



ENERGY CENTER OF WISCONSIN

# Energy Efficiency and Customer-Sited Renewable Energy: Achievable Potential in Wisconsin 2006-2015

*A technical analysis of options for investment in energy efficiency and customer-sited renewable energy as an alternative to electric generation and natural gas usage.*

*Study at a Glance*

*Prepared on Behalf of The Governor's Taskforce on Energy Efficiency and Renewables*

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## STUDY-AT-A-GLANCE

Wisconsin has mandated programs to help its residents, businesses, and industry use energy more efficiently for over 15 years. The delivery mechanisms and spending levels for these programs have varied over the years. In fiscal year 2005, the spending level was \$38 million. The right amount to spend on energy-efficiency and renewable energy programs is an important policy question for which achievable potential energy savings provides an important input. The Governor's Task Force on Energy Efficiency and Renewables commissioned the Energy Center of Wisconsin to estimate the achievable potential for energy efficiency and customer-sited renewable energy.

### **WISCONSIN CAN SUSTAIN ECONOMICALLY JUSTIFIABLE SPENDING OF UP TO A RANGE OF \$75 TO \$121 MILLION ANNUALLY ON ENERGY EFFICIENCY PROGRAMS**

The results of our analysis suggest that, over the next five years, an average of up to \$75 to \$121 million per year could be spent cost-effectively on statewide programs aimed at improving energy efficiency in Wisconsin homes and businesses. These programs would save energy beyond that which would occur naturally in the absence of programs. For each year of operation, these programs could save up to:

- 320 to 482 million kilowatt-hours of electric energy (0.5 to 0.7 percent of annual statewide electricity use and 20 to 30 percent of annual growth) in the first year and 3.8 to 5.6 billion kilowatt-hours over the lives of the energy saving measures affected by the program;
- 44 to 70 megawatts of electric demand (0.3 to 0.5 percent of utility summer peak electric demand and 10 to 20 percent of annual growth) with half of the measures lasting 10 years or more; and
- 7 to 14 million therms of natural gas (0.2 to 0.4 percent of annual statewide natural gas consumption) in the first year and 120 to 220 million therms over the lives of the measures affected by the program.

After five years of program activities, the total effect of program efforts based on the maximum justifiable spending would be enough to:

- Defer the need for one average-size electric power plant;
- Save enough electricity to power between 170,000 and 240,000 Wisconsin homes; and
- Save the amount of natural gas used in 35,000 to 65,000 Wisconsin homes.

### **SIX CUSTOMER-SITED RENEWABLE ENERGY MARKETS COULD SUSTAIN SPENDING OF UP TO \$7 TO \$11 MILLION ANNUALLY**

For the six renewable energy markets that we studied (which do not include utility-scale renewable energy projects), our analysis suggests that up to \$7 to \$11 million could be cost effectively spent on programs, with annual incremental savings of:

- 19 to 27 million kilowatt-hours of annual statewide electricity use;
- 1.9 to 2.7 megawatts of utility summer peak electric demand; and

- 800,000 to 1.3 million therms of annual statewide natural gas consumption.

Because the limited number of renewable energy markets in the analysis were not intended to cover all possible renewable opportunities, actual renewable potential may be greater than that reported here.

### **STUDY METHODOLOGY BASED ON AVOIDED COSTS OF GENERATION; NO ACCOUNTING OF NON-ENERGY BENEFITS**

Our study examined 30 energy efficiency markets and six customer-sited renewable energy markets in Wisconsin. For each, we studied the nature and status of the market, sought input from Wisconsin experts and stakeholders, and examined achievements from programs in Wisconsin and in other parts of the country. We then outlined likely program approaches for each market, and assessed the probable costs and energy savings from the programs. Our overall goal was to ground our assessments in realistic notions of what can be achieved through statewide programs to promote energy efficiency and customer-sited renewable energy.

We used the program administrator test for our measure of cost-effective program activity. This standard stipulates that energy-efficiency programs are cost-effective if they provide energy savings at a lower program cost than the cost of a comparable amount of energy generation. This test provides a measure of the levelized cost of conserved energy from the program administrator's perspective that can be compared to the avoided cost of delivered or generated energy. This test does not take into consideration participation costs incurred by consumers and businesses. The impacts that we credited to the programs are *net* impacts: that is, they represent the net difference in statewide energy consumption and peak electricity demand with the program in place compared to a no-program scenario.

Our analysis does not take into account the environmental or broad economic benefits of saving energy versus consuming it in Wisconsin. However, we do include a summary of some environmental and economic effects of our combined potential results using metrics adopted by the Wisconsin Department of Administration. An accounting of the environmental and economic benefits in the energy efficiency and renewable energy investment decision would increase the value of energy savings, thereby increasing the maximum amount that could be spent cost-effectively.

Also, energy efficiency in many markets is improving due to federal standards and initiatives and other market forces: our analysis counts only the incremental impacts of state-level programs beyond what would naturally occur in these markets. Finally, our analysis did not identify programs specifically targeted toward low-income households.

### **RECOMMENDATIONS**

The results of this study should be used to inform future investment levels in statewide programs designed to promote energy efficiency and customer-sited renewable energy. The specific market results should be used to identify opportunities to modify or expand existing state programs.