

Running With Lightning- Efficiency Programs at a Time of Rapid Change

Fred Gordon, Energy Trust of Oregon

ABSTRACT

The role of utility ratepayer-funded efficiency programs is changing because market forces and government policies are radically accelerating efficiency markets. Efficiency measures that constitute a large percentage of historic program savings are becoming common practice. New equipment is entering the market, often untested for energy impacts. Government entities are providing more funding, assistance, and regulation to prod efficiency markets. Proven conservation opportunities for many programs may be completely accomplished in 10-15 years.

Ratepayer-funded programs play a critical role in conservation. The best bring technical capability, knowledge of markets, and systems for quality and accountability which are not always available from the market or government offerings. However, today's efficiency challenges are far different from those of five or 30 years ago, when these programs were conceived. To remain useful, program and regulatory changes are needed, including: (1) more emphasis on influencing market change as opposed to "bucks for boxes", (2) explicit coordination of programs with development of efficiency codes and standards, (3) an approach to decision making that accepts imprecision and risk-taking as necessary and manages them, (4) faster feedback and revision for market-based programs, including a willingness to exit when a program has done all the good it can do, (5) regulation and verification requirements that measure and reward market change and efficient behavior, (6) a strategy to innovate in programs in a disciplined, accelerated way, and (7) perhaps the most difficult thing- an accountability and rewards framework that carefully balances long and short-term objectives.

"Bucks for Boxes" Worked Well for a Long Time

This paper focuses on evolution of energy efficiency programs operated by utilities and other local ratepayer-funded entities (local program providers). It does not address programs run by state and local government from other funding sources, which often have different objectives and accountability frameworks. For 30 years, ratepayer-funded programs have provided reliable, low-cost energy resources to meet gas and electric loads. The most effective programs feature a market-customized cocktail of financial incentives (usually cash), marketing, and in some cases technical assistance, often delivered through service and equipment vendors. The objective of most programs is to install efficient equipment and make sure it works. While the details of implementation vary, the principle has been "we'll co-invest with you, the customer, to install hardware that saves more energy and lowers your utility bill." Different programs and initiatives target various types of housing and businesses, and different opportunities for efficiency sale (new vs. replacement vs. retrofit of working equipment). While some programs have taken other program approaches, most programs have followed this "Bucks for Boxes" approach, and have succeeded due to their relative simplicity, both in operation and oversight.

It is difficult to exaggerate the success of these programs. Nationally, ratepayers have saved many billions of dollars from avoided power plant construction, transmission and distribution, and fuel costs. Costs nationally average about 2.5 cents per kWh and 37 cents per

Therm, levelized (Friedrich, Katherine, et al, 2009). These are far less than the cost to buy and deliver the same amount of fossil energy. This approach has significantly reduced the growth of gas and electric sales.

“If I’m so Good, Why Does My Head Hurt?”- Drivers of Change

Local efficiency programs have a bright future, but the strategic focus, oversight, content, and speed of change must shift to assure large-scale success. This is because markets, regulations, and government funding are doing much of the job that the local efficiency programs have historically done. Local program providers who are already making adjustments will fare better. The rest of us had better get cracking.

In this section, I will show how the traditional approach is fading in importance, in part due to its success. Then I will use recent examples to show how a “Plan B” is coming together with more coordinated and market-focused practices.

Codes and Standards are Accelerating

Federal, state and local energy codes and standards require specify that new equipment, homes and buildings meet specified efficiency levels. This kind of regulation is feasible once efficient equipment and systems are (1) available in the market, are familiar, (2) shown to be cost-efficient, and (3) well-accepted by a significant fraction of the market. Local program providers often help create these market conditions. However, regulatory processes were, until recently, so slow that local programs had many years of work before codes caught up.

Codes and standards for efficiency are becoming more stringent at a faster rate than ever, especially the Federal equipment standards setting process. Most prominently, within four years new standards will be in place for compact fluorescent lighting in homes (ACEEE, 2007), high-performance T-8 stick fluorescent lamps and ballasts in commercial and industrial buildings, and home furnaces (ACEEE, 2009)(Neubauer). These three measures have been the largest energy-saving measures for home and business retrofit efficiency programs for many years. The success of new standards leaves programs with a need to find new opportunities or the programs will significantly diminish in size and further impact.

While new efficiency measures will emerge, they probably will not be as simple, high-volume, or inexpensive as the old stand-bys. For example, 25- and 28-watt high performance T-8 lamps have recently entered the market and are more efficient than the incipient stick fluorescent standards. However, with lesser lumen output it will take more design thought before they can replace existing lamps, so they may not be suitable for all applications. Furnaces are available at 95% efficiency, in excess of incipient Federal standards, but in many areas the market baseline is now at about 92% or higher, leaving little savings to gain (Cooney).

In Oregon, and many other states, the state energy code development process has also accelerated, changing the landscape for programs. Both residential and commercial Oregon codes have been put on a three-year upgrade cycle (BCAP). Legislative mandates call for increases of 15-25% in efficiency or greater out of the next commercial code cycle. In the past, building codes advanced at a speed that builders could assimilate with modest effort. Now, the frequency of code cycles and the aggressiveness of targets means that some technologies and techniques may enter the market before there is widespread knowledge of how to install them

correctly. If code training and enforcement is not up to this task, the credibility of energy codes could be eroded if compliance is not feasible or assured.

At the same time, aggressive efficiency measures that are “in the code” will no longer contribute toward meeting the goals of traditional programs.

Incentive Money is coming from Government Programs- But for How Long?

The Federal Government is playing a larger role in offering financial incentives. This is both a blessing and a dilemma. In the last 12 months, hundreds of millions in incentives were paid through stimulus programs, other programmatic funding, and tax credits. As this paper is written, a six billion dollar “HomeStar” program for home weatherization is being considered by Congress. The proposed incentives would likely reduce the need for utility incentives in local efficiency programs, and provide services in areas where utilities currently do not fund weatherization. As of mid-April, unofficial estimates were that most of the funding (if authorized) would be expended in 18 months (CEE). While ongoing Federal funding will always be uncertain, the Federal government is now indisputably a major player in energy efficiency, especially for government buildings and homes.

New program objectives come with Federal funding. For example, some recent Federal stimulus money has come with “living wage” requirements that increase the pay scale for weatherization workers. There are equal opportunity hiring requirements, aspirations of creating new jobs, required coordination with specific training efforts, accounting requirements, and so on. Each of these requirements reflects an important and valuable objective, but in combination they may cost enough to damage the ability to deliver savings. For example, difficulties in clarifying Davis-Bacon living wage requirements for low income funding may have significantly delayed rollout of hundreds of millions of dollars in low-income and government building retrofits in 2009 (Burger and Rosencrantz). These concerns are particularly sharp in modest climates like Oregon’s, where the financial return for weatherization is modest to begin with. Temporary Federal programs could push the market delivery system to a higher-cost model, leaving local program providers with delivery systems that cannot meet utility least-cost-planning investment criteria.

Rate Impacts

Multiyear conservation plans based on traditional program approaches project steady increases in funding to (1) accelerate program acquisitions and (2) move past the “low hanging fruit” to the next set of more difficult and expensive efficiency measures. While efficiency investments massively reduce power costs, loads are also reduced. Thus, the cost of efficiency investments is recovered on a diminishing base of loads and therefore rates are modestly increased. In many states, efficiency funding is listed on utility bills while the reduced cost of generation and power delivery is not, which exacerbates the perception of increased costs.

This can lead to resistance to efficiency funding. For example, in Connecticut, a state with a long history of outstanding efficiency programs, mandates for least-cost planning have run headlong into resistance to rate increases. This, in combination with competing legislative uses for efficiency funds, has resulted in stopping and starting programs, damage to the efficiency supply infrastructure, and a tense and confused public discourse (Associated Press). Long-term

savings are not as appealing to the body politic if there is a front-end cost. At the same time, for a variety of reasons, most utilities and commissions are unwilling to minimize the front-end expense by financing the efficiency investment over the life of the savings.

Running Out of Firm Resource

A final major factor is the incipient depletion of *known* conservation supply. Energy efficiency projections used in integrated resource planning in most states are based on proven efficiency measures- commercially available equipment and its current cost and savings. Within the next 10-15 years, many local program providers, including the Energy Trust, plan to perform most of the available retrofits with these measures. Additionally, by this time most of the currently proven efficiency opportunities in new homes, buildings, and appliances are likely to be required by building codes and equipment standards.

Can we find more efficiency opportunities? While there is a clear history of efficiency advances over time (better measures, more affordable technologies, therefore more savings) the advances have been herky jerky- they have not followed a trend that can be extrapolated. Energy Trust has estimates of additional conservation supply from emerging technologies, but, because timing and cost are not certain, utilities do not know how to use this information in planning (Gordon, et al, 2008).

This is a problem because utilities are looking at making long term investments in generating resources that would be influenced by the growth rate of efficiency. While all other variables in utility resource planning (e.g., load growth, fossil fuel prices) are dealt with in terms of probabilities, utility integrated resource planning in most places considers only a “firm” efficiency resource. Because we know that the actual conservation resource is larger than the “known supply,” this “firm efficiency” concept must be complimented by scenario analysis of the possibility of additional conservation supply.

In This New World, What Is The Role of Local Program Providers?

The new realities discussed above point to new roles for local program providers. We are no longer *the* team; we are role players on a bigger team. The roles of local efficiency program providers depend on what others are doing and when they are doing it. This can play itself out in many ways.

Bundlers an Marketers

Some local program providers have developed systems to market packages of efficiency funding and support from many sources to customers. Even if most of the incentive funding is available from government sources it is significant work to perform technical studies, package money from various sources, sell projects and do quality control and evaluation. This is the work that local program providers can do to complement the capabilities of government.

In Oregon, for example, the Oregon Department of Energy (ODOE) has administered energy efficiency tax credits for many years. As the administrative enforcer for state tax credits ODOE can only play only a limited role in marketing those credits. Additionally, as a state agency their staff levels have been constrained. To fill in the gaps, Energy Trust has played all

the roles described above. Our evaluations have shown that without these services there would have been far fewer efficiency actions taken.

The Last Dime to Make the Deal Go

Sometimes government incentives and tax credits may provide almost but not quite enough money to leverage consumer activity. The legislative process, where many incentives are set, may be driven as much by political considerations as market research, so government can over or underpay. To manage expenditures well, local program providers need to apply market research and feedback to understand when their money is needed, or whether simply bundling and marketing other incentives is sufficient.

Accountability

In many states, regulators, or in some cases power wholesalers (e.g. Bonneville Power Administration), have created a strong culture, infrastructure, and accountability system to assure that programs are well administered and that savings actually occur. Because most government programs do not have results as concrete and measureable as energy savings, and many government energy efficiency programs are funded for other motives (e.g., jobs) few government institutions have the institutional history, orientation or capability to hold programs accountable for savings.

The most accountable ratepayer-funded program providers, or their regulators, have procedures to assure evaluation independence, tracking systems to provide reporting and evaluation data, and experience in using utility bills and sub-metered data to answer complex questions. Evaluation can be done affordably. For example, Energy Trust spends around 3-5% of its annual budget for evaluation, market research, and planning combined. Entities with strong evaluation programs are in a position to offer unique value to government entities that want accountability.

Preparing the Ground for Code and Standards

For many years, local programs have paved the way for efficiency codes and standards. However, deliverers have rarely planned or scaled programs for this goal or taken much credit for the accomplishment. An early example is the outlawing of standard magnetic ballasts for commercial lighting in the 1990's. This occurred after 15 years of local incentives for efficient magnetic ballasts created market acceptance for the improved product.

Government knows how to regulate inefficient products once the efficient alternatives are sufficiently acceptable. Local efficiency programs have excelled at building acceptance by (1) supporting product introduction, (2) helping private industry refine the energy performance of products through instrumented field testing and program evaluation, and (3) increasing market saturation and acceptance.

The ENERGY STAR program provides an illustrative example. Through ENERGY STAR, the federal government has played a large role in increasing market share of efficient products. However, many ENERGY STAR products were introduced through utility-funded programs before ENERGY STAR listed them. For other products the brand is driven by local

marketing and incentives (e.g., most ENERGY STAR new home programs). So there are complementary roles for the Federal government and local program providers in marketing.

Utility-funded program implementers have often found a role as quality-assurance partners for Federal programs. One example is the PEARL testing program for compact fluorescent bulbs (CFLs). Even as the ENERGY STAR label became a critical vehicle for marketing CFLs, there were issues of bulb quality and reliability. A testing program initially was funded by a group of local conservation providers. This testing process is now manufacturer-funded and part of the ENERGY STAR certification process (KEMA).

In the Northwest, among other regions, new efficiency regulations can be a “win” for local program deliverers because market transformation is an acknowledged energy savings goal. Market transformation programs can succeed and claim saving by facilitating acceptance of efficient technologies, enabling their inclusion in codes and standards. With sufficient evidence, programs can claim that by creating the market conditions that make regulation acceptable they accelerated a regulation by several years. In order to make this case, savings must be evaluated and programs must produce evidence that they helped create the appropriate condition. Evaluations can show if (1) the program significantly changed product familiarity, acceptance, and market share, (2) changed attitudes of major supply chain actors who influenced standards, and (3) these changes influenced decisions regarding codes and standards. Generally, the leverage provided by efficiency codes and standards is so great, and so inexpensive, that a conservative estimate within the range of likely savings shows programs that influence standards to be well worth the investment.

Helping Codes and Standards Succeed Once They are Instituted

Efficiency programs for new buildings and homes have often helped builders comply with codes and standards by encouraging efficiency actions that exceed the codes. This is because the code often provides the baseline that programs use to estimate savings from more efficiency. While encouraging efficiency beyond code, the programs also explain how to comply with the code. However, because codes are generally assumed to be enforced, or savings are attributed to other causes, incentive programs have not been credited with helping codes work.

As code cycles accelerate, market compliance may become a bigger problem. If people are unfamiliar with new code requirements, energy efficiency programs may devote more time and money to explaining codes. If these programs are accorded no credit for code savings, the programs may appear to perform poorly financially. The solution is to show overseers how the cost and savings from incentive programs and code support efforts work interdependently in achieving savings from upgrading building codes. If the information is well presented, executives and regulators can see the benefits of doing both (Gordon and Robison).

Accelerating Efficiency Innovation through Testing

At the same time that accelerated code and standard cycles are taking efficiency opportunities “out of the hands” of local programs, government and private research is introducing a profusion of new, ostensibly efficient technology. Major manufacturers excel at testing technologies, but the private sector historically has had limited interest in actual, climate specific field energy performance. Moreover, many new innovations are coming from young

firms that lack the institutional and financial capability to do enough testing to introduce a reliable product. It becomes increasingly important for local program innovators to shift their focus to testing these innovations, both to help refine products and document their savings.

For some commodity products like refrigerators, regulators, manufacturers and advocates have arrived at more or less adequate systems of testing and savings estimation. However, for complex systems and new classes of product there are no standard tests. For example, standard water heater ratings have proven to be poorly suited for tankless water heaters. For climate-dependent heating and cooling systems, standard tests may not adequately predict performance in local conditions.

The cost of field testing dozens of potentially important new devices each year is a significant challenge. Testing can be made affordable if local program providers band together to test equipment in their common climate, and test user response in local cultural and rate regimes. For example, the Northwest performs equipment field tests through its Regional Technical Forum and NEEA.

Field testing is particularly important for the many recent innovations that bundle information and provide feedback to consumers on how they use energy. There are new devices for home dwellers and facility operators that provide instant or next day feedback based on data in 15 minute to monthly increments. Some are designed to help save energy, some to save peak, and some for both. Some have been designed with considerable thought to social science theory and user interaction, but for most it is unclear how many people would use them, their frequency of use, how much energy would be saved, and the persistence of those savings. This is an area where collaboration between local program providers and social science researchers may be important to understand how the users engage with the devices, to help refine their effectiveness.

While Innovating, Don't Throw Out What Works

While Federal funding is enticing it may force changes in programs that are not financially sustainable without ongoing Federal support. If higher-cost, federally-assisted programs prove to be short-lived, it may be up to local program providers to assure that there is still a functioning, low-cost program structure to continue to provide energy savings.

For example, if living-wage, deep retrofit, and other requirements in Federally supported weatherization programs lead to significantly higher weatherization costs, it may be important for local providers to continue to work with contractors outside the Federal framework to maintain a low-cost service. While living wages are important, employees may prefer low pay to no work because their product is unaffordable.

Innovate in a More Disciplined Manner

For reasons noted above, efficiency innovation must accelerate. A recent study commissioned by the California Energy Commission showed how innovation in the efficiency industry differs from private industry (Sullivan). Many efficiency pilots are over-designed, do not consider choices early enough, take too long to get out the door, are evaluated in clumsy and time-consuming ways, and in the end, have invested too much to be allowed to fail. So, we invent sub-optimal programs and repair them slowly as they grow or abandon them if they don't work. Private industry often employs a better process for product development, providing a useful model for local program development. In this process, the program developer formally

considers more alternatives at each stage of product design, tests them with early market and technology research, and uses faster evaluation feedback to weed out approaches and focus on the most promising program features.

This approach requires (1) a structured approach to innovation, (2) more research resources and (3) longer timelines before pilots are launched. Consequently, it may only be viable for significant efficiency opportunities with appealing program delivery or marketing alternatives. However, this approach is likely to accelerate the success of those programs for which it is used.

Plan for Regulatory Tipping Points

Local programs designed to accelerate energy codes and standards should plan to achieve levels of market acceptance that are needed for codes and standards to be approved. Planning for tipping points will always require informed judgment, but the rough level of market acceptance that will make code change feasible can be discerned.

For example, Energy Trust achieved about a 14% market share for ENERGY STAR homes in 2008 (internal Energy Trust analysis). Measures that account for most of the program savings were incorporated into the state building energy code the following year, in part because the program created sufficient market acceptance. Had Energy Trust had aimed for a 50% saturation of homes in the three-year program period, it would have been exceedingly difficult and expensive (14% was hard enough), and would have only slightly increased the overall savings for the program and code combined. Based on experience, we know that 5% would not have been enough to create the environment for passage of the *next* new energy building code.

Gauging Success

The type of work described above is feasible only if evaluation, regulatory oversight, and rewards systems are appropriate to this work.

Goals and Evaluations Based on Market Transformation

Going forward, program success in many efficiency markets depends on influencing market practices and/or regulation. For periods prior to regulation, and for markets where regulation is not the end-game, savings analysis must be based on market shifts and influence on those shifts, not just equipment rebated. Market baseline conditions will have to be measured before programs are well underway, and market sales will have to be tracked as well as program sales. Where the objective is regulation, goals can be stated as accelerating the target regulation by creating market acceptance.

Overseers and program deliverers must agree on unbiased ways to attribute savings based on reasonable approximations of program results. This is consistent with utility planning practice. Utility planners always consider a range of likely outcomes for key variables such as future loads or fuel prices. Planning processes are designed to maximize benefits and minimize risk across a range of such possibilities. Analysis of market transformation savings is no less precise, and can be evaluated after the fact with adequate reliability to meet these ends.

Good market transformation evaluations bound the range of likely program effects. Conventions and guidelines can be established to make reasonable but conservative forecasts

within those bounds. This requires that regulators and overseers establish guidelines for evaluation that recognize the importance of multiple sources of evidence regarding market influence (contractors, distributors, participants, comparison groups) as well as statistical precision in individual studies. Measuring the most important things (like market influence) reasonably well is more important than just measuring concrete things (like unit savings) with 95% probability of less than 10% error.

Where judgment plays a role in evaluation, independent review can be a key element in ensuring that analysis is reasonable and of high quality. There are established systems for assuring balanced and independent judgment is applied in market studies.

To provide an example, NEEA approaches this challenge through (1) evaluation of programs by independent consultants, and (2) review of results by a Cost-Effectiveness and Average Megawatt Committee. That committee has evaluation and planning experts from many of the institutions that fund NEEA, and who insist on knowing what their funding is buying. Regulatory staff from the four Northwest states are ex officio members. Energy Trust's evaluation review process follows a similar strategy.

Evaluation of market influence places different requirements on regulators. While rules can set the bounds of adequate study, the role of the public or expert review process in assessing reasonableness of the study increases. This is because, outside of a very few large states, it is difficult for regulatory staff, often few in numbers and broad in responsibilities, to develop the expertise in methods and markets to perform a technical review of a wide range of market evaluations. It is nonetheless important that regulatory staff develop sufficient expertise to understand the basic requirements of good market evaluation, set up effective review processes, evaluate expert comments, and communicate clearly with reviewers about market analysis issues, which often are broader and more nuanced than statistical and economic issues.

Attribution Comes from Causality

Some regulators and program managers use evaluation to assess whether a program had, for example, a 70% or 30% influence on a specific regulation or customer investment. This is difficult to do objectively because "helped 30%" has no rational meaning. It is more meaningful to ask whether the result, be it a shift in market preference or a regulation would likely have happened without the program's help. We can assess this by using multiple, relatively inexpensive sources of evidence. For example, the Energy Trust is claiming that, as part of a national effort alongside other program providers, it influenced the Federal standard for furnace efficiency. To claim this, we showed that (1) our programs increased and sustained high market shares of efficient furnaces, (2) trade allies and participants thought our efforts were influential in growing the market, and (3) that individuals negotiating the standards believed that high levels of equipment sales were instrumental to reaching agreement on a standard. It is feasible to reach this sort of conclusion and then establish a reasonable reward structure, as discussed in the next section.

We believe the appropriate question is whether the standard would have likely proceeded at the same time absent Energy Trust program activity and those of peer organizations across the US. We do not believe that the Federal standard 70% would have happened without us and 30% would not have. This statement has no meaning.

In some states, the idea that a program provider had “30%” influence appears to have arisen from hesitance to provide utilities with full regulatory rewards for achieving market changes under established formulas. This is discussed in the next section.

Regulatory Reward Follows Need

Many regulators award utilities rate relief to compensate for revenues lost due to efficiency programs, and some also provide profit incentives. These are usually based on reported energy savings and a standardized formula. The formulas often do not consider whether utility-funded program’s role in achieving savings is large or small. These formulas often consider the impact of savings each year. Regulators are, reasonably, uncomfortable providing streams of annual rate revenue for the indefinite future based on actions that eventually are in the distant past, such as institution of new regulations.

It seems wise to address this directly- scale regulatory incentives to levels needed to move utilities to take specific actions. If a utility’s role in leveraging savings is relatively small, simple and congruent with utility marketing objectives it makes sense for regulatory rewards to be modest. Higher rewards may be appropriate for actions that are more difficult and less aligned with utility interests. It may be possible to create formulas and categories for different types of action and reward. For example, there may be a reward per kWh or therm for savings where the program provider directly intervenes with individual customers to help get equipment installed. If programs helped leverage a regulation, a lump sum for the influence on the regulation may be more palatable than payment per unit of regulated savings over an extended period of time. Where utilities are helping to assure that regulations are fully implemented, a reward on an annual basis may be more appropriate.

Such a regulatory system may seem more complex than most current systems, and it does require specific knowledge of conservation actions taken. However, it provides regulators with better tools to manage rate money to get the value of efficiency at the least cost.

Progress Indicators

A program to test new technologies needs (1) a strong process and reasonable criteria with which to choose what technology to test, and (2) good measurement methods applied with competence, and (3) flexibility to revisit the plan based on results. Good technology testing takes time, but moving slowly is better than mass marketing a flawed product. There is a tension between the urge to acquire savings quickly and the need to test methodically.

In a similar vein, market transformation programs follow a plan to (1) demonstrate value, (2) increase market presence, and (3) achieve market saturation and preference for efficient technologies. Some plans also influence regulations. The biggest savings come after years of investment, while many of the costs precede most of the saving.

New technologies and market transformation programs pose a dilemma to program overseers- how to judge execution of projects where the energy savings come years later?

One important tool is progress indicators. Progress indicators are milestones involving completion of key steps to later energy savings. They do not measure energy savings, per se. The NEEA business plan (NEEA) has examples of project indicators used as objectives. For example, for heat pump water heaters, early progress indicators could include:

- Manufacturers provide a heat pump water heater that is designed to perform well in Northern climates
- Lab testing
- Field testing
- Establishing a contractor infrastructure to deliver the equipment in large quantities
- Training to assure quality.

While Energy Trust invests in long-term ventures and tracks them based on progress indicators, Energy Trust and the Oregon PUC have thus far elected to measure overall success based on Energy Trust's three-year average savings and cost per unit of energy saved. Our new product development costs are included in (and increase) our cost/kWh and therm. As the portion of funds invested for the long term increases, we may move to a system where performance of some of our funds is tied to progress indicators.

Conclusion

Utility-funded energy efficiency program providers can play an important role in conservation program delivery in the face of more active Federal and state funding, more aggressive codes, and the programs' own past success. However, it will take changes in goal-setting, management, program structure and program feedback for efficiency providers to adapt to a rapidly-changing landscape. These programs can best function as a complementary part of a coordinated system, helping consumers and filling the gaps that the other programs cannot. I believe that with the right regulatory guidance and oversight, the providers are up to the challenge.

References

- [ACEEE, 2007] American Council for and Energy Efficient Economy, 2009, HVAC Manufacturers, **Efficiency Advocates Ink Historic Efficiency Standards Agreement**, <http://www.aceee.org/press/0910ahri.htm>, Washington, D.C., American Council for an Energy Efficient Economy.
- [ACEEE, 2009] American Council for and Energy Efficient Economy, 2007, **2007 Federal Energy Legislation**, <http://aceee.org/energy/national/07nrgleg.htm>, Washington, D.C., American Council for an Energy Efficient Economy.
- Associated Press, 2010, "Conn. Panel Pushes Ways to Cut Electricity Rates", <http://www.ctpost.com/local/article/Conn-panel-pushes-ways-to-cut-electricity-rates-386124.php>, Hartford, Connecticut, Connecticut Post.
- [BCAP] Building Code Assistance Project, 2009, *Code Status, Oregon*, <http://bcap-energy.org/node/90>, Washington, D.C., Building Code Assistance Project.
- Burger, Timothy and Holly Rosenkrantz, 2009, "Wage Rules Delay Recovery Act Energy-Saving Projects, GAO Says", <http://www.bloomberg.com/apps/news?pid=20601087&sid=aKIFuWrrt0eA>, New York, N.Y., Bloomberg, L.P.

- [CEE] Consortium for Energy Efficiency, April 16, 2010, conference call of CEE board and portfolio committee with US DOE re: Homestar program, Washington, DC.
- Cooney, Kevin, Beth Baker, Timea Zentai, Adam Knickelbein, 2009, **Gas Furnace Market Transformation Model Development and Market Research**, http://energytrust.org/library/reports/090805_GasFurnaceMarketTransformation.pdf, Denver, Colorado, Summit Blue Consulting
- Friedrich, Katherine, Maggie Eldridge, Dan York, Patti Witte and Marty Kushler, 2009, **Saving Energy Cost-Effectively: A National Review of the Cost of Energy Saved Through Utility-Sector Energy Efficiency Programs**, Washington, D.C., American Council for Energy Efficient Economy.
- Gordon, Fred, Lakin Garth, Tom Eckman and Charles Grist, 2008, **“Beyond Supply Curves”** in Proceedings- ACEEE 2008 Summer Study on Energy Efficiency in Buildings, Washington, DC. American Council for an Energy Efficient Economy
- Gordon, Fred and Dave Robison, 2006, **“We All Did It: Attribution of Savings in an Environment with Many Helpers”** in Proceedings- ACEEE 2006 Summer Study on Energy Efficiency in Buildings, Washington, DC. American Council for an Energy Efficient Economy
- Haybart, Jack, 2005, **Energy Trust of Oregon Natural Gas Furnace Market Assessment**, http://energytrust.org/library/reports/0508_GasFurnaceMarketAssessment0.pdf, Portland, Oregon, Energy Trust of Oregon
- KEMA, 2008, **Energy Star Consumer Products, Lighting Project, Market Progress Evaluation #4**, <http://www.nwalliance.org/research/reports/E08-195.pdf>, Portland, Oregon, NW Energy Efficiency Alliance
- Neubauer, Max, Andrew deLaski, Marianne DiMascio & Steven Nadel, 2009, **Ka-BOOM! The Power of Appliance Standards**, Report Number ASAP-7/ACEEE-A091, <http://www.standardsasap.org/documents/A091.pdf>, Washington, D.C., American Council for an Energy Efficient Economy, and Appliance Standards Action Project.
- Sullivan, Michael J, 2009, **"Using Experiments to Foster Innovation and Improve the Effectiveness of Energy Efficiency Programs."** http://uc-ciee.org/energyeff/documents/exp_design_wp.pdf, Berkeley, California, California Institute for Energy Efficiency.