PA Consulting Group

State of Wisconsin Department of Administration Division of Energy

Focus on Energy Public Benefits Evaluation

Economic Development Benefits: FY07 Economic Impacts Report

Final: February 23, 2007

Evaluation Contractor: PA Government Services Inc.

Prepared by: Lisa Petraglia, Glen Weisbrod and Brian Baird
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This report is the property of the State of Wisconsin, Wisconsin Department of Administration, Division of Energy, and was funded through the Wisconsin Focus on Energy Program.

EXECUTIVE SUMMARY

OBJECTIVE OF THIS REPORT

This report is a 2006 update of the economic impact study conducted in 2003, to reflect changes in the magnitude and nature of the Wisconsin Focus on Energy programs.

One of the goals of Wisconsin Focus on Energy (Focus) programs is to support economic development. In general, economic development is a process of enhancing the state's economy by supporting the growth, retention, and attraction of business activity in the state. By strengthening and diversifying the state's economic base, Wisconsin residents can enjoy better job opportunities, higher incomes, and higher living standards. Economic prosperity can also increase revenue for state and local government. In an era of global economic change and uncertainty, it is particularly important to see that programs such as Focus are indeed addressing these economic development goals.

This report examines economic development impacts of Focus on Energy programs as of 2006. It is one part of a multi-faceted suite of program evaluation reports. It describes the nature and magnitude of economic development impacts by tracing program effects on income and spending in the state, and by calculating the larger long-term effects on the net growth of business and generation of jobs in the Wisconsin economy. These results are measured by four alternative views—business sales, value added (Gross Regional Product), jobs, and income. The report examines the size of these impacts, their timing, and their characteristics.

It is important to note that economic development impact is one of many program impacts. Other program impacts include reductions in energy use, consumer non-energy benefits, environmental benefits, and cost effectiveness. There is some inter-relationship among these various types of program impacts, though they are measured differently and are associated with different policy objectives. Other impacts are examined in other reports in this series.

WHAT ARE THE FOCUS ON ENERGY PROGRAMS?

Wisconsin "Focus on Energy" is an integrated set of programs designed to help Wisconsin residents, businesses, farms, schools, and local governments identify and install energy and cost-saving efficiency measures, as well as renewable energy sources. The program offers a combination of information, training, energy audits, installation assistance, and incentives. The specific program features differ among various types of users and various types of energy-saving equipment or renewable energy equipment.

Initiated in April 2001, Focus programs are intended to produce both short-term and long-term benefits for Wisconsin residents. In the short term, Focus programs are designed to result in the participating customers gaining the benefits of purchasing more energy-efficient equipment: reduced energy usage, reduced energy bills, and more income to spend on other needs. This also reduces demand for electricity generated during the peak hours of the day and adds to electric system reliability (while also helping to avoid price spikes). In addition, Focus has the long-term policy objective of transforming Wisconsin's energy efficiency and renewable energy markets over time, so that all Wisconsin energy consumers will eventually realize benefits from a marketplace where the basic level of energy efficiency in all kinds of energy-using devices is greater than it was previously.

The program is delivered with participation of the state's energy utilities and "program allies"—trade allies around the state that offer energy-efficient equipment and services. (They include manufacturers, distributors, contractors, retailers, architects, engineers, and other professionals who produce, sell, design, and/or install energy efficiency and renewable energy measures). Business participants become "program partners."

Given broad policy objectives associated with Focus programs, there are many types of benefits to be assessed. This report focuses solely on one of them—impacts on the Wisconsin economy.

PROGRAM CHANGES

Since its launch, Focus on Energy programs have changed with respect to funding and implementation. First, beginning in July 2004, administration of the Business Program was transferred from the Milwaukee School of Engineering to the Wisconsin Energy Conservation Corporation (WECC). This program was also modified to have a more technology-specific focus, and the construction program was dropped. Second, the Biogas and Thermal Energy programs shifted out of the Business portfolio and into Focus' Renewable Energy program Finally, and most significantly, the Wisconsin State biennial budget for 2003–2005 reduced funding by approximately 40 percent as compared to initial expectations (see *Semiannual Report, FY06, Year End*).

Overall, the continuing program changes have shifted the mix and magnitude of some incentives and technologies, but they have not changed the overall program concept. Most importantly for purposes of economic impact analysis, the program still supports the state's economic development in the same basic ways as it did at the time of the 2003 report (as discussed in the text that follows), The major difference in economic impact is that Focus is now operating at a reduced funding level, although the shift in levels of impact is not in direct proportion to funding changes. In addition, the Wisconsin Home Energy Assistance Program (WHEAP), which administers the federally funded Low Income Home Energy Assistance Program (LIHEAP), is no longer included in the Focus economic impact evaluation. The economic impacts tied to the low income weatherization program (WAP) are presented in a separate report.

HOW DOES FOCUS AFFECT THE ECONOMY?

Focus directly affects participating business and residential customers' energy costs. Decreasing energy costs through increased efficiency and conservation can make business operations more profitable and can also leave more money in families' pockets (to spend on other desired purchases). By lowering costs of doing business, it also makes Wisconsin a more competitive location for additional business attraction, investment, and expansion.

Focus also creates other direct and indirect impacts throughout Wisconsin's economy. Wisconsin businesses are major manufacturers of heating and air conditioning equipment, motors, and controls. Focus stimulates sales for these industries in Wisconsin, as well as the development of solar, wind, and biomass energy production within the state. At the same time as it is increasing the flow of dollars staying within Wisconsin, it is also reducing the outflow of money from the state associated with importation of coal and natural gas. Also there are efficiencies for builders/remodelers who use premium energy efficient products (and the retailers who sell them) that return through increased profitability. This latter effect on firms that deliver energy efficient technology into homes, work sites, and institutions is currently not

quantified by Focus' team of evaluators, and therefore not part of the economic impact assessment. Each of these effects produces jobs, increases personal income, and overall makes the Wisconsin economy more efficient and competitive.

There are also cost effects. When customers make energy-efficiency purchases that they might not have made, they are also spending some of their own money, because Focus pays only part of the extra cost of buying energy-efficient equipment. The Public Benefits charge that funds Focus is a cost to customers, although not a new one, since customers have paid the cost of demand-side management programs through utility rates for a number of years.

In general, Focus leads to a wide set of shifts in spending by government, households, and businesses. The result is that some sectors of the economy gain sales while others do not. For instance, reductions in the growth of demand for traditional energy sources can mean less growth (or actual reductions) in business activity and jobs associated with construction and operation of coal-fired power plants, and retail sales from those plants. On the other hand, this is offset by increased business sales and jobs associated with energy-efficient products and services made in Wisconsin. The report covers all aspects of changes in the economy and describes the types of jobs and industries where there are changes in business sales, value added, employment, and income attributable to Focus on Energy.

HOW DO WE ANALYZE IMPACTS ON WISCONSIN'S ECONOMY?

To analyze the economic development impacts of the Focus on Energy programs, the following three steps are performed for two funding scenarios (low and high):

(1) Document Direct Effects. The first step is to track the net direct effects of the program. These are changes in program-related spending by Focus and program participants, household, and business savings in energy costs, and spending on new equipment. Here, careful attention is given to establishing net changes *compared to what would otherwise be expected to occur without the program*.

(2) Apply the Economic Model. The second step is to apply the REMI economic model of Wisconsin. This is a tool used to trace how the direct effects (from step 1) lead to changes in household and business costs, spending and sales patterns in the state. In our analysis, we apply the Wisconsin statewide REMI model to track impacts including:

1. Lower business operating costs
2. Lower household living costs
3. Reduced outflow of dollars to purchase out-of-state coal and natural gas
4. Increase in dollars going to equipment manufacturers and installers in Wisconsin
5. Emissions benefits from NO_x and SO_x reductions (monetized)
6. Non-energy benefits (monetized)
7. Indirect effects on orders for business suppliers and induced effects of workers re-spending their income within Wisconsin.

Results of the REMI model represent changes in the state economy over time. The key indicators of change in the state's economy are changes in business sales, jobs, personal income, and value added (gross regional product) in Wisconsin.

(3) Analyze of Policy Implications. The third and final step in the analysis process is to apply results of the economic model (from step 2) to assess how the forecast program impacts translate into economic development changes. These include:

1. Diversified business growth
2. Expanded mix of those jobs available to Wisconsin residents
3. Shifts in the nature and size of impacts occurring over time
4. Shifts in the competitiveness of Wisconsin as a place to live and to locate a business
5. Changes in the incidence of economic impacts, in terms of urban and rural locations.

This general approach for conducting economic impact analysis, using a regional economic model, has been proven in use around the country including studies of the economic impacts of energy programs and policies in over 20 states.

SUMMARY OF ECONOMIC ANALYSIS RESULTS

The REMI economic model generated estimates of economic impacts of Focus on Energy from its inception in 2002 through 2026. Program funding will continue through 2012 after which measure-related savings persist with some decay and market transformation effects begin to take hold. Since a key feature of Focus programs is energy cost savings for households and businesses, and since those savings continue over the lifetime of installed equipment, it is necessary to measure economic impacts over a period of time. This analysis examined Focus programs assuming a ten-year implementation span. However, some economic impacts will continue for an additional 15 years beyond any active program period.

Tables ES-1a and ES-1b summarize the economic analysis results for all Focus programs combined—including Residential, Renewables, and Business programs for low and high funding scenarios. The tables show the projected economic impacts for selected years and periods. They also show how program impacts accumulate over a 25 year interval. These economic impacts are presented in terms of (1) the number of job years created for Wisconsin residents, (2) the sales generated for Wisconsin businesses, (3) the value added portion of those sales, and (4) disposable income generated for Wisconsin residents.

The tables also summarize impacts when both the Residential and Business programs include expected "market effects" beyond what the program instigates in terms of increases in household and business purchases of energy efficient products, adoption of energy efficient practices, and the ensuing energy savings. These are effects in the economy without formal program participation. Market effects reflect the behavior of customers, retailers, wholesalers, and manufacturers who are influenced by Focus programs to take additional actions on their own to increase the supply and use of energy-efficient equipment *that they would not have done without the existence of the program.* Focus programs specifically incorporate information dissemination, training, and market intervention elements which are intended to encourage such market effects. It is reasonable to expect that such effects would occur, although they are off in the future. These effects, estimated through surveys of customer and market actors, produce measurable effects over time and increase program impacts. To date,

evaluation of market effects has focused on a review of market indicators, including (but not limited to) those that have been included as contract metrics each year for the program administrators. Starting in FY07, however, the residential evaluation team—in coordination with the business evaluation team—will establish a comprehensive system for estimating market effects for the compact fluorescent light bulb (CFL) based on actual retail sales data (as will be discussed in the upcoming *Comprehensive CFL Market Effects Study*).

Altogether, the analysis found that Focus leads to significant economic development benefits for Wisconsin's economy. Even without counting market effects, the first year of program operation causes a variety of household and business cost savings and spending changes that altogether support over 351 jobs in the state, and that impact grows to 1,417 jobs by the fifth year of program operation (for the low funding scenario). The disposable income generated in Wisconsin from program-generated savings and this additional business activity represents $12 million in the first year, and grows to $85 million by the fifth year of program operation. The impacts inclusive of market effects also grow over time, adding a small impact in the first five years, but then adding roughly 2.9–4.0 percent to jobs and income over the 25 year analysis interval.

Tables ES-1a and ES-1b. Economic Development Impacts for all Focus on Energy Programs (excluding WAP), Low and High Funding Scenarios

ES-1A: Low Funding Scenario (mil. $ 2006)	Year 1	Year 5	Year 10	Sum 10 Years	Sum 25 Years
Impact w/o Market Effects					
Jobs (job year for Sums)	351	1,417	3,216	16,711	60,496
Sales generated	$39	$181	$444	$2,208	$8,984
GRP (Value-added)	$26	$104	$265	$1,310	$5,415
Disposable income generated	$12	$85	$213	$1,014	$4,195
Impact with Market Effects*					
Jobs (job year for Sums)	351	1,418	3,218	16,716	62,296
Sales generated	$39	$181	$444	$2,209	$9,261
GRP (Value-added)	$26	$104	$266	$1,310	$5,575
Disposable income generated	$12	$85	$213	$1,014	$4,366
** note: Renewable Program has no built in market effect projections*					

ES-1B: High Funding Scenario (mil. $ 2006)	Year 1	Year 5	Year 10	Sum 10 Years	Sum 25 Years
Impact w/o Market Effects					
Jobs (job year for Sums)	351	1,412	3,934	18,229	73,233
Sales generated	$39	$180	$549	$2,438	$10,863
GRP (Value-added)	$26	$104	$316	$1,411	$6,637
Disposable income generated	$12	$84	$257	$1,097	$5,095
Impact with Market Effects*					
Jobs (job year for Sums)	351	1,414	3,949	18,275	77,741
Sales generated	$39	$180	$551	$2,445	$11,598
GRP (Value-added)	$26	$104	$318	$1,415	$7,060
Disposable income generated	$12	$84	$258	$1,100	$5,468
** note: Renewable Program has no built in market effect projections*					

WHO BENEFITS

To assess the diversity of economic development benefits, the REMI economic model was applied to show the breakdown of economic growth impacts by industry sector and occupation category. The comparison of job impacts by industry shows that Focus programs provide widespread benefits among all sectors of the economy. While many of the program participants are manufacturing and commercial businesses, many of the spillover economic benefits accrue to wholesalers, retailers, and service providers that provide goods and services to participating businesses, or that benefit from the re-spending of additional household income within the state. A further analysis shows that the program economic benefits are concentrated on those industries that offer growth for the state economy.

A further breakdown of job impacts by occupation shows that the types of additional jobs created or supported by Focus programs span a wide range of skill-levels among both blue-collar and white-collar categories. In addition, the impacts are widely distributed among urban and rural areas, with urban areas having proportionally greater participation in the residential programs while the semi-urban and rural areas have had proportionally greater participation in the industrial programs.

1. INTRODUCTION

This chapter discusses: (1) goals of this report, (2) types of programs covered, (3) ways in which economic development impacts occur, (4) how economic development impacts differ from other types of impacts, (5) steps in the analysis process, and (6) why some programs are designed to provide greater economic development impacts than others.

1.1 BACKGROUND

Report Objective. This report describes the nature and magnitude of economic development impacts of the program—tracing changes in the flow of income and spending caused by the program, and showing how the program causes both direct and indirect effects on the flow of money in the Wisconsin economy as well as effects on the state's economic competitiveness for business attraction. The primary objective of economic development is to increase job opportunities and income levels, as part of a broader effort to improve the lives of Wisconsin residents by expanding and diversifying the state's economic base. These economic development impacts are of policy interest because economic development was one of the explicit goals of the Focus program. In this report, we measure economic development impacts through four alternative views—business sales, Gross Regional Product, jobs, and personal income. The report examines the size of these impacts, their timing, and their characteristics.

Program Background. Wisconsin Focus on Energy was initiated in April 2001 as a set of "Public Benefits" energy programs, designed to encourage residential and businesses customers, and local governments, to take advantage of available energy technologies and make more economically efficient (and environmentally-responsible) energy decisions. They were also designed to promote lasting changes in energy and equipment market supply/demand patterns by (a) reducing existing barriers to adoption of economically efficient (and environmentally-responsible) energy products and services, and (b) encouraging the development of new market structures and entities to support those efforts. Focus was designed to produce both short-term and long-term economic benefits for Wisconsin residents. In the short term, it has participating customers gaining the benefits of purchasing more energy-efficient equipment: reduced energy usage, reduced energy bills, and more freed up income to spend on other needs. Installing more energy-efficient equipment of all kinds, from light bulbs to refrigerators to industrial motors, also reduces the demand for electricity generated in the state during the peak hours of the day and thus adds to the system's reliability (while also helping to avoid price spikes that have plagued Midwest utilities in recent years). In the long term, Focus was designed to help transform Wisconsin's energy efficiency and renewable energy markets, so that all Wisconsin energy consumers would eventually realize benefits from a marketplace where the basic level of energy efficiency in all kinds of energy-using devices is greater than would otherwise be the case.

Focus on Energy was set up with six formal policy objectives:

1. Near-term resource acquisition (increased energy efficiency; decreased energy use)
2. Environmental benefits
3. Economic development
4. Market transformation (overcome market barriers to increased energy efficiency)

5. System reliability (electricity generation, transmission, and distribution in the state)
6. Stimulate the energy efficiency services industry.

Given these policy objectives, there are clearly many types of program benefits that need to be assessed: improvements in energy efficiency and total energy consumption; improved air quality resulting from decreased electricity generation; improved health and quality of life; and, improvements in Wisconsin's economy from the activities generated by the program. Each of these areas is being addressed as part of the overall evaluation of Focus on Energy. This report focuses solely on economic development impacts.

1.2 TYPES OF ECONOMIC DEVELOPMENT IMPACTS

Focus directly affects Wisconsin's economy, and thus the income and jobs of Wisconsin residents, in four primary ways:

(1) Enhanced Business Competitiveness. Decreasing energy costs through increased efficiency and conservation can make business operations more profitable. By lowering costs of doing business, it also makes Wisconsin a more competitive location for additional business attraction, investment, and expansion. There is also a benefit (unmeasured to date and not part of this analysis) for Wisconsin firms that sell energy efficient products or include them in their services (as with construction contractors).

(2) Improved Cost of Living. Decreasing electric and gas energy costs for residential customers, through increased efficiency and conservation, can also leave more money in families' pockets (to spend on other desired purchases). Lowering the cost of living means that Wisconsin offers higher potential 'real' income. This is not only attractive to the state's current residents but makes Wisconsin a more attractive place to live and work to people who offer skills the state economy needs in order to grow and expand.

(3) "Import Substitution". Focus also encourages more spending dollars to stay within Wisconsin. Wisconsin businesses are major manufacturers of heating and air conditioning equipment, motors, and controls. Focus stimulates sales for these industries in Wisconsin, as well as the development of solar, wind and biomass energy production within the state. At the same time as it increases the flow of dollars staying within Wisconsin, it also reduces the outflow of money from the state associated with importation of coal and natural gas. These effects combine to stimulate job creation, increase personal income, and overall make the Wisconsin economy more efficient and competitive.

(4) Spin-off Spending Changes. There are also various indirect and induced impacts that cause both positive and negative changes in spending. Suppliers to the directly affected businesses (participants as well as manufacturers and installers of energy-efficient equipment) can realize increased orders for their products and services. Additional jobs and their associated worker income can mean more re-spending of that income on consumer purchases. On the other hand, reductions in the growth of demand for traditional energy sources can mean less growth (or actual reductions) in business sales and jobs associated with construction and operation of coal-fired power plants and retail sales from those plants.

The report covers all aspects of changes in the economy, and describes the types of jobs and industries where jobs are gained as well as lost due to the Focus on Energy program. We refer to the sum of all of the above-cited effects as "economic development" impacts because

they reflect changes in the growth and development of the State's economy—i.e., the flow of money into, out-of, and within the state, affecting jobs and income for Wisconsin residents.

1.3 DISTINGUISHING ECONOMIC DEVELOPMENT FROM OTHER IMPACTS

Some aspects of energy, environmental, and other non-energy impacts can cause changes in the flow of dollars as measured in this report. However, there are other aspects of those impacts that are *not* reflected in the analysis of economic development impacts in this report. They include some aspects of safety, security, reliability, health, and other aspects of quality of life—which either lack estimates of how they affect the economy or have policy importance beyond their mere effect on the flow of dollars.

It is also important to distinguish the analysis of economic development impacts from a traditional benefit-cost analysis. Both consider the benefits of cost savings for households and businesses. However, economic development impact analysis considers only effects on the actual flow of dollars, while benefit-cost analysis can also include non-money benefits that can be put into dollar terms (based on willingness-to-pay studies), such as environmental benefits and some non-energy benefits. On the other hand, a traditional benefit-cost study does not encompass impacts on economic competitiveness, on economic diversification, or on reducing the outflow of dollars from the state by increasing use of Wisconsin-made products and services. An economic development impact analysis can consider all of these other types of impacts. Finally, a benefit-cost study considers program spending as a cost that is subtracted from program benefits, while an economic development impact analysis traces how program spending can also be a source of additional business growth.

In the earlier (2003) benefit-cost analysis report by KEMA, benefits included energy savings, reduced emissions, market effects, non-energy benefits (NEBs), and net economic impacts (both positive and negative). The economic cost savings for participants took into account the subsidies received by participants along with the additional spending by participants (to qualify for those subsidies). The total of all of these net benefits were compared to total program costs, which were calculated as total program spending including subsidies. This effectively represents a perspective for government program funding decisions, in which net benefits are compared to the government costs of program alternatives.

The upcoming benefit-cost evaluation report by KEMA will include the prior defined BC test but also examine an additional "robust" BC calculation. This alternative definition takes on a societal perspective for calculating benefits and costs. In the formulation, benefits include only incremental energy savings, reduced emissions, and the monetized non-energy benefits, while costs include not only program costs but also participant spending. Additionally, to account for the 40 percent reduction in funding levels, each BC ratio described above is calculated for expected (full) and actual (reduced) funding levels.

1.4 STEPS IN THE ANALYSIS PROCESS

There are three steps in the process of analyzing the economic development impacts of the Focus on Energy program. These steps are briefly summarized below, while a more detailed explanation of this methodology is provided in Appendix A.

(1) Document Direct Effects. The first step is to track the net *direct effects* of the program. These are net changes in:

1. Program operations spending—in this case "public benefit" dollars are spent in operating the program and paying incentives to business and household participants.
2. Household and business savings—these are dollar savings to businesses and households (resulting from reductions in energy and electric demand), realized because of the existence of the program.
3. Household and business cost—these are the additional household and business expenditures associated with the incremental cost of purchasing energy-efficient equipment (generally the total cost of new equipment minus incentives paid by the program and net of what would otherwise have been spent anyway).
4. Other spending shifts—shifts in patterns of spending and business sales among sectors of the state economy—affecting the flow of dollars into, out-of, and within the state.
5. We rely on other program evaluation reports to obtain the basic information for these four types of direct economic impacts. A key element of this process is careful attention to establishing the net change in spending and costs incurred by government, households, and businesses compared to what would otherwise be expected to occur without the program. In general, the representation of program cost, participation, and energy impacts in this report builds upon program evaluation studies that are described in more detail in other reports.

(2) Apply the Economic Model. The second step is to apply the REMI economic model of the state of Wisconsin. The model is a tool used to trace how the direct Focus program effects lead to changes in household and business costs, spending and sales patterns throughout the state's economy. As illustrated in Figure 1-1 (on the next page), we apply the inputs from step 1 to the REMI economic model to track a series of shifts in the state economy, including:

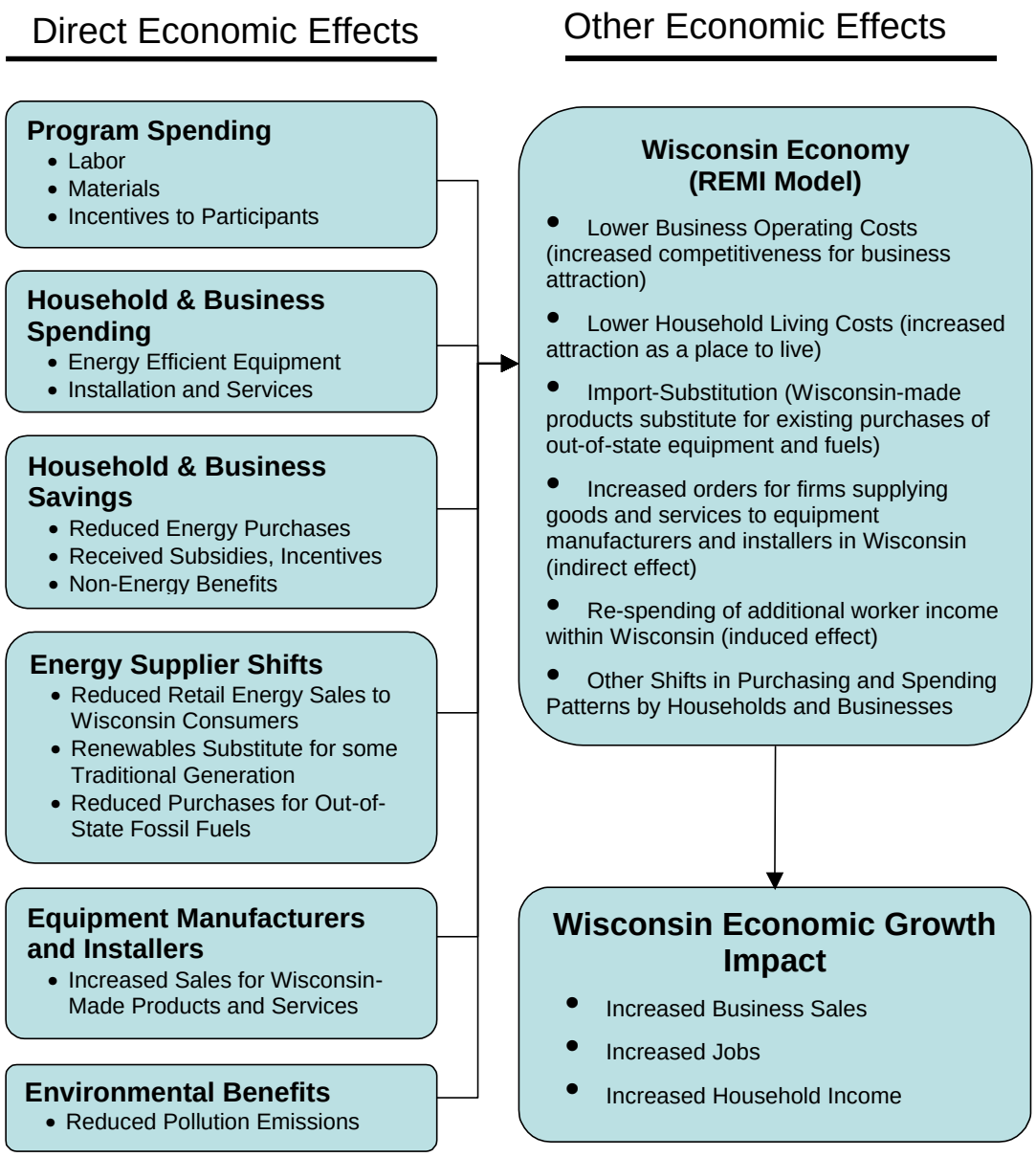
1. Lower business operating costs related to energy consumption (increased competitiveness for business attraction)
2. Lower household living costs (increased attraction as a place to live)
3. Import-substitution (Wisconsin-made products substitute for purchases of out-of-state equipment and fuels)
4. Increased orders for firms supplying goods and services to equipment manufacturers and installers in Wisconsin (indirect effect)
5. Re-spending of additional worker income within Wisconsin (induced effect)

The results of the REMI model represent changes in the economy of the state, on a year-by-year basis. The key indicators of change in the state's economy are:

1. Total volume of business sales—by type of business
2. Total number of jobs associated with the change in business sales—by type of business and occupation category

3. Total *real* disposable income associated with (i) the program-generated savings experienced by households and (ii) more people working in Wisconsin due to the program's business competitiveness benefits.
4. Total gross regional product—the change in "value added" that is generated in Wisconsin, which is essentially the sum of personal income and corporate income (profit).

Figure 1-1 Key Elements of Economic Development Impact



(3) Analyze Economic Development Implications. The third and final step in the analysis process is to apply results of the economic model (step 2) to assess how the forecast program impacts translate into economic development changes. These include:

1. Changes in the growth and mix of jobs for Wisconsin residents in terms of industries and occupations. These can lead to increased diversification of the economy, increased opportunities for job skills, and higher income levels for Wisconsin workers.
2. Changes in the incidence of economic impacts, in terms of urban and rural locations
3. Shifts in the nature and size of impacts occurring over time.
4. Shifts in the economic competitiveness and attractiveness of Wisconsin as a place to live and to locate a business.

1.5 ROLES OF DIFFERENT PROGRAM ELEMENTS

It is important to recognize that Focus on Energy actually encompasses three types of programs, each of which has very different forms of economic impacts.

1. The core Business Program and Residential Program are both designed to achieve energy efficiency through the purchase of more energy efficient equipment. As such, they encourage households and businesses to spend money on purchases of such equipment in cases where the households and businesses will subsequently receive even greater cost-savings benefits from reduced energy use over time.

In addition, Focus includes two public purpose programs that are designed to provide benefits other than energy cost savings.

2. The Focus on Energy Renewable Energy program is intended to stimulate the production of electricity in Wisconsin using non-fossil fuel sources. The Renewables program does *not* reduce energy used but instead substitutes new forms of in-state electricity generation. The in-state generation can reduce the outflow of money from the state that is now going for imports of traditional fuels (e.g., coal and natural gas) and potentially increase electric system reliability. Some forms of renewable generation also add a benefit of decreased emissions. Biomass generation does produce emissions but has the added benefit of using in-state resources (farm waste, waste water products) that would otherwise cost farms to comply with waste regulations from the Department of Natural Resources.

   As a result of this structure, the Renewables program does not produce strong economic impacts within the framework of this economic analysis. It is noteworthy, however that other states operate such programs through public benefits funds and on the wholesale level, most states that have restructured their electric utility industries have specified that utilities include increasing percentages of electricity generated with renewable resources in their electric portfolios.
3. The Low-income Weatherization Assistance program (addressed in a separate report) transfers spending from the Public Benefits fund, along with federal funds, to low income households by paying contractors to improve the energy efficiency of low income households. Contractors install insulation, weather stripping, and other improvements that increase the homes' efficiency. They also install efficient lighting and in some cases provide energy efficient appliances. Low-income program participants therefore realize

energy savings while not spending any of their own resources. Through these subsidies, the Low-income Weatherization program produces important benefits to program participants, not the least of which is increased home affordability. The economic impacts of the Low-income Weatherization Assistance program will be presented in a separate forthcoming report.

All of these elements of Focus on Energy have some effects on the economy, either by shifting purchasing patterns, saving energy, or providing for other non-energy economic benefits. Thus, we apply the same economic analysis framework (discussed next) for all elements of the program. However, we note that those program elements that are specifically designed to save money naturally emerge with the greatest magnitude of economic benefits, while programs with broader aims than just energy cost reductions are less likely to show overwhelming economic benefits because part of their justification is beyond the current measurement of impacts on the economy.

2. OVERALL FINDINGS—IMPACTS OVER TIME

This chapter provides an overall summary of the economic development impacts, based on completion of the first five years of Focus implementation, from 2002 through 2006, and projections of program activity over subsequent years. It also discusses how economic development impacts evolve over time. (Further breakouts of impacts by type of program, type of industry and type of location follows later in Chapters 3, 4, and 5.)

2.1 SHIFTS OVER TIME

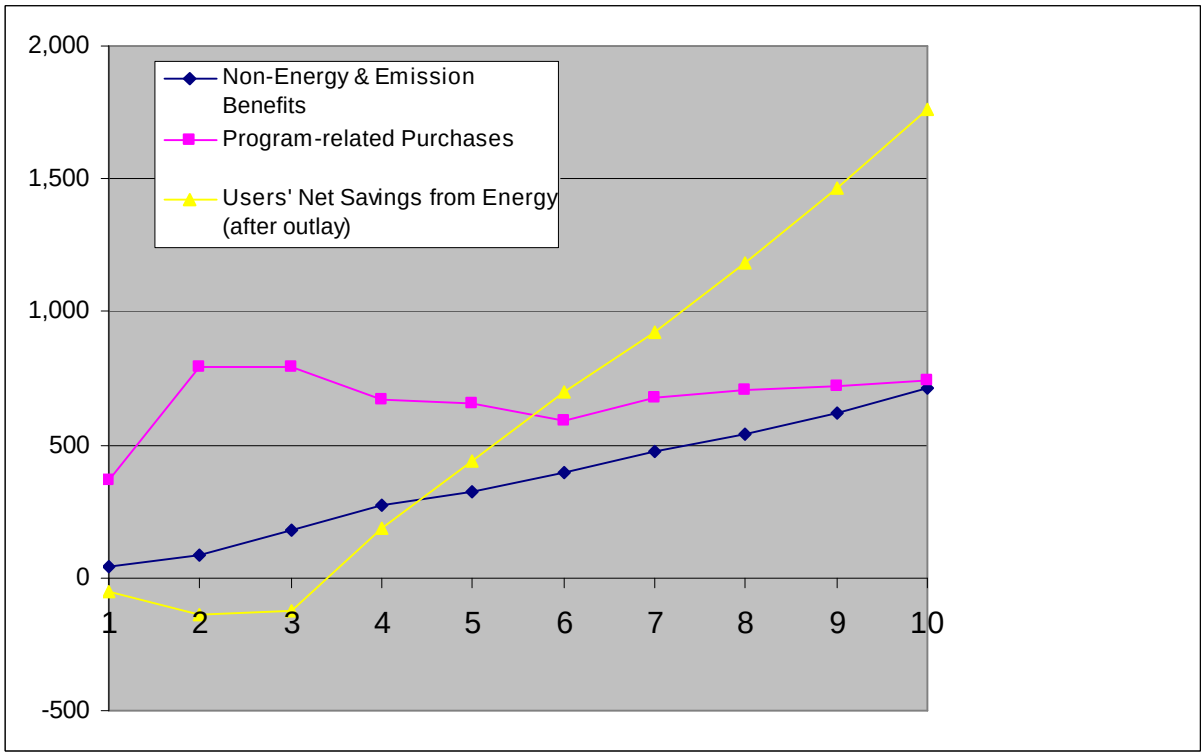
Through the analysis process that was previously described, the REMI economic model generated estimates of the current and projected future economic impacts of Focus on Energy. Since a key feature of Focus programs is energy cost savings for households and businesses, and since those savings continue over the lifetime of installed equipment, it is necessary to measure economic impacts over a period of time.

Figure 2-1 illustrates the economic analysis results for all Focus programs combined—including Residential, Renewable, and Business Programs. It shows the impacts in terms of jobs generated within Wisconsin. The graphic illustrates a number of changes over time:

- Job creation enabled by *user cost savings* tends to grow over time. In the first five years (actual experience), there are some ups and downs in this pattern as the program mix of activities changes and the overall program funding is reduced from what it was in the first two years. Extrapolating the results into the long term, however, leads to more of a "straight line" pattern of growth in economic impact. This is largely due to the accumulated growth in overall savings, as early year participants continue to receive cost savings in future years (until the end of the useful life of the equipment or the end of its active use occurs).
- Job creation attributable to *non-energy benefits and pollution emissions reduction* grows over time as the associated household cost savings and utility emissions-related cost savings accumulate over time.
- Job creation associated with *program spending effects* tails off after the third year, as program spending is reduced. However, job creation impact continue insofar as the program spending continues to increase sales for Wisconsin-based businesses that are producers, assemblers, suppliers, or installers of energy-saving (or energy generating) equipment. This is known as "import substitution" as it keeps more spending going to Wisconsin-based businesses rather than "leaking" out of state to purchase electricity, natural gas, or coal from outside suppliers.

Further breakdowns of impacts by causal factor are provided in Appendix A.

Figure 2-1. Employment Impact Over Time, by Cause, All Focus on Energy Programs excluding WAP (Low Funding Scenario, No Market Effects)



2.2 DIFFERENCES AMONG PROGRAMS

Tables 2-1a and 2-1b show the projected annual economic impacts for selected years and periods, presented in terms of (1) the number of job years created for Wisconsin residents, (2) the sales generated for Wisconsin businesses, (3) the value added portion of those sales, and (4) disposable income generated for Wisconsin residents. The tables also summarize impacts when both the Residential and Business programs include expected "market effects" beyond what the program instigates in terms of increases in household and business purchases of energy efficient products, adoption of energy efficient practices and the ensuing energy savings. These are effects in the economy without formal program participation.

Tables 2-1a and 2-1b. Economic Development Impacts for all Focus on Energy Programs (excluding WAP), Low and High Funding Scenarios

ES-1A: Low Funding Scenario (mil. $ 2006)	Year 1	Year 5	Year 10	Sum 10 Years	Sum 25 Years
Impact w/o Market Effects					
Jobs (job year for Sums)	351	1,417	3,216	16,711	60,496
Sales generated	$39	$181	$444	$2,208	$8,984
GRP (Value-added)	$26	$104	$265	$1,310	$5,415
Disposable income generated	$12	$85	$213	$1,014	$4,195
Impact with Market Effects*					
Jobs (job year for Sums)	351	1,418	3,218	16,716	62,296
Sales generated	$39	$181	$444	$2,209	$9,261
GRP (Value-added)	$26	$104	$266	$1,310	$5,575
Disposable income generated	$12	$85	$213	$1,014	$4,366
** note: Renewable Program has no built in market effect projections*					

ES-1B: High Funding Scenario (mil. $ 2006)	Year 1	Year 5	Year 10	Sum 10 Years	Sum 25 Years
Impact w/o Market Effects					
Jobs (job year for Sums)	351	1,412	3,934	18,229	73,233
Sales generated	$39	$180	$549	$2,438	$10,863
GRP (Value-added)	$26	$104	$316	$1,411	$6,637
Disposable income generated	$12	$84	$257	$1,097	$5,095
Impact with Market Effects*					
Jobs (job year for Sums)	351	1,414	3,949	18,275	77,741
Sales generated	$39	$180	$551	$2,445	$11,598
GRP (Value-added)	$26	$104	$318	$1,415	$7,060
Disposable income generated	$12	$84	$258	$1,100	$5,468
** note: Renewable Program has no built in market effect projections*					

Source: REMI model runs by Economic Development Research Group

2.3 OVERALL CHANGE

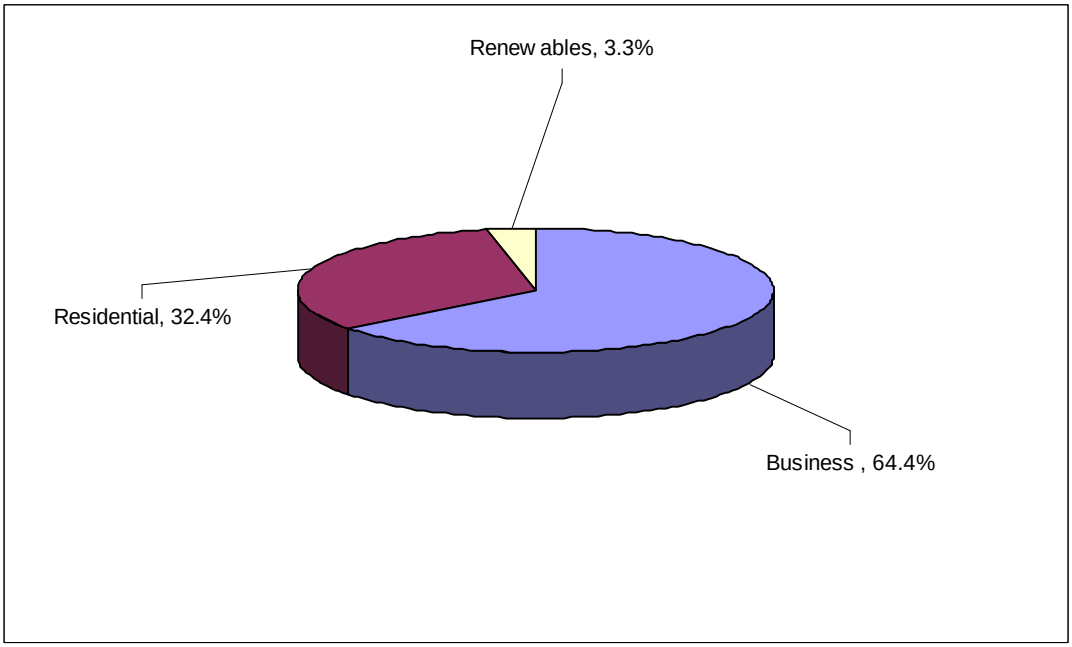
Altogether, the analysis found that Focus leads to significant economic development benefits for Wisconsin's economy. Even without counting market effects, the first year of program operation causes a variety of household and business cost savings and spending changes that altogether support 351 jobs in the state and that impact grows to at least 1,417 jobs by the fifth year of program operation. The personal income generated in Wisconsin from this additional business activity represents $12 million in the first year and grows to $85 million by the fifth year of program operation. The market effects also grow over time, adding a small impact in the first five years, but then adding roughly 2.9–4.0 percent to jobs and income over the projects' assumed 25 analysis interval.

Further breakdowns of economic development impacts are shown by program category in Chapter 3, by industry sector in Chapter 4, and by occupation in Chapter 5.

3. IMPACTS BY PROGRAM CATEGORY

This chapter builds upon the overall summary (in Chapter 2) to provide a breakout of economic development impacts in terms of three program categories: (1) business programs, (2) residential programs, and (3) renewable generation. Figure 3-1 summarizes the overall contribution of each program category to overall job creation impacts.

Figure 3-1. Ten-Year Job Creation Impacts: Breakout by Program Categories (Low Funding Scenario)



Source: REMI model runs by Economic Development Research Group

3.1 BUSINESS PROGRAMS

Administered by The Milwaukee School of Engineering (MSOE) through June 2004, and by Wisconsin Energy Conservation Corporation (WECC) since, Business Programs promote energy efficient equipment and practices covering industrial, commercial, agriculture, and government sectors. Since Focus' launch, these programs have changed in adopting a more technology-specific focus and by eliminating the construction program. Tables 3-1a and 3-1b summarize business program spending and energy impacts for low and high funding scenarios.

Tables 3-1a and 3-1b. Business Programs: Spending and Energy Impacts, Low and High Funding Scenarios – No Market Effects

High Funding Scenario (mil. $2006)	Year 1	Year 5	Year 10
$ Budget	$10.2	$16.2	$49.8
$ Participant net Cost after incentives	$0.8	$16.0	$47.8
$ Direct Savings (cumulative)	$2.2	$40.8	$136.5
kWh Saved (cumulative)	18,767,192	286,319,191	918,355,434
Therms Saved (cumulative)	818,487	21,522,422	69,244,417

Source: KEMA 2007

Low Funding Scenario (mil. $2006)	Year 1	Year 5	Year 10
$ Budget	$10.2	$16.2	$31.3
$ Participant net Cost after incentives	$0.8	$16.0	$30.0
$ Direct Savings (cumulative)	$2.2	$41.1	$109.1
kWh Saved (cumulative)	18,767,192	288,608,915	733,835,427
Therms Saved (cumulative)	818,487	21,447,700	54,718,833

Source: KEMA 2007

Tables 3-2a and 3-2b summarize the projected economic development impacts of the Business Programs over a ten year period as well as over the 25 year analysis interval—both with and without expected market effects (i.e., additional impacts on nonparticipants).

Tables 3-2a and 3-2b. Business Programs: Economic Impacts, Low and High Funding Scenarios

3-2A: Low Funding Scenario (mil. $ 2006)	Year 1	Year 5	Year 10	Sum 10 Years	Sum 25 Years
Impact w/o Market Effects					
Jobs (job years for sum)	157	843	2,324	10,754	44,975
Sales generated	$16	$111	$344	$1,497	$7,272
GRP (Value-added)	$12	$65	$204	$894	$4,290
Disposable income generated	$8	$47	$138	$612	$2,807
Impact with Market Effects					
Jobs (job years for sum)	157	843	2,325	10,758	45,543
Sales generated	$16	$111	$344	$1,498	$7,376
GRP (Value-added)	$12	$65	$204	$894	$4,348
Disposable income generated	$8	$47	$138	$612	$2,845

3-2B: High Funding Scenario (mil. $ 2006)	Year 1	Year 5	Year 10	Sum 10 Years	Sum 25 Years
Impact w/o Market Effects					
Jobs (job years for sum)	157	839	2,790	11,704	52,606
Sales generated	$16	$111	$415	$1,643	$8,548
GRP (Value-added)	$12	$65	$248	$985	$5,041
Disposable income generated	$8	$47	$165	$665	$3,289
Impact with Market Effects					
Jobs (job years for sum)	157	840	2,805	11,751	55,254
Sales generated	$16	$111	$417	$1,650	$9,018
GRP (Value-added)	$12	$65	$249	$989	$5,311
Disposable income generated	$8	$47	$166	$668	$3,465

Source: REMI model runs by Economic Development Research Group

3.2 RESIDENTIAL PROGRAMS

Focus uses six programs to target the Residential sector and associated markets. The residential programs offered by Wisconsin Energy Conservation Corporation (WECC) and their subcontractors are quite diverse. Some are similar to programs that have been offered in Wisconsin for many years (e.g., the ENERGY STAR Products program which evolved from lighting and appliance campaigns from the mid-90's and mirrors Wisconsin's longstanding statewide Low-income Weatherization Assistance program). Others are newer (e.g., Home Performance with ENERGY STAR for the retrofit market). Tables 3-3a and 3-3b summarize residential program spending and energy impacts for low and high funding scenarios.

Tables 3-3a and 3-3b. Residential Programs: Spending and Energy Impacts, Low and High Funding Scenarios – No Market Effects

Low Funding Scenario (mil. $2006)	Year 1	Year 5	Year 10
$ Budget	$11.0	$17.9	$15.8
$ Participant net Cost after incentives	$7.4	$18.0	$13.3
$ Direct Savings (cumulative)	$2.3	$28.9	$50.0
kWh Saved (cumulative)	19,635,409	294,689,660	491,702,794
Therms Saved (cumulative)	850,701	7,007,051	12,247,318

Source: KEMA 2007

High Funding Scenario (mil. $2006)	Year 1	Year 5	Year 10
$ Budget	$11.0	$17.9	$24.9
$ Participant net Cost after incentives	$7.4	$18.0	$20.9
$ Direct Savings (cumulative)	$2.3	$28.9	$60.7
kWh Saved (cumulative)	19,635,409	294,416,609	602,609,482
Therms Saved (cumulative)	850,701	7,005,897	14,754,006

Source: KEMA 2007

Participants in residential programs have additional "non-energy benefits," some of which represent real money. These range from increased sale value for ENERGY STAR homes standards to savings in lighting maintenance costs for fixtures with compact fluorescent bulbs.

Tables 3-4a and 3-4b summarize the projected economic development impacts of the Residential Programs over a ten year period. This includes effects of both cost savings and non-energy benefits, and it is shown both with and without expected market effects (i.e., additional impacts on nonparticipants).

Tables 3-4a and 3-4b. Residential Programs: Economic Impacts for Low and High Funding Scenarios

3-4a: Low Funding Scenario (mil $ 2006)	Year 1	Year 5	Year 10	Sum 10 Years	Sum 25 Years
Impact w/o Market Effects					
Jobs (job years for sum)	177	528	789	5,406	13,830
Sales generated	$21	$65	$90	$659	$1,506
GRP (Value-added)	$13	$37	$55	$384	$964
Disposable income generated	$4	$36	$71	$378	$1,290
Impact with Market Effects					
Jobs (job years for sum)	177	527	788	5,406	15,058
Sales generated	$21	$65	$90	$659	$1,679
GRP (Value-added)	$13	$37	$55	$384	$1,065
Disposable income generated	$4	$36	$71	$378	$1,423

3-4b: High Funding Scenario (mil $ 2006)	Year 1	Year 5	Year 10	Sum 10 Years	Sum 25 Years
Impact w/o Market Effects					
Jobs (job years for sum)	177	527	977	5,916	15,871
Sales generated	$21	$65	$117	$740	$1,742
GRP (Value-added)	$13	$37	$71	$429	$1,114
Disposable income generated	$4	$36	$83	$405	$1,492
Impact with Market Effects					
Jobs (job years for sum)	177	527	977	5,916	17,779
Sales generated	$21	$65	$117	$740	$2,012
GRP (Value-added)	$13	$37	$71	$429	$1,271
Disposable income generated	$4	$36	$83	$405	$1,700

Source: REMI model runs by Economic Development Research Group

3.3 RENEWABLE ENERGY GENERATION PROGRAM

The Renewable Energy Generation Program seeks to encourage households, farms, and businesses to install renewable energy systems that generate electricity or displace fossil fuel consumption. The program has supported photovoltaic installations and wind-powered generators for homes and small businesses, and biogas digester systems for farm, institutional and industrial settings. Many of the biogas systems generate electricity; some are used to provide methane gas for other purposes. In addition, the program has supported biomass combustion, in which waste biomass sources are burned as a source of space and process heating, and solar water heating systems at commercial properties. The program pays incentives based upon the number of kilowatt hours and/or therms expected to be produced per year and overall project size, up to a percentage and dollar limit of the total installed cost. In general, the program does not decrease total energy use, but provides the impetus for renewable fuels to substitute (at the participating home or business) for utility-generated electricity (most likely produced by burning coal or natural gas) or fossil fuels. Tables 3-5a and 3-5b summarize Renewable Energy Generation spending and energy impacts for program years 1–10. Market effects are not considered for the renewable portfolio.

Tables 3-5a and 3-5b. Renewable Energy Generation: Spending and Energy Impacts, Low and High Funding Scenario

Low Funding Scenario (mil. $2006)	Year 1	Year 5	Year 10
$ Budget	$0.9	$2.5	$2.5
$ Participant net Cost after incentives	$0.0	$1.2	$1.0
$ Direct Savings (cumulative)	$0.0	$1.3	$2.8
kWh Saved (cumulative)	440	9,657,898	18,796,412
Therms Saved (cumulative)	0	599,596	1,404,843

Source: KEMA 2007

High Funding Scenario (mil. $2006)	Year 1	Year 5	Year 10
$ Budget	$0.9	$2.5	$8.3
$ Participant net Cost after incentives	$0.0	$1.2	$7.0
$ Direct Savings (cumulative)	$0.0	$1.3	$9.2
kWh Saved (cumulative)	440	9,657,898	66,464,305
Therms Saved (cumulative)	0	599,596	4,151,327

Source: KEMA 2007

Tables 3-6a and 3-6b summarize projected economic development impacts for the Renewable Generation program. Initial positive employment and income impacts occur from small increases in local spending associated with installation of renewable generation equipment. Labor cost (assumed to be locally provided) comprises approximately 50 percent of the renewable portfolio investments and the remaining portion is assumed to be equipment

purchases. While biogas would procure half of its equipment investment from Wisconsin manufacturers/wholesalers, overall, the entire portfolio purchases much of the equipment from out-of-state manufacturers. With projected program growth over time, the positive economic effect continues to grow modestly even though the current economic analysis does not recognize a direct monetary value to businesses or households for environmental benefits or other benefits from distributed power generation, nor does it assume any growth of locally produced renewable generating equipment though the program is intended to help jump start that industry.

Tables 3-6a and 3-6b. Renewable Energy Generation: Economic Impacts for Low and High Funding Scenarios

3-6a: Low Funding Scenario (mil $2006)	Year 1	Year 5	Year 10	Sum 10 Years	Sum 25 Years
Impact w/o Market Effects					
Jobs (job years for sum)	18	46	103	551	1,624
Sales generated	$1.3	$4.1	$10.6	$51.1	$197.5
GRP (Value-added)	$1.0	$2.0	$6.7	$31.6	$156.2
Disposable income generated	$0.5	$1.7	$5.0	$23.4	$91.2

3-6b: High Funding Scenario (mil $2006)	Year 1	Year 5	Year 10	Sum 10 Years	Sum 25 Years
Impact w/o Market Effects					
Jobs (job years for sum)	18	47	169	616	4,717
Sales generated	$1.3	$4.1	$16.8	$55.6	$569.4
GRP (Value-added)	$1.0	$2.0	-$1.7	-$3.0	$479.3
Disposable income generated	$0.6	$1.8	$9.2	$28.0	$307.7

Source: REMI model runs by Economic Development Research Group

The results of breaking out economic development impacts by program category serves to underscore a key point—that Focus on Energy actually encompasses a combination of programs, each of which has a unique combination of goals and capabilities for reducing current energy use, encouraging longer-term market changes, addressing social goals of low income assistance, and/or addressing broader societal goals of encouraging clean fuels and distributed energy generation. As a result, the short-term and long-term economic development impacts of each program follow a different pattern. However, economic development is only one of the objectives of Focus on Energy. Other reports in this series of evaluation studies examine program impacts from alternative perspectives.

4. IMPACTS BY ECONOMIC SECTOR

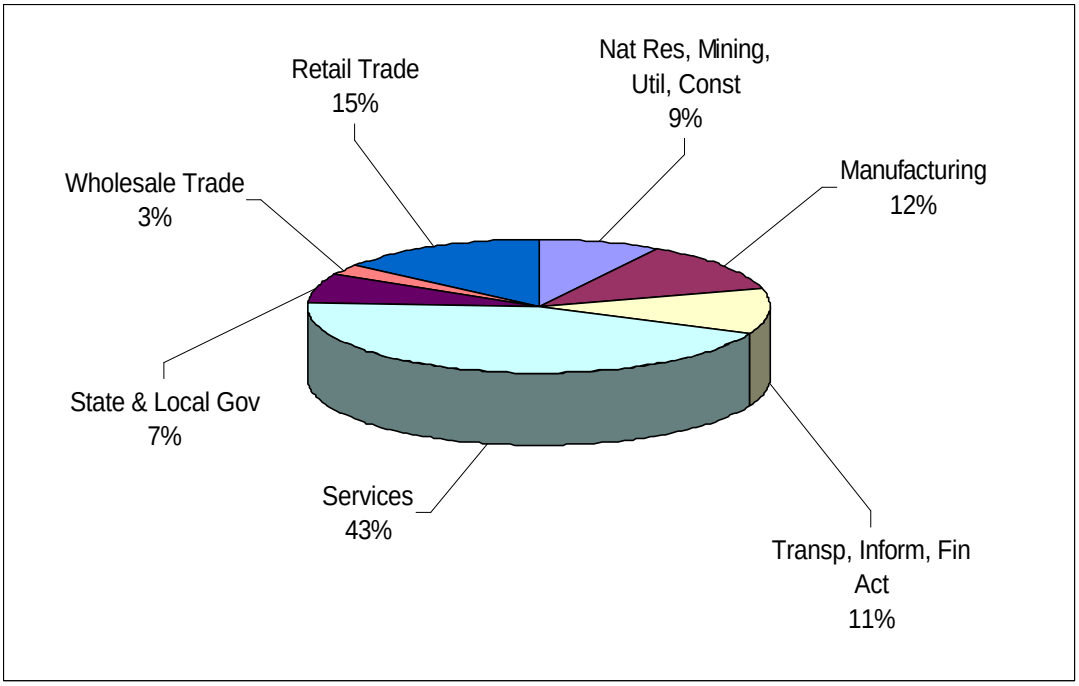
This chapter examines impacts of the first year of Focus on Energy in terms of how it is helping to diversify Wisconsin's economic base. It also examines how these impacts are shaped by Focus on Energy program design and implementation. It is organized into three parts: (1) direct economic impacts; (2) overall economic development effects and (3) comparison of economic development impacts to current business patterns and expected future trends.

4.1 IMPACTS BY INDUSTRY

Figure 4-1 shows a breakdown of overall job impacts for major sectors of the economy. It shows that Focus programs provide widespread benefits among all sectors of the economy. There are several reasons for this result.

- While many of the business program participants are manufacturing and commercial businesses, all of the programs (including also business, residential, and renewables programs) create additional economic benefits by supporting manufacturers, wholesalers, retailers, engineering and installation services, and construction services associated with the energy-saving materials, equipment, and buildings.
- The growth of participating firms also leads to "indirect" growth impacts on other firms that supplier goods and services to them.
- The growth of workers at both the directly affected businesses and the indirectly affected businesses leads to further "induced effects" as the additional worker income is spent on consumer purchases.

Figure 4-1. Summary of Job Impacts by Industry, Year 10 (Low Funding Scenario)



Source: REMI model runs by Economic Development Research Group

Table 4-1 shows how the mix of impact among major sectors of the economy can be viewed differently in terms of business output (dollars of total sales) or in terms of jobs. The key findings from both tables and their interpretation are as follows:

- The *overall impact* of Focus on Energy is to make Wisconsin's total business output $463 million/year higher in the tenth year than would have occurred without the program. This growth involves an additional 2,986 private sector jobs and 3,216 total jobs. (This estimate of job impact expected by year 10 is similar to that originally estimated in the 2003 economic impact study, though the dollar output level shown here is higher due in part to the use of constant year 2006 dollars instead of year 2002 dollars.)
- *Manufacturing* accounts for the largest share of the total statewide output impact—35 percent, though only 13 percent of the total private-sector job impact. The high impact on manufacturing output reflects the program impact on increasing the "cost competitiveness" of this sector as well as the redirection of some business and household purchases towards energy-efficient electrical equipment and machinery manufactured in Wisconsin. The smaller job impact is due to the fact that Wisconsin manufacturing has a high value of output per worker, known as high labor productivity.
- *Retail* accounts for 8 percent of the output impact and almost 16 percent of the private-sector employment impact. The effect on output is attributable to the large residential program, which causes participating households to experience an increase in their disposable income, which they then spending on retail, entertainment, and personal services. The larger job impact is due to the high labor-intensity of retailing.
- *Services* accounts for 23 percent of the output impact and 47 percent of the employment impact. This classification includes energy-related services, which are supported by the business program's marketing and incentive features. The higher share of employment impact is due to the labor-intensive nature of most services.
- The additional impacts on *Transportation*, *Construction*, *Finance,* and *Other Services* is attributable to increased spending by both households (due to disposable income growth) and businesses (due to expansion of activity).

Table 4-1 Impacts on the Economy By Major Industry
(Tenth Year, Output in Constant 2006 Dollars)

Major Industry	Output Impact (mil.)	% of Output	Job Impact	% of Jobs	
				Private-sector	ALL Jobs
Nat Res, Mining, Util, Const	$38	8.2%	277	9.3%	8.6%
Manufacturing	$160	34.5%	389	13.0%	12.1%
Transp, Inform, Fin Act	$94	20.3%	356	11.9%	11.1%
Services	$108	23.3%	1,406	47.1%	43.7%
Wholesale Trade	$25	5.5%	85	2.8%	2.6%
Retail Trade	$38	8.3%	473	15.8%	14.7%
Total Private-Sector	$463	100.0%	2,986	100.0%	92.8%
Total ALL Sectors			3,216		

Source: REMI model runs by Economic Development Research Group

Table 4-2 (split over two pages) shows a more detailed breakdown of the economic model results by industry. These are the same results as previously shown for Table 4-1, but with a much greater level of detail. For instance, the job breakdown shows that the most significant benefits (in terms of creating over 70 jobs) are for construction, HVAC machinery manufacturing, electrical controls, wholesale, retail, technical services, and administration.

Table 4-2. Impacts on the Economy by Detailed Industry (Tenth Year, Output in Constant 2006 Dollars)

Detailed Industry Sector	Output ($ Mil.)	Jobs
Agric, Forestry, Fishing	$0.60	11
Utilities	$5.84	7
Construction	$31.52	259
Wood product mfg	$3.62	15
Nonmetallic mineral prod mfg	$2.07	8
Primary metal mfg	$5.63	13
Fabricated metal prod mfg	$10.13	36
Machinery mfg	$23.43	72
Computer, electronic prod mfg	$18.71	9
Electrical equip, appliance mfg	$33.67	74
Motor vehicle mfg	$5.65	10
Transp equip mfg. exc. motor veh	$2.08	3
Furniture, related prod mfg	$1.43	8
Miscellaneous mfg	$2.56	12
Food mfg	$15.55	33
Beverage, tobacco prod mfg	$1.71	2
Textile mills & Textile products	$0.53	2
Apparel mfg	$1.16	5
Leather, allied prod mfg	$0.96	7
Paper mfg	$7.65	16
Printing, rel supp act	$2.84	16
Petroleum, coal prod mfg	($0.01)	(0)
Chemical mfg	$6.07	9
Plastics, rubber prod mfg	$14.13	41
Wholesale trade	$25.46	85
Retail trade	$38.27	473
Air, Rail and Water transportation	$1.34	4
Truck transp; Couriers, msngrs	$4.13	24
Ground pass & sightseeing transport	$0.54	8
Warehousing, storage	$0.35	4
Publishing, exc Internet	$2.86	13
Motion picture, sound rec	$0.94	6
Internet serv, data proc, other	$3.65	10
Broadcasting, exc Int; Telecomm	$5.67	11
Monetary authorities, et al.	$23.79	69
Sec, comm contracts, inv	$7.67	38
Ins carriers, rel act	$13.69	77
Real estate	$27.56	77
Rental, leasing services	$1.81	14
Prof, tech services	$30.96	279
Mgmnt of companies, enterprises	$12.94	28
Administrative, support services	$8.18	157
Waste mgmnt, remed services	$1.24	7

Continued on the next page

Table 4-2. Impacts on the Economy by Detailed Industry (continued)

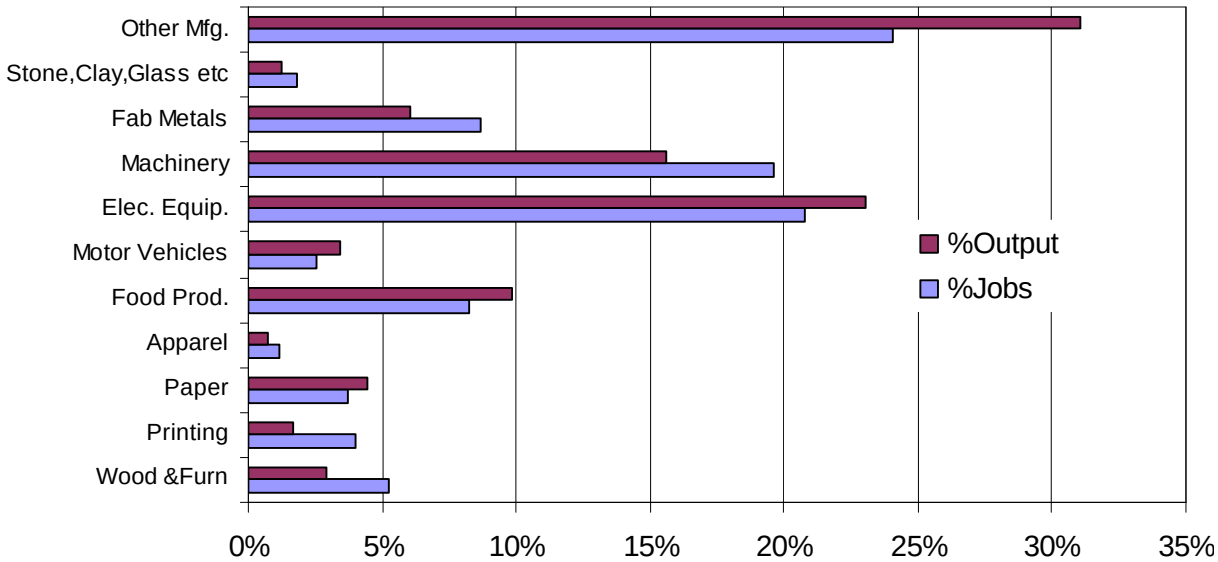
Detailed Industry Sector	Output (mil. $)	Jobs
Educational services	$2.88	68
Ambulatory health care services	$9.17	58
Hospitals	$5.46	43
Nursing, residential care facilities	$2.04	49
Social assistance	$3.86	107
Performing arts, spectator sports	$1.15	27
Amusement, gambling, recreation	$2.88	49
Accommodation	$1.28	18
Food services, drinking places	$13.12	305
Repair, maintenance	$4.27	39
Personal, laundry services	$3.53	50
Membership assoc, orgs	$4.44	92
Private households	$0.15	28
Total Private-Sector	$463.23	2,986

**excludes government and farm jobs*
Source: REMI model runs by Economic Development Research Group

Looking more closely at output impact on the manufacturing sector, Figure 4-2 illustrates how the distribution of industry growth looks different depending on whether it is viewed in terms of business output or jobs. Key findings are that:

- Some of the industries that are saving significant operating costs—such as wood & and paper—do account for a significant share of the impact on business output but a smaller share of the impact on jobs.
- Some of the industries that benefit from redirected spending towards energy efficiency—such as electrical equipment and machinery—have the opposite situation. They account for a small share of the impact on business output but a larger share of the job impact.

Fig. 4-2 Comparison of Output and Job Impacts for Manufacturing Sector (Tenth Year)



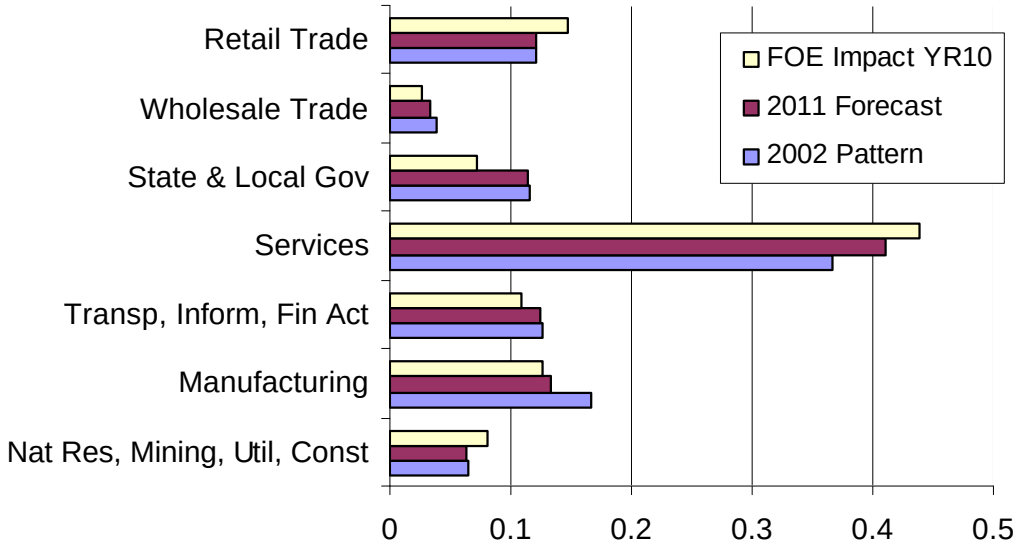
- Food products is another major industry in Wisconsin that accounts for a significant share of both output and job growth impacts. The growth impact on this industry is attributable to both increased cost competitiveness as well as increased consumer spending (freed up by the reduction in energy costs).
- Other industries that are saving significant operating costs—such as metal products and apparel manufacturing—account for only a small share of the impact on business output and jobs. This result is most likely due to the fact that these are more mature and stagnant (or declining) industries, which are losing market share to lower cost competition from abroad. As a result, the improvement in their operating costs in Wisconsin has a more muted impact on their overall competitiveness.

4.2 COMPARISON OF IMPACTS TO BASELINE TRENDS

To understand and interpret the industry mix of jobs supported by Focus on Energy, it is useful to compare: (1) the Focus program ten year mix of job impacts with (2) the state's job mix as of 2001 when Focus on Energy was first started and (3) projections of the state's job mix ten years later (as of 2011, not incorporating any impact of Focus on Energy). Figure 4-3 illustrates this comparison for major sectors of the economy. It shows that:

- The share of total *services* sector jobs in the general economy is expected to increase over the next ten years (2001–2011), but the share of additional jobs supported by Focus on Energy is even larger for that sector of the economy.
- The share of total jobs in the *retail* and *transportation & construction* industry groups is expected to be generally stable over the next ten years. However, their share of total jobs in those industries created by Focus on Energy is larger than either current or projected patterns in the general economy.

Figure 4-3. Comparison of Focus on Energy (FOE) Job Impacts with Baseline 2002 and Projected 2011 Job Profiles



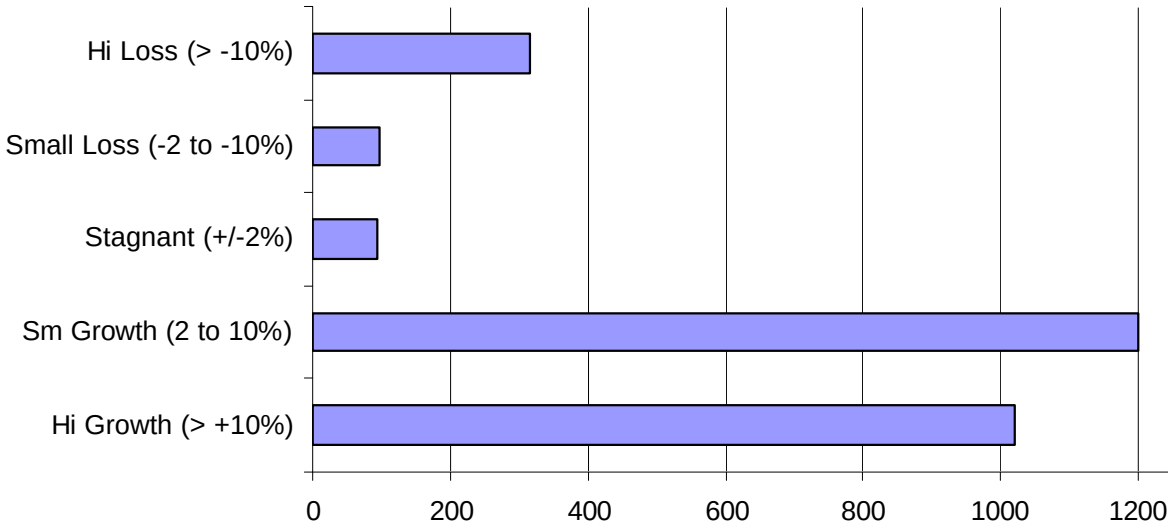
- The share of total jobs in the *manufacturing, wholesaling* and *finance & insurance* industry groups is expected to decline over the next ten years. This actually reflects slower growth or stagnation in these industries, while other sectors of the economy are growing fast. In addition, increasing labor productivity (output/worker) in manufacturing and wholesaling makes jobs grow at a slower rate than industry output. The share of total jobs created by Focus on Energy in these industry groups is smaller than their current or projected future shares of total jobs in the general economy.

The analysis shown in Figure 4-3 was also conducted at a more detailed 66-sector industry level. We calculated the base case forecast of percentage change in employment over the 2001–2011 period, as predicted by the REMI model. Based on this information, we classified all Wisconsin industries into five industry growth classes:

- High growth (over 10 percent increase in employment)
- Small growth (2 to 10 percent increase in employment)
- Stagnant (forecast change +/-2 percent)
- Small loss (-2 to 10 percent loss of employment)
- High loss (over-10 percent loss of employment)

Using this classification, we can transform the distribution of Focus program job impacts by industry (shown earlier in Tables 4-1 and 4-2) into a breakdown of Focus program job impacts by growth class. The result is shown in Figure 4-4. It indicates that fully 37 percent (1,022) jobs created as a consequence of Focus on Energy are in high growth industries, while 44 percent (1,199) are in lower growth industries, 3 percent (94) are in stagnant industries and only 15 percent (414) are in the two classes of shrinking industries. In other words, Focus on Energy is disproportionately creating jobs in what are expected to be Wisconsin's future growth industries.

Fig. 4-4 Impacts on Job Growth by Industry Growth Class, Year 10



5. IMPACTS BY OCCUPATION

This chapter examines the economic impacts of Focus on Energy in terms of its effect on job creation with a focus on occupational type. It is organized into two parts that examine (1) the skill levels of jobs resulting from Focus, and (2) average wage levels. Both sections examine statewide impacts relative to existing Wisconsin occupational patterns.

5.1 OCCUPATION MIX

Table 5-1 provides an overview of overall job creation by occupation (based on the SOC—Standard Occupational Classification groups). These are shown in terms of the values projected for year 10, based on extrapolation of results from the first five years. These results indicate that Focus supports job growth across virtually all major occupational groups, including a range of skill levels among both blue-collar and white-collar categories

Table 5-1. Summary of Job Impacts by Occupation, Program Year 10

SOC Group	Occupation Description	Jobs Created*	Percent of Total
11	Management Occupations	180	6.0%
13	Business and Financial Operations Occupations	123	4.1%
15	Computer and Mathematical Occupations	79	2.7%
17	Architecture and Engineering Occupations	58	1.9%
19	Life, Physical, and Social Science Occupations	19	0.6%
21	Community and Social Services Occupations	52	1.7%
23	Legal Occupations	26	0.9%
25	Education, Training, and Library Occupations	141	4.7%
27	Arts, Design, Entertainment, Sports, and Media Occupations	42	1.4%
29	Healthcare Practitioners and Technical Occupations	87	2.9%
31	Healthcare Support Occupations	52	1.7%
33	Protective Service Occupations	48	1.6%
35	Food Preparation and Serving Related Occupations	303	10.2%
37	Building and Grounds Cleaning and Maintenance Occupations	102	3.4%
39	Personal Care and Service Occupations	96	3.2%
41	Sales and Related Occupations	367	12.3%
43	Office and Administrative Support Occupations	458	15.3%
45	Farming, Fishing, and Forestry Occupations	-2	-0.1%
47	Construction and Extraction Occupations	191	6.4%
49	Installation, Maintenance, and Repair Occupations	122	4.1%
51	Production Occupations	269	9.0%
53	Transportation and Material Moving Occupations	172	5.8%
	Total Jobs Supported by FOE in 10th Program Year	2,986	**100.0%**

The analysis also reveals that:

- White-collar jobs account for over half of those supported by Focus programs, with semi-skilled jobs outnumbering skilled jobs

- Compared to existing Wisconsin employment patterns, Focus generates a higher portion of white-collar skilled jobs, a lower portion of blue-collar skilled jobs, and roughly an equal proportion of white-collar and blue-collar semi-skilled jobs.

- Job impacts are roughly equally distributed among high, medium, and low wage categories, although the high wage category shows the smallest growth. The proportion of new employment is very close to existing Wisconsin proportions.

5.2 OCCUPATION SKILL LEVELS

Job creation follows as a consequence of Focus impacts on business sales growth. Whenever a business grows in the volume of sales activity, there is normally a corresponding increase in employment. However, the magnitude of the change in jobs differs dramatically among industries, because each industry has a different mix of needs for equipment, materials, and workers. For instance, retail and service industries are more labor intensive than manufacturing industries (in terms of the mix of spending on workers relative to spending on equipment), and hence account for a larger share of job impacts than business output (sales volume) impacts.

Another key issue is that the skill and pay level are not the same across industries. Some technology-driven manufacturing and service industries provide a significant amount of jobs for highly paid skilled workers, while other industries such as retailing and wholesaling rely more heavily on lower paid semi-skilled workers.

Each industry has its own unique combination of occupational skill needs. Job growth impact of Focus on Energy are calculated in the REMI economic model by considering the combination of industrial growth opportunities, their occupational requirements, and Wisconsin's existing and projected future workforce skills and pay levels. This process is important in ensuring that the projected impact on jobs are realistic—which means that the industry growth projections are generally consistent with workforce skills and wage levels.

Economic growth impacts of Focus on Energy are best understood by examining the consequences of maintaining the program for ten years. The reason for this is because the cost savings from program participation accumulate over time, leading to more significant impact on the magnitude of spending changes, business attraction from improved competitiveness, development of trade, and market changes over that time span. Many of the economic growth impacts therefore unfold with a delayed effect. Accordingly, this chapter examines differences in the economy in the tenth program year after implementation, compared to what would be expected without the Focus programs.

The economic projections for Focus on Energy is an increasing number of additional jobs in Wisconsin—amounting to 2,986 more jobs present by the tenth year. All but five of those jobs could be classified in terms of the standard occupational groups, so the impacts that are shown in this chapter cover 2,981 private and public sector jobs. Tables 5-2a and 5-2b show a detailed projection of the occupational impacts of Focus on Energy for 94 occupational categories (from the occupation mapping in the REMI model). Overall, it shows that Focus on Energy ultimately affects an extremely wide range of job types, reflecting the broad industry impacts previously noted. The largest numbers of job impacts are in local services such as restaurant, retail, and construction, but Focus also supports a large number of managerial, professional, and manufacturing jobs.

Table 5-2a Impacts on White-Collar Jobs, by Detailed Occupation (tenth program year)*

Category		Wage Group**	Occupation Description	Number of Jobs
White-Collar Skilled (807 jobs, 27% of total)	Manegerial, Business, and Technical Workers (459 jobs, 15.4% of total)	M	Top Executives	67
		H	Advertising, Marketing, Public Relations, and Sales Managers	18
		H	Operations Specialties Managers	43
		M	Other Management Occupations	53
		H	Business Operations Specialists	69
		H	Financial Specialists	53
		H	Computer Specialists	77
		H	Mathematical Scientists	2
		M	Architects, Surveyors, and Cartographers	5
		H	Engineers	31
		H	Drafters, Engineering, and Mapping Technicians	21
		M	Life Scientists	3
		H	Physical Scientists	4
		H	Social Scientists and Related Workers	7
		H	Life, Physical, and Social Science Technicians	5
	Social, Legal, and Other Professional Workers (348 jobs, 11.6% of total)	L	Counselors, Social Workers, and Other Social Service Specialists	31
		L	Religious Workers	14
		L	All other Counselors, Social Workers, and Religious Workers	6
		H	Lawyers, Judges, and Related Workers	16
		M	Legal Support Workers	10
		L	Postsecondary Teachers	29
		L	Primary, Secondary, and Special Education School Teachers	68
		L	Other Teachers and Instructors	16
		M	Librarians, Curators, and Archivists	4
		L	Other Education, Training, and Library Occupations	25
		M	Art and Design Workers	13
		L	Entertainers and Performers, Sports and Related Workers	13
		M	Media and Communication Workers	11
		M	Media and Communication Equipment Workers	4
		H	Health Diagnosing and Treating Practitioners	52
		H	Health Technologists and Technicians	33
		H	Other Healthcare Practitioners and Technical Occupations	3
White-Collar Semmi-Skilled (824 jobs, 28% of total)	Retail Wkrs. (367 jobs, 12.3% of total)	L	Supervisors, Sales Workers	44
		L	Retail Sales Workers	228
		H	Sales Representatives, Services	23
		H	Sales Representatives, Wholesale and Manufacturing	37
		L	Other Sales and Related Workers	35
	Clerical Workers (457 jobs, 15.3% of total)	M	Supervisors, Office and Administrative Support Workers	28
		M	Communications Equipment Operators	4
		H	Financial Clerks	75
		M	Information and Record Clerks	112
		M	Material Recording, Scheduling, Dispatching, and Distributing	64
		M	Secretaries and Administrative Assistants	81
		M	Other Office and Administrative Support Workers	93

** Results are for Residential, Business, and Renewables Programs for low-funding scenario without market effects*

*** See section 5.3 for description of wage categories*

Table 5-2b Impacts on Blue-Collar Jobs, by Detailed Occupation (tenth program year)*

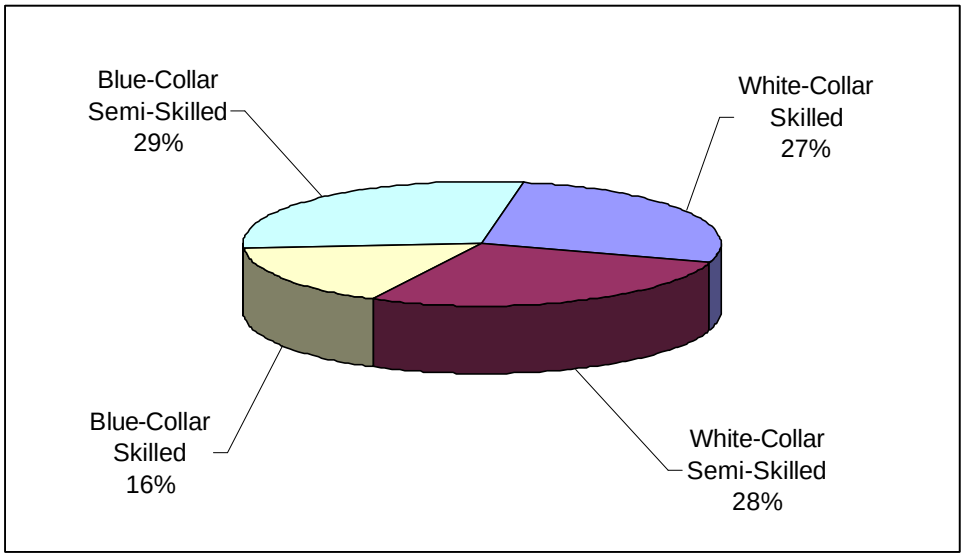
Category		Wage Group**	Occupation Description	Number of Jobs
Blue-Collar Skilled (490 jobs, 16% of total)	Health Care & Protective Service (100 jobs, 3.3% of total)	M	Nursing, Psychiatric, and Home Health Aides	33
		H	Occupational and Physical Therapist Assistants and Aides	2
		H	Other Healthcare Support Occupations	17
		L	First-Line Supervisors/Managers, Protective Service Workers	3
		L	Fire Fighting and Prevention Workers	3
		L	Law Enforcement Workers	14
		L	Other Protective Service Workers	28
	Manufacture, Service, and Repair (390 jobs, 13% of total)	M	Supervisors of Installation, Maintenance, and Repair Workers	10
		H	Electrical Equipment Mechanics, Installers, and Repairers	11
		L	Vehicle and Mobile Equipment Mechanics, Installers	36
		M	Other Installation, Maintenance, and Repair Occupations	65
		H	Supervisors, Production Workers	18
		H	Assemblers and Fabricators	59
		M	Food Processing Workers	16
		H	Metal Workers and Plastic Workers	73
		H	Printing Workers	9
		M	Textile, Apparel, and Furnishings Workers	18
		M	Woodworkers	6
		H	Plant and System Operators	4
		H	Other Production Occupations	65
Blue-Collar Semi-Skilled (860 jobs, 29% of total)	Restaurant, Groundskeep, and Personal Care Workers (500 jobs, 16.8% of total)	L	Supervisors, Food Preparation and Serving Workers	25
		L	Cooks and Food Preparation Workers	76
		L	Food and Beverage Serving Workers	164
		L	Other Food Preparation and Serving Related Workers	37
		L	Supervisors, Building and Grounds Cleaning and Maintenance	6
		L	Building Cleaning and Pest Control Workers	45
		L	Grounds Maintenance Workers	23
		L	Supervisors, Personal Care and Service Workers	4
		L	Animal Care and Service Workers	3
		L	Entertainment Attendants and Related Workers	13
		L	Funeral Service Workers	1
		L	Personal Appearance Workers	14
		L	Transportation, Tourism, and Lodging Attendants	3
		L	Other Personal Care and Service Workers	56
	Agriculture, Construction, and Extraction (189 jobs, 6.3% of total)	L	Supervisors, Farming, Fishing, and Forestry Workers	0
		L	Agricultural Workers	-3
		L	Forest, Conservation, and Logging Workers	0
		L	Forest, Conservation, and Logging Workers	1
		M	Supervisors, Construction and Extraction Workers	17
		M	Construction Trades Workers	150
		M	Helpers, Construction Trades	14
		M	Other Construction and Related Workers	9
		H	Extraction Workers	1
	Transport Workers (171 jobs, 5.8% of total)	M	Supervisors, Transportation and Material Moving Workers	7
		H	Air Transportation Workers	1
		M	Motor Vehicle Operators	64
		H	Rail Transportation Workers	0
		L	Water Transportation Workers	0
		L	Other Transportation Workers	7
		M	Material Moving Workers	92

** Results are for Residential, Business, and Renewables Programs for low-funding scenario without market effects*

*** See section 5.3 for description of wage categories*

To better demonstrate the patterns of impact, Figure 5-1 summarizes the mix of job impacts in terms of combinations of blue collar/white collar and skilled/semi-skilled. Most notably, it shows that white-collar jobs account for over half of the Focus on Energy impacts, with a near equal split between skilled and semi-skilled positions.

Figure 5-1. Occupation Mix of Focus on Energy Job Impacts



To further interpret these results, it is useful to compare the Focus on Energy job impacts to the current mix of occupations in Wisconsin. The results are provided in Table 5-3 and illustrated graphically in Figure 5-2. They show the following results:

- Overall, Focus supports new employment that has a higher proportion of white-collar workers than existing Wisconsin employment trends. This effect is particularly pronounced for skilled white-collar workers. While the generated employment has a lower proportion of blue-collar workers overall (than the state), this effect is particularly strong for skilled blue-collar workers.
- Among white-collar skilled jobs, Focus on Energy is projected to provide a slightly larger (than existing) share of new jobs for managerial, business, and technical workers, as well as a slightly larger share (vs. existing) of new jobs in social, legal, and other professional fields.
- Among white-collar semi-skilled jobs, Focus on Energy is projected to provide a slightly larger (than existing) share of new retail jobs, but a slightly lower portion of clerical workers. This may reflect increased consumer spending on retail and services, due to residential program impacts on the cost of living.
- For blue-collar skilled occupations, Focus-supported jobs in the sub-categories health care & protection and manufacturing service & repair are a smaller fraction of total versus state patterns. This demonstrates the program's modest effect on manufacturing employment
- Finally, among blue-collar semi-skilled jobs, Focus on Energy is projected to provide a lower (than existing) share of new jobs in the transportation occupational category, but

a slightly larger share of jobs in the sub-categories restaurant, grounds, & personal care and agriculture, construction, & extraction.

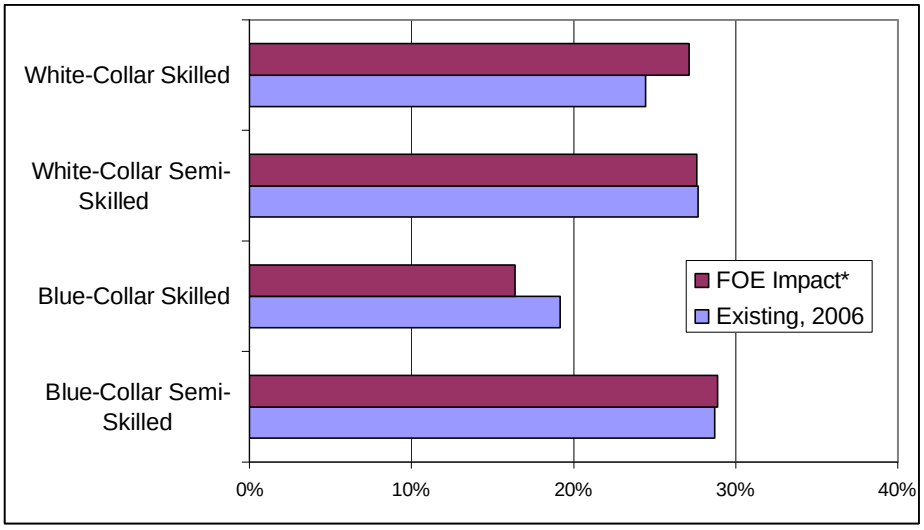
Altogether, these results indicate the new jobs supported as a consequence of Focus on Energy represent a higher share of white-collar jobs and a lower share of blue-collar jobs than now exists in the overall statewide economy. However, the impact on skill-level is different for each broad category. The policy interpretation of this finding thus depends on whether there is an interest in seeing more growth of higher skill technology jobs or providing a broader mix of skilled and semi-skilled jobs in the future.

Table 5-3 Occupation Mix of Existing Jobs and Focus on Energy Job Impacts*

	Existing Statewide Jobs, 2006	Jobs Created by Focus (tenth prg. yr)
Managerial, Bus., and Tech.	13.9 percent	15.4 percent
Social, Legal, and Other Prof.	10.5 percent	11.7 percent
White-Collar Skilled	**24.4 percent**	**27.1 percent**
Retail Workers	11.9 percent	12.3 percent
Clerical workers	15.7 percent	15.3 percent
White-Collar Semi-Skilled	**27.7 percent**	**27.6 percent**
Health Care & Protection	3.8 percent	3.3 percent
Manufacture, Service, & Repair	15.4 percent	13.1 percent
Blue-Collar Skilled	**19.2 percent**	**16.4 percent**
Restaurant, Grnds, & Pers. Care	15.0 percent	16.8 percent
Ag., Construction, & Extraction	5.6 percent	6.3 percent
Transportation workers	8.1 percent	5.8 percent
Blue-Collar Semi-Skilled	**28.7 percent**	**28.9 percent**
Total–All Occupations	**100.0 percent**	**100.0 percent**

** Results include Business, Residential, and Renewables Programs for low funding scenario, excluding market effects.*

Figure 5-2. Occupation Mix of Existing Jobs and Focus on Energy Job Impacts



** Through tenth program year; FOE results include Business, Residential, and Renewables Programs for low funding scenario, excluding market effects.*

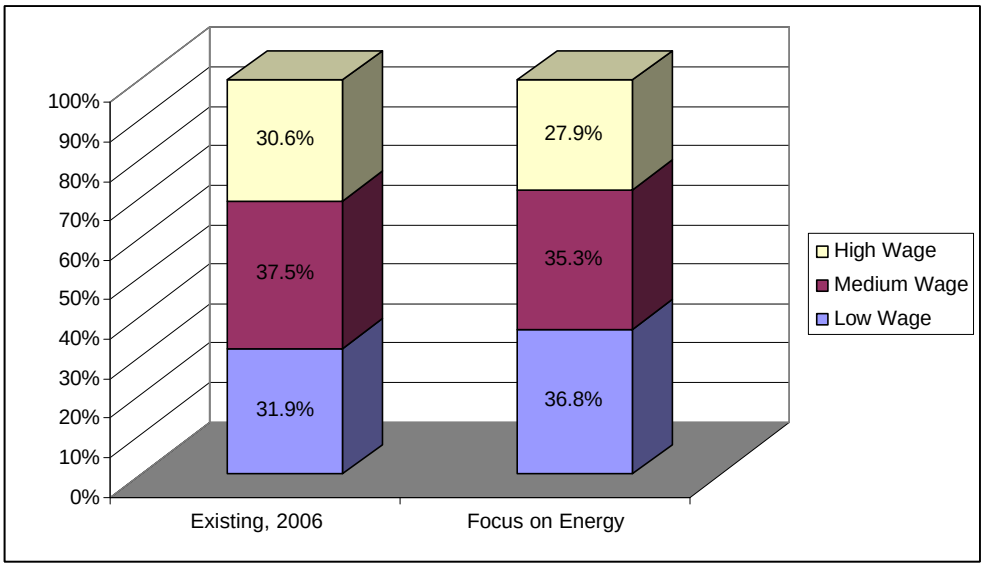
5.3 WAGE LEVELS

The employment supported by Focus programs can be grouped by average wage level as well as occupational group. Differences among wages reflect, to some degree, the demand for that occupation, the skill level required, and the amount of education or training necessary for to be qualified for that position. As a consequence, the pattern of program impacts on industries also leads to impacts on the mix of pay levels for new jobs.

Tables 5-2a and 5-2b group occupational categories into three wage groups: high, medium, and low. The high wage group indicates occupations where the average wage is at least 15 percent greater than the state average wage of $34,700. The low group designates those that are at least 15 percent below the state average, and the medium category gathers all occupations within 15 percent of the average (between $30,174 and $39,905). The annual income levels range from approximately $82,000 at the high end to approximately $10,000 at the low end of the range. The middle group consists of industries where the average annual pay is between $30,200 and $39,900. (All figures are in nominal dollars and reflect 2006 wages as calculated by REMI model). It is clear from this analysis that many of the higher paying jobs are in the manufacturing and credit/finance/banking sector, while many of the lower paying jobs are in retail and service sectors.

Using this classification, Figure 5-3 shows the wage distribution of Focus jobs impacts. This is compared to the wage class distribution of the overall Wisconsin economy. The results indicate that, overall, the wage distribution of Focus-supported employment is relatively close to current Wisconsin levels. However, job impacts are slightly higher in the low wage category and lower for each of the medium and high wage categories. This likely reflects the relatively modest representation of (high-paying) manufacturing job impacts, which is attributable to the high share of households and commercial (as opposed to industrial) program participants.

Figure 5-3 Wage Mix of Existing Jobs and Focus on Energy Job Impacts



Economic development policy may seek to promote forms of economic growth that expand demand for jobs in leading technology industries with above-average pay, or it may seek to replace lost jobs in lower paying, less highly skilled job categories. The results of Figure 5-3

indicate that Focus on Energy is actually succeeding in supporting the growth of a wide range of jobs with generally average pay. The interpretation of this finding depends on clarifying the specific economic development goals. In any case, though, it should be clear that program design and marketing can affect the nature of the job impacts. This means that there are opportunities for further “fine tuning” of the program design and marketing to further achieve those goals.

6. IMPACTS BY URBAN-RURAL LOCATION

This chapter examines the impacts of Focus on Energy (Focus) in terms of the distribution of the economic benefits among urban, rural, and semi-rural counties in the state.

6.1 MEASUREMENT OF ENERGY SAVINGS AS AN ECONOMIC DRIVER

In the preceding chapters of this report, economic development benefits are represented as changes in the economy—jobs, business sales, disposable income, and gross state product. However, the statewide REMI model used to determine the magnitude of these impacts does not provide a distribution of these benefits by geographic region. Therefore, as an alternative, this chapter reports instead on the distribution of key drivers of these economic impacts—the savings in energy costs for households and businesses (including the Farm sector) that have participated in Focus. The choice to explore the distribution of FOE's economic benefits across urban and rural regions was driven by the state's interest in this analysis and the legislated mandate of rural economic development. This analysis is conducted on data representing Focus activity through the end of fiscal year 2006.

The information presented in this chapter on energy bill savings is based on the detailed data concerning gross energy savings that was provided by the Residential and Business program administrators. For purposes of the economic impact and benefit-cost analyses, those gross energy savings were converted to net energy savings and their value calculated based on the utility cost per unit of electricity and natural gas. That represents a societal view of the net program impacts without inflation for activities that would have occurred anyway. The results were then recalculated in terms of the overall impact on the state's urban counties, its rural counties, and its semi-urban counties.

It is important to note that the program impacts on annual savings for households and businesses in FY06 that are shown here are substantially larger than those shown for FY02 in the Economic Policy Report (March 2004). The reason is that the vast majority of the initial year program impacts continue to occur year-after-year, causing the annual savings to continually grow over time as the program continues to operate. So even when the program budget is held constant or reduced, the effect of prior years can continue to accumulate larger and larger energy savings until we reach the end of the "useful life" of the early year installed equipment.

It is also important to note that the breakdown of energy savings by counties that are shown in this analysis appear smaller than those shown in the Semiannual Report (September 2006). The reason is that the Semiannual Report showed gross energy savings rather than the lower value of net energy savings. In addition, that report valued the energy savings based on market prices paid by users rather than the lower utility avoided cost.

6.2 CLASSIFICATION OF COUNTIES AND ELIGIBLE CUSTOMERS

Classification of Counties. Counties were assigned a type of urban, semi-rural, or rural based on a coding system created by the Economic Research Service of the U.S. Department of Agriculture that assigns counties into one of ten categories based on their population density, urban population, and proximity to an urban area. Table 6-1 below shows a description of the eight (of nine classifications) codes that apply to Wisconsin, lists the counties included in each category, and has the codes grouped by county type. Twenty-five of Wisconsin's 72 counties are classified as urban. These 25 urban counties are home to

approximately 72 percent of Wisconsin's population and make up around 30 percent of its land area. The 17 counties classified as rural are home to just over 9 percent of Wisconsin's population and make up around 25 percent of its land area.

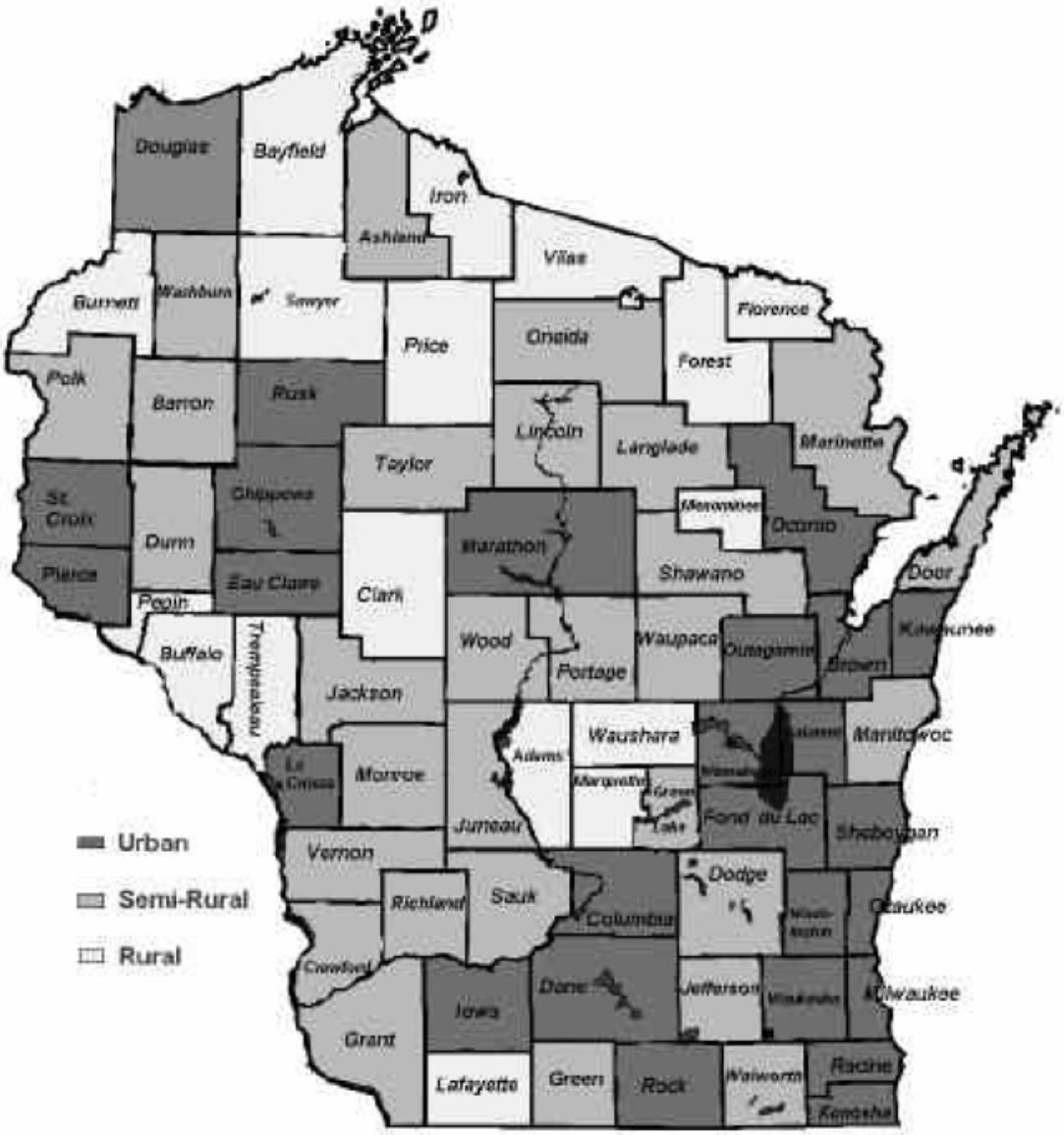
Table 6-1. Classification of Wisconsin Counties by Urban-Rural Status

County Type	Category Code	Category Description	Counties Included	Percent of Total Population	Percent of Land Area
Urban	1	County in metro area with 1 million people or more	Kenosha, Milwaukee, Ozaukee, Pierce, St. Croix, Washington, Waukesha	32.6%	5.6%
	2	County in metro area of 250,000 to 1 million people	Brown, Columbia, Dane, Douglas, Iowa, Kewaunee, Oconto	15.4%	10.9%
	3	County in metro area of fewer than 250,000 people	Calumet, Chippewa, Eau Claire, Fond du Lac, La Crosse, Marathon, Outagamie, Racine, Rock, Sheboygan, Winnebago	24.1%	13.5%
Semi-rural	4	County with urban population of 20,000 people or more, not in a metro area	Dodge, Jefferson, Manitowoc, Portage, Sauk, Walworth, Wood	10.0%	9.3%
	6	County with urban population of 2,500 - 19,999 peoplee, adjacent to a metro area	Barron, Door, Dunn, Grant, Green, Green Lake, Jackson, Langlade, Lincoln, Marinette, Monroe, Polk, Richland, Rusk, Shawno, Taylor, Vernon, Washburn, Waupaca	11.2%	29.4%
	7	County with urban population of 2,500 - 19,999 peoplee, not adjacent to a metro area	Ashland, Crawford, Juneau, Oneida	1.8%	6.5%
Rural	8	Nonmetro county completely rural or less than 2,500 urban population, adjacent to a metro area	Adams, Bayfield, Buffalo, Burnett, Clark, Lafayette, Marquette, Menominee, Pepin, Trempealeau, Washara	3.6%	14.5%
	9	County with less than 2,500 urban population, not adjacent to a metro area	Florence, Forest, Iron, Price, Sawyer, Vilas	5.9%	10.4%
Total				**5,363,675**	**54,314 sq mi**

Source: USDA Economic Research Service (ERS) Rural Urban Continuum Codes.

Figure 6-1 provides a map of Wisconsin's counties, shaded to identify their county type. A review of the map shows that that the classification of counties is largely consistent with what someone familiar with the state might expect: half of Wisconsin's counties are semi-rural, 8 of the 17 rural counties are located in the northernmost portion of the state; 7 of the 25 urban counties are in the Milwaukee area or the corridor between Milwaukee and Chicago, with the other urban counties being those containing Wisconsin's larger cities and or have high rates of commuting to those metropolitan areas—e.g., Dane County (Madison), La Crosse County (La Crosse), Brown County (Green Bay)—or are located close to Minneapolis, Minnesota—e.g., Pierce and St. Croix Counties.

Figure 6-1. Map of Wisconsin Counties by Urban-Rural Class



Classification of Eligibility to Participate. Not all Wisconsin residents or businesses are eligible to participate in Focus. Only those households or businesses in a participating utilities' territory are eligible. While investor owned utilities (IOU's) were required to participate in Focus, municipal utilities and cooperatives were not. Currently there are 31 utilities participating in Focus on Energy. These 31 utilities serve approximately 84 percent of Wisconsin's 2.1 million households and approximately 82 percent of Wisconsin's roughly 280,000 businesses. However, the semi-rural and rural counties are more likely to be served by a municipal or a cooperative utility, and, therefore, homes and businesses located in urban counties are more likely to be located in a participating utility territory with 90 percent of households in urban counties being eligible, while only 65 percent of households located in rural counties are eligible. Similarly, 92 percent of businesses in urban counties are eligible, while only 66 percent of businesses in rural areas are eligible.

For the commercial and industrial sectors the estimates of eligible participants was based on two efforts.

1. The number of businesses in participating utility territories in each county were estimated by determining the proportion of businesses in the state of Wisconsin Department of Workforce Development Standard Name and Address Program (SNAP) covered by Wisconsin's unemployment insurance law. It was determined, based on geographic location, whether each business was in a territory of a utility participating in the Focus on Energy program. Then, for each industry in each county, the proportion of the businesses that were in a participating utility territory was determined. This proportion was then applied to the number of businesses in each corresponding industry/county as reported by Dunn and Bradstreet to arrive at an estimate of the number of businesses eligible to participate in each industry in each county.

2. The second step was to identify the industries targeted by the Business Program administrator. This analysis resulted in the identification of 23 of the 82 two-digit SIC codes as being targeted by the industrial programs and 28 of the 82 two-digit SIC codes as being targeted by the commercial programs, with 8 industries being targeted by both the industrial and commercial programs. The 23 codes identified as being targeted by the industrial programs account for about 33 percent of Wisconsin businesses, while the 28 codes identified as being targeted by the commercial programs account for about 79 percent of Wisconsin businesses. The number of eligible participants was then estimated by summing the eligible participants in each county for each of the industries identified as being targeted by the program administrator.

For the residential sectors, the estimate of the number of eligible households for each county was arrived at by determining the proportion of the area of each census block group that was within the boundaries of a utility participating in Focus on Energy. This proportion was then applied to the population of that census block group to estimate the number of participating households within the block group. These block group estimates were then aggregated to the county level.

6.2 FINDINGS—RESIDENTIAL PROGRAMS

As of June 30, 2006 (the end of the state's 2006 fiscal year), the *gross* annual energy savings attributable to the Focus residential programs had risen to $47,049,417 (as shown in detail in Appendix A of the 2006 Semiannual Report (September 2006). When converted to *net* annual energy savings valued at utility avoided cost, as adopted for the economic analysis, then its net value is calculated to $28,883,776.

The distribution of the value of net energy savings among urban, semi-urban, and rural counties is shown in Table 6-2. It shows 81 percent of the value of energy savings achieved by participating households is occurring in urban counties. This can be compared to the 72 percent of all Wisconsin residents that live in the urban counties, thus indicating a larger share of the energy savings is occurring there. However, as noted previously, this is due almost entirely to the fact that only 65 percent of rural residents are served by participating utilities, while 90 percent of urban residents are served by participating utilities. As shown in the table, the overall distribution of dollars saved actually tracks close to the distribution of eligible population.

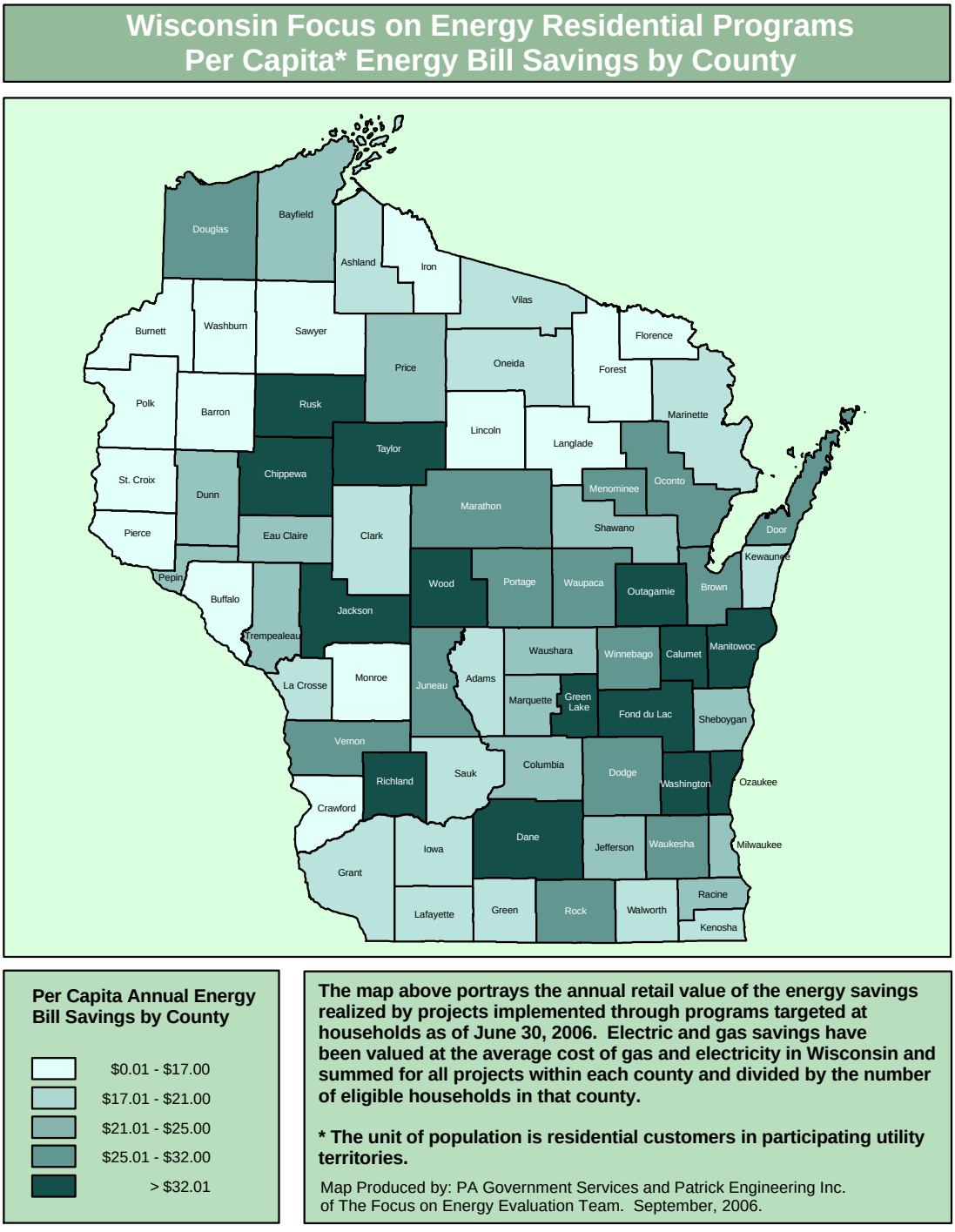
The table also shows the average savings per household. It is important to note that this value represents the total savings among all participating households, divided by the total population residing in these areas. Thus, the higher average savings per resident of urban counties reflects the higher rates of eligibility and participation in those areas.

Table 6-2. RESIDENTIAL PARTICIPATION AND ENERGY BILL SAVINGS

	Annual Dollars Saved	Percent of Dollars Saved	Eligible Customers	Percent of Eligible Customers	Savings per Eligible Customer
Urban	$22,649,907	81%	1,378,981	78%	$16.43
Semi-Urban	$4,474,056	16%	319,732	18%	$13.99
Rural	$838,885	3%	62,721	4%	$13.37
Total Known	**$27,962,849**	**100%**	**1,761,434**	**100%**	**$15.88**
Not Known	$920,927				
Total	**$28,883,776**				

In Figure 6-2, energy bill savings are shown as "per capita" to show differences in the intensity of savings relative to the population in the county. The per capita value is derived by summing the annual energy bill savings from all participants in a county and dividing that sum by the number of eligible participants in that county. Since energy bill savings of residential participants is one of the key factors in generating economic impacts, this map provides a view of how the impact from that economic driver is distributed by county. The comparison of the percentage of counties that fall into each of the five per capita energy bill savings categories shows that the urban counties are very highly concentrated in the upper end of the range, while there are no rural counties in the highest category.

Figure 6-2. Residential Program Energy Savings Per Capita, by County



6.3 FINDINGS—COMMERCIAL SECTOR BUSINESS PROGRAMS

The Focus commercial programs serve commercial organizations including commercial businesses (e.g., stores and offices) as well as public and private organizations (e.g., schools, churches, and government agencies). As of June 30, 2006 (the end of the state's 2006 fiscal year), the *gross* annual energy savings attributable to the Focus commercial programs had risen to $36,497,797 (as shown in detail in Appendix A of the 2006 Semiannual Report (September 2006). When converted to *net* annual energy savings valued at utility avoided cost, as adopted for the economic analysis, then its net value is calculated to $19,856,658.

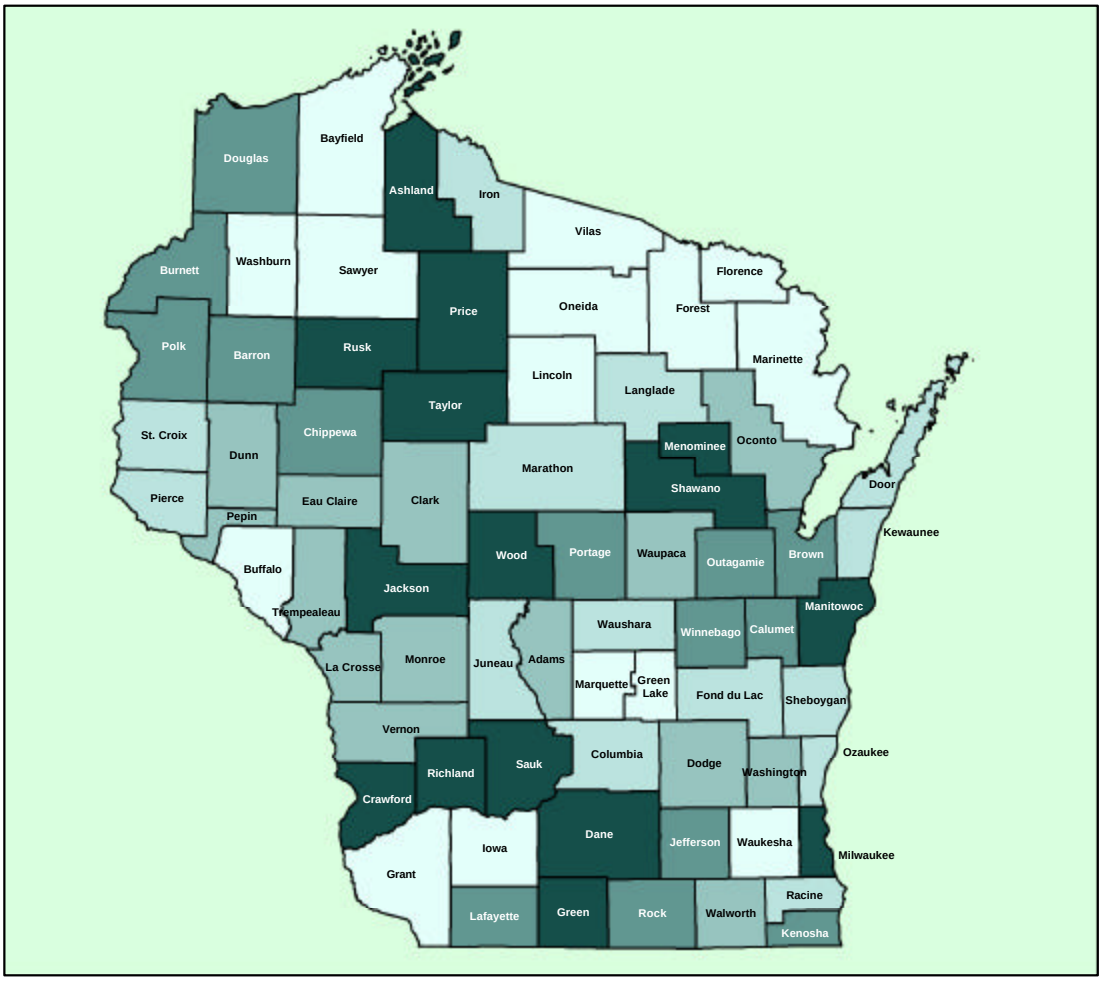
The distribution of the value of net energy savings among urban, semi-urban, and rural counties is shown in Table 6-3. It shows 72 percent of the value of energy savings achieved by participating commercial businesses is occurring in urban counties. This is significantly lower than the urban share of the residential program (81 percent). It indicates that the commercial programs have a broader distribution of benefits in semi-urban and rural areas, compared to the residential program. However, this distribution of dollars saving actually tracks very close to the overall distribution of eligible commercial and government customers,

Table 6-3. COMMERCIAL PARTICIPATION AND ENERGY BILL SAVINGS (By County Type*)

	Annual Dollars Saved	Percent of Dollars Saved	Eligible Customers	Percent of Eligible Customers	Savings per Eligible Customer
Urban	$14,237,387	72%	126,162	72%	$112.85
Semi-Urban	$4,548,054	23%	40,369	23%	$112.66
Rural	$790,966	4%	9,724	6%	$81.34
Total Known	**$19,774,149**	**100%**	**176,255**	**100%**	**$112.19**
Not Known	$82,509				
Total	**$19,856,658**				

In Figure 6-3, energy bill savings are shown as "per business establishment" to show differences in the intensity of savings relative to the number of eligible commercial business establishments in each of the counties. This value is derived by summing the annual energy bill savings from all participating establishments in a county and dividing that sum by the number of eligible establishments in that county. Since energy bill savings of commercial participants is one of the key factors in generating economic impacts, this map provides a view of how the impact from that economic driver are distributed by county. The comparison of the percentage of counties that fall into each of the five per capita energy bill savings categories shows that the rural counties are more concentrated in the lower end of the range. The highest category is still dominated by urban and semi-rural counties, but some rural counties are also represented.

Figure 6-3. Commercial Program Energy Savings Per Business, by County



Per Capita Annual Energy Bill Savings by County

- $0
- $1 - $110.00
- $110.01 - $150.00
- $150.01 - $215.00
- $215.01 - $280.00
- > $280.01

The map above portrays the annual energy savings realized by projects implemented through programs targeted at commercial sector businesses as of June 30, 2006. Electric and gas savings have been valued at the average cost of gas and electricity for commercial businesses in Wisconsin and summed for all projects within each county and divided by the number of eligible commercial businesses in that county.

*** The unit of population is commercial customers in industries targeted by the agricultural and commercial business programs in participating utility territories.**

Map Produced by: PA Government Services and Patrick Engineering Inc. of The Focus on Energy Evaluation Team. September, 2006.

6.4 FINDINGS—INDUSTRIAL SECTOR BUSINESS PROGRAMS

As of June 30, 2006 (the end of the state's 2006 fiscal year), the *gross* annual energy savings attributable to the Focus industrial programs had risen to $39,095,238 (as shown in detail in Appendix A of the 2006 Semiannual Report (September 2006). When converted to *net* annual energy savings valued at utility avoided cost, as adopted for the economic analysis, then its net value is calculated to $21,244,489.

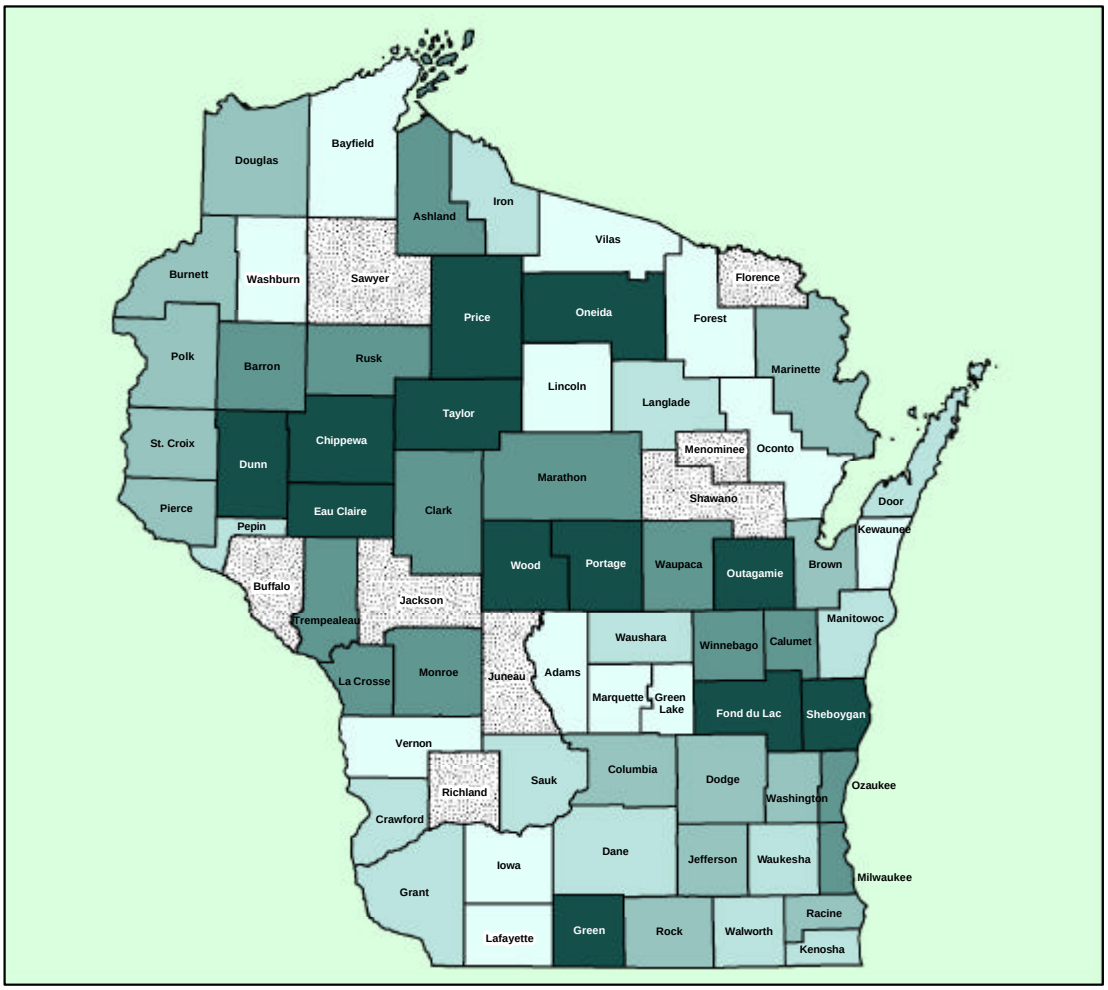
The distribution of the value of net energy savings among urban, semi-urban and rural counties is shown in Table 6-4. It shows 64 percent of the value of energy savings achieved by participating industrial businesses is occurring in urban counties. This is significantly lower than the urban share of the residential program (81 percent) and the commercial program (72 percent). Compared to the actual distribution of eligible industrial businesses, these results show that the industrial programs have a higher distribution of benefiting firms in semi-urban and rural areas compared to the other programs. Compared to the overall distribution of eligible industrial customers, these results also show that industries located in semi-urban and rural areas are also participating and realizing energy savings at a higher rate than their urban counterparts.

Table 6-4. INDUSTRIAL PARTICIPATION AND ENERGY BILL SAVINGS (By County Type)

	Annual Dollars Saved	Percent of Dollars Saved	Eligible Customers	Percent of Eligible Customers	Savings per Eligible Customer
Industrial					
Urban	$13,153,974	64%	62,484	75%	$210.52
Semi-Urban	$6,165,925	30%	17,193	21%	$358.63
Rural	$1,233,185	6%	3,443	4%	**$358.17**
Total Known	**$20,553,085**	**100%**	**83,120**	**100%**	
Not Known	$691,404				
Total	**$21,244,489**				

In Figure 6-4, energy bill savings are shown as "per business" to show differences in the intensity of savings relative to the eligible industrial businesses in the county. The value is derived by summing the annual energy bill savings from all participants in a county and dividing that sum by the number of eligible participants in that county. Since energy bill savings of industrial participants is one of the key factors in generating economic impacts, the map provides a view of how the impact from that economic driver are distributed by county. It also provides a comparison of the percentage of counties that fall into each of the five per capita energy bill savings categories. It shows that counties from all three county types are represented in the highest energy bill savings category. However, the rural and semi-rural counties are more concentrated in the lower end of the range.

Figure 6-4. Industrial Program Energy Savings Per Business, by County



Per Capita Annual Energy Bill Savings by County

- $0
- $0.01 - $75.00
- $75.01 - $160.00
- $160.01 - $310.00
- $310.01 - $550.00
- > $550.00

The map above portrays the annual energy savings realized by projects implemented through programs targeted at industrial sector businesses as of June 30, 2006. Electric and gas savings have been valued at the average cost of gas and electricity for industrial businesses in Wisconsin and summed for all projects within each county and divided by the number of eligible industrial businesses in that county.

*** The unit of population is industrial customers in industries targeted by the industrial programs in participating utility territories.**

Map Produced by: PA Government Services and Patrick Engineering Inc. of The Focus on Energy Evaluation Team. September, 2006.

6.5 RENEWABLE ENERGY PROGRAM

As of June 30, 2006 (the end of the state's 2006 fiscal year), the *gross* annual impacts of the Focus renewable energy program had risen to $6,860,847 (as shown in detail in Appendix A of the 2006 Semiannual Report (September 2006). When converted to *net* annual energy benefit valued at utility avoided cost, as adopted for the economic analysis, then its net value is calculated to be approximately $1,282,222.

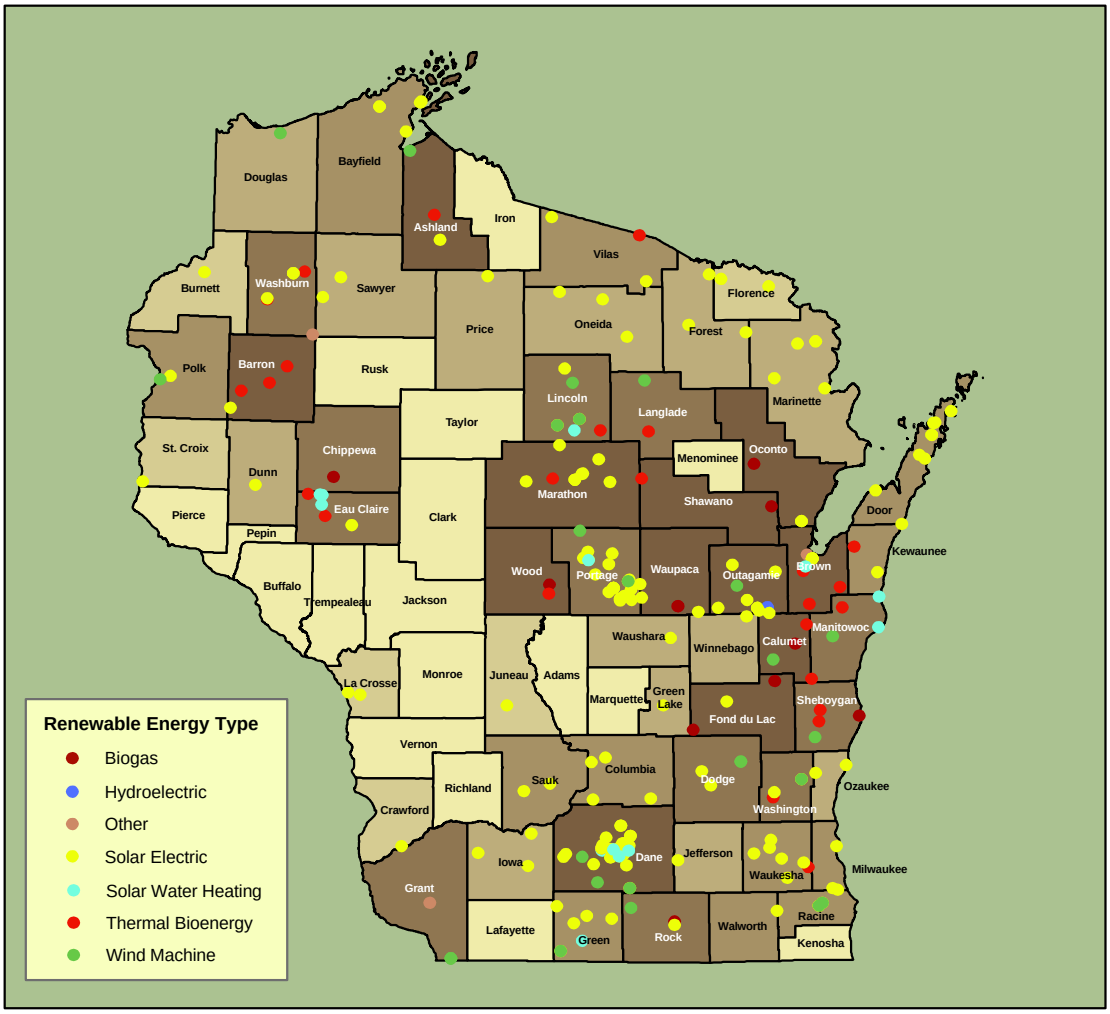
The distribution of the value of net energy benefits among urban, semi-urban, and rural counties is shown in Table 6-5. It shows 60 percent of the value of energy savings achieved by participating industrial businesses is occurring in urban counties, while 40 percent is being achieved in semi-urban and rural areas. This result shows that the Renewables program has a higher share of activity in rural areas and a lower share in urban areas than any of the other focus programs.

Table 6-5. Renewable Energy Participation and Energy Bill Savings

	Annual Dollars Saved	Percent of Dollars Saved
Urban	$769,333	60%
Semi-Urban	$448,778	35%
Rural	$64,111	5%
Total	**$1,282,222**	**100%**

In Figure 6-5, the location of renewable energy projects is shown, along with an indicator of the relative size of the projects. It shows the broad distribution of renewable projects across the state and the substantial share of those projects occurring in rural and semi-urban counties.

Figure 6-5. Renewable Energy Program: Completed Projects and Their Energy Impacts by County



Annual Value of Energy Impacts

- $0
- $1 - $200
- $201 - $1,000
- $1,001 - $11,500
- $11,501 - $175,000
- > $175,000

The map above portrays the annual retail value of the energy impacts realized through renewable energy projects installed as of June 30, 2006. Electric and gas savings have been valued at the average cost of gas and electricity in Wisconsin and summed for all projects within each county. Location of Individual projects is also shown on the map.

Map Produced by: PA Government Services and Patrick Engineering Inc. of The Focus on Energy Evaluation Team. September, 2006

7. CONCLUSIONS

7.1 TOWARDS A MORE COMPLETE INTERPRETATION OF FINDINGS

The findings of this report are based on actual measured impacts of the first five complete years of Focus operation. The report shows that all facets of Focus have impacts on the Wisconsin economy, and that overall the programs are on their way towards generating and supporting new jobs and expanded businesses across the state.

That being said, there is a remaining need to further carry these findings forward, and apply them to provide policy insight into the efficacy of Focus as a public benefit tool. There are three key steps in doing so. They are to: (1) establish the relative role of economic development benefits in a context of broader program goals, (2) define and apply measures for assessing the relative extent to which program benefits target the most critical economic development needs, and (3) identify and apply benchmarks for assessing program impacts, relative to those resulting from alternative forms of energy and non-energy programs.

Initial efforts to address these three steps are summarized below and are supplemented with literature review and discussion material provided in Appendix C. This section and the appendix material should be viewed as initial steps towards progress in addressing broader policy issues, which will be continued in subsequent policy reports.

7.2 ROLE OF ECONOMIC DEVELOPMENT BENEFITS

Focus on Energy was set up with a series of policy objectives, including near-term resource acquisition and long-term market transformation for energy efficiency, environmental benefits, economic development benefits, electric system reliability, and stimulating the energy efficiency services industry. To assess overall program efficacy, it is necessary to consider and assess achievement towards all of these objectives.

However, that does not mean that every program needs to be assessed equally in terms of achievement towards each of the policy goals. It is clear from this report that various programs within the Focus umbrella are differently oriented towards addressing specific goals, so it is possible to map programs to specific goals—including economic development goals. For instance, the analysis in this report showed that the Renewable Energy Generation program is not designed to achieve immediate cost savings for its participants, and hence does not generate short-term growth of Wisconsin's economy. However, the program is designed to stimulate the long-term growth of an industry (installing alternative generation technologies) that can also ultimately have economic development implications.

On the other hand, the analysis of residential programs in this report showed that they are designed to promote immediate cost savings and hence increases in statewide disposable income, as well as to support longer-term market effects. By matching Focus programs to specific types of short-term and long-term economic development impacts, we can (in the future) better track the relative success of these programs in achieving those goals.

7.3 MEASURES OF ECONOMIC DEVELOPMENT TARGETS

In general, economic development is a process of enhancing the state's economy by supporting the attraction, retention, growth, and diversification of business activity in the state.

However, the nature of economic development needs differs by industry, by type of worker skill, by urban/rural location, and by area of the state. A key rule of economic developers is that their efforts should be targeted to those industries, types of workers, and areas where there is the greatest need to attract, retain, grow, and diversify economic activity.

It is also clear from this report that various Focus programs have different target audiences in terms of types of households and types of businesses (commercial, industrial, agricultural, and local government). They also differ in technologies that they address (from construction to lighting equipment), which means that each supports a unique pattern of demand for manufactured products, construction services, and/or installation services. This also translates into a unique mix of occupations and pattern of benefiting industries.

Together, these two observations indicate the value of further tracking the distribution of economic impacts are comparing them to various indicators of economic need, as reflected in Wisconsin statewide economic patterns and trends. While Focus is not fundamentally designed or optimized as a purely economic development program, there can be value in placing our findings on its economic development impacts into the context of statewide economic need. This can be addressed in future policy studies.

APPENDIX A. ECONOMIC MODELING PROCESS

A.1 ECONOMIC MODELS AND THEIR ENERGY APPLICATIONS

The application of economic impact models to measure impacts of programs and policies is widely used and accepted around the nation. Nearly all, if not absolutely all, of the states use such models. The specific application of these models for energy efficiency, renewable energy, and energy pricing policies is also widely applied and proven.

1. The most basic type of economic model is known as an "input-output (I-O) model"—an accounting table that traces the pattern of how households and industries buy from and sell to each other. This type of model is useful because it allows us to trace how changes in spending and business sales lead to indirect spin-off (or "multiplier") effects on other aspects of the economy. A statewide input-output model can also trace program impacts on the net flow of money going into and out of the state.

2. Input-output models have been applied to assess the impacts of energy efficiency and renewable energy programs over a period of 20 years. Most of these studies used one of two input-output modeling tools—RIMS (developed by the US Dept. of Commerce) or IMPLAN (originally developed by the US Dept. of Interior and now offered by a private sector spin-off). Applications of RIMS include studies for the Nebraska, Florida, Wisconsin, and New York. Applications of IMPLAN include reports for Sacramento, Central Illinois, California, Ohio, Oklahoma, four Midwest states, and the nation. Applications using other I-O models include reports for California, the Pacific Northwest, British Columbia, Spain, and China.

3. A more advanced type of economic model is known as a policy analysis and forecasting simulation model, which combines an input-output mode with an additional ability to forecast shifts in prices, competitiveness factors and business attraction over time. The REMI model (developed by Regional Economic Models, Inc.) is the most well-known and widely used policy analysis and forecasting model in the United States. Another policy analysis and forecasting model, known as the REAL model (developed by Regional Economics Applications Laboratory of the University of Illinois), has also been applied in a variety of studies for Midwestern states.

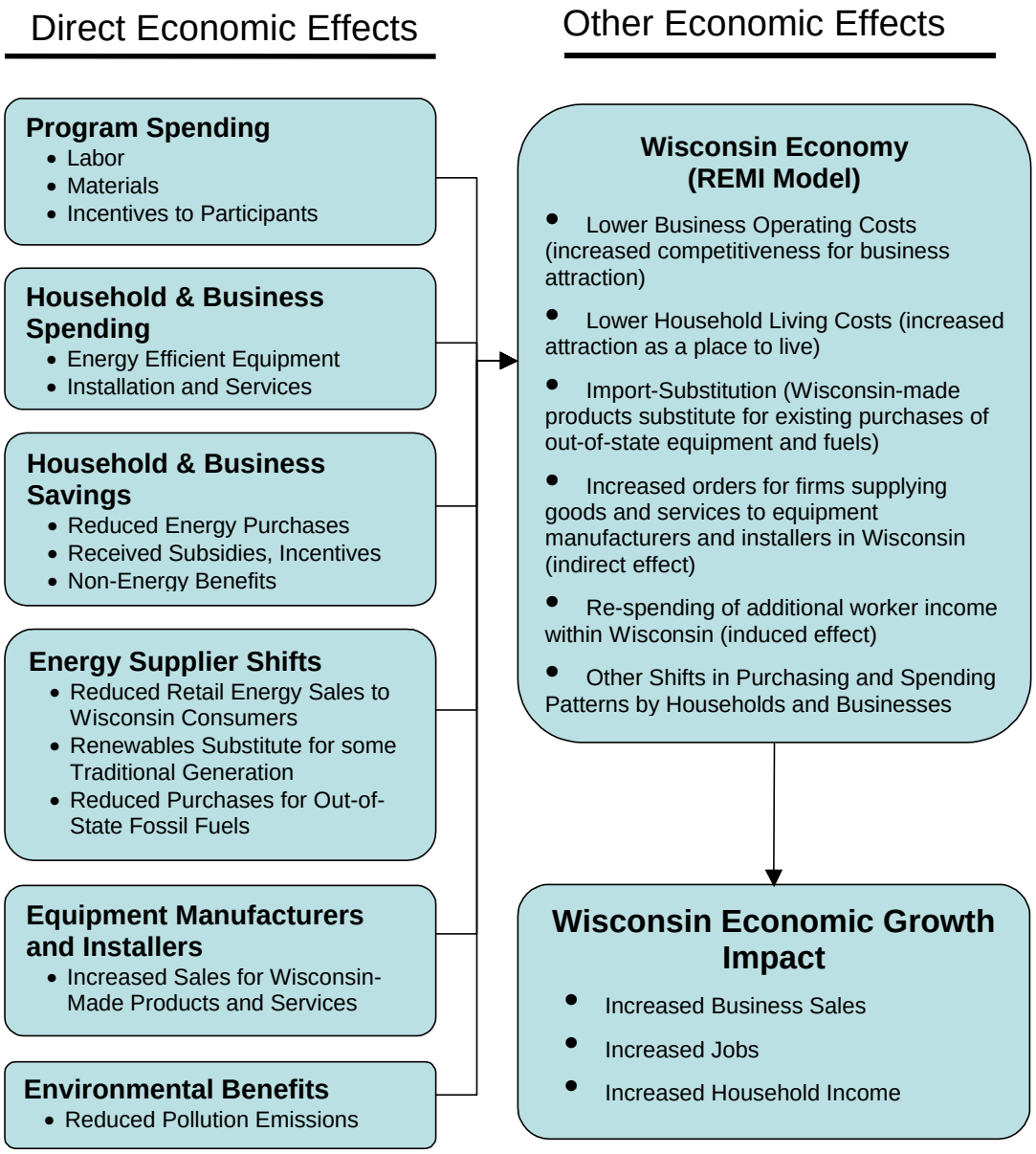
4. Applications of the REMI model for assessment of energy efficiency, renewable energy, and energy pricing policies include reports for California, Wisconsin, Iowa, Wyoming, Massachusetts, and New Jersey. Other applications using the REMI model to assess impacts of regulatory changes and shifts in energy fuels and technologies were reports for Maine, Missouri, Illinois, Michigan, Connecticut, Vermont, New Jersey, Florida, New York, and the Midwest. The REAL model was also recently used to assess impacts of clean energy technologies for ten Midwest states. (Full citations are provided in the Appendix.)

While there are differences in capabilities of the various types of models, they are generally consistent in their underlying structures and are built on similar foundations—(1) the inter-industry technology matrices and purchasing patterns provided in the US national input-output accounting tables, and (2) US Census and Commerce Dept. data on state and regional economic patterns. The findings on economic impact of energy programs are also generally consistent in showing that economic impacts will vary widely depending on the type and magnitude of the program effort, the form of program assistance or intervention, the focus on specific technologies or economic sectors, the level of program participation, the breadth and nature of the program impact area, and time periods covered by the analysis.

A.2 ECONOMIC ANALYSIS PROCESS

REMI calculates the economic effects of Focus on Energy on the state economy by tracking the flow of dollars, changes in purchasing and sales patterns, and impacts on prices and costs resulting from Focus on Energy programs. This process is illustrated in Figure A-1 and discussed in the text on the pages, which follow.

Figure A-1 REMI Model Inputs, Calculations and Outputs for Focus on Energy—



Types of Direct Economic Effects (inputs to the REMI model)

There are six categories of direct effects, which are input to the Wisconsin REMI model, as illustrated in Figure A -1:

- Program Spending—The costs of implementing the Focus programs. This includes the costs of program administration and operation, the labor for installation and implementation of program energy saving measures, and incentives paid to participants.
- Household and Business Spending—Program participants pay a share of all measure equipment and installation costs. These costs are expenditures of business or household income that might have been used otherwise but produce positive results for the Wisconsin businesses that sell energy efficient goods and services. This also includes market effects—spending by households and businesses influenced by the programs to purchase energy-efficient equipment and appliances even if they do not do it through formal participation in the programs.
- Household, Business and Public-sector Savings—Program incentives decrease acquisition costs for participants' purchase of energy-efficient equipment and appliances by paying a portion of the difference in cost (incremental cost) between the price of standard-efficiency and energy-efficient equipment. Reductions in participant energy use lower energy bills freeing household income for other uses, making businesses more competitive and public-sector savings, such as at public schools are available for additional state and local program spending. Households can also realize non-energy benefits, such as increased water savings, decreased maintenance costs, increased property values.
- Energy Supplier Shifts—Reductions in participant energy use will result in some in-state reductions in retail energy sales and reduced importation of coal and other fossil fuels. The development of renewable energy electricity generation will substitute for some of the burning of coal and other fossil fuels. Electricity generation from renewable sources will provide a new revenue stream for farmers (farm biomass fuels) and may generate in-state manufacture and sales of photovoltaic and wind generation equipment.
- Equipment Manufacturers and Installers—Focus on Energy will produce increased demand for Wisconsin-made products and services. This spending buys energy-efficient equipment made in-state, such as motors, controls, cooling equipment. It also supports employment for insulation installers and other sorts of energy service providers. The evaluation to date has yet to quantify any efficiency benefits that accrue to various market providers. Once quantified this aspect can also led to subsequent economic impact generation.
- Environmental Benefits—The value of reduced power plant emissions resulting from reduced energy consumption of program participants. At present the evaluation can track two of four the primary emissions, sulfur and nitrogen oxides (SO_x and NO_x). An environmental analysis can estimate economic effects resulting from emissions reductions from the perspective of utility companies but there are no agreed-upon standards for valuing the dollar impact of emissions reductions from the perspective of individuals.

It is important to note that there is a time dimension to each of these previously-cited direct Focus program impacts. Program operation spending, as well as household and business spending, will occur in each year that the program is continued. However, each year of Focus operation will also produce a stream of energy savings benefits that will last for approximately the life of the energy savings measures installed by the program. This period differs by type of equipment and household or business type, but averages roughly 15 years. We also project that households and businesses will be influenced to install additional energy savings measures that will add to the stream of savings and add to the economic impacts. As a result, the economic impacts of Focus programs will have additional effects that continue for at least the life of the programs and likely longer.

It is therefore critical that the economic impact analysis examine impacts over time. For purposes of measuring these impacts, this study makes the assumption that Focus programs will be operating for ten years. Our analysis then follows program impacts over an additional fifteen years (the average lifetime of installed equipment), for a total analysis period of 25 years.

Types of Intermediate Effects (Assessed within in the REMI Model).

There are six categories of resulting effects which are assessed within the REMI model, as illustrated earlier in Figure A-1:

- Lower Business Operating Costs (Increased Competitiveness for Business Attraction)—Focus on Energy lowers business operating costs by increasing energy efficiency, decreasing energy consumption, and possibly increasing productivity (where the program has influenced businesses to replace operating but obsolete equipment, for example). These effects are net gains to businesses. They can translate to increased profitability, increased productivity, increased ability to compete on price, and subsequent increases in payroll and taxes paid to the state.

- Lower Household Living Costs—Increased energy efficiency resulting from participation in Focus can result in decreased electricity and heating bills. The purchase of some energy-efficient appliances such as dishwashers and clothes washers can have additional non-energy benefits, such as decreased water use and decreased sewer taxes, depending upon the jurisdiction. These lower costs free up income that would otherwise be spent on energy for other uses. Decreased energy costs in a climate of moderate to severe weather also increases the attractiveness of Wisconsin as a place to live.

- Import Substitution (Wisconsin products substitute for out-of-state purchases)—Wisconsin imports most of the fuels made to generate electricity and heat homes. Decreasing these demands reduces the need to import fossil fuels into the state. The development of electricity generation through renewable sources decreases some of the need for importation of fossil fuels that generate electricity in-state. This sort of substitution represents a net gain to the state's economy, since more dollars are spent in-state than previously.

- Increased Orders for Wisconsin firms (indirect effect)—This is an indirect effect of Focus on Energy, resulting from increased purchases of energy efficiency products and services going to Wisconsin firms.

- Re-spending Additional Worker Income (Induced Effect)—Wisconsin workers who benefit by increased demand for their labor increase their own income and in turn increase their spending in their home communities and in other businesses that operate within the state.
- Other Shifts in Purchasing and Spending—Focus on Energy produces net gains in jobs and income throughout the state, directly and indirectly. The increased economic activity resulting from the programs' primary and secondary effects serve to strengthen the state's economy by increasing income while decreasing spending on imported goods and services.

Each of these intermediate impacts also has a time dimension. The household and business cost reductions, increased income, and import substitution impacts will continue to rise as energy savings impacts accumulate over time. As a result, the benefits of reduced costs of living and increase business competitiveness will continue well for decades beyond the assumed program period.

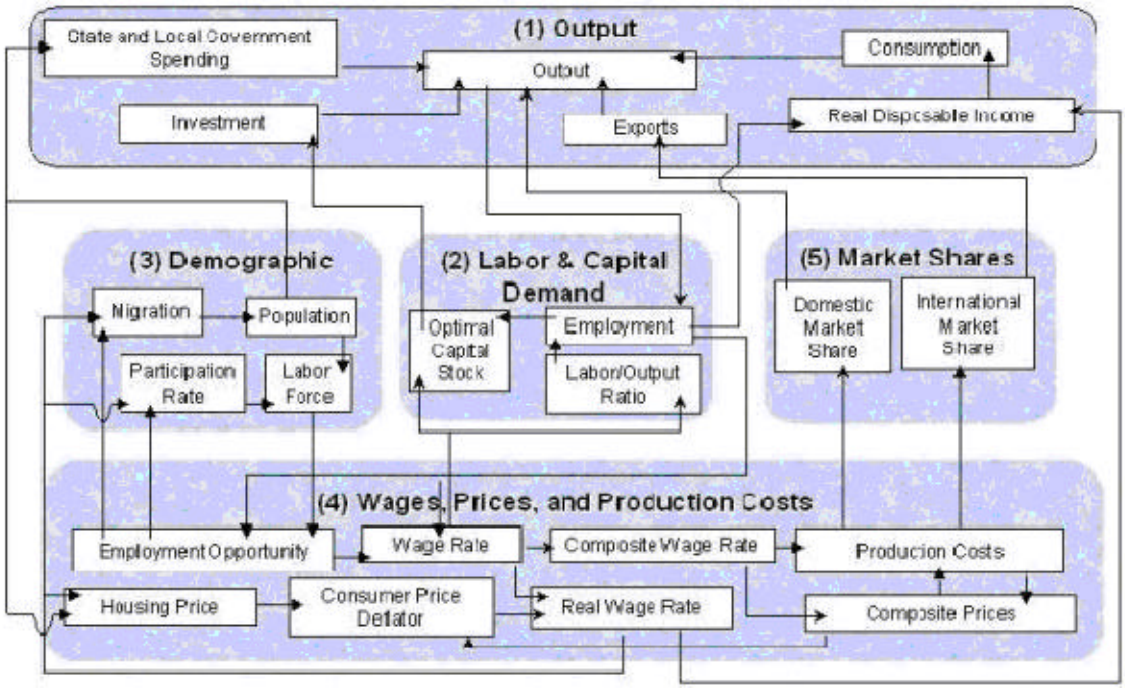
Calculation of Economic Model Results (Forecast by REMI)

The REMI analysis system assesses economic impacts of the preceding factors by applying a large series of economic relationships representing changes in inter-industry purchasing and sales transactions and long run equilibrium responses over time. These responses include changes in energy and other factor costs faced by households and businesses, as well as broader changes in labor demand and supply, wage rates, production costs and profitability, disposable household incomes, the proportions of local demand met by local production, investment demand, population shifts and market shares of national economic growth. (See Figure A-2.)

The end result is that the REMI model forecasts year-by-year changes in four key types of results on the Wisconsin economy:

- Business Sales—Increasing output and hence sales volume of goods and services provided by Wisconsin firms. This is shown by industry type.
- Gross Regional Product (GRP)—This is calculated as the value added portion of business sales, which is the business sales minus cost of materials. It essentially represents the sum of worker income and corporate (profit) income.
- Jobs—The number of jobs (both salaried workers and self-employed individuals) that is generated by expansion in business sales.
- Real After-tax Income—Household disposable income reflects the direct program savings in any given year as well as the after-tax wage income that results from the state's economy experiencing a positive growth response under Focus. Since the latter source of household income comes from a portion of the business sales, the income benefit cannot be added to the business expansion or GRP benefit.

Figure A-2 Internal Calculation Modules Within the Wisconsin REMI Model



A.3 ECONOMIC ANALYSIS ASSUMPTIONS AND LIMITATIONS

Assumptions

Performing an economic analysis requires making a number of assumptions about what Focus on Energy will look like over an extended period of time. Following are some of the important assumptions that were made in advance of analyzing programs' economic impacts. In general we made conservative assumptions to avoid over-estimating the programs' effects:

- For purposes of analysis, it was assumed that Focus on Energy programs were operated for 10 years, while program impacts were observed for 25 years. There are two reasons for this. First, it is necessary to assess program operations impacts for more than one or two years, so that we can observe the cumulative benefit of growing participation and market effects over time. Second, it is necessary to assess energy savings over a period over the lifetime of installed equipment, which averages approximately 15 years beyond the time of the last participant joining the program.
- For the Residential and Business Programs 'market effects' estimates were developed based on information provided by program administrators and additional projections made by program evaluators. Market effects estimate the extent to which Focus influences customers to make purchases of energy-efficient equipment they might not have otherwise made. Market effects factors are derived from Focus on Energy evaluation survey data and estimates made by knowledgeable practitioners.

Limitations

Economic analysis does not capture some types of program benefits at all, or captures them incompletely.

A good example of this is calculating economic benefits of decreasing emissions of atmospheric pollutants such as mercury, sulfur oxides ($SO_{x)}$, nitrogen oxides (NO_x), and carbon dioxide. Decreasing emissions of these pollutants benefits health and improves other quality-of-life concerns, but it is currently difficult or impossible to quantify those impacts from the perspective of individuals living in the state.

It is possible to quantify the value of some avoided emissions by looking at their value in pollution trading credit markets. However, the pollution credit trading markets involve utility companies not individuals. The scale of utility operations statewide is so large that the economic benefits derived from reducing emissions, though significant in themselves, do not register well in the model. Carbon dioxide reductions due to the program are significant but trading markets are only just being organized and we cannot currently place a value on reducing CO_2 emissions, even from the utility perspective.

APPENDIX B. IMPACTS BY KEY DRIVING FACTORS

This appendix describes how we defined and calculated each of the key factors that represents an input to the economic model, and it then shows the contribution of each of those factors to total economic impacts.

B.1 ENERGY COST SAVINGS

Energy cost savings represent the additional disposable income realized by households and the additional retained income realized by businesses as a result of installing program-supported measures that decrease energy use. Energy savings continue through the life of the program and beyond, to the end of measure lives of efficient equipment installed or purchased through the program, or whose purchase was influenced by the program.

Energy savings accrue cumulatively (after persistence loss) to participating business and institutional establishments as a reduction in the relative cost of doing business in Wisconsin—a positive effect on the economy. Over the ten year period analyzed, new savings are generated each year, creating streams of savings that peak in the tenth year. For participating state and local government offices, energy savings are assumed to free up dollars for more public spending.

Table B.1 Economic Impact of Energy Savings, Low Funding Scenario*

	Jobs	Business Sales*	Value-added*	real Disp. Income*
Year 1	58	$5.2	$2.9	$4.8
Year 5	1,091	$121.5	$73.1	$78.6
Year 10	2,604	$341.7	$204.0	$184.1
Sum: Yrs 1-10	12,514	$1,511.3	$897.0	$899.0

*** $ are in millions of constant 2006**
excludes market effects
Combines Business, Residential and Renewable Portfolios

B.2 HOUSEHOLD AND BUSINESS SPENDING

Household and business spending consists of the spending for the incremental costs between standard efficiency and high efficiency equipment and/or replacement of existing equipment before the end of their lifetimes. Since these are additional costs (and the offsetting energy savings are considered elsewhere), their net economic impact is negative. This spending is assumed to be generally constant through the ten year period analyzed. For those programs for which market effects were estimated, additional household and business spending to purchase additional energy efficiency measures was assumed to be proportional to spending by program participants.

Firms are assumed to amortize the additional cost of purchasing and installing energy-saving equipment over the useful life of the equipment. Partially offsetting the loss of income associated with bearing these costs, some of the spending goes back to Wisconsin businesses in the form of increased sales for various types of electrical equipment, machines & computers, instruments and building materials, as well as construction and professional engineering services. This growth in Wisconsin-based business sales is, however, also

diminished slightly by a reduction in spending on electricity and gas purchases, which reduces business sales for Wisconsin utilities.

Table B.2 Economic Impact of Household and Business Program-related Outlays*

	Jobs	Business Sales*	Value-added*	real Disp. Income*
Year 1	-117	-$9.6	-$5.7	-$10.8
Year 5	-991	-$105.0	-$87.0	-$67.0
Year 10	-995	-$125.7	-$86.9	-$68.4
Sum: Yrs 1-10	-7,443	-$823.3	-$575.6	-$534.3

*** $ are in millions of constant 2006**
excludes market effects
Combines Business, Residential and Renewable Portfolios

B.3 PROGRAM SPENDING

Program spending consists of all the goods and services purchased by the program over its life. All program spending derives from public benefits charges paid by Wisconsin ratepayers.

Values for the program budget and total program spending are included in the model. It was assumed there will be an approximately constant mix of labor, travel expenses and materials costs. Program spending generates jobs and business sales in Wisconsin—a positive effect on the economy. Table B-3 shows program spending impacts with and without market effects.

Table B.3 Economic Impact of Program Spending*

	Jobs	Business Sales*	Value-added*	real Disp. Income*
Year 1	371	$40.3	$26.7	$14.4
Year 5	699	$102.2	$59.7	$31.0
Year 10	735	$117.9	$74.1	$38.4
Sum: Yrs 1-10	6,870	$987.4	$601.8	$311.5

*** $ are in millions of constant 2006**
excludes market effects
Combines Business, Residential and Renewable Portfolios

B.4 ENVIRONMENTAL BENEFITS

The economic analysis also considered some environmental impacts of the Focus programs as a whole. The Year 1 Focus programs' energy impacts have associated reductions electricity power plant emissions. For this analysis, we have described some of the impacts of nitrogen and sulfur oxides (NO_x and SO_2) emissions results with respect to their impacts on utility generation costs for power generators within Wisconsin. Within this limited scope, though the reductions were significant accomplishments, their economic effects statewide were found to be minimal in this context. However, this analysis did not look at the economic effects of other environmental impacts that affect individuals directly, such as effects on health. This is a separate issue that should be addressed by the evaluation team and DOA staff (e.g., identification and application of an appropriate damage function that establishes dollar values for the externalities associated with the burning of fossil fuels for electricity generators supplying Wisconsin).

It is important to recognize that economic analysis does not capture some types of program benefits at all, particularly quality of life benefits, and some benefits are captured very incompletely. As suggested above, a good example of this is the calculation of economic benefits resulting from decreases in electric generation pollutant emissions (NO_x, SO_2 and mercury) and greenhouse gas emissions (CO_2). While it is recognized that decreased emissions of pollutants and greenhouse gases have beneficial impacts on health and other quality of life concerns, it is currently difficult or impossible to quantify those impacts from the perspective of individuals living in the state. It is possible to quantify the value of some avoided emissions by looking at their value in pollution trading credit markets. However, the pollution credit trading markets primarily involve and affect utility companies.

In this economic analysis, the scale of utility operations statewide is so large that the economic benefits derived from reducing emissions, though significant in themselves, barely register in the model. This is the case for the NO_x and SO_2 pollutants, which have US markets where credit trading clearing prices have been applied. However, with no US carbon credit market it is more speculative to assign a monetary value; this is unfortunate because the scale of avoided CO_2 currently estimated to be attributable to Focus is significant.

Table B.4 Economic Impact of Emission Benefits*

	Jobs	Business Sales*	Value-added*	real Disp. Income*
Year 1	0	$0.0	$0.0	$0.1
Year 5	31	$3.3	$1.9	$2.2
Year 10	78	$10.0	$6.0	$5.7
Sum: Yrs 1-10	380	$44.6	$26.7	$28.3

*** $ are in millions of constant 2006**

excludes market effects

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B.5 NON-ENERGY BENEFITS

This report includes some estimations of the economic impacts of non-energy benefits that are economic (i.e. reflect a change in some aspect of how money flows in Wisconsin) of the Residential and Low-income Programs, including such items as the impacts of increased ability to pay bills, fewer shutoffs and service calls, decreased maintenance costs, decreased water and sewer costs, and so on.

Table B.5 Economic Impact of Non-Energy Benefits*

	Jobs	Business Sales*	Value-added*	real Disp. Income*
Year 1	40	$3.3	$1.9	$3.6
Year 5	279	$31.1	$18.0	$20.1
Year 10	629	$85.2	$49.9	$42.3
Sum: Yrs 1-10	3,196	$389.5	$227.0	$225.5

*** $ are in millions of constant 2006**

excludes market effects

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