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Maine Home Heating Report 2007

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Maine Home Heating Report 2007

To the Maine Legislature, Utilities and Energy Committee
Betsy Elder, Uldis Vanags, Beth Nagusky 1/30/2007

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The State of Home Heating in Maine Report to the Legislature

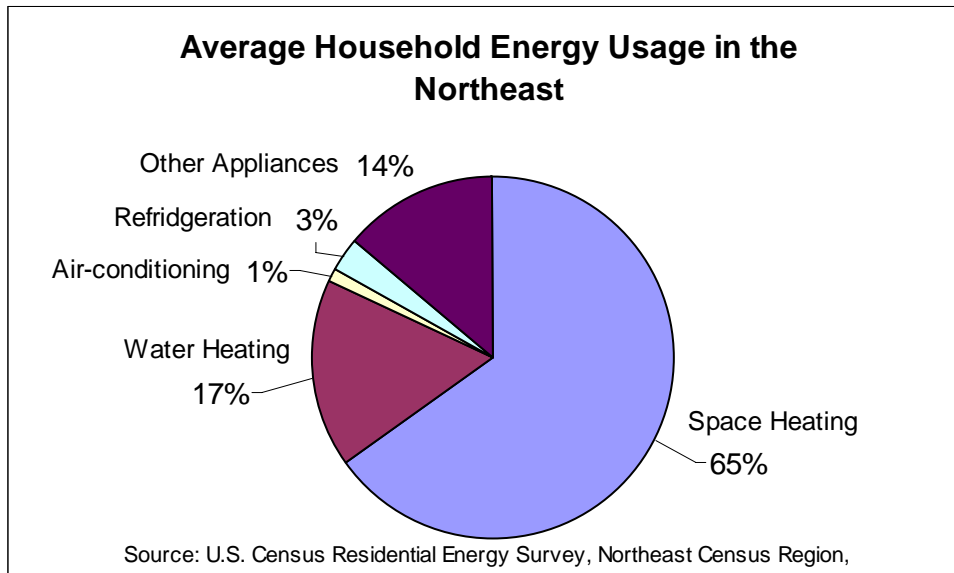
The 122nd Session of the Maine State Legislature enacted L.D. 1931, An Act to Encourage Energy Independence for Maine. Section 9 of that Act required the Governor's Office of Energy Independence and Security to submit a report concerning home heating in Maine to the Joint Standing Committee on Utilities and Energy. This report responds to the six issues the Legislature asked the Office of Energy to examine:

1. Total Statewide and average Maine household heating energy
2. Home heating fuel prices, including taxes, fees and other charges;
3. Total statewide and average household annual home heating expenditures by fuel;
4. Policies and programs to reduce home heating bills;
5. Home heating equipment energy efficiency; and,
6. The point of origin for home heating energy sources used in Maine.

I. Total Statewide and average Maine household annual consumption of heating energy by fuel type

Maine homeowners and renters heat with #2 heating oil (high sulfur distillate), kerosene, propane, natural gas, electricity, wood or coal. Space heating is by far the largest energy requirement both in terms of fuel and cost for a typical household in the Northeast, comprising 65% of household energy usage. Figure 1.

Figure 1



The U.S. Census Bureau estimates that in 2003 there were 671,000 Maine housing units of which 535,091 were occupied and about 69% of the housing units were single unit structures, 21% multi-unit structures, and 10% mobile homes. Of the occupied housing units, 378,000 (71 percent) were owner occupied and 157,000 (29 percent) were renter

occupied.¹ Seventy-nine percent of Maine households are heated with either #2 fuel oil or kerosene. Figure 2 shows that other fuels such as natural gas, liquid petroleum, wood and electricity each provide about 5% of home heating fuel in Maine households. Other fuels, such as coal and wood pellets provide about 1% of the heating fuel resources in Maine.

Figure 2

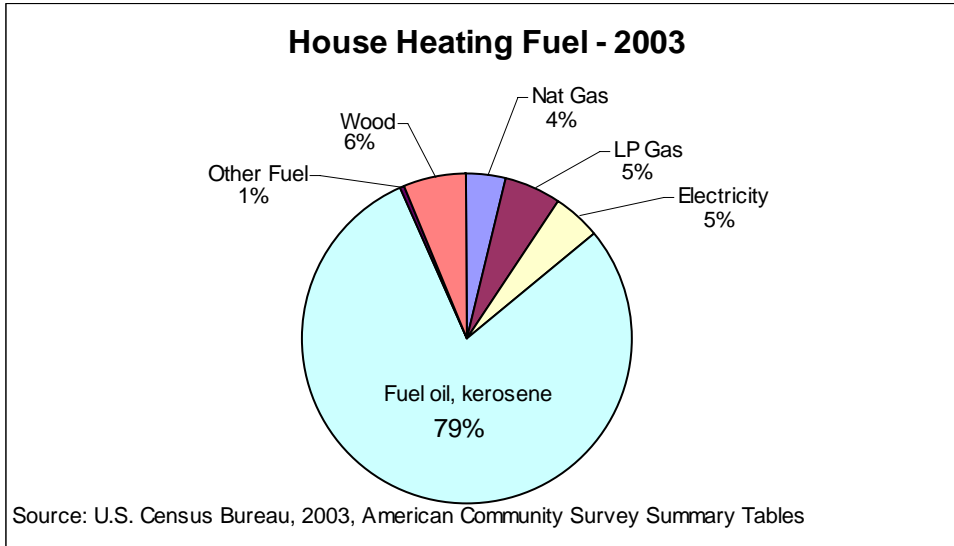
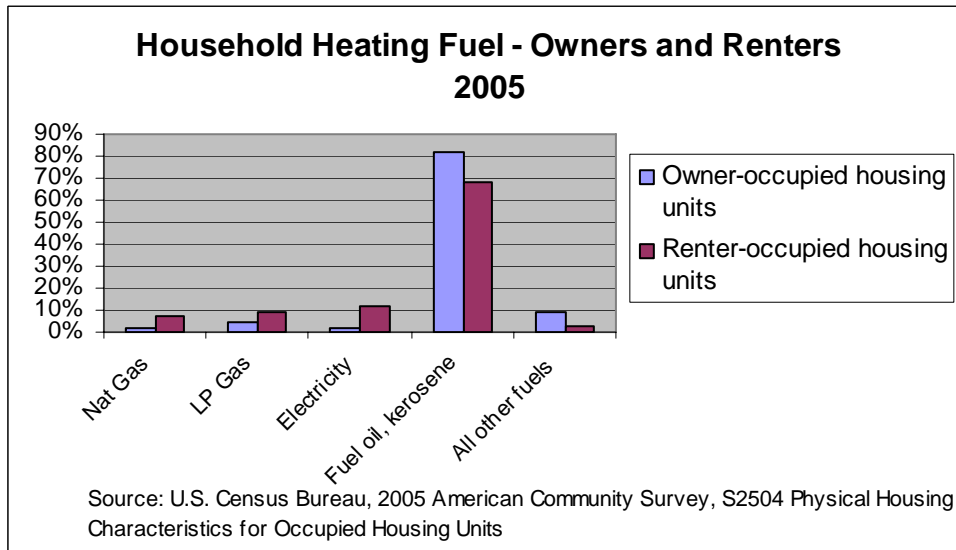


Figure 3



Eighty-two percent of owner occupied homes are heated with oil, as compared to only sixty-nine (69) percent of renter occupied units. Figure 3. A greater number of renter occupied homes are heated with electricity (12%) than of owner occupied (4%). Figure 4 provides the best estimates of annual heating fuel consumption by fuel type statewide and

¹ U.S. Census Bureau Maine Population and Housing Narrative Profile:2003

by household for 2003.² As stated previously, 79% of Maine households heat with fuel oil and kerosene resulting in statewide annual consumption of about 427 million gallons with the average household consuming about 1000 gallons per year. Natural Gas for heat is primarily available in Southern Maine, but becoming more available in central Maine since the Maritimes Northeast pipeline became operational in 2001. Statewide annual usage for households is estimated at 1.5 Billion cubic feet with an average of 69.4 mcf per household. Liquid Propane (LP) gas heats about 29,168 Maine homes with annual state consumption of 58 million gallons per year and an average of 1990 gallons per household.

Wood and electric heat are used as the primary fuel to heat about 11 percent of homes but also as the secondary fuel to supplement homes heating primarily with a petroleum product. The average cost per household for wood and electric heat was not available, particularly for wood use where the price is highly variable. Factors affecting wood prices include the region of Maine where one is purchasing it, the quality (whether soft or hard wood and whether seasoned dry or wet and green, and the volume purchased (whether it is used as a primary or secondary heating fuel). Coal and wood pellets are utilized by about 1 percent of homes in Maine, but reliable data on annual usage for these products is unavailable. Qualitative evidence from increased sales of pellet stoves and pellets indicate an increasing number of Maine households are supplementing primary heating systems with this fuel choice.

Figure 4

Maine Annual Consumption of Household Heating Fuel 2003			
Heating Fuel Type	Statewide Annual Usage	Average Annual Household Usage	Average Annual Heating Cost
Fuel Oil/Kerosene	427 million gallons	1009 gallons	\$1322*
Natural Gas	1.46 Billion cubic feet	69,400 cubic feet	\$979*
LP Gas	58 million gallons	1990 gallons	\$2772*
Electric Heat	21.6 Billion KWH	8487 KWH	Not available
Wood	155,000 cords	4.7 cords	Not available
Coal	Less than 1634 tons	**	**

* Average annual cost per unit from DOE Energy Information Agency for 2003-2004 heating season. Average cost of \$1.31 per gallon for heating oil. Actual cost of kerosene was greater than heating oil.

** Uncertainty in data is too large to make a calculation.

II. Home heating fuel prices

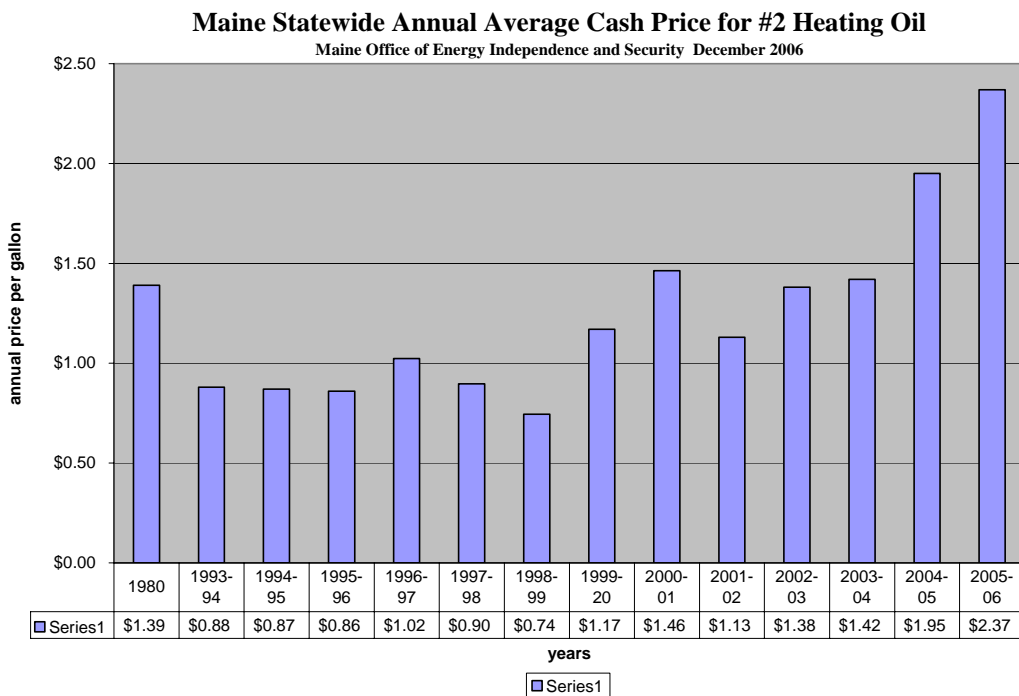
A. Home heating fuel prices current and historical

With a few exceptions, during the past thirteen years consumers have witnessed steady nominal price increases for #2 heating oil. With the 1980 oil embargo year as a bench-

² The latest data available from the US DOE/EIA and US Census Bureau was for 2003.

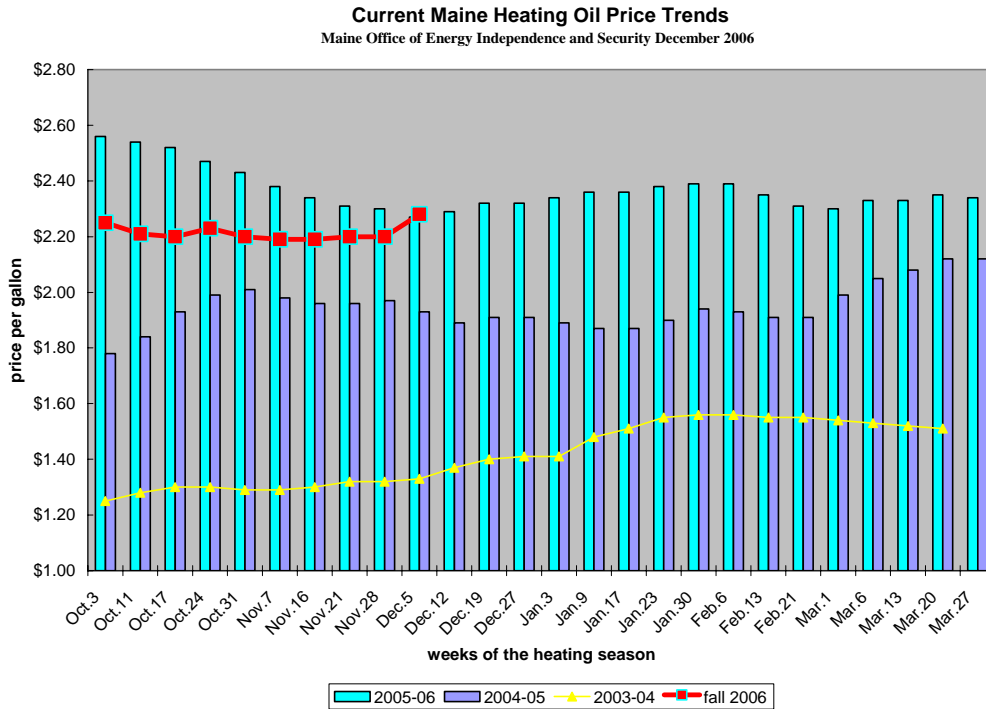
mark of an anomalous and historical high year, Figure 5 demonstrates this trend. In the years 2000-2003, nominal home heating oil prices in Maine were in a comparable range to the high prices witnessed in 1980. The past two seasons, however, Mid-east tensions and volatile petroleum markets have caused heating oil prices to exceed that historic \$1.38-\$1.50 per gallon benchmark and reach a new plateau or price equilibrium. Figure 6 on the following page demonstrates current price trends for #2 heating oil during the heating season months. Heating oil prices for the past eighteen months have been the highest ever witnessed in recent history. In fall of 2005 the U.S. Gulf Coast hurricanes played a major role in causing early heating season prices to be 44% higher than the previous year. While heating oil stocks in New England were 53.5% above the five-year average, more than 700,000 barrels per day of refinery production remained off-line and it was unclear when or if these refineries would be back in service to produce domestic distillate products for the winter. In addition, 98% of the Gulf's crude oil production and 79% of its natural gas production capacity were shut-in. These factors and tensions in the Middle East caused an unsettled market. Imports played a role in keeping consumers supplied with many petroleum products usually provided by Gulf Coast refinery capacity. In spite of these reasons for volatile prices during 2005-2006, heating oil prices for the previous two years while fairly flat were still high and only surpassed by year 2000-01 when the U.S. economy was so challenged by the 9-11 terrorist attacks. The U.S. Energy Information Administration predicts that over the next ten years energy prices will remain approximately where they are today.³

Figure 5.



³ U.S. Dept. of Energy/Energy Information Administration, Long Term Energy Outlook, 2006

Figure 6.



B. Fees and Taxes assessed on #2 Heating Oil, Propane and Kerosene

When used in a residential heating application, #2 heating oil (distillate), kerosene and propane are not taxed in Maine. Sales of heating oil, kerosene and propane are taxed in commercial heating applications. When sold as a motor fuel, #2 heating oil is not dyed (diesel) and is subject to state and federal taxes. The State has reduced the state excise tax by 7.9 cents per gallon for diesel motor fuel that contains at least 2% bio-diesel. (See Appendix 2 for Maine Revenue Services Fuel Tax Rates for all fuels.) Sales of un-dyed kerosene are subject to a \$.244/gallon federal excise tax and to a \$.22/gallon state excise tax (motor fuel tax). One can get a refund if it is used for a tax exempt purpose. Generally the end-user must apply for a refund for excise taxes on clear products. A \$.00071 per gallon (or \$.03/barrel) environmental fee is charged on heating oil and kerosene (but not on propane) for the Inland and Coastal Clean-up Fund. The Groundwater clean-up fund insurance fee is levied on all distillates at \$.29 per barrel. Both of these environmental fees are collected at the terminal.⁴

C. Payment arrangements and surcharges

Homeowners purchasing heating fuels may be faced with a variety of payment arrangements. The lowest price may not necessarily provide the best value in the long

⁴ Per November 2006 communication with Jamie Py of the Maine Oil Dealers Association and the State Fuel Tax Tabulation, Defense Energy Support Center, '99

run. Oil dealers generally offer the following types of payment plans, and consumers are encouraged to shop around and explore which option is best for their situation.

Fixed price contracts allow for the purchase of a set amount of gallons of fuel for a fixed price during a specific period of time. The dealer usually requires payment up front. Fixed price contracts offer stability and predictability but do not guarantee cost savings. The market is fickle and no one can really project with certainty whether prices will go up, down or stay unchanged from the time the contract is signed. **Budget Programs** establish a monthly budgeted amount to pay for heating costs that is spread out in equal payments over 8 or 10 months. The consumer heating bill is paid in equal installments over time avoiding the oftentimes financially burdensome or unworkable single large delivery cost.

CAP price or Downside Protection is another option. If a customer chooses a CAP price and the price drops during the winter, the contract price can also drop. This option carries a premium cost per gallon, much like an insurance premium, to protect the downside price. In other words, if a consumer wants to pay no more than a specific amount and at the same time pay a lower price if the market declines, one can generally expect to pay a premium price for that protection as it costs the oil dealer more money to have that same protection from wholesale suppliers. Not all dealers offer this type of plan and there is no typical downside protection surcharge price. There are as many ways to offer downside protection as there are cost scenarios and there are many different ways to recover the costs; flat fee, multiplier of cash price, or no charge.

Maine consumer rights are governed by Maine Law and the Attorney General's Home Heating Oil Rules. Last session the Maine Legislature enacted L.D.2101 requiring heating oil dealers to secure adequate supplies of fuel at the price and time they commit this fuel to customers engaging in prepay contracts. The Maine Legislature also has enacted legislation amending Maine's laws relating to price gouging. §1105 Profiteering in necessities declares that when an abnormal market disruption is imminent, the Governor may, after considering whether the declaration of an abnormal market disruption itself will disrupt supplies for affected necessities, declare an abnormal market disruption. The declaration must specify (1) the beginning date of the abnormal market condition, (2) the particular necessity, necessities or categories of necessities that are affected by the abnormal market disruption and made subject to the provisions of subsections 3 and 4; and (3) The levels of trade or commerce that are affected by the abnormal market disruption and made subject to the provisions of subsections 3 and 4. A declaration of abnormal market disruption under this subsection expires when the Governor declares it expired or 60 days from the date of its issuance, whichever is sooner. The declaration of abnormal market disruption may be modified by the Governor at any time. The Governor shall publish decision under this subsection in a manner reasonably calculated to give affected persons adequate notice. Any person may petition the Governor regarding the Governor's decisions under this subsection. After the Governor has declared an abnormal market disruption and before the declaration of the abnormal market disruption expires, a person may not sell or offer for sale necessities at an unconscionable price. A violation of subsection 3 is a civil violation that constitutes

and may be prosecuted as an unfair act or practice in the conduct of trade or commerce pursuant to Title 5, section 207, except that the provisions of Title 5, section 213 do not apply. The declaration of an abnormal market disruption creates a rebuttable presumption that the disruption occurred and existed from the beginning date in the declaration to the date of its expiration.⁵

The AG's Office enforces a number of issues pertinent to price, fees and surcharges. For instance, if a dealer makes an unscheduled delivery, the dealer has the right to charge extra. However, before this charge is imposed the dealer must divulge exactly how much the extra charge will be, the reason for it and when he will make the next regularly scheduled delivery. The dealer's surcharge cannot exceed the actual cost incurred by making an unscheduled delivery. If one calls for an immediate delivery on a day the dealer plans to be in your area anyway, one cannot be charged for an unscheduled delivery. Besides the surcharge for an unscheduled delivery, a dealer can charge up to a \$5.00 penalty if the consumer does not order at least 50% of the tank capacity or 100 gallons, whichever is less. If one requires an unscheduled delivery of less than the minimum delivery amount, one can be charged both a penalty and a surcharge. No other extra charges are permitted.

Examples of unscheduled deliveries include:

- When the dealer must dispatch a truck to serve a person on a day during which he would not otherwise be in that area; or
- When a dealer must dispatch a truck to return to an area he has already served that day.

It is *not* an unscheduled delivery when a person requests a delivery for a day on which the truck is already scheduled to be in his area. A dealer may establish a flat rate surcharge for a buyer that does not exceed his average additional costs.

§ 100.7 Price Discrimination Prohibited⁶

A dealer may not discriminate by charging some persons a price higher than his current market price of heating oil. Except for a penalty for a delivery below the minimum delivery requirement or a surcharge for an unscheduled delivery, no other penalties or surcharges are permitted.

§ 100.8 Credit Discrimination Prohibited⁷

A dealer must adhere to the prohibitions against discrimination in the Federal Equal Credit Opportunity Law, which is found at Title 15, 1691(a) through (c) of the United

⁵ Title 10: Commerce and Trade, Part 3: Regulation of Trade, Chapter 201: Monopolies and Profiteering, §1105. Profiteering in necessities

⁶ Maine Attorney General's Home Heating Rules describing consumer home heating rights and unfair trade practices in the sale of heating oil by retail dealers, internet website

⁷ Maine Attorney General's Home Heating Rules describing consumer home heating rights and unfair trade practices in the sale of heating oil by retail dealers, internet website

States Code Annotated and the State's Fair Credit Extension Act, which is found at Title 5, Maine Revised Statutes Annotated, §§ 4595 through 4598.

One can become an established customer of any oil dealer serving your area by making two oil purchases from that dealer. Once one has become an established customer, the dealer must offer the same service given other established customers. For example, if the dealer offers established customers immediate service in an emergency, the dealer must offer the same service to the newly established customer.

Generally, if a dealer quotes a consumer an oil price, that is the price at which the oil must be delivered, unless the dealer specifically states that the price is subject to change. In that case, one will be charged according to the dealer's price on the day the oil is actually delivered. The Attorney General considers it an unfair trade practice to refuse to supply #2 heating oil, (LP) propane or any other heating fuel during the winter months to cash customers. This rule applies even if the customer owes the dealer money. If the customer has cash to prepay or has made arrangements through the Heating Oil Assistance Program (HEAP), the dealer must deliver. This requirement to sell to cash customers applies when the propane is being sold for consumption in a properly installed, approved LP gas heating appliance which is used *as the primary source* to heat the interior of a building which is the person's principal residence.

A variation on this refusal to deliver fuel occurs when a dealer refuses to make a *small delivery*. If a dealer establishes an unreasonably high minimum delivery requirement, the dealer is also in violation of the Maine Unfair Trade Practices Act. A reasonable approach for dealers would be to establish as a minimum, the smallest amount of product that will supply the total connected BTU load under existing climatic conditions. As a guideline for a minimum delivery requirement, whatever is the larger of the following amounts is suggested:

- (1) 50 gallons; or
- (2) 50% of the total ASME system or 50% of the ICC/DOT equipment installation.

The principle that cash customers must be served does not mean, however, that a dealer must make a free, unscheduled delivery. The dealer should deliver on the next regularly scheduled route. If it is a "run-out" situation, due to something other than the dealer's fault, a special delivery charge that reflects the additional costs may be collected.⁸

Generally propane companies lease the tank to a consumer and the Company services the tank for an annual cost billed in addition to the cost of the gas. If one owns their own oil tank they have the liability and must look after it themselves. Most companies insist that customers lease from them so they are in control of it and they can insure safety and reliability of the system. If the customer doesn't use enough fuel to warrant delivery, they may be asked to rent the tank for \$75.00 per year. In Maine, lease transactions subject to the Maine Consumer Credit Code and its implementing regulations are exempt from chapters 2, 4, and 5 of the federal act. (The exemption does not apply to transactions in which a federally chartered institution is a lessor.)

⁸ Consumer Home Heating Rights, Office of the Maine Attorney General, §19.4 LP Gas (Propane)

Natural gas

Natural gas rate structures and tariffs differ substantially from those for heating oil. In addition to the actual cost of the natural gas, basically there are three other kinds of charges. There is the Customer base rate charge (of \$4.96/month for one Maine Natural Gas Utility), the Cost of Gas Recovery Factor which changes based on the actual cost to transport the commodity to market and the Environmental Response Cost (ERC) which is levied based on usage. For one particular Maine utility, the off-peak cost for the first 40 ccf during May 1st- October 31st is \$0.4026/ccf. For purchase of volumes exceeding 40 ccf the cost is \$0.2278/ccf. For on peak customers during November 1st through April 30th the first 40 ccf is \$0.4026 and for usage in excess of 40 ccf the charge is \$0.2278 per ccf.⁹

Additionally, when service is established or reestablished during regular working hours, a service charge of \$12.50 is required of the customer. After hours and on weekends and holidays, a charge of \$18.00 will be assessed. Also, charges of \$5.00 to \$15.00 are levied against customers for returned checks.¹⁰

Electricity

Electricity prices include the system benefit charge (SBC) used to fund Efficiency Maine programs. The SBC is \$0.0015 per kWh.

III. Maine household heating annual expenditures

According to the US Census Bureau, in 2003, 423,610 Maine households heated primarily with #2 heating oil and kerosene. Approximately 37,456 heated primarily with kerosene and 386,154 heated primarily with #2 heating oil. The average Maine household used approximately 1009 gallons [see section 1 chart] of heating oil per year which in 2005-06 averaged \$2.37/gallon. For the average household heating with #2, the annual expenditure was \$2,391.33. Based on DOE/EIA's projected cost of \$2.46 for this year, the average Maine household will spend \$2,482.14 to heat their home this winter. Statewide, the estimated expenditure for #2 heating oil last year was \$923,421,645.¹¹

The annual average for kerosene in 2005-06 was \$2.76/gallon. With 37,456 households using roughly 1009 gallons per year the annual expenditure per household is \$2,784.84. The estimated statewide expenditure for kerosene was \$92,971,036.

Propane is the primary heat source for only 5 percent of Maine households. According to the US Census Bureau, 29,168 Maine households heat primarily with propane, bottled, tank or LP gas. Propane prices during 2005-06 averaged \$2.24/gallon. Because of its lower btu content the usage volumes are much more than other heating fuels (1,990

⁹Northern Utility 2005 data, MPUC, Lucretia Smith, communication November 2006

¹⁰ Residential Heating Rate R-2, MPUC/Northern Utilities, Docket 97 393, November 1, 1999, page 63

¹¹ Avg. annual household consumption x average annual price of fuel x number of households heating primarily with fuel = annual statewide expenditure

gallons/year). On average, propane customers spend approximately \$4,458. to heat their homes. Statewide expenditures on propane are \$130,019,277.

Based on 2003 census data, approximately 21,039 natural gas utility customers heat primarily with natural gas. According to the MPUC, in 2005 the average annual use per residential customer is 61.4 MCF and the average annual cost per residential customer is \$974.23. The total statewide annual expenditure for natural gas is \$20,496,825.¹²

According to the 2003 census data, 25,241 households heat primarily with electricity. The average annual consumption for consumers using an electric space heater with a 1500 Watt output is 180 kWh/month (assuming an average usage of 120 hours per month during the heating season) at a cost of \$24.12/month. The average annual consumption for consumers using electric baseboard heat with a 1000 Watt output is 200 kWh/month (assuming an average usage of 200 hours per month during the heating season) at a cost of \$26.80/month.¹³ According to the MPUC total residential consumption of electricity (all end uses) is 4,100,000 mWhs. The average electricity use for all electricity customers is 500-550 kWh/month and there are 680,000 accounts.

On October 10, 2006 the DOE/EIA released its short-term winter fuels outlook for the 2006-07 heating season. EIA projects that residential heating fuel prices for most households this winter compared to last winter will be lower for natural gas and similar for heating oil but that demand and consumption may increase in the event of a more normal (ie. colder) winter. Prices last year were extremely high due to hurricanes, geopolitical and other factors driving household costs up in spite of the warm winter. Petroleum product prices remain historically high but recently have dropped for most refined products including natural gas. Inventories are robust, most Gulf coast refineries are back on line, the driving season has ended and there were no major disruptions this year from hurricanes. However, petroleum prices are expected to increase from current levels as winter descends and market fundamentals unfold.

The National Oceanic Atmospheric Administration predicted the coming winter to be warmer than normal but colder than last year, meaning that consumption and demand is likely to increase. As a result, household expenditures on heating may increase even if fuel prices remain flat or decline. Natural gas is the largest source of home heating in the United States and the primary fuel for 58 percent of all American households. In Maine there are three natural gas utilities. The Energy Information Administration forecast that the average U.S. household using natural gas will pay \$826 for home heating this winter, down \$119 or 12.5 percent from last winter. A third of U.S. households rely on electricity as their primary heating fuel. EIA estimates they are expected to pay an average of \$839 for heat this winter, up \$58 from last winter. #2 fuel oil users can expect to pay \$1,522 on average this winter, up \$91 from last winter. Households that rely primarily on propane are expected to pay an average of \$1,265 this winter, down \$15 from last year.

¹²Northern Utility 2005 data, Communication with MPUC Lucretia Smith, November 2006

¹³The Energy Guide, Central Maine Power, July 2005, page 12 . These monthly costs are based on the average price of 13.4 cents per kWh. This includes both the CMP delivery price and the Standard Offer energy price.

IV. Policies and programs to reduce home heating bills currently employed in Maine and outside of Maine

Fuel Assistance

The Low Income Home Energy Assistance Program (LIHEAP) is a federally funded program to assist low-income households to pay their home energy bills. The Maine State Housing Authority (MaineHousing) is the LIHEAP and weatherization grantee. The federal Department of Health and Human Services oversees LIHEAP. In Maine, the funds are used primarily to help pay winter home heating bills for those who are income qualified. Maine Housing contracts with Maine’s Community Action Agencies to help administer the program on the local level. The program has three components: fuel assistance, emergency crisis intervention and weatherization. LIHEAP may pay a portion of someone’s bill or may provide emergency assistance in the form of payment to utility or fuel delivery companies if one has less than a quarter of a tank of fuel or are in danger of having utility services disconnected.

MaineHousing was asked by Governor Baldacci and many legislators to find a better deal for the tens of millions of dollars spent on heating oil each year. After a long and thorough process, MaineHousing’s Board of Commissioners voted to establish a new initiative for the purchase of heating oil in the LIHEAP program. MaineHousing adopted rules in 2006 that require oil dealers who serve LIHEAP customers to charge either a margin over rack or a discount off the retail price, rather than the cash price. Director of MaineHousing, Dale McCormick, estimates that the new pricing system will allow MaineHousing to purchase around 450,000 to 500,000 gallons of additional heating oil for LIHEAP customers.

The new program will allow two pricing options for oil dealers who want to participate in the program.

- 1) Margin Over Rack – MaineHousing has set the margins in the table below that they will pay a dealer above the wholesale price paid at the rack (the terminal where the oil is picked up). The margin varies depending upon in which region the delivery is made. The margin includes cost and profit.

MARGIN OVER RACK				
	ALLOWABLE MARGIN FOR #2 HEATING OIL		ALLOWABLE MARGIN FOR K-1	
	LIHEAP FUEL ONLY	ENTIRE SEASON'S FUEL	LIHEAP FUEL ONLY	ENTIRE SEASON'S FUEL
Region 1	28 cents	31 cents	36 cents	39 cents
Region 2	31 cents	34 cents	39 cents	42 cents
Region 3	34 cents	37 cents	42 cents	45 cents
Region 4	37 cents	40 cents	45 cents	48 cents

2) Discount Off Retail – MaineHousing has set a discount off the retail cash price.

DISCOUNT OFF RETAIL CASH PRICE					
	DISCOUNT FOR #2 HEATING OIL			DISCOUNT FOR K-1	
	LIHEAP FUEL ONLY	ENTIRE SEASON'S FUEL		LIHEAP FUEL ONLY	ENTIRE SEASON'S FUEL
Statewide	6 cents	3 cents		6 cents	3 cents

In addition, there are two options within each of the above two pricing options. A dealer can choose to apply this pricing to the LIHEAP fuel only or to the client’s entire heating season’s worth of fuel. The oil dealer is given a larger margin or required to offer a smaller discount if they choose the entire season option as they are providing the Margin Over Rack or Discount Off Retail pricing on more fuel.

The exception to these two options is if a customer is participating in one of the allowed price protection plans. That customer is then excluded from the above pricing system.¹⁴

In conjunction with the Maine Public Utilities Commission, MaineHousing also administers, implements and coordinates the statewide plan and the individual Low Income Assistance Programs (LIAPs) which provide assistance to low-income households on their electric utility bills. Eligibility for LIAP is contingent upon LIHEAP eligibility. The LIAP funds amounted to about \$5.8 million in FY 2005 and about 23,000 households received rate assistance through it. In May 2006, the MPUC voted to increase LIAP funding by 20% to about \$7 million, effective October 1, 2006, to help low-income customers keep pace with rising electricity rates. The different utilities use the fund in slightly different ways. The final rule required that LIAP benefits be stratified so that participants with the greatest needs receive the highest benefits.

Maine’s restructuring law states that “the policy of the state is to ensure adequate provision of financial assistance.” The 1997 legislation continued separate rate assistance program amounting to about \$5.6 million yearly, which had been required of the three largest electric utilities since 1991. It also directed the Maine Public Utilities Commission (MPUC) to oversee the implementation of a statewide assistance program for low-income electricity customers.

Efficiency Maine administers the state’s electric energy conservation programs for all customer classes, including low income. Twenty percent of Efficiency Maine’s budget is devoted to low income programs. In FY 2005, the Low-Income Appliance Replacement

¹⁴ Maine Housing LD 1931 Report, 2006

Program delivered over 1,500 new energy efficient refrigerators (twice as many as were delivered in FY 2004) and over 18,000 compact fluorescent bulbs (three times as many as in FY 2004) to low income customers at a cost of \$1.7 million. Efficiency Maine estimates these replacements will save each customer 1,400 kWh per year and about \$190 annually on their electricity bills. The program is cost effective with a benefit to cost ratio of 1.8 to 1.¹⁵

In 2005 the Maine legislature required gas utilities serving 5,000 or more residential customers in Maine to offer conservation programs to residential and commercial consumers. Northern Utilities, which serves about 25,000 customers in the state, is the only gas utility to which the law applies. Northern provides weatherization measures to eligible low-income customers in coordination with Maine's community action agencies. On November 30, 2005, the MPUC approved a residential low-income benefit for Northern customers that limited the 2005-06 winter gas rate increase to 6% over last winter's rate for LIHEAP eligible households. The estimated benefit for an average residential heating customer was \$231 for the winter season.

Operation Keep Maine Warm

In the fall of 2004 as heating oil prices began to climb and federal fuel assistance did not increase, the Governor's Office of Energy Independence and Security worked with several other state agencies and members of the private sector to develop Operation Keep ME Warm ("OKMW"). OKMW is a unique winterization initiative to assist low income households in the face of higher fuel prices and fewer federal assistance dollars. The program is a first of its kind public-private partnership that uses volunteer teams to install energy conservation measures in the homes of Maine's neediest LIHEAP eligible seniors and persons with disabilities.

Over the past three years the volunteer teams have winterized over 5,000 homes. The program is operated by the Office of Energy Independence and Security, the Maine Commission for Community Service, MaineHousing and social service agencies such as the Red Cross and United Way. Funding comes primarily from MaineHousing and Efficiency Maine. The package of weatherization materials cost approximately \$50 per home. Home Depot created a video to provide instructions to volunteers on how to install the materials correctly and safely. The kits have included some or all of the following:

- Weather stripping and door-sweeps for exterior doors
- Caulking and shrink-wrap plastic for windows
- Interior and exterior tube and rope caulking
- New furnace filters for furnace operation efficiency
- Insulation around hot water pipes
- Foam to seal foundation cracks
- Poly sheeting for exposed areas of the home
- Outlets and light switch insulation

¹⁵ Efficiency Maine's 2005 annual report

- Six compact fluorescent energy saving light bulbs

In the first year, the measures installed in the home were estimated to provide electricity and heating fuel cost savings of approximately \$80 per home, or about 1.5 times the cost of the materials. Based on today’s energy prices, savings are now estimated at \$145 in the first year and \$519 over the life of the measures. The light bulbs and duct insulation will continue to provide additional energy and cost savings in future years.

Operation Keep ME Warm has been a win-win for everyone involved. Homeowners whose homes were winterized benefited from lower fuel and electric bills, reduced cold air drafts, and increased comfort. An equally valuable benefit of the program has been the interactions between the volunteers and the homeowners. Teams of neighbors, high school and college students, members of the community – in most cases total strangers – spend 2 to 3 hours per home to improve their comfort and save them money. The participating homeowners have been extremely appreciative of the volunteer effort and of the program. We hear of many cases where the homeowners have baked pies and cookies for the volunteers. At the same time, from the volunteer perspective, this program was also a success. Many volunteers saw for the first time the conditions under which many of Maine’s neediest citizens live. They gained an increased awareness of the need that exists in our state for energy conservation measures in our existing housing stock, and improved housing conditions. Over the past three years the program has undergone several changes with regard to homeowner intake, volunteer recruitment, materials delivery and other critical aspects of the program. This year customer intake was performed by 2-1-1. Discussions have begun already to design the program for next year.

Maine Home Performance with Energy Star Pilot Program

In response to rising energy prices, Maine’s old building stock and our cold winters, the Governor’s Office of Energy Independence and Security has developed and is implementing a Home Performance with ENERGY STAR residential energy efficiency program. The Maine Home Performance (MaineHP) Program emphasizes a whole-house approach to reducing energy bills, reducing maintenance costs and improving the health and comfort of residential buildings. MaineHP will help stimulate the market for energy efficiency and related services in the State. Originally designed as a three-year pilot program to provide training and marketing support to contractors in York, Cumberland, and Androscoggin counties, as resources become available the intent is to take the program statewide. Funding for this program is from the following sources.

Dependable (Hard) Funds available to Maine Home Performance with Energy Star Program for administration over three year duration of the pilot project.

Amount	Source
\$500,000.	DOE Grant
\$150,000.	SPO/PVE money
\$150,000.	MaineHousing
\$450,000.	Efficiency Maine Contribution (at 25% of program budget or less)
\$1,250,000.	Total funds available to MaineHP Project administration

Funding Which Adds Value to Project (but cannot be used for program administration/or funding is committed but not yet fully defined)

<u>Amount</u>	<u>Source</u>
\$50,000.	EPA funds to be spent in Project Market for advertising
\$300,000.	Northern Utilities (residential energy conservation funds, rebates, PR)
\$ 2,625.	MODA in-kind donation (actual value of renting training facility)
\$ 70,000,	Whole House Makeover Contest/CW/TV program sponsor contributions (1 st year, not including additional Efficiency Maine funds expended on this project)
\$ 140,000,	Whole House Makeover Contest CW/TV program sponsor contributions (2 nd and 3 rd years, not including additional Efficiency Maine funds expended on this project)
<u>\$1,000,000.</u>	<u>Buy-down on MaineHousing HELP loans</u>
\$1,562,625	Total Soft Funds
\$2,812,625	Total Project Value/Includes all funds which support project operations

Contractors are taught to use building science and green energy technology to solve a wide range of problems that exist in typical Maine homes and are instructed on the use of software to calculate the energy savings from a wide range of improvements. Customers of participating certified contractors have access to financing options, including a very low interest loan offered through Maine Housing.

Contractors who participate have an opportunity to:

- Increase their profits by getting larger jobs with higher profit margins
- Reduce the seasonal swings of their business
- Improve their sales closing rates
- Increase their understanding of how buildings work
- Grow their businesses

And, they will help Maine’s homeowners lower their energy bills and reduce Maine’s energy consumption and greenhouse gas emissions. Based on experience elsewhere with this program, homeowners can expect to reduce energy usage by between 10% and 50%. The average annual savings created for each of the 1500 homes in the pilot area can be approximated using an average 7 year return on investment and an average investment of \$6000 resulting in an annual savings of \$857 per year. Assuming an average 20 year life of improvements and no increase in energy prices, the 1500 homeowners will experience over \$25 million in energy savings from the program. The state of Maine will retain that \$25 million as money more likely to be spent within Maine, instead of exported as energy dollars. The installations will create over \$9 million in economic activity with a high percentage of that figure expended on labor. For homeowners eligible for the Maine Housing Authority’s HELP loan, monthly energy savings will exceed monthly debt payments in most instances.

The economic benefits during the pilot actually understate the total benefits since contractors are being taught how to change their business model to a more sustainable one. It is expected that there will be both spillover benefits from the market pressure

created by the successful contractors in the program and sustaining benefits from the continued energy efficiency and health related business activities of the contractors should the program cease operation.

In addition to energy savings, homeowners will experience increases in the value of their homes and reductions in health expenses as environmental causes of health problems are identified and eliminated. Homes with lower energy use and documentation of the improvements made according to program standards will command a higher price and sell faster. Home Performance inspections often reveal combustion safety issues, gas and oil leaks, and contributing sources of respiratory problems such as mold and dust. Home Performance contractors are taught how to effectively remove these contributing sources of problems.

Home Performance across the nation

Home Performance with ENERGY STAR is emerging as a rapidly growing program that works with contractors and consumers to help our country save energy. Pioneered in the 1990's by New York State and Wisconsin, Home Performance is now active in 16 states with a number of states and utilities considering adoption. Home Performance with ENERGY STAR has been jointly adopted by the US Department of Energy, the US Department of Housing and Urban Development and the Environmental Protection Agency as the primary program mechanism for delivering energy savings to existing homes. The program is experiencing this success *because the participating contractors are experiencing dramatic success in selling home performance* to their customers. The MaineHP Program will give participating contractors access to all the advantages of the Home Performance with ENERGY STAR Program.

When a contractor looks at the performance of the whole house using testing techniques, they are able to reliably solve a wide range of performance problems, including ice dams, comfort problems, mold, dust, risk of carbon monoxide exposure and others, all while saving significant energy dollars. Home Performance with ENERGY STAR builds on and combines market drivers that are already affecting business – high energy prices, customer concerns for comfort and indoor air quality and more investment in remodeling as land and housing prices spiral upward. The whole house approach bundles all these consumer interests into a high value package that offers customers a one-stop-shop opportunity. The use of performance testing and building science knowledge builds customer trust and increases their ability to reliably solve problems. See **Appendix 3** for a summary of the Maine program design and implementation strategy.

Whole House/Home Performance with Energy Star Programs in various states

During 2004 and prior to initiating a whole house program, the Office of Energy Independence and Security researched and produced a comparative analysis of residential energy efficiency programs around the country. Federal and state initiatives to promote efficiency investments can include the application of tax credits, utility demand reduction, low interest loans, system benefits charge (public) funds and direct state appropriations to programs assisting with residential efficiency improvements in Maine's

housing stock. Incentives validate new technologies by lending the credibility of the state's endorsement inciting interest in products and best practices and minimizing the usual skepticism about unknown but emerging technologies. If offered appropriately, an incentive can be a powerful tool for influencing consumer purchasing decisions. Financing energy efficiency incentive programs has the effect of expanding consumer choice by encouraging innovation in the private sector. Often the introduction of new efficient products might not occur in the market without an incentive program to boost its visibility and the expansion of choice in the market has the advantageous effect of providing support to other state energy, economic and environmental objectives.

In **Arizona's** Energy Efficient Home Program, a deduction in the state income tax is offered for residential energy improvements. Arizona employs the HERS for certification of potential savings and homeowners are allowed an income tax deduction of 5% of the purchase price (up to \$5,000.) if a residence is certified to be 50% more energy efficient than the 1995 model energy code (MEC) at closing and if the residence accrues the required 90 HERS points, allowing it to qualify. The average tax saving is \$190.

California's statewide Residential Contractor Program (RCP) is funded by the state PUC and was designed to serve both single and multi-family dwellings by promoting a self-sustaining contractor market for energy efficiency services. In this model, the customer receives redeemable vouchers for a specific list of improvements including: HVAC, windows, insulation and lighting upgrades. Contractors are required to be trained in best practices to conduct performance and safety tests in order to accept a voucher. The program was designed to encourage contractors to market and perform home efficiency retrofits and engender consumer appreciation of domestic energy systems and the measures necessary to improve the comfort, safety and efficiency of the home.¹⁶ The RCP was not successful for a number of reasons but primarily the financial incentives were not generous enough to inspire the consumers to implement the entire retrofit. Usually only one of three or four major recommendations would be completed and most often completed jobs were window replacements. Also, there was not enough consistent training statewide on the whole-house approach nor was the funding available to offset the cost of diagnostic equipment. The RCP was discontinued because of high program cost relative to tangible benefits. More recently the California PUC approved \$1.6 million for a pilot program to implement a "Home Performance with ENERGY STAR program to promote whole-house retrofits. The PUC covers the cost of contractor training and infrastructure development and marketing the program to consumers."¹⁷ Also, California offers a tax deduction for low interest loans to purchase energy efficient products or equipment for a residence. The deduction is for loans from a publicly owned utility company for the purchase of energy efficient heating, ventilation, air-conditioning, lighting, solar, advanced metering of energy usage, windows, insulation, zone heating products and weatherization systems. Customers of publicly-owned utility companies that do not offer customer financing may be able to deduct the interest from a home equity or home improvement loan used to purchase energy efficient products and equipment.¹⁸

¹⁶ [Residential Retrofits: Directions in Market Transformation](#), Jennifer Thorne, December 2003, page 11

¹⁷ [Residential Retrofits: Directions in Market Transformation](#), Jennifer Thorne, December 2003, page 12

¹⁸ www.dsireusa.org, California Incentive for Renewable Energy, Tax Deduction for Interest Loans for EE

Canada offers the EnerGuide for House Retrofit Incentive to reduce heating costs, improve home comfort and receive unbiased advice regarding Energy Efficiency retrofits. EnerGuide for Houses (EGH) was created by the Government of Canada to further Canada's climate change goals by reducing greenhouse gas emissions from the housing sector, to foster the development of energy efficiency expertise in the housing industry and to inform Canadian homeowners with reliable data to assist them in making good choices when retrofitting or renovating their homes. Contracted organizations provide service to homeowners and are qualified through a process that assesses their administrative capabilities and technical background in home energy efficiency.¹⁹

The EnerGuide advisors use a systematic methodology to assess a home's energy use. The product is a report with energy upgrade recommendations and a rating label for the house in its pre-retrofit state. Subsequent to the completion of the energy efficiency upgrades by the homeowner, energy advisors return to perform a post-retrofit evaluation and provide an upgraded energy efficiency rating label for the home. Consumers living in Canada are eligible for a grant under the EnerGuide for Houses Retrofit Incentive. The grant payment is based on the difference between the pre and post retrofit EGH rating, as defined in the Retrofit Incentive Grant Table in effect at the time of application. The maximum grant payment value is \$3,348.00 and is provided only one time per owner, per house. Homeowners accept full responsibility for the quality of the materials and work performed. For the purpose of evaluating the grant program, homeowners are required to retain receipts for renovation work completed for three years following the date a grant application is submitted. Actions are then taken by the program to remedy under or over payment of grants identified during this quality assurance process.²⁰

Colorado's E-Star program is a non-profit organization committed to advancing energy efficiency in housing. Originated in 1995 from the Governor's Office of Energy Management and Conservation (OEMC), Colorado's E-Star program was first administered by the Colorado Housing and Finance Authority and started with seed money from the DOE. Through a certified, independent and third-party HERS rater, a detailed inspection and testing of insulation, windows, basements, attics, crawl spaces, HVAC systems, water heaters, building envelope and solar orientation is conducted on existing and new homes. This data is then run through E-Star's approved software to produce an As-Is energy rating with a maximum score of 100 points which assesses current house performance and provides recommendations to improve performance. The rating serves to provide qualification for a special energy efficiency (EEM) mortgage for the homebuyer and provides property-specific recommendations for energy efficiency improvements for homeowners and builders. The costs of any such cost-effective energy efficiency improvements that are implemented can be rolled into an Energy Improvement Mortgage (EIM). E-Star is a market-based mechanism for improving home energy efficiency. Energy ratings are marketed by E-Star tm (the non-profit org.) and purchased voluntarily by the customer. Colorado E-Star staff provide information and resources

¹⁹ <http://oee.nrcan.gc.ca/houses-maisons/english/homeowners/grant/grant.cfm?>

²⁰ Ibid.

necessary to dramatically improve a home's energy efficiency and translate this into a financial advantage.²¹

Idaho offers income tax deductions to residents for installation of insulation and alternative energy systems. Homeowners receive a deduction for the cost of insulation, storm doors, caulking and weather-stripping. In the first year of operation of qualifying installation, 40% (up to \$5,000.) of the cost may be deducted. For the 3 years after installation, 20% (up to \$5,000. a year) of the costs may be deducted. Participation is low due to low tax rates in Idaho: the maximum value of the deduction to the taxpayer is \$390.”²²

Maryland passed legislation in 2000 that waives sales tax for purchases of energy efficient appliances, heating and cooling systems, air conditioners, heat pumps and water heaters and fuel cells. The sales tax legislation was specifically targeted to substitute for discontinued utility funding after electricity restructuring. “The legislation substitutes sales tax relief for utility funding in order to help transform demand for energy efficient appliances in the consumer market in Maryland.”²³

Minnesota offers E-Star financing and mortgages through private lenders to incent the purchase E-Star homes. In 2001 the Minnesota Legislature enacted a bill providing a sales tax exemption for consumers of energy efficient products. The program was developed to reduce peak load and overall energy use in Minnesota and uses technical information about appliances and heating and cooling equipment paired with cost/benefit analyses. Debate on the qualifications standards for the products resulted in a mixture of both standard ENERGY STAR products and other efficient products on the market which can maximize the energy cost reductions including; compact fluorescent bulbs and light fixtures, electric HPWH heaters, natural gas water heaters and gas furnaces. No funding was put aside for program implementation or review so the Minnesota Department of Revenue was tasked with implementing the program and did so through mass mailings to retailers. It's unclear whether the program was effective because a significant portion of retailers are continuing to charge sales tax on exempted items.²⁴

New York provides financial incentives for homeowners through NYSERDA's “Home Performance with Energy Star Program.” NY adopted a market transformation approach which targets builders, community-based organizations, retailers, contractors and multi-family dwelling owners to apply for low interest loans and Energy Services financing. In fact, the first pilot Home Performance with ENERGY STAR program was initiated by NYSERDA in spring 2001. The key elements of it are,

“-an aggressive marketing campaign with a staged rollout in select markets

²¹ Colorado's website on EStar, www.e-star.com/about_estar.html

²² Tax Credits for Energy Efficiency and Green Buildings: Opportunities for State Action, Brown, Quinlan, Sachs & Williams, March 2002, p.iv

²³ Ibid, page 21

²⁴ Tax Credits for Energy Efficiency and Green Buildings: Opportunities for State Action, Brown, Quinlan, Sachs & Williams, March 2002, p.24

- interest rate buy-downs of up to 5% on unsecured loans
- simplified loan applications processed onsite by the contractor
- required diagnostics and whole-house assessment
- contractor training assistance
- use of BPI certification and accreditation for quality assurance
- financial assistance for contractor equipment purchases”²⁵

Additional consumer financing options were added to the program, including direct incentives for consumers that self-finance retrofits outside the program’s loan fund and additional contractor training and referral mechanisms. By early 2003, NYSERDA’s Home Performance with Energy Star Program had generated over 2000 home assessments and a total of 1,340 homes with \$10 million worth of energy related upgrades. The average job cost was \$6,500. (NYSERDA 2003) and the estimated energy savings in New York amounted to over 700,000 kWh from electric measures and 43 billion Btus in gas and oil savings as well as peak demand reductions of 82kW (NYSERDA 2003).²⁶ These impressive results were attributed to the, “strong marketing component designed to create consumer demand, investment of the time and resources necessary to build a competent contractor base through training, certification and technical assistance and the development of a *one-stop shopping approach* for consumers including assessment, implementation and contractor-originated consumer financing.” (Fisk 2003).²⁷

The success of the program led to NYSERDA development of the Assisted Home Performance with ENERGY STAR program 2002. This program provides low-income households with a 50% subsidy toward the services offered through the Home Performance with Energy Star Program. In 2003, NYSERDA scaled back the statewide marketing blitz and expanded into the New York City Metro area housing stock, honing in primarily on low-rise row housing. This program offers expanded financing programs and integration of ENERGY STAR lighting and appliances and advanced metering. In addition, NY promotes the HERS rating system, labels and services.

In **New Hampshire**, the Home Energy Solutions Program is available to assist consumers in maximizing home energy efficiency. Utility customers with permanently installed electric heat systems are eligible to receive up to \$4000. in services for qualified energy efficiency upgrades including; refrigerator rebates, lighting upgrades and weatherization measures including; insulation, air sealing, thermostats and electric hot water conservation measures. A customized computer generated HERS report models the home’s relative efficiency, evaluates factors affecting energy use and recommends measures for using energy more efficiently. N.H. consumers can receive up to \$2,500. in rebates and services for qualified energy efficiency improvements under the Residential Retrofit Program. Improvements include insulation, thermostats, lighting upgrades and efficient refrigerators and a customized report. The program is aimed at helping consumers with permanently installed electric heat and secondarily to customers with high electric usage. Qualified low-income customers living in an apartment or a house,

²⁵ Residential Retrofits: Directions in Market Transformation, Jennifer Thorne, December 2003, page 13

²⁶ Residential Retrofits: Directions in Market Transformation, Jennifer Thorne, December 2003, page 13

²⁷ Ibid, page 13

either rented or owned, can receive up to \$3,600. in services (\$5,900 if customers also qualify for the NH Weatherization Assistance Program), including a customized report (soft energy audit) evaluating their home performance, recommending improvements such as increased insulation, installation of thermostats, lighting upgrades and efficient washing machines and refrigerators.²⁸

The New Hampshire ENERGY STAR homes program offers customers the benefit of building a new (or complete renovation of an existing) single or multi-family dwelling with incentives of up to \$2,500. for energy efficient construction. The ENERGY STAR program provides assistance in evaluating new or renovated home plans, leakage air testing and offers incentives to install ENERGY STAR appliances, lighting systems, duct testing and heating efficiency upgrades. All participating homeowners are eligible to receive a HERS rating. NH residential customers who purchase ENERGY STAR-rated efficient light bulbs and fixtures can redeem rebate coupons at participating retailers. Rebate levels are: \$2. for compact fluorescent light bulbs, \$10. for exterior light fixtures, \$15. for interior fixtures and \$20. for torchiere lamps. NH residential customers who purchase ENERGY STAR qualified appliances can also receive rebates. Purchase of an energy-efficient ENERGY STAR-rated clothes washing machine can provide the customer with a \$50.00 rebate and purchase of an ENERGY STAR-rated room air conditioner can receive a \$25.00 rebate. The statewide Electric Assistance Program (EAP) began on October 1, 2002 and provides qualifying customers with a discount on their monthly electric bill. Program eligibility is determined by total household income and the number of household members. Renters and homeowners who receive an electric bill from the four participating utilities may apply. This program is administered by the six Community Action Agencies (CAA) located throughout the State.²⁹

The Pay As You Save (PAYS) pilot program, offered by Public Service Company of New Hampshire (PSNH) and the New Hampshire Electric Cooperative (NHEC), allows certain customers to finance the purchase of approved efficiency devices, appliances, or services on their electric bill. (See PUC Order No. 23,851, 11/29/01). This innovative pilot program provides eligible customers with a way to purchase efficiency measures while eliminating up-front costs. The costs of installed measures are repaid over time by participating customers from savings on their electric bills.³⁰

Ohio In addition to the standard ENERGY STAR lighting and appliance rebates and HERS rated Energy Efficient Mortgages, the Ohio Office of Energy Efficiency has several programs worth noting. Ohio was awarded \$723,000. in DOE funds for energy efficient and renewable energy projects. The Ohio Office of Energy Efficiency administers the funds for seven discrete projects including \$130,000. allocated for the “Rebuild America Energy Efficiency Audits, Education and Training Program.”³¹ In addition, Ohio gives Governor’s Awards for excellence in energy efficiency. As part of Ohio’s restructuring act, a Universal Service Fund (USF) was established to serve low-

²⁸ www.nh.gov/oep/programs/energy/residential.htm

²⁹ www.nhsaves.com/residential/assistance.html

³⁰ www.nh.gov/oep/programs/energy/paysl.htm

³¹ www.odod.state.oh.us

income residents with high electricity usage. “USF’s Electric Partnership Program (EPP) is designed to improve the electric efficiency of low-income households who participate in PIPP (Percentage of Income Payment Plan) by performing in-home audits and installing appropriate electric base-load and thermal energy efficiency measures. Consumer education helps PIPP participants get the most benefit from their electricity while learning ways to lower their overall usage. The USF EPP is composed of two types of programs:

- A base-load efficiency program which audits lighting, appliances and all other uses of electricity, not related to heating, and installs appropriate measures; and,
- A weatherization program for those who heat with electricity and who have moderate to high usage. This program adds insulation, performs heating system inspections and addresses health and safety measures. Each program will include an education component.”³²

Ohio has several options for financing residential energy efficiency improvements that should not be overlooked. After receiving a HERS rating and report one can apply for funds through a government-insured or conventional loan program. U.S. Dept. of Housing and Urban Development (HUD) loans, FHA, EEMs and FHA Section 203(k) Rehabilitation Mortgage insurance is available for the purchase or refinancing of home improvements which exceed \$5,000. FHA Title I Property Improvement Loan Insurance of \$25,000 for a single family residence and FHA Energy Efficient Home Mortgages are also available. Most of the national lenders offering energy efficient financing operate through conventional loan programs of either an E-STAR mortgage or a Residential Energy Efficiency Improvement Loan (Fannie Mae) of up to \$15,000. with a below market interest rate. These are unsecured loans for a term of 10 years and adopt a whole-house approach to efficiency improvements. Freddie Mac loans are also available with similar terms.

Oregon has two currently operating tax incentive programs that have saved consumers millions of dollars. Oregon’s Business Energy Tax Credit Program is very similar to its Residential program with performance-based tax credits. The Oregon Residential Energy Tax Credit Program is designed to conserve resources, focuses on renewable energy and offers tax credits for solar water heaters and geothermal heat pumps. In recent years the program expanded to include appliances, with a tax credit equal to the amount noted on the list of qualifying appliances (determined by OOE) or 25% of the net purchase price of the appliance, whichever is less.³³ Every year approximately 20,000 tax credits are granted according to a set of standards created by OOE which exceed the ones set by the ENERGY STAR program for energy usage and include water savings as an element. These standards are performance-based with credit amounts based on savings produced

³² www.odod.state.oh.us

³³ Tax Credits for Energy Efficiency and Green Buildings: Opportunities for State Action, Brown, Quinlan, Sachs & Williams, March 2002, p. 25

from eligible products at a rate of 40 cents per kWh per year.³⁴ Clothes washers, refrigerators and dishwashers are the most popular appliances purchased with the tax credit however, the recent addition of furnaces to the list has led to a huge increase in the total number of credits taken. “Qualifying furnaces have 90% or better AFUE and a variable speed (ECM) air handler fan motor. The furnace rebate is \$350, of which \$125 is for its electricity savings from the improved fan motor.”³⁵ Heat pumps were also recently added to the list.

Texas “The total Home Efficiency Program” operated by Austin Energy is one of the oldest continuously operating whole-house programs in the country. Founded in 1982 as the Whole House Rebate and Loan Program, the initiative works with trained contractors and sub-contractors to perform a home energy analysis, develop a proposal for recommended improvements and carry out the desired upgrades approved by the homeowner. The home energy analysis includes inspection of the HVAC system, ducts, attic insulation and envelope leakage.”³⁶ The program emphasizes duct sealing (relative to air infiltration) and incorporates the diagnostic tools like the blower-door and duct blaster. This program relies on the market to promote the full range of benefits to customers. Trained energy specialty contractors participate in the program and are eligible for equipment financing and cooperative advertising. There are sales incentives for job completion and Austin Energy inspects all completed jobs. Utilities invest in advertising and promotion through, “billing inserts, direct mail, billboards, movie theaters, sporting events and newspapers. Customers are also eligible to receive incentives (up to \$1,500.) and a range of payment options (including low-cost unsecured loans) to help offset the costs associated with recommended efficiency measures.”³⁷ Austin Energy also engages in customer outreach with materials to educate them on attractive paybacks, high return on investments and enhanced comfort as an outcome of the whole house retrofit.

Efficiency **Vermont** helped its consumers to make cost-effective efficiency investments which saved 51.2 million kWh of electricity in 2003. Households and businesses are expected to see these savings continue each year for 15 years. Efficiency Vermont also conserved electricity at an expenditure rate of 2.8 cents per kWh, or 38% of the cost that Vermont utilities would have paid to purchase comparable electricity supply elsewhere on the wholesale market.³⁸ The key to the success of Efficiency Vermont’s program is strategic partnerships with a broad network of local providers of energy products and services including; retailers, equipment suppliers, trades-people, architects, engineers, building contractors and other design professionals.³⁹

Efficiency Vermont offers financial incentives to help consumers invest in energy efficiency. Efficiency Vermont customer service representatives work with households to

³⁴ Tax Credits for Energy Efficiency and Green Buildings: Opportunities for State Action, Brown, Quinlan, Sachs & Williams, March 2002, p. 26

³⁵ Tax Credits for Energy Efficiency and Green Buildings: Opportunities for State Action, Brown, Quinlan, Sachs & Williams, March 2002, p. 27

³⁶ Residential Retrofits: Directions in Market Transformation, Jennifer Thorne, December 2003, page 10

³⁷ Residential Retrofits: Directions in Market Transformation, Jennifer Thorne, December 2003, page 10

³⁸ Efficiency Vermont website www.encyvermont.org

³⁹ Ibid.

analyze current power usage and help devise ways to reduce electric bills. They offer a usage survey that enables customers to compile information on their home energy use for submission to the scrutiny and recommendations of Efficiency Vermont. They also offer a home audit CD for the *self starter type* to self-analyze power consumption and efficiency options and they lend meters to measure power consumption of suspect appliances.

Efficiency Vermont provides instant coupons (to any consumer) for the purchase of ENERGY STAR qualified Compact Fluorescent Lights (CFLs) and light fixtures at either local stores or on the internet or by mail order. Efficiency Vermont received national recognition for its unique approach to the national Change a light/Change the World campaign. The EPA and DOE selected Efficiency Vermont to receive the 2004 ENERGY STAR Product Campaign Award. The State of Vermont requires, by law, that lamps with the mercury symbol (Hg) be separated from trash and disposed of properly. Efficiency Vermont also offers a website with information on ENERGY STAR qualified appliances and products. Energy Savings Calculators are available to help calculate how much energy and money one can save with the installation of energy efficient products.⁴⁰

Vermont has ENERGY STAR financing and mortgages which are offered by private lenders and give consumers an incentive to purchase ENERGY STAR-labeled homes and products. The Energy Efficient Mortgage (EEM) and Energy Improvement Mortgage (EIM) can be used by homeowners to pay for energy efficiency measures in a new or existing home. EEMs are federally recognized and can be applied to most home mortgages. Both government-insured and conventional EEMs are available. All buyers who qualify for a home loan can qualify for the EEM, which is intended to give the buyer additional benefits which exceed the terms of a usual mortgage deal. The lender will use the energy efficiency of the house, as determined by a HERS rating, to calculate the tangible benefits. EEMs can be used to finance technologies such as photovoltaics, solar water and space heating and energy efficiency measures.⁴¹

Wisconsin launched a Home Performance with ENERGY STAR pilot in October 2001 with two primary components: a whole-house retrofit program and the Efficient Heating and Cooling Initiative. The Wisconsin Energy Conservation Corporation (WECC) administers the state's residential retrofit or whole-house program in which the customer pays an upfront fee of \$100. to \$200. to a participating contractor for an evaluation of the building's energy performance. (the consultant model) 'The assessment covers the overall age and condition of the home as well as evaluating insulation, air leakage, mechanical equipment, moisture, combustion safety and carbon monoxide levels. The contractor also conducts an interview with the customer. Participating contractors are required to attend training conducted by the WECC. If the customer decides to implement the recommended measure, the WECC refunds \$75 of the assessment cost and the customer is also eligible for other targeted incentives that average about \$500. per house. Once the work is complete, an inspection is performed to ensure that the work meets the program standards. Unlike New York, the WECC spent very little on initial program

⁴⁰ Efficiency Vermont website www.efficiencyvermont.org

⁴¹ Ibid.

marketing. Instead, the program encourages participating contractors to promote the services and program incentives themselves.⁴² “Over the first year of the program, 77 contractors attended the training and 35 took action to perform assessments and implement measures in a total of 158 Wisconsin homes (Carroll 2002). The average home performance job totaled over \$1,900.00 for an average annual customer savings of \$335.00 on electricity and natural gas (EDU2003).”⁴³

“Since the launch of the Wisconsin Home Performance with ENERGY STAR program, WECC has actively encouraged contractors to market and promote the program directly to customers. This not only keeps the program costs low, but it pushes the contractors to develop a sustainable business model that they can continue to build after the financial support for the program ends. This has proven to be one of the more difficult aspects of the program. Many contractors in Wisconsin are skeptical of the market for home performance contracting, particularly in the absence of financial incentives for customers, based on their experience with earlier DSM programs. Once utility funding was discontinued, customer interest dried up and many contractors were left with expensive blower door and other diagnostic equipment without any means to recoup their investment. WECC is working to address this barrier by demonstrating to contractors ways to build a viable home performance business and also providing the training and initial push needed to increase consumer demand in the state. For example, WECC is exploring a remodeling pilot to encourage whole-house contractors to develop relationships with remodelers (such as window replacement firms) as a way to reduce their marketing costs and get a foot in the door of the strong home improvement market in the state. WECC is also evaluating its quality control mechanism and how to activate trained contractors to engage in marketing and participation in the program.”⁴⁴

⁴² Residential Retrofits: Directions in Market Transformation, Jennifer Thorne, December 2003, page 14

⁴³ Ibid.

⁴⁴ Residential Retrofits: Directions in Market Transformation, Jennifer Thorne, December 2003, page 15

	HERS RATING	OTHER AUDIT PROG.	E-STAR HOMES	E-STAR LIGHT & APPLIANCE	EEM EIM	TAX INCENTIVE	UTILITY FUNDED PROGRAM	OTHER
Arizona	✓					✓ 5% of purchase price if 50% eff.	✓	
California	✓				✓	✓ personal tax deduction for EE products		RCP*
Canada		✓			✓			grants
Colorado	✓		✓	✓	✓			Non-profit
Idaho	✓			✓	✓	✓ 20-40% of cost upgradematerials		EPA partner
Maine	✓							
Maryland			✓	✓	✓	✓ sales tax waiver & greenbldg		
Minnesota	✓		✓	✓	✓	✓ sales tax rebate on products (CFLs)		State funded
New York	✓	✓	✓	✓		✓ greenbldg.		
New Hampshire	✓	✓	✓	✓			✓ PAYS & EAP Programs	
Ohio	✓		✓	✓	✓			USF/EPP/PIPP Gov. Awards
Oregon	✓		✓	✓	✓	✓ income-based residential tax credit		Standards exceed e-star
Texas	✓	✓	✓	✓	✓			Austin Energy
Vermont	✓	✓	✓	✓	✓			EPA partner
Wisconsin	✓	✓	✓	✓				Sustainable Contractor-base /Cash back rewards

RCP* -Self sustaining contractor market for EE services. Customer receives redeemable vouchers for specific improvements.

V. The energy efficiency and cost of home heating equipment sold and used in Maine

According to the Maine PUC, with their loan program, a new installed heating system typically costs in the \$4500 range.⁴⁵ Efficiencies of new oil equipment range from 83% to 95%. Efficiencies for gas equipment range from 78% to 95%. Electric resistance heat and electric water heaters are between 27% and 31%, air to air heat pumps between 51% and 62% and geothermal (ground source) heat pumps between 76% and 82% efficient.(OMA). The following values from the www.maine.ghg.raabassociates.org website provide more detail.

⁴⁵ Mike Mayhew, Engineer for MPUC, August 14, 2006

Fuel	Percent of population usage as primary heat fuel	source
Oil	80%	US Census, 2000
Natural Gas	8%	US Census, 2000
Electricity	4%	US Census, 2000
Number of homes in Maine	518,200	US Census, 2000

Maine residential heating and hot water systems annually consume 272 million gallons of #2 fuel oil⁴⁶ and 1196.75 MMCF of natural gas.⁴⁷

Energy Savings associated with Replacing 60% AFUE furnace With Energy Star oil furnace (90%AFUE)	24.25MMBTU/furnace	Calculated based on 20% efficiency increase and avg. 80.8 MMBTU/household for space heating
Estimated cost of conventional Oil furnace	\$2000	EPA
Estimated cost of Energy Star Oil furnace	\$2700	Consumer Energy Council of America
Market Penetration	2%	Estimated (by whom)

Natural Gas Furnaces

#operating at or below 60% AFUE 15%		Expert Judgment
Energy Savings associated with Replacing 60% AFUE furnace with Star natural gas furnace (90% AFUE)	25.25 MMBTU/furnace	Calculated based on 20% efficiency increase and average 80.8MMBTU/ Energy household for space heating
Estimated cost of conventional Natural gas furnace	\$2000	EPA Energy Star
Estimated cost of Energy Star Natural gas furnace	\$2500	EPA Energy Star
Market Penetration	2%	Estimated

Integrated Hot Water Heater

Average energy factor of stand alone water Heater more than 10 years old	50%	USDOE Building Technologies Program
Energy factor of new integrated hot water heater	88%	USDOE Building Technologies Program
Cost of installation	\$900	USDOE Building Technologies Program
Market Penetration	2% of oil heated homes, 2% of natural gas heated homes	Assume install with furnace replacement

Electric to oil conversions reduce greenhouse gases by 50%⁴⁸ Homes heated by oil equipment, as opposed to electricity, can reduce carbon dioxide by 12 tons per year per house. Simply replacing an electric water heater with an oil powered unit can lower CO₂

⁴⁶ EIA, Fuel Oil and Kerosene Sales, 2002, Table 19- Adjusted Sales for Residential Use

⁴⁷ EIA, Annual Natural Gas Deliveries to Residential, by State, 2003

⁴⁸ Oilheat Manufacturers Association Technical Update

release by 2 tons per year. Additional benefits of switching to oil include; lower heating cost (less than a half to one third of electric heating cost), excellent paybacks for homeowners (typically less than 2-3 years) and lower emissions.

Home energy use includes space heating and production of domestic hot water. Typical fuel use in homes in oil heated regions of the US is about 850 gallons of oil a year (118 million BTU/year), and USDOE calculations indicate an average energy use for domestic hot water of about 24 million BTU/year.

State Appliance and Equipment Efficiency Standards and building codes in New England states are summarized in Appendices 4 and 5.

OIL HEAT EQUIPMENT

The distribution, manufacturing and marketing of oil-related equipment is a significant US industry although the companies involved are typically small businesses.

While furnaces heat and distribute air boilers heat and distribute water. One of the advantages of an oil-fired boiler is that it can heat a home's domestic hot water as well as heat the home without need of a separate unit. **Hydronic** boilers can be used in homes that have duct systems by means of a hydro-air system. In a hydronic boiler system, heated water from the boiler is pumped by circulator through radiators, radiant tubing, convectors, vents (hydro-air systems) or baseboards. A hydronic boiler system works in this sequence. "The thermostat sends a signal to the controls on the burner. The fuel pump draws oil through a filter to the burner where the oil is turned into a fine spray mixing it with air and ignites it in the combustion chamber causing the chamber to heat up. Water circulates around the combustion chamber and a circulator pumps the heated water through radiators or baseboards to heat the home. An expansion tank adjusts to varying pressures and eventually the water returns to the heating unit to begin the cycle again. Combustion emissions are vented out the flue."⁴⁹ With hot water heating, dividing the system into separate heating zones provides efficient, comfortable heating. Radiant heating is one of the oldest forms of hot water heating and has made a comeback in recent years.

The condensing oil-fired warm air boiler is one of the newer technologies featuring two heat exchangers and efficiency ratings of 92% reducing operating costs. The ultra-high efficiency is achieved by lowering the stack temperature to the point where the steam in the flue gases turns back into water.

The age of a boiler will may determine its efficiency. On average, efficiency ratings for conventional boilers 30 years old or older are in the mid-60% range. However, new boilers have efficiency ratings from 81% to 92%.⁵⁰

⁴⁹ OilHeat America, Oil Heat Equipment- How it works- National OilHeat Research Alliance, 2006

⁵⁰ Oil Heat America.com, Boilers, National Oilheat Research Alliance (NORA) 2006

Some older boilers may have been converted from coal. Due to antiquated designs, these systems are plagued by high draft loss and poor heat transfer. Newer oil-fired boilers are more efficient, in part because of low-mass construction and reduced water storage resulting in heat loss. The most common design for steel boilers uses fire tubes. Combustion gases flow into these long tubes which are surrounded by water. The oil burner fires into the combustion chamber, which has a dry base design, which means there is no water surrounding the firebox. All the water is contained in the upper section of the boiler. Other steel boilers have a wet base design in which water surrounds the combustion chamber. This design is more efficient because the hot gases pass through the fire tubes twice before they are vented. The wet base design is also called a two-pass system. Like steel boilers, cast-iron boilers also have dry base and wet base designs. In a cast iron boiler, the hot gases rising out of the firebox pass over the outside of each of the boiler's cast sections through the flue channels which are located between the cast sections. The gases are then vented through the flue pipe to the chimney. All boilers have internal passages for the combustion gases. If the passages are too wide, the heat transfer rate will be low. Combustion gas passages that are too wide are often a problem in boilers converted from coal to oil.⁵¹

Cast-iron and steel boilers are tested to verify their heating capacity and efficiency. Boiler ratings are published by The Hydronics Institute. Rating indicators for each boiler model include hot water output in Btus per hour and the Annual Fuel Utilization Efficiency (AFUE) ratio. AFUE is determined by a testing procedure specified by the US. DOE. All heating equipment manufactured after 1980 is required to have a label indicating its AFUE. The AFUE ratio is a measurement of a heating system's seasonal efficiency, taking into account how well the system performs over an entire season of starts and stops. AFUE should not be confused with combustion efficiency, which indicates how well the burner converts oil into heat. In many oil-heated homes tags attached to the equipment indicate combustion efficiency. If the combustion efficiency is below 78, a careful analysis may indicate that the performance would be enhanced with an upgrade.⁵²

Modern oil furnaces range in efficiency from 81% to 95%. Some of the innovations include; low-mass combustion chambers, exchangers, solid-state or microprocessor-based controls and high-pressure flame retention burners.⁵³ An oil furnace system works in the following sequence of events. "The thermostat sends a signal to the controls on the burner and the fuel pump draws oil through a filter to the burner. The burner turns the oil into a fine spray, mixes it with air and ignites it in the combustion chamber causing the chamber to become very hot. Air absorbs heat in the heat exchanger and a blower sends this air through ducts to the conditioned envelope of the home. The air eventually circulates back to the heat exchanger and the cycle continues with combustion emissions being vented out the flue."⁵⁴

⁵¹ Oil Heat America.com, Boilers, National Oilheat Research Alliance (NORA) 2006

⁵² Oil Heat America.com, Boilers, National Oilheat Research Alliance (NORA) 2006

⁵³ Oil Heat America.com, Boilers, National Oilheat Research Alliance (NORA) 2006

⁵⁴ OilHeat America, Oil Heat Equipment- How it works- National OilHeat Research Alliance, 2006

Water Heaters

Oil fired water heaters come in two categories: **direct and indirect**.

With **direct –fired** water heaters, the water is heated directly by the heat of the oil flame. Usually a direct-fired water heater operates simultaneously with a warm air furnace. The oil is burned in a combustion chamber under the water storage tank and hot flue gases heat the water in the tank. In an **indirect-fired** water heating system, the domestic water is heated by hot water from the boiler. In many oil-heated homes, an indirect-fired system will be tankless and works in conjunction with either a hot water boiler or steam boiler. There are three variations: internal tankless coil, external tankless coil and tankless coil with storage tank.

The **internal tankless coil** containing the domestic water supply is located in the water jacket of the boiler. Drawbacks of this design include the absence of hot water storage and the need to maintain the temperature of the boiler at a high enough level to heat the domestic water as it passes through the coil.

The **external tankless coil** has a separate storage tank that contains an internal coil which connects to the sides of the boiler. A newer version of this type of external tankless coil water heater is the plate heat exchanger. It contains a series of wafers or plates with internal porting' plates alternate between boiler water and domestic water.

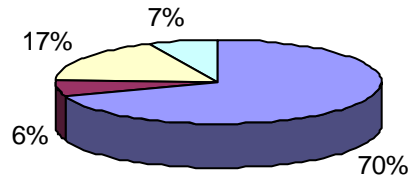
The tankless coil with storage tank (or Aqua Booster) was introduced to increase water heating capacity. After water has been heated by going through the indirect systems coil, it is stored in a vertical storage tank. The temperature of the hot water in the tank is usually maintained by means of a recirculating loop allowing water to be reheated by going back to the coil, either by gravity or forced circulation. Oil-fired water heaters have high recovery rates meaning they can heat large volumes of water quickly. A water heater's recovery rate is the amount of water whose temperature the unit can raise by 100 degrees in one hour. For example, if it can increase the temperature of 40 gallons of water by 100 degrees in an hour, the unit has a 40-gallon recovery rate. Oil-fired water heaters have recovery rates as high as 120 gallons per hour.⁵⁵

VI. The point of origin for energy sources used in home heating in Maine.

According to 2004 DOE data, 70% of Maine's distillate, both high and low sulfur, originates and is refined in Canada. The percentage breakdown of Maine's distillate supplies is illustrated in the following chart with 17% coming from Venezuela, 7% from the Virgin Islands and 6% originating in other locations such as Russia, Korea, Saudi Arabia and the Netherlands. Because of Maine's physical proximity to Canada, it is less dependent on US Gulf-Coast refined products than the rest of the country and even other parts of New England. Most of Maine's high sulfur distillate or #2 heating oil is delivered to and distributed from the ports of Portland and Searsport with some deliveries coming in through Belfast.

⁵⁵ OilHeat America, Oil Heat Equipment- Water Heaters- National OilHeat Research Alliance, 2006

**Maine Distillate Points of Origin
Maine Office of Energy Independence and
Security November 2006**



■ Canada ■ Other ■ Venezuela ■ Virgin Island

Kerosene comes to Maine through Portland, Madawaska and Fort Kent.

New England receives propane in three ways. Algerian and Middle Eastern product is delivered at seaport terminals in Providence Rhode Island and Portsmouth, New Hampshire. The TEPPCO (Texas Eastern Products Pipeline Company) pipeline which runs from Texas to Albany, NY provides some propane supply and outsourced Canadian propane comes to a depot in Auburn, Maine by rail. Seventy percent of Maine's propane comes from Canada through Duke Energy.

Appendix 1

Calculations of Statewide and average Maine household annual heating fuel consumption by type.

Data sources:

- 1) Maine residential sector energy consumption estimates for 2003 from Table S4, U.S. Department of Energy, Energy Information Administration.
<http://www.eia.doe.gov/emeu/states/sep_sum/html/sum_btu_res.html>
- 2) U.S. Census Bureau, American Fact Finder, 2003 American Community Survey Summary Tables. <http://factfinder.census.gov/servlet/ADPTable?_bm=y&-geo_id=04000US23&-all_geo_types=N&-qr_name=ACS_2003_EST_G00_DP4&-context=adp&-ds_name=&-tree_id=303&-redoLog=false&-format=>>
- 3) Fuel BTU energy conversion table

Fuel oil and kerosene

Annual fuel oil consumption = 51.4 trillion BTU
Annual kerosene consumption = 7.9 trillion BTU
Total fuel oil and kerosene consumption = **59.3 trillion BTU**
Number of homes using product = 423,610 homes

Conversion = 138.8 E3 BTU/gallon fuel oil (this conversion was also used for kerosene which is slightly less at 135 E3 BTU/gallon).

Statewide usage = 59.3E12 BTU/138.8E3 BTU = 427,233,429 gallons
Household average = 427,233,429 gallons/423,610 homes = 1009 gallons per home

Natural Gas

Annual fuel consumption = 1.5 Trillion BTU
Conversion = 0.820E6 BTU/1000 ft³
Number of homes using product = 21,039 homes

Statewide usage = 1.5E12 BTU/1,000 ft³/1,025E3 BTU = 1.46E9 ft³
Household average = 1.46E9 ft³/21,039 homes = 69.4 E3 ft³

LP Gas

Annual fuel consumption = 5.3 trillion BTU
Conversion = 91.3E3 BTU/gallon
Number of homes using product = 29,168 homes

Statewide usage = 5.3E12 BTU/91.3E3 BTU/gal = 58E6 gallons
Household average = 58.6E6/29,168 homes = 1990 gallons/year

Electric Heat

EIA data reports total residential electrical sales per year for 2003 at 14.4 trillion BTU. From discussion with Central Maine Power a very small percentage of residential electricity is sold for electric heat and is estimated at 5%.

Annual fuel consumption = 0.05×14.4 trillion BTU/year = 0.72 trillion for space heating
Conversion = 3,340 BTU/KWH
Number of homes using product = 25,451 homes

Statewide usage = $0.72E12$ BTU/3,340 BTU/KWH = 2.16 E8 KWH/year
Household average = 2.16 E8 KWH/25,451homes = 8487 KWH/year

Wood

Annual fuel consumption = 3.1Trillion BTU
Conversion = 20,000E3 BTU/cord
Number of homes using product = 33,057 homes

Statewide usage = $3.1E12$ BTU/20,000E3 BTU/cord = 155,000 cords/year
Household average = 155,000 cords /33,057 homes = 4.7 cords/year

Coal

Annual fuel consumption = less than 0.05Trillion BTU
Conversion = 30,600E3 BTU/ton
Number of homes using product = 735 homes

Statewide usage = $0.05E12$ BTU/30,600E3 BTU/ton = 1,634 tons
Household average = 1,634 tons /735 homes = 2.2 tons

Appendix 2

Fuel Tax rates⁵⁶

Tax Type	Effective 07/01/2004	Effective 07/01/2005	Effective 07/01/2006
Inflation Index	1.023	1.027	1.034
Gasoline	0.252	0.259	0.268
Diesel	0.263	0.270	0.279**
Jet Fuel	0.034	0.034	0.034
Propane	0.183	0.188	0.194
Methanol	0.143	0.147	0.152
Ethanol	0.178	0.183	0.189
CNG*	0.218	0.224	0.232

* CNG (Compressed Natural Gas). The tax rate is applied to every 100 cubic feet. The tax rate on all other fuels is based on each gallon.

**For reporting periods beginning on September 1, 2006, the tax rate for diesel fuel containing at least 2% biological component is 0.200.

⁵⁶ Maine Revenue Services

Appendix 3



MAINE HOME PERFORMANCE



Implementation Plan

1 Introduction

The Governor's Office of Energy Independence and Security is sponsoring development of a Home Performance with ENERGY STAR residential energy efficiency program. Rising energy prices have led to increased public interest in conserving energy. The Maine Home Performance (MaineHP) Program will emphasize a whole-house approach to reducing energy bills, reducing maintenance costs and improving the health and comfort of residential buildings. MaineHP will help stimulate the market for energy efficiency and related services in the State. This three-year pilot program will provide training and marketing support to contractors in York, Cumberland, and Androscoggin counties.

Contractors will be taught to use building science and green energy technology to solve a wide range of problems, and will be instructed on the use of software to calculate the energy savings from a wide range of improvements. Customers of participating certified contractors will have access to financing options, including a very low interest loan offered through Maine Housing.

Contractors who participate will have an opportunity to:

- Increase their profits by getting larger jobs with higher profit margins
- Reduce the seasonal swings of their business
- Improve their sales closing rates
- Increase their understanding of how buildings work
- Grow their businesses

And, they will help Maine's homeowners lower their energy bills and reduce Maine's energy consumption and greenhouse gas emissions. The average annual savings created for each of the 1500 homes in the pilot can be approximated using an average 7 year return on investment and an average investment of \$6000 resulting in an annual savings of \$857 per year. Assuming an average 20 year life of improvements and no increase in energy prices, the 1500 homeowners will experience over \$25 million in energy savings

from the program. The state of Maine will retain that \$25 million as money more likely to be spent within Maine, instead of exported as energy dollars. The installations will create over \$9 million in economic activity with a high percentage of that figure expended on labor. The economic benefits during the pilot actually understate the total benefits since contractors are being taught how to change their business model to a more sustainable one. It is expected that there will be both spillover benefits from the market pressure created by the successful contractors in the program and sustaining benefits from the continued energy efficiency and health related business activities of the contractors should the program cease operation.

In addition to energy savings, homeowners will experience increases in the value of their homes and reductions in health expenses as environmental causes of health problems are identified and eliminated. Homes with lower energy use and documentation of the improvements made according to program standards will command a higher price and sell faster. Home Performance inspections often reveal combustion safety issues, gas and oil leaks, and contributing sources of respiratory problems such as mold and dust. Home Performance contractors are taught how to effectively remove these contributing sources of problems.

Home Performance across the nation

Home Performance with ENERGY STAR is emerging as a rapidly growing program that works with contractors and consumers to help our country save energy. Pioneered in the 1990's by New York State and Wisconsin, Home Performance is now active in 16 states with a number of states and utilities considering adoption. Home Performance with ENERGY STAR has been jointly adopted by the US Department of Energy, the US Department of Housing and Urban Development and the Environmental Protection Agency as the primary program mechanism for delivering energy savings to existing homes. The program is experiencing this success *because the participating contractors are experiencing dramatic success in selling home performance* to their customers. The MaineHP Program will give participating contractors access to all the advantages of the Home Performance with ENERGY STAR Program.

When a contractor looks at the performance of the whole house using testing techniques, they are able to reliably solve a wide range of performance problems, including ice dams, comfort problems, mold, dust, risk of carbon monoxide exposure and others, all while saving significant energy dollars. Home Performance with ENERGY STAR builds on and combines market drivers that are already affecting business – high energy prices, customer concerns for comfort and indoor air quality and more investment in remodeling as land and housing prices spiral upward. The whole house approach bundles all these consumer interests into a high value package that offers customers a one-stop-shop opportunity. The use of performance testing and building science knowledge builds customer trust and increases their ability to reliably solve problems.

Home Performance in Maine

Maine has characteristics that make it a great place for Home Performance. The housing stock is typically older with lots of opportunity for improvement. Land and housing prices are increasing and energy prices are high and are likely to get much higher.

The Maine Home Performance Program is the result of efforts by the Governor's Office of Energy Independence and Security, the Maine Public Utilities Commission, and the Maine Housing Authority to bring home performance contracting to the existing housing market in our State. The primary goals of the pilot MaineHP Program are to: 1) provide significant energy savings to 1500 existing homes; 2) accelerate recognition and acceptance of energy-efficient technologies; 3) train a pool of energy auditors/contractors; and 4) use a comprehensive, whole house approach with intelligent marketing and quality assurance. The MaineHP management team is already making plans to ensure sustainability of the Program beyond the pilot phase.

1.1 Needs Analysis

Maine has some of the oldest and most inefficient housing stock in the country,⁵⁷ cold winters and a large low and middle income population whose incomes have not kept pace with rising energy costs. Forty-five percent of the houses in Maine were built prior to 1960 and fifty-four percent of the heating equipment is at least ten years old. Roughly 80% of Maine people heat primarily with #2 heating oil, 6% with kerosene, 5% with propane and 8% with natural gas. Prices for all these fuels have nearly doubled in the past two years and projections are that prices will remain high for the foreseeable future. Maine consumers pay some of the highest electric rates in the country and feel the pinch of high energy costs.

The Maine Public Utilities Commission concluded that, "Rising energy prices have created an increased interest in home weatherization and insulation services." The Commission estimates that a Whole House energy efficiency program could be implemented in Maine for about \$200,000 in a first year effort and expand to \$500,000 annually over a five-year period."⁵⁸ The Office of Energy Independence and Security (OEIS) agrees with these Commission findings and estimates that it could initiate the Maine Whole House Program for \$404,166 in expenses during the first year and a total of \$1,000,000 over the three and a half year Pilot Program. Additionally OEIS asserts that the proposed Maine Whole House Energy Efficiency Program will create an environment for sustained market transformation and convert the Maine housing market into one less dependent on fossil fuels. The data collection process that is integrated into the contractors' energy savings calculations and business model will create a rich source of data about the performance and problems of Maine's housing stock. This data source will be a valuable tool that can be used to inform the development of energy and housing policy for Maine.

⁵⁷Reducing Household Energy Consumption in Maine:What it would take to achieve a 25% Reduction by 2011, Maine State Planning Office/Patricia Hart, January 2002, page 8.

⁵⁸ State of Maine Public Utilities Commission, Notice of Proceeding, August 17, 2005, page 29

A primary objective in this pilot program is to develop a network of independent contractors who are not only trained in energy efficiency and whole-house diagnosis, but who can also offer implementation of most, if not all, of the recommended enhancements themselves or with the enlisted help of allied contractors; providing the customer with as close to a *one-stop shopping* experience as possible. Incentives will align with installation of comprehensive and high quality energy efficiency upgrades. All improvements will have measurable pay-backs and will be of a quality consistent with current building standards and best practices. A monitoring system to evaluate and report on energy savings achieved by homes participating in the Pilot Program will be created and implemented as a crucial measure of the effectiveness of the Program and as a way of monitoring the performance of the contractors. This evaluation will provide quality assurance, insurance of the contractor's motivations toward the homeowner and assistance in determining whether the Whole House Program should be expanded statewide.

1.2 Benefits

The Whole House Pilot Program will create jobs and provide significant economic benefits to Maine contractors and those in the building trades. Maine's Whole House Pilot Program will reduce homeowner energy costs and dependence on fossil fuels, Maine's contribution to greenhouse gas emissions and will improve the efficiency of energy use in the residential sector. This program will provide significant energy savings to 1,500 existing homes in the pilot market which is York, Cumberland, and Androscoggin counties including the Greater Portland Metropolitan Area. To increase potency of marketing presence and facilitate relationships among auditor/contractors, the pilot program will initially focus on one market. It will accelerate recognition and acceptance of energy efficient technologies, train and promote a pool of qualified, independent energy auditor/contractors, employ a comprehensive, whole-house approach and implement marketing and quality assurance strategies.

For most homes the expenditure of a few hundred to a few thousand dollars for cost-effective energy improvements has the potential to reduce total energy consumption by 10% to 50%.⁵⁹ Based on this, OEIS estimates the annual program heating fuel cost savings alone are \$106,250 to \$531,250 for the first year. (This assumes usage of 850 gallons of #2 heating oil at \$2.50/gallon.) Annual electric energy savings of from \$54,000 to \$270,000 would also be realized. (This assumes electricity costs of \$0.15/kWh and average monthly usage of 600kWh and average annual usage of 7200kWh.) Electricity savings combined with fuel savings for total annual energy savings in the first year would range from \$160,250 to \$801,250. The total energy cost savings over three years, assuming the upgrading of 500 homes per year or 1500 homes total would range from \$480,750 to \$2,403,750. These savings will persist for the remaining life of the home and replaced appliances. Clearly, the benefits far exceed the costs. In the Maine Whole House Program, the index to measure efficiency performance will be based on savings yield, measured in annual kWh saved, per (real) dollar expended. Non-electric fuel cost savings will also be measured in fuels and dollars saved over baseline.

⁵⁹ Wes Riley, Draft Outline for MaineStar Residential Energy Efficiency Program, Horizon Residential Energy Services

OEIS is aware of the challenges of launching a successful whole house program and is employing several strategies to insure its viability and focus of limited funding resources. Initial networking to identify and target a group of independent remodeling contractors with a high prospect for success in the pilot area will occur. Thorough screening and selection of contractors will insure a fit with the Maine Whole House Program approach and insure its incorporation into the business plans of the independent auditor/contractors. The Program will only invest in contractors who are committed to long-term participation and will insert some barriers to entry so that the sincerity of the contractor's interest is insured. OEIS and the PSD will pre-qualify contractors to insure demonstrable business success and the presence of business skills necessary to deliver essential services. Metrics, such as financial stability and good credit, examination of business history, minimum annual business volume and experience in the existing home market will be considered before inviting a contractor to participate.

The Maine Whole House Energy Efficiency Pilot Program will create an environment for sustained market transformation. The Whole House Program is a comprehensive and expansive multi-faceted approach including: buy-downs, financial incentives and rebates for customers and contractors, funding leveraged through utilities, trade organizations, federal and state agencies and other partners, and creative financing solutions to the barriers faced by Maine consumers.⁶⁰

2 Contractor Process

This section describes the program elements that will be developed to support contractor and consultant participation in Maine Home Performance.

2.1 Recruitment

The program will recruit a mix of contractors and consultants with the primary focus being on recruiting contractors who will work towards being able to offer a one-stop shop experience for the participating consumers. Contractors will be required to apply to participate. The application process will require them to demonstrate their trade knowledge and business ability by providing information about their current business operations and their ability to operate computers. Technical background in building science will not be required but experience in providing remodeling or related specialty trade services will be. The program has limited training funds and those funds, along with investments in contractor mentoring, must be used as effectively as possible. We also want to protect contractors who may not have the necessary skills from getting involved with an attractive but complex business model that could end up hurting them. These contractors will be redirected towards consultants who could use them as subcontractors.

⁶⁰ Comments by the Maine Office of Public Advocate on Efficiency Maine's 2006-2008 Program Plan, Optimal Energy, Inc. Sept.26, 2005, page 16

Recruitment efforts will target larger contractors but smaller contractors with strong business skills will also be recruited. Applications to participate in the training will be evaluated by the program implementation team, including the program manager from OEIS. The recruited contractors will include heating contractors, insulation contractors, and remodelers. Consultants will also be eligible to participate. The programs focus with consultants will be on recruiting those consultants who already have strong relationships with contractors who can provide the installation services. The program will also facilitate networking between contractor and contractor and between contractors and consultants.

Maine Home Performance has already received strong expressions of interest from a range of contractors, including insulators, rater/consultants, and weatherization agencies. It should be noted that Maine is predominantly heated with oil heat and hydronic distribution systems are the most common. There is a strong state run heating contractor licensing system already in place. Another contractor type that has identified is an Lead/Asbestos Abatement contractor. Funding for these contractors has dropped off and they may be looking for new areas of work.

Initial training will focus on existing contractors not on potential employees.

2.2 Recommended technology platform

Contractors will be encouraged to adopt a performance testing toolkit that includes a blower door, CO analyzer, digital manometer, combustion efficiency tester and assorted other minor tools. Contractors will be encouraged to obtain an infrared scanner as a way to increase sales by visually demonstrating the need for insulation and air sealing and to improve insulation and air sealing quality control. Contractors will be encouraged to acquire convertible tablet or tablet computers. This will allow the program to develop paperless forms that can be signed by the customer using the tablet computer. The convertible tablets are also excellent for operating the TREAT energy analysis software. TREAT calculations will be required as part of each inspection done by the participating contractors. A set of TREAT templates will be created for common Maine housing types. Contractors will also be required to enter BPI related test in and test out data into the user defined measurement and observations fields in TREAT. Information on savings and testing information will be uploaded to PSD's Online Tracking Tool for Energy Retrofits (OTTER) database where it can be accessed for quality assurance, support for training and savings tracking. Duct blasters will not be required, due to the less than 10% market penetration of ducted heating systems in Maine.

The estimated cost of equipment per certified inspector is:

1. Blower door	\$1730.00
2. CO analyzer ⁶¹	\$450.00
3. Combustion efficiency tester	\$900.00
4. Combustible gas detector	\$250.00

5. Digital manometer	\$795.00
6. Exhaust Fan Flow Meter	\$130.00
7. Other equipment	\$495.00
8. Tablet Computer	\$1700.00
9. <u>TREAT</u>	<u>\$495.00</u>
Total	\$6945.00

Optional, but strongly suggested, is an infrared scanner at a cost of roughly \$8000 or more. A combustion efficiency tester that measures as-measured and air-free carbon monoxide makes the CO analyzer instrument redundant. Equipment discounts are being negotiated for participating contractors, including a 5% discount for blower doors and a 5% discount on infrared cameras from Maine-based Monroe Infrared.

2.3 Training and Certification

Contractors will be offered a combination of technical and business training. Technical training will be created from a combination of PSD’s training resources developed in the process of training three home performance programs in other states and RJ Karg Associates’ well-tested weatherization assistance program training. The training will be Building Performance Institute (BPI) accredited. The initial training will be five days. There will be an additional two day training that focuses on home performance sales and marketing and the use of TREAT. BPI certification at the Analyst or Shell Specialist level will be offered at the end of the mentoring period. Passing the Analyst test will be a requirement for program participation. The certification threshold for participation will be raised as the pilot program progresses. Eventually, accreditation by BPI will be required for all participating contractors. Contractors will be encouraged to test at the higher specialist level if the trainers feel that the contractor is ready for that level of testing. PSD will provide staff not associated with the training to proctor the written exams and field testing.

Efforts will be made to coordinate the MaineHP training with the training and certification requirements of the existing Maine Weatherization Assistance Program. As BPI accreditation is required, weatherization agency staff will be required to obtain the necessary BPI certifications. But their entry into the earlier phases of the program will be made easier.

Training will be offered as a package with a single fee that includes training, mentoring, testing and certification.

	Market Value
1. Five days of classroom and field training	\$1000
2. Training books and binder	\$ 200
3. Two day training on inspections, in home sales & software	\$ 400
4. Business training webinar	\$ 150
5. One on one business advice training	\$ 150
6. Five ½ day field mentoring visits	\$1000
7. <u>BPI certification field test and exam</u>	<u>\$ 500</u>

\$3400

This training and certification package will be offered to contractors at the program subsidized price of \$1700. This package will be offered to Senior Weatherization Auditors for the first year of the program for a fee of \$1300, not including BPI certification testing, which will be made optional for the first year for Senior Weatherization auditors. These Senior Auditor staff will eventually need to obtain BPI specialist certification. The Senior Auditors will require field testing on BPI standards for combustion safety testing and will likely be required to eventually take the BPI tests when the program requires BPI accreditation in order to participate.

As part of the program application process contractors will also have to demonstrate their ability to provide a threshold level of insurance and have a certificate of insurance on file with the program. Other program requirements will be developed in alignment with the requirements for BPI accreditation.

2.4 Mentoring

Contractors will undergo a successful period of mentoring followed by certification testing before being listed as program participants. The training package will include five mentored inspections or jobs. If at the end of the five visits, a contractor still requires mentoring, the program will require a fee of \$200 per ½ day mentoring visit. Each mentoring visit will include a checklist that shows which of the required skills the contractor has successfully demonstrated. This information will be maintained in an online database at the program secure intranet.

2.5 Customer Referral to the Contractor

Consumers will get access to the contractor list via the web or by telephone request. Where possible, the provision of a contractor list will be tied to collection of customer contact information. Every effort will be made to reassure consumers that their information will not be provided directly to a contractor. Options will be available that do not require providing contact information. Consumers will also receive a PDF or hard copy of a “What to Expect from Your Home Performance Contractor” FAQ handout. This handout will also introduce some basic building science principles. It will be designed to promote viral (customer-to-customer referral) marketing. Consumers will be encouraged to pass on the handout to friends and associates who may also be interested in Maine Home Performance contractor services.

This customer contact information will be used as part of an enforcement mechanism to get contractors to register jobs. Customers who have provided their contact information will be re-contacted some period after the initial contact to determine if they have completed any work.

Contractors will be listed according to the number of types of work that they perform, with the contractors doing the most types of jobs listed at the top. Certifications will also be shown. Contractors will also have an option to participate in various \$25 off inspection coupons that will be used as part of various marketing efforts including the

Sunrise Guide and other programs. Contractors who agree to accept the coupons will be indicated on the website.

Various community building efforts will be included in the marketing effort, starting with the establishment of a moderated customer blog at the program website. This blog will focus on getting people to post their success stories. An example of a Performance Systems customer blogging at their own website is at

http://livingindryden.org/2004/01/energy_efficiency_in_our_old_h.html

We also hope to be able to use the EPA ENERGY STAR residential yardstick tool to be able to collect energy usage information from customers, both pre- and post-retrofit. The website will include information related to translating energy savings into environmental benefits. Another important section will be related to how community and not-for-profit organizations can support the Maine Home Performance effort, for example by holding a workshop and by publicizing the effort in their newsletters.

Maine Home Performance will have a toll free number that will ring at Performance Systems Development. DVD copies of the program video developed as part of the Home Energy Makeover Contest will be available for ordering through this number.

2.6 Assessment Standards

Contractors will be agreeing to provide a minimum inspection standard to participating customers. This inspection will include:

1. Heating and hot water combustion safety testing including CO and worst case depressurization
2. CO at appliances, such as stoves
3. Combustion efficiency
4. Blower door CFM 50
5. Ventilation flow from exhaust equipment
6. Pressure pan testing of duct systems
7. TREAT building simulation of energy use calibrated to existing energy bills
8. A TREAT-generated inspection report
9. TREAT-generated savings projections for recommended improvements
10. Any other BPI required tests

Inspection using an infrared scanner will be encouraged but not required. TREAT generated inspection reports will be customizable by the contractor.

2.7 Contractor Standards for Reporting to Program

Contractors will be required to submit the TREAT XML file for completed jobs to the program within one month of the completion of the job. It is expected that contractors, with the assistance of the program will set up systems to save their TREAT XML files and then upload them once a month in a scheduled week. Contractors will be sent reminder emails. A correctly filled out TREAT file should have all the information the program needs including test out results.

Contractors who are not submitting completed jobs to the Program will be first warned and then removed from Program participation. Contractors will have to generally assume that their customers have had access to the Program and have provided their contact information to the Program. Other options for creating consequences for prolonged failure to submit jobs may be explored. It should be noted that submission of a job will be a very easy process if the contractor has completed the TREAT model for that job. Since the TREAT model will also produce a contract and a report for the contractor, the completion of the TREAT model should be a net time saver for the contractor.

2.8 Installation standards

The basic standard for installation will be based on documents prepared by RJ Karg Associates for Maine Housing. The Program will develop amendments to these standards as required and store them online with contractor access. These standards will form the basis of post inspection criteria.

2.9 Quality Assurance

There will be a two stage contractor quality assurance process. The first stage will use PSD staff and subcontractors to inspect a random 15% percent of the work. As BPI accreditation is adopted, and BPI provides quality assurance, the percentage of homes directly inspected by the Program staff will drop significantly. In the second stage, the inspections will be focused more on contractors who are entering the program or who have shown an increase in customer complaints, with BPI providing the baseline quality assurance inspection services.

It is important that the quality assurance process not overly involve the customer. The quality assurance inspectors will have a protocol for what information on the results of the inspection is provided to the customer. It is not the purpose of the inspection to pass public judgment on the work on minor issues. Information on the quality of the contractors work should flow back to the Program and to the contractor so they can fix issues that are observed and improve their process. The inspector will have the TREAT file with the submission and will ask the customer to provide the contract they signed with the contractor.

A range of issues will be defined, including health and safety violations or unaddressed issues, fraud, low quality work, etc. These observations will result in a score for the job. This score will be maintained in a database and actions taken when scores fall below certain thresholds. Certain serious observations could cause a call to the contractor to revisit the job. The development of the scoring system will be done in conjunction with BPI so that the transition to BPI is as smooth as possible.

3 Customer process

Each customer will undergo a set of steps or stages as they go through the Home Performance with ENERGY STAR process. This process may vary depending on the origin of a customer- through direct contact with the Program and referral to a contractor via a list of available contractors or directly to a contractor by the contractors own marketing efforts or a referral.

3.1 Regional eligibility

This three-year pilot program will provide training and marketing support to contractors in York, Cumberland, and Androscoggin counties. This populace area has been selected in order to create the most impact with the least overhead for program development. This three county area contains roughly 60% of state population and the Portland media market. Media efforts will have spill-over to the rest of the state, helping prepare those parts of the state for statewide program expansion. Customer eligibility will be posted on the website and included in other resources. Contractors can serve customers outside the target area as part of their normal business, but these customers must be informed that their jobs are not eligible for the post inspection services provided by the program. This will also be posted on the website.

The program will have an 1-800 (or equivalent) phone number. The number will be answered by PSD. The website will also have a response form for questions. The website will contain a FAQ for common questions.

Customers may come into the program directly through contractors. Part of the program quality assurance process will attempt to get customers to register their jobs through the Program website. This registration will also be used to support Program marketing.

3.2 Financing

Program financing will come through two channels. Low and moderate income customers will be directed to the Maine Housing Authority Home Energy Loan Program (HELP) loan for income qualified applicants. The loan guidelines will be 115% of the county median income. These annual income levels will range from roughly \$60,000 for a family of two in the Portland metropolitan area to \$50,000 outside that area. The interest rates will be 1% for eligible customers served by MaineHP participating contractors. These will be secured loans with a simplified application procedure and will not require assessments of property value. The loans will be handled by participating local banks. MaineHP is in regular contract with Maine Housing regarding the development and marketing of this loan product. Participating banks will be another potential marketing avenue for the Program and potential sponsors for MaineHP Program events.

The Program will develop and issue an RFQ for the selection of preferred financing providers for customers not eligible for the Maine Housing HELP loan. The RFQ will identify providers of both secured and unsecured loan products that will coordinate best with the business operations of the MaineHP participating contractors. Through these preferred financing providers customers will have access to a variety of market rate unsecured contractor originated loans products available for all income levels. Preferred providers will receive marketing assistance and technical support in interfacing with the program software. The applications for these loans will be taken by the contractor or submitted online by the customer. Approval notification will be within 24 hours for most

loans. Program software will be coordinated to support the development of these loan applications.

3.3 Other Incentives

Every effort will be made to coordinate with the efficiency programs offered by Maine utilities. The level of coordination will depend in part on the details of how the utilities are instructed by the Maine Public Utilities Commission to coordinate with MaineHP. The minimum level of coordination could focus on making customer incentives easy to access using the program software.

Contractors will also be trained in assisting customers to access federal tax credits for improving existing homes.

Inspections

Contractors will offer and provide inspections and proposals to customers independent of the Program. The contractor's responsibility for reporting will start with proposals that result in installations. The customer job registration process will be used to support this. The quality assurance survey conducted with registered customers will provide a mechanism for checking contractor submission of installations.

3.4 QA survey

MaineHP will conduct a random quality assurance phone survey of customers with jobs reported by contractors and customers who have downloaded information from the Program or who have registered their jobs with the program independently of the contractors.

The program coordinator will look to Maine college students who are looking for experience in this field to provide support for making the calls associated with this survey. The survey will include questions about perceived savings, changes in comfort and satisfaction with the services provided. This information will also be used to help target additional post inspection of jobs.

3.5 Issue resolution

A Program issue resolution process will be adopted and Program staff will be trained in the protocol. As BPI accreditation is adopted, issue resolution will be handled in part by BPI. The issue resolution system will include tracking of assignment and resolution using the program intranet Customer Relationship Management (CRM) system.

4 Marketing plan

The Maine Home Performance with ENERGY STAR Program will use publicity and leveraging activities as much as possible to create consumer and contractor knowledge of the Program. Marketing contacts will be managed through the program intranet CRM

system. This will allow staff spread out over a wide geographic area to coordinate in their contacts and follow-up activities.

4.1 Marketing partners

Program outreach efforts will include coordination with Program marketing partners. Marketing partners help bring credibility to the program for both contractors and consumers; help in creating consumer demand by leveraging marketing, and help identify contractors who might be prospects for recruiting. These partners will typically be public agencies, not for profit organizations or private third parties with an interest in energy savings, the environment, health, or affordable housing. Marketing partners could also include commercial interests. The role for these parties will typically be in contractor recruitment or in MaineHP Program event sponsorships.

One of the program kickoff activities for the fall of 2006 will include a meeting with key environmental and green building organizations to introduce them to the benefits of Home Performance with ENERGY STAR and will include opportunities for the organizations to market information to their constituencies. Organizations with third party status appreciate the program's use of a contractor list, making it easier for referrals to take place without introducing a concern about endorsement of a single contractor. Information on the significant emissions reductions available from residential energy retrofit will be presented. Creative marketing opportunities will be discussed including offering discounts on audits fees for members of marketing partner organizations.

Commercial outreach efforts will also include the Portland Chamber of Commerce, Lewiston-Auburn Council of Governments, Greater Portland Council of Governments, builder trade organizations, home inspector associations, Maine Oil Dealers Association, building supply houses, realtors, and architects. Opportunities for sustainable economic development will be presented to municipal officials in the target areas.

After the initial outreach effort, there will be additional building science training efforts targeted at the key concerns of various groups. For example, home inspectors may be very interested in a four-hour workshop on carbon monoxide and combustion venting. Environmental groups may desire a workshop with a green building focus. It has been our experience that trusted third parties appreciate the availability of a list of contractors who have differentiated themselves with knowledge and quality assurance. The list allows the trusted third party to make a referral without any appearance of engendering a conflict of business interest. This effort will include additional short workshops offered directly to interested third party groups, or to the group and the public with the group as a co-sponsor for the educational event. These co-sponsored events are also great ways to get publicity through calendar listings and print media coverage.

4.2 Contractor Recruitment

This will be a continuation and expansion of the marketing partner outreach. Outreach efforts will be made to trade groups including remodeling (National Association of Home Builders Remodelers Council) heating contractors (Air Conditioning Contractors of America) and the Maine Contractors Association. PSD has direct links at the national level to these organizations through the HUD project for the development of a national

energy efficiency protocol for remodelers. These linkages will be used to create introductions to the local organizations. Rick Karg has strong connections to the Home Builders and Remodelers Association of Maine and will reach out to this group. Other groups that will be contacted include building materials and heating wholesalers, renewable energy trade associations, not-for-profit agencies, home inspector trade groups, code officials, fire departments (often carbon monoxide first responders) and municipalities.

Outreach directly to contractors will include weatherization agencies, existing energy consultants, insulation and heating contractors. Remodelers will also be recruited, with the goal of integrating home performance as part of green remodeling. This will support Home Performance with Energy Star as a high value service. Outreach efforts will include personal calls, meetings and outreach through trade associations and manufacturers reps and distributors. Contractors will be offered the opportunity to participate as subs or as certified contractors. The contractor recruitment guidelines document is provided in Appendix A.

To date, initial contractor response has been very positive. Informational meetings are being held at regional conferences such the Northeast Regional Weatherization Conference in August 2006 and the Northeast Regional ACI conference in October 2006. The events will be listed in the program.

4.3 Media

Educating and maintaining contact with the media is essential to the ability of the Program to educate consumers about the value of using a Home Performance with Energy Star participating contractor.

The program will work through existing media contacts including the development of a home energy makeover contest. An overall media outreach plan will be developed and implemented. Press events and releases will also a critical outreach element.

The Whole House Makeover Contest will build on the successful contest and television show produced by WPXT, Portland WB affiliate. The MaineHP team will conduct fundraising and provide technical assistance to focus the program on the benefits of performance testing and a whole house approach. The 30 minute program will air in a time rotation on the station as an informational program showing over 70 times. The station will also produce a 4 to 5 minute video for use by the program and a Public Service announcement that will air during the show as well as other times.

As a result of the Whole House Makeover Contest, the team will have a range of buildings that have been inspected and modeled for energy improvements. These homes will be documented as case studies that demonstrate the range of improvement possibilities. A subset of the finalist group contestants will be asked to allow the use of this energy-related information for promotional purposes. Approximately four to six case studies on improvement options with photos and TREAT models will be created. These

case studies are designed to build on the initial interest created by the Home Performance Makeover Contest.

Media outreach will include efforts to educate local politicians and media celebrities. PSD will develop and maintain a list of local media contacts for press releases and human interest stories. The Program will recruit or even pay for the time of a local media celebrity to participate in a home performance inspection of their house. The Program will maintain a steady stream of press releases in support of contractors participating in the program. Additional free media outreach efforts will be conducted as the opportunities present themselves.

4.4 Events

Homeowners interested in home improvement frequently attend home shows as do contractors who are interested in growing their businesses. Home show presence allows the Program to interact with both consumers and contractors. As contractors start marketing the program on their own, home show presence can be reduced or eliminated. Home show marketing will include registering for inspections and other promotional activities. Consumers supplying their email address will be placed on the program email notification service and will get emails describing the program that are suitable for forwarding to their friends. Where possible home show presence will compliment booths purchased by participating contractors.

Other events in Maine will be added to the intranets calendar. An effort will be made to provide educational activities at these events.

4.5 Conduct Home Energy Makeover Contest as Kickoff event

The launch of the MaineHP program will be coordinated with a home energy makeover contest conducted in partnership with the Maine WB TV station. This contest follows up on the Hot Squad video show developed last year by WPXT (Maine WB). Sponsor recruitment has been very successful with over \$100,000 of cash, materials and labor contributions already pledged.

Variations on The Home Performance Makeover Contest have been successfully used to bring together the marketing partners, the contractors and the media in other markets. Homeowners will be invited to submit their utility bills along with some information about their house. Participants will be screened based on their energy intensity (Btus per square foot per heating degree day). Buildings with high energy intensity will then be briefly visited to ensure that there is reasonable potential for improvement. A short list of finalists will be developed and then these homes will be inspected and modeled for the savings and cash flow impact of improvements. The improvements will be donated from manufacturers, local wholesalers and labor by contractors. Local utilities will also be recruited for participation. Details of a similar contest conducted in Colorado are available at www.homenergymakeover.com. This contest also serves to create strong connections with the local media which will serve the Program going forward. The media campaign for the project will emphasize the positive cash flow nature of the

energy retrofits, if financing is used. The inspections create a strong base from which to predict what kinds of improvements contractors will encounter as part of a larger program rollout and will be used as case studies for marketing partner discussions and contractor trainings.

This Program will educate consumers on the whole house process that starts and ends with performance testing, will provide an indication to contractors and their support networks that the Program will be a market force and will create a list of potential customers who can be sent the contractor list and information on getting a loan when the contest is over.

4.6 Develop support and maintain consumer website

A strong consumer website is an important part of the program outreach effort. The website will list participating contractors, information about events and contests, information on Program incentives and financing options and a brief introduction to home performance concepts. Another important part of the site is the “What to expect from your Home performance with ENERGY STAR Contractor” section. This provides consumers with information about the inspection process and what to expect in the way of a report and proposal. Consumers will also be able to register their job for potential quality assurance review. This registry will help the program verify that contractors are reporting all the jobs that they are marketing as Home Performance jobs.

4.7 Develop program video and video press and ad releases

The Program video will be produced as part of the WB Whole House Makeover contest, using footage shot during the testing and installation process and adding in a voice over. This raw material will also be available for other stations to use as part of their own stories on home performance. A short Public Service Announcement ad will also be developed and distributed.

4.8 Negotiate and develop utility inserts

Northern Utilities has expressed an interest in coordinating marketing with the Home Performance program and has indicated that they would entertain a proposal for promotional bill stuffers. Bill stuffers generated over 5000 requests for a video when used as part of the Niagara Mohawk Home Performance Service. Information is even easier to distribute now as many consumers can readily access streaming video via the program web site.

4.9 Image development

A logo has been developed and is in use on documents and the website. The logo was developed with the requirement of integrating with a set of program and contractor marketing materials that are being developed by the US EPA for Home Performance with ENERGY STAR programs across the country.

4.10 Ongoing communications with participants and registrants

A prominent aspect of the Program will be maintaining contact with program participants, encouraging them to promote the Program to others. This will include a newsletter with information on more ways to save and the environmental and financial

benefits of the program. The website will also include case studies and a moderated blog section where participants can create their own case studies with their own text and photos.

4.11 Referral systems

Another important part of the program will be to engender relationships with social service organizations that can be accessed by MaineHP contractors as they find situations that require attention and do not fit into the market-based approach of Home Performance with ENERGY STAR. These agencies will include the low income weatherization program, the Red Cross, Home Energy Assistance Program (HEAP) and others.

5 Program process

5.1 Reporting

The PSD Online Tracking Tool for Energy Retrofits (OTTER) will be adapted for the specific Program design. As noted above, this system will provide detailed and real-time tracking of predicted savings and incentive information. Access to real-time data can be provided directly to OEIS staff or their agents. OTTER allows reporting from the online server using Microsoft Access as a report generator. This greatly reduces the cost of report design and increases the ease of Program evaluation, as discovered by the New Hampshire utility programs and their program evaluators. A more complete description of OTTER is provided in Appendix F.

Recent developments to the TREAT software make it possible to easily generate custom forms directly from TREAT. PSD is currently working with BPI to create a TREAT data upload that will meet BPI's requirements for documenting job performance testing. In addition, the use of the Online Tracking Tool for Energy Retrofits (OTTER) makes it possible to automate large parts of the rebate approval process. It will be the goal of the forms design process to allow contractors to produce filled out forms for customer signature directly from TREAT or OTTER. Submission of rebate information will be done uploading the TREAT export file into OTTER. This file contains detailed savings information, capable of conversion into demand impacts as well as complete descriptions of the work to be done. Reduction of paperwork is critical to contractor participation in the Program.

The database will be used to create reports on a quarterly and annual basis. These reports will provide information on energy savings, the amount invested, the types of investments made and the number of active contractors as well as other pertinent information. Significant transformational events will also be reported. These events will be accomplishments that indicate lasting change to the energy efficiency infrastructure in Maine.

5.2 Billing

Billing will be conducted monthly with the assignment of hours to the primary task areas of the contract.

5.3 Advisory panel

The program advisory panel will be developed in the early spring of 2007. The advisory board will consist of marketing partners and stakeholders who have expressed interest in supporting the growth of the program. These stakeholders are already being contacted and are being kept informed of the program development and are providing feedback. The Program Advisory panel will make this outreach and feedback more formal.

5.4 Project Management

There will be, at a minimum, monthly project meetings. Meetings are being conducted using PSD's WebEx subscription and visual topic mapping software for note taking.

Appendix 4

[New Hampshire](#)

Residential Energy Efficiency Programs

These programs provide financial and technical assistance to improve home energy efficiency and save on energy bills. Energy efficiency also provides benefits to the State's economy and environment.

Electric Utilities' Residential Energy Efficiency Programs

These programs are funded by the energy efficiency portion of [System Benefits Charge \(SBC\)](#) that appears on customers' electric bills. For more information, go to the [Public Utilities Commission](#) and see Orders 23,574; 23,850; and 23,982.

- [National Grid](#)
- [New Hampshire Electric Cooperative](#) - Point to "Residential" in the horizontal menu, and then to "Energy Efficiency" in the dropdown menu to obtain a menu of residential energy efficiency topics.
- [Public Service of New Hampshire](#)
 - [Energy-saving products](#)
 - [Efficiency programs](#)
- [Unitil](#)
 - [Energy Efficiency Programs](#)

The experimental [Pay As You Save \(PAYS\) Energy Efficiency Product Pilot Program](#) is also funded by the energy efficiency portion of the [System Benefits Charge \(SBC\)](#).

Natural Gas Utilities' Residential Energy Efficiency Programs

New Hampshire natural gas utility customers can take advantage of their companies' energy efficiency products and services. For more information:

- [Keyspan](#)
- [Northern Utilities](#)

[Vermont](#)

[Tax Incentives Assistance Project](#)

Provides consumers and businesses information they need to make use of the federal income tax incentives for energy efficient products and technologies passed by Congress as part of the Energy Policy Act of 2005.

Residential

[Residential Building Energy Standards](#)

This energy code affects all new homes (and additions over 500 square feet) built after July 1, 1998.

[Vermont Accreditation Procedure for Home Energy Rating System Providers](#)

The Procedure sets minimum standards for rater training, operating procedures and policies, software programs, and quality control. These standards assure that customers can rely on the representations of accredited providers.

[REScheck](#)

Software designed to demonstrate compliance with requirements of the Council of American Building Officials Model Energy Code and the International Code Council Energy Conservation Code.

[Energy Saving Resources](#)

State and federal resources with helpful information to help you save energy.

[Massachusetts](#)

Residential Energy Programs

Energy Efficiency for Your Home

Energy efficiency means doing more with less energy. Increasing your home's energy efficiency can make it more comfortable, durable and also can reduce your electric, gas and heating oil expenses.

In Massachusetts, electric and gas distribution companies and municipal aggregators offer programs to help you invest in energy efficient products and services for your home. Click [here](#) to go directly to the MassSave website.

Programs Available to Massachusetts Tenants and Homeowners:

[Residential Conservation Service \(MassSave\)](#)

[Energy Assistance for Income Eligible Customers](#)

[Energy Star® Home Program](#)

[Energy Star® Lighting Program](#)

[Energy Star® Appliance Program](#)

For more information about services and incentives available to residential customers in making their home energy efficient, call:
1-866-527-SAVE (7283)

MassSave

MassSave provides one-stop shopping to Massachusetts residential utility customers for energy efficiency and renewable energy services. The Division of Energy Resources (DOER) and the Department of Telecommunications and Energy (DTE) provide oversight and coordination of MassSave, while electric companies, gas companies and municipal aggregators administer the program.

Generally, the program administrators hire contractors to provide customers with the three primary MassSave services:

- [Residential Efficiency and Renewable Energy Hotline](#) (1-866-527-7283); visit www.MassSave.com
- [Home Energy Assessment](#)
- [Quality Assurance Assessment](#)

Residential Efficiency and Renewable Energy Hotline (1-866-527-7283)

The Residential Efficiency and Renewable Energy Hotline provides information about energy efficiency, renewable energy, and home performance. The Hotline has three goals: to answer resident inquiries about energy efficiency and renewable energy, to match residents' needs with appropriate resources, and to identify residents who require a Home Energy Assessment.

The Hotline provides the following services:

- Phone-based appliance education
- Energy efficiency and renewable energy mailings
- Technical assistance about efficiency or renewable energy improvements
- Referrals to efficiency and renewable energy web sites

Home Energy Assessment

The Home Energy Assessment (HEA) provides evaluations of potential energy efficiency and renewable energy improvements for residential utility customers regardless of fuel type.

The energy auditor evaluates the efficiency of a home's heating system, hot water use, draft sources, insulation levels, and potential appliance upgrade savings.

The HEA also educates residential customers regarding the potential impact of all energy efficiency improvements applicable to their home and eligible for financial incentives under the program.

The MA HES program offers financial incentives to residential customers for the following improvements:

Draft and Moisture Correctives

- Air Sealing (stopping drafts)
- Duct Sealing (reducing air leaks in the distribution ducts of hot air and air conditioning)
- Attic Ventilation (in conjunction with attic insulation)
- Bathroom Ventilation (in conjunction with attic insulation)

Insulation Improvements

- Duct Insulation
- Attic Insulation
- Basement Insulation
- Rim Joist Insulation
- Wall Insulation
- Pipe Insulation for Heating Systems

Energy Efficient Appliances

- Refrigerators (replacing inefficient refrigerators before the end of their useful life)
- Thermostats

Heating System Improvements

- Solar Domestic Hot Water (based on a custom analysis of the measure)

- Oil, Gas, Propane, or Electric Heating Systems (replacing inefficient heating systems)

Quality Assurance Assessment

DOER, DTE, MassSave program administrators and MassSave program vendors work together to ensure that program participants receive high quality services by:

- Requiring that program vendors meet certain minimum quality control practices.
- Inspecting each subcontractor's work for completeness, quality, and customer satisfaction.

Additionally, materials installed through the MA HES program meet high standards for both durability and performance. Program vendors:

- Purchase and install materials that have a proven track record of performance;
- Provide a standard one-year labor and materials warranty for all on-site installations; and
- Train all field staff in completing installations that meet or exceed program standards.

DOER, program administrators and program vendors resolve customer complaints related to the MassSave program.

To download the flyer for MassSave, click [here](#).

Energy Star® Home Program (1-800-628-8413, www.energystarhomes.com)

The Energy Star® Home Program provides assistance to Massachusetts residents who are either building a new home or are considering a major renovation of an existing home.

The Energy Star® Home Program provides technical assistance and incentives to make a home 15% or more efficient than the efficiency standard of the Massachusetts building code. An official Energy Star® certification is part of the program at no charge.

Energy Star® Lighting Program

(1-800-491-1077)

Energy Star® lighting products use one-third the energy used by a standard incandescent bulb and last up to 10 times longer. These energy efficient lighting products turn on like an incandescent bulb and provide high-quality and bright light without flickering or humming.

Contact the Energy Star® Lighting Program to find out where you can purchase these products and whether your electric company offers rebates for Energy Star® lighting products

Energy Star® Appliance Program

(1-877-366-3749, www.energystar.gov, or for gas equipment 1-800-232-0672, www.gasnetworks.com)

Appliances carrying the Energy Star® label are up to twice as energy efficient as standard products. Some gas companies offer incentives for buying more energy efficient gas equipment.

Commonwealth of Massachusetts Board of Building Regulations and Standards

(www.mass.gov/bbrs)

The Board of Building Regulations and Standards (BBRS) provides a number of programs to Massachusetts home owners. BBRS recently published a useful brochure to help new home owners ensure that their homes meet the energy efficiency standards of the state's building code. Click here to download this brochure or visit www.mass.gov/bbrs for a complete listing of BBRS initiatives.

[Connecticut](#)

The links below list Connecticut's Clean Energy Fund's Programs and Funding Opportunities of interest to residents.

Residents

[Clean Energy 101](#) – Learn about the benefits of clean energy and the different types of clean, renewable energy sources available today.

[Solar PV Rebate Program](#) – - Solar photovoltaic (PV) systems utilize clean, renewable energy from the sun to produce electricity. Learn about the rebates available through participating installers.

[Connecticut Clean Energy Communities](#) – This program is a partnership

involving the Connecticut Clean Energy Fund, SmartPower, Community Energy, Sterling Planet, the Department of Public Utility Control, and the Office of Consumer Counsel. The program provides Connecticut communities an opportunity to support clean energy alongside its local residents, businesses, and institutions.

CT Clean Energy Trail – The Connecticut Clean Energy Trail is designed to help residents learn more about clean energy through examples of state businesses that have adopted this technology. See photos of the installations and view live energy production data online.

Connecticut Science Center – The Connecticut Clean Energy Fund (CCEF) and the Connecticut Energy Efficiency Fund (CEEF) are investing in a \$2 million partnership to showcase the science of clean energy generation and energy conservation in the new Connecticut Science Center that will be opened in Hartford in 2008.

CTCleanEnergyOptions Program – If you're a customer of The Connecticut Light & Power Company or The United Illuminating Company, now you have the power to choose clean energy. Through the CTCleanEnergyOptions program, your energy dollars pay for electricity production from cleaner sources such as wind and small, low-impact hydro power

[Rhode Island](#)

No information available

[New York](#)

Residential

NYSERDA offers programs for New York State's residents to help them save energy and reduce their energy costs. Whether you are a homeowner, a renter, or a multifamily building owner or manager, there are programs and incentives to assist you in making the place you live, more energy efficient, more comfortable and healthy, and better for the environment.

[Buildings Research and Development](#)

[Contractors & Vendors \(building contractors, retailers, manufacturers, home builders, HVAC technicians\)](#)

[GetEnergySmart Website](#)

[New York Energy \\$martSM Loan Fund](#)

[Residential Family 5+ Units](#)

[Residential Low Income](#)

[Residential Single-Family to Four-Family](#)

[Residential Vendor / Manufacturer](#)

[**Solar-Electric \(PV\) System Incentive Program**](#)

Residential Family 5+ Units

NYSERDA promotes energy efficiency improvements in multifamily buildings in New York State. If you own or operate a multifamily building, you may be eligible to receive technical assistance from energy professionals through one of NYSERDA's programs. These programs help to identify areas for energy efficiency and cost-saving improvements.

[Assisted Multifamily Program \(i.e., for buildings that receive tax credits, section 8, State and local subsidies\)](#)

[Cogeneration for Multifamily Buildings](#)

[Comprehensive Energy Management Services Program \(metering\)](#)

[Low-Income Forum on Energy \(LIFE\)](#)

[New Construction Program](#)

[New York Energy \\$martSM Loan Fund \(low-interest loans\)](#)

[Residential Technical Assistance \(energy engineering services and audits\)](#)

[Smart Equipment Choices \(energy-efficient equipment incentives\)](#)

[Solar-Electric \(PV\) System Incentive Program](#)

[Submetering for Multifamily Buildings](#)

Residential Low Income

NYSERDA promotes low-income residential programs to help homeowners and multifamily building owners save energy and reduce their energy costs. These programs for income-eligible families and individuals reduce heating/cooling costs and improve the safety of homes through energy efficiency measures. Low income programs and services available include NYSERDA's Assisted Home Performance with ENERGY STAR[®] program, the Weatherization Network Initiative, and the Assisted Multifamily Program (AMP). Other programs that assist low-income residents with their energy costs in the State include the Home Energy Assistance Program (HEAP), and the Weatherization (WAP) Assistance Program.

[Low Income](#)

[Low-Income Forum on Energy \(LIFE\)](#)

Residential Single-Family to Four-Family

NYSERDA promotes energy efficiency improvements in single family homes. The New York ENERGY STAR Labeled Homes Program for those looking to build a new home and Home Performance with ENERGY STAR® program for existing homes, help to make homes more energy efficient. Using less energy translates into a cleaner environment and lower electricity bills.

[Assisted Home Performance with ENERGY STAR®](#)

[Comprehensive Energy Management Services \(metering to manage your electricity use\)](#)

[EmPower New YorkSM](#)

[Home Performance with ENERGY STAR](#)

[Low-Income Forum on Energy \(LIFE\)](#)

[New York Energy \\$martSM Loan Fund](#)

[New York Energy \\$martSM Loan Fund \(low-interest loans for energy efficiency upgrades\)](#)

[New York ENERGY STAR Labeled Homes](#)

[Solar Electric System Incentive Program](#)

Residential Vendor / Manufacturer

NYSERDA has established successful and profitable partnerships with many retailers and manufacturers in New York State through its ENERGY STAR® Products Program. The ENERGY STAR is given to products and

appliances that meet or exceed federal energy-efficiency and quality guidelines, without sacrificing performance

[ENERGY STAR® Products Program](#)

[New York Energy \\$martSM Solar-Electric System Incentive Program](#)

Incentives

NYSERDA offers financial and technical assistance to the State's businesses, industries, municipalities, and residents to address New York's energy and environmental needs. Incentives are available through a number of programs for various projects and initiatives such as new construction, commercial/industrial projects, energy efficiency improvements, wind and solar systems, energy audits, and much more.

Residential

- [GetEnergySmart Website](#)
- [Contractors & Vendors \(building contractors, retailers, manufacturers, home builders, HVAC technicians\)](#)
- [New York Energy \\$martSM Loan Fund](#)
- [Solar-Electric \(PV\) System Incentive Program](#)

Residential Family 5+ Units

- [Residential Technical Assistance \(energy engineering services and audits\)](#)
- [Smart Equipment Choices \(energy-efficient equipment incentives\)](#)
- [Comprehensive Energy Management Services Program \(metering\)](#)
- [Solar-Electric \(PV\) System Incentive Program](#)
- [Assisted Multifamily Program \(i.e., for buildings that receive tax credits, section 8, State and local subsidies\)](#)

Residential Single-Family to Four-Family

- [New York ENERGY STAR Labeled Homes](#)
- [Home Performance with ENERGY STAR](#)
- [Solar Electric System Incentive Program](#)
- [New York Energy \\$martSM Loan Fund](#)

- [Assisted Home Performance with ENERGY STAR®](#)
- [EmPower New YorkSM](#)

Appendix 5

State Appliance and Equipment Energy Efficiency Standards

STATUS and IMPLEMENTATION DATES
(updated July 2006)

X = standard enacted; implementation date as indicated.

* See notes for information necessary to interpret this table.

	AZ	CA ⁱ	CT	MA	MD	NJ	NY ⁱⁱ	OR	RI	VT	WA	
STATUS	enacted 2005	by regulation in 2002, 2004 & 2006	enacted 2004	enacted 11/05	enacted 2004	enacted 2005	enacted 2005	enacted 2005	enacted 2005; and 2006	enacted 05/2006	enacted 2005	2003 Fed energy law ⁱⁱⁱ
Automatic commercial ice makers	X 2008	X 2008					X 2010	X 2008	X 2010		X 2008	Jan. 2010
Ceiling fans and ceiling fan light kits		X ^{iv} 2006			X 3/2007		X 2007					Jan. 2007
Commercial clothes washers	X 2008	X 2005/2007	X 7/2007		X 3/2007	X 2007/2010		X 2009	X 2007		X 2007	Jan. 2007
Commercial hot food holding cabinets		X 2006							X 2008			
Commercial pre-rinse spray valves	X 2008	X 2006					X 2007	X 2007	X 2007		X 2007	Jan. 2006
Commercial refrigerators and freezers	X 2010	X 2003/2006	X 7/2008		X 9/2005	X 2010	X 2010	X 2007	X 2010		X 2007	Jan. 2010
Consumer audio and video products^v		X 2006/2007					X TBD					Not covered
Digital television adapters		X 2007					X TBD					Not covered
High intensity discharge lamp ballasts (mercury vapor)									X 2007			Jan. 2008
Illuminated exit signs	X 2008	X 3/2003	X 7/2006		X 3/2005	X 3/2007	X 2007	X 2007	X 2007		X 2007	Jan. 2006
Large packaged AC >20 tons	X 2010	X 2006/2010	X 7/2009		X 8/2005	X 2010	X 2010		X 2010			Jan. 2010
Low-voltage dry-type transformers^{vi}	X 2008	X 3/2003	X 7/2006	X 1998	X 3/2005	X 3/2007	X 2003	X 2003	X 2007		X 2007	Jan. 2007

	AZ	CA ¹	CT	MA	MD	NJ	NY ⁱⁱ	OR	RI	VT	WA	
Medium-voltage dry-type transformers				X 2008						X 2008		Not covered
Metal halide lamp fixtures ^{vii}	X 2008	X 2006/ 2008		X 2009			X 2008	X 2008	X 2008	X 2009	X 2008	Not covered
Pool pumps		2006/ 2008										Not covered
Residential furnaces & boilers ⁶²				X TBD					X TBD	X TBD		Not covered
Residential furnace fans ¹				X TBD					X TBD	X TBD		Not covered viii
Single-voltage external power supplies	X 2008	X 1/2007 7/2007 7/2008 ⁶³		X 2008			X TBD	X 2007	X 2008	X 2008	X 2008	DOE rule-making
State regulated incandescent reflector lamps (BRs, ERs and R20s)		2008		X 2008			X TBD	X 2007	X 2008	X 2008	X 2007	Not covered
Torchieres	X 2008	X 2003	X 7/2006		X 3/2005	X 3/2007	X 2007	X 2007	X 2007		X 2007	Jan. 2006
Traffic signals (pedestrian)		X 2006					X 2007					Jan. 2006
Traffic signals (vehicular)	X 2008	X 2003	X 7/2006		X 3/2005	X 3/2007	X 2007	X 2007	X 2007		X 2007	Jan. 2006
Unit heaters	X 2008	X 2006	X 7/2006		X 9/2005	X 3/2007	X 2007	X 2007	X 2007		X 2007	Aug. 2008
Walk-in refrigerators and freezers		X 2006							X 2008			
Water dispensers (bottle-type)		X 2006							X 2008			

NOTES:

1. The last column shows the effective date product standards included in the 2005 federal energy law (EPAAct 2005). Under the general rules of federal preemption in EPAAct 2005, states which had set standards prior to federal enactment may enforce their state standards up until the federal standards become effective. But, states that have not yet set standards are preempted immediately. State standards with no highlighting (no shading) are now preempted because federal standards will become effective prior to the state implementation date. Those highlighted in yellow (light shading) will be implemented for some period of time before federal standards take effect. The recent federal energy bill has no impact on those with blue highlighting (dark shading).
2. Unless otherwise shown, standards become effective on January 1. Where two dates are shown, the standard has two levels or components which become effective on different dates.

For more information, contact Andrew deLaski, Appliance Standards Awareness Project, (617)363-9470.

⁶² States may be required to apply for a waiver from federal preemption in order to implement furnace and boiler and/or furnace fan standards. Implementation dates may depend on when U.S. DOE grants such waivers.

⁶³ The initial CA power supply standard goes into effect for certain named products on 1/1/2007 and all other products on July 1, 2007. A more stringent standard goes into effect on July 1, 2008.

ⁱ In addition to the products listed in this table, CA has also adopted standards for general service incandescent lamps evaporative coolers, hot tubs (portable electric spas), under cabinet fluorescent lamps, vending machines and some additional products.

ⁱⁱ For most products, the New York legislation requires the implementing agency (Department of State in consultation with New York State Energy Research and Development Authority, NYSERDA) to develop standards by June 30, 2006 and to implement such standards no sooner than six months after issuing final rules. The proceeding to develop these standards (for products not preempted by EPC Act 2005) is currently underway.

ⁱⁱⁱ In addition to the products in this table, the 2005 federal energy bill also includes standards for dehumidifiers (effective Oct. 2007) and compact fluorescent lamps (effective Jan. 2006) and calls for DOE to develop standards for vending machines and battery chargers. The federal standard for vending machines must be issued by August 2009 to be effective by August 2012; equivalent dates for battery chargers are 2008 and 2011.

^{iv} California's initial requirements are limited to labeling and reporting.

^v These include televisions, compact audio products, DVD players and recorders, and digital television adapters (also listed separately in this table).

^{vi} Low voltage dry type transformer standards in MA, NY and OR were set prior to most recent legislation.

^{vii} NY and RI metal halide lamp fixture standards are limited to fixtures which are designed and marketed to operate in a vertical position. CA standards apply to vertical, base up fixtures as of 1/2006 and expand to all other fixtures regardless of position effective 1/2008.

^{viii} The 2005 federal energy bill clarifies DOE authority to establish electricity use standards for furnaces.

^{ix} DOE must issue standard by Aug. 2008; effective by Aug. 2011. State standards are not preempted until a DOE standard goes into effect.
