

# DEMAND SIDE MANAGEMENT AS A COMMUNITY INVESTMENT – AN SEU APPROACH

POLICY NOTE – 01/30/2014

## DEMAND SIDE MANAGEMENT AS A REGULATORY COMMODITY

Demand side management (DSM) has been a tool of electric utilities for nearly four decades<sup>1</sup> and recently has been enlisted in efforts to decarbonize energy service.<sup>2</sup> DSM programs deploy energy efficiency measures, conservation efforts and load-management approaches to shape loads. In addition to environmental benefits, DSM can bring rewards of grid stabilization, grid decongestion, valley filling, and peak demand reduction or ‘peak shaving’. These effects lower costs for generation, transmission, and distribution and reduce long-term capital requirements. In addition, end-users can receive benefits in the form of bill savings, utility incentive payments, and tax credits.<sup>3</sup>

Typically, a large role is reserved for the energy utility in the operation and monitoring of DSM programs.<sup>4</sup> However, the energy utility business model is primarily geared towards the supply of energy rather than delivering energy-savings. As such, energy utilities can experience a conflict between their financial business objectives and DSM. Having evolved around delivering energy rather than saving energy, the energy utility business model conflicts with DSM in three primary ways:

a. The costs to operate, monitor, and market DSM programs may hurt the utility’s revenue requirement if these expenses are not included in rates;

b. Successful DSM programs lead to lower energy consumption which translates to reduced utility revenue; and

c. Unlike conventional asset expansion (such as the construction of additional capacity), energy efficiency programs do not establish a rate of return under conventional ratemaking.<sup>5</sup>

The contemporary approach to resolving these conflicts is to put supportive regulatory frameworks into place that essentially establish a ‘regulatory commodity’ with a guaranteed rate of return for energy savings to enhance utility interest in DSM programs. These supportive policies allow a range of ratemaking mechanisms that energy utilities can use to recover revenue losses.

The DSM regulatory framework has been a critical component to promote higher levels of savings: without regulation, the utility business case would argue in favor of traditional supply-side operations.<sup>6</sup> As a result, energy utilities demonstrate a high level of ambivalence towards energy efficiency programs and will only pursue the option when coaxed by the new commodity established through regulation or forced through regulatory standards and targets.

1. Eto, J. (1996). The past, present, and future of US utility demand-side management programs (LBNL-39931). Berkeley, CA: Lawrence Berkeley National Laboratory.; Fox-Penner, P. (2010). *Smart Power: Climate Change, the Smart Grid, and the Future of Electric Utilities*. Washington, DC: Island Press.

2. Carley, S. (2012). Energy Demand-Side Management: New Perspectives for a New Era. *Journal of Policy Analysis and Management*, 31(1), 6-32.

3. Sim, S. (2012). Electric Utility Resource Planning – Economics, Reliability, and Decision-Making. CRC Press: Boca Raton, FL.

4. Kushler, M., Nowak, S., & Witte, P. (2014). Examining the Net Savings Issue: A National Survey of State Policies and Practices in

the Evaluation of Ratepayer-funded Energy Efficiency Programs. American Council for an Energy-Efficient Economy (ACEEE). Report Number u1401. ACEEE: Washington, DC.

5. York, D., & Kushler, M. (2011). “The old model isn’t working: Creating the energy utility for the 21st century”. American Council for an Energy-Efficient Economy (ACEEE) White Paper. ACEEE: Washington, DC.

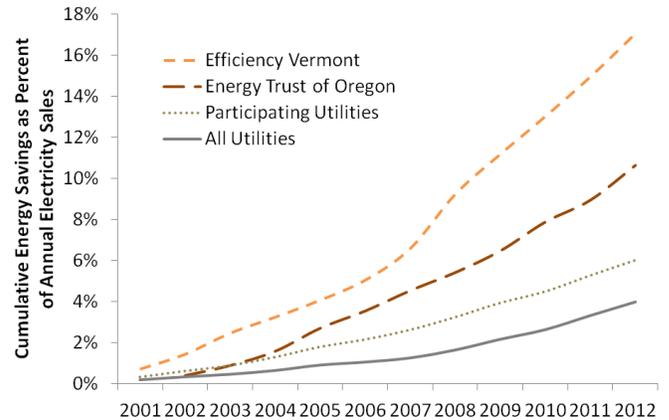
6. York, D., Kushler, M., Hayes, S., Sienkowski, S., Bell, C., & Kihm, S. (2013). *Making the business case for energy efficiency: case studies of supportive utility regulation*. Washington, DC: American Council for an Energy-Efficient Economy.

However, important consequences reside within this approach. The regulatory commodity allows for administrative costs (DSM program associated costs to market, advertise, operate, and monitor the programs) and incentive payment costs (one-time incentive payments or recurring credits on energy bills) to be passed on to the customer base through higher electricity rates. In addition, to compel energy utilities to perform such energy efficiency programs, relatively advanced and elaborate regulation and government involvement is required. Consequently, injecting energy savings objectives into traditionally supply-oriented energy utility portfolios is accompanied by higher rates and regulatory encroachment. This leads many to argue against such regulatory imposition of energy efficiency onto the utility business model.<sup>7</sup> Until recently, few considered an alternative to the regulatory framework. However, over the last decade, organizations that ‘naturally’<sup>8</sup> excel at delivering energy savings have formed. Evidence of superior performance can be found when energy savings from energy utility programs are compared to those of ‘energy efficiency utilities’ (Figure 1). Clearly, utilities designed specifically to provide energy efficiency, such as Efficiency Vermont and Energy Trust of Oregon, significantly outperform conventional energy utilities.<sup>9</sup>

## THE SUSTAINABLE ENERGY UTILITY

The SEU concept was designed by CEEP to move away from the supply-side approach of conventional energy utilities and towards a comprehensive and streamlined approach to deliver on-site energy services. The SEU strategy recognizes the benefits of reductions in use and on-site renewable energy generation as a practical strategy to develop and support community- and livelihoods-based sustainability. As a non-profit utility for the 21<sup>st</sup> century, the SEU aims to directly provide energy and other services (heat, air conditioning, lighting, insulation, water and materials conservation, etc.). To that end, the SEU functions as a central clearing house for comprehensive energy service delivery programs (efficiency, conservation, and renewable energy programs that save materials, water, and energy). To fulfill its objectives, the SEU receives funding from a wide variety of funding sources including third-party financing, revenues from environmental policies intended to lower long-

Figure 1. Track record of ‘energy efficiency utilities’ (Efficiency Vermont and Energy Trust of Oregon) compared to energy efficiency program performance of energy utilities.<sup>10</sup>



Positioning DSM program responsibility with ‘energy efficiency utilities’ can change currently existing dynamics and promote the up-scaling of energy efficiency beyond the relatively limited business case created by the regulatory approach. The Sustainable Energy Utility (SEU), developed by the Center for Energy and Environmental Policy (CEEP), is such an organization and a new approach to DSM is proposed in this policy note involving a leadership role for the SEU to advance and elevate the effectiveness of energy efficiency delivery.

term environmental threats from energy use, public benefit charges, crowdfunding, and philanthropic sources. Serving as a ‘community utility’, the SEU is accountable to the local community it serves as it seeks to deliver energy-efficient services. (For background information on the SEU, see footnotes 11, 12 and 13).

Positioning responsibility for the DSM programs with an SEU fits neatly in the business model of the SEU which revolves around lower energy use while enhancing service delivery. The new DSM approach outlined here consists of two programs, both run by an SEU: the ‘Customer Direct Purchase Program’ and the ‘SEU-financed Customer Purchase Program’. The programs fulfill the role of the SEU as an energy utility of the 21<sup>st</sup> century, making full use of advanced technology and the full connectivity provided by the internet.

7. Didden, M., & D'haeseleer, W. (2003). Demand side management in a competitive European market: Who should be responsible for its implementation? *Energy Policy*, 31, 1307-1314.
8. See note 4
9. Other energy efficiency utilities include: Delaware Sustainable Energy Utility, DC Sustainable Energy Utility, and the Sonoma County Efficiency Financing Program. Because these organizations were created

- recently, data on savings is insufficient to include in Figure 1
10. Electricity data taken from U.S. Energy Information Administration (EIA) Form 861 <<http://www.eia.gov/electricity/data/eia861/>> . Data for Energy Trust of Oregon and Efficiency Vermont retrieved from their annual reports <<http://energytrust.org/>> and <<http://www.encyciencyvermont.com/>>

### An SEU-organized Customer Direct Purchase Program

To offer the community a direct pathway to obtain more efficient appliances, on-site renewable energy technology, and other energy efficiency options, the SEU would be the operator of a direct purchase program that fundamentally changes the dynamic of DSM. Within the program, interested customers purchase qualifying energy efficiency products such as high-efficiency refrigerators. An electronic verification of the purchase is automatically relayed to the SEU by participating vendors.

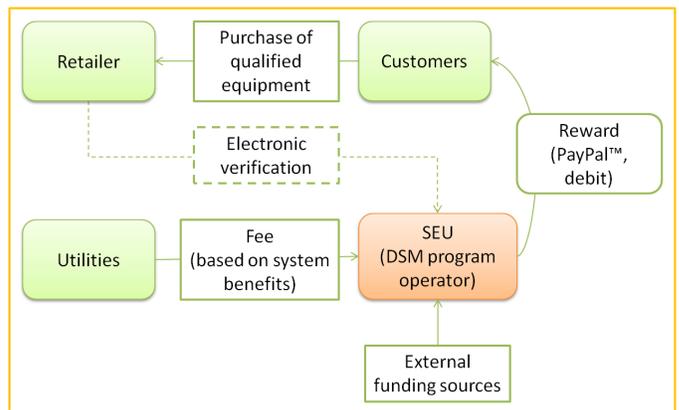
To reward the customer for their energy efficiency product, the local utility pays to an SEU an amount equal to 20%<sup>14</sup> or so of the purchase price of qualifying products. In turn, the SEU pays into an online accessible account created for each participant (after deducting for administrative and marketing costs). The customer-specific account is previously created and can be either a PayPal™ account or debit card account. Each utility payment is based on the net economic benefit to grid users *as a whole*. While our example assumes this

### An SEU-financed Customer Purchase Program

To accommodate larger purchases, such as deep retrofits or solar energy systems, an SEU-financed customer purchase program can be established. Here, customers can obtain a one-year loan from the SEU for the purchase of qualifying products. The loan is underwritten by a participating bank and the SEU can provide for a loan loss reserve or buy down the investment. A process similar to the one for the direct purchase program follows: the local utility pays to the SEU an amount equal to the system benefits provided by the technology. This payment is sent to the customer through their PayPal™ or debit account. Once the loan is retired, an administrative cost for SEU management of the project

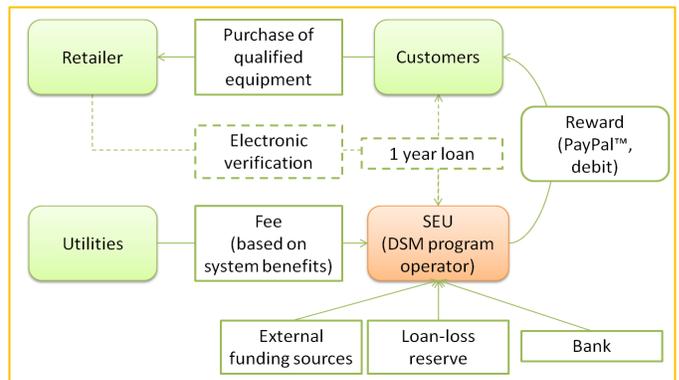
value to be 20%, a local utility in concert with their regulator can set the credit value for each technology based on that technology's specific characteristics such as contribution to grid stabilization or peak shaving.<sup>15</sup> Figure 2 summarizes an dynamics of the SEU-organized Direct Purchase Program.

Figure 2. The SEU Direct Purchase Program.



can be deducted. Figure 3 summarizes the dynamics of the SEU-organized Direct Purchase Program.

Figure 3. The SEU Financed Purchase Program.



11. Houck, J., & Rickerson, W. (2009). The Sustainable Energy Utility (SEU) Model for Energy Service Delivery. *Bulletin of Science, Technology, & Society*, 29(2), 95-107
12. Byrne, J., Martinez, C., & Ruggero, C. (2009). Relocating energy in the social commons: ideas for a sustainable energy utility. *Bulletin of Science, Technology, & Society* 29(2), 81-94
13. The Foundation for Renewable Energy and Environment (FREE) maintains a Free Policy Brief Series that has several issues that cover the SEU: <http://freefutures.org/free-policy-briefs/policy-briefs>

14. While incentive payments often differ depending on the dynamics and context of the particular incentive, a 20% incentive payment can be regarded as typical. For additional information, please see: National Action Plan for Energy Efficiency (2010). Customer Incentives for Energy Efficiency Through Program Offerings. Prepared by William Prindle, ICF International, Inc. <[www.epa.gov/eeactionplan](http://www.epa.gov/eeactionplan)>
15. A common methodology for establishing the system benefit of DSM is the Total Resource Cost (TRC) test. If environmental benefits of DSM are established through mechanisms like carbon taxes or carbon trading schemes, TRC may be a sufficient basis for measuring DSM system benefits.

## AN ONLINE DSM MARKET

To facilitate the energy efficiency programs, the SEU establishes an online market for energy efficiency where qualifying technologies by service territory are electronically posted as well as a listing of all participating vendors (including online suppliers). Customers can routinely check this online market for energy efficiency

opportunities, program guidelines, nearby vendors, etc. This online market effectively creates a new market ‘space’ that spurs utility DSM competition as customers can compare and contrast local utility valuations of DSM to seek out the most attractive rewards for their qualifying purchases.

## ADVANTAGES OF THE SEU DSM COMMUNITY INVESTMENT APPROACH

The approach outlined above offers several critical advantages over the various regulatory approaches to DSM. These advantages can be described from various vantage points.

Customer and Retailer Convenience: The programs work similarly to purchase coupons or tax credits and are easily understandable to both customers and retail stores. In fact, the mechanics of the program in this way assure customers that they will receive financial rewards for their qualifying purchases. In addition, the central position of the SEU in the programs ensures the availability of a ‘one-stop-shop’ – the SEU – limiting customer and retail store confusion. To enhance retail store participation, a fee can also be paid to vendors who promote and verify purchases.

Local Utility: A critical benefit for the local utility is the repositioning of the program operation to the SEU and away from the utility. This ensures that the administrative costs associated with running a DSM program (costs to market, advertise, operate and monitor the program) are now covered by the SEU. As such, any revenue requirement associated with these costs no longer needs to be recovered through rate-based cost recovery mechanisms. While utilities are still involved with the financial incentive payments, these costs can be recovered through the system benefits associated with successful DSM implementation (grid stabilization, peak shaving, valley filling, etc.).

The SEU develops the necessary arrangements with the

local utility to set up the required infrastructure (PayPal™, debit card, or bill crediting accounts). This shared operation reduces transaction costs for local utilities. Finally, as the local utility is the one paying the energy customers, the customer’s perception of the local utility is improved.

Government: In contrast to conventional DSM programs, the SEU approach avoids the need for burdensome regulation to ensure utility revenue recovery. The SEU business model is designed specifically to thrive by providing energy efficiency services, so there is no need for additional regulatory frameworks and their costs. Perhaps most important: **there is no need to increase electricity rates.** Current regulatory policies send a confusing message to energy users. On the one hand, they are told that energy efficiency is cheaper than supply. On the other hand, they are told their rates must increase to pay for successful energy efficiency programs. Such subtle distinctions as the impact on energy rates versus energy bills seldom convince users that they benefit from energy efficiency when it is a regulatory commodity.

Environmental: There are obvious environmental benefits associated with these programs as well. Energy efficiency prevents transmission and distribution losses, prevents the combustion of fossil fuels due to lower energy use, and energy-efficient appliances typically have longer operating lifetimes. These impacts all lower the threats and risks our energy system exerts on the environment.

## CONCLUDING REMARKS

Energy efficiency is one of the most constructive and cost-effective ways to address the main challenges of the 21<sup>st</sup> century – high energy prices, energy security, air pollution, and global climate change. Conventional supply-oriented energy utilities struggle to exploit the vast energy efficiency potential and require regulatory

support to lessen persistent barriers to energy efficiency that are inherent to their business model. SEUs offer a 21<sup>st</sup> century approach to energy services. The programs outlined here save money, save energy, and save the environment through the use of 21<sup>st</sup> century marketing and technology promotion.

**ABOUT THE FOUNDATION FOR RENEWABLE ENERGY & ENVIRONMENT**

The Foundation for Renewable Energy and Environment (FREE) is a non-profit, international organization established to promote a better future based on energy, water and materials conservation, renewable energy use, environmental resilience, and sustainable livelihoods. Guided by experts and distinguished academics, FREE sponsors research, supports graduate education and consults with organizations on strategies to create new sustainability models, to advise policy makers and other societal leaders, and to provide outreach to communities seeking to transform energy-environment relations. Managing an active agenda of conferences, films, exhibitions, seminars, and publications, FREE works with cities, non-profits, governments, businesses, and academic institutions around the world on environment and renewable energy issues.

Founded in 2012, a unique feature of FREE is its ability to harness the creativity and wide band-width of exper-

tise of an evolving network of experts active in over 40 countries. Many were educated in the first U.S. graduate program in the field of energy & environmental policy at CEEP (University of Delaware). These FREE Minds are a vital resource enabling the Foundation to address the pressing issues of our era with the sort of in-depth and diverse thinking they require.

This Policy Note covers an idea of FREE researchers and is available at no cost from the Foundation for Renewable Energy & Environment at: <http://www.freefutures.org>

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