Association of Energy Services Professionals

State of the Industry Report

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Executive Summary

This *State of the Industry Report* was prepared by the Association of Energy Services Professionals (AESP). As the leading trade association for energy services professionals, our mission is to provide professional development and to promote the transfer of knowledge and experience in our industry. This report was developed as a way to help AESP achieve its primary objective of serving its diverse members and sharing knowledge across the industry.

As AESP enters its 20th year, it seems fitting that our association takes a look at one of the major parts of the energy services industry: the Demand Side Management (DSM) industry. DSM has matured considerably during the past two decades. This report provides a status report on the important trends in DSM including spending, savings estimates and impacts, and regulations. This report relied on data from a variety of secondary literature sources, including recently published reports and presentations focusing on the growing DSM industry in both the United States and Canada.

This report is the first in a series of reports that will focus on different sections of the energy services industry. During the coming year, AESP plans to develop companion reports on other sectors of our fast-changing industry and share them with our AESP membership.

- **DSM is here to stay — finally.** After experiencing cyclical periods in both funding and overall interest in DSM programs, it appears that DSM has finally reached a "critical mass." It is a phenomenon that is too big to ignore, given our current economic and energy challenges. Approximately 35 states are in the process of implementing some type of ratepayer-funded electric and/or natural gas energy efficiency programs.

- **Funding for DSM programs is steadily increasing at all levels.** The ARRA funding added another $13 billion to the already nearly $4.5 billion spent by US electric and gas utilities (CEE 2008)—an increase of 21 percent. Canadian budgets reported by eight provinces were $0.6 billion, for a bi-national total of $3.7 billion. Canadian budgets have risen by 32 percent since 2006.

- **Most DSM programs are focusing on the commercial and industrial sectors in both the U.S. and Canada.** This is the area with the greatest savings potential. However, there appears to be an equal split among programs focusing on solely energy efficiency and those focusing on both energy efficiency and peak load management.

- **The DSM industry continues to face a significant workforce shortage**. This shortage is at all levels, including management professionals, "green collar jobs" and trained energy engineers. Moreover, there are not enough training programs currently offered in energy education to meet this gap (Goldman et al (2009).

- **Despite the gains in energy efficiency, energy consumption also continues to grow in all three major sectors.** There have been major gains in energy efficiency in the residential sector during the past 20 years; however, there have also been tremendous increases in overall energy usage. The U.S. Energy Information Administration (EIA) in its 2008 Annual Energy Outlook (AEO2008) projects that electricity consumption in the U.S. residential, commercial, and industrial sectors will grow at an annual rate of 1.07 percent from 2008 through 2030. Energy efficiency programs have potential to realistically reduce this growth rate to 0.83 percent per year from 2008 through 2030.

- **The largest energy savings have been in the residential sector.** In terms of energy savings, there have been significant energy savings in the residential sector, from around 1,000 Megawatt hours (MWH) in 1996 increasing overall to a high of over 3,500 MWh by 2007. Furthermore, the MWh decreases from energy efficiency programs have continued steadily toward a significant resurgence of interest and programs in 2004 and beyond. These are similar to the results found in Canada.

- **Energy efficiency savings are concentrated in a few states.** California and New York account for the majority of energy savings due to efficiency programs. The top four states in terms of Total Incremental Electric savings have saved from 455 GigaWatt hours (GWh) to almost 2,000 GWh of electricity in 2006 alone, a four-fold increase.

- **These programs are also delivering real and last reductions in both on and off-peak energy usage in the U.S. and Canada.** Moreover, these programs continue to target lasting savings in the commercial and industrial markets.

- **Energy efficiency still remains the cheapest energy resource**. According to ACEEE's cost-effectiveness study (2009), energy efficiency remains the least-cost resource for utility resource portfolios. It is much cheaper compared to acquiring other energy options such as generating additional kilowatt hours through new sources using either fossil or renewable energy. Furthermore, as costs for other resources continue to rise, energy efficiency programs are likely to remain the least-cost or cheapest energy resource available to power providers.

- **States are formally establishing energy savings "benchmarks."** While some are mandatory and others are voluntary, 15 states are in the process of developing long-term DSM policies and establishing the use of cost-effectiveness tests to formally measure and evaluate energy efficiency programs.

- **Energy efficiency industry professionals have a wealth of resources available to them to learn more about designing, implementing, and evaluating energy efficiency programs.** These "best practices" focus on developing an effective *vision*, regarding overall program goals, objectives, and outcomes; *commitment* to achieving these goals through proper funding; and providing the necessary *resources* both in funding and personnel to ensure that the programs will succeed.

Overall, the state of the industry for DSM suggests a rosy future. However, it also suggests that much work needs to be done to recruit trained professionals, develop effective programs that deliver lasting savings, and evaluate programs in a cost-effective manner.

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Introduction

This *State of the Industry Report* was prepared by the Association of Energy Services Professionals (AESP). As the leading trade association for energy services professionals, our mission is to provide professional development and promote the transfer of knowledge and experience in our industry. This report was developed as a way to help AESP achieve its primary objective of serving its diverse members and sharing knowledge across the industry.

The purpose of this report is to provide an assessment of the state of the industry and identify future trends. These reports will focus on different sections of the energy services industry, starting with Demand Side Management.

This report describes the important trends in the Demand Side Management (DSM) industry including spending, savings estimates and impacts, and regulations. The data collected for this report were gathered from a variety of secondary literature sources, including recently published reports and presentations focusing on the growing DSM industry in both the United States and Canada.

This report is organized into four sections:

- **Section 1: Scope of DSM Industry**- which focuses on defining and quantifying the actual size and scope of DSM activities in both the US and Canada.
- **Section 2: Savings Impacts and Trends from DSM Activities-** which examines the impacts and trends regarding energy consumption, peak reduction savings, and likely savings potential for both the US and Canada.
- **Section 3: Current DSM Rules, Regulations and "Best Practices" –** which focuses on how energy efficiency programs are being both implemented and evaluated throughout the US. This section also the list of "Best Practices" for both program implementation and program evaluation.
- **Section 4: Key Conclusions**

The *State of the Industry Report* provides additional references and resources to assist our AESP members in designing, developing, implementing, and evaluating effective DSM programs and policies.

This report represents the combined efforts and insights from a variety of DSM industry professionals including our co-authors:

- Tom DuBos, Apogee Interactive
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- Michael Brophy, Enbridge
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- Dan Violette, Summit Blue Consulting

On behalf of the co-authors, special thanks to the AESP Board for sponsoring this report and to the AESP Publications Committee and co-authors for their review and comments. We hope you find this report useful, interesting and perhaps even thought-provoking.

Section 1: Scope of DSM Industry

Co-authors:

Katherine Johnson and Tom DuBos

1.1 Introduction and Overview

Demand Side Management (DSM) programs consist of the planning, implementing, and monitoring activities of electric and natural gas utilities to encourage consumers to modify energy consumption.

The primary objective of DSM programs is to provide cost-effective energy and capacity resources to help defer the need for new sources of power, including generating facilities, power purchases, and transmission and distribution capacity additions. But DSM programs have returned to prominence because they are viewed as effective strategies to combat rising green house gas emissions, provide alternatives to the energy shortage, and enhance overall customer service within the utility industry.

This section summarizes the current funding levels, size and scope of the DSM industry in both the United States and Canada during the past few years.

During the past two decades, utility ratepayer funding for energy efficiency programs has been cyclical. However, the recent surge in both interest in and funding for these programs suggest that DSM is here to stay.

Total budgets reported by program administrators in the United States and Canada now total $4.5 billion, rising 21 percent from 2007. Currently, approximately 35 states are implementing some type of ratepayer-funded electric and/or natural gas energy efficiency programs, with a total U.S. budget of $3.1 billion in 2008 (CEE 2008). Most of this spending is concentrated in 10 states, with each committed to spend $100 million or more in 2008. California continues to be the most heavily-committed to DSM spending and represents more than one-third of all total U.S. efficiency program spending in 2008.

The DSM industry has experienced the "perfect storm" of events leading to projections of unprecedented spending in the next decade. The major drivers for these policies include the emphasis on energy efficiency portfolio standards (EEPS) requirements, a renewed commitment to Integrated Resource Planning (IRP) or DSM requirements, and regulatory incentives designed to further the books or in the pipeline, as well as recent IRPs and DSM plans (Barbose et al 2009).

States are also embracing DSM policies. During the past three years, 11 states have implemented EEPS standards that require long-term energy savings targets.

Funding Levels for Efficiency Programs

1.2 U.S. Efficiency Budgets

The funding levels for energy efficiency programs have increased 10 percent during the past three years, with an estimated $47 billion spent on energy efficiency and related programs in 2008 (Climate Change Business Journal 2009).

The funding levels received an extra infusion of cash through a variety of short-term programs funded by the American Recovering and Reinvestment Act of 2009 (ARRA). All told, these programs will provide another $13 billion in funding for energy efficiency and related programs at the state and federal level beyond the current funding levels established by the states. The ARRA of 2009 provide another mechanism for increased funding to encourage the development of ***new*** energy efficiency programs and activities and thus require a massive increase in the capability to deliver these services (Barbose et al 2009). The distribution of these funds is summarized in Figure 1.

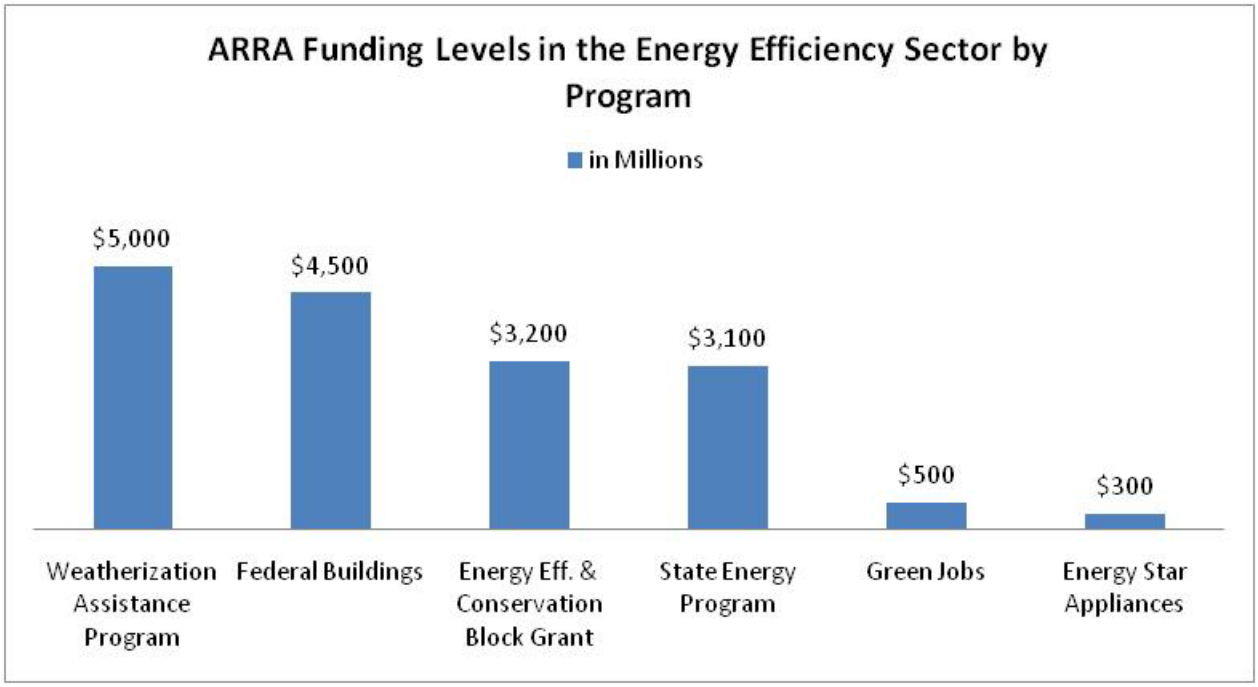

Figure 1: ARRA Funding Levels in the Energy Efficiency Sector by Program
(Source: Genzer 2009)

The Consortium for Energy Efficiency (CEE) has been tracking funding in energy efficiency programs among utilities for the past several years. As reflected in the upward trend in funding at state levels, the CEE reported that utilities in the US have been steadily increasing their funding in energy efficiency activities during the past three years. As Figure 2 shows, these utility

budgets total $3.9 billion in the US of which 90 percent were represented by electric programs (Source: CEE 2008).

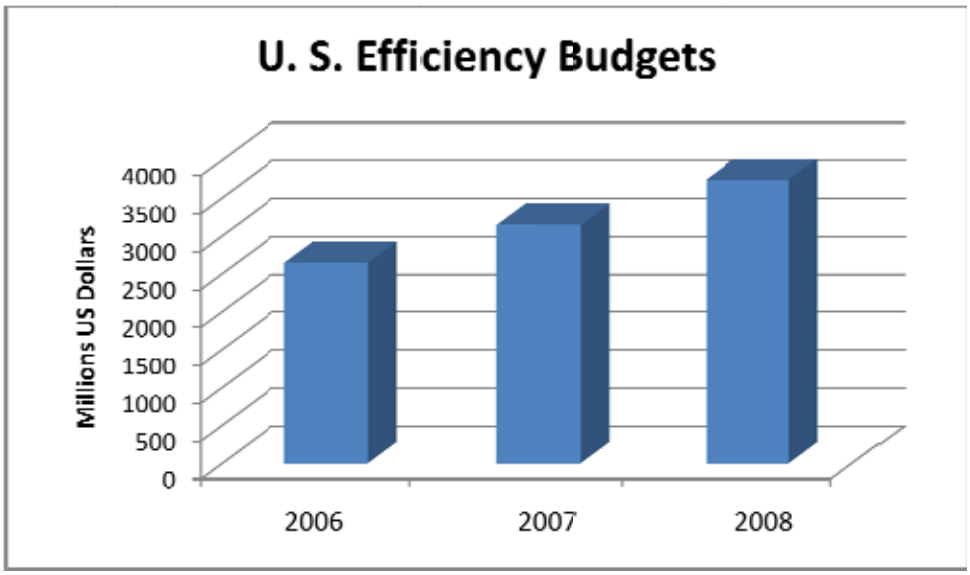

Figure 2: Comparison of US Efficiency Budgets 2006-08
(Source: CEE 2008)

Figures 3 and 4 illustrate the distribution of this energy efficiency funding both across program sectors as well as program method. Most of the spending is focused on energy efficiency programs in the Commercial & Industrial (C&I) and Residential sectors with a focus on DSM, energy efficiency and load management.

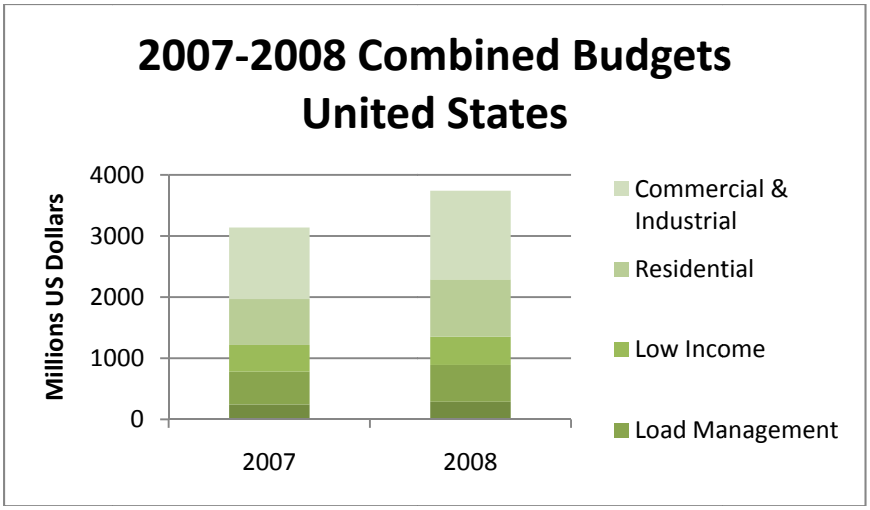

Figure 3: 2007-08 Combined Budgets U.S.
(Source: CEE 2008)

Most of this funding is split between an equal focus on peak load management, energy efficiency, and DSM programs, as Figure 3 shows.

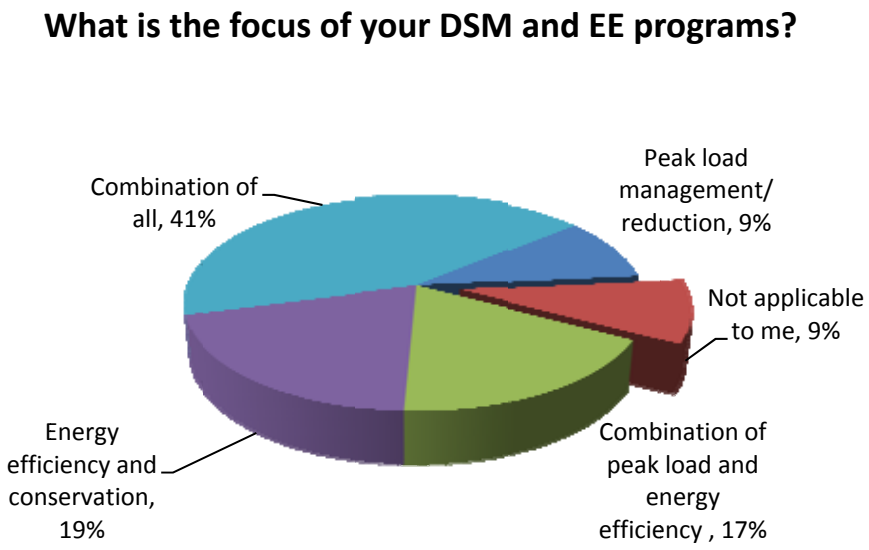

Figure 4: Focus of Utility Programs
(Source: Climate Change Business Journal 2009)

1.2.1 U.S. Electric Utility Funding Levels

The majority of this funding is from electric rate payers (80%; $2.6 billion). Table 1 summarizes the funding of electric efficiency programs by states. As this table shows, the 10 states account for about 78 percent of the total U.S. energy efficiency budget, each of which planned to spend $100 million or more in 2008. California remains the undisputed heavyweight in terms of the absolute magnitude of its spending on energy efficiency, which totals one-third of the total U.S. energy efficiency program budget in 2008 (Barbose et al 2009 Goldman & Schlegel 2009)

Table 1: 2006 Electricity Efficiency Program Spending by State: Total, Percent of Revenues

State	2006 Total Spending ($1000)	Spending as Percent Revenues
California	357,000	1.1
New York	224,897	1.1
Massachusetts	125,000	1.5
Washington	113,288	2.2
New Jersey	83,177	0.9
Wisconsin	73,285	1.3
Connecticut	69,600	1.5
Oregon	63,318	2
Texas	57,800	0.2
Florida	57,000	0.3
Iowa	52,241	1.7
Minnesota	48,109	1
Ohio	28,757	0.2
Nevada	24,000	0.7
Idaho	20,422	1.8
New Hampshire	17,540	1.1
Rhode Island	17,178	1.6
Utah	16,800	1.1
Arizona	16,400	0.3
Vermont	15,806	2.4
Hawaii	12,900	0.6
Maine	11,000	0.8
Colorado	11,000	0.3
Michigan	10,000	0.1
Georgia	10,000	0.1
District of Columbia	8,500	0.7
Montana	8,309	0.9
Kentucky	5,944	0.1
South Carolina	5,882	0.1
Pennsylvania	3,808	0
North Carolina	3,800	0
Illinois	3,222	0
Missouri	2,175	0
South Dakota	819	0.1
North Dakota	513	0.1
Alabama	459	0
Mississippi	435	0
Kansas	338	0

Alaska	162	0
Maryland	90	0
Virginia	84	0
Oklahoma	15	0
Arkansas	0	0
Delaware	0	0
Louisiana	0	0
West Virginia	0	0
Wyoming	0	0

(Source: ACEEE 2008 State Energy Scorecard)

U.S. Natural Gas Utility Funding Levels

In 2007, natural gas energy efficiency budgets totaled nearly $329 million, according to the American Gas Association while the CEE estimates this funding at closer to $500 million (CEE 2008). DSM and energy efficiency programs have begun to become much more popular in the past three years, with the funding levels steadily increasing from 2006-2008. Similar to the electric DSM programs, most of these programs are funding activities targeting the C&I and Residential markets (See Figure 5.)

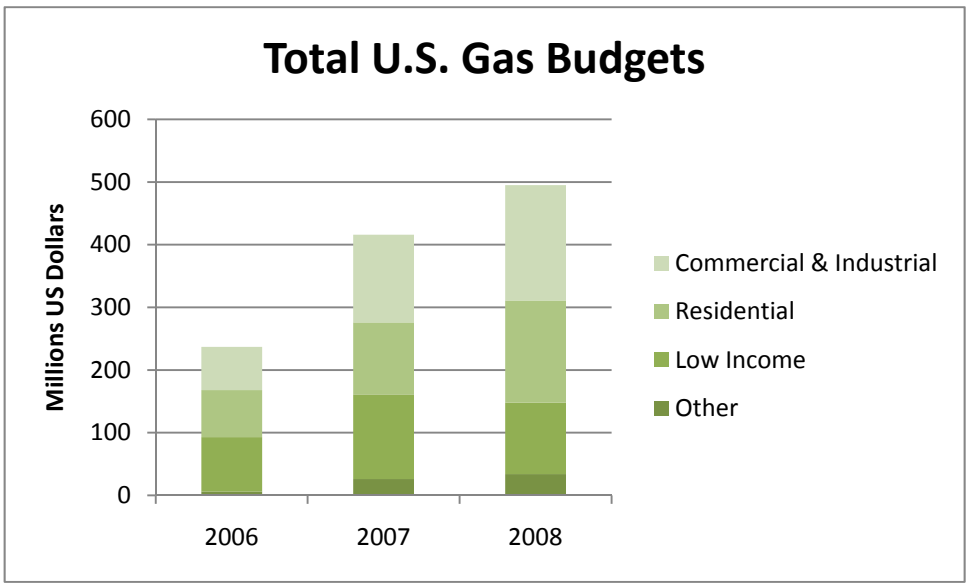

Figure 5: Total U.S. Gas Budgets
(Source: CEE 2008)

Table 2: 2006 Natural Gas Program Spending by State

State	2006 Total Spending (Million $)	Spending Relative to State NG Consumption ($ per MMCf)
California	$94.1	$64.0
Wisconsin	$42.8	$132.0
New Jersey	$32.7	$79.0
Iowa	$29.5	$143.0
Massachusetts	$25.6	$128.0
New York	$21.9	$32.0
Minnesota	$15.2	$49.0
Oregon	$12.1	$87.0
Washington	$8.2	$42.0
Colorado	$2.5	$9.0
New Mexico	$2.2	$30.0
Vermont	$1.5	$187.0
Connecticut	$1.4	$15.0
Idaho	$0.9	$15.0
Maryland	$0.8	$5.0
Nevada	$0.6	$8.0
Ohio	$0.5	$1.0
Kentucky	$0.2	$1.0
Maine	$0.1	$15.0
Total	$292.8	$1,042.0

(Source: ACEEE 2008 State Efficiency Scorecard)

1.3 Canadian Efficiency Budgets

Canadian budgets reported by eight provinces were $0.6 billion, for a bi-national total of $3.7 billion. Canadian budgets have risen by 32 percent since 2006 (Source: CEE 2008) as illustrated in Figure 6.

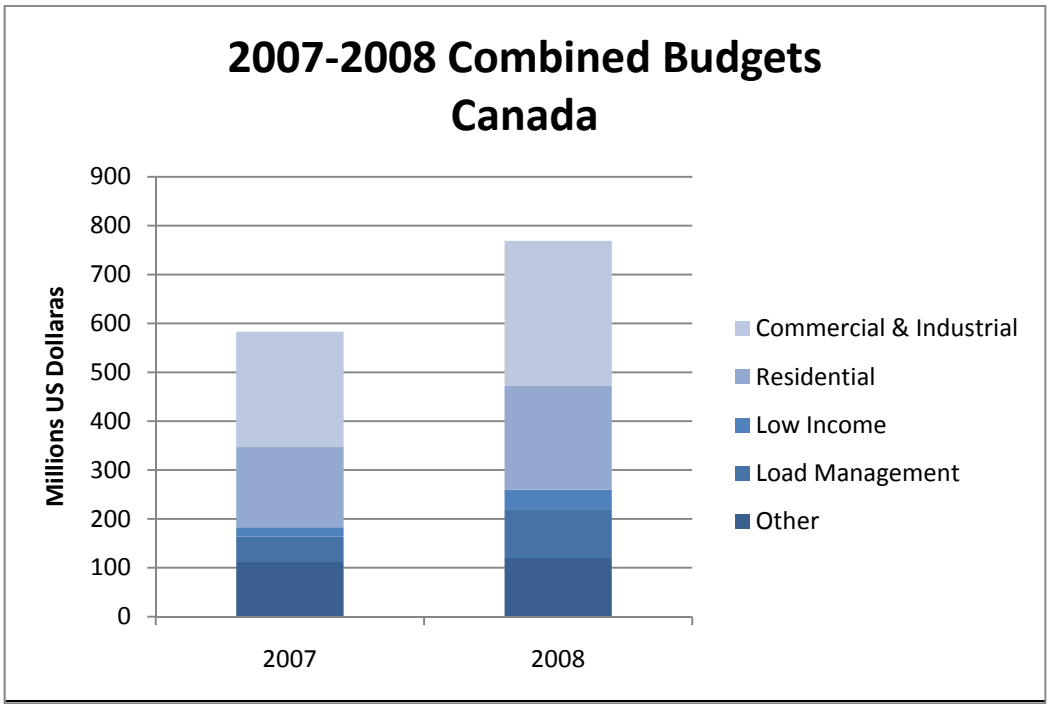

Figure 6: 2007-08 Combined Budgets Canada
(Source: CEE 2008)

The Canadian programs are also nearly equally split between funding activities targeting C&I and Residential customers as shown in Figure 7.

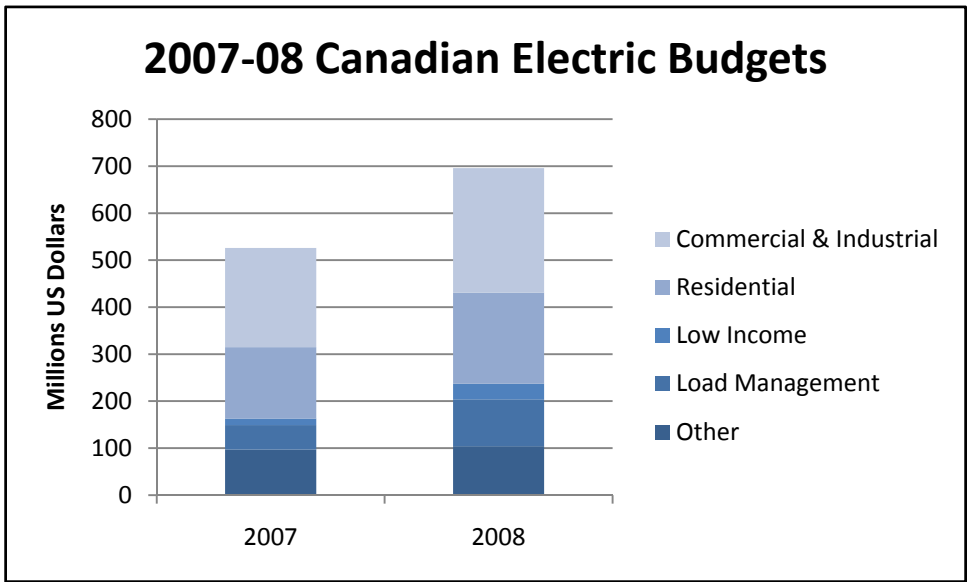

Figure 7: 2007-08 Canadian Electric Budgets
(Source: CEE 2008)

Similar to the funding levels for U.S. gas utilities, the funding levels for gas efficiency programs targeting C&I and Residential programs as shown in Figure 8.

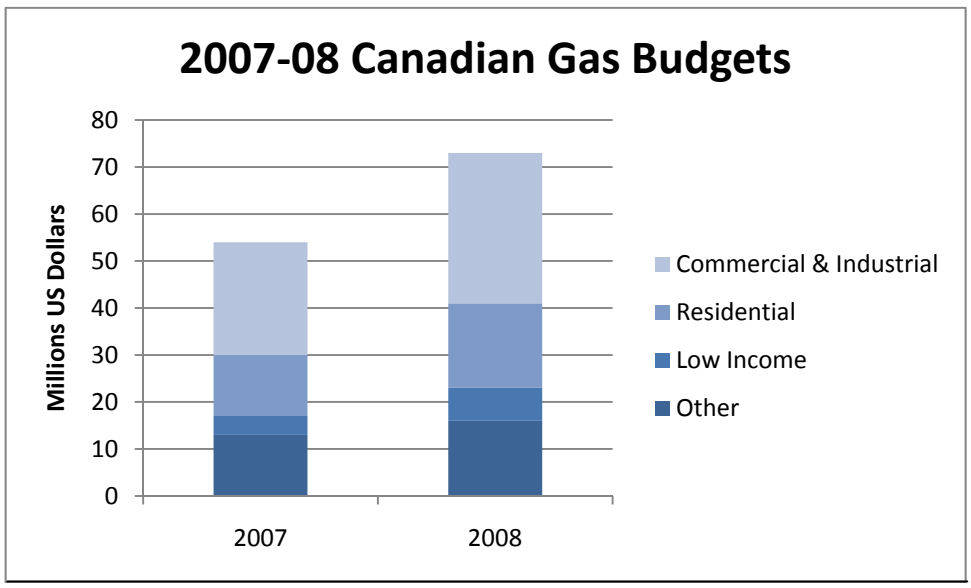

Figure 8: 2007-08 Canadian Gas Budgets
(Source: CEE 2008)

1.4 Workforce Projections

This projected growth in both ratepayer- and taxpayer-funded energy efficiency activities is going to require significant workforce expansions of the energy efficiency services sector (EESS) workforce. Trained personnel are and will be needed to design, implement, and manage energy efficiency programs, and to design, construct, install and maintain energy efficiency building systems. Both policymakers and program administrators are concerned about a shortage of well-trained personnel in the EESS. Goldman et al. (2009) estimated the size and structure of the current EESS workforce, forecast the number of people that will be needed in 2015 and 2020 under various scenarios, and assess shortages and needs in the current workforce in light of expectations for growth (Goldman et al. 2009). This recent study revealed the following key findings:

- Management positions requiring 10 years experience and positions requiring engineering experience with high-efficiency technologies are the most difficult positions to fill taking as long as 12-15 months to fill;
- The re-training of the existing construction and building industry workforce to provide energy efficiency services is critical and these are the same workers who are "under-employed" in this current economic downturn;
- The aging workforce is viewed as a problem among building and construction industry association members (40-45% of workforce is over 50);
- There is a shortage of engineers with efficiency knowledge or experience and energy efficiency services employers are thus willing to hire any engineer with technical aptitude, communication skills and some engineering experience;
- There are not enough certificates or degrees being awarded in energy efficiency related training and education to meet the growing need (Goldman et al 2009).

Section 2: Savings Impacts and Trends

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Luisa Freeman and Greg Wikler

2.1 Introduction and Overview

The past five years have seen significant gains in energy efficiency as documented in various important studies, among them 1) data from the Energy Information Administration (EIA) of the U.S. Department of Energy; 2) a joint project by the Electric Power Research Institute (EPRI) and Edison Electric Institute (EEI), and 3) the American Council for an Energy Efficient Economy (ACEEE). There is no question that energy efficiency has made great strides over this time period over what consumption would have been without the initiatives that have helped keep consumption low.

At the same time however, many households and businesses are getting more energy intensive – or more gadget intensive – serving to erode some of the efficiency gains made.

As the Los Angeles Department of Water and Power notes on their website FAQs:

> *Homes are 22 percent larger and customers have many more items using electricity in the home than 21 years ago. The sales of personal computers have increased from 3.5 million in 1988 to 30 million in 2008 and the number of multi-set TV households has increased 68 percent. In fact, large plasma TVs have replaced refrigerators as the greatest energy consuming appliance in the home.*

The increase in "plug loads" in the commercial sector is similarly notable for office equipment, 24/7 computer use and other tasks. But, as usual, the industry has stepped up to address these challenges with both new programs and new technologies: there are new energy efficiency programs specifically targeting office plug loads and IT systems, and on the technology front, "smart strips" are increasingly finding their way into energy conservation kits and measures lists for both residential and small businesses to help address those discretionary loads.

This section of AESP's *State of the Industry Report* identifies real trends, determines the key drivers behind those trends and offers some predictions as to where the trends are going and what the industry can do to influence energy consumption on an ongoing basis.

2.1.1 Energy Consumption Trends

Figure 9 from the Energy Information Administration (EIA) of the U.S. Department of Energy shows that industry energy use hovers around 37percent of total energy usage in the US as of a 2008 baseline, with commercial at 18percent and residential usage at 30percent of total BTU consumption (i.e., all fuels).

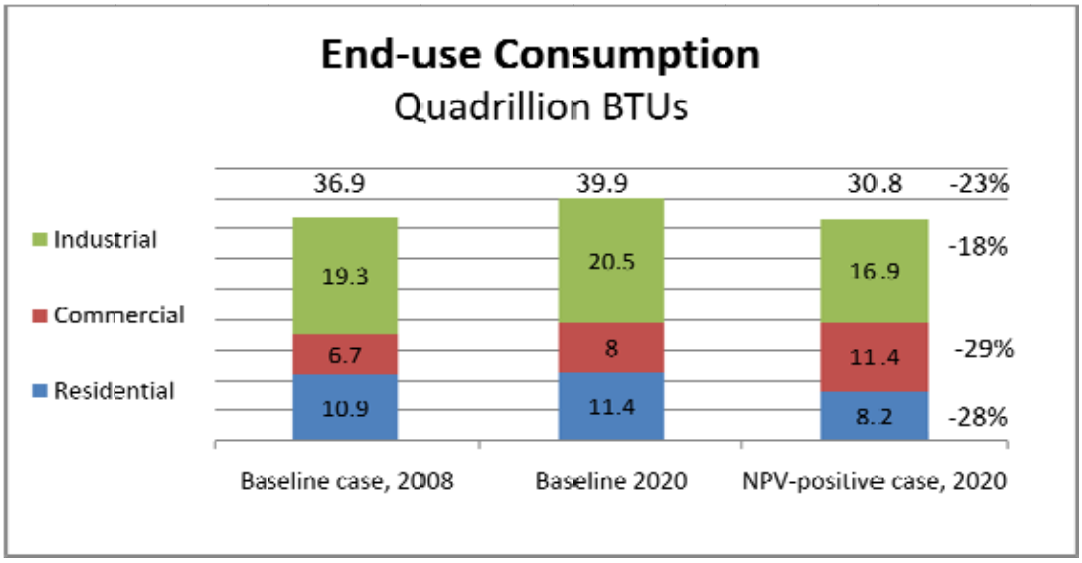


Figure 9: Summary of End-use Consumption and Trends
(Source: EIA 2008 http://www.eia.doe.gov/fuelelectric.html)

The Baseline bar for 2020 suggests that residential and industrial are getting less energy intensive, each for different reasons. In the residential sector, we are seeing naturally occurring efficiencies and in the industrial it has to do with reduced industrial activities nationwide. Conclusions are less clear for the commercial sector. It is hard to speculate on the role of EE in these projections, particularly in the case of residential trends, but less so on C&I since the trends in those sectors are not suggestive of efficiency gains.

While predictions from EIA see these general shares staying about the same under either the Baseline or NPV scenarios, the potential efficiency gains appear highest in the commercial and residential sectors, at 29percent and 28percent respectively, with another 18percent savings predicted in the industrial sector. Overall savings over baseline forecasted consumption are predicted to be around 23percent or 30.8 quadrillion BTUs by 2020, an immense amount of energy savings.

What does the historical record tell us what has been achieved, and how much confidence should we have as an industry that these kinds of additional efficiency gains can be accomplished? An examination of electric energy savings trends is provided first, followed by savings from natural gas program.

2.1.2 Electric Energy Savings Trends

Figure 10 shows the collective amount of annual electric demand reductions achieved from 1996 through 2007 – the last decade) from the national portfolio of DSM programs. It shows that each year over the past decade over 50,000 Megawatts (MW) have been saved annually (with the exception of two years, 2003 and 1998.)

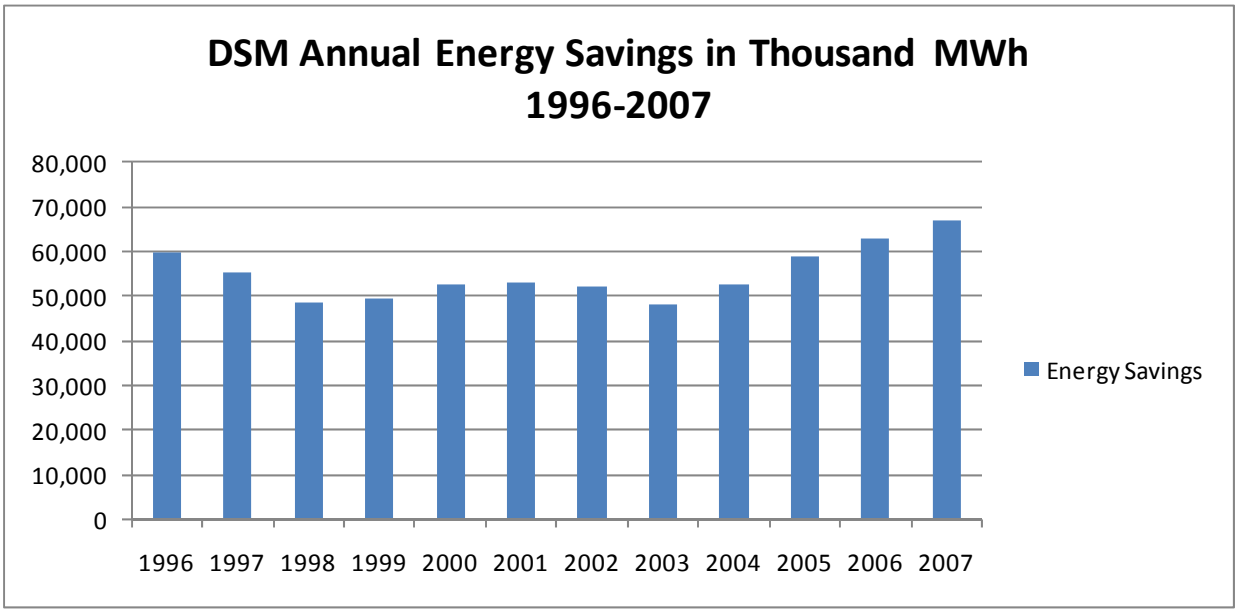


Figure 10: Demand Side Management Program Energy Savings in Thousand MWs
(Source: Energy Information Administration, Form EIA-861, "Annual Electric Power Industry Report." 2009)

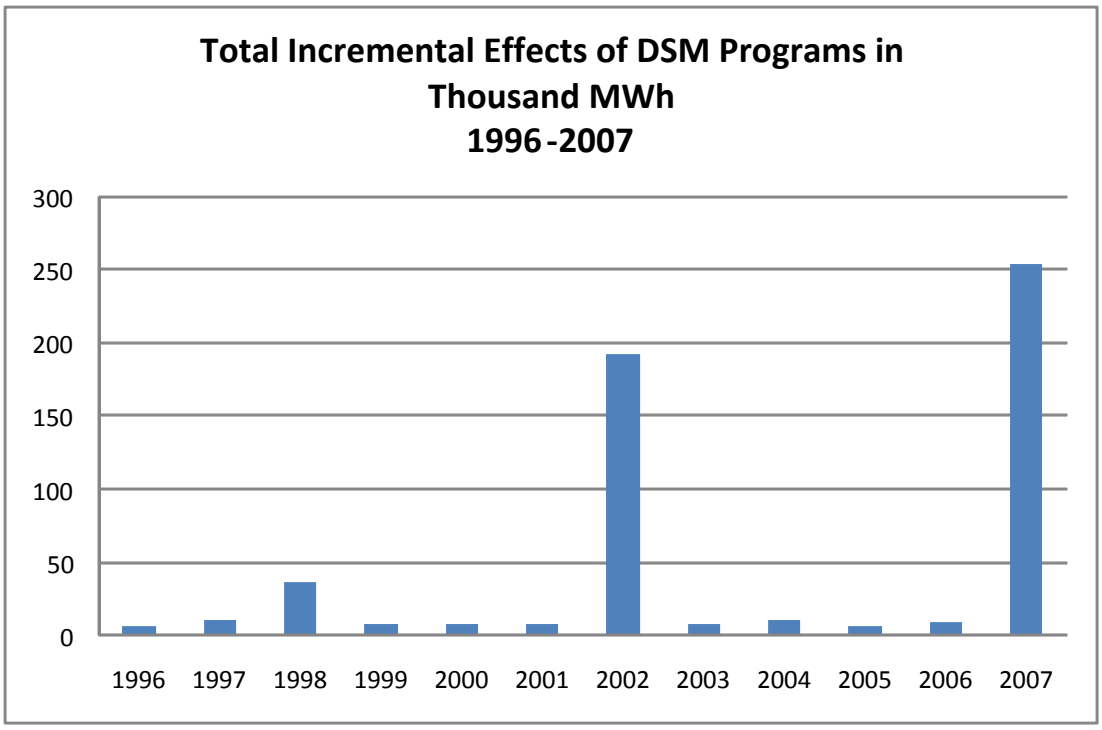


Figure 11: Total Incremental Effects of DSM Programs in Thousand MWs
(Source: Energy Information Administration, Form EIA-861, "Annual Electric Power Industry Report." 2009)

In terms of energy savings – lower consumption as opposed to reduced demand – the next three figures tell the story by major customer sector. Figure 12 shows a remarkable trend of significant energy savings in the residential sector, from around 1000 MWh in 1996 increasing overall to a high of over 3,500 MWh by 2007. Although the industry underwent considerable structural adjustment between 1996 and 2007, the MWh decreases from energy efficiency programs have continued steadily toward a significant resurgence of interest and programs in 2004 and beyond.

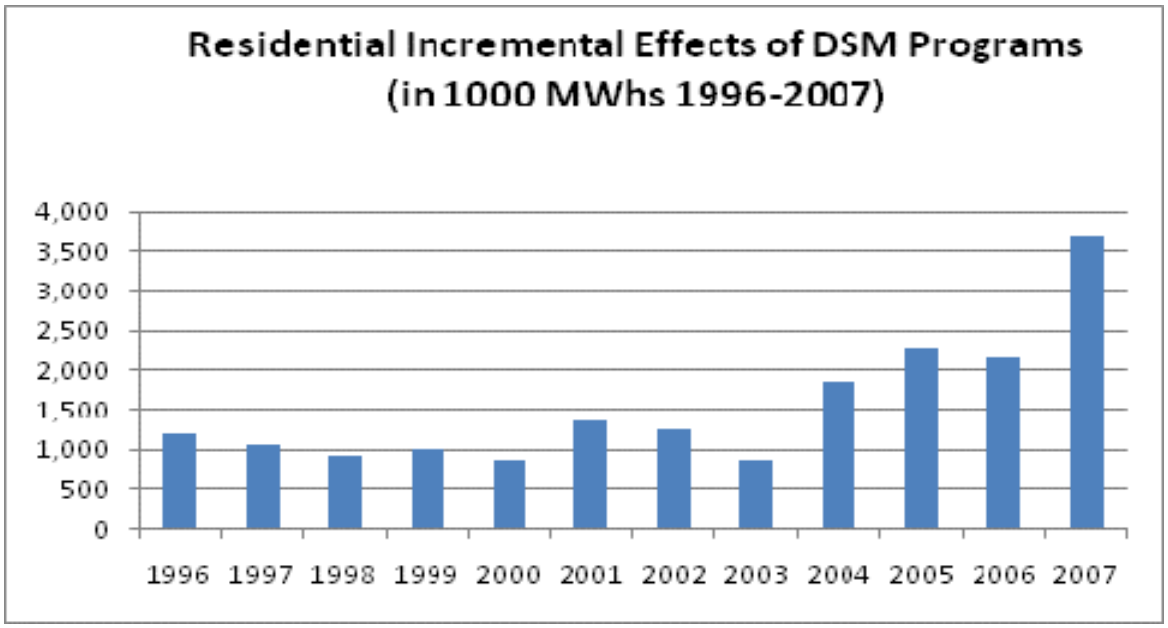


Figure 12: Residential Incremental Effects of DSM Programs
(Source: Energy Information Administration, Form EIA-861, "Annual Electric Power Industry Report." 2009)

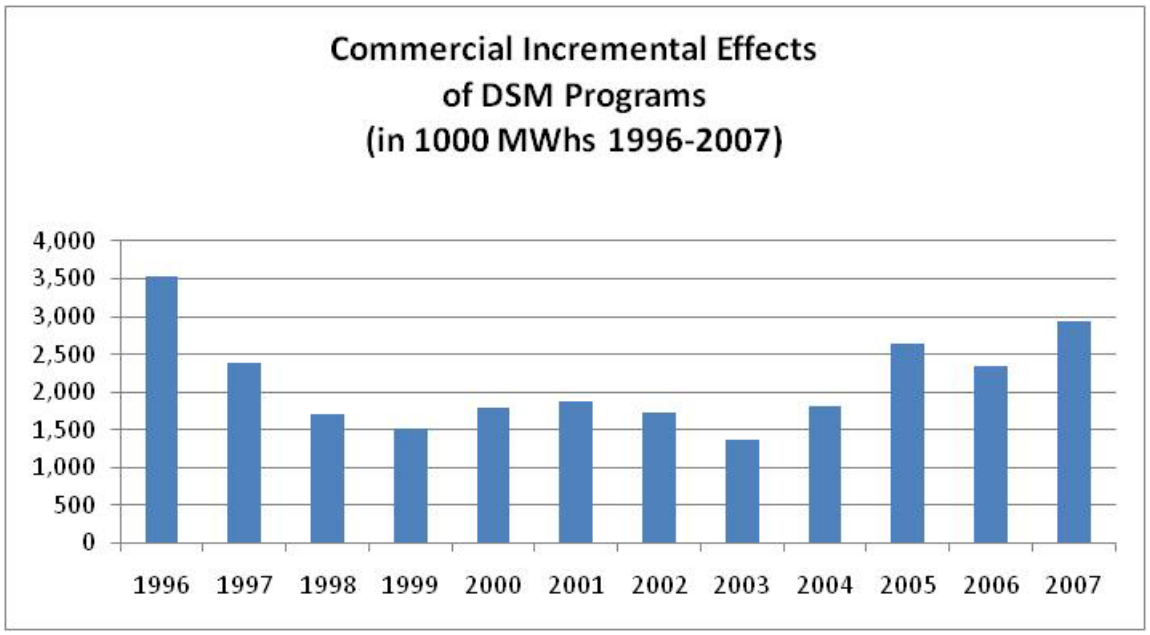


Figure 13: Commercial Incremental Effects of DSM Programs
(Source: Energy Information Administration, Form EIA-861, "Annual Electric Power Industry Report." 2009)

The commercial and industrial sectors show major savings at both ends of the decade, reflecting a combination of regulatory policy and business cycle economics. Given the current policy emphasis on energy efficiency, it is likely that the upward trends in incremental effects of programs will continue for the next few years. (Note no data were available for 2005).

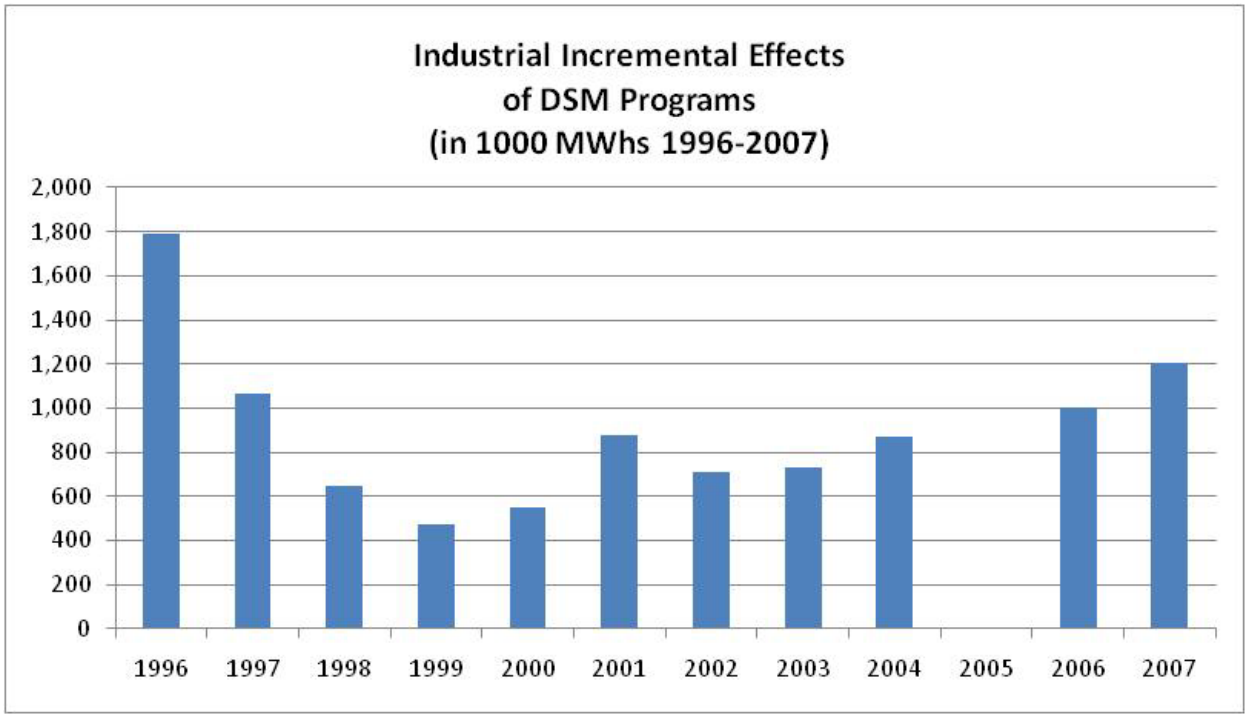


Figure 14: Industrial Incremental Effects of DSM Programs
(Source: Energy Information Administration, Form EIA-861, "Annual Electric Power Industry Report." 2009)

A recently released study conducted by the Electric Power Research Institute (EPRI) and the Edison Electric Institute (EEI) also focused on determining the future potential for energy efficiency programs.

This report begins with the conclusion:

> *The U.S. Energy Information Administration (EIA) in its 2008 Annual Energy Outlook (AEO2008) projects that electricity consumption in the U.S. residential, commercial, and industrial sectors will grow at an annual rate of 1.07 percent from 2008 through 2030. Energy efficiency programs have potential to realistically reduce this growth rate to 0.83 percent per year from 2008 through 2030. Under an ideal set of conditions conducive to energy efficiency programs, this growth rate can be reduced to as low as 0.68 percent per year. (p. 4)*

Regardless of the source consulted, it is clear that additional gains in electric energy efficiency are predicted as reasonably achievable.

The breakdown of electric energy savings by state (2006 data) reflects first, a bicoastal competition that remains unabated, regardless of policies or business cycles that is led by California and New York, with the Pacific Northwest and New England right behind. The top four states in terms of Total Incremental Electric savings have saved from 455 GigaWatt hours (GWh) to almost 2000 GWh of electricity in 2006 alone. Examining state energy savings as a percent of sales, Rhode Island, Vermont and Connecticut all show savings of over 1 percent of sales in the one year period. The Midwest is dominated by Minnesota and Wisconsin to the north and Texas in the South in terms of amount of MWh of energy savings achieved. Those states that have not achieved any incremental electric savings were not included in Table 3.

Table 3: 2006 Incremental Electricity Savings by State

State	2006 Total Incremental Elec. Savings (MWh)	Percent of Electricity Sales
California	1,912,000	0.73
New York	814,293	0.58
Washington	630,691	0.74
Massachusetts	455,000	0.82
Texas	397,305	0.12
Minnesota	370,443	0.55
Oregon	369,827	0.77
Wisconsin	344,232	0.49
Connecticut	328,000	1.04
Iowa	314,248	0.73
Florida	301,118	0.13
New Jersey	227,764	0.29
Nevada	216,000	0.62
Idaho	150,921	0.66
Arizona	123,449	0.17
Utah	121,000	0.46
Kentucky	112,000	0.13
Maine	74,759	0.61
New Hampshire	73,853	0.67
Hawaii	67,914	0.64
Montana	64,651	0.47
Tennessee	61,301	0.06
Colorado	60,028	0.12
South Carolina	14,700	0.02
Indiana	12,631	0.02
Alabama	8,445	0.01
Rhode Island	6,048	1.23
Mississippi	5,463	0.01
Nebraska	5,358	0.02
Missouri	3,873	0

North Carolina	3,051	0
Vermont	2,872	1.08
Georgia	2,534	0
Pennsylvania	2,279	0
Alaska	1,146	0.02
Ohio	393	0
North Dakota	257	0
Illinois	195	0
New Mexico	189	0
Maryland	169	0
Virginia	63	0
Arkansas	30	0

(Source: ACEEE 2008 State Energy Efficiency Scorecard)

2.2 Comparison of Delivery Approaches

A forthcoming study by co-author of this chapter (Freeman) conducted for the Institute for Electric Efficiency (a non-profit consortium formed by EEI of members of the energy efficiency community) describes the comparative accomplishments of utility-delivery versus state agency or third party delivered energy efficiency program models. (Freeman 2009) Investor-owned utilities still dominate the landscape when it comes to the delivery of energy efficiency and demand response programs, with state agencies making up a significant second tier of delivery groups. As indicated in the forthcoming IEE report:

> *Electric utilities have been operating energy efficiency programs since the early 1980s, using ratepayer funds approved by regulators. In the early 2000s, the concept of public benefits charges, collected from ratepayers as a surcharge on utility bills, was introduced whereby a state entity—either the regulatory commission, a state agency or a third party created for the purpose—would implement energy efficiency programs instead of utilities. The idea was that this model would result in higher levels of energy savings because it would circumvent the disincentives utilities face in selling less of their product.*

States that deliver programs using a systems benefits fund model are identified in Table 1. According to the IEE study, many utilities include energy efficiency programs are part of a Resource Acquisition strategy. Utilities are in a unique position because they can fully incorporate EE program planning into Integrated Resource Planning, and design them in such a manner as to maximize their contribution to system optimization goals. When EE programs are treated on an equal footing with generation options, IOUs have an incentive to deliver comprehensive and cost-effective programs. They also enjoy a significant advantage because they are able to collect comprehensive customer data including contact information and usage patterns.

Statewide organizations, on the other hand, can be effective in not only delivering programs with social policy goals in mind – e.g., reducing the overall energy burden of low income households – but also in delivering programs to other sectors. Since state entities are often less constrained by cost benefit tests, they can more easily emphasize education, audits and other informational programs. Also, state entities have been more active in offering financing programs or underwriting loans offered by local banks.

Examining data from EIA on program costs and savings from 2007, Table 4 shows that municipal utilities and investor owned utilities are delivering programs at a lower cost per MWh than state entities, and that on average, across all delivery groups, the spending rate is about $.25 per kWh of electricity saved.

Table 4: Costs and Savings across all Types of Electric Utilities

Type of Organization	Total Annual Expense in Energy Efficiency Measures in 2007 (Direct Cost and Incentives)	Total Annual Energy Efficiency Savings in 2007 (MWh)	$/MWh
Cooperative	$25,111,000	$1,849,077	$13.58
Federal	$6,299,000	$612,330	$10.29
Investor Owned	$1,431,720,000	$56,261,564	$25.45
Municipal	$75,222,000	$4,598,255	$16.36
Municipal Marketing Authority	$4,912,000	$12,971	$378.69
Political Subdivision	$41,038,000	$2,666,193	$15.39
State	$98,986,000	$1,277,499	$77.48
Total	$1,683,288,000	67,277,889	$25.0199

(Source: Data from EIA Annual Electric Utility Data - EIA861 final Data file for 2007. http://www.eia.doe.gov/cneaf/electricity/page/eia861.html)

Tapping another source of data, the 14 electric energy efficiency programs range in cost-savings from $0.016 to $0.033 per kWh with the average cost of $0.025 per kWh and the six natural gas programs save cost-effectively, spending $0.27 to $0.55 per therm, with the average of $0.37 per therm.

Estimates of Peak Demand Savings from Energy Efficiency

The EPRI/EEI Assessment (2009) compared six leading studies of peak savings from energy efficiency programs. According to this analysis, the total peak reduction potential during the time period of 2005-2025 ranges from 6 to 22 percent. Even at the most modest estimates, these studies suggest that energy efficiency activities are making real and lasting reductions in peak energy usage in the U.S.

2.3 Natural Gas Industry Energy Savings Trends

The earliest energy conservation programs from the 1970s, focused on home heating end uses.[1] At the time, the national policy was concerned with reducing dependence on foreign oil in response to oil embargoes, and conservation was encouraged by those who heat their homes with fuel oil or natural gas. The average American home uses one-third less natural gas than in 1980 (American Gas Association (AGA))

Residential natural gas consumption per household fell at a rate of 1 percent annually from 1980 through 2000, and this rate of decline accelerated to 2.2 percent annually from 2000 through 2006. As a result, the average American home uses 32 percent less natural gas now than in 1980 (Joutz & Trost 2007).

Programs funded by natural gas utilities helped customers reduce their natural gas use by 11 trillion British Thermal Units (BTU) in the 2007 program year—averaging 9 percent of usage for residential customers—and avoid 0.6 million metric tons of carbon dioxide emissions (AGA fact sheet)

2.3.1 Canadian Energy Trends

Energy use in Canada increased by 23 percent during the 1990 – 2004 period (Table 5). The increase was driven by a 33 percent increase in activity (a combination of residential and commercial/institutional floor space, number of households, passenger- and tonne-kilometres travelled, and industrial production). Overall, energy efficiency has increased by 13 percent.

Table 5: Natural Gas Savings Trends in Canada

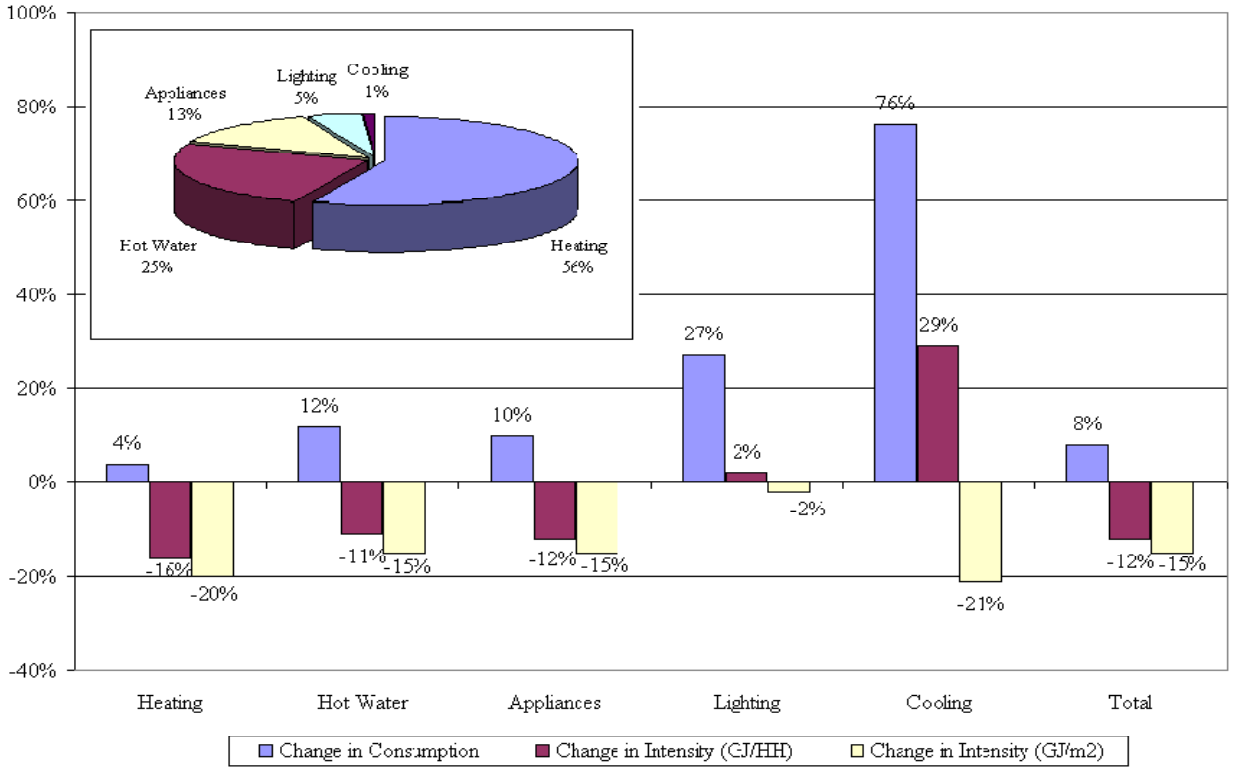
Year	2000	2001	2002	2003	2004	2005	2006	2007
Nationwide natural gas annual end-use savings from LDC DSM programs (millions of m3/yr)	91.8	138.2	150.2	153.4	170.9	202	230	217.8
Cost per m3	0.18	0.16	0.16	0.17	0.18	0.21	0.26	0.32
Nationwide natural gas annual end-use savings from LDC DSM programs (millions of GJ/yr)	3.48	5.24	5.69	5.81	6.47	7.5	8.5	8.1
Cost per GJ	4.76	4.22	4.12	4.47	4.78	5.59	6.98	8.65
Source: Canadian natural gas distribution utilities' best practices in DSM; study update 2008, IndEco Strategic Consulting Inc. on behalf of the Canadian Gas Association								

[1] National Energy Conservation Policy Act of 1976 is the first time the federal government tapped electric and gas utilities as a vehicle for promotion of energy efficiency.

Residential Trends

Overall, these improvements in energy efficiency translated into a decrease in GDP energy intensity of approximately 17 percent; however, due to an increase in per capita GDP, population energy intensity increased by approximately 8 percent. (Source: EEWG 2008, p. 16)

Table 6: End-Use Shares of 2004 Total Residential Energy Consumption and Changes in End-Use Energy Consumption and Intensity, 1990-2004

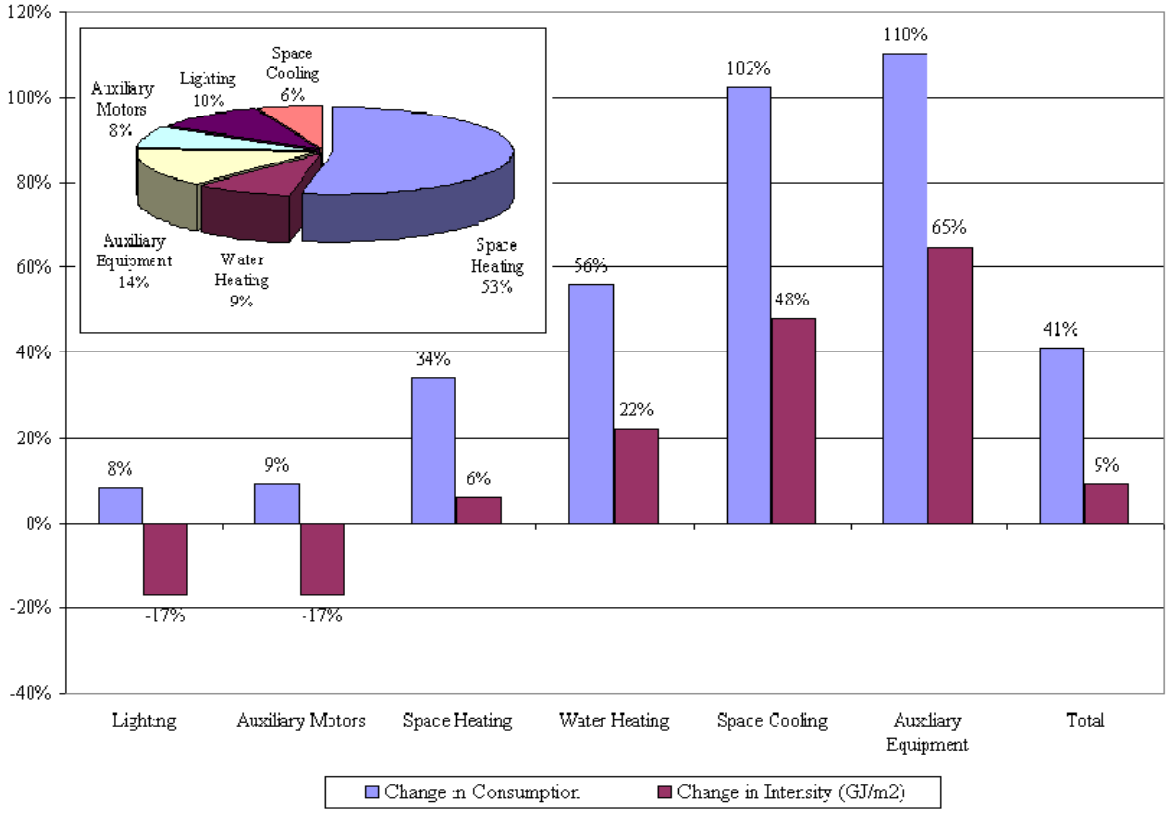


(Source: EEWG Foundation Paper, Energy Efficiency Working Group, Energy Sector Sustainability Table, 2008, p.14.)

Commercial/Institutional Trends

Energy use in the commercial/institutional sector increased 294 PJ (34%) between 1990 and 2004 (Table 5). Overall, commercial energy efficiency improved less than one percent between 1990 and 2004.

Table 7: End-Use Shares of 2004 Total Commercial Energy Consumption and Changes in End-Use Energy Consumption and Intensity, 1990-2004



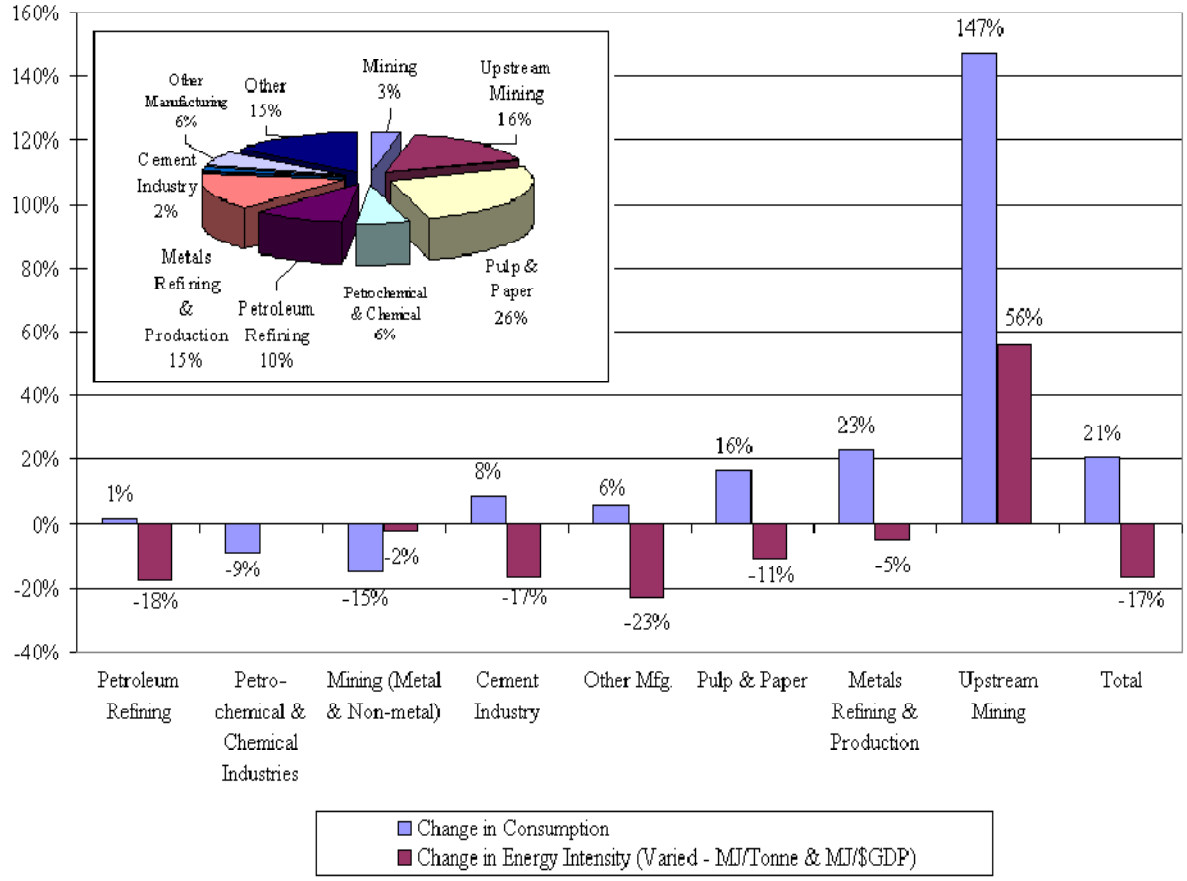
(Source: EEWG Foundation Paper 2008, p. 22)

Industrial Trends

Over the 1990 to 2004 period, net industrial energy use increased by 560 PJ (21%) resulting primarily from a 40 percent increase in activity (a mix of GDP, gross output & production units). Activity increased in all years with the exception of 1990-1993 and 2001 during which industry experienced an economic downturn.

In the sector as a whole, increases in energy efficiency (12%) resulted in avoided energy consumption in 2004; however, since 2001 energy efficiency gains have been moderated by increases in the energy intensities of industries such as upstream mining, forestry and fertilizer. In addition, EE has decreased in some industries due to lower capacity utilization — plants tend to be most efficient when run near capacity — and a shift towards lower quality input fuels such as biomass. The largest increase in energy use by far was in the upstream mining sub-sector. The majority of energy associated with this sub-sector is consumed by the primary energy production industries

Table 8: Sectoral Shares of 2004 Total Industry Energy Consumption and Changes in Industry Energy Consumption and Intensity, 1990-2004



(Source: EEWG Foundation Paper, 2008, p. 26)

Section 3: DSM Policies and Best Practices

Author:

Katherine Johnson

3.1 Introduction and Overview

This section of the AESP *State of the Industry Report* focuses on current DSM policies and regulations designed to achieve significant savings in energy consumption and reductions in greenhouse gas emissions. This section concludes with a discussion of "Best Practices" regarding program implementation and evaluation and identifies additional resources to assist our AESP members.

3.2 Energy Efficiency Savings Targets

According to the most recent ACEEE Scorecard (2008), states are increasingly recognizing the need to establish targeted energy savings goals. Figure 15 illustrates that 15 of 18 states have established savings goals ranging from 0.05 percent to 1.80 percent. Hawaii, Washington, and Pennsylvania are still working out the specifics regarding their energy savings targets.

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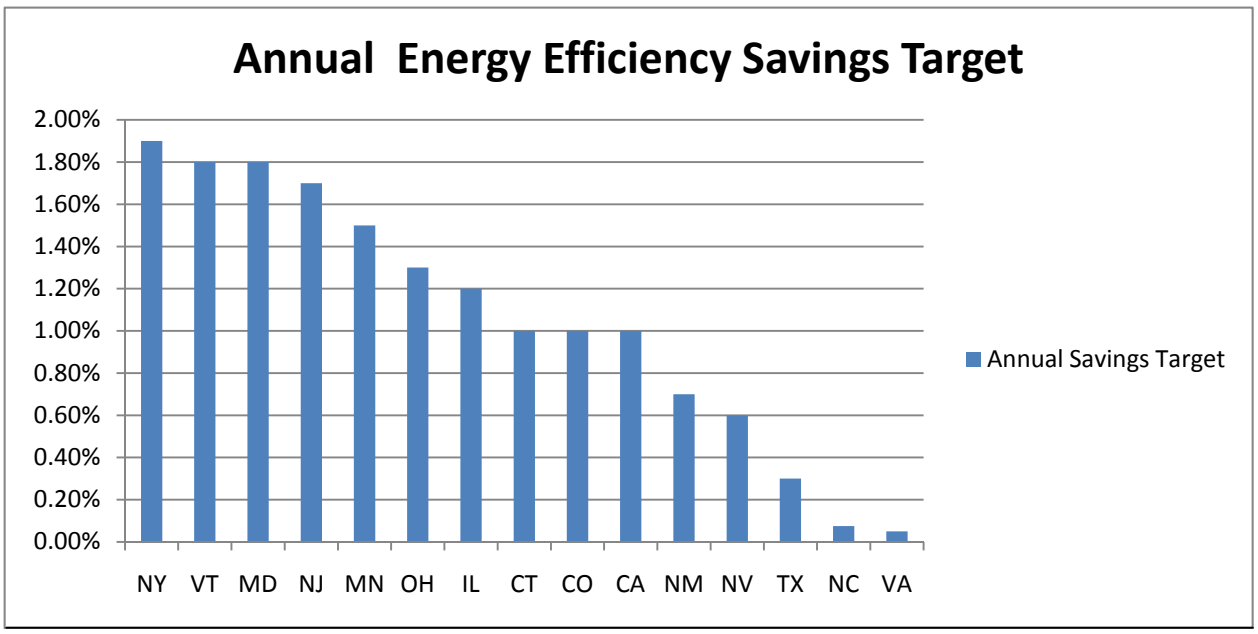


Figure 15: Annual Energy Efficiency Savings Target
(Source: 2008 State Energy Efficiency Scorecard)

Most states (63%) have established these targets as "binding" meaning that they are legally required to reach them. However, a few states (10%) have established "exit ramps" that allow the states to avoid meeting requirements and thus are non-binding. Similarly, 11 percent of these states have established spending caps on these targets, as shown in Figure 16.

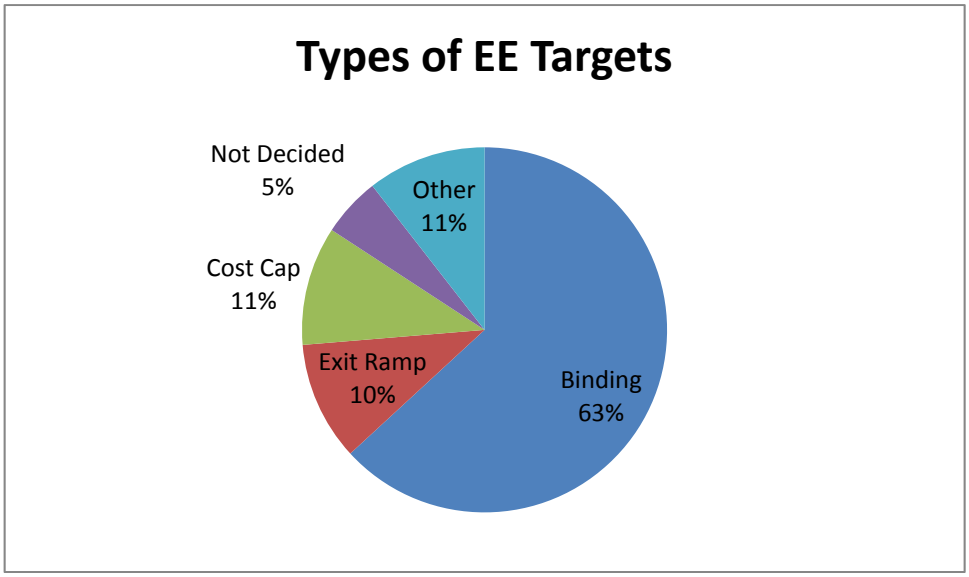


Figure 16: Types of EE Targets
(Source: 2008 State Energy Efficiency Scorecard)

3.3 Cost of Saving Energy

As another way to assess the long-term impacts of the DSM industry, it is important to understand how cost-effective these energy efficiency programs really are. ACEEE conducted a cost-effectiveness study in 2009 and identified the range of costs across 14 states is $0.016 to $0.033 per kWh. Based on the review of six natural gas programs, the costs of saving energy ranged from $0.27 to $0.55 per therm. The bottom line is that energy efficiency remains the least-cost resource for utility resource portfolios. It remains significantly cheaper compared to acquiring other energy options such as generating additional kilowatt hours through new sources using either fossil or renewable energy. Furthermore, as costs for other resources continue to rise, energy efficiency programs are likely to remain the least-cost or cheapest energy resource available to power providers. The following figures summarize these results.

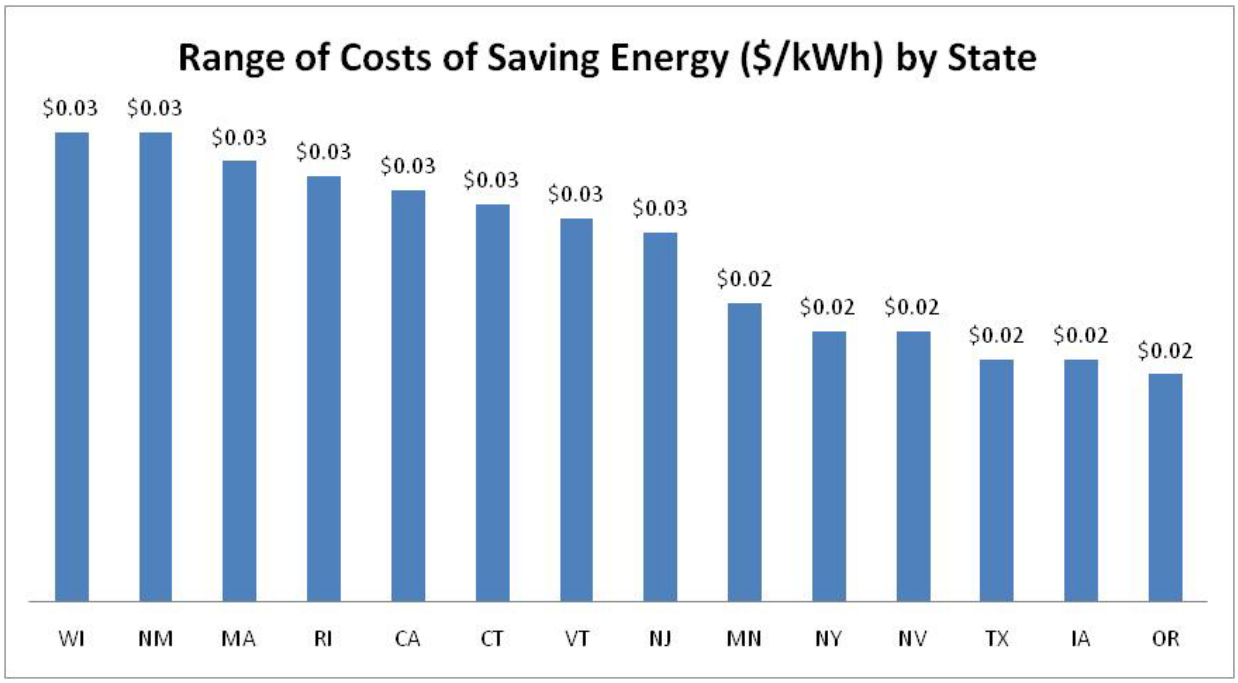


Figure 17: Range of Costs of Saving Energy ($/kWh) by State
(Source: Savings Energy Cost-Effectively Report 2009)

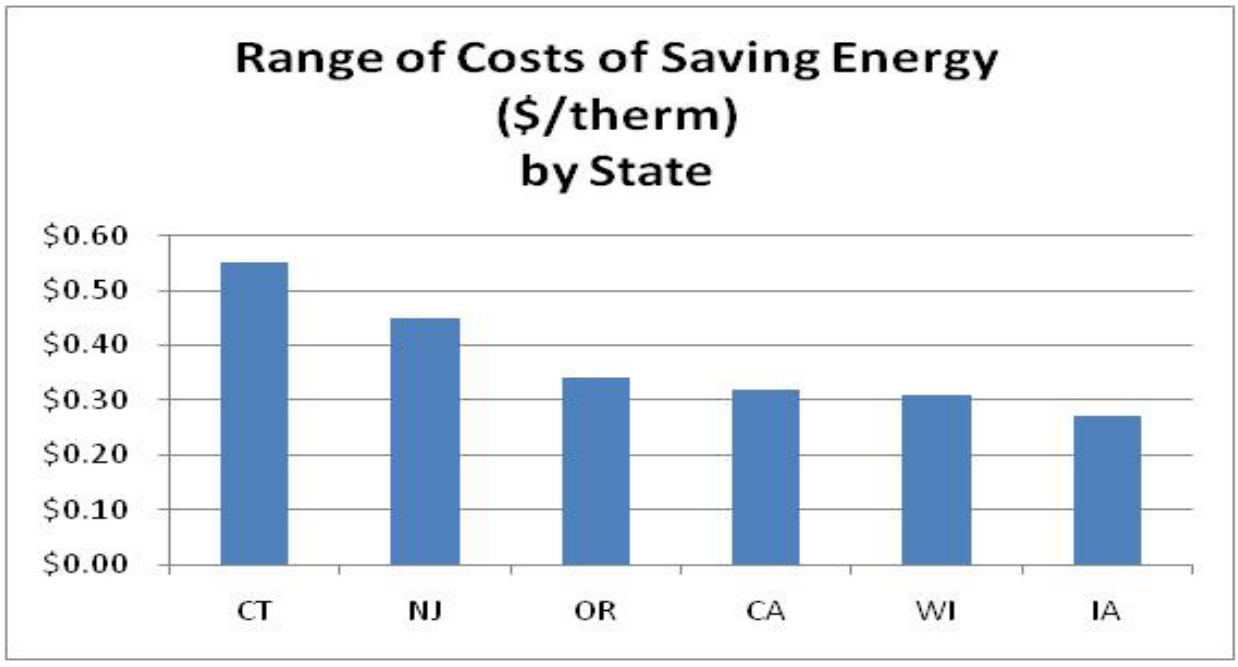


Figure 18: Range of Costs of Saving Energy ($/therm) by State
(Source: Savings Energy Cost-Effectively Report 2009)

3.4 The Role of Cost Effectiveness Tests in DSM

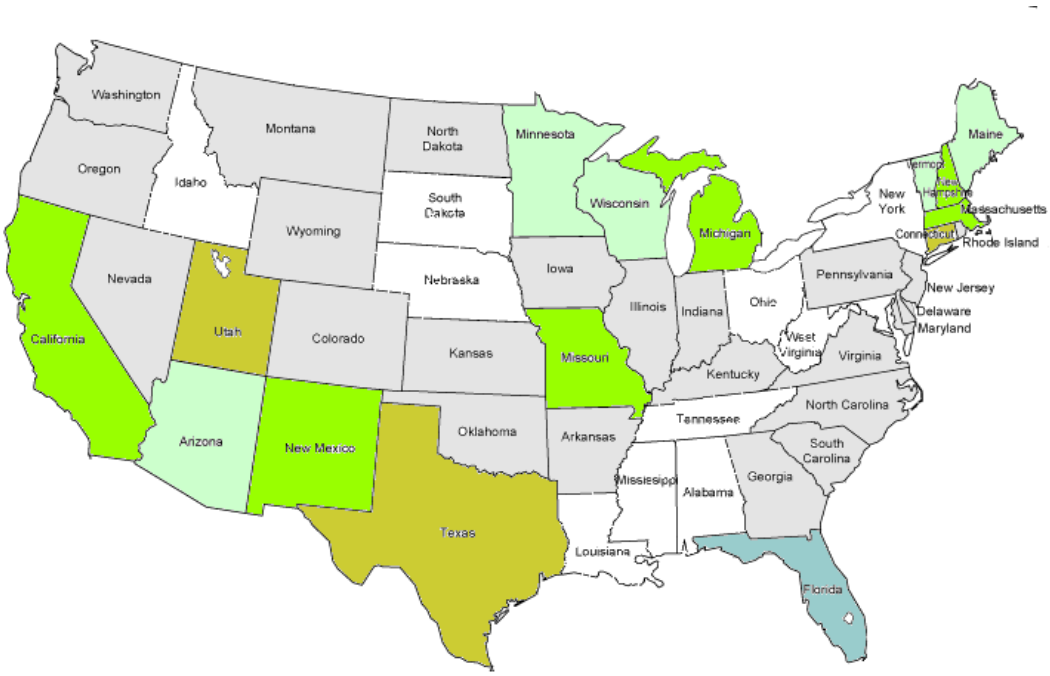
Cost-effectiveness tests help energy efficiency providers prioritize programs based on their overall cost-effectiveness. Basically, cost-effectiveness measure of whether an investment's benefits exceed its costs. How those costs and benefits are defined are decisions made by state utility commissions and individual utilities. There are five cost-effectiveness tests currently used by utilities and commissions in the U.S. and Canada. They are defined as follows:

- *Total Resource Cost (TRC) Test.* Compares the total costs and benefits of a program, including costs and benefits to the utility and the participant and the avoided costs of energy supply.
- *Societal Test. (SCT)* Similar to the TRC Test, but includes the effects of other societal benefits and costs such as environmental impacts, water savings, and national security.
- *Program Administrator/Utility Test. (PACT)* Assesses benefits and costs from the program administrator's perspective (e.g., benefits of avoided fuel and operating capacity costs compared to rebates and administrative costs).
- *Participant Test.* Assesses benefits and costs from a participant's perspective (e.g., the reduction in customers' bills, incentives paid by the utility, and tax credits received as compared to out-of-pocket expenses such as costs of equipment purchase, operation, and maintenance).
- *Rate Impact Measure (RIM).* Assesses the effect of changes in revenues and operating costs caused by a program on customers' bills and rates.

It is important to remember that there is no single test that is best for evaluating the cost-effectiveness of a specific energy efficiency program or portfolio. Rather each test has its strengths and weaknesses. Each test provides different information about the impacts of energy efficiency programs from different perspectives. Together, multiple tests provide a comprehensive approach.

Currently, the most common primary measurement of energy efficiency cost-effectiveness is the TRC, followed by the SCT. The other distributional tests (PCT, PACT, and RIM) are then used to indicate how different stakeholders are affected. Historically, the RIM test is used the least because it is the most restrictive of the five cost-effectiveness tests (Cost-Effectiveness Guide 2008)

Figure 19 summarizes the primary types of cost-effectiveness tests used in the U.S.



Primary Cost-Effectiveness Test Used by Different States					
PCT	PACT	RIM	TRC	SCT	Unspecified
none	CT, TX, UT	FL	CA, MA, MO, NH, NM	AS, ME, MN, VT, WI	AR, CO, DC, DE, GA, HI, IA, ID, IL, IN, KS, KY, MD, MT, NC, ND, NJ, NV, OK, OR, PA, RI, SC, VA, WA, WY

Figure 19: Summary of Cost-Effectiveness Tests by State

3.5 Best DSM Practices

A final component of this State of the Industry report is to summarize the industry's best practices in both program implementation and program evaluation. The following "best practices" have been summarized from the National Action Plan for Energy Efficiency (2008) which reviewed most of the major energy efficiency initiatives currently underway. These "best practices" focus on developing an effective *vision*, regarding overall program goals, objectives, and outcomes; *commitment* to achieving these goals through proper funding; and providing the necessary *resources* both in funding and personnel to ensure that the programs will succeed.

Vision: These best practices focus on developing leadership throughout the organization who can "make the case" for energy efficiency, educate key stakeholders, and enact policy changes that increase investment in energy efficiency as a resource. Visionary leadership is also needed by:

- Senior management within the utility who understand that energy efficiency is a resource alternative that can help manage risk, minimize long-term costs, and satisfy customers.
- State agencies, regulatory commissions, local governments and associated legislative bodies, and/or consumer advocates that expect to see energy efficiency considered as part of comprehensive utility management.
- Businesses that value energy efficiency as a way to improve operations, manage energy costs, and contribute to long-term energy price stability and availability, as well as trade associations and businesses that help customers achieve improved energy performance.

Commitment: These "best practices" focus on utilities and commissions developing organizations that are in alignment and will have policies in place to support energy efficiency programming. Additional factors include:

- Institutionalizing these policies to ensure that energy efficiency goals are realized
- Fostering strong support from upper management and one or more internal champions.
- Developing a framework appropriate to the organization that supports large-scale implementation of energy efficiency programs.

Resources: These "best practices" focus on finding the right staff to implement effective DSM programs with sufficient funding to ensure an adequate program infrastructure that will develop these programs. These best practices include:

- Willingness to devote the necessary resources to make programs successful.
- Clear, well-communicated program goals that are tied to organizational goals and possibly compensation.
- Adequate staff resources to get the job done.
- Align goals with funding.

3.5.1 Best Practices in Evaluation

Program evaluation is also a necessary ingredient for the successful deployment of energy efficiency programs. It also represents an opportunity to identify areas for program improvement, quantify program impacts, and include feedback on program operations. Program evaluation helps optimize program efficiency and ensure that energy efficiency programs deliver intended results. According to the National Action Plan (2008), best practices in program evaluation incorporate the following activities:

- *Budget, plan and initiate* evaluation from the onset; formalize and document evaluation plans and processes.
- *Develop program and project tracking systems* that support evaluation and program implementation needs.
- *Conduct process evaluations* to ensure that programs are working efficiently.
- *Conduct impact evaluations* to ensure that mid- and long-term goals are being met.
- *Communicate evaluation results* to key stakeholders.
- Establishing a tracking system that includes all information necessary for evaluation.
- Conducting evaluating regularly to refine programs as needed (changing market conditions often require program changes).

Process evaluations are used to improve the design and delivery of the program. These are most essential in new programs as they can identify improvements to program delivery that reduce program costs, expedite program delivery, improve customer satisfaction, and better focus program objectives.

Impact evaluations measure the change in energy usage (kWh, kW, and therms) attributable to the program. They use a variety of approaches to quantify energy savings including statistical comparisons, engineering estimation, modeling, metering, and billing analysis.

The term “measurement and verification”(M&V) is often used in energy efficient program evaluations. This term may refer to ongoing M&V that is incorporated into program operations, such as telephone confirmation of installations by third-party installers or measurement of savings for selected projects. Alternatively, it may refer to the external (program operations) actions taken to document savings.

Figure 6 summarizes the DSM evaluation “best practices” identified in a study conducted across the major Canadian utilities. It also provides more concrete examples of the ways in which these best practices can be incorporated into program evaluations.

Summary of DSM Best Practices

Best Practice	ATCO	Enbridge	Gaz Métro	Manitoba Hydro	Sask Energy	Terasen	Union
Monitoring and Tracking							
BP14 – Develop measureable goals for DSM programs and track results	√	√	√	√	√	√	√
BP15 – Develop and use customized tracking systems	√	√	√	√	√	√	√
BP16 – Conduct an assessment of the level of market penetration for a measure or program		√	√	√	√	√	√
BP17 – Produce regular tracking reports for DSM programs	√	√	√	√	√	√	√
BP18 – Produce a separate annual report that outlines the results of DSM activities		√	√	√	√	√	√
BP19 – Include a line item for monitoring and evaluation in the DSM budget		√	√	√	√	√	√
Evaluation systems							
BP20 – Evaluate in a systematic fashion DSM programs ;and input assumptions		√	√	√	√	√	√
BP21 – Make adjustments to savings		√	√	√	√	√	√
BP22 – Conduct a technology assessment of a new technology price to its inclusion in a program		√		√			
BP23 – Integrate feedback loops into program design and delivery	√	√	√	√	√	√	√
BP24 – Consult with stake holders on monitoring and evaluation		√	√		√		√
Verification and audit							
BP25 – Conduct on-site verifications of installed DSM measures		√	√	√			√
BP26 – Conduct an independent audit of DSM activities		√	√	√	√		√

Figure 20: Summary of DSM Best Practices
(Source: DSM Best Practices Update 2008)

Section 4: Key Conclusions

So what does this all mean? In short, it means the DSM industry has made tremendous strides and advances during the past 20 years. However, it also suggests that more work remains to be done. The key findings from each section are summarized next followed by some a discussion of the implications that this will have on the DSM industry for the next decade and beyond.

The key findings from Section 1: DSM Scope are as follows:

- **DSM is here to stay — finally.** After experiencing cyclical periods in both funding and overall interest in DSM programs, it appears that DSM has finally reached a "critical mass." It is a phenomenon that is too big to ignore, given our current economic and energy challenges. Approximately 35 states are in the process of implementing some type of ratepayer-funded electric and/or natural gas energy efficiency programs.

- **Funding for DSM programs is steadily increasing at all levels.** The ARRA funding added another $13 billion to the already nearly $4.5 billion spent by US electric and gas utilities (CEE 2008)—an increase of 21 percent. Canadian budgets reported by eight provinces were $0.6 billion, for a bi-national total of $3.7 billion. Canadian budgets have risen by 32 percent since 2006.

- **Most DSM programs are focusing on the commercial and industrial sectors in both the U.S. and Canada.** This is the area with the greatest savings potential. However, there appears to be an equal split among programs focusing on solely energy efficiency and those focusing on both energy efficiency and peak load management.

- **The DSM industry continues to face a significant workforce shortage**. This shortage is at all levels, including management professionals, "green collar jobs" and trained energy engineers. Moreover, there are not enough training programs currently offered in energy education to meet this gap (Goldman et al (2009).

These findings suggest that DSM's size and scope will continue to grow during the next decade. DSM has emerged as a viable program strategy for electric and natural gas utilities throughout North America. Moreover, DSM funding continues at an unprecedented rate—especially for programs targeting commercial and industrial savings opportunities. However, industry efforts to move forward will be hampered by the critical shortage of qualified managers, implementers and installers who understand DSM programs. These findings suggest that demand for DSM training will continue to outstrip the supply of available workers and therefore the value of organizations like AESP to meet this critical need will continue during the next few years.

The key findings from Section 2: DSM's Savings Impacts and Trends are:

- **Despite the gains in energy efficiency, energy consumption also continues to grow in all three major sectors.** There have been major gains in energy efficiency in the residential sector during the past 20 years; however, there has also been tremendous increases in overall energy usage. The U.S. Energy Information Administration (EIA) in its 2008 Annual Energy Outlook (AEO2008) projects that electricity consumption in the U.S. residential, commercial, and industrial sectors will grow at an annual rate of 1.07 percent from 2008 through 2030. Energy efficiency programs have potential to realistically reduce this growth rate to 0.83 percent per year from 2008 through 2030.

- **The largest energy savings have been in the residential sector.** In terms of energy savings, there have been significant energy savings in the residential sector, from around 1,000 Megawatt hour (MWH) in 1996 increasing overall to a high of over 3,500 MWh by 2007. Furthermore, the MWh decreases from energy efficiency programs have continued steadily toward a significant resurgence of interest and programs in 2004 and beyond. These are similar to the results found in Canada.

- **Energy efficiency savings are concentrated in a few states.** California and New York account for the majority of energy savings due to efficiency programs. The top four states in terms of Total Incremental Electric savings have saved from 455 GigaWatt hours (GWh) to almost 2,000 GWh of electricity in 2006 alone, a four-fold increase.

- **These programs are also delivering real and last reductions in both on and off-peak energy usage in the U.S. and Canada.** Moreover, these programs continue to target lasting savings in the commercial and industrial markets.

The findings from Section 2 demonstrate that energy efficiency programs have led to significant reductions in energy savings. Unfortunately, many of these gains have been offset by increases in energy consumption- especially the growing "plug-load" in the residential and commercial markets. Therefore, DSM programs should continue to focus on ways to reduce overall energy consumption and energy intensity by taking an comprehensive approach to energy efficiency reductions.

The key findings from **Section 3: Current DSM Rules, Regulations and "Best Practices"** are summarized as follows:

- **Energy efficiency still remains the cheapest energy resource**. According to ACEEE's cost-effectiveness study (2009), energy efficiency remains the least-cost resource for utility resource portfolios. It is much cheaper compared to acquiring other energy options such as generating additional kilowatt hours through new sources using either fossil or renewable energy. Furthermore, as costs for other resources continue to rise, energy efficiency programs are likely to remain the least-cost or cheapest energy resource available to power providers.

- **States are formally establishing energy savings "benchmarks."** While some are mandatory and others are voluntary, 15 states are in the process of developing long-term DSM policies and establishing the use of cost-effectiveness tests to formally measure and evaluate energy efficiency programs.

- **Energy efficiency industry professionals have a wealth of resources available to them to learn more about designing, implementing, and evaluating energy efficiency programs.** These "best practices" focus on developing an effective *vision*, regarding overall program goals, objectives, and outcomes; *commitment* to achieving these goals through proper funding; and providing the necessary *resources* both in funding and personnel to ensure that the programs will succeed.

These findings suggest that as energy efficiency will likely remain an important element in energy utilities' overall resource acquisition strategy. Moreover, the savings targets and the ways in which energy savings are measured, will become more standardized as the industry continues to mature. Therefore, it will remain critically important for DSM professionals to develop and incorporate "Best Practices" as a way to help standardize delivery approaches and compare results and savings impacts across and between jurisdictions.

Overall, the state of the industry for DSM suggests a rosy future. However, it also suggests that much work needs to be done to recruit trained professionals, develop effective programs that deliver lasting savings, and evaluate programs in a cost-effective manner.

References

American Gas Association Fact Sheet (http://www.aga.org/NR/rdonlyres/DAC0F194-38C6-4A37-A891-2E93121FF259/0/0209EEFACTSHEET.pdf)

American Gas Association, *Natural Gas Utility Energy Efficiency Portfolios Report—2007 Program Year*, American Gas Association, Policy Analysis, Dec 2008. http://www.aga.org/NR/rdonlyres/122417D7-E42E-49B4-8EE8-9AB26E421B4F/0/1208EEREPORT.pdf

Barbose, G, Goldman, C & Schlegel, J. 2009 "The Shifting Landscape of Ratepayer-Funded Energy Efficiency in the U.S." Lawrence Berkeley National Laboratory, Environmental Energy Technologies Division, Oct., Berkeley, CA

Canadian Gas Association, 2008. "*DSM Best Practices Update,"* IndEco.

CLIMATE CHANGE BUSINESS JOURNAL, Volume 2 No. 6/7 June/July 2009

Consortium for Energy Efficiency (CEE) 2008 Annual Report, Boston, MA, http://www.cee1.org/ee-pe/2008

Eldridge, M, Neubauer, M, York, D, Vaidyanathan, S, Chittum, A, & Nadel, S. 2008. "*The 2008 State Energy Efficiency Scorecard* ACEEE Report Number U086, October.

Electric Power Research Institute and Edison Electric Institute, 2009. "Assessment of Achievable Potential from Energy Efficiency and Demand Response Programs in the U.S. (2010–2030), 1016987 Technical Report, January.

Energy and Environmental Economics & The Regulatory Assistance Project, National Action Plan for Energy Efficiency (2008). *Understanding Cost-Effectiveness of Energy Efficiency Programs: Best Practices, Technical Methods, and Emerging Issues for Policy-Makers*. Energy and Environmental Economics, Inc. and Regulatory Assistance Project. www.epa.gov/eeactionplan [Accessed 12-16-09]

Energy Information Administration. 2008. Form EIA-861 Final Data File for 2006. Retrieved October 30, 2008 from http://www.eia.doe.gov/cneaf/electricity/page/eia861.html.

Freeman, L. 2009. "*Energy Efficiency/Demand Side Management (EE/DSM) Program Delivery Comparison Study,"* Final Report; Black & Veatch Project: 165287, August.

Friedrich, K, Eldridge, M, York, D, Witte, P, & Kushler, M. 2009, "Saving Energy Cost-Effectively: A National Review of the Cost of Energy Saved Through Utility-Sector Energy Efficiency Programs," American Council for an Energy-Efficient Economy (ACEEE) Report No. U092, Washington, D.C.:

Genzer, J. "*American Recovery and Reinvestment Act of 2009 Opportunities for Public Power in Energy Efficiency"* Webinar presented by the law firm of Duncan, Weinberg, Genzer & Pembroke, P.C., Washington DC

Goldman, Charles, Merrian Fuller, Jane Peters, Marjorie McRae, Susan Lutzenhiser, and Matt Spahic. 2009. *Energy Efficiency Services Sector: Workforce Size and Expectations for Growth*. Draft of forthcoming report. Berkeley, Calif.: Lawrence Berkeley National Laboratory.

Joutz, F. and Trost, R. 2007, *"An Economic Analysis of Consumer Response to Natural Gas Prices"*, American Gas Association, March http://www.aga.org/research/studies/energy.htm

U.S. Environmental Protection Agency & U.S. Department of Energy, *Chapter 6, National Action Plan for Energy Efficiency* 2008, Washington, D.C. http://www.epa.gov/cleanenergy/energy-programs/napee/resources/action-plan.html [Accessed 12-15-09]

Witte, D. and Kusher M. 2009, *"Saving Cost Effectively- A National Review of the Cost of Energy Saved through Utility Sector Energy Efficiency Programs,"* ACEEE Report Number U092