# Utility Energy Efficiency Programs: Savings Potential, Program Options, and Policy Recommendations

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# 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

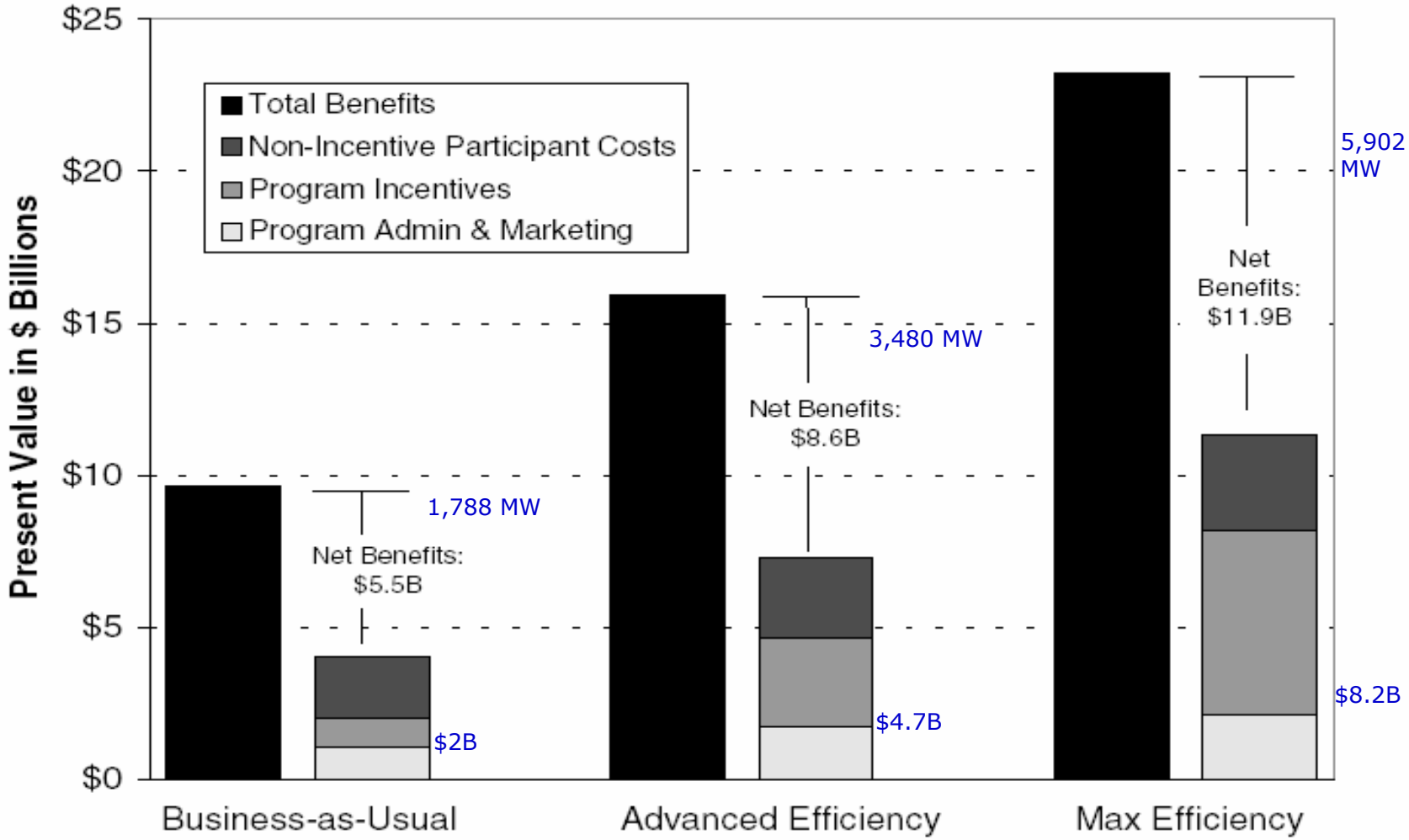
# There is Still Very Large Potential for Greater Energy Efficiency

- 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

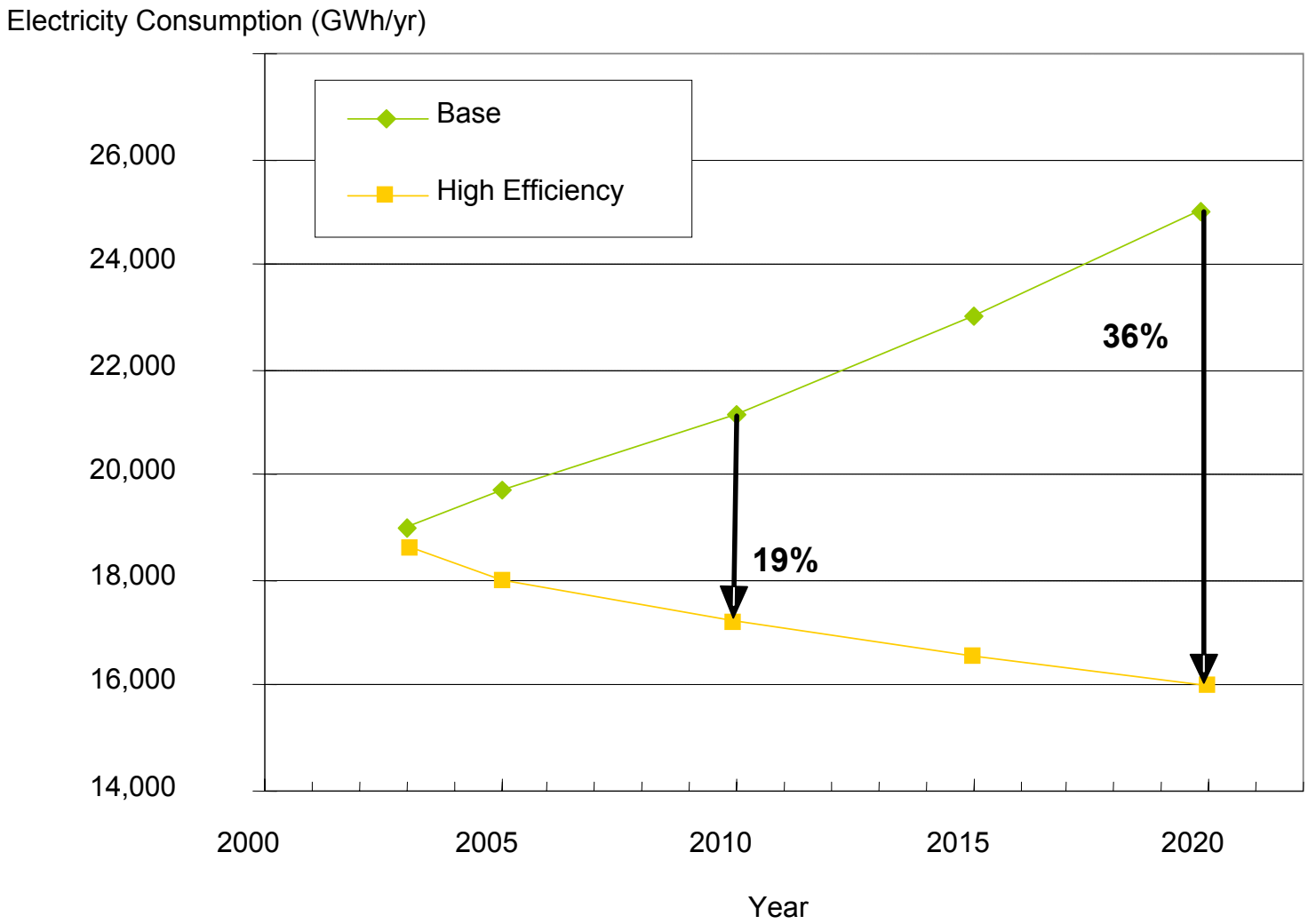
- **Base Scenario for NM**

  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



# The High Efficiency Scenario

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

| Sector | Energy Efficiency Costs | Overall Benefits | Net Benefits | Benefit-Cost Ratio |
|---|---|---|---|---|
| Commercial | 0.3 | 1.7 | 1.4 | 6.5 |
| Residential | 0.3 | 0.9 | 0.6 | 3.0 |
| Industrial | 0.3 | 1.1 | 0.8 | 3.7 |
| **Total** | **0.8** | **3.6** | **2.8** | **4.3** |

Savings can be achieved at an average cost of $0.02 per kWh.

# The High Efficiency Scenario

Macroeconomic impacts

| | Year | Net Change in Jobs | Change in Wage and Salary Compensation (Million $) |
|---|---|---|---|
| **New Mexico** | 2010 | 2,600 | $50 |
| | 2020 | 6,900 | $130 |
| **Region** | 2010 | 20,500 | $450 |
| | 2020 | 58,400 | $1,340 |

# The High Efficiency Scenario

Water savings

| | Year | Billion gallons per year | Number of households equivalent (assuming 500 gallons use per day) |
|---|---|---|---|
| **New Mexico** | 2010 | 3.26 | 17,800 |
| | 2020 | 6.53 | 35,700 |
| **Region** | 2010 | 24.7 | 136,600 |
| | 2020 | 61.6 | 338,800 |

# 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)

| **Policy or program** | Electricity savings potential in 2020 (%) |
|---|---|
| Utility-based Energy Efficiency Programs | 10 – 15 |
| Utility Rate Reform | 3 – 6 |
| Building Codes | 4 – 8 |
| Appliance Standards | 4 |
| Tax Incentives | 1 – 2 |
| Public Sector Investment | 1 – 2 |
| Market Transformation Effect | 5 – 10 |
| **Total** | **28 – 47** |

# 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

**PacficCorp, 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

# SWEEP:

*Dedicated to More Efficient Energy Use in the Southwest*

Resources available online at:

www.swenergy.org

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