

**ENERGY CONSERVATION POTENTIAL FOR  
VASHON-MAURY ISLAND**

**Institute for Environmental Research and Education  
December 2002**

*This report was prepared by the Institute for Environmental Research and Education,  
which is solely responsible for its contents.*

*The work was performed under a generous grant from the Bullitt Foundation.*

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The Vashon-Maury Island community uses an uncommonly large amount of energy, as noted below. The energy use can be divided into home use of energy, transportation use and business use. Approximately 89% of the electricity use is consumed by homes (per Puget Sound Energy data), and probably an even higher proportion of heating is home based.

**Per Capita Household Energy Consumption, Vashon-Maury Island**

<b>Energy Type</b>	<b>Units</b>	<b>Vashon</b>	<b>WA State</b>	<b>USA</b>
<b>Electricity</b>	kWh	9,242	5,568	4,069
<b>Nat Gas</b>	cu ft	14,952	12,216	16,786
<b>Fuel Oil</b>	gal	49	8	21
<b>LPG</b>	gal	38	14	22
<b>Wood</b>	cord	0.21	0.12	0.07
<b>Gasoline</b>	gal	167	445	459
<b>Diesel</b>	gal	215	117	132
<b>Population</b>	#	10,123	5,894,121	281,421,906

Transportation use of fuels is dominated by the commute. It can certainly be reduced, however, to accomplish this goal will require economic restructuring to provide living wage jobs on the island. It therefore is not likely to be accomplished in the near term (the next decade), and we won't look at those potential energy savings in the context of energy conservation.

**Housing Conservation Measures**

Household use of energy includes space heating, hot water heating, lighting and operation of appliances. There is funding available for the weatherization and energy conservation of low-income housing, which comprises about 11% of the housing stock on the island.<sup>1</sup> Only minor incentives are available for moderate to high-income housing, in the form of coupons available through the utility. These two housing stocks have important differences both in patterns of energy consumption and in the potential for improvement, so they have been evaluated separately.

Our evaluation of the potential for conservation assumes that all readily available conservation measures are employed. With the exception of clothes drying, none of these measures required a lifestyle change. Clothes drying is an important use of household

energy, and we are assuming that line drying is substituted for 75% of the total energy use for drying clothes.

Wherever possible, figures from the U.S. EPA Energy Star program<sup>ii</sup> or from the Department of Energy efficiency standards<sup>iii</sup> were used to estimate the energy savings potential. In addition, we assumed that highly efficient water heaters and stoves/ovens are 20% more efficient than the current stock. The table below shows the figures we used for average energy consumption of conventional versus energy efficient appliances.

**Table 2 National Average Conventional And Energy Efficient Appliances**

	<b>Conventional</b>	<b>Energy Efficient</b>
	kWh per year	
<b>Lighting</b>	75	18
<b>Washers</b>	1172	293
<b>Cooking</b>	471	377
<b>Dryers</b>	1820	
<b>Dish washer</b>	697	418
<b>Refrigerators</b>	1000	552

Several other assumptions were made in order to calculate the potential energy savings. For low income housing, we assumed:

- Small square footage and trailers are the low income properties
- Low income properties are heated using electricity
- Low income properties use as much energy as non-low income, because they are poorly insulated
- All low income houses use inefficient appliances
- All low income houses use inefficient lighting
- Low income properties have an average of five 75 watt lights running 4 hrs per day
- Low income houses use 50% of their electricity for space heat

Our weatherization conservation figures were taken from the actual measured performance of low-income weatherization programs in the Puget Sound Energy service area. If we assume that all possible conservation for low-income housing is implemented, we can obtain an estimate of 31% savings of household energy use. The table below shows where these savings would come from.

**Table 3. Vashon Low-income Potential Energy Savings**

<b>Low-income Households</b>	Now	Conservation	Savings
	Low income housing		kWh/yr
Total Electricity use	10,291,248	5,249,820	5,041,428
# Households	542		
Lighting	296,745	74,186	222,559
Washers	635,224	158,806	476,418
Cooking	255,282	204,226	51,056
Dryers	986,440	246,610	739,830
Dish washer	377,593	226,556	151,037
Refrigerators	542,000	299,184	242,816
Heating	5,145,624	4,115,824	1,029,800
Hot water	1,440,775	1,152,620	288,155
Misc.	314,820	314,820	0

For Moderate to high-income housing, we assumed:

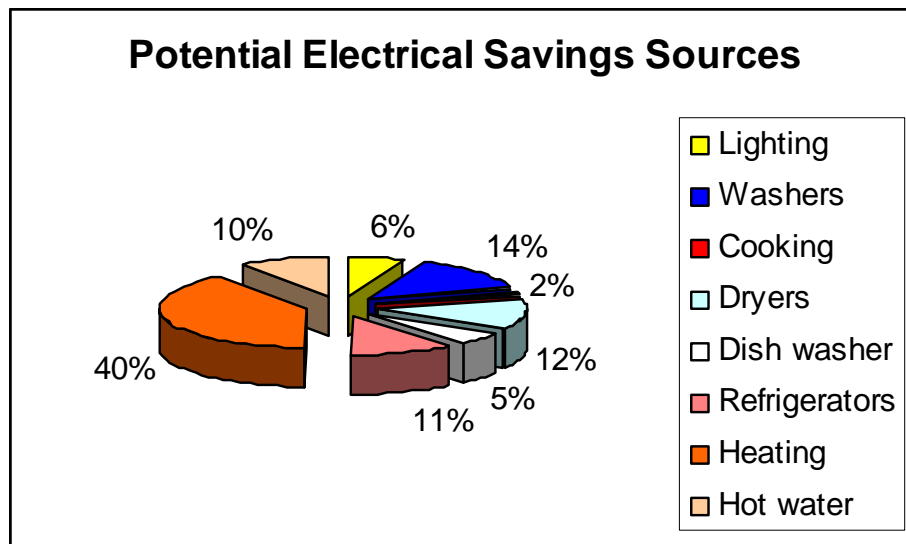
- 90 percent of moderate to high-income houses use inefficient appliances
- 90 percent of moderate to high-income houses use inefficient lighting
- All houses over 2000 sq ft have 2 refrigerators
- 50 percent of moderate to high-income houses are poorly insulated
- Moderate to high-income houses have an average of ten 75 watt lights running 4 hrs per day
- Moderate-income houses use 44% of their electricity for space heating

Assuming, again, that all possible conservation measures are undertaken, we estimate that approximately 38% of household electricity consumption can be eliminated, and 25% of other household fossil fuel consumption can be eliminated.

**Table 4 Vashon Moderate to High-income Potential Energy Savings**

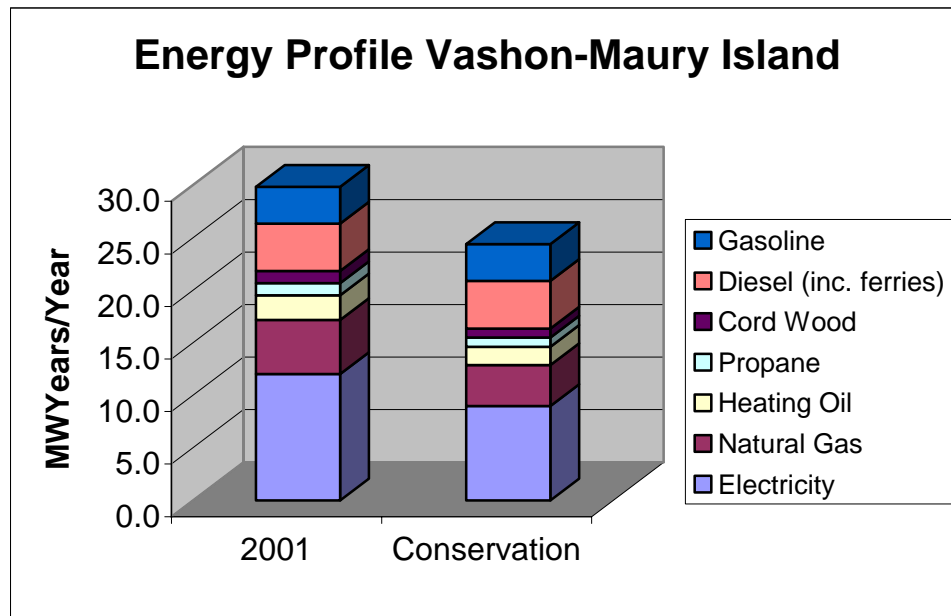
<b>Moderate to High-income Households</b>	Now	Later	Savings
	kWh/yr		
Electricity use	83,265,552	50,953,935	32,311,617
# Households	4148		
# houses > 2000 ft <sup>2</sup>	2068		
Lighting	1,498,880	109,009	1,389,870
Washers	4,496,847	1,215,364	3,281,483
Cooking	1,758,337	1,406,670	351,667
Dryers	3,763,760	940,940	2,822,820
Dish washer	2,889,773	1,733,864	1,155,909
Refrigerators	5,937,523	3,277,513	2,660,010
Heating	36,636,843	18,318,421	18,318,421
Hot water	11,657,177	9,325,742	2,331,435
Misc.	14,626,412	14,626,412	0

These conservation savings can be considered to be “reasonable best case” for conservation on the island. They do not consider significant changes in life style, and they are based on existing technology. On the other hand, these estimates do not consider increases in population or the availability of money to make the necessary improvements. The figure below points out the potential contribution of the various energy conservation technologies.



Converting the fossil fuel heating to electricity equivalents, we can see the total potential change in the energy profile for the island. As noted above, we are not considering the potential to reduce the consumption of fuel for transportation. Neither have we included the 11% of the electricity use, which is due to commercial and industrial uses on the island.

The overall energy savings potential is about 18%, or about 5.5 mega-watt years per year.



### **Actions to Support Energy Conservation**

There are several potential actions that can be taken to support energy conservation. We are working with Puget Sound Energy to increase the low-income weatherization program on Vashon Island. We are also working with King County and local social agencies to the same end.

Conservation for the moderate to high-income households will take longer to accomplish because the incentives are not strong. We have requested funds to support developing a plan for overall energy conservation on the island. Moving forward on that issue will depend on the availability of funds.

<sup>i</sup> Based on 2000 Census figures on households with incomes less than \$ 35,000, King County's cutoff for free weatherization.

<sup>ii</sup> <http://www.energystar.gov/default.shtml>

<sup>iii</sup> <http://www.eren.doe.gov/consumerinfo/refbriefs/bc1.html>