

Evaluating a Public Benefits Program in Wisconsin

Focus on Energy

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Agenda

Overview of Wisconsin's Focus on Energy Program

Impact Evaluation

Market Effects

Economic Impacts

Non-Energy Benefits

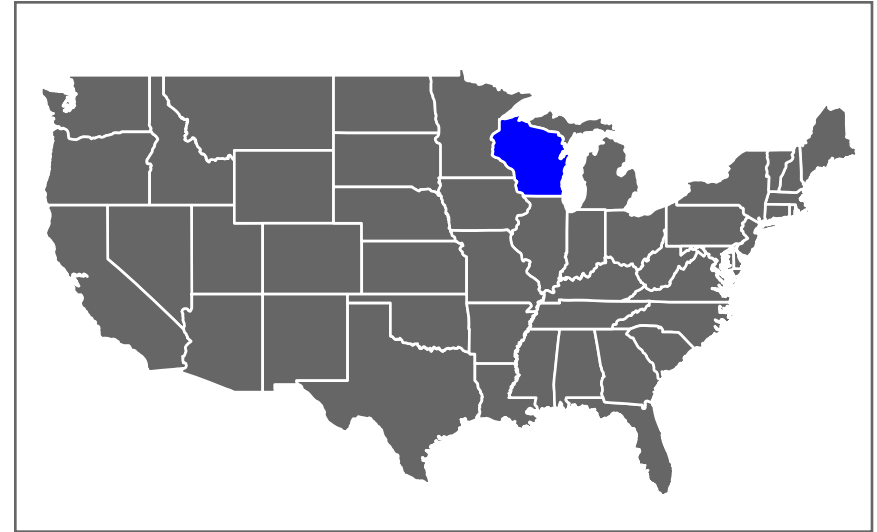
Other Work Areas

Wisconsin's Public Benefits Program: Focus on Energy

Focus on Energy is a state-wide, public benefits-funded energy efficiency initiative.

- Started in 2001
- Funded by a surcharge on utility bills
- EE programs are run by companies that contract with the state
- Includes residential, commercial, industrial sectors with new construction and renewables components
- Has resulted in 1,122 GWh and 194 MW as well as 50.7 million therms in energy savings as of 1 July 2009

Since the program's beginning, PA has led an evaluation team that conducts independent estimation of *verified gross* and *verified net* energy impacts for all sectors.



What We Do for the State of Wisconsin

The State of Wisconsin's investment in energy efficiency programming is protected by our careful, thorough evaluation of program effects.

Verification of **energy impacts** assures program cost effectiveness

- Verify savings accounting
- Net savings
- Benefit / Cost

Estimating **market effects** captures the role of programs in increasing the availability of efficient technologies

- Market share of efficient technologies
- Codes and standards

Calculating the **economic impacts** of programs shows their overall effect on the Wisconsin economy

- Job creation
- Net flow of dollars
- Non-energy benefits

Capturing **non-energy benefits** provides a wider perspective on the programs' effects

- Durability, maintenance, comfort, safety
- Emissions reductions

Verification of Gross Energy Impacts

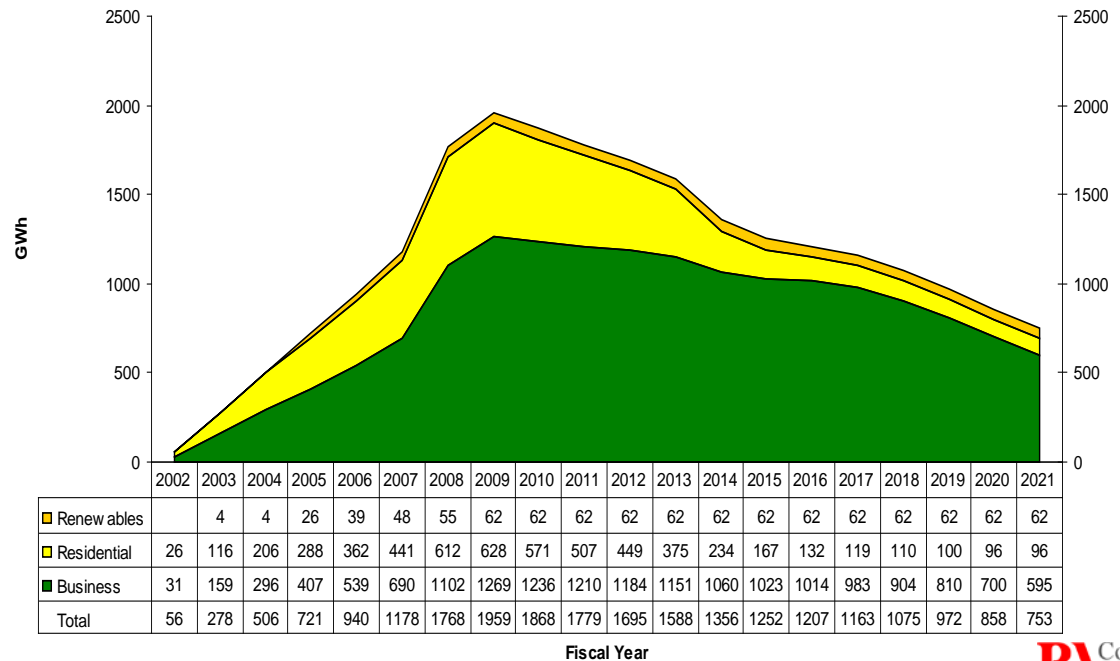
Focus on Energy programs report gross energy savings based on the number and kind of measures that have been installed through a program.

The evaluation team:

- Validates deemed savings for off-the-shelf measures
 - Energy savings, measure life, incremental cost
- Conducts engineering checks for custom projects
- Verifies accounting across multiple programs

• Estimates first-year and lifecycle

Lifecycle Verified Gross Electricity Savings (GWh)



Estimation of Net Energy Impacts

The evaluation team estimates net verified energy savings based on:

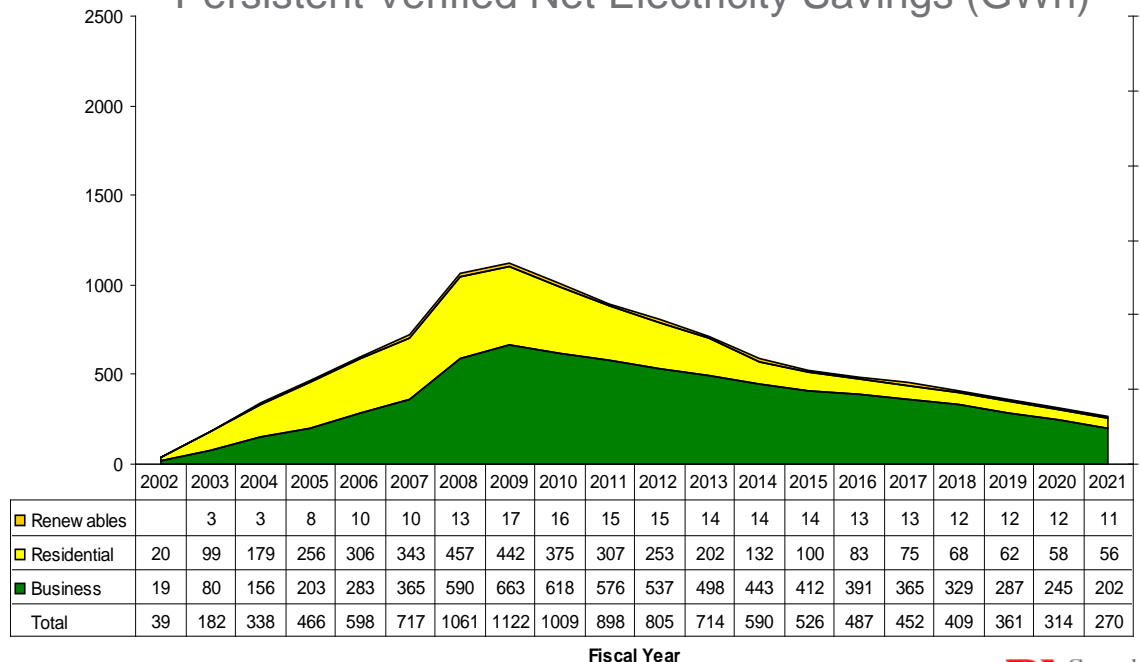
- Free-ridership – Subtracts savings from program beneficiaries that would have installed measures without a program
- Spillover – Adds savings for program beneficiaries who are induced to install additional measures outside the program

- Persistence – Subtracts lifecycle savings from measures no longer providing benefit because

- Uninstalled
- Not Maintained

For each program and each measure

Persistent Verified Net Electricity Savings (GWh)



Cost Benefit Analysis

Twice per year we estimate a simple benefit-cost ratio for the portfolio and for each sector. This is based on a Total Resource Cost test, comparing program and participant costs for installed measures against the avoided cost of supplying energy. The inputs include:

- *Value of Energy Savings.* The present value of utility avoided costs over the life of the measures installed through the program.
- *Value of Avoided Emissions.* The present value of utility avoided costs associated with pollutants displaced by the program over the life of the measures.
- *Program Costs.* Program spending including administrative costs directly related to program implementation, but excluding incentives and other Focus administrative costs (e.g., evaluation, compliance).
- *Incentives.* Financial payments by the program to encourage the adoption of energy efficient measures.
- *Cost of Conserved Energy.* Utility cost for electricity and gas.
- *Net-to-Gross Ratio.* Electricity and therms.

Cost Benefit Analysis

Simple Benefit-Cost and Cost of Conserved Energy, Program-to-Date (July 1, 2001–June 30, 2009)

Program Area	Value of Energy Savings (\$1000)	Value of Avoided Emissions (\$1000)	Program Costs (\$1000)	Incentives (\$1000)	Incremental Costs (\$1000)	B/C	CCE kWh	CCE Therms	Elec %	NTG kWh	NTG Therms
Business	\$835,128	\$42,973	\$93,193	\$77,962	\$379,004	2.8	\$0.040	\$0.230	74%	59%	58%
Renewables	\$35,736	\$2,081	\$12,137	\$11,172	\$66,738	1.0	\$0.194	\$0.229	90%	29%	32%
Residential	\$411,338	\$23,733	\$74,539	\$77,871	\$240,381	1.5	\$0.054	\$0.809	66%	90%	89%
Total	\$1,282,202	\$68,788	\$179,870	\$167,005	\$686,122	2.1	\$0.048	\$0.370	72%	69%	61%

Market Effects

Market effects are changes in the market share of efficient technologies that result from program activity.

One objective of Focus on Energy is to translate market effects into energy impacts attributable to program activities or specific market interventions by the programs.

- Allows inclusion of program-induced market effects into long-term energy resource planning
- Provides an appropriate benefit-cost ratio of market transformation-oriented programs.

There are significant challenges in measuring market effects.

- Market changes take place over a prolonged period of time.
- Programs change their offerings
- Market circumstances change
- Assigning causality

Economic Impacts

One goal of Focus on Energy programs is to enhance the state's economy by supporting the growth, retention, and attraction of business activity in the state.

Estimate economic impacts using REMI model:

- Lower business operating & household living costs
- Reduced outflow of dollars for out-of-state coal and natural gas
- Increased dollars going to manufacturers and installers in Wisconsin
- Emissions benefits from NOx and SOx (monetized)
- Non-energy benefits (monetized)

Summary of Focus On Energy Economic Impacts

	Benefit Category (\$ values = mil. 2006)				Sum 10	Sum 25
		Year 1	Year 5	Year 10	Years	Years
Low Funding Scenario	Jobs	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	\$12	\$85	\$213	\$1,014	\$4,195
High Funding Scenario	Jobs	351	1,417	3,934	18,229	73,233
	Sales generated	\$39	\$181	\$549	\$2,438	\$10,863
	GRP (Value-added)	\$26	\$104	\$316	\$1,411	\$6,637
	Disposable income	\$12	\$85	\$257	\$1,097	\$5,095

Non-Energy Benefits

Non-energy Benefits represent an array of valued attributes deriving from installation of energy efficient measures that are in addition to energy savings.

Example Benefits from Business Programs (\$25.9 million Lifecycle Net):

- Reduced maintenance costs
- Improved employee morale
- Longer equipment life
- Increased productivity
- Reduced waste generation

Example Benefits from Residential Programs (\$35.3 million Lifecycle Net):

- Reduction of carbon monoxide in home
- Elimination of mold problems due to proper air sealing, insulating and ventilation
- Reduced repair and maintenance expenses
- Increased property values
- Reduced water and sewer bills

Reduced Emissions

Reducing energy consumption displaces air emissions related to electricity generation and gas burning. In estimating the amount of displaced emissions we conform to the World Resources Institute’s “Guidelines for Quantifying GHG Reductions from Grid-Connected Electricity Projects.”

- EPA acid rain data provides an 8760 view of emissions
- The energy grid serving Wisconsin is the universe of displaced emissions
- We identify generation on the operating margin and estimate emissions for this mix of fuels
- We match emission rates in each hour to energy displaced in that hour

Lifecycle Emissions Displaced (lbs.) (July 1, 2001–June 30, 2009)

Program Area	Lifecycle Verified Gross MWh	Lifecycle Verified Gross Therms	NO _x	SO ₂	CO ₂	Mercury
Business	1,268,757	76,772,052	4,394,005	3,442,845	3,059,725,836	21.50
Renewables	61,808	5,541,512	231,718	167,826	170,242,385	1.09
Residential	628,205	14,946,810	1,949,488	1,703,315	1,243,723,708	10.06
Total	1,958,771	97,260,374	6,575,212	5,313,987	4,473,691,929	32.64

Other Work Areas

The Focus on Energy project is only part of what we do. We also conduct:

- Energy efficiency potential studies – Feed integrated resource planning
 - NV Energy
 - Missouri River Energy Services
- Billing analysis for pilot program impact studies – Feed TRC test
 - AmerenUE
 - Cape Light Compact
- Process evaluations – Feed program planning
 - AmerenUE
 - Allegheny power
 - Union Gas
 - BC Hydro

Questions or Comments?
