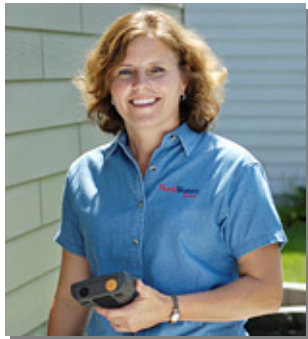




NorthWestern Energy

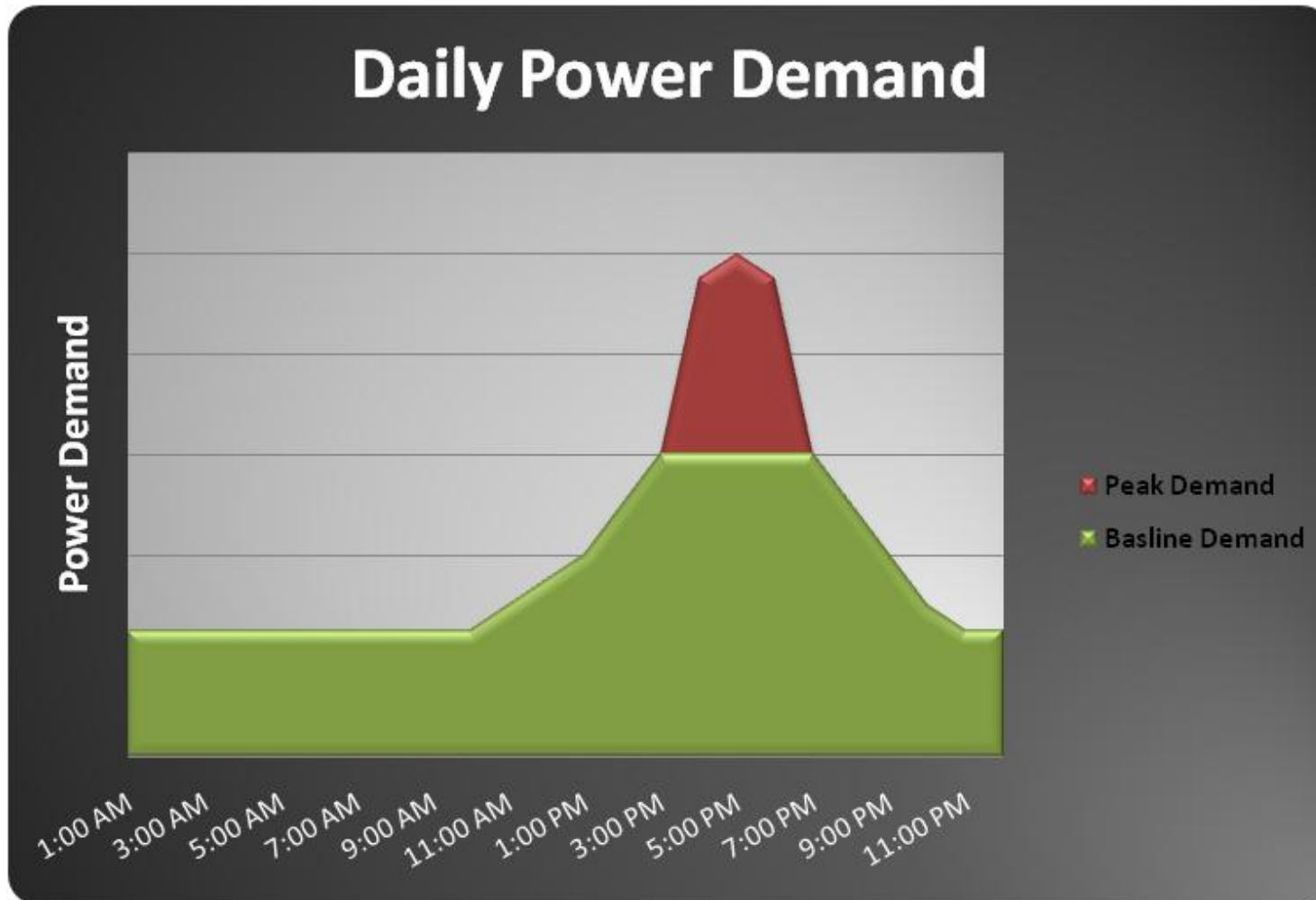
Energy Efficiency Programs: What Works? What Doesn't?

William M. Thomas
Manager Regulatory Support Services

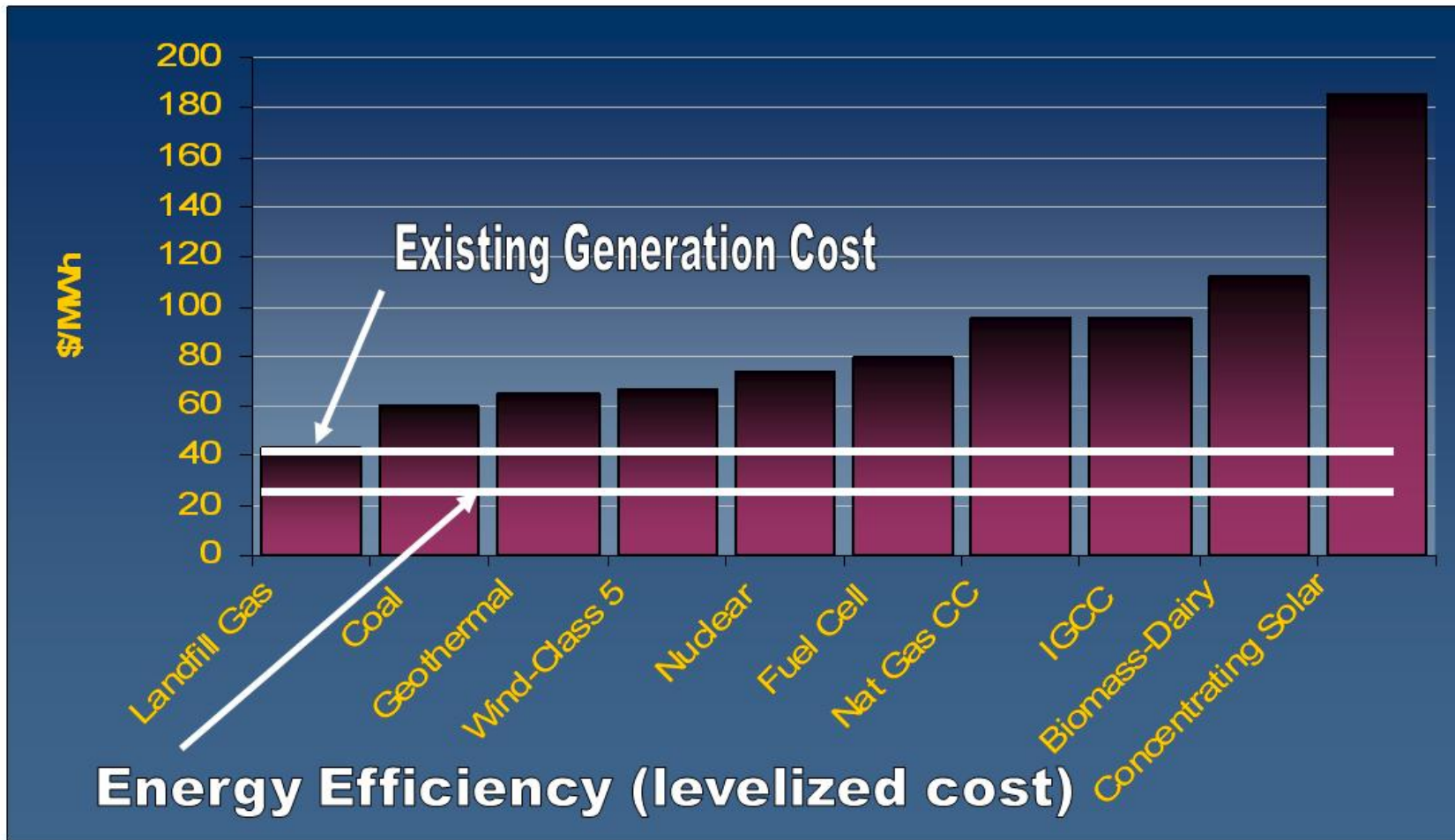
NorthWesternTM
Energy

Delivering a Bright Future

Costs Follow Demand, Prices Follow Cost



Why Demand Side Management?



Source: California Energy Commission, June 2007

DSM Benefits

- Considered and treated as a supply resource option
- Reduces the need for other more expensive energy resources
 - » Estimated cost of DSM = \$ 20-25/MWH
- Decreases cost of energy supply portfolio over the long run
- Provides a tool customers can use to control energy use and cost
- Environmental benefits
- Customers are better off with effective DSM Programs ... especially the participants

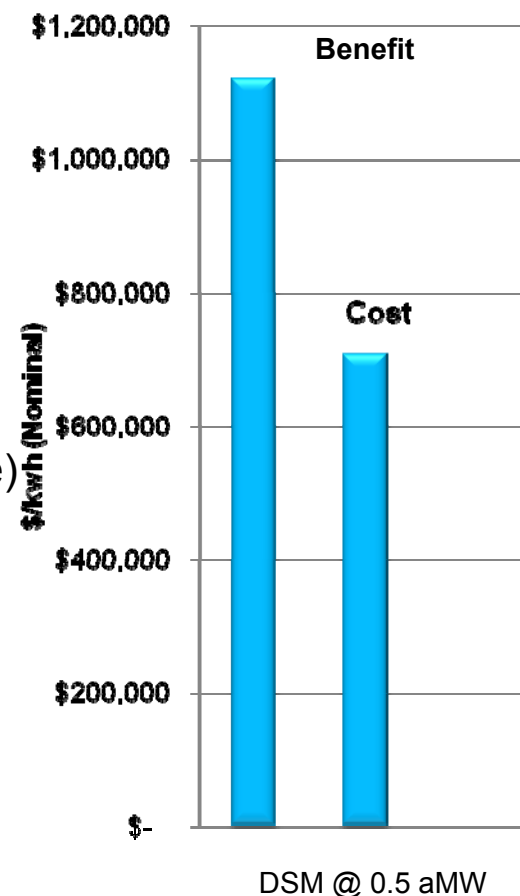
DSM Risks

■ Risks

- » Capital costs – DSM is “front loaded” investment
- » Expected savings may not fully materialize
 - ◆ Equipment not performing as expected
 - ◆ Changes in building use or customer behavior
 - ◆ Premature equipment removal or business closure
- » Result is that cost-effectiveness is compromised
- » Risk can be effectively managed through program design, regular adjustments & modifications

DSM – Planning Into Action

1. Define purpose(s)
 - A. Energy Efficiency Attributes
 - ◆ Low/least cost contributor
 - ◆ Increases customer control options
 - ◆ Environmental benefits
 - B. Foundation Principles:
 - ◆ DSM as resource alternative – placed on “equal footing”
 - ◆ Estimation of energy savings is necessary
 - ◆ Balance DSM Spending with Benefits (low cost resource)
2. Agree on Goals and Objectives: Long-term & Short-term
3. Agree on Rules and Boundaries
 - A. Cost-Effectiveness Tests & Economic Decision Rule
 - B. Measurement & Verification – “enough, but not too much”
 - C. DSM Program Evaluation – Periodic, not continual
 - D. Cost Recovery
 - E. Utility Incentives & Disincentives
4. Strategies, Tactics, Techniques that work/don’t work



Foundation for DSM

1. Recognition of DSM as a resource
 - » Evaluate DSM on equal footing with other resource alternatives
2. Cost-Effectiveness Decision Rule: seeking fairness & inclusiveness
 - » DSM Measures – what to accept / reject?
 - » DSM Results & Performance Evaluations
 - » Traditional DSM Benefit/Cost analysis; consideration given to externalities
 - ◆ Participant Test
 - ◆ Ratepayer Impact Measure (RIM) Test
 - ◆ Utility Cost Test
 - ◆ **Total Resource Cost Test**
3. Appropriate regulatory treatment
 - » Cost Recovery – expense v. capitalize
 - » Elimination of Disincentives

DSM Goals & Objectives

■ Long-term Goals

- » Operate sustainable DSM Program portfolio
- » Acquire low-cost energy resources for the benefit of NWE customers
- » Help customers better manage energy use; provide options
- » Achieve full cost recovery for DSM activities
- » Remove disincentives; provide incentives

■ Short-term Goals

- » Complete design & implementation of full portfolio of DSM Programs
- » Capability Building ... building the DSM delivery infrastructure
 - ◆ Contractors and other service providers
 - ◆ Trade allies (A&E firms, retailers, distributors, trade assoc., etc)
- » Introduce DSM programs, build interest & participation

Things that work...DSM Economic Framework & The Standard Tests

- Cost-Effectiveness evaluates value of program.
- Each of the four tests are designed to answer different questions...
 1. Participant Test – What is the net benefit to a DSM measure/program participant?
 2. Utility Cost Test – Is it cost-effective for the utility to administer DSM programs?
 3. Total Resource Cost Test – Is it cost-effective for society?
 4. Ratepayer Impact Measure Test – What effect will the programs have on utility rates

Read more at: CALIFORNIA STANDARD PRACTICE. MANUAL: ECONOMIC ANALYSIS OF DEMAND-SIDE PROGRAMS AND PROJECTS. July 2002 <http://drrc.lbl.gov/pubs/CA-SPManual-7-02.pdf>

Cost Effectiveness

- Decision Rule is needed:

- » Allows program decisions based on economics that are relevant, fair and consistently applied
- » Provides means to say yes or no to proposed DSM measures
- » Allows consistent economic evaluation of DSM performance

- Total Resource Cost (TRC) test ... a Benefit/Cost ratio

$$\text{TRC} = \text{PV} \frac{(\text{Value of Energy Savings})}{(\text{Utility Cost}) + (\text{Customer Cost})} = 0.9$$

- DSM measures are accepted/rejected using TRC
- DSM Program Evaluation is based on TRC
- Environmental Benefit Factor (10%)

Cost Effectiveness (cont.)

- Comprehensive measures screening for Montana DSM Programs produced target list for South Dakota initial programs:
 - » NorthWestern's avoided costs (electric & natural gas) that are specific to South Dakota service territory were then applied
 - » Best available data used for incremental costs of measures (materials + labor)
 - » Results produced individual DSM measures for grouping into logical DSM Programs for residential and commercial customer segments

Cost-Effective Measures

■ Residential

- » Energy efficient fluorescent lighting (CFLs)
- » Insulation (ceiling, wall, floor, tank & pipe)
- » Programmable thermostat
- » Low flow faucets, shower heads & aerators

■ Commercial

- » High efficiency heat pump
- » Energy management system
- » Energy efficient fluorescent lighting (T8, T5)
- » HVAC
 - ◆ Variable air volume
 - ◆ Variable speed drives
 - ◆ Controls, sensors, sweep controls & photocells
 - ◆ LED exit signs
- » Motors and much more ...



Cost Effectiveness Tests

At the **Program** level...

Program	Total Resource Cost		Participant Test		Utility Cost Test		Ratepayer Impact	
	NPV	B/C	NPV	B/C	NPV	B/C	NPV	B/C
Existing Homes Program	\$4,033,216	2.3	\$6,778,015	5.5	\$720,766	1.3	-\$2,744,799	0.5
High Efficiency New Homes	\$15,222,287	3.3	\$19,370,540	4.4	\$6,738,390	3.6	-\$4,148,253	0.7

and the Measure level.

Lighting and Appliance Program: Measure Cost-Effectiveness								
Measure	Total Resource Cost		Participant Test		Utility Cost Test		Ratepayer Impact	
	NPV	B/C	NPV	B/C	NPV	B/C	NPV	B/C
ES Light Fixtures	\$95	1.8	\$62	1.5	\$158	3.5	-\$33	0.8
High Effic Electric Storage WH	\$83	1.6	\$149	2.0	\$156	3.1	-\$66	0.8
Solar WH	-\$654	0.7	-\$166	0.9	\$483	1.4	-\$487	0.8
Water Heater Audit	\$276	3.7	\$458	5.5	\$327	7.4	-\$182	0.7
Clothes Washer- Energy Star	\$972	5.5	\$1,155	6.4	\$401	4.7	-\$184	0.7
Freezer- Energy Star	\$51	2.4	\$93	3.6	\$69	4.8	-\$41	0.7
Refrigerator - Energy Star	\$42	1.5	\$96	2.2	\$83	3.0	-\$54	0.7

DSM Programs ... Things that work

- Appropriate Economic Decision Rule ... the Total Resource Cost Test
- Energy Audits
 - » On-site inspection and 1-to-1 communication (at the customer's pace)
 - » Step-by-step "How To" instructions (leave them behind in writing)
 - » Direct installation of basic measures
- Programs use multiple delivery methods
 - » Prescriptive and custom rebates
 - » Coupons, mail-out, mail-in, in-store instant rebate
 - » Direct installation
 - » Giveaways
 - » Manufacturer price buy-down
- Applications accepted from customers, building trades and professionals, and program-affiliated contractors
 - » Programs offer technical assistance + incentives
 - » Programs seek trade ally participation
 - » NWE partners with related organizations
- Adequate "feet on the street" ... staff & outside service providers
- Preferred installers
- Community Events
- Website excellence
- Education, education, education

More things that work...

- Programs that are supported by a variety of marketing methods and materials
 - » Newspaper ads, press releases, radio ads
 - » Direct mail, direct telephoning, in-person visits
 - » Point-of-purchase displays, web site
 - » Booths at community and trade events, community outreach, speakers
- Printed materials that are varied and eye-catching
- Materials include program application information and customer education
- Education activities includes workshops and print materials
- Data tracking systems and quality control systems that are strong
- Implementation staff and program tracking software that checks for:
 - » Applicant's NWE accounts, to ensure program eligibility
 - » Applicant's other program activities, to ensure no "double-dipping"
 - » Application internal consistency and missing data
- Participants receive rebate checks quickly (typically within a few weeks)
- Jobs conducted by preferred contractors are inspected on a schedule that declines in frequency as number of satisfactory jobs increases

Still more things that work...

- Periodic Program Evaluation by independent entity
- Operate DSM Programs for three full years (2010-2013)
- Conduct competitive bid process to select independent firm to perform comprehensive DSM Program evaluation
 - » **Impact evaluation** – to determine energy savings achieved and refine Adjustment Factors used in Lost Revenue calculations
 - » **Process evaluation** – to examine the effectiveness of DSM Program design, implementation and ongoing administration
 - » **Economic evaluation** – to determine cost-effectiveness of individual DSM Programs and overall DSM Portfolio using TRC and other traditional metrics
 - » **Independent recommendations** on DSM Program improvements

Things that don't work

- Complexity
- Vagueness about what measures qualify/do not qualify
- Too many forms to fill out
- A website that is incomplete and difficult to navigate
- Nobody available to call and ask questions and get answers (automated phone attendants)
- Lack of consistency and continuity from year to year
- Lack of persistence by utility DSM program personnel
- Insufficient volume and clarity of marketing & outreach
 - » “It pays to advertise ... but it does not always pay more to advertise more.”
- Hassle and inconvenience

DSM Programs

- Residential & Small Commercial Energy Audits
 - » Inspection, education, & direct installation of some measures
 - » Trained personnel are used
- Residential Natural Gas Retrofit Program
 - » Measures
 - » Rebates
 - » Fall Events
- Residential & Commercial Lighting Rebate Programs
 - » Multiple methods to deliver prescriptive rebates
 - » Partnerships with retailers
- Future Programs
 - » Customized incentive program for commercial/small industrial
 - » New Construction
 - » Demand Response ... many variants

DSM Plan



Questions & Comments

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