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# Review of Self-direct Demand Side Management (DSM) Programs

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# Presentation Outline

1. Background
2. Case Studies
3. Comparison of Self-direct Program Design Elements

# Benefits of Demand Side Management (DSM) Programs

Over 40 states have DSM programs, benefits include:

- Lower energy prices
- Reduced grid congestion
- Opportunity to delay or avoid building new generation
- Reduced emissions
- Increased system reliability
- Protection from fuel price risk

→ One review of the cost of saved energy in 14 programs showed an average acquisition cost of 2.5 cents per kWh (Friedrich et al 2009)

→ Cheapest DSM resources are from C/I customers

→ Many of these benefits are only fully realized if the savings are **reliable, verifiable, and additional** so that the system can plan around these resources

# C/I Program Types

Four main types of programs are offered to commercial / industrial customers:

- Technical assistance / energy auditing services
- Prescriptive incentive programs
- Custom incentive programs
- Self-direct programs

# What is a Self-Direct Program?

Self direct programs allow customers to reduce their DSM charges when they make their own investments in energy efficiency without support from the utility customer-funded efficiency programs.

# Self-direct Programs

- Usually targeted at large industrial customers with specialized needs or strong in-house energy engineering capacity
- Self-direct programs are found in at least 24 states
- Many variants on how these programs are structured
- Least-used program in most jurisdictions due to eligibility limits and attractiveness of other program offerings



# Case Studies

# Rocky Mountain Power (Utah & Wyoming)

- **Eligible customers:** Aggregated annual consumption of at least 5,000 MWh or demand of at least 1 MW


- **Eligible projects:** Projects must have a pre-rebate payback period of between 1 and 5 years, and meet the utility's cost effectiveness test
- **Incentives:** Credit against DSM charge of 80% of approved EE project costs, paid over multiple years if needed
  **OR** "Opt-out" of 50% of the DSM charge if customer has no cost-effective DSM potential (none to date)
  - No incentives for historic projects
- Program benefit-cost ratio (TRC) of ~**2.7**

**Sources:** ACEEE 2011, SWEEP 2012, interviews with program staff

# Puget Sound Energy (Washington)

- **Eligible customers:** Customers with demand of at least 3 average MW or 3-phase service over 50,000 volts
- **Eligible projects:** Projects must meet the utility's cost effectiveness tests
- **Incentives:** DSM charge funds can cover up to 100% of approved project costs
  - Program runs on a 4 year cycle – the first two years customers can use their own DSM funds; at the end of two years any unused funds are competitively bid out to the pool of self-direct customers
  - No incentives for historic projects
- Program benefit-cost ratio (TRC) has varied between **1.15 and 4.93** depending on the year

**Sources:** ACEEE 2011, interviews with program staff

# Xcel Energy (Colorado & New Mexico)

- **Eligible customers:** Aggregated annual consumption of at least 10,000 MWh and demand of at least 2 MW


- **Eligible projects:** Projects must meet the utility's cost effectiveness test
- **Incentives:** $0.10/kWh for the ***incremental*** savings over the project lifetime, up to 50% of the ***incremental*** cost
  - No limit to total incentives a customer can claim (not limited to the DSM charges paid)
  - No incentives for historic projects
- Program benefit-cost ratio (TRC) of ~**3.5**

**Sources:** ACEEE 2011, SWEEP 2012, interviews with program staff

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# Elements of Self-direct Program Design

## (comparison of programs)

# Elements of Program Design

- Eligible Customers
- Eligible Projects
- Incentives
- Level of Exemption
- Length of Exemption
- Measuring Savings

# Eligible Customers

| State | Program | Which customers are able participate? |
|---|---|---|
| **Arizona** | **Arizona Public Service** | Consume over **40,000 MWh/yr** of electricity |
| **Colorado & New Mexico** | **Xcel Energy** | Consume over **10,000 MWh** and demand of at least 2 MW (aggregated) |
| **New Mexico** | **Public Service of New Mexico** | Consume over **7,000 MWh/yr** of electricity |
| **North Carolina** | **Duke Energy** | Consume over **1,000 MWh/yr** of electricity |
| **Ohio** | **Statewide** | Consume over **700 MWh/yr** (aggregated) of electricity OR have a national or regional account with multiple facilities in one or more states |
| **Utah and Wyoming** | **Rocky Mountain Power** | Customers with annual consumption of at least **5,000 MWh/year** or demand of at least 1 MW (aggregated from all the customer's in-state facilities) |

- Many ways of setting a bar for eligible customers - $ in DSM charges per year, power demand, but the most common is **annual energy usage** (examples included above).
- Most programs have a ~10x higher threshold for energy consumption for their self-direct program than Ohio's.

**Sources:** ACEEE 2011, SWEEP 2012, interviews with program staff

# Eligible Projects

- Like Ohio, most programs allow projects with a benefit-cost ratio of greater than 1
- Some have simple payback thresholds, e.g. 1 to 7 year simple payback.

**PSE Self-Direct Program**

***Cost Effectiveness Reporting from Annual Reports***

| | UC B/C | TRC B/C |
|---|---|---|
| ***2007*** | 1.34 | 1.15 |
| ***2008*** | 2.93 | 1.98 |
| ***2009*** | 4.60 | 3.30 |
| ***2010*** | 2.21 | 1.84 |
| ***2011*** | 6.20 | 4.93 |

Source: Takala 2012

# Eligible Projects

| State | Program | What EE projects are eligible? |
|---|---|---|
| **Arizona** | **Arizona Public Service** | Projects must meet the societal cost test |
| **Colorado & New Mexico** | **Xcel Energy** | Projects must meet the total resource cost test |
| **New Jersey** | **New Jersey Clean Energy Program** | Projects must have a payback period of less than 8 years |
| **New Mexico** | **Public Service of New Mexico** | Projects must meet the total resource cost test with a payback period of between 1 and 7 years |
| **Ohio** | **Statewide** | Projects must meet the total resource cost test or the utility cost test |
| **Oregon** | **Oregon Dept of Energy** | Projects must have a payback period of less than 10 years |
| **Utah and Wyoming** | **Rocky Mountain Power** | Projects must have a pre-rebate payback period of between 1 and 5 years, and meet the utility's cost effectiveness test |
| **Vermont** | **Statewide** | Projects must meet the same cost effectiveness tests as other EE programs |
| **Washington** | **Puget Sound Energy** | Projects must meet both the total resource cost test and the utility cost test |
| **Wisconsin** | **Statewide** | Projects must meet the same cost effectiveness tests as other EE programs |

**Sources:** ACEEE 2011, SWEEP 2012, interviews with program staff

# Incentives

- Many programs reimburse up to 50-100% of project costs
- A few programs provide incentives based on savings
- A few programs create a customized plan with the customer

| State | Program | How are EE exemptions / incentives structured? |
|---|---|---|
| Arizona | Arizona Public Service | Incentives can cover 100% of EE project costs |
| Colorado & New Mexico | Xcel Energy | $0.10/kWh incremental energy savings over the project lifetime or $525/kW demand reduction (which ever is greater); up to 50% of incremental project cost |
| Idaho | Idaho Power | Incentives can cover 100% of EE project costs |
| Michigan | Statewide | If customers meet the goals in their plan, they are exempted from a portion of the DSM charge |
| New Mexico | Public Service of New Mexico | Incentives can cover 100% of EE project costs |
| Ohio | Statewide | Either 1) an exemption from the DSM charge for an amount of time based on the projected savings, or 2) a rebate capped at 50% of project costs |
| Oregon | Eugene Water and Electric Board | EWEB staff works closely with customers to design 5-year energy savings goals; the customers' DSM charges are reduced if these goals are met |
| Oregon | Oregon Dept of Energy | Incentives can cover 100% of EE project costs |
| Utah and Wyoming | Rocky Mountain Power | Incentives cover up to 80% of approved EE project costs |
| Washington | Puget Sound Energy | Incentives can cover 100% of EE project costs |
| Wisconsin | Statewide | Customer creates a self-direct energy efficiency plan with detailed M&V plans and submits it to the PSC |

**Sources:** ACEEE 2011, SWEEP 2012, interviews with program staff

# Level of Exemption

- Many programs require customers to pay a portion of shared costs, such as program admin and M&V
- If self-direct customers aren't paying for the full cost of their programs, this burden fall to other customer classes

| State | Program | How much of the EE fees are customers exempt from paying? |
|---|---|---|
| Arizona | Arizona Public Service | Incentives given up to 85% of the annual DSM charge |
| Colorado & New Mexico | Xcel Energy | No cap on the amount of incentive relative to the annual DSM charge (incentives can be greater than the DSM charge) |
| Idaho | Idaho Power | Incentives given up to 100% of the annual DSM charge |
| Michigan | Statewide | Incentives given up to 100% of the annual DSM charge, minus administrative and low income program costs |
| New Mexico | Public Service of New Mexico | Incentives given up to 70% of the annual DSM charge. |
| Ohio | Statewide | Up to 100% of the DSM charge can be waived over multiple years based on the Benchmark Comparison Method |
| Oregon | Eugene Water and Electric Board | The full DSM charge, minus utility M&V costs, can be returned to the customer - level of reimbursement is based on meeting the savings goals, not on $ spent |
| Oregon | Oregon Dept of Energy | Incentives for projects given up to 68% of the annual DSM charge |
| Utah and Wyoming | Rocky Mountain Power | Incentives given up to 100% of the annual DSM charge, can be taken over multiple years. Customers must pay a $500 admin fee per project that they submit. |
| Washington | Puget Sound Energy | Incentives given up to 82.5% of the annual DSM charge |
| Wisconsin | Statewide | Incentives given up to 100% of the annual DSM charge, minus administrative and renewable energy charges |

**Sources:** ACEEE 2011, SWEEP 2012, interviews with program staff

# MI: Provisions for Admin & Low Income

Michigan Comp. Laws Section 460.1093 Self-directed energy optimization plan. Sec. 93. (excerpt)


(5) The commission shall by order do all of the following:…

(b) Provide a mechanism to recover from customers under subdivision (a) **the costs for provider level review and evaluation**.

(c) Provide a mechanism to cover **the costs of the low income energy optimization program** under section 89.

# PSE: Provisions for Admin & Market Trans.

Puget Sound Energy customers receive credits for 82.5% of their DSM charge when they invest in approved DSM projects, with carve outs for:

- Program administration – 7.5%
- Market transformation programs – 10%

**Commercial Real Estate (CRE)**

Encouraging energy-efficient building management practices among commercial portfolio property owners.

**Existing Building Renewal (EBR)**

Creating a market-attractive pathway and market capabilities to energy-efficient renewal of existing buildings.

**Commercial Lighting**

Creating tools and market capabilities to support continued advances in new lighting standards.

# Length of Exemption

- Most programs allow multi-year exemptions
- Multi-year exemptions are important for encouraging larger projects with deeper savings

| State | Program | How long / under what conditions are customers exempt from all or part of the DSM charge? |
|---|---|---|
| **Arizona** | **Arizona Public Service** | Multi-year exemption, based on project costs |
| **Idaho** | **Idaho Power** | Up to 3-year exemption, based on project costs |
| **Montana** | **NorthWestern Energy** | Up to 2-year exemption, based on project costs |
| **Ohio** | **Statewide** | Multi-year exemption, based on savings |
| **Oregon** | **Eugene Water and Electric Board** | Multi-year exemption, based on meeting savings goals |
| **Utah and Wyoming** | **Rocky Mountain Power** | Multi-year exemption, based on project costs |
| **Washington** | **Puget Sound Energy** | Up to 4-year exemption, based on project costs |

**Sources:** ACEEE 2011, SWEEP 2012, interviews with program staff

# Opt-out Due to Lack of EE Potential

- **Rocky Mountain Power:** If a customer is able to show that they have done all projects with an 8 year or less payback, they can become exempt from 50% of the DSM charge for 2 years (at which point they have to reapply); no customer has qualified for this opt-out.

- **Oregon Dept of Energy:** If a customer is able to show that they have done all projects with a 10 year or less payback, they can become exempt from 54% of the DSM charge for 2 years (at which point they have to reapply); no customer has qualified for this opt-out.

# How are savings measured?

| State | Program | How are energy savings counted? |
|---|---|---|
| **Colorado & New Mexico** | **Xcel Energy** | Xcel pre-approves projects, requires pre-project monitoring, provides estimates of the rebate level, and requires post-implementation verification reports. Xcel's senior engineers review all the proposals and the reporting. |
| **Montana** | **NorthWestern Energy** | No M&V; savings not reported by utilities as part of their EE portfolio |
| **New Jersey** | **New Jersey Clean Energy Program** | To receive their incentives, customers must submit an EE plan certified by an engineer that includes an M&V plan. Projects are reviewed by program staff. |
| **Ohio** | **Statewide** | M&V is the same as for other EE programs, either deemed savings or engineering analysis with review by the utility and the PUC staff, and subject to the same third party evaluation as other programs. |
| **Utah and Wyoming** | **Rocky Mountain Power** | RMP approves projects before rebates are given. RMP also requires post-implementation commissioning / verification reports, except when the amount of energy savings from the project can be deemed. |
| **Washington** | **Puget Sound Energy** | Program staff review the project proposal and M&V plan, and they inspect the project after installation. |

- Most programs, like Ohio, use M&V similar to their other C/I programs – but the rigor varies
- The baseline matters - "as found" vs. "code or standard industry practice"

**Sources:** ACEEE 2011, SWEEP 2012, interviews with program staff

# References


Barbose , G. L., C. A. Goldman, and J. Schlegel, *The Shifting Landscape of Ratepayer-Funded Energy Efficiency in the U.S*. Lawrence Berkeley National Laboratory, 2009, Download: Report PDF (446.46 KB); Presentation PDF (79.49 KB)

Chittum, Anna, Today's Self-Direct Energy Efficiency Programs: Cost-Effectiveness, Structure, and Lessons Learned: An ACEEE Memorandum, American Council for an Energy-Efficient Economy. Washington, DC: July 2012.

Chittum, Anna, Follow the Leaders: Improving Large Customer Self-Direct Programs. American Council for an Energy-Efficient Economy (ACEEE). Washington, DC: October 25, 2011. http://aceee.org/research-report/ie112

Friedrich, Katherine, Maggie Eldridge, Dan York, Patti Witte and Marty Kushler. 2009. *Saving Energy Cost-Effectively: A National Review of the Cost of Energy Saved Through Utility-Sector Energy Efficiency Programs*. Report U092. Washington, DC: American Council for an Energy-Efficient Economy. http://www.aceee.org/sites/default/files/publications/researchreports/U092.pdf

Kolwey, Neil, Southwest utility Industrial Energy Efficiency Programs: Highlights and Best Practices, Southwest Energy Efficiency Partnership (SWEEP) Report, June 2012

http://www.swenergy.org/publications/documents/Southwest_Industrial_EE_%20Programs.pdf