



# REVIEW OF LEADING RURAL ELECTRIC COOPERATIVE ENERGY EFFICIENCY PROGRAMS

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**About SWEEP:** The Southwest Energy Efficiency Project is a public interest organization dedicated to advancing energy efficiency in Arizona, Colorado, Nevada, New Mexico, Utah, Wyoming. For more information, visit [www.swenergy.org](http://www.swenergy.org).

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## I. Introduction

Rural electric cooperatives (RECs) account for about 12 percent of all electricity sales in the U.S. In states with a significant rural demographic, RECs deliver a much larger portion of total electricity sales. While investor-owned electric utilities in the Southwest have greatly expanded their energy efficiency and other demand-side management (DSM) programs over the past ten years,<sup>1</sup> RECs in the Southwest region are doing relatively little to promote more efficient electricity use by their customers. However, some RECs in other parts of the country implement robust, well-funded energy efficiency programs. The purpose of this report is to review the energy efficiency efforts and the policy context of leading RECs and to provide examples and lessons that could be helpful as RECs in the Southwest and elsewhere consider increasing their commitment to DSM and energy efficiency.

## II. Background

America's RECs were mostly created as part of the New Deal in the decade spanning the late 1930's and 40's to deliver electrical services to areas not served by existing electric companies. Investor-owned electric utilities could not earn a fair return on investment from branching out to serve rural areas due to the high costs of transmitting power over long distances and instead focused their efforts on serving urban areas. In 1934, less than 11% of U.S. farms and rural communities had access to electricity. As a result of federal intervention and funding, nearly all of the country's rural communities were electrified by 1952. Today, approximately one thousand RECs serve 25 million customers across 46 states.<sup>2</sup>

High per capita use of electric power in rural areas, compounded with an aging electrical infrastructure, serve as significant business challenges to the country's RECs and represent primary factors responsible for the rising cost of delivered energy. While many RECs offer energy conservation and education programs to their customers, these organizations face unique challenges to delivering effective utility grade demand-side management (DSM) programs, products and services. The challenges of implementing DSM programs in rural electric cooperatives and small municipal utilities are not easily overcome, yet because these organizations sell roughly 15% of electricity in the country there is a significant opportunity to capture large amounts of untapped energy savings. The characteristics of rural electric territories represent a real opportunity for vibrant DSM programs, and a number of leading RECs have established DSM programs that serve as an industry model.

Throughout the years many RECs have banded together to create their own power generation and transmission (G&T) cooperatives to produce electricity at wholesale costs. These non-profit organizations help RECs to aggregate investments in generation and transmission

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<sup>1</sup> Geller, H. "Update on Utility Energy Efficiency Programs in the Southwest." Southwest Regional Energy Efficiency Workshop, November 8, 2010. <http://www.swenergy.org/events/annual/2010/presentations/1a%20-%20Geller%20SWEET%2011-08-10.pdf>.

<sup>2</sup> USDA Economic Research Service. "Rural Development Strategies: Infrastructure." <http://www.ers.usda.gov/Briefing/RuralDevelopment/Infrastructure.htm>.

resources and in return are offered federally subsidized business loans. As the construction of generation resources is generally not feasible for rural RECs due to both size and financial capabilities, collaboration with G&T organizations has become a real necessity. While the mission of G&T organizations is to deliver cost effective electrical services to its member co-ops, the actual costs associated with operating and maintaining rural electric generation and distribution systems is significant, driving up the cost of rural electricity as compared to more urban areas.

Many G&T cooperatives provide self-funded DSM programs to promote energy efficiency throughout their member REC service territories, often in partnership with their customers. G&T cooperatives benefit directly from DSM and load management programs that help to flatten customer demand for electricity and reduce the need for expensive peaking or baseload power plants tasked with meeting the growing energy demands of REC customers.

As G&T cooperatives are generally larger organizations compared to their smaller REC customers, they often have more resources and funding at their disposal to operate comprehensive and effective DSM programs. However, as electric generation is the primary business model of G&T cooperatives, investment in DSM often falls by the wayside.

There are a number of policy drivers that stimulate REC and G&T organizations pursuit of DSM resources. While these nonprofit organizations are not generally regulated entities, their executive teams can certainly be influenced by regulatory policy. For example, amendments to the Public Utility Regulatory Policies Act of 1978 (PURPA) require states and covered non-regulated electric utilities to consider a broad range of issues including several requirements aimed at expanding energy efficiency programs at the state level. While PURPA requirements apply to just a small portion of rural and municipal electric cooperatives, its DSM regulations have an indirect impact on many organizations and their pursuit of effective DSM programs. Additionally, several states have adopted Energy Efficiency Resource Standards or goals to insure that all utilities achieve a minimum level of energy savings. In some states such as Minnesota, these standards apply to RECs as well as investor-owned utilities.

While some REC and G&T organizations have established cost effective and best in class DSM programs, many of these nonprofit organizations simply lack the member and management commitment necessary to deliver high performance energy saving programs. It is true that almost all RECs communicate directly with their customers about the benefits of energy efficiency, offering tips and stories about energy efficiency through a variety of media sources, newsletters, website, advertisements and even press releases as demonstrated in Table 1.<sup>3</sup> However, the country's REC and G&T organizations greatly lag investor-owned utilities in funding DSM programs and capturing cost-effective energy savings as a percent of total electric sales. While there are a number of efforts currently underway to support REC and G&T investment in DSM programs, higher levels of DSM funding are needed to help rural electric customers use energy more wisely and to better incorporate DSM as a least-cost electric generation resource.

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<sup>3</sup> National Rural Electric Cooperative Association. "Energy Efficiency."  
<http://www.nreca.coop/issues/FuelsOtherResources/Pages/EnergyEfficiency.aspx>.

**Table 1: REC Support of Energy Efficiency<sup>4</sup>**

• 92 percent of RECs communicate directly with consumers about energy efficiency
• 77 percent of co-ops offer energy audits for free or minimal costs
• 49 percent of co-ops offer financial incentives to consumers to increase efficiency
• 40 percent of co-ops provide weatherization and efficiency services to consumers
• 50 percent offer advanced meters to some consumers

There are a number of challenges faced by RECs and G&Ts in developing and implementing effective DSM programs. Determining the most appropriate DSM funding level is a difficult task which is best accomplished through an Integrated Resource Plan (IRP) or Least Cost Planning (LCP) process.<sup>5</sup> These tools are the primary vehicles used by investor-owned utilities to assess the need for generation resources in their service territory, but they are typically not conducted by REC organizations. DSM programs are considered generation resources that complement traditional resources like coal, natural gas, hydro or nuclear based electric generating plants. While DSM comes at a considerably lower price than competing generation resources, these programs are often underfunded, particularly by organizations that do not conduct IRP or LCP studies. REC management must understand the contribution and value of DSM programs to electric generation and distribution systems in order to properly fund DSM programs.

An additional challenge to the development of effective DSM programs is the evaluation of DSM potential that exists within specific REC and G&T service territories. DSM potential studies can provide necessary insight on the opportunities for energy savings that exist within REC customers' homes, businesses and farms.<sup>6</sup> Individual demographics of rural service territories present unique energy saving opportunities which must be well understood in order to design effective DSM programs. Due to the remote location of rural communities, RECs often lack the contractor infrastructure needed to deliver effective DSM programs, which certainly limits the type of DSM programs that can be offered to customers.

Finally, investment in DSM takes a real commitment on the part of cooperative customers, who agree to pay higher electric rates in return for DSM programs which may generate benefits which are not clearly visible or well understood by individual customers. In order to build member acceptance of DSM programs, efforts must be made to document the real costs and benefits of programs, compared with the alternative of not pursuing DSM at all.

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<sup>4</sup> Ibid.

<sup>5</sup> USAID Office of Energy, Environment and Technology. *Best Practices Guide: Integrated Resource Planning for Electricity*. Prepared by The Tellus Institute. [http://pdf.usaid.gov/pdf\\_docs/PNACQ960.pdf](http://pdf.usaid.gov/pdf_docs/PNACQ960.pdf).

<sup>6</sup> National Action Plan for Energy Efficiency. 2007. *Guide for Conducting Energy Efficiency Potential Studies*. Prepared by Philip Mosenthal and Jeffrey Loiter, Optimal Energy, Inc. [http://www.epa.gov/cleanenergy/documents/suca/potential\\_guide.pdf](http://www.epa.gov/cleanenergy/documents/suca/potential_guide.pdf).

### III. Profiles of Leading REC and G&T DSM Efforts

Successful DSM programs come in a variety of sizes and shapes, so this report examines best practices demonstrated by RECs of varying size as well as a number of programs delivered directly by G&T organizations. REC and G&T organizations are typically not regulated by public utility commissions, so commitments to develop and implement DSM programs must be driven by customers and internal management. While a number of factors can influence the commitment to DSM, such as electric rates, service area demographics and state legislation, it is clear that the responsibility for effective DSM programs really starts at home for these organizations.

#### *New Hampshire Electric Cooperative*

The New Hampshire Electric Cooperative (NHEC) is a member-owned and controlled electric distribution utility serving approximately 80,000 customers across 115 towns in rural New Hampshire. In 2001, NHEC joined investor-owned utilities in the state to offer a common selection of DSM programs to its customers. The statewide DSM programs offered by New Hampshire utilities were initiated through a NH Public Utility Commission (NHPUC) study outlining the need and potential design of energy efficiency programs in the state.<sup>7</sup> The NH electric utilities worked in collaboration to design a series of DSM programs branded *NH Saves*, with a mission of offering electric customers in the state like energy savings products, services and rebates regardless of their utility provider or location.

NHEC funds the *NH Saves* programs by collecting a system benefit charge (SBC) of 3.3 mills, or \$0.0033, for each kilowatt hour (kWh) distributed to its customers. In exchange for meeting planned energy savings goals within approved annual DSM budgets, NHEC earns a bonus of up to 12% of its total DSM budget, amounting to over \$134,000, which is passed on to its customers. All costs related to the delivery of DSM programs including customer rebates, marketing, evaluation and internal administration are paid with SBC funds. NHEC joins New Hampshire's investor-owned utilities to provide quarterly DSM program updates, annual progress reports, and annual program filings to the NHPUC for their approval.

Unlike many of the country's REC organizations, NHEC conducts a benefit-cost review of its DSM programs using the Total Resource Cost (TRC) test, which is filed with the NHPUC for approval in conjunction with approval of DSM programs by investor-owned utilities. NHEC collects tracks and reports a variety of program data ranging from engineered savings estimates to customer cost for individual measures installed through its DSM programs. This information is essential to demonstrate the performance of DSM programs and serves as the basis for benefit-cost screening and evaluation of energy efficiency programs.

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<sup>7</sup> NH Energy Efficiency Working Group. "Report to NH Public Utility Commission on Rate-payer Funded Energy Efficiency Issues in New Hampshire. Docket No. DR 96-150. July 6, 1999. [http://www.puc.nh.gov/Electric/96-150%20NH%20Energy%20Efficiency%20Working%20Group%20Final%20Report%20\(1999\).pdf](http://www.puc.nh.gov/Electric/96-150%20NH%20Energy%20Efficiency%20Working%20Group%20Final%20Report%20(1999).pdf)

In 2011, NHEC will spend \$1.3 million on ten DSM programs to save an estimated 36.4 MWh per year of electricity with an additional fossil fuel energy savings produced from its fuel neutral *NH Saves* DSM programs. These programs are cost-effective as well, with a projected benefit-cost ratio of 2.5 based on the TRC test.<sup>8</sup> The *NH Saves* programs are unique in comparison to DSM programs in other states, as a number of the *NH Saves* programs are designed to capture all energy savings regardless of fuel type.

The NHPUC has approved Home Performance with ENERGY STAR, ENERGY STAR Homes, and the Home Energy Assistance programs as fuel-neutral. NHEC files an electric savings goal and a fuel-neutral MMBTU goal for each of these programs to capture all potential fuel savings including oil, propane, natural gas, wood and electricity. Other DSM programs implemented by NHEC include commercial sector programs, geothermal heat pumps, and solar thermal programs for both commercial and residential customers.

NHEC receives additional funding to supplement SBC funds through the Independent System Operator (ISO) New England Forward Capacity Market, and the Regional Greenhouse Gas Initiative (RGGI).<sup>9</sup> NHEC received nearly \$921,000 in RGGI funding to expand its DSM program offerings during a nine month period starting in August of 2009.<sup>10</sup> Additionally, NHEC will receive \$40,000 from the ISO forward capacity in 2011 and an estimated \$50,000 in 2012, further supplementing the company's DSM efforts without raising the cost of delivered energy. While the future of RGGI funding awards to stimulate the expansion of DSM programs in the state of New Hampshire is unlikely, leveraging alternate funding sources such as RGGI proved to be a successful means of ramping up DSM programs without a direct financial burden to electric ratepayers in the state.

NHEC is required by the NHPUC to allocate 14.5% of its 2011 DSM budget to weatherize low income customers' homes through their Home Energy Assistance program (HEA), with a planned funding level increase to 15% in 2012. The company directly contracts with the NH Community Action Agencies to implement this program, which is targeted to save 717,727 kWh lifetime combined with fossil fuel savings contributing to an overall TRC benefit-cost ratio of 2.32 with an annual budget of \$186,000. Because the HEA program is fuel neutral, the majority of energy savings flowing from the program is in the form of heating oil, propane and wood. NHEC works with the NH Community Action Agencies to leverage other funding sources from the Weatherization Assistance Program, State Energy Program, Low Income Home Energy Program and American Recovery and Reinvestment Act (ARRA).

### *Iowa Association of Electric Cooperatives*

The Iowa Association of Electric Cooperatives (IAEC) is comprised of 35 individual REC organizations serving electricity and natural gas to approximately 210,000 customers

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<sup>8</sup> New Hampshire Electric Utilities. "2011-2012 CORE New Hampshire Energy Efficiency Programs." Docket No. DE 10-188. New Hampshire Public Utilities Commission. August 1, 2010.

<http://www.puc.nh.gov/Electric/coreenergyefficiencyprograms.htm>.

<sup>9</sup> ISO New England, Inc. "Forward Capacity Market." [http://www.iso-ne.com/markets/othrmkts\\_data/fcm](http://www.iso-ne.com/markets/othrmkts_data/fcm).

<sup>10</sup> Regional Greenhouse Gas Initiative. <http://www.rggi.org/home>

throughout rural Iowa. REC customers are mostly residential, representing 84 percent of the total customer base, compared with an average of 27 percent residential customer base served by the state's investor owned electric utilities.<sup>11</sup> This demographic detail poses a number of significant challenges to IAEC members as the cost of delivering electricity to residential customers is considerably higher than the cost of delivering electricity to commercial and industrial customers.

In 2008, the Iowa General Assembly enacted legislation SF 2386 to address the state's need for energy efficiency.<sup>12</sup> The legislation outlines a number of directives including a requirement for consumer-owned electric utilities (i.e., municipal utilities and RECs) to establish energy efficiency goals and cost-effective programs to meet prescribed energy savings targets.

The legislation also created an Energy Efficiency Plans and Programs Study Committee to evaluate utility DSM plans, ensure that programs are both effective and meet the needs of Iowa utility ratepayers, and make recommendations for additional requirements that would lead to improvement.<sup>13</sup> In addition, the Commission on Energy Efficiency Standards and Practice was created to identify the state's energy efficiency needs and to provide recommendations targeted to meet these needs and produce significant energy savings across residential, commercial and industrial sectors.<sup>14</sup> This legislation created a powerful infrastructure to support aggressive DSM programs for both investor-owned utilities and REC organizations.

In response to SF 2386 directives, IAEC filed an Energy Efficiency Assessment of Potential document with the Iowa Utilities Board at the end of 2009, outlining \$71.5 million in funding to support DSM programs for the period of 2010 to 2014.<sup>15</sup> This new commitment to aggressive DSM programs represents a 30% increase over 2008 DSM funding levels, with aggressive energy savings goals of 4.2 billion kWh over the lifetime of efficiency measures installed as a result of the five-year effort.

IAEC has branded its DSM programs *Living with Energy in Iowa* to improve customer awareness and recognition of its energy saving services and incentives. *Living with Energy in Iowa* includes a real focus on consumer education with a magazine, website, energy savings tips, articles and advertisements targeted to communicate the benefits of energy efficiency and promote consumer participation in DSM programs. *Living with Energy in Iowa* includes an

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<sup>11</sup> Iowa Association of Electric Cooperatives. [http://www.iowarec.org/about\\_us](http://www.iowarec.org/about_us).

<sup>12</sup> Iowa Legislature. Senate File 2386 - Enrolled. <http://coolice.legis.state.ia.us/Cool-ICE/default.asp?category=billinfo&service=billbook&GA=82&hbill=SF2386>.

<sup>13</sup> Iowa Utilities Board. "Evaluation of Energy Efficiency Goals and Programs Filed with the Iowa Utilities Board by the Iowa Association of Electric Cooperatives." Report to the Iowa General Assembly. January 1, 2011. [http://www.iowa.gov/iub/docs/misc/EE/2011\\_IUB\\_REC\\_EE\\_Report.pdf](http://www.iowa.gov/iub/docs/misc/EE/2011_IUB_REC_EE_Report.pdf)

<sup>14</sup> Iowa Commission on Energy Efficiency Standards and Practice. "Final Report to the Governor and the Iowa General Assembly." January 1, 2011. [http://www.dps.state.ia.us/fm/building/energy/PDF/commission\\_on\\_energy\\_efficiency\\_standards\\_and\\_practices\\_final\\_report.pdf](http://www.dps.state.ia.us/fm/building/energy/PDF/commission_on_energy_efficiency_standards_and_practices_final_report.pdf).

<sup>15</sup> Haeri, H., S. Dimetrosky, C. Bicknell, C. Elliot, T. Jayaweera, E. Morris, T. Larson, et al. 2008. "Assessment of Energy and Capacity Savings Potential in Iowa." Prepared for the Iowa Utility Association by Quantec, LLC, in collaboration with Summit Blue Consulting and Nexant, Inc. <http://www.cadmusgroup.com/pdfs/iaua.pdf>.

impressive selection of natural gas and electric DSM programs which are delivered directly by individual REC organizations and accessed on the web at [www.livingwithenergyiowa.com](http://www.livingwithenergyiowa.com).

IAEC’s Residential Weatherization Program follows the Home Performance with ENERGY STAR design to provide incentives for comprehensive whole house weatherization of electrically heated homes. The program outlines specific pre and post insulation and air sealing levels required to qualify for the 60 percent rebate up to a cap of \$2200 per home. Innovative DSM programs are offered to promote geothermal heat pumps with a \$1650 rebate and additional \$300 incentives for heat pump water heaters. Rebates are also provided to promote the purchase of a wide selection of ENERGY STAR qualified appliances and lighting products including LED fixtures.

IAEC’s commercial DSM programs include incentives for high performance T8 and high output T5 lighting products along with efficient metal halide and high pressure sodium outdoor lighting. While it does not appear that IAEC includes comprehensive commercial or industrial DSM programs, this design most likely reflects an extremely low concentration of commercial and industrial customers. Instead, a unique Livestock Efficiency program is offered to promote energy savings in the important agricultural sector. This program design offers incentives for efficient livestock water heaters, heat lamps, crate heating pads and device controllers.

In January 2011, the Commission on Energy Efficiency Standards and Practices released their report to Iowa’s Governor and legislature, providing detailed recommendations and a statewide needs analysis for energy efficiency.<sup>16</sup> While the report does not directly require Iowa utilities to take any specific actions, the recommendations clearly identify a path for aggressive DSM programs in the state and will certainly influence future policy and programs. The report does incorporate the DSM goals adopted by the state’s electric cooperatives which include saving 1.1 percent of electric sales in 2010, increasing to saving 1.3 percent of electric sales in 2014 as shown in Table 2. Projected energy efficiency program costs to achieve these savings goals are \$13.3 million in 2010, increasing to \$15.2 million by 2014, a 14 percent increase in DSM spending over the next four years. While these figures represent the collective DSM investment by Iowa’s RECs, some organizations plan to contribute as much as 5 percent of their electric revenue annually to fund their DSM efforts.

**Table 2: Joint Iowa Electric Cooperative DSM Plan for 2012<sup>17</sup>**

	Electric Savings		Electric Peak Reduction	
	MWh	Percent of Sales	MW	Percent of Peak
<b>Residential and Low Income</b>	43,461	1.5%	10.684	N/A
<b>Agricultural, Commercial and Industrial</b>	17,716	0.9%	2.157	N/A
<b>Demand Response</b>	0	0	117.546	N/A
<b>Total Goals</b>	61,177	1.2%	130.388	N/A

<sup>16</sup> Iowa Commission on Energy Efficiency Standards and Practice. “Final Report.” (See Reference 14).

<sup>17</sup> Ibid.

## *Hoosier Energy*

Hoosier Energy is a G&T cooperative that produces electricity for 18 RECs serving electricity to 290,000 customers throughout the state of Indiana. As in many of the communities served by REC and G&T organizations, the demand for electricity in Hoosier Energy's service territory is steadily growing. According to a 2009 Power Requirements Study (PRS), the peak demand for electricity by Hoosier Energy customers is forecasted to grow annually by 1.9% through 2028. Hoosier Energy responded quickly to PRS growth forecasts, launching a series of DSM programs in 2009. The G&T developed a portfolio of effective residential and commercial energy efficiency programs together with a smart grid based load management program, tasked with the overarching goal of 5% reduction in peak demand levels by 2018.

In 2010, Hoosier Energy DSM programs produced 24.8 GWh in annual electric savings, representing 0.3% of total energy distributed to REC customers, at a cost of 2 cents per kWh saved, which is well below the cost of electricity delivered from the organization's power plants. Hoosier Energy took the extra step to evaluate the cost effectiveness of its individual DSM programs and combined DSM portfolio. The TRC test was used by the company to measure program effectiveness. The evaluation showed that the DSM portfolio had an impressive benefit cost ratio of 3.35.

Hoosier Energy leveraged additional funding to supplement its new portfolio of DSM programs in 2009, in the form of a \$5.1 million ARRA grant. Hoosier Energy met the ARRA goals by weatherizing 824 low income customer homes at a cost of \$5,000 per home to generate 2,635 MWh of electric savings per year and 0.73 MW of peak demand reduction. Based upon this strong performance, Hoosier Energy received a second ARRA grant for \$5.8 million in September 2010 for the weatherization of 935 homes across 23 Indiana counties.

Hoosier Energy's self-funded DSM programs started in 2010. Programs include incentives for compact fluorescent light bulbs (CFLs), attic insulation, and low-flow water saving devices as well as air and duct sealing. In-home energy audits are offered to customers to identify cost-effective measures targeted for program rebates. The average cost per home weatherized in 2010 was approximately \$4,000. Weatherization measures have the greatest impact on heating bills and consumers with electrically heated homes and high seasonal electric usage are given priority in the selection process. Thirteen member co-ops were active in the program in 2010 with all customers expected to participate in 2011. Results for 151 homes weatherized in 2010 include annual savings of 717 MWh and 0.2 MW of peak reduction.<sup>18</sup>

Hoosier Energy also implemented a direct load control program in 2010. Eleven cooperatives participated in the program in which control devices were installed on water heaters and air conditioners. Participants are offered a variety of participation incentives including one-time payments and monthly bill credits. One member REC offered no incentive, instead emphasizing the importance of conserving energy, contribution to stable rates and environmental benefits. Each controlled air conditioner or heat pump is estimated to provide one kilowatt (kW) of peak demand reduction. Each water heater is estimated to reduce demand by 0.8 kW in winter

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<sup>18</sup> Hoosier Energy. "Demand Side Management 2010." Annual Report. <http://www.hepn.com/assets/files/HoosierEnergyDSM2010Report.pdf>.

months and 0.4 kW in summer months. Control sessions are conducted during on-peak months of June through August and December through February. Very good 2010 results were achieved with 3,555 switches installed to control 3,004 water heaters and 2,089 air conditioners/heat pumps.

### *Oregon Rural Electric Cooperatives*

Oregon electric utilities were first directed to offer DSM programs in the 1981 Residential Energy Conservation Act. Since that time, new legislation has supported the continued development of aggressive DSM programs in the state. Key legislation adopted in 2007 includes a public purpose charge equal to 3 percent of the total revenues collected by utilities which is to be spent on DSM programs.<sup>19</sup> The public purpose charge generates an estimated \$60 million to fund electric DSM programs in the state, which includes public purpose charge payments collected by REC organizations to fund DSM programs for their customers.<sup>20</sup>

Oregon is part of a four state area covered by the Northwest Power and Conservation Council (NPCC) which carries out integrated resource planning (IRP) for the region. NPCC has identified energy efficiency and conservation as a priority electric resource needed to meet load growth in the region. NPCC's most recent report, the *Sixth Northwest Power and Conservation Plan*, indicates that aggressive DSM programs can offset all system load growth by 2012 and 85 percent of system load growth throughout the next twenty years.<sup>21</sup> NPCC's report offers a number of strategies focused on ensuring an adequate and affordable supply of electricity for Northwestern residents. In addition to aggressive DSM programs, NPCC strategies include efforts to advance building energy codes, adopt product efficiency standards, develop regional trade ally efforts, and expand alternate electric resources.

Oregon's RECs are generally modest in size, serving from about 17,000 to 38,000 customers. Despite the small size of these organizations, REC's in the state have demonstrated a clear commitment to helping their customers save energy via a consistent set of residential and commercial DSM programs. REC residential programs typically include low income weatherization, ENERGY STAR Homes, ENERGY STAR Lighting and Appliances, and heat pump and electric water heater rebate programs. REC commercial programs tend to have more variation, but typically include agricultural retrofit rebates, commercial lighting retrofit, irrigation efficiency and comprehensive commercial rebate based programs.

The variation in commercial DSM programs offered by RECs in Oregon has much to do with member demographics, where residential accounts can represent as much as 90 percent of the REC customer base. While the nonprofit Energy Trust of Oregon (ETO) delivers high performance DSM programs on behalf of investor owned utilities in the state, RECs implement

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<sup>19</sup> Senate Bill 838. 74<sup>th</sup> Oregon State Legislative Assembly, 2007 Regular Session. <http://landru.leg.state.or.us/07reg/measure/sb0800.dir/sb0838.en.html>.

<sup>20</sup> Senate Bill 1149. 70<sup>th</sup> Oregon State Legislative Assembly, 1999 Regular Session. Summary of bill available at <http://energytrust.org/About/PDF/sb1149.pdf>.

<sup>21</sup> Northwest Power and Conservation Council. "Sixth Northwest Conservation and Electric Power Plan." February 2010. <http://www.nwcouncil.org/energy/powerplan/6/final/SixthPowerPlan.pdf>.

DSM programs on their own and have demonstrated significant success in helping customers to save energy. However, the ETO appears to greatly influence the design and implementation of REC operated DSM programs and this organization will certainly continue to influence the growth of DSM efforts in the state for many years to come.

Many of Oregon's RECs have also leveraged alternate funding sources to promote DSM and load management programs. Examples of leveraged funding include ARRA grants awarded to encourage the installation of smart meters and the future pursuit of load management programs. For example, Central Electric Cooperative officially launched its Advanced Metering Infrastructure (AMI) project in May 2010 funded by a \$4.65 million matching grant provided by the U.S. Department of Energy (DOE).

In April 2010, Central Lincoln People's Utility District (PUD) was awarded a \$9.94 million U.S. Department of Energy Smart Grid Grant which will be used to purchase and install Smart Grid technology throughout the District's service territory. These Smart Grid projects will include monitoring, evaluating and reporting on system performance and benefits directly to the DOE. Properly used, this technology opens the door to future energy efficiency, load optimization and load management programs which could help to reduce further system electricity use and peak power demand.

Oregon's REC organizations have successfully leveraged technical expertise offered by local and regional industry groups. Oregon's DSM efforts are strongly supported by the Bonneville Power Administration (BPA), Northwest Energy Efficiency Alliance and the Northwest Power and Conservation Council, which have helped to guide the development of consistent DSM programs and promote DSM best practices.

Emerald PUD, for example, has partnered with BPA to bring an interesting load management pilot program called PowerSync to its customers. This two year pilot will examine the effectiveness of controlling heat pump electric heating systems and electric water heating loads, shifting the demand for power to reduce electric system peaks. The benefit of this load reduction program is to reduce Emerald PUD's purchase of expensive peak electricity needed to meet its customers growing energy needs. Participating households are fitted with thermal storage and domestic hot water storage devices to insure that customer's heat and hot water needs are fully met. PowerSync will determine the potential energy savings and load reduction benefits that result from this new behavioral approach to DSM and look to encourage customer participation in responsible peak load reduction programs.

### *Minnesota Rural Electric Cooperatives*

In the Next Generation Energy Act (NGEA) of 2007, Minnesota established unique legislation that requires investor-owned, municipal and rural cooperative utilities to spend at least 1.5% of their gross operating revenues to fund energy efficiency and load management programs. An annual energy savings goal of 1.5 percent of a three-year average of retail electricity and natural gas sales accompanies the budgetary goal, with at least 1 percent savings from demand-side programs and up to 0.5 percent coming from supply-side efficiency improvements. The purpose of this legislation is to promote cost-effective energy efficient

programs, technologies and practices that help Minnesota's gas and electric customers use energy more wisely, while ensuring an adequate supply of affordable energy into the future.

In addition to the aggressive energy efficiency budgets and saving requirements established for the state's electric and gas utilities, the NGEA mandates a per capita energy reduction requirement, a renewable energy resource standard, and a greenhouse gas reduction standard. The legislation requires per capita energy use to be reduced by 15 percent by 2015 through investments in energy efficiency and renewable energy resources, and requires that renewable energy resources make up a minimum of 25 percent of the total energy used in the state. Lastly, this legislation mandates a 15 percent reduction of 2005 greenhouse gas emissions by 2015, increasing to a 30 percent reduction requirement by 2025 and an 80 percent reduction by 2050.<sup>22</sup>

The NGEA created the Minnesota Energy Conservation Improvement Program (CIP), a series of statewide utility-administered supply-side management (SSM) and demand-side management (DSM) programs directly coordinated by the state's Office of Energy Security (OES).<sup>23</sup> The OES reviews and approves utility CIP filings to ensure that energy savings are calculated correctly, statutory requirements are met, and programs are cost-effective. Minnesota ratepayers' investment in DSM programs helps to defer costly new generation resources and distribution infrastructure improvements while ensuring affordable energy costs.

Decoupling is included as a key feature of the NGEA, removing disincentives related to the states gas and electric utilities pursuit of energy efficiency which might otherwise represent a barrier to expanding DSM efforts. The decoupling policy sets criteria and standards to direct utilities in process of eliminating utility revenue based on total energy sales and instead bases revenue on fixed cost recovery. The Minnesota decoupling policy supports aggressive DSM programs and sets the state's utilities on track to exceed energy and greenhouse gas savings requirements.

Many of the country's RECs are not regulated by state public utility commissions and therefore are not required to share the results of their DSM programs. However, electric cooperatives and municipal utilities in Minnesota are required to produce an annual report to the OES, providing accurate reporting and tracking of energy savings information attributable to CIPs. In effort to streamline utility data reporting and to insure a consistent reporting product, the state developed a data tracking and measurement software tool called Energy Savings Platform. This statewide data reporting system streamlines reporting for the 173 gas and electric utilities in the state and allows the OES to effectively coordinate its CIP partners.

Minnesota utilities offer a consistent series of residential and commercial DSM and SSM programs to ensure that all rate payers receive like products and services from the many investor owned and customer owned utilities in the state. In 2008 and 2009, Minnesota's utilities invested

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<sup>22</sup> Minnesota Sustainable Communities Network. "Next Generation Energy Act of 2007." Minnesota Pollution Control Agency. [http://www.nextstep.state.mn.us/res\\_detail.cfm?id=4034](http://www.nextstep.state.mn.us/res_detail.cfm?id=4034).

<sup>23</sup> Minnesota Office of Energy Security.

<http://www.state.mn.us/portal/mn/jsp/content.do?subchannel=null&programid=536917271&sc3=null&sc2=null&id=-536893812&agency=Energy>.

over \$287 million in CIPs, achieving 1.2 million megawatt-hours (MWh) of annual electricity savings and 3.4 billion cubic feet of natural gas savings, delivering an estimated 1.3 million tons of avoided carbon dioxide emissions.<sup>24</sup> These results are detailed in Tables 3, 4 and 5.

During this same two-year period, Minnesota RECs invested over \$88 million to fund DSM programs that save over 249 million kWh of electricity each year. This performance represents a DSM resource that provides electrical savings at an estimated cost of less than 2.5 cents per kWh, well below the statewide average of 8.1 cents per kWh. The demonstrated performance of Minnesota’s REC organizations to deliver effective DSM programs, combined with the aggressive legislative support of DSM programs in the state, surely set the path for continued growth of DSM as a least-cost energy resource.

**Table 3: Electric Cooperative DSM Spending by Customer Segment<sup>25</sup>**

	<b>Commercial/Industrial</b>	<b>Residential</b>	<b>General/Other</b>	<b>Total</b>
<b>2008</b>	\$4,635,199	\$20,650,804	\$3,119,247	\$28,405,249
<b>2009</b>	\$5,060,541	\$23,255,209	\$31,345,150	\$59,660,900
<b>biennium</b>	\$9,695,740	\$43,906,012	\$34,464,397	\$88,066,149
<b>allocation</b>	11%	50%	39%	100%

**Table 4: Electric Cooperative DSM Savings by Customer Segment (kWh)<sup>26</sup>**

	<b>Commercial/Industrial</b>	<b>Residential</b>	<b>General/Other</b>	<b>Total</b>
<b>2008</b>	74,978,447	48,191,025	1,400,510	124,569,982
<b>2009</b>	40,842,676	65,154,997	19,083,771	125,081,444
<b>biennium</b>	115,821,123	113,346,022	20,484,281	249,651,426
<b>allocation</b>	46%	45%	8%	100%

**Table 5: First Year Cost of Savings (\$ per kWh)<sup>27, 28</sup>**

	<b>Commercial/Industrial</b>	<b>Residential</b>	<b>General/Other</b>	<b>Weighted Cost</b>
<b>2008</b>	\$0.0618	\$0.4285	\$2.2272	\$1.0897
<b>2009</b>	\$0.1239	\$0.3569	\$1.6425	\$0.8327
<b>biennium</b>	\$0.0837	\$0.3874	\$1.6825	\$0.3528
<b>allocation</b>	11%	50%	39%	100%

<sup>24</sup> Minnesota Office of Energy Security. “Minnesota Conservation Improvement Program Energy and Carbon Dioxide Savings Report for 2008-2009.” March 23, 2011.

[http://www.state.mn.us/mn/externalDocs/Commerce/CIP\\_Energy\\_and\\_CO2\\_Savings\\_Report\\_2011\\_032411051159\\_CIP\\_CO2\\_Report\\_2011.pdf](http://www.state.mn.us/mn/externalDocs/Commerce/CIP_Energy_and_CO2_Savings_Report_2011_032411051159_CIP_CO2_Report_2011.pdf).

<sup>25</sup> Ibid.

<sup>26</sup> Ibid.

<sup>27</sup> Minnesota Department of Commerce. “2006 Minnesota Cooperative and Municipal Conservation Improvement Program Report: Summary Analysis.” May 2006.

[https://wiki.umn.edu/pub/EnergyConservation/WebHome/2006\\_Coop\\_and\\_Muni\\_CIP\\_report.pdf](https://wiki.umn.edu/pub/EnergyConservation/WebHome/2006_Coop_and_Muni_CIP_report.pdf)

<sup>28</sup> Costs provided for comparative purposes, while actual energy savings will extend throughout the measure lifetime, which is shown to be 14.3 years in the Minnesota CIP report for 2006.

## IV. Recommendations for Best Practice DSM Programs

While many of the country's REC and G&T organizations face similar challenges to delivering effective DSM programs, the organizations profiled in this report are clear examples of RECs and G&Ts that have risen above the rest to establish themselves as DSM leaders. This leadership doesn't happen by accident. There are a number of common elements and practices that have led to the success of these efforts.

### 1. Determine Need

In order to determine the potential benefits of DSM programs, RECs should follow the lead of the country's regulated investor owned utilities by developing an Integrated Resource Plan (IRP) to determine the optimal mix of demand side and supply side system resources needed to meet customer demand. Demand-side resources include energy efficiency programs and peak load reduction or load shifting programs. An IRP is an essential tool for determining the value of DSM and load management programs as compared to other electric resources for specific utility service areas.

A comprehensive IRP evaluates the impact of DSM programs and helps to identify the most appropriate level of DSM needed to ensure that customers receive competitive electric rates and are protected from future rate increases.<sup>29</sup> While an IRP examines a variety of resources including electric power plants, peaker power plants, cogeneration, renewable energy, load management and energy efficiency, there is no inherent requirement to select the least-cost mix of resources. A number of the country's regulated electric utilities have adopted a Least Cost Procurement (LCP) requirement in addition to the traditional IRP process.<sup>30</sup> LCP requires that utilities select the least-cost mix of electric resources while ensuring system reliability and equal valuation of electric resources. DSM electric resources can usually be obtained at a lower cost compared to electricity generated from new power plants and renewable energy resources, meaning LCP leads utilities to emphasize acquisition of DSM resources.

G&Ts and larger RECs are urged to adopt IRP and LCP processes to ensure that their customers benefit from a thorough investigation of options that value demand side and supply side resources on a level playing field. Given the small size and limited capabilities of most RECs, it may be more appropriate to carry out IRP and LCP efforts at the G&T level. An example of this recommendation is the IRP recently completed by Tri-State Generation and Transmission Company, a G&T organization serving 44 RECs located throughout rural Colorado and neighboring states.

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<sup>29</sup> National Action Plan for Energy Efficiency. 2007. *Model Energy Efficiency Program Impact Evaluation Guide*. Prepared by Steven R. Schiller, Schiller Consulting, Inc.

[http://www.epa.gov/cleanenergy/documents/suca/evaluation\\_guide.pdf](http://www.epa.gov/cleanenergy/documents/suca/evaluation_guide.pdf).

<sup>30</sup> Angel, S., J. Bryson, S. Gander, T. Kerr, and K. Pielli. 2006. *Clean Energy-Environment Guide to Action: Policies, Best Practices and Action Steps for States. Chapter 6 - Utility Planning and Incentive Structure*. U.S. Environmental Protection Agency, Office of Atmospheric Programs.

[http://www.epa.gov/statelocalclimate/documents/pdf/guide\\_action\\_chapter6.pdf](http://www.epa.gov/statelocalclimate/documents/pdf/guide_action_chapter6.pdf)

Tri-State completed a long term electric resource plan in 2010 which considered scenarios including high, moderate and low levels of energy efficiency and load management.<sup>31</sup> This resource plan demonstrates that moving from low investment to high investment in DSM programs could save Tri-State and its member cooperatives \$280 million. Unfortunately, Tri-State has not yet committed to pursuing the high DSM scenario in partnership with its REC members.

## ***2. Gain Customer Support***

Educating G&T and REC customers about the value of energy efficiency and load management impacts on electric systems is the key to gaining support for viable DSM programs. Many of the country's G&T and REC organizations communicate with their customers about DSM, offering a variety of programs, rebates and educational materials. However, RECs and their customers are not often educated on the value of these programs relative to ensuring low system costs over the long run. Gaining member and end user appreciation of the value of energy efficiency and load management programs helps to gather support for funding of these least cost resources.

## ***3. Develop Effective Program Leadership***

RECs and G&Ts delivering best in class DSM programs don't get there by accident. These organizations deliver high performance DSM programs to their customers through a well trained and committed DSM team, which includes executive management, program managers and administrative staff. Understanding the value of DSM helps REC and/or G&T leaders to fully commit to operating effective and high performance DSM programs. Top performing REC organizations educate staff through a variety of training opportunities from DSM program evaluation to specialized weatherization classes. A well rounded and educated leadership team will ensure success in the development and delivery of the most effective DSM programs.

## ***4. Leverage Funding Sources***

While many REC and G&T organizations directly fund energy efficiency, load management and renewable energy programs through a surcharge on customers' bills, external funding sources can help to expand programs while minimizing rate impacts. Examples of external funding sources include the Regional Greenhouse Gas Initiative, funds from Regional Independent System Operators, state energy agencies, and ARRA. Also, many charitable organizations provide funding to support programs for specific customer classes such as low income fuel assistance or low income home weatherization programs. Not only can collaboration with charitable funding sources help to reduce the burden of low income programs on rate

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<sup>31</sup> "Integrated Resource Plan / Electric Resource Plan for Tri-State Generation and Transmission Association, Inc." Report submitted to Western Area Power Authority and Colorado Public Utilities Commission. November 2010. [http://www.tristategt.com/ResourcePlanning/documents/Tri-State\\_IRP-ERP\\_Final.pdf](http://www.tristategt.com/ResourcePlanning/documents/Tri-State_IRP-ERP_Final.pdf)

payers, this partnership offers RECs a significant public relations opportunity as well as an effective forum to recruit low income customers in need of weatherization services.

## **5. Establish Goals, Track Data and Evaluate Results**

Due to the unregulated nature of REC and G&T organizations, efforts to identify and evaluate the impacts and cost effectiveness of their DSM programs are uncommon. To ensure that DSM programs are working and deliver benefits for customers, RECs and G&Ts are advised to conduct benefit-cost screening of their entire portfolio of DSM programs. This process is well documented in EPA's *Model Energy Efficiency Program Impact Evaluation Guide*.<sup>32</sup> In order to evaluate program performance a variety of DSM program data must be collected as part of ongoing program delivery ranging from DSM product costs to specific measure energy savings. Data collection not only aids program benefit-cost screening and evaluation, but this information is essential in determining the optimal mix of DSM programs required to best capture cost-effective energy saving opportunities that exist within individual REC or G&T service areas. In the case of G&T-sponsored programs, systems are needed to track data and report actual program results to member co-ops, who need feedback to ensure that their investment in DSM is actually producing real energy saving results in their communities. DSM program evaluation also helps to modify and improve programs over time by, for example, pointing out weak elements in program design or measures that are not cost-effective.

## **6. Develop Effective Contractor and Vendor Infrastructure**

Due to the rural characteristics of REC service territories, the availability of contractors and vendors to deliver DSM products and services is often limited. This contractor scarcity impacts both the availability and performance of specific DSM programs in REC service territories, and defers the development of many DSM programs that would be cost-effective in urban utility service areas. The low population density and small size of REC territories serve as direct disincentives to contractors that may consider delivering energy efficiency services to rural communities.

These challenges require increased effort from REC organizations to develop contractor/vendor trade alliances, innovative DSM program approaches, and community-based industry training. Examples of these recommendations include working with area technical schools to develop weatherization training curriculum, developing trade ally outreach programs to educate and network with potential contractors, and partnering with existing community based organizations that can assist in DSM program implementation.

Because of their larger scale operations, G&T organizations are in a position to deliver DSM programs on behalf of RECs, leveraging contractors and vendors that work across a larger service territory and offering an opportunity for significant costs savings. In addition,

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<sup>32</sup> National Action Plan for Energy Efficiency. 2007. *Model Energy Efficiency Program Impact Evaluation Guide*. Prepared by Steven R. Schiller, Schiller Consulting, Inc. [http://www.epa.gov/cleanenergy/documents/suca/evaluation\\_guide.pdf](http://www.epa.gov/cleanenergy/documents/suca/evaluation_guide.pdf).

implementing uniform DSM programs across a number of RECs served by one G&T, as is being done in Indiana and Iowa, is an effective strategy to stimulate the development of an adequate contractor and vendor base.

## ***7. Adopt Supporting Policies***

Legislative action was critical to the expansion of DSM programs by RECs and G&T organizations in Iowa, Minnesota and Oregon. In Iowa, RECs are required to develop DSM plans and goals; in Minnesota, minimum savings requirements apply to RECs as well as investor-owned utilities; and in Oregon, RECs are required to collect a small utility bill surcharge to fund DSM programs. In all three states, these requirements led to strong DSM programs that provide economic and other benefits to all customers. Other states with weak DSM efforts on the part of RECs and their bulk power providers should consider adopting similar policies.

## **V. Conclusion**

Developing aggressive DSM programs as a low cost energy resource is not a simple endeavor. Commitments to promoting effective DSM programs should occur at multiple levels within electric cooperative organizations from senior management to program managers to customer service personnel. RECs and G&Ts should thoroughly evaluate system needs, benefits and costs for DSM programs. These organizations should clearly communicate the benefits of DSM program participation to customers and motivate action on a broad scale by rural homes and businesses. RECs and G&Ts should also pursue integrated resource planning in order to ensure an adequate and affordable energy supply while prioritizing least-cost electric resources like energy efficiency.

The strongest rural energy efficiency programs are found in states such as Iowa, Minnesota and Oregon which have enacted legislation directing RECs and G&Ts to fund DSM programs and/or meet energy savings and peak load reduction requirements. Despite the efforts of some member-owned utilities, such as Hoosier Energy in Indiana, to initiate significant DSM efforts voluntarily, investments in effective DSM programs will not happen without supportive legislation. SWEEP recommends that state policy makers adopt legislation requiring RECs and G&T organizations to implement significant DSM efforts including budgetary, energy savings and load reduction requirements. Ideally, RECs should be directed to ramp up to saving at least 1% of retail electricity sales per year.

While cost-effective energy savings potential exists everywhere, it should be recognized that there is great diversity among RECs, and that RECs differ from investor-owned utilities in key ways. The demographics and climate conditions of individual service territories will dictate the type and intensity of DSM programs that RECs can offer to customers. Additionally, customer characteristics will determine the potential energy savings that can be gained through DSM programs as well as the cost of electric savings realized through these programs. RECs and

G&Ts should be given the flexibility to design DSM programs that meet the needs of both the customers and the distribution system.<sup>33</sup>

As demonstrated in this review, there is a clear opportunity for RECs to benefit from DSM efforts that are planned and coordinated, if not funded, at the G&T level. G&T leadership enables the development of common DSM program designs; shared regional contractors and vendors; collaborative marketing, trade ally and evaluation efforts; and an overall “economy of scale.” SWEEP recommends that G&T organizations take the lead on DSM program planning and funding, working closely with their member RECs on program implementation.

Last but not least, there is relatively little data available about the DSM programs implemented by RECs and G&Ts. We encourage RECs and G&Ts to make public their DSM plans and report on the actual results of DSM programs. Doing so will shed light on the challenges and results of individual DSM programs, as well as identify best practices. Making this information publicly available and compiling it in a single information clearinghouse, perhaps hosted by the National Rural Electric Cooperative Association (NRECA) or by an energy efficiency organization such as the American Council for an Energy-Efficient Economy (ACEEE), will benefit RECs and their customers nationwide.

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<sup>33</sup> Potter, T. 2008. *Rural Electric Efficiency Prospects*. Southwest Energy Efficiency Project. <http://www.swenergy.org/publications/reep/REEP.pdf>.