programs have helped customers save 340 gwh annually[2] and have reduced annual demand by 49 MW[3]. This is a clear indication that the existing lost margins mechanism has not had the negative consequences identified in the EPA Report.

Decoupling was also addressed by the EPA Report. According to the EPA Report, decoupling requires two major steps for implementation: a "policy decision to separate energy sales from revenues", and "to recouple utility revenues to something other than actual kWh sales" (EPA Report, p. 29). The EPA Report also noted that "The issues with decoupling are extremely complex and require a more comprehensive examination than provided in this document." (EPA Report, p. 30.) It also listed a number of key questions that need to be considered in decision making. Similar questions were highlighted in a March 2004 study, "Decoupling for Idaho Power Company", written by Eric Hirst, a copy of which is attached as Exhibit B.

The Companies have begun to examine decoupling as an alternative to more frequent rate cases in order to fairly recover its fixed costs (HECO FSOP, p. 72). The Companies agree with the EPA that the policy decision to separate energy sales from revenues requires a more comprehensive examination, and that it is not practical for that examination to occur within the current scope of the Energy Efficiency Docket. As noted by the EPA Report, decoupling revenue from sales necessarily involves recoupling revenues to another factor (presumably one that is related to costs), and the establishment of a mechanism to adjust rates for the difference. While the concept of decoupling is relatively straightforward, the mechanics of recoupling revenues to another factor, and the implications for customers and the utility, are much more complex. The Companies are open to reviewing some of these considerations in another forum, such as the RPS workshops, and/or in a collaborative working group, but the consideration and implementation of a specific decoupling mechanism should be considered by the Commission in a future general rate proceeding.

Customer Energy Awareness Program

The Residential Customer Energy Awareness ("RCEA") Program, according to the EPA Report, "is similar to other awareness and educational approaches in the U.S. The underlying and reasonable assumption is that this awareness building better sustains knowledge, recognition, and acceptance of high efficiency purchasing choices and end use behaviors." (EPA Report, p. 22)

The NAP identifies investing in education, training, and outreach as a "best practice" in the design and delivery of energy efficiency programs (NAP, p. 6-10). "Education, outreach, and training should be provided to trade allies as well as customers. Some programs are informational only programs." (NAP, p. 6-35) This recommendation is made by the NAP despite the recognition that "Capturing the energy impacts of energy education programs has proven to be a challenge for evaluators for various reasons. [E]ducation and training efforts are not always designed to achieve direct benefits. They are often designed to inform participants or

[2] Customer level, including free-riders.
[3] Gross generation level, net of free-riders.

market actors of program opportunities, simply to familiarize them with energy efficiency options. Most evaluations of energy education and training initiatives have focused on process issues." (NAP, pp. 6-49 to 6-50).

In this proceeding, HECO has requested that, if the additional funds HECO proposed to spend for informational advertising in HECO's 2005 test year rate case (Docket No. 04-0113) are not approved, the Commission approve the recovery of costs related to the RCEA Program (Docket No. 03-0142) in this docket (HECO FSOP, p. 80).

Energy Efficiency Market Potential and Program Design

The EPA Report concluded that HECO's "proposed programs are generally well designed and are cost-effective based on HECO's assumptions." (EPA Report, p. 18.) HECO agrees with the EPA's conclusion that "It is reasonable to build market potential analyses on those technologies that are well-established in the marketplace and therefore can be assessed for future potential with acceptable accuracies." (EPA Report, p. 19.) HECO also agrees with the EPA Report that "the Commission should require integrated third party measurement and verification of program savings." (EPA Report, p. 18.) HECO is currently in its fourth cycle of independent evaluation of its DSM program impacts since 1996 and has proposed that for future evaluation cycles an independent third party evaluator be selected by the Commission through an RFP process (See HECO's response to DOD/HECO-IR-1-18).

The EPA Report also provided comments on specific DSM programs and HECO would like to take this opportunity to respond to them.

1. "It is important to target end uses that will aid with the immediate need for preserving reserve capacity." (EPA Report, p. 17.) In the Commercial and Industrial ("C&I") Energy Efficiency Program, 9 of the 12 measures focus on lighting and are expected to obtain 56% of the program's total energy savings and 58% of the total peak demand savings. In the C&I New Construction ("CINC") Program, 7 of the 10 prescriptive measures target lighting and are expected to capture 53% of the program's total energy savings and 48% of peak demand savings. Historically, lighting measures have represented about a third of the energy savings for the custom component of the CINC program. HECO also plans to file a modification to the current Residential Direct Load Control program to add the load control of air conditioners to the program, which will help to achieve additional peak demand savings.

2. "The 25% rebate levels and the suggested drop in the 2-year payback stipulation in the Custom Rebates program may raise concerns about the level of free-ridership." (EPA Report, p. 19.) HECO acknowledges the EPA Report's concerns and proposes to re-establish a lower payback threshold of one-year for the C&I Customized Rebate ("CICR") Program. While establishing different threshold levels for key measures as the EPA Report suggests would enable measures more widely adopted to be differentiated from measures not adopted as frequently, implementing those various threshold levels for CICR projects (which typically involve a number of measures) could be complex and could delay the DSM program application process and result in additional costs for the administration of the program.

3. "[A]n alternate model being used in several residential lighting programs is to offer rebates directly to the manufacturers of CFLs." (EPA Report, p. 21.) This may be one of the unique circumstances that differentiates Hawaii from the U.S. mainland. Manufacturers are far physically from Hawaii and, because of that, the traditional relationships established locally have been with distributors. Thus, for Hawaii, HECO has found that those local relationships with the distributors result in more productive marketing efforts.

The above responses to specific DSM program elements acknowledge that the EPA Report identified certain improvements that could be made and HECO will continue to evaluate program design and implementation to enhance program delivery.

Summary

The EPA Report provided thoughtful input on the issues in the subject docket, and the Companies have responded to the EPA Report in the areas of 1) Utility Incentives, 2) Lost Margin/Revenue Recovery, 3) Customer Energy Awareness Program, and 4) Energy Efficiency Market Potential and Program Design. The Companies look forward to a further discussion of all of the issues at the panel hearings scheduled for the week of August 28, 2006.

Sincerely,

Attachments

cc: Division of Consumer Advocacy
K. Davoodi
R. Young, Esq.
B. Moto, Esq.
H. Curtis
K. Datta
C. Freedman
R. Reed
W. Bollmeier II
J. Crouch
H. A. Dutch Achenbach
G. T. Aoki, Esq.
L. D. H. Nakazawa, Esq.

Exhibit A

National Action Plan for Energy Efficiency
and
Public Statements & Commitments in Support of the Action Plan

Table of Contents

Executive Summary 1

Chapter 1: Introduction and Background 1-1

Chapter 2: Utility Ratemaking & Revenue Requirements 2-1

Chapter 3: Energy Resource Planning Processes 3-1

Chapter 4: Business Case for Energy Efficiency 4-1

Chapter 5: Rate Design 5-1

Chapter 6: Energy Efficiency Program Best Practices 6-1

Appendix A: Additional Guidance on Removing the Throughput Incentive A-1

Appendix B: Business Case Details B-1

utilities, and other organizations can build. Experience shows that energy efficiency programs can lower customer energy bills, cost less than and help defer new energy infrastructure, provide energy savings to consumers, improve the environment, and spur local economic development (see box on Benefits of Energy Efficiency). Significant opportunities for energy efficiency are likely to continue to be available at low costs in the future. 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, savings from direct use of natural gas could provide a 50 percent or greater reduction in natural gas demand growth (Nadel et al., 2004).

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 could deliver a large part of these potential savings.[9] Extrapolating the results from existing programs to the entire country would yield annual energy bill savings of nearly $20 billion, with net societal benefits of more than $250 billion over the next 10 to 15 years. This scenario could defer the need for 20,000 megawatts (MW), or 40 new 500-MW power plants, as well as reduce U.S. emissions from energy production and use by more than 200 million tons of carbon dioxide, 50,000 tons of sulfur dioxide, and 40,000 tons of nitrogen oxides annually.[10] These significant economic and environmental benefits can be achieved relatively quickly because energy efficiency programs can be developed and implemented within several years.

Additional policies and programs are required to help capture these potential benefits and address our substantial underinvestment in energy efficiency as a nation. An important indicator of this underinvestment is that the level of funding across the country for organized efficiency programs is currently less than $2 billion per year while it would require about 4 times today's funding levels to achieve the economic and environment benefits presented above.[11, 12]

The current underinvestment in energy efficiency is due to a number of well-recognized barriers, including some of the regulatory policies that govern 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 energy efficiency for new buildings 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, and lack of funding to invest in energy efficiency.

- *Public policy barriers,* which can present prohibitive disincentives for utility support and investment in energy efficiency in many cases.

- *Utility, state, and regional 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 marketplace 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 lead-

opportunities to encourage customers to invest in efficiency where they find it to be cost effective and participate in new programs that provide innovative technologies (e.g., smart meters) to help customers control their energy costs.

National Action Plan for Energy Efficiency: Next Steps

In summer 2006, members of the Leadership Group of the National Action Plan on Energy Efficiency are announcing a number of specific activities and initiatives to formalize and reinforce their commitments to energy efficiency as a resource. To assist the Leadership Group and others in making and fulfilling their commitments, a number of tools and resources have been developed:

National Action Plan for Energy Efficiency Report. This report details the key barriers to energy efficiency in resource planning, utility incentive mechanisms, rate design, and the design and implementation of energy efficiency programs. It also reviews and presents a variety of policy and program solutions that have been used to overcome these barriers as well as the pros and cons for many of these approaches.

Energy Efficiency Benefits Calculator. This calculator can be used to help educate stakeholders on the broad benefits of energy efficiency. It provides a simplified framework to demonstrate the business case for energy efficiency from the perspective of the consumer, the utility, and society. It has been used to explore the benefits of energy efficiency program investments under a range of utility structures, policy mechanisms, and energy growth scenarios. The calculator can be adapted and applied to other scenerios.

Experts and Resource Materials on Energy Efficiency. A number of educational presentations on the potential for energy efficiency and various policies available for pursuing the recommendations of the Action Plan will be developed. In addition, lists of policy and program experts in energy efficiency and the various policies available for pursuing the recommendations of the Action Plan will be developed. These lists will be drawn from utilities, state utility regulators, state energy offices, third-party energy efficiency program administrators, consumer advocacy organizations, energy service companies, and others. These resources will be available in fall 2006.

The U.S. Department of Energy and U.S. Environmental Protection Agency are continuing to facilitate the work of the Leadership Group and the National Action Plan for Energy Efficiency. During winter 2006–2007, the Leadership Group plans to report on its progress and identify next steps for the Action Plan.

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 rate-making practices to promote energy efficiency investments.

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. *<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^{SM} 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^{SM} 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. <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*

tives for energy efficiency include a short-term resource acquisition horizon and wholesale market rules that do not capture the system value of energy efficiency. After an introduction to these barriers and solutions, this chapter will report on successful efforts in states to implement these solutions. The chapter closes with a set of recommendations for pursuing the removal of these barriers.

This chapter refers to utilities as integrated energy companies selling electricity as well as delivering it. Many of these concepts, however, also apply to states that removed retail electricity sales responsibilities from utilities—turning the utility into an electric transmission and distribution company without a retail sales function.

Barriers and Solutions to Effective Energy Efficiency Deployment

Common disincentives for utilities to invest more in cost-effective energy efficiency programs include the "throughput incentive," the lack of a mechanism for utilities to recover the costs of and provide funding for energy efficiency programs, and a lack of shareholder and other performance incentives to compete with those for investments in new generation.

Traditional Regulation Motivates Utilities to Sell More: The Throughput Incentive

Rates change with each major "rate case," the traditional and dominant form of state-level utility ratemaking.[2] Between rate cases, utilities have a financial incentive to increase retail sales of electricity (relative to forecast or historic levels, which set "base" rates) and to maximize the "throughput" of electricity across their wires. This incentive exists because there is often a significant incremental profit margin on incremental sales. When rates are reset, the throughput incentive resumes with the new base. In jurisdictions where prices are capped for an extended time, the utility might be particularly anxious to grow sales to add revenue to cover cost increases that may occur during the freeze.

With traditional ratemaking, there are few mechanisms to prevent "over-recovery" of costs, which occurs if sales are higher than projected, and no way to prevent "under-recovery," which can happen if forecast sales are too optimistic (such as when weather or regional economic conditions deviate from forecasted or "normal" conditions).[3]

This dynamic creates an automatic disincentive for utilities to promote energy efficiency, because those actions will reduce the utility's net income—even if energy efficiency is clearly established and agreed-upon as a less expensive means to meet customer needs as a least-cost resource and is valuable to the utility for risk management, congestion reduction, and other reasons (EPA, 2006). The effect of this disincentive is exacerbated in the case of distribution-only utilities, because the revenue impact of electricity sales reduction is disproportionately larger for utilities without generation resources. While some states have ordered utilities to implement energy efficiency, others have questioned the practicality of asking a utility to implement cost-effective energy efficiency when their financial self-interest is to have greater sales.

Several options exist to help remove this financial barrier to greater investment in energy efficiency:

Decouple Sales from Profits and Fixed Cost Recovery
Utilities can be regulated or managed in a manner that allows them to receive their revenue requirement with less linkage to sales volume. The point is to regulate utilities such that reductions in sales from consumer-funded

[2] Public power utilities and cooperative utilities have their own processes to adjust rates that does not require state involvment.

[3] Over-recovery means that more money is collected from consumers in rates than is needed to pay for allowed costs, including return on investment. This happens because average rates tend to collect more for sales in excess of projected demand than the marginal cost to produce and deliver the electricity for those increased sales. Likewise, under-recovery happens if sales are less than the amount used to set rates (Moskovitz, 2000).

Energy Efficiency Makes Wholesale Energy Markets Work Better

In the wholesale market venue, the value of energy efficiency would be revealed by a planning process that treats customer load as a manageable resource like supply and transmission, with investment in demand-side solutions in a way that is equivalent to (not necessarily the same as) supply and transmission solutions. Demand response and efficiency can be called forth that specifically reduces demand at peak times or in other strategic ways, or that reduces demand year-round.

Declare Energy Efficiency a Resource

To underscore the importance of energy efficiency, states can declare in statute or regulatory policy that energy efficiency is a resource and that utilities should factor energy efficiency into resource planning and acquisition. States concerned with risks on the supply side can also go one step further and designate that energy efficiency is the preferred resource.

Link Energy and Environmental Regulation

Environmental policy-makers have observed that energy efficiency is an effective and comparatively inexpensive way to meet tightening environmental limits to electric power generation, yet this attribute rarely factors into decisions by utility regulators about deployment of energy efficiency. This issue is discussed further in Chapter 3: Energy Resource Planning Processes.

State and Regional Examples of Successful Solutions to Energy Efficiency Deployment

Numerous states have previously addressed or are currently exploring energy efficiency electric and gas incentive mechanisms. Experiments in incentive regulation occurred through the mid-1990s but generally were overtaken by events leading to various forms of restructuring. States are expressing renewed interest in incentive regulation due to escalating energy costs and a recognition that barriers to energy efficiency still exist. Many state experiences are highlighted in the following text and Table 2-2.

Addressing the Throughput Disincentive

Direction Through Legislation

New Mexico offers a bold statutory statement directing regulation to remove barriers to energy efficiency: "It serves the public interest to support public utility investments in cost-effective energy efficiency and load management by removing any regulatory disincentives that may exist and allowing recovery of costs for reasonable and prudently incurred expenses of energy efficiency and load management programs" (New Mexico Efficient Use of Energy Act of 2005).

Decoupling Net Income from Sales

California adopted decoupling for its investor-owned companies as it restored utility responsibility for acquiring all cost-effective resources. The state has also required these companies to pursue all cost-effective energy efficiency at or near the highest levels in the United States. A balancing account collects forecasted revenues and rates are reset periodically to adjust for the difference between actual revenues and forecasts. Because some utility cost changes are factored into most decoupling systems, rate cases can become less frequent, since revenues and costs track more closely over time.[11]

[11] See, for example, orders in California PUC docket A02-12-027. http://www.cpuc.ca.gov/proceedings/A0212027.htm. Oregon had used this method successfully for PacifiCorp, but when the utility was acquired by Scottish Power, the utility elected to return to the more familiar regulatory form.

One device for implementing this policy is an energy efficiency supply curve. The California Energy Commission created such a curve based on an assessment of energy efficiency potential to provide guidance as it reintroduced energy efficiency procurement expectations for the utilities in 2003. Furthermore, the CPUC cooperated with the CEC to set energy savings targets for each of the California investor-owned utilities based on an assessment of cost-effectiveness potential.

A different approach to declaring energy efficiency a resource is to establish a portfolio or performance standard for energy efficiency. In 2005, **Pennsylvania** and **Connecticut** included energy efficiency in their resource portfolio standards. Requiring all retail sellers to acquire sufficient certificates of energy savings will allocate revenue to efficiency providers in an economically efficient way (Pennsylvania Alternative Energy Portfolio Standards Act of 2004; Connecticut Act Concerning Energy Independence of 2005).

As an outcome of its electric restructuring law, **Texas** is using energy efficiency as a resource to reduce demand. Texas' spending for energy efficiency is intended to produce savings to meet 10% of forecasted electric demand growth. Performance is exceeding this level.

Consider Energy Efficiency As a System Reliability Solution

In **New England**, Independent System Operator New England (ISO-NE) faced a reliability problem in southwest Connecticut. A transmission line to solve the problem was under development, but would not be ready in time. New central station generation could not be sited in this congested area. Because the marketplace was not providing a solution, ISO-NE issued a Request for Proposal (RFP) for any resources that would address the reliability problem and be committed for four years. One energy efficiency bid was selected—a commercial office building lighting project worth roughly 5 megawatts (MW). Conditions of the award were very strict about availability of the capacity savings. This project will help to demonstrate how energy efficiency does deliver capacity. While ISO-NE deemed the RFP an emergency step that it would not undertake routinely, this process demonstrates that energy efficiency can be important to meeting reliability goals and can be paid for through federal jurisdictional tariffs.

Other states, including **Indiana**, **Vermont**, and **Minnesota** direct that energy efficiency be considered as an alternative when utilities are proposing a power line project (Indiana Resource Assessment, 1995; Vermont Section 248; Minnesota Certificate of need for large energy facility, 2005.)

Key Findings

This chapter reviews opportunities to make energy efficiency an attractive business prospect by modifying electric and gas utility regulation and the way that utilities collect revenue and make a profit. Key findings of this chapter include:

- There are real financial disincentives that hinder all utilities in their pursuit of energy efficiency as a resource, even when it is cost-effective and would lead to a lower cost energy system. Regulation, which is a key source of these disincentives, can be modified to remove these barriers.

- Many states have experience in addressing financial disincentives in the following areas:

  — Overcoming the throughput incentive.

  — Providing reliable means for utilities to recover energy efficiency costs.

  — Providing a return on investment for efficiency programs that is competitive with the return utilities earn on new generation.

  — Addressing the risk of program costs being disallowed and other risks.

  — Recognizing the full value of energy efficiency to the utility system.

- Communicating the role of energy efficiency in lowering customer energy bills and system costs and risks over time.

Recommendation: Provide sufficient, timely, and stable program funding to deliver energy efficiency where cost-effective. Energy efficiency programs require consistent and long-term funding to effectively compete with energy supply options. Efforts are necessary to establish this consistent long-term funding. A variety of mechanisms have been and can be used based on state, utility, and other stakeholder interests. It is important to ensure that the efficiency programs providers have sufficient long-term funding to recover program costs and implement the energy efficiency measures that have been demonstrated to be available and cost-effective. A number of states are now linking program funding to the achievement of energy savings.

Options to Consider:

- Deciding on and committing to a consistent way for program administrators to recover energy efficiency costs in a timely manner.

- Establishing funding mechanisms for energy efficiency from among the available options such as revenue requirement or resource procurement funding, system benefits charges, rate-basing, shared-savings, incentive mechanisms, etc.

- Establishing funding for multi-year periods.

References

Barone, R.J. (2006, May 23). Presentation to the Rethinking Natural Gas Utility Rate Design Conference, Columbus, Ohio.

California Energy Commission [CEC]. (2005, July). Implementing California's Loading Order for Electricity Resources.

California Public Utility Commission [CPUC]. (1996, December 20). Opinion on Cost Recovery Plans, CPUC D.96-12-077.

California SB 1037, California Statutes of 2005. Chapter 366. (2005) <http://info.sen.ca.gov/pub/bill/sen/sb_1001-1050/sb_1037_bill_20050929_chaptered.html>.

Connecticut, An Act Concerning Energy Independence, Public Act No. 05-1 (House Bill No. 7501) (2005). <http://www.cga.ct.gov/asp/cgabillstatus/cgabillstatus.asp?selBillType=Bill&bill_num=7501&which_year=2005>.

Costello, K. (2006, April). *Revenue Decoupling for Natural Gas Utilities*. National Regulatory Research Institute. <http://www.nrri.ohio-state.edu/NaturalGas/revenue-decoupling-for-natural-gas-utilities/>.

Hansen, D.G. and Braithwait, S.D. (2005, March 31). *A Review of Distribution Margin Normalization as Approved by the Oregon Public Utility Commission for Northwest Natural*. Madison, Wisconsin: Christensen Associates Consulting.

Harrington, C. (2003, May). *Who Should Deliver Ratepayer Funded Energy Efficiency?* Regulatory Assistance Project. <http://www.raponline.org/showpdf.asp?PDF_URL="Pubs/RatePayerFundedEE/RatePayerFundedEEPartI.pdf">.

Indiana Resource Assessment, Indiana Administrative Code [IAC]. 170 IAC 4-7-6, Resource assessment. (1995) <http://www.in.gov/legislative/iac/T01700/A00040.PDF>.

Kantor, G. (2006, June 20). Presentation to the 2006 Western Conference of Public Service Commissioners, Jackson, Wyoming.

Minnesota, Certificate of need for large energy facility, Minnesota Statutes. Chapt. 216B.243(3) (2005). <http://www.revisor.leg.state.mn.us/stats/216B/243.html>.

Moskovitz, D. (2000). *Profits and Progress Through Distributed Resource.* Regulatory Assistance Project. <http://www.raponline.org/showpdf.asp?PDF_URL=Pubs/General/ProfitsandProgressdr.pdf>.

Nevada, Regulation of Public Utilities Generally. Nevada Administrative Code 704.9523: Costs of implementing programs for conservation and demand management: Accounting; recovery. (2004) <http://www.leg.state.nv.us/NAC/NAC-704.html#NAC704Sec9523>.

NERA Economic Consulting. (2006, April 20). *Distributed Resources: Incentives.* <http://www.energetics.com/madri/pdfs/nera_042406.pdf>.

New Mexico, Efficient Use of Energy Act, New Mexico Statutes. Chapt. 62-17-2 and Chapt. 62-17-3 (2005).

Pennsylvania Alternative Energy Portfolio Standards Act, Pennsylvania Act No. 213 (SB 1030) (2004). <http://www.legis.state.pa.us/WU01/LI/BI/BT/2003/0/SB1030P1973.HTM>.

Plunkett, J., Horowitz, P., Slote, S. (2005). *Rewarding Successful Efficiency Investment in Three Neighboring States: The Sequel, the Re-make and the Next Generation (In Vermont, Massachusetts and Connecticut)* A 2004 ACEEE Summer Study on Energy Efficiency in Buildings. <http://www.aceee.org/conf/04ss/panel5.htm>.

U.S. Environmental Protection Agency [EPA] (2006). *Clean Energy-Environment Guide to Action: Policies, Best Practices, and Action Steps for States* (Section 6.2). Washington, DC.

Vermont Section 248. 30 Vermont Statutes Annotated § 248, 4 (A)(b). New gas and electric purchases, investments, and facilities; certificate of public good. <http://www.leg.state.vt.us/statutes/fullsection.cfm?Title=30&Chapter=005&Section=00248>.

2005 Wisconsin Act 141 (2005 Senate Bill 459). <http://www.legis.state.wi.us/2005/data/acts/05Act141.pdf>

The analysis commonly used to value energy efficiency compares the costs of energy efficiency resources to the costs of the resources that are displaced by energy efficiency. The sidebar shows the categories of benefits for electric and gas utilities that are commonly evaluated. The approach is to forecast expected future costs with and without energy efficiency resources and then estimate the level of savings that energy efficiency will provide. This analysis can be conducted with varying levels of sophistication depending on the metrics used to compare alternative resource plans. Typically, the evaluation is made based on the expected cost difference; however, "portfolio" approaches also evaluate differences in cost variance and reliability, which can provide additional rationale for including energy efficiency as a resource.

The resource benefits of energy efficiency fall into two general categories:

(1) Energy-related benefits that affect the procurement of wholesale electric energy and natural gas, and delivery losses.

(2) Capacity-related benefits that affect wholesale electric capacity purchases, construction of new facilities, and system reliability.

The energy-related benefits of energy efficiency are relatively easy to forecast. Because utilities are constantly adjusting the amount of energy purchased, short-term deviations in the amount of energy efficiency achieved can be accommodated. The capacity-related benefits occur when construction of a facility needed to reliably serve customers can be delayed or avoided because the need has already been met. Therefore, achieving capacity benefits requires much more certainty in the future success of energy efficiency programs (particularly the measures targeting peak loads) and might be harder to achieve in practice. However, the ability to provide capacity benefits has been a focus in California, the Pacific Northwest, and other regions, and it should become easier to assess capacity savings as more programs gain experience, and capacity savings are measured and verified. Current methods for estimating energy benefits and capacity benefits are presented below.

Estimating Energy Benefits

Estimating energy benefits requires established methods for estimating the quantity of energy savings and the benefits of these savings to the energy system.

- *Estimating Quantity of Energy Savings.* Savings estimates for a wide variety of efficiency measures have been well studied and documented. Approaches to estimate the level of free-riders and program participants who would have implemented the energy efficiency on their own have been established. Similarly, the expected useful lives of energy efficiency measures and their persistence are commonly evaluated and included in the analysis. Detailed databases of efficiency measures have been developed for several regions, including California and the Pacific Northwest. However, it is often necessary to investigate and validate the methods and assumptions behind those estimates to build consensus around measured savings that all stakeholders find credible. Savings estimates can be verified through measurements and load research. Best practices for measurement and verification (M&V) are discussed in more detail in Chapter 6: Energy Efficiency Program Best Practices.

Benefits of Energy Efficiency in Resource Planning

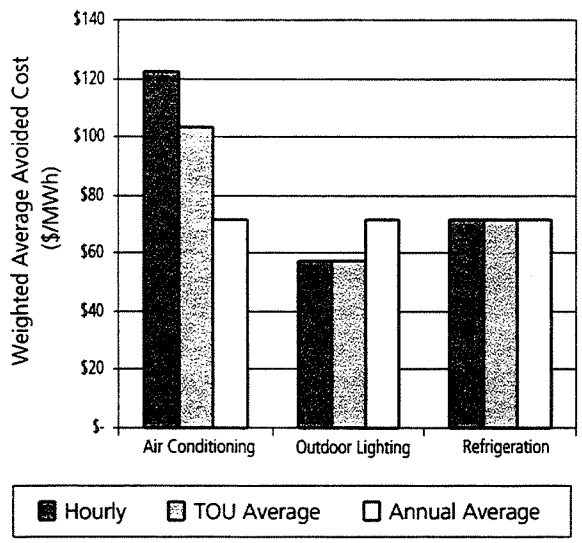
	Electricity	Natural Gas
Energy-related benefits	Reduced wholesale energy purchases	Reduced wholesale natural gas purchases
	Reduced line losses	Reduced losses and unaccounted for gas
	Reduced air emissions	Reduced air emissions
Capacity-related benefits	Generation capacity / resource adequacy / regional markets	Production and liquified natural gas facilities
	Operating reserves and other ancillary services	Pipeline capacity
	Transmission and distribution capacity	Local storage and pressure
Other benefits	Market price reductions (consumer surplus)	
	Lower portfolio risk	
	Local / in-state jobs	
	Low-income assistance and others	

ond factor is estimating the "equivalent reliability" of the load reduction. This measure captures both the probability that the savings will actually occur and that the savings will occur during system-constrained hours. Applying estimates of equivalent reliability to various types of resources allows comparison on an equal basis with traditional capacity investments. This approach is similar in concept to the equivalent capacity factor used to compare renewable resources such as wind and solar with traditional fossil-fueled generation. In markets where capacity is purchased, "counting" rules for different resource types determine the equivalent reliability. The probability that savings will actually occur during peak periods is easier to estimate with some certainty for a large number of distributed efficiency measures (e.g., air conditioners) as opposed to a limited number of large, centralized measures (e.g., water treatment plants).

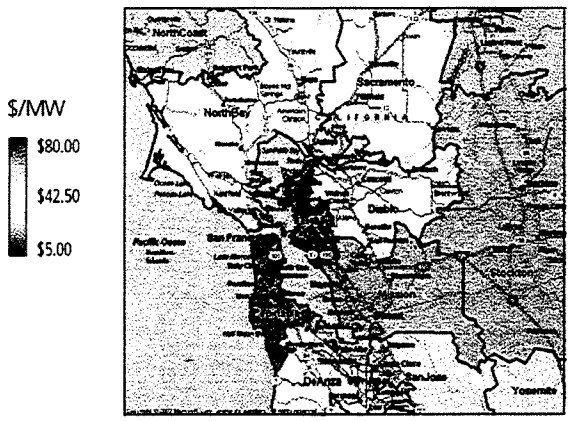
California Avoided Costs by Time and Location

California is a good example of the effect of area and time-differentiation for efficiency measures that have dramatically different impact profiles. The average avoided cost for efficiency (including energy and capacity cost components) in California is $71/megawatt-hour (MWh). Applying avoided costs for each of six time of use (TOU) periods (super-peak, mid-peak and off-peak for summer and winter seasons) increases the value of air conditioning to $104/MWh or 45 percent and lowers the value of outdoor lighting to $57/MWh or 20 percent. Refrigeration, with its consistent load profile throughout the day and year, is unaffected. Applying avoided costs by hour captures the extreme summer peak prices and increases the value of air conditioning savings still further to $123/MWh. Incorporating hourly avoided costs increases the total benefits of air conditioning load reduction by more than $50/MWh. This type of hourly analysis is currently being used in California's avoided cost proceedings for energy efficiency.

Comparison of Avoided Costs for Three Implementation Approaches



Greater San Francisco Bay Area Avoided Distribution Costs



Avoided distribution capacity costs are also estimated by region in California. The Greater San Francisco Bay Area region is shown above in detail. In San Francisco and Oakland, avoided capacity costs are low because those areas are experiencing little load growth and have little need for new distribution investment. The Stockton area, on the other hand, is experiencing high growth and has significant new distribution infrastructure requirements.

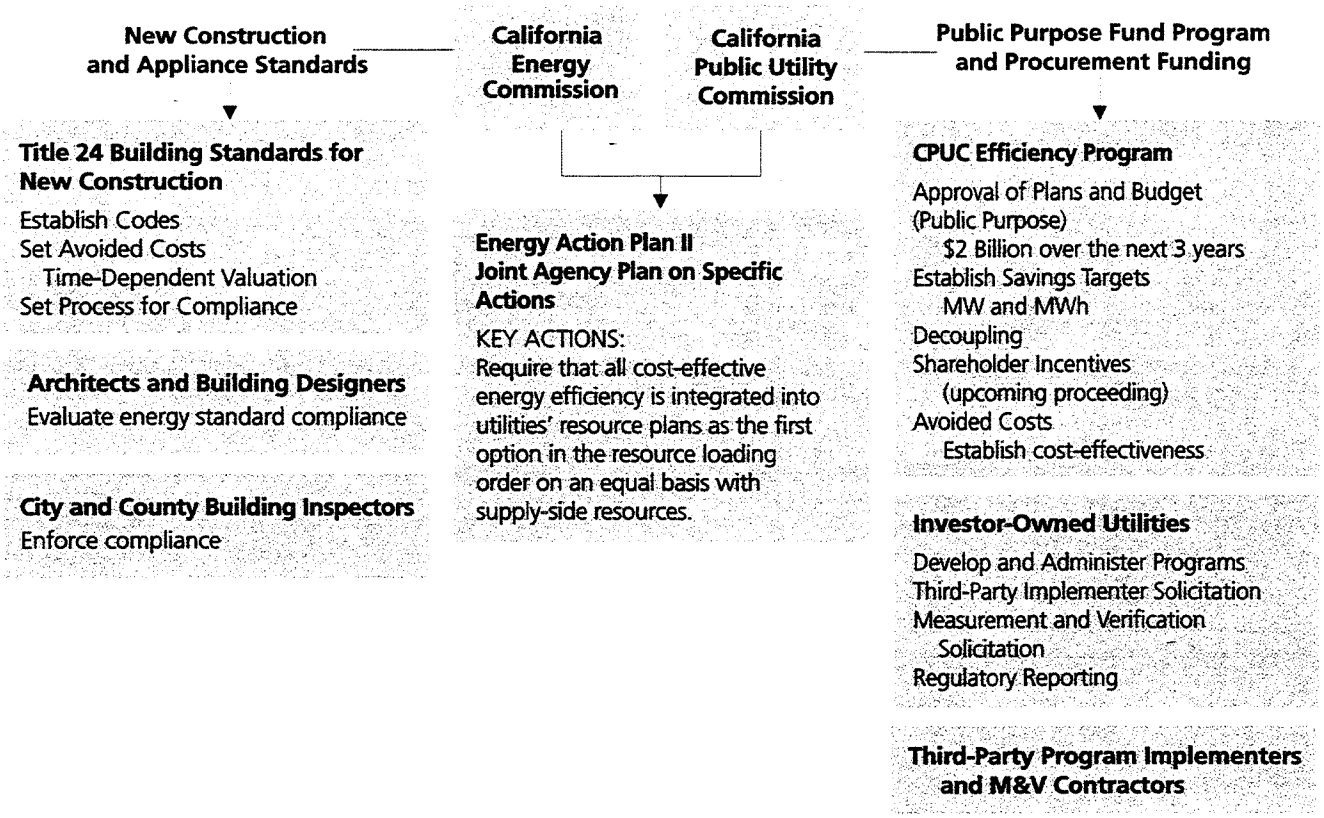
California

California has had a continued commitment to energy efficiency since the late 1970s. Two major efforts are currently being coordinated in the state that address energy use in new buildings as well as efficiency upgrades in existing buildings. Figure 3-2 shows the policy structure, with the California Energy Commission (CEC) leading the building codes and standards process, and the California Public Utility Commission (CPUC) leading the investor-owned utility and third-party administered efficiency programs. Jointly, the agencies publish the Energy Action Plan that explicitly states a goal to integrate "all cost-effective energy efficiency." Recently, the CPUC approved an efficiency budget of $2 billion over the next three years to serve a population of approximately 35 million.

The process for designing and implementing efficiency programs in California by the investor-owned utilities is to develop the programs (either by the utility or through third-party solicitation), evaluate cost-effectiveness, establish and gain approval for the program funding, and evaluate the program's success through measurement and verification. Figure 3-2 illustrates this approach.

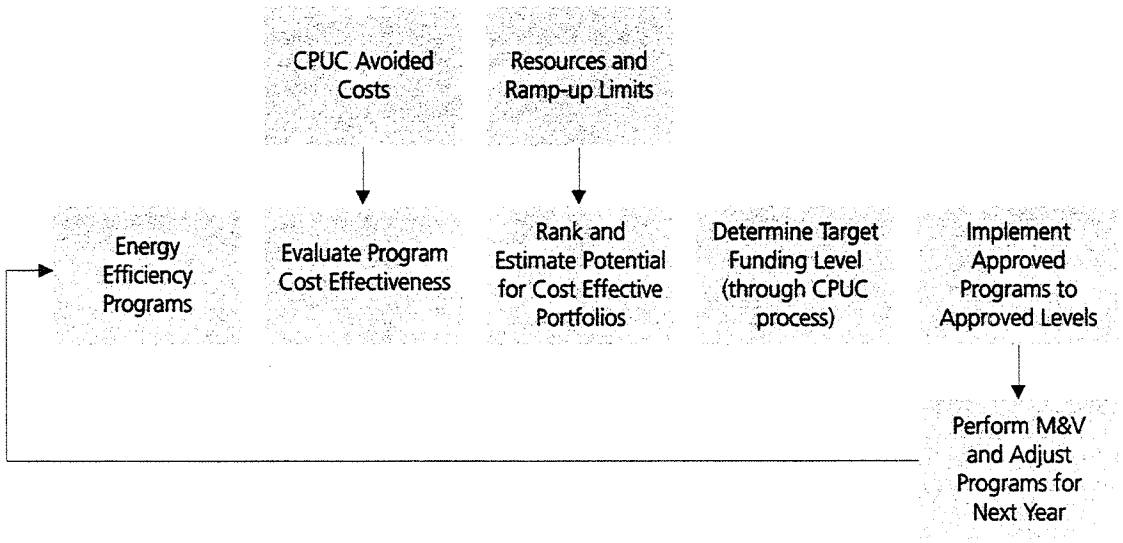
Table 3-2 describes how California addresses barriers for incorporating energy efficiency in planning for the investor-owned utility process.

Figure 3-2. California Efficiency Structure Overview



Source: Energy and Environmental Economics, Inc.

Figure 3-3. California Investor-Owned Utility Process



Source: Energy and Environmental Economics, Inc.

Table 3-2. Incorporation of Energy Efficiency in California's Investor-Owned Utilities' Planning Processes

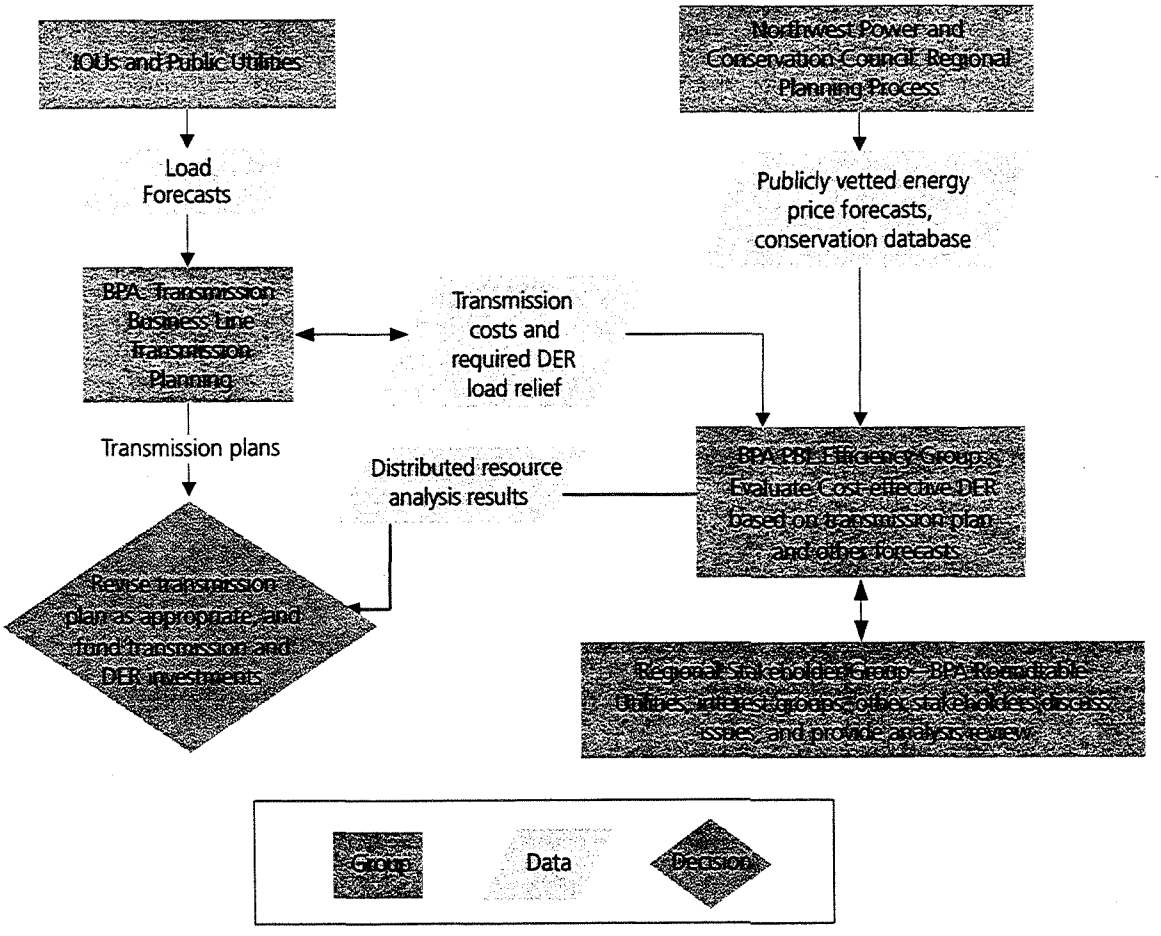
Barriers	California CPUC-Administered Programs
A. Determining the Value of Energy Efficiency	
Energy Procurement	
Estimated energy savings	Customer adoption rates are forecast into the energy efficiency plans with monthly or quarterly reporting of program success for tracking.
Valuing energy savings	Energy savings are based on market prices of future electricity and natural gas, adjusted by loss factors. Emission savings are based on expected emission rates of marginal generating plants in each hour (electricity) or emissions for natural gas.
Capacity & Resource Adequacy	
Estimating capacity savings	Capacity savings are evaluated using the load research data for each measure.
Valuing capacity benefits	Each capacity-related value is estimated by climate zone of the state and incorporated into an "all-in" energy value. Transmission and distribution capacity for electricity is allocated based on weather in each climate zone, and by season for natural gas. California's energy market (currently) includes both energy and capacity so there is no explicit capacity value for electric generation.
Factors in achieving benefits	Capacity benefits are based on the best forecast of achieved savings. There is no explicit link between forecasted benefits of energy efficiency and actual capacity savings.
Other Benefits	
Incorporating non-energy benefits	Non-energy benefits are considered in the development of the portfolio of energy efficiency, but not explicitly quantified in the avoided cost calculation.
B. Setting Targets and Allocating Budget	
Quantity of energy efficiency to implement	CPUC has approved budget and targets for the state's efficiency programs, which are funded through both a public purpose charge and procurement funding.
Estimating program effectiveness	A portion of the public purpose funds are dedicated to evaluation, measurement, and verification with the goal of improving the understanding and quantification of savings and benefit estimates.
Institutional difficulty in reallocating budget	By using public purpose funds, budget doesn't have to be reallocated from other functions for energy efficiency.
Cost expenditure timing vs. benefits	Capacity benefits are based on the best forecast of achieved savings.
Ensuring the program costs are recaptured	CPUC requires that the utilities integrate energy efficiency into their long-term procurement plans to address this issue.

Bonneville Power Administration Transmission Planning and Regional Roundtable

In the Northwest, BPA has been leading an industry roundtable to work with distribution utilities, local and state government, environmental interests, and other stakeholders to incorporate energy efficiency and other distributed energy resources (DER) into transmission planning. DER includes energy efficiency as well as distribution generation and other nonwires solutions. Figure 3-4 illustrates the analysis approach and data sources. Within BPA, the Transmission Business Line (TBL) works with the energy efficiency group in Power Business Line (PBL) to develop an integrated transmission plan. The process includes significant stakeholder contributions in both input data assumptions (led by NWPCC) and in reviewing the overall analysis at the roundtable.[8]

Table 3-3 describes how BPA works with stakeholders to address barriers for incorporating energy efficiency in planning processes.

Figure 3-4. BPA Transmission Planning Process



Source: Energy and Environmental Economics, Inc.

[8] NWPCC conducts regional energy efficiency planning. More information can be found at <www.nwcouncil.org>.

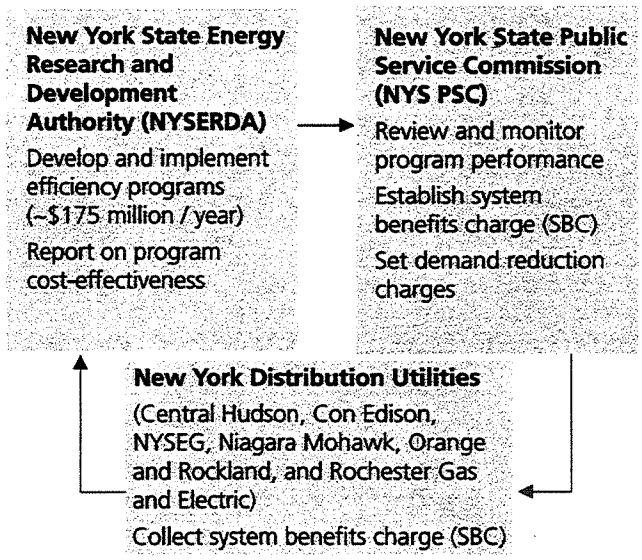
Table 3-3. Incorporation of Energy Efficiency in BPA's Planning Processes	
Barriers	**BPA-Administered Programs**
A. Determining the Value of Energy Efficiency	
Energy Procurement	
Estimated energy savings	The process uses the NWPCC database to define the measure impact and costs. NWPCC maintains a publicly available regional efficiency database that is well regarded and has its own process for stakeholder collaboration. Adoption rates are estimated based on a range of historical program success.
Valuing energy savings	Energy savings are valued based on the NWPCC long-run forecast of energy value for the region, plus marginal losses.
Capacity & Resource Adequacy	
Estimating capacity savings	Capacity savings are based on expected NWPCC efficiency measure coincident peak impacts.
Valuing capacity benefits	The deferral value of transmission investments is used to evaluate the transmission capacity value, which is the focus of these studies. The approach is to calculate the difference in present value revenue requirement before and after the energy efficiency investment (Present Worth Method).
Factors in achieving benefits	The BPA energy efficiency and transmission planning staff work together to ensure that the revised plan with Non-Construction Alternatives (NCAs) satisfies reliability criteria. Ultimately the decision to defer transmission and rely on NCAs will be approved by transmission planning.
Other Benefits	
Incorporating non-energy benefits	The analysis includes an evaluation of the environmental externalities, but no other non-energy benefits.
B. Setting Targets and Allocating Budget	
Quantity of energy efficiency to implement	The target for NCAs is established by the amount of load that must be reduced to defer the transmission line and maintain reliability. This target is driven by the load growth forecasts of the utilities in the region.
Estimating program effectiveness	BPA has been doing demonstrations and pilots of high-potential NCAs to refine the estimates of program penetration, cost, necessary timeline for achieving load reductions, customer acceptance, and other factors. The results of these pilots will help to refine the estimates used in planning studies.
Institutional difficulty in reallocating budget	If NCAs have lower cost than transmission, transmission capital budget will be reallocated to support NCA investments up to the transmission deferral value. Additional costs of NCAs that are justified based on energy value are supported by other sources (BPA energy efficiency, local utility programs, and customers).
Cost expenditure timing vs. benefits	Both transmission and NCAs require upfront investments so there is no significant time lag between costs and benefits. The transmission savings benefit is achieved concurrently with the decision to defer the transmission investment. Energy benefits, on the other hand, occur over a longer timeframe and are funded like other energy efficiency programs.
Ensuring the program costs are recaptured	By developing an internal planning process to reallocate budget, it is easier to ensure that the savings occur.

New York State Energy Research and Development Authority (NYSERDA)

In the mid-1990s, New York restructured the electric utilities and moved responsibility for implementing energy efficiency programs to the NYSERDA. The following figure shows an overview of the NYSERDA process. The programs are funded through the SBC funds (approximately $175 million per year), and NYSERDA reports on the program impact and cost-effectiveness to the New York State Public Service Commission (NYS PSC) annually.

Table 3-4 describes how NYSERDA addresses the barriers to implementing energy efficiency.

Figure 3-5. New York Efficiency Structure Overview



Source: Energy and Environmental Economics, Inc.

Commission. CIP is the primary mechanism by which the electric utilities achieve the conservation targets included in their integrated resource plans.

The Department of Commerce conducts a biennial review of the CIP plan for each investor-owned utility. Interested parties may file comments and suggest alternatives before the department issues a decision approving or modifying the utility's plan. Utilities that meet or exceed the energy savings goals established by the Department of Commerce receive a financial bonus, which they are permitted to collect through a rate increase. Both electric utilities have exceeded their goals for the last several years. Table 3-5 describes how the Minnesota Department of Commerce addresses barriers to implementing energy efficiency.

Table 3-5. Incorporation of Energy Efficiency in Minnesota's Planning Processes

Barriers	Minnesota-Administered Programs
A. Determining the Value of Energy Efficiency	
Energy Procurement	
Estimating energy savings	Energy savings and avoided costs are determined independently by each utility, resulting in a wide range of estimates that are not consistent. Energy costs are considered a trade secret and not disclosed publicly.
Valuing energy savings	
Capacity & Resource Adequacy	
Estimating capacity savings	Capacity savings and avoided costs are determined independently by each utility, resulting in a wide range of estimates that are not consistent. Power plant, transmission, and distribution costs are considered trade secrets and are not disclosed publicly.
Valuing capacity benefits	
Factors in achieving benefits	There is no direct link between the forecasted capacity savings and the actual change in utility procurement budgets.
Other Benefits	
Incorporating non-energy benefits	Differences in the utilities' valuation methods produce varying estimates. In addition, the Department of Commerce incorporates an externality avoided cost in the electric societal cost benefit test, providing utilities with values in $/ton for several emissions, which the utilities translate to amounts in $/MWh based on each utility's emissions profile.
B. Setting Targets and Allocating Budget	
Quantity of energy efficiency to implement	The Department of Commerce approves budget and targets for each utility. Funding levels are determined by state law, which requires 0.5 percent to 2 percent of utility revenues be dedicated to conservation programs, depending on the type of utility.
Estimating program effectiveness	Program effectiveness is handled by each utility. Minnesota's IOUs rely on the software tools DSManager and BENCOST to measure electric and gas savings respectively.
Institutional difficulty in reallocating budget	Budget is not reallocated from other functions. Funding is obtained via a surcharge on customer bills.
Cost expenditure timing vs. benefits	By using a percentage of revenue set-aside, utility customers are directly financing the program; therefore timing of benefits is not critical.
Ensuring the program costs are recaptured	State law requires that each utility file an IRP with the Public Utilities Commission. The conservation plans approved by the Department of Commerce are the primary mechanism by which utilities meet conservation targets included in their IRPs.

Texas

Texas Senate Bill 7 (1999), enacted in the 1999 Texas legislature, mandates that at least 10 percent of an investor-owned electric utility's annual growth in electricity demand be met through energy efficiency programs each year. The Public Utility Commission of Texas (PUCT) Substantive Rule establishes procedures for meeting this legislative mandate, directing the transmission and distribution (T&D) utilities to hire third-party energy efficiency providers to deliver energy efficiency services to every customer class, using "deemed savings" estimates for each energy efficiency measure (PUCT, 2000). Approved program costs are included in the IOU's transmission and distribution rates, and expenditures are reported separately in the IOU's annual energy efficiency report to the PUCT. Actual energy and capacity savings are verified by independent experts chosen by the PUCT. Incentives are based on prescribed avoided costs, which are set by the

can explicitly evaluate the change in power plant investment and impact of such factors as re-dispatch due to transmission constraints, variation in load growth, and other factors. But these models are analytically complex and planning must be tightly integrated with other utility planning functions to accurately assess savings. These challenges can and have been overcome in different ways in regions with a long track-record of energy efficiency programs (e.g., California, BPA, New York).

— Estimating non-energy benefits is an emerging approach in many jurisdictions. Depending on the jurisdiction, legislation and regulatory commission policies might expressly permit and even require the consideration of non-energy benefits in cost-effectiveness determinations. However, specific guidelines regarding the quantification and inclusion of non-energy benefits are still under discussion or in development in most jurisdictions. The consideration of both non-energy and capacity benefits of energy efficiency programs is relatively new, compared to the long history of valuing energy savings.

- *A Clear Path to Funding Is Needed to Establish a Budget for Energy Efficiency Resources.* There are three main approaches to funding energy efficiency investments: 1) utility resource planning processes, 2) public purpose funding, and 3) a combination of both. In a utility resource planning process, such as the BPA non-construction alternatives process, efficiency options for meeting BPA's objectives are compared to potential supply-side investments on an equal basis when allocating the available budget. In this type of resource planning process, budget is allocated to efficiency measures from each functional area according to the benefits provided by efficiency programs. The advantage of this approach is that the budget for efficiency is linked directly to the savings it can achieve; however, particularly in the case of capacity-related benefits, which have critical timing and load reduction targets to maintain reliability, it is a difficult process.

The public purpose funding and system benefits charge approaches in New York, Minnesota, and other states are an alternative to budget reallocation within the planning process. In California, funding from both planning processes and public purpose funding is used. Public purpose funds do not have the same direct link to energy savings, so programs might not capture all the savings attributed to the program. Funding targets might be set before available efficiency options have been explored, so if other cost-effective efficiency measures are later identified, additional funding might not be available. This situation can result in customer costs being higher than they would have been if all cost-effective efficiency savings opportunities had been supported. Using public purpose funding significantly simplifies the planning process, however, and puts more control over the amount of energy efficiency in the control of regulators or utility boards. As compared to resource planning, far less time and effort are required on the part of regulators or legislators to direct a specific amount of funding to cost-effective efficiency programs.

- *Integrate Energy Efficiency Early in the Resource Planning Process.* In order to capture the full value of deferring the need for new investments in capacity, energy efficiency must be integrated early in the planning process. This step will avoid sunk investment associated with longer lead-time projects. Efficiency should also be planned to target investments far enough into the future so that energy efficiency programs have the opportunity to ramp up and provide sufficient load reduction. This timeline will allow the utility to build expertise and establish a track record for energy efficiency as well as be able to monitor peak load reductions. Starting early also allows time to gain support of the traditional project proponents before they are vested in the outcome.

- Providing for frequent updates to energy resource plans to accommodate new information and technology.

Recommendation: Broadly communicate the benefits of and opportunities for energy efficiency. Experience shows that energy efficiency programs help customers save money and contribute to lower cost energy systems. But these benefits are not fully documented nor recognized by customers, utilities, regulators, or policymakers. More effort is needed to establish the business case for energy efficiency for all decision-makers and to show how a well-designed approach to energy efficiency can benefit customers, utilities, and society by (1) reducing customers' bills over time, (2) fostering financially healthy utilities (e.g., return on equity, earnings per share, and debt coverage ratios unaffected), and (3) contributing to positive societal net benefits overall. Effort is also necessary to educate key stakeholders that although energy efficiency can be an important low-cost resource to integrate into the energy mix, it does require funding just as a new power plant requires funding.

Options to Consider:

- Establishing and educating stakeholders on the business case for energy efficiency at the state, utility, and other appropriate level addressing customer, utility, and societal perspectives.

- Communicating the role of energy efficiency in lowering customer energy bills and system costs and risks over time.

Recommendation: Provide sufficient, timely, and stable program funding to deliver energy efficiency where cost-effective. Energy efficiency programs require consistent and long-term funding to effectively compete with energy supply options. Efforts are necessary to establish this consistent long-term funding. A variety of mechanisms has been and can be used based on state, utility, and other stakeholder interests. It is important to ensure that the efficiency programs providers have sufficient long-term funding to recover program costs and implement the energy efficiency measures that have been demonstrated to be available and cost-effective. A number of states are now linking program funding to the achievement of energy savings.

Options to Consider:

- Deciding on and committing to a consistent way for program administrators to recover energy efficiency costs in a timely manner.

- Establishing funding mechanisms for energy efficiency from among the available options such as revenue requirements or resource procurement funding, system benefits charges, rate-basing, shared-savings, incentive mechanisms, etc.

- Establishing funding for multi-year periods.

References:

American Council for an Energy Efficient Economy [ACEEE] (2006, February). *Energy Efficiency Resource Standards: Experience and Recommendations.* <http://aceee.org/pubs/eo63.htm>.

Bokenkamp, K., LaFlash, H., Singh V., and Wang, D. (2005, July). Hedging Carbon Risk: Protecting Customers and Shareholders from the Financial Risk Associated with Carbon Dioxide Emissions. *The Electricity Journal.* 10(6):11–24.

California Public Utilities Commission [CPUC]. (2005, April 7). *Interim Opinion On E3 Avoided Cost Methodology.* Order Instituting Rulemaking to Promote Consistency in Methodology and Input Assumptions in Commission Applications of Short-Run and Long-run Avoided Costs, Including Pricing for Qualifying Facilities. Rulemaking 04-04-025 (Filed April 22, 2004). <http://www.ethree.com/CPUC/45195.pdf>.

Frontier Associates (2005, November 1). *Energy Efficiency Accomplishments on the Texas Investor Owned Utilities (Calendar Year 2004).*

McAluliffe, P. (2003, June 20). Presentation to the California Energy Commission.

New York State Energy Research and Development Authority [NYSERDA] (2005, May). New York Energy $martSM Program Cost-Effectiveness Assessment. Albany, New York.

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

Pacific Gas & Electric Company [PG&E] (2005, June). *2006-2008 Energy Efficiency Program Portfolio, Volume I, Prepared Testimony.*

PacifiCorp. (2005, January). *2004 Integrated Resource Plan.* <www.pacificorp.com/Navigation/Navigation23807.html>

Public Utilities Commission of Texas [PUCT]. (2000, March). *Substantive Rule §25.181. Energy Efficiency Goal.* <http://www.puc.state.tx.us/rules/subrules/electric/25.181/25.181.pdf>

Texas Senate Bill 7, Section 39.905 (1999) <http://www.capitol.state.tx.us/cgi-bin/tlo/textframe.cmd?LEG=76&SESS=R&CHAMBER=S&BILLTYPE=B&BILLSUFFIX=00007&VERSION=5&TYPE=B>

Vermont Public Service Board (2005, July 20). Docket 7081: Investigation into Least-Cost Integrated Resource Planning for Vermont Electric Power Company, Inc.'s Transmission System.

net efficiency costs and pollutant emissions. The business cases were developed using an Energy Efficiency Benefits Calculator (Calculator) that facilitates evaluation of the financial impact of energy efficiency on its major stakeholders—utilities, customers, and society. The Calculator allows users to examine efficiency investment scenarios across different types of utilities using transparent input assumptions (see Appendix B for detailed inputs and results).[1] Policies evaluated with the Calculator are discussed in more detail in Chapter 2: Utility Ratemaking & Revenue Requirements and Chapter 3: Energy Resource Planning Processes.

Eight business cases are presented to illustrate the impact of comprehensive energy efficiency programs on utilities, their customers, and society. The eight cases represent a range of utility types under different growth and investment situations. Each case compares the consequences of three scenarios—no energy efficiency programs without a decoupling mechanism, energy efficiency without decoupling, and energy efficiency with decoupling. Energy efficiency spending was assumed to be equal to 2 percent of electricity revenue and 0.5 percent of natural gas revenue across cases, regardless of the decoupling assumption; these assumptions are similar to many of the programs being managed in regions of the country today.[2] In practice, decoupling and shareholder incentives often lead to increased energy efficiency investments by utilities, increasing customer and societal benefits.

Business Cases Evaluated

Cases 1 and 2: Investor-Owned Electric and Natural Gas Utilities
- Case 1: Low-Growth
- Case 2: High-Growth

Cases 3 and 4: Electric Power Plant Deferral
- Case 3: Low-Growth
- Case 4: High-Growth

Cases 5 and 6: Investor-Owned Electric Utility Structure
- Case 5: Vertically-Integrated Utility
- Case 6: Restructured Delivery-Only Utility

Cases 7 and 8: Publicly- and Cooperatively-Owned Electric Utilities
- Case 7: Minimum Debt Coverage Ratio
- Case 8: Minimum Cash Position

Table 4-1 provides a summary of main assumptions and results of the business cases.

Table 4-1 summarizes assumptions about the utility size, energy efficiency program, and each business case. All values shown compare the savings with and without energy efficiency over a 15-year horizon. The present value calculations are computed over 30 years, to account for the lifetime of the energy efficiency investments over 15 years.

[1] The Calculator was designed to assess a wide variety of utility types using easily obtainable input data. It was not designed for applications requiring detailed data for specific applications such as rate setting, comparing different types of energy efficiency policies, cost-effectiveness testing, energy efficiency resource planning, and consumer behavior analysis.

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

[3] Cumulative and net present value business case results are calculated using a 5 percent discount rate over 30 years to include the project life term for energy efficiency investments of 15 years. All values are in nominal dollars with net present value (NPV) reported in 2007 dollars (year 1 = 2007). Consistent rates are assumed in year 0 and then adjusted by the Calculator for case-specific assumptions. Reductions in utility revenue requirement do not change with decoupling in the Calculator, but might in practice if decoupling motivates the utility to deliver additional energy efficiency. In these cases, societal benefits conservatively equals only the savings from reduced wholesale electricity purchases and capital expenditures minus utility and participant costs of energy efficiency. Energy efficiency program costs given in $/MWh for electric utilities and $/MMBtu for gas utilities.

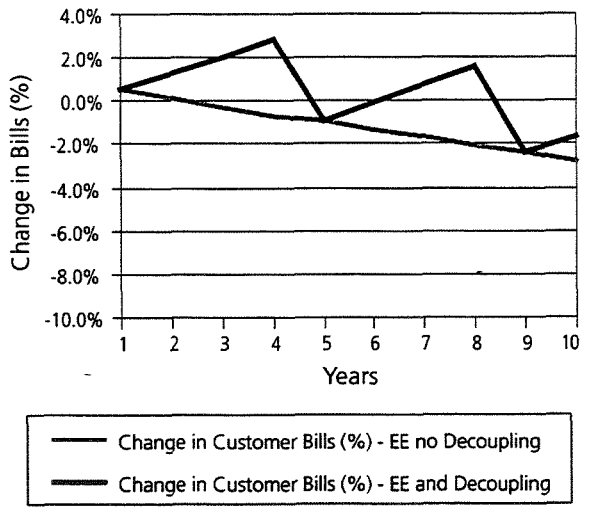
Table 4-3. High- and Low-Growth Results: Natural Gas Utility (continued)

Case 1: Low-Growth (0%)

Customer Bills

Total customer bills with energy efficiency decline over time, indicating customer savings resulting from lower energy consumption. Customer utility bills initially increase slightly with decoupling as rates are increased to hold ROE at target level and spending increases on efficiency.

Percent Change in Customer Bills



Case 2: High-Growth (2%)

Customer Bills

Customer utility bills with energy efficiency reflect the more limited impact of efficiency programs on rate profile. Total customer bills decline over time, indicating customer savings resulting from lower energy consumption.

Percent Change in Customer Bills

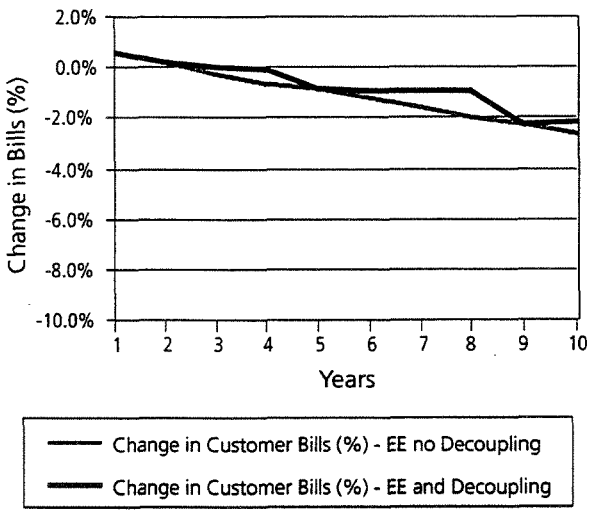


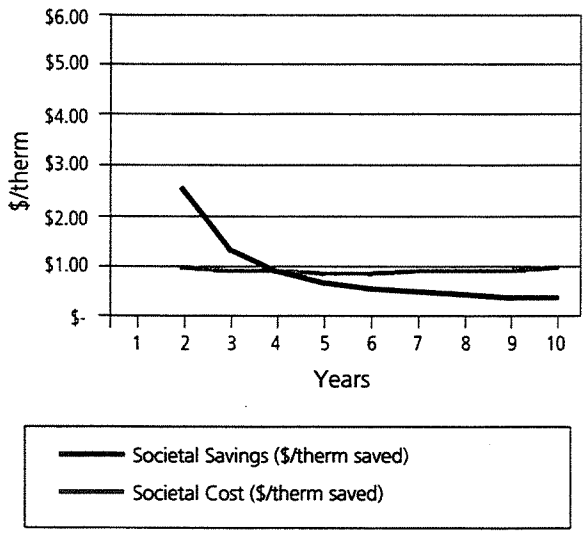
Table 4-3. High- and Low-Growth Results: Natural Gas Utility (continued)

Case 1: Low-Growth (0%)

Net Societal Benefits

Over time, the savings from energy efficiency exceed the annual costs. The societal cost and societal savings are the same with and without decoupling.

Delivered Costs and Benefits of EE

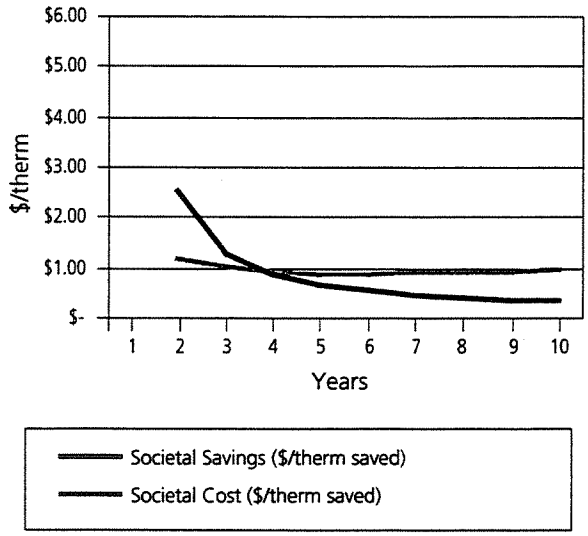


Case 2: High-Growth (2%)

Net Societal Benefits

Over time, the savings from energy efficiency exceed the annual costs. The societal cost and societal savings are the same with and without decoupling.

Delivered Costs and Benefits of EE



Cases 5 and 6: Vertically-Integrated Utility vs. Restructured Delivery Company

In this example, a vertically-integrated electric utility (Case 5) is compared with the restructured electric delivery company (Case 6); both experiencing a 2 percent growth rate and investing 2 percent of revenue in energy efficiency. These cases assume that the vertically-integrated utility has more capital assets and larger annual capital expenditures than a restructured delivery utility.

In general, the financial impact of energy efficiency on delivery utilities is more pronounced than on vertically-integrated utilities with the same number of customers and sales. Once divested of a generation plant, the distribution utility is a smaller company (in terms of total rate base and capitalization), and fluctuations in throughput and earnings have a relatively larger impact on return.

Table 4-5 summarizes the comparison of ROE, rates, bills and societal benefits. Without implementing energy efficiency, both utilities are relatively financially healthy achieving near their target rate of return in each year; however, introducing energy efficiency reduces ROE and earnings for both utilities unless a decoupling mechanism is put in place. Customer rates increases, bill savings, and societal benefits follow similar trends with energy efficiency as discussed in Cases 1 and 2.

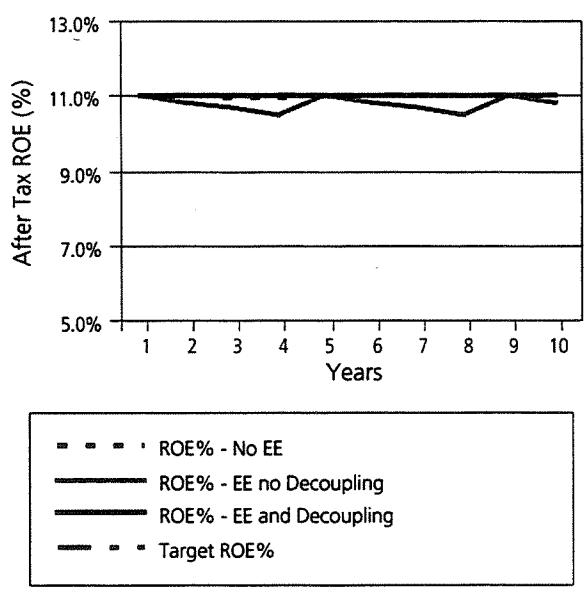
Table 4-5. Vertically Integrated and Delivery Company Results

Case 5: Vertically-Integrated

Return on Equity (ROE)

Because the vertically integrated utility has a large rate base, the impact of energy efficiency upon total earnings is limited and it has little impact upon ROE (with or without decoupling).

Investor-Owned Utility Comparison of Return on Equity



Case 6: Delivery Utility

Return on Equity (ROE)

With a smaller rate base and revenues only from kWh deliveries, energy efficiency has a larger impact on a ROE without decoupling than a vertically-integrated utility.

Investor-Owned Utility Comparison of Return on Equity

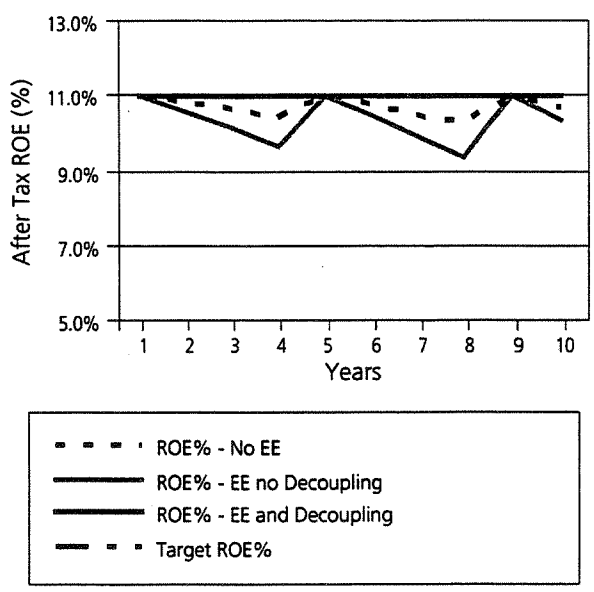


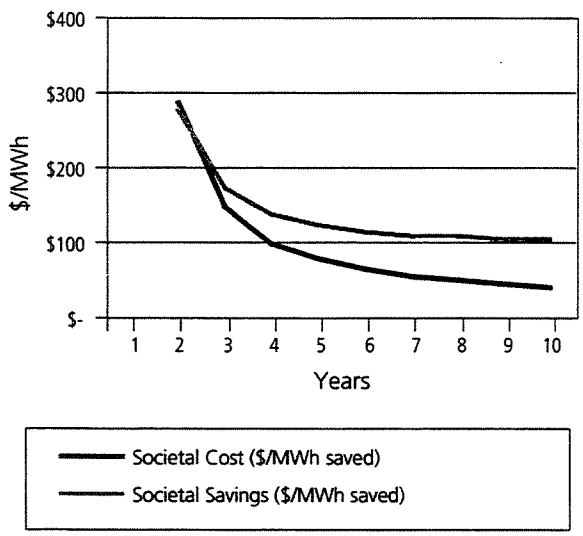
Table 4-5. Vertically Integrated and Delivery Company Results (continued)

Case 5: Vertically-Integrated

Net Societal Benefits

Over time, the savings from energy efficiency exceed the annual costs. The societal cost and societal savings are the same with and without decoupling.

Delivered Costs and Benefits of EE

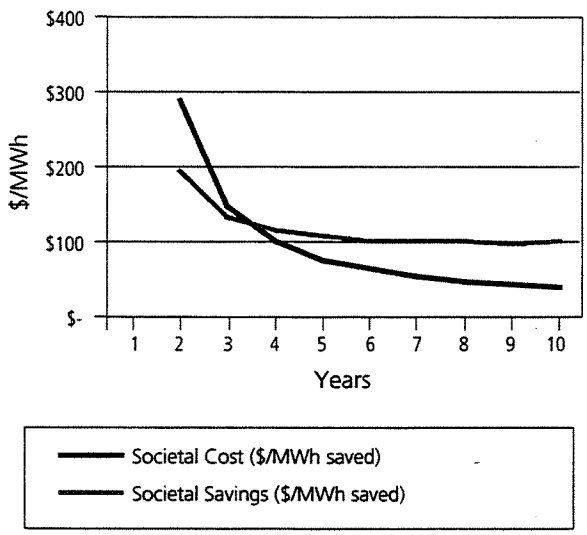


Case 6: Delivery Utility

Net Societal Benefits

As with the vertically integrated utility, savings from energy efficiency exceed the costs over time. The distribution utility has a lower initial societal savings because the distribution company reduces fewer capital expenditures at the outset of the energy efficiency investments. Over time, the societal costs and savings are similar as for the distribution company.

Delivered Costs and Benefits of EE



energy efficiency agencies to promote energy efficiency, 2) increasing awareness of energy issues and risks regarding future energy prices, and 3) the entrance of new energy agents promoting energy efficiency.

Key Findings

This chapter summarizes the challenges and opportunities for employing rate designs to encourage utility promotion and customer adoption of energy efficiency. Key findings of this chapter include:

- Rate design is a complex process that balances numerous regulatory and legislative goals. It is important to recognize the promotion of energy efficiency in the balancing of objectives.

- Rate design offers opportunities to encourage customers to invest in efficiency where they find it to be cost-effective and to participate in new programs that provide innovative technologies (e.g., smart meters) to help customers control their energy costs

- Utility rates that are designed to promote sales or maximize stable revenues tend to lower the incentive for customers to adopt energy efficiency.

- Rate forms like declining block rates, or rates with large fixed charges reduce the savings that customers can attain from adopting energy efficiency.

- Appropriate rate designs should consider the unique characteristics of each customer class. Some general rate design options by customer class are listed below.

  — *Residential.* Inclining tier block rates. These rates can be quickly implemented for all residential and small commercial and industrial electric and gas customers. At a minimum, eliminate declining tier block rates. As metering costs decline, also explore dynamic rate options for residential customers.

  — *Small Commercial.* Time of use rates. While these rates might not lead to much change in annual usage, the price signals can encourage customers to consume less energy when energy is the most expensive to produce, procure, and deliver.

  — *Large Commercial and Industrial.* Two-part rates. Two-part rates provide bill stability and can be established so that the change in consumption through adoption of energy efficiency is priced at marginal cost. The complexity in establishing historical baseline quantities might limit the application of two-part rates to the larger customers on the system.

  — *All Customer Classes.* Seasonal price differentials. Higher prices during the higher cost peak season encourage customer conservation during the peak and can reduce peak load growth. For example, higher winter rates can encourage the purchase of more efficient space heating equipment.

- Energy efficiency can be promoted through non-tariff mechanisms that reach customers through their utility bill. Such mechanisms include:

  — *Benefit Sharing programs.* Benefit sharing programs can resolve situations where normal customer bill savings are smaller than the cost of energy efficiency programs.

  — *On-Bill Financing.* Financing support can help customers overcome the upfront costs of efficiency devices.

  — *Energy Efficiency Rebate Programs.* Programs that offer discounts to customers who reduce their energy consumption, such as the 20/20 rebate program in California, offer clear incentives to customers to focus on reducing their energy use.

- More effort is needed to communicate the benefits and opportunities for energy efficiency to customers, regulators, and utility decision-makers.

Recommendations and Options

The National Action Plan for Energy Efficiency Leadership Group offers the following recommendations as ways to overcome many of the barriers to energy efficiency in rate design and provides a number of options for consideration by utilities, regulators, and stakeholders *(as presented in the Executive Summary):*

Recommendation: Modify ratemaking practices to promote energy efficiency investments. Rate design offers opportunities to encourage customers to invest in efficiency where they find it to be cost-effective and to participate in new programs that bring them innovative technologies (e.g., smart meters) to help them control their energy costs.

Options to Consider:

- Including the impact on adoption of energy efficiency as one of the goals of retail rate design, recognizing that it must be balanced with other objectives.

- Eliminating rate designs that discourage energy efficiency by not increasing costs as customers consume more electricity or natural gas.

- Adopting rate designs that encourage energy efficiency, considering the unique characteristics of each customer class and including partnering tariffs with other mechanisms that encourage energy efficiency, such as benefit sharing programs and on-bill financing.

Recommendation: Broadly communicate the benefits of and opportunities for energy efficiency. Experience shows that energy efficiency programs help customers save money and contribute to lower cost energy systems. But these impacts are not fully documented nor recognized by customers, utilities, regulators and policymakers. More effort is needed to establish the business case for energy efficiency for all decision-makers and to show how a well-designed approach to energy efficiency can benefit customers, utilities, and society by (1) reducing customers bills over time, (2) fostering financially healthy utilities (return on equity, earnings per share, debt coverage ratios unaffected), and (3) contributing to positive societal net benefits overall. Effort is also necessary to educate key stakeholders that although energy efficiency can be an important low-cost resource to integrate into the energy mix, it does require funding just as a new power plant requires funding. Further, education is necessary on the impact that energy efficiency programs can have in concert with other energy efficiency policies such as building codes, appliance standards, and tax incentives.

Option to Consider:

- Communicating on the role of energy efficiency in lowering customer energy bills and system costs and risks over time.

Table 6-1. Overview of Energy Efficiency Programs

Policy Model/ Examples	Funding Type	Shareholder Incentive	Lead Administrator	Role in Resource Acquisition	Scope of Programs	Political Context
SBC with utility implementation: • California • Rhode Island • Connecticut • Massachusetts	Separate charge	Usually	Utility	Depends on whether utility owns generation	Programs for all customer classes	Most programs of this type came out of a restructuring settlement in states where there was an existing infrastructure at the utilities
SBC with state or third-party implementation: • New York • Vermont • Wisconsin	Separate charge	No	State agency Third party	None or limited	Programs for all customer classes	Most programs of this type came out of a restructuring settlement
IRP or gas planning model: • Nevada • Arizona • Minnesota • BPA (regional planning model as well) • Vermont Gas • Keyspan	Varies: in rates, capitalized, or separate charge	In some cases	Utility	Integrated	Program type dictated by resource need	Part of IRP requirement; may be combined with other models
RFP model for full-scale programs and congestion relief	Varies	No	Utility buys from third party	Integrated – can be T&D only	Program type dictated by resource need	Connecticut and Con Edison going out to bid to reduce congestion
Portfolio standard model (can be combined with SBC or IRP): • Nevada • California • Connecticut • Texas	Varies	Varies	Utility may implement programs or buy to meet standard	Standard portfolio	Programs for all customer classes	Generally used in state with existing programs to increase program activity
Municipal utility & electric cooperative: • SMUD (CA) • City of Austin (TX) • Great River Energy (MN)	In rates	No	Utility	Depends on whether utility owns generation	Programs for all customer classes	Based on customer and resource needs; can be similar to IRP model

- *Leadership* at multiple levels is needed to establish the business case for energy efficiency, educate key stakeholders, and enact policy changes that increase investment in energy efficiency as a resource. Sustained leadership is needed from:

  - Key individuals in upper management at the utility who understand that energy efficiency is a resource alternative that can help manage risk, minimize long-term costs, and satisfy customers.

  - State agencies, regulatory commissions, local governments and associated legislative bodies, and/or consumer advocates that expect to see energy efficiency considered as part of comprehensive utility management.

  - Businesses that value energy efficiency as a way to improve operations, manage energy costs, and contribute to long-term energy price stability and availability, as well as trade associations and businesses, such as Energy Service Companies (ESCOs), that help members and customers achieve improved energy performance.

  - Public interest groups that understand that in order to achieve energy efficiency and environmental objectives, they must help educate key stakeholders and find workable solutions to some of the financial challenges that limit acceptance and investment in energy efficiency by utilities.[4]

- *Organizational alignment.* With policies in place to support energy efficiency programming, organizations need to institutionalize policies to ensure that energy efficiency goals are realized. Factors contributing to success include:

  - Strong support from upper management and one or more internal champions.

  - A framework appropriate to the organization that supports large-scale implementation of energy efficiency programs.

  - Clear, well-communicated program goals that are tied to organizational goals and possibly compensation.

  - Adequate staff resources to get the job done.

  - A commitment to continually improve business processes.

- *Understanding of the efficiency resource* creates the business case for energy efficiency. Best practices include the following:

  - Conduct a "potential study" prior to starting programs to inform and shape program and portfolio design.

  - Outline what can be accomplished at what costs.

  - Review measures appropriate to all customer classes including those appropriate for hard-to-reach customers, such as low income and very small business customers.

Developing an Energy Efficiency Plan

An energy efficiency plan should reflect a long-term perspective that accounts for customer needs, program cost-effectiveness, the interaction of programs with other policies that increase energy efficiency, the opportunities for new technology, and the importance of addressing multiple system needs including peak load reduction and congestion relief. Best practices include the following:

- Offer programs for all key customer classes.

- Align goals with funding.

4 Public interest groups include environmental organizations such as the National Resources Defense Council (NRDC), Alliance to Save Energy (ASE), and American Council for an Energy Efficient Economy (ACEEE) and regional market transformation entities such as the Northeast Energy Efficiency Partnerships (NEEP), Southwest Energy Efficiency Project (SWEEP), and Midwest Energy Efficiency Alliance (MEEA).

- Outlining what can be accomplished at what costs.
- Reviewing measures appropriate to all customer classes including those appropriate for hard-to-reach customers, such as low income and very small business customers.
- Ensuring that potential state and federal codes and standards are modeled for and included in evaluation scenarios
- Developing scenarios for relevant time periods.

In addition, an emerging best practice is to conduct uncertainty analysis on savings estimates, as well as other variables such as cost.

With study results in hand, program administrators are well positioned to develop energy efficiency goals, identify program measures and strategies, and determine funding requirements to deliver energy efficiency programs to all customers. Information from a detailed potential study can also be used as the basis for calculating program cost-effectiveness and determining measures for inclusion during the program planning and design phase. Detailed potential studies can provide information to help determine which technologies are replaced most frequently and are therefore candidates to deliver early returns (e.g., an efficient light bulb), and how long the savings from various technologies persist and therefore will continue to deliver energy savings. For example, an energy efficient light bulb might last six years, whereas an efficient residential boiler might last 20 years. (Additional information on measure savings and lifetimes can be found in *Resources and Expertise*, a forthcoming product of the Action Plan Leadership Group.)

Developing an Energy Efficiency Plan

The majority of organizations reviewed for this chapter are acquiring energy efficiency resources for about $0.03/lifetime kWh for electric programs and about $1.30 to $2.00 per lifetime MMBtu for gas program (as shown previously in Tables 6-1 and 6-2). In many cases, energy efficiency is being delivered at a cost that is substantially less than the cost of new supply—on the order of half the cost of new supply. In addition, in all cases where information is available, the costs of saved energy are less than the avoided costs of energy. These organizations operate in diverse locations under different administrative and regulatory structures. They do, however, share many similar best practices when it comes to program planning, including one or more of the following:

- Provide programs for all key customer classes.
- Align goals with funding.
- Use cost-effectiveness tests that are consistent with long-term planning.
- Consider building codes and appliance standards when designing programs.
- Plan for developing and incorporating new technology.
- Consider efficiency investments to alleviate transmission and distribution constraints.
- Create a roadmap that documents key program components, milestones, and explicit energy reduction goals.

Provide Programs for all Customer Classes

One concern sometimes raised when funding energy efficiency programs, is that all customers are required to contribute to energy efficiency programming, though not all customers will take advantage of programs once they are available, raising the issue that non-participants subsidize the efficiency upgrades of participants.

While it is true that program participants receive the direct benefits that accrue from energy efficiency upgrades, all customer classes benefit from well-managed energy efficiency programs, regardless of whether or not they participate directly. For example, an evaluation of the New York State Energy Research and Development Authority's (NYSERDA's) program portfolio

concluded that: "Total cost savings for all customers, including non participating customers [in the New York Energy $mart Programs] is estimated to be $196 million for program activities through year-end 2003, increasing to $420 to $435 million at full implementation" (NYSERDA, 2004).

In addition, particularly for programs that aim to accelerate market adoption of energy efficiency products or services, there is often program "spillover" to non program participants. For example, an evaluation of National Grid's Energy Initiative, Design 2000plus, and small commercial and industrial programs, found energy efficient measures were installed by non-participants due to program influences on design professionals and vendors. The analysis indicated that "non-participant spillover from the programs amounted to 12,323,174 kWh in the 2001 program year, which is approximately 9.2 percent of the total savings produced in 2001 by the Design 2000plus and Energy Initiative programs combined" (National Grid, 2002).

Furthermore, energy efficiency programming can help contribute to an overall lower cost system for all customers over the longer term by helping avoid the need to purchase energy or the need to build new infrastructure such as generation, transmission and distribution lines. For example:

- The Northwest Power Planning and Conservation Council found in its Portfolio Analysis that strategies that included more conservation had the least cost and the least risk (measured in dollars) relative to strategies that included less conservation. The most aggressive conservation case had an expected system cost of $1.8 billion lower and a risk factor of $2.5 billion less than the strategy with the least conservation (NPPC, 2005).

- In its 2005 analysis of energy efficiency and renewable energy on natural gas consumption and price, ACEEE states, "It is important to note that while the direct benefits of energy efficiency investment flow to participating customers, the benefits of falling prices accrue to all customers." Based on their national scenario of cost-effective energy efficiency opportunities, ACEEE found that total costs for energy efficiency would be $8 billion and result in consumer benefits of $32 billion in 2010 (Elliot & Shipley, 2005).

- Through cost-effective energy efficiency investments in 2004, Vermonters reduced their annual electricity use by 58 million kWh. These savings, which are expected to continue each year for an average of 14 years, met 44 percent of the growth in the state's energy needs in 2004 while costing ratepayers just 2.8 cents per kWh. That cost is only 37 percent of the cost of generating, transmitting, and distributing power to Vermont's homes and businesses (Efficiency Vermont, 2004).

- The Massachusetts Division of Energy noted that cumulative impact on demand from energy efficiency measures installed from 1998 to 2002 (excluding reductions from one-time interruptible programs) was significant—reducing demand by 264 MW. During the summer of 2002, a reduction of this magnitude meant avoiding the need to purchase $19.4 million worth of electricity from the spot market (Massachusetts, 2004).

Despite evidence that both program participants and non-participants can benefit from energy efficiency programming, it is a best practice to provide program opportunities for all customer classes and income levels. This approach is a best practice because, in most cases, funding for efficiency programs comes from all customer classes, and as mentioned above, program participants will receive both the indirect benefits of system-wide savings and reliability enhancements, and the direct benefits of program participation.

All program portfolios reviewed for this chapter include programs for all customer classes. Program administrators usually strive to align program funding with spending based on customer class contributions to funds. It is not uncommon, however, to have limited cross-subsidization for (1) low-income, agricultural, and other hard-to-reach customers; (2) in cases where budgets limit

achievable potential and the most cost-effective energy efficiency savings are not aligned with customer class contributions to energy efficiency funding; and (3) in cases where energy efficiency savings are targeted geographically based on system needs—for example, air conditioner turn-ins or greater new construction incentives that are targeted to curtail load growth in an area with a supply or transmission and distribution need. For programs targeting low-income or other hard-to-reach customers, it is not uncommon for them to be implemented with a lower benefit-cost threshold, as long as the overall energy efficiency program portfolio for each customer class (i.e., residential, commercial, and industrial) meets cost-effectiveness criteria.

NYSERDA's program portfolio is a good example of programs for all customer classes and segments (see Table 6-5).

Table 6-5. NYSERDA 2004 Portfolio

Sector	Program	% of Sector Budget
Residential	Small Homes	23%
	Keep Cool	19%
	ENERGY STAR Products	20%
	Program Marketing	16%
	Multifamily	10%
	Awareness/Other	12%
Low Income	Assisted Multifamily	59%
	Assisted Home Performance	17%
	Direct Install	8%
	All Other	16%
Business	Performance Contracting	36%
	Peak Load Reduction	12%
	Efficient Products	9%
	New Construction	23%
	Technical Assistance	10%
	All Other	10%

Nevada Power/Sierra Pacific Power Company's portfolio provides another example with notable expansion of program investments in efficient air conditioning, ENERGY STAR appliances, refrigerator collection, and renewable energy investments within a one-year timeframe (see Table 6-6).

Align Goals with Funding

Regardless of program administrative structure and policy context, it is a best practice for organizations to align funding to explicit goals for energy efficiency over the near-term and long-term. How quickly an organization is able to ramp up programs to capture achievable potential can vary based on organizational history of running DSM programs and the sophistication of the marketplace in which a utility operates (i.e., whether there is a network of home energy raters, energy service companies, or certified heating, ventilation, and cooling [HVAC] contractors).

Utilities or third-party administrators should set long-term goals for energy efficiency designed to capture a significant percentage of the achievable potential energy savings identified through an energy efficiency potential study. Setting long-term goals is a best practice for administrators of energy efficiency program portfolios regardless of policy models and whether they are an investor-owned or a municipal or cooperative utility, or a third-party program administrator. Examples of how long-term goals are set are provided as follows:

- In states where the utility is responsible for integrated resource planning (the IRP Model), energy efficiency must be incorporated into the IRP. This process generally requires a long-term forecast of both spending and savings for energy efficiency at an aggregated level that is consistent with the time horizon of the IRP—generally at least 10 years. Five- and ten-year goals can then be developed based on the resource need. In states without an SBC, the budget for energy efficiency is usually a revenue requirement expense item, but can be a capital investment or a combination of the two. (As discussed in Chapter 2: Utility Ratemaking & Revenue Requirements, capitalizing efficiency program investments rather than expensing them can reduce short-term rate impacts.)

Table 6-6. Nevada Resource Planning Programs

	2005 Budget	2006 Budget
Air Conditioning Load Management	$3,450,000	$3,600,000
High-Efficiency Air Conditioning	2,600,000	15,625,000
Commercial Incentives	2,300,000	2,800,000
Low-Income Support	1,361,000	1,216,000
Energy Education	1,205,000	1,243,000
ENERGY STAR Appliances	1,200,000	2,050,000
School Support	850,000	850,000
Refrigerator Collection	700,000	1,915,000
Commercial New Construction	600,000	600,000
Other – Miscellaneous & Technology	225,000	725,000
Total Nevada Resource Planning Programs	$14,491,000	$30,624,000
SolarGenerations	1,780,075	7,220,000
Company Renewable - PV	1,000,000	1,750,000
California Program	370,000	563,000
Sierra Natural Gas Programs		820,000
Total All Programs	$17,641,075	$40,977,000

- Municipal or cooperative utilities that own generation typically set efficiency goals as part of a resource planning process. The budget for energy efficiency is usually a revenue requirement expense item, a capital expenditure, or a combination of the two.

- A resource portfolio standard is typically set at a percentage of overall energy or demand with program plans and budgets developed to achieve goals at the portfolio level. The original standard can be developed based on achievable potential from a potential study or as a percentage of growth from a base year.

- In most SBC models, the funding is determined by a small volumetric charge on each customer's utility bill. This charge then is used as a basis for determining the overall budget for energy efficiency programming—contributions by each customer class are used to inform the proportion of funds that should be targeted to each customer class. Annual goals are then based on these budgets and a given program portfolio. Over time, the goal of the program should be to capture a large percentage of achievable potential.

- In most gas programs, funding can be treated as an expense, in a capital budget, or a combination (as is the case in some of the electric examples shown previously). Goals are based on the budget developed for the time period of the plan.

Once actual program implementation starts, program experience is usually the best basis for developing future budgets and goals for individual program years.

Use Cost-Effectiveness Tests That Are Consistent with Long-Term Planning

All of the organizations reviewed for this chapter use cost-effectiveness tests to ensure that measures and programs are consistent with valuing the benefits and costs

of their efficiency investments relative to long-term supply options. Most of the organizations reviewed use either the total resource cost, societal, or program administrator test (utility test) to screen measures. None of the organizations reviewed for this chapter used the rate impact measure (RIM) test as a primary decision-making test.[5] The key cost-effectiveness tests are described as follows, per Swisher, et al. (1997), with key benefits and costs further illustrated in Table 6-7.

- *Total Resource Cost (TRC) Test.* Compares the total costs and benefits of a program, including costs and benefits to the utility and the participant and the avoided costs of energy supply.

- *Societal Test.* Similar to the TRC Test, but includes the effects of other societal benefits and costs such as environmental impacts, water savings, and national security.

- *Utility/Program Administrator Test.* Assesses benefits and costs from the program administrator's perspective (e.g., benefits of avoided fuel and operating capacity costs compared to rebates and administrative costs).

- *Participant Test.* Assesses benefits and costs from a participant's perspective (e.g., the reduction in customers' bills, incentives paid by the utility, and tax credits received as compared to out-of-pocket expenses such as costs of equipment purchase, operation, and maintenance).

- *Rate Impact Measure (RIM).* Assesses the effect of changes in revenues and operating costs caused by a program on customers' bills and rates.

Another metric used for assessing cost-effectiveness is the cost of conserved energy, which is calculated in cents per kWh or dollars per metric cubic foot (Mcf). This measure does not depend on a future projection of energy prices and is easy to calculate, however, it does not fully capture the future market price of energy.

An overall energy efficiency portfolio should pass the cost-effectiveness test(s) of the jurisdiction. In an IRP situation, energy efficiency resources are compared to new supply-side options–essentially the program administrator or utility test. In cases where utilities have divested generation, a calculated avoided cost or a wholesale market price projection is used to represent the generation benefits. Cost-effectiveness tests are appropriate to screen out poor program design and identify programs in markets that have been transformed and might need to be redesigned to continue. Cost-effectiveness analysis is important but must be supplemented by other aspects of the planning process.

If the TRC or Societal tests are used, "other resource benefits" can include environmental benefits, water savings, and other fuel savings. Costs include all program costs (administrative, marketing, incentives, and evaluation) as well as customer costs. Future benefits from emissions trading (or other regulatory approaches that provide payment for emission credits) could be treated as additional benefits in any of these models. Other benefits of programs can include job impacts, sales generated, gross state product added, impacts from wholesale price reductions, and personal income (Wisconsin, 2006; Massachusetts, 2004).

At a minimum, regulators require programs to be cost-effective at the sector level (residential, commercial, and industrial) and typically at the program level as well. Many program administrators bundle measures under a single program umbrella when, in reality, measures are delivered to customers through different strategies and marketing channels. This process allows program administrator to adjust to market realities during program implementation. For example, within a customer class or segment, if a high-performing and well-subscribed program or measure is out-performing a program or measure that is not meeting program targets, the program administrator can redirect resources without seeking additional regulatory approval.

[5] The RIM test is viewed as less certain than the other tests because it is sensitive to the difference between long-term projections of marginal or market costs and long-term projections of rates (CEC, 2001).

- *Innovative rates and regulation.* Regulations are needed to provide adequate incentives for energy efficiency investments to both suppliers and customers.

- *Innovative markets.* Market design must ensure that energy efficiency and load response measures that are advanced by regulation become self-sustaining in the marketplace.

- *Smart end-use devices.* Smart devices are able to respond to price signals and facilitate the management of the energy use of individual and networked appliances.

In addition, the use of open architecture systems is the only long-term way to take existing non-communicating equipment into an energy-efficient future that can use two-way communications to monitor and diagnose appliances and equipment.

Consider Efficiency Investments to Alleviate Transmission and Distribution Constraints

Energy efficiency has a history of providing value by reducing generation investments. It should also be considered with other demand-side resources, such as demand response, as a potential resource to defer or avoid investments in transmission and distribution systems. Pacific Gas and Electric's Model Energy Communities Project (the Delta Project) provides one of the first examples of this approach. This project was conceived to test whether demand resources could be used as a least cost resource to defer the capital expansion of the transmission and distribution system in a constrained area. In this case, efforts were focused on the constrained area, and customers were offered versions of existing programs and additional measures to achieve a significant reduction on that specific area (PG&E, 1993). A recently approved settlement at Federal Energy Regulatory Commission allows energy efficiency along with load response and distributed generation to participate in the Independent System Operator (ISO) New England Forward Capacity Market (FERC, 2006; FERC, 2005). In addition, Consolidated Edison has successfully used an RFP approach to defer distribution upgrades in four substation areas with contracts totaling 45 MW. Con Ed is currently in a second round of solicitations for 150 MW (NAESCO, 2005). Recent pilots using demand response, energy efficiency, and intelligent grid are proving promising as shown in the BPA example in the box on page 6-29.

If a utility is looking at deferring transmission and distribution investments, the benefits and costs of energy efficiency and other demand resources are compared to the cost of deferring or avoiding a distribution or transmission upgrade (such as a substation upgrade) in a constrained area. This is based on location specific transmission and distribution costs, which can vary greatly.

Create a Roadmap of Key Program Components, Milestones, and Explicit Energy Use Reduction Goals

Decisions regarding the key considerations discussed throughout this section are used to inform the development of an energy efficiency plan, which serves as a roadmap with key program components, milestones, and explicit energy reduction goals.

A well-designed plan includes many of the elements discussed in this section including:

- Budgets (see section titled "Leverage Private-Sector Expertise, External Funding, and Financing" for information on the budgeting processes for the most common policy models)
  - Overall
  - By program
- Kilowatt , kWh, and Mcf goals overall and by program
  - Annual savings
  - Lifetime savings
- Benefits and costs overall and by program

influential stakeholders to ensure that they are well informed about program offerings and share this information with their customers/constituents.

- Many of the organizations reviewed go well beyond merely informing businesses and organizations by actually partnering with them in the design and delivery of one or more of their efficiency programs.

- Recognizing that markets are not defined by utility service territory, many utilities and other third-party program administrators actively cooperate with one another and with national programs, such as ENERGY STAR, in the design and delivery of their programs.

This section discusses key best practices that emerge from a decade or more of experience designing and implementing energy efficiency programs.

Begin with the Market in Mind

Energy efficiency programs should complement, rather than compete with, private and other existing markets for energy efficient products and services. The rationale for utility or third-party investment in efficiency programming is usually based on the concept that within these markets, there are barriers that need to be overcome to ensure that an efficient product or service is chosen over a less efficient product or standard practice. Barriers might include higher initial cost to the consumer, lack of knowledge on the part of the supplier or the customer, split incentives between the tenant who pays the utility bills and the landlord who owns the building, lack of supply for a product or service, or lack of time (e.g., to research efficient options, seek multiple bids—particularly during emergency replacements).

Conduct a Market Assessment

Understanding how markets function is a key to successful program implementation, regardless of whether a program is designed for resource acquisition, market transformation, or a hybrid approach. A market assessment can be a valuable investment to inform program design and implementation. It helps establish who is part of the market (e.g., manufacturers, distributors, retailers, consumers), what the key barriers are to greater energy efficiency from the producer or consumer perspectives, who are the key trend-setters in the business and the key influencers in consumer decision-making, and what approaches might work best to overcome barriers to greater supply and investment in energy efficient options, and/or uptake of a program. A critical part of completing a market assessment is a baseline measurement of the goods and services involved and the practices, attitudes, behaviors, factors, and conditions of the marketplace (Feldman, 1994). In addition to informing program design and implementation, the baseline assessment also helps inform program evaluation metrics and serves as a basis for which future program impacts are measured. As such, market assessments are usually conducted by independent third-party evaluation professionals. The extent and needs of a market assessment can vary greatly. For well-established program models, market assessments are somewhat less involved and can rely on existing program experience and literature, with the goal of understanding local differences and establishing the local or regional baseline for the targeted energy efficiency product or service.

Table 6-10 illustrates some of the key stakeholders, barriers to energy efficiency, and program strategies that are explored in a market assessment and useful for considering when designing programs.

Solicit Stakeholder Input

Convening stakeholder advisory groups from the onset as part of the design process is valuable for obtaining multiple perspectives on the need and nature of planned programs. This process also serves to improve the program design and provides a base of program support within the community.

Once programs have been operational for a while, stakeholder groups should be reconvened to provide program feedback. Stakeholders that have had an ongoing relationship with one or more of the programs can provide insight on how the programs are operating and perceived in the community, and can recommend program

ments/background/07-J_CPUC_STANDARD_PRACTICE_MANUAL.PDF>

California Public Utilities Commission [CPUC] (2006, April). *California Energy Efficiency Evaluation Protocols: Technical, Methodological, and Reporting Requirements for Evaluation Professionals.* <http://www.calmac.org/publications/EvaluatorsProtocols_Final_AdoptedviaRuling_06-19-2006.pdf>

California Public Utilities Commission [CPUC] (2005, August 17). *Interim Opinion: Energy Efficiency Portfolio Plans and Program Funding Levels For 2006–2008—Phase 1 Issues. <http://www.cpuc.ca.gov/published/comment_decision/48667-03.htm#P292_37591>*

Efficiency Vermont (2004). *Working Together for an Energy Efficient Vermont: 2004 Annual Report. <http://www.efficiencyvermont.com/pages/Common/AboutUs/AnnualReport/>*

Electric Power Research Institute [EPRI] (2006). *IntelliGrid. <http://www.epri.com/IntelliGrid/>*

Elliot, R. N. & Shipley, A. M. (2005, April). *Impacts of Energy Efficiency and Renewable Energy on Natural Gas Markets. Updated and Expanded Analysis.* American Council for an Energy Efficient Economy. Report #E052.

Feldman, S. (1994). *Market Transformation: Hot Topic or Hot Air.* ACEEE Summer Study on Energy Efficiency in Buildings. Washington, D.C.: American Council for an Energy Efficient Economy [ACEEE].

Fort Collins Utilities, APT, & EFI (2005). *2005 ENERGY STAR Awards Application.*

GDS Associates & Quantum Consulting (2004, June). *Independent Assessment of Conservation and Energy Efficiency Potential for Connecticut and the Southwest Connecticut Region.*

Geller, H. (2006, May). *Catching Up: Progress with Utility Energy Efficiency Programs in the Southwest.* Southwest Energy Efficiency Project [SWEEP].

Hirst, E. (1990). *Measuring Performance: Key to Successful Utility Demand-Side Management Programs.* Oak Ridge National Laboratory [ORNL].

Holmes, I. (2006).

ICF Consulting (2005, September). *Avoided Costs of Energy in New England Due to Energy Efficiency Programs.* Presented to AESC Study Group.

Johnson, B. (2006, April 27). *Market Transformation as a Tool to Meet Natural Gas Savings Targets.* KeySpan Energy Delivery: AESP Brown Bag Session Presentation.

KEMA (2004). *New Jersey Energy Efficiency and Distributed Generation Market Assessment.*

KEMA (2002, September). *California's Secret Energy Surplus: The Potential for Energy Efficiency.*

KEMA & XENERGY (2003a, April). *California Residential Sector Energy Efficiency Potential Study.*

KEMA & XENERGY (2003b, March). *California Statewide Commercial Sector Natural Gas Energy Efficiency Potential Study.*

Komor, P. (2005, March). Ten Key Lessons Learned from Successful Energy Efficiency Programs. *Platts.*

Kushler, M., York, D., & Witte, P. (2004, April). *Five Years In: An Examination of the First Half-Decade of Public Benefits Energy Efficiency Policies.* Washington, D.C.: American Council for an Energy Efficient Economy [ACEEE]. *<http://www.aceee.org/pubs/u042.htm>*

Kushler, M., York, D., & Witte, P. (2003, December). *Responding to the Natural Gas Crisis: America's Best Natural Gas Energy Efficiency Programs.* Washington, D.C.: American Council for an Energy Efficient Economy.

Long Island Power Authority (2004). *LIPA Clean Energy Initiative Annual Report 2004.* Uniondale, N.Y.

Massachusetts Department of Telecommunications and Energy [MDTE] (1998). *Investigation by the DTE upon its own motion commencing a Notice of Inquiry/Rulemaking, pursuant to 220 C.M.R. §§ 2.00 et seg., establishing the procedures to be followed in electric industry restructuring by electric companies subject to G.L. c. 164.* (D.P.U./D.T.E. 96-100).

Massachusetts Department of Telecommunications and Energy [MDTE] (1995). *Investigation by the Department of Public Utilities on its own motion into electric industry restructuring.* (D.P.U. 95-30).

Massachusetts Office of Consumer Affairs and Business Regulation, Division of Energy Resources [Massachusetts] (2004, Summer). *2002 Energy*

Southern California Gas Company (2004, May). *Energy Efficiency Programs Annual Summary and Technical Appendix – 2003 Results.* *<http://www.socalgas.com/regulatory/efficiency/reports2003.shtml>*

Southwest Energy Efficiency Project [SWEEP] (2006, January). *Natural Gas Demand-Side Management Programs: A National Survey.*

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

Swisher, J., de Martino Jannuzzi, G., & Redlinger, R. (1997, November). *Tools and Methods for Integrated Resource Planning: Improving Energy Efficiency and Protecting the Environment.* United Nations Environment Programme [UNEP] Collaborating Centre on Energy and Environment.

Thorne-Amann, J. and Mendelsohn, E. (2005). *Comprehensive Commercial Retrofit Programs: A Review of Activity and Opportunities, Report Number A052.* American Council for an Energy Efficient Economy [ACEEE].

U.S. Department of Energy [DOE] (2006). *Weatherization Assistance Plan.* *<www.eere.energy.gov/weatherization>*

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

U.S. Energy Information Administration [EIA] (2006b, June). *Natural Gas Consumption by End Use.* Natural Gas Navigator. *<http://tonto.eia.doe.gov/dnav/ng/ng_cons_sum_a_EPG0_VC0_mmcf_a.htm>*

U.S. Energy Information Administration [EIA] (2005a, November). *U.S. Electric Power Industry Existing Net Summer Capacity by State.* Electric Power Annual. *<http://www.eia.doe.gov/cneaf/electricity/epa/existing_capacity_state.xls>*

U.S. Energy Information Administration [EIA] (2005b, December). *Sales to Bundled and Unbundled Consumers by Sector, Census Division, and State.* Electricity Sales, 2004—Electric Sales, Revenue, and Price. *<http://www.eia.doe.gov/cneaf/electricity/esr/table2.xls>*

U.S. Energy Information Administration [EIA] (2004). *Sales to Bundled and Unbundled Consumers.* *<http://www.eia.doe.gov/cneaf/electricity/esr/table2.xls>*

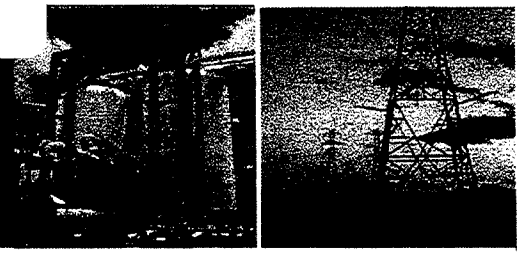
Wisconsin Department of Administration, Division of Energy Focus Evaluation Team. [Wisconsin] (2006, March 3). *Semiannual Report (FY 06) Midyear: Focus on Energy Public Benefits Evaluation.*

through a price adjustment. If the utility earns -1.3 percent of the target, however, an amount equal 0.15 percent of earnings (half the deficiency) is added to the price. Designing this band should leave the utility with ample incentive to make and benefit from process engineering improvements during the plan, recognizing that a subsequent rate case might result in the benefits accruing in the long run to consumers. While the illustration is "symmetrical," in practice, the band can be asymmetrical in size and sharing proportion to assure the proper balance between consumer and utility interests.

- *Course corrections for customer count changes, major changes for unique major customers, and large changes in revenues-per-customer.* Industrial consumers may experience more volatility in average use per customer calculations because there are typically a small number of these customers and they can be quite varied. For example, the addition or deletion of one large customer (or of a work shift for a large customer) might make a significant difference in the revenue per customer values for that class or result in appropriate shifting of revenues among customers. To address this problem, some trigger or off-ramp might be appropriate to review such unexpected and significant changes and to modify the decoupling calculation to account for them. In some cases, a new rate case might be warranted from such a change.

- *Accounting for utilities whose marginal revenues per customer are significantly different than their embedded average revenue per customer.* If a utility's revenue per customer has been changing rapidly over time, imposition of a revenue-per-customer decoupling mechanism will have the effect of changing its profit growth path. For example, if incremental revenues per customer are growing rapidly, decoupling will have the effect of lowering future earnings, although not necessarily below the company's allowed rate of return. On the other hand, if incremental revenues per customer are declining, decoupling will have the effect of increasing future earnings. Where these trends are strong and there is a desire to make decoupling "earnings neutral," vis-à-vis the status quo earning path, the revenue-per-customer value can be tied to an upward or downward growth rate. This type of adjustment is more oriented toward maintaining neutrality, than reflecting any underlying economic principle. Care should be taken to not capture recent growth in revenues per customer that are driven by inefficient consumption (usually tied to the utility having a pro-consumption marketing program).

Appendix B: Business Case Details



To help natural gas and electric utilities, utility regulators, and partner organizations communicate the business case for energy efficiency, the National Action Plan for Energy Efficiency provides an Energy Efficiency Benefits Calculator (Calculator available at *www.epa.gov/cleanenergy/eeactionplan.htm*). This Calculator examines the financial impact of energy efficiency on major stakeholders and was used to develop the eight cases discussed in Chapter 4: Business Case for Energy Efficiency. Additional details on these eight cases are described in this appendix.

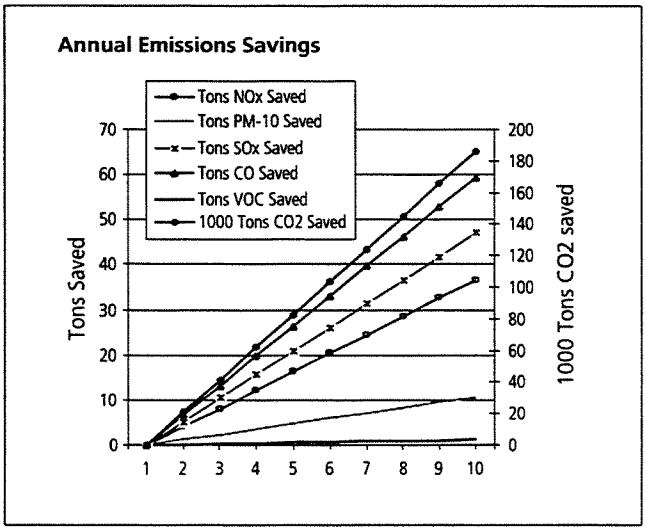
Overview

A business case is analysis that shows the benefits of energy efficiency to customers, the utility and society within an approach that can lead to actions by utilities, regulators and other stakeholders. Making the business case for energy efficiency programs requires a different type of analysis than that required for traditional supply-side resources. Because adoption of energy efficiency reduces utility sales and utility size, traditional metrics such as impact on rates and total earnings, do not measure the benefits of energy efficiency. However, by examining other metrics, such as customer bills and utility earnings per share, the benefits to all stakeholders of adopting energy efficiency can be demonstrated. These benefits include reduced customer bills, decreased cost per MWh of energy provided, increased net resource savings, decreased emissions, and decreased reliance on energy supplies.

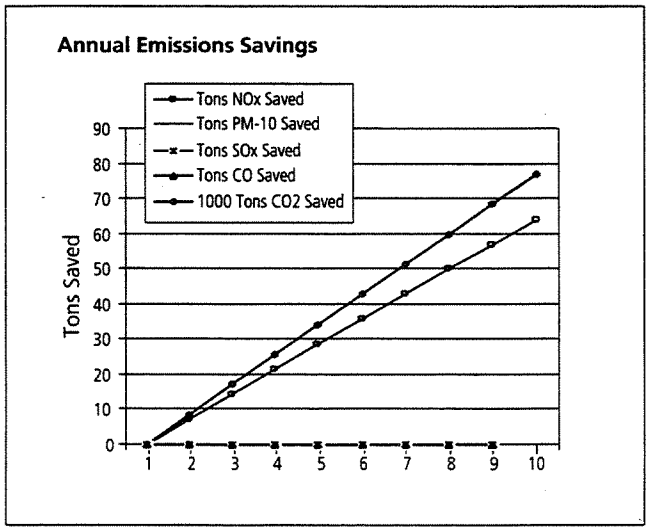
This appendix provides more detailed summary and interpretation of results for the eight cases discussed in Chapter 4: Business Case for Energy Efficiency. All results are from the Energy Efficiency Benefits Calculator's interpretation tab.

Emissions and Cost Savings - Increase
Annual tons of emissions saved increases. Emissions cost savings increases when emissions cost is monetized. Emissions costs and savings are the same with and without decoupling, therefore only one case is shown.

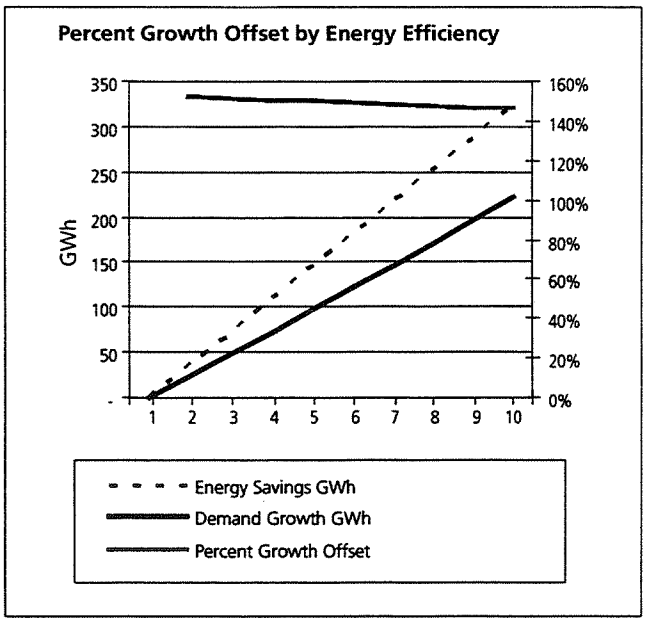
Electric

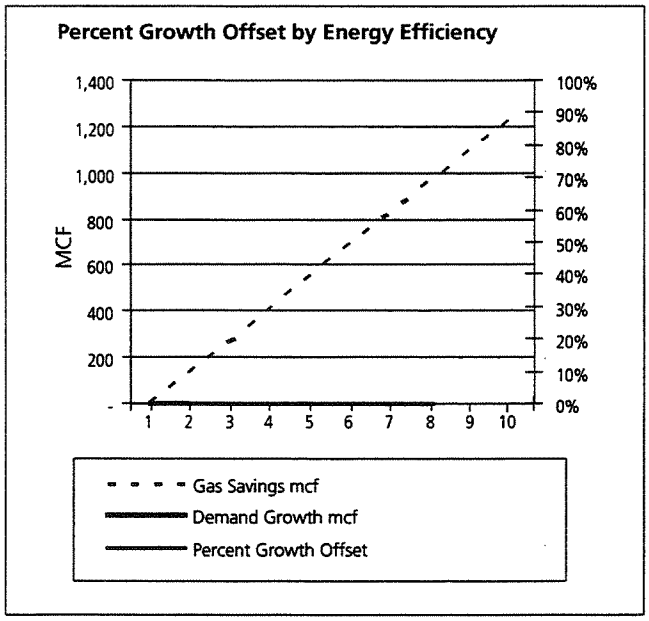


Gas



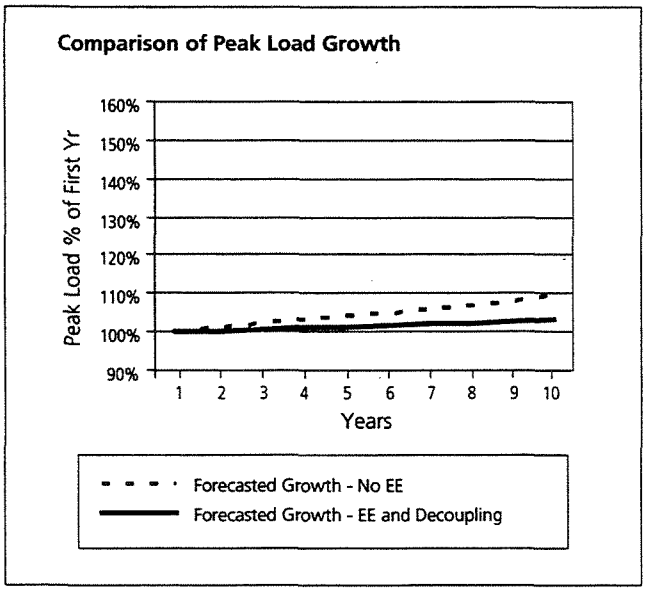
Growth Offset by EE – Increase
As EE programs ramp up, energy consumption declines. This comparison shows the growth with and without the EE and illustrates the amount of EE relative to load growth. Demand growth and energy savings are not impacted by decoupling, therefore only one case is shown.



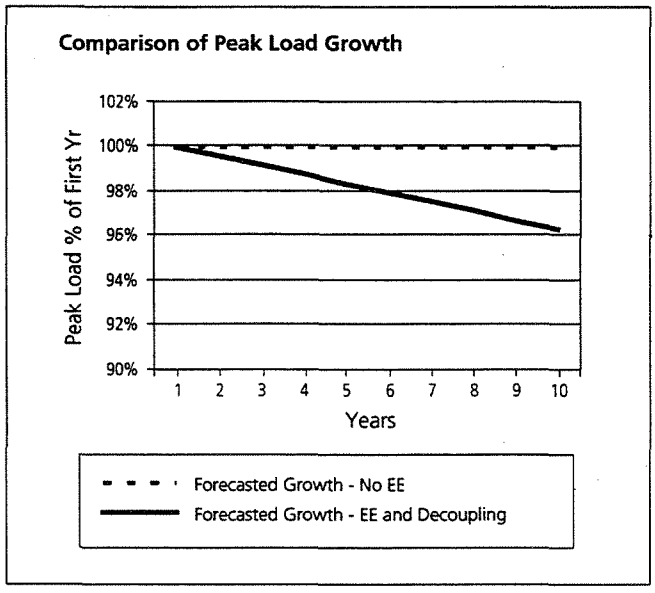


Peak Load Growth – Decrease
Peak load requirements decrease because peak capacity savings are captured due to EE measures. Peak load is not impacted by decoupling, therefore only one case is shown.

Electric



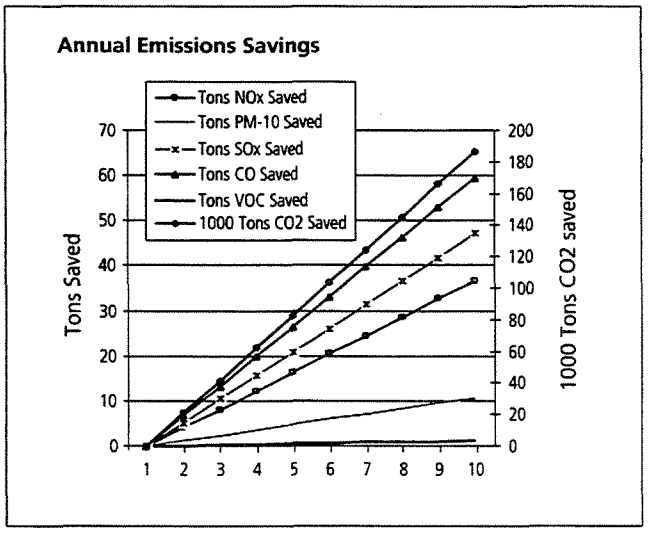
Gas



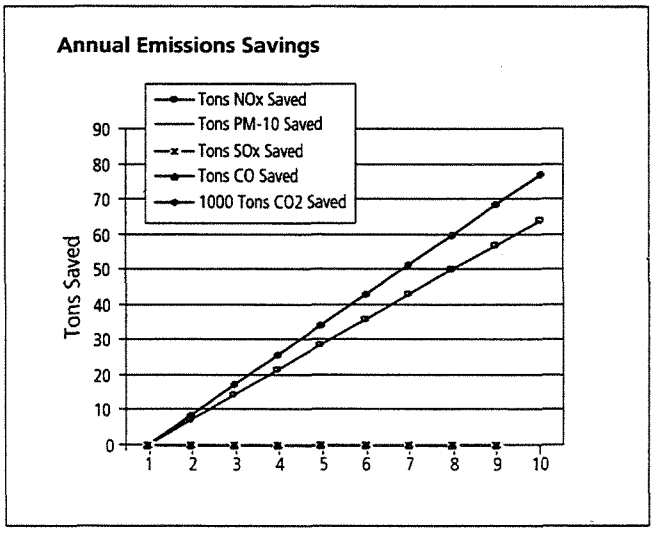
Emissions and Cost Savings - Increase

Annual tons of emissions saved increases. Emissions cost savings increases when emissions cost is monetized. Emissions costs and savings are the same with and without decoupling, therefore only one case is shown.

Electric

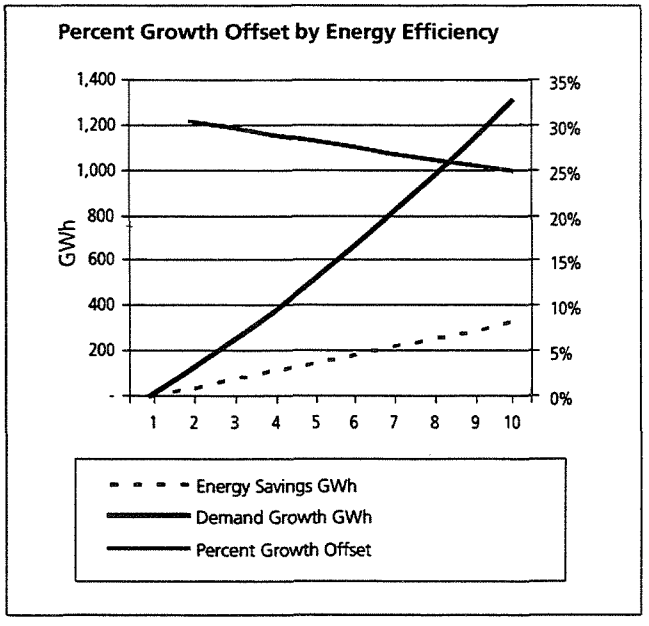


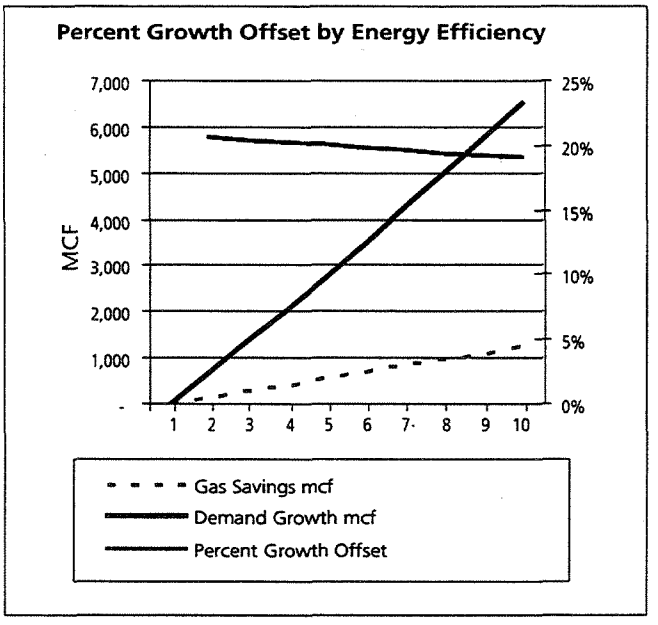
Gas



Growth Offset by EE – Increase

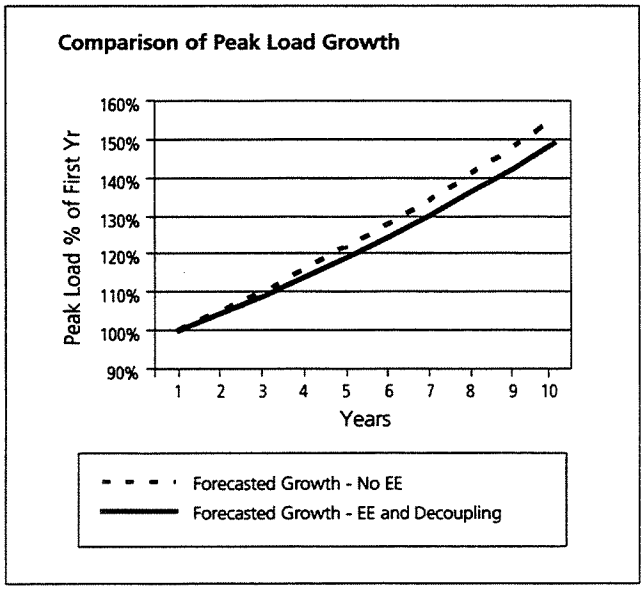
As EE programs ramp up, energy consumption declines. This comparison shows the growth with and without the EE and illustrates the amount of EE relative to load growth. Demand growth and energy savings are not impacted by decoupling, therefore only one case is shown.



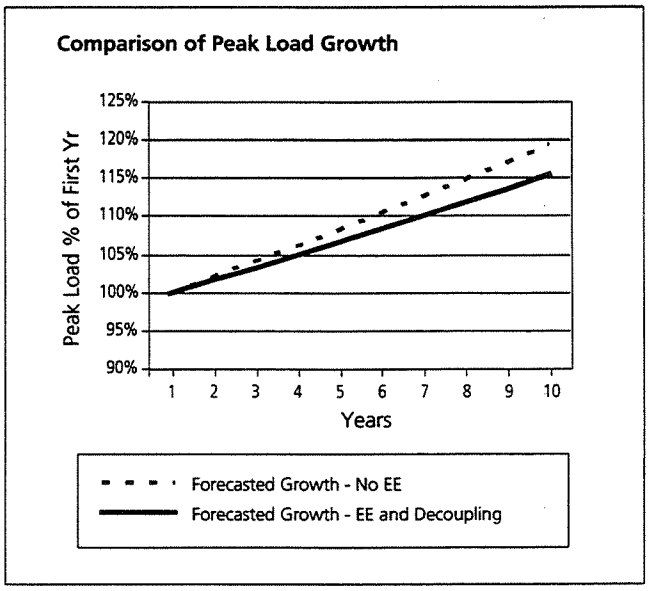


Peak Load Growth – Decrease
Peak load requirements decrease because peak capacity savings are captured due to EE measures. Peak load is not impacted by decoupling, therefore only one case is shown.

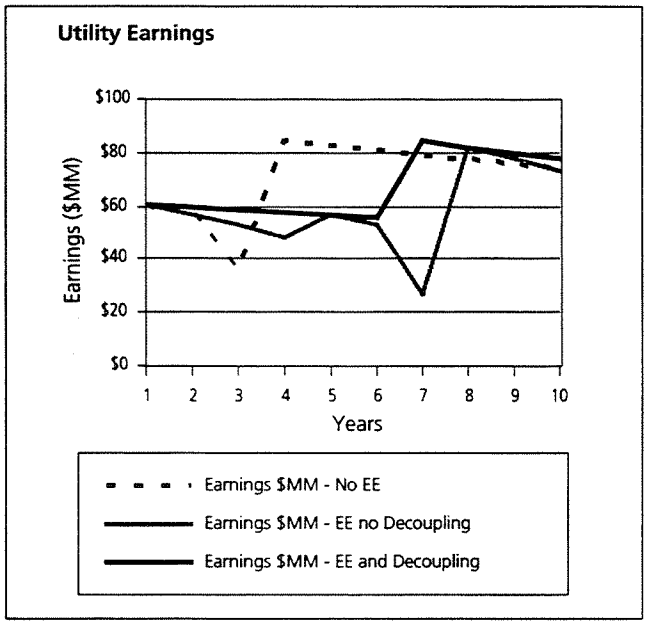
Electric



Gas

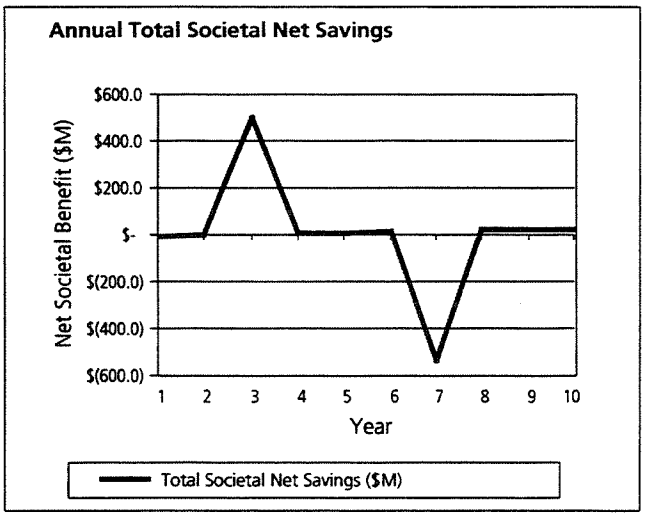


Utility Earnings – Results Vary
Utility earnings depend on growth rate, capital investment, frequency of rate adjustments, and other factors. If EE reduces capital investment, the earnings will be lower in the EE case unless shareholder incentives for EE are introduced. However, utility return (ROE or earnings per share) may not be affected.

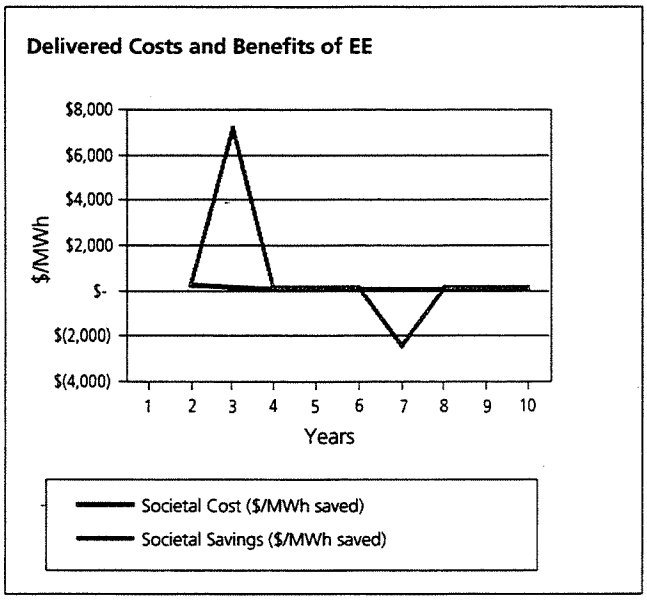


Community or Society Perspective

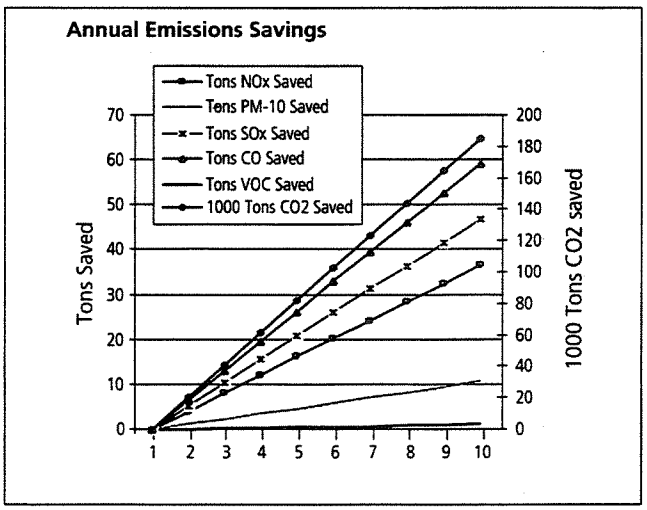
Societal Net Savings - Increase
The net savings are the difference of total utility costs, including EE program costs, with EE and without EE. In the first year, the cost of the EE program is a cost to society. Over time, cumulative EE savings lead to a utility production cost savings that is greater than the EE program cost. The graph shape is therefore upward sloping. Total Societal Net Savings is the same with and without decoupling; therefore, only one line is shown.



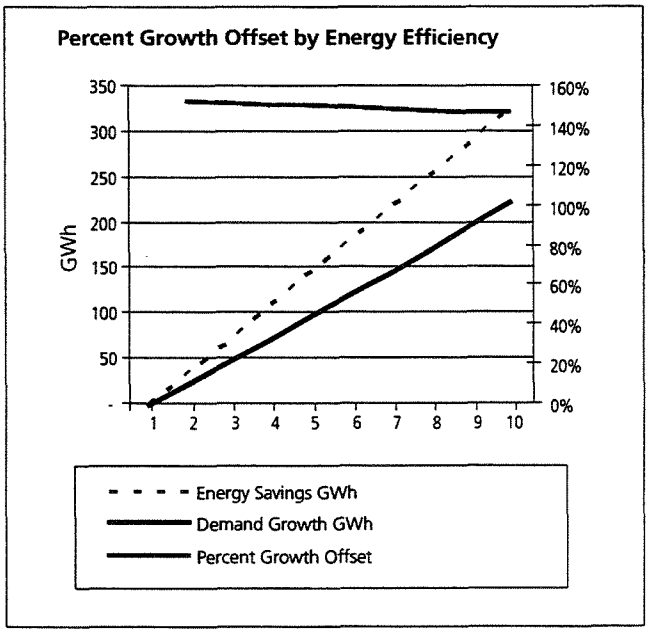
Total Societal Cost Per Unit - Declines
Total cost of providing each unit of energy (MWh, cf) declines over time because of the impacts of energy savings, decreased peak load requirements, and decreased costs during peak periods. Well-designed EE programs can deliver energy at an average cost less than that of new power sources. When the two lines cross, the annual cost of EE equals the annual savings resulting from EE. The Societal Cost and Societal Savings are the same with and without decoupling.



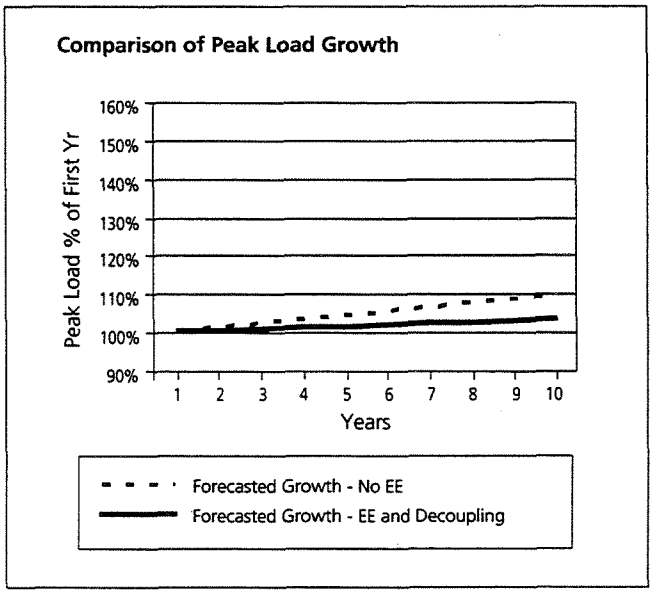
Emissions and Cost Savings - Increase
Annual tons of emissions saved increases. Emissions cost savings increases when emissions cost is monetized. Emissions costs and savings are the same with and without decoupling, therefore only one case is shown.



Growth Offset by EE – Increase
As EE programs ramp up, energy consumption declines. This comparison shows the growth with and without the EE and illustrates the amount of EE relative to load growth. Demand growth and energy savings are not impacted by decoupling, therefore only one case is shown.



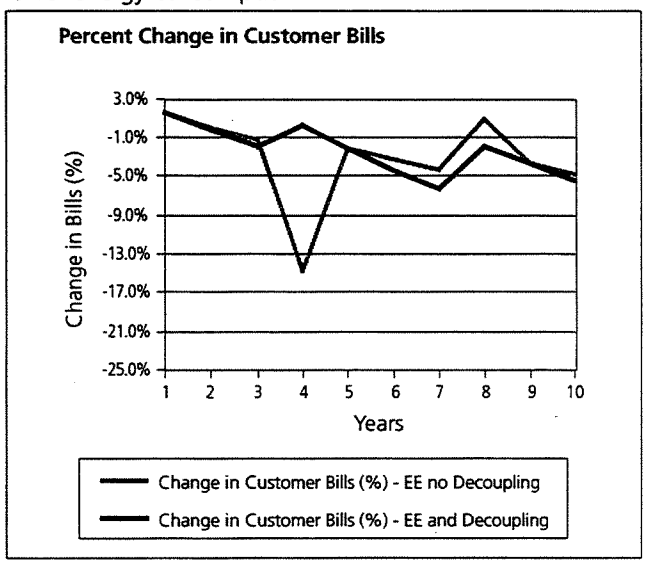
Peak Load Growth – Decrease
Peak load requirements decrease because peak capacity savings are captured due to EE measures. Peak load is not impacted by decoupling, therefore only one case is shown.



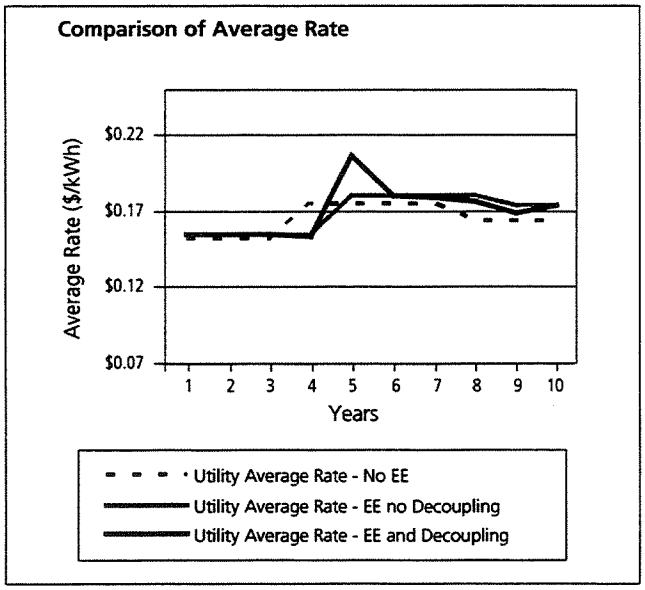
Case 4: High-Growth with Power Plant Deferral

Customer Perspective

Customer Bills – Decrease
In the first year, customer utility bills increase because the cost of the EE program has not yet produced savings. Total customer bills decline over time, usually within the first three years, indicating customer savings resulting from lower energy consumption.

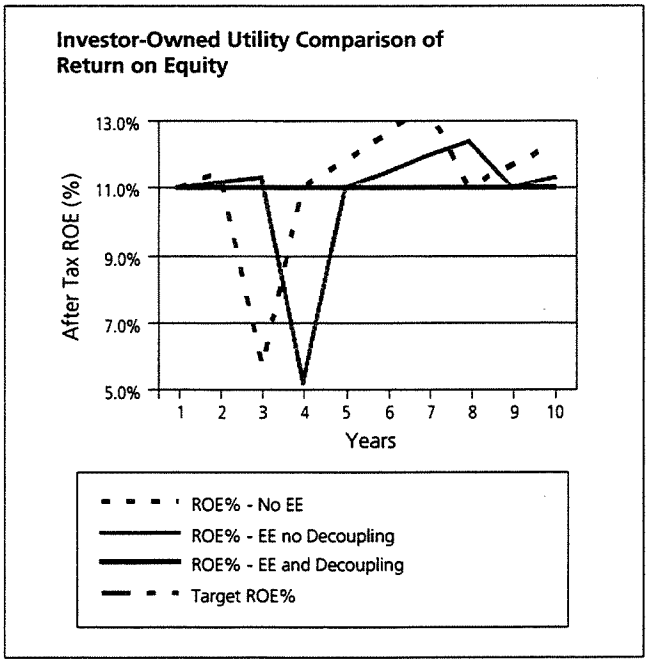


Utility Rates – Mild Increase
The rates customers pay ($/kWh, $/therm) increase when avoided costs are less than retail rates, which is typically the case for most EE programs. Rates increase because revenue requirements increase more quickly than sales.



Utility Perspective

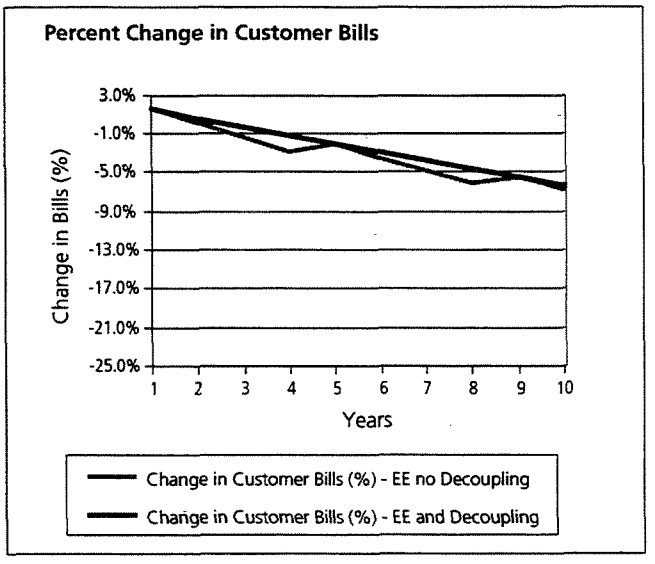
Utility Financial Health – Small Changes
The change in utility financial health depends on whether or not there are decoupling mechanisms in place, if there are shareholder incentives in place (for investor-owned utilities), the frequency of rate adjustments, and other factors. Depending on the type of utility the measure of financial health changes. Investor-Owned Utility - ROE, Publicly- or Cooperatively-Owned Utility - Cash Position or Debt Coverage Ratio.



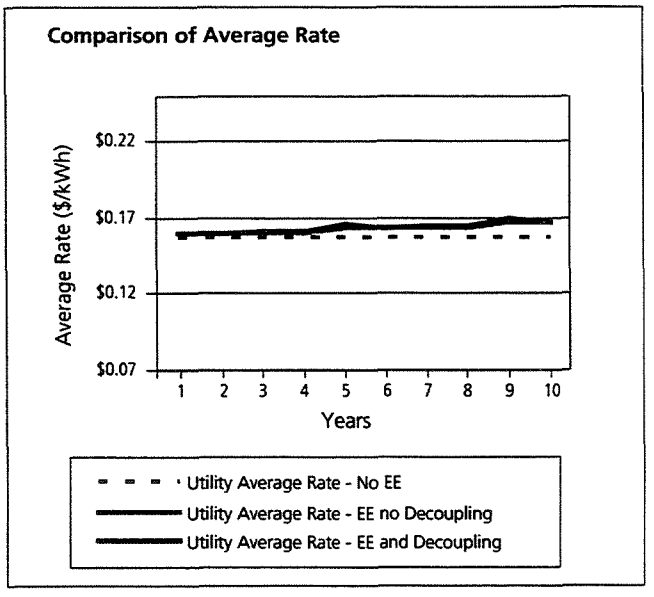
Case 5: Vertically-Integrated Utility

Customer Perspective

Customer Bills – Decrease
In the first year, customer utility bills increase because the cost of the EE program has not yet produced savings. Total customer bills decline over time, usually within the first three years, indicating customer savings resulting from lower energy consumption.

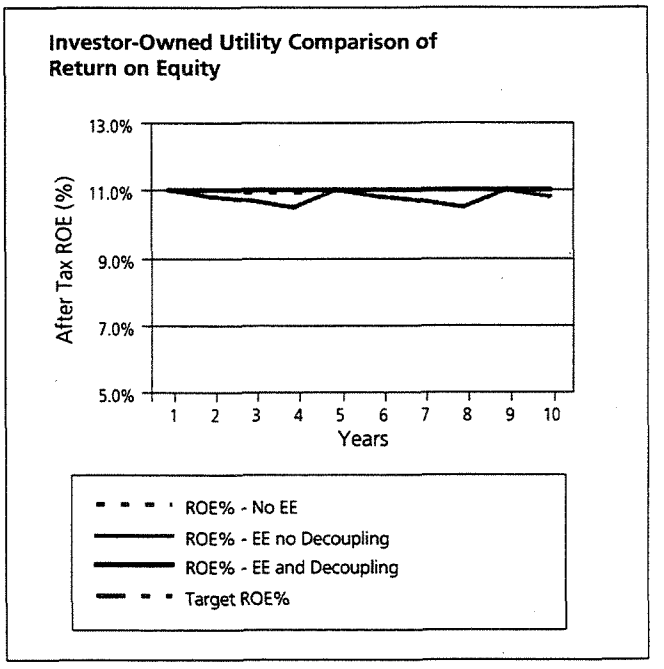


Utility Rates – Mild Increase
The rates customers pay ($/kWh, $/therm) increase when avoided costs are less than retail rates, which is typically the case for most EE programs. Rates increase because revenue requirements increase more quickly than sales.

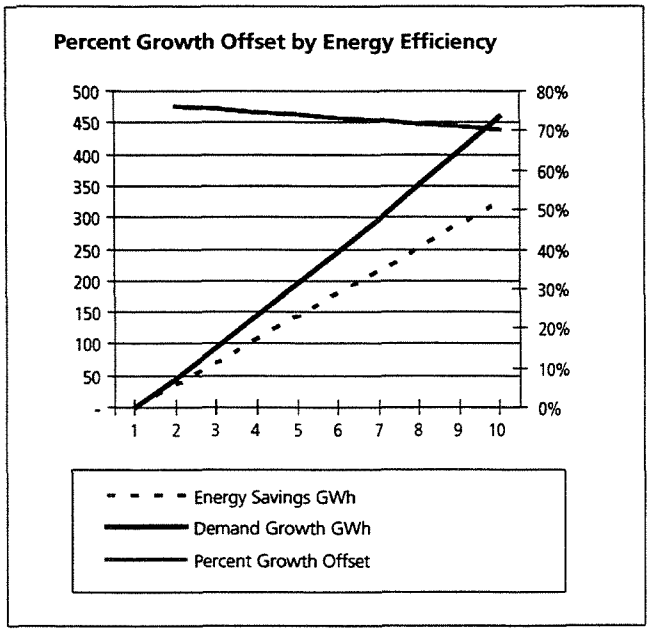


Utility Perspective

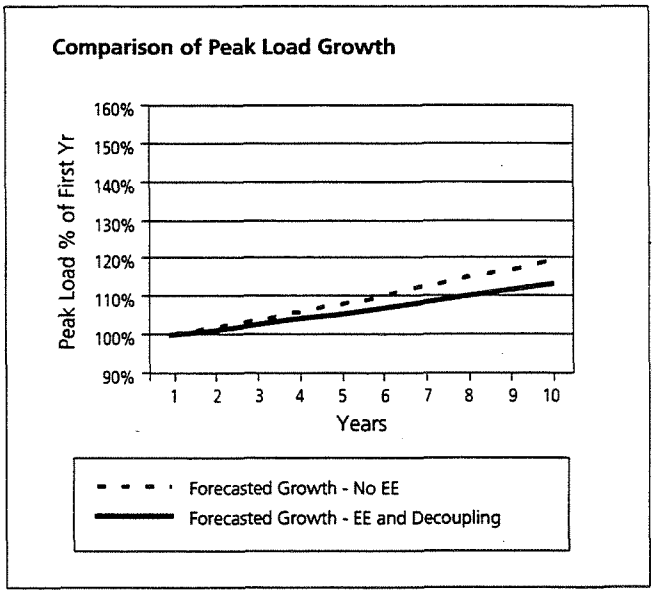
Utility Financial Health – Small Changes
The change in utility financial health depends on whether or not there are decoupling mechanisms in place, if there are shareholder incentives in place (for investor-owned utilities), the frequency of rate adjustments, and other factors. Depending on the type of utility the measure of financial health changes. Investor-Owned Utility - ROE, Publicly- or Cooperatively-Owned Utility - Cash Position or Debt Coverage Ratio.



Growth Offset by EE – Increase
As EE programs ramp up, energy consumption declines. This comparison shows the growth with and without the EE and illustrates the amount of EE relative to load growth. Demand growth and energy savings are not impacted by decoupling, therefore only one case is shown.



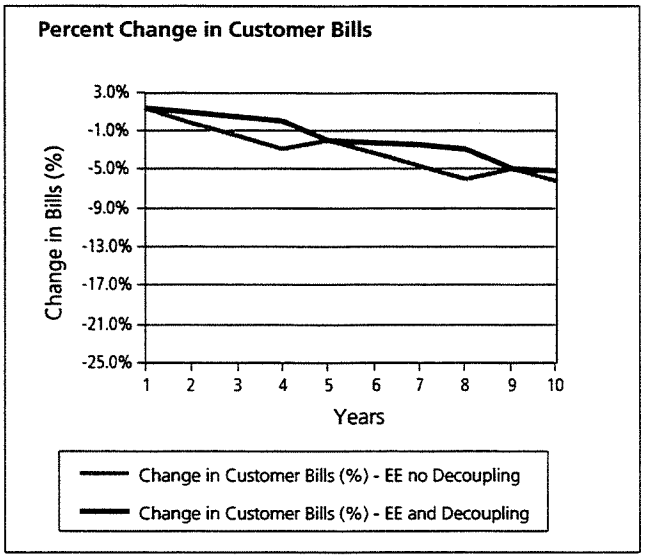
Peak Load Growth – Decrease
Peak load requirements decrease because peak capacity savings are captured due to EE measures. Peak load is not impacted by decoupling, therefore only one case is shown.



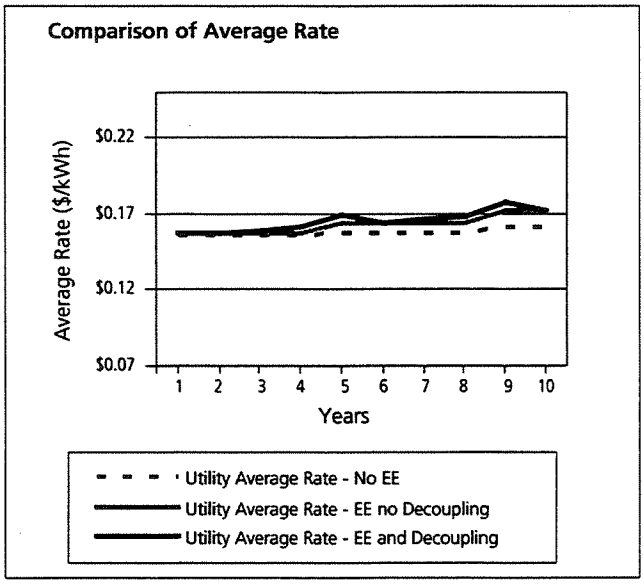
Case 6: Restructured Delivery-Only Utility

Customer Perspective

Customer Bills – Decrease
In the first year, customer utility bills increase because the cost of the EE program has not yet produced savings. Total customer bills decline over time, usually within the first three years, indicating customer savings resulting from lower energy consumption.

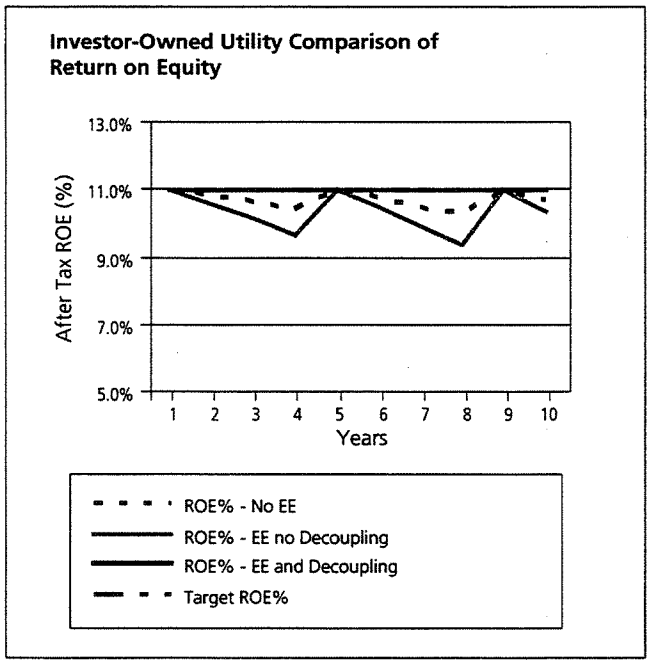


Utility Rates – Mild Increase
The rates customers pay ($/kWh, $/therm) increase when avoided costs are less than retail rates, which is typically the case for most EE programs. Rates increase because revenue requirements increase more quickly than sales.

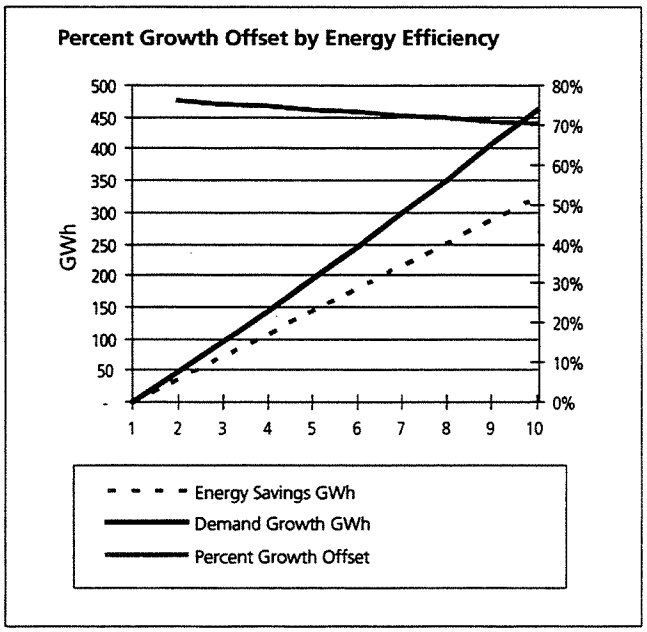


Utility Perspective

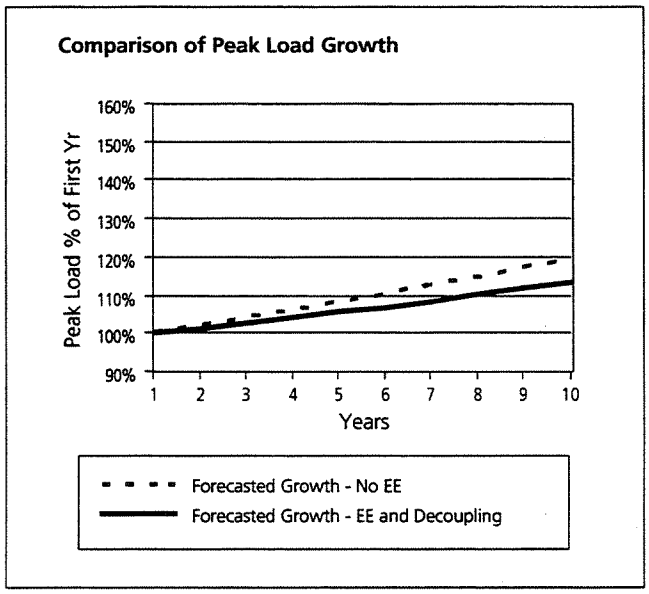
Utility Financial Health – Small Changes
The change in utility financial health depends on whether or not there are decoupling mechanisms in place, if there are shareholder incentives in place (for investor-owned utilities), the frequency of rate adjustments, and other factors. Depending on the type of utility the measure of financial health changes. Investor-Owned Utility - ROE, Publicly- or Cooperatively-Owned Utility - Cash Position or Debt Coverage Ratio.



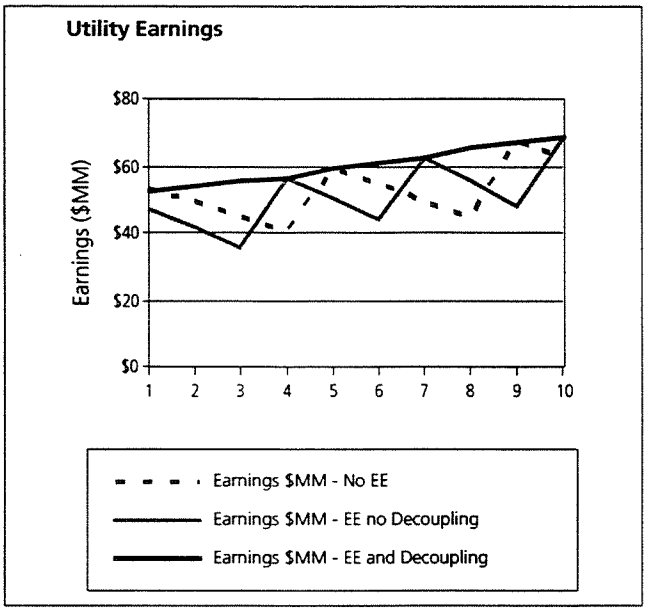
Growth Offset by EE – Increase
As EE programs ramp up, energy consumption declines. This comparison shows the growth with and without the EE and illustrates the amount of EE relative to load growth. Demand growth and energy savings are not impacted by decoupling, therefore only one case is shown.



Peak Load Growth – Decrease
Peak load requirements decrease because peak capacity savings are captured due to EE measures. Peak load is not impacted by decoupling, therefore only one case is shown.

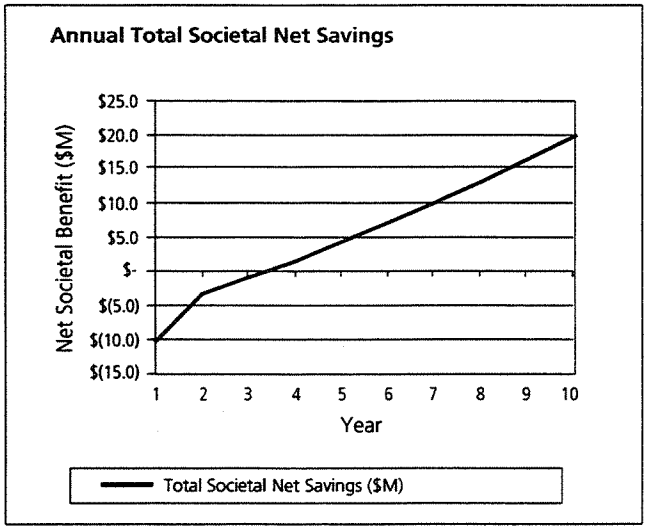


Utility Earnings – Results Vary
Utility earnings depend on growth rate, capital investment, frequency of rate adjustments, and other factors. If EE reduces capital investment, the earnings will be lower in the EE case unless shareholder incentives for EE are introduced. However, utility return (ROE or earnings per share) may not be affected.

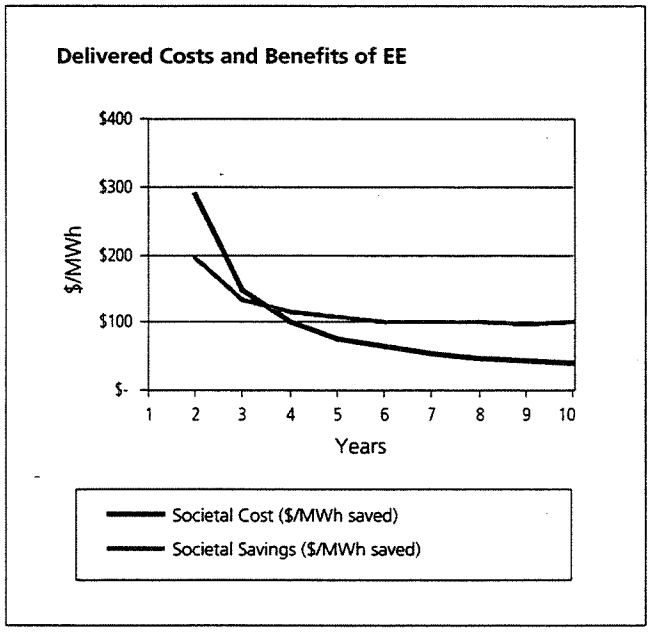


Community or Society Perspective

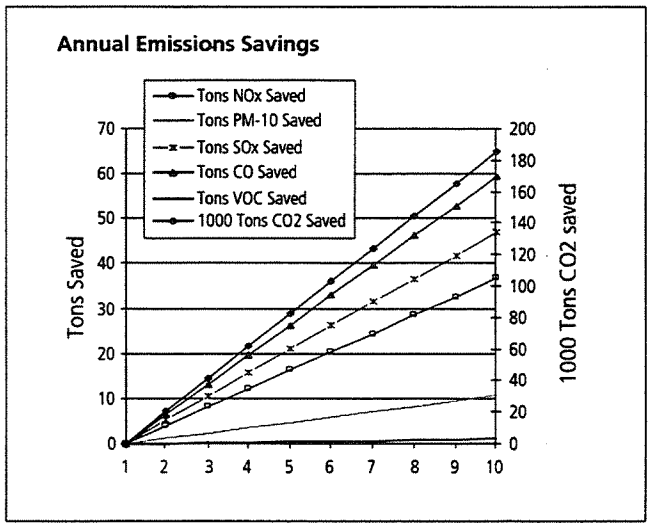
Societal Net Savings - Increase
The net savings are the difference of total utility costs, including EE program costs, with EE and without EE. In the first year, the cost of the EE program is a cost to society. Over time, cumulative EE savings lead to a utility production cost savings that is greater than the EE program cost. The graph shape is therefore upward sloping. Total Societal Net Savings is the same with and without decoupling; therefore, only one line is shown.



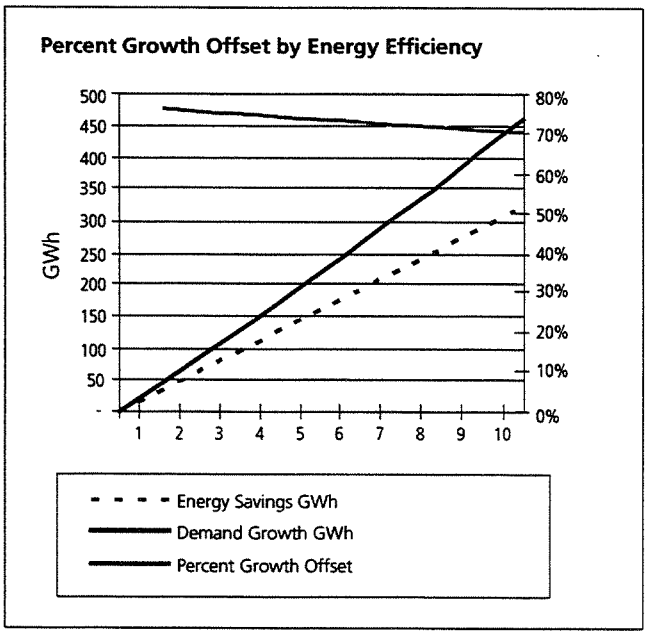
Total Societal Cost Per Unit - Declines
Total cost of providing each unit of energy (MWh, cf) declines over time because of the impacts of energy savings, decreased peak load requirements, and decreased costs during peak periods. Well-designed EE programs can deliver energy at an average cost less than that of new power sources. When the two lines cross, the annual cost of EE equals the annual savings resulting from EE. The Societal Cost and Societal Savings are the same with and without decoupling.



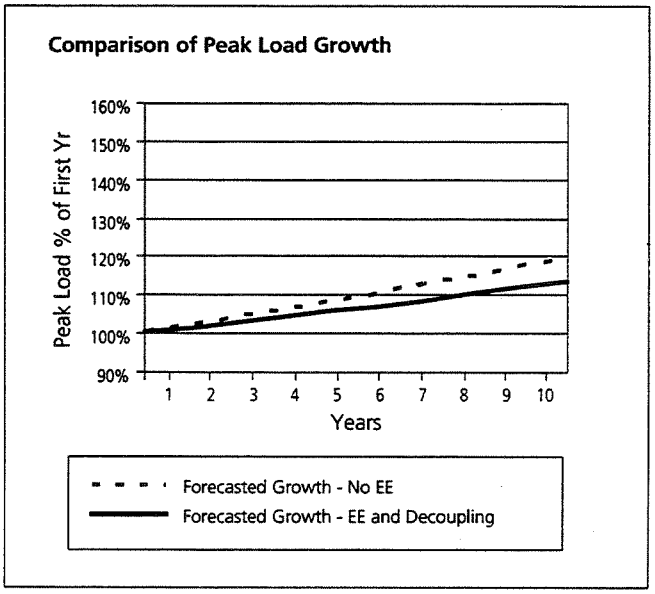
Emissions and Cost Savings - Increase
Annual tons of emissions saved increases. Emissions cost savings increases when emissions cost is monetized. Emissions costs and savings are the same with and without decoupling, therefore only one case is shown.



Growth Offset by EE – Increase
As EE programs ramp up, energy consumption declines. This comparison shows the growth with and without the EE and illustrates the amount of EE relative to load growth. Demand growth and energy savings are not impacted by decoupling, therefore only one case is shown.



Peak Load Growth – Decrease
Peak load requirements decrease because peak capacity savings are captured due to EE measures. Peak load is not impacted by decoupling, therefore only one case is shown.

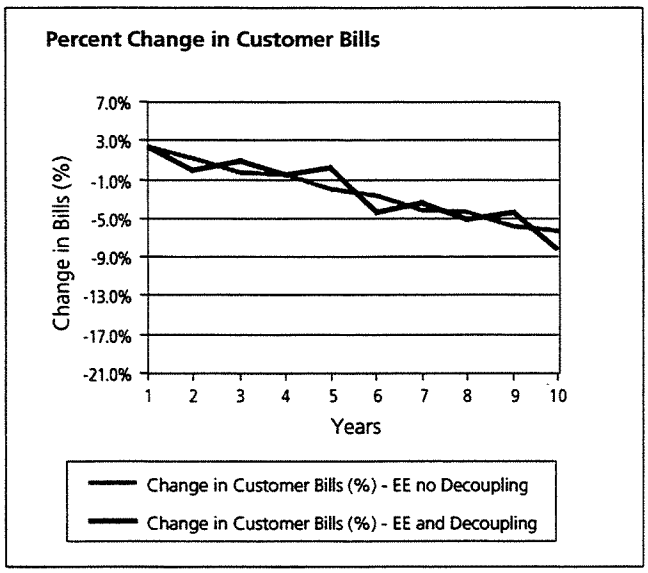


Case 8: Electric Publicly- and Cooperatively-Owned Cash Position

Customer Perspective

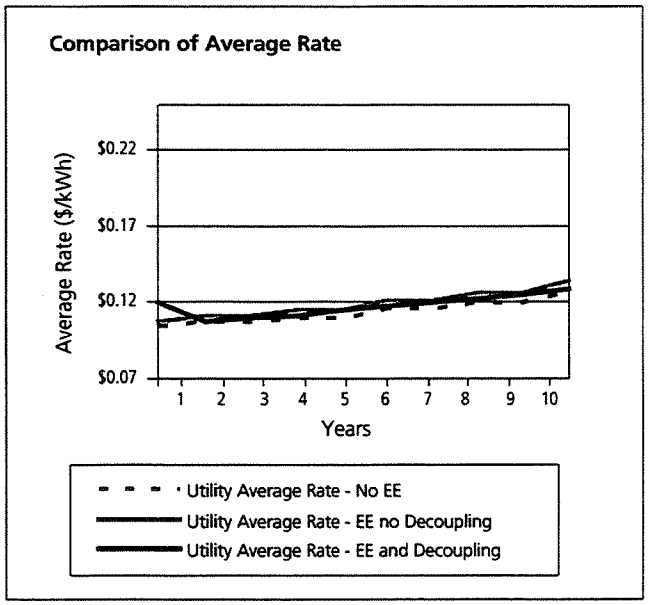
Customer Bills – Decrease

In the first year, customer utility bills increase because the cost of the EE program has not yet produced savings. Total customer bills decline over time, usually within the first three years, indicating customer savings resulting from lower energy consumption.



Utility Rates – Mild Increase

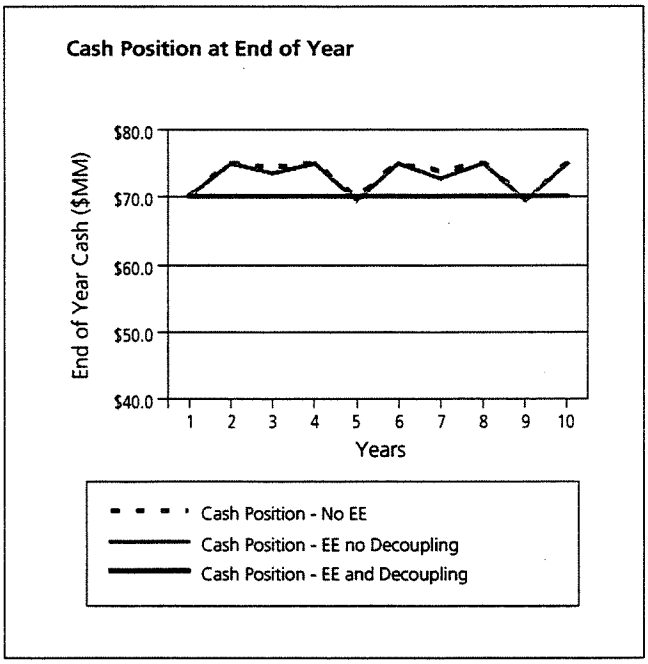
The rates customers pay ($/kWh, $/therm) increase when avoided costs are less than retail rates, which is typically the case for most EE programs. Rates increase because revenue requirements increase more quickly than sales.



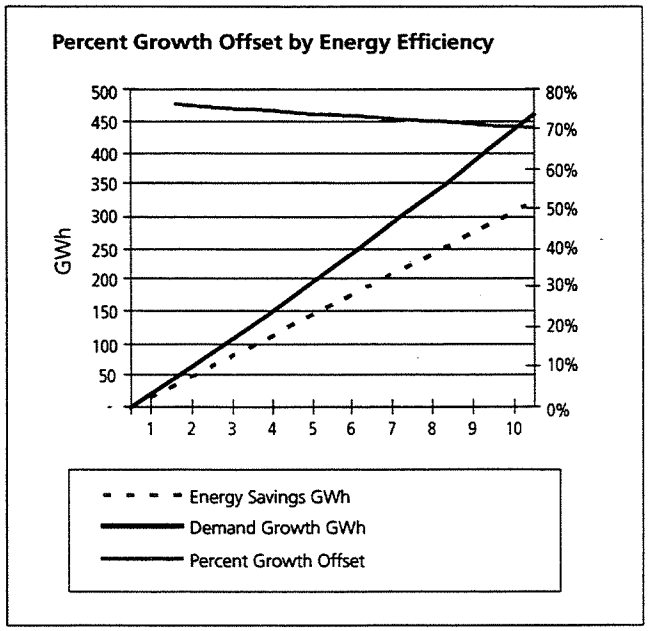
Utility Perspective

Utility Financial Health – Small Changes

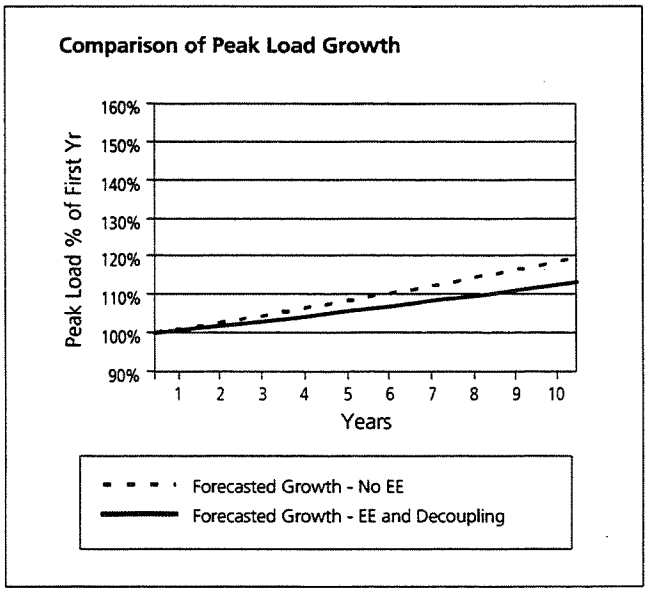
The change in utility financial health depends on whether or not there are decoupling mechanisms in place, if there are shareholder incentives in place (for investor-owned utilities), the frequency of rate adjustments, and other factors. Depending on the type of utility the measure of financial health changes. Investor-Owned Utility - ROE, Publicly- or Cooperatively-Owned Utility - Cash Position or Debt Coverage Ratio.

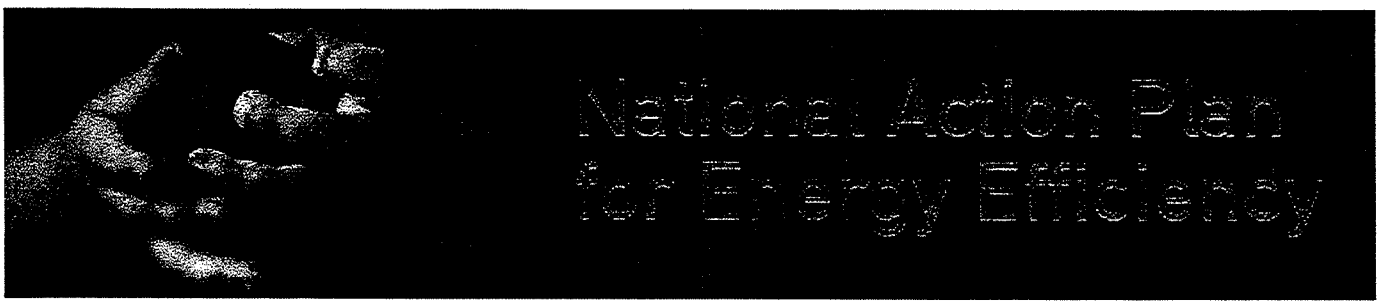


Growth Offset by EE – Increase
As EE programs ramp up, energy consumption declines. This comparison shows the growth with and without the EE and illustrates the amount of EE relative to load growth. Demand growth and energy savings are not impacted by decoupling, therefore only one case is shown.



Peak Load Growth – Decrease
Peak load requirements decrease because peak capacity savings are captured due to EE measures. Peak load is not impacted by decoupling, therefore only one case is shown.





Public Statements & Commitments in Support of the Action Plan

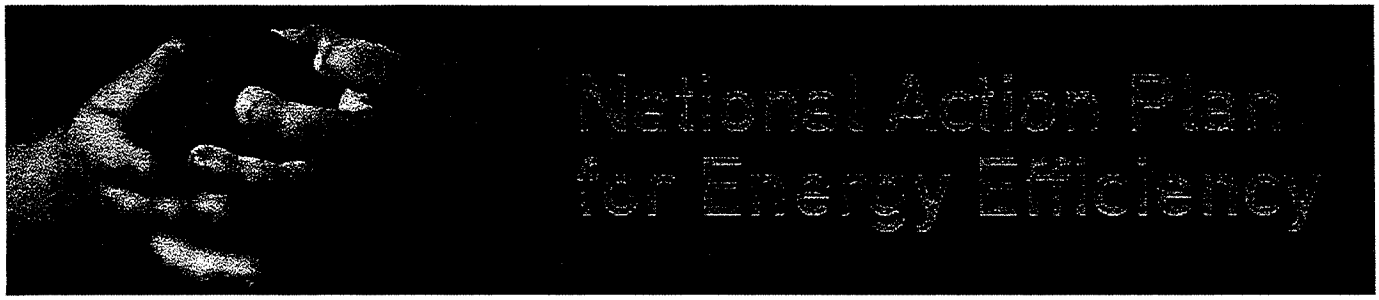
A key component of the National Action Plan for Energy Efficiency is stakeholders committing to take action to advance the Recommendations in their spheres of influence. This document provides 60 public statements and commitments by 82 organizations as of July 31, 2006 to advance energy efficiency. These stakeholders include utilities, state agencies, consumer advocates, large energy users, environmental groups, trade associations, and others.

Alliance to Save Energy

- Endorses Action Plan Recommendations.
- The Alliance to Save Energy (Alliance) will advance the mission of the Action Plan through on-going advocacy efforts before federal, regional, state and local policymakers, including:
  - Advocacy of national programs, funding, and incentives to advance energy efficiency in the power supply, industrial, buildings, and transportation sectors
  - Development of a new initiative, directed at the 11-state, southeastern region, based on applicable Action Plan Recommendations
  - Advocacy for stringent energy-efficiency building codes and higher minimum energy-efficiency standards for appliances and other equipment
- The Alliance will use its website and other communications tools to educate broad audiences and key stakeholders about the need for, and benefits of, full implementation of the Action Plan.
- The Alliance will make available its public communications staff and expertise to promote energy-saving measures to help consumers lower their home and vehicle energy bills and benefit our economy, environment, and national security.
- The Alliance will provide its technical and human resources to support efforts by utilities, utility commissions, government officials, and other stakeholders seeking to implement Action Plan Recommendations.
- The Alliance will provide energy-efficiency curricula for K-12 schools to help those schools, as well as colleges and universities, save energy in their own operations.

American Council for an Energy-Efficient Economy

- Endorses Action Plan Recommendations.
- American Council for an Energy-Efficient Economy (ACEEE) commits to supporting implementation of the plan through:
  - Making available ACEEE resources free via the Web (www.aceee.org), including:
    - ACEEE's state scorecard on utility programs
    - ACEEE's report on energy efficiency resource standards
    - ACEEE's best-practice review of electricity efficiency programs
    - ACEEE's best-practice review of natural gas efficiency
    - ACEEE's best-practice review of low-income efficiency programs
  - Making available ACEEE staff to work with utilities, utility commissions, state energy offices, and other stakeholders in processes to advance efficiency programs and related policies.
  - Following up the issuance of the Plan by attending future Leadership Committee meetings, and by engaging committee members and allied organizations in taking additional steps toward improving efficiency policies and programs.



Eastman Kodak

- Endorses Action Plan Recommendations.
- Eastman Kodak (Kodak) highlights that energy conservation has been part of three successive voluntary environmental goals programs implemented by the company. Under its current environmental goals program, Kodak has committed to reducing worldwide energy usage by 20% in the 2002-2008 timeframe. The company has also committed to a 20% worldwide reduction in greenhouse gas emissions in that timeframe.
- Kodak has been a partner in the ENERGY STAR® program conducted by EPA and DOE. The company has been recognized with several top awards under that program. Kodak is also a member of the EPA's Climate Leaders program. To learn more about Kodak's environmental achievements visit the Kodak website: www.kodak.com/go/hse.

Edison Electric Institute

- Endorses Action Plan Recommendations.
- Edison Electric Institute commits with American Gas Association (AGA) and National Resources Defense Council (NRDC) to redoubled joint efforts in support of the National Action Plan's worthy goals and Recommendations.
- In addition, the industry will emphasize the following areas to help implement the principles:
    - Helping foster more energy-efficient buildings.
    - Promoting the development and deployment of more energy-efficient electric appliances, consumer electronics and other electric technologies.
    - Accelerating the development and use of "smart," or advanced, electric meters.
    - Supporting development of innovative electric ratemaking and rate design that promote efficiency and allows customers to control their electricity bills.
    - Helping commercialize plug-in hybrid electric vehicles that will improve transportation efficiency, reduce fuel costs, improve the environment and help reduce dependence on foreign oil.

Efficiency Texas

- Endorses Action Plan Recommendations.
- Efficiency Texas pledges to continue its campaign to significantly expand energy efficiency programs so that the energy, cost and environmental benefits of energy efficiency are maximized in Texas.

Energetics Incorporated

- Endorses Action Plan Recommendations.
- Energetics Incorporated commits to continue doing our utmost to improve the energy efficiency of our corporate facilities.

EnergySolve Companies

- Endorses Action Plan Recommendations.
- The EnergySolve Companies commit to continue advancing energy efficiency through their energy efficiency services to end-users and their advocacy of energy efficiency in Federal, state and local forums.

Food Lion

- Endorses Action Plan Recommendations.
- Food Lion commits to:
  - Launch an energy awareness campaign targeted to associates in their Deli department, a high-energy-use department where associate actions can single handedly lower energy consumption.
  - Share its energy conservation knowledge with its sister banner stores, including Bloom, Bottom Dollar and Harveys.
  - Continue the pursuit of the ENERGY STAR® designation for its 1,200 retail outlets, by certifying half of its stores by year end.

Great River Energy

- Endorses Action Plan Recommendations.
- Great River Energy commits to:
  - Become a leader in demand response and conservation/energy efficiency efforts.
  - Strive to meet a portion of its new electrical demand through member conservation efforts and new renewable resources.
  - Model best practices and policies identified in the Action Plan, such as designation of conservation and energy efficiency as a high priority resource option; adoption of targets for energy conservation and energy efficiency; pursuit of energy efficiency resources under a long-term resource planning and procurement framework.

Hawaii Public Utilities Commission

- Endorses Action Plan Recommendations.
- Hawaii Public Utilities Commission has undertaken initiatives and actions that are consistent with the Action Plan's laudable goals and Recommendations; and
- Is currently examining, as a high priority matter, energy efficiency issues relevant to the State of Hawaii within its ongoing Energy Efficiency Docket in an effort to increase and enhance the effectiveness of energy efficiency programs in Hawaii.

ISO New England

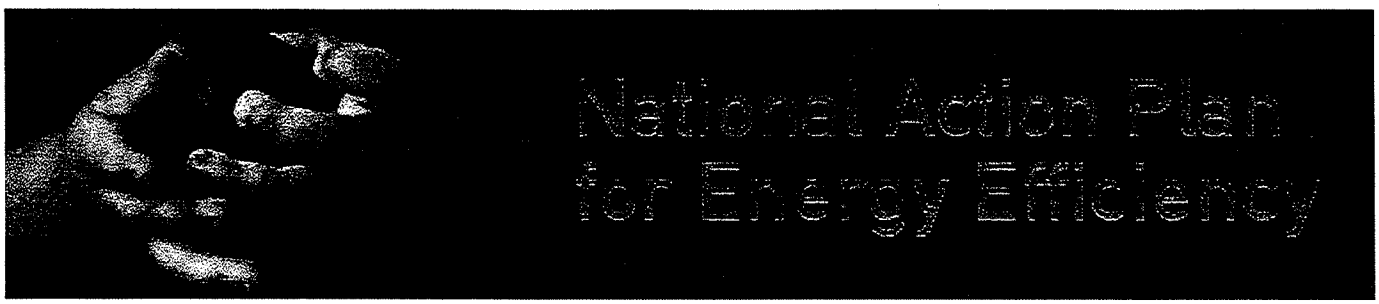
- Endorses Action Plan Recommendations.
- ISO New England commits itself to improving awareness of the beneficial role energy efficiency plays in managing the power grid in New England. ISO New England is particularly focused on achieving greater efficiency during peak periods, particularly in the summer months.
- ISO New England is committed to proactively educating consumers on the issue of growing electricity use and the benefits greater energy efficiency and conservation provide for both power system reliability and consumer cost. On June 20, 2006, ISO New England kicked off its *Take Charge New England*℠ consumer awareness campaign in the region's two largest electricity consuming states: Connecticut and Massachusetts. The ISO supports expanding the *Take Charge New England*℠ campaign in 2007 to include the states of Maine, New Hampshire, Rhode Island, and Vermont.
- ISO New England supports market designs, programs, and measures that result in appropriate incentives for customers to become more energy efficient. This includes integrating demand side resources and actions including consumer conservation into the wholesale marketplace. For example, the ISO is working with stakeholders to enable efficiency programs to fully participate in capacity and reserves markets on equal footing with traditional generation resources. Furthermore, the ISO supports the modification of retail rate structures to encourage consumption during lower priced hours and conservation during higher priced hours.

Iowa Utility Association

- Endorses Action Plan Recommendations.
- Iowa utilities are committed to increasing the awareness and implementation of sound, measurable energy efficiency programs.

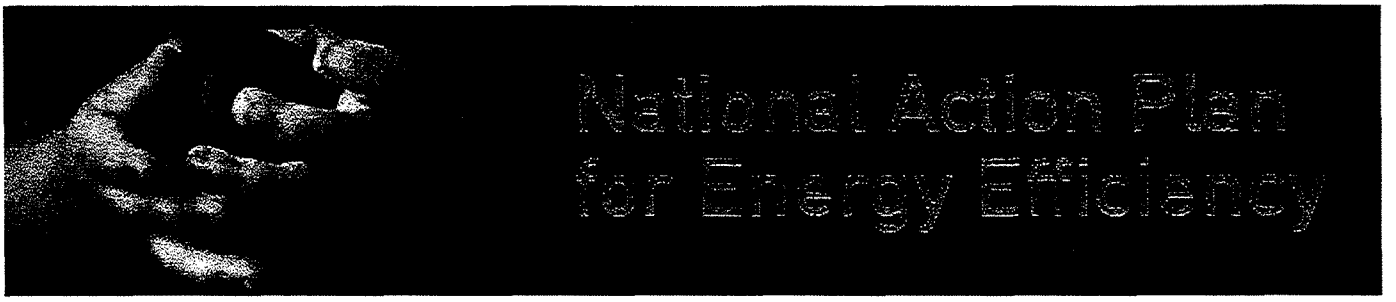
Iowa Utilities Board

- Endorses Action Plan Recommendations.
- Through the efforts of the Iowa Utilities Board (IUB) and the electric and natural gas utilities in the state, Iowa continues to be a national leader in energy efficiency promotion and implementation. Iowa consumers save millions of dollars each year as a result of various programs that have been in place for 15 years. In 2005 alone, Iowa customers realized savings of about $187 million as a result of all the energy efficiency measures implemented through these programs since 1990. Iowa and its utilities are committed to continuing these efforts and they are engaged in activities to expand and enhance them.
- The IUB leads the Iowa Weatherization Challenge into its second year. This effort is designed to engage community groups, local governments, faith-based groups, and other non-profit groups to conduct weatherization projects in their communities. While these weatherization efforts are designed to assist low-income and elderly customers, they will raise the awareness level of all consumers and help promote the ongoing energy efficiency efforts statewide. The IUB has also committed to inform the public about weatherization methods proven to be safe and efficient, to directly assist groups across Iowa in promoting and conducting their events, and to provide matching grant funds of up to $500 to qualified groups undertaking such projects. This year, a total of at least $10,000 in matching funds will be available in Iowa.
- In an effort to give the utilities and their customers the proper incentives to engage in energy efficiency activities, the IUB is conducting several formal investigations. The Board is investigating ways utilities can decouple natural gas service distribution revenues from the volumes that they sell. This will assist in aligning utility incentives and ratemaking processes to promote investment in energy efficiency. The Board is also looking at energy-saving technologies, particularly advanced metering technologies, that would enable utilities to offer rates and rate designs that would send price signals to consumers that would further promote energy efficiency efforts.



North American Insulation Manufacturers Association

- Endorses Action Plan Recommendations.
- NAIMA and its members commit to the following activities to support the Action Plan Recommendations:
  - NAIMA will conduct a seminar for Action Plan participants and appropriate legislators to share information from a series of research studies from the Harvard University School of Public Health that are among the first to quantify the public health benefits from improved energy efficiency in new and existing homes. This data is instrumental in helping legislators understand the broad benefits of energy efficiency and assists with funding advocacy.
  - NAIMA will support efforts to implement energy efficiency in the industrial sector through sponsored training programs on NAIMA's 3E Plus™ Insulation Thickness software program, which calculates the energy, environmental and economic savings from adding the proper levels of pipe and vessel insulation in an industrial facility. NAIMA will work with interested parties to implement these trainings.
  - NAIMA will continue sponsorship of the Database of State Incentives for Renewable Energy (DSIRE) with the North Carolina Solar Center, which lists state and local incentives for consumers and businesses to implement energy efficiency measures and renewable energy. NAIMA will work closely with any utility involved in the Action Plan to promote its programs through this database.
  - Further, NAIMA and its members will dedicate time to participate in appropriate stakeholder groups formed by members of this Action Plan and others.
  - NAIMA will continue to communicate the benefits of energy efficiency to consumers, builders, contractors, designers, legislators, state and federal government representatives, and worldwide policy and advocacy groups working to further the causes of energy efficiency and sustainability. We do this today by serving as an information resource and being an active partner to the various stakeholder groups that make decisions affecting energy efficiency and sustainability. NAIMA will help bring the commitments and achievements from this Action Plan to a broad audience of influencers and potential funding sources.
  - NAIMA will also work with utilities, state energy offices, regional energy efficiency alliances and others to deliver educational programs and materials that encourage the proper levels of thermal insulation in buildings and provide detailed information on proper installation of these materials.
  - NAIMA and its members will continue to advocating for full funding of the Energy Policy Act of 2005 especially in the areas of tax incentives for builders and consumers to improve the efficiency of buildings, programs for building energy efficiency codes and standards and encouraging compliance with these codes and standards above the minimum levels, industrial energy use, state energy programs, and public information and education initiatives.
  - NAIMA will work with utilities to align and harmonize utility incentives with the federal and state tax incentives for homes and buildings in order to maximize energy saving benefits to these incentives. NAIMA will also help align utility incentives by advocating improved energy codes and standards.



Northeast Energy Efficiency Partnerships

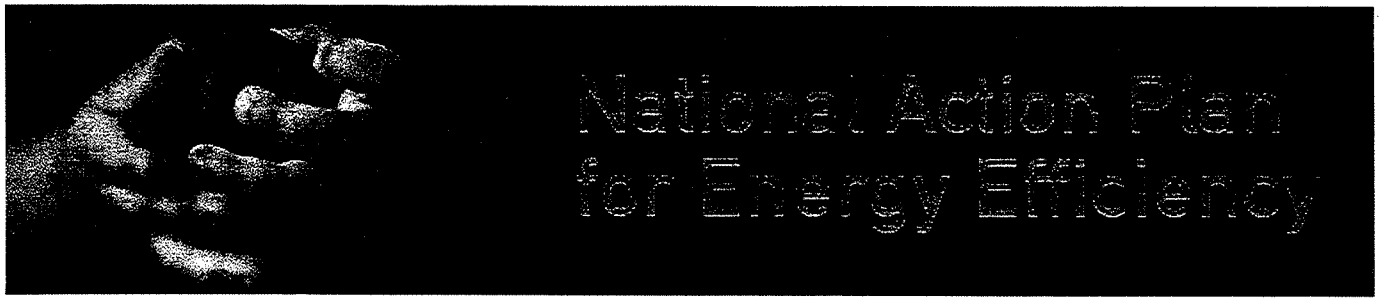
- Endorses Action Plan Recommendations.
- Northeast Energy Efficiency Partnerships (NEEP) commits to work with policymakers, energy efficiency program administrators and other stakeholders to promote the Action Plan Recommendations.
- NEEP commits to promoting energy efficiency in homes, buildings and industry in the Northeast U.S. through regionally coordinated programs and policies that increase the use of energy efficient products, services and practices, and that help achieve a cleaner environment and a more reliable and affordable energy system.
- Specifically, NEEP commits to continuing its efforts to:
  - Increase the commitment of Northeast states to energy efficiency policies and programs for the building sector.
  - Increase the marketplace availability and adoption of quality energy efficient practices and technologies, and
  - Increase the availability and use of effective training and education services regarding best practices to design, build and maintain buildings in an energy and resource efficient manner.
- NEEP pledges to work with states to develop common protocols to measure and value energy efficiency savings on a consistent basis as a means of advancing regional and national energy efficiency solutions.
- NEEP commits to working with other regions of the country, with the EPA, DOE and other organizations to most effectively advance energy efficiency as a key policy solution to our nation's energy needs.

Office of the Ohio Consumers' Counsel

- Endorses Action Plan Recommendations.
- Office of the Ohio Consumers' Counsel commits to:
  - Work in the Midwest Natural Gas Initiative to work towards a 1 percent reduction in demand for gas usage per year by each of the major gas companies.
  - Support the use of smart meters as an option for residential customers.
  - Work with electric companies to design and implement cost-effective energy efficiency programs.

Oregon Governor Ted Kulongoski, Public Utility Commission, Department of Energy, Energy Trust of Oregon

- Endorse Action Plan Recommendations.
- In addition, the Oregon Public Utility Commission has draft legislation to extend the public purpose funding law to 2022 and give the PUC authority to increase the charge for activities related to conservation and renewable resources. The change would not apply to other public purposes and would be limited to an increase or decrease of no more than 1% of revenues.
- In addition, the Oregon Department of Energy is proposing legislation to expand the Business Energy Tax Credit program to builders of High Performance Homes, which combine energy efficiency and renewable energy. The Department coordinates the Energy Efficiency Interagency Team to help state agencies meet the Governor's goal of 20 percent energy savings by 2015.

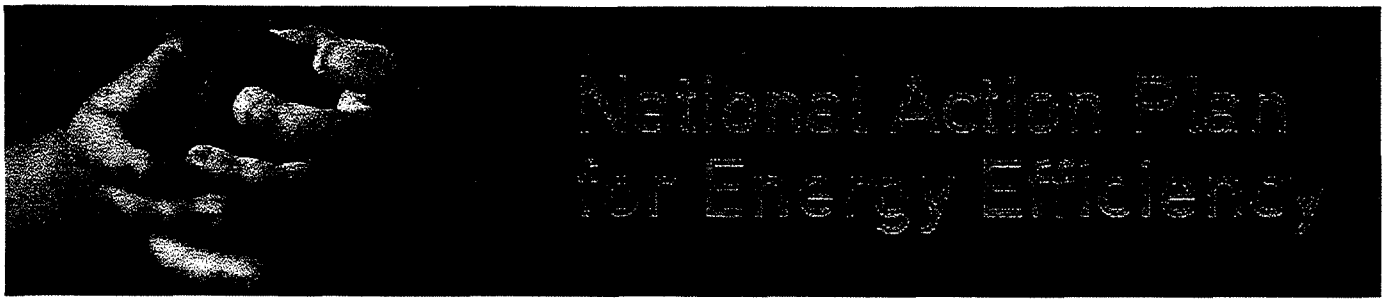


PNM Resources

- Endorses Action Plan Recommendations.
- PNM Resources commits to:
  - Adopt energy efficiency as one of our five corporate environmental sustainability goals by December 31, 2006.
  - Work with public officials, utility regulators and stakeholders in New Mexico and Texas to create a policy and regulatory environment that will align ratemaking incentives with utility investments in cost-effective energy efficiency and reward customers for using less electricity and natural gas.
  - Complete an electric energy efficiency potential study by September 1, 2006 and file an electric energy efficiency plan with the New Mexico Public Regulation Commission by January 31, 2007.
  - Include energy efficiency and demand reduction resources in our 2007 electric supply plan and evaluate these resources on a consistent and comparable basis with supply side resources in future resource planning activities.

Santee Cooper

- Endorses Action Plan Recommendations
- Santee Cooper is committed to a comprehensive conservation program. We are distributing more than 60,000 compact fluorescent lights (CFL) in partnership with the 20 South Carolina electric cooperatives this year. Also, CFLs will be given to all new residential and commercial customers to encourage energy efficiency. Conservation messages are being used in all internal and external communications, executive speeches and giveaways at landfill dedication events.
- Santee Cooper commits to undertaking several new residential and commercial demand side management (DSM) programs beginning this year and continuing over the next several years. Those include reducing the interest rate on Good Cents Loan program, distributing CFLs to new customers, developing a duct sealing program, promoting LEED certified construction, offering meter monitoring services, developing a new energy efficient home program and providing certified Energy Star ratings for Energy Star homes and for federal tax credit.
- Santee Cooper is spearheading South Carolina's first solar Green Power site. Solar panels, totaling 16 kW, have been placed atop four pavilions at Coastal Carolina University in Conway, SC and a dedication event will be held in September 2006.



Seattle City Light

- Endorses Action Plan Recommendations.
- Seattle City Light commits to reaffirm cost effective conservation as the first priority resource to Seattle City Light's future energy needs.
- Seattle City Light commits to strive to meet all new electrical demands from Seattle City Light customers with conservation and renewable resources.
- As the first electric utility in the country to achieve greenhouse gas neutrality, acquire energy efficiency as a key component in City Light's strategy going forward to maintain zero net greenhouse gas emissions.
- Seattle City Light commits to recognize and assess conservation resources on an equivalent basis with generation and other supply side resources in 2006 Integrated Resource Plan.
- Seattle City Light commits to develop 5-year (2008-2012) conservation program action plan that will:
  - Meet direction and energy savings target set in 2006 Integrated Resources Plan.
  - Describe a portfolio of programs which will serve all key customer classes and meet established resource cost effectiveness criteria.
  - Lay out program energy savings goals, funding and staffing requirements over the 5-year period.
  - Explore opportunities to advance building codes and energy standards to the highest level consistent with other public policy goals and objectives.
  - Reflect market transformation as an integral component of overall strategy.
- Seattle City Light commits to support a statewide workshop to explore greater investment in energy efficiency resources.

Southeastern Association of Regulatory Utility Commissioners

- Passed Resolution that states:
  - RESOLVED, That the Southeastern Association of Regulatory Utility Commissioners ("SEARUC"), convened at its 2006 Annual Conference, supports NARUC's July 2004 "Resolution on Gas and Electric Energy Efficiency", as well as NARUC's continued efforts in this regard; and be it further
  - RESOLVED, That SEARUC endorses the principal objectives and Recommendations of the 2006 National Action Plan on Energy Efficiency, and commends to its member commissions a state-specific review of the elements and potential applicability of the energy efficiency policy Recommendations outlined in the Plan, in an effort to identify potential improvements in energy efficiency policy in each of the SEARUC states.

Waverly Light and Power

- Endorses Action Plan Recommendations.
- The Waverly Light and Power Board approved a MOU with the World Wildlife Fund in 2003, stating that Waverly Light and Power would achieve 15% energy efficiency by the year 2020, and that Waverly Light and Power will continue efforts to reduce overall demand (kW) in its service territory as part of a strategy to reduce the need for new electric generating capacity. As of 2005, Waverly Light and Power is pleased to have reduced its peak demand by 6.68% through a number of energy efficiency programs.
- In addition to energy efficiency, in 2006, Waverly Light and Power's Board of Trustees passed a resolution for the utility to reach a goal of 20% of its energy to come from renewable resources by the year 2020.
- The utility also participates in the annual Voluntary Reporting of Greenhouse Gases Emissions and Reductions (EIA-1605)).

Western Conference of Public Service Commissioners

- Passed Resolution that states:
  - RESOLVED, That the Western Conference of Public Service Commissioners ("WCPSC") supports NARUC's July 2004 "Resolution on Gas and Electric Energy Efficiency", as well as NARUC's continued efforts in this regard; and be it further
  - RESOLVED, That WCPSC endorses the principal objectives and recommendations of the 2006 National Action Plan on Energy Efficiency, and commends to its member commissions a state-specific review of the elements and potential applicability of the energy efficiency policy recommendations outlined in the Plan, in an effort to identify potential improvements in energy efficiency policy in each of the WCPSC states.

Xcel Energy

- Endorses Action Plan Recommendations.
- Xcel Energy renews its commitment to energy efficiency and pledges to continue pursuing initiatives to encourage customers to conserve electricity and natural gas.

Exhibit B

Decoupling for Idaho Power Company

DECOUPLING FOR IDAHO POWER COMPANY

Eric Hirst
Consulting in Electric-Industry Restructuring
Bellingham, Washington

March 30, 2004

Prepared for
Idaho Power Company
Boise, Idaho
Mike Youngblood, Project Manager

CONTENTS

1. INTRODUCTION 3

2. CURRENT SITUATION 4

3. COLLECTION OF FIXED COSTS THROUGH VARIABLE RATES 5

4. POSSIBLE RECOUPLING MECHANISMS 8

5. ANALYSIS OF RECOUPLING MECHANISMS FOR IPC 10

6. IPC DECOUPLING-MODEL RESULTS 12
   - BASE CASE 12
   - REVENUE PER CUSTOMER RECOUPLING 15
   - INFLATION RECOUPLING 16
   - FORECAST-LOAD-GROWTH RECOUPLING 17
   - EFFECTS OF DSM PROGRAMS 17

7. CONCLUSIONS 18

APPENDIX A: PAST EXPERIENCE WITH DECOUPLING 21

APPENDIX B. DETAILS ON RECOUPLING WORKBOOK 24

- the frequency with which rates are adjusted for decoupling.

The next section describes the current (2003) situation that Idaho Power Company (IPC) faces with respect to recovery of its fixed costs. Section 3 focuses on class-specific rate structures and how they affect recovery of fixed costs. Section 4 briefly reviews alternative ways to recouple utility revenues to something other than energy sales. Section 5 explains the analytical method developed to examine alternative recoupling mechanisms for IPC, with additional details in Appendix B. Section 6 presents model results. And the final section summarizes the results, findings, conclusions, and recommendations from this study.

2. CURRENT SITUATION

This paper focuses on (and deals only with) the following rate classes: Residential (Schedule 1), Small General (7), Large General (9), Large Power (19), and Irrigation (24). Together, these five classes account for 99% of IPC's 2003 proposed revenue requirement.

Based on information from the current IPC rate case, 56% of the 2003 cost-of-service revenue requirement covers fixed costs ($303 million of the $541 million total), with the remaining 44% for variable energy costs ($237 million for fuel, purchased power, and variable operations and maintenance at generating stations).* As shown in Fig. 1, the fixed-cost (FC) component is greatest for Schedule 7 (70%) and smallest for Schedule 19 (36%); this difference is probably a consequence primarily of differences in load factors among classes. This suggests that the net-revenue-loss problem associated with utility energy-efficiency programs might be greatest for the Small General class of customers.

Figure 1 also shows fixed costs as a share of proposed revenue requirements. Because of the large proposed cost shift from the irrigation class to the other classes (25% of the irrigation cost of service), the share of revenue requirement from fixed costs is much greater for this class than the share

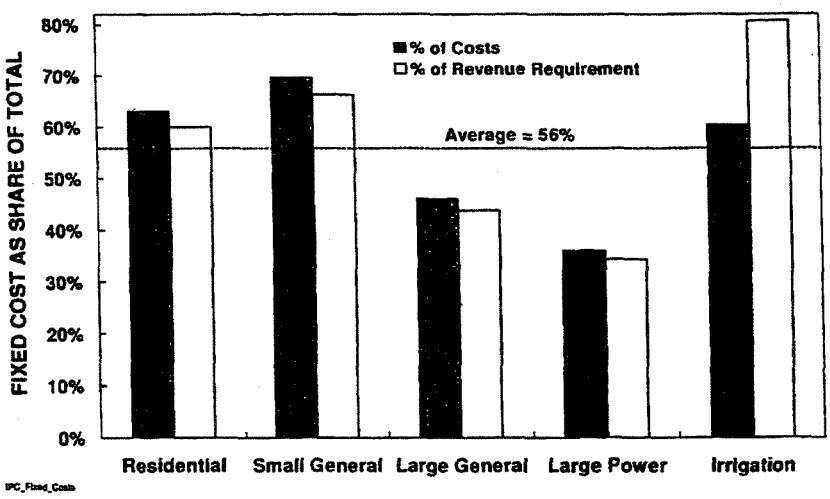


Fig. 1. Percentage of 2003 costs and proposed revenue requirement from fixed costs, by rate class.

*I assume that the only variable costs IPC experiences are for energy production.

of total costs.* The effects of the shift from cost of service to revenue requirements is much smaller (about 5%) for the other four classes. The remainder of this paper uses proposed revenue requirements as the basis for calculating and adjusting fixed costs.

Table 1 provides key statistics, based on the 2003 rate case, for each customer class. The Residential class accounts for just over half of the company's total fixed costs. Normalizing the fixed costs for each class by the number of customers in each class shows substantial differences, ranging from $420/customer for Small General to $206,000 for Large Power. The difference between the proposed energy charge and variable energy cost is greatest for Small General ($40/MWh) and smallest for Large Power ($3/MWh), with an average of $16/MWh.

Table 1. Fixed- and variable-cost characteristics of IPC rate classes[a]

	Rate Class					
	1	7	9	19	24	Total
Fixed costs, million $	153.1	13.5	54.3	21.6	60.8	303.4
Fixed costs as percentage of total cost	63.0	69.7	46.1	36.1	60.4	56.1
Fixed costs as percentage of revenue requirement	60.0	66.4	43.9	34.4	80.7	56.5
Fixed costs/customer, $	457	420	3,186	206,278	4,253	756
Variable cost, $/MWh	21.7	22.1	21.1	19.3	24.6	21.5
Energy charge, $/MWh	51.9	62.0	26.2	22.1	35.3	37.3

[a]The 2003 cost of service for class 24 is $100.7 million, but the proposed revenue requirement is only $75.4 million, a 25% reduction.

3. COLLECTION OF FIXED COSTS THROUGH VARIABLE RATES

The relative importance of decoupling for different rate classes depends on the relationship between fixed and variable costs (Fig. 1) and the rate design for that class (discussed here). Rates for classes 1 and 7 include per-customer and energy charges, while those for the other classes also include several demand charges.#

*The assumption that all of the class 24 fixed costs are to be recovered from the proposed rates implies that the energy charge for this class is much too low. Thus, the substantial subsidy of class 24 costs make the results presented here suspect for that class.

#To keep this discussion from becoming too complicated and to focus on the issues rather than the details, the Schedule 9 and 19 subclasses (Secondary, Primary, and Transmission) are combined into one average class. Similarly, the demand charges are aggregated for each class into one average charge.

Figure 3 presents this information in yet another way. This figure shows the net revenue loss (the loss in FC recovery) to IPC per MWh of energy reduction.* Again, results are shown for two cases: demand changes are proportional to energy changes, and demand changes are independent of energy changes. On a per MWh basis, the company is most exposed to energy-efficiency programs aimed at the Residential and Small General classes, with losses of $27 and $36 per MWh. At the other end of the spectrum, if demand-related revenues are independent of energy sales, the losses for the Large General and Large Power classes are only $3 and $1 per MWh. Averaged over all five classes, the company would lose $16 for every MWh reduction in sales.

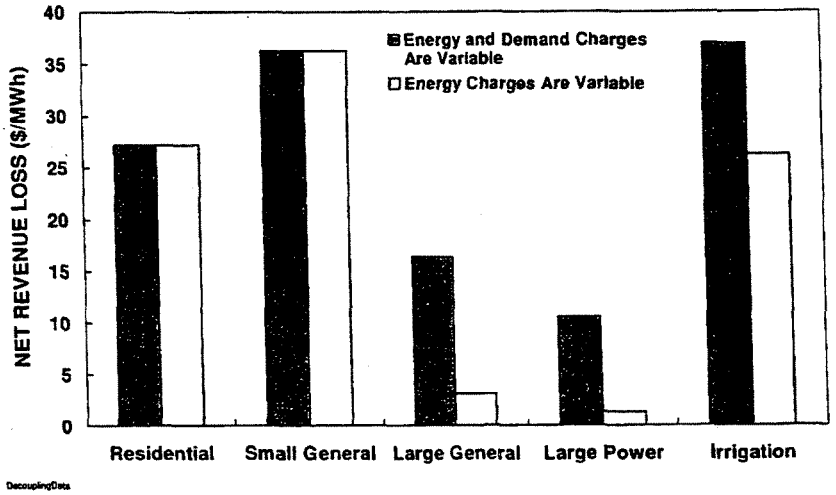


Fig. 3. Loss of fixed-cost revenues per MWh of sales reduction by rate class.

These results suggest that, if IPC decides not to implement decoupling for all rate classes, it might focus initially on schedules 1 and 7. Because the residential class accounts for more than half of IPC's fixed costs and residential customers pay for much of their fixed costs through the energy charge, IPC's earnings losses are quite high, both in absolute terms and on a per MWh basis. Although Schedule 7 accounts for only 4% of IPC's fixed costs, its energy charge of $62/MWh is the highest of all rate schedules.

4. POSSIBLE RECOUPLING MECHANISMS

Decoupling mechanisms, of necessity, recouple utility revenues to something other than sales. Possible recoupling mechanisms include explicit attrition adjustments intended to track the determinants of fixed costs (e.g., the cost of capital), the number of utility customers (which seems most applicable to distribution costs), inflation (perhaps with a productivity offset), the determinants of electricity sales, or some other mechanism. A key policy issue here is whether recoupling should focus on tracking fixed costs (which seems the most reasonable but could

*The numbers shown in Fig. 3 are based on the proposed rate structures, while those in Table 1 are based on actual costs. The only substantial discrepancy occurs for Irrigation customers; Figure 3 shows a net revenue loss of $26.3/MWh while Table 1 shows only $10.7/MWh.

be quite complicated*) or on some proxy for sales (consistent with the traditional treatment of fixed costs). A third option is to agree upfront on the level of allowed fixed costs for a few years and to then have frequent rate cases. The Oregon PUC chose this approach in the mid-1990s for decoupling mechanisms implemented by PacifiCorp and PGE, with rate cases to be held every two years.

Two statistical analyses of data from several utilities showed little connection between changes in a utility's fixed costs and its electricity sales:#

- In the long-run the relationship between [fixed] cost and customer growth is stronger or no worse than the corresponding relationship between costs and sales.
- The short-term analysis of year-to-year changes in sales vs. base costs shows no statistically significant relationship. Yet, ... the assumed existence of a strong correlation between these two factors is the foundation of traditional sales-based regulation.

Similarly, Eto, Stoft, and Belden wrote, "Relying on 25 years of aggregate financial statistics from 160 investor-owned utilities, we find that one-year changes in load or numbers of customers are both poorly-correlated with changes in nonfuel costs. Hence, the proponents of RPC [revenue per customer decoupling] are correct in arguing that RPC does no worse than traditional ratemaking in tracking nonfuel costs (indeed, we find it does slightly better)."§

These analyses show that decoupling replaces one set of factors unrelated to the determinants of fixed costs with another set of factors unrelated to those costs. Decoupling, on average, should have no positive or adverse effect on a utility's opportunity to recover its fixed costs. On a year to year basis, decoupling might (or might not) stabilize FC recovery.

---

*C. Marnay and G. A. Comnes, "California's ERAM Experience," Chapter 3 in *Regulatory Incentives for Demand-Side Management*, edited by S. M. Nadel, M. W. Reid, and D. R. Wolcott, 39–62, American Council for an Energy-Efficient Economy, Washington, DC, 1992.

#D. Moskovitz and G. B. Swofford, "Revenue-per-Customer Decoupling," Chapter 4 in *Regulatory Incentives for Demand-Side Management*, edited by S. M. Nadel, M. W. Reid, and D. R. Wolcott, 63–77, American Council for an Energy-Efficient Economy, Washington, DC, 1992.

§J. Eto, S. Stoft, and T. Belden, *The Theory and Practice of Decoupling*, LBL-34555, Lawrence Berkeley Laboratory, Berkeley, CA, January 1994.

- The summer and nonsummer demand components vary from year to year with the IRP forecasts of maximum monthly demand (maximum of the 12 monthly peaks) each year.

- Only five rate classes are considered here (1, 7, 9, 19, and 24); the other classes (which, together, account for only 1% of IPC's revenues) are ignored.

- The decoupling rate adjustments occur without any lag (i.e., in the same year the costs change). That is, this analysis ignores the complications of balancing accounts and after-the-fact trueups that would affect rates in subsequent years.

- The decoupling mechanisms considered here are all weather-normalized. That is, they—unlike current ratemaking—compensate the company for its fixed costs on the basis of normal weather conditions.*

6. IPC DECOUPLING-MODEL RESULTS

BASE CASE

The base case is defined as the situation forecast for the 2004 IRP in terms of annual growth in the number of customers, peak demand, and energy use for each customer class. The effects on customers and on IPC's FC recovery is exactly as expected, based on the three-year growth in the three recoupling mechanisms.

With forecast recoupling, there are no adjustments (by definition); i.e., actual growth in customers, energy, and demand match expected growth in these factors. Company losses (and customer bill reductions) are greater with inflation recoupling than with RPC recoupling, Table 3 and Fig. 5 show the effects of these two decoupling mechanisms on each rate class when decoupling is implemented on a class-specific basis and when it is implemented in aggregate (last column in Table 3). The results show both percentage and absolute changes in customer bills (and IPC FC revenues), demand charges, and energy charges. (Because classes

*Similarly, customer payments for fixed costs are weather normalized. For example, if the weather one year is extreme, the company will collect (and consumers will pay) less money for transmission and distribution with decoupling than it (they) would under traditional ratemaking. Adding a weather-adjustment component to a recoupling mechanism is feasible but complicates the calculations. Doing so would require use of the IPC computer models that weather adjust sales for each customer class and development of assumptions on "actual" weather (heating and cooling degree days) in future years.

1 and 7 do not have demand charges, these numbers are always zero.)* Annualized changes are one-third the 3-year totals presented here.

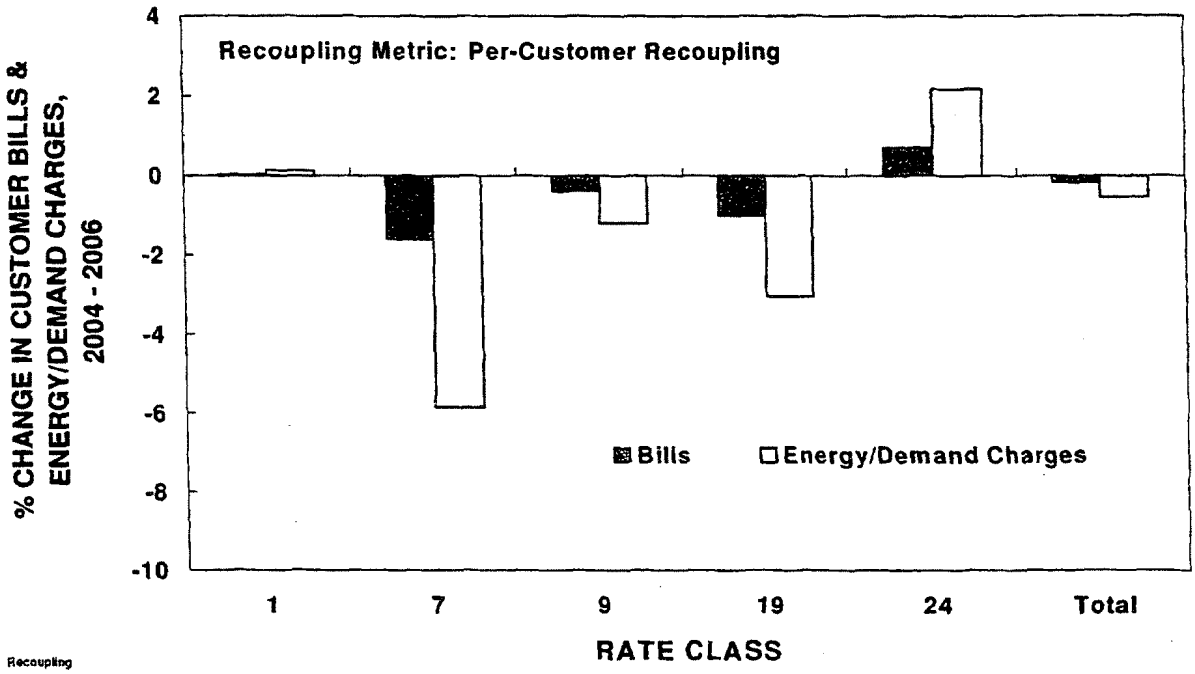
Table 3. Base-case results (3-year changes in electric bills and rates relative to case with no decoupling) for RPC and inflation recoupling, 2004 to 2006[a]

	Rate Class						Aggre-gate[b]
	1	7	9	19	24	Total[b]	
Revenue-per-customer recoupling							
% Electric Bill	0.04	-1.60	-0.38	-1.01	0.72	-0.16	-0.05
$ Electric Bill (thousand $)	320	-1058	-1539	-2009	1593	-2694	-801
% E/D Charges	0.14	-5.85	-1.20	-3.04	2.18	-0.53	-0.16
Energy Charge (¢/kWh)	0.01	-0.36	-0.03	-0.07	0.08	-0.02	-0.01
Demand Charge ($/kW-month)	0.00	0.00	-0.02	-0.07	0.05	-0.01	0
Inflation recoupling							
% Electric Bill	-0.37	-2.39	-0.91	-0.64	0.82	-0.45	-0.45
$ Electric Bill (thousand $)	-2999	-1578	-3637	-1280	1813	-7681	-7,681
% E/D Charges	-1.33	-8.72	-2.81	-1.93	2.48	-1.51	-1.51
Energy Charge (¢/kWh)	-0.07	-0.54	-0.07	-0.04	0.09	-0.06	-0.06
Demand Charge ($/kW-month)	0.00	0.00	-0.05	-0.04	0.06	-0.03	-0.03

[a]Results for forecast recoupling are not shown because it *is* the base case.

[b]These percentage and dollar changes are the same as those IPC would experience in its recovery of fixed costs.

*All the results shown in this section apply the same percentage change to energy and demand charges. It would be possible (and the Recoupling model is set up) to adjust energy charges only. It is not possible to adjust demand charges only because classes 1 and 7 pay no demand charges.



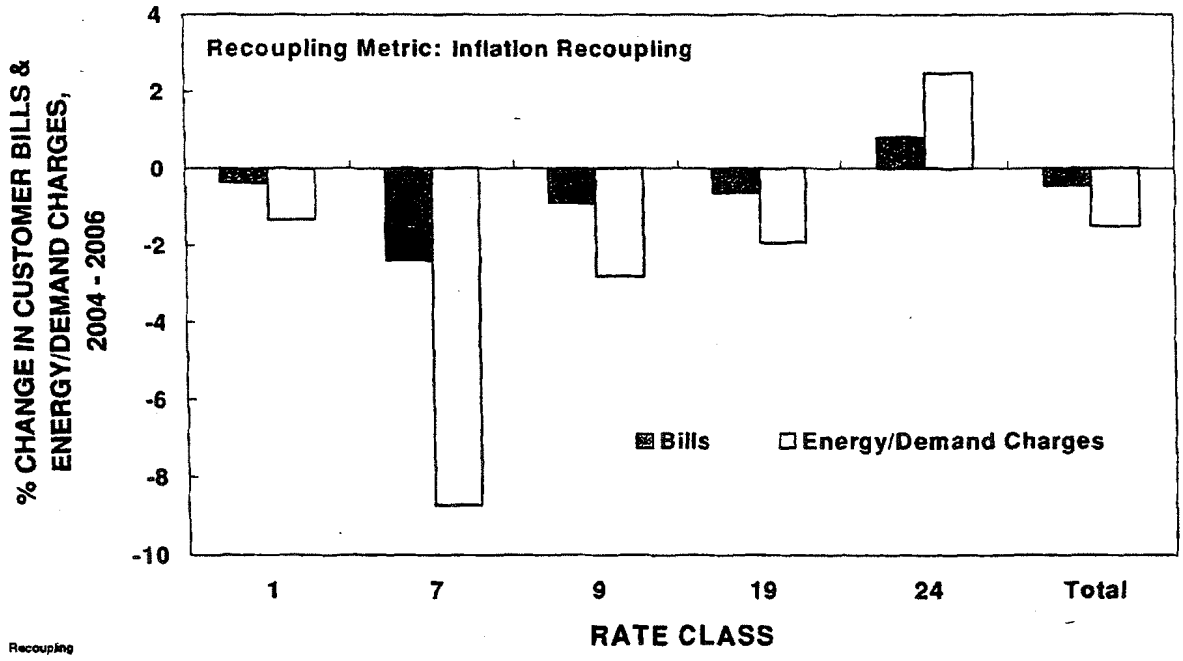


Fig. 5. **Three-year effects of two recoupling mechanisms on customer bills and energy/demand charges by rate class. With RPC decoupling, IPC collects $2.7 million less than it would with no decoupling mechanism. With Inflation decoupling, IPC collects $7.7 million less over this 3-year period. Under these base-case conditions, the forecast load growth recoupling mechanism yields no changes in customer bills or rates.**

FORECAST-LOAD-GROWTH RECOUPLING

Forecast recoupling depends on changes in all three billing determinants. Comparing the right-hand sides of Tables A-4 and A-5 shows that the effects of forecast recoupling, relative to the base case, are identical to those for inflation recoupling.

As with the other two mechanisms, the results are symmetrical around the base case. Similarly, the effects are additive across all three billing determinants.

EFFECTS OF DSM PROGRAMS

When the only change from base-case conditions is slower growth in energy sales (and perhaps peak demand), the company's collection of FC revenues increases (as intended) by the same amount regardless of the recoupling mechanism in place. If demand growth is unaffected by the assumed IPC DSM program (i.e., its only effects are on energy sales), the decoupling adjustment is smaller (as expected, because revenue collection through demand charges is unaffected). Table 4 shows the effects on IPC FC recovery for DSM programs that cut energy and demand by 1%/year (i.e., 1% in 2004, 2% in 2005, and 3% in 2006) and programs that cut energy use only.* The effects of even such a large and effective DSM program on IPC revenues are very small, less than 1% of base revenues over this 3-year period. In these cases, decoupling works exactly as intended to ensure the company suffers no loss in FC revenue because of reductions in energy use or peak demand.

Table 4. Increase in IPC fixed-cost recovery (relative to base case) associated with reductions of 1% per year in energy use or energy use and demand

Reductions in	Increase in IPC fixed-cost recovery, 2004–2006	
	million $	Percentage[a]
Energy only	11	0.7
Energy and demand	16	0.9

[a]IPC fixed-cost revenue for the 3-year period 2004–2006 in the base case is $946 million.

The reductions in energy sales and demand described above, relative to the base case, lead to a 0.9% increase in customer electricity bills and a 3% increase in energy and demand charges over this 3-year period. As shown in Fig. 6, the percentage rate increases are highest for classes 7 and 24 and lowest for classes 9 and 19.

*The same results would obtain for such reductions in energy and demand regardless of the motivation for the energy and demand cuts.

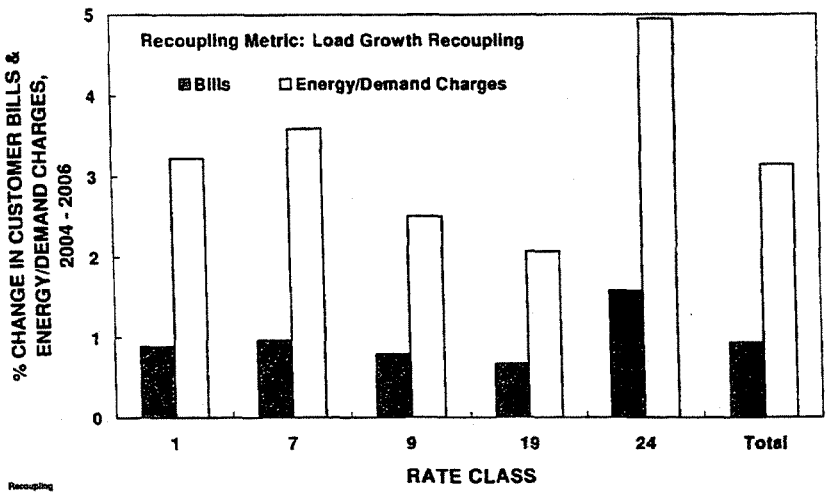


Fig. 6. **Effects of 1% per year reductions in energy use and peak demands for three years on electricity bills and rates, relative to the base case.**

7. CONCLUSIONS

Current electric-utility ratemaking, as practiced in most jurisdictions throughout the United States, collects substantial revenues to recover fixed costs from variable energy charges. This practice makes little economic sense. Specifically, a utility's ability to recover its prudently incurred fixed costs depends on factors that are (a) unrelated to those costs and (b) largely outside its control, including economic and population growth in its service area, which, in turn, affect energy sales.

This long-standing quirk in ratemaking unintentionally, but unavoidably, penalizes utilities that encourage their customers to use electricity more efficiently. Thus, utilities face a clear disincentive to help their customers improve energy efficiency.

Decoupling is a mechanism that breaks the link between electricity sales and utility revenues. To implement decoupling, utility revenues need to be recoupled to some other factor(s). This recoupling is necessary to ensure that the utility has an opportunity to recover its fixed costs. However, many of the factors considered for recoupling—such as the number of customers, inflation, or forecast revenues—may have no more logical connection to fixed costs than does kWh sales.

Although decoupling is intended to remove the penalties in existing ratemaking for utility DSM programs, its effects can be much broader. That is, depending on the recoupling

APPENDIX A: PAST EXPERIENCE WITH DECOUPLING

This brief discussion is divided into three parts, the first dealing with decoupling during the mid-1980s to early 1990s, the second covering the Oregon decoupling collaboratives in the early- to mid-1990s, and the third dealing with decoupling implemented after the Western electricity crisis of 2000/2001.

MID-1980s TO EARLY 1990s

California was the first state, in 1981, to implement a decoupling system, called the Electric Revenue Adjustment Mechanism (ERAM) (Marnay and Comnes 1992). Once every three years, the California PUC set rates for each of the state's utilities in a general rate case. The rate-case process, based on a future test year, included a determination of the amount of money the utility could collect for its fixed costs. The ERAM mechanism was used to ensure that for the years between rate cases the utility collected the correct amount of money to cover these costs.

The PUC used attrition mechanisms to determine the amount of money the utility could collect each year. Financial attrition adjusted for changes in the utility's cost of capital. These adjustments were handled in annual proceedings that set interest rates and return on equity for all the California utilities.

Operational attrition adjusted for changes in operating costs, such as wage rates and the costs for certain materials. These costs were adjusted on the basis of price indices.

Finally, rate-base attrition adjusted for changes in the utility's ratebase. These adjustments were based primarily on forecasts of capital expenditures developed during the general rate cases.

During the first decade of operation, ERAM had very small effects on utility rates and volatility.

New York, during the late 1980s and early 1990s, used decoupling mechanisms similar to California's ERAM.

Washington and Maine adopted decoupling mechanisms in 1991 (Washington Utilities and Transportation Commission 1992; Maine PUC 1993). Neither state used the California approach. Instead, these states adjusted allowed fixed costs on the basis of growth in the number of electricity customers.

The mechanisms adopted in Washington and Maine were used for only a few years. The commissions abandoned decoupling because of substantial rate increases. These rate increases had nothing to do with the utility's DSM programs. In Washington, power-supply costs (which

Table A-2. Base-case growth rates (%/year) from IRP

	Rate Class					Total or
	1	7	9	19	24	Average
			Customers			
2004	2.41	2.63	2.63	1.11	2.05	2.42
2005	2.26	2.59	2.59	1.75	1.80	2.29
2006	2.24	2.55	2.55	1.72	1.77	2.26
Cumulative	1.07	1.08	1.08	1.05	1.06	1.07
			Maximum MW			
2004			2.48	3.41	2.38	2.58
2005			3.03	3.26	2.85	2.98
2006			2.12	1.36	2.62	2.24
Cumulative			1.08	1.08	1.08	1.08
			Average MW			
2004			3.57	3.57	2.49	3.57
2005			2.48	2.47	2.69	2.48
2006			2.13	2.10	2.25	2.12
Cumulative			1.08	1.08	1.08	1.08
			Sales			
2004	2.49	4.87	4.87	2.83	1.77	3.16
2005	2.09	4.02	4.03	3.05	0.45	2.63
2006	2.06	3.51	3.51	3.31	-0.17	2.43
Cumulative	1.07	1.13	1.13	1.09	1.02	1.08

	Price Deflator	
Year	PCWGDP	Inflation, %/yr
2003	1.127	
2004	1.149	1.96
2005	1.171	1.97
2006	1.195	2.06
Cumulative		1.061

Table A-4. IPC Decoupling Results: Inflation Decoupling, 2004 - 2006

	Rate Class							Differences from 0,0,0 Base Case						
	1	7	9	19	24	Total	Aggreg.	1	7	9	19	24	Total	Aggreg.
C, D, E Growth Rates, %/year = 0,0,0														
% Electric Bill	-0.37	-2.39	-0.91	-0.64	0.82	-0.45	-0.45							
$ Electric Bill	-2999	-1578	-3637	-1280	1813	-7681	-7681							
% E/D Charges	-1.33	-8.72	-2.81	-1.93	2.48	-1.51	-1.51							
$ Energy Charge	-0.07	-0.54	-0.07	-0.04	0.09	-0.06	-0.06							
$ Demand Charge	0.00	0.00	-0.05	-0.04	0.06	-0.03	-0.03							
C, D, E Growth Rates, %/year = 1,1,1														
% Electric Bill	-0.98	-3.05	-1.34	-0.98	0.01	-1.01	-1.015	-0.60	-0.66	-0.43	-0.34	-0.81	-0.56	-0.56
$ Electric Bill	-7806	-2015	-5371	-1966	15	-17143	-17143	-4807	-437	-1734	-686	-1798	-9462	-9462
% E/D Charges	-3.44	-11.04	-4.12	-2.95	0.01	-3.33	-3.328	-2.10	-2.32	-1.31	-1.01	-2.47	-1.82	-1.82
$ Energy Charge	-0.18	-0.69	-0.11	-0.07	0.00	-0.12	-0.124	-0.11	-0.14	-0.03	-0.02	-0.09	-0.07	-0.07
$ Demand Charge	0.00	0.00	-0.08	-0.06	0.00	-0.07	-0.070	0.00	0.00	-0.03	-0.02	-0.06	-0.04	-0.04
C, D, E Growth Rates, %/year = 1,0,0														
% Electric Bill	-0.53	-2.58	-0.95	-0.65	0.80	-0.55	-0.55	-0.16	-0.18	-0.04	-0.01	-0.02	-0.09	-0.09
$ Electric Bill	-4262	-1700	-3794	-1299	1770	-9284	-9284	-1263	-122	-157	-19	-43	-1603	-1603
% E/D Charges	-1.89	-9.40	-2.94	-1.96	2.42	-1.82	-1.82	-0.56	-0.68	-0.12	-0.03	-0.06	-0.31	-0.31
$ Energy Charge	-0.10	-0.58	-0.08	-0.04	0.09	-0.07	-0.07	-0.03	-0.04	0.00	0.00	0.00	-0.01	-0.01
$ Demand Charge	0.00	0.00	-0.06	-0.04	0.06	-0.04	-0.04	0.00	0.00	0.00	0.00	0.00	-0.01	-0.01
C, D, E Growth Rates, %/year = 0,1,0														
% Electric Bill	-0.37	-2.39	-1.22	-0.93	0.58	-0.60	-0.60	0.00	0.00	-0.32	-0.29	-0.23	-0.14	-0.14
$ Electric Bill	-2999	-1578	-4909	-1864	1295	-10055	-10055	0	0	-1271	-585	-518	-2375	-2375
% E/D Charges	-1.33	-8.72	-3.79	-2.81	1.76	-1.97	-1.97	0.00	0.00	-0.98	-0.88	-0.72	-0.46	-0.46
$ Energy Charge	-0.07	-0.54	-0.10	-0.06	0.06	-0.07	-0.07	0.00	0.00	-0.03	-0.02	-0.03	-0.02	-0.02
$ Demand Charge	0.00	0.00	-0.07	-0.06	0.04	-0.04	-0.04	0.00	0.00	-0.02	-0.02	-0.02	-0.01	-0.01
C, D, E Growth Rates, %/year = 0,0,1														
% Electric Bill	-0.82	-2.87	-0.98	-0.68	0.26	-0.78	-0.78	-0.44	-0.48	-0.08	-0.04	-0.56	-0.32	-0.32
$ Electric Bill	-6543	-1893	-3943	-1362	576	-13165	-13165	-3544	-315	-306	-82	-1237	-5484	-5484
% E/D Charges	-2.88	-10.37	-3.03	-2.04	0.77	-2.56	-2.56	-1.55	-1.65	-0.22	-0.11	-1.71	-1.05	-1.05
$ Energy Charge	-0.15	-0.64	-0.08	-0.05	0.03	-0.10	-0.10	-0.08	-0.10	-0.01	0.00	-0.06	-0.04	-0.04
$ Demand Charge	0.00	0.00	-0.06	-0.04	0.02	-0.05	-0.05	0.00	0.00	0.00	0.00	-0.04	-0.02	-0.02
C, D, E Growth Rates, %/year = 0,1,1														
% Electric Bill	-0.82	-2.87	-1.30	-0.97	0.03	-0.92	-0.92	-0.44	-0.48	-0.39	-0.33	-0.79	-0.47	-0.47
$ Electric Bill	-6543	-1893	-5215	-1946	58	-15539	-15539	-3544	-315	-1578	-667	-1755	-7858	-7858
% E/D Charges	-2.88	-10.37	-4.00	-2.92	0.07	-3.02	-3.02	-1.55	-1.65	-1.19	-0.98	-2.42	-1.51	-1.51
$ Energy Charge	-0.15	-0.64	-0.10	-0.06	0.00	-0.11	-0.11	-0.08	-0.10	-0.03	-0.02	-0.09	-0.06	-0.06
$ Demand Charge	0.00	0.00	-0.08	-0.06	0.00	-0.06	-0.06	0.00	0.00	-0.02	-0.02	-0.06	-0.03	-0.03