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ENVIRONMENT DIRECTORATE
ENVIRONMENT POLICY COMMITTEE

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Working Party on National Environmental Policies

Household Responses to Environmental Policy: Preliminary Results and Outline of the Final Report

19-20 November 2008
OECD Headquarters, Paris

This report presents some preliminary findings of the OECD Household Survey on Environmental Behaviour implemented in 2008 in 10 member countries. This project aims at better understanding the determinants of household behaviour to improve the design of policies targeting: residential energy use, waste generation and recycling, personal transport choices, organic food consumption and water use. The final results of this work will be presented at a Conference to be held 19-20 March 2009, at OECD Headquarters. The conclusions of this project will be published in 2009.

As a follow-up stage, it is envisioned that a new OECD survey will be carried out in 2010, with a particular focus on the adoption of eco-innovations by households and the development of a low-carbon economy.

ACTION REQUIRED: For discussion

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English - Or. English

NOTE FROM THE SECRETARIAT

This report presents some preliminary findings of the OECD Household Survey on Environmental Behaviour implemented in 2008 in 10 member countries. This project aims at better understanding the determinants of household behaviour to improve the design of policies targeting: residential energy use, waste generation and recycling, personal transport choices, organic food consumption and water use. The final results of this work will be presented at a Conference to be held 19-20 March 2009, at OECD Headquarters. The conclusions of this project will be published in 2009.

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CHAPTER 1. INTRODUCTION

1. Background and Objectives

Households' impact on the environment is a concern, and projections show that their pressure on natural resources is likely to significantly increase by 2030 (OECD, 2008a). Governments multiply measures aiming at promoting more sustainable patterns of consumption. However, designing policies targeting households' behaviour is a challenge for policy-makers. Households as economic agents differ from firms and their great heterogeneity needs to be accounted for by Governments. The OECD project on "Household Behaviour and Environmental Policy" aims at better understanding the diversity of people's environmental behaviour within households, in order to improve policies targeting residential energy use, water consumption, transport choices, organic food consumption, and waste generation and recycling.

As part of the first step of the project (2006-2007), existing empirical evidence on the main drivers of household behaviour in these five environmental policy areas was reviewed. The results were presented at a Workshop and a publication is now available (OECD, 2008b).

This review of evidence pointed to a number of gaps and suggested that the OECD could play a role in addressing them. As existing studies generally limit their scope to a single country and/or focus on a single environmental concern, an international comparison across different countries and various environmental areas would be a real value.

As such, in a second stage of the project (2008-2009), a large scale OECD household survey on environmental behaviour covering five key policy areas (energy, waste, food, water and personal transport) was implemented in 2008 in ten countries representing different OECD regions: Australia, Canada, Czech Republic, France, Italy, Korea, Mexico, the Netherlands, Norway and Sweden.

This Survey examines how households respond to environmental policies implemented by governments and how household differ in their environmental behaviour in the five areas. The study looks at how to various types of environmental policies affect people's behaviour (*e.g.* waste charges, waste recycling services, energy price, energy efficiency labelling, fuel taxes, organic food labelling). Using the data collected, differences in environmental behaviour across households groups are also analysed according to individual characteristics (e.g. income, age, household size, education, urban *versus* rural).

This report presents preliminary findings. Based upon the complete survey results, policy recommendations will be formulated to design efficient and effective environmental policies targeted at households while addressing social concerns.

2. Methodology and dataset

2.1 Method of data collection

The Secretariat used an Internet panel-based survey to implement the OECD Household Survey. This is an innovative, cost effective and very promising approach to large-scale data collection. The Secretariat consulted the main service providers in this area and identified Lightspeed Research as the best partner in the light of key relevant characteristics for the OECD project (*e.g.* size of the panels owned, geographical coverage, panel representativity, cost and expertise in multi-country surveys). The survey provider collected responses to the questionnaire using its on-line consumer panels in different countries.

As with other survey methods, possible bias can exist when using internet panel-based surveys. This is an important issue to raise and we have given some thoughts to two broad caveats: a sample bias and a response bias. The sample bias has been addressed through the stratification of the sample (*e.g.* age, income, region). Response bias could have been an issue if the OECD survey was related to Information Technologies or the Internet but in our case, the topic researched is uncorrelated to the method of data collection. The risk of 'professionalism' of the respondents in the panel has been addressed in the criteria used to select a service provider. The rules applied to manage the panel have been carefully examined such as the incentive mode used for the respondent, and the number maximum of surveys panelist can respond to per year.

2.2 Questionnaire design

A similar questionnaire was administered in the 10 participating countries (see Annex 1). The survey questionnaire is composed of seven parts: two parts dealing with socio-demographic and attitudinal characteristics, and five parts relating to household behaviour in the five environmental areas of interest: waste generation and recycling, personal transport choices, residential energy use, organic food consumption and water use.

The survey questionnaire has been developed by the Secretariat of the OECD Environment Directorate, with inputs from an Advisory Committee, the research teams involved in the project, other OECD Directorates working in related areas (*e.g.* Trade and Agriculture Directorate, Committee on Consumer Policy) and the International Energy Agency.

2.3 Implementation and dataset

The draft questionnaire has been pre-tested in Canada, Italy, Korea, Sweden and the United Kingdom in the Spring 2007. The questionnaire was revised in the light of the lessons learned and the Survey was implemented simultaneously in all 10 countries in January-February 2008.

The survey allowed for the collection a unique dataset of 10 000 households in 10 countries. This represents a sample of approximately 1 000 respondents per country.

2.4 Data Analysis and Research Teams

The analysis of the survey data is coordinated by the OECD Environment Directorate, with research teams with extensive experience based in selected participating countries. These include:

1. ***Catholic University, Piacenza – Italy***: Stefano BOCCALETTI (research team leader) – Organic Food

2. ***Charles University, Prague – Czech Republic***: Milan SCASNY (research team leader) – Energy Efficiency
3. ***Korean Environment Institute (KEI) – Korea***: Kwang-yim KIM (research team leader) – Waste Generation
4. ***SLU University – Sweden***: Bengt KRISTRÖM (research team leader) – Renewable Energy
5. ***Statistics Norway - Norway***: Bente HALVORSEN (research team leader) – Gender Issues
6. ***The Australian National University – Australia***: Quentin GRAFTON (research team leader) – Water Consumption
7. ***Universidad Ibericoamericana – Mexico***: Alejandro GUEVARA-SANGINES (research team leader) - Transport
8. ***University Pantheon-Sorbonne and INRA – France***: Katrin MILLOCK and Céline NAUGES (research team leaders) – Water Conservation and Water Quality
9. ***York University – Canada***: Ida FERRARA (research team leader) – Waste Recycling and Waste Prevention

2.5 Advisory Committee and Project Contributors

In order to ensure the soundness of the survey instrument and the political relevance of the outcome of the work, an Advisory Committee including government representatives from the participating countries was set up to help inform this project. The Committee met twice since it was set up. The first meeting was held in May 2007, in Paris, to provide guidance on the design of the questionnaire and on the survey implementation. The objective the second meeting, held 17th September 2008, was to discuss the preliminary results of the 2008 OECD survey and to ensure policy relevance of the outcome of the work.

The project on Household Behaviour and Environmental Policy benefited for support from a number of contributors including: The Australian Department of the Environment and Water Resources, Environment Canada, The Dutch Ministry of Housing, Spatial Planning and the Environment (VROM), The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, Germany, The French Ministry of the Environment (MEED), The Ministry of the Environment, Czech Republic, The Ministry of the Environment and Natural Resources, Mexico (SEMARNAT), The Ministry of Environment, Republic of Korea, The Norwegian Ministry of the Environment, The Region Emilia Romagna, Italy and Swedish Energy Agency (STEM).

3. Structure of the report

The final report will consist of eight chapters presenting a cross-country analysis of household behaviour and environmental policy, building on the results of the 2008 OECD Survey. The book will begin with an introduction chapter (**Chapter 1**); **Chapter 2** will present main results on residential water use[1]. It will cover water use and water conservation as well as demand for water quality; **Chapter 3** will

[1] This Chapter will be based on two reports to be presented and discussed at the 19-20 March 2009 Conference. The first report, on water consumption, will be prepared by the Australian research team lead by Quentin GRAFTON - *The Australian National University.* The second report, addressing water conservation and demand for water quality, will be prepared by the French research team lead by Katrin MILLOCK and Céline NAUGES - *University Panthéon-Sorbonne and INRA.*

present survey results on personal transport choices[2]. This charter covers car use, car ownership and car choice as well as mode choice and demand for public transport; **Chapter 4** will present survey findings on residential energy demand[3]. It will distinguish energy efficiency and renewable energy; **Chapter 5** will sum up the findings on organic food consumption[4]; **Chapter 6** will look at results on domestic waste generation, recycling activities and waste prevention[5]. **Chapter 7** will look at gender differences in environmental behaviour across the five areas analysed[6]. Finally, **Chapter 8** will conclude by providing policy recommendations for the design of effective and efficient policies targeting households, while addressing social issues like distributional concerns.

This paper presents some preliminary results of the OECD household survey on environmental behaviour. A preliminary outline of the publication is provided in Annex 2.

[2] This Chapter will be based on two reports to be presented and discussed at the 19-20 March 2009 Conference. The first report, on car use, car choice and car ownership, will be prepared by Secretariat and experts. Clotilde BUREAU – *ENSAE*, provided preliminary results. The second report, addressing mode choice and personal transport use, will be prepared by the Mexican research team lead by Alejandro GUEVARA-SANGINES **-** *Universitad Ibericoamericana.*

[3] This Chapter will be based on two reports to be presented and discussed at the 19-20 March 2009 Conference. The first report, on energy efficiency, will be prepared by the research team from Czech Republic lead by Milan SCASNY - *Charles University, Prague.* The second report, addressing renewable energy use, will be prepared by the Swedish research team lead by Bengt KRISTRÖM - *SLU University.*

[4] This Chapter will be based the report to be prepared and discussed at the 19-20 March 2009 Conference by the Italian research team lead by Stefano BOCCALETTI **-** *Catholic University, Piacenza.*

[5] This Chapter will be based on two reports to be presented and discussed at the 19-20 March 2009 Conference. The first report, on waste generation, will be prepared by the Korean team lead by Kwang-yim KIM - *Korean Environment Institute (KEI).*The second report, waste recycling and waste prevention, will be prepared by the Canadian team lead by Ida FERRARA - *York University.*

[6] This Chapter will be based the report to be prepared and discussed at the 19-20 March 2009 Conference by the Norwegian research team lead by Bente HALVORSEN – *Statistics Norway.*

CHAPTER 2. RESIDENTIAL WATER USE: A CROSS-COUNTRY ANALYSIS

This chapter presents preliminary findings on household environmental behaviour related to residential water use. The analysis covers residential water consumption and water conservation (Section 1), as well as demand for water quality (Section 2).

1. Residential water consumption and water conservation

The OECD data set provides information on water consumption, the average price of water, water metering, water saving behaviours, the use of water savings devices, household characteristics (income, age, household size, dwelling type, etc.), and attitudinal characteristics such as participation in environmental activities.

This section seeks to answer the following questions:

- Is there a significant difference in water consumption between households that face unit water charges and those which do not?
- How do general attitudes towards the environment (environmental awareness, membership in environmental organization…) influence water consumption and water conservation?
- How responsive are households to changes in water charges in terms of their water consumption?
- Who would be most adversely affected by increases in water charges?

1.1 Water consumption

Effect on Unit Water Charges

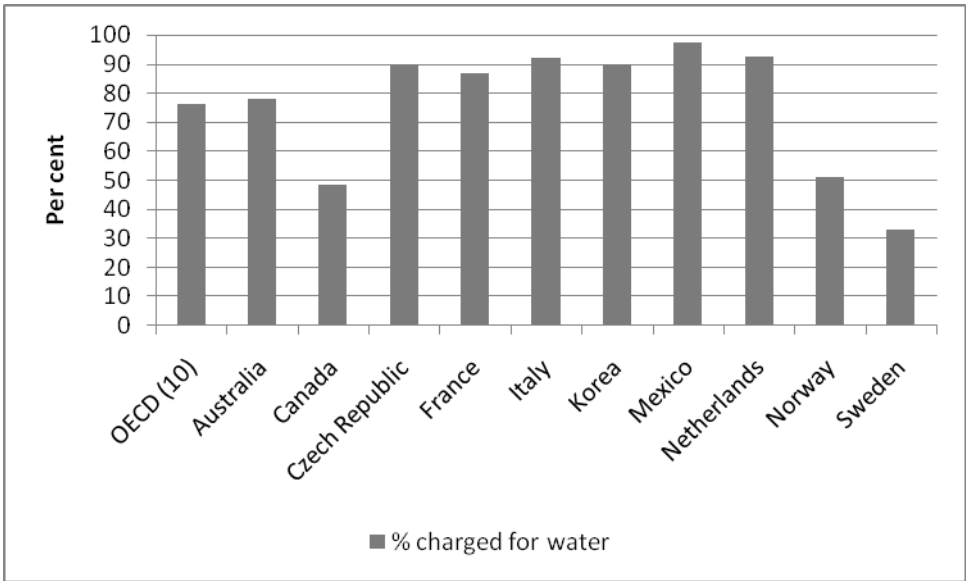
The data show that there are significant difference in water consumption between those households that face volumetric charges and those that do not. Namely, after controlling for other potential factors (income, household size, employment, ownership status, dwelling type, environmental concerns and investments in water saving devices) households that face a volumetric charge will, on average, consume at least 20 per cent less water than households who do not. Figure 2.1 shows the share of respondents reporting being charged for water consumption in their primary residence, per country.

In the general, the variables that appear to have a statistically significant effect on water consumption include the number of adults in the household (+), having a higher education (+), larger size of residence (+), older house (-), working full-time (+), dwelling owner (+), residence in suburban region (+), and the use of a dual flush toilet (-). Environmental attitudinal variables do not seem to have a statistically significant effect on water consumption.

In summary, there is a statistically significant and negative effect on residential water consumption from charging households on the basis of the volume of water they use. A number of socio-economic and household characteristics variables are also shown to have a statistically significant effect on residential

water use. However, there is no statistical evidence that environmental attitudes, as measured in the survey, have an impact on household water consumption.

Figure 2.1 – Share of respondents reporting being charged for water consumption in their primary residence



Household Effects of Increased Water Charges

A key concern of governments about raising the volumetric price of water is its potential impact on households and, in particular, low income households with large families. These concerns can, to a large extent, be addressed by returning the extra revenues generated from a higher volumetric price back to targeted households independent of their actual water consumption (Grafton and Ward, 2008).

The OECD household survey allows for a better understanding of the impact of an increase in water charges on households. The results indicate that overall proportion of household income spent on residential water consumption is about 1 per cent and varies from a low of 0.46 per cent in Korea to a high of 1.93 per cent for the Czech Republic. Preliminary findings suggest that higher-income households are less responsive to changes in the average price of water than are medium and low-income households. This suggests that the biggest proportional change in residential water consumption will come from low and medium income households.

The results also show that low- income households (less than 15,000 €) spend, proportionately, more than twice as much on their water bill than high-income households (more than 60,000 €). Consequently, equivalent price changes in the ten countries would have different distributional impacts. This provides further evidence that low income households will, in the absence of any lump sum transfers, suffer the most from increases in the volumetric price of water in the absence of transfers.

A preliminary analysis of the data indicates that:

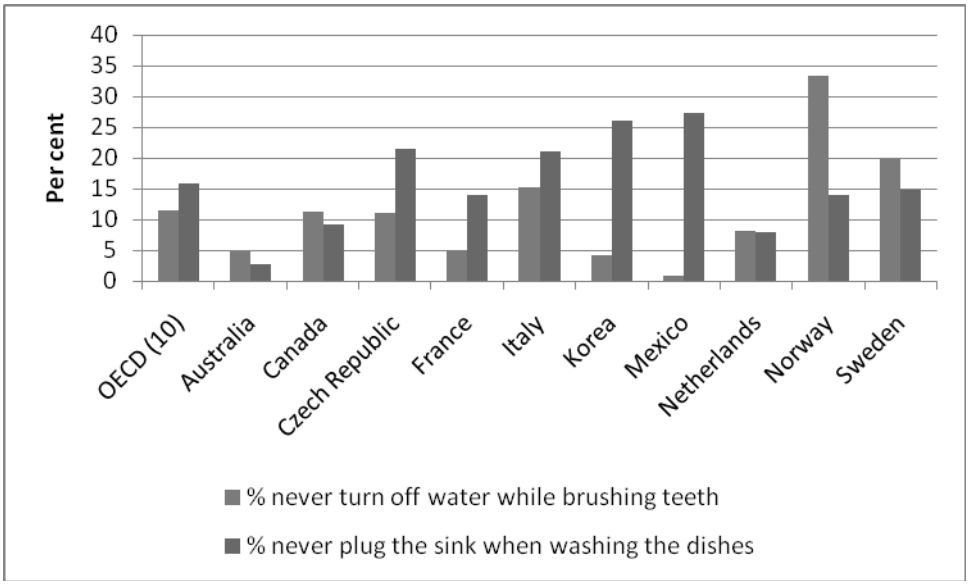
1. households that incur a volumetric charge for their water have a significantly lower water consumption;

2. the average price charged for water and the use of dual flush toilet have a statistically significant and negative effect on household water consumption;
3. household size, dwelling size, income, age of respondent dwelling ownership have a statistically significant and positive effect on water consumption;
4. environmental attitudes and participation or membership in environmental organizations have no statistically significant effect on water consumption,
5. high-income households have statistically significant and smaller price elasticity of water consumption that do low income households; and,
6. low-income households spend more than twice as much on residential water use than high income households.

1.2 Water savings behaviours

Information campaigns to conserve water use through a change in water-use practices are key policy lever used by government to manage water demand. In the OECD survey, respondents were asked to provide an indication of what water savings practices they undertook (Q91 in Annex 1). Figure 2.2 presents the results by country.

Figure 2.2 – Share of respondents reporting never undertaking some water saving practices



Using these responses, a series of models were estimated to test which factors increase the probability of undertaking water-savings behaviours. The presence of a volumetric water charge has the largest effect on increasing the probability of respondents undertaking water saving behaviours. These charges increase the probability of (1) turning off the water while brushing teeth, (2) taking a shower instead of a bath, (3) watering the garden in the coolest part of the day and (4) collecting rainwater and recycling waste water. By contrast to the estimates with water consumption, some attitudinal variables, such as having a high level of concern for the environment, increase the probability of undertaking water saving behaviours. However, an increased probability of undertaking such behaviours is found to be insufficient to significantly affect household water consumption.

A preliminary analysis of the data indicates that:

1. environmental attitudes and participation or membership in environmental organizations do increase the likelihood of undertaking some water savings behaviours;
2. households that incur a volumetric water charge have an increased likelihood that they will undertake water saving behaviours;

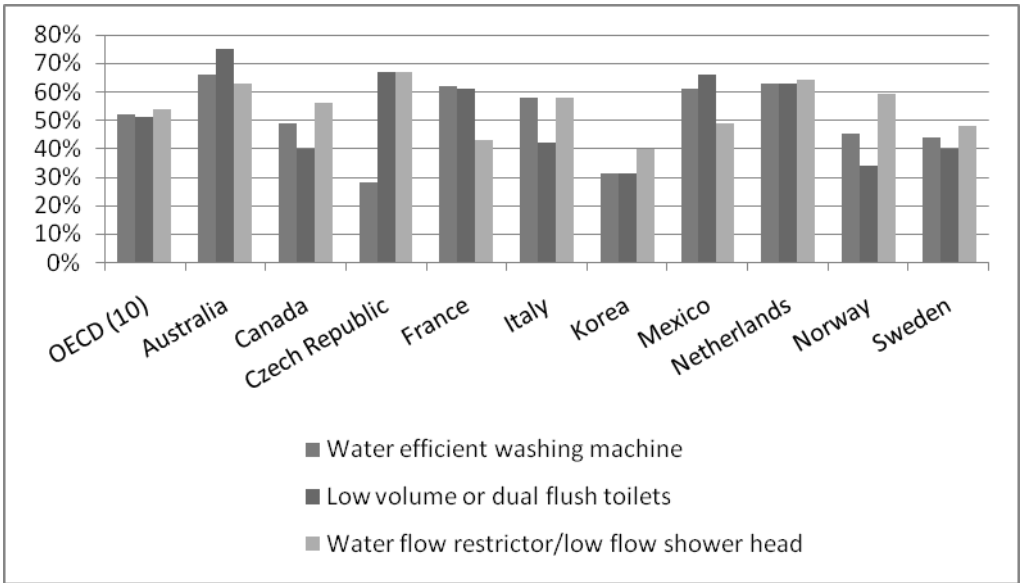
1.3 Household adoption of water saving equipments

This section examined the adoption of water-efficient equipment by households. We discuss the effectiveness of price and non-price policies (water rationing for example), the role of socio-demographic variables, psychological factors, and informational policies (metering and labelling) in inducing water conservation. Lastly, policy recommendations derived from the analysis are presented.

The preliminary analysis indicates that, during the last 10 years, about half of the respondents invested in (or were already equipped with) a water-efficient washing machine, low volume or dual flush toilets, and a water flow restrictor tap or a low flow shower head. Figure 2.3 reports the share of respondents who invested during the last 10 years or were already equipped with (1) a water-efficient washing machine, (2) low volume or dual flush toilets, and (3) water flow restrictor taps or low flow shower heads, in all ten countries (OECD-10) and in each country.

About half of the respondents are equipped with a water-efficient washing machine, low volume or dual flush toilets, and a water flow restrictor tap or a low flow shower head. In almost all countries, the share of respondents owning each of these types of water-efficient equipment varies between 28% and 75% of the surveyed population. Fewer respondents are equipped with a water tank to collect rainwater.

Figure 2.3 – Share of respondents owning water-efficient equipment, by country



What are the factors driving household decision to invest in water saving equipments in the light of the OECD survey results? The analysis suggests the following preliminary results:

- The adoption of water-efficient equipment is strongly affected by socio-economic variables. The effect of household wealth appears to be strong (e.g. income, residence size).
- Concern for environmental issues is a strong predictor of adoption of water efficient equipment
- In general, respondents have a poor knowledge of their water bill. This suggests that the price of water as such is not sufficient to explain the adoption of water-efficient equipment. But, being metered, or not seems, to matter greatly.
- Households that are metered and charged for their water consumption individually are found to have a much higher probability to invest in water-efficient equipments (i.e. water-efficient washing machines, water flow restrictor, dual flush toilets) compared to households that are not charged for their water.
- Measures related to the provision of information and labelling induce the adoption of water saving equipment, but mainly among higher-income households.

2. Demand for water quality

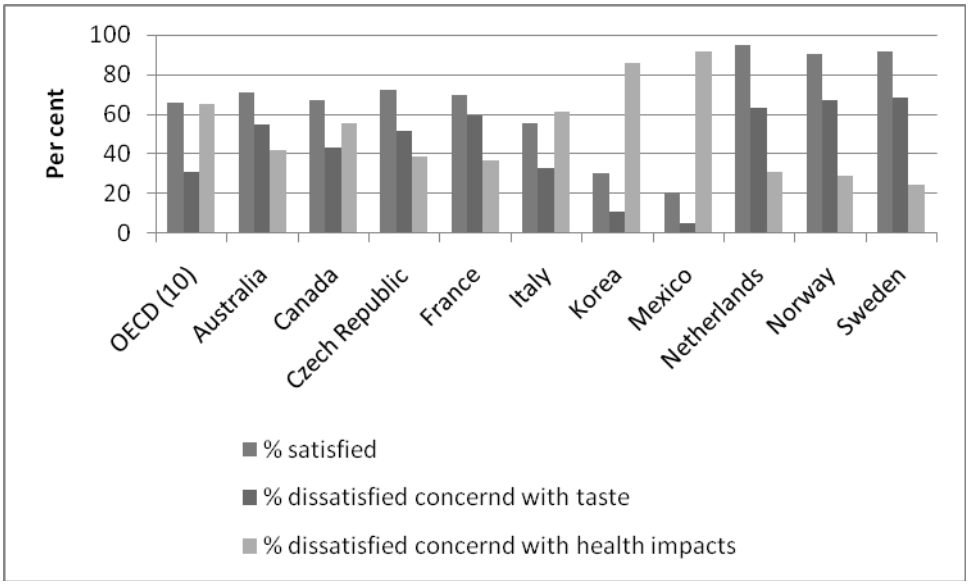
This section seeks to answer the following questions:

- Are household satisfied with the quality of their tap water?
- How much are households willing to pay for improved water quality? Does the willingness to pay for water quality vary with across household groups?

2.1 Satisfaction with tap water

The preliminary analysis of the survey data indicates that the percentage of respondents being satisfied with the quality of their tap water varies significantly from one country to the other (from 95% to 21%). Broadly speaking, we can distinguish three groups of countries (see Figure 2.4). The first group gathers countries, where more than 90% of the surveyed respondents declare to be satisfied with the quality of their tap water, includes the Netherlands (95%), Sweden (92%) and Norway (90%). The "medium quality tap water" group gathers countries where the percentage of respondents satisfied with water quality varies between 50 and 80 percent. It includes the Czech Republic (72%), Australia (71%), France (70%), Canada (67%), and Italy (56%). Finally, the "low quality tap water" group gathers Mexico and Korea, where less than 30 percent of respondents declare to be satisfied with quality of water from the tap.

Figure 2.4 – Respondents opinion about the quality of their tap water



The reasons for being dissatisfied vary from one country to the other. For those not being satisfied with the water provided at the tap, Figure 2.4 reports the percentage of respondents who have some concern with taste and health respectively. In the "high quality tap water" group, taste is the major concern while health is the primary concern in the "low quality" group. In the "medium quality" group, the concerns are slightly more balanced, except in Italy where the health concern dominates. These results indicate that we should expect significantly different willingness to pay for a better water quality from one country to another.

2.2 Willingness to pay for improved water quality

The willingness to pay (WTP) for better water quality is usually elicited using stated[7] and revealed preferences[8] approaches.

Existing studies tend to focus on households' behaviour after some specific contamination problems and their willingness to pay for reducing the concentration of contaminating pollutants in drinking water to standard levels (Harrington, Krupnick and Spofford, 1989; Abdalla, Roach and Epp, 1992; Laughland et al. 1996; Dupont, 2005).

The WTP for improved water quality is usually found to vary across households, depending on their socio-demographic characteristics (age, level of education, income, household composition) but also on their perception of risk. Attitudinal characteristics have been less frequently considered in the literature,

[7] This method is based on households stating how much they would be ready to spend to avoid bad water quality.

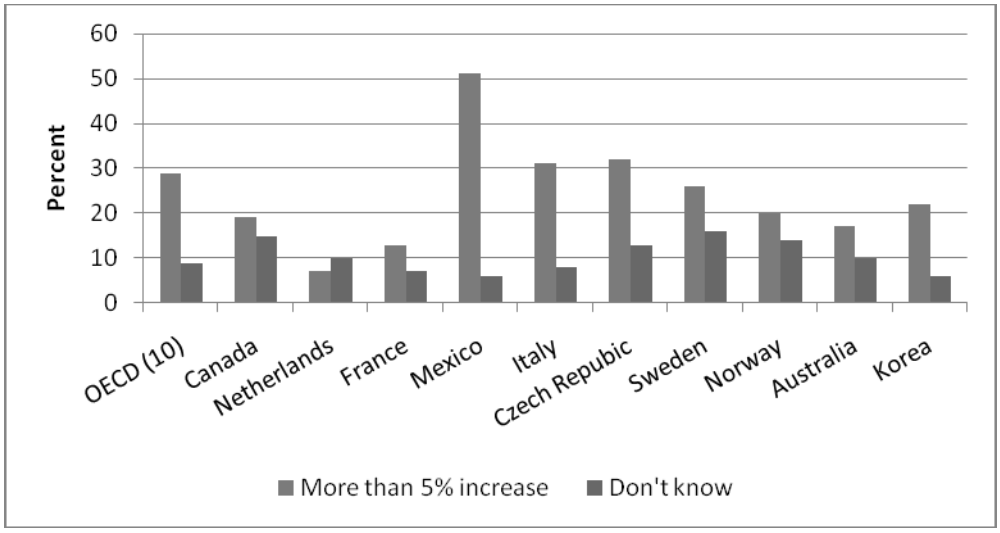
[8] This approach calculates actual expenditures by the households to improve water quality (e.g. by purchasing bottled water or installing home water filters).

with the exception of Luzar and Cosse (1998) who find that subjective norms and individual's attitudes towards the environment (including water) both have a positive effect on the WTP.

In the OECD survey, respondents were asked to state "What is the maximum percentage increase in the annual water bill they would be willing to pay above their actual water bill to improve the quality of their tap water". The responses should be seen as merely indicative since the breadth of the questionnaire did not allow for the presence of more elaborated scenarios and means of elicitation.

The data collected indicates that households are usually not aware of their water bill and a limited number reported their annual water bill. Preliminary results are in line with previous studies on general water quality improvement and indicate that households are on average willing to pay rather small amounts for better quality tap water. When considering the 10 countries, findings suggest that the willingness to pay (WTP) ranges from 11 to 32 USD (2008) annually per household. The highest relative WTP for better tap water quality was found in Mexico, followed by Czech Republic Italy and Korea. Figure 2.5 presents the percentage of respondents willing to pay more than 5% increase in their water bill to improve the quality of their tap water per country.

Figure 2.5 - Respondent's willingness to pay for better tap water



Results of the survey are analysed according to household's socio-economic, demographic and attitudinal characteristics, as well as respondents' concerns about health and/or taste related to water consumption. Income and education appear to have a positive though very limited effect on household willingness to pay WTP for water quality. The willingness to pay seems to be decreasing with age. Women are found to have a lower willingness to pay for a better drinking water quality, and respondents with a high education level seem to be willing to pay more for water quality. The presence of young children - or other variables related to the composition of the household – do not appear to be significant in the estimations. Attitudinal variables, such as concern for the environment, appear to be significant in explaining the WTP for better tap water quality. However, country specific estimation results suggest that attitudinal characteristics may play a more important role in richer countries. There are also large country-specific effects which should capture the important differences in the infrastructure of water provision as well as in the regulatory standards concerning water quality in each country.

CHAPTER 3. THE DETERMINANTS OF PERSONAL TRANSPORT CHOICES: A CROSS-COUNTRY ANALYSIS

This chapter presents preliminary findings on household environmental behaviour related to personal transport choices. Section 1 examines the question of car ownership, car choice and car use, while the determinants of mode choice and public transport use are analysed in Section 2.

Like in the other chapters, the survey data is analysed to determine the effect of three different types of variables on personal transport choices: socio-economic variables, given at the personal or household level, attitudinal variables, measuring the sensitivity of the respondent to environmental issues, and policy variables.

1. Car ownership, car choice and car use

Some of the principal policy issues to be examined in this section include the following:

- How do household socio-demographic characteristics (e.g. income, age, household size, rural/urban) influence car ownership, car use and car fuel choice?
- How do general attitudes towards the environment (environmental awareness; membership in environmental organization; …) influence car ownership, car use and car fuel choice?
- How responsive are households to changes in petrol price in terms of their car use?

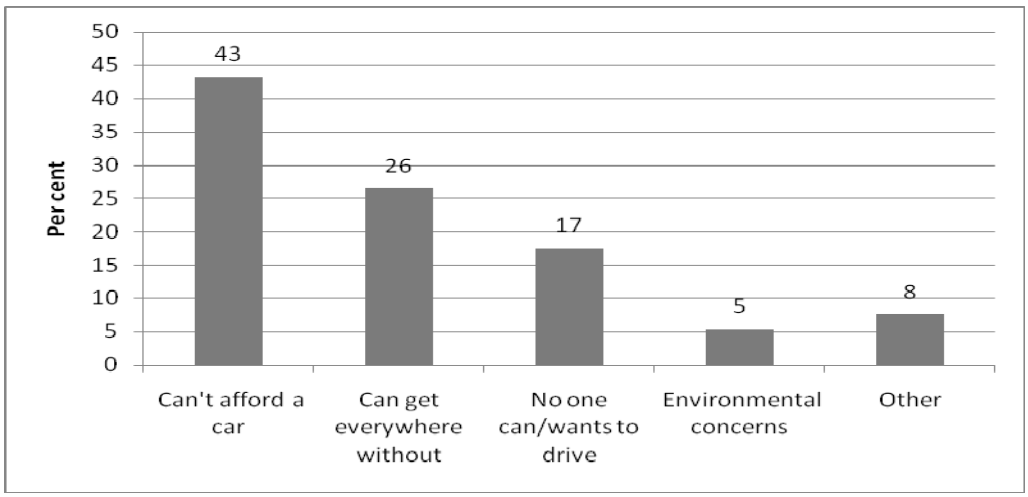
1.1 Existing evidence

One of the most consistent conclusions across studies is that income has a positive effect on car ownership, its use and total travelled distance (Train, 1980; Bhat and Koppelman, 1993; Asensio et al., 2002; Johansson-Stenman, 2002; Giuliano and Dargay, 2005). Another consistent finding is that women have smaller probabilities to own a car, use it less and travel shorter distances than men. Household size is commonly associated, but not always, with greater probabilities to own a car and a greater intensity of its use (Giuliano and Dargay, 2005; Nolan, 2002; Feng et al., 2005). With respect to the number of children, Fullerton et al. (2004) and Giuliano and Dargay (2005), among others, conclude that distance travelled is greater as the number of children in household increases.

1.2 Car ownership

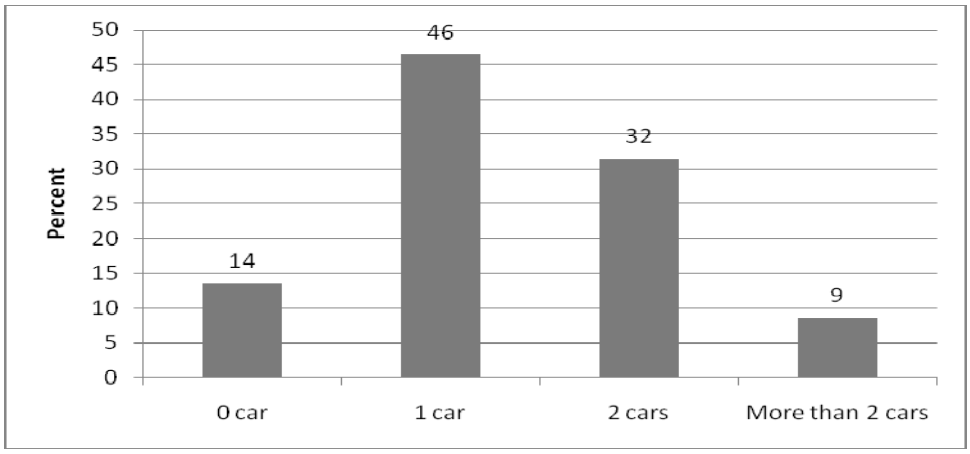
The preliminary results indicate that 14% of the households surveyed reported not owning or using regularly a vehicle (car or motorcycle). For the 10 countries, the main reasons stated by respondents for not having a car are in the order of importance: “can’t afford it” (43%), “can get everywhere we want without a car” (26%), followed by “no one can/wants to drive”. “Environmental concerns” comes last, stated only by 5% of the 1378 respondents which do not have a car (see Figure 3.1 below).

Figure 3.1 - Main reason for not having a car for the whole sample, OECD (10).



Less than 9% of respondents reported having more than two cars. More that 75% of them own three cars. Figure 3.2 gives the distribution of car number for the whole sample, OECD (10).

Figure 3.2 - Distribution of car ownership for the whole sample, OECD (10).



Preliminary results suggest that while the same determinants seem to be at stake when deciding whether to own zero, one or two cars, different considerations enter into account when deciding to have more than two cars.

Several conclusions can be drawn from the preliminary survey results. First, the majority of the results associating car ownership with socio demographic variables are consistent with expectations and results found in previous studies.

Income has a significant and positively influence on car ownership but its effect is very limited. Car ownership is also higher for educated people, people living in a house and owners of their residence. Quite intuitively, the number of adults positively impact on the number of car owned. It is interesting to note that while the number of small children increases the probability of having one car compared to having no car, the number of children increases the probability of having two cars compared to having one car. Similar to

what has been found in other studies[9], we observe a life cycle effect of age: car ownership increases with age up to a threshold (65 years in our study) where it decreases.

The impact of the living area on car ownership is also very intuitive: people living in rural areas tend to have more cars than people living in suburban areas (the base case), who themselves have more cars than people living in urban areas. This result reflects the difference in the relative convenience of car versus public transport according to the living area.

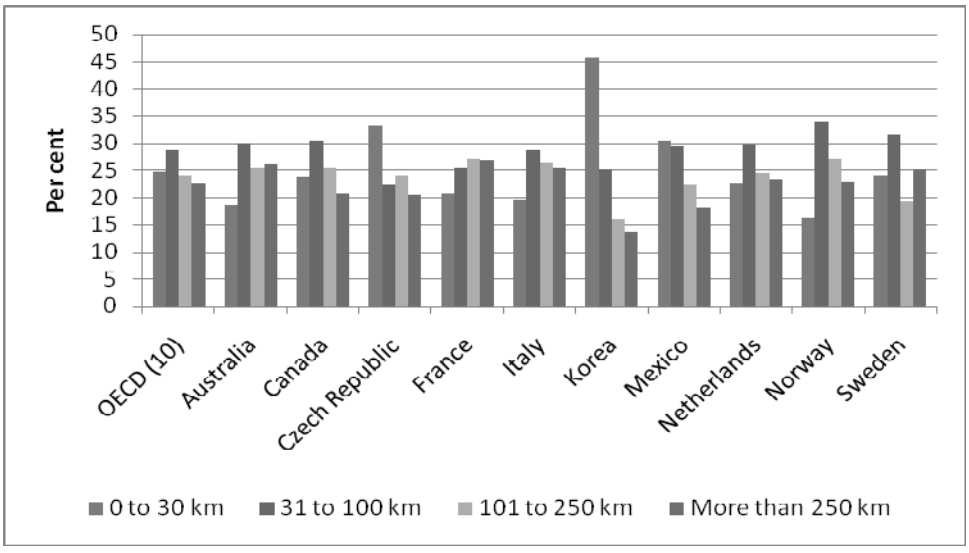
Secondly, variables reflecting the relative convenience of public transport use compared to car use have a significant impact on car ownership. The availability of public transport significantly and negatively impacts the decision of the number of vehicles owned. While we expect public transport availability to be closely related to car use (i.e. number of kilometres driven or mode choice), the impact of public transport on car ownership is less obvious. We also observe that public transport rapidity is significant in the decision to own zero, one or two cars.

Finally, environmental considerations do not seem to be an important determinant in the decision of the number of cars to own. This result is corroborated by the answers to a question asked to people reporting not having a vehicle, about their main reason for not owning a car (See Figure 3.2 above).

1.3 Car use

In the framework of the survey, respondents were asked for the number of kilometres they personally drive (car/motorcycle) during a typical week. The countries where the share of respondents driving less than 30 km is the highest are Korea (45%), Czech Republic (33%) and Mexico (31%). As expected, the percentage of respondents driving more than 250 km per week is the highest in Canada. It is worth noting that this percentage is also above the OECD (10) in France, Italy and Sweden. Figure 3.3 displays the distribution of kilometres driven by country. [10]

Figure 3.3 - Number of kilometres driven per week, by country



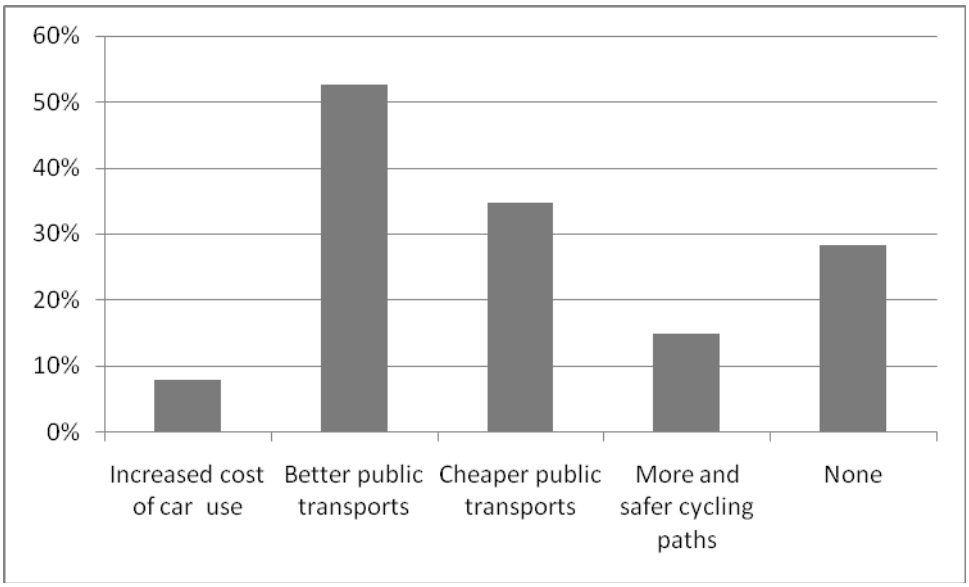
[9] See for example Steg et al (2001) or Dargay and Hanly (2004)

[10] For the subsample of people who did not answer "don't know" to the question.

Preliminary estimations indicate that significant and important determinants of the number of kilometres driven are the employment status (full time workers drive on average 20 kilometres more than people who do not work), living area (the more isolated the area, the more people use their car), and gender (men drive on average 47 kilometres more than women per week). The number of children, income and environmental norms are significant determinants of car use but the magnitude of their effect is less important. We also observe a life cycle effect of age, with people between 35 and 55 years old driving the most.

Finally, both variables related to public transport are significant and are consistent with the expected effect of public transport on car use: the availability of a public transport stop and the relative rapidity of public transport compared to car have a negative effect on the number of kilometres driven by car. This result is supported by Figure 3.4 which presents the main motivation for driving less (see also Figure 3.5 for results by country).

Figure 3.4 – Main motivation to drive less



The main factor which would encourage respondents to drive less is improved public transport. Indeed, 50% of the households surveyed indicated that they would dive less if better public transport were available. In order of importance, the main reasons to encourage respondents to drive less a car/motorcycle are: better public transport (52% of respondents); cheaper public transport (35%); more and safer cycling paths (15%) and increased cost of car/motorcycle use (8%).

It is interesting to note that almost one third of the respondents stated that nothing would make them use a car/motorcycle less. This is particularly the case for high-income respondents with children and living in urban areas. Respondents indicated that the increased cost of car use would affect their behaviour, though in a more limited manner. However, this statement needs to be qualified in the light of recent events as fuel price increases appear to have significantly affected driving habits in some countries. Indeed, the survey indicates that 36% of households have adapted their driving style during the past year in an effort to save on fuel (*e.g.* reduce speed). The effect would probably be even more pronounced if people were surveyed now.

1.4 Car choice

Alternative car technologies such as hybrid, electric or biofuel vehicles are a potential answer to reduce fuel consumption and greenhouse gas emission levels. A number of studies have examined households' vehicle type choice (e.g. brand, passenger car, sport utility vehicle) but limited evidence is available on choices according to fuel type and they are mainly based on stated preference surveys. [11]

In the survey, respondents were asked about the fuel type of the car they used most often. The percentage of respondents in the total sample [OECD(10)] who reported having an alternative fuel car as their main car is very small (less than 6%), and it mainly corresponds to people owning a LPG (liquefied petroleum gas) car (87%). While these results may suggest that market penetration of such types of vehicles is still limited, it can also be due to the fact that alternative fuel vehicles may be used as a second car rather than as a main car.

The small number of observations limits the potential means of analysis of the determinants of car choice. However, a descriptive review of the data seems consistent with expectations.

The number of cars owned appears to be higher for people owning hybrid vehicles. This result may suggest that hybrid vehicles are often used as second vehicles. Hybrid and biofuel vehicles are often newer than their conventional counterparts, mainly because these technologies are at the early stages of their market penetration.

While not significant, we can observe that people having LPG or hybrid vehicles are more concentrated in suburban and urban areas. One could assume that infrastructure associated with alternative fuel vehicles is more developed in more concentrated areas. We also observe that there are more people in the highest income decile in the sub-sample of people owning a hybrid vehicle than for people having a conventional fuel vehicle. Indeed, alternative fuel vehicles often have higher capital costs, which could explain why wealthier people are more likely to buy these types of cars.

Finally, while sensitivity to environmental concerns does not significantly differ between the different types of vehicles, we observe that membership of an environmental organisation is positively correlated with the possession of an alternative fuel vehicle.

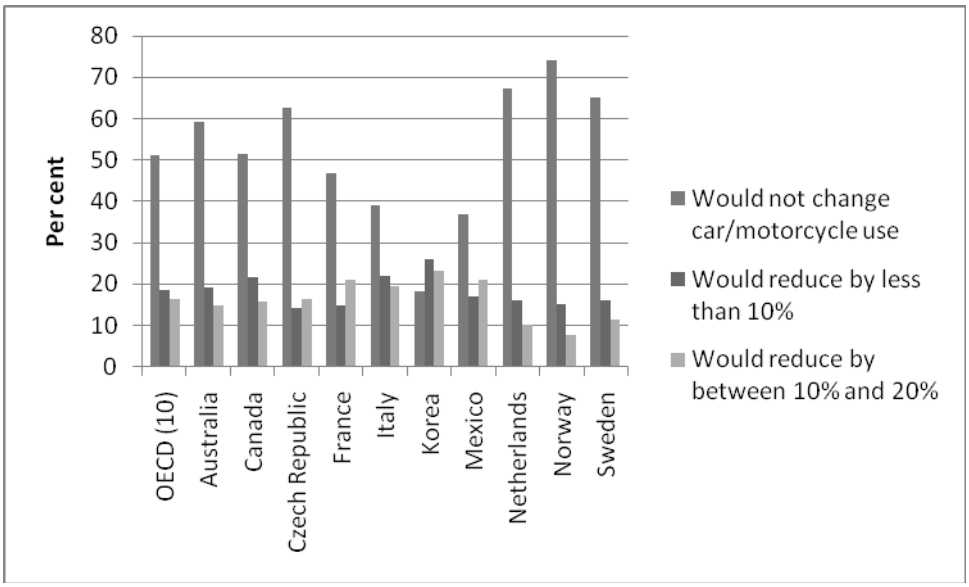
It is interesting to note that Korea and Italy are the countries where the largest number of respondents reported using a LPG vehicle. When looking at the regions in which more than 5% of the car owner respondents reported having a LPG vehicle, the 7 regions of Korea correspond to the 7 regions of our sample with the highest share of LPG vehicles. Measures taken by the Government in favour of LPG could explain this LPG high penetration rate. The number of LPG filling stations in Italy is one of the highest in Europe. In addition, the price of LPG is about half of gasoline price in both countries due to tax rebate. This suggests that government incentives and the provision of adequate infrastructures can play a significant role in increasing household ownership and use of alternative fuel vehicles.

[11] See the literature reviews made on the subject by Dargay (2006) and Knockaert (2005)

1.5 Price elasticity of demand

Respondents were asked about the likely effect of a 20% increase in fuel prices on their fuel consumption for their personal car/motorcycle use. Figure 3.5 presents the distribution of answers for the sample.[12]

Figure 3.5 – "Prospective" price elasticity of demand, by country.



It is interesting to note that people who use their car to go to work are much less willing to reduce their fuel consumption than respondents who do not. Environmental norms are also highly significant, so that people who "care" for the environment are more likely to reduce car use. The effect of residence location (*e.g.* rural *vs.* urban) is less marked than for car use. Nevertheless, people living in isolated areas still appear to have the least price elastic demand.

Finally, people with no public transport stop available have a lower elasticity of demand and rapidity of public transport positively impact on this elasticity.

2. Mode choice and public transport use

Some of the principal policy issues to be examined in this section include the following:

- How is household car use influenced by the presence of adequate public transport options?
- How do general attitudes towards the environment (environmental awareness; membership in environmental organization; …) influence mode choices and public transport use?

[12] This represents a sample of 6,449 persons who reported using a car and gave an answer different from "don't know" or "prefer not to answer".

- What characteristics of public transport (reliability, proximity, security, etc...) are most important in encouraging households to switch from car use?
- Who benefits most from improvements in public transport services? Who is most reluctant to switch from car use?

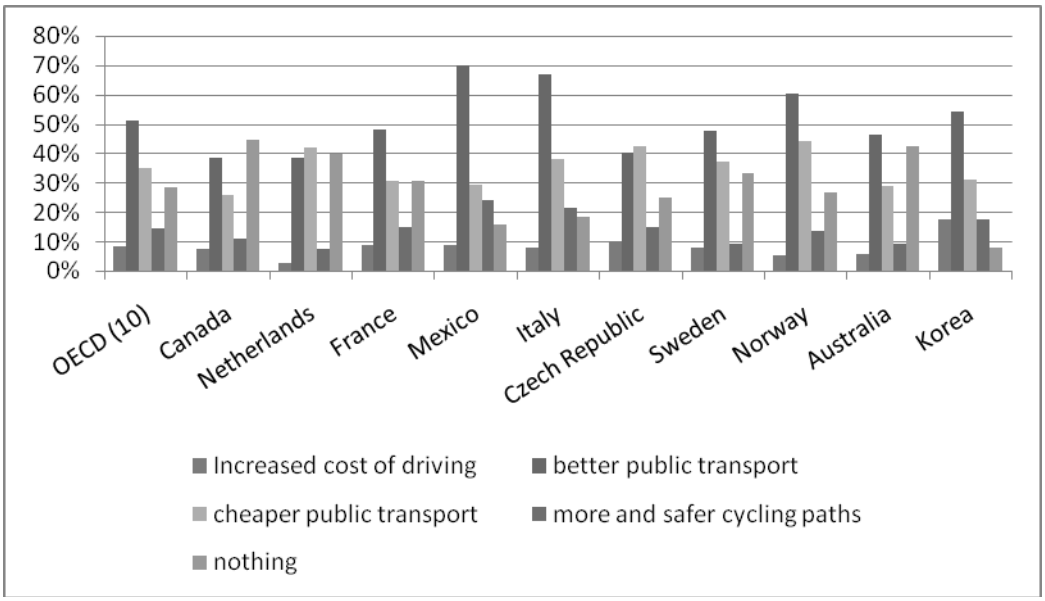
2.1 Main findings in the literature

Empirical evidence suggest that there are fewer incentives to use public transport as income rises (Johansson-Stenman, 2002; Dieleman et al., 2002) and that women use public transport more than men. A common finding is that population density, city size are associated with a more intensive use of public transport (Bhat and Koppelman, 1993; Train, 1980; Simma and Axhausen, 2003; Giuliano and Dargay, 2005; Dargay and Hanly, 2004; Johansson-Stenman, 2002; Abreu e Silva et al., 2006). Attitudes to environment are found to be relevant determinants for increasing public transport use (Steg et al., 2001; Golob and Hensher, 1998). However, despite of its importance, few authors incorporate it in estimations.

2.2 Public transport and motivation to drive less

Survey findings indicate that men tend to use their car or motorcycle more often than women, who generally use public transport. The main factor which would encourage people to drive less is improvements in public transport. Indeed, more than 50% of the respondents surveyed indicated that they would drive less if better public transport were available. In Mexico and Italy, this percentage reaches almost 70% (see Figure 3.6).

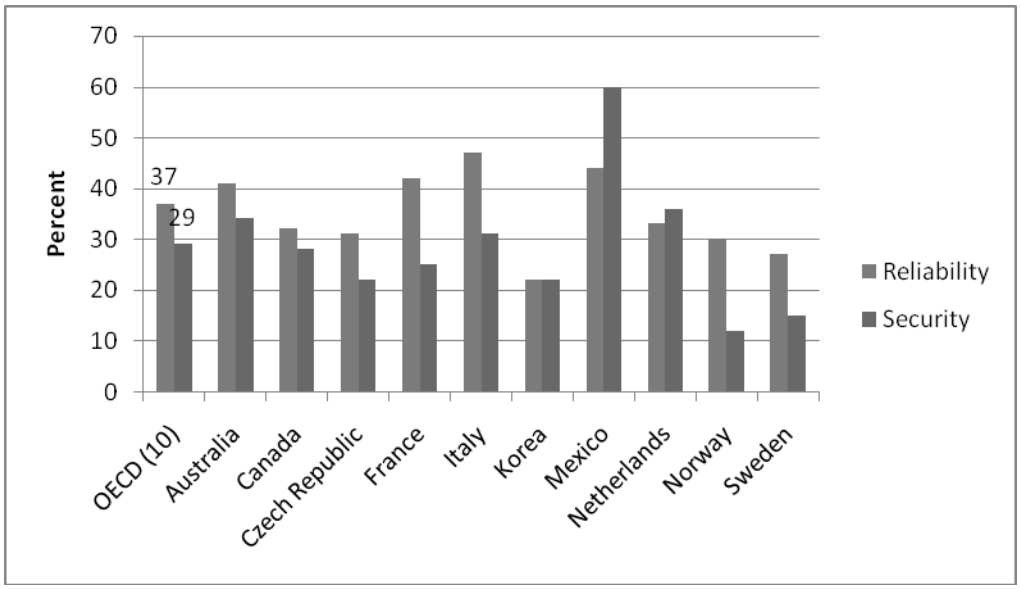
Figure 3.6 - Respondents' main motivations to reduce car use, by country.



The survey results suggest that increased rapidity is the aspect of public transport which is quite likely to encourage respondents to reduce their car/motorcycle the most (85%), followed by reliability (77%) and convenience (76%). More comfortable public transport comes next (73%) while security of public transport is the least frequently aspect of public transport stated by respondents (66%) as being quite or very likely to encourage them to use their car/motorcycle less. However, these figures show variations across countries (See Figure 3.7). The top three countries where reliability of public transport is reported

most likely to reduce driving are Italy, Mexico and France, while security seems to matter the most in Mexico.

Figure 3.7 - Extent to which reliability and security of public transport are reported to be very likely to reduce driving, by country.



Looking at the main mode of transportation for different activities (walking, car, public transport, and bicycle), the findings of the survey show that 20% of the respondents travel by public transport when commuting to and from work or visiting family and friends. When considering countries' differences, the results indicate that public transport are the main mode of transportation used to commute to and from work in Korea (45% of respondents) followed by Mexico and Sweden, while public transport is only cited by one Australian in 10.

The travel time to work (one way) is less than half an hour for 72 % of respondents. When asked how long it takes them to take public transport instead of driving a car for different travelling purposes (commute to and from work, shopping, education, and professional activities), in all cases, a greater proportion of respondents stated that it takes more time to use public transport compared to driving. For example, for almost half of the respondents, travelling to work by public transport takes more time, compared with 28% of respondents who said it takes the same or less time[13].

2.3 Determinants of mode choice and public transport use

Preliminary finding suggest that income determines the intensity of public transport use, but does not have a significant effect on the probability of commuting by public transport. The effect of gender on public transport use is consistent with the literature (Abreu e Silva et al., 2006; Johansson-Stenman, 2002). Being a woman tends to increase expenditures on public transport, as well as being a student and living in rural and suburban areas. The number of children younger than five years old decreases the probability of commuting by public transport, a result that is consistent with Dieleman et al. (2002).

[13] 16% of the respondents stated that it is not possible to use public transports to commute to work and 9% didn't know what to answer.

Results also indicate that for respondents who travel more than 30 minutes to commute to their work (one way), public transport expenditures are 51% greater. The findings indicate that people who have adopted some transport-related environmentally friendly' habits, such used car sharing/pooling, have a greater probability to commute by public transport, but this not imply an increase in intensity of use. However, respondents who adapted their driving style to use less fuel in the past year have a smaller probability of commuting by public transport. This result may indicate that these people prefer to keep commuting by car, but have decided to reduce their fuel consumption either for financial or environmental reasons. It is also notable that people concerned with air pollution are found to have a greater probability of commuting by public transport. On the other hand, concerns about climate change do not seem to be an important motivation for mode choice.

Finally, the effect of pricing measures on mode choice and public transport use is analysed using the survey data. Preliminary findings show that pricing measures, such as parking fees, have a positive effect on increasing the intensity of public transport use. However, it is worth noting that, pricing measures have a limited effect in promoting substitution of car use for alternative modes. They tend to increase the intensity of public transport, yet only for those that already use this mode of transport, at least some of the time.

CHAPTER 4. THE DETERMINANTS OF RESIDENTIAL ENERGY USE: A CROSS-COUNTRY ANALYSIS

This chapter presents findings on household environmental behaviour related to residential energy use. The analysis covers the determinants of energy efficiency (Section 1), as well as demand for renewable energy (Section 2).

The analysis on residential energy demand attempts to further our understanding of how respondents react to different types of policy instruments using the OECD 10 country web survey.

1. Energy Efficiency

Improving energy efficiency is a key challenge when addressing climate change issues. Improving energy efficiency is regarded as a priority of the EU climate policy. An EU Directive on end-use energy efficiency and energy services entered into force in 2006 and an EU energy efficiency action plan was adopted in 2006 to help reduce energy consumption by 20 per cent in 2020 (CEC, 2006). Besides, the directive on energy labelling and the 2002 energy performance of buildings directive are in the process of being revised. However, a report published early 2008 draws attention to the fact that most EU member states are not taking sufficient action on energy efficiency. Other OECD regions are also developing initiatives to improve residential energy efficiency. Recent measures include the phasing-out of incandescent bulbs in Australia, by 2009 as well as the enforcement of new lighting standards; the provision of grants to homeowners in Canada to improve the energy performance of their dwellings (ecoENERGY Retrofit – Homes); and the Korean "e-Standby Programme", a national initiative to reduce standby power of electronic appliances.

The main questions addressed in this section include:

- How do general attitudes towards the environment (environmental awareness; membership in environmental organization; …) influence demand energy efficiency?
- Who invests in energy efficiency measures? Who takes advantage of grants to invest for energy conservation?
- How effective is energy efficiency labeling for appliances (and for buildings when available)?
- Who is most adversely affected by increases in residential energy prices?

1.1 Existing evidence

The previous OECD publication presenting the results of a literature review on household behaviour and environmental policy (OECD, 2008b) summarized a number of salient points about residential energy demand, which are listed here:

1. Demand for energy is generally quite price-inelastic. There is some consensus on the short-run price-elasticity being about 0.3. The long-run price elasticity might be 0.7. Thus, over the long-run energy demand responds to price in a non-negligible manner. Economists have been more optimistic than many other researchers about the price response.

2. Demand for energy responds to income, but the response varies substantially across studies. If a number must be singled out, a not unreasonable choice would be close to unity and lower in the short-run. More recent estimates tend to push these figures downwards.
3. Price- and income elasticities vary across data type (time-series, cross-section, panel), methodology, time-period and short-run vs. long-run. Thus, it might be dangerous to use average elasticities when trying to judge a demand elasticity in a particular case.
4. According to the mainstream economic view, income encompasses a large number of factors that superficially seems to affect demand. While additional appliances increase energy demand, they were bought because increases in income. The same mechanism might well explain variations across demographic factors. For example, because age and income are usually strongly positively correlated, it is difficult to disentangle their respective impact.
5. Demand for energy depends on a host of exogenous factors, most importantly temperature.
6. Attitudes such as "feelings of obligation", "importance of conservation" as well as "comfort and health concerns" have been found to correlate with energy conservation behaviour. Psychology-based studies show mixed results; in some studies attitudinal variables are important, in others not. An open question is still whether the "green consumer" will dominate consumption patterns to such a degree than environmental policies are not needed.
7. Mass information ("please turn off the lights") has limited success. There is a large literature in psychology on targeted information again with varying success rate.
8. Insofar as the impact of demographic variables on energy consumption can be detached from income influence, empirics suggest that energy consumption varies over the lifecycle and cultural practices.
9. Energy policy tends to have regressive impacts, because energy budget-shares decrease with income. To substitute away from higher energy prices, households may have to install capital-intensive equipment. The extent to which households can use the capital markets have implications for the regressivity of energy policy.

1.2 Main results

Energy costs

Question Q70 asks respondents if they took into account energy costs when purchasing or renting their current primary residence. Approximately 30% of the respondents reported taking into account such costs. The highest percentage is found in Czech Republic (49%), followed by Canada (41%), Korea (37%) and Mexico (37%). Energy costs were less often considered in Norway (22%), Netherlands and Australia (19%).

Energy costs are more likely to be considered in a household's choice of housing by older people, with university education, more children (particularly younger than 5), owner-occupier and who recently moved in houses built in the last 5 years. Respondents with the pro-environmental attitudes are also more likely to take into account energy costs when purchasing or renting their primary residence.

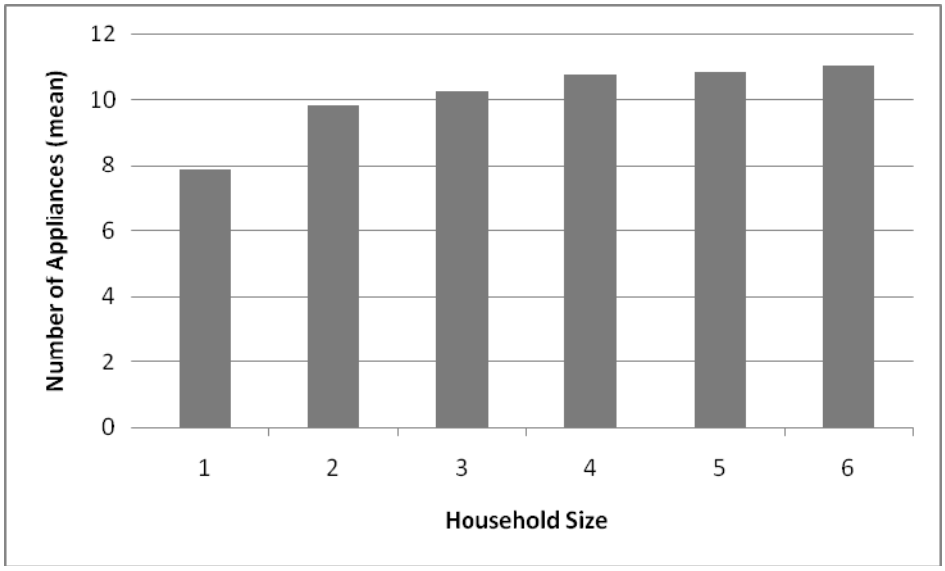
Electric Appliances

The questionnaire also allowed collecting information about whether households are equipped with certain appliances and in case they are, how many appliances of particular type they have in their primary residence. On average, the household have almost 10 electric appliances of those listed for which information is requested. The highest number of these appliances is found in Australia, Norway and Canada (more than

11), while Korean, Mexican and Czech households are equipped by the lowest number of the appliances (about 8).

Findings suggest that income and ownership of appliances is positively correlated for appliances such as washing machines, microwaves, and set-top boxes. The number of appliances is increasing with the size of the household (see Figure 4.1). In general, semi-detached and detached houses are more likely to be equipped with the appliances, and the probability of the households having an appliance increases with the size of residence.

Figure 4.1 – Effect of household size

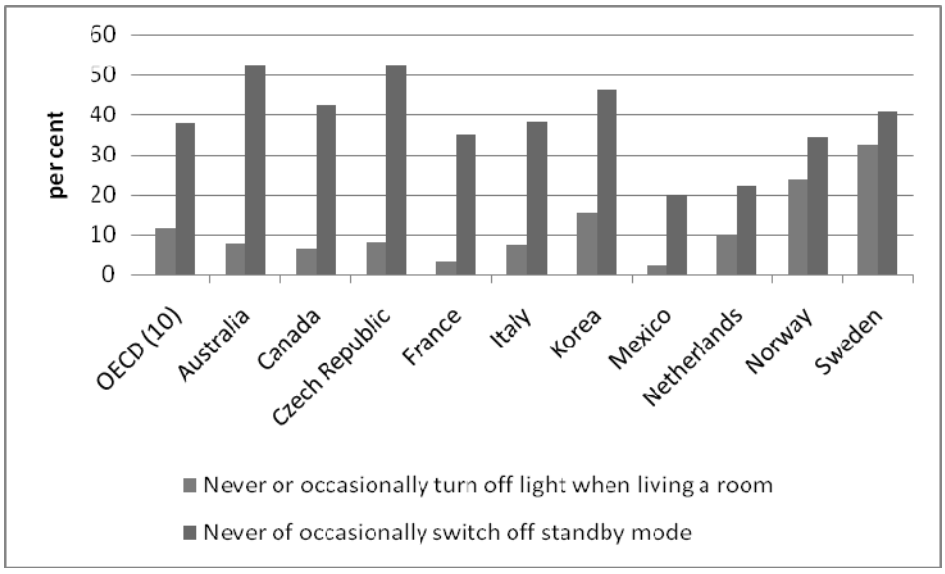


Energy Saving Behaviour

The questionnaire allows collecting information on households' energy saving behaviour. Four types of energy-saving activities are distinguished: switching off lights when living a room, cutting down on air conditioning or heating to limit energy consumption, energy-efficient use of washing machines or dishwashers, turning off appliances when not in use, turning-off of the stand-by mode of appliances/electronic devices (Q72).

Survey results show that turning off the light is the most common energy-saving activity, followed by economic use of washers and washing machines, and turning off the appliances when not in use. On the other hand, an activity that is the rarest is turning off of the stand-by mode. Survey results show great variation across countries. Australia, Czech Republic and Korea have the highest percentage of respondents reporting that they never or occasionally switch off standby mode of appliances and electronic devices (approximately 50%), while Norwegians and Swedes reported turning off lights when leaving a room less often than respondent from other counties (see Figure 4.2).

Figure 4.2 – Energy Saving Behaviour



With respect to the characteristics of respondents, women and older people tend to perform energy-saving activities more often. Interestingly, education level is associated with energy-saving activities only weakly and negatively. Income is negatively associated with energy saving activities.

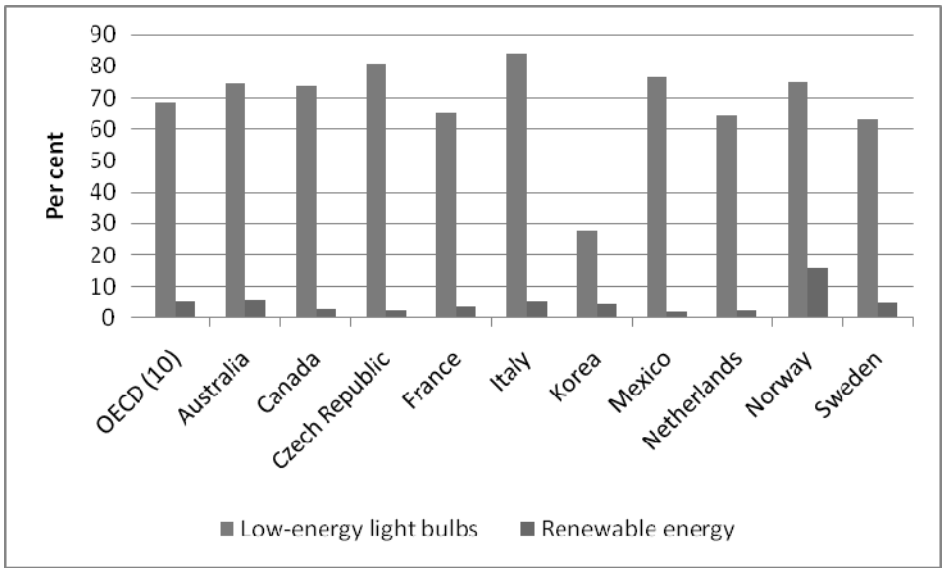
Concerning attitudinal variables, respondents concerned with the environment tend to perform energy saving activities more often as well as respondents who reported taking into account environmental labels when purchasing a good. Interestingly, people supporting environmental organization or being active in such organization did not generally report higher frequency of energy saving activities.

Energy Saving Equipments

The questionnaire provides information on energy saving equipments as well. Respondents were asked if they had installed in their current primary residence any of the following 5 items over the past ten years: energy-efficiency-rated appliances (e.g. top rated washing machines, refrigerators), low-energy light bulbs (compact fluorescent), thermal insulation (e.g. walls/roof insulation, double-glazing), efficient heating boiler (e.g. condensing boiler), or renewable energy (e.g. solar panels, wind turbines).

The percentage of respondents reporting having installed low-energy light bulbs in their current primary residence over the ten past years is quiet similar in all ten countries (around 70% for the whole sample), except for Korea (28%). As expected, the percentage of respondents reporting having installed renewable energy is low (around 5% for the whole sample). Norway is an exception with more than 15% (see Figure 4.3).

Figure 4.3 – Energy Saving Behaviour



From those who installed certain energy-related equipment, 26% received public support for installation of renewable energy equipment.

The results suggest that owner-occupier households are more likely to make energy efficiency investments than tenants. Environmental attitudes increase probability to invest in energy efficient equipments.

2. Demand for renewable energy

The main questions addressed in this section include:

- How much are households willing to pay to use only renewable energy? Does WTP vary significantly across household groups?
- How do general attitudes towards the environment (e.g. environmental awareness; membership in environmental organization) influence demand for renewable energy?
- Who invests in renewable energy?

2.1 Existing evidence

The literature on renewable energy is rather extensive and many papers try to place a value on the price premium for renewable electricity (see Longo et al., 2006). Quite a few valuation studies have been carried out in the United States (Farhar, 1999; Zarnikau, 2003; Jensen et al., 2004, Roe et al., 2001), and in the United Kingdom (Diaz-Rainey and Ashton, 2007; Fouquet, 1998; Batley et al., 2001; Hanley and Nevin, 1999). Some results suggest that socio-demographic parameters such as age, education and income are significant explanatory factors of the willingness to pay for renewable energy.

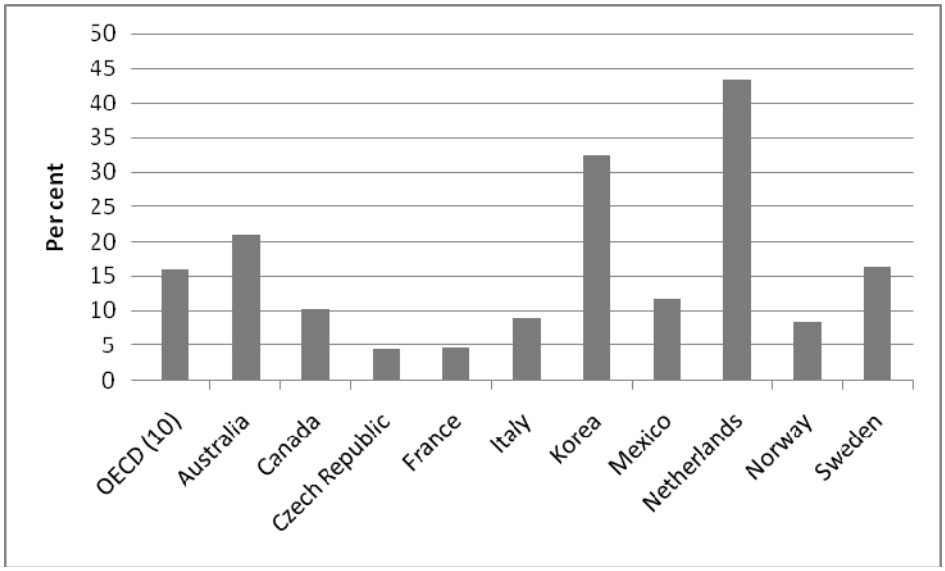
The correlation between attitudinal factors and WTP for green electricity is also examined in the literature (Diaz-Rainey and Ashton, 2007; Ek and Söderholm, 2008). The authors find that while income is a main component in understanding the decision to by green energy, attitudinal variables such as perceived responsibility also plays an important role.

2.2 Survey data

In the survey, by "renewable energy" we mean energy sources such as wind, solar, geothermal, hydro." The survey contains information that allows detailed analysis on renewable energy demand. The principal information comes from Q67, Q68 and Q69.

Looking at whether or not the household has undertaken special measures to buy renewable energy (Q67), survey results show considerable variation across countries, with the Netherlands[14] displaying the most highest percentage of households stating that they take special measures ((43%) followed by Korea (33%), while France, Italy and Czech Republic and Norway record less than 10%. Figure 4.4 presents results for the OECD (10), and by country.

Figure 4.4 - Percentage of households taking measures to buy renewable energy from their energy provider.



Respondents who answer "no" to the previous question are asked why they do not buy renewable energy (Q68). Table 4.1 presents the summary across countries. The proportion of respondents stating that the service is not available and their household is not interested is remarkably consistent across countries and represents 8% of the whole sample. The number of respondents saying that they have no access, but are interested to use the service is consistent with the literature reviewed. These results can be interpreted as suggesting that the latent unfilled demand for renewable energy is significant. The last column in the table shows that there may be an information gap to be filled. Many respondents claim that "I don't know anything about these kinds of services".

Table 4.1 - Reason for not buying renewable energy

	NA, not	NA, but	Avail., not	Already	No knowledge

[14] Figure for the Dutch respondents seem to be consistent with a finding reported in Bird et al. (2002). For a discussion about the policies employed in Netherlands in this context, see van Rooijen, and van Wees (2006).

	interested	interested	interested	avail.	
OECD (10)	8%	40%	9%	8%	33%
Australia	7%	27%	22%	8%	36%
Canada	9%	47%	4%	9%	30%
Czech Republic	7%	41%	5%	4%	42%
France	11%	37%	3%	4%	44%
Italy	11%	46%	4%	2%	37%
Korea	7%	67%	2%	3%	21%
Mexico	9%	74%	1%	2%	15%
Netherlands	4%	3%	53%	19%	21%
Norway	10%	32%	1%	25%	32%
Sweden	9%	22%	12%	5%	51%

2.3 Main results

How much are households willing to pay to use only renewable energy?

Question 69 asks "What is the maximum percentage increase on your annual bill you are willing to pay to use only renewable energy? Please assume that your energy consumption remains constant".

The preliminary results findings of the survey suggest that the short answer to the first question is: not much. While there is significant variation across countries, the respondents display a price premium of less than 5%. This finding is well within the range of results reported in recent research. Furthermore, the stated price premium varies across household groups in several ways. However, household income plays little, if any, role, according to the model used and, most importantly, given how income is measured in the survey.

Does attitude towards the environment influence demand for renewable energy?

A consistent message across the models used here is that environmental awareness and especially membership in environmental organizations play an important role in the demand for renewable energy. This result is found in several other studies as well.

Who invests in renewable energy?

The questionnaire provides information about investment in renewable energy by asking respondent whether or not the household has installed renewable energy equipment in the past 10 years, in their primary residence.

Are "investors" different in some dimensions from those who have chosen not to invest in renewable energy? According to the analysis, one answer to the question is that the investor in renewable energy is more likely to be: Italian, Norwegian or Korean (and less likely to be a Canadian); a man; living in a detached house; a member of an environmental organization, and to have also installed energy efficiency equipment (e.g. a condensing boiler). Because only about 5% of the sample has invested in renewable energy equipment, these results need to be interpreted with caution.

CHAPTER 5. THE DETERMINANTS OF ORGANIC FOOD CONSUMPTION: A CROSS-COUNTRY ANALYSIS

This chapter presents preliminary findings on household behaviour related to organic food consumption.

Some of the main issues to be examined in this chapter include the following:

- What more strongly encourages consumption of organic foods – concern for private health or public environmental concerns?
- For which type of foods (dairy, fruit, meat, etc...) is organic labeling most effective? For which type of household? Which labels are the more effective at inducing organic food consumption?
- How do general attitudes towards the environment (environmental awareness; membership in environmental organization; …) influence organic food consumption?
- What would households generally be willing-to-pay as a price premium to purchase organic foods? Are there important differences for different types of food (dairy, meat, eggs, etc…).
- Who would be most adversely affected by increase in organic food prices?

1. Reviewing the evidence

Studies available suggest that most consumers are not willing to pay a price premium higher than 10-20% for organic food compared to conventional food. Yet, analyses of specific organic food markets across countries suggest substantially higher actual price premiums of certain products. Examples include eggs and poultry in the United States (Oberholtzer et *al.*, 2006), or pork in Canada.

The use of contingent valuation methods to elicit Willingness-to-pay (WTP) for food quality attributes such as organic is quite common in the literature. Available evidence indicates that the influence of socio-economic and demographic factors, like education or age, on WTP can be significant. Several studies also report that the likelihood of purchasing organic products and paying a premium increases with income (Torjusen et al., 1999; Hill and Lynchechaun, 2002; Fotopoulos and Krystallis, 2002; O'Donovan and McCarthy, 2002; Sandalidou et al., 2002).

However, findings are sometimes contradictory. Although most studies report that women are more likely to purchase organic food than men (Rimal et al. 2005), other studies suggest the opposite (Wandel and Bugge, 1996). In a similar way, some US studies reported that income had no significant influence on WTP for organic products (Wilkins and Hillers, 1994) which contrast with general findings. Besides, some studies find no clear linkages between demand for organic food products and socio-demographic characteristics of households such as gender, age, or education (Willer and Yussefi, 2004).

Knowledge and awareness about organic products seem to have direct and indirect effects on consumer attitudes and the willingness to pay a price premium for organic food. Because organic products are credence

goods[15], consumers may not know whether a product is produced using organic or conventional methods, even after repeated purchase and consumption (Giannakas, 2002). Several studies have found a positive relationship between consumer purchase decisions and organic product labeling (Chang and Kinnucan, 1991; Kim et al., 1999; Wessels et al., 1999; Øystein et al., 2002).

The literature addressed the issue of whether environmental or health considerations are the most important in households' decision to consume organic food and a number of studies highlight the role of health concerns as a main motivation to buy organic food (Wier and Calverley, 2002; Fotopoulos and Krystallis, 2002; Schifferstein and Oude Ophuis, 1998; Chinnici et al., 2002; Baker et al., 2004).

Finally, few studies consider the impact of attitudinal factors such as concern for the environment as a determinant of organic food consumption. Recent results indicate that environmental motives can have a strong positive impact on consumers' attitudes towards organic food (Honkanen et al., 2006; Squires et al., 2001; Harper and Makatouni, 2002).

2. Main results of the survey

2.1 Consumption of organic food

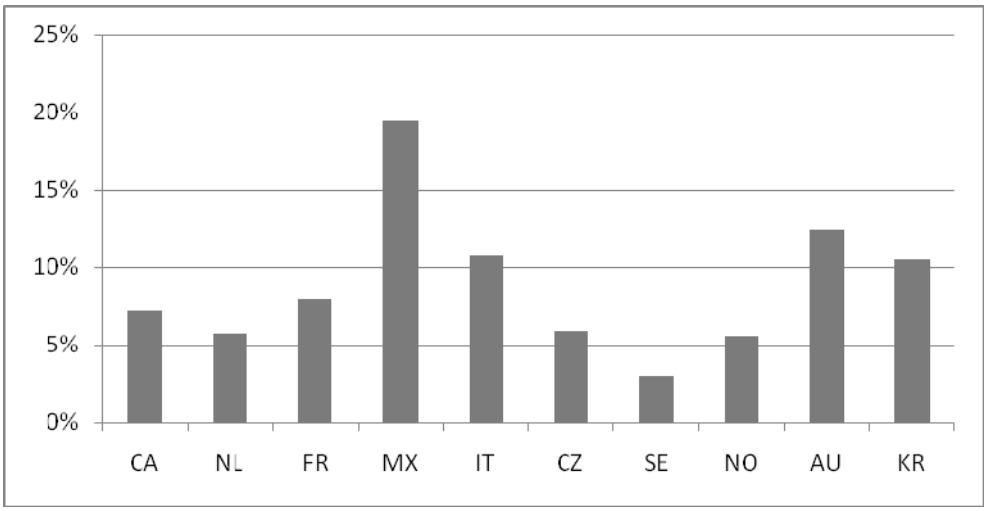
Most socio-economic and demographic variables are not found to be significant. Preliminary findings suggest that married respondents have lower expenditure shares of organic food for all products except eggs. Similarly to other empirical studies, we found a negative relationship between age and consumption: respondents over 35 years of age spend relatively less on organic products in all product categories.

The organic expenditure share increases with the size of the family and is higher for individuals living in urban areas. Environmental motivation confirms its leading role in stimulating the consumption of organic food for most product categories. Health concerns seem to be particularly important for 'fresh fruits and vegetables': the result is not surprising, because chemicals (pesticide) residues are perceived to be an health issue especially for these products.

Labelling identification doesn't seem to be an issue in most of the countries surveyed, with the exception on Mexico where almost 20% of the respondents report that they find it "very difficult" to identify organic food labels (see Figure 5.1). The degree of comprehension has a positive and significant impact on organic food consumption for several products. The easier to understand the label, the larger the share of organic products in these categories (e.g. fresh fruits and vegetables, milk and other dairy products).

[15] Credence goods can be defined as goods and services where there is a major asymmetric information problem between the consumer and the supplier. In contrast to experience goods, the utility gain or loss of credence goods is difficult to measure after consumption as well.

Figure 5.1 - Percentage of respondents reporting that it is "Very Difficult" to Identify Organic Food Labels



2.2 Willingness to pay for organic food

In general, the analysis shows a relatively low Willingness-to-pay (WTP) for the added value of organic food. Several factors trigger consumption, but they mostly increase the probability of paying a premium not greater than 15%.

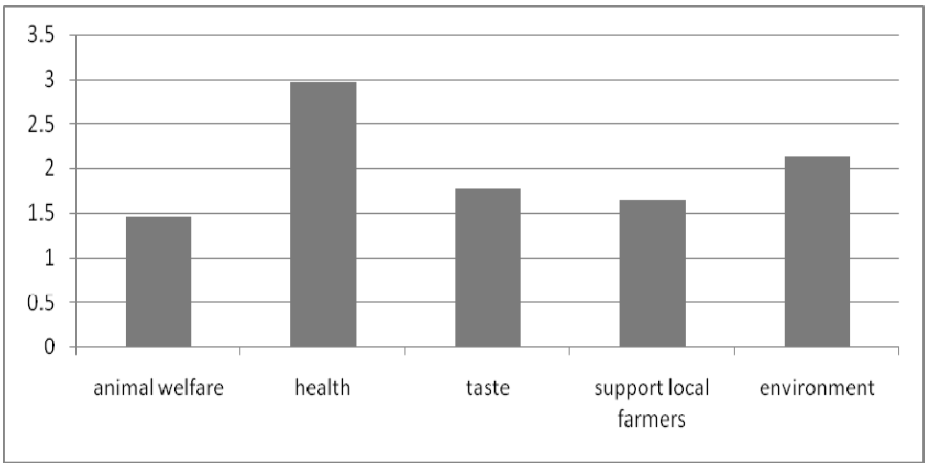
Preliminary findings indicate that willingness to pay (WTP) for organic food increases with education for all products. The consumption of organic food appears to be only weakly related to income. Respondents who live in urban areas have a higher mean WTP for organics. In addition, attitudinal variables such as concern for the environment increase the willingness to pay more for organics. However, consumers currently willing to pay high premiums for organics would like to have more confidence in the importance of these benefits.

It is interesting to note that consumers not willing to pay much for organics do not trust the actual certification systems.

2.3 Relative importance of health versus environment concerns

Respondents were asked to rank the different factors in terms of their on their motivation to consume (or buy) organic food. In line with the literature, health aspects were ranked first. The preservation of the environment comes second followed by taste and support to local farming. Animal welfare comes last (see Figure 5.2).

Figure 5.2 - Main motivation to consume organic food products.



In order to assess whether health or environmental concerns are more important in the individual purchase decision, respondents were asked to indicate if they would continue to consume organic products if it was proved that organic food is better for personal health, but that there is no indication that it is better for the environment, or in the opposite case if organic food is better for the environment, but there is no indication that it is better for personal health. Preliminary results indicate that a greater proportion of respondents would continue to consume organic food products in the second case (52%) than in the first case (45%), confirming the importance of heath aspects in the motivation of households to consume organic food.

CHAPTER 6. HOUSEHOLD WASTE GENERATION AND RECYCLING: A CROSS-COUNTRY ANALYSIS

This chapter presents findings on household environmental behaviour related to domestic waste. The analysis covers waste generation (Section 1), as well as waste recycling and waste prevention (Section 2).

1. Waste generation

The OECD data set provides information on the quantity of mixed waste put out for collection each week, as well as the characteristics of mixed waste collection services and the way households are charged for waste management in their primary residence.

This section will seek to answer the following questions:

- Whether unit-based waste fees have significant effects on waste generation relative to 'flat' (or no) fees? Does this vary significantly by material? Does this vary significantly by type of unit-pricing (e.g. weight-, volume-, frequency-based)?
- To which extent is household waste generation affected by attributes of waste-related public services? (e.g. frequency of waste collection services)?
- How do general attitudes towards the environment (environmental awareness; membership in environmental organization; …) influence waste generation levels?
- Who would be most adversely affected by increases in waste charges?

1.1. Existing evidence

The literature on waste generation mainly focuses on the effects of unit pricing where households pay according to the amount of waste put out for collection. In general, studies conclude that a unit-based fee is effective at reducing waste, compared to no fee or to a fixed fee with which generating an additional bag of garbage entails no cost for the household. There is evidence that unit pricing yields the benefits predicted on theoretical grounds. In terms of the relative performance of the various unit pricing systems, there is some indication that a volume-based system[16] tends to provide households with stronger incentives than a system where households contract for a specified volume of waste to be picked up at given intervals. The empirical literature is limited on the effects of other types of unit pricing on waste generation and recycling. The few studies which compare the incentives provided to households in volume and weight-based programs stress the risk of household engaging in "stomping" to reduce waste volume in the volume-based system (Fullerton and Kinnaman, 1996).

Municipalities also often implement recycling programmes as a means of diverting waste from landfills. Various waste separation services, door-to-door or drop-off programmes, can be provided to households to

[16] For instance, bag or tag programmes require households to either purchase specific waste bags or stickers to fix on their own containers.

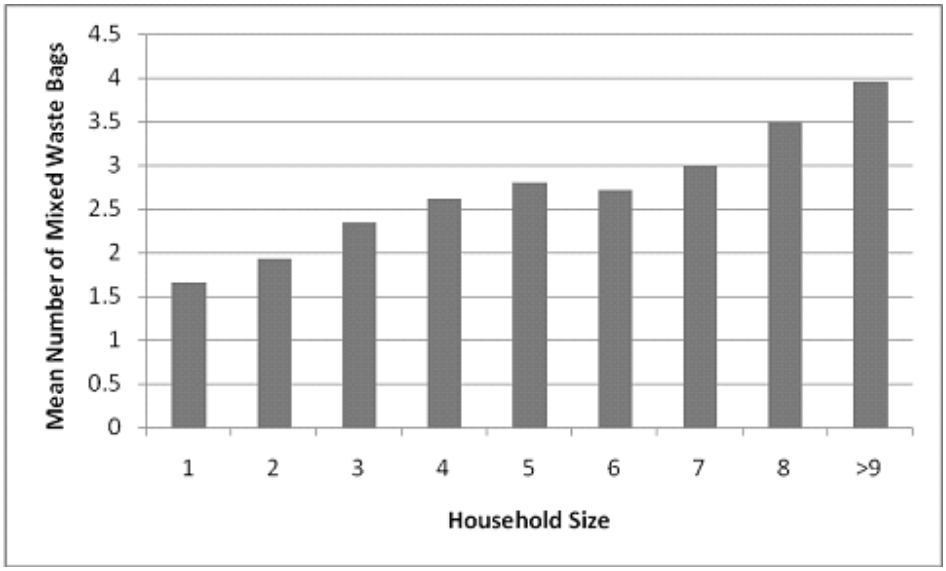
reduce the time and inconvenience costs associated with recycling. Findings here suggest that municipalities with recycling programs tend to have higher recycling rates but not necessarily for every type of recyclable material. In addition, the available evidence suggests that curbside recycling is more effective if combined with unit pricing, and vice versa.

The impact of income on waste disposal is well documented. High-income households tend to dispose of more waste than low-income households. Evidence suggests that user charges may be regressive in the sense that low-income households would pay a greater proportion of their income in waste collection charges than do higher income households. Finally, demand for mixed waste collection services tend to increase with household size.

1.2. Preliminary findings

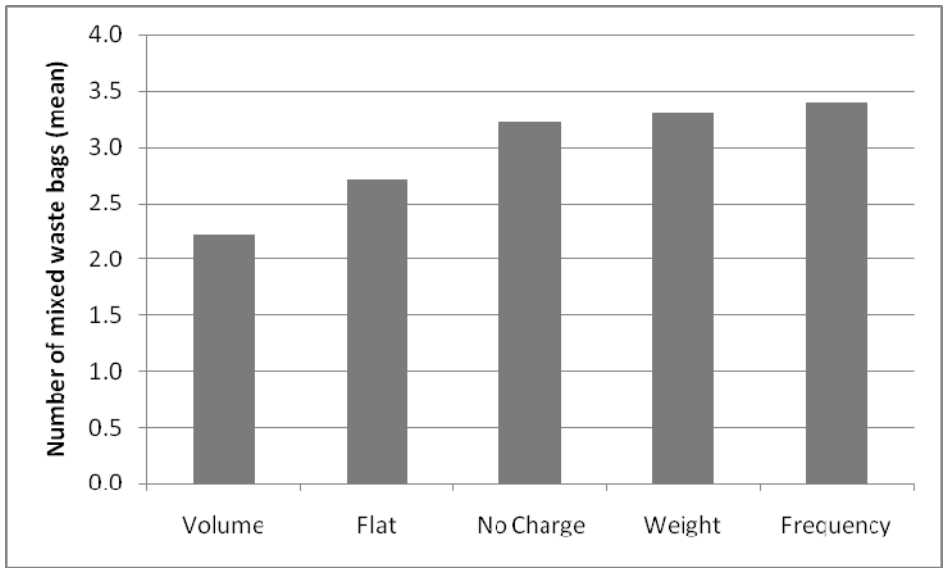
The preliminary results indicate that quantity of mixed waste put out for collection by households increase with household's size. It is important to note that while the relationship is positive, the quantity of waste produced does not increase proportionally with the size of the households (see Figure 6.1).

Figure 6.1 – Effect of household size



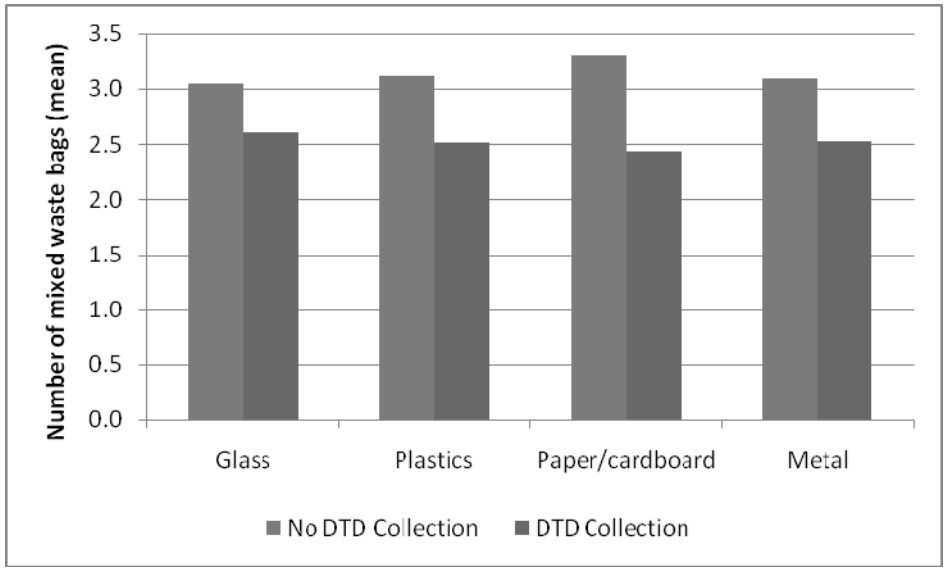
Looking at the effect of different unit pricing schemes on the volume of mixed waste put out by households for collection each week, the results indicate that, as expected, a system where waste is charged according to volume (number of bags) results in less missed waste generation than other systems (see Figure 6.2). Differences between waste generation rates, for other systems, are likely to be attributable to other correlated factors. It is interesting to note that weight-based systems do not result in less bags put out for mixed waste collection per week than a "no charge" system, reflecting the common finding that a charge on weight does not affect volume.

Figure 6.2 – Effect of different pricing systems



The questionnaire provides information on the different types of waste collection services available to respondents for selected materials including glass, plastic, aluminium/tin/steel, and paper/cardboard. As expected, and consistent with the literature, the availability of door-to-door collection services tends to reduce the number of bags of mixed waste produced per week. The difference appears to be relatively greater for 'bulkiest' waste such as paper/cardboard (see Figure 6.3).

Figure 6.3 – Effect of door-to-door recycling collection services



2. Waste Recycling

This section will seek to answer the following questions:

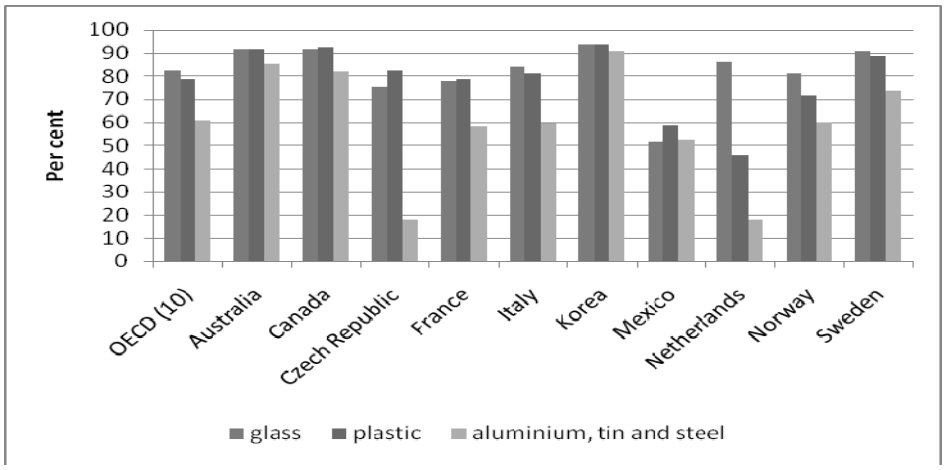
- Whether unit-based waste fees have significant effects on waste recycling rates relative to 'flat' (or no) fees? Does this vary significantly by material? Does this vary significantly by type of unit-pricing (e.g. weight-, volume-, frequency-based)
- Does the presence of a recycling programme significantly affect the effect of a user fee on recycling? Does this vary significantly by material?
- To which extent do household waste recycling decisions depend on the attributes of recycling programmes (e.g. door-to-door/drop off; frequency of pick up)? Does this vary significantly by material?
- How do general attitudes towards the environment (environmental awareness; membership in environmental organization; …) influence waste recycling levels?
- What would households generally be willing-to-pay for waste separation to be carried out by a third party on their behalf?
- Who is most adversely affected by increases in waste charges?

2.1 Determinants of waste recycling

Most households reported recycling different materials. The analysis suggests that the decision to recycle a particular material has a positive influence on the decision to recycle another material. This correlation is particularly strong among glass, plastic, aluminium, and paper, which tend to be recycled together with the same type of collection services.

Preliminary results indicate that the decision to recycle or not, and recycling levels, vary among countries. This suggests that institutional and cultural factors tend to play a role in household recycling behaviour. Australia, Canada, Korea and Sweden show the highest recycling participation rates for most of the materials considered in the survey: glass; plastic; aluminium, tin and steel; paper; food/garden waste; batteries and pharmaceuticals. Figure 6.4 presents the percentage of respondents recycling different materials in the 10 countries surveyed. In terms of the percentage of the different materials recycled by households, rates are highest in Sweden.

Figure 6.4 – Household recycling behaviour for selected materials

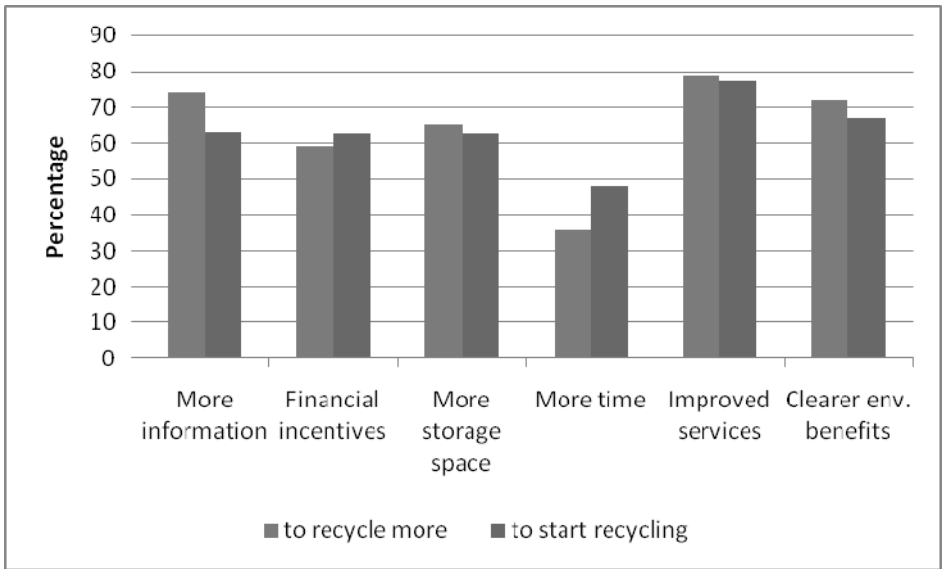


Results indicate that being married or living as a couple has a positive effect on recycling participation and intensity for glass and plastic. Age is also an important factor: in general, young individuals tend to recycle less. Household size does not seem to matter but household composition does. The presence of children under 5 reduces both participation and intensity of recycling for glass, plastic, and paper. Income seems to have an impact with higher income households being more likely to recycle glass and plastic. Finally, home ownership and size of residence tend to encourage increased recycling.

The evidence supporting the importance of attitudinal characteristics in the recycling decision is quite strong. The index measuring the level of concern towards the environment always has a positive effect on recycling, independent of the material in question.

Survey results suggest that the main motivation to recycle more are improved collection and recycling services, and more practical information about recycling options. A clearer perception that recycling will lead to environmental benefits is another key factor. This finding is in line with the conclusion that attitudes towards the environment are important in recycling decisions. Figure 6.5 presents household's main motivations for recycling more (or starting to recycle if they do not already report doing so).

Figure 6.5 – Main motivation to recycle



The relationship between the effects of unit pricing for mixed waste and the provision of recycling services is interesting. When assessed on their own, both have a positive impact. However, when unit pricing is assessed in conjunction with door-to-door collection, the evidence suggests that the presence of curbside collection is more likely to reduce the effectiveness of unit pricing rather than to increase it. Hence, from a policy point of view, door-to-door collection and unit pricing may be substitutes rather than complements, at least with respect to their effect on recycling. Unit pricing indices waste prevention.

The policy variables which most significantly influence household recycling participation and the intensity of recycling across the five materials considered are: the type of collection service available for recyclable materials, the frequency of door-to-door collection if available, and the frequency of mixed waste collection. As for specific types of services, door-to-door collection and drop-off containers are always effective at increasing recycling, bring back with refund is effective for glass, plastic, and aluminium, and bring back without a refund is never effective.

While the presence of door-to-door collection for recyclables increases recycling levels, the frequency of collection has a negative impact on both recycling participation and intensity for all materials but food. Increasing how often mixed waste is collected also reduces recycling.

2.2 Determinants of willingness to pay for recycling services

The Survey addresses the question about the willingness to pay for recycling services through two questions. A fist question asks respondents how much they would be willing to pay each month for having a third party taking care of separating waste at home in their place (Q45). If the answer to Q45 is zero, respondent are asked why they would not be willing to pay anything for this service (Q46).

Findings show that the following socio-demographic variables are significant: age, household composition, employment status and residence type are significant in both empirical analyses. In particular, younger individuals (between 18 and 34 years of age), individuals living in households with more adults, and individuals working full time are more likely to express a positive willingness to pay and also tend to have a higher willingness to pay. On the other hand, students and individuals living in a house are less likely to be willing to pay for recycling services and tend to have a lower willingness to pay. Furthermore, the probability of a positive willingness to pay is higher for smaller residence.

Among attitudinal variables, concern for the environment has a significantly positive effect on the probability of willing to pay for this service and on the amount respondents are willing to pay. Social norms, as reflected by a belief that recycling is a civic duty and/or by a desire to be seen by others as responsible citizens, increase the willingness to pay as well. It is interesting to note that among respondents willing to pay nothing for "recycling services", 65% state that they prefer to be responsible for recycling themselves (see table 6.1).

Table 6.1 – Reason for zero-willingness to pay for recycling services (in percentages)

Prefer to be responsible for recycling	Can't afford it	It does not concern me	Other
65%	20%	10%	5%

With respect to policy variables, results suggests that in the presence of economic incentives for recycling, individuals are less likely to be willing to pay for recycling services but when recycling is mandatory, they tend to express a higher willingness to pay by about one euro. The presence of any type of unit pricing system does not seem to influence willingness to pay.

Finally, there is some evidence that the extent to which illegal disposal is considered a problem is significant in the choice about willingness to pay.

3. Waste Prevention and Illegal Dumping

This section will seek to answer the following questions:

- Does the labelling of consumer products with their recycled content influence purchasing decisions?
- Whether unit-based waste fees have significant effects on waste prevention (e.g. products with reduced toxic content, refillable containers) relative to 'flat' (or no) fees?
- Do waste fees affect the perception that illegal dumping is a significant problem?

3.1 Determinants of waste prevention

The OECD Survey allows addressing the question about waste prevention and the factors contributing to waste prevention indirectly. Two questions can be used in the analysis: whether or not logos related to waste are taken into account by households in their purchasing decisions (Q34) and a question about the frequency of use of products with recycled content and refillable containers.

There exist institutional and cultural factors which yield differences across countries. The results suggest that the probability of engaging in waste prevention, as captured by the probability of taking into account recycling logo/label information in purchasing decisions, is higher in Sweden than in any other country. The results also suggest that the intensity of waste prevention, as captured by how regularly products with recycled content or refillable containers are used is, for the most part, lower in Sweden than in the other countries. However, Korea respondents have a lower intensity of use for products with recycled content relative to Sweden.

In terms of socio-demographic characteristics, age and education seem to matter for the use of products with recycled content, in addition to gender and type of area of residency. Specifically, younger and/or male individuals, less educated individuals, and individuals living in an urban or suburban area tend to use products with recycled content less regularly.

Results indicate that individuals who report greater concern for environmental problems or provide time and/or money to environmental organizations are more likely to engage in waste prevention. Individuals who rank environmental concerns high in order of importance or show a stronger attitude towards the environment are more likely to take recycling labels into account in purchasing decisions, but there is no evidence that they make more extensive use of products with recycled content or of refillable containers. Individuals who believe that recycling is beneficial for the environment or that it is a civic duty tend to be more likely to engage in waste prevention activities. However, individuals who face mandatory recycling are less likely to account for recycling labels in their purchasing decisions, while individuals who want to be seen by others as responsible citizens or consider economic incentives in recycling decisions, make greater use of products with recycled content and of refillable containers.

Looking at policy variables, unit pricing, whether based on weight, volume, or frequency, does not seem to affect waste prevention decisions. Finally, the presence of any type of waste collection service for each of the five recyclable materials included in the analysis is consistently insignificant; hence, the presence of waste collection services for recyclables does not affect whether recycling labels are taken into account in purchasing decisions and how often products with recycled content or refillable containers are used.

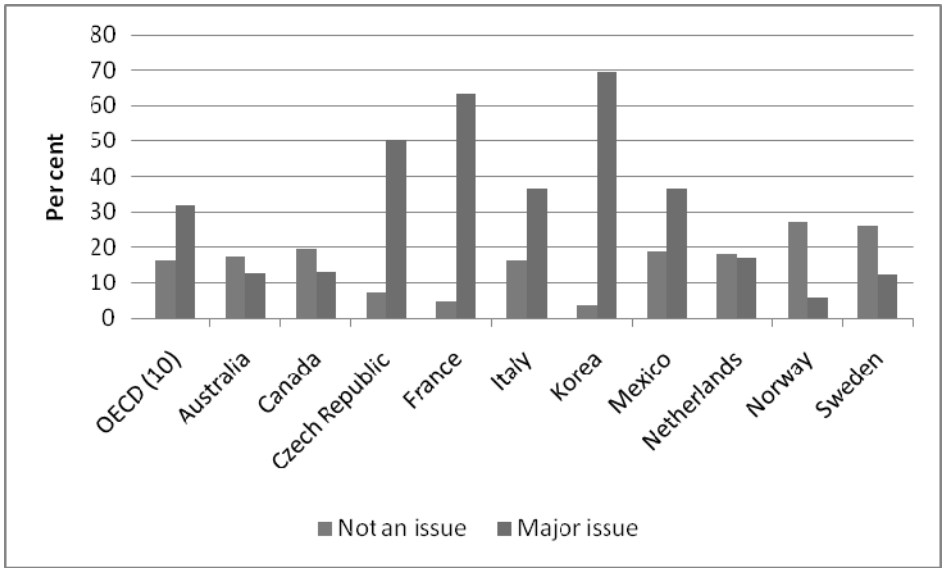
3.1 Illegal dumping

Although illegal disposal is often considered as a main shortcoming of a unit pricing system, the empirical studies that attempt to measure the impact of implementing such a system on households' propensity for illegal disposal do not allow for a definitive statement.

Most conclude that illegal activities are either not a problem (Reschovsky and Stone, 1994; Van Houtven and Morris, 1999; Dijkgraaf and Gradus, 2004), or a limited one. In the last case, the effect consists merely of small waste transfers to neighbouring municipalities without unit pricing (Linderhof *et al.,* 2001) which tends to decrease over time (Miranda and Aldy, 1998). On exception is the study by Fullerton and Kinnaman (1996) that reports significant increases in illegal waste disposal (up to 40 percent of the weight reduction in curbside garbage).

The data collected in the OECD Survey includes respondents characterization of the issue of illegal disposal in their area. Based on the responses, more respondents living in communities with a volume-based program seem to describe illegal disposal as a major problem. Figure 6.6 presents the proportions of respondents for which think that it is a "moderately important problem" or a "major problem" in the total sample as well as per country.

Figure 6.6 – Respondents opinion on illegal dumping



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ANNEX 1 – OECD QUESTIONNAIRE ON HOUSEHOLD ENVIRONMENTAL BEHAVIOUR IN FIVE AREAS: WASTE, TRANSPORT, ENERGY, OEGANIC FOOD AND WATER

ENVIRONMENT DIRECTORATE

OECD QUESTIONNAIRE ON HOUSEHOLD ENVIRONMENTAL BEHAVIOUR

2008 OECD SURVEY

CANADIAN EDIT MASTER – ENGLISH VERSION

1. How would you define your status in your current primary residence?

1. Married or living as a couple
2. Living with parents or other relatives
3. Living alone
4. Living as a single parent
5. Sharing a house/flat with non-family members

2. Thinking about purchasing responsibilities for the household (utility bills, grocery shopping etc), would you say that:

1. You have primary responsibility for these decisions
2. You share responsibilities for these decisions
3. You have no responsibility for these decisions **-> CLOSE SURVEY**

Part A - SOCIO-DEMOGRAPHIC CHARACTERISTICS

3. Are you :

1. Male
2. Female

4. What year were you born?

5. How many adults of 18 years old or more (including yourself) live in your household?

1. 1
2. 2
3. 3
4. 4
5. 5+

6. How many children, under 18, live in your household?

1. 0
2. 1
3. 2
4. 3
5. 4
6. 5+

ASK Q6b TO THOSE WITH CHILDREN (Q6=2-6)

6b. How many of these children are under 5 years old?

1. 0
2. 1
3. 2
4. 3
5. 4
6. 5+

7. Which of the following regions do you currently live in?

1. Alberta
2. British Columbia
3. Manitoba
4. New Brunswick
5. Newfoundland
6. Nova Scotia
7. Ontario
8. Prince Edward Island
9. Quebec
10. Saskatchewan

8. What is the highest level of education that you have completed?

1. Did not graduate from High School
2. High School Graduate
3. Some Post-Secondary Education
4. Bachelor's Degree (BA)
5. Post Graduate Degree (Master or PhD)
6. Prefer not to answer

9. What is your current employment status?

1. Employed full time
2. Employed part time / casual
3. Retired
4. Homemaker - househusband/wife
5. Seeking a job/unemployed
6. In employment but not currently working (e.g. sick leave, maternity/paternity)
7. Student
8. Volunteer work only
9. Other

ASK Q10 IF Q9=1, 2, 3, 6 ("EMPLOYED" or "RETIRED" or "IN EMPLOYMENT BUT NOT CURRENTLY WORKING")

10. How would you characterise your current occupation (or previous occupation if retired)?

Please select the classification which most closely characterises your occupation

1. Liberal profession (e.g. medical doctor, lawyer) and teachers
2. Middle/senior executive
3. Self-employed in commerce, industry or agriculture
4. Salaried employee (office)
5. Manual worker (manufacturing, agriculture, etc.)
6. Other, please specify: **OPEN END**

11. Which of these ranges best reflects the approximate combined <u>annual</u> income of everyone in the household, <u>after tax</u>?

Please include income from all sources, including wages, government pensions and benefits and investments

1. $1 - $14 800
2. $14 801 - $22 200
3. $22 201 - $29 100
4. $29 101 - $35 200
5. $35 201 - $41 300
6. $41 301 - $47 500
7. $47 501 - $54 700
8. $54 701 - $62 900
9. $62 901 - $73 500
10. $73 501 - $91 700
11. $91 701 - $119 200
12. More than $119 200
13. Don't know
14. Prefer not to answer

12. Are you the person who earns the most in your household?

1. Yes
2. No
3. Don't know

13. Do you and/or another member of your household own your current primary residence?

1. Yes
2. No

14. Is your primary residence:

1. An apartment in a building with less than 12 apartments in total
2. An apartment in a building with more than 12 apartments
3. A detached house
4. A semi-detached / terraced house
5. Other (specify)

14a. Approximately how many months per year do you live in your current primary residence?

DROPDOWN MENU WITH NUMBERS FROM 1 TO 12

16. How many rooms are there in your home?

Please exclude bathrooms

1. 1
2. 2
3. 3
4. 4
5. 5
6. 6
7. 7
8. 8
9. 9
10. 10
11. 11
12. 12 or more

15. What is the approximate size of your primary residence in square feet? (Please estimate)

2 DROP DOWN MENUS

- **Residence**

1. Less than 270 ft²
2. 270 ft² - 540 ft²
3. 541 ft² - 1070 ft²
4. 1071 ft² - 1610 ft²
5. 1611 ft² - 2150 ft²
6. More than 2150 ft²
7. Don't know

- **Garden/ Terrace/ Balcony**

1. No garden/ terrace/ balcony possessed

2. Less than 110 ft²
3. 110 ft² - 540 ft²
4. 541 ft² - 1610 ft²
5. 1611 ft² - 3230 ft²
6. More than 3230 ft²
7. Don't know

17. How would you best describe the area in which you live?

1. Isolated dwelling (not in a town or village)
2. Rural
3. Suburban (fringes of a major town/city)
4. Urban

19. Approximately how long ago was your primary residence constructed?

1. Less than 5 years ago
2. Between 5 and 15 years ago
3. Between 16 and 30 years ago
4. Between 31 and 50 years ago
5. Between 51 and 80 years ago
6. More than 80 years ago
7. Don't know

20. Approximately how many years have you lived in your primary residence?

1. Less than 2 years
2. 2 to 5 years
3. 6 to 15 years
4. More than 15 years

21. What is the postal code of your primary residence?

Part B - ATTITUDINAL CHARACTERISTICS

22. Please rank the following issues in order of their importance to you.
1 stands for the most important and 6 for the least important.

Drag or double click on an issue on the left to move it to the right hand side. If you want to reorder an issue once it is on the right hand side, select it and then use the up and down arrows

1. International tensions (terrorism, war)
2. Economic concerns (unemployment, inflation)
3. Environmental concerns (waste, air pollution)
4. Health concerns (Bird flu, AIDS)
5. Social issues (poverty, discrimination)
6. Personal safety (crime, theft…)

23. How concerned are you about the following environmental issues?
Please select one answer per row

	Not concerned	Fairly concerned	Concerned	Very concerned	No opinion
Waste generation					
Air pollution					
Climate change (global warming)					
Water pollution					
Natural resource depletion (forest, water, energy)					
Genetically modified organisms (GMO)					
Endangered species and biodiversity					
Noise					

24. Have you voted in any of the following types of elections in the past 6 years?
Please select all that apply

1. National/ general elections
2. Local elections
3. None of the above

25. In the past 24 months have you given any of your personal time to support or participate in activities of any of the following types of groups/ organisations?
Please select as applies

1. Parent-teacher association
2. Environmental organisation
3. Local community organisation
4. Charitable organisation
5. Other association/ organisation
6. None of the above

27. Are you currently a member of, or contributor/donator to, any environmental organisations?

1. Yes
2. No

28. To what extent do you agree with each of the following statements?
Please select one answer per row

	Strongly disagree	Disagree	Agree	Strongly agree	No opinion
Each individual/household can contribute to a better environment					
Environmental impacts are frequently overstated					
Environmental issues should be dealt with primarily by future generations					
Environmental issues will be resolved primarily through technological progress					
Environmental policies introduced by the government to address environmental issues should not cost me extra money					

29. Please rank the following sources of information on environmental issues in terms of their trustworthiness.
1 stands for the most trustworthy and 5 for the least trustworthy

1. Independent researchers and experts
2. National/ Local governments
3. Environmental non-governmental organisations (NGOs)
4. Consumers' organisations
5. Producers' and retailers' associations

31. For each of the following categories, how often does your household choose to use the products listed, rather than the alternatives?
Please select one answer per row

	Never	Occasionally	Often	Always	Don't know
Paper with recycled content (e.g. stationery)					
Products with reduced toxic content (e.g. environmentally friendly cleaning products)					
Refillable containers (e.g. bottles, washing detergents)					
Reusable shopping bags					

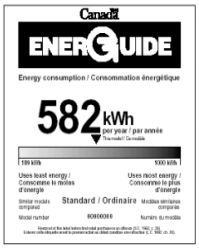
ASK Q32 WHEN CODES 1-2 AT Q31 SELECTED FOR "NEVER"

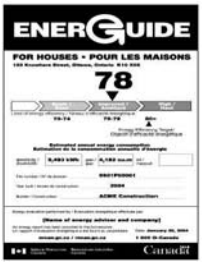
32. Which factors discourage you from buying [PIPE IN PRODUCTS SELECTED IN Q31=NEVER]?
Please select all that apply

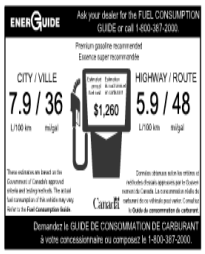
1. Product availability
2. Product quality (e.g. considered inferior)
3. Product appearance (e.g. colour, packaging)
4. Price (too expensive)
5. Not familiar with the product(s)

6. Not interested

33. Among the following logos/ labels, please select the ones you are familiar with:







☐ None of the above

SKIP Q34 IF Q33=NONE OF THE ABOVE

34. Among the following logos/ labels, select the ones you take into account in your purchasing decisions:

SHOW LOGOS SELECTED IN Q33, INCLUDE AS CLICKABLE

Part C - WASTE

The following section will cover waste generation and recycling.

35. How often is your household mixed waste collected (by a third party) from your primary residence or from containers where you dispose of your waste?

This excludes waste sorted for recycling/composting

1. More than once a week
2. Once a week
3. Less than once a week
4. Don't know

36. On average, how much mixed waste does your household put out for collection <u>each week?</u>

Please indicate the approximate number of bags, taking the size of the bags in the picture below as a reference

Mixed waste for collection	Number of bags
	None
	1
	2
	3
	4
	5
	6
	7
	8
	9
	10
	11
	12
	13
	14 or more
	Don't know

39. What are the waste collection services available for recyclable materials in your area?
Select all that apply

	Door-to-door collection	Drop-off centres/containers	Bring back with refund (to the retailer/manufacturer)	Bring back with no refund (to the retailer/manufacturer)	No service available	Don't know
Glass bottles/ containers						
Plastic bottles/containers						
Aluminium, tin and steel cans						
Paper/cardboard						
Food or garden waste						

ASK Q40 IN A LOOP FOR ITEMS SELECTED IN DOOR-TO-DOOR IN Q39

40. How often are X collected door to door?

1. More than once a week
2. Once a week
3. Less than once a week
4. Don't know

37. Which of the following materials does your household recycle? MULTI

1. Glass bottles/containers
2. Plastic bottles/containers
3. Aluminium, tin and steel cans
4. Paper/Cardboard
5. Food waste
6. Garden waste
7. Batteries (domestic)
8. Pharmaceuticals/medicines
9. None of the above

ASK Q41 IN A LOOP FOR ITEMS SELECTED IN Q37 EXCEPT FOR CODES 6, 7 & 8

41. Please indicate approximately what percentage of [PIPE ITEM SELECTED IN Q37] your household recycles?
It includes returns to the retailer/manufacturer

1. 25%
2. 50%
3. 75%
4. 100%
5. Don't know

ASK Q42 IF Q37 != 99
SKIP Q42 IF Q37=99, GO TO Q44

42. How important are the following factors in motivating your household to recycle?
Please select one answer per row

	Not at all important	Not important	Fairly important	Very important	Not applicable
It is beneficial for the environment					
It is mandated by the government					
I want to save/receive money					
I think it is my civic duty					
I want to be seen by others as a responsible citizen					

ONLY ASK IF THEY RECYCLE (Q37 != 9)

43. Approximately how many minutes does your household spend on average <u>each week</u> on recycling activities?
Time spent to (clean) sort and store your recyclable waste as well as bring it to drop-off containers/centres or door-to-door collection

1. Less than 5 minutes
2. 5 to 14 minutes
3. 15 to 29 minutes
4. 30 to 59 minutes
5. 1 to 2 hours
6. More than 2 hours
7. Don't know

IF Q37=99 => ASK Q44

44. How important would the following factors be in encouraging your household to start recycling?
Please select one answer per row

	Not at all important	Not very important	Quite important	Very important
More practical information on how to recycle (what is recyclable, services available, etc.)				
Greater financial incentives (saving/ receiving money)				
More storage space at home				
Having more time to recycle				
Improved collection and recycling services (more frequent, more accessible)				
Stronger belief that the environmental benefits are significant				

☐ 99. None of the above would encourage my household to start recycling **EXCLUSIVE**

If Q37!=99 => ASK Q44a

Q44a. How important would the following factors be in encouraging your household to recycle more?

	Not at all important	Not very important	Quite important	Very important
More practical information on how to recycle (what is recyclable, services available, etc.)				
Greater financial incentives (saving/ receiving money)				
More storage space at home				
Having more time to recycle				
Improved collection and recycling services (more frequent, more accessible)				
Stronger belief that the environmental benefits are significant				

☐ 99. None of the above would encourage my household to recycle more

45. If the current system were to be changed in such a way that you need not separate your waste at home at all, but this is done on your behalf by a third party, how much would you be willing to pay <u>each month</u> for this service?

Please select one

1. $0
2. $1
3. $2
4. $3
5. $4
6. $5
7. $6
8. $7
9. $8
10. $9
11. $10
12. $11
13. $12
14. $13
15. $14
16. $15
17. $16
18. $17
19. $18
20. $19
21. $20
22. $21
23. $22
24. $23
25. $24
26. $25
27. $26
28. $27
29. $28
30. $29
31. $30 or more
32. Don't know

IF Q45=1 ASK Q46

46. Why would you not be willing to pay anything?

1. Prefer to be responsible for recycling
2. Cannot afford it
3. It does not concern me
4. Other, please specify:

49. How would you characterise the issue of illegal dumping* in your area?

*** By illegal dumping we mean the disposal of household waste in a non-permitted area.**
Please select one

1. Not an issue
2. Minor problem
3. Moderately important problem
4. Major problem
5. Don't know

SKIP Q48 IF Q49 = 1

48. How do you think illegal dumping* could be more effectively controlled?

*** By illegal dumping we mean the disposal of household waste in a non-permitted area.**
Please select all that apply

1. Regulation against illegal dumping should be better enforced (including fines)
2. Waste collection services should better meet household demand (availability, accessibility)
3. Information on available waste disposal services should be increased
4. Charges for collection and management of waste should be lower
5. No opinion

50. How is your household charged for the collection and management of mixed waste in your primary residence?
Please select one

1. Flat fee (e.g. lump sum included in property taxes, charges or rent)
2. Volume-based unit charge/ price (per bag, container etc.)
3. Weight-based unit charge/ price (per kg, pound etc.)
4. Frequency based charge (according to how often the waste is collected)
5. Charge/ price based on household size
6. Other form of charging, please specify:
7. Not charged
8. Don't know

Part D - TRANSPORT

The following section will cover personal transport.

In this section, when using the word "car" we also include vans and sport utility vehicles (SUV).

52. How many vehicles are owned or used regularly by your household (including company cars)?

Number of car(s) ☐

0
1
2
3
4
5 or more

Number of motorcycle(s) ☐

0
1
2
3
4
5 or more

IF Q52 NUMBER OF CARS=0, ASK Q53

53. What is the main reason for your household not having a car?
Please select one

1. Can't afford a car
2. Can get everywhere we want without a car
3. No one can/ wants drive
4. Environmental concerns
5. Other, please specify:

IF Q52 NUMBER OF CARS != 0, ASK Q54

54. Please enter the information concerning the car you use most often.

	Fuel type	Age of the car (years)	Seating capacity (persons)	Engine Size
Car used most often				

Fuel Type:

1. Unleaded
2. Leaded
3. LPG (liquefied petroleum gas)

4. Diesel
5. Hybrid
6. Biofuels
7. Electric
8. Don't know

Age of the car:

1. Less than 1 year old
2. 1 year old
3. 2 years old
4. 3 years old
5. 4 years old
6. 5 years old
7. 6 years old
8. 7 years old
9. 8 years old
10. 9 years old
11. 10 years old
12. 11 years old
13. 12 years old
14. 13 years old
15. 14 years old
16. 15 years old
17. 16 years old
18. 17 years old
19. 18 years old
20. 19 years old
21. 20 years old
22. 21 years old
23. 22 years old
24. 23 years old
25. 24 years old
26. 25 years old or older
27. Don't know

Seating capacity:

1. 1 person
2. 2 people
3. 3 people
4. 4 people
5. 5 people
6. 6 people
7. 7 people
8. 8 people
9. More than 8 people

Engine size:

1. Less than 1 litre
2. 1 - 1.5 litres
3. 1.6 – 2 litres
4. 2.1 – 3 litres
5. More than 3 litres

6. Don't know

18. How far is your primary residence from the public transport stop/station which is most convenient for your daily commute?

Please select the corresponding means of transport usually used to get there (walking, driving, public transport) and indicate the time required in minutes

Usual means of transport	Average time in minutes (one way)	Don't know	No public transport stop/ station available	Not applicable
1. Walking 2. Car/ motorcycle 3. Public transport 4. Bicycle	1. Less than 5 minutes 2. 5 to 15 3. 16 to 30 4. 31 to 45 5. 46 minutes to 1 hour 6. More than 1 hour			

SKIP IF Q52 CAR = 0 AND MOTORCYCLE = 0

55. How many kilometres do you personally drive (car/motorcycle) during a typical <u>week</u>?

1. Do not drive
2. Less than 30km
3. 31 - 100 km
4. 101 - 250km
5. 251 - 500km
6. 501 - 700km
7. 701 - 900km
8. 901 km – 1000
9. More than 1001 km
10. Don't know

ASK Q56 IF Q55 != 1

56. What would encourage you to drive (car/motorcycle) less?

Select all that apply

1. Increased cost of car/motorcycle use
2. Better public transport
3. Cheaper public transport
4. More and safer cycling paths
5. Other (please specify):
6. None of the above would make me use a car/ motorcycle less

IF Q56=2, ASK Q57

57. What aspects of public transport are likely to encourage you to use your car/motorcycle less?

	Not at all likely	Not very likely	Quite likely	Very likely
More convenient (e.g. stops closer to home and destination)				
More reliable (e.g. fewer delays, strikes)				
More rapid (e.g. higher frequency, speed)				
More comfortable (e.g. less crowded)				

More secure (e.g. improved personal safety)				

ASK Q58 IF Q55 != 1

58. What would be the likely effect of a permanent increase in fuel prices of 20% on your fuel consumption for your personal car/motorcycle use? (e.g. by driving less, buying a more fuel efficient vehicle, etc.)

Please select one

1. Would not change
2. Would reduce by less than 10%
3. Would reduce by between 10% and 20%
4. Would reduce by more than 20%
5. Don't know
6. Prefer not to answer

59. What is your main mode of transportation for each of the following activities?

If you use a combination of modes for a given activity please select more than one answer per row

	Walking	Car	Public Transport	Bicycle	Motorcycle	Not applicable
Daily commute to and from work						
Travel undertaken for your usual professional activities						
Visiting family and friends (excluding vacation/weekend trips)						
Shopping						
Education						
Sports and cultural activities						

IF Q59 WORK != "NOT APPLICABLE", ASK Q60

60. Approximately how long does it take you to get to work (one way)?

1. Less than 15 mins
2. 15 – 30 mins
3. 31 – 45 mins
4. 46 mins – 1 hour
5. More than 1 hour

61. For the following travel purposes, how long does it take you to use public transport compared to driving a car or a motorcycle (one way)?

SHOW "WORK", "SHOPPING", "EDUCATION" IF THEY'RE NOT SELECTED AS "NOT APPLICABLE" IN Q59

When applicable please select one answer per row

	Less time						**More time**						
	- 60 mins	- 46 to 60 mins	- 31 to 45 mins	- 16 to 30 mins	- 5 to 15 mins	Same time	+ 5 to 15 mins	+ 16 to 30 mins	+ 31 to 45 mins	+ 46 to 60 mins	+ 60 mins	Not possible	Don't know

Daily commute to and from work													
Travel undertaken for your usual professional activities													
Shopping													
Education													

62. What are the approximate costs associated with your own travel each <u>month</u> for the following?

Please fill in as appropriate and provide your answer to the nearest dollar

	Amount in $ per month	Not applicable	Don't know
Fuel			
Parking			
Charges for road usage (e.g. road/city tolls)			
Public transport			

63. During the past year, have you done any of the following?

Select all that apply

1. Used car sharing/pooling
2. Used recycled tires/low rolling resistance tires
3. Offset your carbon emissions
4. Changed a car for another one which uses less fuel
5. Used public transport more than the previous year
6. Walked or cycled more than the previous year
7. Adapted your driving style to use less fuel (e.g. reduce speed, reduce air conditioning use)
8. Changed a car for another one which uses less polluting fuel
9. None of the above

Part E - ENERGY

The following section will cover residential energy use

64. Which of the following sources of energy do you use in your primary residence?
Select all that apply

1. Electricity
2. Natural gas
3. Fuel oil
4. Wood or wood chips
5. Coal
6. District heating
7. Other (please specify):

65. In your household, which of the bills do you pay according to your household consumption?
Select all that apply

FILTER LIST ON Q64

1. Electricity
2. Natural Gas
3. Fuel Oil
4. Wood or wood chips
5. Coal
6. District heating
7. **INSERT ANSWER FROM Q64, CODE 8, IF SELECTED**
8. None of the above

ASK Q66b ONLY IF q64=ELECTRICITY

66b. Does the electricity price paid by your household vary according to the time of use?
This would imply that your household would pay a lower price during off-peak period (e.g. night time) and a higher price during peak period (e.g. early evening).

1. Yes
2. No
3. Don't know

ASK Q67 ONLY IF Q64=ELECTRICITY

67. Does your household take special measures to buy <u>renewable energy</u> from your <u>electricity provider?</u>
By renewable energy we mean energy sources such as wind, solar, geothermal, hydro

1. Yes
2. No
3. Don't know

IF Q67=2 ASK Q68

68. Please state why you do not buy renewable energy.

1. Service not available and our household is not interested
2. Service not available, but our household would be interested to do so
3. Service available, but our household is not interested
4. Energy from electricity provider is already from renewable energy sources
5. I don't know anything about these kind of services

69. What is the maximum percentage increase on your annual bill you are willing to pay to use only renewable energy?
Please assume that your energy consumption remains constant

1. I would not pay anything additional
2. Less than 5%
3. 5%-15%
4. 16%-30%
5. More than 30%
6. Don't know

70. Did you take energy costs into account when purchasing or renting your current primary residence?

1. Yes
2. No
3. Not sure

71. Which of the following appliances do you have in your primary residence? MULTI

1. Dishwashers
2. Clothes washers / clothes washer-dryers
3. Clothes dryers
4. Fridges / fridge-freezers
5. Separate freezers
6. Ovens
7. Microwave ovens
8. Electric water heating boilers
9. Televisions
10. Set-top boxes
11. Computers
12. Air conditioners

71b. How many of the following appliances do you have? DROPDOWN FOR EACH PRODUCT, FILTER PRODUCTS ON THOSE AMONG THE 7 BELOW SELECTED IN Q71

1. Fridges
2. Separate freezers
3. Televisions
4. Set-top boxes
5. Computers
6. Air conditioners

DROP DOWN

1. 1

2. 2
3. 3
4. 4
5. 5 or more

72. How often do you perform the following in your daily life?
Please select one answer per row

	Never	Occasionally	Often	Always
Turn off lights when leaving a room				
Cut down on heating/air conditioning to limit your energy consumption				
Wait until you have full loads when using washing machines or dishwashers				
Turn off appliances when not in use				
Switch off standby mode of appliances/electronic devices				

73. Has your household installed any of the following items over the past ten years in your current primary residence?
If these measures are not feasible in your house/apartment or if they would need to be carried out by the landlord, select "not possible".

	Yes	No	Already equipped	Not possible
Energy-efficiency-rated appliances (e.g. top rated washing machines, refrigerators)				
Low-energy light bulbs (compact fluorescent)				
Thermal insulation (e.g. walls/roof insulation, double-glazing)				
Efficient heating boiler (e.g. condensing boiler)				
Renewable energy (e.g. to install solar panels, wind turbines)				

FOR ITEMS SELECTED AS "YES" IN Q73

74. For which of the following has your household benefited from support from the government (for instance grants, preferential loans, energy audits)?

FILTER ITEMS SELECTED IN "YES" IN Q73

☐ None of the above

75. How important are the following factors in encouraging you to reduce your energy consumption?
** By energy conservation measures we mean for instance investments in energy efficient equipment (fridge), thermal insulation.*

	Not at all important	Not important	Fairly important	Very Important
More practical information on energy conservation measures*				
Higher energy prices				
Belief that the environmental benefits are significant				
Greater availability of energy-efficient products				
Easier identification of energy efficiency labels				

Less expensive to invest in energy-efficient equipment				

Part F - ORGANIC FOOD

The following section will cover organic food consumption.

By organic we mean a production process where, depending on the standard, fewer chemicals (i.e. pesticides, fertilizers, drugs, additives), if any, are used.

76. Do you have primary (or shared) responsibility for food shopping in the household?

1. Yes
2. No

77. Please estimate your household's average <u>weekly</u> expenditures on <u>food</u> for the following items:

Please do not include expenditures in restaurants or canteens

	Amount in $ per week *Please provide your answer to the nearest dollar*	Don't know	Not applicable/ product not consumed in the household
1. Fresh fruits and vegetables			
2. Milk and other dairy products			
3. Eggs			
4. Meat and poultry			
5. Bread, pasta, rice and cereal			

ASK Q78 FOR EACH OF THE ITEMS IN Q77 DIFFERENT FROM "NOT APPLICABLE/ PRODUCT NOT CONSUMED IN THE HOUSEHOLD"

78. Please estimate the percentage of expenditures of your household for the following items which are <u>organic products</u>:

Please select one answer per row

	0 %	1%-5%	6% - 10%	11%-25%	26%-50%	51%-75%	76%-99%	100%	Consume organic products but % unknown	Don't know if consume organic products at all
1. Fresh fruits and vegetables										
2. Milk and other dairy products										
3. Eggs										
4. Meat and poultry										
5. Bread, pasta, rice and cereal										

IF AT LEAST ONE ITEM SELECTED IN "CONSUME ORGANIC PRODUCTS BUT % UNKNOWN" => CONSIDER Q78 != 0% => ASK Q80, Q83b, Q83 WITH OPTION "What would encourage you to consume more organic products?" AND ASK Q81 WITH OPTION "Would you continue to consume (or buy) organic food if it was found that"

IF ALL ITEMS SELECTED IN "DON'T KNOW IF CONSUME ORGANIC PRODUCT AT ALL" => CONSIDER Q78 = 0% => SKIP Q80, ASK Q83b, Q83 WITH OPTION "What would encourage you to start consuming organic products?" AND ASK Q81 WITH OPTION "Would you start to consume (or buy) organic food if it was found that"

ASK Q80 ONLY IF AT LEAST 1 ITEM IN Q78 IS DIFFERENT FROM 0%

80. Please rank the following factors in terms of the importance of their effect on your motivation to consume (or buy) organic food? **DYNAMIC RANK, RANDOMISE ITEMS**

1 stands for the most important and 5 for the least important

1. Respect animal welfare
2. Better for health
3. Better taste
4. Support small and local farmers
5. Preserve the environment

ASK Q83b FOR EACH OF THE ITEMS LISTED IN Q77

83b. What is the maximum percentage price increase you are willing to pay for organic products of the following categories compared to conventional substitutes?

	0%	1-5%	6-15%	16-30%	31-50%	> 50%	Don't know
Fresh fruits and vegetables							
Milk and other dairy products							
Eggs							
Meat and poultry							
Bread, pasta, rice and cereal							

83. **IF ALL ITEMS IN Q78 = 0%, ASK**

What would encourage you to start consuming organic food products?

IF AT LEAST ONE ITEM IN Q78 !=0%, ASK

What would encourage you to consume more organic food products?

Please select one answer per row

	Not at all important	Not important	Fairly important	Very Important
Better availability of organic products				
Lower price of organic products				
Better appearance of the food				
trust in health benefits of organic products				
trust in environmental benefits of organic products				
trust in certification and labelling of organic products				

☐ None of the above

81. **IF AT LEAST 1 ITEM IN Q78 IS DIFFERENT FROM 0%, ASK**

Would you continue to consume (or buy) organic food if it was found that:

IF ALL ITEMS IN Q78 = 0%, ASK

Would you start to consume (or buy) organic food if it was found that:
Please give one answer per row

	Yes	No	Don't know
Organic food is better for the environment, but no indication that it is better for personal health.			
Organic food is better for personal health, but no indication that it is better for the environment.			

84. In your opinion, how easy is it to identify organic food labels/logos when buying products?

1. Very difficult
2. Quite difficult
3. Quite easy
4. Very easy
5. No opinion

85. In your opinion, how understandable are organic food labels/logos?

1. Very difficult to understand
2. Fairly difficult to understand
3. Fairly easy to understand
4. Very easy to understand
5. No opinion

Part G - WATER

The following section will cover water consumption and use.

87. Is your household charged for water consumption in your primary residence?

1. Yes
2. No
3. Not sure

IF Q87=2, ASK Q88

88. What would best describe your situation in your primary residence?

1. Not connected to the mains water (using a well/bore, a rainwater tank)
2. Connected to the mains water but not charged for water consumption
3. Don't know

IF Q87=1, ASK Q89

89. How is your household charged for water consumption?

1. Charged according to how much water is used (e.g. via a water meter)
2. Flat fee (e.g. lump sum included in charges or rent)
3. Don't know

ASK IF Q87 != 2

90. Approximately how much was the total annual cost for water consumption for your primary residence?

Please indicate if possible amount in $ and corresponding annual consumption in m³

Amount in $ per year *Please provide answer to the nearest dollar*	Volume of water consumed in m³

☐ Don't know

91. How often do you do the following in your daily life?

Please select one answer per row

	Never	Occasionally	Often	Always	Not applicable
Turn off the water while brushing teeth					
Take showers instead of bath specifically to save water					
Plug the sink when washing the dishes					
Water your garden in the coolest part of the day to reduce evaporation and save water					
Collect rainwater (e.g. in water tanks) or recycle waste water					

92. Has your household invested in the following appliances/devices in the past 10 years in your current primary residence?

If these measures would need to be carried out by the landlord, select "Not possible".

	Yes	No	Already equipped	Not possible
Water efficient washing machines				
Low volume or dual flush toilets				
Water flow restrictor taps / low flow shower head				
Water tank to collect rainwater				
Water purifier for drinking water				

93. For which of the following has your household benefited from government support to make this investment (for instance grants and incentives)?

Please select all that apply

1. **Filter items 1-4 selected in the "yes" column in Q92**
2. Don't know
3. None of the above

94. How important are the following factors in encouraging you to reduce your water consumption?

	Not at all important	Not important	Fairly important	Very Important
Practical information on things you can do to save water at home				
Money savings				
Clear importance of the environmental benefits of saving water				
Availability of water-efficient products				
Confidence in water-efficiency labels				
Lower cost of water-efficient equipment				
Mandatory water restrictions (e.g. periodic bans on watering garden)				
None of the above				

95a. Do you drink tap water for your normal household consumption?

1. Yes
2. No

95. Are you satisfied with the quality of your tap water for drinking?

1. Yes
2. No

IF Q95=2, ASK Q96

96. In your tap water, what is of most concern to you?

1. Taste
2. Concern about health impacts
3. Neither of these

IF Q95=2, ASK Q97

97. What is the maximum percentage increase you would be willing to pay above your actual water bill to improve the quality of your tap water, holding water consumption constant?

1. Nothing
2. Less than 5%
3. Between 5% and 15%
4. Between 16% and 30%
5. More than 30%
6. Don't know

ANNEX 2 – DRAFT OUTLINE OF THE PUBLICATION

HOUSEHOLD AND THE ENVIRONMENT:
A COMPARATIVE STUDY FOR PUBLIC POLICY