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enerInfo Building is published three times per year by the Canadian Building Energy End-Use Data and Analysis Centre (CBEEDAC) at the University of Alberta.

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GREEN APPLIANCE CHOICES

The concept of being environmentally aware, or “green”, has gained increased prominence in recent years. In the context of appliances, its importance is reflected in product advertising that often focuses more on environmental benefits, or at least a claimed lower degree of environmental harm, than on the price of the good or the extent to which it provides the expected services. Obviously at least some consumers value these claimed environmental benefits, as they purchase these products - often at a higher initial purchase price - rather than similar products which may not have, or may appear not to have, these same characteristics. Presumably, some consumers purchase products with claimed environmental benefits purely because they believe them to be cost-effective choices, but others may do so simply because they wish to be, or to be seen to be, environmentally aware, that is, "doing their part" to help reduce the environmental implications of their actions.

While some jurisdictions have mandated the adoption of so-called “green” products, in Canada this choice has for the most part been left to consumers, although the implementation of various minimum efficiency standards, as well as a variety of incentive programs, has no doubt had an effect. What is not well known is the extent to which households in Canada have availed themselves of these products. Although this information is not collected frequently, the 2003 Canadian Survey of Household Energy Use (SHEU03) allows identification of the energy-efficient appliance choices made by Canadian households, as well as the penetration of various Energy Star appliances and the prevalence of other forms of energy-saving household behaviour. Analysis of this information, reported in a recent CBEEDAC research study that is summarized in this newsletter, is designed to serve as a baseline against which comparable information contained in a subsequent and as yet unreleased 2007 survey can be contrasted, and to facilitate an investigation - which we will report in a future newsletter - of the relationship between green appliance choices and observed energy consumption.





Environmental Awareness and Appliance-Based Green Households

David L. Ryan

The 2003 Survey of Household Energy Use (SHEU03) is the first household survey within Canada to ask questions about energy-efficient appliances, and particularly those with the Energy Star designation. Appliances with this designation only began to be marketed and promoted in Canada in 2001 following an arrangement with the US Environmental Protection Agency and the US Department of Energy.

Table 1 summarizes survey responses to questions concerning the presence of various Energy Star (ES) designated appliances in Canadian households. According to column (1), for any appliance except DVD players, fewer than 16% of Canadian households had an ES model of that appliance in 2003. Of course, not all households have all appliances - column (2) shows the proportion of households with each type of appliance, including both ES and non-ES models, in 2003. Presumably, all these households could

have chosen to purchase a new ES model of these appliances but many decided not to do so. Indeed, column (3) shows that except for DVD players, less than 20% of the households who owned each type of appliance had an ES model of that appliance. Finally, since only appliances purchased in Canada between 2001 and 2003 (the time of the survey) could have the ES designation, column (4) shows the percentage of households that purchased a model of that appliance within this period who have an ES model. These percentages range from 34% for stereo equipment to almost 70% for washing machines.

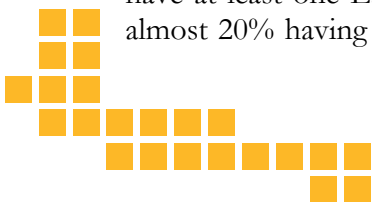
Overall, this information indicates that ES model penetration is considerably higher than might be inferred from the values in Column (1). This suggests that as old appliances wear out and are replaced, households are more likely to choose ES models, so that the penetration of ES models of these appliances is likely to increase over time.

Table 1: Proportion of Households with Specific Energy Star Appliances

Appliance	ES/Total	Use Appliance	ES/Use Appliance	ES/Possible ES
	(1)	(2)	(3)	(4)
Main refrigerator	15.4%	99.9%	15.4%	64.5%
Main freezer	5.5%	61.0%	9.0%	63.8%
Dishwasher	9.6%	55.1%	17.4%	65.1%
Washing machine	15.0%	88.3%	17.0%	69.4%
Television	13.4%	98.8%	13.6%	44.5%
VCR	12.4%	82.9%	15.0%	44.1%
DVD	21.9%	53.4%	41.0%	45.1%
Stereo	9.4%	86.2%	10.9%	34.4%
Furnace	5.7%	57.0%	10.0%	63.9%
Central AC	3.8%	26.7%	14.2%	56.5%

Table 2 shows that over 58% of households have at least one ES model of an appliance, with almost 20% having more than two ES designated

appliances. Consistent with the information in Table 1, this penetration of ES models is seen to be greatest (over 30%) for appliances designed for



housework (washing machines, etc.) and for entertainment (DVD players, etc.), but remains relatively low (under 23%) for heating or cooling appliances. The relatively low proportion of households with no ES models of any appliance (41.8%) but higher proportions of households with no ES models of each of the three categories - housework, entertainment, and appliances - suggests that there is

not a great deal of overlap in household decisions to purchase ES models of appliances in different categories. In other words, to a large extent, households that purchase an ES model of a housework appliance do not seem to be the same households that purchase an ES model of an entertainment appliance or of a heating or cooling appliance.

Table 2: Proportion of Households with Energy Star (ES) Appliances

Type of Appliance	Number of Energy Star Appliances			
	None	One	Two	More than Two
All	41.8%	24.4%	15.5%	18.3%
Housework	68.6%	21.0%	7.3%	3.1%
Entertainment	65.8%	18.3%	10.1%	5.8%
Heating or Cooling	77.6%	20.2%	2.2%	---

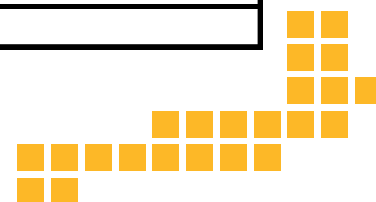
Even in the context of energy use for appliances in residential buildings, being an environmentally-aware household is not limited to purchasing ES models of household appliances. Table 3 shows that a sizeable proportion of Canadian households have adopted other energy-saving behaviour asso-

ciated with appliance choice and operating characteristics.

Based on the information in Table 3, in 2003 almost one-third of Canadian households used cold water for washing clothes, while 25% had a moisture detector in their clothes dryer, which can

Table 3: Proportion of Households with Other Energy Saving Behaviour

Appliance/Activity	Proportion with the Specified Appliance/Activity relative to:	
	All Households	Subsample with Appliance
Front-loading washing machine	10.1%	11.5%
Use cold water for washing clothes	32.1%	36.3%
Moisture detector in clothes dryer	25.0%	30.1%
Dry dishes in dishwasher with heat off and/or door open	25.4%	46.1%
High efficiency furnace	20.2%	38.1%
Programmable Thermostat (PT) – one or more	29.8%	30.6%
PT that is programmed	23.0%	77.3%
Temperature of largest heating area varies	57.8%	
Water-saving showerhead	53.7%	
Use some Compact Fluorescent Lights (CFL)	31.8%	
Use some fluorescent lights	57.8%	
Use some halogen lights	47.8%	
Only use incandescent lights	20.2%	





Environmental Awareness (cont'd.)

prevent unnecessary energy use. Over one quarter of Canadian households dry dishes in a dishwasher either with the heat off and the door closed or heat off and the door open, and this proportion increases to almost 50% if only those households with a dishwasher are considered. In terms of space heating, over 38% of households with a furnace have a high efficiency model - compared to 10% for ES models as shown in Table 1. Finally, in terms of lighting, over 30% of Canadian households used some CFLs in 2003, while over 50% had at least one fluorescent lamp and only 20% relied entirely on incandescent lightbulbs.

This analysis suggests that, at least in terms of appliance choice and usage, there are many Ca-

nadian households that could be categorized as environmentally aware, although the extent of this environmental awareness differs quite noticeably across households. Of course, for a variety of behavioural reasons, environmental awareness in appliance choice and other energy-saving behaviour might not necessarily be fully reflected in household energy consumption. The intensity of this relationship between energy-efficient appliance choice, other household characteristics, and household energy consumption, which is examined in ongoing research, may have important policy implications in the sense of indicating the extent to which environmental awareness is a key factor in increasing energy efficiency in Canadian households.

PEOPLE

One of CBEEDAC's principal objectives is to promote the development of graduate student expertise in the analysis of energy use in the residential and commercial sectors. As a result, a number of graduate students act as researchers for CBEEDAC for short and sometimes longer periods of time while they are undertaking their graduate studies, and sometimes immediately after completion of their course of study. CBEEDAC would like to publicly acknowledge the contributions of these individuals to the research that has been conducted.

Among graduate students who have recently completed their work with CBEEDAC are **Mark Maxson, James Lin, Liming Wang, and Matthew Hansen**. Matthew has now moved on to work with the *National Energy Board* in Calgary, while Mark is employed with the federal *Department of Finance* in Ottawa. James is continuing with his studies towards a PhD in economics at the University of Alberta. Another long-time CBEEDAC employee, **Ronggui Liu**, is now employed by the *Alberta Department of Finance*. We wish them all well in their future endeavours.

BUILDING SERVICES

CBEEDAC has the expertise to provide services to the building sector in the area of data storage and analysis. For more information regarding these services, on becoming a sponsor of CBEEDAC, or about the services provided by other Data and Analysis Centres, contact CBEEDAC or see our Web site (www.ualberta.ca/~cbeedac).

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