



Summary of Impact and Process Evaluation of NorthWestern Energy 2007-2011 Demand Side Management Programs January 2013 Report

Summary for SDPUC May
2014

NorthWestern
Energy

E+ **Efficiency
Plus**



Summary of Report
Impact Findings
Process Findings
CFL Study
Impact Recommendations
Process Recommendations





DSM programs are a least cost resource

Cost Recovery of DSM costs and lost revenues

- Requires proof of savings
- Demonstrate appropriate public purpose of Universal System Benefits (USB) dollars

Utility needs to demonstrate meeting objectives and acting as good stewards of customer dollars

Independent 3rd Party evaluation provides

- Industry accepted methodologies
- Additional verification of claims and arguments to regulators
- Burden of proof on the utility



Impact

- Gas and electric gross savings
- Net savings
- Measure persistence
- Installation vs. measure rebate date

Economic Analysis

- Benefits, costs and cost-effectiveness

Process

- Program planning, design, and management
- Branding, marketing, outreach, and media use
- Quality control, data tracking, and evaluation
- Free ridership, spillover, leakage

Report Volume 1

- Vol 1 NWE 2007-11 Impact and Process Evaluation.docx
 - Executive Summary and overall methodology, findings and recommendations
 - Individual chapters for 24 programs
 - Chapters on special studies
 - CFL operating hours
 - Savings persistence
 - Installation vs. rebate date
- Impact Result Tables - Calendar.xlsx
 - Portfolio tabulations of savings, costs, cost-effectiveness tests and levelized costs
 - Individual sheets by program, including lifetime savings
- NWE Recommendations Master Matrix.xlsx
 - 239 program-specific recommendations

Report Volume II

- Vol II NWE 2007-11 Impact and Process Evaluation.docx

Tracker Year Results

- Impact Result Tables - Tracker.xlsx



Evaluation Timing and Scope

Evaluation work conducted from Jan – Oct 2012

Portfolio of 24 programs (DSM and USB)

Evaluation covered all program activity from 7-1-2006 thru 12-31-2011

Standardized program tracking database, covering all programs, all years,
>300,000 records

Samples drawn from the most recent two years of program activity and results applied to the entire period

Gross and net savings (kWh, dkt) and cost-effectiveness evaluated by
Calendar and Tracker Year

1,416 process evaluation with participants, non-participants, trade allies, and program staff

Compared with more than 50 program best practices

Formulated 239 program-specific recommendations for improvements



24 Programs Evaluated

Building Operator Certification

DEQ Appliance

E+ Audit Home or Business

E+ Building Blocks Pilot

E+ Business Partners

E+ Commercial Existing Electric Rebate

E+ Commercial Existing Gas Rebate

E+ Commercial Lighting

E+ Commercial New Electric Rebate

E+ Commercial New Gas Rebate

E+ Electric Motor/Rewind Rebate

E+ Free Weatherization/Fuel Switch

E+ Irrigation

E+ New Homes

E+ Renewable

E+ Residential Existing Electric Rebate

E+ Residential Existing Gas Rebate

E+ Residential Lighting

E+ Residential New Electric Rebate

E+ Residential New Gas Rebate

Low Income Appliance

NEEA Initiatives

Vending Miser

Motor Management Training



E+ Audit Home or Business

- Home Electric Survey
- Home On-site Audit
- Small Business Electric Appraisal

E+ Commercial Lighting

- Commercial CFL Direct Install
- Commercial Lighting Rebate

E+ Renewable

- Business Renewable
- Residential Renewable

E+ Residential Lighting

- In-Store Coupon
- Trade Show
- Mail-In
- Mail-Out
- Residential CFL Direct Install
- Upstream CFL Buy-down

Northwest Energy Efficiency Alliance (NEEA)

- (specific to Montana) has many components



Participant Samples

- 2007-09
 - File-Review Only – 1,181
- 2010-11
 - Site Visit – 638
 - Light Loggers – 76 residences and 220 loggers
 - Telephone
 - Free-Ridership – 922
 - Spillover – 508

Non-Participant Samples

- Telephone – 231
- Residential, Irrigation, Other Small and Other Larger

Trade Ally Samples

- Telephone – 228
- Residential, Commercial, Irrigation, Renewables, CFL Retailers

Program Staff

- In-Person and Telephone – 35
- Corporate DSM staff, other NWE staff, implementation contractors, low income free weatherization



Free Ridership, Spillover, Leakage, and Net-to-Gross Adjustments

Challenges in Estimating Free Ridership

- The Measurement Issues: Reliability and Validity
- Established Approaches to Validity
 - Face Validity
 - Internal Consistency
- Doubts about the Face Validity of Self-Reported Free Ridership

Challenges in Estimating Spillover

- The Measurement Issues: Identifying Its Occurrence and Quantifying Its Savings
- Spillover and the Confounding of Free Ridership Estimators
- Relative Magnitudes of Spillover and Free Ridership Effects

Estimated Leakage by NWE Program

- None reported

Net-to-Gross Recommendations

- Program design should seek to avoid free-ridership
- However, no quantitative adjustment to impacts should be made for free ridership or spillover



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All Programs						
			Units	Reported Energy Savings	Evaluation Energy Savings	Net Savings Adjustment Rate
Electric						
	Electric Supply - DSM		kWh	275,073,686	248,463,014	0.90
	Electric - USB		kWh	34,262,001	22,101,125	0.65
	All Programs Electric		kWh	309,335,688	270,564,139	0.87
Natural Gas						
	Natural Gas Supply - DSM		dkt	548,774	343,421	0.63
	Natural Gas - USB		dkt	325,536	233,824	0.72
	All Programs Natural Gas		dkt	874,310	577,245	0.66

Cost-Effectiveness – Calendar(2007-11)

All Programs							
			Units	Total Resource Cost B/C Ratio	Program Administrator Cost B/C Ratio	Ratepayer Impact Measure B/C Ratio	Societal Cost B/C Ratio
Electric							
	Electric Supply - DSM		kWh	2.14	3.66	1.81	2.36
	Electric - USB		kWh	0.28	0.52	0.45	0.31
	All Programs Electric		kWh	1.41	2.49	1.46	1.56
Natural Gas							
	Natural Gas Supply - DSM		dkt	1.00	1.46	1.10	1.10
	Natural Gas - USB		dkt	1.77	1.77	1.32	1.95
	All Programs Natural Gas		dkt	1.28	1.60	1.20	1.41



Methodology

- Site visit sample selected from 2007-08 installations in 17 programs
- 119 projects inspected / surveyed to determine if still operational and saving energy
- Literature review conducted for a set of measures not included in site visit sample

Findings and Recommendations

- Evidence that effective useful life (EULs) should be re-examined or changed for certain measures in 8 programs
- EULs should be standardized across programs for the same technologies and sectors, such as residential CFLs
- Consider creating separate EULs for the direct-installed and owner-installed elements of audits
- Reassess EULs for commercial CFLs and unconventional renewable energy projects.



Methodology

- Obtained rebate date from program tracking data
- Install date either from tracking data or project files
- Computed number of days between install and rebate
- Noted when that interval crossed into new tracker year

Findings and Recommendations

- Comparison possible for 14 programs, as some delivery methods, e.g., CFL buy-down do not allow for recording install date
- Savings weighted average days between install and rebate – 115 days
- 28% of measures tested crossed June 30th into new tracker year
- Recommend continuing to use rebate date as it is the only date readily available across all programs



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Activity Areas

- Program Planning and Design
- Management
- Branding, Marketing, Outreach, and Media Use
- Quality Control and Data Tracking
- Evaluation

Nonparticipant Findings

- Residential, Small Commercial, Large Commercial, Irrigation nonparticipants



Service Territory Context

- Rural, mountainous, noncontiguous, “islands” of communities
- 75% of customers are residential, but little electric space heating load
- Large C&I on Choice

Program Planning and Design

- Conducts independent assessments of efficiency potential
- Annually updates available measures and incentives
- Uses variety of distribution channels, incentive approaches, services

Follows More than 12 Best Practices for Planning and Design

- Develops sound program plans, responsive to market conditions, HTR
- Encourages contractor participation
- Keeps programs and funding stable



Program Management and Administration

Program Management and Administration

- Program staff *extremely* lean compared to 39 program administrators (LBNL study)
- Efficiency staff supported by Corp Communications, Community Relations
- Experienced program implementation contractor
 - Frequent communication, collaboration

Follows more than 12 Best Practices for Management and Administration

- Program roles, responsibilities clear
- Processes in place for systematic inspections, verification
- Program processes simple, assistance available
- Single-point of contact for participants
- Uses well-qualified engineering staff for technical programs

Branding, Website, and Other Services

- Careful branding, use of logos
- Corporate Communications staff are valued members of efficiency team
- Website evolution; in 2010 efficiency pages reworked with ad agency

Marketing and Outreach

- Extensive outreach to customers and trade allies through multiple channels
- Frequently hosting or participating in events, often distributing measures
- Nonresidential one-on-one and small group outreach
- Trade allies supported with newsletters, facilitated network, annual meetings

Community Relations

- NWE's CR managers provide outreach to multiple communities (based in 6 major cities)
- Discuss efficiency with individual customers and at events

Follows More than 8 Best Practices for Marketing and Outreach

- Communicates with customers through multiple media
- Uses website to attract and inform
- Uses Energy Star products and logo
- Leverages marketing dollars (trade ally relationships, co-hosting events)
- Conducts cross program marketing



Quality Control

- Automated and manual checking of application forms, invoices, incentives
- Audit results reviewed by technical staff
- Inspections in all programs

Follows More than 9 Best Practices for Quality Control

- Sample-based post-installation inspections
- Inspects all large projects and uncertain savings estimates
- Assesses customer satisfaction
- Preferred contractors

Data Tracking and Reporting

- 30 databases, including cross-program databases that interact with other files
- Databases, purpose, variables are documented
- All participants checked for eligibility
- Payments tracked together
- Consistent reports generated

Follows More than 15 Best Practices for Data Tracking and Reporting

- Functions – including QC – are automated
- Databases dynamically linked
- Algorithms validated
- Tracking reports used to manage programs



Data Tracking for Evaluability

- Recommendations offered for:
 - Date tracking – savings start date
 - Cost tracking – measure & participant costs
 - Unique identifiers – file naming conventions, grouping of project-specific files

Evaluation Practices

- Conducts regular, independent evaluations
- NWE supportive of evaluation needs
- Culture of receptivity to new ideas and research
- Staff want to improve programs
- Program evolution from 2007 in response to prior evaluation findings

Follows More than 15 Best Practices for Evaluation

- Obtains market baselines
- Conducts detailed ex post impact evaluations
- Conducts comprehensive evaluations
- Estimates realization rates
- Estimates measure lives
- Fosters a culture that values and uses evaluation findings

Residential, Small Commercial, Large Commercial, Irrigation nonparticipants

High awareness of Energy Star

Most contacts knew about pertinent qualifying measures

Most learned about NWE programs through publications and advertisements

In general, majorities aware of rebates and audits

- Fewer aware of renewables

The few using the website did so for contact information or to pay bill

Under half think they are likely to participate in future



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Findings from Special Studies of CFLs

Operating hours

– Residential

- Light Logger study
 - 76 residences and 220 light loggers
 - Sample represents 2010-11 program activity
 - Average of 2.02 hours per day
- Hours before 2010 adjusted based on earlier metering studies
- Hours for each program based on bulb count by year
 - E+ New Homes - 2.24
 - E+ Residential Lighting - 2.30
 - NEEA Initiatives - 2.4

– Non-residential

- Hours per day from Commercial CFL Direct Install - 6.14

Non-residential share of “Buy-Down” bulbs from Trade Ally surveys

- 19.4% - Applied to E+ Residential Lighting and NEEA CFL initiatives



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Impact

- Increase marketing to make customer more aware of NWE offerings
- Collect customer e-mail addresses for future evaluations
- Use consistent program names
- Update Unit Energy Savings (UES) values



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- Planning and design
 - Prepare written program plans
 - Reduce the frequency of updates
 - Update customers about program changes
- Management and administrative
 - Write down process plans
 - Solicit program feedback from trade allies
 - Increase use of internet tools
- Marketing and outreach
 - Provide more information about efficiency opportunities through mail
 - Notify participating trade allies by email of all Montana-based efficiency related workshops, seminars, and training opportunities
 - Recruit additional trade allies as preferred contractors
 - Incorporate additional non-energy benefits and marketing messages
- Quality control
 - Consider project inspection costs when setting ongoing inspection rates
- Evaluation
 - Adopt a fast-feedback evaluation approach
 - Monitor product markets and conduct market saturation studies
 - Conduct more frequent, smaller-scope evaluations