Muskrat Falls Review
Exhibit - GRK# 5
Filed: Feb 23, 2012 Board Secretary: (A) Bt.

RAP | Energy solutions for a changing world

Electricity Regulation In the US: A Guide

Electronic copies of this guide and other RAP publications
can be found on our website at **www.raponline.org**.

To be added to our distribution list,
please send relevant contact information to **info@raponline.org**.

RAP | Energy solutions for a changing world

Electricity Regulation in the US: A Guide

March 2011

The Regulatory Assistance Project

HOME OFFICE
50 State Street, Suite 3
Montpelier, Vermont 05602

phone: 802-223-8199
fax: 802-223-8172

www.raponline.org

Contents

13. Integrated Resource Planning/ Least-Cost Planning

Integrated resource planning (IRP, or *least-cost planning*) evolved in the 1980s, in the wake of the significant costs of a variety of expensive new power plants — some finished, and some abandoned during construction — that caused sharp electric-rate increases in many parts of the United States.

Of course, all utilities do some sort of long-range planning, but not all these plans are developed with the involvement of the regulator and other stakeholders. Not all regulators require IRPs to be prepared; of those that do, not all approve them, while others accept them without ruling; and some utilities prepare them without any regulatory requirement to do so.

This section discusses a formalized system of planning for future power supply, transmission, and distribution needs, including a provision for public involvement and commission oversight.

13.1. What is an IRP?

IRPs examine forecasted load growth for a utility, and evaluate alternative means of meeting that growth.[53] These documents look at a wide range of options to meet future needs, including continued operation of existing power plants, building new power plants, or buying power from non-utility generators,. They may also consider non-generation alternatives, such as investing in energy efficiency programs, promoting efficient new construction, reducing transmission and distribution system line losses, encouraging customer-owned generation, and any other available, reliable, and cost-effective means of meeting customer needs.

Some IRPs also consider local and regional transmission requirements, setting forth a plan for future upgrades to existing lines and/or construction of new lines. Because utilities sell power to one another, additional transmission interconnections may eliminate the need for construction of new power plants.

The goal of an IRP is to identify the least-cost resource mix for the utility and its consumers. *Least-cost* in this case means lowest total cost over the planning horizon, given the risks faced. The best resource mix is typically the

53 In some cases, utilities may be facing predicted load declines, rather than increases. Even so, the principles of integrated resource planning remain the same.

one that remains cost-effective across a wide range of futures and sensitivity cases — the most *robust* alternative — and that also minimizes the adverse environmental consequences associated with its execution. Most IRPs do not consider distribution-plant improvements that can reduce line losses and avoid the need for generation; but increasingly, utilities are including consideration of non-traditional alternatives.

13.2. How Does an IRP Guide the Utility and the Regulator?

An IRP compares multiple alternatives, and examines the costs, reliability, and environmental impacts of each. The utility will use the results of the IRP to decide what types of resources to acquire, whether it's better to own power plants or buy power from others, and how to manage its programs to achieve the desired results. The regulator may use the IRP to determine what investments the utility may make, and it should use the IRP as one tool in evaluating the prudence of the utility's actions over time. However, simply including a proposed resource in an IRP (whether approved or merely accepted by the regulator) does not necessarily "make it prudent" or confer pre-approval, nor does it excuse the utility from continuous re-examination of proposed projects in light of such factors as changing loads, changing costs, and emerging alternatives.

Roughly 30 states rely on IRPs, and the manner in which they do so varies. Some consider the IRP approval process to be pre-approval of the investments that follow, but most still conduct project-specific prudence review before those investments are included in rates. The detailed and complex nature of an IRP often means that its success or failure depends critically on the commitment of utilities to the process, and on the involvement of the commission and stakeholders.

13.3. Participating in IRP Processes

Where the regulator requires an IRP, it often provides for the participation of stakeholders — consumers' groups, industries, environmental advocates, business groups, and others — in the planning or review process.

An IRP advisory group may be formed to review drafts, propose alternatives for evaluation, and report to the regulator when the finished product is submitted for review. Sometimes stakeholders can intervene in the formal regulatory process; each state that requires IRPs has its own approach. The detailed and complex nature of the IRP can make it a challenging and resource-intensive vehicle for stakeholders.

Environmental regulators participating as stakeholders can also inform the IRP process. Any new power plant that receives a certificate of approval from a utility regulator will also usually require environmental permits.

Environmental regulators may also want to ensure that the IRP assumptions are consistent with those used by air, land, and water regulatory agencies in their respective resource-planning efforts. The IRP can help environmental regulators determine, first, whether their existing standards are adequately protective; second, the level, timing, and stringency of future air, land, and water standards; and third, the potential role of energy efficiency in helping to meet current and future environmental requirements.

Some regulators examine the proposed IRP in detail, and may order changes. Others will conduct a more cursory review, and only determine whether the document meets the minimum requirements of their law or rules.

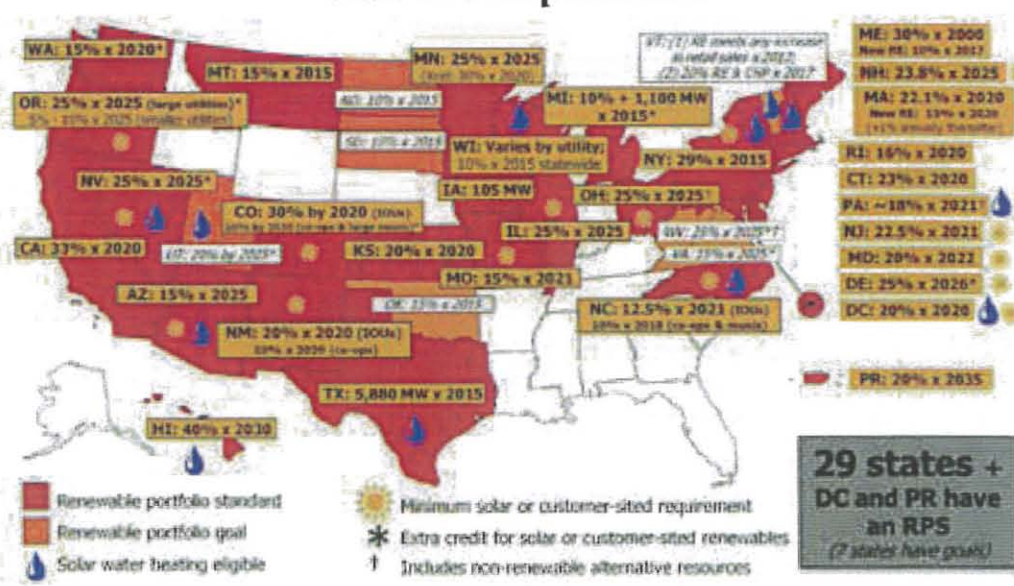
13.4. Energy Portfolio Standards and Renewable Portfolio Standards

Most states have adopted specific resource portfolio standards for utilities. Most of these require each utility to meet a specific portion of its energy requirements with qualifying renewable resources; these are known as *renewable portfolio standards* (RPS). Several have required a specified mix of energy efficiency resources and renewable energy resources; these are known as *energy portfolio standards.* A few, including California, Washington, and Minnesota, have adopted requirements for utilities to secure all cost-effective energy-efficiency resources.

The map below shows states with RPS requirements as of November 2010.

Figure 13-1:

State RPS Requirements



Source: Database of State Incentives for Renewables and Efficiency. www.dsireusa.org/summarymaps/index.cfm?ee=1&RE=1

13.5. How an IRP Can Make a Difference

The most sophisticated IRP in the United States is probably the regional power plan prepared by the Northwest Power and Conservation Council. The Council is a four-state body (Washington, Oregon, Idaho, Montana), created by Congress in 1980 as part of a regional electric power act that expanded the authority of the Bonneville Power Administration. The Council planning process is set out in federal law.[54]

The First Power Plan, published in 1983, led to the termination of two partially completed nuclear power plants in which over $2 billion had been invested. Once lower-cost and lower-risk alternatives were identified, it became clear that continued preservation of the mothballed units was not economic. Billions of dollars were saved by the substitution, over the next 27 years, of energy efficiency investments for supply-side investments. This represents a tangible difference for consumers.

The Sixth Power Plan, released in 2010, contains more than 5,000 pages of analysis, and recommends that the Pacific Northwest take the following actions:

- Invest in 5,900 megawatts of energy efficiency, virtually all of which is cost-effective even without any carbon dioxide mitigation requirement;
- Improve energy building codes for residential, commercial, industrial, and agricultural facilities;
- Invest in approximately 5,000 megawatts of wind and geothermal resources;
- Plan for the possibility of some additional natural gas generation, particularly for peaking;
- Potentially retire existing coal plants and replace them with new generating facilities, which will become cost-effective if the price of carbon exceeds $40/ton.

The Council process is public, transparent, and very technically sophisticated. While IRPs in other states may also be highly sophisticated, none currently come close to the detail, rigor, or transparency of that prepared by the Council.

For more details:

National Association of Regulatory Utility Commissioners, 1989, *Profits and Progress Through Least-Cost Planning.* www.raponline.org/Pubs/General/Pandplcp.pdf

www.raponline.org/docs/rap_moskovitz_leastcostplanningprofitandprogress_1989_11.pdf

Northwest Power and Conservation Council, 2010, *Sixth Power Plan.* www.nwcouncil.org/energy/powerplan/6/default.htm

54 Pacific Northwest Electric Power Planning and Conservation Act, 16 USC 839

14. Energy Efficiency Programs

Energy efficiency is considered *cost-effective* when the cost of installing and maintaining measures that improve the efficiency of energy usage, compared with what the consumer would otherwise do, is less than the total cost of building, maintaining, and operating the generation, transmission, and distribution facilities that would otherwise be needed to supply enough energy to achieve the same end-use over the same lifetime. There are also environmental costs of both energy supply and some energy efficiency measures, which can and should be considered in measuring cost-effectiveness.

Energy efficiency is a superior resource to meet consumer needs for many reasons. First, it is reliable: high-efficiency air conditioners and lighting systems don't break down in thousand-megawatt increments like power plants and transmission lines. Second, a kilowatt saved is worth more than a kilowatt supplied, because the utility system avoids transmission and distribution costs and line losses, plus it avoids the reserve capacity needed to assure reliable service. Last, but not least, the society avoids the pollution and other externalities caused by power production.

This section describes utility involvement in energy efficiency, and alternative methods to achieve high levels of energy efficiency in a local area.

14.1. Why Are Utility Commissions Involved?

It is not usually natural for a business to try to reduce the demand for its services — yet utilities may be uniquely qualified to play a role in improving the efficiency of energy usage. They have relevant technical knowledge, and they have a business relationship with all of the energy users in their service territory. At a minimum, utilities should be involved in energy efficiency planning, because the degree to which consumers invest in efficiency affects the extent to which utilities must invest in more costly new supplies and efficiency — and this also affects the reliability of the grid. Regulators must be involved to ensure that the economic benefits of energy efficiency investment are achieved, and to ensure that the regulatory systems in place are adequate to allow timely cost-recovery even when sales diminish or decline through the utility's own efforts.

Economic theory suggests that competition will produce an efficient allocation of goods and services if certain preconditions are met. These include the requirements that goods be perfect substitutes for each other (rather than unique objects, like the Mona Lisa), that all producers and consumers have perfect information, that no producer or consumer is large enough to move the market, that there is free entry and exit, and that capital is fungible and can be instantly redeployed. None of these precepts holds true in the energy field. In particular, consumers seldom have perfect information; and low-income households, small businesses, and others have limited or very limited access to capital.

While many of these market failures can be addressed through better consumer information, by more accurate, forward-looking pricing of energy, or through strict codes and standards, evidence shows that those options will not achieve all cost-effective energy efficiency. For this reason, most states have determined that there is a role for utilities in achieving what the market cannot achieve — wide deployment of cost-effective energy efficiency measures.

Utilities usually invest in energy efficiency because their commission or state legislature requires them to draw on efficiency as the least expensive, most environmentally benign, most reliable, and most "local" energy resource available. Even without a commission mandate, utilities may have an increasing desire to use energy efficiency as a low-cost solution to the risk associated with large anticipated increases in generating costs, and in emissions costs (arising, for example, from putting a price on carbon dioxide emissions). When mandating energy efficiency, regulators set the parameters for an efficiency program or a portfolio of programs, determine who will operate the programs, establish the criteria by which programs will be evaluated, handle complaints if the program runs into problems, and determine the level and timing of the utility's cost recovery.

14.2. Utility vs. Third-Party Providers

In some states, third-party providers such as the Energy Trust of Oregon and Efficiency Vermont implement statewide energy efficiency efforts. These providers receive funding from consumers through the utilities, but they are separate economic entities, and generally are subject to oversight and regulation by the utility regulatory commission.

Evidence suggests that these third-party providers do at least as well in achieving energy savings goals as the most motivated utilities. However, it is crucial for them to coordinate with the utilities, so that in addition to reducing power plant and transmission needs, the savings are concentrated in the locations where they are needed, to avoid distribution-system upgrade costs, and coordinated with utility system planning and operations.

14.3. Range and Scope of Programs

Energy efficiency programs address barriers that keep consumers from investing in efficiency on their own. These programs are effective only if consumers and other market actors voluntarily participate. (Building energy codes and appliance and equipment energy standards, to be discussed later, are mandatory when they are enforced but do not reflect all cost-effective energy efficiency measures.) The barriers to be addressed include lack of consumer awareness that savings can be achieved, and lack of information about what to do and how to do it. Barriers also include financial limitations faced by the consumer, and market failures owing to lack of awareness and training among vendors, builders, etc.

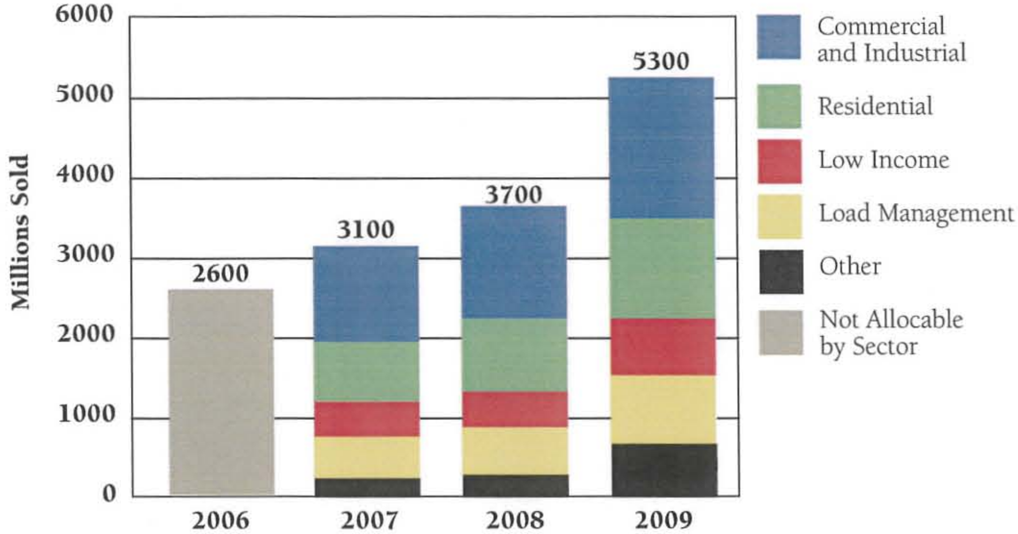
In several states, the utility (or third-party provider) is charged with procuring all cost-effective energy efficiency. These organizations must operate a complete range of programs directed at all end-uses of energy and all classes of consumers. They promote efficiency in both new construction and retrofit applications, and work with residential, commercial, industrial, institutional, and agricultural customers.

In other states, utilities are only required to operate limited efficiency programs, restricted to some class of consumer, by a limited budget or savings-achievement target, or by other specified constraints.

Utilities or third-party providers offer grant and loan programs to help consumers pay for energy efficiency. They also provide technical assessments of energy efficiency measures and cost-effectiveness. They engage in market transformation programs, to help more efficient technologies become commercially viable. And, perhaps most important, they engage in detailed program evaluation to ensure that their expenditures provide a net benefit to consumers.

In 2009, electric and gas utilities invested over $5 billion in energy efficiency programs.

Figure 14-1:
U.S. Utility Investment in Energy Efficiency Programs 2006-09

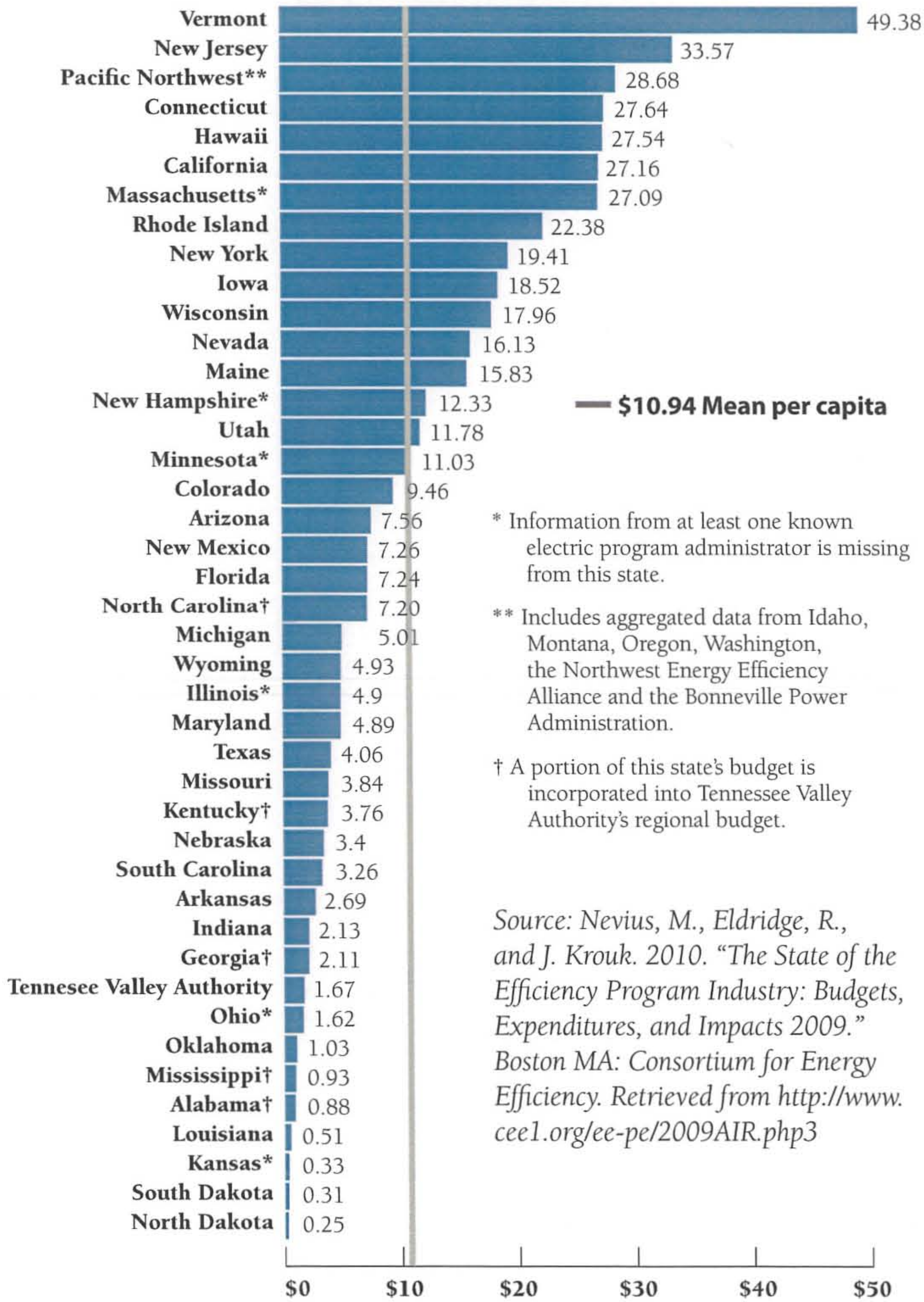


Source: Nevius, M., Eldridge, R., and J. Krouk. 2010. "The State of the Efficiency Program Industry: Budgets, Expenditures, and Impacts 2009." Boston MA: Consortium for Energy Efficiency. Retrieved from http://www.cee1.org/ee-pe/2009AIR.php3

The level of program activity and expenditure varies dramatically from one state to another. In general, the far West and the Northeast have moved more aggressively than other regions on implementing energy efficiency, but recent movement in Minnesota and Wisconsin and a few other upper Midwestern states indicates that the trend is expanding.

Figure 14-2:

Annual Per-Capita Utility Investment in Energy Efficiency Programs by State



* Information from at least one known electric program administrator is missing from this state.

** Includes aggregated data from Idaho, Montana, Oregon, Washington, the Northwest Energy Efficiency Alliance and the Bonneville Power Administration.

† A portion of this state's budget is incorporated into Tennessee Valley Authority's regional budget.

Source: Nevius, M., Eldridge, R., and J. Krouk. 2010. "The State of the Efficiency Program Industry: Budgets, Expenditures, and Impacts 2009." Boston MA: Consortium for Energy Efficiency. Retrieved from http://www.cee1.org/ee-pe/2009AIR.php3

14.4. Cost Causation and Cost Recovery

In most states, all electric consumers pay into the energy efficiency fund through a system benefit charge, and all electric consumers are eligible to participate in the programs. However, some programs are limited to residential and small business consumers; in some states, some or all of the amounts paid by large industrial customers are sequestered, and available only for the use of the customer that paid them, an approach termed *self-direction.*

In general, the utility is allowed to recover all of its expenditures for energy efficiency through a tracking mechanism. In some states, both the revenue and expenditures for certain classes of customer are handled separately.

14.5. Total Resource Cost, Utility Cost, and Rate Impact Tests

Regulators and utilities use several different cost "tests" to determine if energy efficiency programs are producing good value.

The most important of these is the *total resource cost* (TRC) test, which compares all the costs of energy efficiency measures to all the costs of the energy supply alternative. In the TRC, it is critical to count *all* non-energy benefits of efficiency measures, considering their implications for water, sewer, natural gas, and other savings. It is equally critical to count all the costs of the power supply alternative, including production, transmission, distribution, line losses, reserve power plants to cover outages, quantifiable environmental costs of power supply, and any cost incurred directly by the customer.[55] A variation of the TRC, called the *societal cost test*, includes non-monetary costs and benefits such as environmental damage and health impact costs, on the one hand, and improved customer amenity value derived from efficiency measures on the other.

The *program administrator cost test* (PACT, utility cost test, or UC test) measures only those costs and benefits that affect the utility or the customer's bill from the utility. The non-energy benefits of efficiency, as well as costs paid directly by the customer (not through the utility), are not counted. The only environmental costs and benefits included are those for which the utility must actually pay. For example, if a utility pays a 50% incentive for a lighting retrofit, only half the cost of the efficiency measure would be counted, and

55 Some states have applied the TRC in a more limited fashion, excluding avoided transmission and distribution capacity costs, marginal line losses, quantifiable environmental costs, or non-energy benefits such as water, sewer, and soap savings. Where costs or benefits are excluded, the value of the analysis is impaired.

compared with 100% of the energy savings benefits as measured by the utility's cost of providing energy. Conversely, a high-efficiency clothes washer provides energy, water, sewer, and soap savings, but the PACT counts only the energy savings. The PACT also excludes many of the environmental costs of generating electricity. The PACT is a useful tool for determining if a utility's limited efficiency budget is helping achieve the maximum level of efficiency, but it does not measure the overall cost-effectiveness of the program.

The *ratepayer impact measure* (RIM) test measures whether a given efficiency program causes rates to rise or fall for non-participants in the program. Most energy efficiency measures that save a significant amount of energy fail the RIM test. Utility costs go up to pay for all or part of the cost of energy efficiency measures. In addition, utility revenues decline because the customers installing the energy efficiency measures use less energy. As a result, higher utility costs must be divided among fewer utility sales in setting rates, and rates per unit of energy go up, even though the total of customer energy bills goes down. Some efficiency programs focused on peak-period usage do pass the RIM test, because they avoid the need for expensive, seldom-used resources needed only to meet peak demands while not reducing overall revenues much.

14.6. Codes, Standards, and Market Transformation

Many energy efficiency measures are so cost-effective that state or federal law mandates require them. The most familiar of these are building energy codes for new construction, and appliance efficiency standards for major home appliances. Such codes and standards generally are implemented after measures have been *proven up* through incentive programs offered by utilities or third-party providers.

In a variety of ways, utility or government investment in energy efficiency research, development, and demonstration can lead to *market transformations,* through which an improved mix of products is offered to and purchased by consumers. For example, offering incentives to manufacturers may lead to the availability of higher-efficiency products, and educating architects and developers may lead to the specification of higher-efficiency measures in new buildings. These methods may be far less expensive than programs to influence ultimate consumers.

Many states have adopted *energy efficiency resources standards* (EERS) for their utilities. An EERS requires a utility to meet a specified portion of its energy needs through energy efficiency — in effect, energy efficiency would decrease the demand for power by a certain amount and can thus be considered a resource in its own right. The standards do not necessarily require that the utilities invest funds directly in actual installations: support of codes, standards, and encouragement of voluntary programs may suffice to achieve some or all of the required energy efficiency. As of 2010, 24 states have adopted EERS of some form, and four have pending standards.[56]

For more detail:

Regulatory Assistance Project, 2007, *Energy Efficiency Policy Toolkit.* www.raponline.org/Pubs/Efficiency_Policy_Toolkit_1_04_07.pdf

Renewable Energy and Energy Efficiency Partnership, 2010, *Compendium of Best Practices: Sharing Local and State Successes in Energy Efficiency.* www.raponline.org/docs/RAP_REEEP_CompendiumofBestPractices_2010_05_28.pdf

Regulatory Assistance Project, 2010, *Smart Policies Before Smart Grids: How State Regulators Can Steer Smart Grid Investments Toward Customer-Side Solutions.* www.raponline.org/docs/RAP_Schwartz_SmartGridACEEEsummerstudy_2010_8_17.pdf

American Council for an Energy Efficient Economy, 2010, *State Energy Efficiency Policy Database.* www.aceee.org/sector/state-policy/utility-policies

Consortium for Energy Efficiency, *Energy Efficiency Program Budget and Expenditure Data.* www.cee1.org/ee-pe/2009AIR.php3#budgetdata

56 A survey of EERS in place is available from the American Council for an Energy Efficient Economy at www.aceee.org/node/5981