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Energy Efficiency as a Resource

The Economic and Environmental Importance of Energy Efficiency as a Resource; DSM in the Marketplace

Nevada Legislative Interim Committee
Study on the Production and Use of Energy
Senate Concurrent Resolution No. 19
19 January 2010

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Think of Energy Efficiency as an invisible, on-site power plant, generating inexpensive, renewable electricity with no transmission line losses, and with positive environmental and economic benefits.

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Marketplace Barriers to implementation of Energy Efficiency Measures

The two main impediments to implementation of energy efficiency measures

1. Apathy
2. Inertia of the Status Quo

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Energy Efficiency
is the
Rodney Dangerfield
of
energy resources

It just doesn't get enough respect and should be considered to have parity with renewable power generation in reducing fossil fuel generation.

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Historically, many of our country's leaders have posited for conservation and reduction of waste

"Conservation means development as much as it does protection. I recognize the right and duty of this generation to develop and use the natural resources of our land, but I do not recognize the right to waste them, or to rob, by wasteful use, the generations that come after us."

Theodore Roosevelt August 10, 1910

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In the current administration's goal for national energy independence, President Obama and Secretary of Energy Chu have named Energy Efficiency as our highest priority resource.

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- In order to reduce our fossil fuel consumption, we must
  - PRODUCE MORE RENEWABLE ENERGY
    and
    REDUCE OUR ENERGY CONSUMPTION THROUGH THE USE OF MORE ENERGY EFFICIENCY AND MORE ENERGY CONSERVATION MEASURES

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Reduction of fossil fuel generation and sustainability is a marriage of energy conservation, energy efficiency, and renewable generation.

It will serve our planet for the long term.

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We should not put
the renewable energy cart
in front of
the energy efficiency horse.

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1. Reduce our energy consumption to levels that, using best practices and technology, are sustainable and as low as practical.
2. Meet the need with the best available supply-side means and methods.

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As stated in a recent Southwest Energy Efficiency Project report:

"Efficiency does not come in barrels.

You can't pipe conservation across state or national borders. We do not have highly publicized, acrimonious legal disputes over the siting of energy conservation plants on ecologically sensitive public lands in the West. We do not endure public flaps about the negative visual impact that energy efficiency will have for residents living along coastlines. Energy efficiency and energy conservation … are silent, unobtrusive, and all too often ignored.

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"On the other hand, energy efficiency and conservation present one of our best opportunities for creating a sustainable energy future that will both reduce our own troubles and earn us the admiration and gratitude of posterity."

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The cleanest and least expensive power plant is

The one you can avoid building because of reduction of demand.

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The mid 1970s

Energy concerns burst onto our collective radar screens in the mid-seventies

- Gas Lines
- Increased prices
- Brown outs
- Appeals to patriotism
- Seminal green movement

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Since the energy efficiency movement started with the energy crisis of the mid-1970's, only one state in the union has managed to reduce per-capita energy consumption—California.

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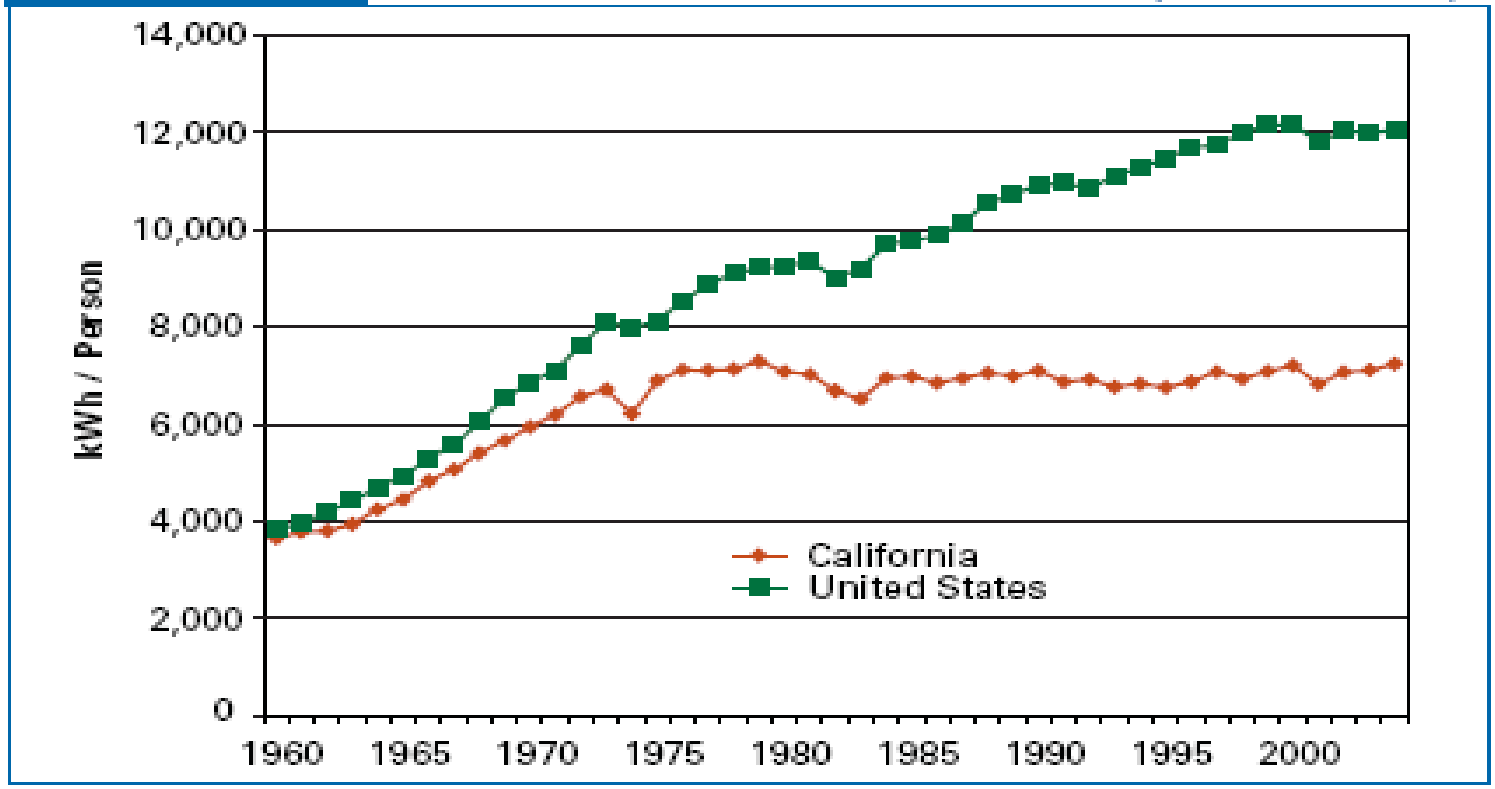
Figure 1 Per Capita Electricity Use in the United States and California (1960-2004)



Source: CEC 2005c

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California's energy conservation and energy efficiency policies have saved more than 40,000 gWh (gigawatt hours) of electricity and 12,000 mW (megawatts) of demand—avoiding the need to build 24 large (i.e. 500 mW) power plants, and equal to the energy required to power 3.8 million homes.

The California EE Program 2004-2013 eliminates the need for 10 new power plants.

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Revenue Decoupling

- Breaks the link between sales and delivery revenues, thus eliminating the traditional disincentive for its utilities to promote DSM.
- Nevada provides 5% Return on Equity "Adder" for utility-funded DSM
- Important to maintain a financially strong public utility

- Renewable Portfolio Standard

2001--Nevada followed the national trend by requiring its utility providers to meet a Renewable Portfolio Standard

15% by 2013

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States with Standards for Electricity from Renewable Resources, 2007-2009

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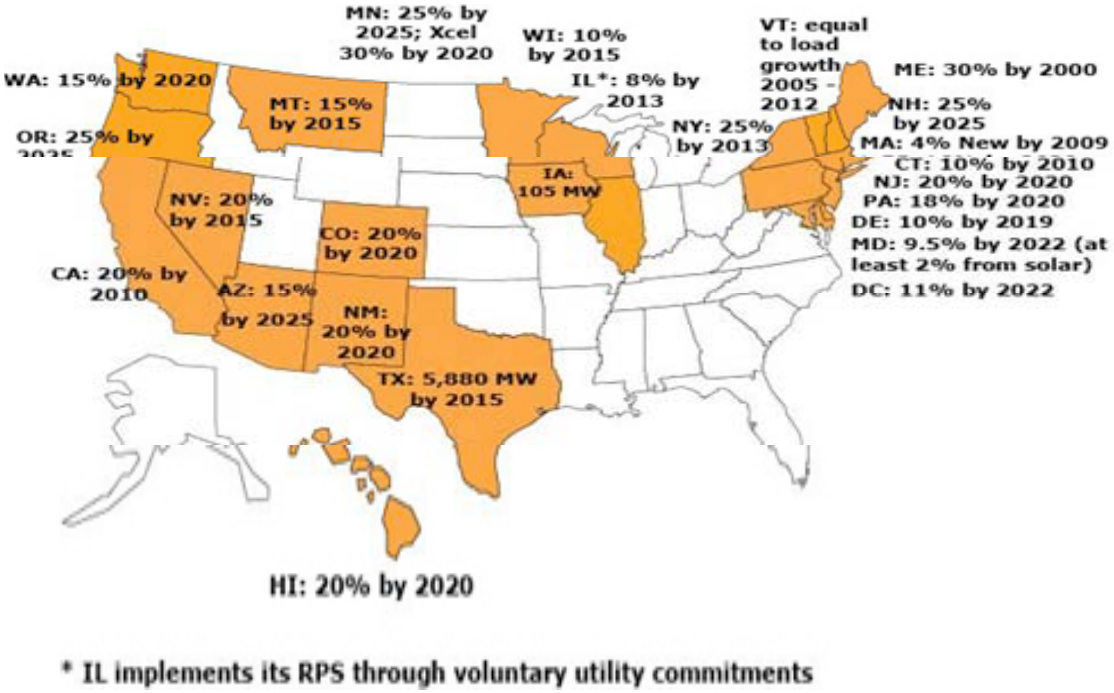

* IL implements its RPS through voluntary utility commitments

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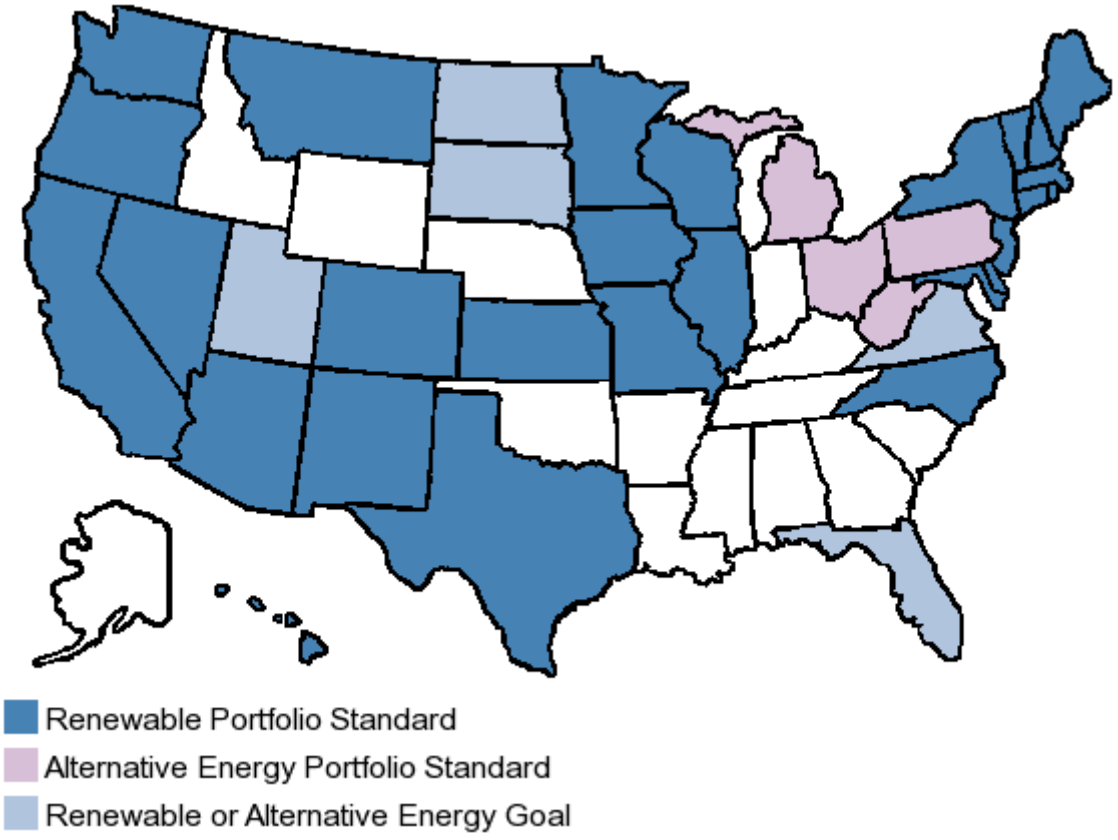
Renewable & Alternative Energy Portfolio Standards 2009



Renewable Portfolio Standard

- At first the NV Utility could not meet the RPS
  - Subject to penalties
  - Renewable (Green) providers couldn't get funding for expensive plants due to adverse economic conditions at SPPC/NPC
- **A NEW DAY DAWNED IN 2005**

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2005 – AB3

Nevada enacted innovative energy legislation with its Energy Omnibus Bill

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- Preamble to AB-3 (2005-SS)

…..

"Whereas, The Nevada Legislature encourages a sound financial economy, the reduction of usage and demand of fossil fuels, and reduction of harmful emissions"

…..

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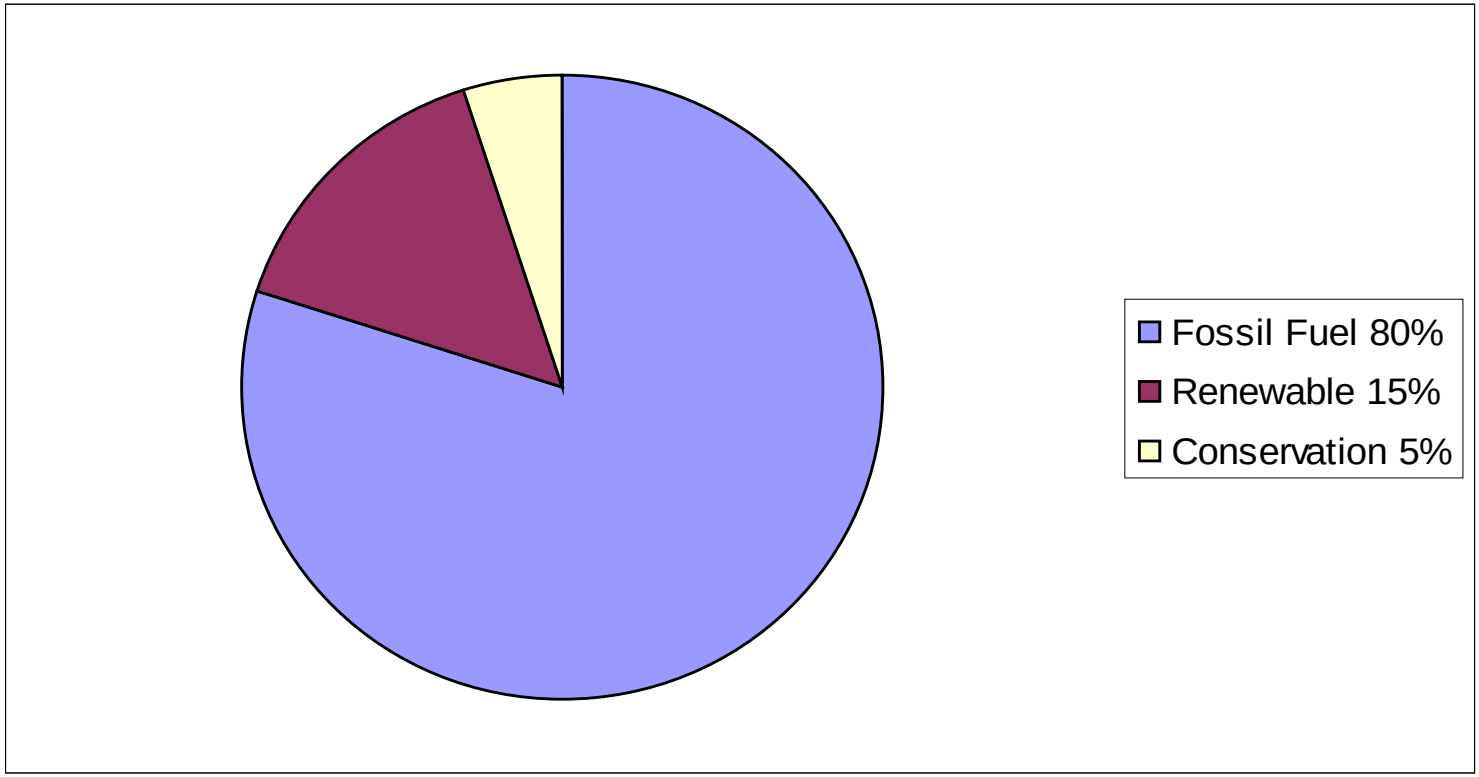
- Nevada Utility Resources
  2015 Requirement



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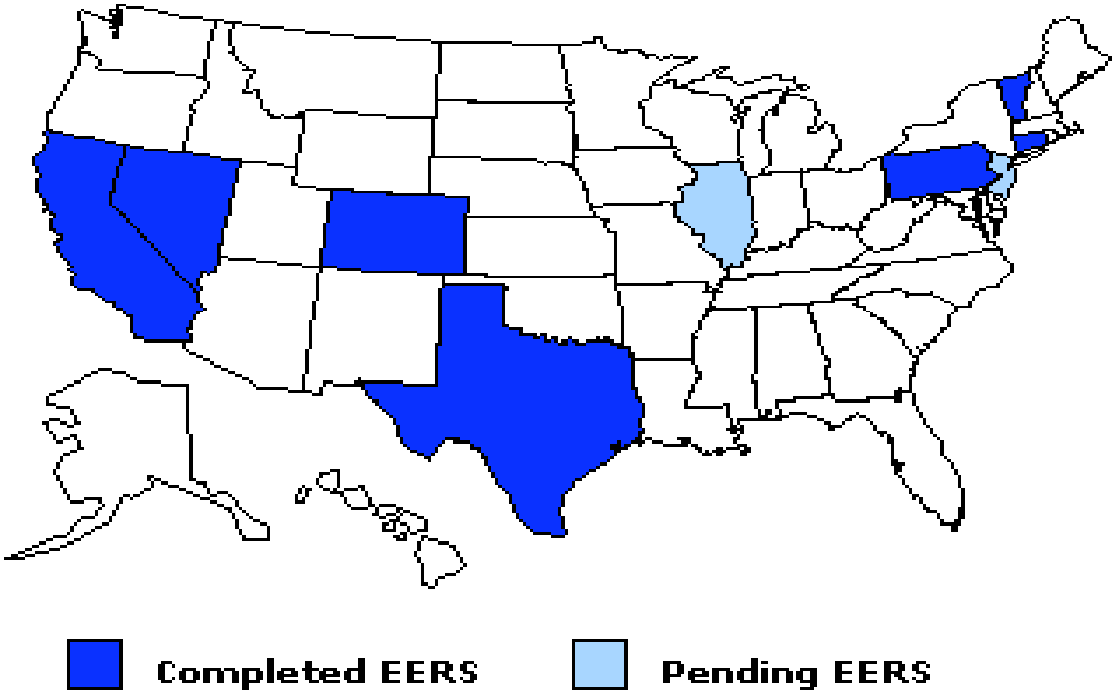
States with Standards
for
Energy Efficiency, 2006



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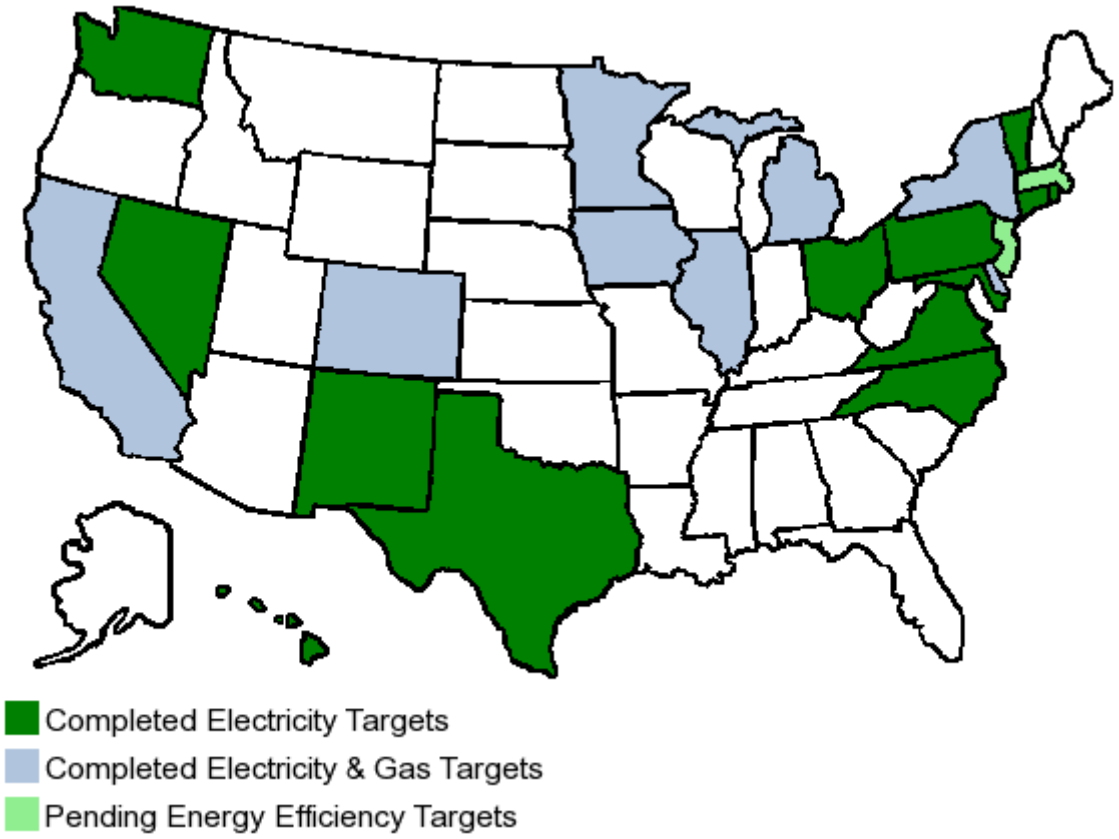
- Energy Efficiency Standards and Targets 2009



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Energy Efficiency Portfolio Standard

An Energy Efficiency Portfolio Standard (EEPS) is a mechanism to encourage more efficient generation, transmission, and use of electricity and natural gas. An EEPS is similar in concept to a Renewable Portfolio Standard (RPS), in that an EEPS requires utilities to reduce energy use by a specified and increasing percentage or amount each year.

Some states have a separate EEPS and RPS, while other states combine the mechanisms by allowing energy efficiency to meet part or all of an RPS.

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Energy Efficiency & Conservation

- The Gift that Keeps on Giving
- Essential for the Economic Vitality of the Nation
- Need to Change Attitudes
- Need to Keep Some of the $ We Send Out of our State and Country for Energy Costs
- Newly proposed NV Energy N/S Intertie and Renewable generation will help considerably

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Measurement and Verification

- If Energy Efficiency is to be counted upon in an Integrated Resource Plan as a “negawatt” resource, it must be accurately measured, and re-verified periodically for persistency (continued efficacy).
  - Certified Measurement and Verification Professionals (“CMVP”) in accordance with the protocols of the Association of Energy Engineers (AEE)
  - Resnet certified auditors
- Not only does this assure continued reliability of the resource, but it provides continuing **green-collar** jobs.

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Free-ridership and Spillover

- Free-ridership—Customers who receive financial incentives to install DSM that they would have installed anyway
- Spillover—Side effects, sometimes unintended, from DSM programs. Sometimes thought of as "trickle-down" benefits. **Spillover Benefit** (Positive Externalities) - A benefit obtained without compensation by third parties from the production or consumption of other parties. Example: A retailer experiences higher sales volume when harvesting daylight.

Cost-Benefit Analysis

- Simple Payback
  - Historical method of determining cost-benefit
  - Marginal cost of DSM/Annual Savings
  - =Payback in years
  - Provides source and application of funds
- Life-Cycle Analysis
  - Important and realistic measure
  - Annual savings X life-expectancy (in years)
    - vs Marginal cost of energy efficiency measure

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- **Methods and Technologies to achieve energy efficiency and peak demand reduction**

  Although a decade ago, there were very few methods and technologies available to produce significant and cost-effective energy efficiency, there are now a plethora of choices.
  To name a few, there are technologies available in energy efficient lighting, HVAC, higher efficiency motors and motor controllers, energy management systems, daylight harvesting, building envelope improvements, intelligent thermostats, and dispatchable load management.
  Building envelope improvements include such things as thermal barrier window coverings, better insulation, reflective roofs.

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Dispatchable Load Management

- Dispatchable Load Management allows for control of customers' usage, frequently on a TOU basis, generally in order to reduce peak demand. For example, in Nevada, according to the utility provider's DSM Director Larry Holmes, its 2009 Air Conditioning Load Management DSM Program, reduced the need for a 150mW peaking plant.
- Dispatchable Load Management is often effectively outsourced to third-party providers.

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Benefits of Energy Efficiency

There are significant benefits from employing greater energy efficiency. Among them are:

- Provides lower cost alternative to fossil fuel or renewable power generation
- Reduction of fossil fuel consumption
- Increase robustness of utility supply
- Reduce carbon footprints, greenhouse gas and other harmful emissions
- Exert deflationary effect on prices due to the price elasticity of demand
- Provide jobs in engineering, electrical installation, maintenance, commissioning, measurement and verification
- National Security
- Enhancement of security of energy supply
- Improve trade deficits, nationally and statewide in energy short states
- Provide societal benefits

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Provides societal benefits

- Societal benefits are important—The increase in energy costs to low income and senior citizens energy costs emulate a regressive tax increase. They cause a disproportionate financial burden and hardship on those least able to bear it.

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Enhancement of security of energy supply

- There is a clear and present worldwide danger.
- The global supply of power is tenuous.
- Security of supply in the current environment is the No. 1 concern of utility companies worldwide, according to the first Utilities Global Survey produced by Price WaterhouseCoopers.
- Supply concerns are heightened by the dramatic growth predicted for energy demand in the next three decades.

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- **Security of supply tops the list of concerns**

Reducing energy use limits the destructive power of disasters, both natural and technological. In our current circumstances, the balance between energy supply and demand is a precarious one, and the slightest disruption in supply, such as that caused by recent hurricanes, will cause energy prices to shoot up. Reducing energy dependence will help us cope more effectively with these disruptions.

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Reducing energy use will play a crucial role in enhancing our national security in an age of terrorism and instability, decreasing our dependence on energy imports and thus making us less vulnerable to the actions within unstable and unfriendly nations. Our demand for fossil fuels, particularly oil, puts our nation's security at risk. We import most of the oil we use, and much of it comes from unstable and volatile OPEC nations in the Persian Gulf.

“Green” should be apolitical

Because a new green ideology, properly defined, has the power to mobilize liberals and conservatives, evangelicals and atheists, big business and environmentalists around an agenda that can both pull us together and propel us forward.

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Tretiak family

Not just “talking the talk”

But

“Walking the walk”

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Bob Tretiak and family c. 1971 before the first gas crisis—200 Gallons per weekend

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Bob Tretiak c. 1986 after the first gas shortage—

Walking the renewable walk for 35 years, not just talking the talk

Transmission and Delivery Losses

- Transmission and distribution lines do not conduct electricity with

  100 percent efficiency.
- Ninety-two percent is the average; longer power lines have lower efficiencies.
- With Energy Efficiency, there are ZERO T&C losses.

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DSM can be good for business

- Recent authoritative study correlating daylighting and retail sales concluded
- The more hours of useful daylight per store per year, the higher the sales
- Energy savings were the primary motivation for both the original installation of skylights with photocontrols
- Spillover effect of fewer returns
- Less formal field survey has shown increased jewelry sales from better quality LED lighting in leading retail store

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- Contradictory financial behavior
- Sometime after 9/11 — an unprovoked mass murder perpetrated by 19 men, 15 of whom were Saudis — green went geostrategic, as Americans started to realize we were financing both sides in the war on terrorism. We were financing the U.S. military with our tax dollars; and we were financing a transformation of Islam, in favor of its most intolerant strand, with our gasoline purchases. How rational is that?

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America waking up to reality

- More Americans have concluded that conserving oil to put less money in the hands of hostile forces is now a geostrategic imperative.
- According to Dan Nolan, who oversees energy projects for the U.S. Army's Rapid Equipping Force "Energy independence is a national security issue," Nolan said. "It's the right business for us to be in."

Inertia of the *status quo*

Management often has daily operations and long-term planning and energy efficiency just isn't on its radar screen. Facilities managers have historically adopted an "if it ain't broke, don't fix it!" approach. A corollary to this is that when "it breaks," replace it with what was there before because of familiarity, expedience, elimination of the need to develop new specifications, and ease of retrofit installation.

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"20th Century" is not synonymous with modern!

This is the 21st Century, calling for 21st Century technological solutions.

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It is important to “go deep”– to implement new technology measures that can produce the greatest reductions in energy use.

By doing so, budget expenditures on wasted power can be reduced, thus saving jobs, and eliminating the need for some furloughs and reductions in force.

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By reducing its $25 Million annual power bill by just 20%--the 2015 mandated target (when 40% is probably achievable), the State of Nevada can save $5,000,000 in jobs! while reducing its carbon footprint and setting a good example for all Nevadans.

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Provides lower cost alternative to fossil fuel or renewable power generation

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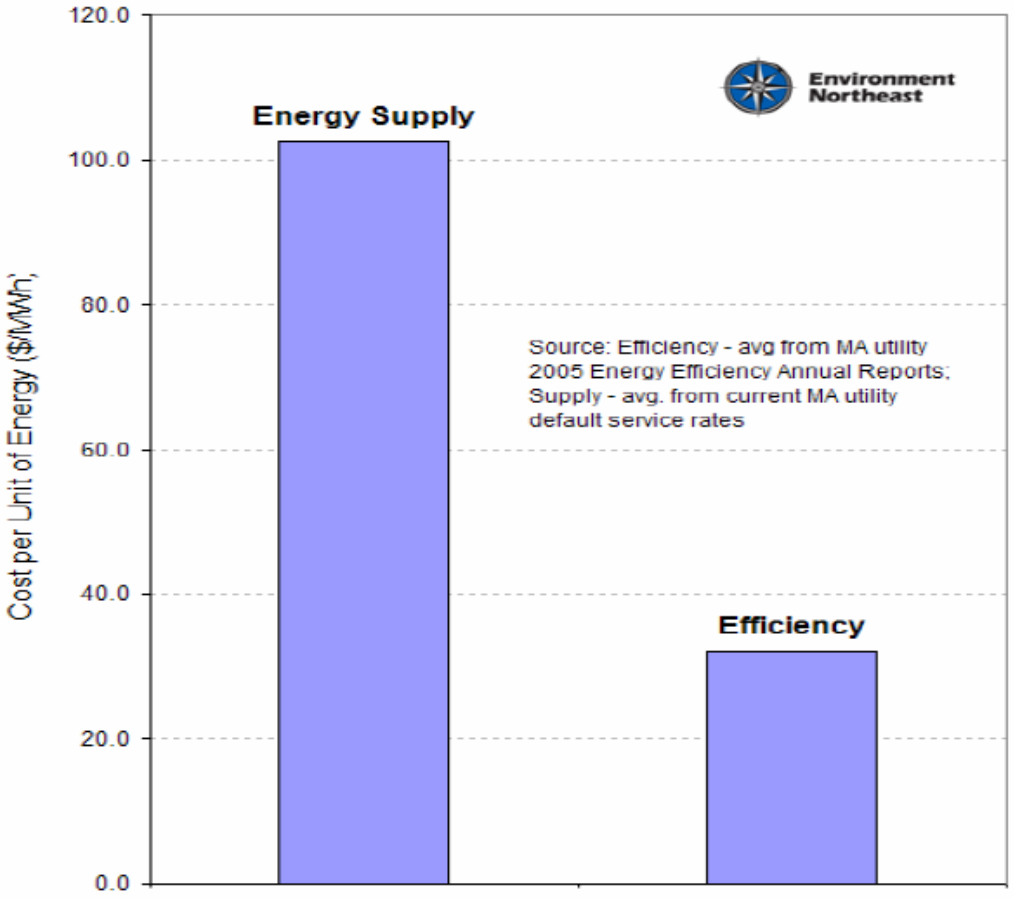
The below chart shows the relative costs of traditional energy supply versus those of energy efficiency in the Northeastern United States.



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Economic Benefits of Energy Conservation Measures

- Saving tax dollars by having the public facilities implement ECMs
- Reduction of energy deficit, often peak-load purchases at high prices
- Exerting a deflationary effect on energy prices; higher prices act economically like a regressive tax
- Improving general financial health of utility providers and robustness of electrical supply.
- **Creation of Jobs**—Engineers, Electricians, M&V Personnel, Weatherization Technicians, Energy Auditors, Outreach Co-ordinators, Liasons and more!

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Portfolio Energy Standard

replaces old term

Renewable Portfolio Standard

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Portfolio Energy Credits

"*PECS*"

(an environmental credit)

replaces old term

Renewable Energy Credits

"RECs"

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Environmental Credits

- Entities meet specific standards
  - Mandated by statute or regulation
  - Voluntary
- Meet on their own
- Purchase from those who have exceeded their own standard and have surplus credits
- Examples
  - SO_2
  - CO_2
  - CO
  - Renewable Energy (“RECs” or “Green Tags”)
  - Energy Conservation Measures (“ECM PECs” or “White Tags”)

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Studies have shown that

Financial Incentives are the #1 reason why customers implement energy saving projects

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Climate Action in Congress

Climate Action in the House

- On June 26, 2009 the U.S. House of Representatives passed the American Clean Energy and Security Act of 2009 (ACES Act), H.R. 2454, by a vote of 219 to 212. This comprehensive national climate and energy legislation would establish an economy-wide, greenhouse gas (GHG) cap-and-trade system and critical complementary measures to help address climate change and build a clean energy economy. The legislation was introduced into the House Energy and Commerce Committee by Committee Chairman Henry Waxman (D-California) and Rep. Edward Markey (D-Massachusetts), chairman of the Subcommittee on Energy and the Environment, on May 15, 2009.

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- **Climate Action in the Senate**

- Now that the House has passed the ACES Act, similar legislation is under consideration in the U.S. Senate. The Senate Energy and Natural Resources Committee, chaired by Sen. Jeff Bingaman (D-New Mexico), passed the American Clean Energy Leadership Act of 2009 (S.1462) on June 17. This bill addresses several energy issues, including many addressed under the ACES Act. On November 5, the Senate Environment and Public Works Committee, chaired by Sen. Barbara Boxer (D-California), passed the Clean Energy Jobs and American Power Act of 2009 (S.1733), which draws heavily from the ACES Act and establishes a cap-and-trade system.

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- IEC supports Federal and Nevada Cap and Trade as a free market system for providing market-based incentives for Energy Efficiency to drive more use of new EE technology, as well as R&D of such important technology
- This will help ensure that the Energy Efficiency horse is placed in front of the Renewable Energy cart.

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Recently the PUCN (Public Utilities Commision of Nevada) has questioned the IRP because it has proposed supply-side expansion with large fixed investments. These investments would provide for the power needs of a growing Nevada populace. With the recent stagnation of growth, these capital costs might end up being paid for by fewer customers than anticipated, thus raising utility rates.

This problem is NOT a risk inherent in DSM measures!

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Energy Conservation Measure Portfolio Energy Credits

- Provides much needed incentive to overcome two main impediments to implementation of energy conservation
  - Apathy
  - Inertia of the Status Quo
- **It also provides ongoing funding for M&V, retro-commissioning, if necessary, and replacement at end of life-cycle.**
- **Free market should set the value of the ECM PECs through Cap and Trade**
- **Purchase vehicle under current Nevada law—**
  - **Power Purchase Agreement**

EE PECs—The solution

- In the long run, a free-enterprise, free-market pricing of ECM-PECs is one of the most efficient means of delivering the desired reduction of fossil fuel consumption and introducing DSM innovation into the marketplace

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- Toward this end, the ECM-PECs should be owned by customers and the utility should purchase them in the same manner in which they purchase RECs (Renewable Energy Credits)
- It's worked well to incentivize innovation and implementation of renewable energy measures and will likewise work well for Energy Conservation Measures.

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Heroes and Honorable Mention

- Senators Randolph Townsend & Mike Schneider
- LCB Scott Young
- Assembly Chris Giunchigliani, Jason Geddes & Joe Hardy
- SWEEP,NRDC, Western Resource Advocates, NV Conservation League, Sierra Club

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Questions ??