1: Introduction and Background

Overview

We currently face a number of challenges in securing affordable, reliable, secure, and clean energy to meet our nation's growing energy demand. Demand is outpacing supply, costs are rising, and concerns for the environment are growing.

Improving the energy efficiency[1] of our homes, businesses, schools, governments, and industries – which consume more than 70 percent of the energy used in the country—is one of the most constructive, cost-effective ways to address these challenges. Greater investment in energy efficiency programs across the country could help meet our growing electricity and natural gas demand, save customers billions of dollars on their energy bills, reduce emissions of air pollutants and greenhouse gases, and contribute to a more secure, reliable, and low-cost energy system. Despite this opportunity, energy efficiency remains an under-utilized resource in the nation's energy portfolio.

There are many ways to increase investment in cost-effective energy efficiency including developing building codes and appliance standards, implementing government leadership efforts, and educating the public through programs such as ENERGY STAR®.[2] Another important area is greater investment in organized energy efficiency programs that are managed by electric and natural gas providers, states, or third-party administrators. Energy efficiency programs already contribute to the energy mix in many parts of the country and have delivered significant savings and other benefits. Despite the benefits, these programs face hurdles in many areas of the country. Identifying and removing these barriers is a focus of this effort.

October 2005

Excerpt from Letter From Co-Chairs to the National Action Plan for Energy Efficiency Leadership Group

Energy efficiency is a critically under-utilized resource in the nation's energy portfolio. Those states and utilities that have made significant investments in energy efficiency have lowered the growth for energy demand and moderated their energy costs. However, many hurdles remain that block broader investments in cost-effective energy efficiency.

That is why we have agreed to chair the Energy Efficiency Action Plan. It is our hope that with the help of leading organizations like yours, we will identify and overcome these hurdles.

Through this Action Plan, we intend to identify the major barriers currently limiting greater investment by utilities in energy efficiency. We will develop a series of business cases that will demonstrate the value and contributions of energy efficiency and explain how to remove these barriers (including regulatory and market challenges). These business cases, along with descriptions of leading energy efficiency programs, will build upon practices already in place across the country.

Diane Munns
President, NARUC
Member, Iowa Utilities Board

Jim Rogers
President and CEO
Duke Energy

To drive a sustainable, aggressive national commitment to energy efficiency through gas and electric utilities, utility regulators, and partner organizations, more than 50 leading organizations joined together to develop this National Action Plan for Energy Efficiency. The Action Plan is co-chaired by Diane Munns, Member of the Iowa

[1] Energy efficiency refers to using less energy to provide the same or improved level of service to the energy consumer in an economically efficient way. The term energy efficiency as used here includes using less energy at any time, including at times of peak demand through demand response and peak shaving efforts.

[2] See EPA 2006 for a description of a broad set of policies being used at the state level to advance energy efficiency.

Utilities Board and President of the National Association of Regulatory Utility Commissioners, and Jim Rogers, President and Chief Executive Officer of Duke Energy. The Leadership Group includes representatives from a broad set of stakeholders, including electric and gas utilities, state utility commissioners, state air and energy agencies, energy service providers, energy consumers, and energy efficiency and consumer advocates. This effort is facilitated by the U.S. Department of Energy (DOE) and the U.S. Environmental Protection Agency (EPA). The National Action Plan for Energy Efficiency:

- Identifies key barriers limiting greater investment in energy efficiency,
- Reviews sound business practices for removing these barriers and improving the acceptance and use of energy efficiency relative to energy supply options, and
- Outlines recommendations and options for overcoming these barriers.

In addition, members of the Leadership Group are committing to act within their own organizations and spheres of influence to increase attention and investment in energy efficiency. Greater investment in energy efficiency cannot happen based on the work of one individual or organization alone. The Leadership Group recognizes that the joint efforts of the customer, utility, regulator, and partner organizations are needed to reinvigorate and increase the use of energy efficiency in America. As energy experts, utilities may be in a unique position to play a leadership role.

The rest of this introduction chapter establishes why now is the time to increase our investment in energy efficiency, outlines the approach taken in the National Action Plan for Energy Efficiency, and explains the structure of this report.

Why Focus on Energy Efficiency?

Energy Challenges

We currently face multiple challenges in providing affordable, clean, and reliable energy in today's complex energy markets:

- *Electricity demand* continues to rise. Given current energy consumption and demographic trends, DOE projects that U.S. energy consumption will increase by more than one-third by the year 2025. Electric power consumption is expected to increase by almost 40 percent, and total fossil fuel use is projected to increase similarly (EIA, 2005). At work and at home, we continue to rely on more energy-consuming devices. This growth in demand stresses current systems and requires substantial new investments in system expansions.
- *High energy prices.* Our demand for natural gas to heat our homes, for industrial and business uses, and for power plants is straining the available gas supply in North America and putting upward pressure on natural gas prices. Many household budgets are being strained by higher energy costs, leaving less money available for other household purchases and needs; this situation is particularly harmful for low-income households. Consumers are looking for ways to manage their energy bills. Higher energy bills for industry are reducing the nation's economic competitiveness and placing U.S. jobs at risk. Higher energy prices also raise the financial risk associated with the development of new natural gas-fired power plants, which had been expected to make up more than 60 percent of capacity additions over the next 20 years (EIA, 2005). Coal prices are also increasing and contributing to higher electricity costs.
- *Energy system reliability.* Events such as the Northeast electricity blackout of August 2003 and Hurricanes Katrina and Rita in 2005 highlighted the vulnerability of our energy system to disruptions. This led to an

increased focus on energy reliability and its economic and human impacts, as well as national security concerns using fossil fuel more efficiently and increasing energy supply diversity.

- *Transmission systems* are overburdened in some places, limiting the flow of economical generation and, in some cases, shrinking reserve margins of the electricity grid to inappropriately small levels. This situation can cause reliability problems and high electricity prices in or near congested areas.

- *Environmental concerns.* Energy demand continues to grow as national and state regulations are being implemented to significantly limit the emissions of air pollutants, such as sulfur dioxide (SO_2), nitrogen oxides (NO_X), and mercury, to protect public health and the environment. Many existing base load generation plants are aging and significant retrofits are needed to ensure old generating units meet these emissions regulations. In addition, emissions of greenhouse gases continue to increase.

Addressing these issues will require billions of dollars in investments in new power plants, gas rigs, transmission lines, pipelines, and other infrastructure, notwithstanding the difficulty of building new energy infrastructure in dense urban and suburban locations even with current energy efficiency investment. The decisions we make now regarding our energy supply and demand can either help us deal with these challenges more effectively or complicate our ability to secure a more stable, economical energy future.

Benefits of Energy Efficiency

Greater investment in energy efficiency can help us tackle these challenges. Energy efficiency is already a key component in the nation's energy resource mix in many parts of the country, and experience shows that energy efficiency programs can lower customer energy bills; cost less than, and help defer, new energy production; provide environmental benefits; and spur local economic development. Some of the major benefits of energy efficiency include:

- *Lower energy bills, greater customer control, and greater customer satisfaction.* Well-designed programs can provide opportunities for all customer classes to adopt energy savings measures and reduce their energy bills.[3] These programs can help customers make sound energy use decisions, increase control over their energy bills with savings of 5 to 30 percent, and empower them to manage their energy usage. Customers often express greater satisfaction with electricity and natural gas providers where energy efficiency is offered.

- *Lower cost than supplying new generation only from new power plants.* Well-designed energy efficiency programs are saving energy at an average cost of one-half of the typical cost of new power sources and about one-third of the cost of providing natural gas.[4] When integrated into a long-term energy resource plan, energy efficiency could help defer investments in new plants and lower the total energy system cost.

- *Modular and quick to deploy.* Energy efficiency programs can be ramped up over a period of one to three years to deliver sizable savings. These programs can also be targeted to congested areas with high prices to bring relief where it might be difficult to deliver new supply in the near term.

- *Significant energy savings.* Well-designed energy efficiency programs are delivering energy savings each year on the order of 1 percent of total electric and natural gas sales.[5] These programs are helping to offset 20 to 50 percent of expected growth in energy

[3] See Chapter 6: Energy Efficiency Program Best Practices for more information on leading programs.

[4] Based on new power costs and gas prices in 2015 (EIA, 2006) compared to electric and gas program costs based on leading energy programs, many of which are discussed in Chapter 6: Energy Efficiency Program Best Practices.

[5] Based on leading energy efficiency programs, many of which are discussed in Chapter 6: Energy Efficiency Program Best Practices.

demand in some areas without compromising the end users' activities and economic well-being (Nadel, et al., 2004; EIA, 2006).

- *Environmental benefits.* Cost-effective energy efficiency offers environmental benefits related to reduced demand, such as reduced air pollution and greenhouse gas emissions, lower water use, and less environmental damage from fossil fuel extraction. Energy efficiency is an attractive option for generation owners in advance of requirements to reduce greenhouse gas emissions.

- *Economic development.* Greater investment in energy efficiency helps build jobs and improve state economies. Energy efficiency users often redirect their bill savings toward other activities that increase local and national employment, with a higher employment impact than if the money had been spent to purchase energy (York and Kushler, 2005; NYSERDA, 2004). Many energy efficiency programs create construction and installation jobs, with multiplier impacts on other employment and local economies (Sedano et al., 2005). Local investments in energy efficiency can offset energy imports from out-of-state, improving the state balance of trade. Lastly, energy efficiency investments usually create long-lasting infrastructure changes to building, equipment and appliance stocks, creating long-term property improvements that deliver long-term economic value (Innovest, 2002).

- *Energy security.* Energy efficiency reduces the level of U.S. per capita energy consumption, thus decreasing the vulnerability of the economy and individual consumers to energy price disruptions from natural disasters and attacks upon domestic and international energy supplies and infrastructure.

Long Island Power Authority's (LIPA) Clean Energy Program Drives Economic Development, Customer Savings, and Environmental Quality Enhancements

LIPA started its Clean Energy Initiative in 1999 and has invested $229 million over the past 6 years. LIPA's portfolio of energy efficiency programs from 1999 to 2005 produced significant energy savings, emissions reductions and stimulated economic growth on Long Island:

- 296 megawatts (MW) peak demand savings
- 1,348 gigawatt-hours (GWh) cumulative savings
- Emissions reductions of:
  - Greater than 937,402 tons of carbon dioxide (CO_2)
  - Greater than 1,334 tons of NO_X
  - Greater than 4,298 tons of SO_2
- $275 million in customer bill savings and rebates
- $234 million increase in net economic output on Long Island
- 4,500 secondary jobs created

Source: LIPA, 2006

Decades of Experience With Energy Efficiency

Utilities and their regulators began recognizing the potential benefits of improving efficiency and reducing demand in the 1970s and 1980s. These "demand-side management" (DSM) approaches meet increased demands for electricity or natural gas by managing the demand on the customer's side of the meter rather than increasing or acquiring more supplies. Planning processes, such as "least-cost planning" or "integrated resource planning," have been used to evaluate DSM programs on par with supply options and allow investment in DSM programs when they cost less than new supply options.

DSM program spending exceeded $2 billion a year (in 2005 dollars) in 1993 and 1994 (York and Kushler, 2005). In the late 1990s, funding for utility-sponsored energy efficiency was reduced in about half of the states due to changed regulatory structures and increased political and regulatory pressures to hold down electricity prices. This funding has partially recovered with new

policies and funding mechanisms (see Figure 1-1) implemented to ensure that some level of cost-effective energy efficiency was pursued.

Notwithstanding the policy and regulatory changes that have affected energy efficiency program funding, wide scale, organized energy efficiency programs have now been operating for decades in certain parts of the country. These efforts have demonstrated the following:

- *Energy efficiency programs deliver significant savings.* In the mid-1990s, based on the high program funding levels of the early 1990s, electric utilities estimated program savings of 30 gigawatts (the output of about 100 medium-sized power plants) and more than 60 million megawatt-hours (MWh).

- *Energy efficiency programs can be used to meet a significant portion of expected load growth.* For example:

  — The Pacific Northwest region has met 40 percent of its growth over the past two decades through energy efficiency programs (see Figure 1-2).

  — California's energy efficiency goals, adopted in 2004 by the Public Utilities Commission, are to

Puget Sound Energy's (PSE) Resource Plan Includes Accelerated Conservation to Minimize Risks and Costs

PSE's 2002 and 2005 Integrated Resource Plans (IRPs) found that the accelerated development of energy efficiency minimizes both costs and risks. As a result, PSE significantly expanded its energy efficiency efforts. PSE is now on track to save 279 average MW (aMW) between 2006 and 2015, more than the company had saved between 1980 and 2004. The 279 aMW of energy efficiency represents nearly 10 percent of its forecasted 2015 sales.

Source: Puget Sound Energy, 2005

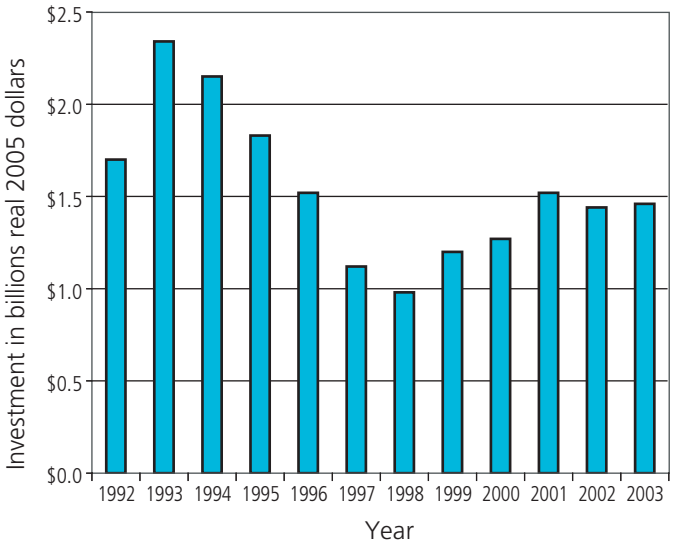
Connecticut's Energy Efficiency Programs Generate Savings of $550 Million in 2005

In 2005, the Connecticut Energy Efficiency Fund, managed by the Energy Conservation Management Board, invested $80 million in energy efficiency. This investment is expected to produce $550 million of bill savings to Connecticut electricity consumers. In addition, the 2005 programs, administered by Northeast Utilities and United Illuminating, resulted in:

- 126 MW peak demand reduction
- 4,398 GWh lifetime savings
- Emissions reductions of:
  - Greater than 2.7 million tons of CO_2
  - Greater than 1,702 tons of NO_X
  - Greater than 4,616 tons of SO_2
- 1,000 non-utility jobs in the energy efficiency industry

Source: CECMB, 2006

Figure 1-1: Energy Efficiency Spending Has Declined



Source: Data derived from ACEEE 2005 Scorecard (York and Kushler, 2005) adjusted for inflation using U.S. Department of Labor Bureau of Labor Statistics Inflation Calculator

use energy efficiency to displace more than half of future electricity load growth and avoid the need to build three large (500 MW) power plants.

- *Energy efficiency is being delivered cost-competitively with new supply.* Programs across the country are demonstrating that energy efficiency can be delivered at a cost of 2 to 4 cents per kilowatt-hour (kWh) and a cost of $1.30 to $2.00 per lifetime million British thermal units (MMBtu) saved.

- *Energy efficiency can be targeted to reduce peak demand.* A variety of programs address the peak demand of different customer classes, lowering the strain on existing supply assets (e.g., pipeline capacity, transmission and distribution capacity, and power plant capability), allowing energy delivery companies to better utilize existing assets and deferring new capital investments.

- *Proven, cost-effective program models are available to build upon.* These program models are available for almost every customer class, both gas and electric.

Southern California Edison's (SCE) Energy Efficiency Investments Provide Economic and Environmental Savings

SCE's comprehensive portfolio of energy efficiency programs for 2006 through 2008 will produce:

- 3 percent average bill reduction by 2010
- 3.5 billion kWh of energy savings
- 888 MW of demand savings
- 20.5 million tons of CO_2 emission reductions
- 5.5 million tons of NO_X emission reductions
- Energy saved at a cost of less than 4.1 cents/kWh

Source: *Southern California Edison,* 2006

New York State's Aggressive Energy Efficiency Programs Help Power the Economy As Well As Reduce Energy Costs

New York State Energy Research and Development Authority's (NYSERDA's) portfolio of energy efficiency programs for the period from 1999 to 2005 produced significant energy savings, as well as stimulated economic growth and jobs, and reduced energy prices in the state:

- 19 billion kWh/year of energy savings
- 4,166 added jobs/year (created/retained) from 1999 to 2017
- $244 million/year in added total economic growth from 1999 to 2017
- $94.5 million in energy price savings over three years

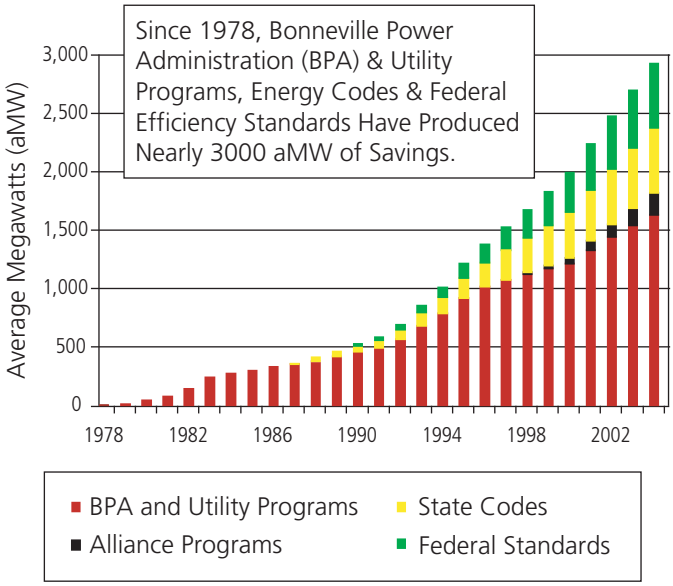
Source: NYSERDA, 2006

National Case for Energy Efficiency

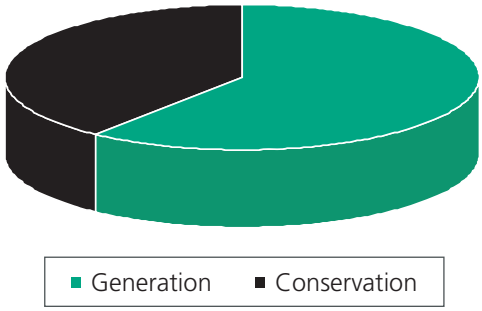
Improving the energy efficiency of homes, businesses, schools, governments, and industries—which consume more than 70 percent of the energy used in the country — is one of the most constructive, cost-effective ways to address the nation's energy challenges. Many of these buildings and facilities are decades old and will consume the majority of the energy to be used in these sectors for years to come. State and regional studies have found that adoption of economically attractive, but as yet untapped, energy efficiency could yield more than 20 percent savings in total electricity demand nationwide by 2025. Depending on the underlying load growth, these savings could help cut load growth by half or more compared to current forecasts (Nadel et al., 2004; SWEEP, 2002; NEEP, 2005; NWPCC, 2005; WGA, 2006). Similarly, energy efficiency targeted at direct natural gas use could lower natural gas demand growth by 50 percent (Nadel et al., 2004). Furthermore, studies also show that significant reductions in energy consumption can be achieved quickly (Callahan, 2006) and at low costs for many years to come.

Figure 1-2: Energy Efficiency Has Been a Resource in the Pacific Northwest for the Past Two Decades

Pacific Northwest Energy Efficiency Achievements 1978 - 2004



Energy Efficiency Met Nearly 40 Percent of Pacific Northwest Regional Firm Sales Growth Between 1980 to 2003



Source: Eckman, 2005

Capturing this energy efficiency resource would offer substantial economic and environmental benefits across the country. Widespread application of energy efficiency programs that already exist in some regions[6] could deliver a large part of these potential savings. Extrapolating the results from existing programs to the entire country would yield over the next 10 to 15 years[7]:

- Energy bill savings of nearly $20 billion annually.
- Net societal benefits of more than $250 billion.[8]
- Avoided need for 20,000 MW (40 new 500 MW-power plants).
- Avoided annual air emissions of more than 200 million tons of CO_2, 50,000 tons of SO_2, and 40,000 tons of NO_X.

These benefits illustrate the magnitude of the benefits cost-effective energy efficiency offers. They are estimated based on (1) assumptions of average program spending levels by utilities or other program administrators that currently sponsor energy efficiency programs and (2) conservatively high estimates for the cost of the energy efficiency programs themselves (see Table 1-1).[9] They are not meant as a prescription; there are differences in opportunities and costs for energy efficiency that need to be addressed at the regional, state, and utility level to design and operate effective programs.

6 See highlights of some of these programs in Chapter 6: Energy Efficiency Program Best Practices, Tables 6-1 and 6-2.

7 These economic and environmental savings estimates extrapolate the results from regional programs to a national scope. Actual savings at the regional level vary based on a number of factors. For these estimates, avoided capacity value is based on peak load reductions de-rated for reductions that do not result in savings of capital investments. Emission savings are based on a marginal on-peak generation fuel of natural gas and marginal off-peak fuel of coal; with the on-peak period capacity requirement double that of the annual average. These assumptions vary by region based upon situation-specific variables. Reductions in capped emissions might reduce the cost of compliance.

8 Net present value (NPV) assuming 5 percent discount rate.

9 This estimate of the funding required assumes 2 percent of revenues across electric utilities and 0.5 percent across gas utilities. The estimate also assumes that energy efficiency is delivered at a total cost (utility and participant) of $0.04 per kWh and $3 per MMBtu, which are higher than the costs of many of today's programs.

Table 1-1. Summary of Benefits for National Energy Efficiency Efforts

Program Cost	Electric	Natural Gas	Total
Utility Program Spending (% of utility revenue)	2.0%	0.5%	
Total Cost of Efficiency (customer & utility)	$35/MWh	$3/MMBtu	
Cost of Efficiency (customer)	$15/MWh	$2/MMBtu	
Average Annual Cost of Efficiency ($MM)	$6,800	$1,200	
Total Cost of Efficiency (NPV, $MM)	$140,000	$25,000	$165,000
Efficiency Spending - Customer (NPV, $MM)	$60,000	$13,000	$73,000
Efficiency Program Spending - Utility (NPV, $MM)	$80,000	$13,000	$93,000
Resulting Savings	**Electric**	**Natural Gas**	**Total**
Net Customer Savings (NPV, $MM)	$277,000	$76,500	$353,500
Annual Customer Savings $MM	*$18,000*	*$5,000*	*$23,000*
Net Societal Savings (NPV, $MM)	$270,000	$74,000	$344,000
Annual Net Societal Savings ($MM)	*$17,500*	*$5,000*	*$22,500*
Decrease in Revenue Requirement (NPV, $MM)	$336,000	$89,000	$425,000
Annual Decrease in Revenue Requirement ($MM)	*$22,000*	*$6,000*	*$28,000*
Energy Savings	**Electric**	**Natural Gas**	**Total**
Percent of Growth Saved, Year 15	61%	52%	
Percent of Consumption Saved, Year 15	12%	5%	
Peak Load Reduction, Year 15 (De-rated)[1]	34,000 MW		
Energy Saved, Year 15	588,000 GWh	1,200 BcF	
Energy Saved (cumulative)	9,400,000 GWh	19,000 BcF	
Emission Reductions	**Electric**	**Natural Gas**	**Total**
CO2 Emission Reduction (1,000 Tons), Year 15	338,000	72,000	410,000
NOx Emission Reduction (Tons), Year 15	67,000	61,000	128,000
Other Assumptions	**Electric**	**Natural Gas**	
Load Growth (%)	2%	1%	
Utility NPV Discount Rate	5%	5%	
Customer NPV Discount Rate	5%	5%	
EE Project Life Term (years)	15	15	

Source: Energy Efficiency Benefits Calculator developed for the National Action Plan for Energy Efficiency, 2006.

NPV = net present value; $MM = million dollars

[1] De-rated peak load reduction based on the coincident peak load reduced multiplied by the percent of growth-related capital expenditures that are saved. Peak load reductions in unconstrained areas are not counted.

As a nation we are passing up these savings by substantially underinvesting in energy efficiency. One indicator of this underinvestment is the level of energy efficiency program funding across the country. Based on the effectiveness of current energy efficiency programs operated in certain parts of the country, the funding necessary to yield the economic and environmental benefits presented above is approximately four times the funding levels for organized efficiency programs today (less than $2 billion per year). Again, this is one indicator of underinvestment and not meant to be a national funding target. Appropriate funding levels need to be established at the regional, state, or utility level based on the cost-effective potential for energy efficiency as well as other factors.

The current underinvestment in energy efficiency is due to a number of well-recognized barriers. Some key barriers arise from choices concerning regulation of electric and natural gas utilities. These barriers include:

- *Market barriers*, such as the well-known "split-incentive" barrier, which limits home builders' and commercial developers' motivation to invest in new building energy efficiency because they do not pay the energy bill, and the transaction cost barrier, which chronically affects individual consumer and small business decision-making.

- *Customer barriers*, such as lack of information on energy saving opportunities, lack of awareness of how energy efficiency programs make investments easier through low-interest loans, rebates, etc., lack of time and attention to implementing efficiency measures, and lack of availability of necessary funding to invest in energy efficiency.

- *Public policy barriers*, which often discourage efficiency investments by electric and natural gas utilities, transmission and distribution companies, power producers and retail electric providers. Historically these organizations have been rewarded more for building infrastructure (e.g., power plants, transmission lines, pipelines) and increasing energy sales than for helping their customers use energy wisely even when the energy-saving measures might cost less.[10]

- *Utility, state, and region planning barriers*, which do not allow energy efficiency to compete with supply-side resources in energy planning.

- *Energy efficiency program barriers*, which limit investment due to lack of knowledge about the most effective and cost-effective energy efficiency program portfolios, programs for overcoming common market barriers to energy efficiency, or available technologies.

While a number of energy efficiency policies and programs contribute to addressing these barriers such as building codes, appliance standards, and state government leadership programs, energy efficiency programs organized through electricity and gas providers also encourage greater energy efficiency in the homes, buildings, and facilities that exist today that will consume the majority of the energy used in these sectors for years to come.

[10] Many energy efficiency programs have an average lifecycle cost of $0.03/kWh saved, which is 50-75% of the typical cost of new power sources (ACEEE, 2004; EIA, 2006).

The National Action Plan for Energy Efficiency

To drive a sustainable, aggressive national commitment to energy efficiency through gas and electric utilities, utility regulators, and partner organizations, more than 50 leading organizations joined together to develop this National Action Plan for Energy Efficiency. The Leadership Group members (Table 1-2) have developed this National Action Plan for Energy Efficiency Report, which:

- Reviews the barriers limiting greater investment in energy efficiency by gas and electric utilities and partner organizations.
- Presents sound business strategies that are available to overcome these barriers.
- Documents a set of business cases showing the impacts on key stakeholders as utilities under different circumstances increase energy efficiency programs.
- Presents best practices for energy efficiency program design and operation.
- Presents policy recommendations and options for spurring greater investment in energy efficiency by utilities and energy consumers.

The report chapters address four main policy and program areas (see Figure 1-3):

- *Utility Ratemaking and Revenue Requirements.* Lost sales from the expanded use of energy efficiency have a negative effect on the financial performance of electric and natural gas utilities, particularly those that are investor-owned under conventional regulation. Cost-recovery strategies have been designed and implemented to successfully "decouple" utility financial health from electricity sales volumes to remove financial disincentives to energy efficiency, and incentives have been developed and implemented to make energy efficiency investments as financially rewarding as capital investments.

The goal of the National Action Plan for Energy Efficiency is to create a sustainable, aggressive national commitment to energy efficiency through gas and electric utilities, utility regulators, and partner organizations.

The Leadership Group:

- Recognizes that utilities and regulators have critical roles in creating and delivering energy efficiency programs to their communities.
- Recognizes that success requires the joint efforts of the customer, utility, regulator, and partner organizations.
- Will work across their spheres of influence to remove barriers to energy efficiency.
- Commits to take action within their own organization to increase attention and investment in energy efficiency.

Leadership Group Recommendations:

- Recognize energy efficiency as a high-priority energy resource.
- Make a strong, long-term commitment to implement cost-effective energy efficiency as a resource.
- Broadly communicate the benefits of and opportunities for energy efficiency.
- Promote sufficient, timely, and stable program funding to deliver energy efficiency where cost-effective.
- Modify policies to align utility incentives with the delivery of cost-effective energy efficiency and modify ratemaking practices to promote energy efficiency investments.

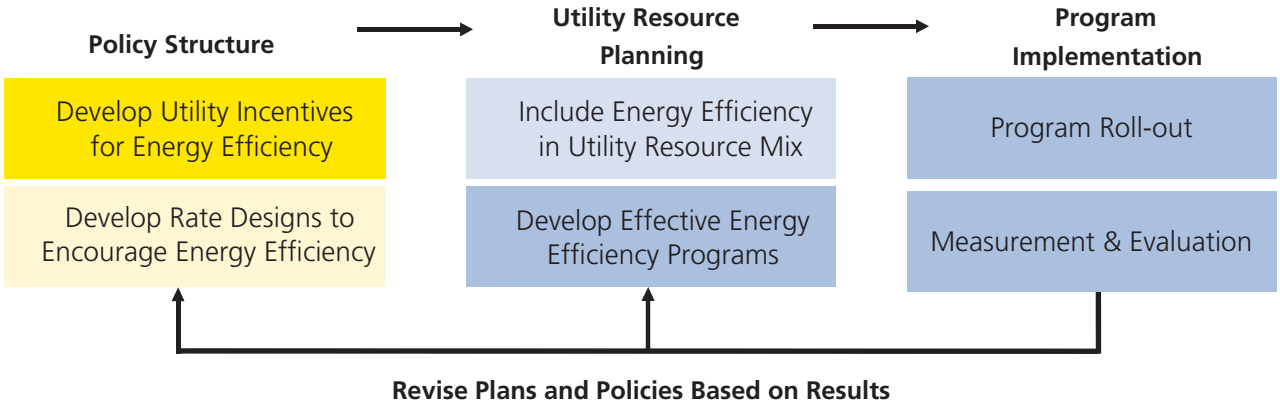
- *Planning Processes.* Energy efficiency, along with other customer-side resources, are not fully integrated into state and utility planning processes that identify the need to acquire new electricity and natural gas resources.

- *Rate Design.* Some regions are successfully using rate designs such as time-of-use (TOU) or seasonal rates to more accurately reflect the cost of providing electricity and to encourage customers to consume less energy.

- *Energy Efficiency Program Best Practices Documentation.* One reason given for slow adoption of energy efficiency is a lack of knowledge about the most effective and cost-effective energy efficiency program options. However, many states and electricity and gas providers are successfully operating energy efficiency programs across end-use sectors and customer classes, including residential, commercial, industrial, low-income, and small business. These programs employ a variety of approaches, including providing public information and training, offering financing and financial incentives, allowing energy savings bidding, and offering performance contracting.

Figure 1-3: National Action Plan for Energy Efficiency Report Addresses Actions to Encourage Greater Energy Efficiency

Timeline: Actions to Encourage Greater Energy Efficiency



Action Plan Report Chapter Areas and Key Barriers

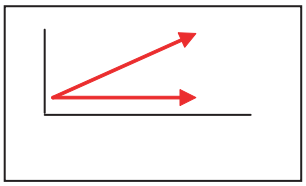
Utility Ratemaking & Revenue Requirements	Planning Processes	Rate Design	Model Program Documentation
Energy efficiency reduces utility earnings	Planning does not incorporate demand-side resources	Rates do not encourage energy efficiency investments	Limited information on existing best practices

Business Cases for Energy Efficiency

A key element of the National Action Plan for Energy Efficiency is exploring the benefits of energy efficiency and the mechanisms and policies that might need to be modified so that each of the key stakeholders can benefit from energy efficiency investments. A key issue is that adoption of energy efficiency saves resources and utility costs, but also reduces utility sales. Therefore, the effect on utility financial health must be carefully evaluated. To that end, the Leadership Group offers an Energy Efficiency Benefits Calculator (Calculator) that evaluates the financial impact of energy efficiency on its major stakeholders—utilities, customers, and society. The Calculator allows stakeholders to examine different efficiency and utility cases with transparent input assumptions.

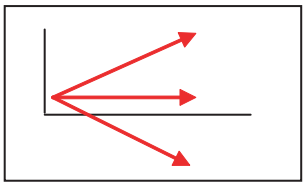
The business cases presented in Chapter 4 of this report show the impact of energy efficiency investments upon sample utility's financial health and earnings, upon customer energy bills, and upon social resources such as net efficiency costs and pollutant emissions. In general, the impacts of offering energy efficiency programs versus not offering efficiency follow the trends and findings illustrated below from the customer, utility and society perspectives.

Utility Perspective. Energy efficiency affects utility revenues, shareholder earnings, and costs associated with capital investments. The utility can be financially neutral to investments in energy efficiency, at a minimum, or encourage greater investment through the implementation of a variety of decoupling, ratemaking, and incentives policies. These policies can ensure that shareholder returns and earnings could be the same or increased. Utility investment in infrastructure and contractual obligations for energy procurement could be reduced, providing a favorable balance sheet impact.



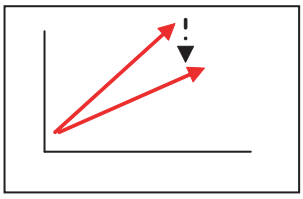
Utility Returns – No Change or Increase

Utility earnings remain stable or increase if decoupling or the use of shareholder incentives accompanies an energy efficiency program. Without incentives, earnings might be lower because effective energy efficiency will reduce the utility's sales volume and reduce the utility's rate base, and thus the scope of its earnings.



Change in Utility Earnings – Results Vary

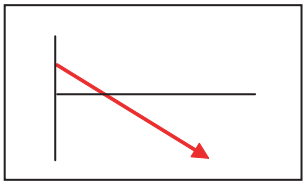
Depending on the inclusion of decoupling and/or shareholder incentives, utility earnings vary. Utility earnings increase if decoupling or shareholder incentives are included. If no incentives, earnings might be lower due to reduced utility investment.



Peak Load Growth and Associated Capital Investment – Decreases

Capital investments in new resources and energy delivery infrastructure are reduced because peak capacity savings are captured due to energy efficiency measures.

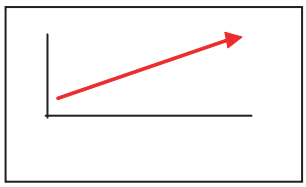
Customer Perspective. Customers' overall bills will decrease with energy efficiency because lower energy usage offsets potential rate increases to cover the cost of offering the efficiency program.



Customer Bills – Decrease

Total customer bills decline over time as a result of investment in cost-effective energy efficiency programs as customers save due to lower energy consumption. This decline follows an initial rise in customer bills reflecting the cost of energy efficiency programs, which will then reduce costs over many years.

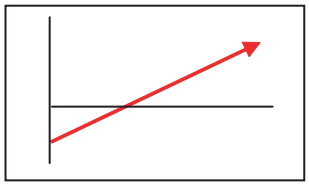
Customer Perspective (continued)



Customer Rates – Mild Increase[12]

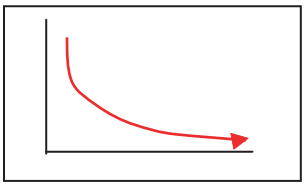
Rates might increase slightly to cover the cost of the energy efficiency program.

Community or Society Perspective. From a broad community/society perspective, energy efficiency produces real savings over time. While initially, energy efficiency can raise energy costs slightly to finance the new energy efficiency investment, the reduced bills (as well as price moderation effects) provide a rapid payback on these investments, especially compared to the ongoing costs to cover the investments in new energy production and delivery infrastructure costs. Moreover, the environmental benefits of energy efficiency continue to grow. The Calculator evaluates the net societal savings, utility savings, emissions reductions, and the avoided growth in energy demand associated with energy efficiency.



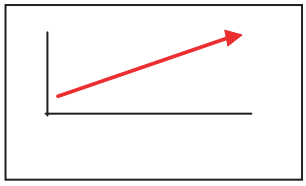
Net Resources Savings – Increases

Over time, as energy efficiency programs ramp up, cumulative energy efficiency savings lead to cost savings that exceed the energy efficiency program cost.



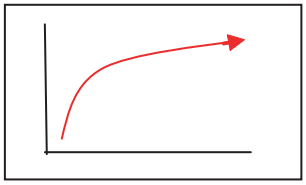
Total Resource Cost (TRC) per Unit - Declines

Total cost of providing each unit of energy (MWh, MMBtu gas) declines over time because of the impacts of energy savings, decreased peak load requirements, and decreased costs during peak periods. Well-designed energy efficiency programs can deliver energy at an average cost less than that of new power sources.



Emissions and Cost Savings – Increases

Efficiency prevents or avoids producing many annual tons of emissions and emission control costs.



Growth Offset by EE – Increases

As energy efficiency programs ramp up, the percent of growth that is offset by energy efficiency climbs and then levels as cumulative savings as a percent of demand growth stabilizes.

[12] The changes shown in the business cases indicate a change from what would have otherwise occurred. This change does not include a one-time infrastructure investment in the assumptions, but it does include smooth capital expenditures. Energy efficiency will moderate prices of fossil fuels. The fuel price reductions from an aggressive energy efficiency program upon fuel prices have not been included and could result in an overall rate reduction.

About This Report

The National Action Plan for Energy Efficiency is structured as follows:

Chapter 2: *Utility Ratemaking & Revenue Requirements*

- Reviews mechanisms for removing disincentives for utilities to consider energy efficiency.
- Reviews the pros and cons for different strategies to reward utility energy efficiency performance, including the use of energy efficiency targets, shared savings approaches, and shareholder/company performance incentives.
- Reviews various funding options for energy efficiency programs.
- Presents recommendations and options for modifying policies to align utility incentives with the delivery of cost-effective energy efficiency and providing for sufficient and stable program funding to deliver energy efficiency where cost effective.

Chapter 3: *Energy Resource Planning Processes*

- Reviews state and regional planning approaches, including Portfolio Management and Integrated Resource Planning, which are being used to evaluate a broad array of supply and demand options on a level playing field in terms of their ability to meet projected energy demand.
- Reviews methods to quantify and simplify the value streams that arise from energy efficiency investments—including reliability enhancement/congestion relief, peak demand reductions, and greenhouse gas emissions reductions—for direct comparison to supply-side options.
- Presents recommendations and options for making a strong, long-term commitment to cost-effective energy efficiency as a resource.

Chapter 4: *Business Case for Energy Efficiency*

- Outlines the business case approach used to examine the financial implications of enhanced energy efficiency investment on utilities, consumers, and society.
- Presents case studies for eight different electric and natural gas utility situations, including different ownership structures, gas and electric utilities, and different demand growth rates.

Chapter 5: *Rate Design*

- Reviews a variety of rate design structures and their effect in promoting greater investment in energy efficiency by the end-user.
- Presents recommended strategies that encourage greater use of energy efficiency through rate design.

Chapter 6: *Energy Efficiency Program Best Practices*

- Reviews and presents best practices for operating successful energy efficiency programs at a portfolio level, addressing issues such as assessing energy efficiency potential, screening energy efficiency programs for cost-effectiveness, and developing a portfolio of approaches.
- Provides best practices for successful energy efficiency programs across end-use sectors, customer classes, and a broad set of approaches.
- Documents the political and administrative factors that lead to program success.

Chapter 7: *Report Summary*

- Summarizes the policy and program recommendations and options.

For More Information

Visit the National Action Plan for Energy Efficiency Web site: *www.epa.gov/cleanenergy/eeactionplan.htm* or contact:

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Table 1-2. Members of the National Action Plan for Energy Efficiency

Co-Chairs

Diane Munns	Member President	Iowa Utilities Board National Association of Regulatory Utility Commissioners
Jim Rogers	President and Chief Executive Officer	Duke Energy

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Barry Abramson	Senior Vice President	Servidyne Systems, LLC
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Jeff Burks	Director of Environmental Sustainability	PNM Resources
Kateri Callahan	President	Alliance to Save Energy
Glenn Cannon	General Manager	Waverly Light and Power
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Lonnie Carter	President and Chief Executive Officer	Santee Cooper
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Larry Downes	Chairman and Chief Executive Officer	New Jersey Natural Gas (New Jersey Resources Corporation)
Roger Duncan	Deputy General Manager, Distributed Energy Services	Austin Energy
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William Flynn	Chairman	New York State Public Service Commission
Jeanne Fox	President	New Jersey Board of Public Utilities
Anne George	Commissioner	Connecticut Department of Public Utility Control
Dian Grueneich	Commissioner	California Public Utilities Commission
Blair Hamilton	Policy Director	Vermont Energy Investment Corporation
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Mary Healey	Consumer Counsel for the State of Connecticut	Connecticut Consumer Counsel
Helen Howes	Vice President, Environment, Health and Safety	Exelon
Chris James	Air Director	Connecticut Department of Environmental Protection
Ruth Kinzey	Director of Corporate Communications	Food Lion
Peter Lendrum	Vice President, Sales and Marketing	Entergy Corporation
Rick Leuthauser	Manager of Energy Efficiency	MidAmerican Energy Company
Mark McGahey	Manager	Tristate Generation and Transmission Association, Inc.
Janine Migden-Ostrander	Consumers' Counsel	Office of the Ohio Consumers' Counsel
Richard Morgan	Commissioner	District of Columbia Public Service Commission
Brock Nicholson	Deputy Director, Division of Air Quality	North Carolina Air Office
Pat Oshie	Commissioner	Washington Utilities and Transportation Commission
Douglas Petitt	Vice President, Government Affairs	Vectren Corporation

Bill Prindle	Deputy Director	American Council for an Energy-Efficient Economy
Phyllis Reha	Commissioner	Minnesota Public Utilities Commission
Roland Risser	Director, Customer Energy Efficiency	Pacific Gas and Electric
Gene Rodrigues	Director, Energy Efficiency	Southern California Edison
Art Rosenfeld	Commissioner	California Energy Commission
Jan Schori	General Manager	Sacramento Municipal Utility District
Larry Shirley	Division Director	North Carolina Energy Office
Michael Shore	Senior Air Policy Analyst	Environmental Defense
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Deb Sundin	Director, Business Product Marketing	Xcel Energy
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Tom Welch	Vice President, External Affairs	PJM Interconnection
Jim West	Manager of *energy right* & Green Power Switch	Tennessee Valley Authority
Henry Yoshimura	Manager, Demand Response	ISO New England Inc.

Observers

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Roger Cooper	Executive Vice President, Policy and Planning	American Gas Association
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Donald Gilligan	President	National Association of Energy Service Companies
Chuck Gray	Executive Director	National Association of Regulatory Utility Commissioners
John Holt	Senior Manager of Generation and Fuel	National Rural Electric Cooperative Association
Joseph Mattingly	Vice President, Secretary and General Counsel	Gas Appliance Manufacturers Association
Kenneth Mentzer	President and Chief Executive Officer	North American Insulation Manufacturers Association
Christina Mudd	Executive Director	National Council on Electricity Policy
Ellen Petrill	Director, Public/Private Partnerships	Electric Power Research Institute
Alan Richardson	President and Chief Executive Officer	American Public Power Association
Steve Rosenstock	Manager, Energy Solutions	Edison Electric Institute
Diane Shea	Executive Director	National Association of State Energy Officials
Rick Tempchin	Director, Retail Distribution Policy	Edison Electric Institute
Mark Wolfe	Executive Director	Energy Programs Consortium

References

American Council for an Energy-Efficient Economy [ACEEE] (2004). *A Federal System Benefits Fund: Assisting States to Establish Energy Efficiency and Other System Benefit Programs.* Washington, DC.

Callahan, K. Alliance to Save Energy (2006, January 17). *Energy Efficiency As a Cornerstone of National Energy Policy.* Presented to United States Energy Association, Washington, DC.

Connecticut Energy Conservation Management Board [CECMB] (2006, March) Energy Efficiency: Investing in Connecticut's Future: Report of The Energy Conservation Management Board Year 2005 Programs and Operations. *<http://www.dpuc.state.ct.us/Electric.nsf/cafda428495eb61485256e97005e054b/5abe828f8be753568525713900520270/$FILE/FINAL%20ECMB%202005%20Report.pdf>*

Eckman, T. (2005, September 26). *The Northwest Forecast: Energy Efficiency Dominates Resource Development.* Paper presented at the ACEEE Energy Efficiency As a Resource Conference. *<http://www.nwcouncil.org/energy/present/default.htm>*

Innovest Strategic Value Advisors [Innovest] (2002, October). *Energy Management & Investor Returns: The Real Estate Sector*.

Long Island Power Authority [LIPA] (2006). *Clean Energy Initiative Annual Report 2005*.

Nadel, S., Shipley, A., and Elliott, R.N. (2004). *The Technical, Economic and Achievable Potential for Energy Efficiency in the U.S.—A Meta-Analysis of Recent Studies.* Washington, DC: American Council for an Energy-Efficient Economy [ACEEE].

New York State Energy Research and Development Authority [NYSERDA] (2006, May) *New York Energy $mart℠ Program Evaluation and Status Report.* Report to the System Benefits Charge Advisory Group, Draft Report.

New York State Energy Research and Development Authority [NYSERDA] (2004, May). *New York Energy $mart℠ Program Evaluation and Status Report*, Report to the System Benefits Charge Advisory Group, Final Report. Albany.

Northeast Energy Efficiency Partnerships [NEEP] (2005, May). *Economically Achievable Energy Efficiency Potential in New England*. Optimal Energy.

Northwest Power and Conservation Council [NWPCC] (2005, May). *The 5th Northwest Electric Power and Conservation Plan*. *<http://www.nwcouncil.org/energy/ powerplan/default.htm>*

Puget Sound Energy (2005, April). *Least Cost Plan*. *<http://www.pse.com/energyEnvironment/electricSupplyResPlanning.aspx>*

Sedano R., Murray, C., and Steinhurst, W. R. (2005, May). *Electric Energy Efficiency and Renewable Energy in New England: An Assessment of Existing Policies and Prospects for the Future.* Montpelier, VT: The Regulatory Assistance Project.

Southern California Edison (2006, January 6) Advice Letter (1955-e) to the California Energy Commission.

Southwest Energy Efficiency Project [SWEEP] (2002, November). *The New Mother Lode: The Potential for More Efficient Electricity Use in the Southwest*. Report for the Hewlett Foundation Energy Series.

U.S. Energy Information Administration [EIA] (2006). *Annual Energy Outlook 2006*. Washington, DC).

U.S. Energy Information Administration [EIA] (2005, January). *Annual Energy Outlook 2005*. Washington, DC). *<http://www.eia.doe.gov/oiaf/archive/aeo05/index.html>*

U.S. Environmental Protection Agency [EPA] (2006). *Clean Energy-Environment Guide to Action: Policies, Best Practices, and Action Steps for States*. Washington, DC.

Western Governors' Association [WGA] (2006, June). *Clean Energy, a Strong Economy and a Healthy Environment*. A Report of the Clean and Diversified Energy Advisory Committee.

York, D. and Kushler, M. (2005, October). ACEEE's 3rd National Scorecard on Utility and Public Benefits Energy Efficiency Programs: A National Review and Update of State Level Activity. *http://www.aceee.org/pubs/u054.pdf*