

Utility Energy Efficiency Developments in the States and DC

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The American Council for an Energy Efficient Economy (ACEEE)

Non-governmental organization (NGO) dedicated to advancing energy efficiency through research, education and advocacy.

~40 staff

Focus on End-Use Efficiency in Industry, Buildings, Utilities, Transportation, & National/State Policy

Known for conferences, research reports and as a major contributor to U.S. energy-efficiency legislation

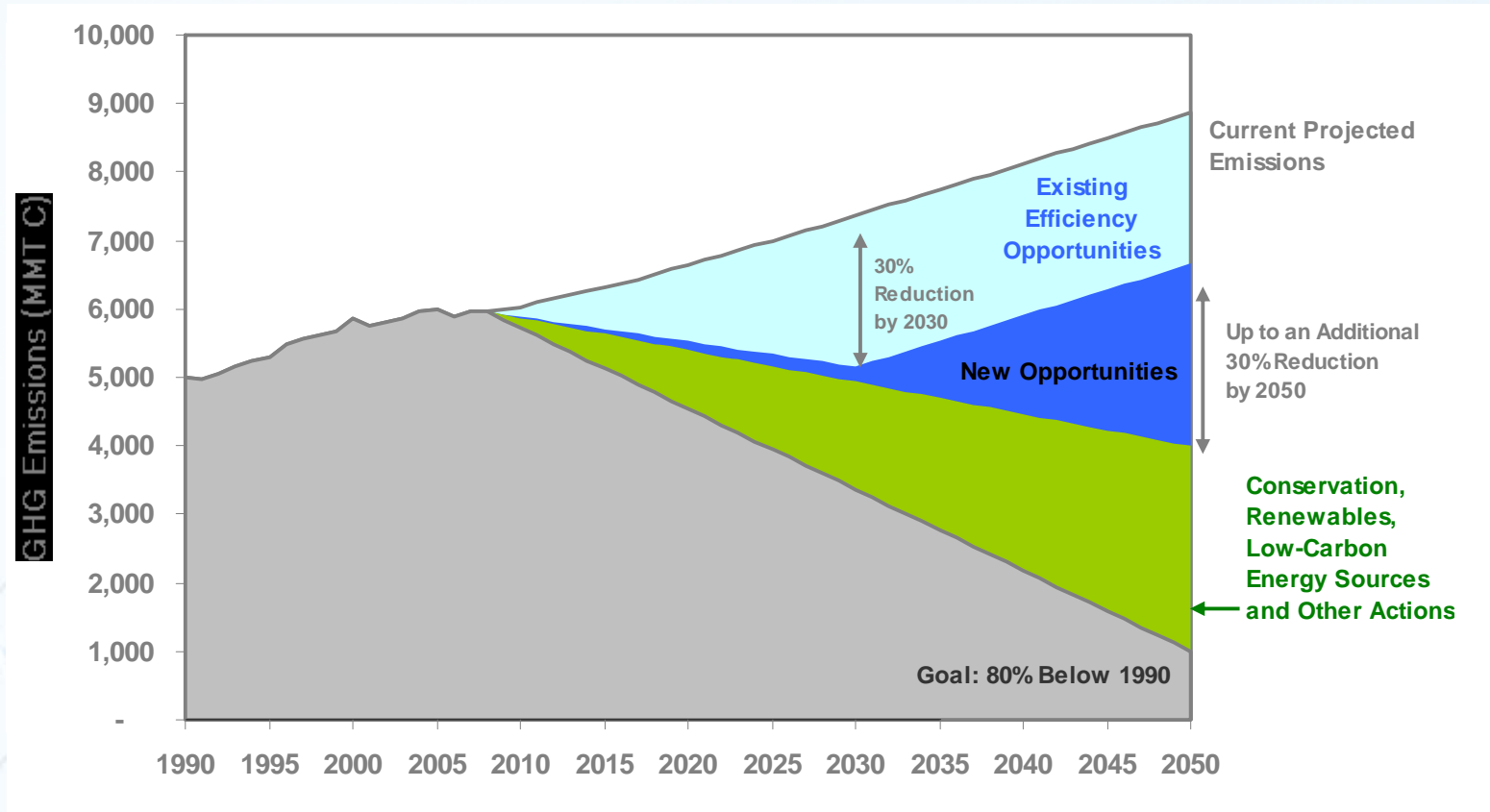
- Played major role in efficiency provisions in EPA Act 1992, EPA Act 2005, and EISA 2007

Funding ~1/3 foundations, 1/3 contracts, 1/3 conferences & other

Overview

- Introduction to Energy Efficiency and Energy Efficiency Programs
- National Trends
 - EERS
 - Performance Incentives
 - Small Business Programs
- Innovative Programs
 - California: New Markets
 - Vermont: Comprehensive Approach
- Successful Programs
 - Lighting
- Integrated Resource Planning

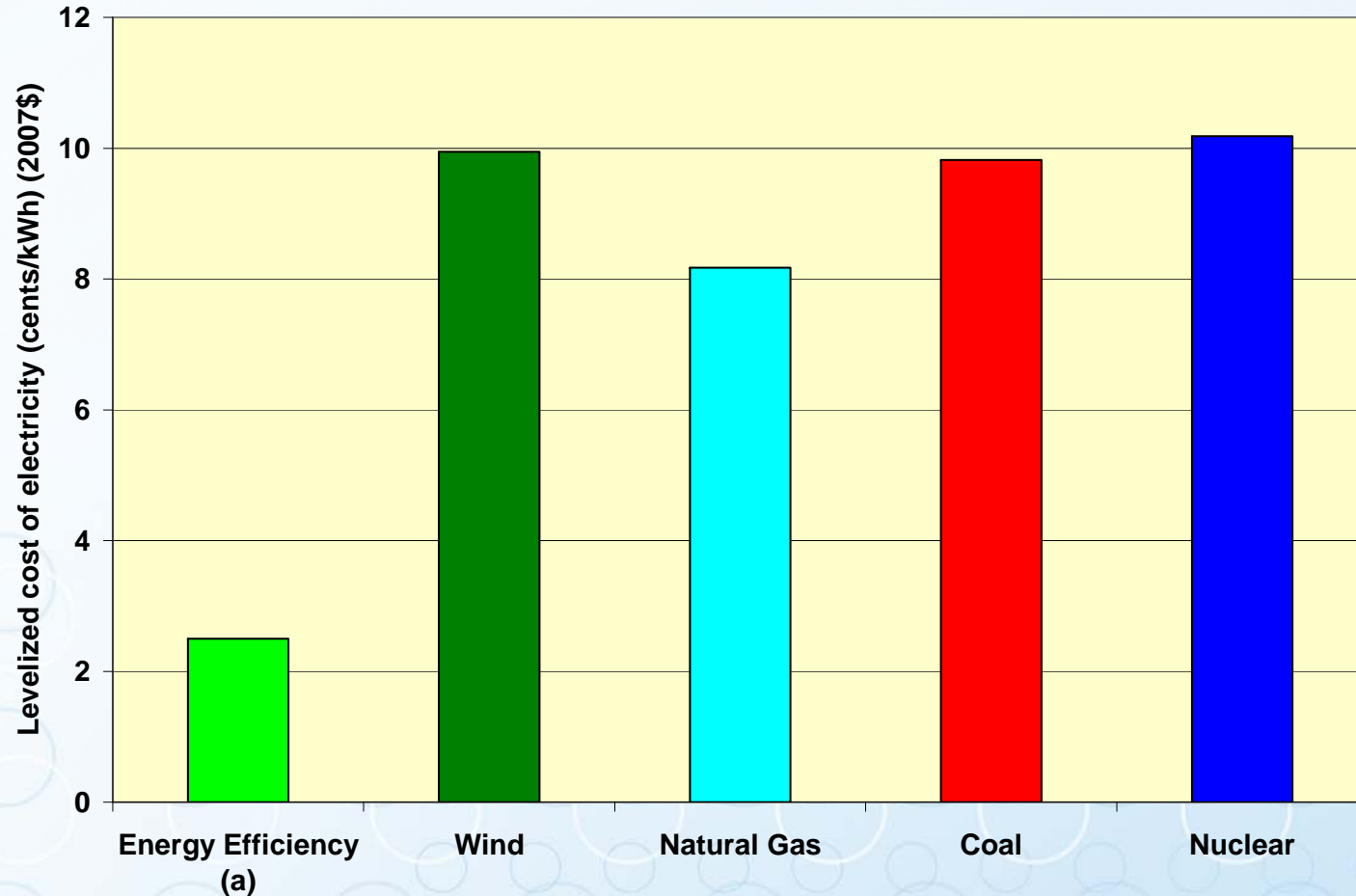
Role of Efficiency in Addressing Climate Change in the U.S.



Note: This graph is stylized and is not exact.

Energy Efficiency as a Resource

The Cost of New Electric Resources



(a)

Energy Efficiency Programs – two main structures:

Utility demand-side management (DSM):

Utilities administer programs as required by regulation or legislation; overseen by state regulatory authorities; program costs are covered via regulated rate setting processes.

Public benefits programs:

Programs are funded through “public benefits charges”—usually associated with utility restructuring, fees assessed on all “distribution” utility customers. A way to fund programs in competitive utility market structure.

Public Benefits Energy Efficiency Programs – two main approaches:

Non-utility administration:

- State government agencies, non-government contractors, or independent non-profit organizations administer and may also implement programs.
- Examples: Efficiency Vermont, Energy Trust of Oregon, New York Energy Smart Program, Wisconsin Focus on Energy, Efficiency Maine and New Jersey Clean Energy Program. Still generally overseen by state regulatory authorities.

Utility administration:

- Utilities receive public benefits funding to administer programs with oversight by state regulatory authorities (very similar to DSM; mostly a difference of funding mechanisms and program requirements).
- In place in California, Massachusetts, Connecticut, Texas and several other states.

Utility-Run Energy Efficiency Programs

- Utilities offer discounts and rebates in order to encourage residential and business customers to invest in energy-use reduction measures
- Residential programs may include discounts for compact fluorescent light bulbs, home weatherization, Energy Star appliances, air conditioning and furnace tune-up programs
- Commercial and industrial programs include improvements to lighting, heating and cooling in buildings, as well as industrial equipment and processes

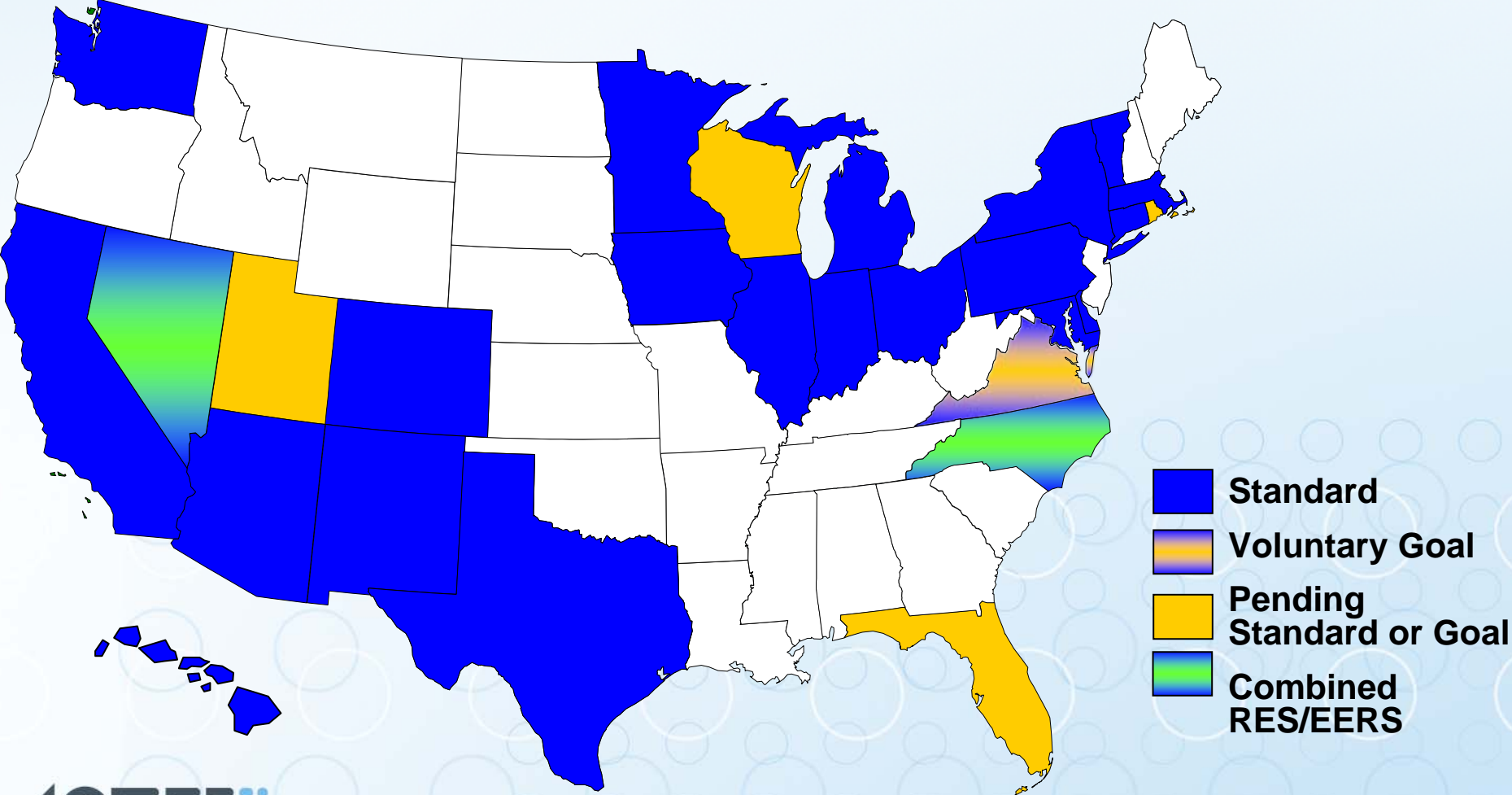
National Trends

- Energy Efficiency Resource Standards (EERS)
 - Electric and Natural Gas
- Performance Incentives
- Small Business Programs

Energy Efficiency Resource Standard (EERS)

- Electric and/or gas savings targets for utilities
 - Includes end-use efficiency and sometimes combined heat and power (CHP) and codes/standards
 - Targets generally start low and increase over time
- Achieve substantial energy and emissions savings
- Performance based—emphasizes savings targets, not spending targets
- Can start programs quickly, without many years of study (but targets should be based on cost-effective opportunities)
- Savings must be documented in accordance with evaluation rules set by regulators

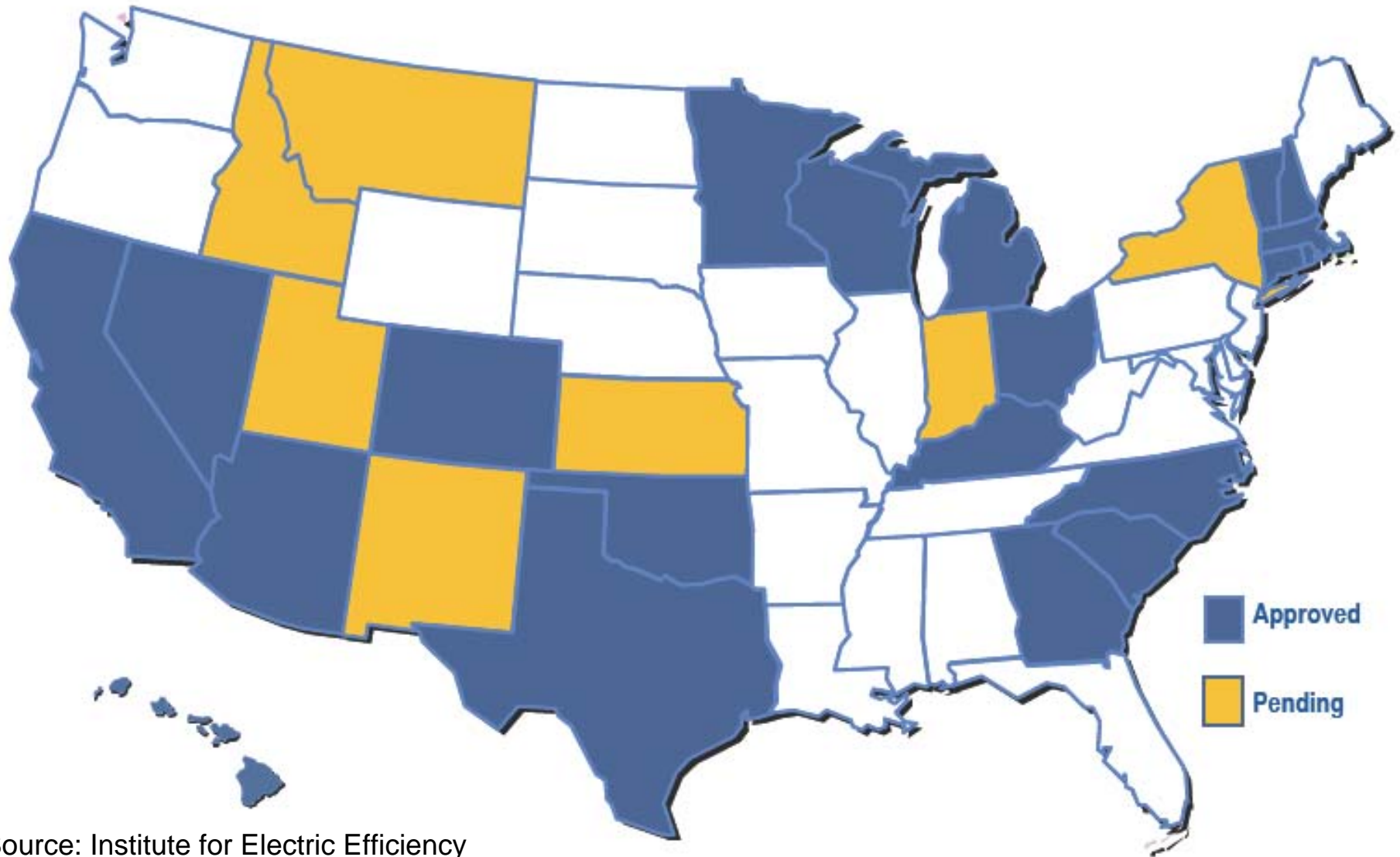
State Energy Efficiency Resource Standards (EERS) – 22 States



Performance Incentives

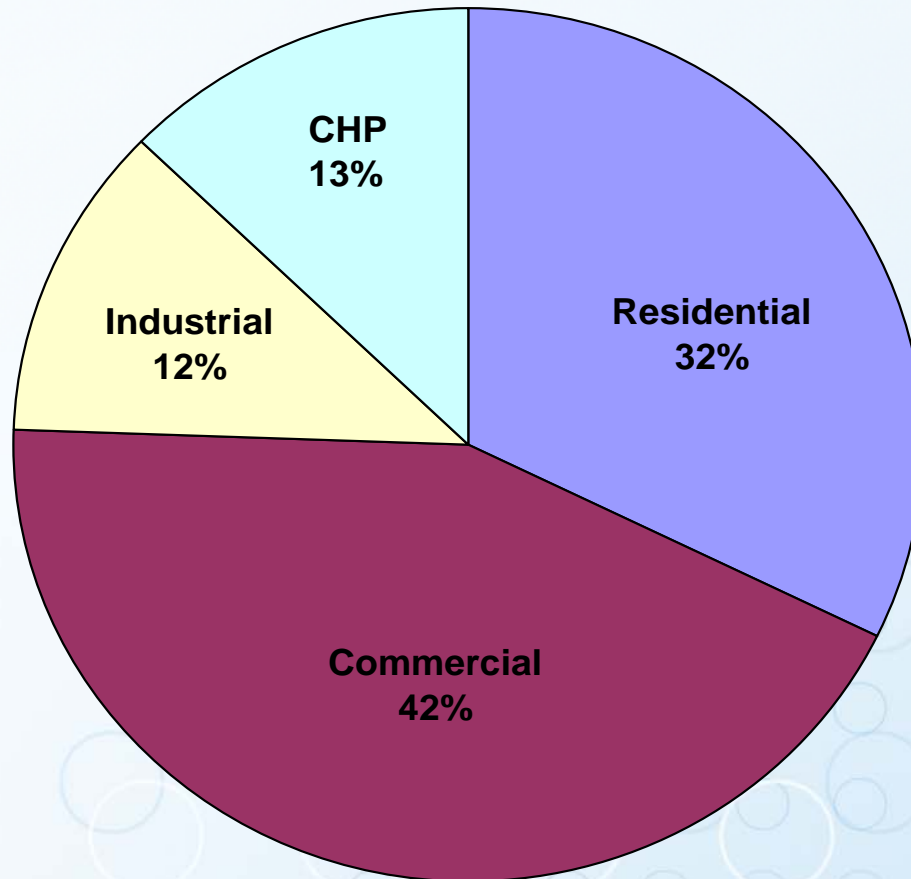
- **Performance targets**
 - Utility earns a financial incentive by exceeding a specified energy savings target, and then receives a defined amount of economic incentive in return.
- **Shared savings**
 - Utility shares the net benefits resulting from successful implementation of energy efficiency programs with ratepayers. The utility typically receives a specified percentage of the net benefits.
- **Altered Rate of Return**
 - Utilities are allowed an increased return on investment for energy efficiency investments or are offered a bonus return on total equity investment for superior energy efficiency performance.

Performance Incentives for Electric Efficiency



Source: Institute for Electric Efficiency

Energy Efficiency Potential by Sector in Virginia by 2025 (Electricity)



Potential savings =
31% in 2025
(as percent of
forecasted
consumption in
2025)

Small Business Programs

- Targets small commercial with monthly demand of less than 100 kW (or 200 kW)
- Incentives to cover upfront costs tend to be significant (50-80%)
- Focus on replacing inefficient equipment such as HVAC, refrigeration, and lighting

Connecticut – Small Business Advantage Program

- Provides commercial customers with cost-effective, turn-key energy-saving services.
- No-cost energy audits, incentives of up to 40% of the installed costs, and interest-free financing of remaining balances for up to 36 months.
- In 2008 almost 2,000 projects were completed with an annual system demand savings of 10.4 MW, an annual customer energy savings of 46.7 MWh, and lifetime customer savings of 557 MWh.

Connecticut: Small Business Advantage Program Example

XtraMart convenience store in North Haven received \$4,500 incentive from UI for \$5,600 efficiency upgrade; cost to store - \$1,100

New controls for more efficient operation of refrigeration system fans and heaters save over 26,000 kWh per year

Annual savings to XtraMart:
\$2,500



Innovative Programs

- California
 - Data Centers
 - Statewide Multifamily Energy Efficiency Rebate Program
- Vermont
 - Deep Savings: Farm to Market to Table

California



- \$3.1 billion approved for utility programs 2010-2012
- Savings goal about 1%/year
- New statewide programs on:
 - Cal SPREE (Statewide Program for Residential Energy Efficiency)
 - Commercial: Benchmarking
 - Industrial: Continuous Energy Improvement
 - Zero Net Energy New Construction
 - HVAC: Focus on compliance
- Also focus on marketing and evaluation
- Evaluation goals broadened and approaches to be reconsidered.
 - Move toward deemed savings estimates that will remain in effect through the 3-year period

California: PG&E; Data Center Upgrade at Juniper Networks – Sunnyvale, CA

- Juniper, a global company, conducts vital stages of its product development at labs scattered in various locations with engineers testing new products and product upgrades at facilities that typically run around the clock.
- PG&E gave Juniper a \$327,000 rebate from PG&E for installing energy-sipping equipment that will save the company more than **\$262,000** in energy costs annually.
- Juniper replaced old servers that used about 30% their capacity with energy-efficient servers capable of server virtualization.

California: PG&E; Data Center Upgrade at Juniper Networks – Sunnyvale, CA

- Virtualization allows multiple applications to run concurrently so data centers can be consolidated – **Juniper now runs one server per lab instead of eight.**



Source:

- http://www.pge.com/includes/docs/word_xls/about/rates/rebateprogrameval/monthlyreports/08-07_cpuc_ee_monthly_report.xls
- <http://www.next100.com/2008/12/proof-you-can-stay-lean-and-gr.php>

California: Statewide Multifamily Energy Efficiency Rebate Program (PG&E, SDG&E, SCE and SCG)

Rebates of up to \$1,500 for products and improvements.

- **Dwelling units** include lighting, appliances, and heating improvements.
- **Common areas** include sensors and heating appliance and controls.

2006 program installations:

3,000 multifamily properties, >160,000 units, more than **\$20 million** in paid incentives resulting electric savings of **5 MW, 52 million kWh**.

Vermont

- Energy Efficiency programs are implemented through a statewide “Energy Efficiency Utility” – Efficiency Vermont
- Efficiency Vermont has a competitively selected contract to supply energy efficiency resources
- Systems in place to assure accountability and performance
- Over 130 staff; Over 40 subcontractors
- Hundreds of partners that provide energy efficiency products and services

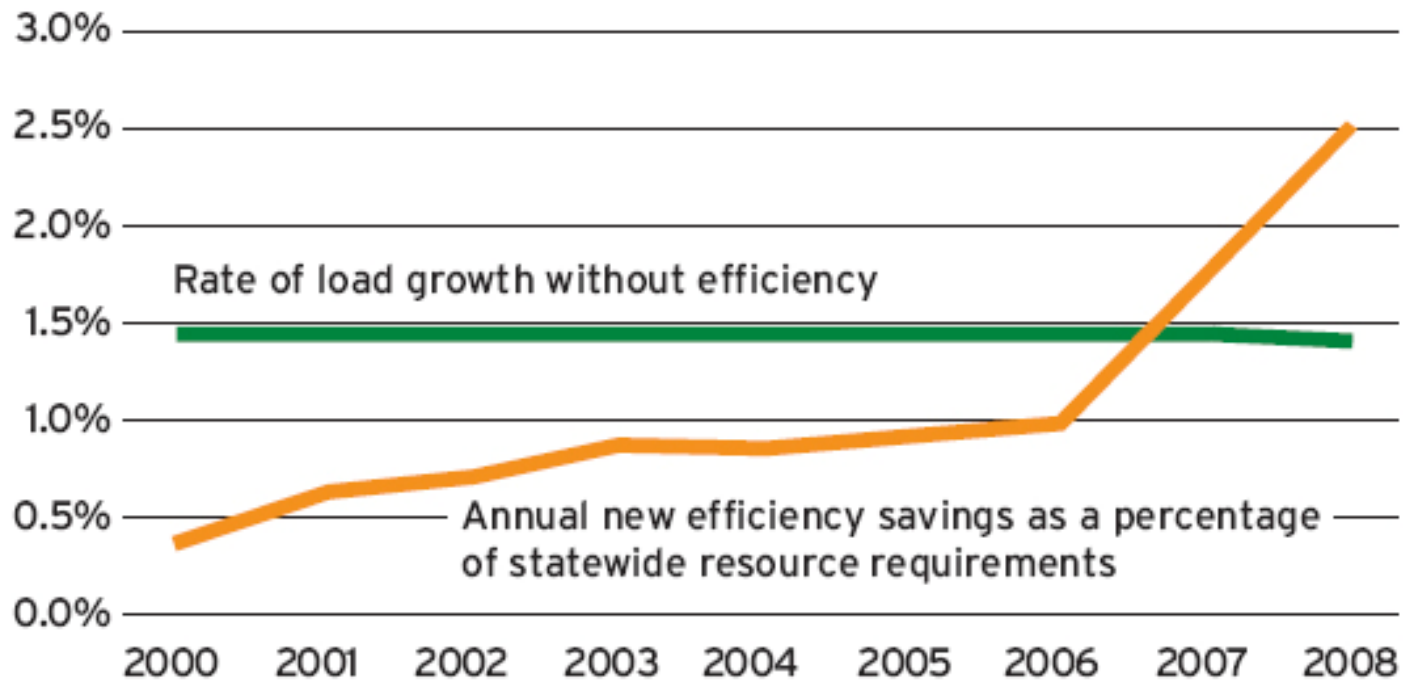
Goals for Acquisition of Energy Efficiency Resources

- Vermont statute requires, as a component of utility service, acquisition of all energy efficiency resources that are lower in cost than generation alternatives
- Utility regulators determine the pace of acquisition, considering both near-term rate impact and long-term efficiency policy goals
- Current goals (2009-2011) are to reduce electricity requirements by approximately 2% each year

Vermont – Raising Efficiency to a New Level



Energy Savings vs. Projected Load Growth



An Example.....a Tale of Cheese from Farm to Market to Table



Cabot Cooperative's dairy farmers reduce their costs with energy-efficient refrigeration, lighting and process equipment.

Efficiency Vermont provides engineering assistance, cash incentives, loan subsidies and loan guarantees to Cabot's dairy farmers.

**First-Year Energy Savings:
3,300,000 kWh - \$290,000**

An Example.....a Tale of Cheese from Farm to Market to Table



Since 2000, Cabot Creamery has worked with Efficiency Vermont to install efficient lighting, motors and controls in its cheese processing plant to reduce energy use.

Efficiency Vermont provided engineering analysis, financial analysis and cash incentives

**First-Year Energy Savings:
740,000 kWh - \$54,000**

An Example.....a Tale of Cheese from Farm to Market to Table



The energy-efficient lighting and refrigeration system in Cabot's new warehouse reduce the energy costs for long-term storage of cheese.

Efficiency Vermont provided engineering, technical analysis, financial analysis and cash incentives

**First-Year Energy Savings:
1,400,000 kWh - \$104,000**

Successful Programs – Lighting

- Savings thus far have been heavily dominated by lighting – both for C&I and Residential – but especially so for residential.
 - **Minnesota**
 - One-Stop Efficiency Shop Lighting Rebate Program; Lighting Efficiency
 - **Nevada**
 - Sure Bet
 - **Arizona**
 - ENERGY STAR® Residential Lighting Program
- New federal lighting standards take effect in 2012, affecting potential savings from CFL programs.
- Need new ideas for residential sector.

Minnesota: One-Stop Efficiency Shop Lighting Rebate Program; Lighting Efficiency (Xcel Energy)



- The **One-Stop** rebate program saves energy through lighting retrofits in small businesses.
- Since 2000, One-Stop has saved over 114 million kWh in 2553 businesses, paying 45% of project costs, and maintained a 94% customer satisfaction rating.
- Under the **Lighting Efficiency** program, rebates are provided to C&I customers for qualifying lighting equipment purchase and installation for new construction or retrofit projects.
- From 2002-2006 Lighting Efficiency has served almost 4,500 customers, saved almost 275 million kWh and reduced demand by 52 MW.

Arizona: ENERGY STAR® Residential Lighting Program (Arizona Public Service)

- Manufacturer buy-down, aggressive promotion and consumer outreach campaign to secure reduced-price ENERGY STAR CFLs for retail outlets.
- CFL incentives for 2007 averaged \$1.12 per bulb. Close to 4 million CFLs have been sold since late 2005—1.3 million in 2006 alone, well over the annual goal of 940,000.
- APS estimates more than 360 GWh of total lifetime savings through 2006, which translates into **\$25 million in energy cost savings.**

Integrated Resource Planning (IRP)

- IRP requires a utility to objectively analyze the potential of all available resources – supply and demand – to identify a resource mix that produces a least-cost, reliable resource plan.
- This typically results in energy efficiency being selected as a key utility resource because efficiency measures cost less than other, traditional production resources, greatly increasing the role of energy efficiency in the utility's long-term resource portfolio.

Integrated Resource Planning (IRP): Energy Efficiency as the “First Fuel”

- A number of states, including [California](#), [Massachusetts](#), [Connecticut](#), [Maine](#), [Wisconsin](#), [Washington](#), [Delaware](#), [Vermont](#) and [Rhode Island](#) have implemented some form of integrated resource planning.
- Specifically, in the states above, energy efficiency is recognized as the “first fuel.”
- All cost-effective energy efficiency must be acquired before procuring other resources.

Conclusion

- States continue to adopt various policies in favor of energy efficiency.
- Utilities are steadily increasing implementation of energy efficiency programs.
- Programs have been successful thus far, but new, innovative programs will be needed to achieve **deeper** (higher savings/participant) and **broader** (more participants) energy savings.

For more information on these topics, see ACEEE publications (available as free downloads):

<http://www.aceee.org>

- *Compendium of Champions: Chronicling Exemplary Energy Efficiency Programs from Across the U.S., Report #U081.*
- *The 2009 State Energy Efficiency Scorecard, Report #E097.*
- *Energy Efficiency Resource Standards: Experience and Recommendations, Report #E063.*
- *Five Years In: An Examination of the First Half-Decade of Public Benefits Energy Efficiency Policies, Report #U041.*
- *Aligning Utility Interests with Energy Efficiency Objectives: A Review of Recent Efforts at Decoupling and Performance Incentives, Report #U061.*
- *Meeting Aggressive New State Goals for Utility-Sector Energy Efficiency: Examining Key Factors Associated With High Savings Report #U091.*

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