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Presentation at the Utility Energy Efficiency Task Force Meeting
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September 23, 2004
Southwest Energy Efficiency Project (SWEEP)

- Public interest initiative promoting greater energy efficiency in AZ, CO, NV, NM, UT, and WY
- Founded in 2001, based in Boulder, CO
- Board of Directors includes utility, state government, national laboratory, and private sector representatives
- Working closely with utilities in other states
- Majority of funding provided by the Energy and Hewlett Foundations, U.S. Department of Energy, and U.S. Environmental Protection Agency

www.swenergy.org
Definition of Energy Efficiency

- Energy efficiency reduces the energy used by specific end-use devices and systems such as air conditioning, heating, refrigeration, or lighting.
- Substitution of more advanced equipment, processes, or operational strategies to produce the same or an improved level of end-use service with less energy use.
- Opportunities to save electricity and natural gas.
- Distributed, small scale, economical and reliable resource that also provides significant environmental benefits.
There is Still Very Large Potential for Greater Energy Efficiency

- Penetration of many well-established energy efficiency measures is still relatively low
- New energy savings technologies and practices continue to be developed
- Cost and performance of existing energy efficiency measures continue to improve
- Capital stock turnover always presents opportunities to upgrade energy performance
Examples of Economic/Achievable Energy Efficiency Potential

- New York: 27% electricity savings potential over 20 years (2003 study)
- Vermont: 31% electricity savings potential over 10 years (2003 study)
- Southwest states: 33% electricity savings potential over 17 years (2002 study)
- California: 11% achievable electricity savings potential in 10 years from expanded utility programs only (2002 study)
- Utah: 20% achievable gas savings potential in 10 years (2004 study)
California 10-Year Savings Potential

From California’s Secret Surplus: The Potential for Energy Efficiency; Rufo and Coito; September 2002
The New Mother Lode: The Potential for More Efficient Electricity Use in Southwest

- **Base Scenario for NM**
  
  Projects growth of electricity use assuming that current policies and trends are maintained, with demand growing 1.5% per year on average in NM between 2003 and 2020.

- **High Efficiency Scenario for NM**
  
  Projects growth of electricity use assuming widespread adoption of cost-effective, commercially-available energy efficiency measures. Demand declines 0.6% per year between 2003 and 2020.
Electricity Consumption & Savings in New Mexico

Electricity Consumption (GWh/yr)

- **Base**
- **High Efficiency**

<table>
<thead>
<tr>
<th>Year</th>
<th>Base</th>
<th>High Efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>14,000</td>
<td>18,000</td>
</tr>
<tr>
<td>2005</td>
<td>16,000</td>
<td>19,360</td>
</tr>
<tr>
<td>2010</td>
<td>18,000</td>
<td>21,840</td>
</tr>
<tr>
<td>2015</td>
<td>20,000</td>
<td>24,528</td>
</tr>
<tr>
<td>2020</td>
<td>22,000</td>
<td>27,755</td>
</tr>
</tbody>
</table>

- 19% savings in 2010
- 36% savings in 2020
The High Efficiency Scenario

Costs and benefits (billion $, cumulative during 2003-2020)

<table>
<thead>
<tr>
<th>Sector</th>
<th>Energy Efficiency Costs</th>
<th>Overall Benefits</th>
<th>Net Benefits</th>
<th>Benefit-Cost Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial</td>
<td>0.3</td>
<td>1.7</td>
<td>1.4</td>
<td>6.5</td>
</tr>
<tr>
<td>Residential</td>
<td>0.3</td>
<td>0.9</td>
<td>0.6</td>
<td>3.0</td>
</tr>
<tr>
<td>Industrial</td>
<td>0.3</td>
<td>1.1</td>
<td>0.8</td>
<td>3.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>0.8</strong></td>
<td><strong>3.6</strong></td>
<td><strong>2.8</strong></td>
<td><strong>4.3</strong></td>
</tr>
</tbody>
</table>

Savings can be achieved at an average cost of $0.02 per kWh.
# The High Efficiency Scenario

## Macroeconomic impacts

<table>
<thead>
<tr>
<th>Region</th>
<th>Year</th>
<th>Net Change in Jobs</th>
<th>Change in Wage and Salary Compensation (Million $)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>New Mexico</strong></td>
<td>2010</td>
<td>2,600</td>
<td>$50</td>
</tr>
<tr>
<td></td>
<td>2020</td>
<td>6,900</td>
<td>$130</td>
</tr>
<tr>
<td><strong>Region</strong></td>
<td>2010</td>
<td>20,500</td>
<td>$450</td>
</tr>
<tr>
<td></td>
<td>2020</td>
<td>58,400</td>
<td>$1,340</td>
</tr>
</tbody>
</table>
## The High Efficiency Scenario

### Water savings

<table>
<thead>
<tr>
<th>Region</th>
<th>Year</th>
<th>Billion gallons per year</th>
<th>Number of households equivalent (assuming 500 gallons use per day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Mexico</td>
<td>2010</td>
<td>3.26</td>
<td>17,800</td>
</tr>
<tr>
<td></td>
<td>2020</td>
<td>6.53</td>
<td>35,700</td>
</tr>
<tr>
<td>Region</td>
<td>2010</td>
<td>24.7</td>
<td>136,600</td>
</tr>
<tr>
<td></td>
<td>2020</td>
<td>61.6</td>
<td>338,800</td>
</tr>
</tbody>
</table>
Policies for Achieving Higher Efficiency

- Expand utility energy efficiency programs
- Use “Total Resource Cost” test to evaluate cost effectiveness
- Adopt Energy Savings Goals or Standards
- Adopt mechanisms to fund utility energy efficiency programs
- Provide utilities with financial incentives to implement effective programs
- Upgrade building codes, support code implementation, and adopt product standards
- Adopt “best practices” in public sector energy management
## Potential Electricity Savings (Region)

<table>
<thead>
<tr>
<th>Policy or program</th>
<th>Electricity savings potential in 2020 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utility-based Energy Efficiency Programs</td>
<td>10 – 15</td>
</tr>
<tr>
<td>Utility Rate Reform</td>
<td>3 – 6</td>
</tr>
<tr>
<td>Building Codes</td>
<td>4 – 8</td>
</tr>
<tr>
<td>Appliance Standards</td>
<td>4</td>
</tr>
<tr>
<td>Tax Incentives</td>
<td>1 – 2</td>
</tr>
<tr>
<td>Public Sector Investment</td>
<td>1 – 2</td>
</tr>
<tr>
<td>Market Transformation Effect</td>
<td>5 – 10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>28 – 47</strong></td>
</tr>
</tbody>
</table>
Common Types of Utility Energy Efficiency Programs

- Rebates for households that purchase efficient appliances, air conditioners, lighting devices, or shell measures
- Cycling controls for residential and commercial AC systems
- Grants for low-income home weatherization
- Audits and rebates for businesses that upgrade efficiency
- Technical and financial assistance to industries
- Training, certification and outreach to builders, contractors, and other energy service providers
- Education and promotion of energy-efficient products
- Demand-side bidding to solicit energy efficiency projects from businesses and energy service companies (ESCOs)
- Design assistance and incentives for builders that construct efficient new homes or commercial buildings
Examples of Leading Utility/State Energy Efficiency Programs

- **National Grid, MA**, 2001: spent $64M on energy efficiency and DSM, 37 MW peak load reduction, $0.024/lifetime kWh saved, achieved 187 GWh/yr (1.0%) annual electricity savings

- **Connecticut**, 2002: $87M utility DSM budget, 99 MW (1.5%) peak load reduction, 246 GWh/yr (0.9%) electricity savings, supports 1,000+ jobs in energy services industry

- **Efficiency Vermont**, 2003: $13M DSM effort, 54 GWh/yr (0.95%) of savings, $0.026/kWh average cost of electricity savings

- **Xcel Energy, Minn.**, 2003: $42M DSM budget, 111 MW (1.8%) peak load reduction, 245 GWh/yr (0.85%) electricity savings; 2.9 benefit-cost ratio
Leading Utility Energy Efficiency Efforts in the Southwest Region

PacificCorp, Utah

- Uses Total Resource Cost test to determine if DSM programs are cost effective
- Has concurrent cost recovery (tariff rider) but no financial incentive for the utility
- Spending $17-18 million on DSM programs as of 2004 (~1.7% of revenues)
- Plans to spend around $22 million (~2.2% of revenues) in 2005
- Reducing peak demand ~70MW and electricity use ~110 GWh/yr from 2004 programs alone
- Average cost of saved energy is ~$0.02/kWh
- Industrial self-direction option
Leading Utility Energy Efficiency Efforts in the Southwest Region

**Nevada Power/Sierra Pacific Power**

- Uses TRC test and has financial incentive (DSM expenditures earn approved ROR + 5%)
- Ramped up DSM programs in 2003 to $11.2M per yr (~0.4% of revenues)
- DSM budget should grow to $14-17 million in 2005
- Energy savings of 35 GWh/yr and peak load reduction of 16 MW per year, just in first year
Other Utility Energy Efficiency Efforts in the Southwest Region

- **Xcel, CO**: Committed to 124 MW peak demand reduction through DSM during 2001-05; achieving this goal plus 165 GWh/yr savings by 2005; spending $61M over 5 years, 2004 budget = $20 million

- **Ft. Collins, CO**: Municipal utility set goals to reduce electricity use per capita 10% and peak demand per capita 15% by 2012, launching programs in 2004
Program Monitoring and Evaluation

- Thorough monitoring and evaluation absorbs 5-10% of overall DSM budget
- Important to conduct both impact and process evaluations
- Techniques for evaluating program-induced energy savings are well-developed; include consideration of both “free riders” and “free drivers” (spillover effect)
- Persistence of energy savings is another important evaluation issue
Challenges to Developing Energy Efficiency Resources

- Efficiency measures are small scale and highly diffuse; need to influence millions of purchase and operating decisions
- Need to design and operate programs that “make a difference” in the marketplace
- Need to carefully monitor and evaluate program impacts
- Need to combine policies and programs into effective market transformation strategies
Recommendations for New Mexico

- View energy efficiency as a strategic resource
- Implement all cost-effective energy efficiency programs using the Total Resource Cost test
- Adopt energy savings and peak demand reduction goals
- Adopt a DSM program funding mechanism
- Develop a robust set of DSM programs for all customer classes, utility by utility
- Provide investor-owned utilities with financial incentives tied to program performance
- Adopt appropriate monitoring and evaluation procedures
- Form a DSM collaborative to assist with program design and accompany program implementation
Conclusions

- Energy efficiency/DSM is a large and cost-effective resource (~$0.02-03/kWh saved)
- Leading utility DSM programs reduce peak demand by ~1.5-2%/yr and reduce electricity use by ~0.8-1.0%/yr; improve system load factor
- Leading utilities spend 2-3% of revenues on a comprehensive set of DSM programs
- Utilities should get cost recovery and a financial incentive based on program performance
- Thorough DSM program monitoring and evaluation is important
Resources available online at:

www.swenergy.org

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