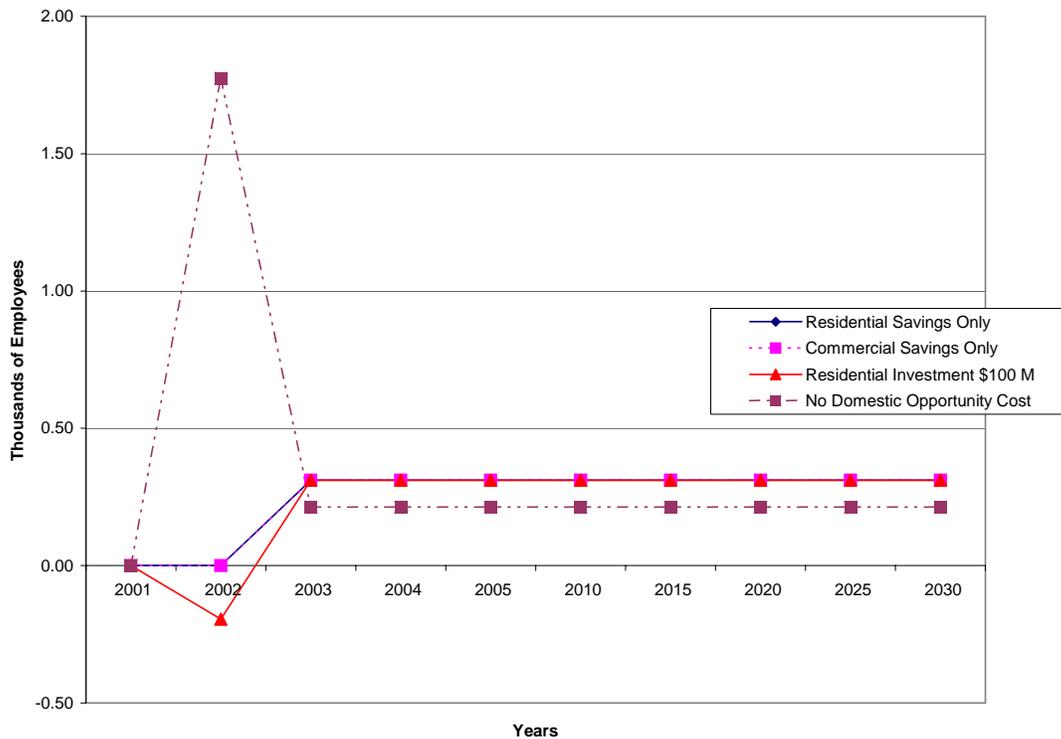
economy.<sup>b</sup> Figure 1.1 also shows that an investment in energy-efficient technology reduces the amount of energy needed. Reducing energy consumption reduces energy purchases (which in turn reduces employment and income in the energy-supplying sectors) and produces dollar savings that can be spent on any good or service, including energy (which creates employment and income). In addition, some energy efficiency investments may save the purchaser other costs such as maintenance services, and these savings also have impacts.

All of these pathways in Figure 1.1 either affect the interindustry intermediate procurement (the matrix  $W[I-BW]^{-1}$  in Figure 1.1) or the final demand (the set of goods and services in the economy purchased for final consumption or new investment, as distinguished from those purchased merely as intermediate inputs to current production). In residential applications, the necessary model calculations are relatively straightforward, because residential savings are assumed to be entirely recycled into personal consumption and investment (that is, final demand). For commercial building applications, the process is more complicated because the interindustry relationships between specific sectors are affected, not just final demand. For savings in the commercial sector, the interindustry portion of the input-output table is automatically recomputed; then the model is run with the recomputed table. Because the energy and maintenance intensity of the commercial sector changes, the coefficients of the input-output structure are automatically recalculated at each time step. The financial impacts of energy and non-energy cost savings (for example, savings in building maintenance) are computed by the model. These savings are treated like “free” income, available to be saved or invested by the sector collecting the income.

A brief hypothetical example from Scott et al. (2002) illustrates the concepts and functioning of the ImBuild II model. It is assumed that consumers spend a premium of \$100 million on more-efficient residential heating and air-conditioning equipment in the year 2000, which each year thereafter saves them \$15 million in electricity, \$30 million in natural gas, and \$5 million in building maintenance expenditures, for annual savings of \$50 million. This \$50 million annual savings yields a simple payback period of 2 years. The first two cases in Figure 1.2 show the employment effects of the \$50 million savings alone. In the first case, the savings are confined to the residential sector. The second case shows how the impacts would change if these energy savings had instead been experienced in the commercial sector, where the savings are initially experienced as an increase in the profitability of those businesses saving the energy.

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<sup>b</sup> It is assumed that personal (household) consumption represents 70% of spending; gross private fixed investment, 10%; federal defense spending 2%; federal non-defense spending, 6%; and state and local government spending, about 12%. These percentages are close to the actual distribution of final demand among these sectors in the U.S. economy.



**Figure 1.2.** Impact on National Employment of a Hypothetical Once-Only \$100 Million Investment in Appliance Efficiency

These profits are assumed to be *recycled* in the economy as spending by workers, spending by the firms themselves, and by governments experiencing increases in tax collections. In the first case, the energy savings in the residential sector of \$50 million have a net impact on the U.S. economy of about 310 jobs, or about 0.6 additional jobs per \$100 thousand dollars of direct energy savings. The impact is virtually identical if the energy savings occur in the commercial sector, because the employment intensity of the spending mix of businesses, their workers, and government associated with commercial savings is only slightly different from the spending intensity of the household sector alone, which is associated with residential saving. Next, Figure 1.2 adds a third and fourth case to show the employment impacts of the \$100 million investment itself. The third case shows the impact of the investment premium. In this case, even though investment in the technology itself generates employment, the short run net employment impact is negative (*minus* 200 jobs) because the opportunity cost of the investment premium is the dollar amount the investment would have produced elsewhere in the U.S. economy, which on average is more labor-intensive than the manufacturing sector that makes the new technology.<sup>a</sup> Typically, efficiency subprograms are considered relatively labor-intensive, but this is not always the case. Heating and air conditioning manufacture, for example, is quite capital-intensive. The strength and direction of the investment effect depends on the size of the investment premium and its combined domestic U.S. direct

<sup>a</sup>Strictly speaking, the labor intensity that counts is the employment, direct *and indirect*, that is created by each dollar of spending. Thus, it is theoretically possible for a capital-intensive industry to buy lots of labor-intensive inputs from other industries and the total effect to be labor intensive as a result.

and indirect labor intensity, relative to that of other domestic spending (the opportunity cost of the investment). For the employment impact of the investment to be positive, the sectors supplying the new technology must on average create more domestic jobs per dollar of spending than does other domestic spending. An extreme form of this positive investment effect would occur, if the investment were financed internationally (that is, no domestic opportunity cost is included). This is the fourth case in Figure 1.2, which shows a short-run jobs impact of more than 1770 and a long-run jobs impact of 210. The fourth case also corresponds to many regional analyses that have been made of energy conservation impacts, where the investment funds are assumed to come from *somewhere else* and have no opportunity cost in the region.

The energy and non-energy savings from installation of efficient technology do not affect employment in the national economy until reinvested or spent. For purposes of the analysis conducted for this report, we assume that any increments to the economic value-added in each sector as a result of the investment (that is, the energy and non-energy savings) are allocated to compensation of labor, capital, and business taxes in the same proportions as all other value-added<sup>b</sup> in that sector. The income of each sector then is assumed to be spent on investment and consumption of goods and services (final demand) in the same proportions as existing compensation of labor, capital, and government. That is, if a given sector captures 1% of all personal consumption expenditures in the economy and a 0.7% share of all business fixed investment, it will receive these same percentage shares of the efficiency-related increase in spending. Similarly, if labor compensation represents 70% of the baseline total value added in an industry, it will receive 70% of any energy savings in that industry. Finally, labor compensation, business profits and taxes are allocated to consumption, investment, and government spending, according to current proportions.

ImBuild accumulates the energy and non-energy savings in the residential buildings sector and the changes in economic value-added associated with energy and non-energy savings within the commercial buildings sector. The model then calculates spending impacts associated with these savings by proportionately increasing final demand across all sectors as noted previously, while at the same time reducing final demand in the sectors supplying the resources that are saved. This step accounts for the spending associated with the monetary savings and improvements in technological efficiency and for the associated shift from energy to non-energy spending. It also accounts for changes in the patterns of activity in the economy due to technological change caused by the EERE subprograms (that is, less electricity is used per dollar of output in retailing because of more efficient lighting).<sup>c</sup>

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<sup>b</sup>Economic value-added is the value of output of the sector, less the cost of purchased materials and services. The sum of value-added in all sectors is Gross Domestic Product (GDP).

<sup>c</sup>ImBuild does not account for all of the long-term run impacts of the technological change. The change in energy-using capital in the commercial sector would alter the marginal value of all of the factors of production (including both labor and capital) and would induce a rearrangement of capital and labor that would ultimately result in an increase in output and in final demand. We show the multiplier effect created by spending of the energy and non-energy savings, but not the productivity effect of increased capital stock that would be created by the investment portion of the spending. Most economic models, including many dynamic simulation models, do not completely reflect the effect of capital accumulation and growth in capacity on final output and employment.

ImBuild collects the estimates of the initial investments, energy and non-energy savings, and economic activity associated with spending of the savings (increases in final demand in personal consumption, business investment, and government spending), and provides overall estimates of the increase in national output for each economic sector using the adjusted input-output matrix. Finally, the model applies estimates of employment and earned income per dollar of economic output for each sector and calculates impacts on national employment and earned income.

## 2.0 Analysis

### 2.1 EERE Weatherization and Intergovernmental Program

This analysis encompasses the EERE Weatherization and Intergovernmental Program (WIP) subprograms that were evaluated for Fiscal Year 2005 in response to the Government Performance and Results Act (GPRA). Table 2.1 shows the level of incremental residential and commercial investments and net energy savings in the selected years 2005, 2010, 2020, and 2030 for the subprograms that were evaluated. Each subprogram is designated with a numerical subprogram code to ensure ease in numerical modeling and for tracing a given subprogram as it undergoes periodic name changes. It is important to note that the values in Table 2.1 represent levels of *current* investment and energy and non-energy savings in the year shown, because it is *current* investment and *current* energy and non-energy savings that determine the impact on employment and earned income. Reported in this way, the values in Table 2.1 cannot be used to determine a rate of return on any particular investment because an investment in a given year provides a stream of savings over several years, and the energy savings experienced in any particular year are a function of the cumulative previous investment in energy efficiency. The investment and energy savings levels in a given year affect the level of gross domestic product (GDP) in that year, in turn affecting the level of national employment and earned income. Although the subprograms differ from each other in size and timing, for the most part the annual investment exceeds the annual savings early in the period, and savings tend to dominate later on. In a few cases, the early investments are expected to be so durable and to fall so much in cost that the later years show investment savings vis-à-vis conventional technology.

The differences in investment reflect differences identified by the analysis as the size of the potential market opportunity or market niche for each subprogram, differences in the expected rate of market penetration into each niche, and differences concerning the incremental cost of the new technologies and practices penetrating the market, compared to the more conventional technologies or practices that they replace. Because investments occur over a period of years, current savings do not necessarily correlate well with current investments. Some technologies and practices are expected to generate relatively large energy savings and require relatively little incremental investment, while others require relatively more incremental investment or generate fewer savings. Generally, net energy expenditure is reduced, but reduced spending for one fuel (e.g., electricity for lighting) can result in slightly more expenditure for another (e.g., natural gas for heating) due to building system effects, as described in Appendix A. Savings are also sensitive to timing. For example, some subprograms like Information Outreach are expected to be still strongly affecting incremental investment in the year 2030, while others like Rebuild America are expected to have ended, and still others like Energy Star Refrigerators have a technology expected to be competitive with the older technology and are enjoying pure savings by that date. For WIP subprogram details, refer to the GPRA documentation report (Elliott et al. 2004).

Many of the WIP subprograms have increasing market penetration and investment levels through the year 2030. Thus, the energy savings levels for many of the subprograms are expected to increase far beyond 2030. By the end of the period shown in Table 2.1, total annual savings have substantially exceeded total annual investments, and are continuing to accelerate. Investments as a group have begun

to flatten out after 2010. Some of the incremental adoption of the technologies and the energy investments due to the subprograms accelerates an adoption process that would have occurred later, anyway. Incremental investments due to these WIP subprograms are overtaken by “normal” investments in the space of three to ten years, depending on the subprogram. In other cases, it can be argued that the technology or practice never would have been developed without the WIP subprogram; therefore, the investment and savings would not have been overtaken in the marketplace. For details, see Elliott et al. (2004).

**Table 2.1.** Levels of Subprogram Investment Cost and Savings in the EERE Weatherization and Intergovernmental Program in Fiscal Years 2005, 2010, 2020, and 2030 (Millions of 2003 Dollars)

		2005	2010	2020	2030
<b>1. Weatherization Assistance</b>					
	901 Weatherization Assistance				
Investment		\$531.6	\$569.5	\$577.6	\$577.6
Savings		\$79.5	\$486.3	\$1,266.3	\$1,303.7
<b>2. State Energy Program</b>					
	903 State Energy Program				
	9031 SEP: Codes				
Investment		\$4.7	\$73.6	\$97.2	\$83.4
Savings		\$1.3	\$78.4	\$351.3	\$594.9
	9032 SEP: Energy Audits				
Investment		\$640.0	\$555.3	\$378.3	\$215.7
Savings		\$46.7	\$218.8	\$382.9	\$354.3
	9033 SEP: Rating & Labeling				
Investment		\$54.0	\$64.7	\$14.2	\$2.8
Savings		\$24.9	\$158.5	\$465.3	\$478.2
	9034 SEP: Workshops/Training				
Investment		\$870.2	\$759.9	\$529.9	\$316.2
Savings		\$56.6	\$267.8	\$490.5	\$495.0
	9035 SEP: Loans				
Investment		\$56.4	\$56.4	\$56.4	\$56.4
Savings		\$17.4	\$110.3	\$323.8	\$332.7
	9036 SEP: Retrofits				
Investment		\$299.4	\$282.1	\$236.1	\$199.8
Savings		\$14.3	\$71.1	\$143.3	\$174.1
	9037 SEP: Technical Assistance				
Investment		\$118.6	\$114.2	\$104.5	\$95.8
Savings		\$4.3	\$22.3	\$50.0	\$70.2
<b>3. Gateway Deployment</b>					
	1332 Rebuild America				
Investment		\$781.2	\$891.9	\$0.0	\$0.0
Savings		\$59.0	\$383.5	\$443.4	\$378.9
	135 Information Outreach				
	1351 Information Outreach - Pilot Projects				

		2005	2010	2020	2030
Investment		\$1.2	\$6.5	\$34.3	\$66.3
Savings		\$0.0	\$0.6	\$5.4	\$18.5
	1352	Information Outreach - Outreach Activities			
Investment		\$4.6	\$26.0	\$137.0	\$265.0
Savings		\$0.2	\$4.9	\$42.7	\$146.1
	1338	Building Codes Training and Assistance			
Investment		\$43.3	\$820.0	\$1,006.0	\$870.6
Savings		\$11.9	\$813.5	\$3,739.2	\$6,294.1
	422	Energy Star			
	4221	Energy Star: Clothes Washers			
Investment		\$348.0	\$363.1	\$458.5	\$505.4
Savings		\$171.4	\$393.6	\$716.3	\$1,069.8
	4223	Energy Star: Refrigerators			
Investment		\$192.8	\$384.2	\$429.5	\$462.9
Savings		\$9.4	\$66.5	\$172.4	\$289.0
	4226	Energy Star: Electric Water Heaters			
Investment		\$17.8	\$167.0	\$155.8	\$160.0
Savings		\$4.8	\$147.8	\$734.1	\$1,546.1
	4225	Energy Star: Gas Water Heaters			
Investment		\$10.8	\$51.3	\$115.2	\$133.4
Savings		\$0.6	\$13.3	\$94.6	\$224.2
	4224	Energy Star: Room Air Conditioners			
Investment		\$382.2	\$370.2	\$456.0	\$493.6
Savings		\$5.4	\$16.9	\$41.6	\$71.4
	4228	Energy Star: CFLs			
Investment		\$102.7	-\$137.6	-\$580.4	-\$710.0
Savings		\$292.6	\$3,065.0	\$6,548.1	\$7,466.0
	4222	Energy Star: Dishwashers			
Investment		\$115.2	\$120.7	\$139.8	\$154.3
Savings		\$3.6	\$16.0	\$46.6	\$87.5
	4227	Energy Star: Windows			
Investment		\$64.7	\$197.5	\$0.0	\$0.0
Savings		\$40.5	\$766.6	\$2,995.1	\$3,417.5
		Inventions and Innovations			
Investment		\$502.5	\$1,028.6	\$2,492.0	\$1,803.3
Savings		\$15.7	\$273.2	\$3,960.2	\$8,249.4
<b>Weatherization and Intergovernmental Program</b>					
Investment		\$5,141.9	\$6,764.9	\$6,838.0	\$5,752.6
Savings		\$860.2	\$7,375.2	\$23,013.2	\$33,061.7

## 2.2 Results

The investments and energy savings attributable to the penetration of WIP subprograms in the marketplace will result in substantial macroeconomic effects. The following tables summarize these effects. Table 2.2 shows the impact of the energy savings alone on potential national employment on a year-by-year and subprogram-by subprogram basis. The employment effects are called potential here because this estimate is really of the change in demand for workers. Actual employment effects could include changes in wage rates and also would be affected by changes in labor supply conditions. Table 2.3 shows the comparable effects on national earned income. Before accounting for investment costs, the effects of savings alone in the year 2030 are an increase of about 235,000 potential jobs and about \$2.9 billion in national earned income.

Several of the WIP subprograms do not apply to residential and commercial buildings. Except for the Innovations and Innovations subprogram, these subprograms generally do not produce energy savings or else do not have sufficient program data available to allow analysis in this assessment. These subprograms include:

- The Clean Cities project submitted input information and characterizations for the EERE GPRA process; however, no calculations of energy impacts or investments were available for inclusion in this report.
- Renewable Energy Production Initiative (REPI). This activity provides incentive payments to qualified producers of biomass, geothermal, solar, or wind energy. This activity evaluates energy production that has already occurred and makes reward payments from the coming year's budget accordingly. Also, due to missing data on energy production outcomes and investment premiums, no prospective impact analysis of this program could be performed.
- International Programs: This program implements the energy-related provisions of international agreements to which the United States is a party. These activities generally involve funding U.S. technology demonstrations in foreign countries. The impacts do not accrue to the United States in the form of energy savings.
- Tribal Energy Program: This program principally engages in the electrification of Indian Reservations. It also promotes energy efficiency in tribal communities. Although the program funds the development of new renewable energy supply resources on reservations, the scale of these developments is not projected to be significant in national terms.

As was previously discussed, obtaining WIP energy savings benefits requires a substantial national investment in energy efficient technologies and practices. For the most part, this incremental national investment will be made in manufacturing sectors that are relatively capital intensive to produce new or better equipment. We assume the source of the investment capital will be the U.S. economy as a whole, which is less capital intensive on average than is manufacturing. Just as in the example in Figure 1.2, most of the energy efficiency investments will tend to reduce national employment while they are occurring, because they divert investment into capital-intensive sectors. Therefore, Table 2.4, which combines the employment effects of the required energy efficiency investments and the employment effects of the required savings, shows lower employment impacts than does Table 2.2, which includes only the effects of the energy and non-energy savings and ignores the investment effects. By 2030, Table

2.4 shows potential net employment increases of about 228,000 jobs, about 97 percent of the level in Table 2.2. Comparing the effects on national earned income in Tables 2.3 and 2.5 presents a similar, but slightly more mixed picture. The net effect on earned income of the required investment, combined with the effect of resulting energy and non-energy savings, is a mixed effect because many of the jobs created in the capital-intensive manufacturing sectors as a result of Weatherization and Intergovernmental Program-related investments are also high-wage jobs. This tends to compensate to some degree for the reduction in overall employment levels associated with the diversion of national spending into capital-intensive manufacturing activity. By 2030, Table 2.5 shows a potential net positive impact on national earned income of about \$3.1 billion, about six percent higher than the level in Table 2.3.

The impacts on investment and energy savings result from the interaction of four factors: 1) the size of the (usually growing) market at each point in time, which results in increasing investment and savings, 2) the increasing penetration rate for the EERE technologies and practices, based on lifetime cost savings vis-à-vis conventional technology and the associated payback period for the investment, which results in increasing investments and savings, 3) increases in the efficiency of a dollar of incremental investment, based in turn on the sales-volume-based rate of decline in the price of the technology and the higher durability of the EERE technology, which can considerably reduce investment even as the savings hold constant or increase, and 4) the market-transformation, crowding-out effects of one technology on market prospects of all of its potential competitors, which increases investment and savings due to the WIP subprogram. Even in those cases where the WIP subprogram mainly accelerates market adoption of efficient technologies, it is usually assumed that the adoption is accelerated by ten years. Combined with the long lead times required to introduce commercial versions of technologies to the marketplace and generally slow turnover rates of building stock, the result is that many technologies are still in the rapidly increasing market penetration phase of adoption in 2030. See Elliott et al. (2004) for methodological assumptions.

The individual WIP subprograms differ significantly from each other in scale, timing, and impact. Taking investment effects into account, more than 70 percent of the positive job and earnings impacts come from only three subprograms: Training and Technical Assistance, Energy Star Compact Fluorescent Lights (CFLs), and Inventions and Innovations (I&I). Together, they account for 67% of the annual energy savings in 2030, 73% of the net savings, 72% of the net jobs, and 73% of the net earned income effects. These subprograms are large-scale subprograms that are expected to produce large energy savings relative to the investments required. The combined net annual savings from three subprograms is projected at over \$20 billion, even after investment costs in 2030 are subtracted. The savings alone from these subprograms generate an estimated 168,000 potential jobs (164,000 after investment effects).

The initial effect of the required investment is a short-run reduction in jobs and income in the economy, but the net effect is small. By the year 2005, the effects of energy savings already more than compensate for the effects of investment. Many of the WIP subprograms will have achieved only part of their ultimate market penetration at the end of the period. However, the overall positive net impact on employment (228,000 jobs) and earned income (\$3.1 billion) in the year 2030 still is a significant boost to the economy, an effect that would continue to grow after 2030 as savings increase and investments are completed.

**Table 2.2.** Effect of Subprogram Energy Savings from the EERE Weatherization and Intergovernmental Program on Potential National Employment

Code	Descriptor	Effect on Total National Employment (Thousands of Jobs)									
		2005	2006	2007	2008	2009	2010	2015	2020	2025	2030
<b>1. Weatherization Assistance Program</b>											
901	Weatherization Assistance	0.6	0.8	1.2	1.6	2.0	2.5	4.6	6.4	6.5	6.6
<b>2. State Energy Program</b>											
903	State Energy Program	Details in 9031-9037									
9031	SEP: Codes	0.0	0.0	0.1	0.3	0.4	0.6	1.6	2.6	3.5	4.4
9032	SEP: Energy Audits	0.5	0.6	0.8	1.1	1.3	1.5	2.2	2.5	2.4	2.3
9033	SEP: Rating & Labeling	0.3	0.4	0.6	0.8	1.0	1.2	2.4	3.5	3.5	3.6
9034	SEP: Workshops/Training	0.6	0.7	1.0	1.3	1.5	1.8	2.7	3.2	3.2	3.2
9035	SEP: Loans, Grants, & Incentives	0.2	0.3	0.4	0.5	0.7	0.8	1.7	2.4	2.5	2.5
9036	SEP: Retrofits	0.1	0.2	0.3	0.3	0.4	0.5	0.7	0.9	1.0	1.1
9037	SEP: Technical Assistance	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.4	0.4
<b>3. Gateway Deployment</b>											
1332	Rebuild America	0.5	0.4	0.7	0.9	1.2	1.5	1.8	1.5	1.2	1.1
135	Information Outreach	Details in 1351-1352									
1351	Information Outreach - Pilot Projects	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
1352	Information Outreach - Outreach Activities	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.5	0.8
1338	Building Codes Training and Assistance	0.1	0.5	1.4	2.9	4.3	6.0	16.8	27.9	37.7	46.8
422	Energy Star	Details in 4221-4228									
4221	Energy Star: Clothes Washers	1.6	1.3	1.6	1.8	2.1	2.3	3.3	4.2	5.2	6.3
4223	Energy Star: Refrigerators	0.1	0.1	0.2	0.3	0.4	0.5	0.9	1.3	1.7	2.2
4226	Energy Star: Electric Water Heaters	0.1	0.1	0.2	0.4	0.7	1.1	3.1	5.5	8.3	11.6
4225	Energy Star: Gas Water Heaters	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.5	0.8
4224	Energy Star: Room Air Cond	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.4	0.5
4228	Energy Star: CFLs	3.4	5.2	9.0	13.7	19.1	23.2	41.0	49.7	53.8	56.8
4222	Energy Star: Dishwashers	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.5	0.7
4227	Energy Star: Windows	0.4	0.8	1.4	2.3	3.4	4.6	12.0	17.4	19.3	19.5
<b>4. Non-Building</b>											
	Inventions and Innovations	0.2	0.4	0.6	0.9	1.4	2.2	13.4	31.8	47.1	64.2
<b>Weatherization and Intergovernmental Program</b>		<b>8.9</b>	<b>12.0</b>	<b>19.7</b>	<b>29.6</b>	<b>40.5</b>	<b>50.7</b>	<b>109.0</b>	<b>162.4</b>	<b>199.4</b>	<b>235.2</b>

**Table 2.3.** Effect of Subprogram Energy Savings from the EERE Weatherization and Intergovernmental Program on Potential National Earned Income

Code	Descriptor	Effect on Total National Earned Income (Million 2003\$)									
		2005	2006	2007	2008	2009	2010	2015	2020	2025	2030
<b>1. Weatherization Assistance</b>											
901	Weatherization Assistance	\$7.0	\$6.6	\$7.5	\$8.4	\$9.3	\$10.3	\$15.5	\$19.4	\$20.0	\$20.6
<b>2. State Energy Program</b>											
903	State Energy Program	Details in 9031-9037									
9031	SEP: Codes	0.2	0.8	2.4	4.9	7.1	9.6	26.0	43.4	58.8	73.2
9032	SEP: Energy Audits	6.9	10.1	14.2	18.0	21.4	24.4	36.1	41.0	39.3	36.6
9033	SEP: Rating & Labeling	4.3	7.1	10.3	14.0	17.9	22.1	44.3	64.8	65.6	66.6
9034	SEP: Workshops/Training	8.1	11.8	16.6	21.1	25.1	28.6	43.1	50.4	51.0	49.8
9035	SEP: Loans, Grants, & Incentives	3.0	4.9	7.2	9.7	12.5	15.3	30.9	45.1	45.7	46.3
9036	SEP: Retrofits	1.7	2.4	3.4	4.4	5.2	5.9	9.0	10.6	10.8	10.8
9037	SEP: Technical Assistance	0.4	0.5	0.8	1.0	1.2	1.3	2.1	2.6	2.9	3.1
<b>3. Gateway Deployment</b>											
1332	Rebuild America	6.0	7.3	11.4	15.7	20.1	24.5	28.8	24.2	20.0	17.1
135	Information Outreach	Details in 1351-1352									
1351	Information Outreach - Pilot Projects	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.4	0.6
1352	Information Outreach - Outreach Activities	0.0	0.0	0.0	0.1	0.1	0.1	0.4	1.1	2.1	3.4
1338	Building Codes Training and Assistance	1.8	7.8	23.4	50.0	73.4	102.7	286.8	476.1	642.5	796.4
422	Energy Star	Details in 4221-4228									
4221	Energy Star: Clothes Washers	11.4	9.2	11.0	12.8	14.7	16.5	23.3	28.6	34.8	41.7
4223	Energy Star: Refrigerators	1.2	1.7	2.8	3.9	5.0	6.2	11.7	16.0	21.0	26.9
4226	Energy Star: Electric Water Heaters	0.6	1.0	2.2	4.6	9.1	13.7	38.4	68.3	103.3	143.8
4225	Energy Star: Gas Water Heaters	0.0	-0.1	-0.2	-0.3	-0.4	-0.6	-1.6	-4.1	-6.7	-9.6
4224	Energy Star: Room Air Cond	0.7	0.8	0.9	1.2	1.4	1.6	2.7	3.9	5.1	6.6
4228	Energy Star: CFLs	37.2	66.4	114.3	173.2	242.2	294.0	520.2	631.6	685.0	723.2
4222	Energy Star: Dishwashers	0.4	0.6	0.8	1.0	1.3	1.5	2.8	4.3	6.1	8.1
4227	Energy Star: Windows	2.9	5.7	10.9	17.7	25.6	34.2	86.9	122.2	130.7	128.0
<b>4. Non-Building</b>											
	Inventions and Innovations	1.4	4.8	6.9	10.5	15.4	23.6	136.6	334.0	501.5	687.5
<b>Weatherization and Intergovernmental Program</b>		<b>\$95.1</b>	<b>\$149.7</b>	<b>\$246.7</b>	<b>\$372.0</b>	<b>\$507.7</b>	<b>\$635.7</b>	<b>\$1,344.0</b>	<b>\$1,983.8</b>	<b>\$2,440.0</b>	<b>\$2,880.6</b>

**Table 2.4.** Effect of the Full Investment Scenario on Potential National Employment

Code	Descriptor	Effect on Total National Employment (Thousands of Jobs)									
		2005	2006	2007	2008	2009	2010	2015	2020	2025	2030
<b>1. Weatherization Assistance Program</b>											
901	Weatherization Assistance	0.5	0.8	1.2	1.6	2.0	2.4	4.5	6.3	6.5	6.5
<b>2. State Energy Program</b>											
903	State Energy Program	Details in 9031-9037									
9031	SEP: Codes	0.0	0.0	0.1	0.2	0.4	0.5	1.5	2.5	3.4	4.3
9032	SEP: Energy Audits	-0.1	0.1	0.3	0.6	0.8	1.0	1.8	2.2	2.2	2.1
9033	SEP: Rating & Labeling	0.3	0.3	0.5	0.7	0.9	1.1	2.3	3.5	3.5	3.6
9034	SEP: Workshops/Training	-0.2	0.0	0.3	0.6	0.9	1.1	2.1	2.7	2.9	2.9
9035	SEP: Loans, Grants, & Incentives	0.2	0.2	0.3	0.5	0.6	0.8	1.6	2.4	2.4	2.5
9036	SEP: Retrofits	-0.1	-0.1	0.0	0.1	0.1	0.2	0.5	0.7	0.8	0.9
9037	SEP: Technical Assistance	-0.1	-0.1	0.0	0.0	0.0	0.0	0.1	0.2	0.3	0.3
<b>3. Gateway Deployment</b>											
1332	Rebuild America	0.4	0.3	0.5	0.8	1.1	1.3	1.8	1.5	1.2	1.1
135	Information Outreach	Details in 1351-1352									
1351	Information Outreach - Pilot Projects	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
1352	Information Outreach - Outreach Activities	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.4	0.7
1338	Building Codes Training and Assistance	0.1	0.4	1.3	2.7	4.2	5.8	16.6	27.6	37.4	46.6
422	Energy Star	Details in 4221-4228									
4221	Energy Star: Clothes Washers	0.9	0.7	0.9	1.2	1.4	1.7	2.5	3.4	4.3	5.4
4223	Energy Star: Refrigerators	-0.1	-0.1	-0.1	0.0	0.1	0.2	0.6	0.9	1.3	1.7
4226	Energy Star: Electric Water Heaters	0.0	-0.1	-0.1	-0.1	-0.1	0.3	2.3	4.7	7.5	10.8
4225	Energy Star: Gas Water Heaters	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.5	0.7
4224	Energy Star: Room Air Cond	-0.1	-0.1	-0.1	0.0	0.0	0.0	0.1	0.2	0.2	0.4
4228	Energy Star: CFLs	3.3	5.2	9.0	13.7	19.2	23.3	41.4	50.2	54.4	57.4
4222	Energy Star: Dishwashers	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.3	0.4	0.6
4227	Energy Star: Windows	0.3	0.6	1.2	2.1	3.1	4.3	12.0	17.4	19.3	19.5

Code	Descriptor	Effect on Total National Employment (Thousands of Jobs)									
		2005	2006	2007	2008	2009	2010	2011	2020	2025	2030
<b>4. Non-Building</b>											
	Inventions and Innovations	-0.8	-0.1	-0.1	-0.1	0.0	0.2	6.1	26.6	43.6	60.2
<b>Weatherization and Intergovernmental Program</b>		4.6	8.0	15.3	24.5	34.7	44.4	98.1	153.8	192.8	228.2

**Table 2.5.** Effect of the Full Investment Scenario on Potential National Earned Income

Code	Descriptor	Effect on Total National Earned Income (Million 2003\$)									
		2005	2006	2007	2008	2009	2010	2015	2020	2025	2030
<b>1. Weatherization Assistance Program</b>											
901	Weatherization Assistance	\$39.8	\$39.9	\$41.2	\$42.6	\$44.0	\$45.5	\$51.2	\$55.1	\$55.7	\$56.3
<b>2. State Energy Program</b>											
903	State Energy Program	Details in 9031-9037									
9031	SEP: Codes	0.3	1.4	3.7	7.3	9.2	11.9	29.2	46.4	61.6	75.7
9032	SEP: Energy Audits	26.6	29.3	32.8	36.2	39.0	41.5	50.4	52.6	47.9	43.2
9033	SEP: Rating & Labeling	6.0	8.8	11.8	15.8	19.8	24.1	46.6	65.2	65.7	66.6
9034	SEP: Workshops/Training	34.9	37.9	42.0	45.8	49.2	52.0	63.1	66.7	63.5	59.5
9035	SEP: Loans, Grants, & Incentives	4.8	6.7	8.9	11.5	14.2	17.1	32.6	46.8	47.4	48.0
9036	SEP: Retrofits	10.9	11.6	12.4	13.2	13.9	14.6	16.9	17.9	17.4	17.0
9037	SEP: Technical Assistance	4.0	4.2	4.3	4.5	4.7	4.9	5.4	5.8	5.9	6.1
<b>3. Gateway Deployment</b>											
1332	Rebuild America	58.7	48.3	65.3	73.3	76.9	84.6	28.8	24.2	20.0	17.1
135	Information Outreach	Details in 1351-1352									
1351	Information Outreach - Pilot Projects	0.1	0.2	0.2	0.3	0.3	0.4	1.0	2.2	3.5	4.5
1352	Information Outreach - Outreach Activities	0.3	0.7	0.9	1.1	1.3	1.7	4.3	9.1	14.7	18.9
1338	Building Codes Training and Assistance	4.3	18.7	49.1	94.4	114.2	150.6	350.3	535.0	696.8	847.4
422	Energy Star	Details in 4221-4228									
4221	Energy Star: Clothes Washers	25.6	23.6	25.5	27.4	29.3	31.3	41.1	47.4	54.4	62.4
4223	Energy Star: Refrigerators	12.2	17.4	24.0	25.3	26.6	28.1	35.3	40.5	46.5	53.3
4226	Energy Star: Electric Water Heaters	-1.1	-2.0	-2.9	-4.2	-6.1	-1.9	24.0	53.7	88.5	128.8

Code	Descriptor	Effect on Total National Earned Income (Million 2003\$)									
		2005	2006	2007	2008	2009	2010	2015	2020	2025	2030
4225	Energy Star: Gas Water Heaters	0.5	0.8	1.1	1.6	2.0	1.9	3.5	1.5	-0.7	-3.2
4224	Energy Star: Room Air Cond	19.7	19.9	20.1	20.0	19.9	20.0	24.6	26.6	28.8	31.2
4228	Energy Star: CFLs	42.1	70.5	116.7	172.8	238.1	287.4	500.3	603.8	653.4	689.2
4222	Energy Star: Dishwashers	6.0	6.2	6.3	6.6	6.9	7.3	9.2	11.1	13.2	15.6
4227	Energy Star: Windows	6.3	12.0	19.2	27.9	36.9	44.8	86.9	122.2	130.7	128.0
<b>4. Non-Building</b>											
	Inventions and Innovations	24.4	15.7	22.0	31.6	43.2	61.4	278.9	400.0	514.2	687.0
<b>Weatherization and Intergovernmental Program</b>		\$326.	\$371.	\$504.	\$654.	\$783.	\$929.	\$1,683.	\$2,233.	\$2,629.	\$3,052.
		4	6	6	8	6	1	6	8	2	6

## **2.3 Summary of Impacts**

The improvements in energy efficiency expected from EERE's Weatherization and Intergovernmental Program require a significant annual capital expense to achieve, as shown in Table 2.1. Initially, this annual investment is larger relative to annual savings. However, because the stock of energy efficient equipment and practices continues to grow, eventually the annual savings significantly outstrip the investment. By 2030 the energy savings alone, as shown in Table 2.1, are over \$33 billion per year, a significant national benefit. This does not count other obvious benefits, such as operational savings due to improved durability and efficiency of equipment, improved environmental quality from reduced burning of fossil fuels, and improved livability and increased value of structures. The impacts presented in Tables 2.2 through 2.5 illustrate the growing importance of energy efficiency through time to the U.S. economy as a result of these savings. By the year 2010, the net positive impacts are about 44,000 jobs and almost \$1 billion in earnings, but by 2030 the impacts grow to around 228,000 jobs and over \$3.1 billion, between 3 and 5 times larger.

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## **Attachment**

### **Detailed Calculations on the EERE Weatherization and Intergovernmental Program**

# **Attachment: Detailed Calculations on the EERE Weatherization and Intergovernmental Program**

## **Table Notes**

*Table A.1:* This table shows the effects of individual EERE Weatherization and Intergovernmental Program subprograms (identified by their 2005 GPRA codes and titles) on national incremental investment in energy-efficient technology or practices in individual years. Current investment spending is reported each year because current investment spending affects current employment and earned income. Also shown for each year and subprogram are the effects of the accumulated investments on current expenditures for oil, natural gas, and electricity. (Impacts on non-energy expenditures for items such as maintenance services generally have not been estimated and are not shown.) Current spending affects current employment and earned income. In most cases, the investment is expected to reduce net fuel expenditure, but sometimes consumption of one fuel will be altered by the change in consumption of another, resulting in an increased expenditure for that fuel. Thus, for example, for Subprogram Code 4228, Energy Star CFLs, Table A.1 shows the nation spending \$7.7 billion less for electricity for the residential sector, but spending slightly more for residential natural gas and oil in the year 2030 than it otherwise would have. This happens because adopting more efficient electric equipment results in less unintentional heating of conditioned space in the winter from lighting, requiring that slightly more heating fuels be burned.

*Table A.2:* Purchases from different industrial sectors of the economy are associated with different inter-industry sales of goods and services and different requirements for labor (e.g., an increase in purchases of plastic-framed efficient windows will not have an identical impact to increased purchases of more efficient refrigerators; because the production processes and materials used are different). Therefore, to estimate the impact of a given investment, the investment must be allocated to the sectors from which the investing business or household buys equipment and services. This table shows how the incremental investment premium associated with each EERE Weatherization and Intergovernmental Program subprogram is assumed to be distributed among industrial sectors. The assumed allocation in each case was made in consultation with the GPRA researchers, based on subprogram information provided by DOE subprogram managers, as well as the characteristics of the technologies that are expected to be adopted as a result of the subprogram. For example, Subprogram 4228, Energy Star CFLs, is expected to result in incremental investments, divided one-half each to the two manufacturing sectors that will produce the equipment: Lighting Bulbs and Tubes and Other Lighting and Wiring. These units are expected to be more expensive to manufacture than are equivalent units using conventional technology. Because no incremental installation cost or retail markup is expected, the entire premium results from the fact that these units are expected to be more expensive to manufacture than those with the conventional technology. Contrast this with the much more complex and fragmented impact for Rebuild America, where the additional investment is divided among several industries that manufacture equipment and the construction sector.

**Table A.1.** EERE Weatherization and Intergovernmental Program: Subprogram Investment Costs and Energy Savings, by Year (Million \$2003)

Subprogram and Category		Fiscal Year					
		2005	2010	2015	2020	2025	2030
<b>1. Weatherization Assistance</b>							
	901 Weatherization Assistance						
	Investment	\$531.6	\$569.5	\$577.6	\$577.6	\$577.6	\$577.6
	Expenditures on Oil, Residential	-\$18.8	-\$118.2	-\$228.1	-\$320.6	-\$333.2	-\$343.7
	Expenditures on Oil, Commercial	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
	Expenditures on Natural Gas, Residential	-\$40.8	-\$245.7	-\$450.0	-\$628.8	-\$634.9	-\$635.8
	Expenditures on Natural Gas, Commercial	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
	Expenditures on Electricity, Residential	-\$20.0	-\$122.4	-\$229.3	-\$317.0	-\$321.9	-\$324.1
	Expenditures on Electricity, Commercial	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
	Change in Energy Expenditures	-\$79.5	-\$486.3	-\$907.3	-\$1,266.3	-\$1,290.0	-\$1,303.7
<b>2. State Energy Program</b>							
	903 State Energy Program						
	9031 SEP: Codes						
	Investment	\$4.7	\$73.6	\$101.7	\$97.2	\$88.4	\$83.4
	Expenditures on Oil, Residential	\$0.0	-\$1.7	-\$4.5	-\$7.1	-\$9.8	-\$12.5
	Expenditures on Oil, Commercial	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
	Expenditures on Natural Gas, Residential	-\$0.2	-\$7.3	-\$20.0	-\$32.9	-\$45.4	-\$57.8
	Expenditures on Natural Gas, Commercial	\$0.1	\$5.7	\$15.3	\$26.4	\$36.1	\$45.2
	Expenditures on Electricity, Residential	-\$0.2	-\$11.5	-\$31.4	-\$50.3	-\$68.2	-\$85.9
	Expenditures on Electricity, Commercial	-\$1.0	-\$63.5	-\$171.4	-\$287.4	-\$389.5	-\$483.9
	Change in Energy Expenditures	-\$1.3	-\$78.4	-\$212.0	-\$351.3	-\$476.8	-\$594.9
	9032 SEP: Energy Audits						
	Investment	\$640.0	\$555.3	\$467.7	\$378.3	\$281.0	\$215.7
	Expenditures on Oil, Residential	-\$0.1	-\$0.2	-\$0.3	-\$0.4	-\$0.6	-\$0.7
	Expenditures on Oil, Commercial	-\$0.6	-\$3.0	-\$5.1	-\$6.2	-\$6.1	-\$5.9
	Expenditures on Natural Gas, Residential	-\$0.2	-\$1.3	-\$2.4	-\$3.5	-\$4.5	-\$5.5
	Expenditures on Natural Gas, Commercial	-\$7.3	-\$40.8	-\$65.1	-\$81.4	-\$82.2	-\$80.8
	Expenditures on Electricity, Residential	-\$0.3	-\$1.9	-\$3.2	-\$4.6	-\$5.8	-\$7.0

Subprogram and Category	Fiscal Year					
	2005	2010	2015	2020	2025	2030
Expenditures on Electricity, Commercial	-\$38.2	-\$171.5	-\$253.0	-\$286.8	-\$273.8	-\$254.5
Change in Energy Expenditures	-\$46.7	-\$218.8	-\$329.0	-\$382.9	-\$372.9	-\$354.3
9033 SEP: Rating & Labeling						
Investment	\$54.0	\$64.7	\$74.6	\$14.2	\$2.8	\$2.8
Expenditures on Oil, Residential	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Oil, Commercial	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Natural Gas, Residential	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Natural Gas, Commercial	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Electricity, Residential	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Electricity, Commercial	-\$24.9	-\$158.5	-\$318.5	-\$465.3	-\$471.5	-\$478.2
Change in Energy Expenditures	-\$24.9	-\$158.5	-\$318.5	-\$465.3	-\$471.5	-\$478.2
9034 SEP: Workshops/Training						
Investment	\$870.2	\$759.9	\$648.0	\$529.9	\$404.8	\$316.2
Expenditures on Oil, Residential	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Oil, Commercial	-\$0.6	-\$3.5	-\$6.1	-\$7.6	-\$7.8	-\$7.8
Expenditures on Natural Gas, Residential	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Natural Gas, Commercial	-\$11.1	-\$62.1	-\$100.3	-\$128.0	-\$134.9	-\$137.2
Expenditures on Electricity, Residential	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Electricity, Commercial	-\$44.9	-\$202.2	-\$304.0	-\$354.9	-\$358.8	-\$350.0
Change in Energy Expenditures	-\$56.6	-\$267.8	-\$410.4	-\$490.5	-\$501.6	-\$495.0
9035 SEP: Loans						
Investment	\$56.4	\$56.4	\$56.4	\$56.4	\$56.4	\$56.4
Expenditures on Oil, Residential	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Oil, Commercial	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Natural Gas, Residential	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Natural Gas, Commercial	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Electricity, Residential	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Electricity, Commercial	-\$17.4	-\$110.2	-\$221.6	-\$323.8	-\$328.1	-\$332.7
Change in Energy Expenditures	-\$17.4	-\$110.3	-\$221.7	-\$323.8	-\$328.1	-\$332.7
9036 SEP: Retrofits						
Investment	\$299.4	\$282.1	\$257.9	\$236.1	\$213.2	\$199.8
Expenditures on Oil, Residential	-\$0.5	-\$1.7	-\$2.1	-\$3.4	-\$4.4	-\$5.6

Subprogram and Category	Fiscal Year					
	2005	2010	2015	2020	2025	2030
Expenditures on Oil, Commercial	-\$0.1	-\$0.6	-\$1.0	-\$1.3	-\$1.2	-\$1.2
Expenditures on Natural Gas, Residential	-\$1.8	-\$10.5	-\$18.8	-\$27.4	-\$35.5	-\$43.9
Expenditures on Natural Gas, Commercial	-\$1.5	-\$8.3	-\$13.3	-\$16.6	-\$16.8	-\$16.5
Expenditures on Electricity, Residential	-\$2.6	-\$15.0	-\$25.6	-\$36.3	-\$45.7	-\$55.1
Expenditures on Electricity, Commercial	-\$7.8	-\$35.0	-\$51.5	-\$58.4	-\$55.8	-\$51.8
Change in Energy Expenditures	-\$14.3	-\$71.1	-\$112.3	-\$143.3	-\$159.3	-\$174.1
9037 SEP: Technical Assistance						
Investment	\$118.6	\$114.2	\$109.3	\$104.5	\$99.7	\$95.8
Expenditures on Oil, Residential	-\$0.3	-\$1.0	-\$1.2	-\$1.9	-\$2.5	-\$3.2
Expenditures on Oil, Commercial	\$0.0	-\$0.1	-\$0.2	-\$0.2	-\$0.2	-\$0.2
Expenditures on Natural Gas, Residential	-\$1.0	-\$6.0	-\$10.7	-\$15.5	-\$20.2	-\$24.9
Expenditures on Natural Gas, Commercial	-\$0.2	-\$1.3	-\$2.1	-\$2.6	-\$2.6	-\$2.6
Expenditures on Electricity, Residential	-\$1.5	-\$8.5	-\$14.5	-\$20.6	-\$25.9	-\$31.3
Expenditures on Electricity, Commercial	-\$1.2	-\$5.5	-\$8.0	-\$9.1	-\$8.7	-\$8.1
Change in Energy Expenditures	-\$4.3	-\$22.3	-\$36.7	-\$50.0	-\$60.1	-\$70.2
<b>3. Gateway Deployment</b>						
1332 Rebuild America						
Investment	\$781.2	\$891.9	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Oil, Residential	-\$0.9	-\$5.9	-\$6.7	-\$6.6	-\$6.2	-\$5.9
Expenditures on Oil, Commercial	-\$0.5	-\$3.1	-\$4.0	-\$3.4	-\$2.8	-\$2.4
Expenditures on Natural Gas, Residential	-\$4.3	-\$33.3	-\$44.7	-\$44.9	-\$44.2	-\$44.1
Expenditures on Natural Gas, Commercial	-\$6.4	-\$45.7	-\$59.4	-\$55.4	-\$48.5	-\$43.8
Expenditures on Electricity, Residential	-\$16.6	-\$122.2	-\$163.4	-\$162.4	-\$162.2	-\$162.4
Expenditures on Electricity, Commercial	-\$30.3	-\$173.3	-\$203.2	-\$170.7	-\$140.7	-\$120.3
Change in Energy Expenditures	-\$59.0	-\$383.5	-\$481.5	-\$443.4	-\$404.7	-\$378.9
135 Information Outreach						
1351 Information Outreach - Pilot Projects						
Investment	\$1.2	\$6.5	\$16.5	\$34.3	\$53.7	\$66.3
Expenditures on Oil, Residential	\$0.0	\$0.0	-\$0.1	-\$0.3	-\$0.6	-\$1.0
Expenditures on Oil, Commercial	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Natural Gas, Residential	\$0.0	-\$0.2	-\$0.8	-\$2.2	-\$4.5	-\$7.8
Expenditures on Natural Gas, Commercial	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0

Subprogram and Category	Fiscal Year					
	2005	2010	2015	2020	2025	2030
Expenditures on Electricity, Residential	\$0.0	-\$0.3	-\$1.1	-\$2.9	-\$5.9	-\$9.8
Expenditures on Electricity, Commercial	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Change in Energy Expenditures	\$0.0	-\$0.6	-\$2.1	-\$5.4	-\$11.0	-\$18.5
1352 Information Outreach - Outreach Activities						
Investment	\$4.6	\$26.0	\$66.0	\$137.0	\$214.9	\$265.0
Expenditures on Oil, Residential	\$0.0	-\$0.3	-\$0.7	-\$1.9	-\$3.9	-\$6.7
Expenditures on Oil, Commercial	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Natural Gas, Residential	-\$0.1	-\$2.2	-\$7.7	-\$20.5	-\$42.5	-\$72.4
Expenditures on Natural Gas, Commercial	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Electricity, Residential	-\$0.1	-\$2.4	-\$8.1	-\$20.3	-\$40.6	-\$66.9
Expenditures on Electricity, Commercial	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Change in Energy Expenditures	-\$0.2	-\$4.9	-\$16.5	-\$42.7	-\$87.0	-\$146.1
1338 Building Codes Training and Assistance						
Investment	\$43.3	\$820.0	\$1,085.5	\$1,006.0	\$927.0	\$870.6
Expenditures on Oil, Residential	-\$0.3	-\$15.3	-\$40.9	-\$63.9	-\$87.9	-\$112.7
Expenditures on Oil, Commercial	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Natural Gas, Residential	-\$1.4	-\$65.9	-\$179.8	-\$296.3	-\$408.2	-\$520.4
Expenditures on Natural Gas, Commercial	\$0.8	\$57.3	\$160.1	\$274.0	\$371.8	\$463.4
Expenditures on Electricity, Residential	-\$1.8	-\$103.6	-\$282.4	-\$452.6	-\$613.8	-\$773.0
Expenditures on Electricity, Commercial	-\$9.2	-\$686.1	-\$1,920.7	-\$3,200.5	-\$4,320.5	-\$5,351.4
Change in Energy Expenditures	-\$11.9	-\$813.5	-\$2,263.7	-\$3,739.2	-\$5,058.6	-\$6,294.1
422 Energy Star						
4221 Energy Star: Clothes Washers						
Investment	\$348.0	\$363.1	\$436.8	\$458.5	\$481.4	\$505.4
Expenditures on Oil, Residential	-\$10.6	-\$24.2	-\$33.6	-\$41.7	-\$49.8	-\$58.1
Expenditures on Oil, Commercial	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Natural Gas, Residential	-\$58.8	-\$137.9	-\$196.7	-\$262.1	-\$329.2	-\$400.9
Expenditures on Natural Gas, Commercial	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Electricity, Residential	-\$101.9	-\$231.5	-\$327.8	-\$412.5	-\$506.3	-\$610.9
Expenditures on Electricity, Commercial	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Change in Energy Expenditures	-\$171.4	-\$393.6	-\$558.1	-\$716.3	-\$885.3	-\$1,069.8
4223 Energy Star: Refrigerators						

Subprogram and Category		Fiscal Year					
		2005	2010	2015	2020	2025	2030
	Investment	\$192.8	\$384.2	\$413.6	\$429.5	\$445.9	\$462.9
Expenditures on Oil, Residential		\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Oil, Commercial		\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Natural Gas, Residential		\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Natural Gas, Commercial		\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Electricity, Residential		-\$9.4	-\$66.5	-\$125.6	-\$172.4	-\$226.3	-\$289.0
Expenditures on Electricity, Commercial		\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Change in Energy Expenditures		-\$9.4	-\$66.5	-\$125.6	-\$172.4	-\$226.3	-\$289.0
	4226 Energy Star: Electric Water Heaters						
	Investment	\$17.8	\$167.0	\$153.7	\$155.8	\$157.9	\$160.0
Expenditures on Oil, Residential		\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Oil, Commercial		\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Natural Gas, Residential		\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Natural Gas, Commercial		\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Electricity, Residential		-\$4.8	-\$147.8	-\$412.6	-\$734.1	-\$1,110.9	-\$1,546.1
Expenditures on Electricity, Commercial		\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Change in Energy Expenditures		-\$4.8	-\$147.8	-\$412.6	-\$734.1	-\$1,110.9	-\$1,546.1
	4225 Energy Star: Gas Water Heaters						
	Investment	\$10.8	\$51.3	\$106.7	\$115.2	\$124.1	\$133.4
Expenditures on Oil, Residential		\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Oil, Commercial		\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Natural Gas, Residential		-\$0.6	-\$13.3	-\$38.0	-\$94.6	-\$156.5	-\$224.2
Expenditures on Natural Gas, Commercial		\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Electricity, Residential		\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Electricity, Commercial		\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Change in Energy Expenditures		-\$0.6	-\$13.3	-\$38.0	-\$94.6	-\$156.5	-\$224.2
	4224 Energy Star: Room Air Conditioners						
	Investment	\$382.2	\$370.2	\$438.2	\$456.0	\$474.5	\$493.6
Expenditures on Oil, Residential		\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Oil, Commercial		\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Natural Gas, Residential		\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Natural Gas, Commercial		\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0

Subprogram and Category	Fiscal Year					
	2005	2010	2015	2020	2025	2030
Expenditures on Electricity, Residential	-\$5.4	-\$16.9	-\$29.5	-\$41.6	-\$55.2	-\$71.4
Expenditures on Electricity, Commercial	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Change in Energy Expenditures	-\$5.4	-\$16.9	-\$29.5	-\$41.6	-\$55.2	-\$71.4
4228 Energy Star: CFLs						
Investment	\$102.7	-\$137.6	-\$415.7	-\$580.4	-\$658.6	-\$710.0
Expenditures on Oil, Residential	\$0.8	\$5.4	\$6.6	\$8.5	\$8.5	\$8.7
Expenditures on Oil, Commercial	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Natural Gas, Residential	\$5.6	\$62.9	\$119.5	\$158.7	\$182.0	\$203.2
Expenditures on Natural Gas, Commercial	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Electricity, Residential	-\$299.0	-\$3,133.2	-\$5,536.7	-\$6,715.2	-\$7,277.2	-\$7,677.9
Expenditures on Electricity, Commercial	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Change in Energy Expenditures	-\$292.6	-\$3,065.0	-\$5,410.6	-\$6,548.1	-\$7,086.6	-\$7,466.0
4222 Energy Star: Dishwashers						
Investment	\$115.2	\$120.7	\$132.9	\$139.8	\$146.9	\$154.3
Expenditures on Oil, Residential	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Oil, Commercial	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Natural Gas, Residential	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Natural Gas, Commercial	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Electricity, Residential	-\$3.6	-\$16.0	-\$30.1	-\$46.6	-\$66.0	-\$87.5
Expenditures on Electricity, Commercial	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Change in Energy Expenditures	-\$3.6	-\$16.0	-\$30.1	-\$46.6	-\$66.0	-\$87.5
4227 Energy Star: Windows						
Investment	\$64.7	\$197.5	\$0.0	\$0.0	\$0.0	\$0.0
Expenditures on Oil, Residential	-\$2.0	-\$24.7	-\$45.4	-\$74.5	-\$82.6	-\$86.3
Expenditures on Oil, Commercial	-\$0.1	-\$2.8	-\$16.3	-\$40.4	-\$59.2	-\$64.6
Expenditures on Natural Gas, Residential	-\$12.8	-\$253.1	-\$664.6	-\$958.6	-\$1,063.2	-\$1,089.9
Expenditures on Natural Gas, Commercial	-\$0.4	-\$16.0	-\$94.0	-\$248.6	-\$358.3	-\$379.4
Expenditures on Electricity, Residential	-\$24.9	-\$466.1	-\$1,182.9	-\$1,654.1	-\$1,815.3	-\$1,844.0
Expenditures on Electricity, Commercial	-\$0.2	-\$4.1	-\$15.2	-\$19.0	\$11.2	\$46.6
Change in Energy Expenditures	-\$40.5	-\$766.6	-\$2,018.4	-\$2,995.1	-\$3,367.3	-\$3,417.5
Investments and Innovations						
Investment	\$502.5	\$1,028.6	\$3,716.9	\$2,492.0	\$1,626.3	\$1,803.3

Subprogram and Category	Fiscal Year					
	2005	2010	2015	2020	2025	2030
Expenditures on Oil, Industrial	-\$6.2	-\$62.8	-\$403.0	-\$864.4	-\$1,173.6	-\$1,467.7
Expenditures on Natural Gas, Industrial	-\$4.0	-\$80.1	-\$511.6	-\$1,276.8	-\$2,117.5	-\$3,215.5
Expenditures on Electricity, Industrial	-\$5.5	-\$130.3	-\$750.0	-\$1,818.9	-\$2,663.8	-\$3,566.2
Change in Energy Expenditures	-\$15.7	-\$273.2	-\$1,664.5	-\$3,960.2	-\$5,954.9	-\$8,249.4
<b>Weatherization and Intergovernmental Program</b>						
Investment	\$5,141.9	\$6,764.9	\$8,444.4	\$6,838.0	\$5,718.1	\$5,752.6
Expenditures on Oil, Residential	-\$32.8	-\$187.7	-\$356.9	-\$513.9	-\$572.9	-\$627.8
Expenditures on Oil, Commercial	-\$1.8	-\$13.1	-\$32.6	-\$59.0	-\$77.4	-\$82.1
Expenditures on Oil, Industrial	-\$6.2	-\$62.8	-\$403.0	-\$864.4	-\$1,173.6	-\$1,467.7
Expenditures on Natural Gas, Residential	-\$116.3	-\$714.1	-\$1,514.7	-\$2,228.6	-\$2,606.7	-\$2,924.4
Expenditures on Natural Gas, Commercial	-\$26.1	-\$111.2	-\$158.7	-\$232.1	-\$235.5	-\$151.7
Expenditures on Natural Gas, Industrial	-\$4.0	-\$80.1	-\$511.6	-\$1,276.8	-\$2,117.5	-\$3,215.5
Expenditures on Electricity, Residential	-\$492.4	-\$4,465.8	-\$8,404.1	-\$10,843.4	-\$12,347.0	-\$13,642.1
Expenditures on Electricity, Commercial	-\$175.1	-\$1,609.9	-\$3,467.3	-\$5,176.0	-\$6,336.3	-\$7,384.2
Expenditures on Electricity, Industrial	-\$5.5	-\$130.3	-\$750.0	-\$1,818.9	-\$2,663.8	-\$3,566.2
Change in Energy Expenditures	-\$860.2	-\$7,375.2	-\$15,598.9	-\$23,013.2	-\$28,130.6	-\$33,061.7

**Table A.2.** EERE Weatherization and Intergovernmental Program: Allocation of Subprogram Investment Costs by Sector

Code	Name	Maximum Incremental Investment (2003\$/year)	Percent Distribution	Comments
<b>1. Weatherization Assistance</b>				
901	Weatherization Assistance	\$577.6	Residential Construction 50%; 8.3% each to Millwork, Paint and Allied Products, Rubber and Plastic Products, Other Glass Products, Mineral Wool, Metal Doors	Weatherization mostly involves incremental expenditures on residential construction, plus increases in costs of window and door components and insulation.
<b>2. State Energy Program</b>				
903	State Energy Program			
9031	SEP: Codes	\$101.7	Complex	Same proportions as in all U.S. investment
9032	SEP: Energy Audits	\$640.0	Complex	Same proportions as in all U.S. investment
9033	SEP: Rating & Labeling	\$74.6	Complex	Same proportions as in all U.S. investment
9034	SEP: Workshops/Training	\$870.2	Complex	Same proportions as in all U.S. investment
9035	SEP: Loans	\$56.4	Complex	Same proportions as in all U.S. investment
9036	SEP: Retrofits	\$299.4	Complex	Same proportions as in all U.S. investment
9037	SEP: Technical Assistance	\$118.6	Complex	Same proportions as in all U.S. investment

<b>3. Gateway Deployment</b>				
1332	Rebuild America	\$891.9	Commercial Construction 32.5%; Other Non-residential Construction 11.4%;Machinery and Equipment 11.5%; Commercial Refrigeration and Heating Equipment 10%; Wholesale and Retail Trade 7.6%, "Other" Manufacturing 5.5%; Other Structural Metal Products 5.4%; Sheet Metal Work 5.1%; Computer and Office Equipment 4.4%; Communications Equipment 3%; Measuring and Control Devices 1.3%; and Less than 0.5% each on Other Service Equipment, Power Equipment, Motors and Generators, Relays and Industrial Controls, Other Electrical Equipment, Other Fabricated Metal Products, Engines and Turbines, Misc. Electric Supplies.	Approximately the same proportions as for U.S. capital investment as a whole, except that household and transportation equipment are excluded and the extra investment is put into non-residential construction.
135	Information Outreach			
1351	Information Outreach - Pilot Projects	\$66.3	Residential Construction 10.4%; Commercial Construction 22.1%; all others same as for Rebuild America	Information Outreach is a residential and commercial Program. It is assumed that 2/3 of the building construction cost increment will be commercial
1352	Information Outreach - Outreach Activities	\$265.0	Residential Construction 10.4%; Commercial Construction 22.1%; all others same as for Rebuild America	Information Outreach is a residential and commercial Program. It is assumed that 2/3 of the building construction cost increment will be commercial
1338	Building Codes Training and Assistance	\$1,085.5	Same as Information Outreach	Same as Information Outreach
422	Energy Star			
4221	Energy Star: Clothes Washers	\$505.4	Household Laundry Equipment 100%	This sector is the manufacturing sector for the advanced equipment
4223	Energy Star: Refrigerators	\$462.9	Household Refrigerators and Freezers 100%	This sector is the manufacturing sector for the advanced equipment
4226	Energy Star: Electric Water Heaters	\$167.0	Household Appliances, Not Elsewhere Classified 100%	This sector is the manufacturing sector for the advanced equipment

4225	Energy Star: Gas Water Heaters	\$133.4	Household Appliances, Not Elsewhere Classified 100%	This sector is the manufacturing sector for the advanced equipment
4224	Energy Star: Room Air Conditioners	\$493.6	Household Appliances, Not Elsewhere Classified 100%	This sector is the manufacturing sector for the advanced equipment
4228	Energy Star: CFLs	\$102.7	Lighting Bulbs and Tubes 50%; Other Lighting and Wiring 50%	These sectors are the manufacturing sectors for the advanced equipment
4222	Energy Star: Dishwashers	\$154.3	Household Appliances, Not Elsewhere Classified 100%	This sector is the manufacturing sector for the advanced equipment
4227	Energy Star: Windows	\$211.6	Other Glass Products 80%; Other Wood Products 5%;Plastics 5%; Metal Doors, etc.5%, Other Fabricated Metal Products 5%	These sectors are the manufacturing sectors for the advanced equipment. Most of the additional cost is expected in the glass and coatings, but some additional cost is expected in the frames.
	Inventions and Innovations	\$3,716.9	13 components.	Separate detailed analysis was done for each of 13 components. Most investment was in new machinery, equipment, and motors.

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