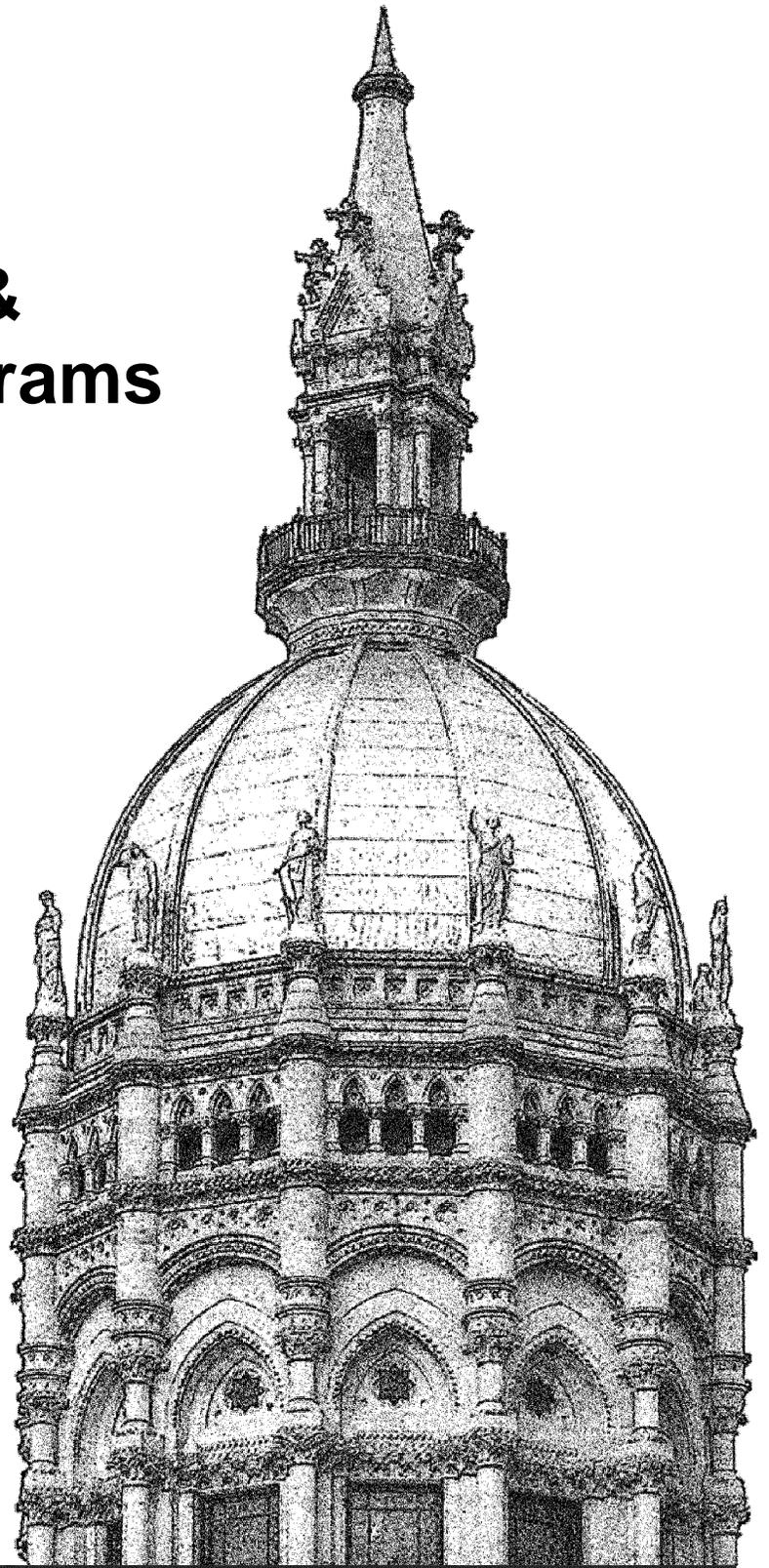


# Energy Efficiency & Conservation Programs In Connecticut

January 2009



**PRI**

**Legislative Program Review and  
Investigations Committee**

Connecticut General Assembly

**CONNECTICUT GENERAL ASSEMBLY  
LEGISLATIVE PROGRAM REVIEW AND INVESTIGATIONS COMMITTEE**

The Legislative Program Review and Investigations Committee is a joint, bipartisan, statutory committee of the Connecticut General Assembly. It was established in 1972 to evaluate the efficiency, effectiveness, and statutory compliance of selected state agencies and programs, recommending remedies where needed. In 1975, the General Assembly expanded the committee's function to include investigations, and during the 1977 session added responsibility for "sunset" (automatic program termination) performance reviews. The committee was given authority to raise and report bills in 1985.

The program review committee is composed of 12 members. The president pro tempore of the Senate, the Senate minority leader, the speaker of the house, and the House minority leader each appoint three members.

**2007-2008 Committee Members**

***Senate***

Edward Meyer

*Co-Chair*

Robert J. Kane\*

John W. Fonfara

Anthony Guglielmo

John A. Kissel

Andrew M. Maynard

\* preceded by David J. Cappiello

***House***

Julia B. Wasserman

*Co-Chair*

Mary Ann Carson

Marilyn Giuliano

Michael P. Lawlor

Mary M. Mushinsky

J. Brendan Sharkey

**Committee Staff**

Carrie Vibert, Director

Catherine M. Conlin, Chief Analyst

Jill E. Jensen, Chief Analyst

Brian R. Beisel, Principal Analyst

Michelle Castillo, Principal Analyst

Maryellen Duffy, Principal Analyst

Miriam P. Kluger, Principal Analyst

Scott M. Simoneau, Principal Analyst

Janelle Stevens, Associate Legislative Analyst

Michelle Riordan-Nold, Legislative Analyst II

Eric Michael Gray, Legislative Analyst

Bonnine T. Labbadia, Executive Secretary

**Project Staff**

Catherine M. Conlin

Michelle Riordan-Nold

STATE CAPITOL ROOM 506

HARTFORD, CT 06106

(860) 240-0300

Email: [pri@cga.ct.gov](mailto:pri@cga.ct.gov)

[www.cga.ct.gov/pri/index.htm](http://www.cga.ct.gov/pri/index.htm)

---

LEGISLATIVE PROGRAM REVIEW  
& INVESTIGATIONS COMMITTEE

**Energy Efficiency and Conservation Programs in  
Connecticut**

JANUARY 2009

---

---

# Connecticut's Energy Efficiency & Conservation Programs

## EXECUTIVE SUMMARY

INTRODUCTION .....	1
PRI Focus of Study .....	1
Rationale of Energy Policy Goal One .....	1
Rationale of Energy Policy Goal Two.....	2
<b>I. A Profile of Connecticut's Energy Use .....</b>	<b>5</b>
Connecticut's Energy Consumption.....	7
Connecticut's Energy Costs .....	7
Statewide Consumption and Cost by Type of Energy .....	8
Residential Energy Consumption and Prices.....	15
<b>II. Benefits of Energy Efficiency Programs.....</b>	<b>19</b>
Types of Programs .....	21
State Initiatives.....	22
Connecticut .....	23
Planning.....	25
Program Implementation.....	25
Administration and Oversight .....	27
Measurement, Verification, and Evaluation.....	27
<b>III. Assessing the State's Energy Reduction Goal.....</b>	<b>29</b>
Renewable Portfolio Standard.....	29
Electric Efficiency Progress .....	30
<b>IV. Connecticut's Energy Efficiency Programs .....</b>	<b>35</b>
Connecticut's Energy Efficiency Fund .....	37
CEEF Funding Level Analysis .....	43
CEEF Activity Level Analysis .....	47
CEEF Savings and Benefit Analysis .....	47
Connecticut Municipal Electric Energy Cooperative .....	51
CMEEC Activity Level Analysis .....	54
CMEEC Savings and Benefit Analysis .....	54
Electric Efficiency Partners Program .....	55
Connecticut Clean Energy Fund.....	56
<b>V. State Funded Programs .....</b>	<b>61</b>
Energy Conservation Loan Fund (ECL).....	61
ECL Activity Level Analysis .....	63
Furnace Rebate Program .....	64
Fuel Oil Conservation Board .....	65
Energy Efficiency and Conservation in State Buildings .....	66
Connecticut's Experience.....	67
<b>VI. State Organizational Structure and Funding .....</b>	<b>73</b>

Organization .....	73
Funding .....	76
<b>VII. Program Planning and Design .....</b>	<b>81</b>
Residential Program Design .....	84
Benefits to Residents .....	86
Residential Vendor Training and Certification .....	87
Financing Residential Energy Efficiency .....	89
Other States' Energy Loan Programs .....	89
Connecticut Compared to Other Programs.....	91
Performance Contracting.....	92
Lead by Example.....	93
<b>VIII. Energy Efficiency Program Implementation and Payment Structure .....</b>	<b>97</b>
Program Administration and Implementation .....	97
Current Payment Structure – Performance Incentives.....	99
Connecticut's Performance Incentive Structure .....	99
<b>IX. Measurement and Evaluation .....</b>	<b>103</b>
Connecticut Energy Efficiency Fund .....	104
Energy Independence Act 2005.....	107
Connecticut Clean Energy Fund.....	107
Connecticut Municipal Electric Energy Cooperative .....	108
Fuel Oil Conservation Program.....	108
<b>X. Assessing the State's Low-Income Energy Assistance Programs .....</b>	<b>111</b>
Connecticut's Low-Income Assistance Programs .....	111
Cash Assistance Programs.....	112
Operation Fuel.....	116
Utility-Sponsored Low-Income Programs.....	118
Energy Cash Assistance: Findings and Recommendations .....	121
Low-Income Weatherization Programs.....	124
Utility-Sponsored Weatherization Programs.....	129
Municipal Utility Weatherization Program .....	134
Community Action Agency Status Report on Weatherization.....	135
Weatherization: Findings and Recommendations .....	136
Best Practices for Low-Income Weatherization .....	139

## APPENDICES

- A. Scope of Study
- B. Status of Public Act 07-242 – as of September 2008
- C. Glossary of Energy Terms
- D. Database of Financial Incentives for Renewable Energy and Energy Efficiency
- E. Consumer Resources for Information on Energy Efficiency and Conservation
- F. Connecticut Energy Efficiency: Consumers Served
- G. WRAP Measure Description
- H. Program Review Staff Proposal for New Organizational Structure
- I. Agency Response



# Executive Summary

---

## Connecticut's Energy Efficiency and Conservation Programs

### Purpose of Study

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. 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.*

### General Findings

The committee concluded 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, ranking 44 in per capita consumption in 2005. However, Connecticut's energy prices are high, 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.

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 creating new generation. In New England, efficiency measures generally cost two-thirds less than the expenditures required to increase 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.

The study found 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.

The study also found 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.

The study found that deficiencies exist in the current residential program, with different measures taken depending on which utility is offering the program, and low turn-in rates on rebates, indicating that residential customers are not implementing significant efficiency measures after their audit. The study found that the current residential loan program is not as widely used as some programs in other states. Further, Connecticut does not utilize performance contracting to any great extent at the local level, and has not done so at the state level, despite a 2003 statutory requirement to implement an energy reduction performance contract in a state agency as a pilot program.

Further, none of the energy efficiency or alternative energy programs offer technical assistance to municipalities that would provide objective guidance on all efficiency and conservation measures a town might take and how best to finance them. Also, the current programs focus little on low-income rental and multi-family residences, landlords, and other hard-to-serve customers.

The program review committee found 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. The study analyzed the performance incentives structure in place that partially pays the two utilities for administering and implementing the energy efficiency programs in Connecticut and found that there seems to be little connection between 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.

Saving energy is the primary 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 no formal, established schedule for evaluating efficiency and renewable energy programs. Many of these programs -- including many of the Clean Energy Fund and the 2005 Energy Independence Act initiatives, and the DSS weatherization program --

have not been evaluated recently, if ever. Further, among states with robust energy efficiency programs, Connecticut ranks 15 out of 19 in percentage of program dollars spent on evaluation.<sup>1</sup>

When efficiency programs have been evaluated, the program administrators or implementers have typically been involved in selecting the evaluators and paying for the evaluation. Further, the evaluations that have been done place more emphasis on process or program incentive levels rather than on saving energy and costs.

The report also examined 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 indicated that for 2009, Connecticut's federal energy assistance funds will almost double to \$125 million. While the legislature supplemented that with a \$35 million General Fund allocation in August 2008, the deficit mitigation measures proposed by the governor and approved by the legislature in January 2009 rescind the \$35 million state allocation. While it is difficult to determine the degree to which the recent funding will affect affordability, the increased federal allocations coupled with a continued drop in oil prices, should help ease what could have been a severe problem for lower-income residents.

The committee found the annual application process for the Connecticut Energy Assistance Program is cumbersome and proposes a three-year application renewal process. Finally, the study reviewed the various weatherization programs serving low-income residents and found: conflicting goals and objectives in the utility-run programs; differences in the services provided to customers served by the two utility weatherization programs; and a lack of comprehensive impact evaluations of programs to determine energy savings or cost effectiveness.

## **Recommendations**

In response to study findings, the program review committee adopted nine recommendations, set out below. Included among them: establishing a goal of a 10 percent reduction in per capita energy consumption by 2015, using 2006 consumption as the baseline; moving responsibility and resources for the evaluation function for all energy efficiency and renewable energy programs to the Office of Consumer Counsel, ensuring an adequate number of staff to manage and oversee evaluations; and directing the Department of Public Utility Control to explore the feasibility of a discounted utility rate for low-income gas and electric customers.

In addition to the nine adopted recommendations, the committee considered but did not adopt a set of staff-proposed recommendation to consolidate all energy efficiency and alternative programs into one energy authority in the form of a quasi-public agency, with one board of directors, one pooled funding stream, and one three-year plan and budget. The intent of the

---

<sup>1</sup> 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.

proposals was to address the recognition of program fragmentation and the lack of a fuel-blind approach, which make overall energy reduction hard to achieve.

Ultimately, a majority of the committee membership did not support the proposal (which is required by committee statute for approval). A variety of reasons were cited, including: opposition to the creation of a new quasi-public agency; support for how the programs were currently operating in terms of serving consumers; and a concern that the proposed authority would decrease policymakers' ability to oversee the programs.

- 1. 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.**
- 2. The gas utility contribution to the energy efficiency and conservation programs shall be one percent of the utilities' previous year's revenues.**
- 3. The legislature shall 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. The legislature and the governor should 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.**
- 5. 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.**
- 6. A new division within the Office of Consumer Counsel (OCC) shall be dedicated to evaluating all energy efficiency, conservation, and renewable energy programs. 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 organizations 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 should be conducted to verify yearly energy and capacity savings and total resource benefits and progress towards goals; and**
  - **half the evaluation budget shall focus on impact evaluations, with the remainder for process and market effects evaluations.**
    - **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 (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 staff should come from two and a half percent of current programming budgets.**
7. **The annual application process for energy cash assistance 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.**
  8. **The Department of Public Utility 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.**
  9. **The weatherization programs 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.**

# Introduction

---

## Purpose of Study

The Legislative Program Review and Investigations committee initiated this study in May 2008. Availability and affordability of energy have been a primary concern to Connecticut residents and policymakers for some time. Committee members wanted a review that would 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. Those two goals 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.*

## Focus of Study

The committee approved a study scope focusing on what the results have been in reducing Connecticut's energy consumption and assisting the state's low-income households with their energy needs. The scope of the study is contained in Appendix A. The study focused on how accessible the programs were from a consumer point of view and determined whether state energy efficiency and conservation programs were established and implemented in an effective and efficient way. The scope also required an analysis of nine different areas, including examining organizations for implementing programs in other states, and identifying opportunities to improve Connecticut's program structure and delivery.

Part of the assessment of the progress toward the goals was to determine why the goals were developed and the benefits that would be achieved in meeting them. Those areas are outlined below.

## Rationale of Energy Policy Goal One

The reason for Connecticut to implement measures to reduce demand and consumption of energy, especially at peak demand times, is that they provide many benefits to all state residents and businesses. Those benefits include:<sup>2</sup>

- more sustainable and stable rates of growth in energy demand;
- reduced risk of huge price increases and price volatility;
- lower total energy bills for all consumers;

---

<sup>2</sup> Many of the benefits are cited by the American Council for Energy-Efficient Economy, and noted in the Connecticut Energy Efficiency Fund 2008 Energy Excellence Plan, May 2008, p.8.

- increased energy reliability, including reduced risks of blackouts and shortages that can have drastic impacts on the state’s well-being and economy;
- less need to site and pay for potentially controversial, expensive, and environmentally harmful energy supply facilities;
- cuts in emissions of air pollutants and greenhouse gases;
- balance in and diversification the manner of a state’s “energy portfolio”; and
- direct and indirect economic development benefits including: developing a “green workforce”; and more reduction in energy consumption and costs makes a more competitive business environment, even to the extent of keeping some businesses open that otherwise may close or relocate.

### **Rationale of Energy Policy Goal Two**

The reasons for ensuring that assistance is provided to low-income residents to meet their energy needs are fairly apparent:

- Many of the state’s low-income residents are also vulnerable in some other way – e.g., elderly and/or disabled -- and heat and light become as basic a need as food or medicine.
- As energy costs rise, bills for light and heat take a greater portion of income and more and more residents have a harder time paying those bills, making the need for financial assistance more acute.
- Since low-income energy assistance is considered a societal responsibility, federal and (to a lesser extent) state dollars support these programs. Also, because low-income residents also pay electric bills and consequently the surcharges on those bills, financial support also comes from electric companies as well as gas companies, through their rates.

**Methods.** Many sources were relied on in developing the report. In addition to state statutes, staff relied on energy documents produced by a variety of both federal and state government agencies and nonprofit policy organizations were used. Many interviews were held with staff from several state agencies, including: the Office of Policy and Management; Office of the Attorney General; Office of Consumer Counsel; and the Departments of Public Utility Control, Economic and Community Development, Environmental Protection, and Social Services.

Interviews were also conducted with staff from the state’s investor-owned and municipal electric utilities, and a number of board members and staff from the Energy Conservation and Management Board, the Clean Energy Fund, the Connecticut Energy Advisory Board, and the Low-Income Energy Advisory Board. A number of these boards’ meetings were also observed.

Committee staff also met with representatives of the Institute for Sustainable Energy, Operation Fuel, and the Connecticut Association for Community Action Agencies (CAFCA).

Staff 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.

**Report organization.** This report is organized into ten chapters. Chapters I through III profile Connecticut's energy consumption, describe the benefits of energy efficiency, and assess the state efforts in reducing energy consumption. Chapter IV provides a comprehensive description of all programs currently in place to implement energy efficiency and clean energy programs that are funded by ratepayers. Chapter V describes programs funded with state bonds, General Fund monies, or special dedicated funding.

The last five chapters contain findings and recommendations related to energy efficiency and conservation programs. Chapters VI through IX analyze how the current structure and programs compare to best practices from the National Action Plan for Energy Efficiency and other literature in the field. Each of these chapters begins with a synopsis of best practices in that given program area. These chapters analyze the current organizational structure and funding, as well as review program planning, implementation, and measurement and evaluation efforts.

Finally, Chapter X examines the state's progress in achieving the second policy goal – assisting low-income residents meet their energy needs both through cash assistance and weatherization programs.

It is the policy of the Legislative Program Review and Investigations Committee to provide agencies included in the scope of a review with the opportunity to comment on the committee findings and recommendations prior to the publication of a study report in final form. Comments were received from the Office of Policy and Management and are published as Appendix I.



## A Profile of Connecticut's Energy Use

This chapter discusses overall energy consumption trends both nationally and in Connecticut. The chapter also describes what the costs of energy have been and their impact on the economy in this state and nationwide. While national figures are based on recent 2007 data, comparative information between Connecticut and other states is somewhat older (2005). Finally, the consumption and costs of different types of energy and the increasing burden those costs are placing on Connecticut households, especially those of lower income, are analyzed.

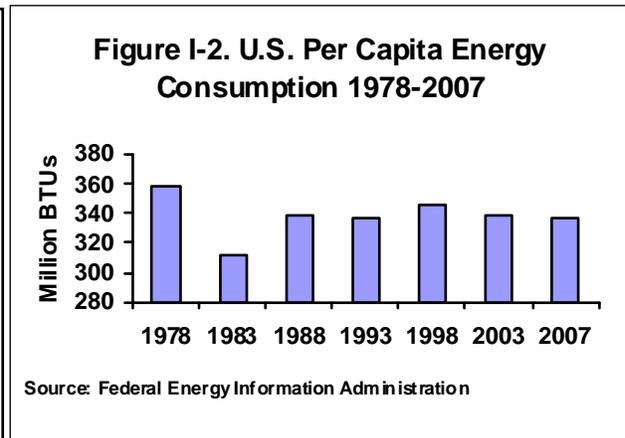
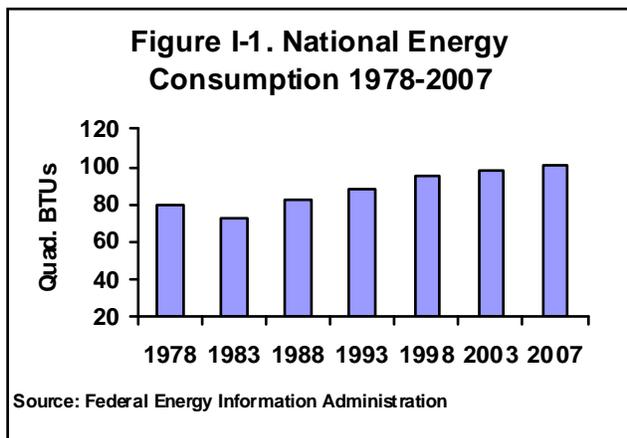
To help put energy use in perspective, and assist in understanding this chapter, Table I-1 provides some terms of measurement for different types of energy and overall consumption. Appendix C also provides a glossary of commonly used energy terms.

<b>Table I-1. Energy Terms for Measurement</b>	
<b>Number of Households in Connecticut in CL&amp;P and UI territory</b>	1.4 million
<b>Average Energy Consumption per Household</b>	
Electricity	700 kWh per month – 8400 kWh per year
Oil	800-900 gallons per year
Natural Gas	1,030 ccf per year
<b>Energy Measurements</b>	
<b>Electricity</b>	kWh (kilowatt hours) – measures the amount of electricity consumed over time: 1,000 kWh = 1 MWh 1,000 MWh = 1 GWh  KW – measures the amount of constant electricity needed
<b>Oil</b>	Gallons – measures the amount of oil consumed in gallons
<b>Natural Gas</b>	Ccf- measures the amount of gas consumed in <i>hundreds</i> of cubic feet Mcf – thousands of cubic feet MMcf – millions of cubic feet
<b>Overall Energy – BTU</b>	BTU – British Thermal Units measures energy consumption and allows for consumption comparisons among fuels that are measured in different units Quadrillion BTUs - for total population Millions of BTUs - for individuals

Nationally, over the past 30 years overall consumption of energy (including transportation uses) has increased about 27 percent from about 80 quadrillion BTUs in 1978 to 101.6 in 2007, as shown in Figure I-1. National consumption declined more than 10 percent

between 1978 and 1983, as a result of a national recession in the early 1980s, a reduction in overseas oil production, and higher oil prices. However, the impact was temporary, and when prices dropped again national consumption resumed, although somewhat more moderately.

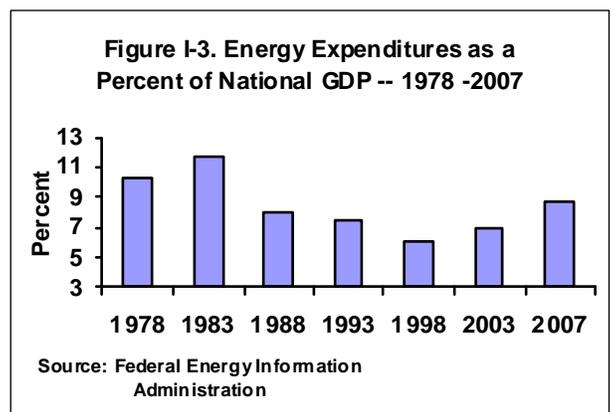
Measured on a per-person basis, energy consumption has remained fairly stable during the same time period, as shown in Figure I-2. The per-person use was at its peak in 1978 at 359 million BTUs, before dropping substantially in the early 1980s, and then grew moderately. More recent per capita consumption has actually declined, from 345 million BTUs in 1998 to 337 million BTUs in 2007.



Much of the national increase in energy use is due to economic growth. Data show that gross domestic product (GDP) significantly outpaced growth in energy consumption. Nationally, between 1997 and 2007, the GDP increased by almost 67 percent in actual dollars, while national energy consumption grew by about 7 percent.

A newer measure that attempts to gauge intensity of energy consumption to support the economy calculates energy use for every dollar the economy produces. Thus, if energy consumption is measured in 1,000 BTUs for every real dollar of GDP, i.e., the energy it takes to produce every dollar of economic growth, the decline in consumption is also dramatic. Thus, for every dollar of GDP in 1997 it took 10.89 (in 1,000 BTUs) to produce that, and only 8.78 (in 1,000 BTUs) in 2007, a reduction of almost 20 percent.

While the energy being consumed to drive the economy may be lessening, the cost of energy as a percent of GDP is increasing after being stable for a time. As Figure I-3 shows, energy expenditures are not taking as much of the national gross product as they were during the late 1970s and early 1980s, when the energy costs accounted for almost 12 percent of GDP. That percentage has been increasing, though, and is again approaching 10 percent.



## **Connecticut's Energy Consumption**

It is difficult to compare trends nationally with Connecticut using the same time period as above, because the most recent state data is for 2005. Consumption data for the period between 1995 and 2005 show that the state's energy consumption grew from 778.2 trillion BTUs to 900.2 trillion BTUs, an increase of about 15.6 percent. For the same period – 1995-2005 -- national consumption increased about 10 percent.

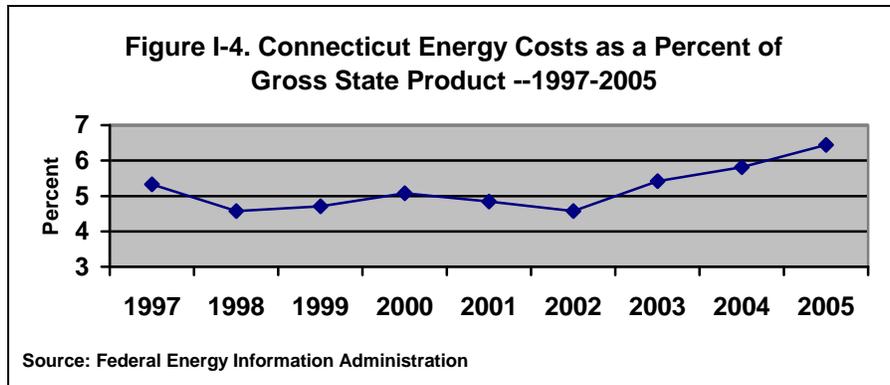
Compared to other states, Connecticut's overall consumption is fairly low. In total energy consumption (all sources), Connecticut ranked 33rd of 50 states and D.C. in 2005. Comparing Connecticut to other states by end-use sector, the residential and the commercial sector (e.g., office buildings, retail) both ranked 28th. Connecticut ranked 44th in consumption by the industrial (manufacturing) sector, reflecting that Connecticut's economy is not heavily manufacturing- based.

Per capita consumption in Connecticut also is comparatively low. The state ranked 44th in total energy consumed per capita in 2005, an increase from 2001, when Connecticut ranked 47th. Connecticut's 2005 per capita consumption of 258.2 million BTUs is about 24 percent less than the national average per capita consumption of 339.2 million BTUs, indicating that Connecticut residents are relatively low consumers of energy.

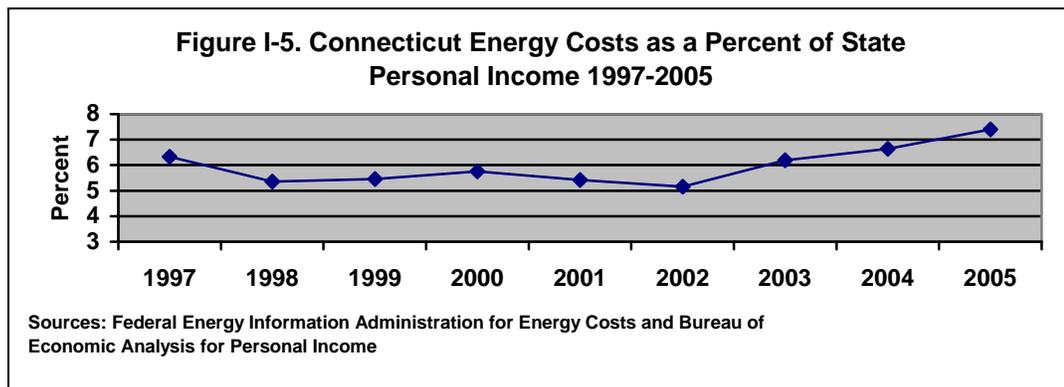
## **Connecticut's Energy Costs**

Connecticut has not been a high energy-consuming state, but Connecticut has high energy prices. In 2005, Connecticut had the third-highest prices in the nation per million BTUs. At \$19.40 per million BTUs, Connecticut was behind only Hawaii and D.C., and was about 20 percent higher than the national average price of \$15.66. However, Connecticut ranks in the middle (26) of all the states when comparing expenditures per person. Connecticut expended \$3,571 per person on energy in 2005, only 1.2 percent above the national average of \$3,525. Because Connecticut residents pay a lot for energy, they may be more cautious energy consumers; hence their overall expenditures do not differ much from the national average.

The two graphs below show the growth in energy expenditures as a measure of the state economy. Figure I-4 illustrates the growth in Connecticut's overall energy expenditures as a percent of gross state product. Between 1997 and 2005, growth in that measure has gone from less than 5 percent in the late 1990s to almost 7 percent in 2005, an almost 40 percent increase. While actual data are not available beyond 2005, additional and dramatic increases in energy costs since then make it likely that energy expenses are consuming a much greater share of the state's economy.



Energy expenses as a share of the state’s total personal income have also grown over the same period – from a low of about 5 percent in 2002 to more than 7 percent in 2005 (Figure I-5). Again, if more recent data were available, this ratio would likely be much higher since energy prices have increased substantially since 2005. Further, state personal income is a gross measure of the overall income of all state residents, but the impact energy costs have on individuals and households can be much higher than the 7 percent, depending on their income. This impact will be discussed later in this chapter.



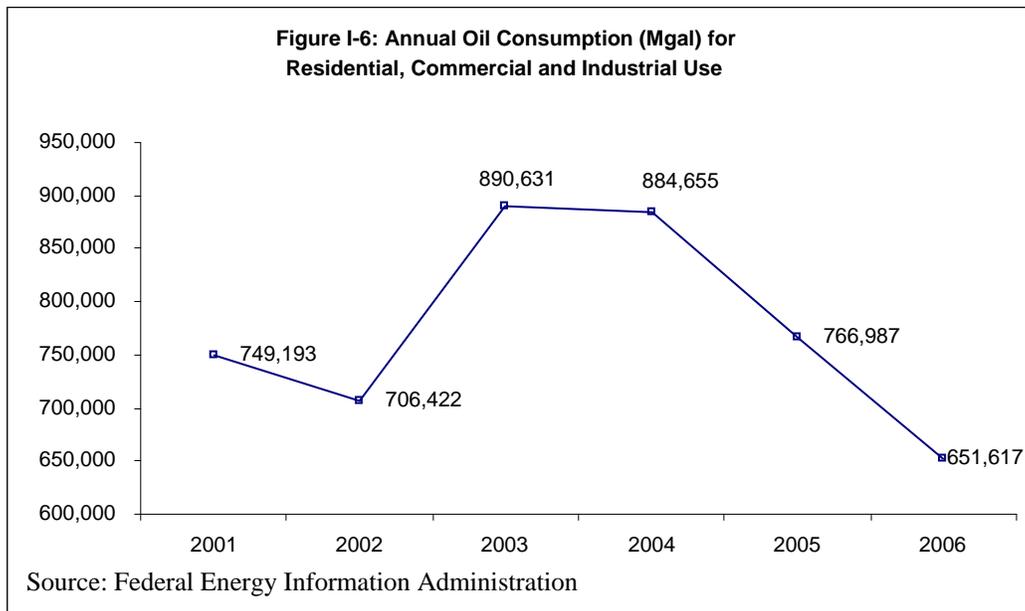
### Statewide Consumption and Cost by Type of Energy

Just as Connecticut does not rank high in overall consumption of energy, it also does not rank high in consumption of any one type of energy. However, because of the state’s geographic location and lack of fossil fuels, it pays some of the highest prices for all types of energy. A brief description of consumption and price of energy in Connecticut follows.

**Oil.** In 2005, Connecticut ranked 29th of the 50 states and D.C. for overall consumption of oil. Within Connecticut, residential customers are the largest consumers of oil, consuming over 500 million gallons of oil in 2006 (see Table I-2).

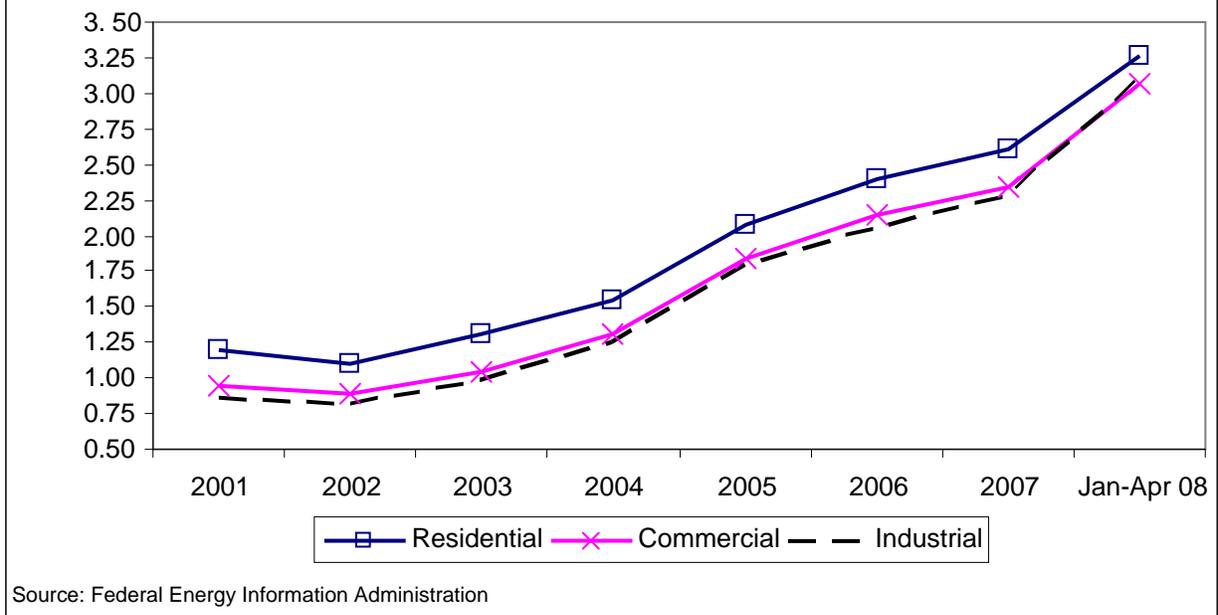
<b>Table I-2: Annual Oil Consumption (Mgal) in Connecticut by Sector</b>						
	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>
Residential	579,489	565,684	682,429	713,161	626,032	525,807
Commercial	144,988	124,644	155,903	148,599	126,262	111,141
Industrial	24,716	16,094	52,299	22,895	14,693	14,669
<b>Total</b>	<b>749,193</b>	<b>706,422</b>	<b>890,631</b>	<b>884,655</b>	<b>766,987</b>	<b>651,617</b>
Source: Federal Energy Information Administration						

Figure I-6 depicts the total oil consumption for the state since 2001. As the figure demonstrates, total consumption reached a high in 2003 and has been on a decline ever since.



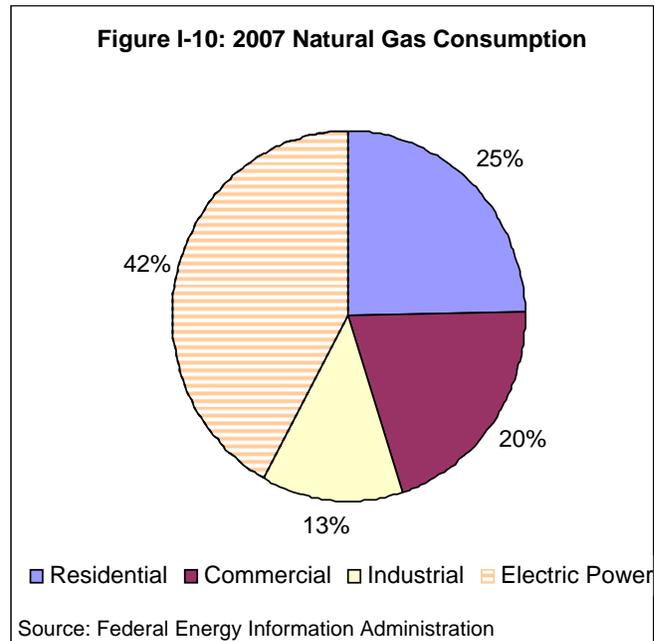
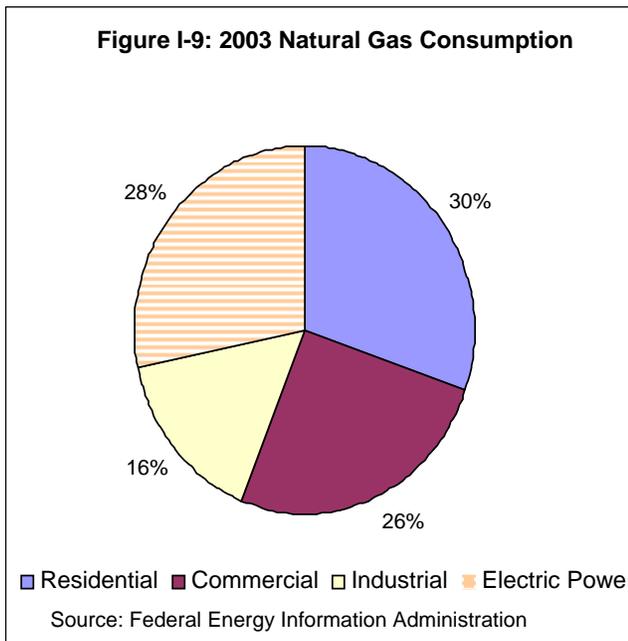
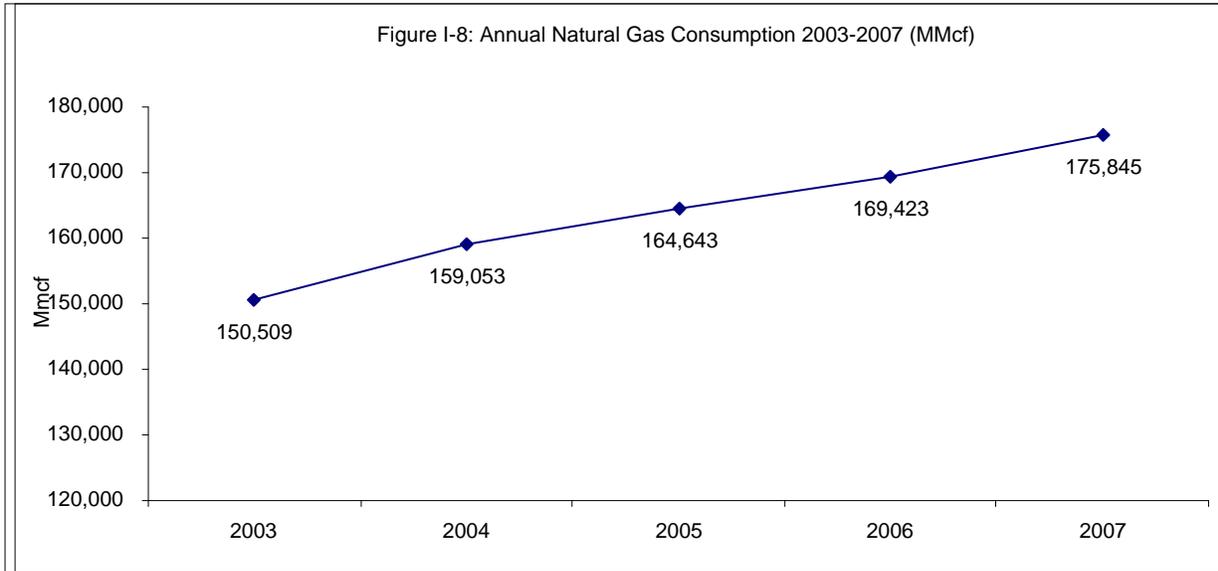
Oil prices for all users, residential, commercial, and industrial, generally have steadily increased since 2001 (Figure I-7). Residential customers have experienced a 172 percent increase in prices since 2001, reaching an average high of \$3.27 per gallon for the first four months in 2008. Commercial and industrial customers have seen larger percentage increases since 2001, 226 percent and 257 percent respectively, although still at a lower average price per gallon than for residential customers.

**Figure I-7: CT Average Annual Price of Oil  
by Customer Type (excluding taxes)**

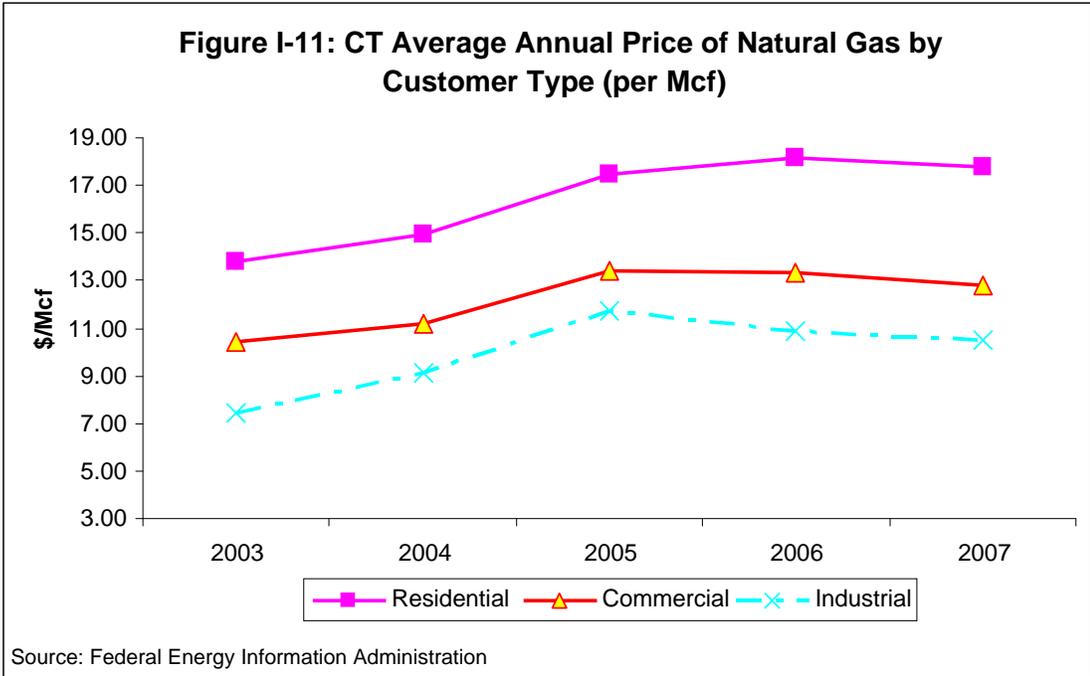


**Natural gas.** Connecticut is not a large consumer of natural gas; it ranks 36th among the 50 states and D.C. in 2005 (the latest year all state rankings were developed). Further, much of the natural gas consumed in the state in 2007 – about 42 percent - was used for the production of electricity. The remainder of the state’s natural gas consumption was split among residential (25 percent), commercial (20 percent), and industrial (13 percent) customers.

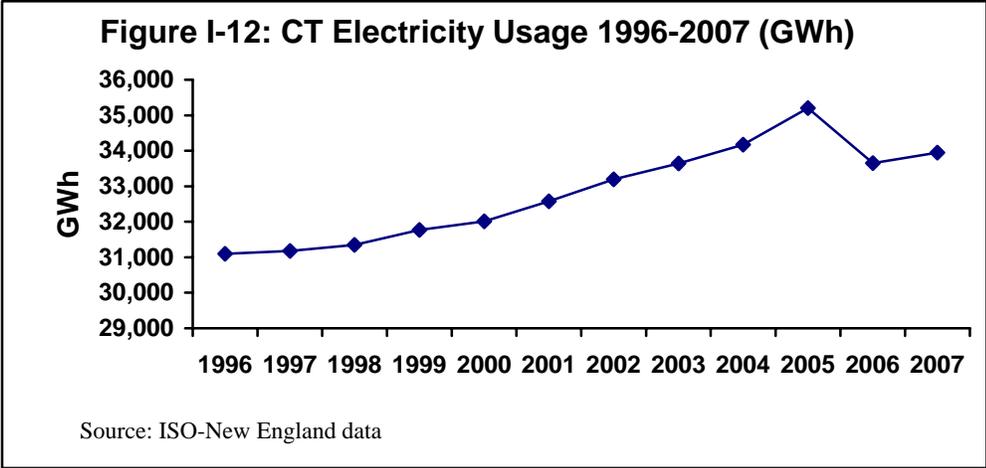
Overall consumption for all customer types has seen a steady increase since 2003 as shown in Figure I-8. The electric industry’s shift from reliance on coal to natural gas has increased its overall share. Over the past four years, consumption of natural gas to produce electricity has increased by one and half times, going from 28 percent to 42 percent (Figures I-9 and I-10). In contrast, commercial, industrial, and residential customers have all decreased their consumption.



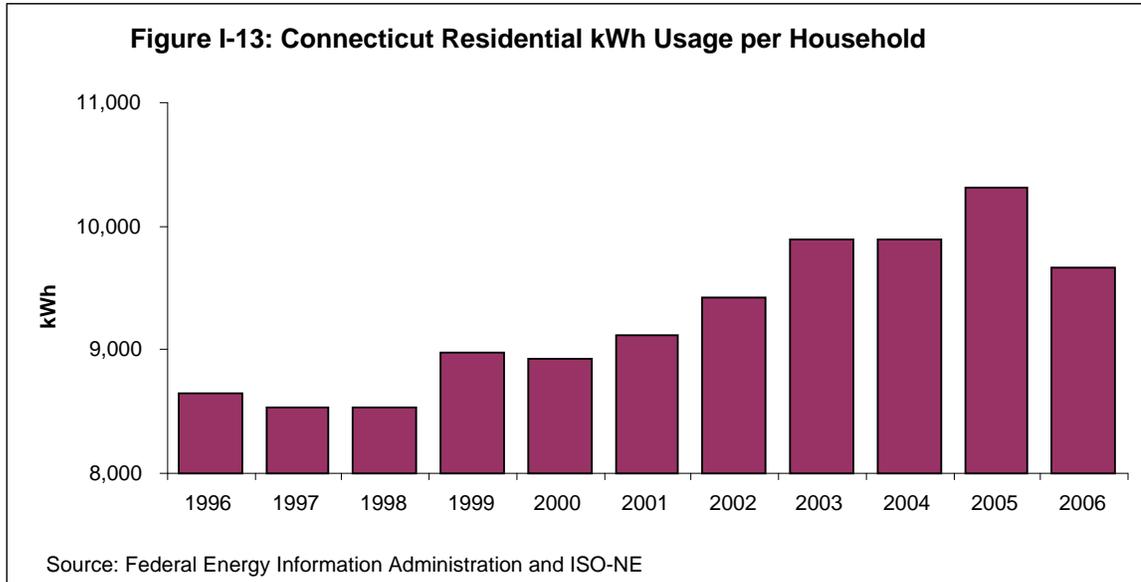
Natural gas prices have also been on the rise since 2003, although since 2005 they appear to have leveled off (Figure I-11). Similarly to oil prices, residential customers pay the highest price for natural gas among the three customer types.



**Electricity.** Consumption of electricity has steadily increased since 1996 (see Figure I-12). However, in 2006 there was a precipitous drop, which leveled out in 2007. Most likely the drop was a result of the large increase in electricity prices around that time.



Following the pattern of overall electricity usage, residential consumers have also steadily increased electricity consumption (see Figure I-13).



Consumption trends in electricity vary by sector as shown in Table I-3. While the number of households has grown by less than 7 percent from 1996 to 2006, residential use has grown by almost 11 percent, indicating the real growth has been in usage per household. Further, in the industrial sector, there has actually been a decline in manufacturing (as measured by employment) of more than 20 percent, while industrial electricity usage has declined by almost half that, indicating usage has outpaced the economic growth in that sector. Only in the commercial non-manufacturing sector has the sector growth outstripped electric consumption growth.

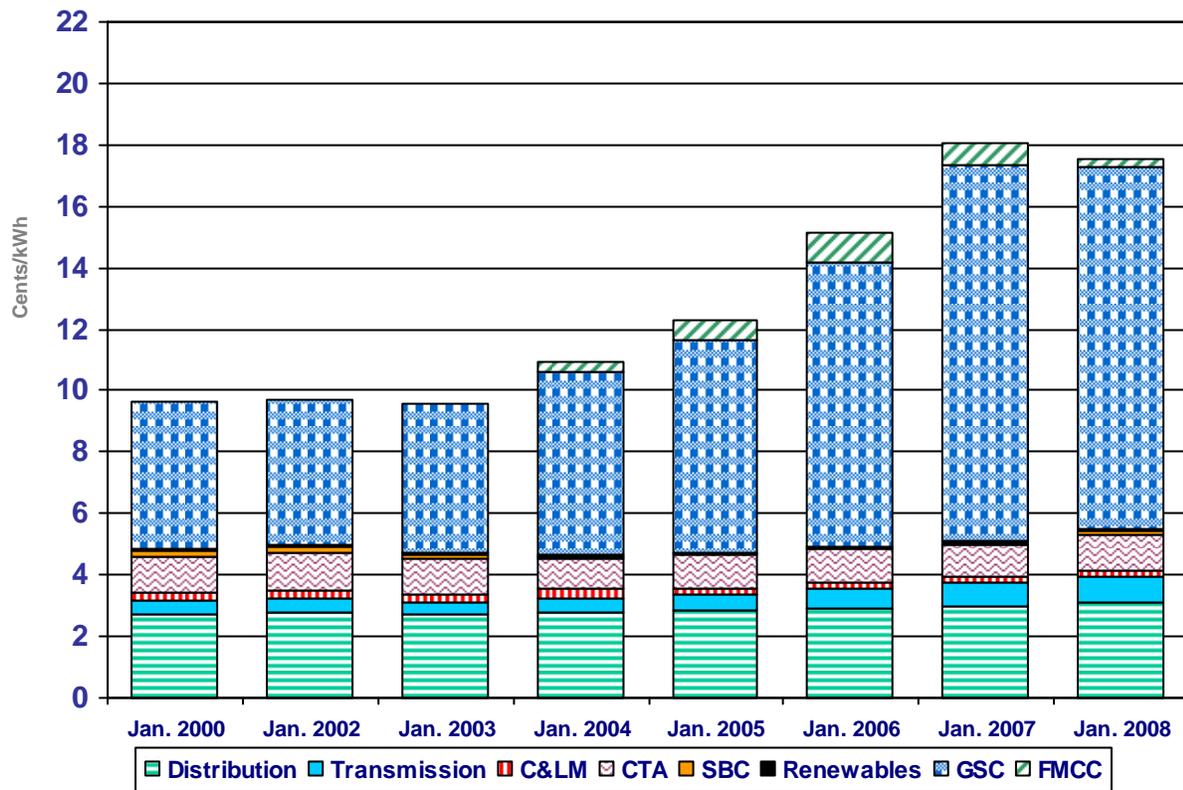
<b>Table I-3: Connecticut Electric Demand: Components of Growth</b>	
	<u>Percent Growth</u> 1996 to 2006
<b>Sum-of-companies Forecasts</b>	
Residential GWh Sales	17.9%
Households	6.7%
Usage	11.2%
Commercial GWh Sales	18.3%
Non-manufacturing Employment	10.8%
Usage	7.5%
Industrial GWh Sales	(11.5%)
Manufacturing Employment	(21.3%)
Usage	9.8%
Source: "An Analysis of Demand for Electricity in Connecticut prepared for the ECMB," January 28, 2008.	

In overall electricity sales in 2006, Connecticut ranked 35th among the 50 states and D.C. However, within New England, Connecticut residents and commercial customers consume the most kWh per month.<sup>3</sup> In Connecticut, these two customers types together account for 83 percent of total sales, with the remainder being sales to the industrial and transportation sectors.

Connecticut has the second highest average residential retail electricity prices out of the 50 states and D.C., according to the most recent rankings from the Federal Energy Information Agency. At about 18 cents per kWh, Connecticut trails only Hawaii in what its residential electric customers pay.

The primary driver of the cost of electricity is the generation service charge as shown by Figure I-14. Since 2005, this charge has comprised about two-thirds of the cost of electricity.

**Figure I-14: CL&P & UI Average Electric Rates, 2000 - 2008**

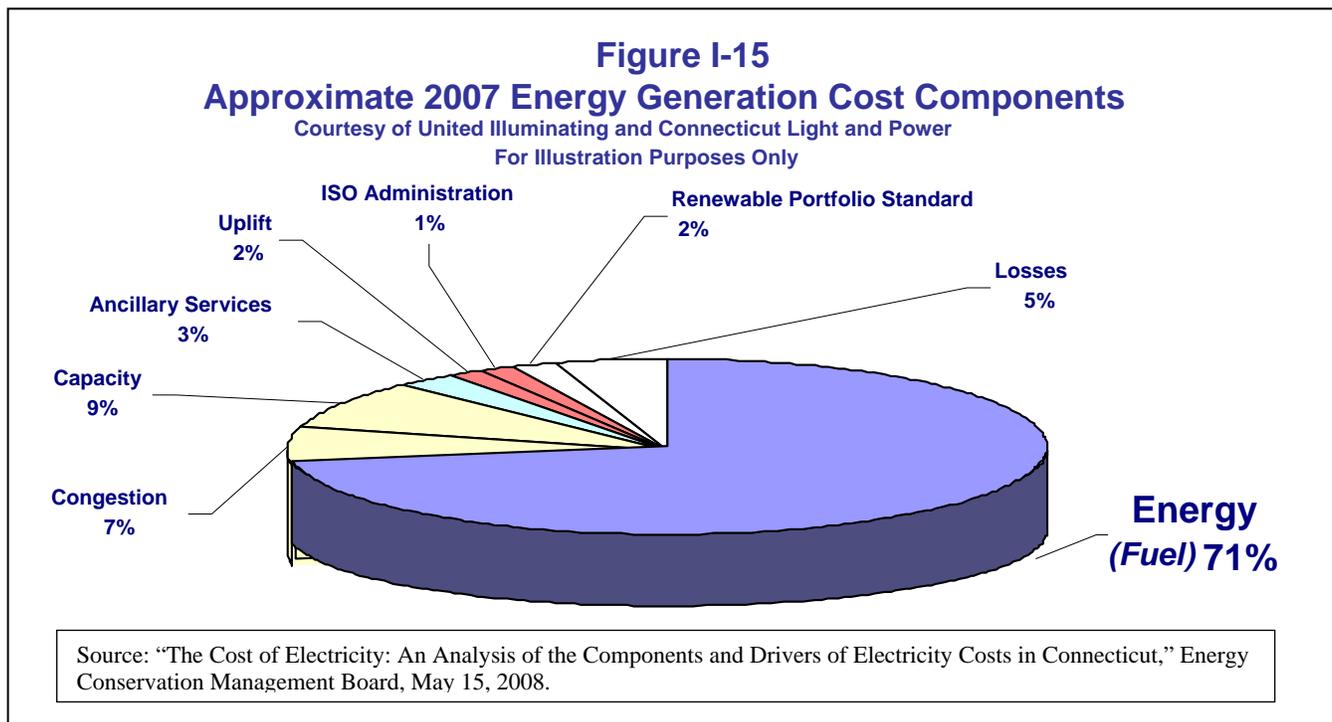


[FMCC=Federally Mandated Congestion Charges; GSC=Generation Service Charge; SBC=Systems Benefits Charge; CTA= Competitive Transition Assessment; C&LM=Conservation & Load Management]

Source: "The Cost of Electricity: An Analysis of the Components and Drivers of Electricity Costs in Connecticut," ECMB, May 15, 2008.

<sup>3</sup> <http://www.eia.doe.gov/cneaf/electricity/esr/table5.html> (viewed on Federal Energy Information Administration)

Figure I-15 illustrates the components of that generation charge, of which more than 70 percent pays for fuel.



### Residential Energy Consumption and Prices

**Home heating.** Households in Connecticut primarily use oil (50 percent) as the primary source of home heating fuel followed by natural gas (30 percent) and electric heat (15 percent). The remainder of households use another fuel source. This compares to the average U.S. household where 51 percent heat with natural gas; 9 percent, oil; 30 percent, electric heat; 7 percent, liquefied petroleum gases; and the remainder, other sources.

In Connecticut, the primary source of heat varies based on whether the residence is owner or renter occupied (Table I-4).

House Heating Fuel	All Housing Units	Owner Occupied	Renter-Occupied
Oil	50.3%	59.4%	29.4%
Natural gas	30.0%	26.1%	39.0%
Electricity	14.9%	9.3%	27.7%
Other	4.8%	5.2%	3.9%

Source: 2006 U.S. Census Bureau American Community Survey

The price of home heating oil rose at a relatively stable rate through the late 1990s and early part of this decade, but over the past two years prices have been much more volatile.

Between March 2007 and August 2008, the price of oil jumped 69 percent (Table I-5). However, in the latter part of 2008 prices fell dramatically, to 2007 levels.

	March	April	May	June	July	Aug	Sept	Oct	Nov
<b>2007</b>	\$2.44	\$2.50	\$2.50	\$2.54	\$2.61	\$2.56	\$2.64	\$2.80	\$3.18
<b>2008</b>	\$3.76	\$3.97	\$4.29	\$4.60	\$4.65	\$4.13	\$3.84	\$3.22	\$2.81
% change	54%	59%	72%	81%	78%	61%	45%	15%	(12%)

Source: Office of Policy and Management

If the prices had continued in the trend experienced over the summer of 2008, the cost of energy for households for the 2008-09 heating season would have steeply increased from past years. The 2008-09 heating bill for an average household that uses oil could have cost between \$3,304 and \$3,717, using the summer price of oil, compared with an average annual cost of \$2,035 for the 2006-07 heating season.<sup>5</sup> As shown in Table I-6, natural gas customers will also experience an increase for the 2008-09 heating season, with an estimated bill of \$2,393.<sup>6</sup>

Heating Fuel Source	2006-07	2007-08	2008-09 (projected)	% Change
Oil <sup>7</sup>	\$2,035	\$3,058	\$ 3,511	73%
Natural Gas	\$1,597	\$1,693	\$2,393	50%

Source: PRI calculations

**Electricity.** A Connecticut household uses about 700 kWh (kilowatt hours) of electricity per month<sup>8</sup>. There are two major electric investor-owned utilities in the state that supply electricity for residential customers – Connecticut Light & Power (CL&P) and United Illuminating (UI). Table I-7 shows the most recent data on rates for residential customers.

Standard Residential Rate	CL&P	UI
Monthly Service Charge	\$15.00 per month	\$14.33 per month
Rate per kWh	17.651 ¢	24.5716 ¢ (summer) 20.3207 ¢ (winter)

Source: CL&P and UI websites (viewed data)

Using the above published rates, this means that the average CL&P customer can expect to pay approximately \$140 a month, or \$1,660 for the year. For the same average monthly usage

<sup>4</sup> OPM, “Connecticut Heating Oil Regional Retail Price.”

<sup>5</sup> PRI calculation using OPM’s average monthly retail price for the 2007 heating season (Jan-April) and EIA average of 800-900 gallons of oil consumed per household.

<sup>6</sup> PRI calculation: Average usage of 1,030 ccf using June 2008 EIA price of \$23.23 per thousand ccf (most recent price available)

<sup>7</sup> PRI calculation: average between a high and low usage customer

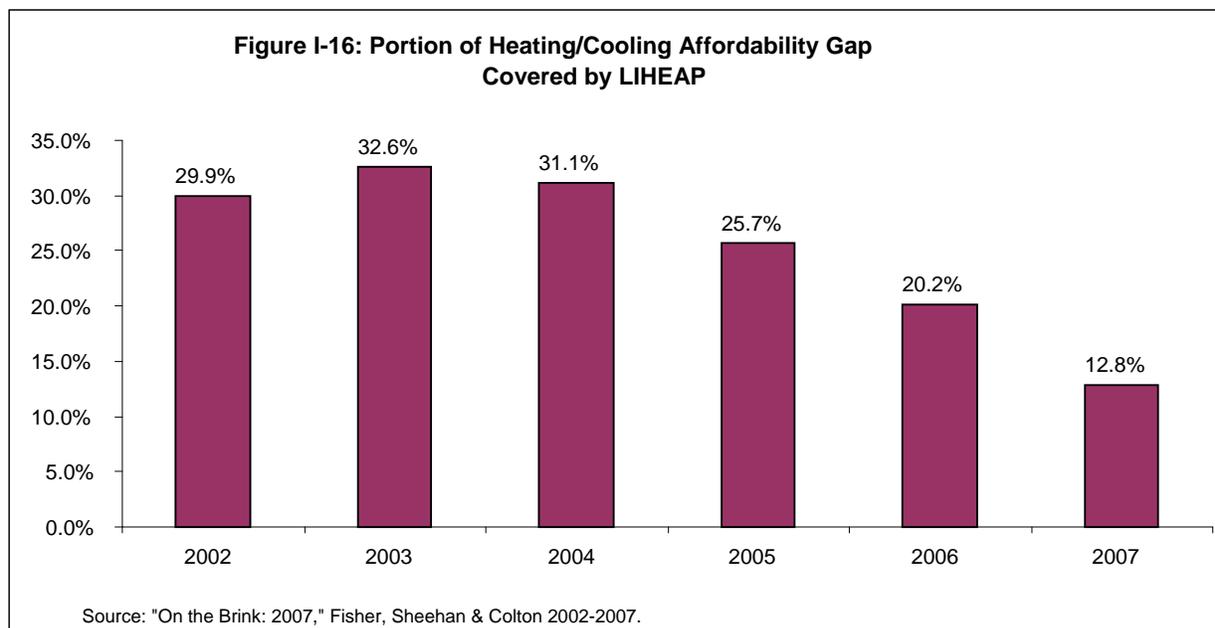
<sup>8</sup> EIA (<http://www.eia.doe.gov/cneaf/electricity/esr/table5.html>)

of 700 kWh, the standard residential UI customer pays approximately \$156 a month, or \$1,856 for the year.

About half of Connecticut households – those that heat with home heating oil – will be paying approximately \$3,500 in the 2008-2009 season to heat their homes. For about half the households in Connecticut, then, heating their homes will cost approximately two times the cost of their electricity bills. For households earning 60 percent of the state median income of \$55,323,<sup>9</sup> their total energy bill if they heat with oil will be approximately \$5,160 representing about 10 percent of annual income.

**Affordability gap.** As energy prices increase, the financial pressure on low-income households rises. The affordability level for home energy bills - including heating, cooling, electricity, and hot water - is considered to be 6 percent of household income. Last year, the average difference between actual and affordable energy bills for Connecticut households at or below 185 percent of the federal poverty level (FPL)<sup>10</sup> reached \$2,929 per household.<sup>11</sup> This placed Connecticut 48th among the 50 states and D.C. with one of the highest average affordability gaps.

The federal low income home energy assistance program (LIHEAP) assists households with the heating and cooling portion of their energy bills. In 2002, LIHEAP covered 29.9 percent of the affordability gap. However, in 2007, LIHEAP covered only about 12.8 percent of the energy affordability gap, as Figure I-16 illustrates.



<sup>9</sup> FY 2008 Federal Poverty Guidelines for a household of four

<sup>10</sup> For 2008, 185 percent of FPL is equivalent to an annual income of \$39,220 for a family of four

<sup>11</sup> "Home Energy Affordability Gap: Connecticut Legislative Districts," Fisher, Sheehan, and Colton, November 2007.

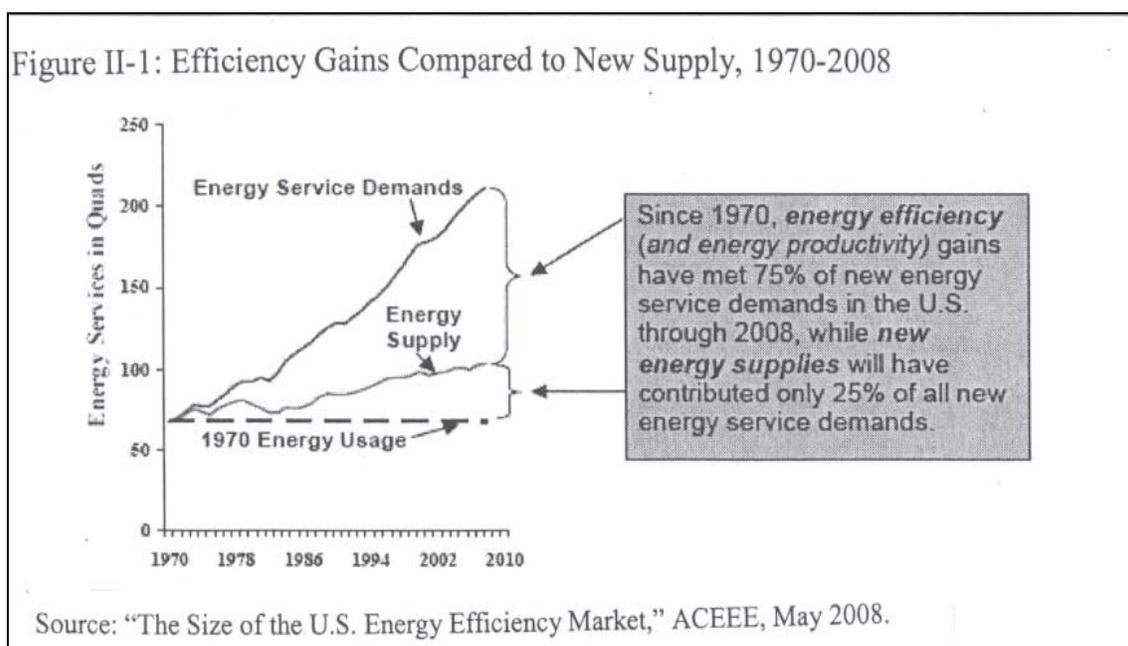
Table I-8 illustrates the impact the home energy burden – the gap between affordability and income-- has on low-income households by income level. Additionally the table illustrates how many households are affected by the gap in coverage for home heating and cooling needs.

<b>Table I-8: Connecticut Home Energy Burden, 2007</b>			
Poverty Level	Home Energy Burden	No. of Households	Annual Income for Household of Four
Below 50%	100%	50,164	<\$10,660
50-74%	40%	24,418	Up to \$15,688
75-99%	29%	27,954	Up to \$15,900
100-124%	22%	32,976	Up to \$26,288
125-149%	18%	37,286	Up to \$31,588
150-185%	15%	56,028	Up to \$39,220
Source: "On the Brink: 2007," Fisher, Sheehan & Colton 2002-2007.			

### Benefits of Energy Efficiency Programs

While energy efficiency practices have been around for quite some time, only recently have they been recognized as the most economical and cleanest way to address energy needs. As shown in the previous chapter, nationwide energy consumption, as measured per dollar of economic output or gross domestic product, has been reduced to half of what it was in 1970. In other words, each unit of energy consumed today provides substantially more energy services than the same unit did in 1970.

While it is difficult to state precisely how much of that is due to energy efficiency, a recent study by the American Council for an Energy Efficient Economy (ACEEE) indicates that about 75 percent is due to more efficient energy measures and use and 25 percent is due to increased energy supply. The ACEEE, a well-respected broad-based research and policy organization in the area of energy efficiency, analyzed national energy consumption data and forecasts and arrived at this finding, which is illustrated in Figure II-1 below. The graph shows increasing energy demands have been met more with energy efficiency measures than with new generation or supply. The graph also shows that the reliance on efficiency to meet energy needs is decidedly growing.

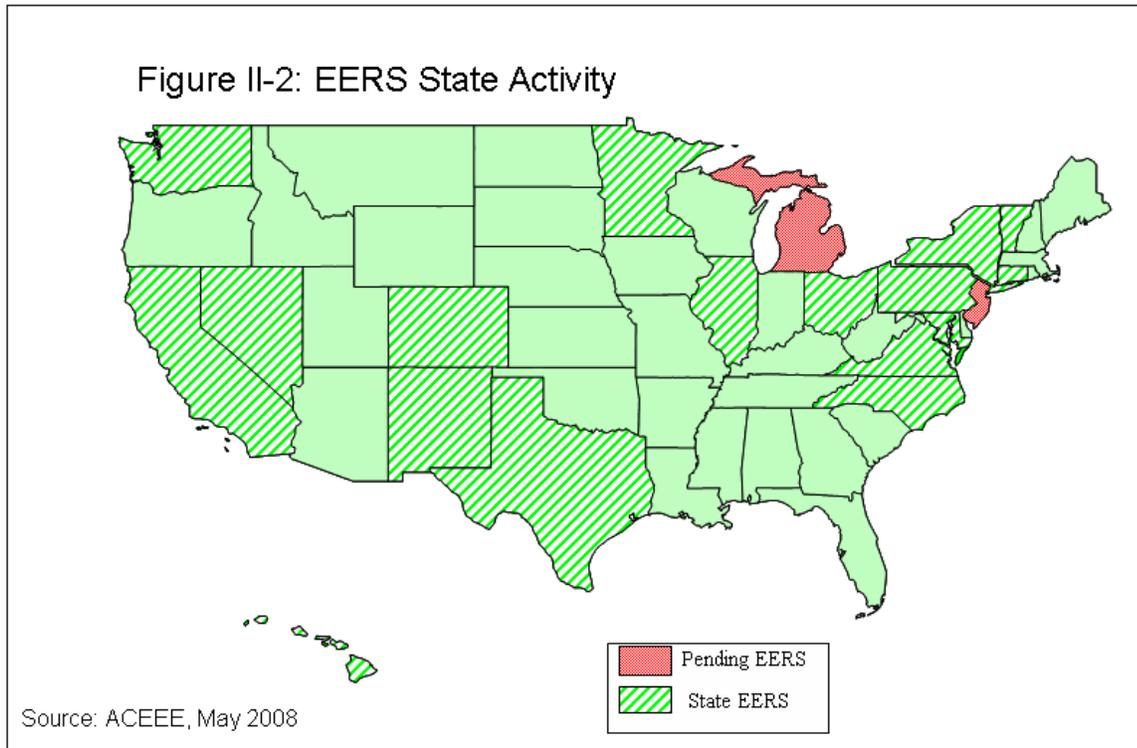


Unlike new power supply sources, energy efficiency is not as visible, and thus has not received the attention, credit, or investment it deserves as the best way to meet future energy needs while reducing environmental impacts. However, there appears to be a recognizable societal shift in attitudes – by policymakers, business leaders, and ordinary consumers -- that appears likely to accelerate the influence energy efficiency and conservation has in transforming lifestyles and the economy.

Several major influences are cited as contributing to this sea change in attitude:

- rising and more volatile energy prices;
- issues around delivering capacity for conventional energy supplies (e.g., transmission lines);
- increased urgency in responding to climate change concerns;
- growing consumer and investor concerns about energy industry responsibility; and
- rapid pace of technological advances.

While no broad national policy has been adopted to reduce energy consumption or promote energy efficiency requirements, 19 states including Connecticut have begun to impose energy efficiency resource standards (EERS) including renewable standards as state policy. The map below in Figure II-2 illustrates the states that have adopted, or are pending adoption, of efficiency energy resource standards as of May 2008.



While Connecticut is considered to have an energy efficiency standard, that goal really revolves around its renewable portfolio standard (RPS) more than a mandated reduction in overall energy use resulting from energy efficiency, as some other states have. The RPS requirements set percentage amounts of electricity to be supplied (or purchased) through alternative sources rather than through traditional sources. As a way for utilities to meet the state's RPS requirements, Connecticut uses its energy portfolio, which includes energy efficiency programs. Beginning in 2006, Connecticut has set an ambitious phased-in target of

meeting 10 percent of its electricity generation needs by 2010 through Class I or II renewable resources, with at least 7 percent coming from Class I. Class I includes solar, wind, landfill gas, fuel cells, wave, or tidal power, while Class II resources include generation from facilities like trash-to-energy, biomass, or certain hydroelectric facilities.

Starting in 2007, the state's electric utilities are additionally required to procure at least 1 percent of sales – increasing to 4 percent in 2010 – from Class III resources, which include combined heat and power systems installed after January 1, 2006; waste heat recovery systems installed after January 1, 2007; and energy efficiency and conservation programs begun after January 1, 2006.

Regardless of the standard established, the adoption of such goals sets the stage for a state's support of policies and programs that make the mandated standard achievable. Almost all states considered leaders in implementing energy efficiency programs have set fairly ambitious energy efficiency and/or renewable energy standards. Indeed, it is not a coincidence that states that receive high grades on the ACEEE energy efficient scorecard also have standards for efficiency or renewable energy use in place. The types of programs aimed at promoting such policies are discussed in this chapter.

## **Types of Programs**

Typically, the way to achieve a policy goal is either to mandate that certain measures take place or to offer incentives so that residents and businesses will adopt them by choice. In many cases, a state may choose to use both methods. Examples of mandated programs aimed at energy conservation and efficiency include:

- reduction of greenhouse gases through cap and trade agreements;
- reduction in use of energy (typically some percentage by a future date) through efficiency programs; and
- use of Leadership in Energy and Environmental Design (LEED) standards for all new building construction.<sup>12</sup>

In addition, or alternatively, promoting energy efficiency as a policy goal can be achieved through offering incentives. Most often these are financial incentives, from tax credits or exemptions, to rebates, grants, and loans.

**Federal incentives.** The federal government offers several incentives, including:

- two programs aimed at individual taxpayers who install alternative energy measures such as solar heating or purchase items (e.g., insulation or windows) to make their homes more energy efficient;
- exemption from both corporate and personal income tax of any utility-granted subsidies issued to businesses or individuals for installing efficient or

---

<sup>12</sup> LEED standards are a suite of measures developed by the U.S. Green Building Code Committee that incorporate environmentally sustainable goals for a building.

renewable energy measures, and a tax credit for home builders who build energy efficient homes;

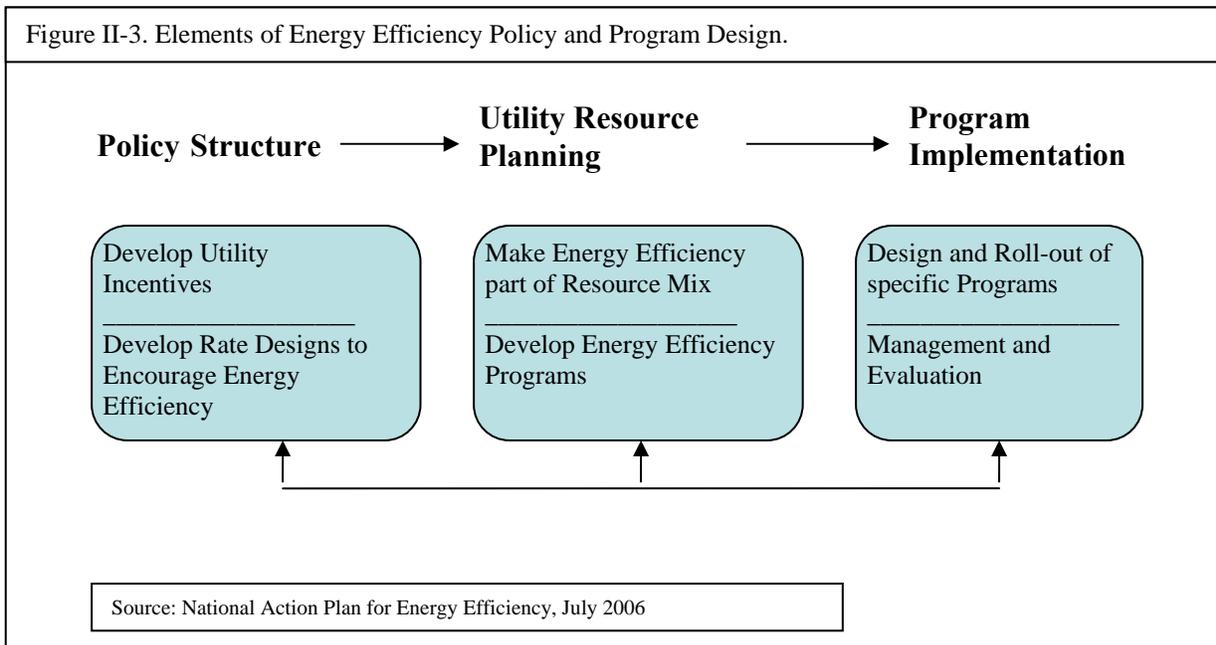
- grants and loan programs, including a program known as energy efficient mortgages where loans by private lenders to individual homeowners of up to \$8,000 can be added onto their mortgages and are guaranteed by the Federal Housing Administration. Another program offers loans and grants to local and state governments and commercial establishments for implementing energy efficiency measures or installing renewable energy technologies; and
- federal block grants to states to provide weatherization services to low-income persons who qualify. Federal production incentives are also available to state or local governments or non-profits to produce and sell electricity generated through renewable sources.

Some of the federal incentive programs expired at the end of 2007; others that were due to expire at the end of 2008 were reauthorized by Congress.

### State Initiatives

Absent a national energy efficiency policy or standard, many states have exercised their authority to establish a variety of measures aimed at encouraging energy efficiency. The *National Action Plan for Energy Efficiency* issued in July 2006 suggests a multi-pronged approach for states to use in developing meaningful energy efficiency structures, described here.

According to the national plan, each major component of the proposed energy efficiency infrastructure illustrated in Figure II-3 is important in ensuring good results, but requires many steps to implement. Often, there are obstacles and barriers to implementation, many times tied to financial constraints.



## Connecticut

Connecticut has made strides to put into practice many of the elements illustrated. Some of the components were put in place as the result of electric restructuring in 1998 and thus have been part of the energy efficiency design for some time. Others have been required only since 2007, when P.A. 07-242 established a whole host of energy efficiency measures, some of which have not yet been implemented. (See Appendix B for a status of all P.A. 07-242 requirements).

In addition to the RPS mandate discussed earlier, Connecticut through the Department of Environmental Protection participates in a regional cap and trade agreement to reduce the state's greenhouse gases. Under the program, electric power providers who cut their emissions by more than the targeted amount can sell their excess credits to non-compliant plants through an auction. Funds raised through the auction can be used to strengthen energy conservation and efficiency programs. Regulations for Connecticut's participation in the program were approved in July 2008, and the first two auctions were held in September and December 2008, each yielding about \$3 million for efficiency and alternative energy programs.

**Rate design and structure.** Because Connecticut consumers have the second-highest electric rates per kWh in the nation, there is already a financial incentive to use less electricity. But there are many ways that rates can be structured to encourage energy efficiency, at either the utility or consumer level. For example, consumers can be charged a different rate depending on how much they use, so that if they consume beyond a certain number of kWh per month, the rate goes up.

Another way that rates can be structured is to charge lower rates when customers use electricity during periods of low demand, also known as time-of-use rates. In the past, these rates were optional for customers, and peak rates were charged from 7 a.m. to 11 p.m. weekdays. Beginning in 2008 and 2009, the peak rate hours are now 12 noon to 8 p.m., and mandatory time-of-use rates are being phased in for customers of both utilities according to a schedule set by DPUC, with the largest-usage customers being mandated first. CL&P's residential customers were slated to begin mandatory time-of-use rates in 2009, but because of the costs of changing the metering system, DPUC has issued a delay and ordered CL&P to first conduct a pilot to determine which types of meters should be used.

**Surcharge.** While technically not part of the ratemaking structure, a surcharge on customer electric bills is the most common way of funding energy efficiency programs. Typically, a surcharge is expressed as a mill per kWh of usage. Twenty states and D.C. are using this method with varying surcharge levels. Table II-1 shows the states that have implemented this type of surcharge and the mill/kWh charge. Since electric restructuring in 1998, Connecticut has statutorily required a surcharge of 3 mills per kilowatt hour for energy efficiency programs and another 1 mill per kWh for renewable energy projects. For a residential electric customer using 700 kWh a month, 3 mills equates to about \$2.10, and 1 mill equates to about \$0.70.

<b>Table II-1. State Electric Surcharges for Energy Efficiency and Renewable Energy Programs</b>		
<b>State</b>	<b>Energy Efficiency (EE) surcharge Mill/kWh</b>	<b>Renewable energy surcharge Mill/kWh</b>
Arizona	0.57	0.73
California	3.21	0.76
Connecticut	3.00	1.00
Delaware	0	0.178
D.C.	0.38	0.02
Illinois	0.03	0.04
Maine	1.5	0
Maryland	1 (per settlement w/2 largest utilities)	
Massachusetts	2.50	.50
Michigan	0.07	Included in EE
Montana	0.84	0.17
Nevada	0.82	0.18
New Hampshire	1.75	2.91
New Jersey	1.22	0.41
New Mexico	0.10	0
New York	0.83 (& \$100 million supported by unregulated utilities)	0.25 (in research and development)
Ohio	0.11	0.72
Oregon	1.48	0.38
Pennsylvania	0.04 (used for research and development)	0.05
Rhode Island	2.30	(in EE)
Vermont	2.9	
Source of Data: American Council for an Energy-Efficient Economy, Summary of Public Benefit Programs, 2007		

In Connecticut, the 3 mill energy efficiency surcharge annually raises approximately \$90 million and the 1 mill renewable energy surcharge accounts for another \$30 million annually. Since 2003, however, only about two-thirds of those funds have been going to support the energy efficiency and clean energy funds; the other one-third has been going to pay for bonds issued when the state was in a fiscal crisis in 2003. (Restoration to full funding for both funds was required in 2007 legislation, which is discussed in Chapter IV).

In addition to electric rate surcharges that go directly to fund energy efficiency programs, other rate structure mechanisms can offer more direct incentives for reducing energy use and implementing efficiency measures -- from outright rebates based on a percentage reduction to increasing rates during peak demand hours (or conversely lowering them for usage during times of low demand).

In 2007, Connecticut's electric utilities implemented a statutorily required direct rebate program for residential customers who demonstrated lower usage during the summer of 2007 compared to the same months in 2006. About \$24 million was returned to about 371,000 customers in the form of rebates on their bills. However, measuring how much reduction is due to actual conservation and efficiency, or how much is due to cooler weather, for example, is always difficult. The Department of Public Utility Control issued a report on the program citing this issue as well as the costs and recommended that better methods of evaluating impact be in place before implementing another such rebate program.

**Planning.** The second action area outlined in the national plan (Figure II-3 above) is that a state should engage in planning efforts including resource planning. P.A. 07-242 required that the utilities and the Connecticut Energy Advisory Board develop an integrated resources plan (IRP) for the state. Also known as the procurement plan, it is to include energy efficiency as part of how energy will be procured. The plan was submitted to DPUC in September 2008 for its approval. The plan reinforces the requirement that electric companies, by 2010, procure at least 4 percent of their generation from Class III resources, which includes energy efficiency programs.

Energy efficiency measures are also now being recognized and valued as part of meeting the future electric needs of the New England region. The independent system operator (ISO), which controls the electric supply to meet demand for the region (thus preventing blackouts), also plans for the future capacity requirements in New England. In February 2008, ISO-New England began paying electric utilities for demand side resources, including energy efficiency measures, just as suppliers of electricity are paid. This new source of revenue, resulting from the first ISO-New England forward capacity market auction, will support the expansion of energy efficiency programs in New England.

In addition to the integrated resource plan discussed above, Connecticut has a number of plans around energy and energy efficiency, including: the Conservation and Load Management Fund (or CEEF) developed by the utilities and the Energy Conservation Management Board; and the Comprehensive Clean Energy Fund Plan. All of these plans, along with accompanying budgets, must be submitted and approved by the Department of Public Utility Control, Connecticut's utility regulatory agency. Connecticut has a number of other plans that impact energy efficiency, including the Climate Change Action Plan and the Clean Energy Vision Plan, which do not require DPUC approval, but which do establish energy goals for the state.

### **Program Implementation**

The literature on energy efficiency finds one of the clearest benefits of implementing efficiency and conservation programs is that they cost less than increasing the supply. The cost of increasing electric supply by building new generation plants or adding transmission lines is generally double the cost of efficiency programs. The benefits are even more pronounced in regions of the country like New England where generation costs are very high. As Chapter IV discusses, Connecticut's ratepayer-funded energy efficiency programs are calculated to result in \$4 in lifetime electric savings for every \$1 spent.

Once benefits are realized, they must be communicated to customers so they will participate. In addition to communicating benefits and demonstrating results, other major factors in program design and implementation should ensure the following:

- provide programs for all key customer groups;
- align goals with funding;
- make it easy for customers to participate;

- measure and assess programs, ensuring that new technologies are adopted; and
- communicate and publicize results.

**Types of programs offered.** Every state in the country provides some financial incentives aimed at energy efficiency and/or renewable energy.<sup>13</sup> An incentives summary is contained below, and a full listing is in Appendix D.

- Twenty-one states allow credits on taxes owed on personal income for renewable energy installation, and a fewer number (11) allow credits on taxes owed on personal income for implementing energy efficiency measures. Connecticut does neither.
- Twenty-three states, not including Connecticut, offer programs with credits (32 in total) to offset state corporate income tax for renewable energy. Eight states issue corporate income tax credits to businesses for energy efficiency. Connecticut does not.
- Twenty-eight states, including Connecticut, exempt the purchase of renewable energy products from sales tax. Eleven states, including Connecticut, have sales tax exemptions on energy efficient products. Connecticut had allowed sales tax exemptions on certain ENERGY STAR household appliances, but the exemption expired in 2007.
- Thirty-three states, including Connecticut, offer some type of property tax exemption for renewable energy system installation. Connecticut, for example, *requires* towns to exempt from property tax renewable energy systems using Class I resources such as solar or wind, and *authorizes* town to exempt combined heat and power systems. A much smaller number (four) of states have exemptions on any increased value of property due to energy efficiency measures taken.
- By far, the most common financial incentive offered is the use of rebates on energy efficient or renewable products. Forty-two states have programs that issue a total of about 625 different rebates (mostly by utility companies) for energy efficient products, and 38 states have more than 200 different rebates for renewable energy measures.
- Outright grants are also offered to a lesser extent – 24 states and D.C. have grant programs to assist entities with renewable energy measures, and 20 states offer energy efficiency grants. Deferred or low-interest loans are also a financial incentive to residents and businesses. Connecticut offers both grants and loans, many through the Connecticut Energy Efficiency Fund.

---

<sup>13</sup> Database of State Incentives for Renewables and Efficiency (DSIRE) maintained at North Carolina State University. Website dsireusa.org accessed August 2008.

## **Administration and Oversight**

The energy efficiency and low-income assistance programs that are supported by ratepayers are subject to DPUC oversight, and include:

- Connecticut Energy Efficiency Fund plan and budget;
- Connecticut Clean Energy Fund plan and budget; and
- Utility-sponsored plans and budgets that support low-income customers such as matching payment and forgiveness programs.

As part of the approval process, the plans and budgets are subject to public hearings and public comment periods. Frequently, the Office of Consumer Counsel, the state advocate office for ratepayers, will provide official input.

For those programs that are not ratepayer supported, the oversight can be submission of a plan to the legislature, as is the case with the Connecticut Energy Assistance Plan, or to the federal funding agency, as with the federal Department of Energy weatherization assistance program.

## **Measurement, Verification, and Evaluation**

A vital step in program development and implementation is ensuring that energy efficiency programs, including the financial investments to support them, deliver results. This means the program administrators must collect, track, and report on data including client participation, costs, and benefits. However, equally important is ensuring that the information is monitored and evaluated periodically by objective third parties, and that the results are used to improve the quality of the programs.

The measurement, verification, and evaluation of the utility-sponsored programs is somewhat formalized, and there is money in the CEEF and the Clean Energy Fund budgets for conducting evaluations. There is no requirement as to how often the individual CEEF programs be evaluated, although the Clean Energy Fund programs are statutorily required to be evaluated every five years.

Typically, national consultants specializing in energy efficiency are hired to evaluate ratepayer-funded programs. There are a variety of tests and evaluation protocols and measures that are used depending on the program and the type of energy being assessed. The measurement and evaluation aspects of the electric efficiency programs will become even more important with the start of the Forward Capacity Market. As the auction payments for those begin in 2010, ISO-New England will require evaluations with demonstrated results in order for the program sponsors to be paid.

Evaluations of programs that do not receive ratepayer funds are less formal, and often years go by without an assessment of whether goals are met, how well a program is working, or even how many residents are being served. Measurement and evaluation aspects of individual energy efficiency programs are discussed further in later chapters.



### Assessing the State's Energy Reduction Goal

The previous chapter discussed generally the energy efficiency standards states have developed and the benefits of energy efficiency programs and practices. Connecticut established broad energy policy in statute in 1978, containing eight goals. The program review study called for an assessment in achieving two of the eight goals. This chapter discusses the Connecticut's progress in achieving the following statutory goal:

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

The program review committee 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 an established quantitative state goal to reduce electricity consumption overall or to reduce electricity consumption off projected growth.

As reported in the previous chapter, 19 states, including Connecticut, have energy efficiency goals or standards, but to date those 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 (RPS)

While the state has no measurable energy reduction goal, Connecticut via its renewable portfolio standard has established 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.”

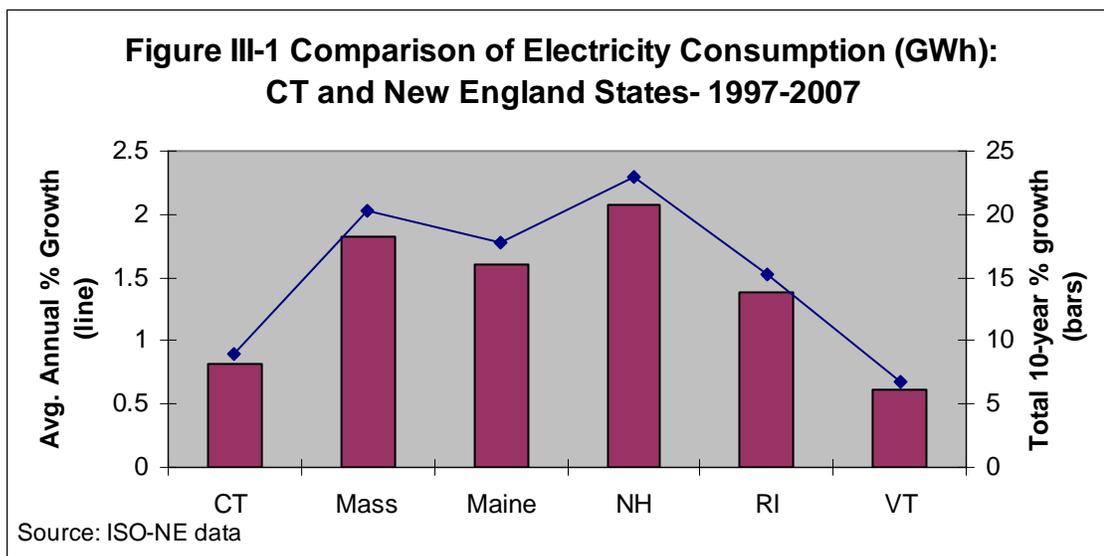
**Measuring RPS progress.** Electric generators and suppliers report to the Department of Public Utility Control (DPUC) on their compliance with the RPS procurement, and the department establishes alternative compliance payments if goals are not met. However, the reports are not due to the department 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 compiled by DPUC 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 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 III-1).*



To arrive at the results shown in the figure, program review staff examined the yearly net energy consumption by state 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 in each state 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 except Vermont. 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 described in Chapter II. 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.<sup>14</sup> Thus, the cost-effectiveness standard for efficiency programs in Connecticut is not as difficult to achieve as in other parts of the country.

Figure III-1 above 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<sup>th</sup> 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 renewable energy -- assesses Connecticut's progress in reducing or altering its electricity consumption, not its overall energy use. *The program review committee believes to achieve other goals the state has set, such as 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 acknowledged 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 study scope) and electricity generation, state residents' demand for energy continues to increase, and much of the supply relies on fossil fuels.

**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

---

<sup>14</sup> *Economically Achievable Energy Efficiency Potential in New England*, Northeast Energy Efficiency Partnerships, Inc., p.6

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.

The program review committee 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, the program review committee 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 percent 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 in December 2008. 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.



### Connecticut's Energy Efficiency and Conservation Programs

As Figure IV-1 illustrates, Connecticut has a myriad of programs aimed at energy efficiency and conservation as well as a number designed to help lower-income residents pay energy costs.

**Ratepayer-funded programs.** Many of the energy efficiency and conservation programs are funded by electric utility customers and, more recently, gas company customers. The ratepayer-funded programs are the:

- Connecticut Energy Efficiency Fund (CEEF);
- Energy Independence Act (EIA) programs;
- Municipal utility sponsored programs administered through the Connecticut Municipal Electric Energy Cooperative (CMEEC);
- Electric Efficiency Partners (EEP) program; and
- Clean Energy Fund (CCEF).

This chapter describes these major funds that are supported with ratepayer monies. In most cases this is done through an extra surcharge on all customers' bills, while in others financial support for programs is built into the overall rate. The funding mechanisms are explained below, as well as program administration, what oversight mechanisms exist, descriptions of the specific programs within each fund, and what energy savings and benefits have been realized, if available.

**State-funded programs.** This chapter also discusses similar aspects of the state-funded energy efficiency programs, which include the:

- Energy Conservation Loan Program (ECL);
- Furnace rebate program within the Office of Policy and Management;
- Fuel oil conservation program; and
- Efforts in state government facilities.

**Low-income energy assistance programs.** Chapter X provides a description of those programs assisting low-income households. Funding for these programs comes from federal and state government, charitable donations, and utility ratepayers. These programs include:

- Connecticut Energy Assistance Program (CEAP);
- Operation Fuel;
- Utility-sponsored matching payments and debt forgiveness; and
- Weatherization programs administered both by the state and utility companies.

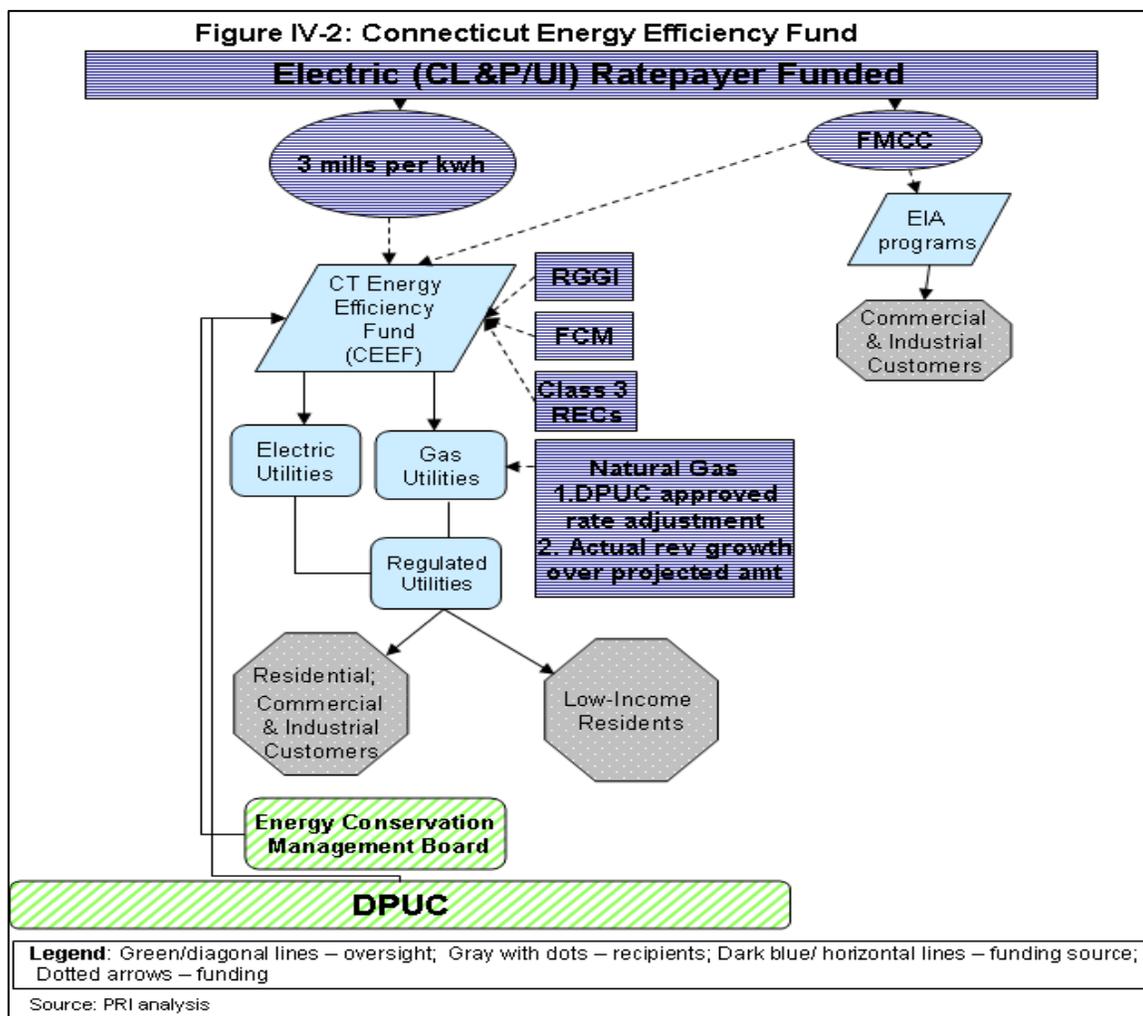


## Connecticut Energy Efficiency Fund

The Connecticut Energy Efficiency Fund (CEEF) was created by legislation in 1998, formerly known as the Conservation and Load Management Program, as a result of electric restructuring. When the fund first started it applied only to the investor-owned electric utilities and only more recently as a result of 2005 legislation were gas utilities added. The CEEF's primary objectives are: (1) advancing efficient use of energy; (2) reducing air pollution and other negative environmental impacts; (3) promoting economic development; and (4) providing energy security and affordability.

For calendar year 2007, the fund spent close to \$100 million. The fund is primarily financed through a charge on United Illuminating (UI) and Connecticut Light and Power (CL&P) customer bills. The fund supports the development and administration of cost-effective energy efficiency and load management programs for residential, commercial, and industrial customers. The programs are administered by the electric utilities, CL&P and UI, and thus only serve customers in their territories.

Figure IV-2 shows the CEEF structure including the funding mechanisms, utilities involved, customers served, and administrative and regulatory oversight in existence.



**CEEF funding.** The primary funding mechanism is through a statutorily established 3 mills per kWh surcharge (\$0.003 cents) on each electric ratepayer's bill. This means the typical residential customer is charged \$25.20 annually. Of the approximately \$90 million that is raised through the surcharge, the amount directed to the fund in 2007 was \$66 million. Lesser amounts of funding are derived from the conservation adjustment mechanisms (CAMs) on gas utility customer bills and proceeds from: the ISO-NE Forward Capacity Market (FCM), Class III Renewable Energy Credits (RECs)<sup>15</sup>, and the Federally Mandated Congestion Charge (FMCC).<sup>16</sup>

The second largest source of funding for the CEEF programs is derived from the FMCC. Additional money, when ratepayer surcharge funding has not met demand for efficiency projects, has been authorized by DPUC to be raised through this charge that amounted to \$12 million in 2007. In addition, the utility companies in 2005 were authorized to raise money for projects through the charge that were designed to ultimately lower charges incurred because of congestion.

As a result of the 2007 energy legislation, a portion of the financial value derived from the Class III Renewable Energy Credits (RECs) is directed to the CEEF. In 2007, the fund collected \$3.9 million from the RECs.

Another source of funding for the CEEF includes the Forward Capacity Market, which generated \$2.6 million in 2007. Beginning in 2006 the Federal Energy Regulatory Commission approved a settlement that established a redesigned wholesale electric capacity market in New England. The new market was structured to encourage the maintenance of current power plants and construction of new generation facilities. ISO-New England, the operator of the region's electric market, projects energy needs for the region ahead three years. An auction is conducted to purchase the power resources necessary to satisfy the region's future needs. The auction includes electric supply from power plants and, for the first time in February 2008, includes as eligible capacity, *decreased electricity use through demand-side management resources*. Having the auction cover a three-year period allows new projects still under development to compete in the market.

The first auction was held in February 2008, and the Connecticut Energy Efficiency Fund will receive revenues from the auction beginning in June 2010. The energy efficiency measures purchased through the auction will have to go through a measurement and verification process to verify that energy efficiency measures promoted by the programs were installed, are still in place, and are functioning as intended.

**CEEF program administration.** The programs funded through the Connecticut Energy Efficiency Fund are administered by the electric utilities (CL&P and UI) in conjunction with the

---

<sup>15</sup> Renewable Energy Credit - A certificate that is issued for each Megawatt-hour (MWh) of energy generated from certain clean or renewable resources or for each MWh of energy conserved through the installation of energy efficiency measures. RECs can be sold or traded to fulfill the Renewable Portfolio Standard and are monitored by ISO-NE.

<sup>16</sup> Federally Mandated Congestion Charges – The Federal Regulatory Energy Commission allowed generators to incorporate into their rates additional charges for areas where lack of transmission caused congestion problems; issue was especially acute in Southwest region of the state. The DPUC authorizes FMCC additional funds from ratepayers to establish programs that will help alleviate those congestion problems.

gas utilities (Connecticut Natural Gas, Southern Connecticut Gas, and Yankee Gas). The electric utilities receive an administration fee, known as a performance incentive, as payment for operating the programs, and also receive reimbursement for operating expenses. In 2007, the performance incentive for the two major utilities totaled \$5.7 million, or about 6 percent of total expenditures. A detailed analysis of the performance incentives is contained in Chapter IX.

Generally, the utilities market the programs, although the Energy Management Conservation Board (described below) has begun to actively promote the Connecticut Energy Efficiency Fund as the sponsor of the programs.

The two electric utilities accept applications from residents and businesses in their respective service areas, determine program eligibility, and pay for the financial incentives or specific efficiency measures, depending on the program.

For most of the programs, the utilities also select the vendors that will do the work required in the business or home. Both utilities indicated to committee staff that they use a competitive process based on response to qualifications to select vendors. Connecticut Light and Power stated it received 18 proposals and chose 12 different vendors for its small business program, while United Illuminating contracts with 14 vendors in its small business programs. CL&P has selected five vendors to conduct its Home Energy Solutions (HES) program, while UI has three vendors for that program.

There are a couple of exceptions where the utilities do not select the vendors. For the low-income weatherization programs the utilities use the same community action agencies that conduct the work for the publicly funded weatherization program, although UI also has one private vendor. These programs are described in detail in Chapter Ten. In the large commercial and industrial programs, the establishments select their own contractors, and submit the work proposal to the utility. The utility reviews it, and if it agrees with the proposal, will send out a letter of award, although the two utilities differ on how and when this is done.

**Administrative oversight.** The Energy Conservation Management Board (ECMB), a statutorily established 14-member board, advises and assists with the implementation and administration of the CEEF programs. The board has three statutory tasks:

- review and approve plans including reviewing the budgets and budget allocations, program proposals, and new initiatives;
- monitor the performance of programs, evaluate program implementation, and provide feedback to the utilities on a regular basis; and
- examine and make recommendations to the DPUC and/or General Assembly on key policy matters.

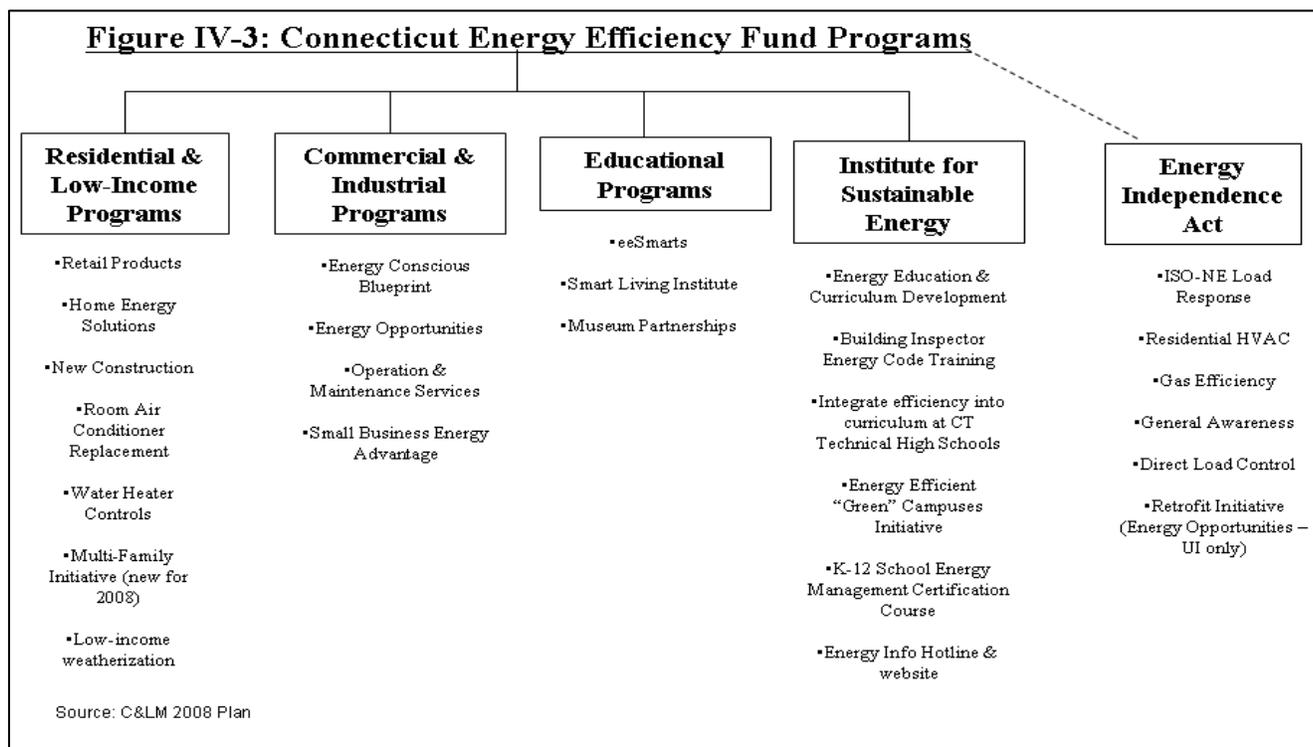
The board has six consultants under contract to assist in these efforts. Utility members of the board may only vote on matters relating to conservation measures pertaining to their utility. Expenses for the ECMB and its consultants, which comes out of the CEEF, totaled \$475,542 or about 0.5 percent of overall spending in 2007.

**Regulatory oversight.** The Department of Public Utility Control (DPUC), the state’s regulatory body for investor-owned utilities, has regulatory and budget oversight over the Connecticut Energy Efficiency Fund since funding is derived from the rates set by the department.

Each year the utilities and the ECMB develop a plan for the Connecticut Energy Efficiency Fund (also known as the Conservation and Load Management Plan) for submission to DPUC. Typically the plan is submitted to the department in October and is based on the upcoming calendar year. The DPUC treats the plan as a regulatory proceeding, requiring a docket number and accompanying filings, a hearing, and a resulting decision on the plan, its programs, and its funding levels. The DPUC issued its most recent final decision regarding the 2008 Plan in June 2008. The decision set the funding level of the CEEF at \$136.7 million for the 2008 program year (including funding from all sources), \$15.4 million above the proposed budget filed October 1, 2007, since demand for energy efficiency programs was higher than planned.

**Energy efficiency programs.** CEEF programs are designed to meet the needs of all residential customers including low-income residents, as well as commercial and industrial customers. In addition, the fund supports educational programs administered by the utilities and contracts with the Institute for Sustainable Energy to assist with educational outreach. Figure IV-3 displays the programs offered in each sector.

The 2005 Energy Independence Act (EIA) required the implementation of programs aimed at reducing peak demand. These programs are supported with ratepayer funds, administered by the utilities, and included in CEEF plans and documents submitted to DPUC. Therefore, these programs are included as part of CEEF programming and will be discussed later in this chapter.



**Residential programs.** As shown in Figure IV-3, there are six CEEF funded programs established for all residential customers regardless of income level. There is also a weatherization program, targeted for low-income households (discussed in Chapter X). The residential and low-income programs received \$26 million in 2007.

Table IV-1 lists the largest programs available for residential customers, with activity levels from 2004 through the second quarter of 2008.

<b>Table IV-1: CEEF Major Residential Programs</b>		
<b>Program</b>	<b>Description</b>	<b>Customers served (2004-Q2 2008)</b>
Retail Products	In 2008 the utilities pursued negotiated cooperative promotions (NCPs) where payment of incentives is tied to store-level sales data. Previously, rebates and coupons were offered directly to customers but were abandoned upon determination they were not cost-effective.	Approx. 10.5 million bulbs, fixtures, and appliances
Home Energy Solutions	Provides comprehensive in-home energy services including both an audit and direct installation of many efficiency measures.	Households – 35,284 (electric) 6,661 (gas)*
New Construction	Encourage builders and consumers to move beyond ENERGY STAR specifications to high-performing homes that qualify for federal tax credits. Where this is not possible, work to upgrade the energy elements of the home beyond standard code levels.	Households - 5,934
Weatherization	Spectrum of services from neighborhood canvass to comprehensive weatherization. Further discussion in Chapter 10.	Households – 69,987 (electric) 5,867 (gas)*
<b>TOTAL Spent on Residential Programs (2004-Q2 2008)<sup>17</sup></b>		<b>\$105,230,079</b>
*Gas households also included in the electric household count		
Source: Information requested from CL&P and UI; C&LM 2008 Plan		

**Commercial and industrial programs.** Table IV-2 describes five CEEF funded programs established for commercial and industrial customers. The commercial and industrial programs in 2007 received \$60.2 million.

<sup>17</sup> Total dollars expended includes residential programs not listed in the table such as the Room Air Conditioner Turn-in Program

<b>Table IV-2: CEEF Major Commercial and Industrial (C&amp;I) Programs</b>			
<b>Program</b>	<b>Description</b>	<b>Incentive</b>	<b>C&amp;I Customers Served<sup>18</sup> (2004-Q2 2008)</b>
Energy Conscious Blueprint	New C&I construction, planned remodeling, major renovations, and new equipment	Up to 100% of incremental cost	3,603
Energy Opportunities	All C&I customers	Up to 60% of installed cost (dependent upon energy-efficient measure) and possible two-year payback buy down  Prescriptive rebates from \$15-\$55 per fixture or 100% of the incremental cost	2,043
Accelerated Chiller Retirement  (Only applies to electric chillers not gas engine chillers)	C&I customers with water-cooled chiller 25 years or older. Unit must operate during ISO summer peak hours.	Incentives are the lesser amount of 75% of the total installed cost, 100% of the Utility Measure Cap, or \$600/ton installed cost.	27
Small Business Energy Advantage	All C&I customers, including municipalities and state buildings, with up to 200 kW (CL&P) or 150 kW (UI) of average peak demand	Interest free financing with prescriptive incentives for : Lighting up to 50% installed cost HVAC up to 50% of installed cost Refrigeration up to 50% of installed cost	7,979
Operation & Maintenance (O&M) Services	All C&I customers	Incentives up to 50% of installed cost (Southwest CT customers eligible for incentives up to 100% of installed cost).	148
<b>TOTAL Spent on Commercial and Industrial Programs (2004-Q2 2008)</b>			<b>\$205,712,206</b>
Source: Information requested from CL&P and UI; CEEF 2008 Plan			

**Educational programs.** Each utility operates specific educational programs for customers in its area. UI operates the Smart Living Center in Orange intended to educate residents about the importance of energy efficiency through exhibits. CL&P has a Museum Partnership program, which established a permanent exhibit at the Stepping Stones Museum in Norwalk and has also partnered with the Clean Energy Fund to create a joint exhibit at the Connecticut Science Center. One joint program, eeSmarts, provides science education curriculum related to energy efficiency for grades K-8.

**Institute for Sustainable Energy (ISE).** The institute was established in 2001 at Eastern Connecticut State University to focus on matters related to energy education, energy policy, energy conservation and load management, energy efficiency, renewable energy, and the dissemination of information to promote a more sustainable energy future.

Funding is primarily provided by the Connecticut Energy Efficiency Fund. The institute also receives funding from the Clean Energy Fund, Tremaine Foundation, and the Office of Policy and Management. The total budget for 2008 is \$622,000; approximately \$400,000 is provided by the Connecticut Energy Efficiency Fund. For the 2009 program year, the institute's total budget is \$680,000 of which CEEF will provide \$500,000.

<sup>18</sup> Represents the number of customers served; one customer can have multiple efficiency measures installed

The institute sponsors numerous educational programs including:

- Building Inspector Code Training that increases awareness, knowledge, and enforcement of the energy-related components of the state energy building code for residential and commercial inspectors;
- K-12 School Energy Management Certification Course that focuses on identifying cost effective practices and alternatives to school maintenance personnel's current operating procedures as well as on purchasing efficient equipment; and
- Energy Education Curriculum Development Program that developed and launched a high school education curriculum accessible through [www.cteducationenergy.com](http://www.cteducationenergy.com). The program also works with the Connecticut technical high schools to integrate energy efficiency and renewable energy topics into the curriculum to help prepare students to enter "Green Collar Jobs" in Connecticut.

In addition, the institute administers [www.CTEnergyInfo.com](http://www.CTEnergyInfo.com), a new, more consolidated website aimed at coordinating information and serving as a clearinghouse for web-based information. The institute also staffs the 1-877-WISE-USE phone line during regular business hours for calls other than those directly related to CEEF programs. The phone line provides energy efficiency information to callers and also tracks call volume, sources of calls, and topics of interest.

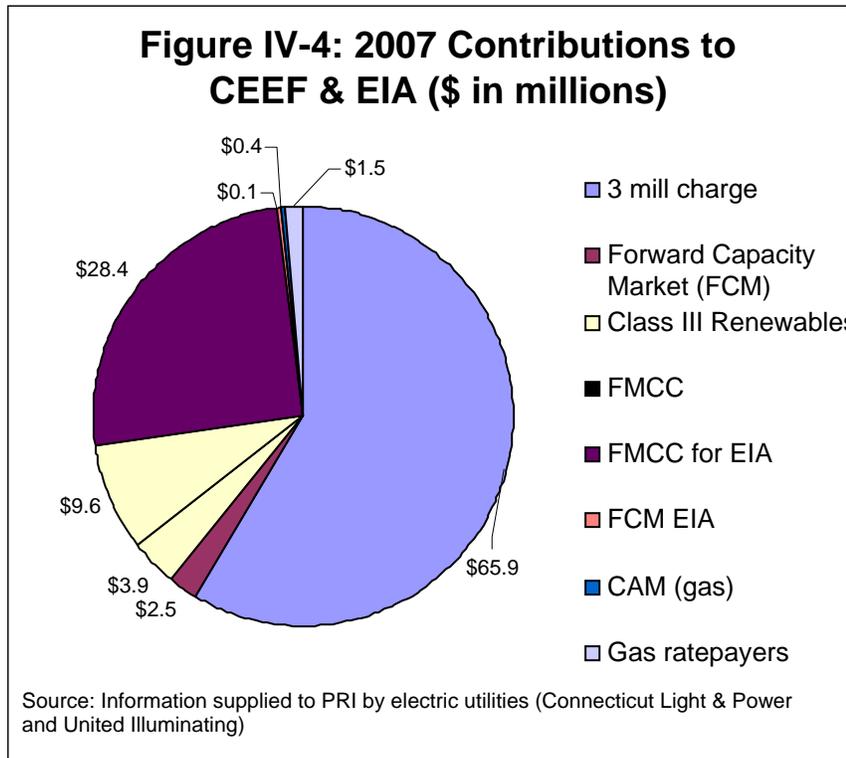
***Energy Independence Act (EIA)***. While not technically a program, the act (P.A. 05-01) established several initiatives and programs to reduce electric power supply costs. The joint programs offered by the utilities include ISO-NE Load Response Programs and a General Awareness Campaign. Two programs are only offered for UI customers: a Commercial Retrofit Program and a Residential HVAC Program. One program, the Gas Efficiency Pilot Program, was only offered by CL&P and is currently not offered. These programs, aimed at commercial and industrial customers, encourage onsite generation and conservation through load management as a way to reduce generation-related congestion charges. The charge on electric ratepayer bills for these programs in 2006 and 2007 totaled \$51.2 million.

## **CEEF FUNDING LEVEL ANALYSIS**

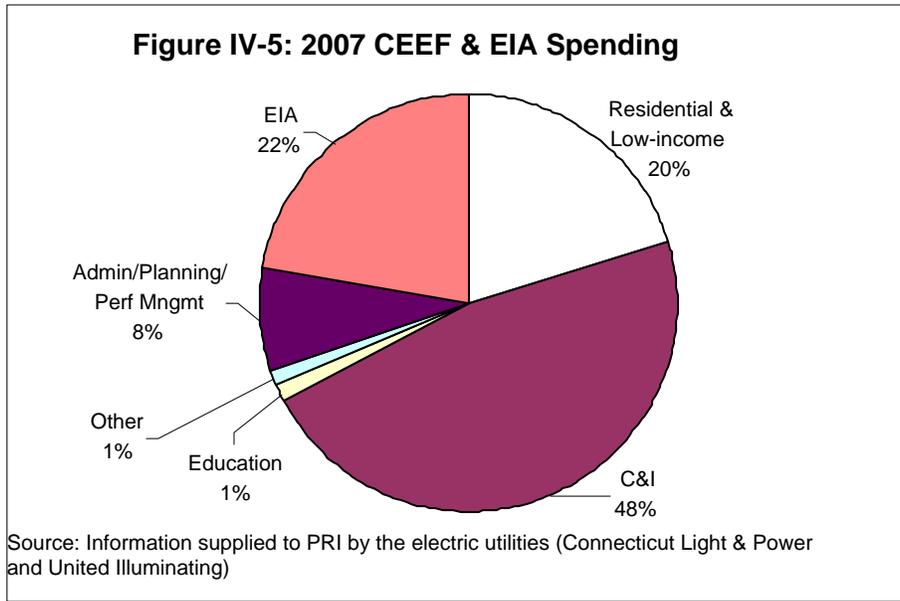
This funding analysis covers both CEEF and EIA programmatic spending. Monies collected for CEEF specific programming totaled \$100 million in 2007 and monies raised for EIA programs totaled \$28.4 million in 2007.

**History of funding.** CEEF funding and budgeting was seriously impacted in 2003, when the legislature used the fund to help alleviate the state's fiscal crisis. Beginning in 2004 and 2005, the fund decreased due to the transfer of money from CEEF to the General Fund and to pay for deficit reduction bonds. Ratepayers are still charged 3 mills per kWh, but each year a portion of the charges goes towards repayment of the deficit reduction bonds. Since 2003, \$85 million has gone to pay off the bonds and \$31 million has been transferred to the state General Fund. However, in P.A. 07-242, the legislature appropriated \$95 million from the General Fund to defease the state deficit reduction bonds maturing after December 30, 2007.

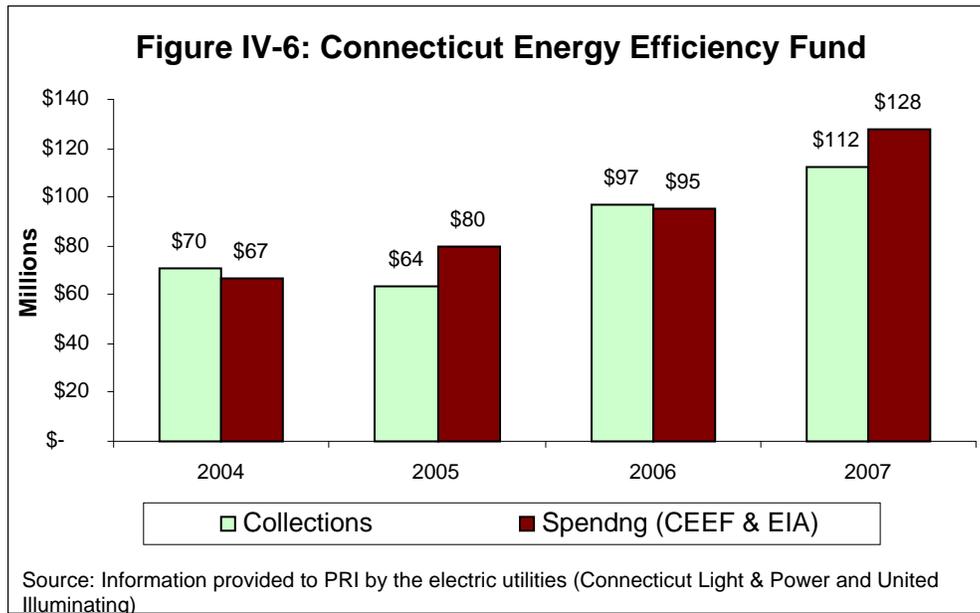
**Sources.** As mentioned previously, the public benefits surcharge (3 mills per kWh) is not the only source of CEEF funding, although it is the largest with \$65.9 million contributed in 2007. Figure IV-4 shows the other sources of funding that constitute the CEEF, including funding raised specifically for Energy Independence Act programs.



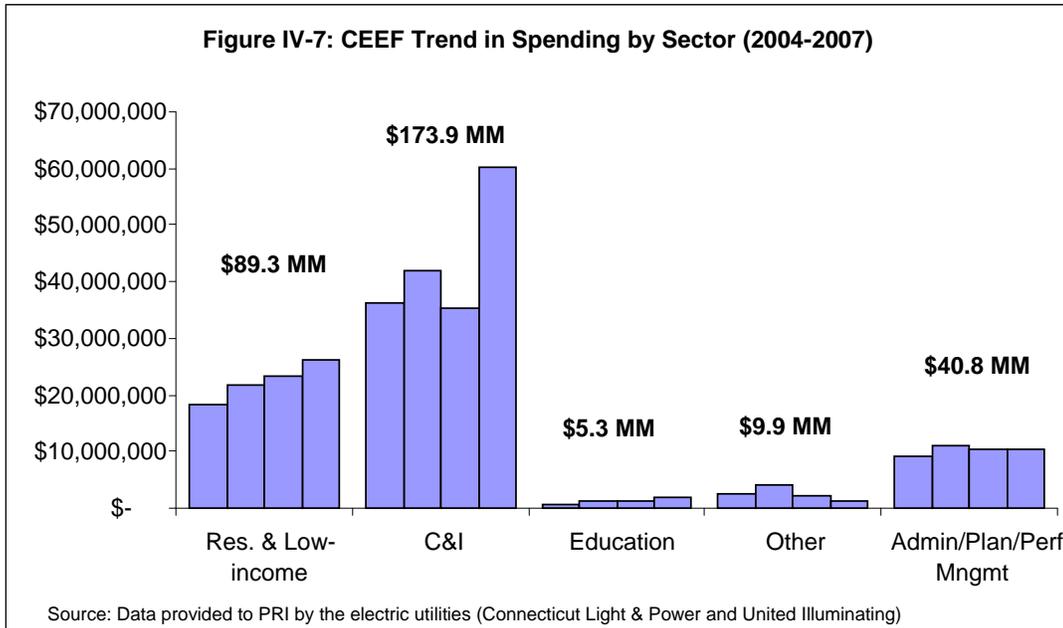
**Spending on CEEF and EIA programs.** Spending on energy efficiency programs in 2007 was \$128.2 million. These expenditures included programming for residential, commercial, and industrial customers as well as projects required under the EIA. Figure IV-5 shows how spending is allocated for the various programs as well as for administration and performance management fee spending.



Between 2004 and 2007, the Connecticut Energy Efficiency Fund spent a total of \$319 million on energy efficiency and conservation programs as well as \$51 million for EIA programs. In the same time period, \$343.6 million has been collected as shown in Figure IV-6.



Between 2004 and 2007, CEEF spent \$89.3 million on residential and low-income programs. During the same period, \$173.9 million was spent on commercial and industrial efficiency programs. As shown in Figure IV-7, residential and low-income spending has steadily increased over time, whereas C&I program spending has fluctuated with a 70 percent increase between 2006 and 2007.



**Parity.** The Energy Conservation Management Board has an objective of parity in treatment among the ratepayers. Commercial and industrial, residential non low-income, and residential low-income customers contribute approximately 58 percent, 31 percent, and 11 percent respectively to CEEF. Thus spending that benefits a ratepayer group in a given year should be proportional to their contribution made through the 3 mill charge. However, as Table IV-3 demonstrates, when actual spending levels are analyzed it does not appear this objective has been met. Only CEEF funding and programs were considered, not EIA programs since they are specifically targeted to reducing peak demand and load among commercial and industrial users.

The percentage in 2007 sums to more than 100 percent since spending was greater than collections by the 3 mill charge. This is largely due to an increase of \$25 million over the prior year in spending on commercial and industrial projects.

	2004	2005	2006	2007
Residential including low-income	26%	34%	33%	34%
Commercial & Industrial	51%	66%	50%	78%

Source: PRI analysis

**Energy Independence Act.** Approximately 20 percent of charges from ratepayers is targeted toward programs established by the 2005 Energy Independence Act. As noted previously, these programs are targeted primarily to large commercial and industrial customers to achieve a decrease in peak load. Table IV-4 shows the breakout of spending for the different programs for the two years they have been in operation.

<b>Table IV-4: Energy Independence Act Total Program Expenditures (Actual \$)</b>			
<b>Program Name</b>	<b>2006</b>	<b>2007</b>	<b>Total</b>
ISO-NE Load Response	\$ 18,925,251	\$ 25,975,715	\$ 44,900,966
Residential HVAC	1,260,482	42,473	1,302,955
Energy Opportunities	2,142,084	2,024,202	4,166,286
General Awareness	298,136	296,900	595,036
Gas Pilot Program	121,094	45,388	166,482
Direct Load Control	-	43,720	43,720
<b>Total</b>	<b>\$ 22,747,047</b>	<b>\$ 28,428,398</b>	<b>\$ 51,175,445</b>
Source: CL&P and UI			

## CEEF ACTIVITY LEVEL ANALYSIS

Although the intent of the Connecticut Energy Efficiency Fund is to focus on both electric and gas efficiency, the vast majority of program participants have been electric customers. This is due to CEEF's focus on programs and technologies targeted to electric customers since the bulk of funding comes from electric customers. Gas utility customers began contributing to CEEF only in 2006, although gas utilities had operated their own programs on a much smaller scale previously. There has been an effort to create equity by having the electric and gas utility customers pay for the program measures that relate to their respective energy savings. The majority of the savings to date have come from electricity.

**Residential customers served.** Between 2004 and the second quarter of 2008, 111,205 residential households<sup>19</sup> have been served by three of the residential programs: Residential New Construction, Home Energy Solutions,<sup>20</sup> and Low-Income Weatherization. (See Appendix E for trend information on participant levels).

**Commercial and industrial customers served.** Between 2004 and the second quarter of 2008, 15,003 commercial and industrial customers have been served by all the programs offered by CEEF. These figures represent the number of customers and not the number of projects, as one customer might utilize multiple efficiency projects at its facility. (See Appendix F for trend information on participant levels).

## CEEF SAVINGS AND BENEFIT ANALYSIS

The Connecticut Energy Efficiency fund is required to calculate energy savings and benefits as a result of the efficiency measures implemented as a way to show the cost-effectiveness of the programs.

**Calculated savings.** Each year the electric utilities (CL&P and UI) submit program savings documentation (PSD) to DPUC. The documentation serves as the base of the demand reduction calculations that are submitted to ISO-NE for the forward capacity market and also form the basis of estimated savings in the CEEF plan approved by DPUC.

<sup>19</sup> Does not include retail products, lighting, or purchases from Smart Living Catalog

<sup>20</sup> In 2007, CEEF combined smaller residential programs to create one comprehensive residential program offering an energy audit and direct measure installation called Home Energy Solutions.

The savings calculations in the PSD manual represent typical measures that, if taken, would produce the savings estimate. According to the PSD manual, third party engineering consultants are hired to run simulations necessary for complicated detailed projects and review all calculations for reasonableness. Any projected electricity savings in the tables below are those calculated by the utilities for the programs based on the PSD manual.

Table IV-5 shows the calculated savings to the grid from residential programs and Table IV-6 shows the calculated savings from programs implemented for commercial and industrial customers. Table IV-7 shows the gas efficiency savings for the residential programs (savings for commercial and industrial programs were only realized in 2008). For an explanation of the various energy measurements, such as megawatts and kilowatt hours, see Table I-1 on page 5.

In order to maintain a reliable electricity system, Connecticut requires approximately 7,000 megawatts of power to meet summer peak demand for one year. As can be seen in Tables IV-5 and IV-6 below, since 2004, the residential, commercial, and industrial programs have saved Connecticut approximately 390.8 megawatts<sup>21</sup>.

<b>Table IV-5: Residential Annual Electricity Savings (MW)</b>					
<b>Residential</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>Total</b>
Retail Products	6.5	5.6	6.3	7.3	25.7
Residential New Construction	0.4	2.1	2.5	0.8	5.8
Home Energy Solutions	2.9	3.9	3.8	2.9	13.6
Low-Income	0.9	1.2	1.6	1.4	5.2
Appliance Retirement	1.7	1.9	.5	-	4.1
Other programs currently not offered	1.2	.6	-	-	1.8
<b>TOTAL</b>	<b>13.7</b>	<b>15.4</b>	<b>14.6</b>	<b>12.4</b>	<b>56.1</b>
Source: CL&P and UI					

<b>Table IV-6: Commercial &amp; Industrial Annual Electricity Savings (MW)</b>					
<b>C&amp;I - Major Programs</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>Total</b>
Energy Conscious Blueprint	29.2	22.5	13.5	12.0	77.1
Energy Opportunities	3.2	3.9	18.6	21.7	47.3
Operating & Maintenance Services	0.8	1.8	0.7	0.5	3.8
Small Business Advantage <sup>22</sup>	6.2	6.9	10.2	11.3	34.6
ISO-NE Load Response	34.7	78.4	31.1	23.7	167.9
Other Programs currently not offered	1.4	2.4	-	-	3.9
<b>TOTAL</b>	<b>75.5</b>	<b>115.9</b>	<b>74.1</b>	<b>69.2</b>	<b>334.7</b>
Source: CL&P and UI					

<b>Table IV-7: Gas Efficiency Program Annual Savings (ccf)</b>		
<b>Residential</b>	<b>2006</b>	<b>2007</b>
Home Energy Solutions	39,696	175,381
Low-Income	123,734	235,099
<b>TOTAL</b>	<b>163,430</b>	<b>410,480</b>
Source: CNG, SNG, Yankee Gas		

<sup>21</sup> The savings reported are not actual realized savings but rather calculated savings based on engineering estimates

<sup>22</sup> Includes projects completed for municipalities and schools

Like Table IV-5, Table IV-8, shows residential electricity savings but measures them in kilowatt hours. Efficiency measures for residential customers have saved the equivalent of the electricity needed for 10,621 to 14,266 homes in a given year (a typical household in Connecticut consumes approximately 700 kWh a month or 8400 kWh in a year).

<b>Table IV-8: Residential Annual kWh Savings (000's)</b>				
<b>Residential</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>
Retail Products	78,261	69,304	79,772	93,060
Residential New Construction	932	3,589	4,487	3,182
Home Energy Solutions	1,758	2,434	5,779	8,931
Low-Income	12,606	13,887	14,388	14,661
Appliance Retirement	7,244	10,220	3,458	-
Other programs currently not offered	4,278	6,004	-	-
<b>TOTAL</b>	<b>105,079</b>	<b>105,438</b>	<b>107,884</b>	<b>119,834</b>
Source: CL&P and UI				

Table IV-9 lists the total kWh savings from commercial and industrial programs since 2004, as well as the savings by individual programs.

<b>Table IV-9: Commercial &amp; Industrial Annual kWh Savings (000's)</b>				
<b>C&amp;I – Major Programs</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>
Energy Conscious Blueprint	54,639	55,297	61,690	59,307
Energy Opportunities	18,591	24,167	114,771	125,509
Operating & Maintenance Services	3,553	11,330	5,754	5,774
Small Business Advantage	23,668	21,018	38,322	44,978
Other programs currently not offered	6,794	11,786	-	-
<b>TOTAL</b>	<b>186,703</b>	<b>212,362</b>	<b>220,537</b>	<b>235,568</b>
Source: CL&P and UI				

**EIA electricity savings.** The Energy Independence Act requires DPUC to authorize near-term measures that would reduce Federally Mandated Congestion Charges (FMCCs). As shown in Table IV-10, 226 less megawatts and 367 less megawatts were used in 2006 and 2007 respectively as a result of the implemented measures.

<b>Table IV-10: EIA Electricity Savings (Annual MW Savings)</b>		
	<b>2006</b>	<b>2007</b>
Load Response	223	365
Energy Opportunities	2	2
Residential HVAC	0.8	0
Gas Pilot Program	0.11	0.16
<b>TOTAL</b>	<b>226</b>	<b>367</b>
Source: CL&P and UI		

A gas efficiency pilot program was an approved near-term measure supported by the EIA legislation. The pilot program funded four projects and reduced FMCCs by providing reductions in electrical consumption and peak load through the use of efficient gas cooling technologies instead of electrical cooling equipment. Table IV-11 below shows the total energy savings from

the pilot program based on 225 tons of installed capacity. Over the course of the program, an additional 50 tons were installed, so the total actual energy savings would be slightly higher than what is shown in the table. Although the technology demonstrated it reduced peak demand and overall energy use, the program is no longer offered.

	<b>Electric Unit Energy Usage</b>	<b>Natural Gas Unit Energy Usage</b>	<b>Electric Savings</b>	<b>% inc/(dec)</b>
Peak Demand (kW)	115	5	110	(96%)
Electrical Usage (kWh)	53,735	3,677	50,058	(93%)
Natural Gas Usage (ccf)		3,494		100%
<b>BTU Usage</b>	<b>661,468,971</b>	<b>430,831,278</b>	<b>230,637,694</b>	<b>(35%)</b>

Source: Docket 05-07-14PH01 Late File No. 4

**Cost benefit analysis.** Various cost benefit tests are employed for measuring the cost-effectiveness of efficiency programs. A summary of these cost-effective tests and what they measure is provided in Table IV-12.

<b>Cost Test</b>	<b>Questions Addressed</b>
Participant Cost Test	-Is it worth it to the customer to install EE?
Ratepayer Impact Measure	-Would the project require an increase in rates to reach the same operating margin? -What happens to customers' bills or rates?
Utility Cost Test ( a.k.a. Electric System B/C Ratio)	-Do total utility costs increase or decrease?
Total Resource Cost Test (a.k.a. Total Resource B/C Ratio)	-Are all of the benefits greater than all of the costs (regardless of who pays the costs and who receives the benefits)?
Societal Cost Test	-Are all of the benefits, including indirect benefits, greater than all of the costs (regardless of who pays the costs and who receives the benefits)?

The DPUC requires the Connecticut Energy Efficiency Fund to report on the cost effectiveness of their programs to ensure programs are designed to obtain energy savings and system benefits, including mitigation of federally mandated congestion charges. Currently, DPUC only requires plan goals to be submitted, not actual numbers from the prior year. Table IV-13 shows the actual utility cost test results based on realized savings and the *estimated* total resource cost test.

Using the utility cost test and total resource cost test, the utility companies apply the calculation to the individual programs and the efficiency measures taken to arrive at the actual cost-effectiveness results. For example, for every dollar the fund spends on the retail products program, the electric system calculated lifetime savings range from \$6 to \$9.80. From these program results, CEEF aggregates or levels out the savings for all fund programs. This process is the origination of the claim that overall, “every \$1 spent yields \$4 in savings.”

CL&P and UI utilize different methods of accounting for program expenditures and therefore electric and total energy savings are not necessarily accounted for in the year they were

realized. CL&P accounts for *both* the cost and savings of the efficiency measure when the project is complete. On the other hand, UI realizes the energy savings when the project is complete but realizes the cost of the project when the letter of agreement is signed. For UI, this results in costs and savings not aligning in the same accounting year for projects that cross over calendar years and can explain the significant differences in cost effectiveness results between the two companies.

Although the DPUC issued a decision in 2005 (Docket 05-06-05) requiring both companies to utilize a “singular, consistent method,” company practices did not change and the issue has been raised again by the DPUC.

**Table IV-13: Cost Effectiveness Tests 2007 (based on \$1 spent)**

	Utility Cost Test (Actuals)			Total Resource Cost Test (Estimated) <sup>23</sup>		
	CL&P	UI	Overall	CL&P	UI	Overall
<b>Residential</b>						
Retail Products	6.1	9.8	6.8	6.8	4.0	5.9
Residential New Construction	1.3	1.7 <sup>24</sup>	1.5	2.0	2.9	2.2
Home Energy Solutions	1.6	1.1	1.5	1.9	1.2	1.8
Low Income	1.1	2.0	1.2	2.5	2.7	2.5
<b>Commercial</b>						
Energy Conscious Blueprint	4.2	3.3	4.0	6.9	3.3	5.9
Energy Opportunities	4.9	3.8	4.7	2.5	1.8	2.3
O&M	3.0	14.3	4.2	2.7	17.4	4.2
Small Business	4.1	4.5	4.2	2.3	2.2	2.3
<b>Overall</b>			<b>4.0</b>			<b>3.1</b>

Source: PRI analysis based on data provided by UI & CL&P

### Connecticut Municipal Electric Energy Cooperative (CMEEC)

The Connecticut Energy Efficiency Fund does not serve customers served by non investor-owned utilities. Instead, CMEEC -- a cooperative formed in 1976 by the state’s publicly owned electric utilities -- oversees energy efficiency programs for its customers.

CMEEC is owned by the municipal utilities in the cities of Groton and Norwich, the Borough of Jewett City, and the Second (South Norwalk) and Third (East Norwalk) Taxing Districts of the City of Norwalk. CMEEC also provides all the power required by other utilities that participate in CMEEC, including the Town of Wallingford Department of Public Utilities, the Bozrah Light and Power Company, and the Mohegan Tribal Utility Authority. All together these utilities provide power for about 5 percent of Connecticut residents.

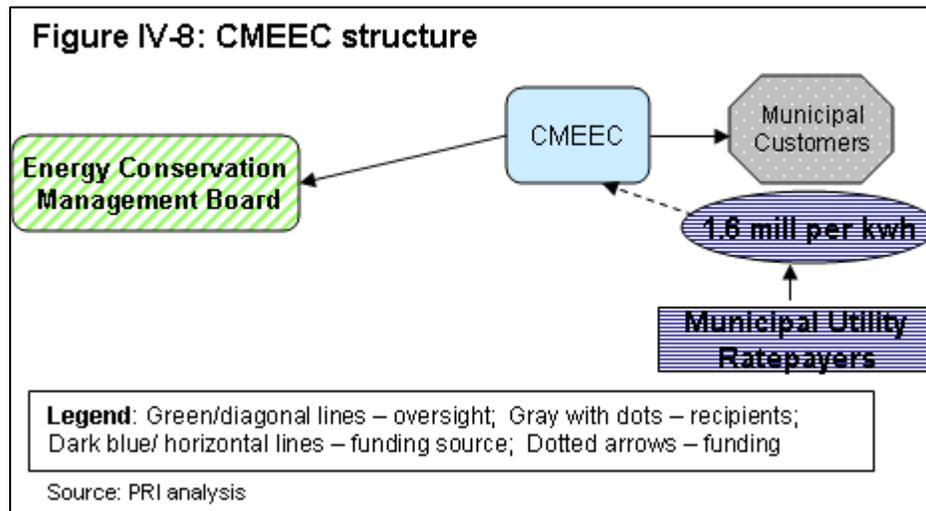
<sup>23</sup> The utilities do not track customer costs so only estimated figures can be provided

<sup>24</sup> Calculated average (2003-2007) since the accounting method employed by UI does not match savings and costs in the same year

The broad goals of CMEEC are to:

- develop and implement a collaborative program which balances the existing statewide efforts;
- create unique programs where these make the most sense; and
- capitalize on direct customer relationships.

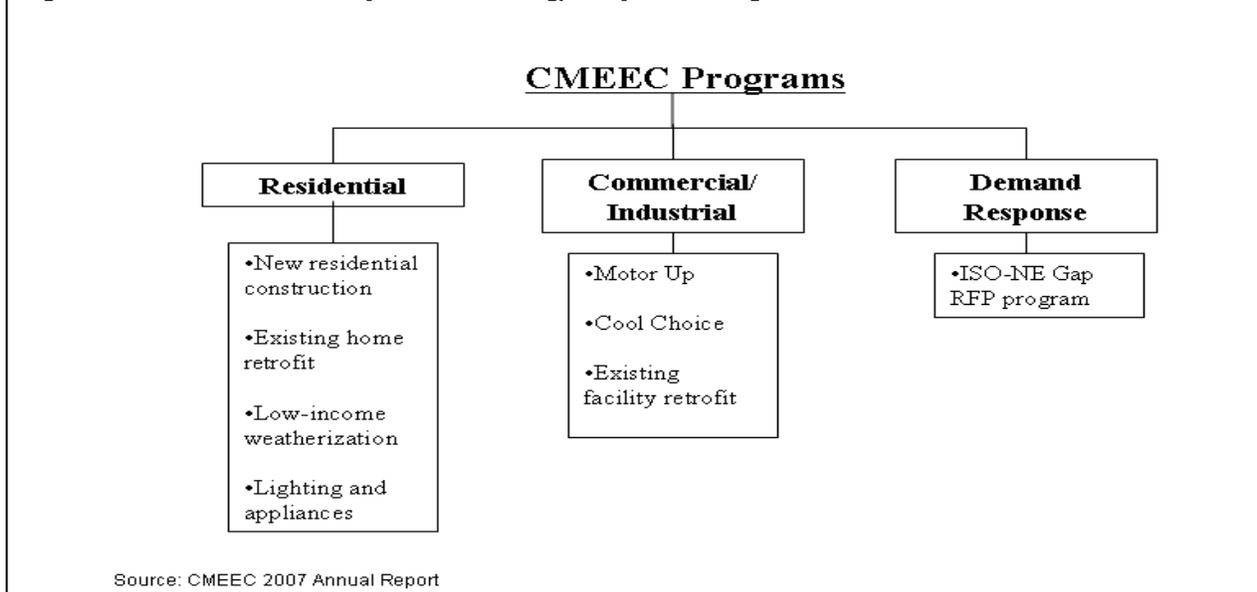
Figure IV-8 shows the structure for implementing energy efficiency and conservation programs to municipal utility customers.



**Funding.** The 2005 Energy Independence Act, discussed earlier in the CEEF description, mandated that municipal utilities charge 1 mill per kilowatt hour beginning in 2006 for energy conservation programs, and increasing to 2.5 mills starting January 2011. The money from the surcharge goes into a special nonlapsing fund held by CMEEC, which must develop a conservation plan to include efficiency programs consistent with CEEF programs. The plan is submitted to ECMB for review, although CMEEC programs and budget are not part of CEEF and not subject to the same level of approval by ECMB. Also, DPUC does not approve its plan and budget.

**Energy efficiency programs.** Each municipal utility operates its own energy efficiency programs for residential, commercial, and industrial customers with CMEEC coordinating the programming. In addition, municipal customers can participate in the demand response program through ISO-NE. Figure IV-9 shows the different programs offered by CMEEC.

Figure IV-9: Connecticut Municipal Electric Energy Cooperative Programs



**Residential programs.** CMEEC program offerings for residential customers are: incentives for new residential construction; an existing home retrofit; low-income weatherization program; and rebates for efficient lighting and appliances. Participation by each of the municipal utilities varies by program. For example, Norwich Public Utility (NPU) is the only utility participating in the new residential construction program while Groton Utilities and NPU were the only two that offered weatherization services to low-income residents in 2007. CMEEC does not offer a program similar to the CEEF Home Energy Solutions program where customers who are not low-income can receive an energy audit with direct installation of efficiency measures.

**Commercial and industrial programs.** CMEEC is supporting two programs, Motor Up and Cool Choice, which offer financial incentives for equipment replacement for commercial customers. These programs are modeled after the programs offered under CEEF. The existing facility retrofit, a third program for commercial, industrial, and municipal sectors, offers customers technical and financial assistance to promote replacement of existing equipment with more efficient alternatives.

**Demand response program.** In an effort to reduce summer peak electricity use, CMEEC teamed up with EnerNOC, Inc., a large demand response and energy management solutions provider, to offer participation in the ISO-New England “Gap RFP” program. The program resulted in 2.5 megawatts of demand response registered with ISO-New England (meaning on a day with high electricity usage, EnerNOC can reduce its electrical usage to maintain system reliability).

**Energy efficiency financing.** Municipal utilities have developed financing products that allow commercial and industrial customers to amortize energy efficiency project costs as a way to overcome the initial capital investment required for the projects. In 2007, ten customers took advantage of project financing.

## CMEEC ACTIVITY LEVEL ANALYSIS

Table IV-14 below provides the amounts collected by CMEEC as a result of the 2005 Energy Independence Act, as well as the programmatic spending levels.

<b>Table IV-14: CMEEC Energy Efficiency Collections &amp; Spending</b>		
	<b>2006</b>	<b>2007</b>
<b>Collections</b>	\$1,729,251	\$2,173,771
<b>Spending</b>	\$1,409,690	\$2,469,154
Residential	\$602,059	\$994,880
Commercial & Industrial	\$807,631	\$1,474,274
Source: CMEEC		

Table IV-15 shows the 2007 participation levels for the various energy efficiency programs offered by the municipal utilities.

<b>Table IV-15: CMEEC Energy Efficiency Customers Served</b>	
	<b>2007</b>
<b>Residential</b>	
CFLs distributed	210,000
Low Income Households	142
Existing Home Retrofit	100
Appliance rebates	850
<b>Commercial/Industrial</b>	
Commercial Equipment Replacement	11
C&I – Existing Facility retrofit	67
Source: 2007 Annual CMEEC report	

## CMEEC SAVINGS AND BENEFITS ANALYSIS

Table IV-16 lists the calculated savings from the energy efficiency measures implemented during the 2007 calendar year. Table IV-17 demonstrates both the utility cost test and total resource cost test for residential and commercial programs.

<b>Table IV-16: Municipal Electric Energy Savings (2007)</b>		
<b>Sector</b>	<b>Savings Measurement</b>	
	<b>Annual MW</b>	<b>Annualized kWh</b>
Residential	0.30	5,829,507
Commercial/Industrial	3.96	8,778,731
Source: Data provided to PRI by CMEEC		

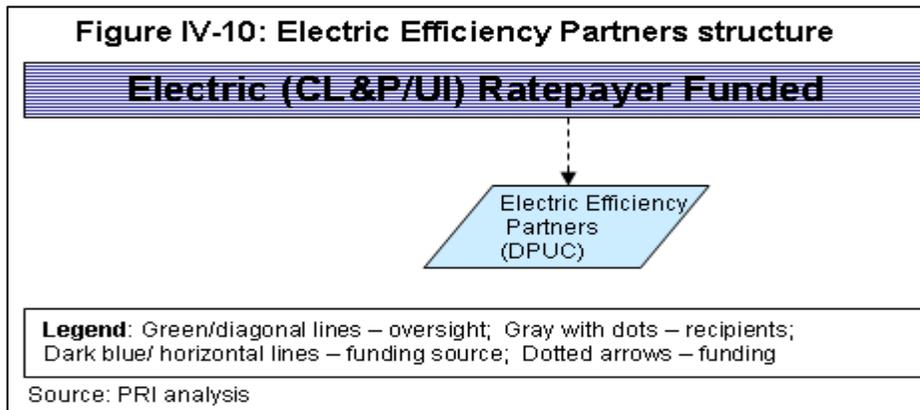
Sector	Utility Cost Test	Total Resource Cost Test
Low Income Program	0.8	0.8
Existing Home Retrofit	1.2	1.1
Efficient Products	4.9	4.1
Commercial	6.7	2.5
Overall	5.7	2.7

Source: CMEEC 2007 Annual Report

### Electric Efficiency Partners Program (EEP)

The EEP program was established by P.A. 07-242. The objective of the EEP program is to support enhanced demand-side management technologies<sup>25</sup> that conserve electricity and reduce electric distribution customers' electric demand in the state, specifically reducing peak demand. The EEP program was specifically established to support programs that for one reason or another would not receive funding from CEEF. The legislation requires approved technologies to have a payback ratio of 2:1.

Figure IV-10 shows the current funding and administrative structure for the Electric Efficiency Partners Program.



**Funding.** The legislation authorized spending for EEP of up to \$60 million a year collected through a charge imposed on electric ratepayers. As of August 2008, funds had not yet been collected through the rates.

P.A. 07-242 stated that at least 75 percent of the appropriated annual ratepayer investment must be used for technologies. Additionally, an entity cannot receive funding through the EEP if the entity has received funding for the same project through CEEF program funds.

<sup>25</sup> An example of an approved technology is a gas chiller that provides area air conditioning for industrial and commercial customers.

**Program administration.** The legislation requires that the program be administered by DPUC. The department reviews project proposals, determines eligible technology measures and incentives, and also determines the criteria for certifying partners. A partner can either be a General Partner or a Vendor Partner. A General Partner will facilitate the EEP program, having the ability to recommend several technologies to a customer. A Vendor Partner, on the other hand, supplies only approved technologies. Partners are responsible for overseeing the site-specific EEP program projects and for reviewing project documentation while verifying project savings and cost-effectiveness. The partnership may end once the technology is deployed or it may be an ongoing process to help the end user deploy technologies at a time when the customer and the electric system can realize the greatest savings.

The legislation also required DPUC to develop a low-interest loan program to help customers finance their share of any efficiency measures adopted. The department can offer these loans under an existing agreement with the Connecticut Development Authority (CDA), or through an entity chosen by competitive bid. The financing agreements entered into with CDA cannot exceed \$10 million.

**Activity level.** As of August 2008, DPUC had application forms posted on its website for the two types of partners and a customer application form. Thus far, three applications have been received for technologies of which two were approved, but no general partner or customer applications have been received.

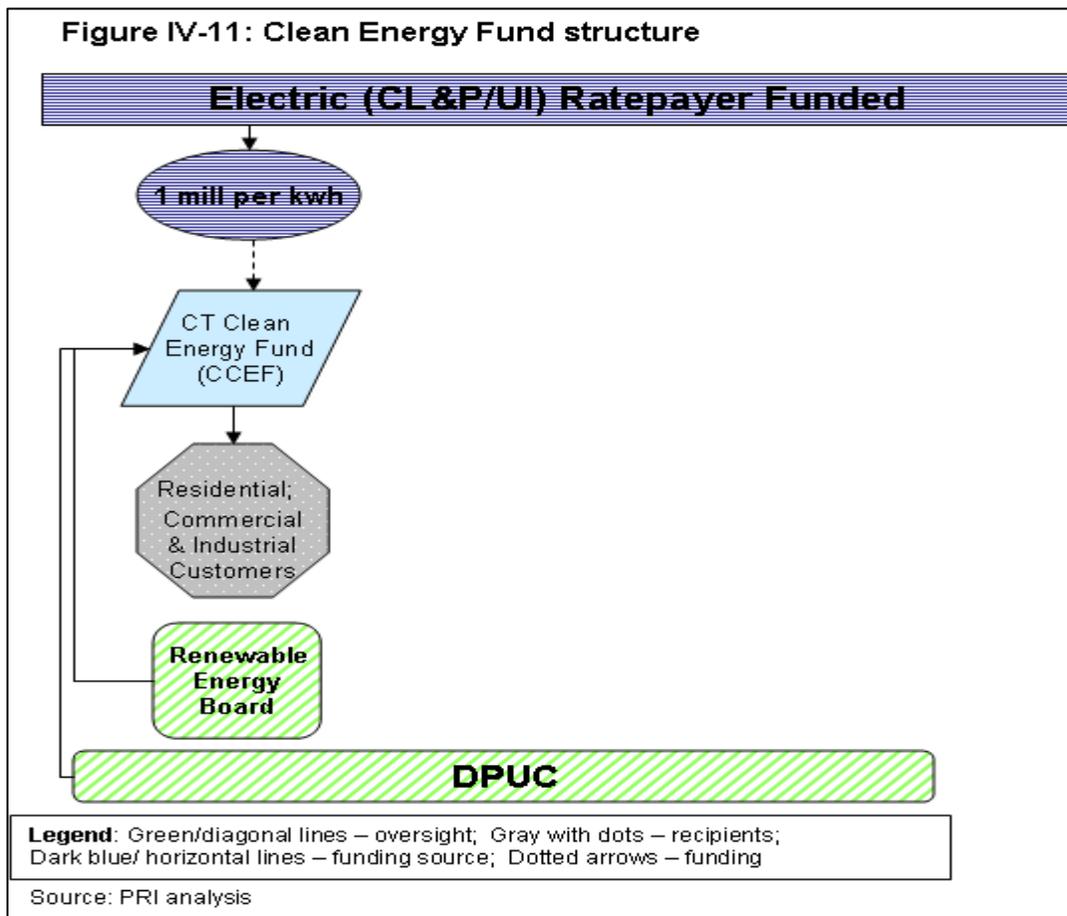
### **Connecticut Clean Energy Fund (CCEF)**

The Clean Energy Fund, also known as the Renewable Energy Investment Fund, was established in 1998 as part of electric restructuring required by the state legislature (C.G.S. Sec. 16a-245m). The purpose of the fund is to provide financing for alternative sources of energy. Its goals are to:

- 1) increase installed renewable energy capacity;
- 2) promote renewable energy technologies; and
- 3) build public awareness about renewable energy and make renewable energy sustainable.

The Clean Energy Fund programs did not become operational until 2000, and in its early stages from 2000 to 2004, the fund largely focused on investments (i.e., venture capital) for renewable energy.

Figure IV-11 shows the funding structure as well as administrative and regulatory oversight for the Clean Energy Fund.



**Funding.** The Clean Energy Fund is financed by a surcharge of not less than .001 cent (1 mill) per kWh on ratepayers’ electric bills. This and some other rate surcharges are now combined into one public benefits charge on electric ratepayers’ bills, but the amount allocated for the Clean Energy Fund is 1 mill. Other sources of revenue have been interest and payments for renewable energy credits (RECs) as described earlier in the CEEF funding. Table IV-18 below shows the planned revenues and aggregate expenditures for the fund for FY 08 and FY 09.

	Revenues (Plan)	
	FY 08	FY 09
Utility Customer Assessments	\$22,279	\$29,331
Interest on Deposits	\$4,234	\$2,025
Renewable Energy Credits	\$200	\$215
<b>Total Fund revenues</b>	<b>\$26,722</b>	<b>\$31,571</b>
	Expenditures (Plan)	
Staff Salaries and Wages	\$2,137	\$2,405
Benefits	\$1,120	\$1,297
Other	\$1,327	\$1,225
<b>Total Operating Expenses</b>	<b>\$4,584</b>	<b>\$4,927</b>
Grants and Programs	\$20,726	\$43,745
<b>Total Fund Expenditures</b>	<b>\$25,310</b>	<b>\$48,672</b>

Source: Connecticut Clean Energy Fund Budget

The Clean Energy Fund staff indicates that the expenditures for fund programs are increasing dramatically because of increased program demand and funding allocated to projects already approved “in the pipeline”.

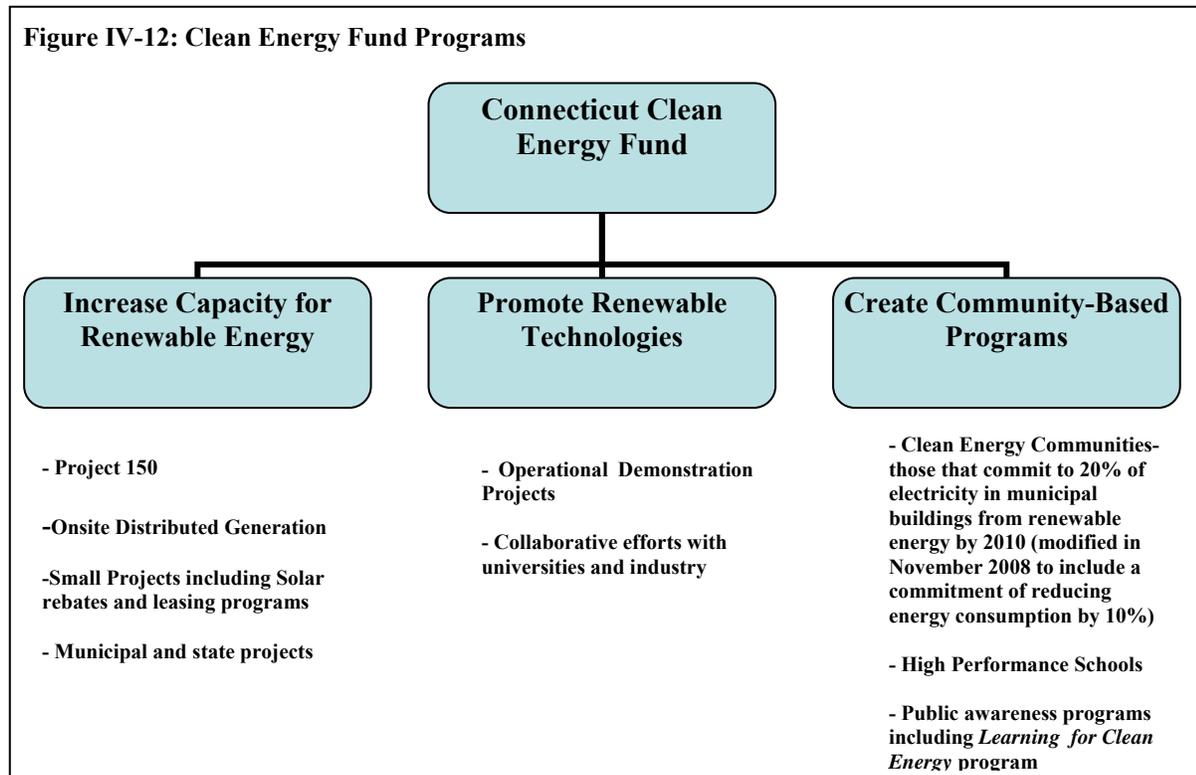
**Program administration.** The Clean Energy Fund is under Connecticut Innovations Incorporated (CII) a quasi-public agency, for administrative purposes only. However, the Connecticut Clean Energy Fund has its own executive director and staff, and reports to a 15-member Renewable Energy Investments Board, also known as the Connecticut Clean Energy Board.

**Administrative oversight.** Public Act 07-152 reconstituted the board, which had previously been advisory to CII, and increased its membership from 11 to 15. The 2007 act added the heads (or designees) of the Office of Consumer Counsel, the Department of Emergency Management and Homeland Security, Office of Policy and Management and the Department of Environmental Protection, and 11 appointed members with various specified expertise and backgrounds – three by the Governor; one by each of the six legislative leaders; and two by the CII board.

The act also gave the board significantly more authority, requiring that no fund expenditures be made without prior board approval, and also required the board to develop a comprehensive plan, hold public hearings on the plan, and submit the plan to DPUC for action after its proceedings.

**Regulatory oversight.** Public Act 07-152 required that the Clean Energy Fund develop a comprehensive plan, receive public comment, and hold three public hearings on the plan, before submitting it to the Department of Public Utility Control for approval. Up until 2007, the Clean Energy Fund developed a strategic plan but outside approval was not required. The Clean Energy Fund developed its comprehensive plan and submitted it to DPUC in April 2008. DPUC held a public hearing and comments were received, but DPUC had not made a final decision on the plan as of August 2008.

**Clean Energy Fund Programs.** Figure IV-12 below shows the Clean Energy Fund programs organized by fund goals.



**Program activity and results.** Connecticut residents and businesses in the two major electric utility service areas are eligible for the programs. Specific information on the programs is available on the Clean Energy Fund website. Table IV-19 below describes the programs, including eligibility criteria, the number that are completed or approved, and program expenditures on the program as of June 2008.

As with the Connecticut Energy Efficiency Program, the Clean Energy Fund also measures and reports on savings from the programs including:

- the electric savings (equivalent to households @ average of 700 kWh/month);
- avoided emissions (e.g., tons of carbon dioxide) resulting from its programs; and
- lifetime avoided \$ congestion charges mandated by the Federal Energy Regulatory Commission.

Table IV-19 sets out more detail about the Clean Energy Fund programs, expenditures, and results.

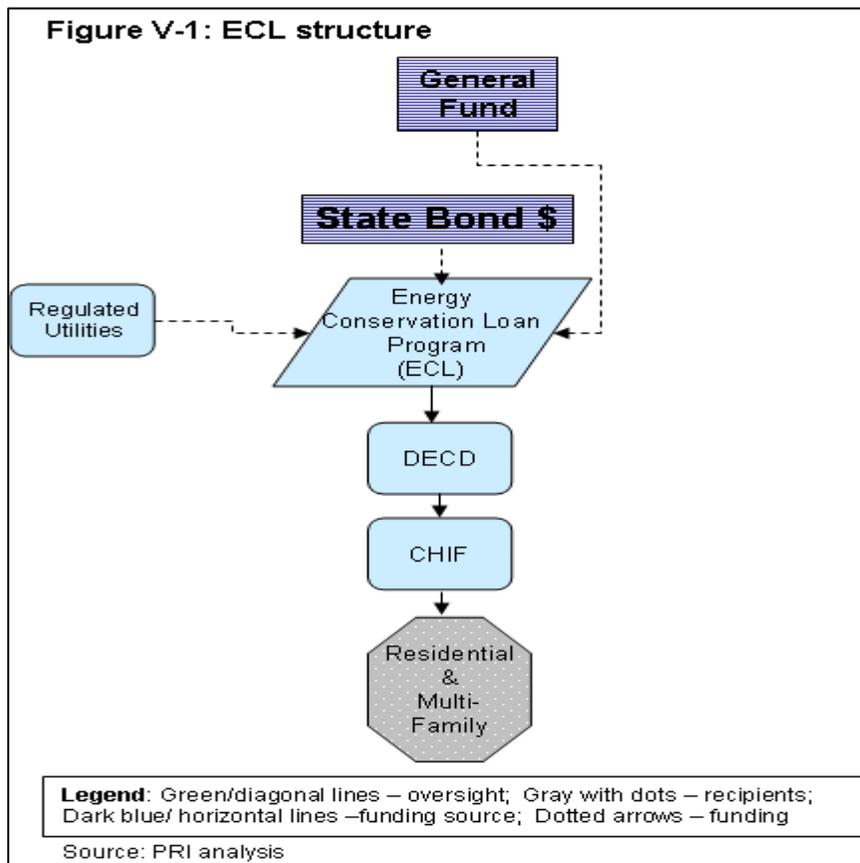
<b>Table IV-19. Clean Energy Fund: Program Activity, Expenditures and Results July 2008</b>			
<b>Program</b>	<b># of projects</b>	<b>Expenditures to Date</b>	<b>CCEF-reported results (over lifetime)</b>
<b>On-site Renewable Distributed Generation</b>	89 projects	\$56.3 million	Electricity saved= 4,046 homes FMCC avoided= \$2.8m Tons carbon dioxide avoided =107,000
<b>Project 150</b> – program is legislatively mandated. Requires utilities to enter long-term electricity purchase agreements (EPAs) with projects that receive CCEF funding. EPAs must purchase at least 150 megawatts of Class I renewable energy	7 projects	\$5.8 million	Electricity saved= 88,413 homes FMCC avoided= \$81.4m Tons carbon dioxide avoided =4.9m
<b>Residential and small solar photovoltaic (PV) systems</b> Use a pre-qualified installer -- 23 approved installers Equipment must be new, meet certain standards, and produce no more than what has been the customers' annual electric consumption Rebate approval must be issued before work begins – Typically rebates are half the cost (1/2 of \$44,000) No income limits Eligible for sale renewable energy credits and eligible for personal income tax credit (30% of cost, up to \$2000) <b>Solar lease program</b> New program begun in July 2008 To help finance the half of the solar installation not covered by the rebate CCEF works with lender to offer lease arrangements – typically about \$120 a month Income limits of 150% of MFI by area – family of 4 in Hartford area -- \$121,650	529 projects	\$11.9 million	Electricity saved= 290 homes FMCC avoided= \$321,471 Tons carbon dioxide avoided = 28,940
<b>Operational Demonstration Projects</b>	7 Completed 3 in Progress	\$11.7 million	
<b>Community-based programs</b>	-75 towns participate in 20% by 2010 -35 grants issued -160 PV systems to 28 towns	\$3.3 million	
Source: Clean Energy Comprehensive Plan –FY 09-10, and CCEF website			

## State Funded Programs

This chapter discusses energy efficiency programs that are primarily supported with state monies, either through state-issued bonds, the General Fund, or in some cases, part of the proceeds from a particular tax, such as the gross receipts tax on petroleum products. As with the funds discussed in the previous chapters, there is overlap in funding mechanisms, and the program administration lines are not always clear and definitive. The programs discussed in this chapter include: the Energy Conservation Loan Fund; the recently established furnace rebate program; the fuel oil conservation program; and programs targeted to energy efficiency in state facilities.

### Energy Conservation Loan Fund (ECL)

The conservation loan funds were established in 1979 (C.G.S. Secs. 16a-40a to 16a-40c) to provide financing at below market rates to single family and multi-family residential property owners for the purchase and installation of cost-saving energy conservation improvements. Figure V-1 shows the funding and administrative structure of the program.



**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 \$23.7 million in total. 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 2008 Special Session. However, prior to the August 2008 bond authorization, the last bond issued was in 1992.

**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.

Since 1979, CHIF has lent over \$84.6 million in energy conservation loans to all 169 towns in the state. Approximately 13-15 loans are closed each month with an average loan amount of \$10,000 in 2005, increasing to \$12,000 in 2008. The ECL low interest rate loans to households are subsidized by the state's major utilities based on a formula outlined in C.G.S. Sec. 16a-40b(f). In FY 08, the gas and electric utilities paid close to \$400,000.

CHIF does not have an annual budget for marketing activities. In 2006, CHIF spent \$2,000 on special marketing activities to promote several new aspects of the ECL program but since then has not had funds for marketing activities. The top three ways in which borrowers learn about the ECL program are by: 1) word of mouth; 2) referrals from contractors; and 3) the CHIF website.

**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.<sup>26</sup>

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 \$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, the client must have a debt load of less than or equal to 39 percent of the client's 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.

CHIF also offers a program for senior citizens to prevent them from going without heat. If a resident has a furnace that has been red tagged – meaning it does not function-- CHIF will

---

<sup>26</sup> The income eligibility levels were increased in the August 2008 Special Session to 200 percent of area median income. For a household of four this equates, for example, to \$95,550 in Waterbury MSA and \$176,700 in the Stamford-Norwalk MSA

offer a loan to replace or fix the furnace regardless of credit history. Customers receive a three year deferred loan, payable upon the sale of the house. CHIF also offers a three year deferred loan if a homeowner experiences a hardship due to divorce, death, or a medical reason. After three years, CHIF will reevaluate the homeowner's financial conditions for repayment.

There are certain types of home improvements that qualify for a loan. CHIF classifies improvements into two categories: Type 1 and Type 2. Enumerated below are examples of the improvements covered by the two programs.

**Type 1 Improvements:**

- Energy efficient insulation
- Replacement thermal windows and doors
- Replacement furnaces and boilers
- Replacement hot water heaters
- Secondary heating systems using a source of heat other than electricity
- Conversion of a primary electric heating system to a system using a source of heat other than electricity if home was constructed prior to 1/1/80
- Vinyl or aluminum siding for existing eligible structures
- Replacement roofs

<b>Type 1 Interest Rates</b>	
<b>% Median Family Income (MFI)</b>	<b>Interest Rate</b>
50% MFI	0%
51-150% MFI	3%

**Type 2 Improvements:**

- Replacement central air conditioning systems
- Heat pumps or solar systems and passive solar additions

<b>Type 2 Interest Rates</b>	
<b>% Median Family Income (MFI)</b>	<b>Interest Rate</b>
50% MFI	1%
51-80% MFI	3%
81%-150% MFI	6%

**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 to the OPM furnace rebate program requirements, discussed next. Since the programs are new, it is unclear whether consumers will find the incentives and the loan program attractive enough to expend the additional funds.

**ECL ACTIVITY LEVEL ANALYSIS**

A majority of the loans are provided to single-family households as demonstrated in Table V-1. The number of loans issued increased by 35 percent between 2005 and 2006 but then dropped 17 percent in 2007. Since the program started in 1979, over 21,000 loans have been issued.

<b>Loan type</b>	<b>Calendar Yr 2005</b>		<b>Calendar Yr 2006</b>		<b>Calendar Yr 2007</b>	
	<b># loans</b>	<b>Total Funded</b>	<b># of loans</b>	<b>Total Funded</b>	<b># of loans</b>	<b>Total Funded</b>
<b>Single Family</b>	161	\$1,553,545	252	\$2,188,727	202	\$1,973,818
<b>Multifamily</b>	4	\$65,912	2	\$59,527	9	\$267,925
<b>Total</b>	165	\$1,619,457	254	\$2,248,254	211	\$2,241,743

In each of the past three years, loans for heating systems (representing 35-40% of all loans), thermal windows (at 30-35%), and roofs (at 20-25%) were the most common type of improvements funded by the program. However, in the past year CHIF has seen an increase in the number of requests for replacing heating systems due to the rise in energy costs.

Over the past three years, the number of loans between 30 and 120 days delinquent has ranged from a high of 44 in 2005 to a low of 34 in 2007, representing 4.7 percent and 3.6 percent respectively of the total loans outstanding in those years. DECD and CHIF will work with the borrowers of loans that are over 120 days outstanding to set up a feasible repayment schedule.

### **Furnace Rebate Program**

The furnace rebate program was established during the 2007 legislative session as part of P.A. 07-242 and amended during the August 2008 Special Session. Between July 1, 2007 and June 30, 2017, the Office of Policy and Management must provide rebates of up to \$500 for the purchase and installation of high efficiency home heating equipment or for the repair and upgrade to a high efficiency heating system.

**Funding.** While the initial rebate program was established in 2007, it was not until the August 2008 State Bond Commission meeting that \$5 million in bonds was issued for the program. As a result of the August 2008 Special Session, the legislature appropriated an additional \$3 million in funding for the furnace replacement program and an additional \$2 million for furnace/boiler repair and upgrades.

**Program administration.** The program is run through the Energy Unit of the Office of Policy and Management. All information, including applications and guidelines, can be found on the OPM website.

According to P.A. 07-242, the Energy Conservation Management Board must report to the Energy and Technology Committee on the cost-effectiveness of the rebate program by January 1, 2009.

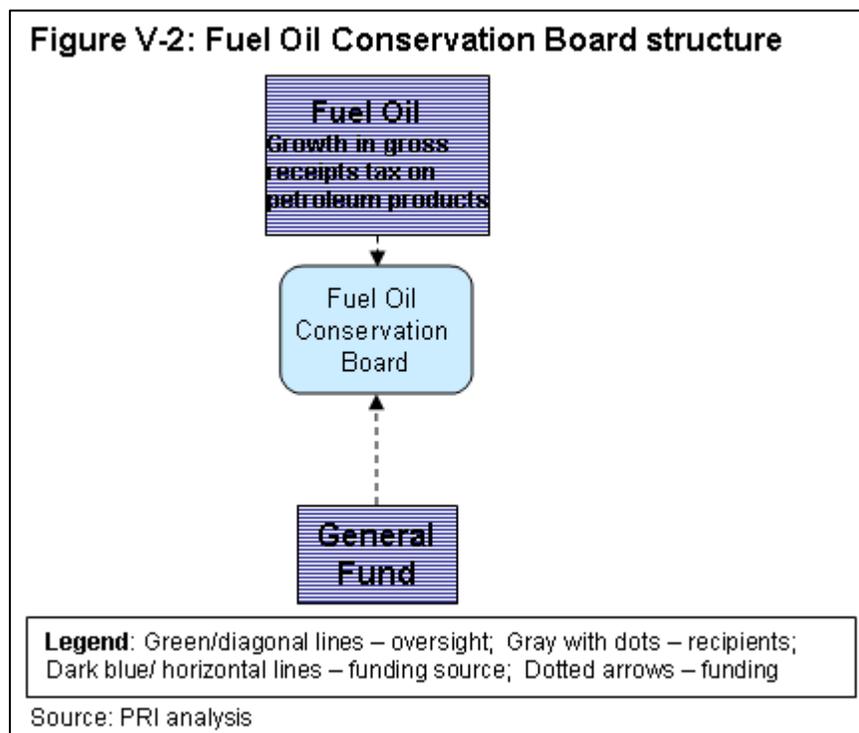
**Eligibility.** To be eligible for the rebate, the furnace or boiler must be installed between July 1, 2007 and April 15, 2009. A replacement natural gas furnace/boiler must meet or exceed Federal ENERGY STAR standards. A replacement oil or propane furnace/boiler must be at least 84 percent efficient. Rebate levels are based on an applicant's 2007 filing status for federal income tax and state adjusted gross income (AGI), and are reduced by 10 percent for every \$10,000 the applicant's income exceeds the category threshold. For example, to receive the full

\$500 rebate, a single filer's AGI cannot exceed \$56,500, and the AGI for married joint filers cannot exceed \$100,500 to be eligible for the full rebate.

Residents can also qualify for a rebate of up to \$500 if they repair or upgrade their existing boilers or furnaces on or after August 1, 2008, to improve the efficiency. The rebate only applies to residences of up to four dwelling units.

### Fuel Oil Conservation Board

More than 50 percent of Connecticut households heat with home heating oil; those residents were not the target population of the programs and services offered by CEEF, which focuses primarily on electric use. Recognizing the gap, the legislature through P.A. 07-242 established a 13-member board to administer energy efficiency and conservation programs targeted at oil heating customers. All board appointments must come from groups specifically designated in the legislation, including: fuel oil dealers; and representatives of the heating, ventilation, and air conditioning trades; environmental groups; and residential customers, one of whom represents low-income residents. Figure V-2 shows the funding and administrative structure for the Fuel Oil Conservation Board.



**Operational administration.** P.A. 07-242 established very specific directives and timeframes for organization and operations. The board must establish itself as a federally tax exempt nonprofit (501c) organization, and issue an RFP to select an entity to administer the programs. By November 1, 2007, the board was required to contract with the selected administrator for up to three years.

**Oversight.** Once the administrator was selected, a comprehensive plan was required to be developed by March 1, 2008, and submitted to the Energy Conservation Management Board for its approval. The Fuel Oil Conservation Board advises and assists the administrator in the development of the plan and its implementation. The Office of the Attorney General is also required to select a third party to audit the activities of the board on a biennial basis.

**Funding.** The funding for these fuel oil conservation initiatives is to come from the excess in the petroleum products gross receipts tax over the 2006 revenue, subject to a \$10 million cap, decreasing to \$5 million in 2009, and annually thereafter. The funds are to go into a fuel oil conservation account, which is a separate non-lapsing account within the General Fund, but any monies not spent are transferred to the General Fund.

Because of funding issues around when the Comptroller could allocate money into the fuel oil conservation account, the board had no funding until the 2008 June Special Session when the legislature authorized the Comptroller to deposit \$2.5 million in the account, with the remainder going into the account by October 1, 2008. In addition, in the August 2008 Special Session, \$7 million was authorized in surplus General Funds to establish an energy audit program within OPM for persons who heat their homes with oil or another non-regulated source. The monies would cover the costs of the audit -- beyond a \$75 required fee from the customer -- performed by qualified oil companies and other vendors between September 1, 2008 and June 30, 2009.

**Activities.** The fuel oil board issued an RFP in February 2008 to select an administrator, but did not meet from May through September. As of September 2008, a board subcommittee had reviewed the responses to the RFP for an administrator and the board recommended the subcommittee negotiate a fairly short-term contract with the subcommittee's final candidate. The board was also considering a proposal from the CAP agencies that already serve persons in the low-income energy assistance programs (discussed in the next chapter), who were already known to need furnace repairs and replacement, or were awaiting other residential conservation measures.

The board issued a plan in December 2008 and held a public hearing to receive public comment. In January 2009, Public Act 09-1 (deficit mitigation act) reduced the FY 09 funding for fuel oil conservation programs by \$2.5 million (or 50%). As of April 2009, the program had funded more than 300 furnace upgrades or replacements.

## **Energy Efficiency and Conservation in State Buildings**

Government buildings are a significant source of energy consumption. Focus on energy efficiency in state government facilities has always been a concern, but has become more acute as the costs of energy have increased. Attention to the practice of energy efficiency by state governments is one of the eight areas where states are judged by ACEEE on the state energy efficiency scorecard. The national organization ranks and awards states on their model efficiency programs, including how well they practice energy efficiency in state facilities, transportation, and procurement practices, or "leading by example" (LBE) as the category is labeled.

As cited earlier, ACEEE ranks Connecticut in the top three states for overall score, but puts the state in the middle of the rankings with a score of 1 out of a possible 3 in the “lead by example” category. In 2006, sixteen states achieved a higher ranking. Common deficiencies in state programs are:

- *Limited knowledge.* Information sharing and learning from the experiences of other states can help break the barrier of limited knowledge.
- *Insufficient funding.* Innovative financing mechanisms are already being used by many states to fund some of the LBE efficiency programs.
- *Limited support and staff availability.* Identifying a “champion” in each agency is important to ensure that LBE programs are implemented.

The ACEEE report suggests some key policies that can improve a state’s energy efficiency practices, and hence its overall program. Some of those are:

- using energy efficiency performance criteria, including EPA’s ENERGY STAR requirements;
- establishing new and existing building energy efficiency targets and savings goals;
- implementing procurement requirements, such as ENERGY STAR appliances, energy efficient equipment, and vehicles;
- identifying and using innovative financing mechanisms (e.g., energy savings performance contracts that require the savings cover the cost of improvements);
- adopting a tracking and reporting system for agency-by-agency data collection; and
- assigning an agency-level energy manager to be accountable for progress.

## **Connecticut’s Experience**

In 2007, costs for energy in Connecticut state buildings were approximately \$123 million. While less than 1 percent of the state budget, nonetheless, it is a significant operating cost. However, the attention and priority given to energy efficiency and conservation programs is episodic and results are spotty, as the discussion below indicates. For the most part, state government’s energy costs are an operating expense paid for from the General Fund. Capital improvements to state buildings, including installation of energy efficiency measures, are mostly supported with state bond funds.

In the 2001 June Special Session, the legislature required that \$12 million be diverted from the Connecticut Conservation and Load Management Fund (now known as the Connecticut Energy Efficiency Fund) to a non-lapsing account for the Department of Public Works (DPW) for energy conservation programs in state facilities. DPW recently issued two reports on the status of those funds and the projects, which are summarized in the two tables below. Table V-2

summarizes the status of projects that are being funded without utility matching funds and Table V-3 summarizes the status of projects that will tap into the CEEF Small Business Energy Advantage Program.

Table V-2. Status Summary of Projects Using \$12 Million Diverted from CEEF to DPW: No Utility Matching Funds		
Project Status – 37 potential projects	DPW Funds	Agency Contributions
11 completed	\$3.5 million	\$700,000
18 underway; not yet complete	\$3.83 million	\$150,000
1 project complete	No DPW funding	\$310,710 (OPM)
1 project for solar PV	\$150,000	Applied to Clean Energy Fund (\$450,000)
5 projects cancelled (bidding and contract issues, too cost prohibitive, or not enough savings projected)	N/A	N/A
1 project “on hold” (bidding issues)	N/A	N/A
Total	\$7.3 million	
Source: PRI Staff Summary of DPW July 2008 status report		

Table V-3. Status Summary of Projects Using \$12 Million Diverted from CEEF to DPW: With CEEF Funding		
Project Status – 23 potential projects	DPW Funds	CEEF Small Business Program Funds
3 completed/substantially completed	\$264,248	\$261,685
3 underway	\$135,199	\$124,196
5 about to start	\$214,104	\$227,796
6 on hold, pending CL&P funding (1 project does not have cost figures yet)	\$129,620 (5 projects)	\$93,185
6 on hold – DPW review or other reasons	\$489,996	\$302,243
Total	\$1,233,167	
Source: PRI Staff Summary of DPW July 2008 status report		

Since the \$12 million was dedicated seven years ago, the identification and completion of projects has been slow; only 35 projects have been completed or are underway, with about \$8.5 million spent or committed. One possible contributing factor is that responsibility for oversight and implementation of state facility energy management appears split between the Office of Policy and Management and the Department of Public Works. Further, there is only one and a half FTE staff at the Department of Public Works to oversee energy efficiency projects.

**P.A. 03-132.** Other attention has been given to energy management and efficiency in state buildings. In 2003, P.A. 03-132 was passed to implement the recommendations of the 2002 program review study on Energy Management by State Government. Three primary recommendations in that legislation were: 1) a mandate that the Office of Policy and Management require each state agency to identify methods available to reduce energy costs and the feasibility of implementing those methods; 2) that the Governor's budget include a line-item breakdown of each agency's energy expenditures; and 3) that OPM and DPW establish a pilot program that selects a state facility or complex to be covered by an energy performance contract with a private vendor.

In response to the legislation, OPM did survey all state agencies and in February 2004 released a report entitled *Energy Management in State Facilities: A New Direction*. That report identified strategies for improvement including development of energy consumption monitoring data by building and by time of day, and linking that information to CoreCT (state government's automated business system for personnel, bill payment etc.) so that use data would automatically be reported at the time of bill payment.

However that linking has not yet been done, both because of system issues and because the biggest state government user of energy, higher education, is not on the CoreCT system. Thus, sound data on energy consumption in state facilities is difficult to obtain. Partially due to the lack of system capabilities, the budget reporting of energy expenses by agency has not been done.

The 2004 OPM report also identified the need for energy benchmarking in state buildings that compares their energy profile to similar buildings, to better target those state facilities most in need of energy improvements. In 2005, OPM issued a memorandum of agreement with the Institute for Sustainable Energy to conduct this benchmarking effort. To date, 110 buildings have been benchmarked, and some have been identified for energy efficiency projects as outlined in Table V-2 and V-3 above.

However, the second recommendation to pilot a private vendor energy performance contract was never implemented. Thus, no results can be analyzed to assess whether this might be an opportunity for state government to execute energy efficiency in a cost-effective way.

**Governor Rell directive.** In mid-December 2004, following significant increases in electric rates, Governor Rell directed the Department of Public Utility Control, the Office of Consumer Counsel, and the Energy Conservation Management Board to identify opportunities to reduce electric consumption at state facilities. The focus was to reduce the impact of increases in electric rates on the state budget.

The working group issued a report in February 2005, stating “there are considerable opportunities for savings that remain untapped.” The report cited that a major gap was that the state had no comprehensive energy efficiency plan for its agencies. The report proposed 32 action steps that could be taken to reduce electricity consumption, many of which, according to the report authors, could be implemented quickly and would involve little or no upfront financial investment relative to the savings that could be achieved. The 32 proposals for change focused on the following:

- directing state agencies to contact electric utilities to ensure they are receiving the most beneficial rate or using the rate schedule that provides the lowest overall cost;
- creating a single point of contact for energy efficiency at all state agencies, staffed by personnel with expertise in energy efficiency;
- assigning responsibility for energy efficiency to management at each state agency;
- instilling an energy efficiency ethic among state employees;
- developing statewide energy efficiency standards and practice for agencies;
- establishing state energy reduction goals, suggesting a 10 percent reduction in 2005 and an additional reduction of 5 percent in 2006;
- using incentives to sustain consumption reduction like embedding a portion of the savings in the agency budget;
- participating in load response programs; and
- establishing a state government energy plan, and preparing an energy efficiency scorecard for every state building and the equipment it contains.

However, the report did not clearly designate any agency or staff as being responsible for implementation. No status report on the results has ever been issued, and while it is clear that many of the steps have not yet been implemented, progress is being made in some areas. For example, state government:

- participates in load response programs;
- has recently begun using the electricity markets and its clout as a large purchaser to obtain favorable rates for state government’s energy supply, realizing considerable financial savings; and

- issued an energy plan for state buildings in 2007.

**Load response.** P.A. 05-01, the Energy Independence Act, established several initiatives to reduce electric power supply costs caused by inadequate transmission and generation infrastructure in Connecticut, especially in the southwestern region of the state. Many of the financial incentives have supported installing onsite electric generation so that demand can be reduced off the New England electric grid during times of peak demand. Since 2005, 11 state agencies at 40 different sites have been participating in these load response programs, which generate about \$1.7 million in payments to state government from ISO-New England, the region's independent electric grid operator.

**State energy plan.** The state has also developed a state energy management plan for state facilities. The plan, which was also a requirement of P.A. 07-242, was developed by the Office of Policy and Management Energy Unit and issued in September 2007, modified in November 2007. The plan provides anticipated savings and efficiencies that could be realized around certain proposals, including expansion of the load response program discussed above.

One of the tasks outlined in the plan is to develop a master contract with the utilities to govern state agency participation in ratepayer-supported CEEF and CCEF programs. In the early years of the Connecticut Energy Efficiency Fund, the state accessed the fund frequently. Between 2000 and 2004, 326 state projects received financial incentives from the Connecticut Energy Efficiency Fund totaling over \$7.8 million.

However, in the wake of ethics scandals, Governor Rell issued a series of Executive Orders during 2005 and 2006 requiring contracting reforms in state government. It was determined that the state access to the Connecticut Energy Efficiency Fund would be affected and that more formal contracting would be required. The provisions for the master contract have been developed over the past year and a request for proposals has been issued by the Department of Administrative Services. Responses were due on September 23, 2008.

During the time the contract was being developed, the state's participation in CEEF has fallen dramatically. United Illuminating indicates that only 32 state projects participated in its programs during 2005-2008 (to date), and received funding of about \$112,000, while CL&P stated that for the 2005-2007 calendar years, it funded 60 state projects for a total of about \$1.1 million.

Since the Clean Energy Fund is within a quasi-public state agency, the state would not have faced similar contracting issues with that fund, but only two state agencies have used or attempted to use it since its inception. DOT received \$140,000 for a solar system and DEP has applied to the fund for a \$450,000 solar system. Public Act 07-242 authorized \$30 million in bonds for the Clean Energy Fund to support the costs of renewable energy and combined heat and power projects in state buildings that could meet certain design ratings. However, the State Bond Commission has not issued any bonds for that purpose to date.



## State Organizational Structure and Funding

***Best Practice:*** 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.

The findings resulting from this study lead to the conclusion that the *organizational structure and programs aimed at energy efficiency and renewable energy are currently operating in a fragmented way, 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 these 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.”<sup>27</sup> 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 have had narrow scopes 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, had they 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.

### Organization

Figure IV-1 on page 36 illustrates the funding, delivery, oversight, and regulatory functions around these programs can prove difficult (if not impossible) for a consumer to navigate. Further, the committee study concludes 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.

<sup>27</sup> Various Energy Issues for Connecticut: Draft Phase II, November 2008, pp. 3 and 15

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 been 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 residences using 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 both agencies have carried out the assigned programs well, the program review committee 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 chapter. 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. A plausible explanation for this is because there is no staff clearly identified as Connecticut 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, 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 Chapter III, 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 a study on the energy workforce, and coordinating work on the construction of the new Science Center, most efforts are informal. Other specific statutory requirements on coordination, e.g., evaluation efforts, have not been fulfilled.

Because energy efficiency and renewable energy programs are located in different agencies, it is difficult to meet the statutorily required efforts at coordination and to achieve overarching state goals of reducing energy consumption and promoting alternative energy. Further, any joint efforts with other governmental agencies become more difficult. A primary example is potential action that could be undertaken with EPA to assist Connecticut communities in first reducing their energy use in municipal buildings by 10 percent, before adopting an alternative energy goal. If programs were co-located the goals for achieving efficiency and alternative energy might be more easily realized.

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.

As a way to address the recognition of program fragmentation and the lack of a fuel-blind approach to make overall energy reduction achievable, the committee considered a staff-proposed recommendation to consolidate all energy efficiency and alternative programs into one energy authority that would be in the form of a quasi-public agency. The proposal would have consolidated most of the programs described in Chapters IV and V-- the Connecticut Energy Efficiency Fund (CEEF), the Connecticut Clean Energy Fund (CCEF), the Electric Efficiency Partners (EEP), the Energy Conservation Loan Program (ECL), municipal utility conservation, OPM's furnace rebate program, the Energy Independent Act programs, and weatherization programs. In addition to program operations, funding and planning functions would also be streamlined under a consolidation (See Appendix H for a schematic of the proposal.)

Ultimately, a majority of the committee membership did not support the proposal, for a variety of reasons, including: opposition to the creation of a new quasi-public agency; support for how the programs were currently operating in terms of serving consumers; and a concern that the proposed authority would decrease policymakers' ability to oversee the programs.

## Funding

**Best practice:** Energy efficiency funding should be: stable and predictable; support programs for all customer groups; tied to long-term goals; and 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 VI-1 provides the appropriated amounts that are ongoing, and Table VI-2 shows one-time allocations.

<b>Table VI-1. Annual Funding – 2008 Approximate Allocations</b>		
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 (ECLP)	\$2
Federal Department of Energy	Weatherization Assistance program/ DSS/ CAP agencies	\$2.5
<b>Total</b>		<b>\$180.4 million</b>

<b>Table VI-2. 2008 One-time Funding</b>		
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 ECLP	\$4
General Fund to add to Weatherization Program	Weatherization Assistance program/ DSS/ CAP agencies	\$2
<b>Total</b>		<b>\$25.5 million</b>

As Tables VI-1 and VI-2 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 1 mill 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 is spent in 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. As of early 2009, the future funding of both the Connecticut Energy Efficiency Fund and the Clean Energy fund are again at risk because of the state's dire financial situation.

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 charges are established in statute and therefore the stability in funding is assured, a longer-term plan and budget process could provide more predictability to residential and business consumers that efficiency programs would be offered without major changes.

Not only does the planning cycle lack long-term stability, it is also time-consuming and labor intensive. The electric utilities annually prepare the CEEF plan in concert with ECMB. The gas utilities develop a consolidated energy efficiency plan and CMEEC creates its energy efficiency plan, both of which are submitted to ECMB, with 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 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 DPUC.

**Revenue sources.** As shown in Table VI-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 the committee does not consider that revenue for energy efficiency should be on a dollar-for-dollar basis with 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. As noted earlier, in 2007, Connecticut ranked 12th 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, which was \$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, the program review committee recommends:

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

The legislature in 2007 also 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 in 2008, and thus will provide considerable revenue for oil conservation.

The committee finds that while this revenue 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 sales<sup>28</sup>, if they were taxed. The committee believes it is important to maintain a level of parity in funding among the fuel sources.

Therefore, the program review committee recommends:

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

---

<sup>28</sup> 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

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

The program review committee 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.*

Since 2005, the legislature has required:

- a natural gas conservation program to serve natural gas customers;
- 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 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 CEEF.

In establishing additional programs, the legislature recognized the need for more coordination among all the different entities. Gas companies are required to have the Energy Conservation Management Board (ECMB) approve their plan, and the municipal electric utilities are required to submit their plan to ECMB, although it does not have approval authority. The Fuel Oil Conservation plan is also required to be submitted to the ECMB for its approval.

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 programs 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. Emphasis should be placed on designing programs that meet all energy conservation needs -- from identification of problems to helping align financing mechanisms.

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 develops into 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.

The program review committee concludes that no matter what agency is delivering the programs, the following factors or “best practices” should be considered in designing the programs<sup>29</sup>:

- *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 bills by an average of 25 percent in the housing units served.”
- *Programs should be developed that serve all customer groups.* These groups include residential, low-income, small business, and large commercial customers.
- *Programs should be developed that target hard-to-serve customers.* For example, programs could be developed for multi-family rental housing, nursing homes, and municipalities, including schools.

---

<sup>29</sup> These “best practices” are adaptations of standards and guidelines included in the *National Action Plan for Energy Efficiency*, July 2006.

- *Programs should ensure that where feasible, energy savings undertaken should follow a hierarchical approach.* This means the most cost-effective energy efficiency measures are taken first before upgrades or alternative energy measures are considered. For example, insulation, duct sealing and other weatherization measures should be taken before installing a new furnace (or at least done simultaneously).
- *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, the same programs should offer the same rebates, charge the same co-pay, install the same warranted measures, and offer incentives to all customers of those programs no matter the fuel source, or area of the state.
- *All programs should be implemented by persons certified and trained in a given area.*
- *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.
- *Programs should be evaluated as recommended in Chapter IX, 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 flexibility in designing programs should be maintained to achieve overarching energy savings goals, several major program initiatives that might be incorporated into a program 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.

Chapter I showed that Connecticut is not a high energy-consuming state; ranking 44th 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 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 chapter. 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 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.

Chapter I 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 units 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 percent).<sup>30</sup>

**CEEF residential program design.** It has only been since the middle of 2007 that the CEEF has developed the Home Energy Solutions program, which offers a more "holistic

---

<sup>30</sup> "Reducing Oil Use Through Energy Efficiency," American Council for an Energy Efficient Economy, p. 17.

approach” to weatherizing homes for customers that are not low-income. Residents schedule the HES audit through the utility; 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 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 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 a \$300 co-pay was required of customers who heat with oil. 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. The fact the program was established underscores the need to have uniform coordinated programs for all customers regardless of energy type or funding source.

As a result of 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. Introducing additional subsidized home energy audit programs may increase availability and decrease waiting time for customers, but, 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.*

## **Benefits to Residents**

There must be demonstrable benefits for residents to undertake measures for which they will have to pay. Therefore, residential energy efficiency programs should provide residents with tangible benefits such as certifying a house as “energy efficient.”

**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 pages 15-16), 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 or 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.** Theoretically, implementing a 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. Depending on demand, if resources needed to be prioritized, older (pre-1980) housing units could be targeted first. Funding 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 a home certification program like the one discussed above would 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 energy efficiency and conservation. The two electric utilities worked with Gateway Community College during the summer of 2008 to sponsor CEEF-funded training in the building analyst program, which is a certification program endorsed by the Building Performance Institute (BPI).<sup>31</sup> 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 the 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 information about 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 in Connecticut and make specific recommendations for what efforts need to be undertaken to improve it. The study is expected to be completed 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).

The ENERGY STAR program developed by the federal Environmental Protection Agency and Energy Department issues energy standards in a number of areas including household appliances, new home construction, and in conducting home energy audits. Information on which states use the standards in their programs is included on the ENERGY STAR website. Twenty-two states offer programs that meet the ENERGY STAR energy performance evaluation standards for existing homes. According to the website, Connecticut's CEEF programs meet the ENERGY STAR standards for new home construction, but Connecticut is not among the 22 states using the guidelines for existing homes.

---

<sup>31</sup> 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.

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 energy 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 Maine staff, because the customers receive no reimbursement for the initial evaluation or implementing recommended measures, demand for evaluators has been low.

There is acknowledgement 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, 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 offered the training quarterly and 50 people completed each session, the cost would be about \$700,000 annually, at the Maine cost of \$3,500 per person. Assuming a pass rate of 75 percent (not everyone passes the certification test), about 150 people could be certified in one year.

The Energy Efficiency Fund should work with the community colleges to locate qualified instructors, and provide the training facilities, equipment, and ongoing support to ensure that such a program is successful. Once homeowners recognize the certification 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.

The federal economic stimulus package currently being negotiated in Congress may well offer Connecticut and other states some financial support in this area. Components of the package under consideration may well provide some funding for both training and expanding a workforce capable of undertaking residential (as well as municipal and other public building) energy conservation projects, as well as offer tax credits and other incentives to homeowners to undertake conservation projects and purchase products to become more energy efficient.

### **Financing Residential Energy Efficiency**

As part of the committee study, 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 were low*. In the average home, 13 percent of electricity was saved and natural gas consumption was reduced by six percent.<sup>32</sup>

The committee 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 opportunity to install the measures has passed, customers do 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 (previously described in Chapter V) 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.

### **Other States' Energy Loan Programs**

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

---

<sup>32</sup> PRI calculation based on data provided by the utilities on annual electricity and gas savings and number of customers served.

Table VII-1. Comparison of Energy Loan Programs in Selected Jurisdictions								
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 listed in the table above that have higher activity levels than Connecticut 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 has 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 Energy Conservation Loan program 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: 1) funding energy efficiency loans by municipalities through the issuance of special tax bonds that are paid by participating homeowners as a line item on property tax bills; and 2) 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, but 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.

## **Performance Contracting**

Large and small companies have offered "whole building" approaches to energy savings for 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 about energy management in state buildings, including the requirement that the 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 energy savings company both indicated that there are few other towns engaging in performance contracting in Connecticut mostly because municipalities have little experience with it, and they fear the risk.

Many states have adopted model performance contracting language as part of their energy statutes. Massachusetts established performance contracting provisions in its 2008 comprehensive energy legislation known as the Green Communities Act that state agencies and local governments may use as guiding language. 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? Second, 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. The federal stimulus package may well target some funding toward making municipal buildings more efficient.

### **Lead By Example**

As discussed in Chapter V, Connecticut state government has not been ranked high for 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. Also, minimal progress has been made 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 an energy conservation plan that lists 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 identify ways, through employee surveys and other means, the Capitol complex could conserve energy use. Many of the responses suggest simple behavioral changes while 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 2008 requiring that all future appliance purchases in executive branch agencies shall meet ENERGY STAR standards. 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, the program review committee 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, the program review committee 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

*Best practice: 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, the committee focused on the implementation of the energy efficiency programs funded with electric ratepayer money. Committee 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 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. *The program review committee 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 earlier 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 (EEP) 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 the EEP program participants but 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 Chapter Ten.

Electricity savings currently serve as the only mechanism for measuring whether implementation is successful. Savings are calculated for individual measures installed and then 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.

It was also found, based on the phone survey, that *many participants 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 “rate-payer” 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.

Energy efficiency program administrators should consider the following “best practices” when designing and implementing programs:

- Develop and issue requests for proposals to implement all 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.

- 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.

### **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 DPUC with a rate request. United Illuminating is the first utility to request full decoupling as part of its current rate case 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:

$$\text{Incentive} = \text{Total spending (minus administration and Energy Conservation Management Board expenses)} \times \text{weight} \times \text{pretax incentive (\%)}$$

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 VIII-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).

<b>Table VIII-1. Connecticut Utility Incentive Structure</b>	
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, and 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 VIII-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, 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 VIII-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 analysis of incentive documentation.

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 VIII-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 sectors, yet the goals were exceeded by only 63 percent.

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 Chapter IX). Based on incentives and the performance of both utilities, the program review committee believes it is unclear whether the goals are set too low or the utilities have exceptional performance.

The program review committee 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 Chapter IX.

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 VIII-5.

<b>Table VIII-5. Administrative Costs in Comparison States</b>			
<b>State</b>	<b>Services</b>	<b>Percent of Budget</b>	<b>Receive an Incentive Payment**</b>
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			
**If a state receives an incentive payment, it is included in administrative costs			
Source: PRI staff analysis.			

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 the committee makes no recommendation to change this specific incentive structure, the recommendation proposed in Chapter IX to have a more robust evaluation process will help remedy the deficiencies between actual savings realized compared with reported savings upon which incentive levels are calculated.

## Measurement and Evaluation

**Best practice:** *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 IX-1 describes the three types of evaluation methods.

<b>Table IX-1. Types of Evaluations</b>	
<b>Name</b>	<b>Description</b>
Process	helps 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	measures 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 IX-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.

<b>Table IX-2. Recognized Energy Efficiency Program Leaders in Evaluation, Compared to Connecticut</b>				
<b>Portfolio Administrator</b>	<b>Budget</b>	<b>\$ allocation for evaluation</b>	<b>% of Budget Allocation</b>	<b>Required Periodically</b>
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 CEEF 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 was formed and one of its functions includes oversight of energy efficiency program 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 all final draft evaluation reports. These subcommittee responsibilities are completed in consultation with the utilities' evaluation teams (i.e., program administration). In addition, ECMB employs a part-time consultant who assists the committee with the management of the evaluation work.

**Evaluation planning.** Each year the CEEF plan submitted to DPUC includes a section on program evaluation. 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. The program review committee 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 design and implementation of evaluations 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 energy efficiency program administrators have 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.

Committee staff reviewed evaluations posted on the ECMB website and 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) and 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) evaluations. 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 utility 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*, the program administrator. 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, EVT is required to submit energy savings figures to the DPS on or before April 1 each year. 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 DPUC at the same time as the CEEF plan so that the regulatory agency can review how the calculations and savings are derived. The ECMB consultants 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 CEEF 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 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.

*The program review committee 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 charges<sup>33</sup> 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.*

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.

---

<sup>33</sup>The 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.

Periodic progress reports have been made 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 2008. 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. *The committee 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.*

### **Connecticut Municipal Electric Energy Cooperative (CMEEC)**

The 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 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. Connecticut General Statutes Sec. 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 what portion of funding will go towards evaluation of the programs based on the approved October 2008 plan.*

Based on all the preceding findings, the committee proposed that evaluation work for all energy efficiency, conservation, and renewable energy programs be planned and implemented under an independent entity. The intention of the following recommendation is to ensure that meaningful, rigorous evaluations are conducted on programs intended to achieve electric and overall energy savings. Therefore, the program review committee recommends:

**A new division within the Office of Consumer Counsel (OCC) shall be dedicated to evaluating all energy efficiency, conservation, and renewable energy programs. 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) and submitted to DPUC for its approval. 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; and**
- **half the evaluation budget shall focus on impact evaluations, with the remainder for process and market effects evaluations.**
  - **Cost: The OCC will probably require three 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 (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 current programming budgets.**

The program review committee believes moving the evaluation function to the Office of Consumer Counsel provides 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 evaluation into one organization will ensure all programs are evaluated regardless of the type of energy or revenue source.

## 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:

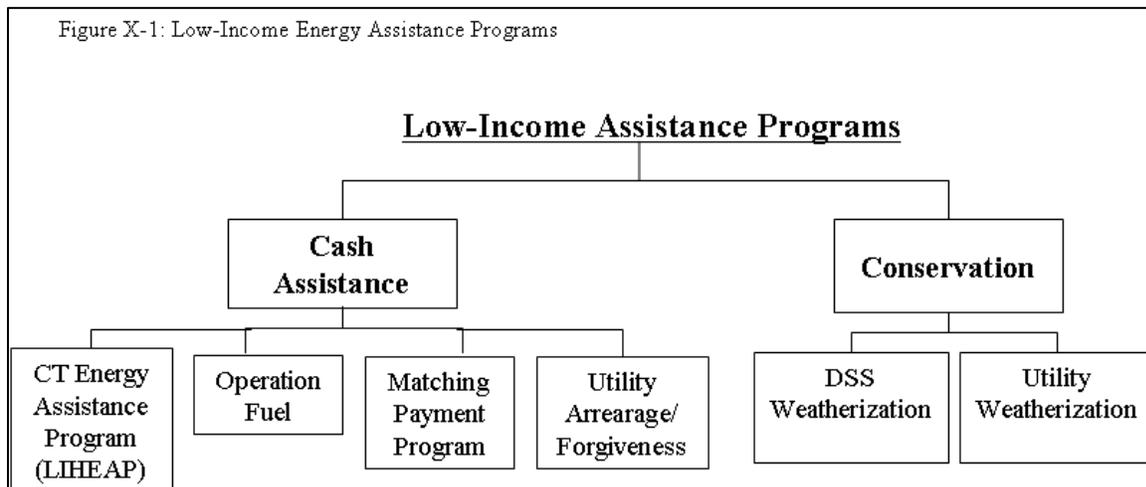
- *to ensure that low-income households can meet essential energy needs*

This chapter identifies all of the programs Connecticut has in place to assist poorer residents, including a discussion of eligibility requirements, activity levels and costs of all energy programs. The chapter also describes how the programs operate, as well as where deficiencies are found and recommendations for improvement.

### Connecticut’s Low-Income Assistance Programs

Energy costs are taking a greater share of everyone’s household budget, and lower-income residents are especially hard hit. Often these households use more energy as an ill, disabled, or elderly person lives in the house, and thus the unit is occupied for more hours; also the building structures are frequently older and inefficient. Since lower-income households pay the same energy prices as others, it takes a greater portion of their household income.

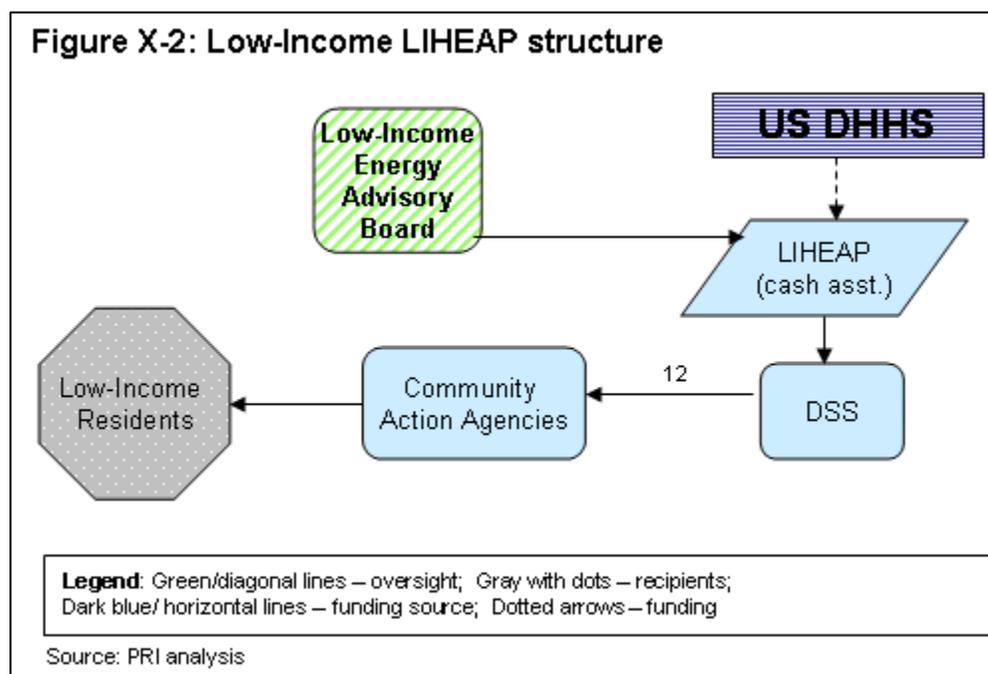
As Figure X-1 demonstrates, energy assistance for low-income households is provided as cash assistance or through conservation measures. Both types of programs are supported both with utility ratepayer funding and with federal and state funds, as well as charitable donations.



## CASH ASSISTANCE PROGRAMS

These programs offer assistance that help low-income customers pay their bills, and are shown on the left of Figure X-1. The major energy cash assistance program for low-income households is known as the Connecticut Energy Assistance Program (CEAP), which is funded almost exclusively with federal dollars. Those federal dollars come to Connecticut by way of a block grant through the Low Income Home Energy Assistance Program (LIHEAP), a federal Department of Health and Human Services initiative begun in 1980.

The purpose of the program is to *assist* low-income households with their heating (or cooling) expenses. The program clearly states, however, that the purpose is *not* to pay for *all* of a household's energy costs. Figure X-2 below shows how the program is implemented.



**Funding.** LIHEAP is not an entitlement program, so once the allocation of the block grant runs out the state must fund the program or terminate enrollment. Funding is based on a formula and allocated for the federal fiscal year. FFY 08 allocations totaled about \$65 million, which included a federal contingency allocation of almost \$17 million. Table X-1 below shows the aggregate expenditures for FFY 07, the latest data available on expenditures during the study.

<b>Table X-1. Connecticut Energy Assistance Program – FFY 07</b>	
Client Asst. Benefits	\$54,881,921
CAP Agency administration	\$4,244,317
Assurance 16 (case management)	\$1,000,000
Federal charges	\$12,778
DSS administration	\$230,000
<b>Total</b>	<b>\$60,369,016</b>
Source: CEAP 2007 Report to Legislature	

**Operations and administration.** The Department of Social Services is the state agency designated to receive the federal block grant funding, but DSS contracts out the actual operation of the program to the 12 Community Action Agencies (CAPs), anti-poverty agencies created by federal law in the 1960s.

The CAP agencies rely on other volunteer programs, town agencies, fuel banks, and 2-1-1 (Infoline) to provide information and to take applications, but the CAP agencies make the eligibility determinations. The CAP agencies make the payments directly to the utility or fuel oil deliverer, and while payments from the program are not issued before November 1, over the past two years applications have been accepted beginning in August to make the application and approval process less compressed.

The CAP agencies have been administering the Energy Assistance Program since its inception, and this is a common model for delivery of the LIHEAP program throughout the country.

**Oversight.** The Department of Social Services is statutorily required to develop a plan for the Connecticut Energy Assistance Program. The plan must be submitted to the Office of Policy and Management, and a legislative public hearing on the plan is held prior to its approval. The Low-Income Energy Advisory Board, an 18-member board created by the legislature in 2005, also advises on the plan. The board is made up of both representatives of state agencies and non-profit agencies that serve low-income and elderly residents, including DSS, OPM, DPUC, and the Office of Consumer Counsel, as well as utility companies and home heating oil deliverers. The board is mandated to advise and assist DSS and OPM in developing and implementing energy assistance and weatherization programs for low-income residents, and additionally to advise the DPUC on the impact of utility rates and policies.

**Eligibility criteria.** The criteria for energy assistance are based on income, with benefit levels dependent on poverty level categories. For most households, the top income level to be eligible is at 150 percent of the federal poverty level -- for a family of four, that income is \$31,800 a year. There is a component of the program, the contingency heating assistance program, (CHAP) that provides limited assistance to households with higher incomes.

Connecticut's program also applies an asset test. Homeowners may not have liquid assets exceeding \$10,000 (or the amounts over that will be added to their annual income) and renters may not have liquid assets exceeding \$7,000. Table X-2 shows the income categories and benefit level for households in each category. (Households with elderly and disabled members are treated differently, as explained below).

**Basic benefits.** All households that meet these income and asset requirements, regardless of the heat source, may receive the basic payment indicated *once* during a heating season. The table below shows both the benefit structure that was in place prior to the approval of the 2009 plan and the increased benefit levels provided in the current plan, which was approved by the relevant legislative committees in early September 2008.

<b>Table X-2. Connecticut Energy Assistance Plan – Basic Benefit Structure</b>						
<b>Income as % of federal poverty level</b>	<b>Basic Heat Benefit</b> (primary heat only; benefit paid to vendor)				<b>"Renter" Benefit</b> (heat included in rent & rent exceeds 30% of gross income; benefit paid to household)	
	<b>Vulnerable</b> (household includes member who is disabled, 60+ or under 6 years)		<b>Non-vulnerable</b>		<b>No differentiation of vulnerable and non-vulnerable</b>	
	Pre-2009 Plan	Post-2009 Plan	Pre-2009 Plan	Post-2009 Plan	Pre-2009 Plan	Post-2009 Plan
0%-100% <b>(CEAP)</b>	\$ 675	\$925	\$ 635	\$885	\$ 270	\$455
101%-125% <b>(CEAP)</b>	\$ 580	\$830	\$ 535	\$785	\$ 255	\$440
126%-150% <b>(CEAP)</b>	\$ 485	\$735	\$ 435	\$685	\$ 240	\$425
150%-200% <b>(CEAP Elderly &amp; Disabled)</b>	\$ 400	\$650	Not Applicable		(No "renter" benefit)	
150% FPL - 60% state median income <b>(CHAP)</b>	\$300	\$625	Not Applicable			
Source: Connecticut Legal Services Inc., and PRI analysis of the 2009 CEAP plan legislative amendment.						

**Additional benefits.** Once a household has received the basic benefits, which are outlined in the table above, the household may be eligible for additional assistance. If the house is heated with a deliverable fuel, like home heating oil or propane, and not a utility, the household may receive a one-time crisis benefit, if the application is made by mid-March. The crisis benefit had been \$400 for all CEAP households and \$200 for CHAP households, but those amounts increased to \$565 for both program components in the 2009 plan.

If crisis benefits are also exhausted, households with deliverable fuels may be eligible for two “safety net” benefits, which had been \$400, but increased to \$625 effective with the 2009 plan. The household must be unable to pay for fuel, have no other heated shelter option, apply before mid-March and be interviewed by CAP agency staff. Finally, if a household is a “vulnerable” one (defined in table), the household may receive an additional payment, which had been \$400 but also increased to \$625 for the 2009 heating season. Thus, for the poorest “vulnerable” households that heat with a deliverable fuel, the maximum amount available through the low-income assistance program is \$3,365 per heating season.

There are also other much smaller elements of the CEAP program that offer eligible households assistance with heating conservation measures such as cleaning and tuning their

heating systems, or, if necessary, furnace repair or replacement. Those numbers are provided in the weatherization section later in the chapter.

**Program activity.** Table X-3 below shows households served and expenditures for each of the components of the LIHEAP program for the 2007 heating season. Thus, 84,757 unique households received basic benefits, with fewer households receiving other components of the program.

<b>Table X-3. Low Income Energy Assistance Program Components: Activity and Expenditures 2007</b>		
<b>Basic Benefits Program</b>		
Applications Received	97,791	
Applications Approved	84,757	
<b>Basic Benefits Program</b>		
	<b>Households</b>	<b>Expenditures</b>
CEAP	65,229	\$37,240,447
CHAP	17,617	\$5,328,119
<b>Crisis Benefit Program</b>		
CEAP	18,126	\$6,222,753
CHAP	5,767	\$988,956
<b>Rental Assistance</b>		
CEAP	1,911	\$506,415
<b>Safety Net</b>		
CEAP	8,585	\$3,337,753
<b>Furnace Repair/Replacement</b>		
	403	\$1,126,528
<b>Conservation Measures</b>		
	940	\$130,950
<b>Total Units – all programs</b>	<b>118,578</b>	<b>\$54,881,921</b>
Source: DSS 2007 report		

**Fig. X-3. Number of CEAP Energy Asst. Households: by Fuel Type 2007**

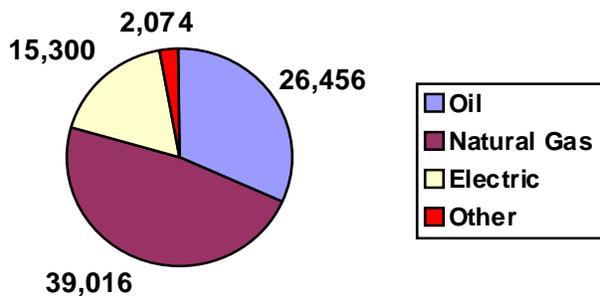


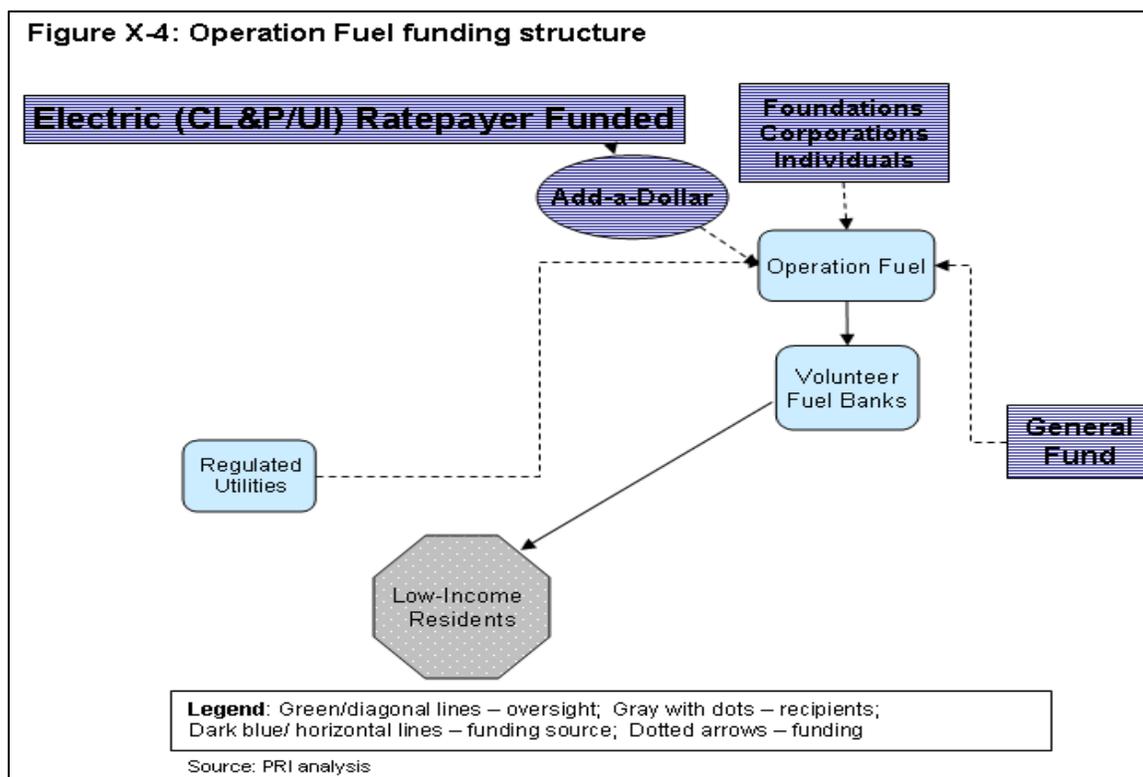
Figure X-3 shows the number of energy assistance households by the type of fuels used to heat their homes. Almost half (47%) were heated with natural gas, about 32 percent heat with oil, and about 18 percent with electricity. This is somewhat different than the ratio of Connecticut households overall by heating source, where more than half heat with oil. This is most likely due to the fact that more renters (72%) than homeowners (28%) are receiving cash energy assistance and more renters use gas and electric heat.

**Vendors.** Clients in the energy assistance program who heat with oil may use any heating oil delivery company as long as the company is registered with the Department of

Consumer Protection, and has filed a vendor document with the Department of Social Services. DSS pays vendors a discounted price -- a 31 cent reduction off the average daily price at New Haven harbor for heating oil quoted by the Oil Price Information Service (OPIS). However, adjustments are made based on the county in which the delivery is made to allow for costs of transporting and delivery. Propane and kerosene deliveries are paid at retail levels. Because of the discount in what vendors are paid from DSS, there was concern about whether there would be a drop in the number of vendors overall or by area, but DSS indicates that the total number of vendors participating has increased over 2008.

## OPERATION FUEL

This program was established in 1977 to provide assistance to families, the elderly, and disabled who do not qualify for state energy assistance. Its mission is to serve households with incomes from 151 percent to 200 percent of the federal poverty level and have a documented crisis such as an illness, unemployment, non-support, or death of a partner. Figure X-4 demonstrates the funding mechanisms and structure for Operation Fuel.



**Program administration.** Operation Fuel delivers the energy assistance through 63 statewide fuel banks that run the program voluntarily and receive no compensation for administrative costs. These organizations include town social services departments, community action agencies, religious organizations, and non-profit organizations. Unlike the state administered energy assistance, Operation Fuel pays retail prices for the fuel it provides. In FY 07, Operation Fuel paid an average of \$2.61 for a gallon of oil, whereas in FY 08 it paid an average of \$3.35 for a gallon of oil. Operation Fuel’s operations, funding, and reporting are conducted on a state fiscal year basis.

The maximum allowable grant per household was \$400 in FY 07 and \$500 in FY 08. The fuel banks operate from December 1 through May 31 if enough funds exist to keep operating. In 2008, Operation Fuel continued to operate through the summer providing grants of up to \$250 to help customers with energy bills.

**Funding.** Operation Fuel is supported by a variety of funding mechanisms. Its original funding source was established in 1983, when the Connecticut General Assembly passed Public Act 83-505. That legislation mandated gas and electric companies that serve more than 75,000 customers to provide an opportunity for their customers to add one dollar to their monthly bill payment. Operation Fuel is the recipient of the donations, which currently provides approximately 25 percent of its funding. The utility companies voluntarily match the donations made by customers. Both UI and CL&P match 50 cents on the dollar, up to the first \$150,000. In 2007, their contributions amounted to 8 percent of Operation Fuel’s revenues. Foundation and corporate funding account for another quarter of the program budget as well as contributions made by individuals. Total revenue for the year ending June 30, 2007 was \$1,446,126.

In addition, Operation Fuel funding has been supplemented recently by the General Fund. As part of major energy legislation passed in 2007 (P.A. 07-242), Operation Fuel received \$2.5 million from the state General Fund to run the Clean Slate Program. This program targets low-income households with utility payment arrearages up to 24 months old and less than \$3,000. To qualify for a grant of up to \$1,000, the recipient had to make two payments during the winter season. Due to the late arrival of the funds, Operation Fuel provided close to \$1 million in grants in FY 08 but will carry this program into the 2009 fiscal year. Also, in the August 2008 Special Session, \$8.5 million was allocated to Operation Fuel for households with income between 150 percent and 200 percent of FPL and \$5 million was allocated for households between 200 percent of FPL and 100 percent of state median income. Operation Fuel was also allocated \$500,000 for its 2008-2009 year operating expenses.

**Program eligibility.** Operation Fuel typically serves households with incomes between 151 percent and 200 percent of federal poverty level – for 2009, \$31,800 to \$42,400 for a family of four. Although the mission of Operation Fuel is to serve customers who do not qualify for state assistance, the fund’s board of directors in 2007 implemented an Exceptions Policy for clients who did not meet the income guidelines or had received state assistance. This program helps households from 200 percent of the federal poverty level to 60 percent of state median income.

**Program activity.** Table X-4 provides the activity level for Operation Fuel for the last two fiscal years.

<b>Table X-4: Operation Fuel Customers Served</b>		
	<b># of households</b>	<b>Total amount</b>
FY 2007	3,512	\$1,007,222
FY 2008 <sup>34</sup>	5,500	\$2,365,229

UTILITY-

SPONSORED LOW-INCOME PROGRAMS

## **Shut-off Prohibition**

Statutorily, all utility companies are prohibited from shutting off or not reinstating service from November 1 to May 1 for hardship customers who are not able to pay their bills.

**Eligibility.** First, to be eligible for shut off prohibition, a household must demonstrate “hardship.” Those are households:

- whose income is solely through a government assistance program (such as Social Security);
- whose income is below 150 percent of poverty; or
- where a member is seriously ill.

Generally, the household must prove a financial hardship through submitting some type of financial documentation (e.g., a payroll stub, Social Security or DSS assistance verification) to the utility. Those eligible for the Connecticut Energy Assistance Program are automatically referred to the utility. In cases of medical hardship, a DPUC-approved physician’s form must be submitted.

With customers who heat with gas, there must be some attempt to pay a minimal amount before reinstatement of service. Thus, if the customer was provided service the prior winter based on hardship, and the gas was shut off during the summer, those customers must first pay a certain amount in order to be reinstated for an additional season. They must pay the lesser of: \$100; the minimum payments due on the agreed payment plan; or 20 percent of the debt owed to the gas company at the time of shut-off.

## **Matching Payment Program**

In addition to prevention of utility shut-off, the electric and gas companies offer assistance to low-income customers in paying their back utility bills. Figure X-5 shows the funding, oversight, and implementation structure for the Matching Payment Program as well as the Arrearage Forgiveness program.

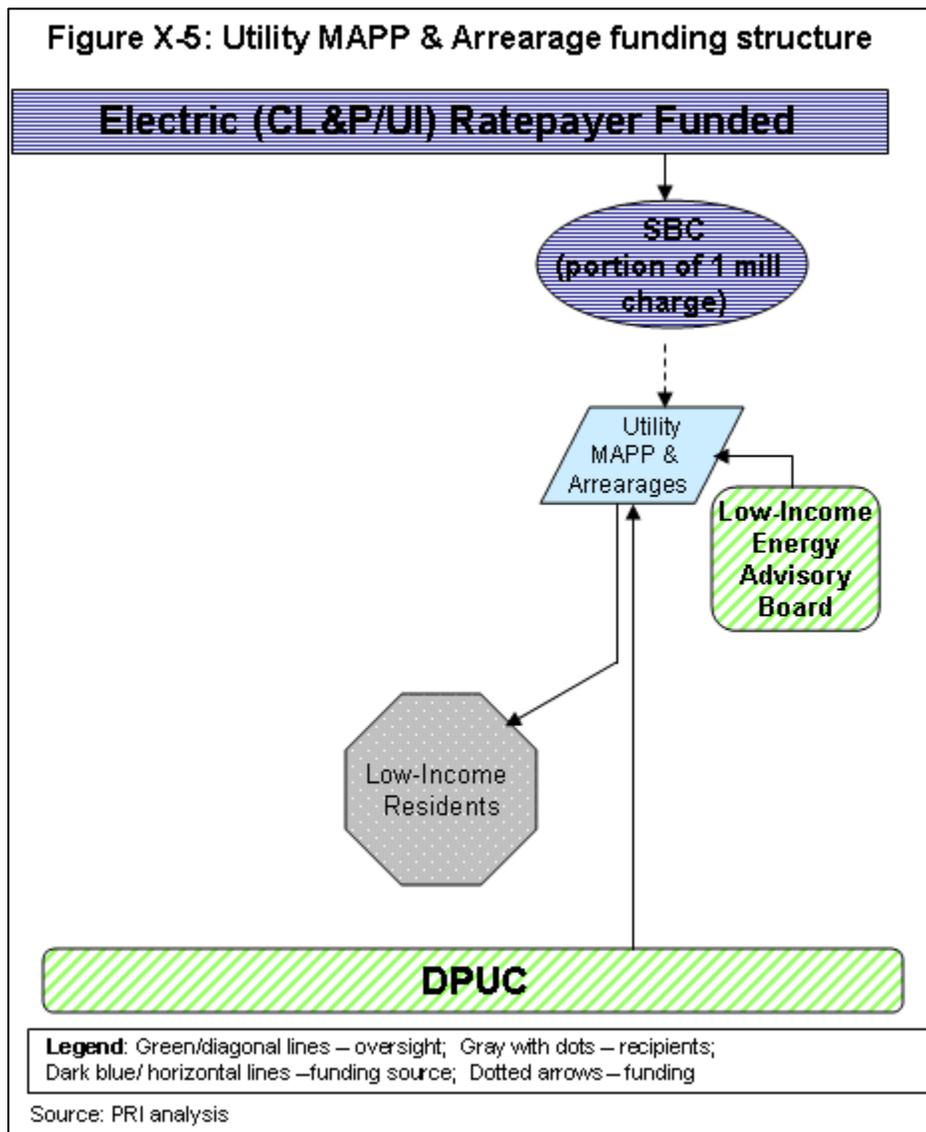
**Program eligibility.** To be eligible for matching payments from the utility, the customers must:

- each year between November 1 and May 1, apply for and receive energy assistance from the state’s program or another program operated by a nonprofit, including Operation Fuel; and
- enter into and comply with a repayment agreement for the unpaid amount (minus the anticipated energy assistance payment).

---

<sup>34</sup>Fiscal Year 2008 numbers are preliminary and have not been audited

Figure X-5: Utility MAPP & Arrearage funding structure



**Program administration.** The utilities administer their own low-income cash assistance programs, typically out of their customer services division. While there are similarities among the utilities in the programs offered, there are also differences. Most of the utilities have a representative on the Low-Income Energy Assistance Advisory Board, which seeks to coordinate all low income assistance programs. In addition, the utilities now have a memorandum of understanding (MOU) with the CAP agencies, which are already administering the state-sponsored low-income energy assistance. Under the agreement, the CAP agencies take applications -- and are paid a small administrative fee by the utility for each application taken -- for the utility matching payment programs, but the utilities determine eligibility and apply the payments.

In some cases, the utility companies have combined matching payment and arrearage programs, and in other cases, like United Illuminating, they are separate, with the difference in UI programs based on whether the customer heats with electricity or not.

The utilities use a variety of ways to inform customers of their assistance programs, including brochures and letters. In addition, the utilities have held forums in the fall of both

2008 and 2009 to inform the CAPs, other social service agencies, and customers about the programs.

**Program oversight.** The Low-Income Energy Advisory Board seeks to coordinate and improve all energy assistance programs targeted at low-income groups, including the utility-sponsored programs. In addition, the utilities must submit their plans to DPUC for approval, which the utilities do as a joint plan.

In its 2007 decision on the low-income programs, DPUC ordered the utility companies to establish a focus group to address new ways of communicating the matching payment plan, and indicated DPUC would be meeting with program stakeholders to examine the program's benchmarks and objectives to determine the success of the program.

**Funding.** The funding for the low-income assistance programs comes from the rates charged to utility customers, either as part of the basic rate, some portion of the systems benefits charge on electric bills, or a combination of both. All matching payment plans and arrearage programs along with accompanying budgets must be approved by the Department of Public Utility Control. In addition, for customer arrearage payments that are not collectible, the utility after a period of time writes the amount off as bad debt. The total amount of bad debt is subsequently considered in the utility's filing for rate increases at DPUC.

**Program activity.** Table X-5 below shows the number of persons participating in the programs for 2007 and the amounts paid by each utility. (Two of the utilities furnished 2008 data as well, but committee staff used 2007 data to be consistent). The number of total households served could be somewhat over-counted because some households heat with natural gas but are also served by an electric utility under that hardship program.

<b>Table X-5. Low-income Assistance Utility-Sponsored Programs: 2007 Activity Levels</b>			
<b>Utility</b>	<b>Clients (households)</b>	<b>Total Expenditures</b>	<b>Average Payment</b>
United Illuminating Matching Payment Program	3,988 applied		
	2,902 matched	\$1,730, 894	\$596
United Illuminating Forgiveness Program (electric heat)	390 applied		
	230 matched	\$130,728	\$568
Connecticut Light and Power	4,223	\$2,297,000	\$543
Southern Connecticut Gas Matching Payment and Forgiveness	14,288	\$7,288,071	\$510
Connecticut Natural Gas Matching Payment and Forgiveness	12,522	\$6,747,612	\$538
Yankee Gas	6,148	\$1,686,000	\$274
<b>Total</b>		<b>\$19,880,305</b>	
Source of Data: Utilities Responses to PRI Information Request			

As shown in the table for the United Illuminating Company, about two-thirds to three-quarters of the clients who apply for the matching payment programs are successful in receiving matching assistance. According to staff for the gas companies, a similar proportion of clients who apply receive matching payments. However, many clients are not successful in making all the payments, and end up with arrearages.

United Illuminating indicated it had about \$4.3 in uncollectible billing for its low-income/hardship customers in 2007. CL&P and Yankee Gas wrote off about \$15.5 million for low-income customers during 2007, but those utilities also wrote off \$21.7 million as uncollectible for non-hardship clients.

### **ENERGY CASH ASSISTANCE: FINDINGS AND RECOMMENDATIONS**

In summary, there are a variety of cash assistance programs with different eligibility criteria to receive assistance, primarily based on income levels. While this creates confusion both for the agencies that administer and operate the programs and especially for clients, 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 the committee proposed no changes in the organizational delivery for cash assistance or with the eligibility criteria, program review concluded 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. Low-income advocacy groups, local social service agencies, and the CAP agencies themselves raised concerns about many the application process.

The program review committee 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.**

The committee recognizes that the CEAP is not an entitlement program and that once the funds have been expended no additional clients can be served. However, the program review committee 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.

The committee 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, especially for lower-income households. As noted in Chapter I, low-income 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.<sup>35</sup>

Because of energy price increases and very small increases in federal funds over most of the decade, the LIHEAP funding covered a shrinking portion of the gap in energy affordability, as indicated in Chapter One. However, federal allocations to the LIHEAP program increased nationwide, and Connecticut is receiving about \$125 million for 2009, almost double the amount received in 2008. In the August 2008 Special Session, the General Assembly supplemented that funding with \$35 million from the General Fund surplus, but after heating oil prices dropped precipitously, and budget reductions were needed, the \$35 million was cut in the governor's deficit mitigation plan that was approved by the General Assembly early in 2009.

The increased federal funding and the considerable recent drop in home heating oil prices should avert what could have been a severe crisis during the 2009 heating season. As noted earlier in the chapter, the 2009 CEAP plan increases benefits for all income levels. However, since applications may be submitted until the spring of 2009 (unless funding runs out), it is yet

---

<sup>35</sup>“Home Energy Affordability Gap – On the Brink: 2007”, Fisher, Sheehan & Colton.

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. The committee 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 all the payments. Connecticut Natural Gas estimates that 70 percent of its customers in those programs do not succeed. Thus, unpaid amounts go uncollected and often end up as overwhelming debt for the consumer and bad debt for the utility. The bad debt for the utility is eventually considered in its rate filing, with all rate payers ultimately paying for uncollectible utility bills.

The program review committee 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, with a declining reduction rate as usage increases. Arizona has such a program in place, and Table X-6 shows the declining discount as usage increases.

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. The estimated costs of the Arizona discount, if used in Connecticut, would 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 X-7 and Table X-8 show the costs per customer for such a structure.

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 X-8: Suggested 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		

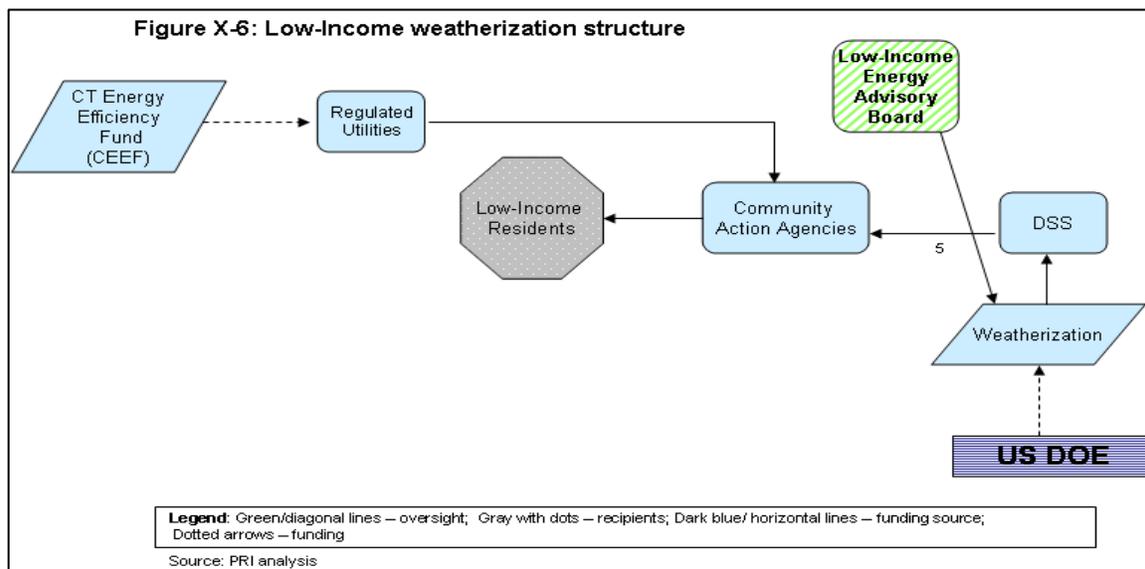
If all CEAP households were determined eligible for the electricity discount, the discounted electricity rates would cost about \$21.4 million. The gas discounted rates would cost about \$12 million, based on the number of low-income customers who sign up for gas utilities' matching payment plans. Thus,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

The program review committee concludes 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 and 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, the committee 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.**

### LOW-INCOME WEATHERIZATION PROGRAMS

As shown in Figure X-1 at the beginning of the chapter, there are also two weatherization programs for low-income households in Connecticut, one under the Department of Social Services and the other operated by the utility companies and funded either by CEEF or the municipal electric utility companies. Figure X-6 below shows both the funding and implementation structure for the weatherization programs.



**DSS Weatherization Assistance Program (WAP).** The Department of Social Services is the state agency in Connecticut designated to receive the U.S. Department of Energy block grant for weatherization. Over the past three years, FY 06-FY 08, the block grant has averaged about \$2.5 million annually. The purpose of the program is to help low-income residents reduce their energy bills by making their homes more energy efficient. The allocation formula to each state is based on three factors: 1) the percentage of low-income residents in the state; 2) climatic conditions; and 3) financial burden of energy costs on the state's low-income residents.

**Eligibility.** The program is available to anyone at or below 200 percent of the federal poverty level – in FY 09, \$44,100 a year for a family of four. There is a single application process for CEAP and the weatherization program, but a CEAP applicant is given a card that must be filled out and returned in order to be put on a weatherization service list. Also, a landlord permission form must be submitted in order for work to be done on a rental unit. According to DSS program information, the landlord is expected to pay 20 percent of the material costs, up to a maximum of \$250 per unit. However, DSS data show amounts of landlord contributions collected are minimal. Less than \$5,000 was collected statewide, with amounts from the five CAP agencies involved in the program ranging from \$0 to more than \$3,000.

**Program administration.** DSS contracts with five of the 12 CAP agencies to conduct the weatherization programs in that CAP service area. As with the energy cash assistance program, the CAP administration is a common administrative model, with almost every state nationwide using CAP agencies to operate the weatherization program. A listing of the five Connecticut CAP agencies under contract and the activity for each agency are provided in Table X-9 below.

**Table X-9: WEATHERIZATION ASSISTANCE PROGRAM 2006-2008**

**GOALS AND COMPLETIONS by CAP AGENCY**

AGENCY	04/01/2007-03/31/2008		04/01/2006-03/31/2007		04/01/2005-03/31/2006	
	Goals	Completions	Goals	Completions	Goals	Completions
	<i>Bridgeport Area</i>	121	127	145	204	104
<i>Stamford Area</i>	33	26	38	0	28	15
<i>Norwalk Area</i>	23	24	34	8	19	9
<b>TOTAL ABCD</b>	<b>177</b>	<b>177</b>	<b>217</b>	<b>212</b>	<b>151</b>	<b>158</b>
<i>Hartford Area</i>	170	201	197	235	149	94
<i>Bristol Area</i>	22	22	30	19	18	35
<i>New Britain</i>	26	26	32	23	20	13
<b>TOTAL CRT</b>	<b>218</b>	<b>249</b>	<b>259</b>	<b>277</b>	<b>187</b>	<b>142</b>
					1	
<i>New Haven Area</i>	120	71	170	117	107	102
<i>Derby Area</i>	35	62	54	50	32	42
<b>TOTAL CAA/NH</b>	<b>155</b>	<b>133</b>	<b>224</b>	<b>167</b>	<b>139</b>	<b>144</b>
<i>Waterbury Area</i>	95	94	132	132	85	76
<i>Danbury Area</i>	27	27	42	14	27	16
<i>Meriden Area</i>	30	39	45	73	29	43
<b>TOTAL NOW</b>	<b>152</b>	<b>160</b>	<b>219</b>	<b>219</b>	<b>141</b>	<b>135</b>
<i>Willimantic Area</i>	80	136	95	119	61	64
<i>New London Area</i>	97	106	114	116	71	74
<b>TOTAL ACCESS</b>	<b>177</b>	<b>242</b>	<b>209</b>	<b>235</b>	<b>132</b>	<b>138</b>
<b>TOTAL</b>	<b>879</b>	<b>961</b>	<b>1128</b>	<b>1110</b>	<b>750</b>	<b>717</b>

Source: Department of Social Services

The program year for the weatherization program runs from April 1 through March 31 and annual budget, expenditures, and activity levels are reported for that period. The DSS contracts specify a target number (or goal) of units that will be weatherized in each CAP area, and also specify a maximum amount for labor and supplies that can be expended. The goals are established using DOE guidelines for the average maximum expenditure per unit and the total allocation. It is up to the individual CAP agency whether to use CAP staff on the weatherization program or subcontract the work.

**Budget and expenditures.** Table X-10 below indicates the weatherization budget and expenditures for the five CAP agencies for program years 2006 through 2008. Typically about 75 percent of the budget goes to the actual program, which includes material, weatherization staff, travel to the site, and storage rental space. The other 25 percent is for administration, which includes: training; financial audits; insurance; and DSS and CAP administrative costs.

<b>Table X-10. Weatherization Program – CAP Agency Budgets and Expenditures</b>						
<b>Agency</b>	<b>Budget 04/07-03/08</b>	<b>Expenditures 04/07-03/08</b>	<b>Budget 04/06-03/07</b>	<b>Expenditures 04/06-03/07</b>	<b>Budget 04/05-03/06</b>	<b>Expenditures 04/05-03/06</b>
ABCD	554,578	553,956	577,692	568,031	456,179	445,216
CRT	673,313	468,057	688,213	386,037	557,249	364,658
CAA/NH	486,766	363,626	625,112	385,308	420,337	344,404
NO	634,193	460,374	741,068	635,369	546,807	450,490
ACCESS	552,807	495,553	571,515	457,911	401,333	362,800
<b>TOTAL</b>	<b>2,901,657</b>	<b>2,341,566</b>	<b>3,203,600</b>	<b>2,432,656</b>	<b>2,381,905</b>	<b>1,967,568</b>
<b>Source: Department of Social Services</b>						

As the table indicates, the annual amounts expended are always less than the amounts budgeted. This is mostly because the CAP agencies weatherize fewer units than the annual established goals as listed in Table X-9, but does not explain the lower amount expended in 2008, given that the statewide goals were exceeded. In discussion with CAP agency staff, they indicate the agencies do not always know how close they are to expending their full budgeted amounts during the weatherization season.

**Average cost per unit.** Based on the weatherization program expenditures and the number of units completed, the average cost each year is shown below:

- \$2,743 in program year 2006;
- \$2,886 in program year 2007;
- \$2,437 in program year 2008.

These amounts do not include the contributions to weatherizing these units that are made by the utilities, which will be explained below.

**Activity analysis.** As Table X-9 indicates, in two of the three years the statewide goals were not met. Most of that is due to substantial underperformance by the CAP agency in the New Haven area, CAA/NH, which met only about 68 percent of the goal set in 2007 and about 85 percent in 2008.

A general assessment of the goals and completion rates would indicate that goals are too low but that even those have not been met. For example, hypothetically if only half of the CEAP

assistance units needed weatherization -- approximately 42,000 households – and generously assuming that about 28,000 of those have been weatherized (1,000 x 28 (years of program) = 28,000), that would mean it would take another 14 years to complete the households receiving cash energy assistance alone. However, the CAP agencies and DSS indicate the budget constrains the number of units that can be weatherized in a given year.

Table X-11 shows the breakdown of weatherization units by whether they are owner or rental units and by fuel type. As the table shows, the vast majority of units weatherized are owner-occupied, and over half of the units weatherized are heated with home heating oil. This is in contrast to the cash energy assistance program where only about one-third of residents were in units that heat with oil. The most plausible explanation is that most people in the cash energy assistance program are renters (72%), and are much less likely to heat with oil.

<b>Table X-11. Weatherization Program Activity by Owner/Renter and by Fuel Type: 2006 through 2008</b>						
<b>Owner/Renter Occupied</b>		<b>2008</b>		<b>2007</b>		<b>2006</b>
Owner-Occupied *		881		865		654
Renter-Occupied *		78		94		63
* Includes Single and Multi Family Dwellings						
<b>Fuel Type</b>						
Natural Gas		274		293		183
Oil #2		568		565		454
Electricity		59		41		45
Propane		21		27		13
Kerosene		38		30		21
Wood		1		3		1
Total		961		959*		717
				(*other 150 units unknown)		
Leveraged **		784		506		383

\*\* Units were leveraged with WRAP, NU, Southern Connecticut Gas, Block Grant, and/or CEAP funds  
Source: DSS

As Table X-11 notes, a great number of the units that receive weatherization assistance through the DSS program are “leveraged”, meaning they also receive some financial assistance from another program, typically from a utility.

**Measures taken.** A variety of measures are performed for weatherization assistance, depending on the need and the primary payer. Those units that are weatherized under the DSS program receive the most comprehensive measures, including sidewall and attic insulation and heating system repair. Furnace replacements may be done, but costs cannot be paid solely from the weatherization funds, and prior DSS approval is needed for furnace replacements.

There is no evaluation component to the DSS weatherization program, beyond ensuring that the work has been completed. According to DSS staff, the last formal evaluation was done by the federal Department of Energy, which funds the program, and the net savings were determined to be about 17 percent of residents’ prior energy bills. However, the federal DOE

website indicates that the weatherization program nationally has saved residents about 32 percent of their previous energy expenses.

#### **UTILITY-SPONSORED WEATHERIZATION PROGRAMS**

In addition to the weatherization assistance provided through the DSS program, the utilities sponsor their own weatherization assistance programs for their low-income customers. The weatherization programs receive funding through the Connecticut Energy Efficiency Fund, are administered by the two major electric utilities, and serve customers in their respective service areas. Connecticut Light and Power's program is called the Weatherization Residential Assistance Program (WRAP), and is also supported by Yankee Gas and Connecticut Natural Gas. The UI Helps program is primarily sponsored by United Illuminating, but receives support from Southern Connecticut Gas.

**Eligibility.** Both utility-sponsored programs have the same eligibility criteria:

- income at or below 60 percent of state median income – for a family of four, \$56,292 annually for 2008-2009;
- a high energy burden as a percent of income;
- has not received weatherization in the previous 18 months; and
- submission of a landlord permission slip, although the landlord will not be charged for services.

**Program administration.** Applications may be made through CAP agencies or other social service agencies but the utilities make the eligibility determinations. The utilities contract with the CAP agencies in their respective areas to perform the weatherization services. The WRAP (CL&P) program contracts with all 5 CAP agencies that are in the DSS program and the UI Helps program contracts with CAA/New Haven and ABCD, the CAP agency serving the Bridgeport area. UI Helps also contracts with a private vendor. While there is no requirement that the utilities contract with the CAP agencies, this is done so that there is opportunity to “leverage” or optimize utility monies with the dollars already being spent through the DSS program.

Both utilities operate the programs on a calendar year basis. The weatherization programs are included in the CEEF plan and budget, which are developed with the Energy Management Conservation Board, and submitted for DPUC approval.

The two utilities vary somewhat in the way they deliver the programs; this coupled with the differences in the size of the programs results in varying activity and budget levels. To show the variation, the WRAP and UI Helps activity levels are discussed separately below.

## WRAP

**Program activities.** Table X-12 below shows the actual budget and activity level of the WRAP program from 2000 to 2007.

<b>Year</b>	<b>Expenditures</b>	<b>Units Weatherized</b>	<b>Average per unit</b>
2000	\$4,406,000	6,749	\$653
2001	\$5,036,000	6,675	\$754
2002	\$4,716,000	6,022	\$783
2003	\$3,181,000	3,683	\$864
2004	\$4,591,000	8,765	\$524
2005	\$4,682,547	9,818	\$477
2006	\$5,298,638	10,461	\$506
2007	\$6,306,400	11,056	\$570

Source: CEEF 2008 Plan and CL&P

As the table indicates, the expenditures for the WRAP program dropped in 2003, when funding was diverted from CEEF, but has been gradually increasing since that time. In 2007, the WRAP program expended over \$6 million and provided services to more than 11,000 units. Average per-unit costs have varied from year to year, with the highest per unit cost in 2003 at \$864 in 2003.

Because the number of WRAP units completed appeared so high, given the much lower number completed in the DSS-sponsored program, committee staff asked CL&P for additional information about the WRAP units weatherized and the measures taken. CL&P indicated it operates four sub-programs with the first two offering the most comprehensive measures and the last two much fewer. The following is a summary of the sub-programs and activity levels for 2007. (see Appendix G for program details)

**Leveraging with DSS.** This sub-program component provides additional utility funding to the DSS programs to increase the comprehensiveness of the measures taken in those households. The customer must have electric or gas heat and be eligible for the energy assistance program, and have an already approved application through the DSS/CAP program. The CAP agencies do the work, and a bill is submitted to the utilities for the portion of the work the utility will pay for – each measure has a per-unit payment. In addition, for those units that have utility heat, the utility pays for the initial audit cost (about \$100). The audit determines the weatherization measures necessary. Activity level in this program for 2007 was:

- Total expenditures = \$550,000
- Units Completed = 854
- Average Cost = \$652

**Utility-WRAP.** This second sub-program is somewhat comprehensive, but does not supplement the DSS services. For this sub-program, the utility reviews the application and determines if the household is eligible, and then submits the work order to the contractor for scheduling and completion. The contractor conducts the audit and identifies the measures that should be implemented. The measures installed under this component of this sub-program are similar to those under the DSS weatherization. According to the utilities, most measures can be installed the same day, but several -- such as insulation and heating system replacements -- require additional time. A breakdown of the activity levels by homeowner and renter is contained in Table X-13 below.

<b>Table X-13. WRAP Subprogram 2 Activity: By Single-family (owner) or Rental Units – 2007</b>		
<b>Unit Type</b>	<b>Average Cost</b>	<b>Expenditures</b>
1,523 Single-family	\$652	\$1,037,163
1,723 Rental	\$576	\$992,448
3,246 Total completed	\$625	\$2,029,611
Source: CL&P		

**Lighting program.** The third sub-program serves mostly entire multifamily complexes, whether only one meter or individual unit meters. No applications are taken for this program, and thus no eligibility criteria are established. However, low- and moderate-income housing complexes are targeted under this component. Lighting measures are installed in common areas as well as in individual units; most often these are conversions from incandescent lighting to fluorescent lighting. Some of the more costly measures taken -- such as common area conversion or retrofit -- are not included in the average cost per unit. The 2007 activity level was:

- Total Expenditures = \$458,488
- Units completed = 784
- Average cost = \$257

**Neighborhood canvassing.** This sub-program serves participants through a neighborhood canvass approach. Typically, the utility WRAP staff and the CAP weatherization staff identify neighborhoods or multifamily complexes where many residents would be eligible for WRAP services. Once areas have been identified, staff then notify neighborhood residents of the dates of the canvass through mailings or flyers. Also, local police and fire are notified to alleviate potential concerns about the legitimacy of canvassers in the area. Compact fluorescent

bulbs may be left with customers and applications for the comprehensive program are left with residents. CL&P reports indicate that the cost per unit below does not include any refrigerators or room air conditioners that might be installed at another time (which would also require the filing of an application). The 2007 activity level was:

- Total Expenditures = \$1,029,204
- Units completed = 5,185
- Average cost = \$198

**WRAP units.** About 40 percent of the WRAP clients are homeowners and 60 percent are renters, which is very different than the DSS program where over 90 percent of clients own their homes. A major difference in the weatherization services received depends on the heating source of the unit. Table X-14 below shows the weatherized WRAP units by heat source, and which utility was the primary funding source for the measures taken.

<b>Heating Type</b>	<b># customers</b>	<b>Total Expenditures</b>	<b>Avg \$ Per Unit</b>
Primarily electric	2,890	\$1,030,652 (all CL&P \$\$)	\$357
Primarily home heating oil	3,806	\$848,593 (all CL&P \$\$ )	\$223
Primarily Yankee Gas	1,238	\$430,146 (all YG \$\$)	\$347
Primarily CT Natural Gas	531	\$334,017 (all CNG \$\$)	\$629
Primarily gas utility or propane	2,591 (includes the gas utility customers above)	\$3,662,992 (all CL&P \$\$)	\$1,413
<b>Total</b>	<b>11,056</b>	<b>\$6,306,399.44</b>	<b>\$570</b>
Source: CL&P			

## UI Helps

**Program activity.** Table X-15 shows the UI Helps expenditures and number of weatherized units from 2000 through 2007. The overall expenditures are less than those of the CL&P WRAP program, but that is to be expected since CL&P is a much larger utility with many more customers. However, the number of units completed by UI program is similar in some years to the CL&P completed units, but the average per unit cost in the UI Helps program is less.

<b>Year</b>	<b>Expenditures</b>	<b>Units Weatherized</b>	<b>Average per unit</b>
2000	\$1,795,000	6,452	\$278
2001	\$1,500,000	7,720	\$194
2002	\$1,168,000	7,078	\$165
2003	\$799,000	5,377	\$149
2004	\$803,000	4,722	\$170
2005	\$1,086,000	8,603	\$126
2006	\$1,250,000	6,116	\$204
2007	\$888,663	3,660	\$243
Source: CEEF 2008 Plan and UI			

Table X-16 shows the UI Helps completed units by heating source, and as the table indicates the majority of the units weatherized heat with electricity, but there is not much difference in the cost per unit among the three primary heat sources. By far the largest cost per unit was for those completed in the Low-income ENERGY STAR category, which covers comprehensive measures and new appliances. However, only 21 units (less than 1 percent) receive that level of service.

<b>Heat source</b>	<b>Number</b>	<b>% of units</b>	<b>Avg. Cost</b>
Heating Oil	630	17	\$223
Natural Gas	243	7	\$209
Electric	2,766	76	\$179
Low-income ENERGY STAR Homes	21	.57	\$956
Source: United Illuminating			

**Benefits of the utility weatherization programs.** Both the WRAP and UI Helps programs report on the savings in the CEEF plan, both as the electric test and the total resource test. The goals and the actual savings are shown in the Table X-17 below:

<b>Table X-17. Utility Weatherization Programs: Reported Savings</b>				
	<b>2008 B/C Savings</b>		<b>2008 TRT Savings</b>	
	<b>Stated Goal</b>	<b>Actual</b>	<b>Stated Goal</b>	<b>Actual</b>
WRAP	2.2	1.1	3.1	2.5
UI HELPS	2.2	2.0	3.9	2.7
Source of Data: 2008 CEEF Plan and Utility Responses to PRI staff information request				

**Evaluation of WRAP and UI programs.** All CEEF programs are evaluated periodically. The Energy Conservation Management Board, which oversees the Connecticut Energy Efficiency Fund programs, engaged a consultant to conduct an evaluation of the utility-sponsored weatherization programs, which was released in December 2006. While the evaluation found that the programs accomplish their goals of helping to reduce customers' energy use, it also determined that neither program represents "best practice" among low-income weatherization programs. The assessment found that while some participants in both programs received comprehensive services (e.g., insulation, refrigerators) that have a large impact on their energy use and bills, most participants receive measures that have a relatively minor impact on energy consumption and bills (e.g., compact fluorescent bulbs, showerheads).

Further, the evaluation found that each utility was using a different resource test to measure success, and that the predicted benefits for each were probably too high. Interestingly, the savings numbers for both programs were lower in 2005 and 2006 when the evaluation was conducted than those in the 2008 plan and shown in Table X-17 above, especially when considering that UI is completing far fewer units than it did in 2005 and 2006.

The evaluation team made 26 recommendations to improve the programs. Some of the proposals, such as UI partnering with the Bridgeport CAP agency, have been implemented. Other proposals -- like ensuring more similarity between the two utility programs, and improving coordination with all energy assistance programs to ensure that eligible households receive all measures to reduce their energy bills -- have yet to be achieved.

## **MUNICIPAL UTILITY WEATHERIZATION PROGRAM**

Calendar year 2007 was the first year that municipal utility low-income residential customers received weatherization services paid for through the statutory surcharge on all municipal utility electric bills. However, it is not clear that all municipal utilities offered these services. The municipal utilities' cooperative (CMEEC), which does the reporting for its member utilities, indicated that \$155,716 was allocated for low-income weatherization programs for 2007, but only \$82,801 was spent.

Groton Utilities (GU) and Norwich Public Utilities (NPU) indicated they had provided services and NPU indicated its program is particularly comprehensive in identifying all sources

of energy waste and the program takes steps to save on all energy sources -- electricity, gas and water. The activity level for the municipal utility weatherization programs for 2007 was:

- Total expenditures = \$82,801
- Units completed = 142
- Average cost = \$583

**Savings.** The benefit-cost ratio stated in the municipal utilities annual report indicates a benefit-cost ratio for the weatherization programs of 0.8, meaning the costs of the measures taken outstrip the electric cost reduction. However, since the report from the utilities also indicates that fairly comprehensive measures were taken, participating customers may see their other energy costs go down, not just a small reduction in electric bills.

#### COMMUNITY ACTION AGENCY STATUS REPORT ON WEATHERIZATION

In an effort to determine how many people had received weatherization services during 2007, whether funded by DSS or a utility, and how many are awaiting services, program review staff asked the CAP umbrella organization, Connecticut Association for Community Action (CAFCA) to provide recent weatherization program data, which is summarized in Table X-18.

<b>Table X-18. Community Action Agency Weatherization Status Report: September 2008 (for 2007)</b>						
<b>CAP AGENCY</b>	<b>DOE/DSS # completed</b>	<b>DOE/DSS # waiting</b>	<b>CEAP/Furnace # completed</b>	<b>CEAP/furnace # waiting</b>	<b>Utility # completed</b>	<b>Utility # waiting</b>
ACCESS (Willimantic)	242	240	18 repairs 3 replacements	12	2,842 WRAP/CL&P)	320
Community Renewal Team Hartford	250	170	25 repairs 21 replacements	20	6,135 (WRAP/CL&P)	420
NO Inc.	166	820	13 repairs 15 replaced	13	2,133 (WRAP/CL&P)	168
CAA/NH New Haven	133	213	14 repairs 10 replaced	17	300 (UI) 150 (SCG)	No waiting list
ABCD (Bridgeport)	177	275	5 repairs 30 replaced	34	150 (UI) 50 (Wrap/CL&P)	No waiting list

Source of Data: CAFCA Response to PRI request September 2008

#### Recent Weatherization Legislation

In the August 2008 Special Session, \$2 million was appropriated to the DSS weatherization program. DSS developed a plan by November 1, 2008 required in the legislation for:

1. providing funds for weatherization projects for low-income households participating in the Connecticut Energy Assistance Program;
2. prioritizing assistance to households with incomes below two hundred per cent of the federal poverty level; and
3. coordinating provision of assistance to maximize effectiveness of these funds with the utility-sponsored weatherization assistance programs overseen by the Energy Conservation Management Board, and those undertaken by the Fuel Oil Conservation Board.

## **WEATHERIZATION: FINDINGS AND RECOMMENDATIONS**

As the description of the weatherization program points out, the program operate very differently. Activity levels, per-unit costs, measures taken when a home is weatherized, and savings calculated all vary depending on the entity administering the program. The rest of the chapter provides analysis of these differences, identifies contributing factors, and proposes improvements based on some comparisons of weatherization programs in other states.

**Program objectives.** The weatherization program administered by the utility companies is outlined in the annual Connecticut Energy Efficiency Plan. The plan indicates that the objectives of the program are to:

- 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.

*The committee 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**

The *program review committee also finds that the two utilities operate the program differently.* Despite DPUC directives that the two utilities offer uniform programs, the CL&P and UI weatherization programs vary considerably. As described earlier in the chapter, the CL&P WRAP program has four components under 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 summarized in Table X-19.

As Table X-19 shows, the first two sub-programs that 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.

<b>Table X-19. CL&amp;P WRAP: Sub-programs 2007</b>		
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 overall percentage (50%) of state households that 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**

Information was requested from all the weatherization program administrators—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. *The lack of outcome data is especially problematic in assessing the cost effectiveness of the programs, given the wide variation in amounts spent. Further, the program review committee 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 of 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 of Vermont's program and issued in February of 2007 indicated that the first year savings in electricity was 1,438 kWh.<sup>36</sup> 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), estimated household savings for oil would be slightly more than \$400 a year. Together, the savings would total about \$660 for each weatherized unit.

Another evaluation of 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.<sup>37</sup> 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.

---

<sup>36</sup> "An Update on the Impacts of Vermont's Weatherization Assistance Program, conducted by Dalhoff Associates, LLC.," February 2007, p. ES-3.

<sup>37</sup> "Exemplary Utility-Funded Low-Income Energy Efficiency Programs," ACEEE, 2005, p.12.

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 earlier in the chapter, even if 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.

While the utility-sponsored weatherization programs appear to complete many more units each year than the DSS program, for many of those units it is unclear how comprehensive the measures taken are, especially given the much lower costs per unit.

### **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:

- *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.

*The program review committee 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.

### **Improved Coordination Needed**

The above findings indicate that the low-income weatherization programs need to be better coordinated, regardless of funding or where a customer lives. As noted earlier, the committee considered but did not adopt a comprehensive consolidation of all energy efficiency and conservation programs. However, the committee does support coordination and goal setting within the weatherization programs.

Therefore, the program review committee recommends:

**The weatherization programs should be designed to offer uniform, comprehensive, and “fuel-blind” measures to eligible low-income households throughout the state. The programs 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.**

**The 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.**

If the programs established a target goal of comprehensively weatherizing 30 percent of low-income households within five years, there would be an incentive for programs to coordinate. This goal is a measurable one, and programs could be assessed on how well they are progressing toward that outcome. 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 LIHEAP funding to weatherization programs. But states may also apply for a waiver to allocate 25 percent of LIHEAP funding to weatherization (rather than to cash assistance), which may prove more cost beneficial in the long-term.

If the weatherization results from the Massachusetts and Vermont evaluated programs could be replicated in Connecticut, about \$675 a year could be saved 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.

Since the DOE funding is only a small portion of the overall weatherization funding pool, the programs will have to be coordinated and utility funding leveraged better than in the past to more comprehensively weatherize the targeted number of units, and accomplish the energy savings goal. In addition, weatherization of low-income households appears to be a primary target area of the federal economic stimulus package currently under consideration in Congress. Connecticut should strengthen the coordination of its programs so that it is in position to use the funding as soon as it becomes available.

DSS has developed a plan for better coordination with the other weatherization programs, as was required in the August 2008 Special Session, and the Energy Conservation Management Board is statutorily charged with ensuring that effective prioritization and coordination occurs. The goals, energy savings, and time-frame recommended by the program review committee will provide the framework for the ECMB to assess the weatherization programs' progress and results.

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. The current programming must incorporate the following objectives:

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

While the program review committee 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 provide sufficient justification to seek the federal waiver.

# **APPENDICES**

## **Appendix A: Scope of Study**

---

### **ENERGY CONSERVATION AND EFFICIENCY PROGRAMS IN CONNECTICUT**

In recent years, national and world events have had a significant impact on energy availability and affordability to businesses and residents in Connecticut. Rising prices are affecting the quality of life for Connecticut residents. Concern has been expressed about how well Connecticut energy conservation and efficiency programs address residential and business needs, in addition to whether the current efforts are accessible to consumers in the state.

In 1978, the Connecticut General Assembly passed legislation (codified in C.G.S. Sec. 16a-35k) setting forth eight goals that provide a broad energy policy for the state. Two of those goals are: *to assist citizens and businesses in implementing measures to reduce energy consumption and costs; and to ensure that low-income households can meet essential energy needs*. In the ensuing 30 years since those goals were established, there have been many changes to the landscape for providing energy. Many of these were tied to the deregulation of the electric industry in 1998, which also established a number of programs aimed at promoting and implementing energy conservation and efficiency.

Most recently, the legislature enacted P.A. 07-242, An Act Concerning Electricity and Energy Efficiency, that made a number of substantive changes to the state's energy laws. For example, the act restored funding for the electric conservation and clean energy funds in addition to establishing new energy efficiency programs and tax incentives for energy efficiency and renewable energy.

### **AREA OF FOCUS**

This study will focus on assessing progress made in achieving the two broad goals of reducing energy consumption and assisting low-income households. It will also examine efforts currently underway to educate and assist residential and commercial consumers in these areas, and determine whether state energy efficiency and conservation programs are established and implemented in an effective and efficient way.

### **AREAS OF ANALYSIS**

- 1) Identify and describe all programs and organizations that promote and implement energy conservation and efficiency policies in the areas of electricity, natural gas, and home heating oil; the extent of coordination among programs; and any gaps that may exist.
- 2) Identify and describe all programs aimed at assisting low-income residents pay their heating and electric bills, and the coordination of the programs.
- 3) Examine the trends in capacity and demand for the programs and the timeliness of assistance provided.

- 4) Identify and analyze the distribution and utilization of all funds intended to improve conservation and efficiency of residential and commercial use of energy, and/or provide financial assistance to eligible consumers.
- 5) Describe programs and financial incentives currently offered, including how residents and businesses are informed, and how accessible the programs are to relevant consumers.
- 6) Review the status of implementation of P.A. 07-242 (An Act Concerning Electricity and Energy Efficiency) related to energy conservation and efficiency.
- 7) Examine surrounding states' structures to determine whether a particular structure facilitates the implementation of energy efficiency and conservation policies and programs and also identify any model structures nationwide.
- 8) Identify opportunities to improve the structure and delivery of Connecticut's state energy conservation, efficiency, and financial assistance efforts for residents and businesses.

#### **AREAS EXCLUDED FROM SCOPE**

The scope would not examine energy conservation and efficiency programs in the transportation area.

## Appendix B

### Status of Public Act 07-242 – As of September 2008

<b>Public Act 07-242 update on matters related to energy efficiency and conservation</b>			
<b>Sec.</b>	<b>Program Description</b>	<b>Status</b>	<b>Date effective</b>
1	The Secretary of OPM shall provide a \$500 rebate for the purchase and installation in residential structures of replacement 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% efficient. Rebates shall not exceed five million dollars in aggregate per year.	Funding recently provided in the August 2008 Special Session as well as the August meeting of the State Bond Commission.	July 1, 2007 to January 1, 2012
2	State Bond Commission shall authorize the issuance of bonds with the proceeds to be deposited in the Energy Conservation Loan Fund to provide funding for Section 1.	Not applicable after funding was made available through the August 2008 Special Session.	July 1, 2007
3	ECMB, in consultation with the electric distribution companies, shall establish a cost-effective program to 1) provide rebates to residential customers who replace an existing window air conditioning unit with a federal Energy Star unit or replace a central air system to meet federal Energy Star requirements. ECMB, in consultation with the Low-Income Energy Advisory Board, develop a program for residential customers who live in apartments. The program will be funded by the Energy Conservation and Load Management Fund. On or before January 1, 2009, ECMB shall report to the legislature the results of the rebate program	ECMB worked with two electric companies to develop the programs which are included in the 2008 C&LM/CEEF Plan. Rebate amounts were reduced for some of the systems to meet the cost-effective requirement.(per ECMB)	January 1, 2008 to September 1, 2008
10	Requires OPM in consultation with Public Works, DEP and Public Safety to adopt regulations that are consistent with or exceed silver building rating of the LEED rating system for new construction or renovation of a state facility, and renovation of a public school facility, within specified cost parameters. Facilities may be exempt if the Institute for Sustainable Energy finds the cost of such compliance to outweigh the benefits.	“Green Building Standards” submitted to the Attorney General’s office for review in September 2008. Upon approval, will be sent to the legislature in early October for approval.	January 1, 2008
12	Establishes minimum energy efficiency standards for a specific list of new products sold, offered for sale or installed in the state.	Regulations adopted in 2008	October 1, 2007
13	Added the following ways in which the money collected from the systems benefit charge can be used: costs associated with the CT electric efficiency partner program established pursuant to section 94; reinvestments and investments in energy efficiency programs and technologies pursuant to section 101 of the act; and costs associated with the electricity conservation incentive program established pursuant to section 119	In progress	Effective from passage
14	ECMB in consultation with the electric distribution and gas companies, develop and estimate the cost of a comprehensive residential conservation	CEEF combined the home energy programs into one comprehensive Home Energy Solutions Program that was	October 1, 2007

<b>Public Act 07-242 update on matters related to energy efficiency and conservation</b>			
<b>Sec.</b>	<b>Program Description</b>	<b>Status</b>	<b>Date effective</b>
	<p>program including but not limited to:</p> <ol style="list-style-type: none"> <li>1) An audit identifying appropriate conservation measures applicable to a utility customer's dwelling unit;</li> <li>2) a system that prioritizes customers to be assisted in the installation of the measures identified in the audit;</li> <li>3) a system of oversight that advises and assists a customer in obtaining landlord authority for installation of cost-effective measures and assists a customer in accessing incentives; and</li> <li>4) provides financing for conservation measures on the utility bill</li> </ol> <p>On or before February 1, 2008, ECMB shall report to the legislature regarding development and cost of a comprehensive residential conservation program</p>	<p>implemented after the legislation. ECMB prepared a report on the current offering which is included in "2008 Connecticut Energy Excellence Plan" completed May 27, 2008.</p> <p>The requirement to provide financing for conservation measures on the utility bill has not been completed</p>	
39	Expands customers who are eligible for net metering to all customers not just customers in dwellings of one to four units who generate electricity from a Class I renewable energy source or a hydropower facility that has a nameplate capacity rating of two megawatts or less. Customers are also allowed to carry forward credits into subsequent billing periods which is reconciled annually.	<p>DPUC final decision delivered January 31, 2008 for CL&amp;P in Docket 03-07—02RE10</p> <p>A final decision for UI is still pending (Docket 05-06-04RE04)</p>	October 1, 2007
40	Extends the time period and increases the requirement for the use of Class I or Class II renewable energy sources by electric suppliers or distribution companies. For 2007, 3.5% of electricity generated must be from Class I and an additional 3% of total output or services shall be from Class I or Class II. In addition the department shall adopt regulations for this section.	In progress	October 1, 2007
41	Requires CMEEC to first develop standards for promoting renewable resources and second submit both the standards and an annual report to the Clean Energy Fund Advisory Board for review.	Plan submitted to the Clean Energy Fund Advisory Board in March 2008.	July 1, 2007
42-44	A customer, who implements energy conservation or customer-side distributed resources, shall be eligible for Class III credits which shall not be less than 1 cent per kWh. For nonresidential projects receiving funding from the CEEF, 25% of the financial value derived from the credits will go to the customer with the remainder going to the CEEF. For nonresidential customers not receiving CEEF funding, 75% of the credit value will go to the customer with the remainder going into the fund. For projects that serve residential customers, 75% of the financial value derived from the credits will go into the fund.	Open Docket at DPUC (05-07-19 RE01)	Effective from passage
46	Requires rather than allows municipalities to exempt certain renewable energy systems from the property tax that are installed after October 1,	In progress	October 1, 2007

<b>Public Act 07-242 update on matters related to energy efficiency and conservation</b>			
<b>Sec.</b>	<b>Program Description</b>	<b>Status</b>	<b>Date effective</b>
	2007.		
47	Requires rather than allows municipalities to exempt from property tax any passive or active solar water or space heating system or geothermal energy resource, in any type of building installed on or after July 1, 2007.	In progress	October 1, 2007
51-52	Electric distribution companies, in consultation with CEAB, review the state's energy and capacity resource assessment and develop a comprehensive plan for the procurement of energy resources with a focus on reducing demand through energy efficiency and demand reduction resources that are cost-effective, reliable, and feasible. DPUC will oversee the implementation of the procurement plan.	CL&P and UI prepared the Integrated Resource Plan and submitted it to the CEAB. CEAB submitted a revised IRP to the DPUC on August 1, 2008 for their approval.	Effective from passage
53	Expanded the membership of the CEAB from nine to fifteen and required the board to review the procurement plan submitted by the electric distribution companies, pursuant to section 51, as opposed to producing an annual energy plan.	New appointees complete and the procurement plan was delivered to the DPUC for approval.	Upon passage
58	CEAB shall conduct a study to develop recommendations on how to: <ul style="list-style-type: none"> <li>• Coordinate and integrate the state's energy entities</li> <li>• Achieve the goals of RGGI</li> <li>• Promote indigenous alternative fuel sources</li> </ul>	Study is to be completed by January 1, 2009; first phase of the study complete.	Effective July 1, 2007
59	CEAB shall conduct a study on the efficacy, innovativeness and customer focus on electric conservation programs and report to the legislature.	Complete. Final report issued February 1, 2008 titled "Connecticut Electric Conservation Programs Study."	Not later than July 1, 2007 hold a hearing; Not later than February 1, 2008 submit a report
65	Requires the CEAP program to maintain the assistance levels of the CEAP that were established in 2005 legislation	CEAP program maintains the increases authorized in the 2005 legislation – basically \$675 per household a heating season --and crisis funding (August 2008 SS increases CEAP levels)	July 2007  2008 SS increases take effect 2008/2009 heating season
66	Requires DSS to buy all deliverable fuels for the CEAP program at discounted prices and requires the CAP agencies that administer the CEAP program to provide DSS with pricing information and to begin accepting application for CEAP on Sept. 1 annually (in which funding is available)	CEAP report does include the CAP agency fuel pricing. CEAP 2009 plan requires vendors to charge	July 1, 2007 (limitations placed by budget bill 07-4)
67	Extends the end of period (from April 15 <sup>th</sup> to May 1 <sup>st</sup> – November 1 begins moratorium period) which utilities are prohibited from terminating service for their hardship cases (including households who have a seriously ill member, are 125% of FPL, or income is solely SS, VA or unemployment insurance).	Utilities are using the extended date, and are making changes in system to better identify hardship cases	
68	Exempts from sales tax – all equipment and installation for: solar electric and space and water heating systems; geothermal; and ice storage for	Many weatherization items are listed on DRS website as being exempt from sales tax. Solar systems not listed.	July 1,2007

<b>Public Act 07-242 update on matters related to energy efficiency and conservation</b>			
<b>Sec.</b>	<b>Program Description</b>	<b>Status</b>	<b>Date effective</b>
	cooling for utility customers on time-of-use rates.		
71	Allows electric companies to meet RPS standards by entering into long-term contracts (up to 15 years) that procure renewable energy credits. Credits are sold separately from power produced and count for electric companies' compliance. Required DPUC to establish a contested (regulatory case) to determine provisions contracts and process	DPUC issued draft decision on June 30, 2008 Final decision July 31, 2008 DPUC <i>allows</i> companies to procure RECs through contracts but does not require Authorizes max. of 0.4 mills per kWh for incentive	
74	Allows the CT Health and Educational Facilities Authority to provide grants and other financial assistance to colleges, hospitals, nursing homes and other nonprofits to implement energy efficiency and renewable energy projects	No CHEFA grants have been made	October 1, 2007
75 and 80	Reinstates until <i>June 30, 2008</i> the provision in 2005 legislation that lowers the interest for non lower-income groups and expands the type of projects the loans may be used for and increases the maximum loan amount from \$15,000 to \$25,000.	Lower interest rate continued. August 2008 SS allowed zero percent loans for residents with up to 200% of area median income	
78	State building inspector and Codes and Standards Cmttee to amend SBC to require certain buildings costing over a certain amount to build (\$5m) or \$2m to renovate to meet the LEED silver standard. Inspector and Cmttee. to waive requirement if ISE determines costs to comply significantly outweigh benefits	Many revisions to state building code, including required changes submitted to legislature's Regulation Review Committee, September 2008	Revise code by Jan. 1, 2008. New Building over \$5m to comply Jan. 2009, renovations over \$2m by Jan. 2010
81,82 and 128	Requires Operation Fuel (OF) to establish a one-time program to assist people with utility arrearages of more than 24 months old – grants up to \$1,000, and provide case management services like budget counseling. Extends the optional check off on utility bills to all electric and gas companies for OF's operations and increases check off amounts, and requires utility companies to submit any company contributions at the same time. Requires utility companies and fuel oil dealers to coordinate program promotions.	\$5m grant funding from OPM -- \$2.5m for arrearage forgiveness program; \$1.75 for expansion Operation Fuel's regular program, and \$.75m for OF infrastructure improvements (e.g., information technology) Operation Fuel implemented the grant program outlined in 2007. Utilities in compliance with check-off.	
84	Requires ECMB to contract with a 3 <sup>rd</sup> party for an assessment of energy efficiency potential to be issued to General Assembly	ECMB issued an RFP – Not completed	Required to report to GA by February 1, 2008
85	Requires electric companies to implement time-of-use (TOU) rates for large customers must include off peak, shoulder and peak	Phase-in mandatory schedule for time-of –use rates. New off-peak hours: 8 p.m. to 12 noon (accompanied by campaign "Wait Until 8")	Begun in early 2009
86	Requires that DPUC direct the electric utility companies to negotiate long-term contracts with each of the generators within 60 days of DPUC selecting the generators. DPUC can approve only those contracts it finds would lower rates	DPUC issued decision in August 2007 selecting 3 generators that utilities could negotiate with	
87, 88	Requires DPUC, with ECMB to establish a plan for energy efficiency and outreach marketing	\$5m in General Fund monies allocated for this. Much is a website clearinghouse of info entitled Ctenergyinfo.org	Implementation by March 2008

<b>Public Act 07-242 update on matters related to energy efficiency and conservation</b>			
<b>Sec.</b>	<b>Program Description</b>	<b>Status</b>	<b>Date effective</b>
111, 127		Also energy hotline 1-800-WISE-USE w/calls handled at the Institute for Sustainable Energy at ECSU	
89	All utilities, including municipals, to submit a plan to DPUC for notifying customers of impending blackouts and steps they can take	DPUC indicates will be addressed in Energy Outreach/Awareness program	Part of DPUC decision 1/16/08
90 and 91	Authorizes \$50m in bonding for a separate Clean Energy Fund Acct to establish a municipal renewable energy and efficient energy generation grant program. Priority for grants to be given disaster relief centers and high schools. Grants to make the cost of these generation sources competitive w/ town's current electricity expenses.	No bonding funding was allocated	October 1, 2007 for applications to be developed. Report to E&T committee by Jan 1, 2009.
92	Requires retail supplier choice	In place -- information on DPUC website	Ongoing
93	Requires DEP to develop regulations to implement the regional greenhouse gas initiative (RGGI)	Regulations approved by Regulations Review Committee in July 2008. First carbon credit auction to be held on September 25, 2008	
94 and 96	Electric Efficiency Partners <ul style="list-style-type: none"> <li>requires ECMB to evaluate and approve technologies that can be used by "partners" and file those evaluations with DPUC by October 15, 2007, including evaluation of cost/benefit</li> </ul>	DPUC held technical meetings early in 2008, issued final decision in June 2008 Applications for the program are on DPUC website DPUC has authorized no funding through rates as of September 2008 Full explanation in Section III –this report	P.A. 07-242 authorized up to \$60 million through rates for funding
97	<ul style="list-style-type: none"> <li>ECMB must provide DPUC with analysis of growth in overall and peak demand by October 15, 2007</li> </ul>	Submitted to DPUC and briefing to key legislators in June 2008	
97	Requires ECMB to also develop an Energy Excellence Plan that: <ul style="list-style-type: none"> <li>Describe in detail existing higher education energy efficiency resources</li> <li>Quantify role energy efficiency programs can lay in making business climate more competitive</li> <li>Identify measures and research investment that can make CT a national leader in energy efficiency</li> <li>Detail efficiency efforts that can lead to a reduction of peak electric demand by 10% by 2010</li> </ul>	Plan was submitted to Energy and Technology Committee in May 2008 (most aspects addressed)	February 1, 2008
98	Requires electric utilities to submit a plan for advanced metering	DPUC issued decision on generic rate design reopener: UI currently has advanced metering; allowed to enhance current program with communications, billing and metering so that customers can better manage energy use	

<b>Public Act 07-242 update on matters related to energy efficiency and conservation</b>			
<b>Sec.</b>	<b>Program Description</b>	<b>Status</b>	<b>Date effective</b>
		DPUC decision to CL&P authorizes a pilot with phased-in testing during 2008 and 2009 because costs of new metering so high	
99	Requires electric companies to off real time pricing	Same as above	
100	Requires ECMB and DPUC to develop an e-mail cell phone alert to reduce peak consumption	Part of outreach campaign	
102, 103	DEP/DPUC short term on-site generation program	DPUC issued RFP in 1/08 for manager of a pilot program on back-up on-site generation	
104	Requires DPUC to conduct study of standard service procurement	DPUC issued decision in April 2008. Decision states that neither a non-profit or for profit should be used for procurement but that utilities may use long-term bilateral contract with generators for standard supply. Must not exceed 20% of standard supply and all contracts must be approved by DPUC	April 2008
106	Requires DPUC to study development of financial incentive program to utilities to stabilize or reduce electric (peak) demand	DPUC issued final decision in January 2008. determined not yet feasible to develop a program	
108 109	DPUC, with OPM and Clean Energy Fund develop a grant program for distributed generation/renewable energy	Grant program in place at DPUC – Funded with \$50m bond	
115	Additional funding to gas conservation and efficiency programs through the growth in utilities gross receipts tax over projections	To date no funding resulted from this –	
116	<ul style="list-style-type: none"> <li>• Establishes a 13-member Fuel Oil Conservation Board</li> <li>• Requires the board to establish itself as a nonprofit (501c)</li> <li>• To issue an RFP to select an administrator for fuel oil conservation programs and contract with entity for up to three years. Renew or issue an new RFP</li> <li>• Administrator must submit a comprehensive fuel oil conservation plan to ECMB</li> <li>• FOCB to assist the administrator in plan development an implementation</li> <li>• Funding is to come from excess over 2006 revenues in gross receipts tax on sale of petroleum products -- \$10m annual limit (PA 07-1 limited it to \$5m a year beginning in 09) Monies not spent revert to GF</li> <li>• Every 2<sup>nd</sup> year (even years), AG to select a third party to audit FOCB activities and report to E&amp;T and Environment committees</li> <li>• Board to report annually to committees on expenditures, balances and cost effectiveness of programs</li> </ul>	RFP issued for administrator – selection and negotiation of contract underway. No programs have been implemented as of September 2008. Funding allocated in June and August Special Sessions	January 1, 2008 to September 1, 2008

<b>Public Act 07-242 update on matters related to energy efficiency and conservation</b>			
<b>Sec.</b>	<b>Program Description</b>	<b>Status</b>	<b>Date effective</b>
117	DPUC to start proceedings if new RFP does not meet demand identified in the Integrated Resources Plan (IRP)	IRP went to DPUC in September 2008 -- Not determined resources needed	
118	Requires electric companies to waive its demand charges for fuel cell owners under certain conditions	Issued as part of generic rate design decisions	
119	Required electric utility companies to offer a conservation incentive program to allow customers a credit of 10%, 15% or 20% off the generation portion of their bills for July through September if they reduced their consumption compared to the same period for 2006.	DPUC issued decision in June 2007 and changed the months from June to August to July to September to allow more time for customers to become aware of the program. DPUC issued report on program – CL&P – 290,078 customers in rebate program = \$17.2m UI had 81,207 customers = \$4.2m DPUC cautions using again (at least to 2009) given costs and unknown direct impact on use	July - September 2007
121	Authorizes \$30m in bonding through the Clean Energy Fund for renewable energy and combined heat and power projects in state buildings. To be eligible the buildings must be certified (or in the process) in the LEED program. P.A. 07-4 expanded the eligibility to include to LEED-silver building or 2 globe-rating in the Green Globes program (another rating system)	No bonding money has been allocated -	
122	Requires certain percentage of state fleet vehicles purchased use alternative fuel or other energy efficient	DAS indicates 55% of 992 vehicles purchased from 9/07 to 8/08 meet the standards	50% of vehicles purchased between Jan 1, 2008 and December 31, 2009. 100% after that
124	Increases the amount of megawatts electric companies must purchase from generators of Class I renewable resources through long-term contracts. Had been 100 megawatts; law requires 125 megawatts from October 1, 2007 to October 1, 2008 and 150 megawatts after that.	Requires a study to be done by DPUC, with the OCC and the Ct Clean Energy Advisory Board on these contracts and report to the E&T committee on these contracts. DPUC considered analysis done by CCEF, EDCs and OCC and issued a decision in January 2008 on which renewable generating projects DPUC would approve. Clean Energy has approval of “150 projects” in its plan.	
125	Requires DPUC to examine the effectiveness of ECMB’s programs (through contested case proceeding)	ECMB indicates DPUC does ongoing review of programs when it annually approves conservation and load management plan and budget	July 1, 2010

## Appendix C

### Glossary of Energy Terms

**BTU** - The standard measure of heat energy. It takes one Btu to raise the temperature of one pound of water by one degree Fahrenheit at sea level. One Btu is equivalent to 0.293 watt-hours.

**Demand-side management** - Conservation resource planning considering factors affecting energy usage for each customer class and generally designed to reduce or shift load.

**Electric generation company** - a company that generates/produces electricity for sale in a competitive market.

**Electric supplier** - an entity licensed by the DPUC to provide electric generation services to end use customers using the transmission and distribution facilities of an electric distribution company.

**Electric distribution company** - the company that delivers electricity to the retail customer's home or business. This company owns the power lines, poles, wires, conduits or other fixtures needed to handle the transmission and distribution of the electricity along public highways or streets.

**FERC** - Federal Energy Regulatory Commission regulates the price, terms and conditions of power sold in interstate commerce. Also regulates the price, terms and conditions of all transmission services. FERC is the federal counterpart to state utility regulatory commissions.

**FMCC** - Federally-Mandated Congestion Costs - Effective January 1, 2004, federal law requires that two line item charges for congestion costs, energy-related and/or reliability-related costs be added to customer bills. They are defined as charges to the consumer resulting from deficiencies in the electricity transportation system. Congestion costs occur when a more costly generator is dispatched before a less costly one because there isn't adequate transmission capacity to get the generation from the less costly plant to the load center that needs it.

**“Gap RFP”** – On December 1, 2003, ISO New England Inc. (ISO-NE) issued a Request for Proposals (RFP) soliciting up to 300 MW of temporary supply and demand resources for Southwest Connecticut (SWCT) for the period 2004 to 2008. The purpose for acquiring these resources was to improve the electric system reliability in SWCT through the summer of 2007, when the 345 kV transmission loop is planned for completion.

**Gigawatt (GW)** - One thousand megawatt hours (1,000 mWh) or one million kilowatt hours (kWh) or one billion watts (1,000,000,000 watt hours) of electricity.

**HVAC** - A system that provides heating, ventilation and/or cooling within or associated with a building.

**Independent System Operator (ISO)** - a neutral operator responsible for maintaining instantaneous balance of the electric grid system. The ISO performs its function by controlling the dispatch of flexible plants to ensure that loads match resources available to the system. The operator for this region is ISO- New England.

**Kilowatt (kW)** - One thousand (1,000) watts. A unit of measure of the amount of constant electricity needed to operate given equipment. On a hot summer afternoon a typical home, with central air conditioning and other equipment in use, might have a demand of 4 kW.

**Kilowatt-hour - (kWh)** a measure of electricity consumption equivalent to the use of 1,000 watts of power over a period of one hour.

**Load management** - the shifting of customer energy demands for a utility's power to different time periods of the day.

**Megawatt (MW)** - One thousand kilowatts or one million watts. One megawatt is enough energy to power 200 average homes

**Megawatt hour (MWh)** - One thousand kilowatt-hours, or an amount of electricity that would supply the monthly power needs of a typical home having an electric hot water system

**Peak load or peak demand** - The electric load that corresponds to a maximum level of electric demand in a specified time period. Peak periods during the day usually occur in the morning hours from 6 to 9 a.m. and during the afternoons from 4 to about 8 or 9 p.m. The afternoon peak demand periods are usually higher, and they are highest during summer months when air-conditioning use is the highest

**Renewable energy** - solar energy, wind, ocean thermal energy, wave or tidal energy, fuel cells, landfill gas and biomass conversion technologies are considered renewable energy sources.

**Systems Benefits Charge** - the charge on each electric customer's bill that covers certain regulatory and social policy costs, such as public education, hardship protection, low-income conservation benefits and taxes.

## Appendix D



### Financial Incentives for Renewable Energy

State	Personal Tax	Corp. Tax	Sales Tax	Prop. Tax	Rebates	Grants	Loans	Industry Support	Bonds	Production Incentives
Federal	3-F	4-F				2-F	3-F			1-F
Alabama	1-S				3-U	1-S	1-S 1-U			1-U
Alaska							2-S			1-U
Arizona	3-S	1-S	1-S	2-S	6-U		2-U			
Arkansas										
California				1-S	5-S 35-U 1-L	1-L	2-S 1-U 1-L			1-S 2-U
Colorado			1-S 1-L	2-S	7-U 3-L	1-L 1-P	3-U 1-L	1-S		
Connecticut			1-S	1-S	2-S	4-S	2-S	2-S		1-P
Delaware					1-S	2-S				
Florida		2-S	1-S	1-S	1-S 7-U 2-L	1-S	4-U			1-U
Georgia	1-S	1-S	1-S		3-U		3-U			1-U
Hawaii	1-S	1-S			2-U		1-S 2-U 1-L	1-S	1-L	
Idaho	1-S		1-S	1-S	2-U	2-P	1-S		1-S	1-P
Illinois				2-S	1-S	2-S 1-P		1-S		
Indiana				1-S	1-S 25-U	1-S				
Iowa	1-S	1-S	1-S	3-S	6-U	1-S	2-S			
Kansas				1-S			1-S			
Kentucky	1-S	2-S	1-S		5-U		2-U 1-P			1-U
Louisiana	1-S	1-S		1-S			1-S			
Maine					1-S	1-S	1-S			
Maryland	2-S	2-S	2-S	4-S 3-L	3-S 1-L		2-S			
Massachusetts	2-S	3-S	1-S	1-S	2-S 2-U	3-S	1-S 1-U	2-S		1-P
Michigan				1-S	1-U	4-S		2-S		
Minnesota			2-S	1-S	2-S 9-U	2-U	5-S 1-U			1-S 1-U
Mississippi					4-U		1-S			1-U
Missouri		1-S			6-U		1-S 1-U			
Montana	3-S	1-S		3-S	2-U	1-U 2-P	1-S	2-S		1-P
Nebraska			1-S		2-U		1-S			
Nevada				3-S	1-S					
New Hampshire				1-S	3-U		1-S			
New Jersey			1-S		4-S 1-U		1-S 1-U			1-S
New Mexico	3-S	3-S	2-S					1-S	1-S	1-U
New York	2-S	1-S	1-S	2-S 1-L	5-S 3-U	2-S	2-S	2-S		1-S
North Carolina	1-S	1-S	1-S	2-S			1-S	1-S		1-U 1-P
North Dakota	1-S	1-S		2-S			1-U			
Ohio		1-S	1-S	1-S 1-L	6-U	2-S				1-S
Oklahoma		1-S					3-S 1-U	1-S		
Oregon	1-S	1-S		1-S	3-S 12-U	1-S 2-P	1-S 7-U	1-S		1-U 1-P
Pennsylvania				1-S		3-S 3-L	1-S 1-U 5-L			
Rhode Island	1-S	1-S	1-S	2-S	1-U					1-P
South Carolina	1-S	2-S	1-S		1-S 2-U	1-S	1-S 4-U			1-S
South Dakota				3-S	1-U		2-U			
Tennessee				1-S		1-S	1-S			1-U

Texas		1-S		1-S	7-U		1-S	1-S		
Utah	1-S	1-S	1-S		5-U					
Vermont		1-S	1-S	1-S	1-S	1-S 1-U	1-S			2-U
Virginia				1-S				1-S		1-U
Washington			1-S		12-U	1-L 2-P	9-U	1-S		1-S 3-U 1-P
West Virginia		1-S		1-S						
Wisconsin				1-S	2-S 2-U	1-S 1-U		1-S		4-U
Wyoming			1-S		1-S 1-U					
District of Columbia						1-S				
Palau										
Guam										
Puerto Rico	1-S		1-S	1-S						
Virgin Islands					1-S	1-S				
N. Mariana Islands										
American Samoa										
Totals	32	36	28	56	228	57	99	21	3	39

F = Federal S = State/Territory L = Local U = Utility P = Private



**DSIRE**  
Database of State Incentives for Renewables & Efficiency

### Financial Incentives for Energy Efficiency

State	Personal Tax	Corp. Tax	Sales Tax	Prop. Tax	Rebates	Grants	Loans	Bonds
Federal	2-F	3-F				1-F	2-F	
Alabama					10-U		1-S 10-U	
Alaska					1-S 2-U		4-S	
Arizona	1-S				3-U		1-U	
Arkansas							1-S 4-U	
California					59-U	5-U	2-S 7-U	
Colorado					17-U	1-U	2-U	
Connecticut			1-S		13-U	1-S 1-U	2-S 3-U	
Delaware								
Florida					16-U	1-S 2-U	4-U	
Georgia		1-S	1-S		14-U		10-U	
Hawaii					5-U			
Idaho	1-S				17-U		1-S 2-U	
Illinois					1-S 2-U	2-S		
Indiana					27-U	1-U		
Iowa					21-U	1-S	1-S 3-U	
Kansas					2-U		1-S	
Kentucky	1-S	1-S	1-S		11-U		6-U	
Louisiana					1-S 1-U		1-S	
Maine					2-S 2-U		2-S	
Maryland	1-S	1-S		2-S		1-S	2-S	
Massachusetts	1-S	1-S			24-U		4-U	

Michigan						2-S		
Minnesota					70-U	5-U	4-S 4-U	
Mississippi					6-U		1-S 3-U	
Missouri	1-S		1-S		19-U		1-S 2-U	
Montana	1-S	1-S			6-U	1-U	1-S	1-S
Nebraska					3-U		1-S	
Nevada				1-S	5-U			
New Hampshire					15-U	2-U	1-S 1-U	
New Jersey					7-S 1-U		1-S	
New Mexico	1-S	1-S			5-U			1-S
New York	1-S	1-S		1-S	4-S 6-U	2-S	2-S	
North Carolina			1-S		1-S 4-U		1-S 9-U	
North Dakota						1-S	2-U	
Ohio					7-U	1-S		
Oklahoma	1-S				1-U		3-S 1-U	
Oregon	1-S	1-S			5-S 35-U	2-U	1-S 13-U	
Pennsylvania						4-S	2-S 1-U	
Rhode Island					5-U		1-U	
South Carolina			2-S				1-S 6-U	
South Dakota					2-U		2-U	
Tennessee					21-U		2-S 24-U	
Texas			1-S		35-U		1-S 5-U	
Utah					9-U		2-S	
Vermont			1-S		9-S 3-U		1-S 1-U	
Virginia			1-S	1-S	1-U		1-U	
Washington					65-U	1-S 3-U	10-U	
West Virginia			1-S			1-S		
Wisconsin					4-S 14-U		1-S 2-U	
Wyoming					3-U	1-S	1-S 1-U	
District of Columbia								
Palau								
Guam								
Puerto Rico								
Virgin Islands					1-S	1-S		
N. Mariana Islands								
American Samoa								
Totals	13	11	11	5	623	44	193	2

F = Federal S = State/Territory L = Local U = Utility

## Appendix E

### Consumer resources for information on Energy Efficiency and Conservation

The channels for locating information abound. Listed below is a compilation of the various resources for energy efficiency and conservation information:

State Resources:		Description
<b>General energy information</b>	<a href="http://www.ctenergyinfo.com">www.ctenergyinfo.com</a>	Developed by the DPUC in conjunction with the Institute for Sustainable Energy to assist consumers in location information about energy-related matters
<a href="#">Energy Efficiency</a>	<a href="http://www.ctsavesenergy.org">www.ctsavesenergy.org</a>	<a href="#">Energy Conservation Management Board website</a>
	<a href="http://www.smartlivingcatalog.com">www.smartlivingcatalog.com</a>	<a href="#">Enables CL&amp;P and UI customers to shop online for ENERGY STAR products.</a>
	<a href="http://www.chif.org">www.chif.org</a>	<a href="#">Energy Conservation Loan Program website</a>
	<a href="http://www.ctgreenschools.org">www.ctgreenschools.org</a>	<a href="#">College and university initiative to make campus facilities more energy efficient and environmentally friendly with the assistance of the Institute for Sustainable Energy and the Department of Environmental Protection.</a>
Clean Energy	<a href="http://www.ctcleanenergy.com">www.ctcleanenergy.com</a>	Website for the Connecticut Clean Energy Fund
	<a href="http://www.ctsolarlease.com">www.ctsolarlease.com</a>	<a href="#">Solar leasing plan for moderate to low income households</a>
<a href="#">Energy Education</a>	<a href="http://www.sustainenergy.org">www.sustainenergy.org</a>	<a href="#">The Institute for Sustainable Energy website provides information on the core activities of the Institute</a>
	<a href="http://www.ctenergyeducation.com">www.ctenergyeducation.com</a>	<a href="#">A curriculum resource for educators of high school students</a>
	<a href="http://www.coolitchallenge.org">www.coolitchallenge.org</a>	<a href="#">A competition for middle and high school students where students learn about the science of climate change and then create local solutions. This program is run by the Institute for Sustainable Energy and funded primarily by the Tremaine Foundation.</a>
	<a href="http://www.wattsnewct.ct.gov">www.wattsnewct.ct.gov</a>	<a href="#">An education campaign created by the legislature and managed by the DPUC to inform electric customers about electric competition</a>
	<a href="http://www.eesmarts.com">www.eesmarts.com</a>	<a href="#">A CEEF initiative providing educational materials for teachers aimed at elementary and middle school children</a>
	<a href="http://conservationeducation.org">http://conservationeducation.org</a>	<a href="#">Connecticut League of Conservation Voters Energy Fund</a>
	<a href="http://onethingct.com">http://onethingct.com</a>	<a href="#">Governor's initiative to educate consumers on conservation</a>
	1-877-WISE-USE	<a href="#">To get answers to energy related questions.</a>
	2-1-1 (Infoline)	<a href="#">An online database that can provide information on energy and conservation programs, utility payment programs, and shut-offs and winter protection.</a>
<a href="#">Low-income energy assistance</a>	<a href="http://www.ct.gov/dss">www.ct.gov/dss</a>	<a href="#">Energy and heating assistance for low-income renters and homeowners</a>
	<a href="http://www.operationfuel.org">www.operationfuel.org</a>	<a href="#">Non profit providing fuel assistance to Connecticut residents.</a>
<a href="#">Biofuel Resource</a>	<a href="http://www.ctbiofuelinfo.org">www.ctbiofuelinfo.org</a>	<a href="#">A mechanism to help create a market in Connecticut for the use of biofuels by connecting the people who have the waste with processing facilities. The site is still under construction but is a 2008 initiative of the ISE with the help of a grant from the legislature.</a>
<a href="#">State energy policy</a>	<a href="http://www.ctenergy.org">www.ctenergy.org</a>	<a href="#">Connecticut Energy Advisory Board</a>
	<a href="http://www.ct.gov/opm">www.ct.gov/opm</a>	<a href="#">Office of Policy and Management: Energy Management Unit which produces the "State of Energy", a periodic electronic newsletter on energy issues</a>

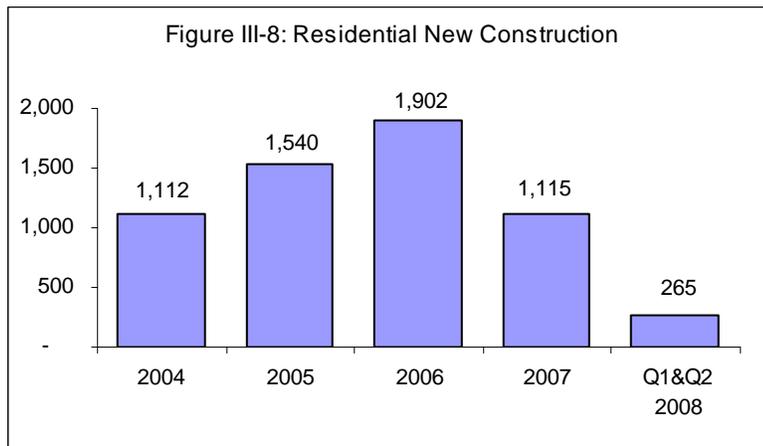
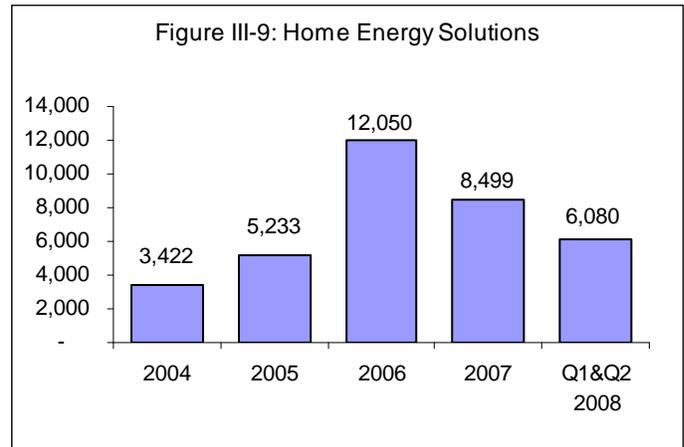
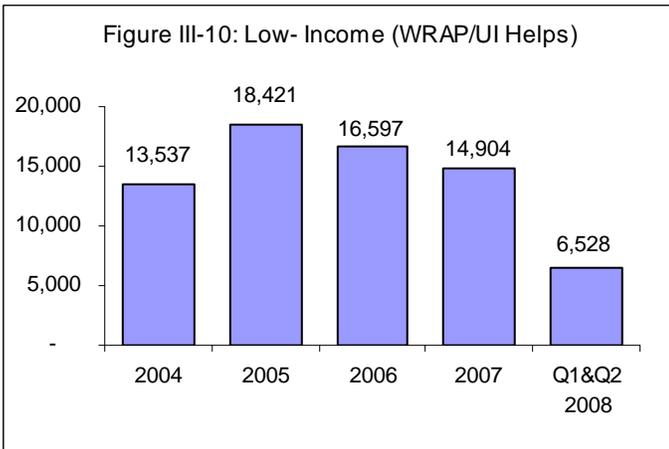
<b>National Resources:</b>		
<a href="#">Clean Energy</a>	<a href="http://www.dsireusa.org">www.dsireusa.org</a>	<a href="#">Database of state incentives for renewable energy</a>
<a href="#">Energy Efficiency</a>	<a href="http://www.aceee.org">www.aceee.org</a>	<a href="#">American Council for an Energy Efficient Economy</a>
<a href="#">Energy Education</a>	<a href="http://www.eia.gov">www.eia.gov</a>	<a href="#">Federal Energy Information Administration – official energy statistics</a>

## Appendix F

### Connecticut Energy Efficiency Fund: Customers Served

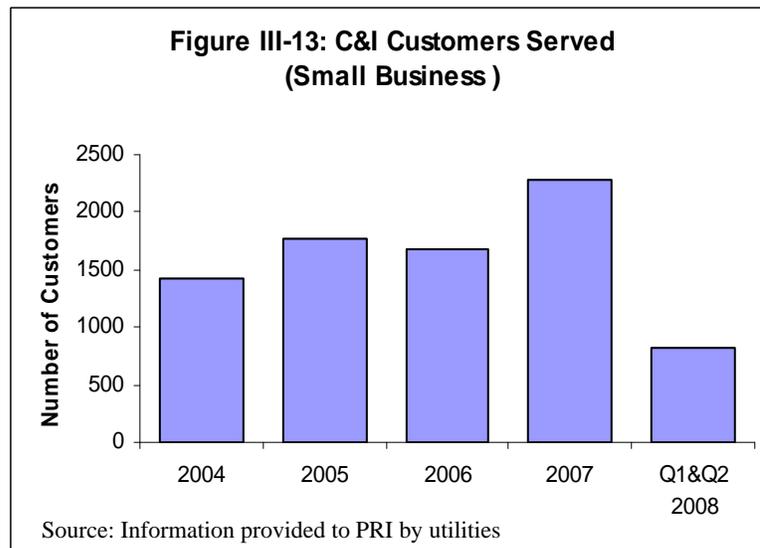
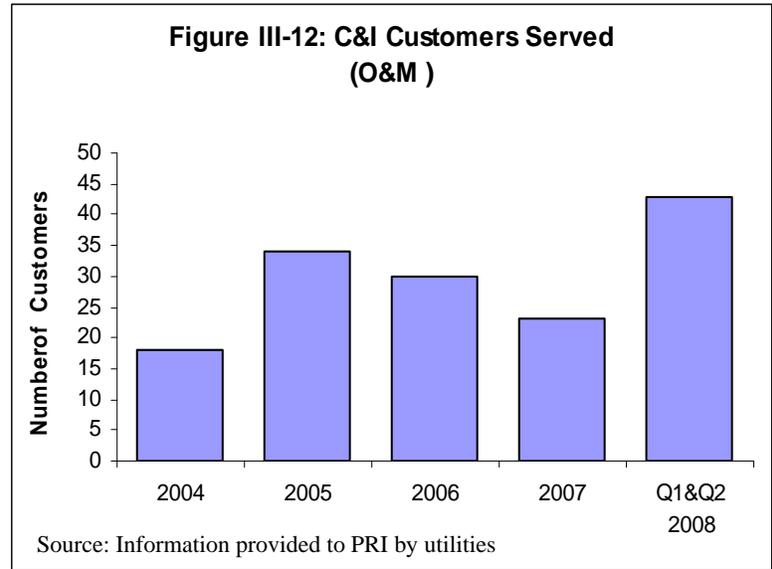
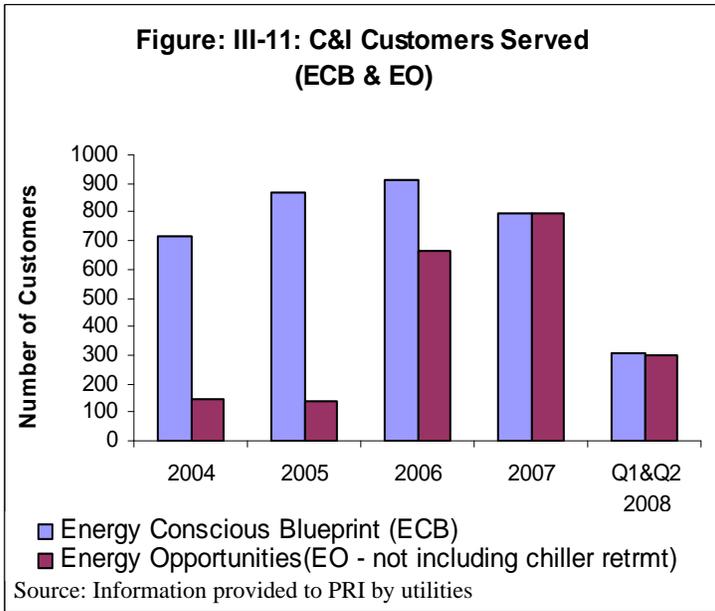
**Residential.** The total customers served since 2004 are:

- Low -income (WRAP/UI Helps) – 69,987
- Home Energy Solutions – 32,284
- Residential New Construction – 5,934



**Commercial and Industrial.** The total customers served since 2004 are:

- Energy Conscious Blueprint and Energy Opportunities – 5,646
- Operation & Maintenance – 148
- Small Business – 7,979



## Appendix G

### WRAP MEASURE DESCRIPTION

The table below shows the Measures that are used in the Sub-Programs.

<u>MEASURE</u>	<u>SUB-PROGRAM</u>			
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
1. Set water heater thermostat at 120°F	X	X		
1b. Install waterbed covers	X	X		X
2b. Install CFL-15 Watt	X	X	X	X
2c. Install CFL-20 Watt	X	X	X	X
2m. Torchiere lamp replacement	X	X		X
2n. Small table lamp (22 Watt)	X	X	X	X
2p. Large table lamp (22 Watt)	X	X	X	X
2*1. Install CFL (Globe 15-Watt)	X	X	X	X
2*2. Install CFL (Recess 15-Watt)	X	X	X	X
2*3. Install CFL (Three-way)	X	X	X	X
2*4. Install Outdoor Flood (23-Watt)	X	X	X	X
3. Install electric outlet/switch gasket	X	X		
4. Install low-flow shower head	X	X	X	X
5. Wrap water heater to R-6	X	X		
6. Install low-flow faucet aerator	X	X	X	X
7. Install door sweep	X	X	X	
8. Caulk window	X	X	X	
9. Caulk exterior door	X	X	X	
10. Weather strip window	X	X	X	
11. Weather strip door	X	X	X	
12. Insulate attic hatchway	X	X		
13. Interior heat leak sealing (caulk)	X	X		
14. Install basement window coverings	X	X		

MEASURE	SUB-PROGRAM			
	1	2	3	4
15. Insulate heating ducts to R-6	X	X		
16. Insulate vertical attic door	X	X		
17a. Install 10' pipe insulation to R-3.2 on DHW pipes only	X	X		
18. Seal sill plate or baseboard (interior)	X	X		
19. Insulate pull-down stairs	X	X		
21. Minor carpentry		X		
25a. Increase non-gas ceiling insulation level to R-38 (when existing is at or below R-11)	X	X	X	
25b. Increase gas ceiling insulation level to R-38 (when existing is at or below R-11, YGS & CNG Only)	X	X	X	
26. Replace broken window/door glass	X	X		
27. Window glazing (5 maximum)	X	X		
27b. Window locks-Top	X	X		
27c. Window locks-Side	X	X		
28a. Clean, tune, and test	X	X		
28b. Heating system repair	X	X		
29. Burner replacement (Steady state efficiency level at or below 75 percent)	X	X		
30. Furnace boiler replacement	X	X		
30a. E-Star furnace replacement	X	X		
31. Increase sidewall insulation R-13	X	X	X	
32. Minor plumbing		X	X	X
33. Miscellaneous		X		
40. Replacement window units		X	X	

**Sub-Program Descriptions:**

**1 = Leveraged Funding to DSS Weatherization program.**

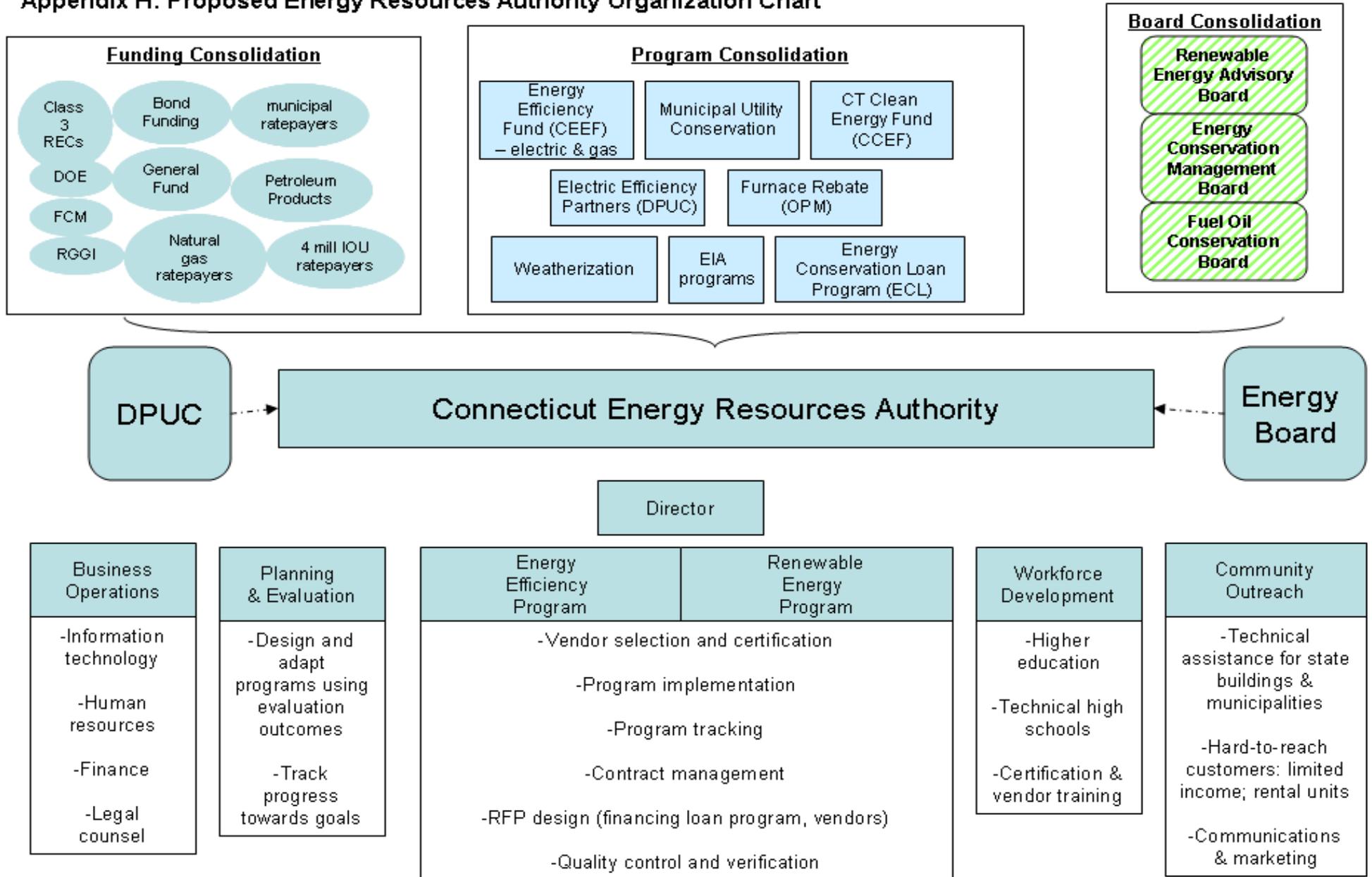
**2 = Most comprehensive measures of the WRAP program.**

**3 = Less comprehensive -- primarily lighting measures. Program concentration is multi-family complexes.**

**4 = Least comprehensive -- primarily neighborhood canvass. Provides information, performs some minor measures, including lighting.**

Source: CL&P Weatherization Residential Assistance Program

# Appendix H: Proposed 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

**APPENDIX I**  
**Office of Policy and Management Comments on**  
**PRI Recommendations**  
**March 19, 2009**

1. 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% reduction in per capita energy consumption off the 2006 baseline measure by 2015.

**Comment: State energy policy already includes the concept of using efficiency and conservation as a means to reducing overall energy consumption. While having a goal is laudable and can often be an impetus to getting things done, strict statutory goals most often are not met and accountability is always an issue. As in this case we are talking about energy usage in total in the State (as opposed to energy usage within state government) getting results to match up with a target is going to be both incredibly difficult and potentially costly.**

2. The gas utility contribution to the energy efficiency and conservation programs shall be one percent of the utilities' previous year's revenues.
3. The legislature shall 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.

**Comment: These two recommendations continue the piecemeal approach to funding energy conservation programs for consumers. It continues to perpetuate the belief that there are differences in conserving one fuel over another. This approach adds unnecessary administrative costs to all conservation undertakings as coordination and oversight becomes more complex. The consumer wants to and should be encouraged to save energy in any and all forms that is appropriate for its situation. The consumer should not be forced to contact or deal with multiple entities to achieve energy efficiency. This is one reason why consumers do not partake of services – government has made it difficult to access. Funds created by existing assessments should have greater flexibility and promote energy conservation, regardless of source.**

4. The legislature and the governor should 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.

**Comment: There are two opposing concepts in this recommendation – one focusing on reducing energy use and the other on reducing energy cost. With regard to reducing energy usage in state facilities, the Governor has on a number of occasions expressed the desire to have agencies reduce their energy usage. While the intent is worthwhile, the implementation typically falls short of the desired outcome for one reason – lack of financial support to undertake meaningful and lasting energy efficiency and conservation in state buildings. It costs money to save money, and without specific resources in the budget to support this effort, achieving the stated goal of reducing energy usage will continue to be difficult.**

APPENDIX I  
Office of Policy and Management Comments on  
PRI Recommendations  
March 19, 2009

**Reducing energy costs will likely follow in the long run if we reduce energy consumption. Energy prices can vary considerably from period to period. Regardless of the efforts to reduce usage, cost can and will change independently. One cannot always achieve simultaneous reductions in usage and costs.**

5. 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.

**Comment: Focusing only on the expenditure reporting without an understanding of the energy requirements that that level of expenditure supports will lead to erroneous interpretation and conclusions. One of the Energy Unit's major undertakings is the design and implementation of a major database that will allow for the reporting of energy usage and costs at the agency (and specific building) level. Once fully implemented, this should provide decision-makers with the appropriate information on which to base future initiatives to save either or both cost and/or usage.**

**The problem with performance contracting continues to be the moving of capitol expenditures into the operating budget of an agency. This has two major implications for the State. First, assuming the state can borrow funds at a rate lower than a commercial for-profit entity, then why would the State want to incur higher imbedded interest charges? Second, operating budgets are already strained; shifting capitol project costs to the operating ledger will place additional budgetary constraints on the agency and the State. Also, performance contracting fees would typically be accounted for under an agency's "contractor" line item, and not show up as being related to energy expenditures. This will skew the reporting of energy costs envisioned elsewhere in the recommendation.**

6. A new division within the Office of Consumer Counsel (OCC) shall be dedicated to evaluating all energy efficiency, conservation, and renewable energy programs. 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 organizations 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 should be conducted to verify yearly energy and capacity savings and total resource benefits and progress towards goals; and
  - Half the evaluation budget shall focus on impact evaluations, with the remainder for process and market effects evaluations.
- 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 (includes fringe benefits) with the remainder of

**APPENDIX I**  
**Office of Policy and Management Comments on**  
**PRI Recommendations**  
**March 19, 2009**

the allotted budget for hiring third-party evaluators. Funding for all the evaluation work including the addition of OCC staff should come from two and a half percent of current programming budgets.

**Comment: Notwithstanding the Governor’s recommendation to eliminate the OCC entirely, the major issue with this proposal is that it perpetuates the concept that energy is synonymous with utility (electricity and/or natural gas). Energy conservation, to be effective and consumer focused, needs to address all energy forms, including energy used to heat or cool buildings and energy used to provide transportation needs. Expanding the OCC jurisdiction beyond being the consumer advocate for utilities is not something we can support and is not an expense that we can undertake at this time.**

7. The annual application process for energy cash assistance 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.

**Comment: This will likely increase the program costs as we would now rely on CEAP recipients to self-police the eligibility rules. There would be little incentive for a recipient to report income changes that might push them over the eligibility threshold – increasing potential fraud as well as administrative costs. This would militate against the policy of preserving resources for those most in need. Also, while this concept may work with certain groups of customers that qualify year after year, as the CEAP program is solely reliant on federal LIHEAP funds, changes in eligibility and/or benefits may change annually as federal changes to the program are enacted.**

8. The Department of Public Utility 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.

**Comment: This is actually the recommendation that came out of the Low Income Energy Advisory Board. As it is a study, the issue of cross-subsidization would be raised and discussed in an appropriate venue.**

9. The weatherization programs 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.

**APPENDIX I**  
**Office of Policy and Management Comments on**  
**PRI Recommendations**  
**March 19, 2009**

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.

**Comment: It is unclear from the recommendation whether it seeks a state-supported program or is attempting to alter the federal Weatherization Assistance Program (WAP). Obviously, finding fiscal resources for a state-supported weatherization program will be difficult. Under WAP, the state typically receives between \$1 and \$2 million per year. WAP is a federal program that comes with very specific guidelines as to what can be done in each house and how much can be spent on each house. This would run afoul of the stated recommendation. As for using LIHEAP funding for weatherization, while this has always been allowed, it is not a viable option in CT as any dollars taken from LIHEAP for weatherization will reduce available funds for CEAP benefits, thus potentially putting the State in the position of finding its own resources to support CEAP.**