

NATIONAL OVERVIEW OF THE STATUS OF UTILITY DSM

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TOPICS

- Background
 - DSM as a resource
 - Definitions
 - Brief history of utility energy efficiency
- Current status: Results of a recent national survey
 - What states have utility-sector energy efficiency programs
 - Approaches to funding and administration
 - Spending levels
 - Savings impacts
 - Cost-effectiveness

RATIONALE FOR ENERGY EFFICIENCY AS A UTILITY SYSTEM RESOURCE

SIMPLY STATED:

- Utility systems need to have adequate supply resources to meet customer demand
- To keep the system in balance, you can add supply resources, reduce customer demand, or a combination of the two
- In most cases, it is cheaper to reduce customer demand than to acquire new supply resources

[True for electricity and natural gas]

- There needs to be a practical and acceptable mechanism for utilities to acquire energy efficiency resources



Definitions

ENERGY CONSERVATION

Saving energy by doing with less or doing without (e.g., setting thermostats lower in winter and higher in summer; turning off lights; taking shorter showers; turning off air conditioners; etc.)

ENERGY EFFICIENCY

Measures which result in producing the same or better levels of amenities (e.g., light, space conditioning, motor drive power, etc.) using less energy. Measures are generally long-lasting and save energy across all time periods for which the end-use equipment is in operation.

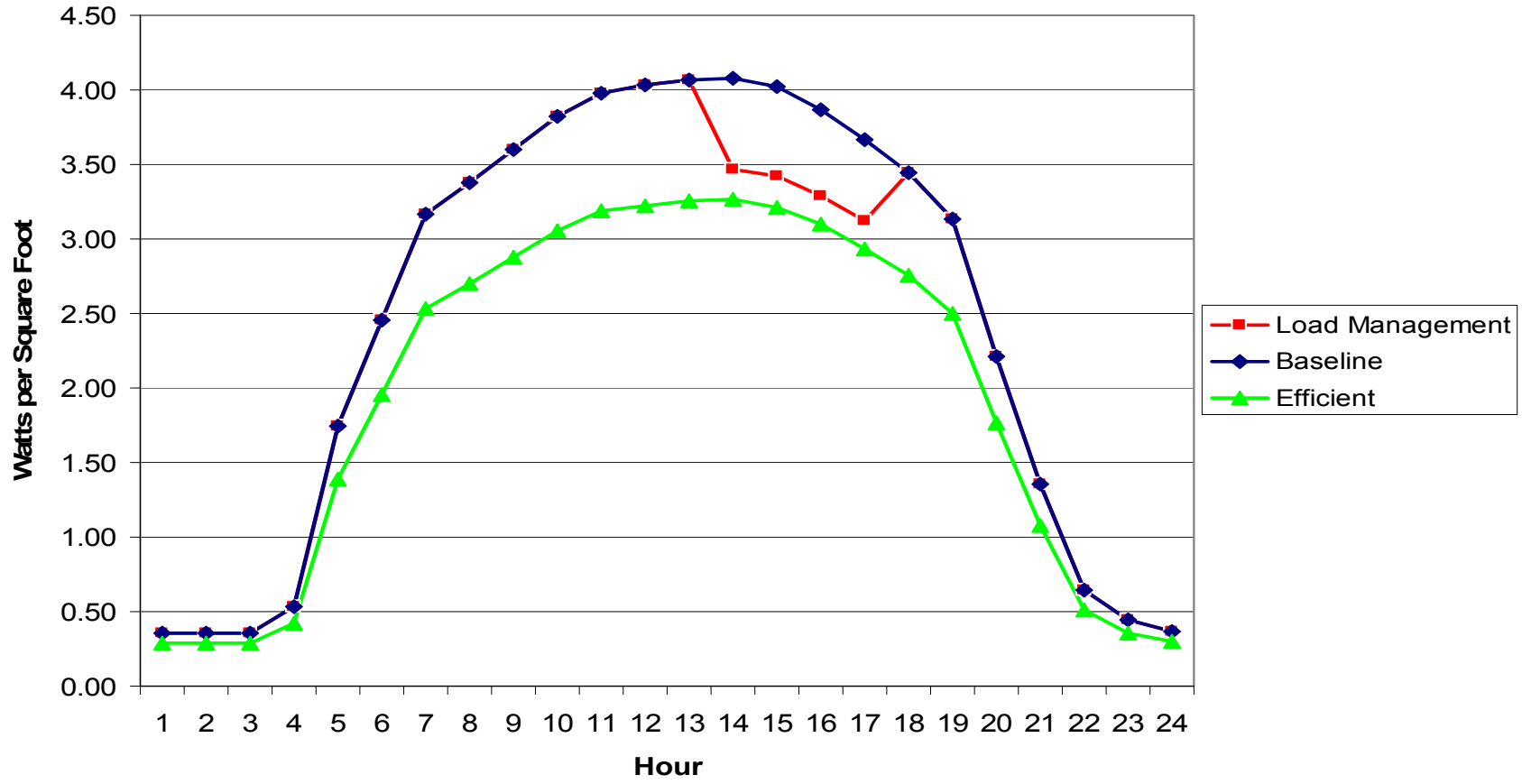
Definitions (continued)

LOAD MANAGEMENT (Including Demand Response)

Load management programs seek to lower peak demand during specific, limited time periods, by temporarily curtailing electricity usage or shifting usage to other time periods.

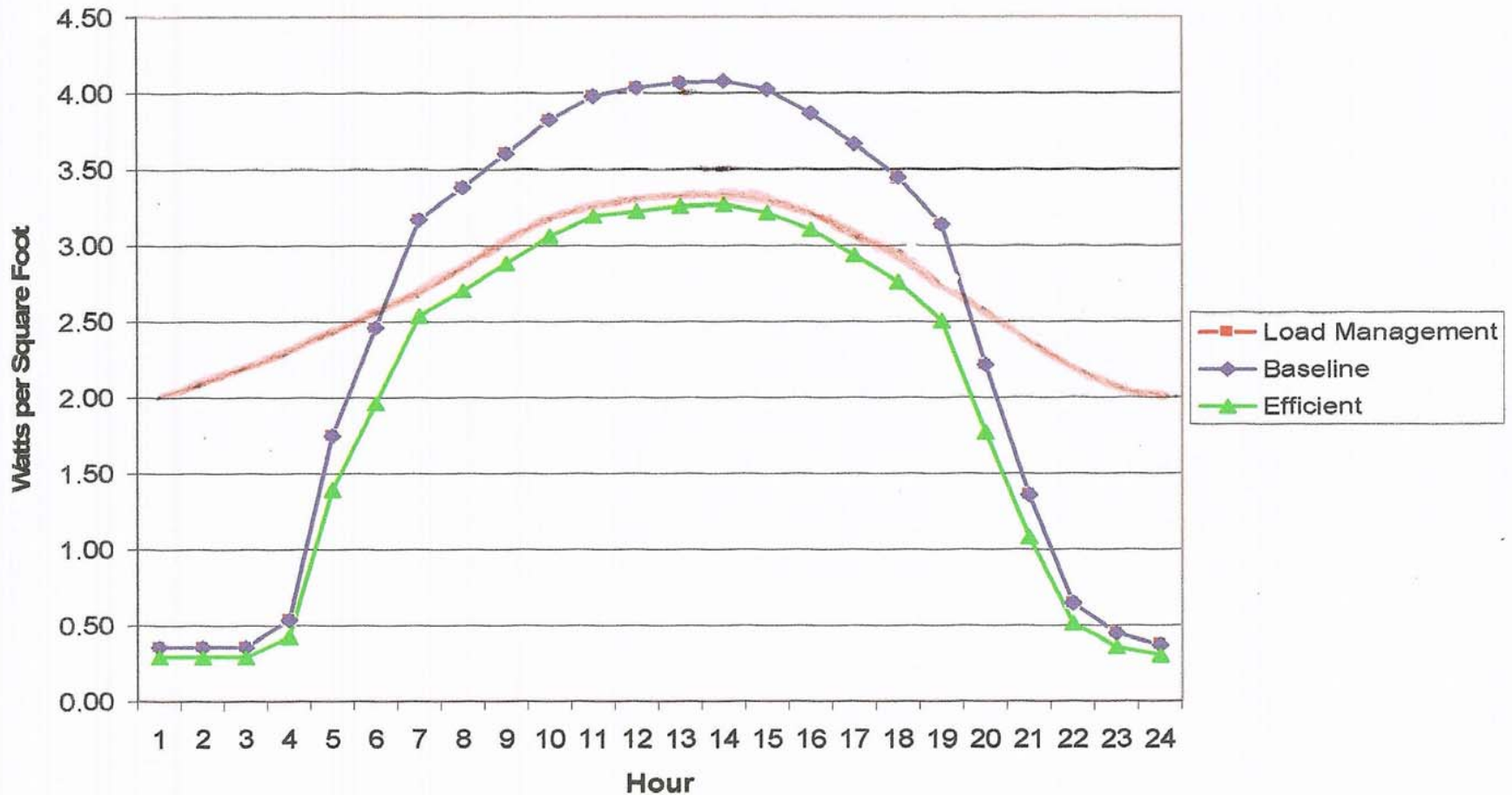
Energy Efficiency Compared to Load Management (4 hr curtailment)

Combined Commercial Cooling and Lighting Loadshape
Baseline, Load Management (STDR), and Energy Efficiency



Electric System Efficiency vs. Energy Efficiency

Combined Commercial Cooling and Lighting Loadshape
Baseline, Load Management (STDR), and Energy Efficiency



COMPARISON OF BENEFITS

ENERGY EFFICIENCY

- can reduce system peak demand
- reduces total energy consumption
- reduces consumption of natural resources
- reduces air emissions
- can reduce energy imports
- effects are long-lasting

LOAD MANAGEMENT (& DEMAND RESPONSE)

- reduces system peak demand very well
- little or no effect on total energy use
(or possibly even increases usage)
- little or no effect (or possibly negative) on:
use of resources; air emissions; energy imports
- effects are temporary and short duration

One Key Challenge

The electric industry prefers load management/DR and is mildly to openly averse to energy efficiency.

(See: Regulating Electric Distribution Utilities as if Energy Efficiency Mattered ACEEE, 1999, U993

<http://www.aceee.org/store/proddetail.cfm?CFID=527376&CFTOKEN=86519831&ItemID=201&CategoryID=7>)

Primary reason:

Utilities tend to prefer Load Management/DR because it lowers peak demand during the highest cost time periods without really reducing their total sales or throughput of electricity.

Energy Efficiency may reduce peak demand, but it also reduces overall sales (thus adversely affecting short term profits).

SOME BRIEF HISTORY:

4 MAJOR PHASES OF UTILITY-SECTOR ENERGY EFFICIENCY

1. The 1970's Energy Crisis Era (circa 1975-1983)
 - Primary purpose: help customers cope with soaring utility bills driven by high fossil fuel prices
 - Heavily residential in focus
 - More natural gas than electricity

2. THE IRP ERA (circa 1984-1995)

- Primary purpose: reduce runaway utility system costs (heavily driven by expensive generation...esp. nuclear) by integrating energy efficiency as a system resource
- All customer sectors
- Primarily electricity industry

3. THE RESTRUCTURING/PUBLIC BENEFITS ERA (circa 1995-2001)

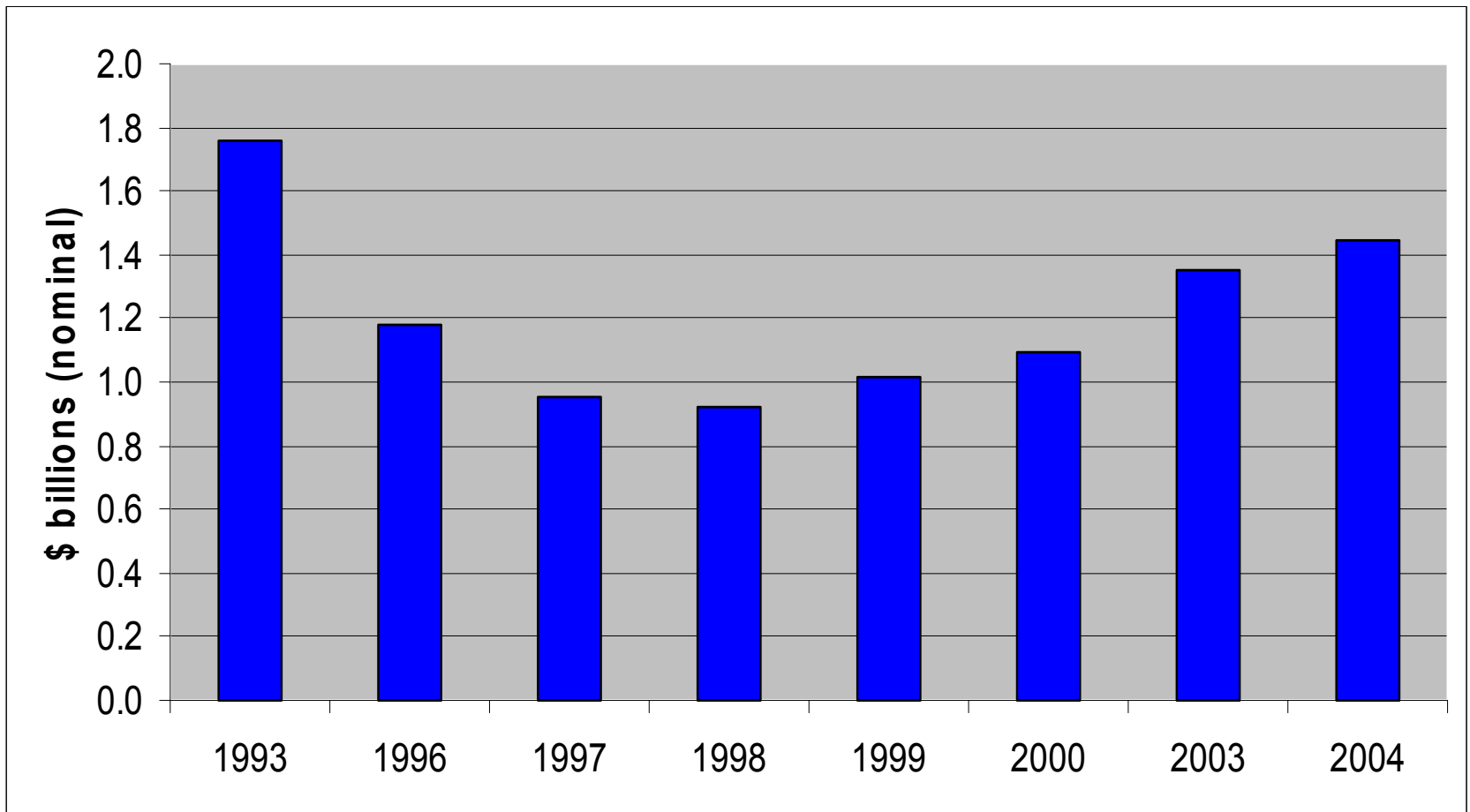
- Primary purpose: preserve the “public benefits” of energy efficiency in an industry being substantially deregulated
- Heavy emphasis on “market transformation”
- More focus on mass markets
- Energy efficiency essentially a public good, rather than a utility system resource

4. THE RESOURCE PROCUREMENT ERA (circa 2001-present)

- Primary purpose: bring energy efficiency back as a resource, in response to growing utility system cost and reliability concerns (& failure of “competitive” model to produce desired system resource outcomes)
- Other corollary objectives emerging (e.g., environmental, economic development)
- First electric, then gas also when prices soared
- Emphasizes outcomes rather than process (in contrast to the 2nd and 3rd Eras)
- All of the above very conducive to public policies such as an Energy Efficiency Resource Standard (EERS)

Annual Spending on Utility Sector Energy Efficiency Programs 1992-2004

[nominal dollars]



Energy Efficiency Has Proven Itself as a Resource

- DSM from 1985-1994: 29,000 MW @ \$.03/kWh
[see RAP report: *Efficient Reliability...* Cowart, 2001]
- A number of states have reported avoiding multiple power plants over time with energy efficiency

Energy Efficiency produces a variety of additional benefits

- Transmission and distribution level savings
- Reduced environmental emissions
- Local economic benefits
- Helps hold down the market cost of energy

SOME GOOD REFERENCES ON UTILITY-SECTOR ENERGY EFFICIENCY

Efficient Reliability: The Critical Role of Demand-Side Resources in Power Systems and Markets

by Richard Cowart, Regulatory Assistance Project,
Vermont, June 2001

<http://www.raonline.org/Pubs/General/EffReli.pdf>

Five Years In: An Examination of the First Half-Decade of Public Benefits Energy Efficiency Policies

Kushler, York & Witte, ACEEE, April 2004

<http://www.aceee.org/pubs/u041.pdf>



CURRENT STATUS OF UTILITY SECTOR DSM

(BASED ON ACEEE SURVEY IN DECEMBER 2006)

- 30 states have “substantive” utility sector energy efficiency programs in operation (includes “system benefit fund” programs)
- At least 45 states have some types of utility load management/demand response programs
- 23 states have utility sector *programs* for customer level renewable energy systems

(Not including RPS policies. At least 19 states have that)

WHAT IS AN "ENERGY EFFICIENCY PROGRAM" ?

An organized effort to try to encourage and facilitate customer implementation of energy efficiency improvements (residential and business)

Key elements

- Public information, education and persuasion
- Information, training, and incentives to “trade allies” (retailers, contractors, etc.)
- Economic incentives for customers (e.g., rebates)
- Quality control, monitoring, and evaluation

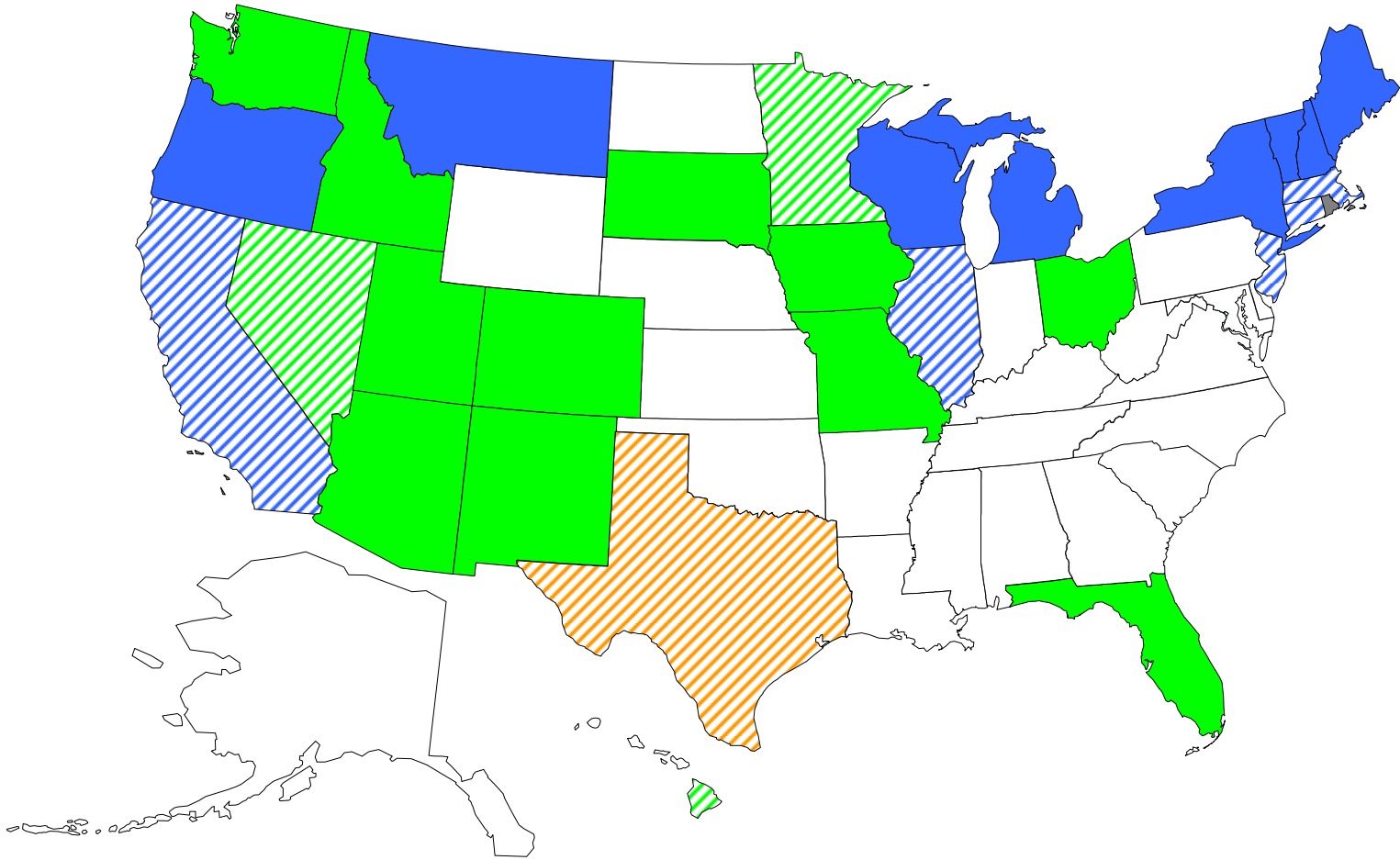
[Note: providing brochures and web sites with “conservation tips” does NOT count!]

3 BASIC POLICY APPROACHES FOR UTILITY SECTOR ENERGY EFFICIENCY PROGRAMS

1. Require funding for energy efficiency through utility rate cases (traditional approach)
2. Provide funding for energy efficiency through statewide system benefit funds (most common recent approach)
3. Establish binding savings targets for utilities [e.g., an “energy efficiency resource standard”]
(newest trend in the industry)

Funding approaches and programs can be tailored to meet the unique needs of each state

STATES WITH EE PUBLIC BENEFIT FUNDS OR OTHER UTILITY EE PROGRAMS



ENERGY EFFICIENCY FUNDING MECHANISMS

16 states: statewide system benefit charge

10 states: included in rates

4 states: tariff rider

[At least 9 of those states have an EERS type mechanism in place or under consideration]

ENERGY EFFICIENCY ADMINISTRATIVE APPROACHES (for utility-sector energy efficiency)

20 states: Utility Administration

7 states: State Agency Administration

3 states: “Third Party” Administration
(thus far, non-profit organizations)

ENERGY EFFICIENCY SPENDING LEVELS

- Nationally: over \$1.6 billion
- Range across states: \$3.0 million to \$580 million
 - 0.04% to 3.6% of gross revenues
 - Mean: 1.34% of gross revenues
 - Median: 1.2% of gross revenues

ENERGY EFFICIENCY SAVINGS IMPACTS

19 states report annual MWh savings

total: nearly 6.2 million MWh/yr.

range: 580 MWh to 1.9 million MWh/yr.

13 states report annual MW savings

total: nearly 1,800 MW/yr.

range: 1 MW to 447 MW/yr.

EE annual savings as a percent of annual sales:

range: 0.1% to 1.2% annual savings

mean: 0.53%

median: 0.4%

EE COST-EFFECTIVENESS TESTS

6 states: no B/C test applied

19 states: yes, required

5 states: yes, but not required

[Side note:

- only 2 of 23 states with renewable energy programs apply a B/C test
- Only 15 of 45 states with load management/demand response programs apply a B/C test]

OF THE 24 STATES THAT USE B/C TESTS FOR EE

Most of the states use more than one test:

15 states use: Total Resource Cost (TRC) test

11 states use: Utility Cost (UC) test

8 states use: Ratepayer Impact (RIM) test

7 states use: Societal Cost test

Of states that identified a primary test:

3 specify societal

3 specify TRC

2 specify UC

1 specifies TRC and UC

1 specifies RIM

COST-EFFECTIVENESS RESULTS

From a previous ACEEE study (*Five Years In...*)

Overall median B/C results reported

- C&I programs: 2.5-2.6 to 1
- Residential programs: 1.6-1.7 to 1
- Across all programs: 2.1-2.5 to 1

Median reported cost of conserved energy: 3.0 cents/kWh

From this most recent study

Rough estimate of overall cost of conserved energy:

~ 3.0 cents/kWh (from reported spending and savings across 19 states)

SOME ADDITIONAL RESOURCES

Using Targeted Energy Efficiency Programs to Reduce Peak Electrical Demand and Address Electric System Reliability Problems Nadel, et.al. ACEEE, 2000

<http://www.aceee.org/store/proddetail.cfm?CFID=569382&CFTOKEN=28344766&ItemID=189&CategoryID=7>

That report profiles six key energy efficiency technologies

- Res. A/C equipment (new & retrofit)
- Res. A/C tune-up & repair
- C&I HVAC equipment
- Commercial building retro-commissioning
- C&I lighting retrofit
- C&I lighting advanced design

and concludes that they have the potential to save 64,000 MW over 10 years (~40% of projected growth in U.S. peak demand)



MORE RESOURCES

America's Best: Profiles of America's Leading Energy Efficiency Programs

York & Kushler, ACEEE, 2003

<http://www.aceee.org/pubs/u032.htm>

[profiles 63 energy efficiency programs selected from around the country for their "best practices" ... spread across 20 different categories, from commercial new construction to residential lighting.]

Energy Efficiency and Electric System Reliability: A Look at Reliability-Focused Energy Efficiency Programs Used to Help Address the Electricity Crisis of 2001 Kushler, Vine and York, ACEEE, 2002.

<http://aceee.org/pubs/u021full.pdf>

[22 “case studies” of successful examples of “reliability-focused energy efficiency programs”]

CONCLUDING OBSERVATION: MOMENTUM TOWARD EE IS BUILDING RAPIDLY

Many factors are converging to make energy efficiency the top priority electric system resource

- High and volatile fuel prices
- Customer/political dissatisfaction with high costs
- ‘NIMBY’ issues re: power plants and transmission lines
- Rising power plant construction costs
- Power plant cost recovery risks
- Environmental policy objectives (esp. global warming)
- Environmental cost risks

A number of states are actively examining strategies to expand their utility-sector energy efficiency efforts.