

Staff Findings
and Recommendations

Energy Efficiency and
Conservation Programs in
Connecticut
(Not approved by the
Committee)

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Legislative Program Review
& Investigations Committee

Committee Staff on Project
Catherine M. Conlin, Chief Analyst
Michelle Riordan-Nold, Legislative Analyst II

Legislative Program Review and Investigations Committee
Connecticut General Assembly
State Capitol Room 506
Hartford, CT 06106

Tele: (860) 240-0300

E-Mail: PRI@cga.ct.gov

Web: www.cga.ct.gov/pri/index.htm

Introduction

Energy Conservation and Efficiency Programs in Connecticut

The committee undertook this study in May 2008 to assess what progress Connecticut has made in achieving two of the eight broad goals of the state's energy policy, which was established in statute in 1978. As noted in the briefing report, the two broad goals under review are to:

- *assist citizens and businesses in implementing measures to reduce energy consumption and costs; and*
- *ensure that low-income households can meet essential energy needs.*

Study Focus and Methods

As part of this assessment, program review committee staff examined whether the energy efficiency and conservation programs in Connecticut are established and implemented in an effective and efficient manner. The study approved by the committee was focused on: 1) identifying opportunities to improve the structure and delivery of Connecticut's programs; and 2) examining surrounding states' structures to determine if a particular structure facilitates the implementation of energy efficiency and conservation policies and programs.

The program review committee staff relied on many sources in developing this report. Committee staff conducted extensive interviews of the various constituencies associated with the state's energy efficiency and renewable energy programs including those serving low-income households. Committee staff also attended numerous board meetings associated with the energy boards established by the legislature, and observed two focus groups held in connection with a legislatively required examination of the state's energy structure and organization being conducted by the Connecticut Academy of Science and Engineering. Staff also attended a legislatively sponsored "Green Forum" in October 2008, which included participation from experts from many energy areas.

Staff interviewed numerous officials in other states directly implementing programs and individuals associated with national organizations specializing in researching best practices for energy efficiency and renewable programs. In addition, phone interviews were conducted with representatives of approximately 20 businesses, schools, and municipalities that utilized the Connecticut Energy Efficiency Fund in 2007.

General Findings

The study concludes that it is difficult to measure Connecticut's progress in reducing energy consumption for a number of reasons. First, the state has no overarching goal to reduce overall energy use from any baseline measure. Connecticut has never been a high energy-consuming state; the state ranked 44 in per capita consumption in 2005. However, Connecticut's energy prices are high, ranking behind only Hawaii and the District of Columbia. But because

consumption is low, Connecticut's 2005 per capita expenditures on energy was only 1.2 percent above the national average.

As discussed in the September briefing report, over the past 35 years, about 75 percent of the nation's increased energy demand has been met through greater efficiency, while supply expansion has met the remaining 25 percent. Energy efficiency is much less costly than new generation. In New England, efficiency measures generally cost two-thirds less than the expenditures required to build capacity through power plants, transmission lines, or natural gas pipelines. Energy efficiency reduces reliance on foreign oil and lowers harmful emissions, known as "greenhouse gases," into the air.

Even with higher prices for energy and the demonstrated benefits of increased efficiency, there has been no actual reduction in energy use nationally or here in Connecticut. However, the study finds that among the New England states, Connecticut's total increase in electric consumption from 1997 to 2007 is lower than all but Vermont's. Also, Connecticut has been nationally recognized as a leader in energy efficiency programs. The American Council for an Energy-Efficiency Economy, a nonprofit policy and research organization that evaluates and ranks state energy efficiency programs, ranked Connecticut among the top three states in its 2006 and 2008 scorecards.

Connecticut has established an energy goal known as a renewable portfolio standard, where a percentage of electricity procured by the utilities must come from certain renewable energy resources each year until the goal of 20 percent of electricity generation from renewable resources by 2020 is reached. The goal includes energy efficiency as part of the portfolio standard, but is aimed at increasing the portion of electricity obtained from renewable resources not at reducing overall energy, or even electricity, use. To achieve meaningful decreases in energy use, there first must be a state goal to reduce overall energy consumption.

Program review staff finds that while Connecticut has several energy efficiency and conservation programs and funding for the programs is generous compared to most other states, the programs are not focused on overall energy conservation and efficiency use. Instead, programs are targeted to particular energy types, usually linked to the funding source, which means most address electricity use. Committee staff concludes that, in order to focus on reducing energy use, the programs should be brought together into one quasi-public organization, the Energy Resources Authority and the revenues combined. In this way, programs will be designed to be fuel-blind, target total energy reduction in the home or workplace, and provide the greatest benefits to the consumer in the most cost-effective way.

The report finds that efficiency and renewable energy program planning is fragmented and because plans and budgets are required annually, is also labor-intensive. Further, the short-term process does not offer the programmatic and funding stability vendors and consumers need to make important decisions. Proposed recommendations call for a consolidated three-year planning and budgeting process.

While committee staff believes that the program design and planning should be left to the new quasi-public agency, the study does conclude that several program areas should be a part of

the portfolio. These program areas should include: a residential energy certification program; well-publicized and broadly marketed residential energy financing; technical assistance to municipalities that provides objective guidance on efficiency and conservation measures and how best to finance them; and programs that will focus on low-income rental and multi-family residences, landlords, and other hard-to-serve customers.

Committee staff finds that even though the current Connecticut Energy Efficiency Fund (CEEF) programs are designed to be uniform, differences exist in program implementation between the two ratepayer funded residential and low-income energy efficiency programs. Committee staff analyzed the performance incentives structure in place that partially pays the two utilities for administering and implementing the energy efficiency programs in Connecticut. Staff finds that there seems to be little connection with amounts spent on programs and annual electricity savings. In addition, the process is complicated and not transparent. Further, the goals -- which are set primarily by the companies, and on which the incentives are based -- are almost always achieved or exceeded. However, when comparing overall compensation (administrative costs and incentive payments) as a percentage of program costs, Connecticut's payments are about average among several selected states.

Committee staff concludes that the CEEF program implementation should be bid through request for proposals, and the contracts should be for a designated period, sufficiently long enough to support reliability and create demand, but with a termination date so that results can be evaluated. Ultimately, the goal should be to have many of the programs become market-based. The contracts should be performance-based, with final payments based on energy savings results.

Saving energy is the primarily goal of any energy efficiency program and, therefore, evaluating saving results is crucial. The report finds the current measurement and evaluation process has many deficiencies. There is not a formal, established schedule for evaluating efficiency and renewable energy programs. Many of them -- including many of the Clean Energy Fund and the 2005 Energy Independence Act initiatives, and the DSS weatherization program -- have not been recently evaluated, if ever. Further, among states with robust energy efficiency programs, Connecticut ranks 15 out of 19 in percentage of program dollars spent on evaluation.¹

When efficiency programs have been evaluated, the program administrators or implementers have typically been involved in selecting the evaluators and have paid for the evaluation. Further, the evaluations that have been done focus more on process or program incentive levels rather than on energy and cost savings. To address these issues, committee staff recommends: the evaluation function for all energy efficiency and renewable energy programs be established in the Office of Consumer Counsel; an adequate number of staff is hired to manage and oversee evaluations; and a portion of the budget is allocated for evaluation work.

¹ According to 2007 expenditure analysis conducted by the Consortium for Energy Efficiency, a non-profit corporation whose mission is to accelerate development and availability to the public of energy-efficient technologies and to improve communications and commonality of programs in the efficiency field.

The report also examines the state's progress in meeting the goal of assisting low-income residents with their energy needs and finds that until recently rapidly escalating energy prices coupled with little growth in federal funding made energy increasingly unaffordable for low-income households in Connecticut. The "energy affordability gap" in Connecticut was ranked third greatest among all the states in 2007. The report indicates that for 2009, Connecticut's federal energy assistance funds will almost double to \$125 million, and the legislature supplemented that with a General Fund allocation in August. While it is difficult to determine the degree to which the additional funding will affect affordability, the increased federal and state assistance, coupled with a recent drop in oil prices, should help mitigate what could have been a severe problem for lower-income residents.

Committee staff finds the annual application process for the Connecticut Energy Assistance Program is cumbersome and proposes a three-year application renewal process. Staff also proposes that the Department of Public Utility Control explore the feasibility of a discounted utility rate for low-income gas and electric customers.

Finally, the study reviewed the various weatherization programs serving low-income residents and finds: conflicting goals and objectives in the utility-run programs; differences in the services provided to customers served by the two utility weatherization programs; and none of the programs had comprehensive impact evaluations conducted to determine energy savings or cost effectiveness. Committee staff proposes that the current weatherization programs be consolidated and implemented uniformly in the new Energy Resources Authority.

Report Organization

This report is organized into six sections, each containing staff analysis, findings (presented in italics), and recommendations. At the beginning of each section that focuses on energy efficiency program organization, design, and implementation, a box containing the "best practice" is presented. The "practice" is a brief synopsis of program features discussed in the National Action Plan for Energy Efficiency and other literature in the field. Staff used that industry standard as a guide in identifying where Connecticut programs were deficient and in proposing remedies.

The first five sections are focused on the state's progress in meeting the first policy goal—reducing energy consumption and costs. Section I examines overall efforts in achieving the first goal of reducing energy consumption. Section II reviews the current organization structure and funding levels for achieving the state's goals. Section III proposes a new method for planning and design. Section IV discusses program implementation and Section V reviews the evaluation work to measure our current programs. Section VI examines the progress of the second goal – assisting low-income residents meet their energy needs.

Assessing the State's Energy Reduction Goal

This section discusses the state's efforts and progress in achieving its goal of reducing energy consumption. The state established a broad energy policy in statute in 1978. The policy contains eight goals, and the program review study called for an assessment in achieving two of the eight. The first policy goal under examination is to:

- *Assist citizens and businesses in implementing measures to reduce energy consumption and costs*

Program review committee staff concludes it is difficult to assess the progress the state has made in reducing energy consumption. *Connecticut has never put in place an overall energy reduction goal of a quantifiable amount or measure by a certain date.* Connecticut has targeted its energy efficiency programs primarily on electric savings, because the funding has come from electric ratepayers. However, there is not a state goal to reduce electricity consumption overall or to reduce electricity consumption off projected growth.

As reported in the briefing, 19 states, including Connecticut, have energy efficiency goals or standards, but to date those states' goals or targets are on electricity use only. Some of those states have set goals of reducing electricity by a certain percentage off expected growth, and a few, including New York and Maryland, have set targets of actual reductions from the baseline of a previous year.

Renewable Portfolio Standard

While the state has no energy reduction goal, Connecticut, in 1998 as part of electric restructuring, established a renewable portfolio standard (RPS). Beginning in 2006, the RPS statutorily sets a target of meeting 10 percent of the state's electricity generation needs through Class I and II resources by 2010. Class I includes solar, wind, wave and tidal power, while Class II includes power generated from trash-to-energy, biomass, or certain hydroelectric facilities.

The RPS was modified in 2005 and requires that, beginning in 2007, electric utilities procure one percent of electricity each year through Class III resources, which includes energy efficiency as a resource. Thus, by 2010 the goal is that 4 percent of the state's electricity will come from energy efficiency or other Class III resources. Comprehensive 2007 energy legislation (P.A. 07-242, Section 51) provides further emphasis in achieving that component of the goal by stating:

“the [electric] resource needs of the state must first be met through all available energy efficiency and demand reduction resources that are cost effective, reliable and feasible.”

Measuring RPS progress. Electric generators and suppliers report to the Department of Public Utility Control (DPUC) on their compliance with the RPS procurement, and the

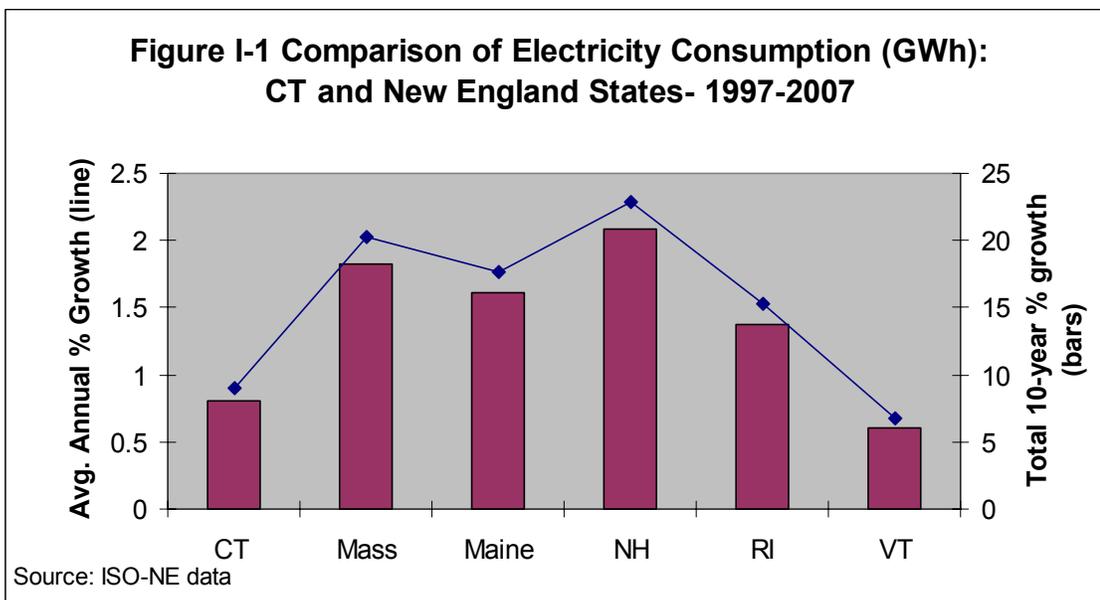
department establishes alternative compliance payments if goals are not met. However, the reports are not due to the department until October of the following year (e.g., October 2008 for 2007).

Measuring how well Connecticut’s electricity generators and suppliers are doing in achieving the RPS goals is rather problematic. Because of the lag time in reporting, the latest compliance status report was for 2006, when the goal to be achieved was 2 percent in Class I and 3 percent in Class II. That report showed that the procurement by the state’s two largest distribution companies – CL&P and UI – fell slightly short of meeting the procurement goal in Class I, while meeting or surpassing Class II; the mandates for Class III had not yet taken effect. DPUC indicates that upon review of preliminary data for 2007 it appears that procurement standards were met for Class I and II, but fell slightly short on Class III.

Prior to the inclusion of energy efficiency as a Class III resource and making it part of the RPS there was no overall measurement of electric energy efficiency in achieving a statewide standard. Now, at least how the state is doing in achieving electric energy efficiency goals is part of the portfolio standard and, as such, is being measured and tracked for RPS compliance. Further, the emphasis that the 2007 energy legislation placed on meeting the state’s needs with efficiency measures first should assist in achieving that part of the RPS.

Electric Efficiency Progress

Electric efficiency programs and funding for them have been statutorily in place since 1999, prior to the RPS standard mandates. Therefore, there should be some evidence that the state is doing better in reducing consumption than it would be if the programs did not exist. *While there has not been an outright reduction in electricity consumption in Connecticut over the past few years, Connecticut has made more progress in controlling electric load growth than other New England states, except Vermont (as shown in Figure I-1).*



To arrive at the results shown in the figure, program review staff examined the yearly net energy consumption in gigawatt hours (GWh) as reported by ISO-New England, the region's electric system grid operator. The bars in the graph indicate the total percentage increase in electricity use over the 1997-2007 period, and the line shows the annual average change in electric consumption for each state. (This measures annual consumption only, and does not show peak demand differences.) The figure shows that for both measures -- the average annual increase, and the cumulative increase over the 10-year period -- Connecticut's consumption growth was lower than other states in the region. Connecticut's total increase in electric usage was 8.9 percent, second only to Vermont's increase of 6.1 percent.

The value of energy efficiency programs has been demonstrated and the benefits were described in the September briefing report. Typically, on a nationwide basis, energy efficiency programs are estimated to cost about half the total cost of building additional supply to meet increased demand. Given that electric generation and transmission are more expensive in the New England region, estimates for this region are that efficiency measures cost two-thirds less than increasing supply.² Thus the cost effectiveness standard for efficiency programs in Connecticut is not as difficult to achieve as in other parts of the country.

Figure I-1 above also does not measure the percent of electricity that comes from renewable resources that are used as part of the region's grid or supply. As reported by the federal Energy Information Administration, data on renewable electricity use showed that Connecticut ranked 38 of the 50 states, generating only 3.8 percent of on-grid electricity through renewables (i.e., solar or wind power). In New England, only Rhode Island had a lower percentage produced through renewables. Using either measure -- annual state electric consumption or percent of electricity supply from renewables -- assesses Connecticut's progress in reducing or altering its electricity consumption, not its overall energy use. *Program review staff believes to achieve other goals the state has set, like reducing harmful emissions or increasing energy independence, Connecticut will have to set energy reduction goals and begin to measure progress.*

Greenhouse gas emission goals. Connecticut issued a Climate Change Plan in 2005 that set a state goal to reduce greenhouse gas (GHG) emissions to 1990 levels by 2010, and 10 percent below that by 2020. That plan contained 55 comprehensive recommendations that went beyond electricity use to energy use overall. However, while the plan's recommendations implied a reduction in overall energy consumption was necessary to achieve the state's climate change targets, *the plan did not call for a clear goal of reduction of energy consumption.*

The 2007 progress report on the Climate Change Plan acknowledges that the 2010 goal on GHG reductions will likely not be achieved. The report indicated that Connecticut has slowed the growth rate in its energy consumption, but, despite cleaner and more efficient transportation (which is outside the scope of this study) and electricity generation, state residents' demand for energy continues to increase, and much of the supply relies on fossil fuels.

² *Economically Achievable Energy Efficiency Potential in New England*, Northeast Energy Efficiency Partnerships, Inc., p.6

Energy use reduction. While Connecticut's 2007 energy legislation (P.A. 07-242) was far-reaching, and broadly addressed energy in many areas in a programmatic way, its primary focus remained on electricity. Policymakers and others have placed the most emphasis on electric efficiency and conservation because surcharges on electric bills have been the major funding source. A drawback of ratepayer funding, however, is that utility regulators and program administrators are reluctant to implement measures that achieve non-electric savings.

There is now recognition that a holistic approach to reducing energy use overall is needed to achieve other goals like reducing harmful emissions, improving energy independence by relying less on foreign oil, and lowering overall energy bills for consumers. This is especially true in New England where two-thirds of most residential consumers' energy consumption is for heating and one-third for non heating uses such as lighting and appliance usage.

Some states are beginning to develop a more comprehensive strategy to reduce consumption. Vermont, in 2008 legislation, revised its energy statutes considerably, recognizing that the state's focus should be on all energy, not just electricity, and on the energy consumer, not just the electric consumer. Similarly, Massachusetts, in its 2008 "Green Communities Act," broadened the scope of its energy reduction efforts to include energy impacts on communities beyond electricity.

The federal Environmental Protection Agency (EPA) in the New England Region has recently developed programs to help communities that commit to the challenge of reducing all energy use by 10 percent or more. More than 122 towns and cities throughout New England, including 18 in Connecticut, have made that commitment. In concert with the federal EPA, the Connecticut Clean Energy Fund (CCEF) changed the standards for its Community Challenge program, effective November 1, 2008. Prior to November, communities met the CCEF standard to receive grants if they pledged to obtain 20 percent of electricity for town buildings from renewable energy by 2010. Now, towns will first have to commit to the EPA challenge as well: 10 percent reduction in energy use in town buildings. The CCEF indicates this requirement is expected to encourage a holistic approach to municipal energy strategies, reduce the use of fossil fuels and corresponding emissions, and save towns money, which can then be used to support clean energy.

Program review staff believes this recent activity points to a growing recognition that a comprehensive approach to energy reduction and conservation is necessary for sound energy policy and program planning to be developed. Therefore, program review committee staff recommends:

In addition to its renewable portfolio goal, Connecticut shall have an overarching state goal of reducing energy consumption through efficiency and conservation measures first. The state shall adopt a target of 10 percent reduction in per capita energy consumption off the 2006 baseline measure by 2015.

While some consider a cautious approach to goal-setting better, many states are now establishing bold targets for decreasing electric consumption, or reducing greenhouse gas

reductions, believing only when the bar is set high will progress ever be made. In November 2008, California Governor Schwarzenegger announced an executive order requiring utilities to procure one-third of their electricity from renewable sources by 2020. In Maryland, the state is aiming for a 15 per cent per capita decrease of 2007 electricity consumption levels by 2015. Vermont's goals of energy reductions include improving the energy fitness of 20 percent of the state's housing stock by 2017. Connecticut's Energy Excellence Plan, issued in May 2008, called for "bold and meaningful savings goals" (p.3) yet no specific goals or objectives were recommended.

P.A. 07-242 required the Energy Conservation Management Board (ECMB) to contract with a third party to conduct an assessment of energy efficiency potential in Connecticut. While the study was supposed to be submitted to the General Assembly in February 2008, it is only nearing completion now. Policymakers and others might be reluctant to establish a goal of energy reduction until the study is issued. However, committee staff examination of the scope (and anticipated savings measurements) of the study reveals the assessment will focus primarily on potential electric savings.

State Organization for Achieving the Goal

The findings contained in this report lead to the conclusion that the *organizational structure and programs aimed at energy efficiency and renewable energy are currently operating in a fragmented way that focus on the energy source that funds the program, and do not target all measures that would help the customer reduce overall energy use.*

State policymakers are aware fragmentation is a problem. Studies have been called for to examine how to improve system coordination, including several required by P.A. 07-242. One of the studies required the Connecticut Energy Advisory Board to develop recommendations to "coordinate and integrate the state's energy entities." The draft of the final phase of the report includes a recommendation that, "Connecticut should facilitate and otherwise enhance the integration of individual state entity plans, strategies and actions toward achieving energy, environmental, security and economic goals."³ The report also concludes that "properly sequencing energy efficiency and renewable energy investment decisions would better ensure that the dollars collected to increase deployment of those resources are used to meet the state's overarching goals." However, there are no specific recommendations on how the integration, coordination, and efficiency objectives should be achieved.

Similarly, the Connecticut Energy Excellence Plan (also required by P.A. 07-242) called for "comprehensive energy efficiency solutions for all residents and businesses for all energy types" (p.3) but presumed full integration of all programs.

Other studies of energy efficiency that have been commissioned have had a narrow scope examining only one type of program, or the administration of a program or fund, in isolation. While those studies (e.g., the GDS February 2008 study on the Connecticut Energy Efficiency Fund) may have reached a conclusion that the status quo was fine, committee staff believes if the

³ Various Energy Issues for Connecticut: Draft Phase II, November 2008, pp.3,15

reviews had been examining the broad spectrum of programs -- especially from a consumer perspective, or the best way to meet state goals -- they might have concluded something different.

To make the committee staff's recommended state reduction goal achievable, staff believes that all administration, funding, and delivery of energy efficiency, conservation, and renewable energy programs should be consolidated. The implementation and delivery should be coordinated and implemented with a hierarchical, cost-effective approach that helps all energy consumers first reduce their energy consumption and then adopt clean energy. This needs to be done in a "fuel-blind" way without concern for the funding mechanism, what type of energy will be saved, or which program will claim the savings.

The following sections contain a series of recommendations that consolidate and coordinate programs and funding in one agency. The goal of the organization will be to achieve the overall energy reduction goal through a coordinated, comprehensive approach to energy efficiency program planning, design, and implementation. The focus of the organization and its programs should be to serve all customers in a cost-effective manner.

Organizational Structure and Funding

Organizations should have a governance structure that is representative of various interest groups, have adequate staff with expertise in relevant energy program areas, and have flexibility in approach to program planning and design and be accountable for performance.

ORGANIZATION

The September briefing report provided a description of the many various funds and programs Connecticut has developed around energy efficiency, conservation, and renewable energy. The report also illustrated through a diagram (p. 30, September 25 briefing) that the funding, delivery, oversight, and regulatory functions around these programs can prove difficult (if not impossible) for a consumer to navigate.

The report showed that *energy programs are developed around funding source and primarily targeted to the energy use that finances the program.* The system is very fragmented and not designed with the consumer's overall energy reduction as the objective. Because the system is set up in such a targeted (i.e., single energy source) fashion, there are many plans and administrative and oversight bodies, yet none are well coordinated. *This disjointed system also makes governance, measurement, and evaluation difficult and potentially duplicative.*

The fragmentation has become exacerbated as gaps in energy programs have been identified, and legislatively mandated programs created to address those gaps. Further, because there is no agency with a clear responsibility to plan, design, and implement energy programs, the legislature has assigned the programs to a variety of agencies.

For example, the Office of Policy and Management was assigned to implement the furnace rebate program and the home energy audit for non-regulated fuels. The Department of Public Utility Control, the agency with regulatory authority over electric and gas utilities, was given several programs to administer, including the electric efficiency partners program, the distributed generation grant program, and the design of a one-stop consumer website that contains all energy information.

While program review staff believes that both agencies carried out the assigned programs well, committee staff finds *that the implementation and delivery of energy programs to consumers is not in the normal scope of duties of either agency and may present organizational conflicts in the case of a regulatory agency administering programs.* Further, the greater the number of agencies involved with energy program implementation, the less a consumer is likely to know where to go.

Other energy entities, including local and federal government agencies, can also be confused. For example, federal EPA staff seemed unsure which agencies to contact regarding the EPA Community Challenge program as described in the previous section. The federal

employees indicated to committee staff that they work with staff of the Clean Energy Fund, but have had difficulty identifying staff in the Connecticut Energy Efficiency Fund to collaborate with on the program. Program review committee staff believes this is because there is no staff clearly identified as Energy Efficiency Fund employees. There are personnel at each of the two major utilities -- CL&P and UI -- that administer the programs, and independent consultants hired by the Energy Conservation Management Board carry out particular functions, but not one of them clearly has a full-time CEEF staff role.

Since most of the funding for efficiency has historically come from electric ratepayers, there has been a focus on providing programs that save electricity. Because the vast majority of Connecticut residents and businesses are electric utility customers, and thus pay the surcharge for the energy efficiency fund, the DPUC's oversight of the ratepayer funded programs has prioritized electric savings.

Further, Connecticut separates the administration for energy efficiency from alternative or renewable energy. As discussed in Section I, the focus recently at the federal and state level is to view energy conservation programs on a comprehensive, cost-effective continuum, with energy efficiency measures taken first. Most of the states that have imposed a public service benefit charge for efficiency and renewable energy programs do not separate responsibility into two agencies.

Connecticut's Clean Energy Fund and the Energy Efficiency Fund have been statutorily required to coordinate since the creation of both entities in the late 1990s. However, except for a jointly issued RFP for study on the energy workforce, and coordinating work on the construction of the new Science Center, most efforts are still informal. Other specific statutory requirements on coordination, e.g., evaluation efforts, have not been fulfilled.

If energy efficiency and renewable energy programs were organized in the same agency, committee staff believes it would be easier to meet the statutorily required efforts at coordination and to achieve overarching state goals of reducing energy consumption and promoting alternative energy. For example, joint efforts could be undertaken, along with the EPA, to assist Connecticut communities in reducing their energy use in municipal buildings by 10 percent. If the 75 towns that have already committed to the Clean Energy Fund's goal of 20 percent renewable energy by 2010 were also to adopt the energy reduction objective, the state would be that much closer to reaching the proposed energy reduction goal of 10 percent. In addition to adopting conservation targets in town buildings, the energy agency along with the town, could promote the same reduction efforts among residents and businesses, noting that efficiency is the least costly energy there is.

Committee staff's efforts to propose one stop for all energy assistance programs were somewhat constrained by federal regulatory issues. Staff recognized these limitations around organization and program implementation when making the organizational recommendation. For example, the designated grantee agency in each state that receives the federal Low Income Home Energy Assistance Program (LIHEAP) funding is almost always the same agency that receives other social services block grant funding; in Connecticut that is the Department of Social Services (DSS). The state DSS also implements other cash assistance programs in

addition to energy assistance and for those reasons the LIHEAP and the Connecticut Energy Assistance Program would continue to be within the state Department of Social Services, and cash energy assistance would not be implemented through the new authority.

The federal weatherization program offers some flexibility in the state agency designated to operate the program as long as the subcontractors are community action agencies or similar nonprofits. In addition, the weatherization program is basically an energy efficiency and conservation program that is better aligned with an agency whose main purpose is to design and deliver that type of program.

The major objective of the program review committee staff's proposal is to establish one entity with responsibility for efficiency and alternative energy program delivery, regardless of energy type or source of funding. This agency, however, would not be responsible for developing broad energy policy for the state but instead be responsible for designing, creating, and helping finance cost-effective programs to carry out the policy. Therefore, program review committee staff recommends:

There shall be created the Connecticut Energy Resources Authority as a quasi-public agency (body politic and corporate, as defined in C.G.S., Sec. 1-120).

A 22-member board of directors for the authority shall be established to provide governance and oversight (see next recommendation for membership).

The powers and purposes of the authority shall include the following functions (as illustrated in Figure II-1):

- **plan, design, implement, and help finance energy efficiency and alternative energy programs aimed at reducing the state's consumption and meeting the state's statutorily established renewable portfolio standards;**
- **issue requests for proposals, and enter into contracts for implementing and administering any of the authority's energy efficiency or renewable energy programs;**
- **develop a three-year plan with an accompanying three-year budget (see Section III);**
- **hold at least one public hearing on the plan, and submit the plan, with public comments to the Department of Public Utility Control. The DPUC shall consider the plan and hold a public hearing before issuing a decision on the plan;**
- **receive funding from any source (discussed further in this section);**

- **hire staff and employ or retain special consultants or advisors;**
- **incorporate evaluation recommendations into programs as required, and track and measure annual progress toward achieving overarching goals of reducing state energy consumption (programmatic evaluations shall be conducted outside the agency (as proposed in Section V)); and**
- **other responsibilities as noted through the report.**

Funding from all sources currently targeted at energy efficiency programs or renewable energy program delivery to customers in Connecticut would be allocated to the Energy Resources Authority.

Costs for administration of the authority shall not exceed eight percent of total authority revenues. The Board of Directors and the Department of Public Utility Control shall consider the extent to which programmatic administrative costs are included in contractual obligations when establishing and approving the administrative budget.

Compensation for the director and other authority management staff shall be established by the governing/oversight board, but shall be part of the plan and budget that is submitted to the DPUC for public hearing. Annual reports on progress in meeting the plan's goals shall be submitted to the legislature's Energy and Technology Committee and the Department of Public Utility Control. Future compensation should be tied to meeting the programmatic goals set in the plan as well as the overarching goals for the authority in reducing state energy consumption and adopting renewable energy.

States across the country utilize different administrative structures for implementing energy efficiency and renewable energy programs. The literature indicates there is no model or ideal organization to deliver a well-run program. In fact, states ranked by the American Council for an Energy-Efficient Economy (ACEEE) as having the best programs implement their programs through: state agencies, non-profits, public benefit corporations (quasi-public entities), and regulated utilities. Program review committee staff believes a state quasi-public agency provides the best structure for Connecticut's programs for a number of reasons.

First, this organizational model ensures that an independently run agency will implement programs aimed at reducing all energy consumption. The agency would access all the funding sources that are now fragmented so that administration and delivery would be more cost-effective and comprehensive. Programs would be designed and implemented to be uniform for all customers regardless of area of the state or the type of energy used and targeted to reducing the greatest amount of energy.

Second, a quasi-public offers several benefits not provided by a state agency. The former's administrative structure balances accountability with the adaptability to adjust program offerings based on market changes. Also, in order to operate the programs effectively and

efficiently, the new organization will need to have flexibility in terms of contracting requirements to be able to establish such working agreements in a timely manner. Finally, a quasi-public will continue the state's ability to invest in emerging and promising technologies for renewable energy.

This recommendation consolidates the two major ratepayer-funded programs – the Connecticut Energy Efficiency Fund and Clean Energy Fund – into one authority. The Clean Energy Fund is currently located within a quasi-public agency (the Connecticut Innovation Inc.) for administrative purposes only, so for the most part it operates like a quasi-public agency now.

Similarly, the Energy Conservation Management Board functions like a quasi-public in that it enters into contracts, hires consultants, etc. However, on the other hand, it is still a volunteer board, with no full-time staff dedicated solely to overseeing the planning, program goal-setting and design, and contractor selection. Committee staff believes all these components noted above are necessary for transparent, independently operated programs that sever the connection from the funding source to program implementation. This new organization should provide assurances to smaller funding sources that programs will be delivered uniformly to all residents without regard to the type of energy they use.

Governing/Oversight board. Boards provide oversight and expertise for organizations. In particular, they can help an organization by: (1) promoting transparency in the program administrator's decision-making process; (2) providing a forum to obtain valuable technical expertise from stakeholders and non-market participants; (3) encouraging collaboration among stakeholders; and (4) creating an additional venue for public participation.

The program review staff recommends establishing a governing board for the newly created Energy Resources Authority. Since the new organization will have responsibility for both energy efficiency and renewable energy, representation on the board shall include individuals who can provide expertise in all matters related to energy efficiency, conservation, and clean energy resources to ensure the best program delivery. Although the recommendation specifies the membership of the governing board, this should not preclude the board from establishing subcommittees around particular functions or from seeking external topic-specific expertise when it deems necessary.

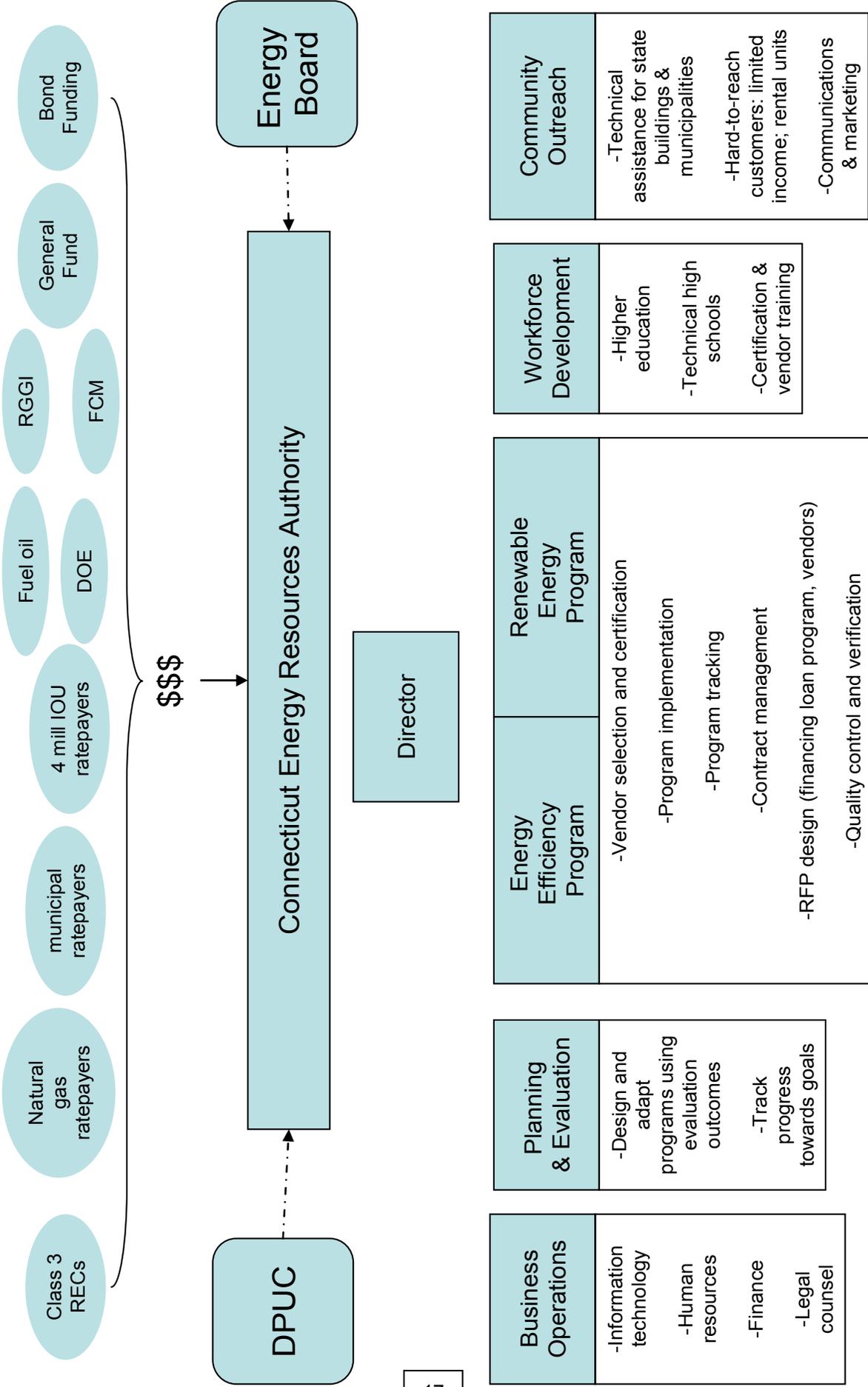
Program Review staff recommends the 22-member oversight board shall consist of the following members:

- **The Consumer Counsel or designee from that office;**
- **The Commissioner of Environmental Protection or the commissioner's designee;**
- **The Secretary of the Office of Policy and Management or the secretary's designee;**
- **The Attorney General or his designee;**
- **The State Building Inspector within the Department of Public Safety;**
- **A representative of residential low-income customers appointed by the governor;**

- Two persons with experience in business or commercial investments, one each appointed by the governor and by the majority leader of the Senate;
- One person with expertise regarding renewable energy resources appointed by the president pro tempore of the Senate;
- Two representatives of a state-wide business association, manufacturing association or chamber of commerce, one each appointed by the president pro tempore of the Senate and the minority leader of the Senate;
- A representative of residential customers appointed by the speaker of the House of Representatives;
- One person representing a municipality appointed by the speaker of the House of Representatives;
- One person representing a state or regional environmental protection organization appointed by the majority leader of the House of Representatives;
- One person with expertise regarding local building codes appointed by the minority leader of the House of Representatives;
- One representative of each of the two major electric distribution companies and one from the municipal electric utilities -- one appointed by the pro tempore of the Senate, one by the speaker of the House of Representatives, and one by the governor;
- Two representatives selected by the gas companies in this state, one each appointed by the majority leader of the Senate and the minority leader of the House of Representatives; and
- Two representatives from oil companies in the state, one each appointed by the minority leader of the Senate and the majority leader of the House of Representatives.

The board shall assist the Energy Resources Authority in the development of and implementation of a comprehensive plan, which shall be approved by the Department of Public Utility Control. The board shall establish compensation for the director and the management positions of the authority, and shall, as much as possible, link future compensation to achievement of goals of the authority and the state in reducing overall energy consumption and achieving renewable energy standards.

Figure II-1. Energy Resources Authority Organization Chart



Key:
 RECs – Renewable Energy Credits; IOU – Investor-Owned Utility; DOE – Department of Energy; RGGI – Regional Greenhouse Gas Initiative;
 FCM – Forward Capacity Market; DPUC – Department of Public Utility Control

FUNDING

Energy efficiency funding should be: stable and predictable; support programs for all customer groups; tied to long-term goals; and be tied to results.

Connecticut expends a substantial amount of money on energy efficiency and clean energy programs. *In 2008, revenue allocations from all sources exceeded \$200 million.* While much of that is stable and predictable, other funding included one-time infusions of funds to address particular needs, such as rebates or loans for furnace repair and replacement. The tables below show revenue allocations for energy efficiency and clean energy programs. Table II-1 provides the appropriated amounts that are ongoing, and Table II-2 shows one-time allocations.

| Table II-1. Ongoing Funding – 2008 Approximate Allocations | | |
|---|--|---|
| Revenue Source | Program/Agency | Total Annual Amount (\$ in millions) |
| 3 mill electric charge | CEEF/utilities | \$90 |
| 1 mill electric charge | CT Clean Energy Fund | \$30 |
| EIA FMCC | CEEF/utilities and DPUC | \$30 (will go down to \$10 million in 2009) |
| Adjustment on gas rates | CEEF/utilities | \$6.8 |
| 2.5 mill surcharge on municipal electric bills | CMEEC/ municipal | \$2.2 |
| ISO forward capacity market proceeds | CEEF | \$2.6 |
| Renewable Energy Credits | CT Clean Energy Fund | \$3.9 |
| Proceeds from first RGGI Auction | CEEF and Ct Clean Energy Fund | \$2.9 |
| Allocation from the gross receipts tax on petroleum products | Fuel Oil Conservation Board | \$7.5 (will go down to \$5 million in 2009 and thereafter) |
| Revolving loan proceeds | DECD/CHIF for Energy Conservation Loan Program | \$2 |
| Federal Department of Energy | Weatherization Assistance program/ DSS/ CAP agencies | \$2.5 |
| Total | | \$180.4 million |

| Table II-2. 2008 One-time Funding | | |
|---|--|---|
| Revenue Source | Program/Agency | Total Annual Amount (\$ in millions) |
| General Fund for Fuel Oil Conservation | Fuel Oil Conservation Board | \$2.5 |
| Bond Funds for Furnace Rebate Program | Office of Policy and Management | \$5 |
| General Fund for furnace repair and replacement | Office of Policy and Management | \$5 |
| General Fund for Energy Audit program | Office of Policy and Management | \$7 |
| General Fund and Bond Allocation to add to ECLP | DECD/CHIF for Energy Conservation Loan Program | \$4 |
| General Fund to add to Weatherization Program | Weatherization Assistance program/ DSS/ CAP agencies | \$2 |
| Total | | \$25.5 million |

As the tables show, the state has both long-term revenue sources as well as shorter-term funding that finance the energy efficiency and clean energy infrastructure. However, as the tables also show, the allocations go to several different agencies and programs, often for single-purpose objectives.

Comparison with other states. *The electric surcharge on Connecticut ratepayer bills – 3 mills for efficiency programs and the 1 mill charge for renewable energy – is among the highest in the nation.* Connecticut expends more than most other states on energy efficiency.

The Consortium on Energy Efficiency, which is made up of electric and gas utilities in the United States and Canada, ranks state spending in a number of ways. Based on total actual dollars from electric and gas charges alone, Connecticut ranks seventh in budgeted amounts for energy efficiency, regardless of state size, sales, or population.

On a per capita basis, Connecticut spends \$29.59 on its electric efficiency budget, second-highest after Vermont at \$38.08. Connecticut's electric efficiency budget at almost \$30 per person is more than 2.5 times greater than the national average per capita budget of \$10.79.

Most of that funding comes from electric utilities; Connecticut's gas utilities spend less on efficiency and conservation than many other states. Gas spending in 2007 was about \$4 million, which placed Connecticut twelfth of the 25 states with gas contributions to efficiency programs. On a per capita basis, Connecticut's 2007 gas spending was \$1.15, about half the national average per capita budget of \$2.36.

Stability in funding. Experts in energy efficiency, including many who worked on the National Action Plan for Energy Efficiency, indicate that one of the foundations of success is a reliable funding stream on which vendors and consumers can depend. While Connecticut has a comparably adequate and stable funding stream, some events have affected its reliability over the years.

In 2003, the legislature, to help address the state's fiscal crisis, diverted all funding from CEEF and CCEF to the General Fund and, until this year, portions of the surcharges were allocated to pay for bonding. Thus, for six years, neither fund was receiving full allocations from the ratepayer surcharges. In 2008, financial accounting differences and the way agreements were processed led to major budget issues with CL&P's commercial and industrial programs, causing some projects to be put on hold until a later time. United Illuminating also closed some programs because of program budget overspending.

Further, the one-year planning and budgeting cycle adds a measure of instability to the programs. The 2008 CEEF plan and budget (also known as a conservation and load management plan) was just approved in late August, forcing program changes. Because the 3 mill and 1 mill charge are established in statute and therefore the stability in funding is assured, a longer-term plan and budget process would provide more predictability to residential and business consumers that efficiency programs will be offered without major changes.

The planning cycle not only is unstable but also is time-consuming and labor intensive. The electric utilities annually prepare the CEEF plan in concert with the ECMB. The gas utilities develop a consolidated energy efficiency plan and the CMEEC creates its energy efficiency plan, which are both submitted to ECMB, the gas plan also going to the DPUC. In addition, the fuel oil conservation board recently held a public hearing on its plan, and submitted the plan to the ECMB in November as required, but that plan does not need DPUC approval. Finally, the Clean Energy Fund must also develop a plan that requires DPUC approval. Thus, for energy efficiency and conservation program delivery, five separate plans are developed, each requiring hearings at the development stage, and all except two also require proceedings and deliberations at the DPUC.

Program review staff believes the current planning and budgeting process is duplicative and continues a system where programs are fragmented along funding streams. Further, *single-year planning and budgeting is labor intensive for the developers and the regulators, while diminishing the continuity and stability in program delivery that consumers and energy efficiency vendors need.* Therefore, program review committee staff recommends:

Planning. The Energy Resources Authority shall be required to develop a three-year Energy Resources Plan that incorporates the following current plans:

- **the Connecticut Energy Efficiency Fund plan;**
- **the Connecticut Clean Energy Fund plan;**
- **the CMEEC plan for municipal utilities;**
- **the Fuel Oil Conservation plan; and**
- **the gas utilities conservation plan.**

The new Energy Resources Authority plan would be developed with the assistance of the Authority's governing board. At least one public hearing on the plan would be required prior to submission to the DPUC. The DPUC would hold proceedings on the plan before issuing a decision. DPUC would issue binding decisions on sections of the plan that relate to regulated

utilities, but public comments and other input could be offered on any part of the plan.

Budgeting. The budget for the authority and all programs shall be incorporated into the plan, with spending based on anticipated revenues over the three-year period.

While planning and budgeting would require approval every three years, an annual report on programs and progress toward an overarching goal would be required.

Revenue sources. As shown in Table II-1, by far the biggest revenue source for energy efficiency has been the surcharges on electric ratepayers' bills. Seventy-five percent of the revenues that go to energy efficiency are from electric surcharges, even though only 28 percent of the state's energy consumption is of electricity.

While certainly program review staff does not consider revenue for energy efficiency should be on a one-for-one ratio on consumption, there should be a greater attempt to ensure that distributors and consumers of other types of energy pay some "fair share."

Connecticut gas utilities and their customers contribute relatively little toward energy efficiency. In 2007, Connecticut ranked 12 of the 25 states that have gas efficiency programs. While the gas companies' contribution recently increased considerably -- to \$6.8 million in 2008 and will be about \$9 million in the 2009 plan submitted to DPUC -- it is not based on a statutory or regulatory formula or a specified surcharge. The \$9 million allocated in 2009 is still less than one percent of gas utility revenues (\$1 billion in 2007). Further, the gas utilities and their customers make no contribution to renewable energy, while electric ratepayers contribute a one-mill surcharge to renewable energy. Thus, gas company contribution on a percentage-of-revenue-basis is less than the electric surcharge of about 1.5 percent electricity company revenues that fund efficiency programs only.

In 2007, the legislature sought to create an additional revenue source for gas efficiency programs through a mechanism that allocated the difference in revenue realized in the gross receipts tax on public service corporations (utility companies) over the revenues estimated in the budget. However, this mechanism did not produce any funding.

To develop a predictable revenue stream for gas efficiency programs that is closer to the per capita expenditures nationwide, and one based on gas utilities revenue, program review committee staff recommends:

The gas utility contribution to the energy resources programs shall be one percent of the utilities' previous year's revenues.

The legislature also in 2007 created a revenue mechanism for the fuel oil conservation program. Funding for that program comes from the actual excess amounts collected in the petroleum products tax over the estimated amounts. There was a \$10 million cap in 2008,

decreasing to \$5 million in 2009 and thereafter. The actual revenues collected did reach the \$10 million cap, and thus will provide considerable revenue for oil conservation.

Program review staff believes that it is worth noting that while this was dedicated to fund fuel oil conservation, the tax on petroleum products actually exempts home heating oil. The tax applies to gasoline, kerosene and diesel, as well as petroleum derivatives such as plastics and paint. However, while home heating oil is exempt, and thus does not really contribute revenue to the fund, the \$10 million funding level would represent approximately 0.7 percent of heating oil sales⁴, if they were taxed. Program review staff believes it is important to maintain a level of parity in funding amongst the fuel sources.

Therefore, program review committee staff recommends:

The legislature maintain the established funding stream from the gross receipts tax on petroleum products for funding of energy conservation programs at \$10 million in 2009, and annually thereafter.

⁴ PRI calculation using the most recent (2006) Federal Energy Information Administration data for heating oil consumption for residential, industrial, and commercial consumers multiplied by the average price for each of the sectors.

Program Planning and Design

Programs should be developed that are geared to meet overarching goals, serve all customer groups, and are fuel blind.

Program review staff finds that as energy prices have climbed and demand for conservation has increased over the years, the legislature has created programs to serve the needs of different constituents as they have arisen. As a result, *programs have been designed around the fuel or utility paying for them, rather than with a holistic approach that serves all a customer's energy needs.*

As discussed in the September briefing report, since 2005, the legislature has required:

- a gas conservation program to serve customers with natural gas;
- conservation programs for customers served by municipal electric utilities;
- an energy partners program targeted at business customers who would not be served because of the program requirements of the Connecticut Energy Efficiency Fund;
- a furnace rebate program for residential customers;
- a fuel oil conservation program for customers with home heating oil, who were not served by the Connecticut Energy Efficiency Fund; and
- a home energy audit program for those not served by the home energy solution program operated by the CEEF.

In establishing additional programs, the legislature recognized the need for more coordination among all the different entities. It required the gas companies to have the Energy Conservation Management Board (ECMB) approve their plan, and required the municipal electric utilities to submit their plan to the ECMB, although it does not have approval authority. The Fuel Oil Conservation plan was also required to be submitted to the ECMB for its approval, which occurred in November after a public hearing was held in October 2008.

The legislature in 1998 also called for coordination when it created the two original ratepayer-funded programs, the Clean Energy Fund and the Connecticut Energy Efficiency Fund, requiring a joint committee of the Energy Conservation Management Board and the Renewable Energy Board (i.e., Clean Energy Board). However, coordination has been informal and inconsistent, and it is still unclear, for example, which fund has purview over geothermal systems.

Because there is no organization responsible for energy conservation program planning and design, the legislation enacted to create these recent programs was very specific in laying out the program as well as detailing the administration of the entities charged with program responsibility. For example, the authorizing statute for the furnace rebate program details the efficiency ratings of furnaces that qualify for rebates, the rebate levels, and the levels of income to qualify for the full or partial rebates.

Despite these efforts towards a more coordinated approach, and the specifics mandated for each particular program, confusion exists among consumers. It is not always clear for consumers which agency, fund, quasi-public organization, or board is the most appropriate avenue by which to seek services, or which program might best serve them.

Further, even with the addition of the recently statutorily mandated programs, *there remain gaps in programs, especially for hard-to-serve customers*. For example, on average only 16 nursing homes each year participate in the Connecticut Energy Efficiency Fund programs. Connecticut has more than 250 nursing homes, many of which were constructed at least 25 years ago. Most of these homes rely almost entirely on state and federal Medicaid dollars to operate, and thus any energy cost increases translate into increased rate requests. Responsibility for designing programs that meet all energy conservation needs -- from identification of problems to helping align financing mechanisms -- for these types of clients should be assigned to the newly created authority.

Many programs should evolve into market-based endeavors. When a program is designed, it should have an implementation period and deadline for reauthorization. During the implementation phase, programs should assist customers in recognizing the value of continuing to practice the program measures without an incentive. Enabling efficiency and conservation measures to become common in the marketplace should be a program objective, just the way that compact fluorescent light bulbs have now become an everyday purchase. In addition, the more a program or item becomes a routine transaction, the more cost-effective it is likely to become, with vendors dealing directly with customers who will demand the best service at a reasonable cost.

Therefore, program review committee staff recommends:

The Energy Resources Authority three-year plan should include all programs designed to target both energy efficiency and reduction goals and alternative energy goals. Each program for both energy efficiency and alternative energy use should have measurable objectives that include the following:

Energy Consumption Component

- **Activity measures – such as how many homes completed**
- **Baseline measures – such as average facility consumption (and costs) prior to the program implementation**
- **Planned energy savings – by appropriate measures – e.g., therms, BTUs, kWh, or gallons of heating oil**
- **Realized energy savings**

Cost-effectiveness of program -- per unit and overall program

Reduction in congestion costs -- if that is a program objective

Reduction in greenhouse gas emissions

Economic Development -- number of persons employed directly or indirectly as a result of the program

In addition, program review staff proposes the following factors or “best practices” should be considered in designing the programs⁵:

- *Overarching goals for each sector should first be established, and then design programs best suited to achieving the goal.* For example, Connecticut might follow Vermont’s lead in establishing a residential goal in its 2008 energy efficiency act to “reduce annual fuel needs and fuel bill by an average of 25 percent in the housing units served.”
- *Programs should be developed that serve all customer groups – residential, low-income, small business, and large commercial customers.*
- *Programs should be developed that target hard-to-serve customers.* For example, multi-family rental housing, nursing homes, and municipalities, including schools.
- *Programs should ensure that where feasible, energy savings undertaken should follow hierarchical approach.* The most cost-effective energy efficiency measures are taken first before upgrades or alternative energy measures are considered. For example, insulation and duct sealing and other weatherization measures should be taken (or at least simultaneously) before installing a new furnace.
- *Programs should either be market-based, or designed to become market-based over a period of time.* In market-based programs, the consumer chooses the installer, auditor or other energy technician or professional.
- *Programs should not advocate nor prohibit any form of technology based on fuel type.* As much as possible, customers may choose technology based on price, cost effectiveness, and rebates or incentives. Incentives should be offered for technologies that reduce overall energy consumption. They should not be targeted to a specific fuel type if that fuel type does not offer the most in energy savings.
- *Programs should have a uniform design no matter the administrator or provider.* For example, programs should offer the same rebates, charge the same co-pay, install the same warranted measures, and offer incentives to all customers of a particular program no matter the fuel source, or area of the state.

⁵ These “best practices” are adaptations of standards and guidelines included in the *National Action Plan for Energy Efficiency*, July 2006.

- *All programs should be part of the same plan with public input.* At least one well-publicized hearing should be held on the plan before submission to the Department of Public Utility Control.
- *All programs should be implemented by persons certified and trained in a given area* (see the recommendations on training and certification).
- *Programs should be designed to accomplish the most energy savings of all types in the most cost-effective way possible.* This will often mean that as many measures as possible be taken in one visit, at least for residential customers. Often the audit/testing component is one of the most costly steps, so whatever measures can be taken simultaneously brings down the costs of the test. The program design will designate the cost-benefits tests it will meet.
- *Programs should be designed to measure energy savings overall.* Since funding from all sources will be pooled under one authority to design energy-savings programs, it is important that the program measures and evaluations be designed around all energy reductions, not just electric.
- *Programs should be evaluated as recommended in Section V, and require reauthorization after an established period.* As discussed previously, programs are often designed to change behavior so that the market will offer the program or product that the customer will accept without an incentive. When that happens, the supported or subsidized programs may no longer make good economic sense. Other programs may not deliver the energy reductions anticipated and when an evaluation determines that, the program should be altered or not reauthorized.

While program review staff believes that the new energy resources authority should have flexibility in designing any and all programs that achieve overarching energy savings goals, several major program initiatives that should be incorporated into that portfolio are discussed below.

RESIDENTIAL PROGRAM DESIGN

The general literature around energy efficiency indicates that residential customers will undertake efficiency programs if they believe that energy costs are high and will remain high. Connecticut's energy prices are among the highest in the nation and, therefore, state consumers have an important economic incentive to become more energy efficient.

The briefing report showed that Connecticut is not a high energy-consuming state. Connecticut ranks 44 in per capita energy consumption. However, because the state has the third-highest energy prices in the nation, convincing consumers that conservation and efficiency

measures will save them energy and money in the long-run should be easier than in other parts of the country where energy is cheaper. Also, the toll energy costs take on the household budget is more apparent now than a few years ago, when oil, gas, and electricity were less expensive.

The demand for the energy efficiency programs in Connecticut has grown and this past year has exceeded many of the energy efficiency program budgets, as noted in the previous section. Thus, the desire for Connecticut consumers to become more energy efficient has increased, which further supports the need for programs to be consolidated and offered in a more goal-oriented way. For example, residential programs should take into consideration the scope and acuity of the energy conservation issue.

Much of Connecticut's housing stock is old. The 2007 annual report of the Department of Economic and Community Development indicates that three-quarters of the housing units in Connecticut (about 1 million of the 1.44 million) were built before 1980 and half were built before 1960. Further, while no firm figures exist, it is likely that only a small percentage of those old homes have been comprehensively weatherized.

The briefing report indicates that about two-thirds of the average residential customer's energy costs are for heat and one-third is for electricity. Less than 15 percent of housing units have electric heat; therefore for many housing units there is a need to focus more on measures that will make the unit more efficient for (non-electric) heating. Because the Home Energy Solutions (HES) program is paid for by the electric surcharge, there has been an emphasis on paying for those measures that are designed to save electricity. More recently, those customers who heat with gas receive weatherization services as well, but the extent to which heat conservation measures are installed is uncertain. Further, HES customers who heat with oil (and are charged a co-pay for the audit) do not typically receive a rebate for insulation even though a recent report indicated that by far the largest single-measure savings for oil-heated homes comes from insulation (28%).⁶

It has only been since the middle of 2007 that the CEEF has developed the Home Energy Solutions program, which offers a more "holistic approach" to weatherizing homes for customers that are not low-income. Residents schedule the HES audit through the utility and there is currently about a six-week wait, and the customer has no choice in the selection of the vendor.

As the HES program got off the ground, there were variations in the program delivery depending on the vendors and which utility was paying for the services. Most installers were not certified and were being trained "on the job." Even now, almost two years later, *DPUC proceedings have determined that the HES program is being offered differently depending on the utility, and that measures taken often are the "low-hanging fruit" that consumers might have done anyway.* Further, because the program remains primarily focused on the same technologies (e.g., compact florescent light bulbs) that are now widely available, the program may not be the most cost-effective way to achieve the savings.

The CEEF cost for the HES program in 2007 was slightly more than \$1,000 per unit. Until early 2008, there was no cost to any customer. However, starting in February 2008 oil-

⁶ "Reducing Oil Use Through Energy Efficiency," American Council for an Energy Efficient Economy, p. 17.

heating customers were required to pay a \$300 co-pay. Legislation passed in the August 2008 Special Session authorized another audit program whereby oil customers could have a home energy audit conducted by a vendor other than a HES provider, including their home heating oil delivery service. The legislation allocated \$7 million to the Office of Policy and Management to pay for the audits, although a \$75 customer co-pay was a requirement for the audit. The program was an attempt to level the playing field for those customers who would have been charged the steeper fee for HES, and to expand the field of vendors being paid to provide the audits. That the program was established again points to the need to have uniform coordinated programs for all customers regardless of energy type or funding source.

In a November 2008 DPUC decision on the Home Energy Solutions program, all utility customers in that program who applied after November 17, 2008, will now be charged a \$75 fee. Much of the cost of the home energy audit comes from the testing with fairly sophisticated equipment, such as the blower-door test. Thus, to better offset the expense of the tests and make the results cost effective, every attempt should be made to offer all incentives, including immediate installation, so that the maximum energy savings can be achieved.

Energy efficiency installers and others in the field have stated that customers will invest more of their own money if they have to pay an initial contribution for an energy assessment. This appears to be borne out by the rebate return rates experienced in the HES program to date. UI indicated that HES participants in its service area returned 11 percent of the rebates overall and CL&P home solutions participants returned fewer than 7 percent of the rebates for insulation, and 25 percent of the rebates for energy efficient appliances. It is difficult to assess the impact the new audit program and fee changes to the HES program will have on program participation, implementation or results since both have just begun.

As the DPUC proceedings revealed differences in the way the two utilities design and operate the HES program, *there may well be variation among the vendors as to the problems they identify in the audits, the solutions they recommend and/or implement, and the incentives they offer. Committee staff believes introducing additional subsidized home energy audit programs may increase availability and decrease waiting time for customers. However, without greater assurances that comprehensive energy solutions are implemented and that consistency among the programs and the vendors is required, the increased access does little to ensure quality or energy savings.*

For all these reasons, program review committee staff recommends:

The Energy Resources Authority shall establish a goal of certifying 20 percent of Connecticut's housing stock as energy efficient by 2015. The Authority should develop a residential energy certification program focused on total energy savings, and would incorporate those measures at the time of testing that on average would reduce the customer's energy consumption by at least 20 percent.

The customer would pay an initial audit/test fee of \$150.00, which would be reimbursable if the measures necessary to certify the house as energy

efficient were performed. All vendors would be paid the same auditing/test fee by the Energy Resources Authority. The consumer would pay for the costs of the measures, but half the costs of measures – up to a total of \$1,500 - - would be reimbursable to the consumer. The installer would submit the invoice for the audit, along with a copy of the customer’s invoice with measures recommended and installed, to the Energy Resources Authority.

Program review staff further recommends that the residential certification program provide a list of qualified vendors from which consumers could choose, and those qualified vendors be listed on the authority’s website. To be a “qualified” vendor there must be at least one member of each unit – responsible for conducting the testing, performing installation and providing information to customers -- who is certified as a building or energy analyst by a nationally recognized energy certification organization.

Qualified vendors would also be responsible for providing information on, and taking an application upon customer request, for financing through a program sponsored by the Energy Resources Authority.

Program Benefits

There must be demonstrable benefits for residents to undertake measures for which they will have to pay. There are a number of incentives provided to the consumer under this proposed program including:

- energy cost-savings;
- increased property value at the time of resale;
- current property tax provisions do not tax energy efficiency improvements to existing properties; and
- reimbursement of half the costs, up to \$1,500, and favorable financing for other endorsed measures.

Energy reduction and cost-savings. Consumers might implement more comprehensive measures at the time of an audit if it could be shown that the steps taken would reduce overall energy consumption by 20 percent, which for older homes is very realistic. Based on the average household energy consumption in Connecticut and using 2007-2008 prices (see page 16 of committee’s September briefing report), a 20 percent reduction would save the average consumer about \$935. Thus, if any measures taken by consumers cost them \$1,000 or less, the payback period will be only one year.

Property value increase. Property buyers and sellers recognize that an energy efficient home should add to its appeal and value. States, including Connecticut, have implemented methods that provide some type of documentation that verify this. Legislation passed in the 2008 session requires the results of any energy audit that may have been conducted and potential effectiveness of any recommendations to be included as part of the real estate transaction disclosure documentation. While this might provide some potential sellers the incentive to obtain the audit, it might prevent others from getting one, particularly if they were not certain

they would take measures to correct major energy deficiencies. Other states, like Washington and Oregon, require an energy rating as part of the multiple listing service (MLS) when a house is being marketed for sale.

An energy certificate program, versions of which have been adopted in Maine, Massachusetts, and Texas, may provide the necessary incentive that links the certificate with proof that measures proposed were installed, and a way to collect reimbursement for them. Landlords may also see the benefits of an energy certificate both when selling a property, and when renting the property as it could be advertised that tenants would save on utility and heating bills over another similar property without the energy certificate.

Costs. Implementing the goal of 20 percent of housing stock receiving an energy certificate by the year 2015 would mean completing about 288,000 residential units in the next five years, or about 57,600 residential units a year. Estimating an average cost of \$1,000 for reimbursement of measures to certify a unit, the annual cost would be \$57.6 million. With the pooling of existing resources, that cost should be achievable. Depending on demand, if resources needed to be prioritized, older (pre-1980) housing units could be targeted first. Funding of a comprehensive fuel-blind energy-savings program like this would go a long way to achieving parity in revenue allocation for residential customers.

Residential Vendor Training and Certification

The success of the home certification program recommended above will depend on customers' reliance that the vendor making the recommendations:

- is knowledgeable;
- is skilled and trained in the equipment and in performing the analysis; and
- will propose the measures necessary to make the home more energy efficient, to realize the savings estimated, and to be issued the home energy certificate.

To achieve this, it is necessary that there be a sufficient workforce trained to deliver a standardized program. While no firm statistics are available, Connecticut does not seem to have an adequate supply of trained people in many aspects of the energy efficiency and conservation area. The two electric utilities worked with Gateway Community College this past summer to sponsor CEEF-funded training in the building analyst program which is a certification program endorsed by the Building Performance Institute (BPI).⁷ Fifty-five people received the training, but not all have completed the field work or passed the test necessary to be certified. At least one person on each of the community action agencies' weatherization teams is certified as an auditor by BPI or equivalent.

Two recent efforts examined energy workforce needs in the state. First, the Clean Energy Fund initiated a study in conjunction with the Energy Efficiency Fund to establish a baseline of the renewable and energy efficiency industry in Connecticut and also perform a gap analysis. A component of the study will examine the current energy workforce profile in Connecticut and

⁷ The Building Performance Institute, Inc. is a nationally recognized training and credentialing organization that certifies people at varying levels in the "whole system" approach to evaluating a residential building.

make specific recommendations for what efforts need to be undertaken to improve it. That study has not been completed but is expected to be done by the end of the first quarter in 2009.

Second, the 2008 Connecticut Energy Excellence Plan, required by P.A. 07-242, was issued in May 2008. The plan contained seven broad recommendations including “energy efficiency infrastructure development (i.e., job creation), [and stated] aggressive savings goals require the capability of the entire delivery system for energy efficient equipment, design, engineering, performance contracting, installations and quality control must be built up over the next 10 years. Supporting efforts are needed for education, training, professional development and other infrastructure development through partnerships with educational institutions, trade and business associations, and other market allies” (p.4).

Therefore, program review committee staff recommends:

One of the responsibilities of the newly established Energy Resources Authority shall include workforce development in the energy conservation and renewable energy area. The authority should collaborate with the community college system and others to ensure that training and certification programs are offered to help create and maintain a qualified workforce. The first priority should be to train an adequate number of individuals in the building analyst certification program to ensure that the Residential Certification Program (recommended above) can be implemented.

The ENERGY STAR program developed by the federal Environmental Protection Agency and Energy Department issue energy standards in a number of areas including household appliances, new home construction, and conducting home energy audits. Twenty-two states offer programs that meet the ENERGY STAR energy performance evaluation standards for existing homes. While Connecticut’s CEEF programs meet the ENERGY STAR standards for new home construction, it is not among the 22 states using the guidelines for existing homes, according to the agencies’ website.

Maine, among the 22 states using the ENERGY STAR guidelines for conducting home energy audits, also goes a step further. The state’s efficiency program identifies any service provider in its Maine Home Performance Program (i.e., its residential certification program) as a Home Performance evaluator. To be a Home Performance evaluator, a provider must:

- complete the training;
- be certified -- performing the required field work and passing the test -- by the Building Performance Institute as a building analyst 1;
- sign a participation agreement with the program, which lists required elements that each service provider *must* do under the program and optional steps that each provider *may* propose because they are best industry practices;

- provide proof of access to the required equipment necessary to conduct the Home Performance analysis; and
- perform a Maine Home Performance evaluation when requested by a homeowner.

The cost for the five-day evaluator training and certification is \$3,500 a person. According to staff in the Maine Home Performance Program, the State of Maine currently pays for about half the training costs. Approximately 50 percent of the trainees eventually become certified and work in the field. However, according to the staff there, because the customers receive no reimbursement for the initial evaluation or implementing recommended measures, demand for evaluators has been low.

Program review staff acknowledges that there is some value in putting one's own money into training and certification. At some future point perhaps the program in Connecticut could be supported with payments by individuals, when there is recognition that this is an industry where sufficient demand for services will offer gainful employment. Until then, there is a need to provide all supports necessary, including financial support to create a well-trained workforce so residential energy evaluation can be sustained.

Maine staff indicates the five-day training is offered every few months. If Connecticut could offer the training quarterly and 50 people complete each session, that would cost about \$600,000 annually. Assuming a pass rate of 75 percent (not everyone passes the certification test), about 150 people could be certified in one year.

The Energy Resources Authority would be responsible for working with the community colleges to locate qualified instructors, provide the training facilities and equipment, and the ongoing support to ensure that the program is successful. Once homeowners recognize the program's value in monetary savings and improved comfort, demand for the energy certification services should increase. If program demand is sufficient, individuals interested in the training eventually may not need to be fully subsidized.

FINANCING RESIDENTIAL ENERGY EFFICIENCY

Program review staff analyzed the savings calculated in the state's major residential energy efficiency program -- Home Energy Solutions -- and finds that *while the program served 6,000 homes in the first two quarters of 2008, the consumption reductions are low*. In the average home, 13 percent of electricity is saved and natural gas consumption is reduced by six percent.⁸

Committee staff believes that the low savings are due to a number of factors. Much of the work done at the time of the audit, changing light bulbs and some weatherization measures, does not produce significant savings. Efficiency components that yield higher energy savings such as attic and wall insulation are not part of the initial direct install measures. Once the

⁸ PRI calculation based on data provided by the utilities on annual electricity and gas savings and number of customers served.

opportunity to install the measures has passed, customers might not act on the incentives later, as shown by the low rebate turn-in rate discussed above.

Another contributing factor is the lack of affordability or reluctance to commit the level of financing needed to install the necessary measures to produce real savings. Even with rebates and other financial incentives, making a home more energy efficient can be expensive to consumers, especially if the costs must be paid all at once. Connecticut has offered financial assistance through the Energy Conservation Loan Program to homeowners for more than 28 years. However, the participation rate is low, serving only about 0.5 percent of the state's owner-occupied households since 1979.

The Energy Conservation Loan program is discussed below and includes descriptions of comparative programs in other states, along with committee staff findings and recommendations.

Energy Conservation Loan Program (ECL)

As described in the briefing report, the energy conservation loan program was established in 1979 to provide financing at below market rates (including some at zero percent) to single family and multi-family residential property owners for the purchase and installation of cost-saving energy conservation improvements.⁹

Funding. The Department of Economic and Community Development (DECD) funds the program through revolving loans and the issuance of bonds in principal amount not exceeding in the aggregate \$23.7 million. Annually, the proceeds from the loan repayments amount to approximately \$2 million. At its August 2008 meeting, the State Bond Commission issued an additional \$2 million for the fund, and the legislature allocated another \$2 million in General Fund surplus to the program at its August 22 Special Session.

However, prior to the August 2008 bond authorization, the last bond issued was in 1992. Thus, for the past 16 years, the funding has been established at the level of loan repayments, about \$2 million a year.

Program administration. DECD contracts with the Connecticut Housing Investment Fund (CHIF) to administer the program. CHIF is a private, nonprofit organization established to finance affordable housing and neighborhood revitalization projects throughout Connecticut.

Eligibility. Historically, Connecticut's loan program capped income eligibility at 150 percent of median area family income, but in the August 2008 Special Session those levels were increased. Now, Connecticut single family homeowners (1-4 units) with income up to 200 percent of the median family income (MFI) by geographic area and family size may qualify for a zero percent loan.¹⁰

Homeowners may borrow between \$400 and \$25,000 with a maximum loan term of 10 years. Multi-family property owners may borrow up to \$2,000 per unit with a maximum of

⁹ C.G.S. Sections 16a-40a-16-40c

¹⁰ For a household of four, this equates to \$95,550 in Waterbury MSA and \$176,700 in the Stamford-Norwalk MSA

\$60,000 per building for a period of 10 years for eligible improvements. All loans under this program are secured loans.

In order to qualify for a loan, the client must meet the following criteria:

- A debt-to-income ratio of less than or equal to 39 percent of gross income (calculated based on housing expenses, loan obligations, revolving charges, and monthly income)

About half of all loan applications are rejected each year, with approximately 80 to 90 percent of the rejections due to high debt-to-income ratios. Another 5 to 10 percent of applicants are rejected due to poor credit, and the remainder due to bankruptcy or existing tax liens.

Recent restrictions. The August 2008 Special Session legislation allocating funding to the ECL program appears to limit the zero percent loans to the purchase of very high efficiency boilers and furnaces -- natural gas furnaces or boilers that meet or exceed federal ENERGY STAR standards, and propane and oil furnaces and boilers that are not less than 84 percent efficient. These are similar requirements to the OPM furnace rebate program. It is still unclear whether consumers will find the incentives and the loan program attractive enough to expend the additional funds.

Other States' Energy Loan Programs

There are more than 150 residential energy efficiency loan programs in the United States. Table III-1 highlights programs that have seen higher utilization rates than other programs, yet still have only served a fraction of "potential" customers.

| Table III-1. Comparison of Energy Loan Programs | | | | | | | | |
|---|---|--|---------------------------------|---------------|---|--|---------------------------|--|
| Sponsoring Entity | Source of Capital | Credit Requirements | Marketing | Program Start | Avg. Loan Amount | Interest Rate & Term | Activity Levels in 2007 | % owner-occupied households served in 2007 |
| PA Keystone Helps | PA Treasury, Housing Finance Authority, & Energy Dev. Authority | FICO >640 | Contractors | 2005 | Up to \$10,000 for unsec; up to \$35,000 for sec. | Unsec. 8.99% for 3,5, or 10 yrs; sec. 6.375% – 8.878% for 10 yrs | 1,500 | <0.1% |
| Efficiency VT (EVT) | Bank funds; public benefits charge (rate-payers) | Varies based on loan product | EVT but some contractors | 2006 | \$8,000 - \$15,000 | Buy down 3.5%; Interest 2-6.5%; 5 years | 34 loans; \$257,000 | <0.1% |
| Manitoba Hydro (Canada) | Utility's general revenue funds | No set bar, review credit and bill payment history | Contractors, suppliers, utility | 2001 | \$4,800 - \$7,500 | 6.5% up to 5 years | 8,100 loans; \$39 million | <1.9% |
| NYSERDA Energy Smart Loan Fund | Bank funds; public benefits charge | Lender does underwriting | Lenders and contractors | 1998 | SF \$11,000-\$20,000; MF varies | Buy down 4%; term varies | SF 340 loans; MF 29 loans | <0.1% |
| NYSERDA Home Perf. With Energy Star | Fannie Mae and public benefit charge subsidy | FICO>640 | Contractors | 2003 | \$7,800-\$20,000 | 5.99% for 3, 5, 7 or 10 years | 541 loans; \$4.2 million | <0.1% |
| Unsec. – unsecured; sec. – secured; SF – Single Family; MF – Multi Family FICO – measure of credit risk used by credit rating agencies Source: “Enabling Investments in Energy Efficiency, a study of programs that eliminate first cost barriers for the residential sector,” Merrian Fuller, Efficiency Vermont, August 2008. | | | | | | | | |

Two of the programs have higher activity levels and are described in more detail below.

Pennsylvania energy loan program. In 2006, Pennsylvania launched the Keystone Helps energy loan program to assist homeowners with financing high efficiency and renewable energy improvements. In 2008, with the help of the Pennsylvania Housing Finance Agency the program expanded into larger “whole house” and renewable energy loans.

Funding. The program is principally sponsored by the Pennsylvania Treasury Department, which provided \$20 million in funding for homeowners. The Pennsylvania Energy Development Authority also invested \$500,000 to help secure loans for low-income customers.

Program administration. AFC First, a national lending institution, is the exclusive lender and administrator for the program. Administrative duties include: loan processing and servicing, maintenance of customer service call center, creation and distribution of all marketing materials, contractor training and approval, centralized loan approval and underwriting, dealer disbursements, and verification of work completion.

An important component of the Keystone Helps program is the relationship AFC First has developed with energy efficiency contractors. All work funded under the loan program must be performed by an approved contractor. Contractors must demonstrate ethical and fiscal responsibility before they are approved. Requirements include but are not limited to: good standing with the Better Business Bureau, established for at least three years, and appropriate state licensing. AFC First does extensive contractor recruitment and training for the loan program.

Eligibility. There are no income qualifications for the program. Homeowners must have good credit and a debt-to-income ratio of no more than 50 percent. The program is for installation of ENERGY STAR rated products and other high efficiency and renewable energy improvements. All work can be financed if at least 65 percent of the project is comprised of the following: high efficiency heating and air conditioning systems; ENERGY STAR rated windows, doors, insulation and sunrooms; and geothermal, wind, solar, solar hot water, and whole house home performance remodeling.

Manitoba Hydro. The province of Manitoba, Canada has the highest annual loan volume with 8,100 loans disbursed in 2007 and a total of 41,000 loans issued since the program began in 2001. The program offers unsecured loans at 6.5 percent for a term of up to five years. The program offers a quick turnaround for loan approvals, typically the same business day and within seconds using a web-based system for their 1,100 contractors and 200 retailers. Manitoba assesses credit worthiness by reviewing bill payment history and/or conducting a credit review. About 94 percent of applications are approved and the default rate over the program life is 0.2 percent. Loan payments are added as a line item to the utility bill, known as on-bill financing.

Connecticut Compared to Other Programs

The problem of achieving higher residential energy savings is not unique to Connecticut. Many barriers exist to improving the efficiency of homes including the following:

- Transaction costs – The time and effort required to get enough information to make a decision, apply for a loan, and arrange for the work to be done, may be reviewed as burdensome.
- Uncertainty of energy savings – On average, a set of measures might produce a predictable level of savings, but savings can never be perfectly predicted for an individual home.

- Initial capital investment – The initial cost of a project may deter investment, either because the homeowner does not have access to the capital or has higher-priority items for investments.

Connecticut's energy efficiency loan program shows a low utilization rate when compared with Pennsylvania's program, even though Connecticut's program offers competitive interest rates. Connecticut's program has been in existence for 28 years and has served approximately 0.5 percent of households, whereas Pennsylvania's program started a little under three years ago and has already served 0.1 percent of all households.

There appear to be a number of factors that have influenced the lower utilization in Connecticut. First, the ECL debt-to-income ratio may be set too low. *Connecticut's required ratio is 39 percent while Pennsylvania's program sets the limit at 50 percent.* The debt ratio criterion is also the reason for the majority of loan rejections in Connecticut.

Second, Pennsylvania recruits, screens, and approves contractors that provide the energy efficient upgrades for homeowners. AFC First also offers extensive training to contractors via regional seminars and site visits. The experience of programs across the country suggests the *most effective outreach and marketing is done by well-informed contractors.*

More generally, other factors may hinder homeowner participation. To the extent that homeowners are counting on energy savings to pay off a loan, longer loan terms may be necessary so that the energy savings are financed on a positive cash-flow basis. In addition, a loan program in itself may not be enough to achieve greater energy savings for existing homes.

Programs across the country are experimenting with different financing mechanisms, loan eligibility criteria, and repayment options to increase both participation levels and energy savings. Two financing mechanisms currently being piloted include, having municipalities fund energy efficiency loans through the issuance of special tax bonds that are paid by participating homeowners as a line item on property tax bills and financing energy efficiency improvements through mortgage refinancing. New programs have also experimented with basing loan eligibility on home ownership and past payment of taxes, rather than a good credit history, with term limits of 20 years that can be transferred with ownership. Additionally, a few programs tie repayment of the loan to the meter as opposed to the homeowner which encourages homeowners to install measures that may outlast their tenure.

The Connecticut Energy Efficiency Fund planned to offer financing to homeowners through the Home Energy Solutions program, beginning in 2008; however, the plan did not get off the ground. The program is proposed again in the 2009 plan, with mention of the issuance of requests for proposals, but it is unclear whether it will come to fruition.

With the newly created Energy Resources Authority that offers programs aimed at the state's energy efficiency and renewable needs, program review staff suggests the energy conservation loan program be incorporated into the new organization. In order for homeowners to maximize energy savings opportunities financing must be provided as an option in connection with other program services. The current CHIF contract expires on January 31, 2009. Program

review staff realizes that a new program could not be implemented before that expiration date, but suggests that the current contract should be extended only for a one-year period.

Therefore, program review committee staff recommends:

The division responsible for program implementation in the new Energy Resources Authority should design a residential financing program that is easily accessible to customers with more flexible underwriting guidelines, and that could be offered in connection with the Residential Certification program. The ERA should seek competitive bids for loan program administration. The contract with CHIF should continue through 2009 to allow time for the new program to be developed.

With the creation of one administering organization, the residential loan program can be integrated into efficiency and renewable portfolio offerings and gain increased exposure and utilization. The financing of residential measures is a crucial element in customers implementing energy efficiency, and should help accomplish the goals set for overall reduction in residential consumption.

PERFORMANCE CONTRACTING

Large and small companies have offered “whole building” approaches in energy savings to private businesses, government agencies, towns, schools, hospitals, and other large facilities for many years. The concept, also known as performance contracting or energy savings contracting, is relatively simple. The facility owner or government agency enters into a contract with an energy savings company (ESC) that identifies all the measures that need to be taken to conserve and reduce energy. The costs of measures are financed by the ESC and the company is paid from the energy savings produced over the life of the contract, typically 15 or 20 years.

In 2003, P.A. 03-132 enacted program review committee recommendations around energy management in state buildings, including the requirement that the state Office of Policy and Management and the Department of Public Works establish a pilot program using performance contracting. The program was never implemented, so the benefits or drawbacks of this type of program are not based on any experience, but are theoretical only.

While widely practiced by other state and local governments, the use of such contracts by public entities in Connecticut is not very common. The Town of East Hartford is in the initial stages of an energy performance contract and is experiencing positive results, according to town officials and staff knowledgeable about the contract. But representatives of the town and the ESC both indicated that there are few other towns engaging in performance contracting in Connecticut mostly because municipalities have little experience with it, they fear the risk.

Many states have adopted model performance contracting language as part of their energy statutes. Massachusetts, in its 2008 comprehensive energy legislation known as the Green Communities Act, incorporates performance contracting provisions that state agencies and local governments may use. The Energy Services Coalition -- a national nonprofit organization with a

board of directors that represents energy savings companies and suppliers as well as consumers like state energy offices and nonprofits -- also has developed model contract language, as well as guidelines for engaging in the entire process.

Two key questions need to be addressed before performance contracting is undertaken. First, would the measures to reduce energy be taken otherwise? Secondly, will the building outlive its usefulness and be vacated, or otherwise be substantially renovated, and therefore, nullify the savings? Also, if financing through normal government channels – operating budget or bonding – cannot be raised, then performance contracting is an alternative. The current economic downturn has resulted in even tighter access to capital for both private and public sectors, so all opportunities to finance projects that result in energy reduction and savings should be explored.

Program review staff believes that there is a value to performance contracting. While staff does not propose adoption of particular model language in statute, it recommends:

The Energy Resources Authority should have adequate staff who can serve as independent technical advisors to state agencies and towns before undertaking an energy savings project. The staff could provide objective analysis of energy savings measures that might be adopted and whether performance contracting might be the best alternative for financing.

LEAD BY EXAMPLE

As discussed in the briefing report, Connecticut state government has not been rated highly in its energy efficiency and conservation in its facilities. ACEEE ranked it about average (16 states ranked higher) and several studies and reports evaluating the state's performance have cited many deficiencies. The briefing report also cited minimal progress in implementing state facility projects that were to be financed with \$12 million diverted from the Connecticut Energy Efficiency Fund in 2001. But, probably the most basic weakness of state government's energy efficiency efforts is that *the state has never established an energy reduction goal as recommended in the governor's working group report of February 2005*. That group had recommended a 10 percent reduction in 2005 and a further decrease of 5 percent in 2006.

State government needs to make a commitment to reducing its energy use if it requires residents and businesses to do likewise. In this current fiscal climate, Connecticut consumers are making efforts to reduce their household costs, including using less energy and becoming energy efficient; there is an expectation that state government will also.

Finding areas that could save energy use in state facilities should not be difficult. At a recent "Green Energy Forum" held in the state's Legislative Office Building, one energy savings company expert invited to participate identified -- by impromptu observation -- several faulty practices and products in the one hearing room alone. The Office of Legislative Management has developed an energy conservation plan which has listed more than 20 potential projects that could make the facility more efficient. Also, recently a number of legislators and legislative staff have formed an informal task force to solicit ideas and identify ways that the Capitol complex

could conserve energy use. Many of the responses suggest simple behavioral changes and other greater actions, like not running escalators all the time, have already been initiated.

Governor Rell has initiated the *One Thing* campaign, a statewide effort reminding residents and businesses of ways to practice energy conservation and efficiency. The governor also issued Executive Order 17 in February of this year requiring that all future appliance purchases in executive branch agencies shall be ENERGY STAR. While these endeavors are laudable, they do not go far enough. If state government is to “lead by example”, the legislature and the governor should require all state agencies to reduce their energy consumption by at least 10 percent by a certain date, as was recommended in the 2005 report to the governor.

Other measures that were also recommended then and have yet to be achieved should be implemented to ensure success. Some of those proposals would require the Office of Policy and Management to assist agencies in making modifications to reporting and budgeting practices. But if there is an urgency of purpose, those should not be obstacles. The governor should hold her agency heads responsible for achieving energy reductions, just as she would for achieving cost savings in the agency budget, but all branches of government need to elevate the importance of taking action. If all branches were to achieve a reduction of 10 percent in energy use that would translate to more than \$17 million in savings (based on 2005 costs).

Therefore, program review committee staff recommends that:

The legislature and the governor establish a joint effort to require reduced energy use in state facilities by at least 10 percent by January 1, 2010. The joint effort should be through both executive order and legislative budgetary oversight. The legislature’s Appropriations Committee should require agencies to demonstrate energy cost reductions in their budgets.

The 2003 program review energy legislation (P.A. 03-132) resulting from the committee’s report on *Energy Management in State Buildings* required that the governor’s budget include a line-item breakdown of each agency’s energy budget, and that a pilot program for performance contracting be implemented within state government, but neither has been done. These requirements would help with oversight of energy reduction compliance, and may offer a cost-effective way of funding energy efficiency projects in state facilities.

Therefore committee staff recommends:

Both the statutory requirement that the Governor’s budget include a line-item breakdown of each agency’s energy expenditures and the requirement that the Office of Policy and Management implement a pilot program using performance contracting be fulfilled.

Energy Efficiency Program Implementation and Payment Structure

Programs should be cost-effective, efficiently administered, adopt a holistic approach to energy reduction, and link performance to payment. In addition, programs should be established for a period of time -- long enough for stability but not indefinite so performance can be evaluated.

As part of this study, committee staff focused on the implementation of the energy efficiency programs funded with electric ratepayer money. Staff reviewed the incentive payments that serve as an important mechanism for encouraging the utilities to administer the programs.

Program Administration and Implementation

Prior to electric restructuring, the investor-owned utilities, Connecticut Light & Power (CL&P) and United Illuminating (UI), each ran its own electric efficiency programs. In 1998, at the time of electric restructuring, the Connecticut Energy Efficiency Fund (CEEF) was created, but the utilities continued to administer the programs. It is now almost 10 years later, and while the question of who should run the programs or even determine the programs has periodically been explored, that role remains with the utilities and has never been put out to bid.

Programs that receive CEEF funding are designed by the utilities with the assistance of the Energy Conservation Management Board and its consultants. *Program review committee staff finds in general the utilities are flexible to market needs and change program design as necessary*, but there are areas around program implementation that need improvement.

The first area concerns the approval of new technology. The utility-run programs approve the technologies that will be offered financial incentives; sometimes that approval is unduly difficult to obtain. One example pointed out in the briefing report is gas chiller technology, which was used in a pilot program to test its total energy savings, including electric savings. Despite showing considerable total energy savings, the technology is not approved for use in CEEF programs.

As a way to offer incentives for technology that delivers energy efficiency but is not covered under the CEEF programs, the legislature created the Electric Efficiency Partners program in 2007. Under this new program administered by DPUC, there is an opportunity for non-electric technologies to be considered if they provide cost-effective energy savings. However, the number of applications received for participation in the program has been low, possibly because additional financial information is required of program participants that is not required by the CEEF programs.

Implementation differences also exist within CEEF programs between the two utilities. The Home Energy Solutions (HES) program is marketed as one program but the implementation

by the utilities is actually different. For example, UI limits the amount of duct sealing that can be done in a home since it does not impact electricity savings whereas CL&P allows all ducts in a home to be sealed. DPUC, in a recent technical session, reminded the companies of the need to have a uniform program. Differences in program implementation also exist in the low-income weatherization program, which is discussed in more detail in Section VI.

Electricity savings currently serve as the only mechanism for measuring whether implementation is successful. Savings are calculated for individual measures installed and the overall savings are calculated on that basis. *However, because there are no broad energy savings goals and measures for all sectors, it is difficult to assess whether the implementation of the programs within sectors is consistent.* If there was a metric such as savings per square foot, it would be easier to assess consistent program offerings across the state.

As noted throughout this report, implementation of electric ratepayer-funded efficiency programs emphasizes electric savings. Program review committee staff conducted phone interviews of a sampling of businesses, schools, and municipalities that utilized CEEF in 2007. In general, program participants were pleased with the incentives provided and had seen measurable electricity savings. However, some participants expressed a desire for more natural gas incentives and a “whole building” approach to realizing energy savings.

Committee staff also finds, based on the phone survey, that *many participants still identify the programs with the utilities rather than with CEEF.* While there has been a concerted effort made to market and establish the programs as part of the Connecticut Energy Efficiency Fund, many interviewees referred to the programs as “utility” programs as opposed to “ratepayer” funded programs. Since the implementation of programs requires the application to be made and approved through the utilities, the perception remains that the programs are utility funded and utility run.

To address delivery and implementation of all energy efficiency programs, including those that are ratepayer-funded, committee staff has made the recommendation of the creation of the Energy Resources Authority (Section II). Committee staff also makes the following specific recommendation:

Beginning in 2010, the Energy Resources Authority should issue requests for proposals for administration and implementation of all of its energy efficiency programs, including those currently administered by the utilities.

Rather than recommending criteria that the new Energy Resources Authority should follow, program review committee staff believes the entity should have the flexibility to design and implement programs based on stakeholder feedback but following the “best practices” outlined in Section III. The Energy Resources Authority should:

- Develop and issue requests for proposals to implement all of its energy efficiency programs. The requests for proposals should be based on a contracting model where implementers and administrators are paid on energy savings produced. Contracts should be for a set period of time – long enough to bring stability and

consistency to program implementation -- yet not indefinite so that performance evaluations can be used to determine compensation and whether the contract should be renewed.

- Pay contractors in installments, with the final payment due a year after project completion, when energy savings have been verified, and with the possibility to earn more if additional savings are achieved.
- Clearly define portfolio implementation responsibilities and clarify roles to minimize confusion. Link performance evaluations and contract terms to tangible measures that are known in advance and developed jointly by the relevant Energy Resources Authority manager and the employee or contractor.
- Develop programs that take a “holistic approach” to energy savings and seek to include programs with related and complementary goals (for example, energy conservation, water conservation, renewable energy, and demand response). Offer “one bundle” that is seamless to the customer.
- Efficiently deliver integrated programs to all end-users regardless of their size. Larger customers should be assigned a single point of contact. Smaller customers should be offered a “whole building” strategy that incorporates measures from multiple programs.

If the Connecticut utilities determined they could, individually or jointly, offer a bid that would best meet the expectation for program implementation, they could respond to the request for proposals.

Current Payment Structure -- Performance Incentives

Since utilities make their revenues based on the electricity or gas they sell, there is an economic disincentive to help customers become more energy efficient. Regulators and policymakers have created other mechanisms for utilities so they will promote energy efficiency. The two mechanisms commonly employed are performance incentives and decoupling.

Performance incentives are given to administrators of energy efficiency programs if savings goals are achieved. Decoupling refers to the disassociation of a utility’s revenues from sales in the ratemaking process, which makes the utility indifferent to maximizing sales and therefore more likely to promote efficiency programs. The process for implementation of these policy tools must be transparent and reliable when ratepayer funding is involved.

Connecticut has the authority to use both performance incentives and decoupling. Since electric deregulation, Connecticut has used performance incentives as a means for rewarding the utilities for administering energy efficiency programs. In 2007, the legislature also added decoupling as an additional incentive for utilities. The decoupling mechanism is to be used when utilities come to the DPUC with a rate request. United Illuminating is the first utility to request full decoupling as part of its rate case currently under review at DPUC.

For efficiency programs not administered by utilities in other states, the use of performance incentives and decoupling varies. For example, the Vermont Energy Investment Corporation (VEIC), a non-profit organization, administers Vermont's programs known as Efficiency Vermont. While VEIC is not an investor-owned utility, it still receives a performance incentive while the utilities in the state also have decoupling. The Energy Trust of Oregon, which is a non-profit operating all the energy efficiency and renewable programs in that state, does not receive an incentive payment and the state only allows decoupling for the gas utilities.

Connecticut's Performance Incentive Structure

CL&P and UI each receive performance incentives (often referred to as performance management fees) for operating the energy efficiency programs in addition to what they are paid for administering the programs. The purpose of incentives is to balance a range of objectives including: costs, participation rates, and electricity savings.

Each program within the residential, commercial, and industrial sectors has established goals that include both annual and lifetime savings in kilowatt hours and kilowatts and annual goals for number of customers served. The incentive calculation for each goal is computed as follows:

$$\text{Incentive} = \text{Total spending (minus administration and ECMB costs)} * \text{weight} * \text{pretax incentive \%}$$

Each goal has an associated weight - reviewed and approved by DPUC based on the importance of the goal - with all weights totaling to one. For example, the goal of serving a certain number of low-income residents has a weight of 0.01 while increasing focus on the multi-family market has a weight of 0.005. In total, *68 percent of the incentive payment is based on aggregate electricity savings (34 percent for the residential sector and 34 percent for commercial and industrial sector) and 32 percent is for the unit (i.e., activity) measures by sector.*

The pretax incentive is structured so that if the electric companies achieve at least 70 percent of the goals they receive some incentive payment (see Table IV-1 for incentive structure). Incentive payments are on a pre-tax basis but are "below the line," (i.e., not included in the return on equity calculations examined by DPUC).

| Table IV-1. Connecticut Utility Incentive Structure | |
|--|----------------------------|
| Percent of Goal Achieved | Pretax Incentive (percent) |
| 70% | 2% |
| 80% | 3% |
| 90% | 4% |
| 100% | 5% |
| 110% | 6% |
| 120% | 7% |
| 130% | 8% |
| Source: DPUC Docket 07-10-03 | |

Process. The electric utilities, in conjunction with the ECMB consultants, develop both the electric savings goals and unit goals (i.e., number of customers served, workshops held, equipment replacements on which the incentive calculation is based). The goals are included in the CEEF plan and submitted to DPUC.

Goal achievement and incentives. For all of the program years examined, 2005-2007, both utilities typically exceeded the goals and received an incentive payment greater than five percent as seen in Table IV-2. CL&P received at least five percent in all years, and only in one year, 2005, did United Illuminating not receive at least five percent. However, in that year UI's total spending was 14 percent below the planned budget so one would not expect it to reach 100 percent of goals.

| Year | Electric Utility | Incentive (\$ in thousands) | Pre-tax Incentive % |
|-------------|-------------------------|------------------------------------|----------------------------|
| 2005 | CL&P | \$3,867 | 6.9% |
| | UI | \$825 | 4.8% |
| 2006 | CL&P | \$4,057 | 7.9% |
| | UI | \$1,010 | 7.2% |
| 2007 | CL&P | \$4,788 | 6.6% |
| | UI | \$933 | 5.1% |

Source: DPUC Docket 07-10-03

In 2007, as reported in the briefing, both electric utilities spent more than what was budgeted. However, when the companies submitted documentation to receive the 2007 incentive payments, they did not adjust the energy savings or activity goals to reflect the increased savings that would be expected from an increase in spending. DPUC ordered the utilities to recalculate their incentive payments factoring in the increased spending and savings levels. This was the first time DPUC had requested this of the utilities. When the revised documentation was provided to DPUC it showed the lowered incentive payments, but no explanation was provided as to how the incentive and recalculated savings goals were arrived at.

Based on committee staff analysis of the revised 2007 incentive documentation, Table IV-3 shows the incentive levels received and the number of measures in each category. CL&P received payment of five percent or more for 89 percent of the measures and UI achieved at least five percent for 81 percent of the measures. CL&P and UI received the maximum incentive of 8 percent for 56 and 62 percent of the measures respectively.

| Utility | Total No. of measures | Achieved < 5% | Achieved ≥ 5% | % of total | Achieved = 8% | % of total |
|----------------|------------------------------|-------------------------|----------------------|-------------------|----------------------|-------------------|
| CL&P | 27 | 3 | 24 | 89 % | 15 | 56% |
| UI | 26 | 5 | 21 | 81% | 16 | 62% |

Source: PRI staff findings.

Committee staff's review finds that *it is hard to determine whether there is a relationship between annual spending and electricity savings levels*. As displayed in Table IV-4, although UI spent 7 percent below the planned budget for residential programs, it was able to exceed the plan goals by 43 percent. On the other hand, spending was 96 percent above planned levels for the commercial and industrial sector, yet the goals were exceeded by only 63 percent.

| Table IV-4. Claimed annual savings/spending increase compared to plan, 2007 | | | |
|--|---------------|--|---|
| Utility | Sector | Annual savings % inc/(dec) compared to plan | Annual spending % inc/(dec) compared to plan |
| CL&P | Residential | 4% | 10% |
| | C&I | 82% | 60% |
| UI | Residential | 43% | (7%) |
| | C&I | 63% | 96% |

Source: PRI Staff Analysis of Incentive Documentation

Thus, while there are significant financial incentives tied to performance, the goals are largely set by the companies and actual saving results are not rigorously evaluated (as discussed further in Section V). Based on incentives and the performance of both utilities, committee staff believes it is unclear whether the goals are set too low or the utilities have exceptional performance.

Program review committee staff believes *the current incentive payment process is not sufficiently transparent*. The utilities in consultation with consultants develop annual goals on which incentives are based. A large part of determining goal achievement is tied to the calculated electricity savings, which lacks a thorough vetting process, also discussed further in Section V.

The DPUC regulators -- who provide external oversight and approval authority over the plan, budget, and incentive payments -- lack the staff resources to thoroughly evaluate the justification for payments. The regulators must balance and prioritize a workload that includes rate case materials having an impact on ratepayers in the order of \$50 million versus a \$5 million incentive payment for energy efficiency program administration.

Although it appears relatively easy to achieve payment for meeting or exceeding goals and the *incentive process lacks strong oversight, the amounts paid to the utilities in Connecticut are not extraordinary*. Program review staff compared Connecticut's administrative costs for implementing programs as a percent of program budget with other states that ACEEE has designated as having high performing energy efficiency programs. The results are shown in Table IV-5.

| Table IV-5. Administrative Costs in Comparison States | | | |
|---|--|--------------------------|-------------------------------------|
| State | Services | Percent of Budget | Incentive Included in Budget |
| Connecticut | Renewable | 18% | No |
| Vermont | EE (electric) | 11.3% | Yes |
| Connecticut | EE (electric and gas) | 11% | Yes |
| Wisconsin | EE and Renewable | 11% | No |
| New York | EE | 10.1% | No |
| Oregon | EE and Renewable (Electric and Gas) | 8.1% | No |
| Vermont figure includes the percent of the budget allocated to DPS for evaluation | | | |

After factoring in both the incentive payment and the administrative costs for implementing Connecticut's Energy Efficiency Fund programs and calculating the total as a percentage of program costs, Connecticut's total costs are within the range of other states. Thus, it appears that *rather than incentivizing based on real results – since performance is self-reported, and actual spending and goal achievement have little relationship – Connecticut's payment structure is actually compensation for administrative costs.*

While staff makes no recommendation to change this specific incentive structure, the broader recommendations made for changes in program planning, design, and implementation, as well as payment based on performance after robust measurement and evaluation, should remedy the deficiencies.

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Measurement and Evaluation

To run effective programs, an evaluation plan must be developed that has a defined timeline for evaluations and that focuses spending based on savings achievement. Evaluations must be conducted by third-party evaluators in a transparent environment with a process for adopting evaluation results.

Models for Evaluation

Evaluation is an important component of all energy efficiency programs since it verifies results, helps improve programs, and demonstrates internal and external accountability. A recent publication, “National Energy Efficiency Best Practices Study,” commissioned by California’s Public Utility Commission (PUC) emphasizes the importance of continuous evaluation for energy efficiency programs. Best practice suggests that regular evaluations with timely feedback result in robust programs that deliver improved energy savings. Programs must continually be improved based on feedback from the evaluations. There are three types of evaluations commonly conducted to create and maintain cost-effective efficiency programs: process, impact, and market effects. Table V-1 describes the three types of evaluation methods.

| Table V-1. Types of Evaluations | |
|--|--|
| Name | Description |
| Process | help assess program performance with respect to the delivery of the programs |
| Impact | measures the <i>actual</i> energy savings and cost-effectiveness of the programs, which is critical for documenting program impact on both short and long-term energy resource needs |
| Market effects | measure the maturity of the market, which helps determine incentive levels and exit strategy |
| Source: National Energy Efficiency Best Practice Study, July 2008. | |

The study commissioned by the California PUC also recommends evaluation efforts be focused based on potential savings achievement. Evaluation resources should be targeted toward categories, programs, and projects that are largest or with the most uncertainty in savings estimates. In addition, creating a culture that values evaluation and adopts the results is imperative for continuous improvement. In order to achieve results, program managers need to value the evaluation process and results, but not be participants in the actual evaluation itself.

States that have been recognized for achieving well-designed programs typically conduct evaluations at least every two to three years. Table V-2 below lists efficiency programs that have been recognized as leaders for their commitment to conducting regular evaluation and implementing the findings into program design and delivery. The table also shows how Connecticut fares in comparison to the other states.

| Table V-2. Recognized Energy Efficiency Program Leaders in Evaluation, Compared to Connecticut | | | | |
|---|-----------------------------------|-------------------------------------|-------------------------------|------------------------------|
| Portfolio Administrator | Budget | \$ allocation for evaluation | % of Budget Allocation | Required Periodically |
| California investor-owned utilities | \$2 billion (2006-2008) | \$162.8 million | 8% | Yes |
| Energy Trust of Oregon | \$93.6 million (EE and Renewable) | \$3.2 million | 3.4% | Yes |
| Efficiency Vermont | \$14.8 million | \$0.4 million | 2.7% | Yes |
| NYSERDA | \$175 million | \$3.5 million | 2% | Yes |
| Connecticut Energy Efficiency Fund | \$86 million | \$1 million | 1% | No |
| Source: Best Practices Benchmarking for Energy Efficiency Programs, July 2008; 2008 C&LM Plan | | | | |

A recent report published by the Consortium for Energy Efficiency (CEE) found that for efficiency programs across the country, the average spent on evaluations is 2.7 percent of a program's annual budget. The report also showed that *of the states with annual energy efficiency spending greater than \$20 million, Connecticut ranked 15 out of 19 in terms of dollars spent on evaluation.*

Connecticut Energy Efficiency Fund

In 1998, the Energy Conservation Management Board (ECMB) was formed and one of its functions includes oversight of evaluations. In 2005, ECMB developed a process for the selection and content of third party program evaluations and formed a subcommittee with responsibility for: evaluation planning, development of requests for proposals, interim review of work products, and review of the final draft report. These subcommittee responsibilities are completed in consultation with the utilities' evaluation teams (i.e., program administration). In addition, the ECMB employs a part-time consultant who assists the committee with the management of the evaluation work.

Evaluation planning. Each year a section is included on program evaluation in the CEEF plan that is submitted to the DPUC. The plan describes in general terms the importance of evaluation and lists a few factors that are considered when determining which studies will be initiated for the upcoming year. However, no formal schedule exists for when or how often any program will be evaluated.

Oversight of evaluations. As mentioned before, one of ECMB's managerial functions is to oversee evaluations. Program review committee staff believes that evaluation oversight is a

significant responsibility to place with a volunteer board. The subcommittee consists of three non-utility members with utility members serving as non-voting advisors.

Although the utilities serve as non-voting members of the subcommittee, the utilities nonetheless play an important role in determining the evaluation work that will be completed. *Just restricting the voting capabilities of the utilities does not create the necessary “arms-length” best practice in conducting evaluations.* This is particularly problematic when the utilities can review draft evaluation reports.

Because energy efficiency programs are administered by the utilities, *evaluation contractors’ independence may be compromised when they enter into contracts with and submit invoices to the entities (CL&P and UI), whose work they are to evaluate.* Transparency in the process is also missing when the requests for proposals for evaluation work are not posted on the ECMB website. It appears the utilities issue the requests for proposals and contractors must work through the utilities.

Evaluation work is only meaningful when program management is engaged in the process and embraces the recommended changes as necessary. However, the evaluation decision-making should occur as a separate function outside of the program administration. Without a fully designated evaluation function outside the management organization, a void exists for effective evaluation, including planning, implementation and integration of results into CEEF program design.

Conflicts of interest and bias in the results can occur when the administrative oversight of energy efficiency programs has a role in the evaluation process. California recognized this inherent conflict and ordered evaluations to be managed by the Energy Division of the public utility commission if they pertain to: 1) the measurement and verification of energy savings as it relates to programs; 2) generation of savings estimates or cost-effectiveness inputs; and 3) evaluation of whether portfolio goals were met. This separation of duties provides the added confidence that an entity, with full time staff separate from the program implementers, manages the process rather than those who stand to profit from program achievements.

Evaluation type. Best practices recommend a thorough evaluation plan must include all three types of evaluations: process, impact, and market effects. However, more emphasis should be targeted towards programs with the largest investments or areas where energy savings are harder to obtain particularly when incentives to utilities (using ratepayer monies) are paid according to savings realized.

A program review committee staff review of evaluations posted on the ECMB website determined that, between 2005 and October 2008, seven impact evaluations were completed out of the 17 listed. However, only one was completed on a major program offering (Operations and Maintenance) but it only focused on evaluating CL&P’s program.

To date the “actual” energy savings from the low income programs, WRAP and UI Helps, have not been calculated nor has an evaluation of energy savings as a result of the Home Energy Solutions (HES) program been conducted. An evaluation of the HES program was planned for 2008 but has been delayed until 2009. *When impact evaluations of programs have*

been completed they have found actual energy savings to be less than what is cited by the utilities in their calculations of incentive payments.

Many states have evaluation plans that outline specific goals to balance the types of evaluations conducted. For example, New York has a systematic evaluation approach, requiring a certain percent of the evaluation budget be set aside for impact assessments (47 percent) with the remainder of the budget going towards market effects (30 percent) and process (23 percent). Most state plans also call for evaluations of major program offerings every two to three years and of minor programs less often or with less rigorous evaluations.

Verification. Accurate and credible savings estimates are a vital component of any energy efficiency program, particularly when the program is funded through ratepayer monies. In Connecticut, *the savings reported by the companies in the plans and annual reports do not go through a thorough external verification process.* In many states there are formal structures for such verification.

Best practice example. Vermont's structure includes all the components that best practice guidelines recommend: external oversight and administration, defined evaluation plan, and feedback loop for evaluation results.

The Department of Public Service (DPS) – similar to Connecticut's Office of Consumer Counsel – is responsible for conducting and overseeing evaluation work for Efficiency Vermont. This includes both contracting out for ongoing programmatic level evaluations and for annually verifying the savings submitted by Efficiency Vermont (EVT).

Although Efficiency Vermont is on a three-year planning cycle, annually it is required to submit energy savings figures to the DPS on or before April 1. DPS then verifies the energy savings, capacity, and total resource benefit claims in a two-month intensive review. The DPS process includes: reviewing documentation for all large commercial and industrial projects; designing and implementing a stratified random sample survey of small to medium size commercial and industrial projects completed; and verifying residential measure savings claims. The DPS then submits its findings on savings claims to the Public Service Board (similar to DPUC). In the early years of this process, the DPS found savings to be overstated on average by 10 percent. This past year savings were overestimated by less than five percent.

On an ongoing basis, a technical advisory group reviews EVT's technical reference manual additions and revisions, follows up on DPS' findings from its verification process, and provides a forum for other issues related to savings estimates. This rigorous, transparent, and thorough process ensures accurate energy savings claims and quality programming.

Adoption of evaluation results. In Connecticut, the utilities develop the Program Savings Documentation (PSD), which states the assumptions used to calculate measured electricity savings. The PSD is submitted to the DPUC at the same time as the CEEF plan so that the regulatory agency can review how the calculations and savings are derived. The consultants of the ECMB work with the utilities to ensure savings are updated based on completed evaluations. Since DPUC has no one charged with reviewing all evaluation results, and the

results are not uniformly posted on the ECMB website, the savings calculations are often left unchallenged or unproven.

Future requirements. As noted in the 2009 CEEF plan, more evaluation will need to be done to fulfill the requirements for participation in the ISO-NE Forward Capacity Market (FCM). The market purchases the power resources necessary to satisfy the region's future needs and includes both electric supply from power plants and decreased electricity use through demand-side management resources. The payments for participation as an eligible resource in the FCM will be tied to rigorous measurement and verification standards that must demonstrate electricity savings. Therefore for 2009, the C&LM plan indicates that two-thirds of the planned evaluations are for FCM purposes.

Energy Independence Act 2005

The Energy Independence Act (EIA) (P.A. 05-01) established several initiatives and programs to reduce electric power supply costs. The act also directed the DPUC to authorize near-term measures that reduce federally mandated congestion charges. The programs, aimed at commercial and industrial customers, encourage onsite generation and conservation through load management as ways to reduce generation-related congestion charges. These programs are not aimed at energy efficiency. The charge on electric ratepayer bills for these EIA programs in 2006 and 2007 totaled \$51.2 million with a projected \$29 million in spending for 2008.

Program review committee staff finds that although approximately \$80 million will have been spent on EIA programs by the end of 2008, no formal evaluation has been completed nor is there any intention of completing an evaluation. The statutory purpose of the programs was to reduce federally mandated congestion charges¹¹ but no action has been taken to see if the programs fulfilled that purpose. The measures have also not been tested to see if they are cost-effective.

The DPUC curtailed 2009 program spending to approximately \$10 million in recognition that the programs originally offered were meant to be short-term measures and the need for the programs may no longer exist based on changes in the market.

Connecticut Clean Energy Fund

Similar to the Energy Conservation Management Board, the Clean Energy Board (also known as the Renewable Energy Board) is statutorily required to evaluate its programs. The statute requires that the programs be evaluated at least every five years, beginning in December 2006. *The Clean Energy Fund has missed the statutory deadline for evaluating many of its programs.*

¹¹The Federal Regulatory Energy Commission allowed generators to incorporate into their rates additional charges for areas where lack of transmission caused congestion problems (i.e., federally mandated congestion charges). The issue was especially acute in the Southwest region of the state. The DPUC authorizes FMCC additional funds from ratepayers to establish programs that will help alleviate those congestion problems.

The fund has contracted with a nationally recognized independent energy consultant, NEXUS, to monitor progress in creating public awareness of clean energy and to assess participation in the clean communities program, where residents sign up to purchase a certain percent of electricity from clean energy. Baseline assessments, including a baseline investment or cost-based estimation of the programs, were conducted in 2005 and 2006, respectively. Periodic progress reports have been conducted at least annually since then, and an updated evaluation report using investment analysis is expected on these programs in December 2008.

The fund has not had a formal evaluation of the progress made in increasing the state's capacity for renewable energy, although a draft of a final evaluation report is expected by the end of the year. The fund has also just contracted for an evaluation of its demonstration projects and other efforts aimed at promoting innovative renewable energy technologies.

In its annual comprehensive plan submitted to DPUC, the Clean Energy Fund allocated slightly more than \$1 million for monitoring and evaluation of all its programs in its latest annual plan, although it is unclear how much the fund actually spends on evaluations.

Collaborative activity. The statutes require the establishment of a joint committee of the two boards to “examine opportunities to coordinate the programs and activities funded by the [two funds] to reduce the long-term cost, environmental impacts and security risks of energy in the state.” There is some communication between the two boards, and it has been increasing. There is an informal subcommittee and recently a joint request for proposals has been released to look at the economic development impacts of the work by both funds. Also, both funds worked on jointly funding the new Science Center in downtown Hartford.

However, the statutes specifically require that evaluations occur after consultation between the two boards. *Committee staff finds that consultation around evaluations has not happened, often because evaluations are conducted on individual fund programs, rather than on how both funds are achieving the overall objectives outlined in statute.* Thus, staff proposes that evaluation work for renewable energy be planned and implemented as recommended below.

Connecticut Municipal Electric Energy Cooperative

Connecticut Municipal Electric Energy Cooperative, which is a cooperative of municipal electric utilities, has implemented electric efficiency programs since 2006. For the design and delivery of its programs, CMEEC has relied primarily on the evaluation work completed by the ECMB. For ongoing evaluation of programs, CMEEC participates where applicable in the evaluation work done by the Northeast Energy Efficiency Partnership. In addition, CMEEC has an external consultant verify all benefit and cost ratio savings for its programs. More recently, CMEEC developed a measurement and verification plan to fulfill the Forward Capacity Market evaluation requirements that begin in 2010.

Fuel Oil Conservation Program

Since the Fuel Oil Conservation Board just issued its first [2008] plan in October 2008, no evaluations have been completed to date. The Connecticut General Statutes Section 16a-22

requires the programs in the plan to be “evaluated as to cost-effectiveness by comparing the value and payback period of the program benefits to the program costs to ensure that the programs are designed to obtain fuel oil savings, the value of which are greater than the costs of the program.” However, *it is unclear how evaluation will occur and the portion of funding that will go towards evaluation of the programs based on the approved October 2008 plan.*

The intention of the following recommendations is to ensure that meaningful, rigorous evaluations are conducted on programs intended to achieve electric and overall energy savings. Therefore, program review committee staff recommends:

A new division within the Office of Consumer Counsel (OCC) shall be dedicated to evaluating the programs administered by the Energy Resources Authority. The division shall develop a detailed plan with evaluations prioritized based on articulated criteria (e.g., programs and projects that are largest or with the most uncertainty in savings estimates). Additionally, evaluations must be coordinated and done separately from the organization implementing the energy savings programs. To conduct this evaluation model:

- **work will include ongoing evaluations of energy efficiency and renewable energy programming and an annual verification of energy savings;**
- **annual evaluations shall be conducted to verify yearly energy and capacity savings and total resource benefits and progress towards goals;**
- **half the evaluation budget shall focus on impact evaluations, with the remainder for process and market effects evaluations; and**
- **DPUC shall hire an additional person who oversees and approves the evaluation plan of the Energy Resources Authority and can ensure evaluation recommendations are adopted and incorporated into program design and savings calculations. Funding for the additional person shall come from the administrative budget of the Energy Resources Authority.**
 - **Cost: The OCC will probably require 3 full-time employees to manage the evaluation work and the annual verification process. Therefore, approximately \$400,000 will need to be directed to the OCC for personnel expenses, \$130,000 to the DPUC for a full-time staff person (includes fringe benefits), with the remainder of the allotted budget for hiring third-party evaluators. Funding for all the evaluation work including the addition of OCC and DPUC staff should come from two**

and a half percent of the Energy Resources Authority's overall budget.

Initially consideration was given to having the evaluation work done within the new organization. However, program review staff believes that approach would not provide the necessary arms length separation to ensure administrative independence and incorporation of evaluation findings.

As can be seen by Vermont's experience, having an outside entity verifying the savings creates effective oversight. Over time, Efficiency Vermont has improved its savings estimates. By having the Office of Consumer Counsel responsible for evaluation work, Connecticut residents can ensure true savings are being realized from the programs utilizing ratepayer funding.

A clearly defined strategy and timeline for evaluation planning will create a transparent process. Creating an evaluation plan that must be approved by DPUC will ensure the funding of evaluations supports the overall goals of the fund and maximizes ratepayer dollars.

Ratepayer dollars will also go further by allowing for the evaluation of one program offering or continuum of services as opposed to the current system of evaluating multiple utility programs (CL&P, UI, and CMEEC). Bringing all programs into one organization will ensure all programs are evaluated regardless of the type of energy or revenue source.

Section VI

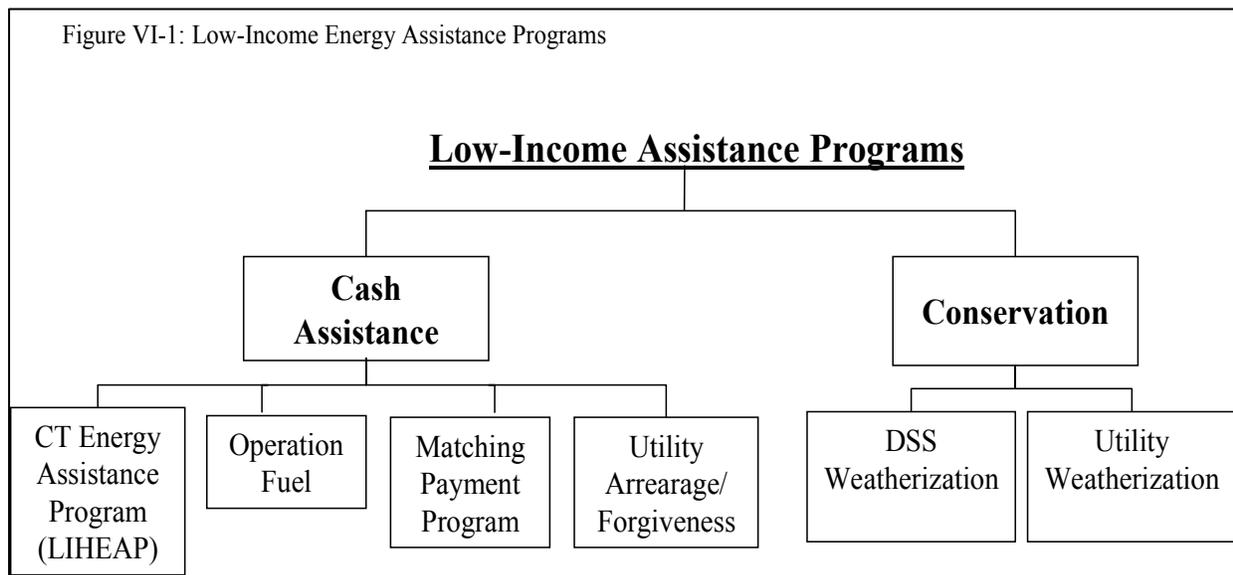
Assessing the State’s Low-Income Energy Assistance Programs

The committee’s study also called for an examination of how well the state is meeting another of its major energy goals:

- *to ensure that low-income households can meet essential energy needs*

Connecticut like most other states has a prohibition against shutting off utility service under certain circumstances; in 34 states the prohibition lasts for a certain period of time, typically through the cold winter months. In this state, this prohibition is in effect from November 1 to May 1 for customers who cannot pay their bills and who demonstrate hardship, as explained in the briefing report. *This prohibition is a primary assurance that low-income customers’ utility energy needs are met during the heating season.*

In addition, there are two major programs – cash assistance and energy conservation -- that help low-income residents. The program delivery mechanisms for those programs are presented in the figure below.



Cash Assistance Programs

These programs offer assistance that help low-income customers pay their bills, and are shown on the left of Figure VI-1. The assistance programs are operated through a variety of agencies including the Department of Social Services, which contracts with the community action (CAP) agencies to administer Connecticut’s Energy Assistance Program (CEAP). CEAP is funded with federal Low Income Home Energy Assistance Program dollars. About two-thirds of the funding assists those people who heat with oil or another non-regulated heat source. Residents who are protected from utility shut-off, like those who heat with electricity or gas,

receive the basic one-time cash benefit from the state CEAP program. They may then enroll in a utility-operated matching payment program.

Operation Fuel, a nonprofit agency, also provides cash assistance to residents who heat with a deliverable (non-utility) fuel, and serves primarily those who would not qualify for CEAP assistance but are still low-income.

The utilities operate their own matching payment and forgiveness programs, typically requiring that the client first obtain assistance from the state CEAP or a nonprofit agency like Operation Fuel. Once the customer enrolls with the utility and agrees to make monthly payments, the utility will match the energy assistance payments and any payments the client makes.

Funding. There are several sources of funding to help low-income residents pay their energy bills including: the federal government through the LIHEAP block grant; the state’s General Fund that supplements the federal dollars and that helps fund Operation Fuel; contributions that ratepayers designate on their utility bills and other charitable donations that support Operation Fuel; and a portion of the surcharge on electric customers’ bills, as well as a combination of other funding from gas and electric rates that fund the utility programs. A breakdown of funding for 2009 is provided below. Varied funding sources and programs operate in different fiscal years, but the table shows estimated funding levels for the upcoming heating season.

| | |
|--|-------------------|
| LIHEAP | \$125 |
| General Fund -- CEAP | \$35 |
| General Fund -- Operation Fuel | \$17.5 |
| Portion of Electric Systems Benefit Charge (ratepayer funds) | \$8.5 (estimated) |
| Gas Utilities (based on 2007 expenditures) | \$14 |
| Source: Budget documentation including August 2008 Special Session Acts. | |

Eligibility. As the September briefing report indicated, there are many different eligibility criteria to receive assistance, primarily based on income levels. While this creates confusion both for the agencies that administer and operate the program, and for clients especially, the varying criteria are probably necessary. In many cases (LIHEAP for example), the basic criteria are established by federal regulation. Further, the programs do provide a hierarchical benefit structure, with higher levels of assistance going to the very low-income groups.

While no changes are recommended in the organizational delivery for cash assistance or with the eligibility criteria, steps should be taken to ease the administration of the CEAP program, and its coordination with other energy cash assistance programs. One administratively burdensome step that seems unnecessary is the application process that is required each year. A CEAP plan is developed annually and requires approval from several legislative committees.

The plan is usually approved in late summer, with a benefit structure that begins on November 1. While the CAP agencies in some years have begun taking applications in August, the CAP agencies cannot begin determining eligibility until after the plan is approved. Thus, because the benefits may start on November 1, there is a very short time from the receipt of applications to when the cash assistance is needed to purchase heat. Committee staff heard complaints about many aspects of the process both from low-income advocacy groups, local social service agencies, and the CAP agencies themselves.

Program review staff believes that the determination of applications each year is unnecessary and burdensome, and therefore recommends:

The annual application process should be replaced with a three-year application renewal process. Once a client is determined to be eligible, the eligibility would be for a three-year period. The application would require the client to notify the CAP agency during the three-year period if income or circumstances change that would make the client no longer eligible. The CAP agencies, working with DSS and accessing relevant databases, would be required to verify the continued eligibility through a sample of at least 20 percent of the applications each year.

Program review staff recognizes that the CEAP is not an entitlement program and that once the funds have been expended, no additional clients can be served. However, committee staff believes that once determined eligible, most clients' income circumstances do not change frequently. DSS staff indicate that the automated system does not maintain data on the percentage of clients who receive CEAP assistance year after year. But DSS staff estimate from experience that at least 70 percent of clients are not new applicants. Further, the requirement that a new application be filed each year is not a condition for entitlement programs like Medicaid and TANF, which provide more generous benefits than cash energy assistance.

Committee staff believes the time and effort needed to determine all aspects of about 100,000 client applications yearly in the span of two or three months overloads the CAP agencies' abilities to process applications and determine eligibility efficiently and effectively. Further, it seems an unnecessary burden on clients to gather all documentation each year and go to a CAP agency to file the application. The process creates anxiety both for clients who do not know if their eligibility will be determined in time to pay for heat, and for vendors, who are not sure if they will be paid for delivery. If applications were determined on a three-year rolling basis – DSS could determine how the renewals would be done in its CEAP plan -- with all application information filed and verified every three years, this should address the current administrative hurdles of timing and application volume. With less administrative time expended on processing new applications, it should allow more staff resources to: verify the continued eligibility of clients as the above recommendation requires; detect fraud; and carry out other aspects of the program (e.g., bill payment).

Affordability Gap

Historically, there has been an expectation that energy bills will consume about 6 percent of a household's income. As energy prices increase, this becomes increasingly unrealistic, specially for lower-income households. For example, a family of four at 185 percent of federal poverty level (\$39,220) could be expected to afford about \$2,350 for its energy bills (at 6 percent of income). The difference between that amount and what the household's actual energy bill is has come to be labeled the energy affordability gap. A 2007 study analyzed the gaps, or the amounts that poor households cannot afford, and found that Connecticut's affordability gap is \$2,929. Thus, poor households in Connecticut can afford to pay less than half of their energy bills, which makes the state's gap the third-highest in the country.¹²

Because of energy price increases and no increasing federal funds (until this year), the LIHEAP funding covered a shrinking portion of the gap in energy affordability. In 2003, the program covered 32.6 of the gap, but by 2007 it had shrunk to 12.8 percent. Connecticut will receive about \$125 million in LIHEAP funding for 2009, almost double the amount received in 2008. In the August Special Session, the General Assembly supplemented that funding with \$35 million from the General Fund surplus.

The increased federal funding, and additional state money, will assist in filling the energy affordability gap, especially considering the recent drop in home heating oil prices. The approved CEAP plan will allow the most vulnerable households that heat with a deliverable fuel to receive up to \$3,365 in basic and crisis benefits. The plan also increases the basic assistance amounts, to \$925 for the poorest households to \$625 for those at 60 percent of state median income. However, it is yet unknown how many people will apply and be determined eligible for assistance. The Office of Policy and Management estimates an overall caseload of 90,600 households, an increase of 5 percent over 2008 levels, but that may be low given the current economy.

While the LIHEAP program states that it is not intended to pay for a household's total energy bill, even with the increase in funding, it will not be close to covering the gap for those who are eligible for CEAP. Committee staff believes that additional measures that can assist in reducing a low-income household's energy bills should be implemented. Sixteen states require a reduced or alternative rate on electric, gas utilities or both, mostly based on income. The reduced rate structure helps make lower-income households' utility bills more affordable, and stretches the cash assistance through the CEAP and Operation Fuel further, since those programs would pay the reduced rate. The Department of Social Services already pays a reduced rate to home heating oil vendors who participate in the CEAP program.

While Connecticut utilities do provide assistance to low-income residents through matching payments and arrearage forgiveness plans, many customers are not successful in making the payments. Connecticut Natural Gas estimates that 70 percent of its customers do not succeed. Thus, the amounts go uncollected and ultimately end up as overwhelming debt for the consumer and bad debt for the utility. The bad debt for the utility is eventually considered in the

¹²“Home Energy Affordability Gap – On the Brink: 2007”, Fisher, Sheehan & Colton.

utility's filing for a rate increase. Thus, all rate payers are ultimately paying for uncollectible utility bills.

Committee staff believes that while a discounted rate for low-income customers should be established, there should be an incentive for customers to conserve and reduce consumption, and therefore proposes a declining reduction rate as usage increases. Arizona has such a program in place, and Table VI-2 shows the declining discount as usage increases.

| Table VI-2: Arizona Discount Electricity Rates by Usage | |
|---|----------|
| Kilowatt Hours of Usage | Discount |
| 0-400 kWh | 40% |
| 401-800 kWh | 26% |
| 801-1200 kWh | 14% |
| 1201 kWh and up | \$13.00 |
| Source: "Energy and Telephone Assistance in the States: Public Programs that help Low-Income Households," AARP, 2007. | |

However, the costs of such a generous discount, given the high electric prices in Connecticut would be great. Committee staff estimated the costs of the discount to be about \$500 per year per household based on average usage. That would total about \$45 million just for electricity rate discounts. If a less generous but tiered rate structure, with discounts up to average usage, were developed for both electric and gas low-income customers, it would be less costly but still provide substantial assistance. Table VI-3 and Table VI-4 show the costs per customer for such a structure.

| Table VI-3: Discounted Electricity by Monthly Usage: | | |
|---|----------|---------------------|
| Electricity Kilowatt Hours of Usage | Discount | Monthly \$ Discount |
| 0-400 kWh | 20% | \$14.40 |
| 401-700 kWh | 10% | \$5.40 |
| Total monthly discount | | \$19.80 |
| Total yearly discount | | \$237.60 |
| Source: PRI staff analysis | | |

| Table VI-4: Discounted Natural Gas by Yearly Usage: | | |
|--|----------|---------------------|
| Natural Gas Usage | Discount | Monthly \$ Discount |
| 0-515 CCFs | 20% | \$239 |
| 516-1030 CCFs | 10% | \$120 |
| Total yearly discount | | \$359.00 |
| Source: PRI staff analysis | | |

If all CEAP households were determined eligible for the electricity discount, the discounted electricity rates would cost about \$21.4 million. The gas discounted rates would cost about \$12 million, based on the number of low-income customers who sign up for gas utilities' matching payment plans. Thus, a discounted utility rates structure as proposed here would total \$34 million.

Program review staff believes that a discounted utility rate program should be established, but believes many issues may need to be resolved before a program could be implemented. For example, factors including who might be eligible, the impact on regulated

utilities and unregulated electricity generators, as well as whether there will be a need to continue matching payment plans, should all be examined. Therefore, committee staff recommends:

The Department of Public Utility Control shall open a proceeding to investigate the feasibility, structure, and costs of implementing a discounted rate system to make gas and electric rates more affordable for low-income people in Connecticut. The feasibility study should be completed by January 1, 2010.

WEATHERIZATION

As illustrated in Figure VI-1, and explained in the briefing report, the other type of energy assistance provided to low-income residents is weatherization services. Measures implemented are to improve the energy efficiency of the residence to reduce energy consumption, improve comfort, and lower energy bills. There are two major weatherization programs: one offered through the Department of Social Services with federal funding from the Department of Energy; and the other through the utility companies with CEEF funding.

Activities and Funding

The DSS program is implemented through five of the 12 community action agencies, and services are statewide. Typically, the annual funding is approximately \$2.5 million, and somewhat less than 1,000 units are completed each year. The average spent per home is about \$2,500.

The CEEF program is administered by the utilities and implemented primarily through the same five community action agencies. Funding information for the CEEF-funded weatherization program was outlined in the briefing report. Funding for 2007 was slightly more than \$7 million, with CL&P funding at \$6.3 million and UI at \$888,663. For both utilities, the funding dedicated for low-income weatherization is about 25 percent of the budget for all residential customers, and only about 7 percent of CEEF funding overall.

Since 2003, CL&P funding for the weatherization program has increased as has the number of units weatherized each year. In 2007, CL&P funded measures in more than 11,000 units, with an average per unit cost of \$570. UI's funding had increased each year from 2003 to 2006, but declined almost 30 percent in 2007, and the units weatherized in 2007 dropped 40 percent, to 3,660. The 2007 expenditure per unit in UI's weatherization program is \$243.

Program Objectives

The CEEF plan indicates that the weatherization program operated by the utilities will:

- Conduct a *fuel-blind* energy audit or walk through needs analysis survey of a household;
- Identify causes of *high electricity use* related to lighting and appliances;
- Install *all cost-effective energy saving measures* including those listed [in the plan];

- Provide budget and credit counseling when appropriate and requested;
- “Piggy-back” service delivery whenever possible to services being delivered through public or utility funding, to reduce administrative costs as well as the inconvenience to the customer with multiple home visits; and
- Conduct neighborhood canvassing to targeted areas to maximize program participation.

Program review staff finds the objectives of the program appear to be somewhat conflicting. For example, one objective states the program is to be *fuel-blind*, while the next states it will identify *causes of high electricity* use. Yet the third objective states all cost-effective *energy* measures should be installed. When objectives are so contradictory, actual operations of the program remain unclear.

Program implementation. *Program review staff also finds that the two utility programs operate differently.* Despite DPUC directives that the two utilities offer uniform programs, the CL&P and UI weatherization programs vary considerably. As described in the September briefing report the CL&P WRAP program has four sub-components to its weatherization program, with varying levels of work completed and with different average costs per unit. The activity levels and average costs of the four program components are shown in Table VI-5.

As Table VI-5 shows, the first two sub-components, which offer the most measures, served 4,100 households, or about 37 percent of the total units completed. Still, almost half of all the units (5,185) served in the CL&P program received only the neighborhood canvassing services, which provides general information to promote future interest in the program.

| Table VI-5. CL&P WRAP Program: Sub-components 2007 | | |
|---|---------------------------------|-----------------------|
| Program Sub-Component | Activity Level –Units Completed | Average per-unit cost |
| Leveraging w/DSS | 854 | \$652 |
| CL&P WRAP | 3,246 | \$625 |
| Lighting | 784 | \$257 |
| Neighborhood Canvass | 5,185 | \$198 |
| Total | 11,056 | \$570 |
| Source: CL&P | | |

The statistics provided by the community action agencies to program review staff show that almost all the weatherization services completed by CL&P are done by the three CAPs in the CL&P area. Further, the CL&P WRAP program appears balanced in proportion of customers served by fuel type with 26 percent electric, 35 percent oil, and 39 percent gas. However, the statistics did not show which customers (by fuel type) received which services.

The UI Helps program primarily uses one outside vendor for its low-income weatherization program. UI expended about 14 percent of its program budget and serviced about 18 percent of units completed through the two community action agencies in the UI area, while about 85 percent of the funding went to a private vendor. Thus, despite the objective to

“piggyback” services, the UI program used the CAP agencies in fewer than 20 percent of the units it “weatherized.”

The comprehensiveness of measures taken at the units completed in the UI program is also unclear. The \$243 per-unit cost of its weatherization program suggests the scope of services is narrow. The UI unit cost is less than half the \$570 overall average cost per unit in CL&P’s program. The \$243 overall average also includes the cost of refrigerator and/or air conditioner replacement, which was done in about 15 percent of the units. This further suggests that the weatherization measures taken in the UI Helps program are not comprehensive.

It is also questionable whether the utilities’ programs are actually “fuel-blind.” The UI Helps program statistics show that only 17 percent of the units weatherized use oil heat, which is considerably different than the state’s general home heating oil use, where about 50 percent heat with oil. It is also considerably less than the 35 percent of units served in the CL&P weatherization program that used home heating oil.

Program review staff discussed the way the UI weatherization program operates with the two community action agency weatherization directors in the UI service area, both of whom also have experience with the CL&P WRAP program, and both confirm the two programs operate differently. Thus, *although all electric ratepayers fund the CEEF programs, low-income customers in Connecticut receive different services through the utility-sponsored weatherization program, depending on the utility service area in which they live.*

Impact of Weatherization Programs

Program review staff requested information from all the weatherization program administration—DSS and the two utilities -- on the results achieved in lowering energy consumption (and energy bills) in units completed in the respective programs. Neither the federally funded DSS weatherization program nor those sponsored through CEEF had reliable information. None of the programs conducted impact evaluations or had statistics measuring baseline energy use before and after the program. *This is especially problematic in assessing the cost effectiveness of the programs, given the wide variation in amounts spent. Further, program review staff could not make a determination on the energy savings of any of the weatherization programs operating in Connecticut.*

Broadly speaking, the more comprehensive the measures taken the greater the savings. The federal Department of Energy (DOE), which supports the DSS program, funds broad measures in each weatherized unit, with an average cost of about \$2,500. The DOE website indicates that for each unit weatherized in its program the average savings is about 32 percent in heating bills, an average of \$350 in overall first-year energy cost savings.

Two recent evaluations on low-income weatherization programs in other New England states conclude that savings can be considerable if comprehensive measures are taken. It is important to consider the states selected since they have similar climate conditions to Connecticut and similar percentages of household that heat with fuel oil. One evaluation

conducted on Vermont's program and issued in February of 2007¹³ indicated that the first year savings in electricity was 1,438 kWh. At current Connecticut residential electric rates (\$.18 per kWh) this would save \$258 in a household's electric bills in the first year alone. The same report indicates the average oil savings for a weatherized unit was 137 gallons in the initial year. With current Connecticut prices of about \$3.00 a gallon (undiscounted), that would save the household slightly more than \$400 a year. Together, the savings total about \$660 for each weatherized unit.

Another evaluation conducted on the Massachusetts weatherization program showed similar results. Oil heat weatherization measures produced a reduction in heating oil consumption of 150 gallons per year per home; at current prices that is about \$450 a year. If an oil heating system was replaced with an efficient unit, it saved 290 gallons. (Thus, it is important that weatherization measures be taken first, saving about half the gallons, but at considerably less cost). Further, if comprehensive measures were taken, including replacements of old, inefficient refrigerators, electricity consumption could be reduced by about 2,000 kWh.¹⁴ Even for the average household weatherized, the savings total about 1,200 kWh per year; at current residential electricity rates in Connecticut that is about \$216.

Historically, the major weatherization program in Connecticut has been funded with federal Department of Energy dollars and has focused on low-income households. The program, administered through DSS, and operated through five community action agencies, has generally weatherized fewer than 1,000 units each year. As noted in the September briefing report, assuming very conservatively that only half of the households receiving low-income cash-assistance need weatherization, it would take another 14 years to weatherize the remaining units given the current annual completion rate.

The CEEF has "leveraged" (added) some dollars to the DSS weatherization program, and the two utilities also operate their low-income weatherization programs, mostly through the same five community action agencies. However, as the briefing report indicates the two utilities appear to operate very different programs, with CL&P taking much more comprehensive measures in some of its sub-programs, depending on heating source and type of unit. Further, the United Illuminating program indicated it "weatherized" more than 3,600 units during 2007, but it is unclear what measures were taken in those units, even for those with electric heat, which was 76 percent of the UI weatherized units. It would appear from the average cost -- \$243 for all units and \$179 for electric-heated units -- that the measures were not comprehensive.

BEST PRACTICES FOR LOW-INCOME WEATHERIZATION

The same report that summarized the results in Massachusetts concluded a number of best practices that are common among most of the exemplary low-income programs the report selected as models. (Connecticut's programs were not noted.) The report identified the following as common traits:

¹³ "An Update on the Impacts of Vermont's Weatherization Assistance Program, conducted by Dalhoff Associates, LLC.," February 2007, p. ES-3.

¹⁴ "Exemplary Utility-Funded Low-Income Energy Efficiency Programs," ACEEE, 2005, p.12.

- *Partnerships and multi-party collaboratives are common* that leverage funding from multiple sources.
- *Programs employ sophisticated diagnostic and analytical tools*, like blower-door testing, infrared imaging, and other diagnostic tools to identify and prioritize measures needed to improve energy efficiency and reduce energy costs.
- *Whole house approaches are common*. Increasingly, measures are not analyzed or addressed in isolation, but the interactivity of measures is considered and the most cost-effective strategy developed.
- *All types of energy use are targeted*. Programs that are “fuel-blind” and use an integrated approach and offer a full scope of energy efficiency measures are more cost-effective than those that target fuel types and also help ensure that customers reduce the greatest amounts of energy use and costs.
- *Program cost effectiveness should be less of an issue than with other programs*. These programs should not be held to the same cost-effectiveness tests as other energy efficiency programs, because the customer is paying for little or none of the costs and because these programs focus more on total energy bill savings rather than on utility system avoided production costs.
- *Program evaluation is an integral and ongoing element of programs*. While cost effectiveness should not be the primary measure, programs need to be evaluated, preferably by objective third-party evaluators, to assess overall impact and process to improve program performance.

Program review staff concludes that these “best practices” are not widely applied in Connecticut’s weatherization programs. There are a number of reasons for this including that the programs are implemented by different entities, funded by different sources, and use different processes to select vendors and units to be weatherized. Further, weatherization measures taken vary considerably in scope and costs, and performance objectives are different. But no impact evaluations have been done to determine the best results.

Reorganize for Improved Coordination

The above findings point to a need to have one low-income weatherization program, operated consistently on a statewide basis offering uniform services no matter where the customers live, and how it is funded. Program review staff believes that all of the funding and program administration for low-income weatherization should be organized in one place.

While there are current regulatory requirements that the subcontractors in the federal Department of Energy-funded program be community action agencies or other similar nonprofit agencies, there is no requirement that the grantee agency needs to be a state agency. While in most states, the DOE funding goes to housing or social service agencies, which then subcontract

with the CAPs, there are a few states where an authority or quasi-public receives the weatherization funding.

Funding. If the \$2.5 million in federal dollars were combined with the almost \$7 million in ratepayer funded CEEF weatherization services and the \$2 million in recent General Fund appropriation, there could be one well-funded program providing a uniform, consistent approach to comprehensively weatherizing homes for Connecticut's low-income households. Further, a portion (e.g., 25 percent) of the gas utility assessment of \$10 million (\$2.5 million) and 50 percent of the revenues for energy efficiency from the gross receipts tax on petroleum products (\$5m) could be added to the comprehensive weatherization program.

If the programs were located in one place and the funding from all sources (about \$18 million) pooled into one consistent program, it would make a target goal of comprehensively weatherizing 30 percent of low-income households within five years an achievable goal. Based on the CEAP recipient household numbers, that would mean that 6,000 units a year would be targeted for comprehensive "fuel-blind" weatherization. Further, the federal energy assistance program allows states to allocate 15 percent of the federal LIHEAP funding and also to apply for a waiver to allocate 25 percent of the funding to weatherization (rather than to cash assistance), which may prove more cost beneficial in the long-term.

If the weatherization results from Massachusetts' and Vermont's evaluated programs can be replicated in Connecticut that could save about \$675 a year on a household's energy bills. If the average cost of weatherizing is about \$2,500, the payback period is less than four years. Even in the first year, the \$675 reduction in energy costs means the cash assistance goes further, while creating weatherization jobs for people in communities, and improving the housing stock.

Therefore, program review staff recommends:

There shall be a uniform, coordinated weatherization assistance program within the new Energy Resources Authority. Current funding and administration would be combined within the new agency. The weatherization program should be designed to offer uniform, comprehensive, and "fuel-blind" measures to eligible low-income households throughout the state. The program should set a goal of weatherizing at least 30 percent of eligible low-income households within five years, and reducing energy consumption in each household by at least 20 percent.

Impact of weatherization programs should be evaluated similarly to other energy efficiency and conservation programs and payment structure should be based on performance.

To maximize funding for weatherization, the state should explore all opportunities for using the LIHEAP program to fund weatherization including allocating the full 15 percent allowed under the program currently and, depending on cost-effectiveness and evaluation results, seek a waiver for 25 percent.

Program review staff recognizes that there are administrative and regulatory obstacles to establishing one program. For example, the program will have to ensure that any DOE funding would have to be allocated to community action agencies, but other qualified vendors could be selected to implement the program and paid through the other funding streams. Since the DOE funding is only a small portion of the overall weatherization funding pool, committee staff finds it makes sense to coordinate it under the combined agency with the more comprehensive programmatic and financing infrastructure. Contracting, vendor selection, and bill payment could all work more smoothly in an authority or quasi-public rather than a state agency with many restrictions.

While program review recognizes that cost-effectiveness of this program should be measured differently from other programs, it is important that impact evaluations be conducted. These are needed to both determine the performance of individual vendors, as well as to assess the cost-effectiveness of allocating a greater portion of LIHEAP funding to weatherization rather than to cash assistance and provides sufficient justification to seek the federal waiver.

Also of concern in the program design is how to target rental units, where most CEAP recipients live, yet where renters need landlord approval for weatherization. Committee staff recognizes the need for the new Energy Resources Authority to design a program that incorporates the following objectives:

- convinces property owners that there are benefits for implementing weatherization in units where low-income tenants live;
- ensures that some landlord monetary contribution is made, e.g., the DOE requirement is 20 percent of costs or \$250, whichever is less; and
- ensures that savings that result to renters from weatherization are not transferred to the landlord through increased rents.