

Analysis and evaluation of Swiss data collected for the 2nd OECD Survey on Environmental Policy for Individual Behavior-Change

**Study Commissioned by the Federal Office for the Environment
(FOEN)**

Version 3/11/2015



sustainserv

Imprint

Federal Office for the Environment FOEN

Economics and Environmental Monitoring Division
Consumption and Products
CH 3003 Bern

The FOEN is an agency of the Federal Department of the Environment, Transport, Energy and Communications (DETEC).

FOEN support:

Marie-Amélie Dupraz-Ardiot
Tschirren Michel FOEN
Meylan Benjamin FOEN
Hügi Michael FOEN
Krey Boris SFOE
Gautschi Anders FOEN
Gasser Yannick FOEN

Note: This study/report was prepared under contract to the Federal Office for the Environment (FOEN). The contractor bears sole responsibility for the content.

Contractor:

Sustainserv GmbH
8002 Zürich

Contact:

Simon Burkart
Tel. +41 43 322 10 10
Fax +41 43 322 10 19
simon.burkart@sustainserv.com

Author:

Till Berger
Simon Burkart
Monica van der Weele

Disclaimer:

The data used in this report is sourced from an OECD survey on Environmental Policy and Individual Behavior Change (EPIC/2011) - conducted periodically by the Environment Directorate. The views expressed here do not necessarily reflect those of the Organization for Economic Cooperation and Development (OECD) or its member countries. This study was compiled on behalf of the FOEN. The contractor is solely responsible for the content.

Contents

1	Executive Summary	5
2	Introduction	6
2.1	Synopsis	6
2.2	Goals and Approach	6
2.2.1	Mapping	6
2.2.2	Sample description	8
2.2.3	Analysis method	9
2.2.4	Basic response outline per question	9
3	Detailed Analysis	10
3.1	Attitudes	10
3.1.1	Environmental concerns	10
3.1.2	Specific environmental issues	11
3.1.3	Strategies for solving environmental problems	12
3.1.4	Trustworthiness of information sources	15
3.1.5	Satisfaction with local environmental quality	16
3.1.6	Knowledge about climate change	17
3.2	Water (consumption)	19
3.2.1	Water-saving behavior & water-efficient devices	19
3.2.2	Quality of tap water	20
3.2.3	Water conservation behavior	21
3.2.4	Willingness to pay for improved water quality	23
3.3	Personal Transportation	23
3.3.1	Environmental considerations in car purchase	23
3.3.2	Car purchase & public transportation options	24
3.3.3	Modes of transport	25
3.3.4	Characteristics of public transportation	27
3.3.5	Support for policies to limit motor vehicle emissions	29
3.3.6	Car label in purchasing decisions	31
3.3.7	Willingness to pay more for electric cars	33
3.4	Waste and Recycling	34
3.4.1	Waste and recycling levels, waste prevention	34
3.4.2	Effects of waste fees on waste generation and recycling	36
3.4.3	Waste generation and frequency of collection	38
3.4.4	Recycling decisions and recycling programs	39
3.4.5	Dispose of hazardous waste	41
3.5	Residential energy use	42
3.5.1	Demand for energy efficiency and renewable energy	42
3.5.2	Energy efficiency measures and financial support	46
3.5.3	Renewable energy and financial support	49
3.5.4	Energy efficiency labeling for appliances	52
3.5.5	Willingness to pay for renewable energy	54
3.6	Food	56

3.6.1	Consumption of organic foods	56
3.6.2	Organic food consumption and animal welfare meat	57
3.6.3	Willingness to pay for organic food	58
3.6.4	Labeling of organic food	60
3.7	Cross-Cutting Topics	63
3.7.1	Willingness to pay	63
3.7.2	Motivations to conserve resources	65
3.7.3	Understanding of labels	68
3.7.4	Stated and actual behavior	69
3.7.5	Adoption of new technologies	72
4	Swiss Policies Overview	74
4.1	Objective	74
4.2	Definition “political instruments”	74
4.3	Sources	74
4.4	Policies / Instruments overview per dimension	75
4.4.1	Instruments - Water (consumption)	75
4.4.2	Instruments - Personal Transportation	75
4.4.3	Instruments - Waste (generation and recycling)	75
4.4.4	Instruments - Energy (generation and consumption)	76
4.4.5	Instruments - Food (consumption - organic / animal welfare)	77
4.4.6	Current focal points (Green Economy Action Plan)	77
5	Findings & Recommendations	79
5.1.1	Recommendations - Attitudinal characteristics	79
5.1.2	Recommendations - Water use	79
5.1.3	Recommendations - Personal Transportation	79
5.1.4	Recommendations - Waste and Recycling	80
5.1.5	Recommendations - Energy use	81
5.1.6	Recommendations - Food	81
6	Glossary	82
7	Further Information	82

1 Executive Summary

This report entails a detailed analysis of the Swiss data set from the 2011 'OECD Survey on Environmental Policy for Individual Behavior Change' with corresponding recommendations for possible policies or governmental measures. The questionnaire used to evaluate the (Swiss) responses contains a section on attitudinal characteristics concerning the environment, as well as five dimensions concerning environmental behavior with respect to water use, personal transportation, waste & recycling, residential energy use and food.

Three types of attitudes to the environment were found to influence environmental behavior: "Skeptics" (36%) showed consistently lower environmental friendly behavior than "Altruists" (48%) and "Green Growthers" (15%). They believe environmental problems are not substantiated and they are less willing to make compromises in lifestyle. Altruists (who do not need reciprocation from others to be environmentally friendly) usually demonstrated the most eco-friendly behavior, but in some aspects, such as water conservation behavior, Green Growthers showed the most environmentally friendly behavior.

Water usage is a topic of note in terms of environmental behavior. Most participants are willing to save water but wish to have more information about water consumption and its influence on the environment. The benefits of saving water mostly concern potential energy reductions with respect to hot water consumption. Nevertheless it is important that water consumption stays on a low level. Main recommendations are the promotion of water efficient devices and the information of consumers about their water consumption.

Public transportation was perceived as too expensive, so that particularly this aspect should be tackled in order to encourage participants to use it more frequently. Furthermore, most participants are willing to pay 10% more for electric cars and usually support government actions to reduce CO₂ emissions - with the exception of higher taxes on fuel. Recommendations comprise the promotion of car sharing, the fostering of electric mobility and the improvement of cycling and pedestrian paths.

Waste levels and recycling rates were analyzed – taking several different aspects into account. It seems that general attitudes to the environment have little influence on waste levels and recycling rates, but there were differences in the support of actions to prevent waste – Skeptics showed the least support of actions to reduce waste generation. Furthermore, there were differences in attributes of waste-related public services such as frequency of collection and charging types. Main recommendations are to increase the convenience of waste disposal, by improving drop off centers or to inform households about the average amount of produced waste and recycling rates.

Energy efficiency usually correlated with overall attitudes to the environment, but it also seems that money – i.e. lower costs - serves as a motivator to use less energy. Moreover, there is a marked interest in smart meters (50%) and renewable energy tariffs (30%), which suggests that energy efficiency and renewable energy are important themes in Switzerland. Main recommendations are measuring and comparing energy use or encouraging people to choose renewable energy tariffs over conventional energy tariffs by setting the default option to "renewable energy sources".

Although organic food and animal welfare products are not directly linked to the environment, this study showed that attitudes to the environment had an effect on the consumption of these products. The price of organic food was perceived as most important for its consumption, but most participants are willing to pay more for organic food and animal welfare products than for conventional products. The BioSuisse label seems to be effective in general, but is more effective in urban areas, and for smaller households. Main recommendations are intensifying the information/education on labels, lowering the prices of organic food and encourage people to eat less meat.

2 Introduction

2.1 Synopsis

The OECD launched its first survey on green behavior of households in 2008. The second round of the survey („OECD Survey on Environmental Policy for Individual Behavior Change“) was implemented from February to March 2011 in 11 countries: Australia, Canada, Chile, France, Israel, Korea, Japan, the Netherlands, Spain, Sweden and Switzerland. Approximately 1000 households were surveyed in each country using an internet-based questionnaire, focusing on five key areas: residential energy use, waste generation and recycling, food consumption, personal transport choices, and water consumption. The responses of the survey were analyzed to provide a picture on: i) ways to promote energy efficiency and an increased use of renewable energy sources at home; ii) the effect of perceptions and environmental concerns; iii) embracing water-saving behaviors and adopting water-efficient devices; iv) the role played by attitudes in shaping transportation choices, waste disposal and recycling behaviors; and on v) drivers of organic food consumption.

2.2 Goals and Approach

The OECD survey provides some country-specific results, but without any compilation of the results per country. The aim of this study is to:

- 1) extract information regarding Switzerland and to further specify the information on the behavior of Swiss households by way of more in-depth analysis of the Swiss data set.
- 2) compile all results in a report specifically related to the situation in Switzerland. This report should be based on selected research questions from the OECD study, and should conclude with a short look at selected cross-cutting issues (i.e. willingness to pay; motivations to conserve resources; understanding of labels; stated and actual behaviors; the adoption of new technologies) - concluding with brief recommendations on possible policies or governmental measures (i.e. improvements of existing ones or new ones) to be taken.

2.2.1 Mapping

In order to provide the best possible (i.e. most comprehensive) response to each research question posed, the most fitting OECD-Questionnaire question(s) were allocated - as shown directly below. Refer to the „Detailed Analysis“ section to view the OECD items in full.

Attitudes	Research Question	Questionnaire item(s)
Attitudes1	What is the perceived importance of environmental concerns relative to other global issues?	B2
Attitudes2	What is the perception on the relative importance of specific environmental problems (e.g. natural resources depletion, air pollution, waste generation, etc.)?	B3
Attitudes3	Are strategies for solving environmental problems perceived as fair and effective?	(B6)
Attitudes4	Are the different information sources perceived as trustworthy?	B7
Attitudes5	What is the (level of) satisfaction with local environmental quality?	B8
Attitudes6	(What) is the knowledge level (with respect to) causes and consequences of climate change?	B11
Water Consumption	Research Question	Questionnaire item(s)

Water1	Which factors affect household water-saving behaviors and household adoption of water-efficient devices?	G6
Water2	Which factors drive household satisfaction (levels) with (respect to) the quality of tap water?	G8
Water3	How do general attitudes towards the environment influence residential water use levels and water conservation behavior?	G2*B6
Water4	How much are households willing to pay for improved water quality?	n/a

Personal Transportation	Research Question	Questionnaire item(s)
-------------------------	-------------------	-----------------------

Transport1	How is the decision to purchase a car—and what type to purchase—linked to (a) environmental considerations and;	a) D3*D1a
Transport2	... (b) the presence of different public transportation options?	b) D7*D1a
Transport3	How do attitudes towards the environment correlate with the use of private cars, public transportation and other modes of transport?	D10*B6
Transport4	What characteristics of public transportation systems are most important to households in considering their use?	D9a*D10
Transport5	Which types of households support government policies to limit greenhouse gas emissions from motor vehicles?	B9*A13
Transport6	Do car labeling schemes affect household purchasing decisions?	D3*L4

Waste and Recycling	Research Question	Questionnaire item(s)
---------------------	-------------------	-----------------------

Waste1	How do the general attitudes to the environment correlate with waste generation levels, recycling levels and waste prevention?	C2*B6; C4*B6; B10*B6
Waste2	Whether unit-based waste fees have significant effects on waste generation or waste recycling relative to flat (or no) fees?	C7*C4; C7*C2
Waste3	To what extent is household waste generation affected by attributes of waste-related public services, such as frequency of waste collection?	C2*C1
Waste4	To what extent do household waste recycling decisions depend upon the attributes of recycling programs (door to door collection, drop off)?	C3*C4
Waste5	How do households dispose of some types of hazardous waste, such as e-waste or pharmaceutical products?	C8&C9

Residential Energy Use	Research Question	Questionnaire item(s)
------------------------	-------------------	-----------------------

Energy1	How do general attitudes towards the environment (environmental awareness; membership in environmental organization) correlate with demand for energy efficiency and;	E4*B5;
Energy2	... for renewable energy?	E4*B6

Energy3	Who invests in energy efficiency measures? Who takes advantage of grants investments in energy conservation?	E10&E10a
Energy4	Who invests in renewable energy equipment (e.g. solar panels)? Who takes advantage of grants to install/use renewable energy?	E10&E10a
Energy5	How effective is energy efficiency labeling for appliances and for buildings?	E10*L1

Food	Research Question	Questionnaire item(s)
Food1	What more strongly encourages consumption of organic foods and are there significant differences across different household groups?	F10*A
Food2	To what extent do households' general attitudes towards the environment affect organic food consumption and;	B6*F6;
Food3	... consumption of food which take animal welfare into account?	B6*F8
Food4	How much are households willing to pay as a price premium to purchase organic foods? Does the willingness-to-pay vary significantly across household groups?	F9*A13; F9*A9

Cross-cutting Topics	Research Question	Questionnaire item(s)
Cross1	Willingness to pay	E5/D5/B9/B10/F9/F7
Cross2	Motivations to conserve resources	D9/C4a/G6
Cross3	Understanding of labels	n/a (various labels)
Cross4	Stated and actual behaviors	B6/C4/D10/F4/E9
Cross5	Adoption of new technologies	E10/E4/D1a/E8

2.2.2 Sample description

The data for this study was provided by the OECD and was already validated. This study is based on all cases of the Swiss sample set which consists of 1089 participants. Respondents were recruited from GMI's (Global Market Insite) in-country panels. To ensure representativity in the sample, quotas were set for age, gender, region and income (see Section 6 for how quota targets were set). When quotas were filled, respondents with these characteristics were stopped from completing the questionnaire. Panellists selected on the basis of these characteristics received emails inviting them to respond to the survey. To promote participation in the survey, a small in-kind incentive, worth approximately \$5-\$10 USD was offered to respondents.

The sample is representative for the Swiss population, because the participants are evenly distributed with respect to demographics. 519 participants were male and 570 were female. The average age was 44 years and the age ranged between 18 and 69 years. One third of the participants had no education over and above high school; one third had up to three years of education beyond high school and one third had more than three years.

Household size was distributed as follows: 19% of the households consisted of one person, 37% of two people, 18% of three people, 19% of four people and 8% of five or more people. Furthermore, 22% of the households reside in a major town or city, 17% reside on the fringes of major towns or cities (suburbs), 58% reside in a small town or village and 4% reside in an isolated dwelling. The sample is apportioned according to the regions in Switzerland, which means, for example, that most participants live in Canton Zürich and the least participants live in Canton Uri.

2.2.3 Analysis method

Most of the analysis work was completed with basic descriptive methods such as means, medians, modes, standard deviations and frequency analysis. Some research questions were tackled using advanced statistical methods – including cross tabulation, correlations (Spearman) and t-tests.

2.2.4 Basic response outline per question

The following standard table structure is used to present the findings per (study/research) question:

Research question	This amounts to the study question that the (Swiss) data set ought to answer.
OECD questionnaire	The mapped OECD questionnaire question(s) are listed next.
Mapping decision	The mapping of the OECD questionnaire question(s) to the study/research question is outlined more fully - where required.
Graphic(s)	Illustration of the results (i.e. the primary, resultant diagram(s) is/are shown here).
Results	The main – as well as additional, unexpected or substantial findings are listed and expounded.
Interpretation	This outlines the most overt conclusions that may be drawn from the findings (incl. relevant restrictions)

3 Detailed Analysis

3.1 Attitudes

3.1.1 Environmental concerns

Research question

What is the perceived importance of environmental concerns relative to other global issues?

OECD questionnaire

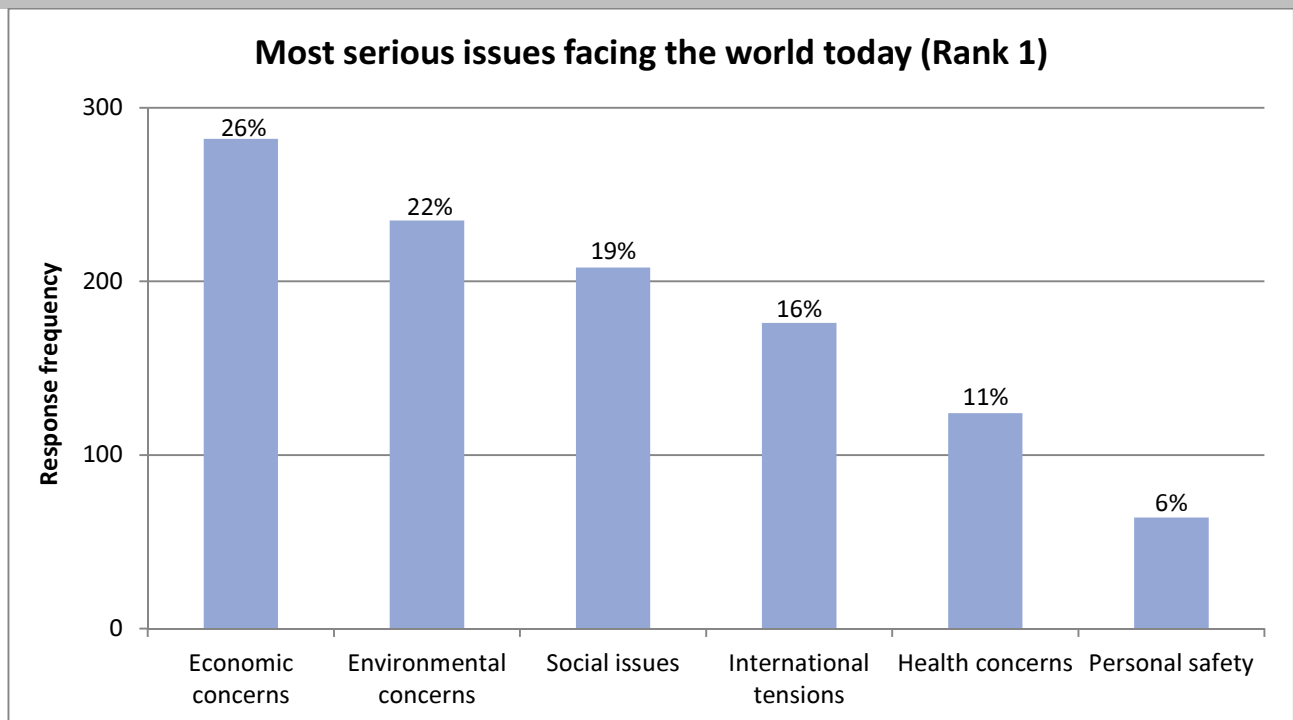
B2. In your view, what are the most serious issues facing the world today?

- International tensions (e.g. terrorism, war)
- Economic concerns (e.g. unemployment, inflation, financial crisis)
- Environmental concerns (e.g. pollution, waste, climate change)
- Health concerns (e.g. cancer, infectious disease)
- Social issues (e.g. poverty, discrimination)
- Personal safety (e.g. crime, theft)

Mapping decision

Item B2 matches this question best.

Graphic(s)



Results

235 participants (22%) ranked environmental concerns the most serious issue facing the world today. Only economic concerns were stated more frequently as being the most serious issue. 57% (624 participants) ranked environmental concerns as one of the top three issues.

In this study, environmental concerns are deemed the second most important issues facing the world today.

Interpretation

Environmental concerns (pollution, waste, climate change) seem to be of very serious concern for most respondents. One possible explanation could be the obvious impacts of climate change on the weather, the media coverage of climate change or the visible pollution of the air, water and grounds. One possible explanation for economic concerns being of *highest* concern could be the financial crisis which peaked around the year 2011 when this study was conducted.

3.1.2 Specific environmental issues

Research question

What is the perception on the relative importance of specific environmental problems (e.g. natural resources depletion, air pollution, waste generation, etc.)?

OECD questionnaire

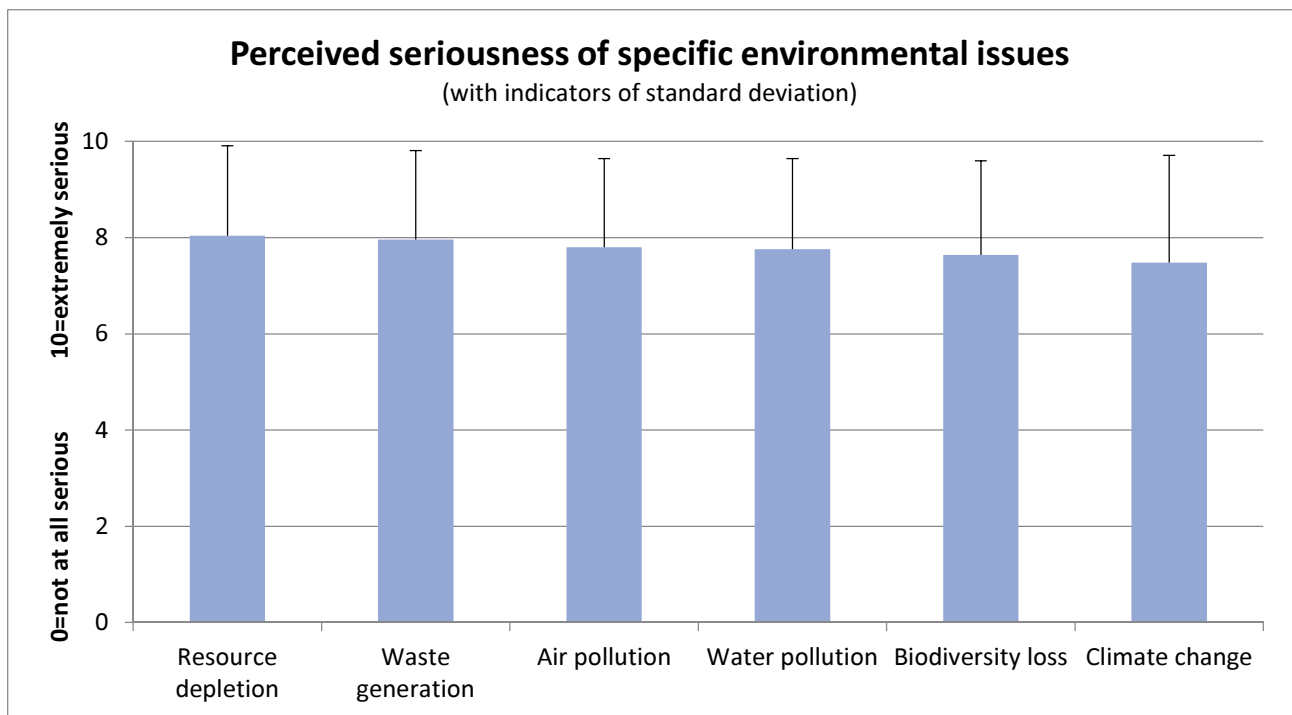
B3. How serious are the following environmental issues facing the world?

- Waste generation
- Air pollution
- Climate change (global warming)
- Water pollution
- Natural resource depletion (forest, water, energy)
- Endangered species and biodiversity

Mapping decision

Item B3 matches this question best.

Graphic(s)



Results

On average, the specific environmental problems are all perceived as very serious with small standard deviations between 1.8 (air pollution) and 2.2 (climate change).

Although resource depletion was the most serious environmental issue, all specific environmental problems are perceived as very serious.

The extreme value (10=extremely serious) was chosen especially often and is in four cases the most chosen option (statistical mode).

Interpretation

The fact that all the specific environmental issues are perceived as extremely serious is an affirmation of the result in item B2 (What are the most serious issues facing the world today?). Participants of this study seem to be very concerned about the environment.

3.1.3 Strategies for solving environmental problems

Research question

Are strategies for solving environmental problems perceived as fair and effective?

OECD questionnaire

B6. To what extent do you agree with each of the following statements?

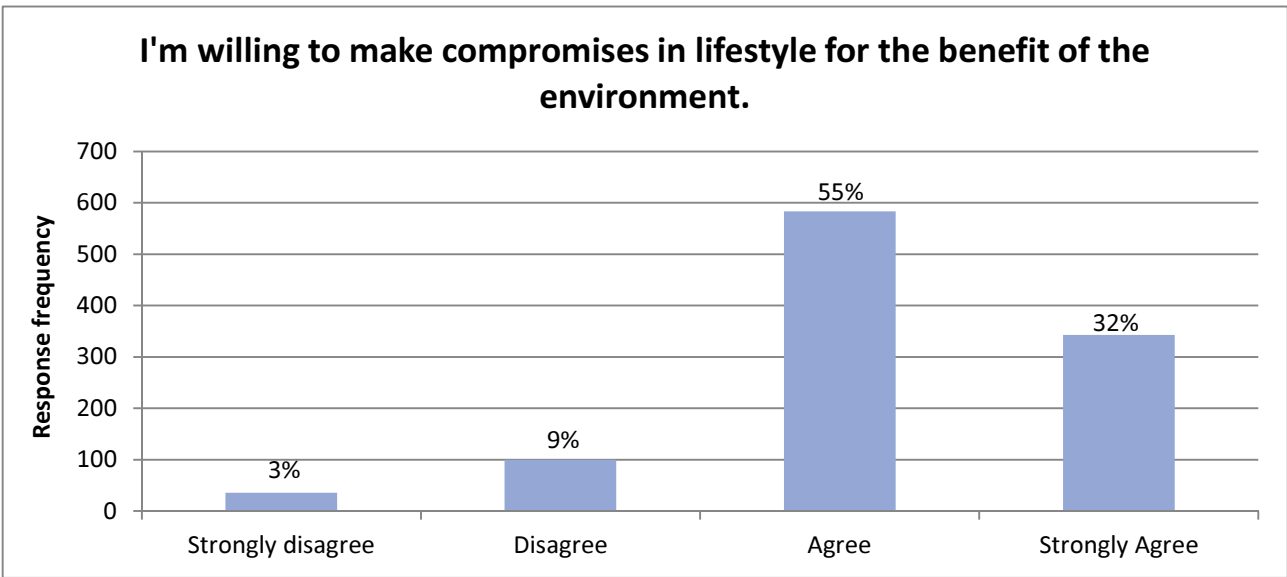
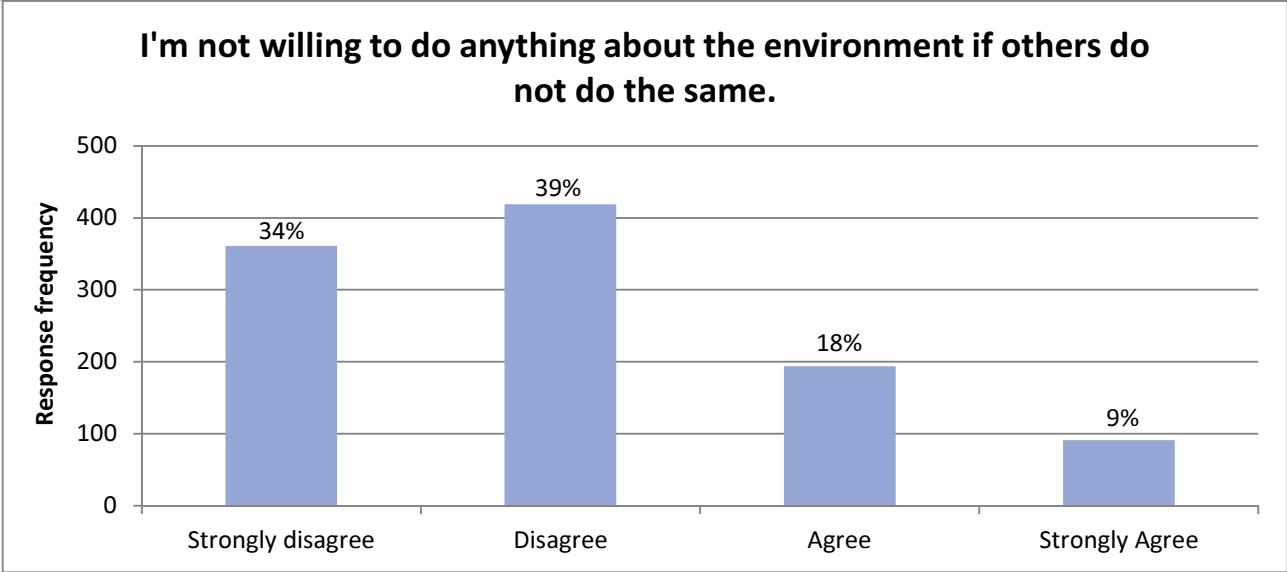
- I am not willing to do anything about the environment if others do not do the same
- I am willing to make compromises in my current lifestyle for the benefit of the environment
- Policies introduced by the government to address environmental issues should not cost me extra money
- Environmental issues will be resolved in any case through technological progress

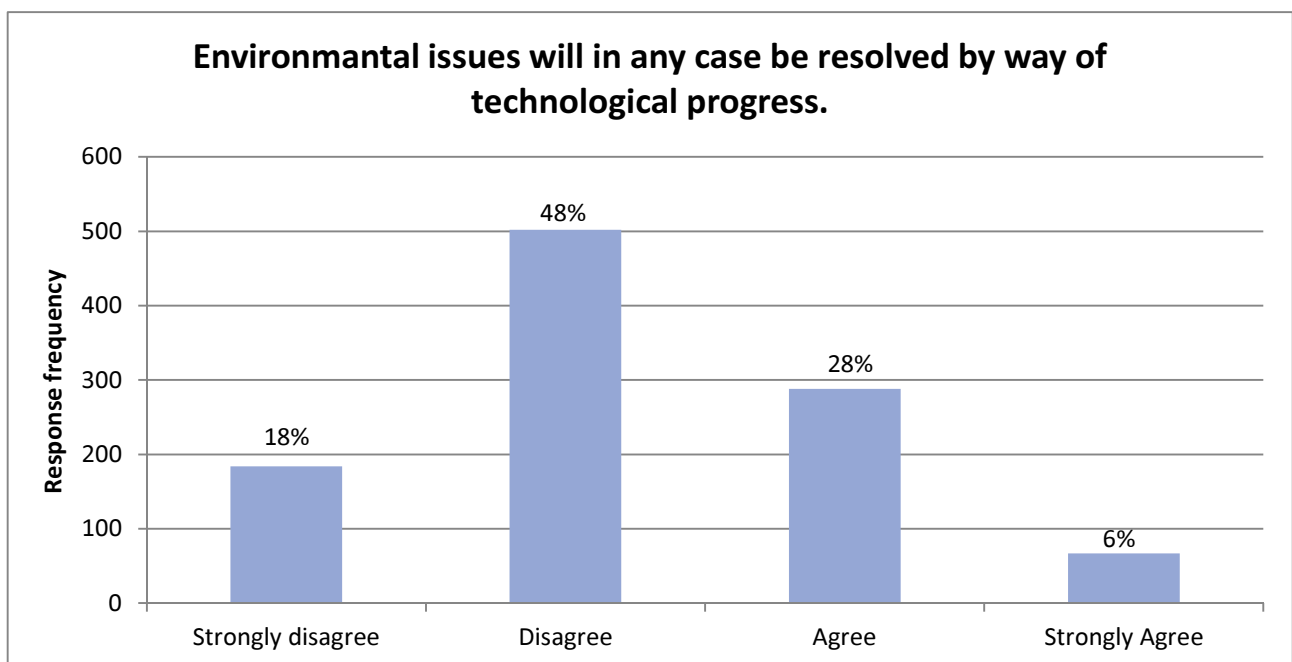
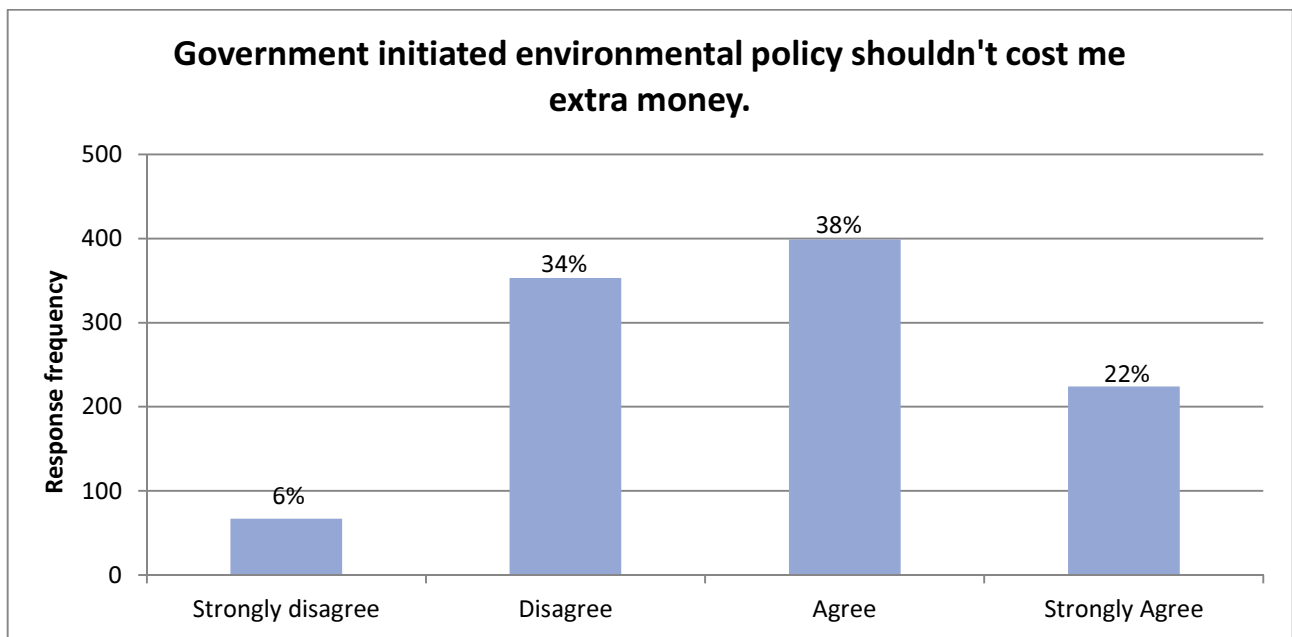
Mapping decision

Fairness and effectiveness were not part of the questionnaire in this form.

Item B6 however has four questions which contain aspects of fairness and effectiveness of strategies for solving environmental problems.

Graphic(s)





Results

Most people are willing to do something about the environment, even if others do not do the same. They are even willing to make compromises in lifestyle for the benefit of the environment.

When it comes to paying for environmental policies, the attitudes are split. Less than half of the participants are willing to pay for environmental policies but more than half are not.

Most people disagree with the idea that technology can solve environmental issues.

It can thus be assumed that the strategy of resolving environmental issues through technological progress is not perceived as effective enough.

The statement 'I'm not willing to do anything about the environment if others do not do the same.' is double negative which could have been difficult to understand correctly. People who disagree are considered altruists.

Interpretation

Although the fairness and effectiveness of strategies could not be estimated, it can be stated, that most participants are altruistic when it comes to 'doing' something about the environment.

Specialty of item B6

The attitudinal data in the survey were used to „cluster“ respondents into classes with similar preferences about environmental goods and services, and willingness to contribute to public goods.

Three different clusters were determined in Item B6 (7 statements about the attitude towards the environment).

Altruists (48%):

They believe that environmental problems are real and express a willingness to make compromises in their lifestyle to solve these problems.

Members of this class also expressed the least need for reciprocation from others in order to undertake action to solve environmental problems.

Green Growthers (15%):

Green Growthers share the belief with Altruists that environmental problems are real and appear willing to make lifestyles compromises to solve them.

The key difference between Green Growthers and Altruists is that the former express a greater belief in the potential for technological progress to solve environmental problems.

Skeptics (36%):

They believe that environmental issues are overstated and do not wish to pay for government issued environmental policies.

But on the other hand they do report a general willingness to make compromises for the benefit of the environment, though not to the same degree as the other two substantive classes.

3.1.4 Trustworthiness of information sources

Research question

Are the different information sources perceived as trustworthy?

OECD questionnaire

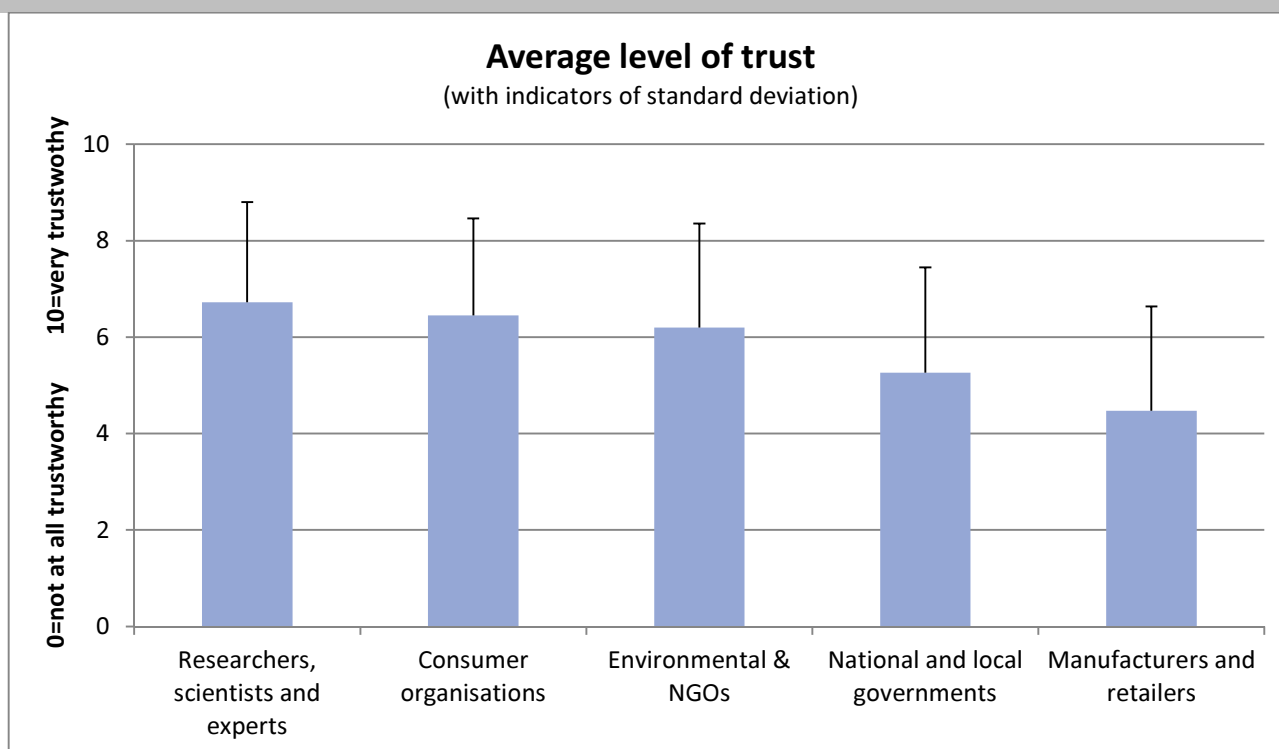
B7. How trustworthy do you consider the following sources with regard to information on claims about the environmental impacts of products?

- Researchers, scientists and experts e.g. at universities or research institutes
- National/ Local governments
- Environmental non-governmental organizations (NGOs)
- Consumer organizations
- Manufacturers and retailers (including producer associations)

Mapping decision

Item B7 matches this question best.

Graphic(s)



Results

The average level of trust among the different information sources varies between 4.5 (manufacturers and retailers) and 6.7 (researchers scientists and experts).

There is an especially high difference between the highest and the lowest level of trust with approximately one standard deviation (2.2).

Interpretation

The trustworthiness of information sources regarding the environmental impacts of products is perceived very differently. The perceived trustworthiness of manufacturers, retailers and governments is much lower than that of researchers, scientists and experts.

3.1.5 Satisfaction with local environmental quality

Research question

What is the (level of) satisfaction with local environmental quality?

OECD questionnaire

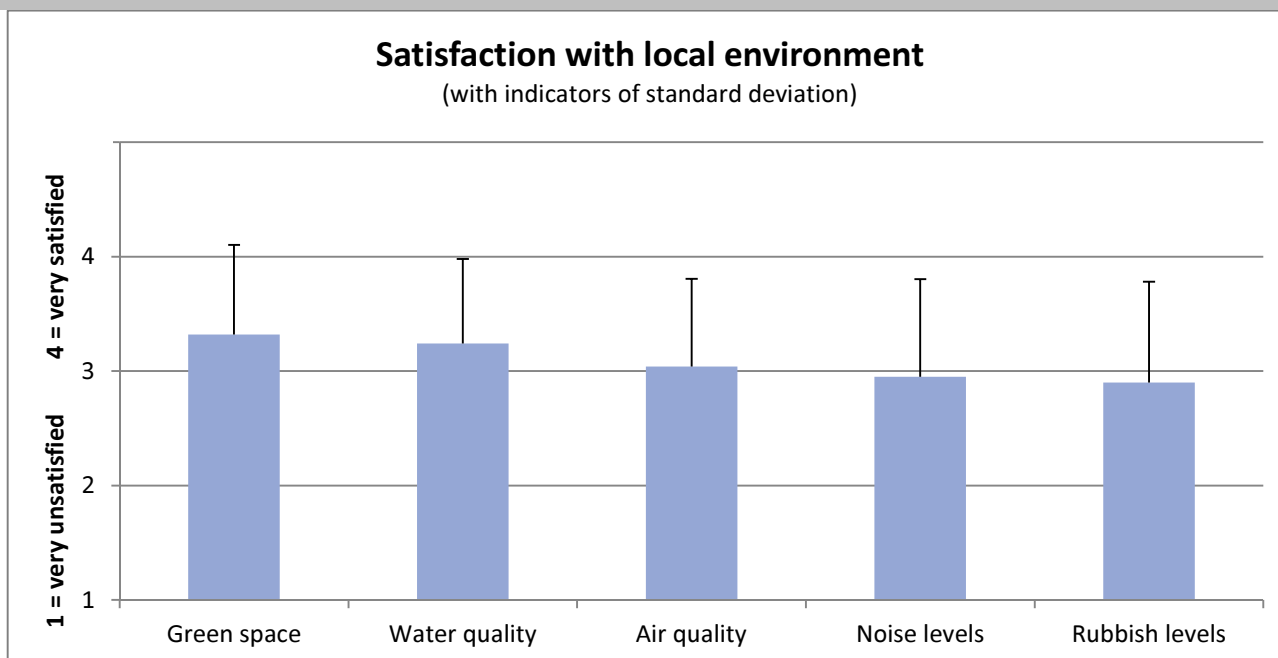
B8. How satisfied are you with the following aspects of your local environment?

- Air quality
- Water quality (lakes, rivers, sea)
- Access to green spaces (parks, forests)
- Level of noise
- Litter and rubbish in your area

Mapping decision

Item B8 matches this question best.

Graphic(s)



Results

Satisfaction with local environment is highest with respect to access to green spaces (3.3) and lowest regarding litter and rubbish levels in the area (2.9).

Noise levels and rubbish levels have a negative connotation (reason why they are lowest?) while the other aspects have a positive connotation.

Interpretation

Participants are mostly satisfied with local environmental quality with only few exceptions.

An interesting question would be, whether people in urban areas have different satisfaction levels than people in rural areas or whether there are differences in age or gender.

3.1.6 Knowledge about climate change

Research question

(What) is the knowledge level (with respect to) causes and consequences of climate change?

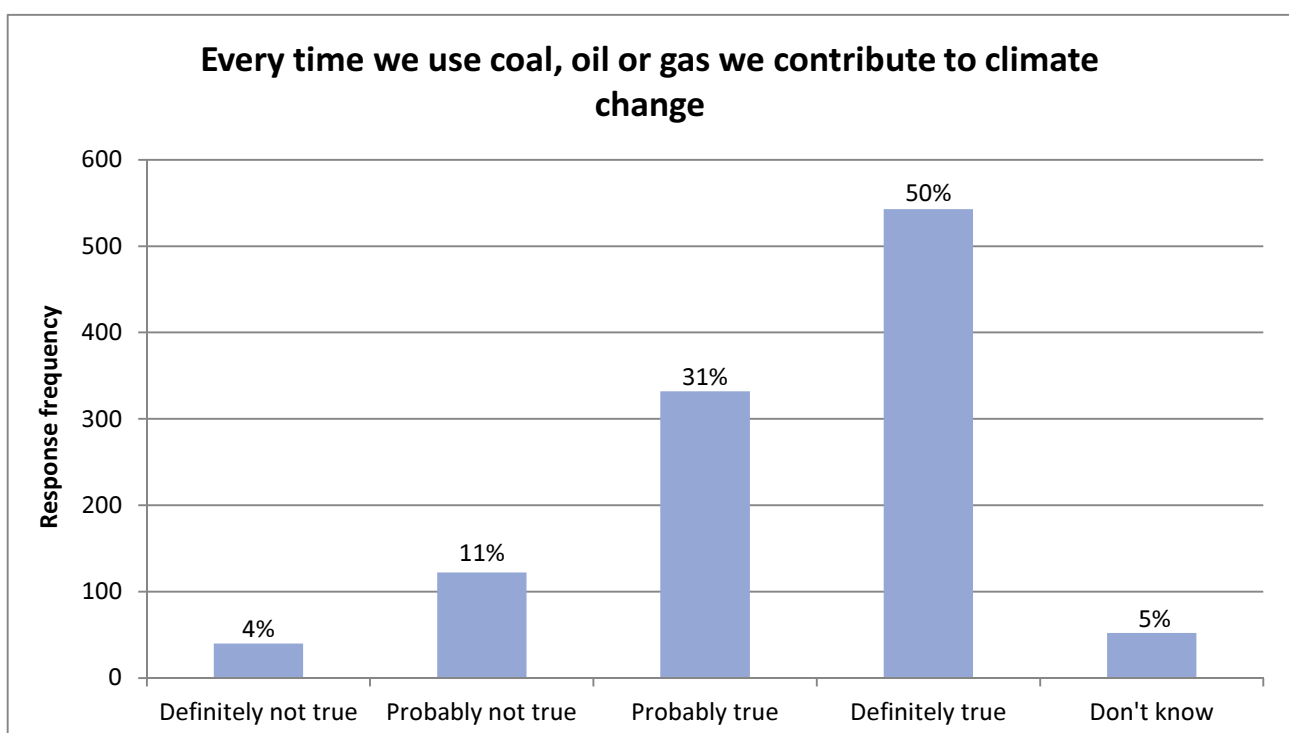
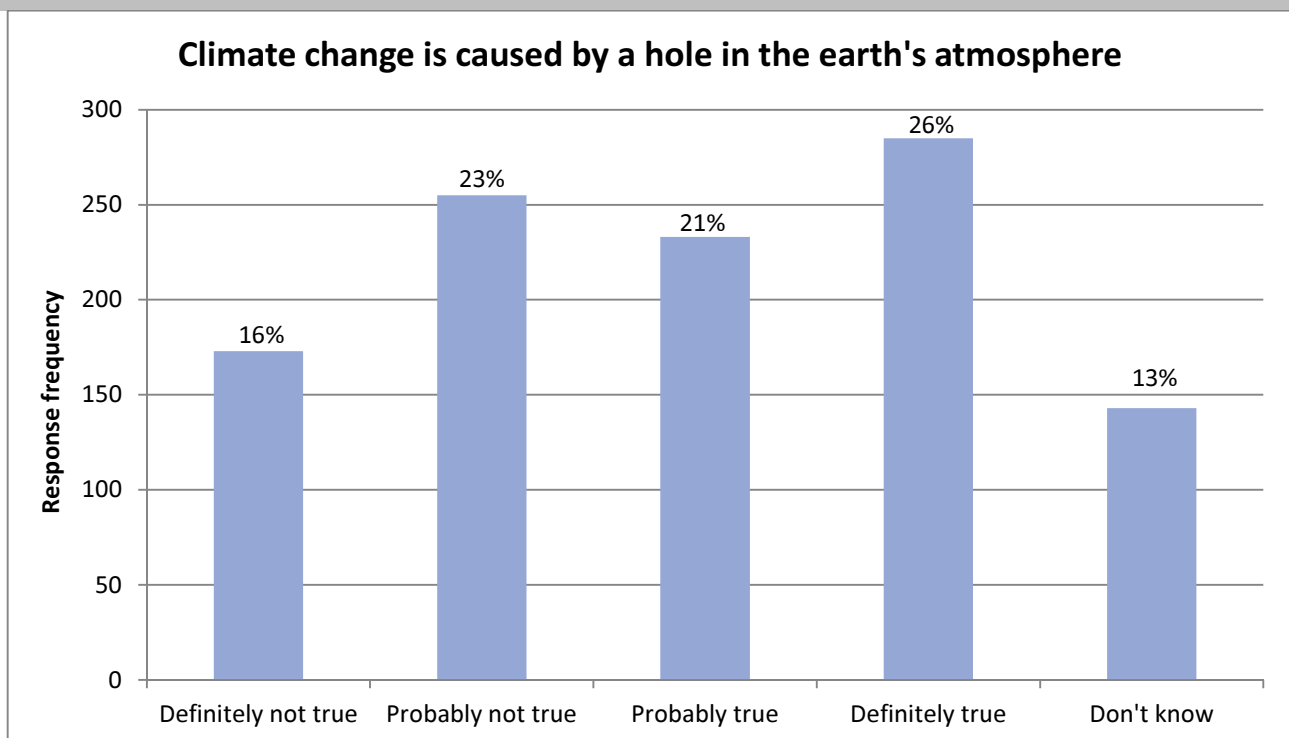
OECD questionnaire

B11. For each statement below, tick the box that comes closest to your opinion of how true it is.

- Climate change is caused by a hole in the earth's atmosphere
- Every time we use coal, oil or gas we contribute to climate change

Mapping decision

Item B11 matches this question best. Consequences of climate change were not part of the questionnaire.



Results

47% of all participants think that climate change is caused by a hole in the atmosphere. 39% think that this is not true and 13% do not know.

80% think that fossil energy contributes to climate change. 15% think that this is not true and 5% do not know.

The statement "Climate change is caused by a hole in the earth's atmosphere" is a common misconception and indeed most people think it is true or do not know.

The statement "Every time we use coal, oil or gas we contribute to climate change" is a well-known fact and most people seem to know that, yet some still do not think it's true.

Further calculations showed that participants, who agreed that we contribute to climate change by using fossil fuels, also have more trust in researchers, scientists and experts.

Interpretation

Although a majority knows about the effects of burning fossil fuels, the knowledge level about the causes of climate change reveals major misbeliefs and skepticism.

3.2 Water (consumption)

3.2.1 Water-saving behavior & water-efficient devices

Research question

Which factors affect household water-saving behaviors and household adoption of water-efficient devices?

OECD questionnaire

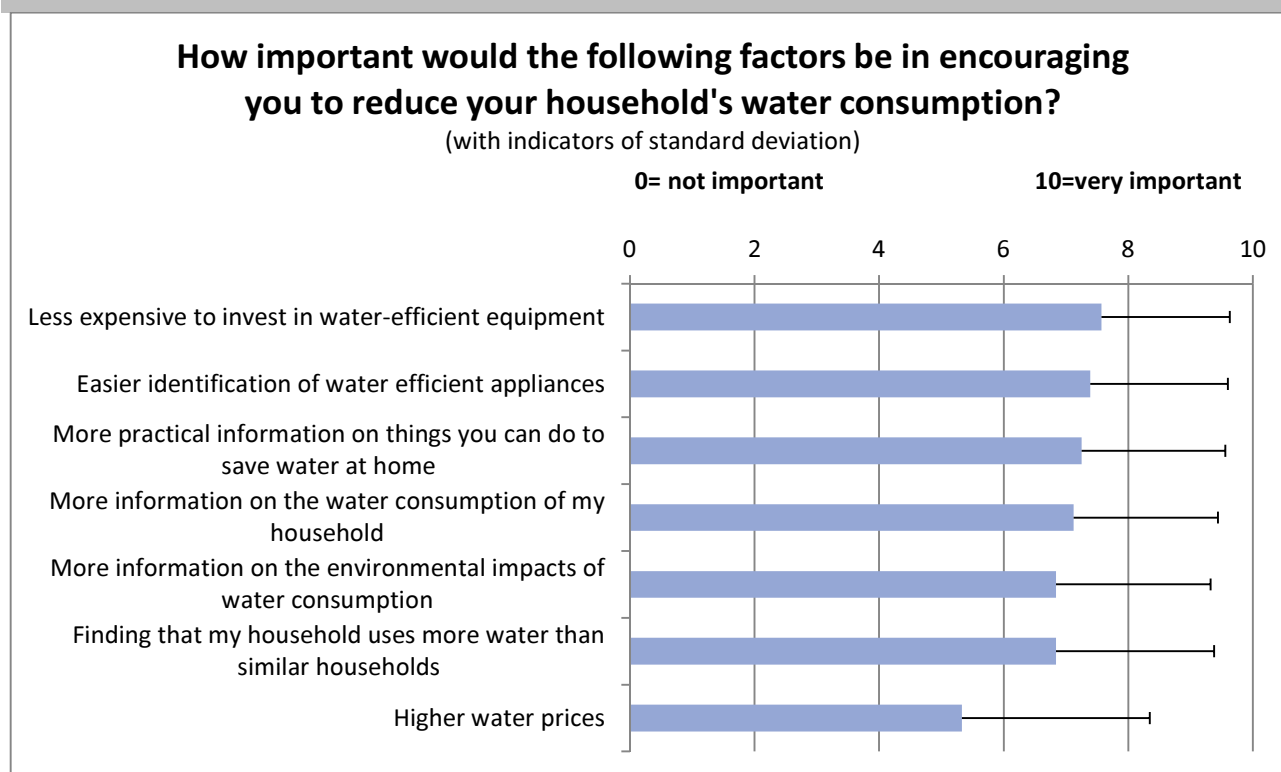
G6. How important would the following factors be in encouraging you to reduce your household's water consumption?

- More practical information on things you can do to save water at home
- Higher water prices
- More information on the environmental impacts of water consumption
- More information on the water consumption of my household
- Finding that my household uses more water than similar households
- Easier identification of water efficient appliances
- Less expensive to invest in water-efficient equipment

Mapping decision

Item G6 matches this question best. Item G2 (How often do you do the following in your daily life? E.g. Turn off the water while brushing teeth) also measures water-saving behavior (Water conservation).

Graphic(s)



Results

The various factors that encourage people to reduce water consumption are generally equally important with around 7/10 respondents listing the most important factor to be 'less expensive water-efficient equipment'.

Higher water prices seem to be an exception with an indicated importance of 5.3. The standard deviation is especially high with 3.0. For a detailed interpretation, further analysis would be necessary.

Although the highest importance is related to costs (expensive water-efficient equipment), some people seem to be reluctant to reduce water consumption at the onset of higher water costs.

Interpretation

Lack of information about water consumption, water saving and its impact on the environment are the factors which affect water saving behavior the most, rather than the price of water.

The same applies for installing water-efficient equipment, which is affected mostly by its high price and difficult identification rather than the price of water.

Water prices seem to be of little importance for the participants in this study. One reason could be that water consumption is a small expenditure for households compared to electricity for example - and still many households do not pay according to how much water they consume.

3.2.2 Quality of tap water

Research question

Which factors drive household satisfaction (levels) with (respect to) the quality of tap water?

OECD questionnaire

G8. How satisfied are you with the following aspects of your tap water?

- Taste

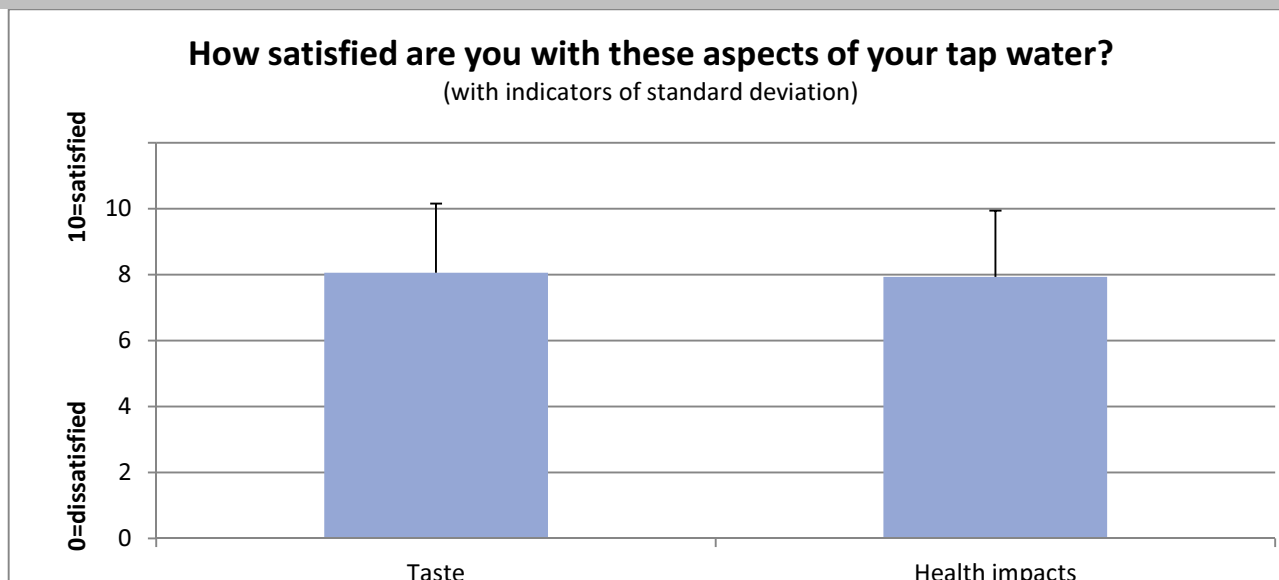
- Health impacts

Mapping decision

The quality of tap water is queried in item B8.

A combination of item G8 and item B8 shows the satisfaction level factors.

Graphic(s)



Results

Satisfaction with respect to the taste of tap water is slightly higher than health impacts.

Both aspects enjoy a high satisfaction level with a few exceptions.

The correlation between satisfaction with tap water (G8) and satisfaction with local water quality (lakes, rivers, sea) (B8) is for taste: $r=.29^{**}$ and for health impacts: $r=.28^{**}$.

This indicates that satisfaction with the local water quality of the surrounding lakes, rivers and seas amounts to a substantial factor for the satisfaction with the quality of tap water.

Interpretation

The satisfaction with the quality of tap water is driven by the satisfaction with the water quality of local lakes and rivers. Further research could find areas where participants are less satisfied with quality of tap water or local lakes and rivers which could lead to specific recommendations to improve either.

3.2.3 Water conservation behavior

Research question

How do general attitudes towards the environment influence residential water use levels and water conservation behavior?

OECD questionnaire

G2. How often do you do the following in your daily life?

- Turn off the water while brushing teeth
- Plug the sink when washing the dishes by hand
- Water 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

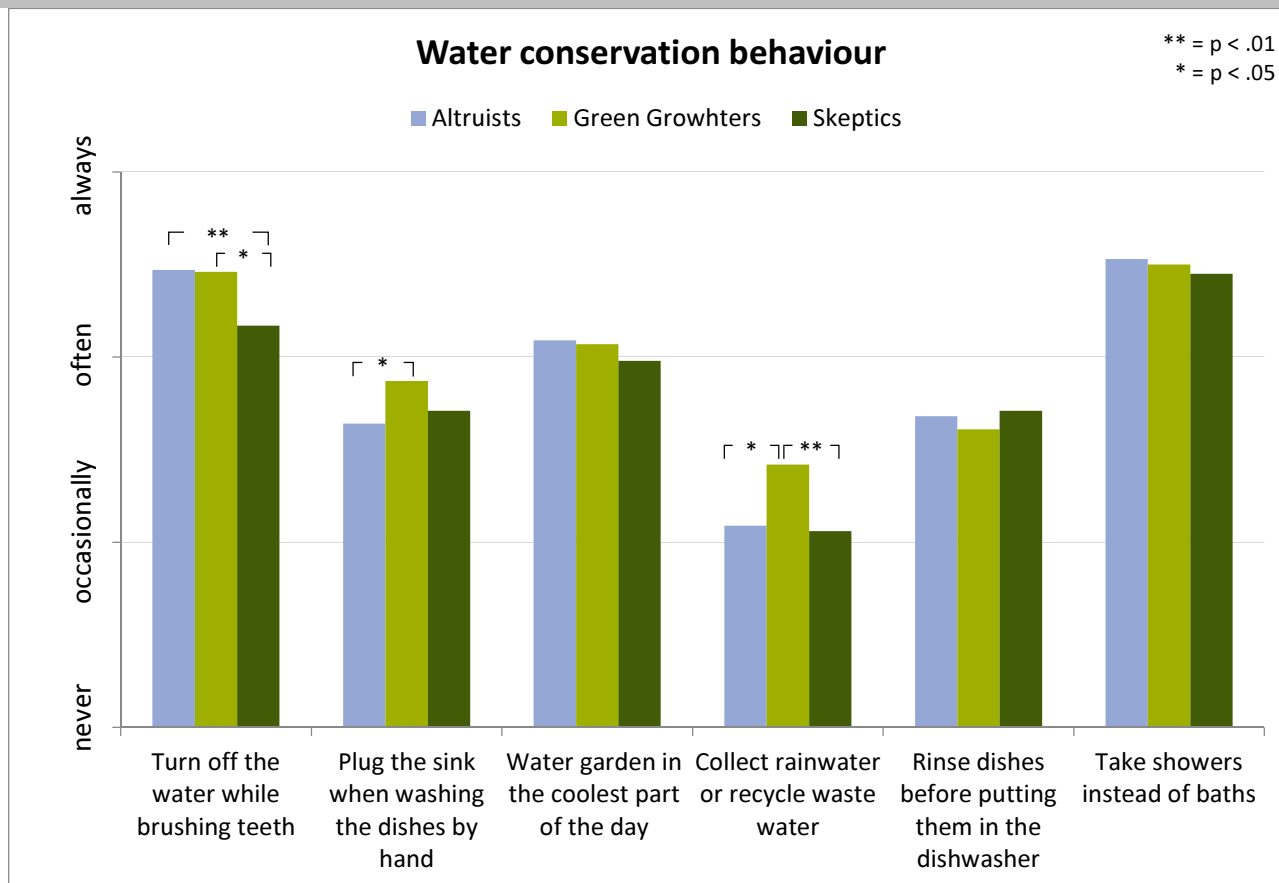
- Rinse dishes before putting them in the dishwasher
- Take showers instead of baths

Mapping decision

A combination of item G2 and clusters of item B6 (Attitudes to the environment) matches this question best.

Water use levels were not part of the questionnaire.

Graphic(s)



Results

There are some significant differences between the various attitudes towards the environment with the largest pertaining to collecting rainwater or recycling waste water.

Green Growthers seem to display the most pronounced water conserving behavior. Together with Altruists, they seem to conserve considerably more water than Skeptics.

The option 'Rinse dishes before putting them in the dishwasher' is not considered to amount to water conserving behavior!

Interpretation

Participants who are willing to make compromises in lifestyle for the environment and believe that environmental problems are real (Green Growthers and Altruists) tend to conserve more water than those who do not (Skeptics). One possible reason could be the lack of information, or skepticism about water-saving techniques, or the benefits of conserving water (see Water-saving behavior & water-efficient devices).

3.2.4 Willingness to pay for improved water quality

Research question

How much are households willing to pay for improved water quality?

OECD questionnaire

n/a - The willingness to pay for improved water quality was not part of the OECD questionnaire.

3.3 Personal Transportation

3.3.1 Environmental considerations in car purchase

Research question

How is the decision to purchase a car – and what type to purchase – linked to environmental considerations?

OECD questionnaire

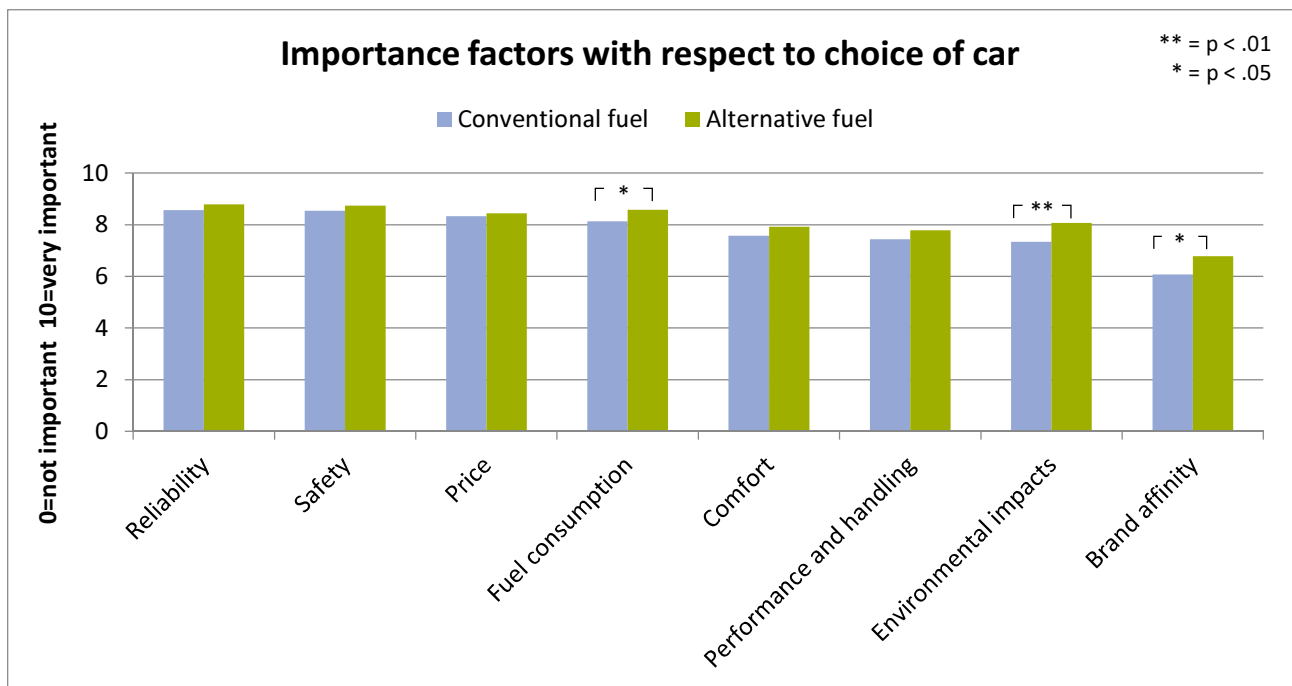
D3. How important are the following factors in your choice of car?

- Price
- Fuel consumption
- Environmental impacts
- Comfort
- Safety
- Performance and handling
- Reliability
- Brand affinity

Mapping decision

A combination of item D3 with item D1a (type of car) matches this question best. 'Fuel consumption' and 'environmental impacts' are regarded as environmental considerations. D1a (type of car) was re-categorized: Hybrid car, pure electric car and flex-fuel car = Alternative fuel; None of the above = Conventional fuel

Graphic(s)



Results

The importance of factors in car choice was compared between participants who drive conventional cars and participants who drive cars with alternative fuels.

Most factors seem to be very important with respect to the choice of cars - with highest values in reliability.

Fuel consumption was accorded the 4th highest factor of importance, and environmental impacts the second lowest.

Participants who drive alternative cars had higher values in every factor than participants who drive conventional cars. The differences were significant regarding fuel consumption and brand affinity and highly significant when it comes to environmental impacts.

Furthermore, the choice of car type was compared with item B3 (how serious are environmental issues?) and it was found that participants who have no car were more concerned about environmental issues than participants who have cars (no matter what fuel type). The difference was highly significant.

Interpretation

Environmental considerations are somewhat important when purchasing a car, but more important for those who buy cars with alternate fuel systems.

Whether the decision to not buy a car is driven by environmental considerations can only be assumed, but participants who do not own a car are generally more concerned about the environment than those who own cars.

3.3.2 Car purchase & public transportation options

Research question

How is the decision to purchase a car – and what type to purchase – linked to the presence of different public transportation options?

OECD questionnaire

D7. How long does it take to get to the most convenient public transport stop/station?

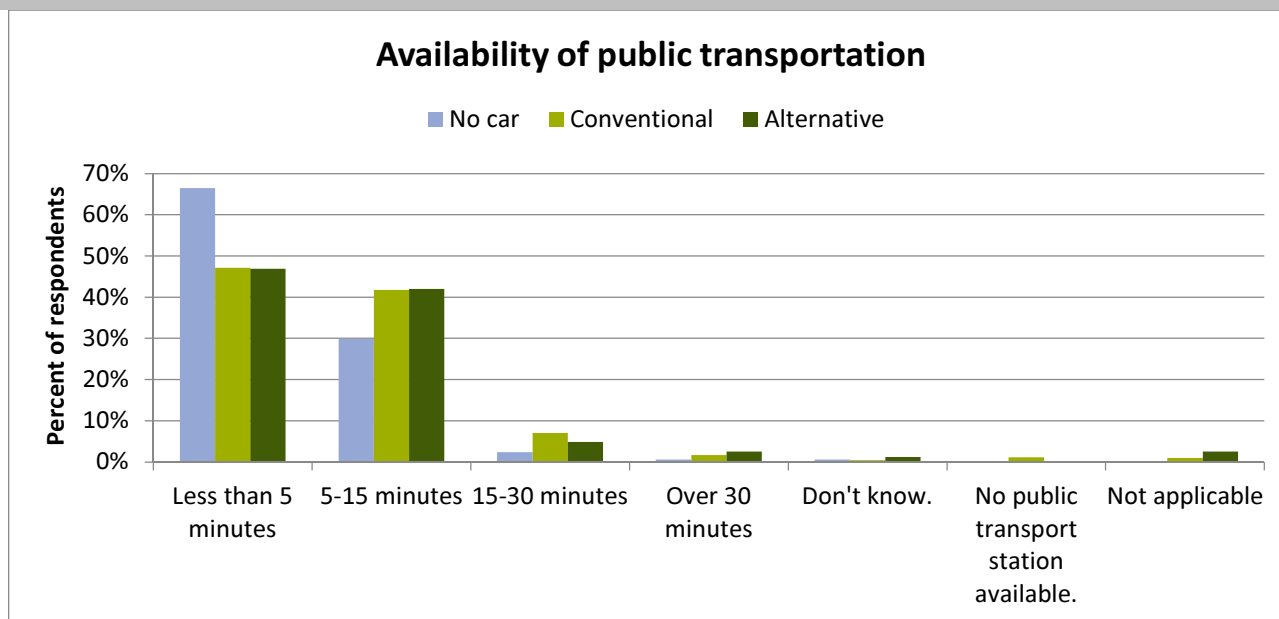
- Less than 5 minutes
- 5-15 minutes

- 16-30 minutes
- Over 30 minutes
- Do not know
- No public transport/ station available
- Not applicable

Mapping decision

A combination of item D7 with item D1a (type of car) matches this question best. D1a (Type of car) was re-categorized: Hybrid car, pure electric car and flex-fuel car = Alternative; none of the above = Conventional

Graphic(s)



Results

As may be expected, most participants who do not have a car live close to public transport options and participants who have a car generally live further away.

There were no substantial differences between different car types.

Interpretation

The decision to purchase a car is strongly linked to the availability of public transportation options. What type of car to purchase - is not linked to public transport options. Supposedly there are other reasons to purchase a car and to find out how strong the presence of public transportation options are, further analysis would be needed.

3.3.3 Modes of transport

Research question

How do attitudes towards the environment correlate with the use of private cars, public transportation and other modes of transport?

OECD questionnaire

D10. What is your main mode of transportation for each of the following activities? (Please choose the mode which accounts for the greatest distance)

- Daily commute to and from work

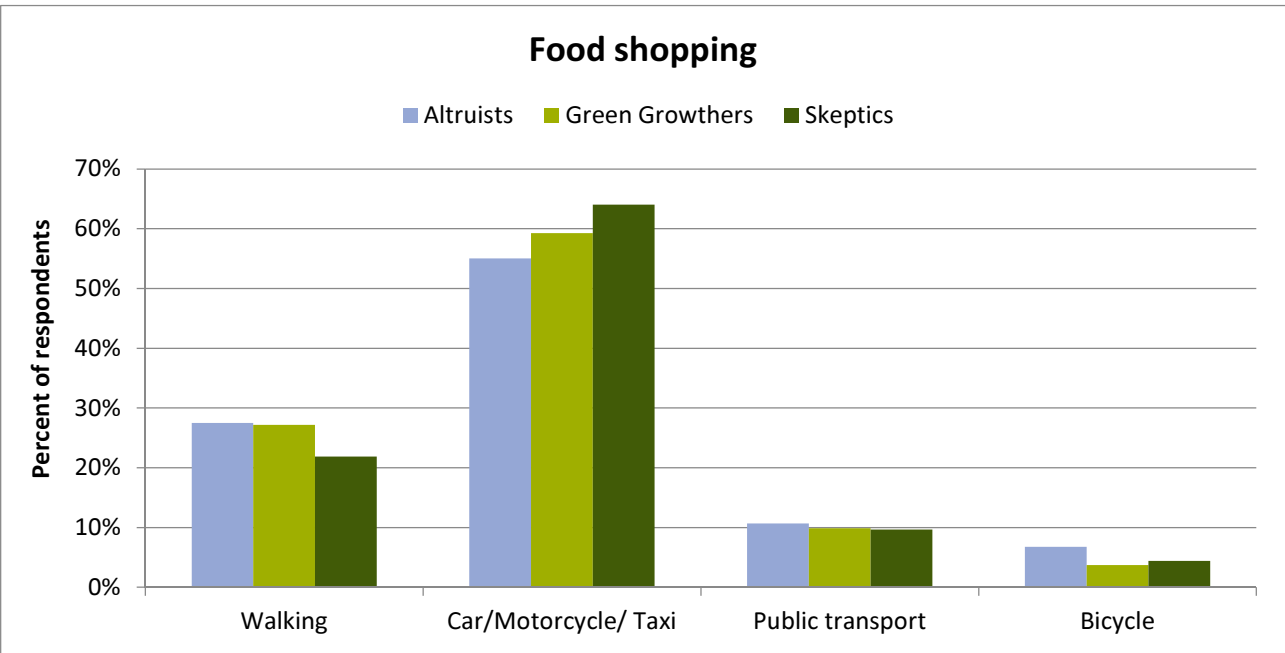
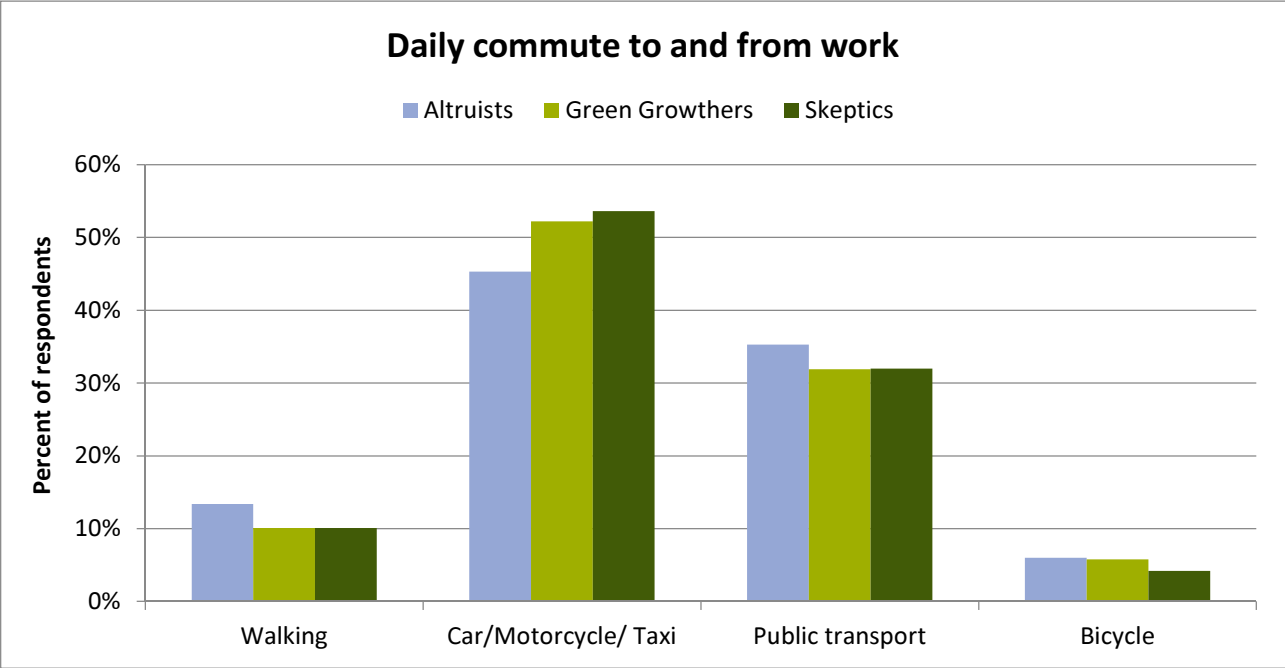
- Food Shopping

- Walking
- Car/motorcycle/Taxi
- Public Transport
- Bicycle
- Not applicable

Mapping decision

A combination of item D10 with clusters of item B6 (Attitudes to the environment) matches this question best.

Graphic(s)



Results

Altruists seem to be eco-friendlier than Green Growthers and Skeptics. In all eco-friendly categories (walking, public transport, bicycle) they had the highest response rate. Skeptics were the least eco-friendly group and Green Growthers were in the middle.

There were some differences between the modes of transport for food shopping and the daily commute to work. Walking was chosen 12% for daily commute to work and 25% for food shopping. Public transport was chosen 34% for daily commute to work, but only 10% for food shopping. Car/Motorcycle/Taxi was chosen 50% for daily commute to work and 59% for food shopping. The “Bicycle” option displayed practically no differences.

Interpretation

The mode of transportation seems to correlate with attitudes to the environment. Participants who believe, environmental problems are real and are willing to do something about it (Altruists and Green Growthers) chose eco-friendly modes of transportation more than those who do not.

3.3.4 Characteristics of public transportation

Research question

What characteristics of public transportation systems are most important to households in considering their use?

OECD questionnaire

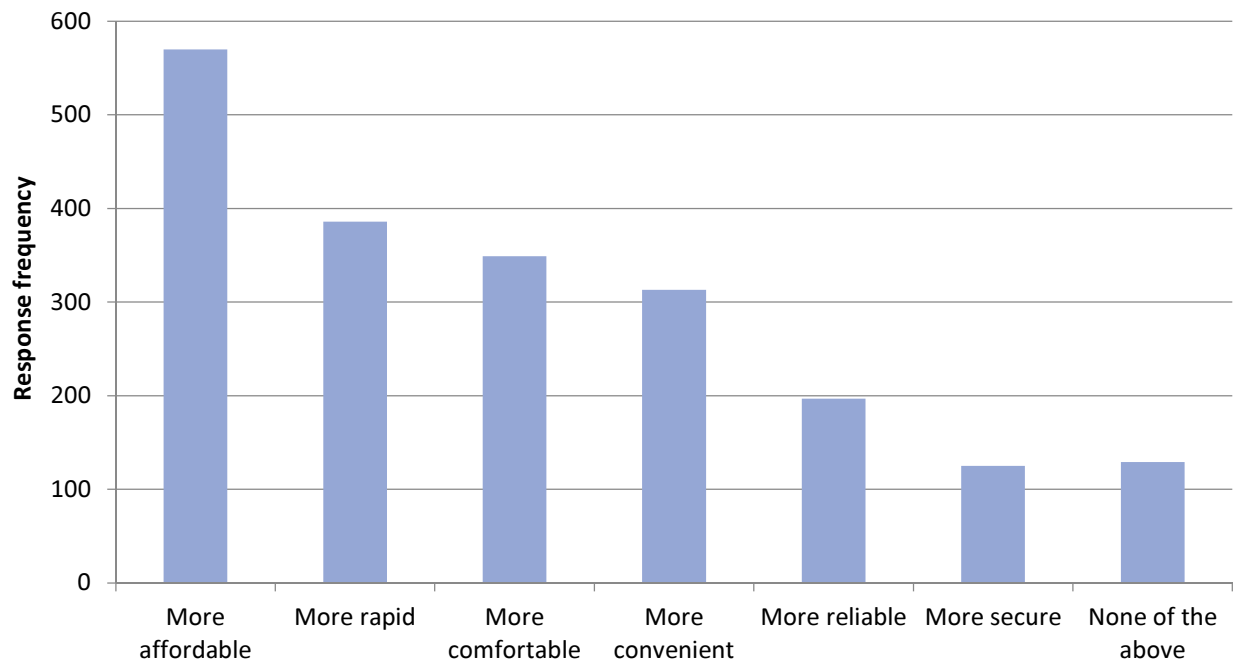
D9a. Would any of the following aspects of public transport encourage you to use your car/motorcycle less?

- 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)
- More affordable
- None of the above

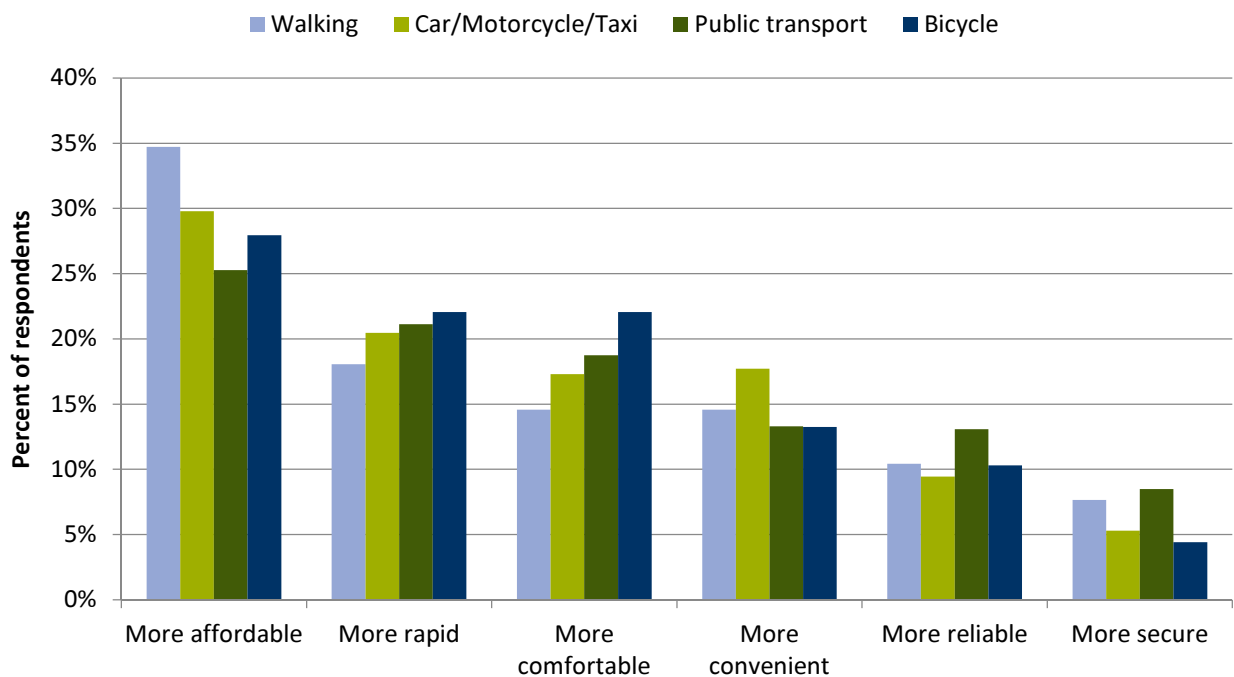
Mapping decision

A combination of item D9a with D10 matches this question best.

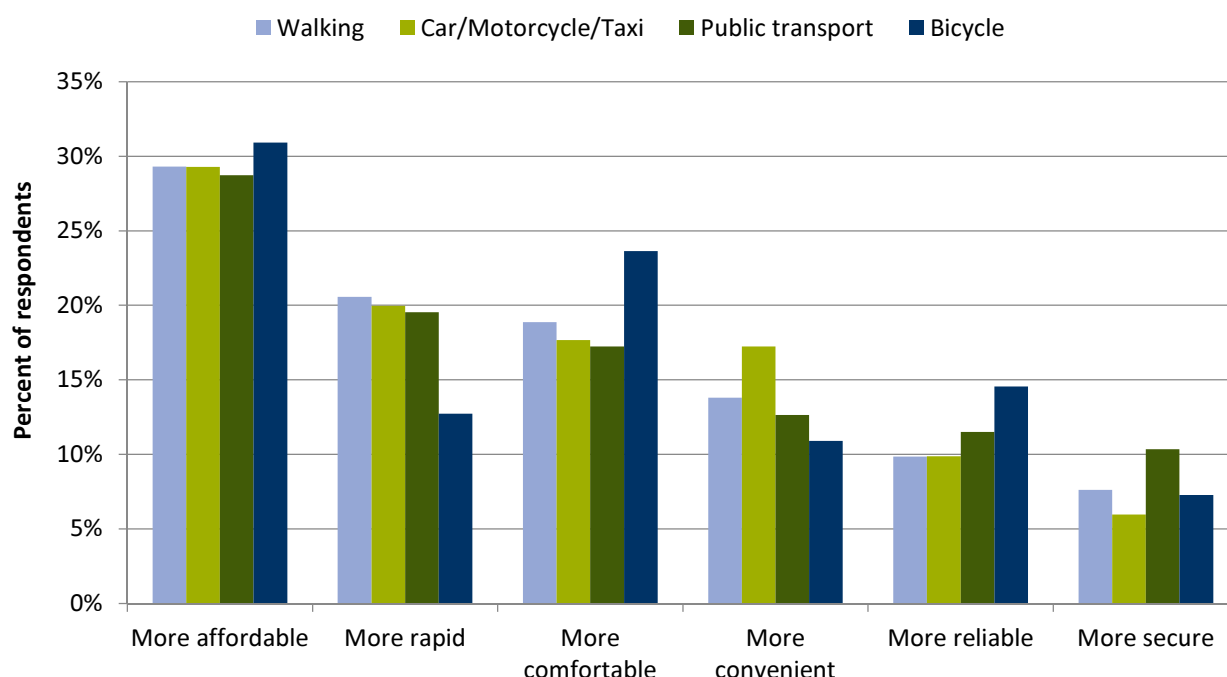
Would any of these aspects of public transport encourage you to use your car less?



Aspects of public transport to use car less - by mode of transport to work



Aspects of public transport to use car less - by mode of transport for food shopping



Results

Most respondents would use their car less, if public transport was more affordable. Speed, comfort and convenience were also important characteristics of public transport.

With modes of transport, the ranking of the public transport characteristics doesn't change much except in the case of using a bicycle for food shopping. More comfort in public transport is considered more important for participants who take the bike for food shopping than the frequency or speed of public transport.

Interpretation

The price of public transport systems is by far the most important characteristic, even for participants who use them regularly. This indicates that the price to performance rate of public transportation is rather low or that car use is still too inexpensive (or public transport too expensive).

3.3.5 Support for policies to limit motor vehicle emissions

Research question

Which types of households support government policies to limit greenhouse gas emissions from motor vehicles?

OECD questionnaire

B9. To what extent would you support the following government actions to reduce motor vehicle CO₂ emissions?

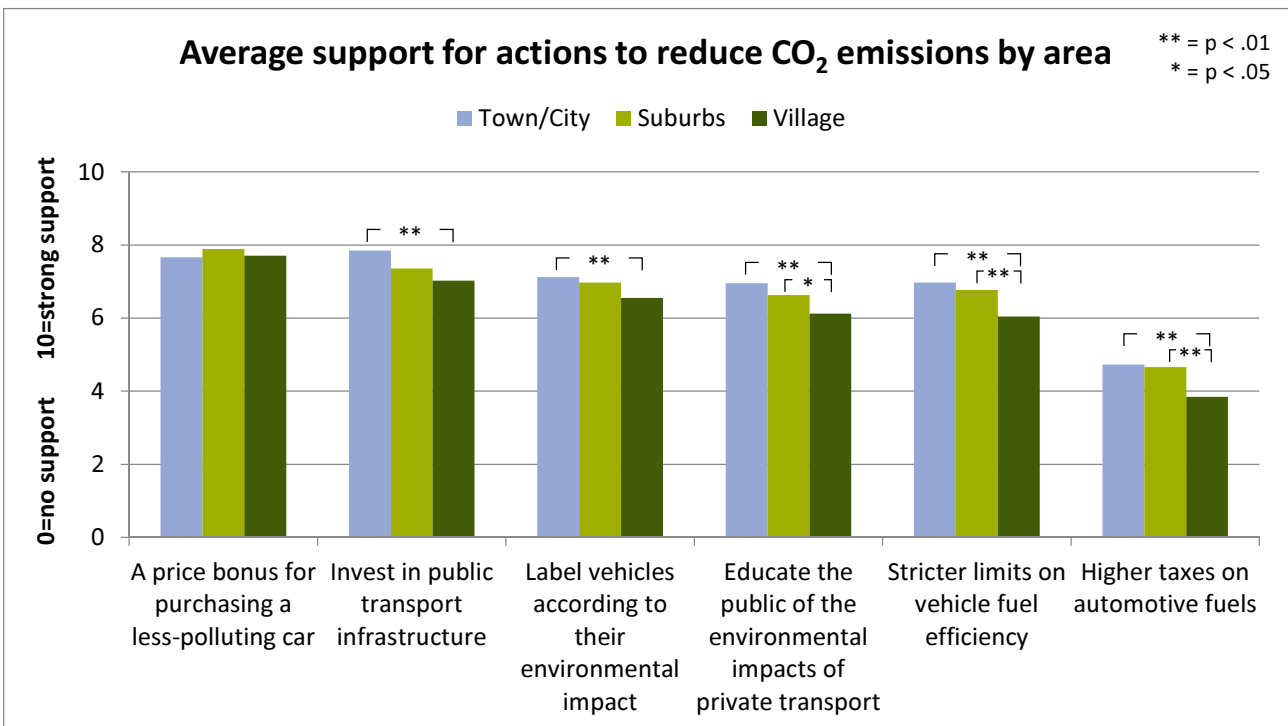
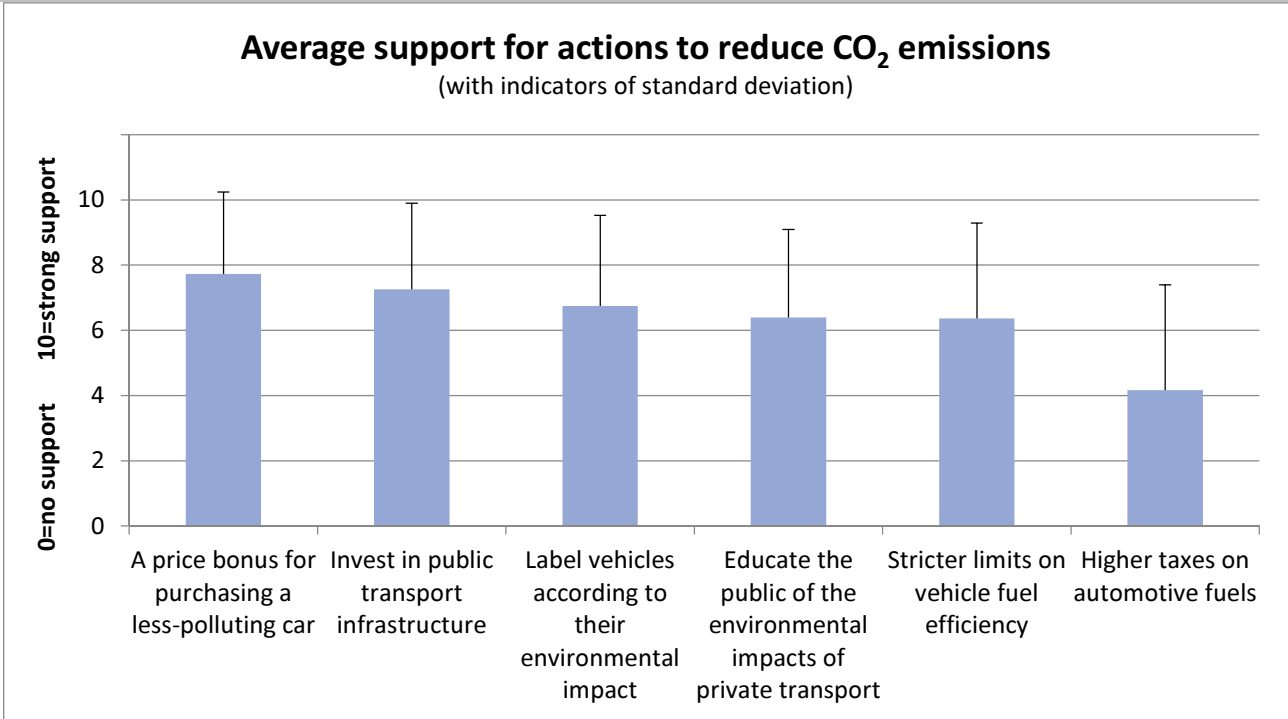
- Stricter limits on vehicle fuel efficiency
- Higher taxes on automotive fuels
- A price bonus (or tax credit) for purchasing a less-polluting car
- Invest in public transport infrastructure (e.g., buses, metro, bicycle lanes)
- Educate the public of the environmental impacts of private transport
- Label vehicles according to their environmental impact

Mapping decision

A combination of item B9 with item A13 (urbanity) matches this question best.

Item A13 was re-categorized from 4 into 3 categories to allow better display.

Graphic(s)



Results

Most policies were supported strongly, except for higher taxes on fuels. A price bonus for purchasing a less-polluting car was supported the most.

Support for almost every policy is significantly stronger in urban than in rural areas.

Income showed no differences in support for policies to reduce CO₂.

A correlation between items B3 (seriousness of environmental issues), B5.2 (support of environmental organizations) and B9 (support for policies) was calculated. Correlations lay between $r=.11^{**}$ and $r=.43^{**}$, which means that participants who have higher environmental awareness also tend to support governmental policies to reduce CO₂ emissions.

Interpretation

Overall support for governmental policies to reduce CO₂ emissions is strong and this outcome could serve as a guide for future policy making. Participants are apparently not keen on paying higher taxes on fuel. The reasons should be examined in more detail.

3.3.6 Car label in purchasing decisions

Research question

Do car labelling schemes affect household purchasing decisions?

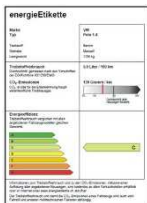
OECD questionnaire

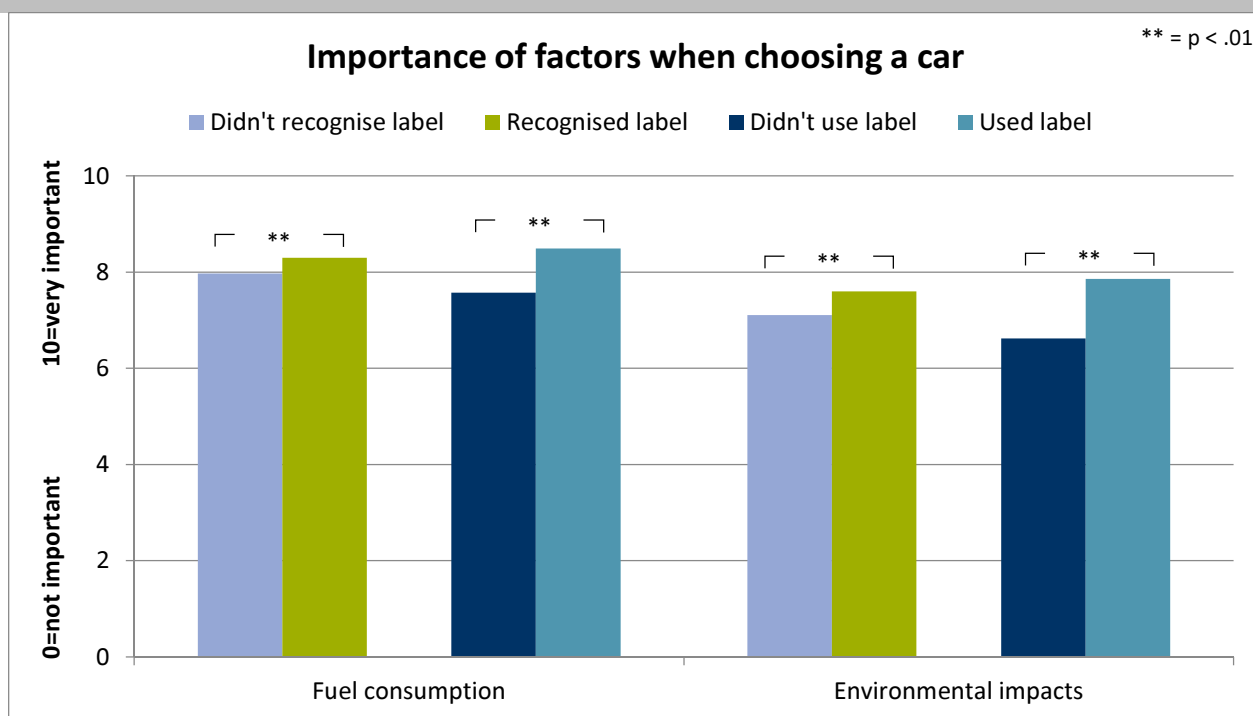
D3. How important are the following factors in your choice of car?

- Fuel consumption
- Environmental impacts

Mapping decision

A combination of item D3 with L4 (recognition of car efficiency label “energieEtikette”) matches this question best.





Results

Car efficiency label (Energieetikette)	Frequency	Percent
Do not recognize label	461	42.3%
Recognise label	628	57.7%
Total	1089	100%
Do not use label	165	26.3%
Use label	463	73.7%
Total	628	100%

628 of 1089 participants recognized the car efficiency label and 463 make use of it in their purchasing decisions which means that car labelling affects purchasing decisions in the case of 74% of the participants who recognize the efficiency label.

Participants who recognized and used the car efficiency label also stated that fuel consumption and environmental impacts of a car are more important factors in their choice of car than those who did not. All differences in importance are highly significant.

Interpretation

The car efficiency label (energieEtikette) affects participants' purchasing decisions strongly. In addition, ecological considerations in car purchasing are linked to label recognition and use.

However, half of the participants didn't recognize the label. One reason could be that other aspects of a car are more important than its ecological impact (see 3.3.1 Environmental considerations in car purchase)

3.3.7 Willingness to pay more for electric cars

Research question

How much are households willing to pay for an electric car, and what is the perceived value of these cars?

OECD questionnaire

D5. How much more would you pay for an electric car (only electric motor) compared to a conventional car?

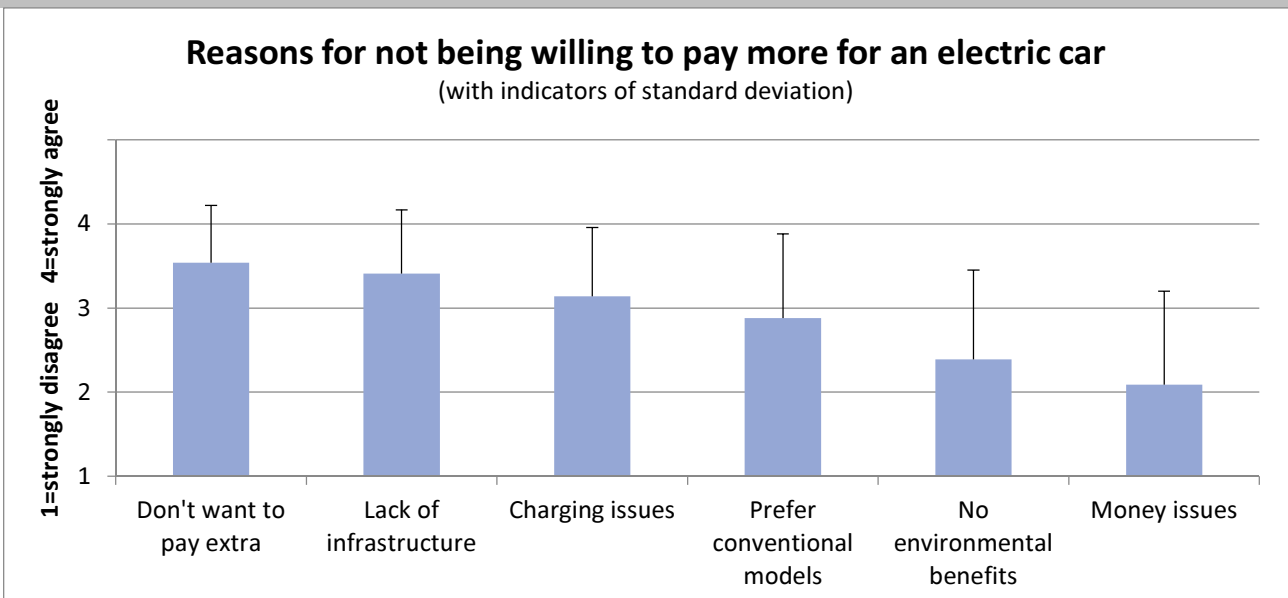
D5a. Why are you not willing to pay more for an electric car? If D5=0%

- I do not think I should have to pay extra for an electric car
- Adequate infrastructure is not yet available for electric cars (i.e. limited charging facilities)
- Inconvenience of electric cars due to the need to charge frequently
- I prefer conventional models to the electric cars available
- I do not think there are environmental benefits of electric cars
- If I had more money I would pay more for an electric car

Mapping decision

Item D5 and item D5a match this question best.

Graphic(s)



Results

The average increase in price for an electric car was 15%. Median was 10% and standard deviation was 17%. Since the standard deviation is higher than the mean, interpretation with the median would be more accurate.

16% of all participants were not willing to pay more for an electric car at all.

The extra price for an electric car was the most agreed reason for not being willing to pay more. The lack of money was apparently not a very important reason, it was mostly declined. Lack of infrastructure and charging issues were also important to those who were not willing to pay extra for an electric car.

Interpretation

Most people are willing to pay more for an electric than for a conventional car. The perceived value of an electric car is roughly 10% higher than of a conventional car.

It seems that the price difference to conventional cars is most important for participants who are not willing to pay more for an electric car. It seems to be a question of principle and not money.

3.4 Waste and Recycling

3.4.1 Waste and recycling levels, waste prevention

Research question

How do the general attitudes to the environment correlate with waste generation levels, recycling levels and waste prevention?

OECD questionnaire

C2. On average, how much mixed waste does your household generate each week?

C4. Please indicate approximately what percentage of the following waste items that your household recycles.

B10. To what extent would you support the following government actions to reduce household waste generation?

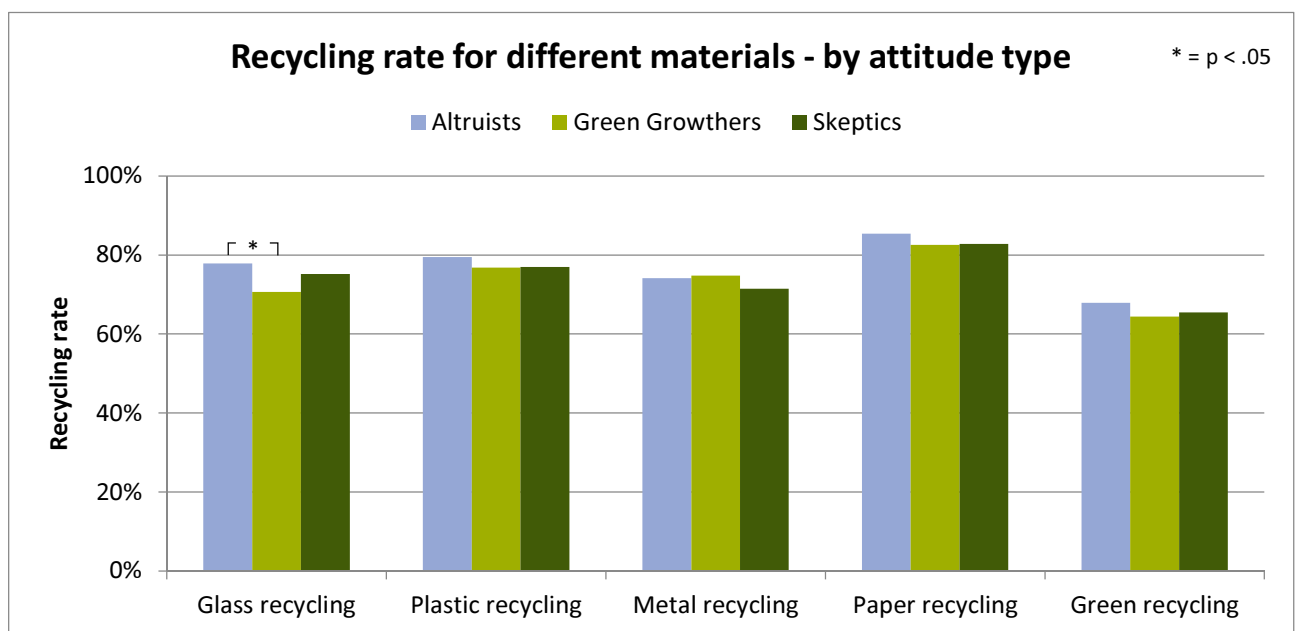
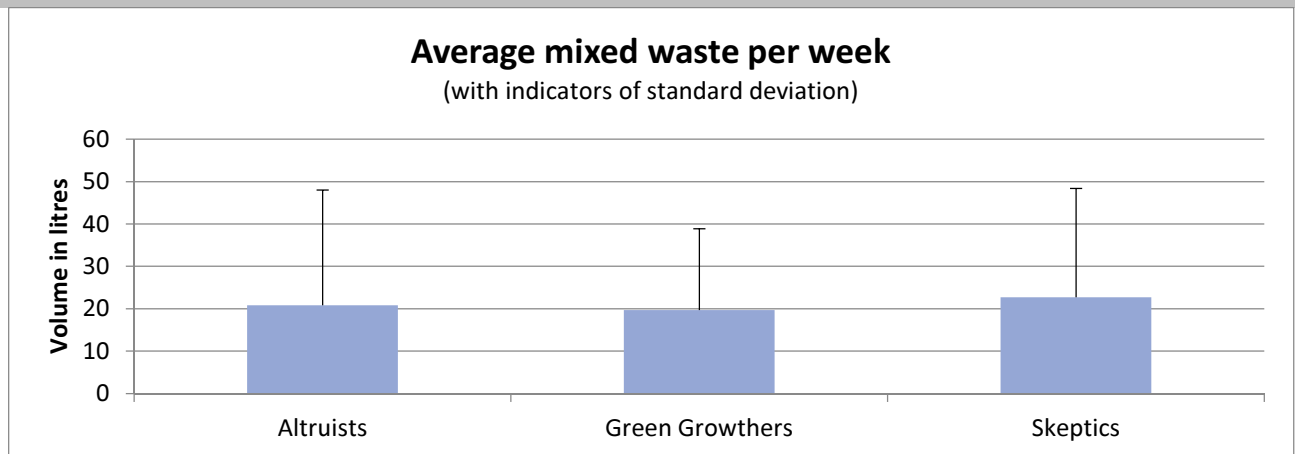
- Charge for waste collection by volume or weight
- Encourage manufacturers to reduce packaging of their products
- Encourage people to buy products with less packaging
- Send an annual summary to each household/apartment block of the volume of waste collected
- Educate the public on the environmental impacts of waste

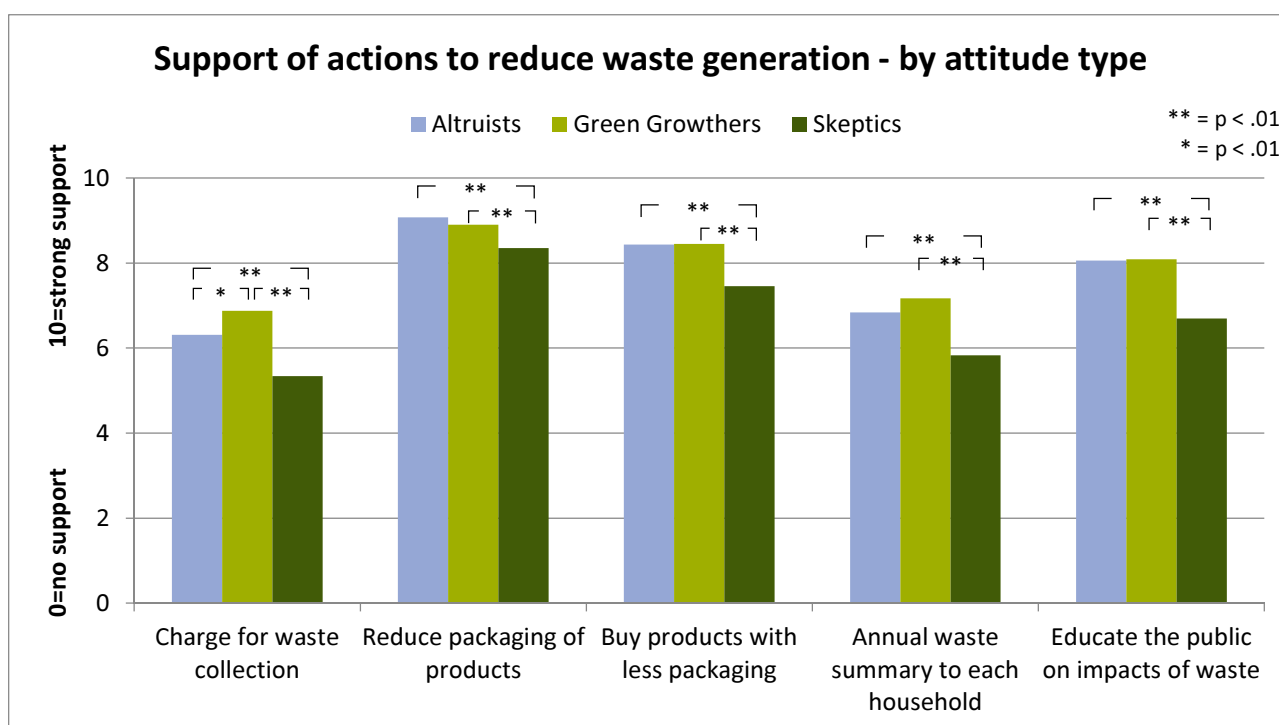
Mapping decision

A combination of items C2, C4 and B10 with clusters of item B6 matches this question best.

Mixed waste volume in item C2 was recalculated from volume per household to volume per person.

Average mixed waste levels were measured with an estimation of bag size and number of bags each week. There were several outliers with highest estimates of 800 liters by household per week. This may be a reason why some results are not as expected.





Results

Waste generation levels were equally high in all clusters of environmental attitudes, but standard deviation was unusually high. There were no significant differences between the clusters.

Similar to waste generation levels, attitude towards the environment seems to have only little influence on the recycling rate. Altruists seem to have the highest recycling rates but differences were very small.

Skeptics consistently showed less support for actions to reduce waste generation or waste prevention. All differences were highly significant.

Correlations were calculated between item B3 (seriousness of environmental issues), average waste levels and each recycling rate. Highest correlations were found between seriousness of waste generation and plastic recycling $r = .12^{**}$, paper recycling $r = .11^{**}$ and waste levels $r = -.11^{**}$. This indicates that, the more participants are concerned about waste generation in general, the more they recycle and the less they produce waste.

Interpretation

General attitudes to the environment do not correlate with waste levels or recycling rates - but indeed with support for waste prevention. One reason for the lack of differences in environmental attitudes could be that waste reduction or recycling are not only considered environmentally friendly behavior - but also a civic duty (Cross-cutting topics). Besides, recycling and waste reduction generally both save household money which is a powerful motivation for certain behavior.

3.4.2 Effects of waste fees on waste generation and recycling

Research question

Whether unit-based waste fees have significant effects on waste generation or waste recycling relative to flat (or no) fees?

OECD questionnaire

C7. How is your household charged for the collection of mixed waste in your primary residence?

- Flat fee (e.g. lump sum included in property taxes, charges or rent)
- According to volume (e.g. per bag, per container, bag tags etc.)

- According to weight (e.g. per kg, pound etc.)
- According to frequency of collection(e.g. how often the waste is collected)
- According to size of household or residence
- Other form of charging, please specify:
- Not charged
- Do not know

C4. Please indicate approximately what percentage of the following waste items that your household recycles.

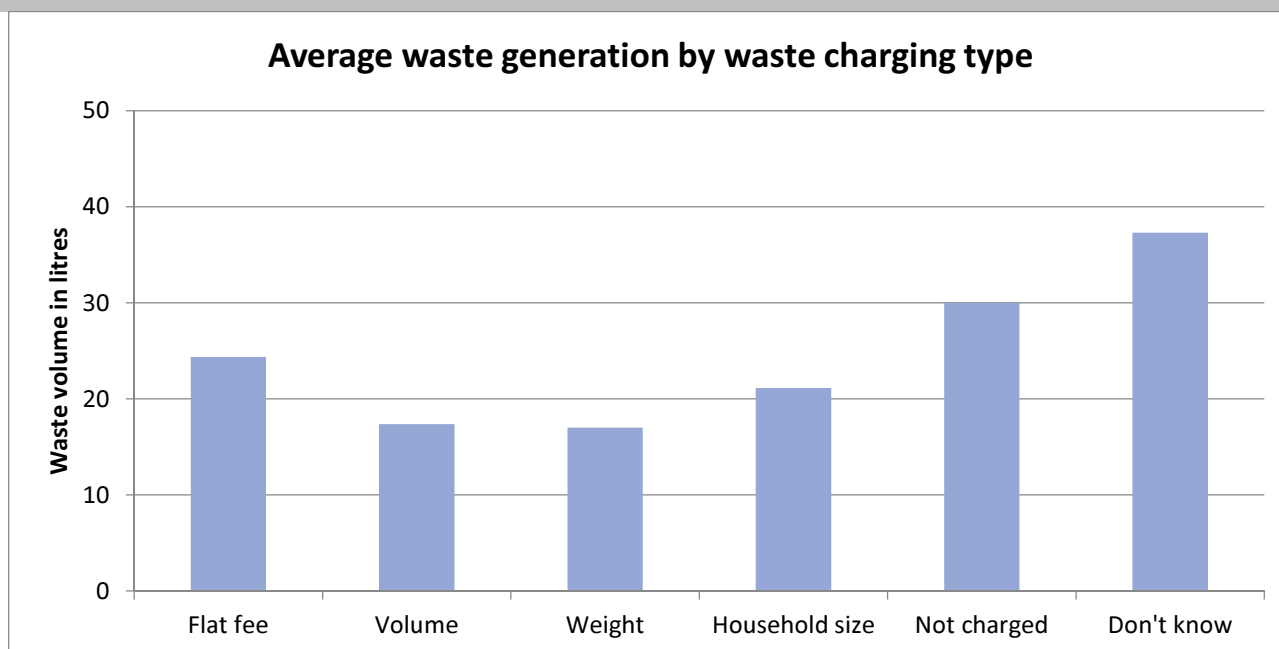
Mapping decision

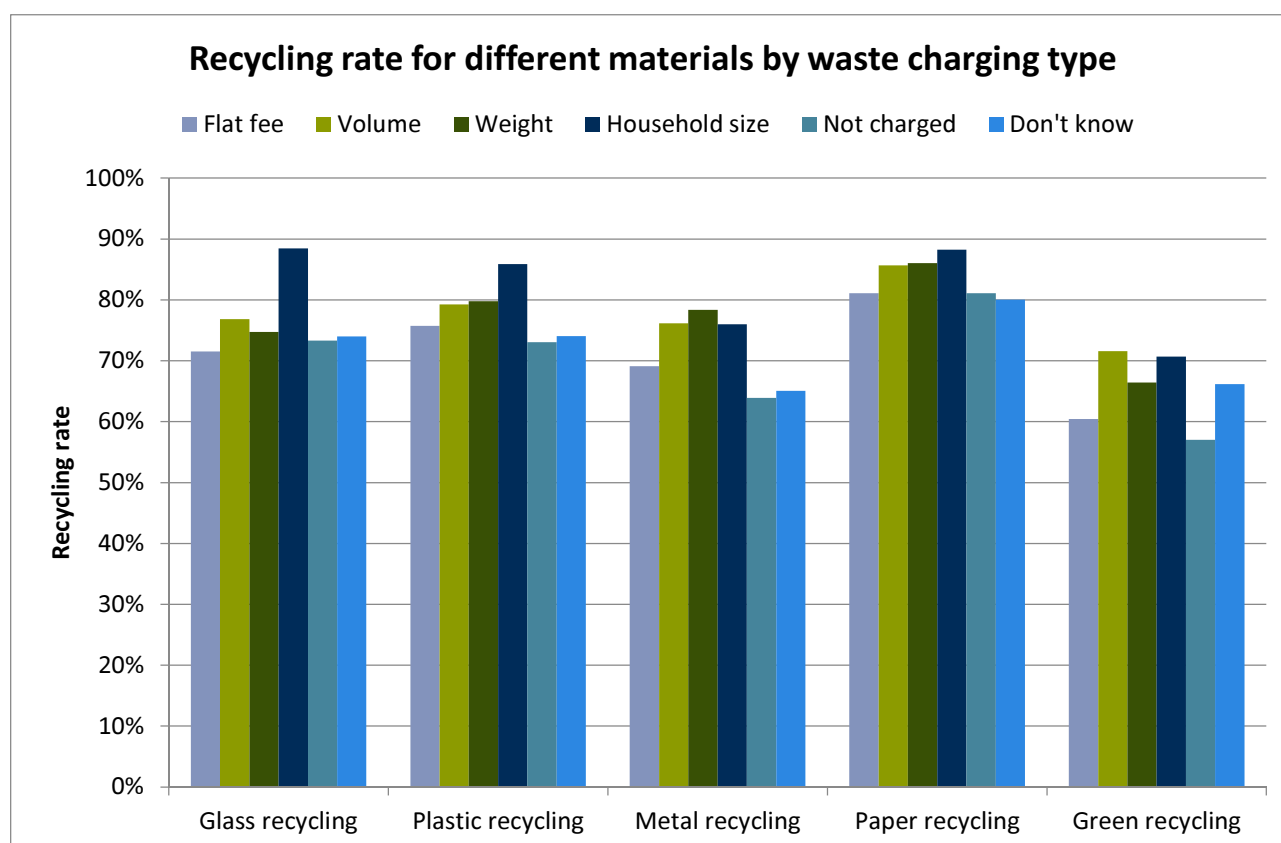
A combination of items C2 (average waste generation) and C4 with item C7 matches this question best.

Frequency of collection and other forms of collection were not included in the analysis because of the very small group sizes, resp. the difficulty in classification of other charging types.

Average mixed waste levels were measured with an estimation of bag size and number of bags each week. There were several outliers with highest estimates of 800 liters by household per week. This may be a reason why some results are not as expected.

Graphic(s)





Results

The least waste volume is generated when waste collection is charged by volume, weight or household size. When charged with a flat fee, the volume is significantly higher and when not charged, or participants do not know how they are being charged, waste volumes are highest.

The effects of waste charging type are similar when compared to the recycling rate of different materials. The smallest recycling rates occur when waste is charged with a flat fee or not charged at all - or participants do not know how they are being charged.

When waste is charged by household size, recycling rates seem to be highest in almost every material.

Interpretation

Unit-based waste fees (volume, weight, household size) encourages less waste production and more recycling than flat fees or no charging system.

Curiously, many participants do not know how they are being charged for mixed waste. This could be an affirmation of the strong effect of waste charging.

3.4.3 Waste generation and frequency of collection

Research question

To what extent is household waste generation affected by attributes of waste-related public services, such as frequency of waste collection?

OECD questionnaire

C1. How often is your mixed waste collected from your primary residence or from containers where you dispose of your waste?

- Every day

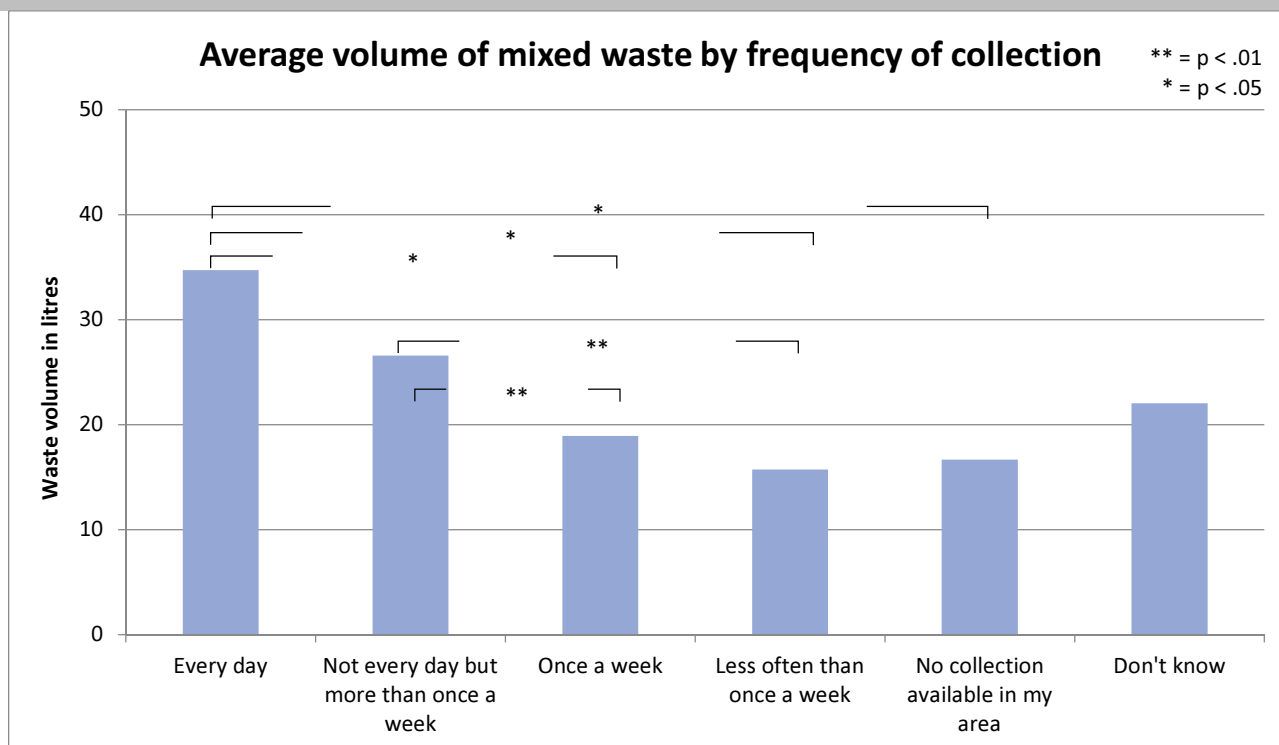
- Not every day but more than once a week
- Once a week
- Less often than once a week, (e.g. every second week)
- No collection available in my area
- Do not know

Mapping decision

A combination of item C1 with item C2 (average waste generation) matches this question best.

Average mixed waste levels were measured with an estimation of bag size and number of bags each week. There were several outliers with highest estimates of 800 liters by household per week. This may be a reason why some results are not as expected.

Graphic(s)



Results

The more often mixed waste is collected, the more waste volume is produced. The lowest volume of mixed waste per week is produced when mixed waste collection is less than once a week.

Interpretation

The connection between the frequency of waste collection and waste volume is surprising. The reason for this effect should be examined with further analysis or research.

3.4.4 Recycling decisions and recycling programs

Research question

To what extent do household waste recycling decisions depend upon the attributes of recycling programs (door to door collection, drop off)?

OECD questionnaire

C3. What are the waste collection services available for recyclable materials in your area?

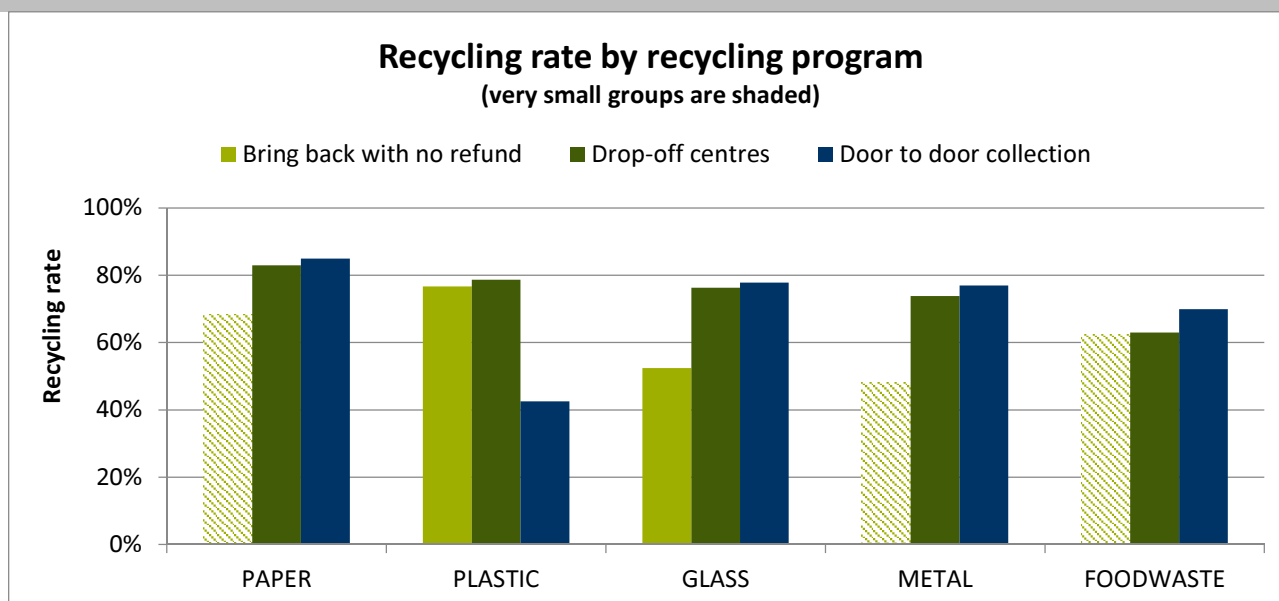
- Door-to-door collection
- Drop-off centers/ containers
- Bring back with refund (to the retailer/ manufacturer)
- Bring back with no refund (to the retailer/ manufacturer)
- No recycling service available
 - Glass bottles/ containers
 - Plastic bottles/ containers
 - Aluminum, tin and steel cans
 - Paper/ cardboard
 - Food and garden waste

Mapping decision

A combination of item C3 with item C4 (recycling rates) matches this question best.

Some groups were too small for a proper interpretation and were shaded in the display.

Graphic(s)



Results

Paper, glass, metal and food waste had the highest recycling rates in the case of door to door collections, slightly lower rates with drop-off centers and mostly low rates with bring back programs.

Plastic seems to be an exception because the highest recycling rates were registered with bring back programs.

Interpretation

Recycling rates are highest with door to door collection, except for plastic. Plastic (PET) usually has to be brought back to the point of sale and this seems to work well. The small difference between door to door collection and drop-off centers is surprising since drop-off centers require more effort to recycle than door to door collections. Apparently the drop-off system is convenient enough to achieve a high recycling rate in most materials.

3.4.5 Dispose of hazardous waste

Research question

How do households dispose of some types of hazardous waste, such as e-waste or pharmaceutical products?

OECD questionnaire

C8. In general, how do you dispose of old electronic equipment?

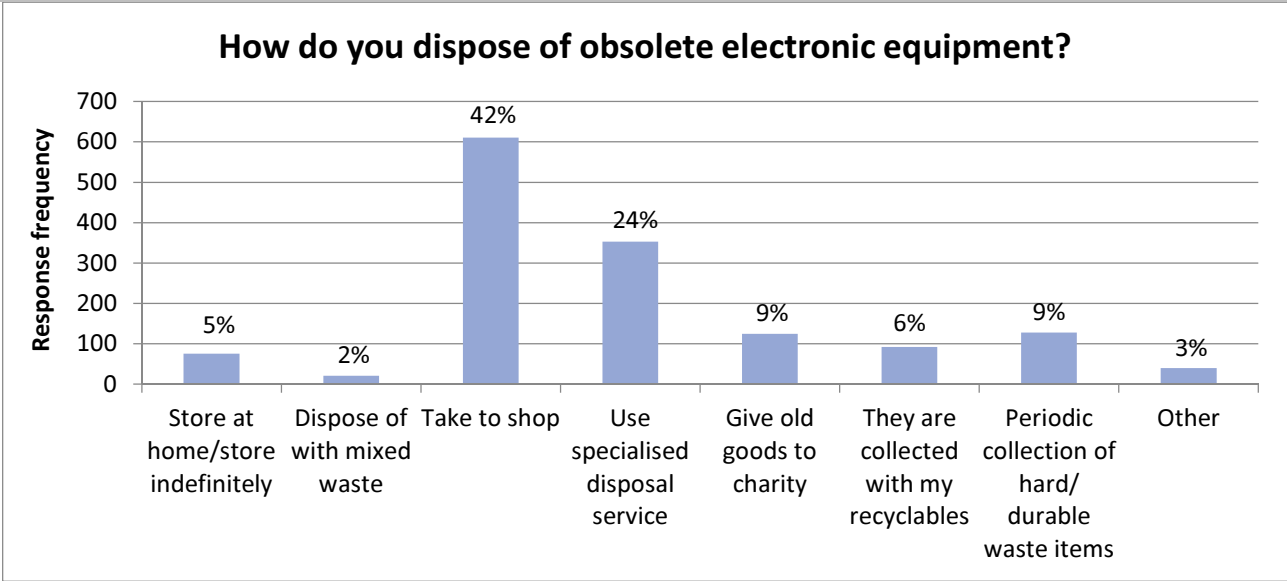
C9. How do you dispose of old/unused medicines?

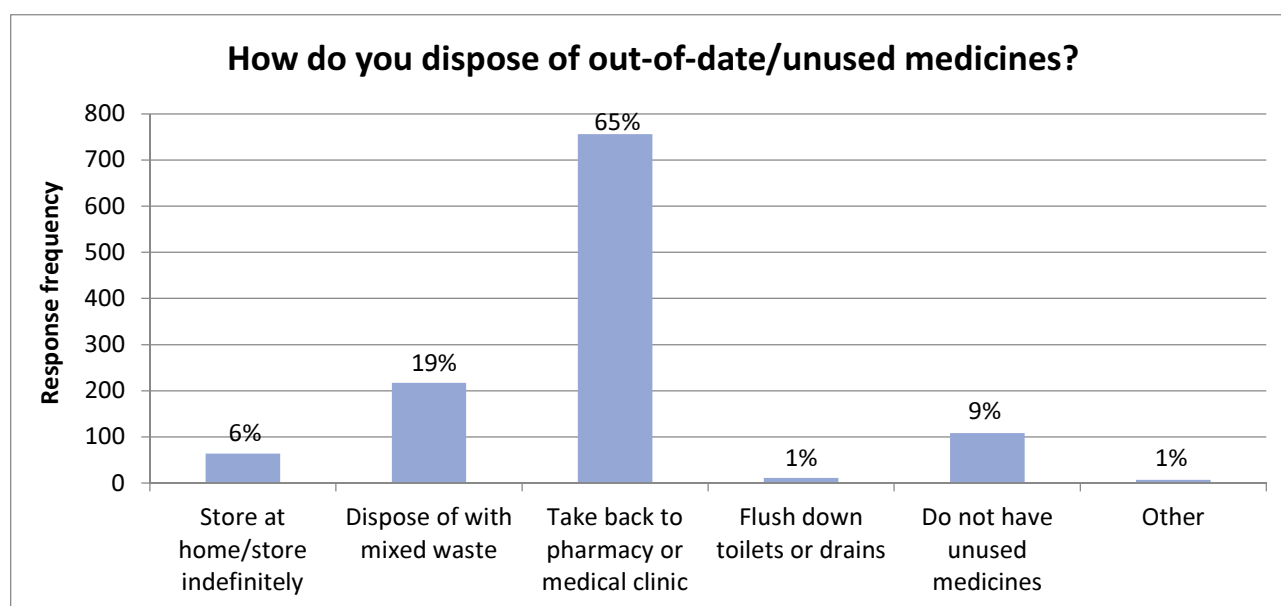
- Store at home/store indefinitely
 - Dispose of with mixed waste
 - Take to shop
 - Use specialized disposal service
 - Give old goods to charity
 - They are collected with my recyclables
 - Periodic collection of hard/durable waste items
 - Other, please specify:
- Store at home/store indefinitely
 - Dispose of with mixed waste
 - Take back to pharmacy or medical clinic
 - Flush down toilets or drains
 - Do not have unused medicines
 - Other, please specify

Mapping decision

Items C8 and C9 match this question best.

Graphic(s)





Results

2/3 of the respondents bring back their electronic equipment to the point of sale or use specialized disposal services. Similar to electronic equipment, old/unused medicines are taken back to the store, pharmacy or medical clinic.

Interpretation

The discipline demonstrated in waste disposal and recycling - in this study - extends also to electronic and medicinal waste. Although some participants still dispose of this kind of waste in an undesirable manner, most of them use a designated disposal service.

3.5 Residential energy use

3.5.1 Demand for energy efficiency and renewable energy

Research question

How do general attitudes towards the environment (environmental awareness; membership in environmental organization) correlate with demand for energy efficiency and for renewable energy?

OECD questionnaire

E4. Has your electricity provider proposed the following services to your household?

- Differentiated electricity rate for peak time (e.g. early evening) and off-peak time (e.g. night)
- Smart electricity meters allowing you to monitor consumption by viewing electricity usage in real time
- A 'renewable/green' energy tariff where you are guaranteed a specified amount of renewable electricity in your supply

Mapping decision

A combination of items E4 and B5/B6 matches this question best. B4 was also considered environmental awareness.

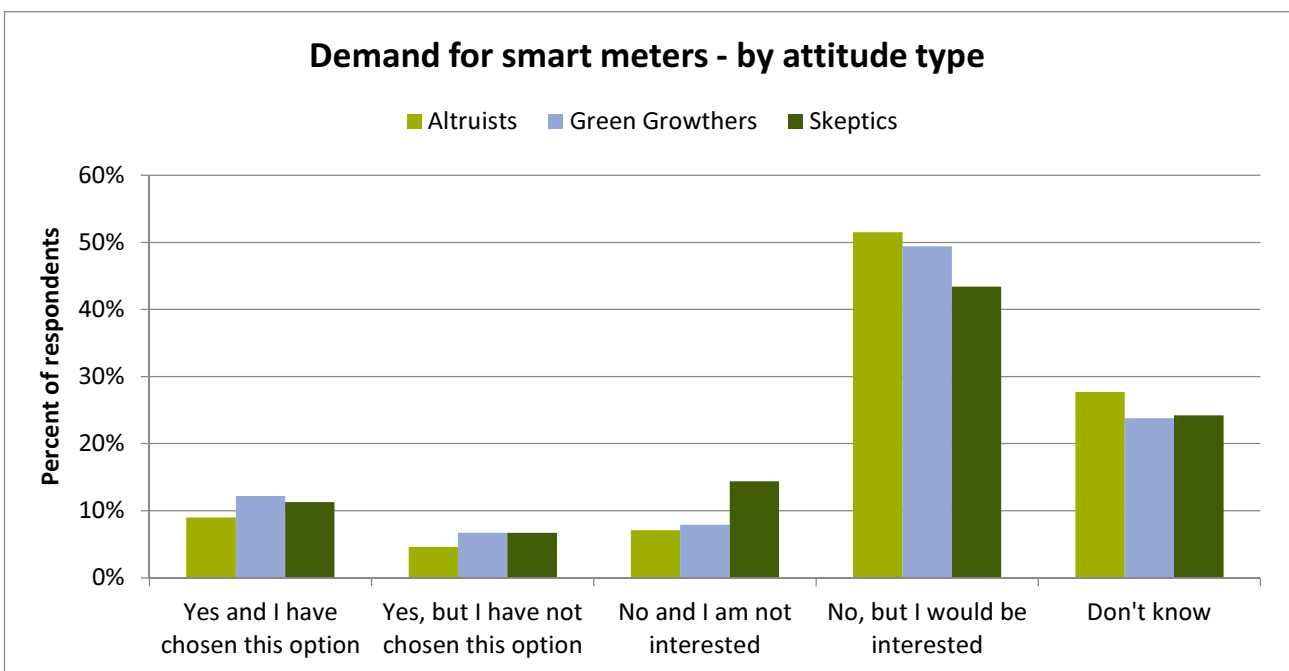
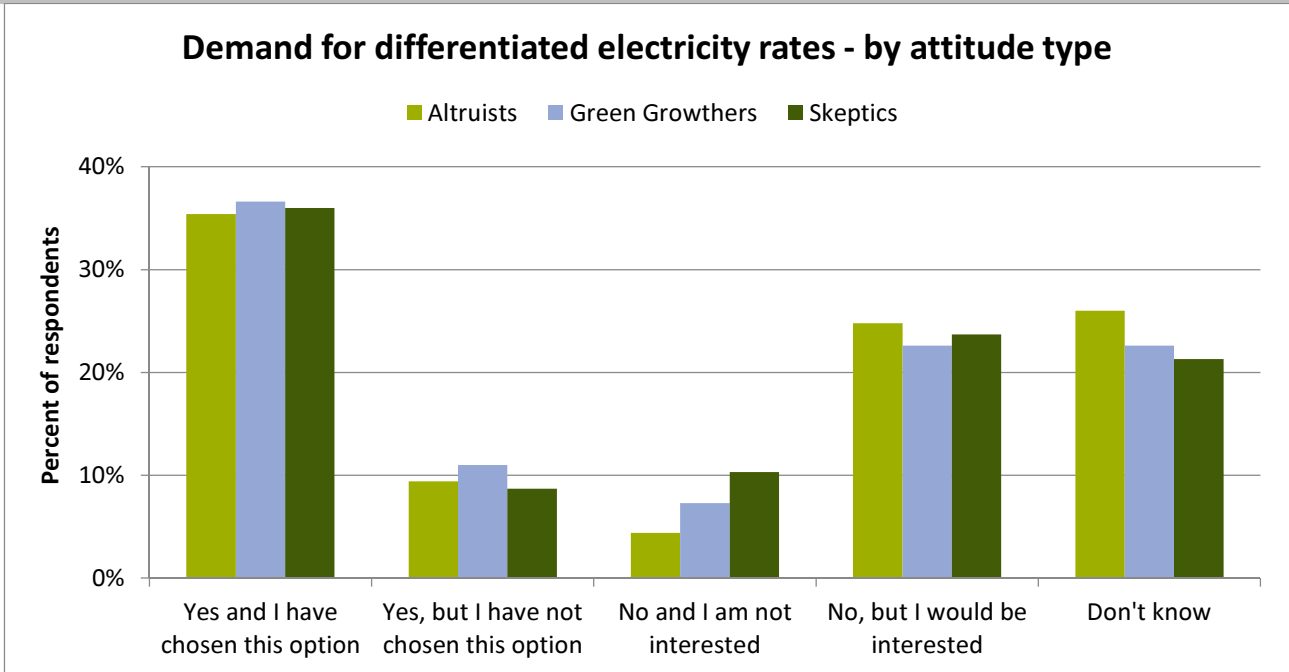
Environmental awareness is covered with clusters of item B6 (attitudes to the environment) and item B4 (seriousness of environmental issues).

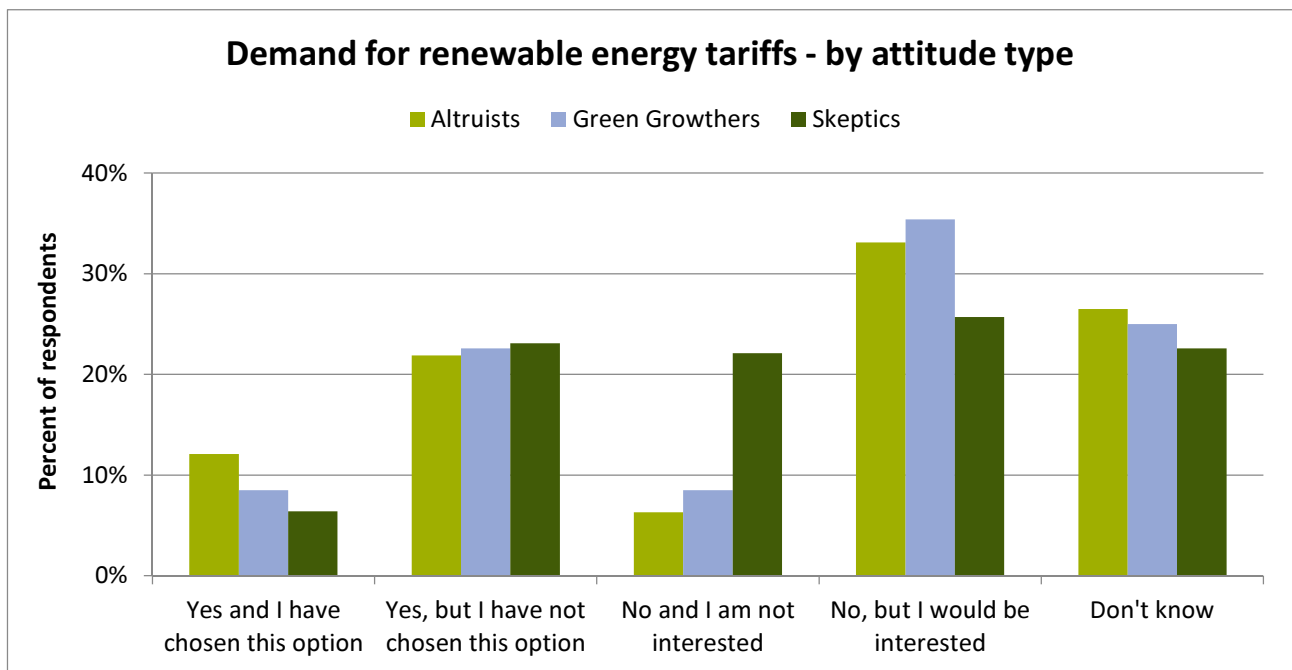
Membership in environmental organization is covered with item B5.

Demand for energy efficiency is covered in item E4.1 (differentiated electricity rates) and E4.2 (smart meters).

Demand for renewable energy is covered in item E4.3 (renewable energy tariff).

Graphic(s)





Results

Energy efficiency (by way of differentiated electricity rates and smart meters) is chosen by a majority of the respondents, or at least most respondents are interested.

Skeptics seem to be less interested in energy efficiency, but still chose it, when offered.

Green Growthers seem to have opted for energy efficiency more often than Altruists, but are less interested - although the differences are not substantial.

Renewable energy is chosen by less than 10% and not chosen by more than 20% of the respondents.

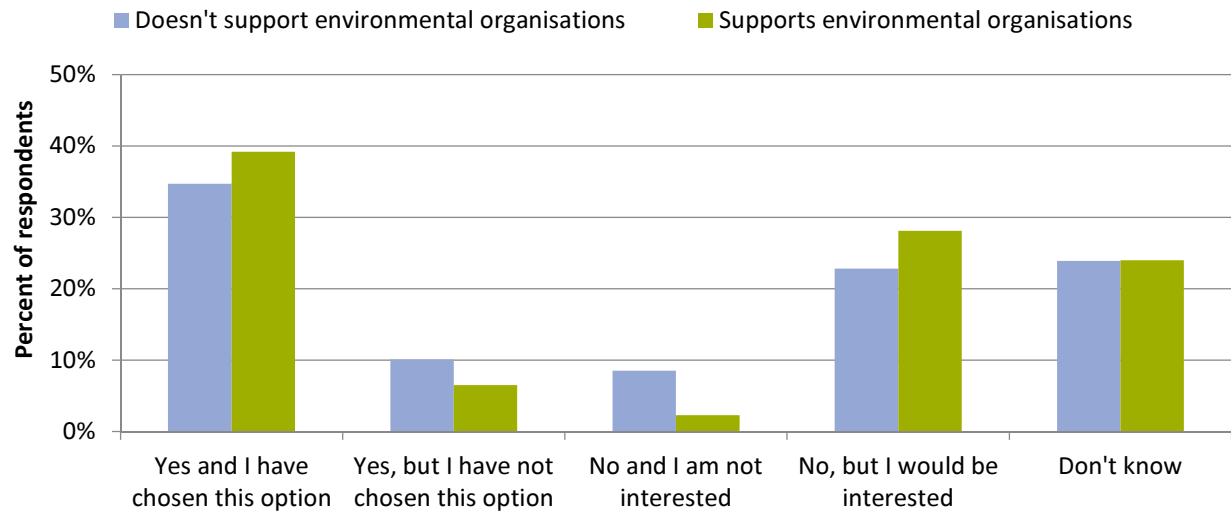
Skeptics chose less frequently - and are less interested in - renewable energy tariffs than Altruists and Green Growthers.

Demand for energy efficiency and renewable energy was also correlated with a scale of item B4 (seriousness of environmental issues). Demand for differentiated energy rates did not correlate, but the correlation between seriousness of environmental issues and demand for smart meters was $r=.12^{**}$ and with demand for renewable energy $r=.24^{**}$, which means that participants who have more environmental awareness also have more demand for smart meters and renewable energy tariffs.

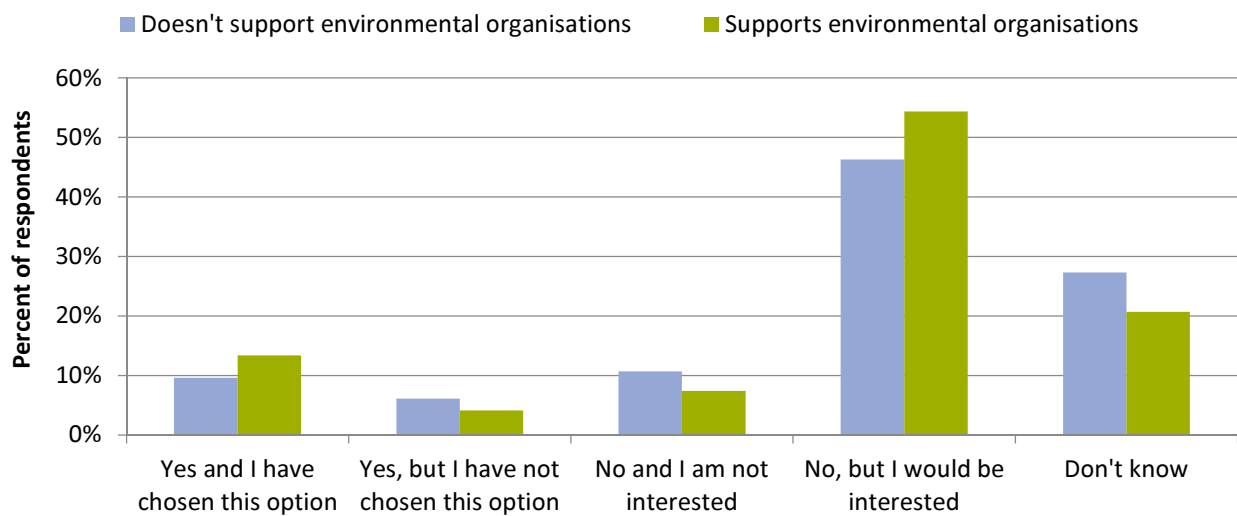
Interpretation

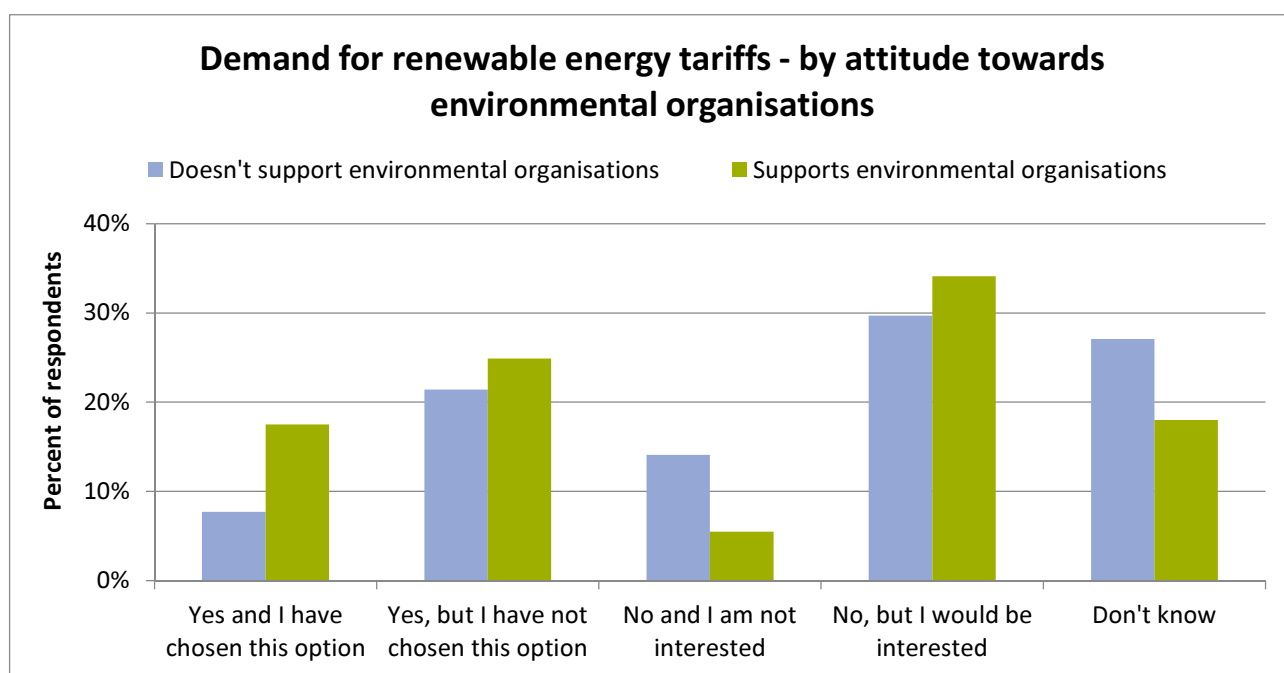
Demand for energy efficiency measures does not correlate as much with general attitudes to the environment as with the demand for renewable energy tariffs. This seems plausible in the sense that energy efficiency saves money, which is a strong motivation for energy-saving behavior regardless of attitude to the environment - and renewable energy tariff costs money which only participants, who make compromises in lifestyle for the environment, are willing to pay.

Demand for differentiated electricity rates - by attitude towards environmental organisations



Demand for smart meters - by attitude towards environmental organisations





Results

Demand for energy efficiency and for renewable energy was higher with participants who supported or participated in activities of environmental organizations. 217 people stated that they support environmental organizations.

Interpretation

The fact that 'environmental activists' care for the environment and are willing to pay for its improvement is not surprising. These results are at very least an affirmation of this link.

3.5.2 Energy efficiency measures and financial support

Research question

Who invests in energy efficiency measures? Who takes advantage of grants investments in energy conservation?

OECD questionnaire

E10. Has your household installed any of the following items over the past ten years in your current primary residence?

- Top rated energy-efficient appliances (e.g. top rated washing machines, refrigerators)
- Low-energy light bulbs (compact fluorescent, LED)
- Energy-efficient windows (e.g. double or triple glazed windows)
- Thermal insulation of walls/roof
- Heat thermostats

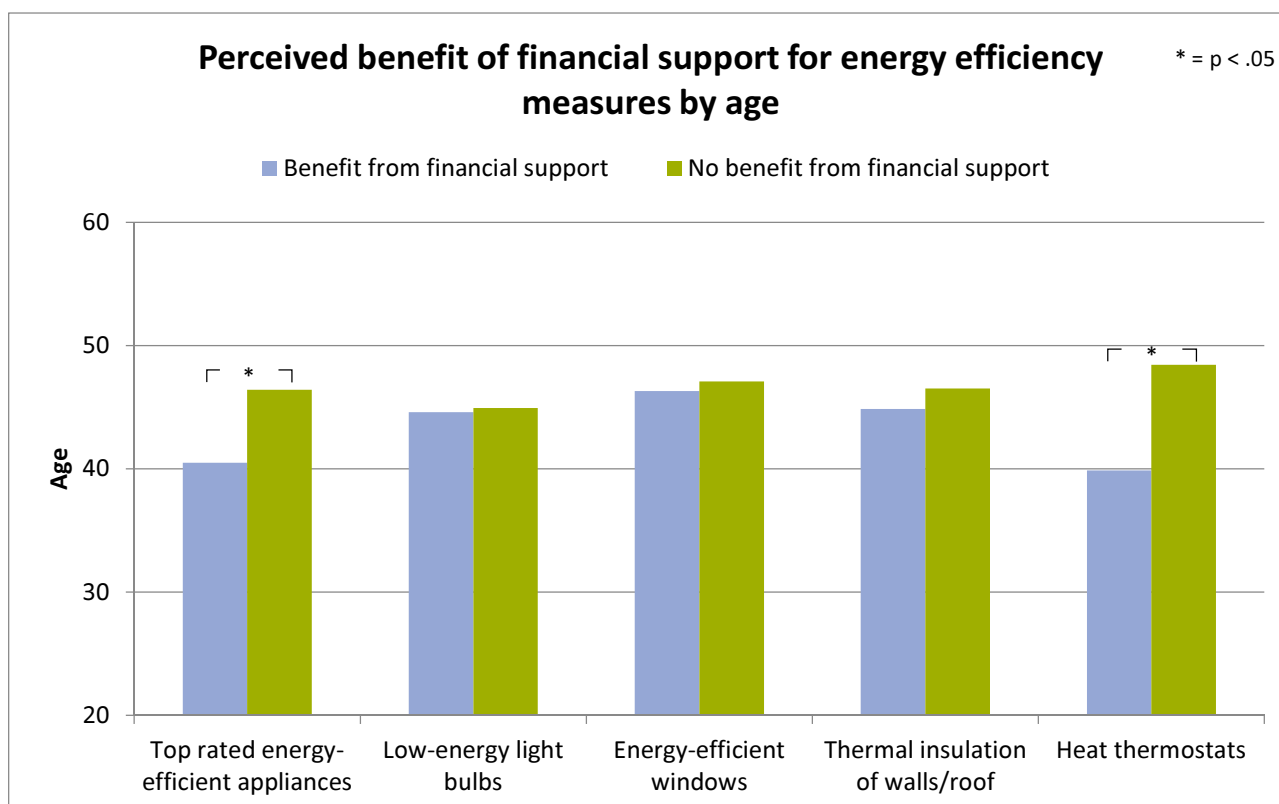
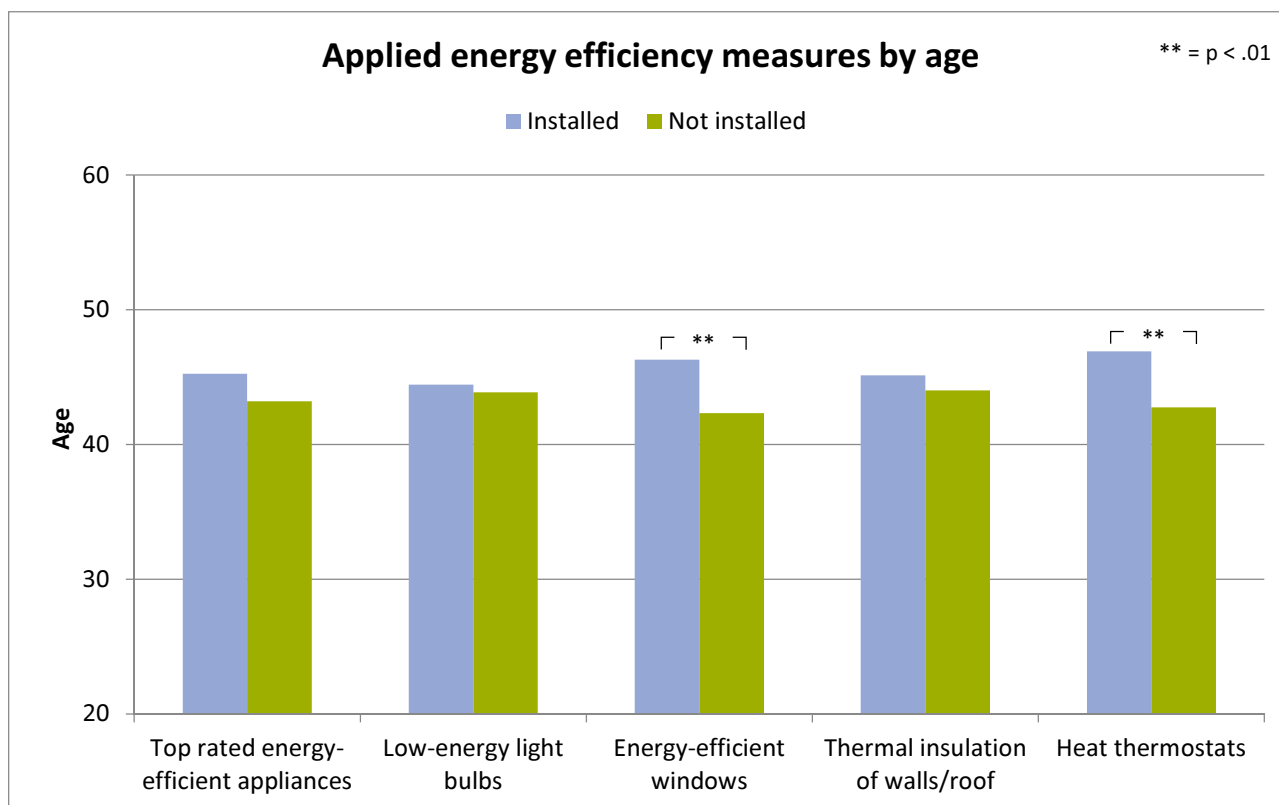
E10a. For which of the following has your household benefited from government (or utility company) financial support (e.g. grants or preferential loans)? (If E10=Yes)

Mapping decision

E10 and E10a match this question best.

Energy efficiency measures were compared between several demographic variables.

Graphic(s)



Results

Participants who installed energy efficient measures were older on average than those who did not.

The age difference was highly significant in the case of installation of energy-efficient windows and heat thermostats.

Participants who benefited from financial support for energy efficiency measures were younger on average than participants who did not.

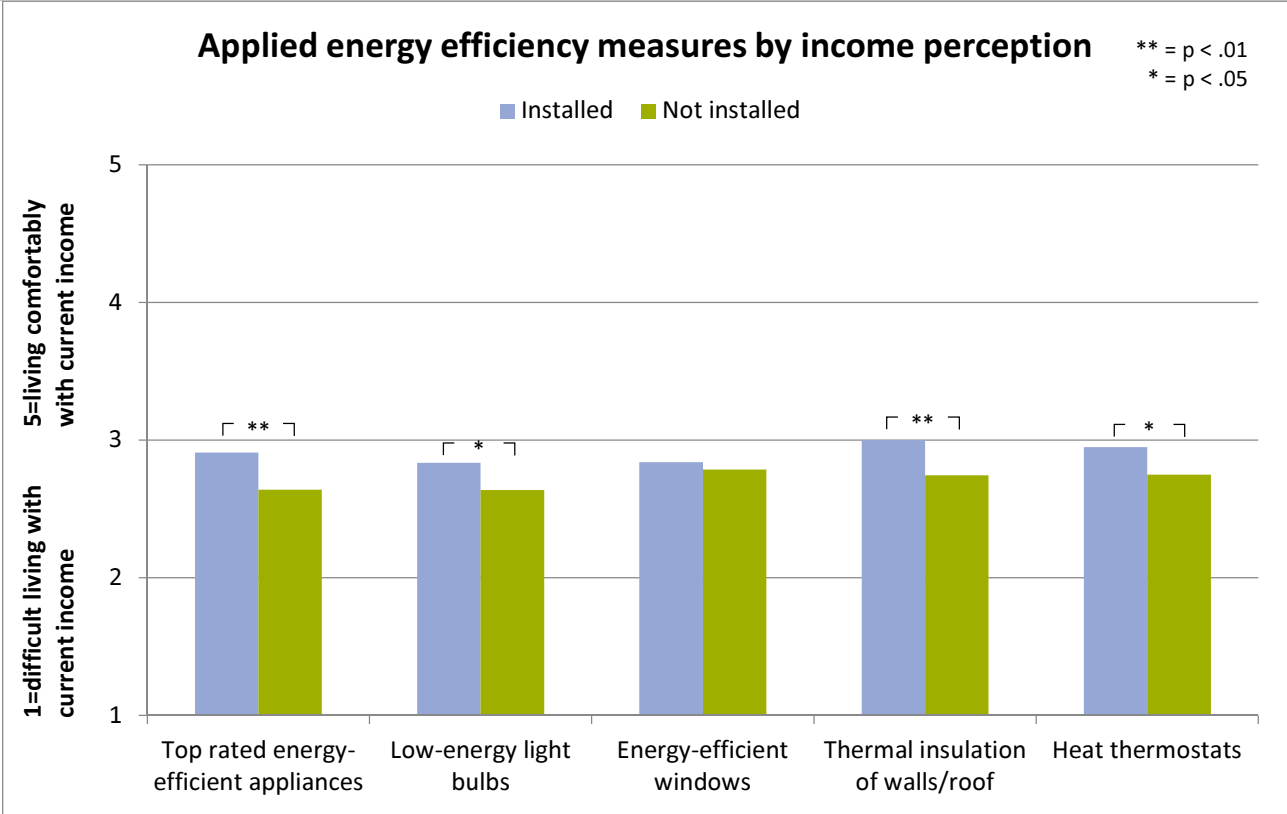
The age difference was significant in top rated energy-efficient appliances and heat thermostats.

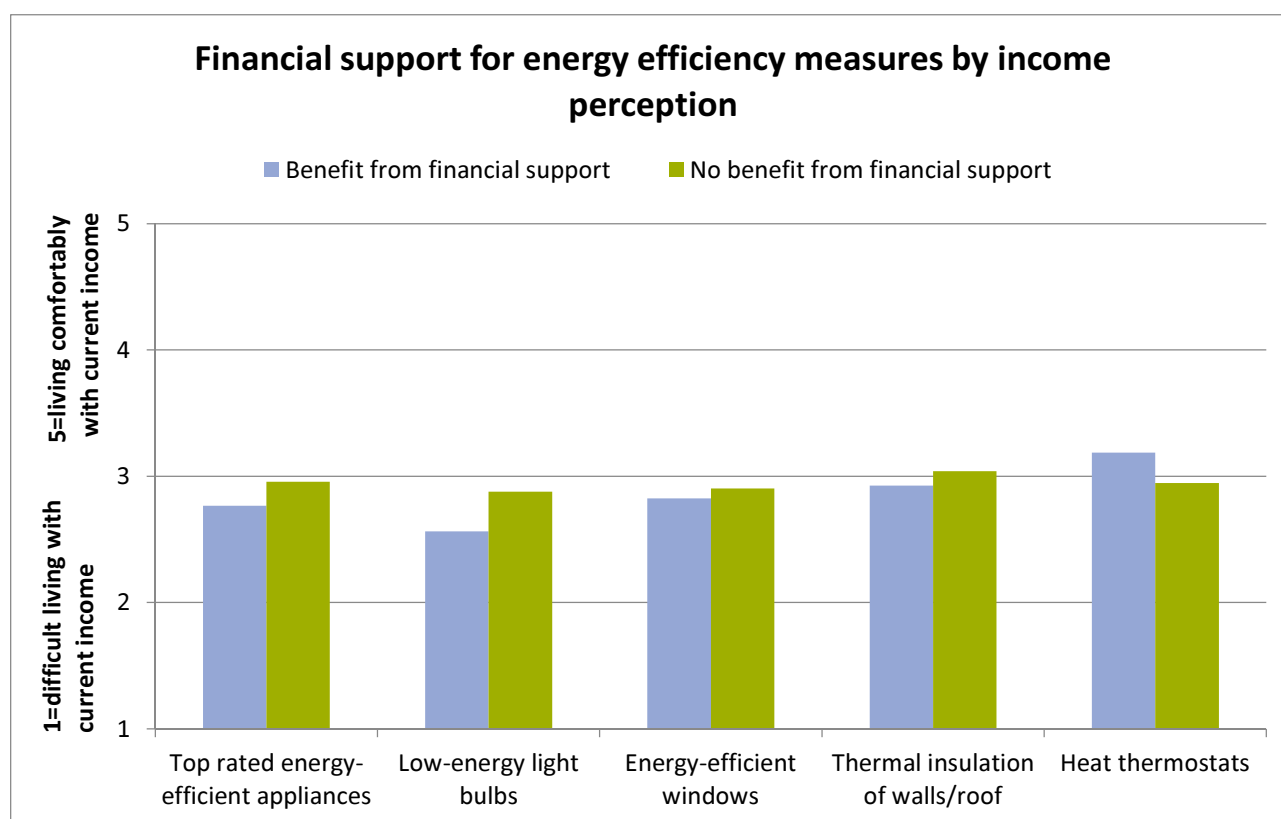
Interpretation

Although the age difference was not substantial, participants who invest in energy efficient measures are older. One reason could be the extra time available when retired or changing attitudes during one’s lifetime.

The age difference was even smaller with participants who received benefits for energy efficient measures, but those who benefit from financial support were younger than those who did not. Perhaps younger participants still have family and therefore require more money than older ones.

Graphic(s)





Results

Participants who installed energy efficient measures had less difficulty living with their current income.

The difference in income perception was highly significant when it comes to the installation of top rated energy-efficient appliances and thermal insulation of walls/roof, and significant in the case of low-energy light bulbs and heat thermostats.

There were no significant income perception differences between participants who benefited from financial support for energy efficiency measures and those who did not.

Interpretation

As expected, energy efficient measures are linked to income perception. This does not mean that participants who have difficulty living with their current income do not invest in energy efficient measures. It seems to be a question of priorities and perhaps long-term (money) saving considerations.

3.5.3 Renewable energy and financial support

Research question

Who invests in renewable energy equipment (e.g. solar panels)? Who takes advantage of grants to install/use renewable energy?

OECD questionnaire

E10. Has your household installed any of the following items over the past ten years in your current primary residence?

- Solar panels for electricity or hot water
- Wind turbines
- Ground source heat pumps

E10a. For which of the following has your household benefited from government (or utility company) financial support (e.g. grants or preferential loans)? (If E10=Yes)

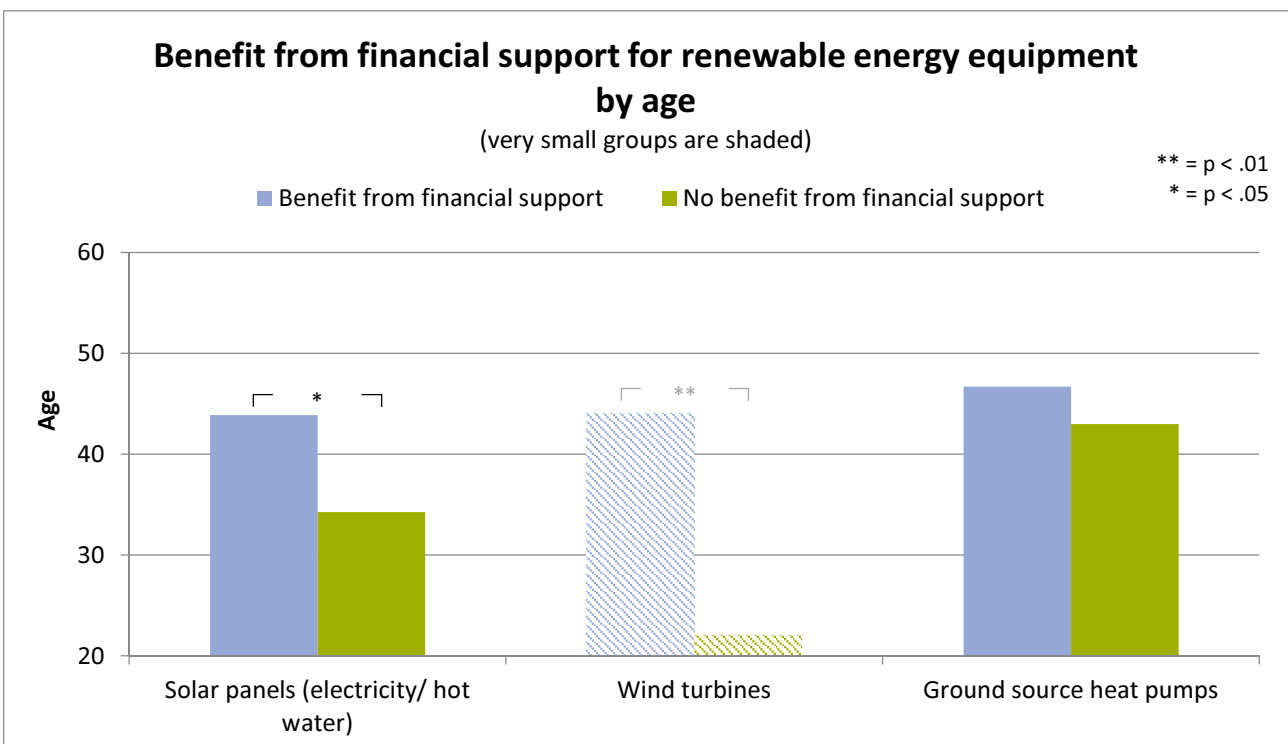
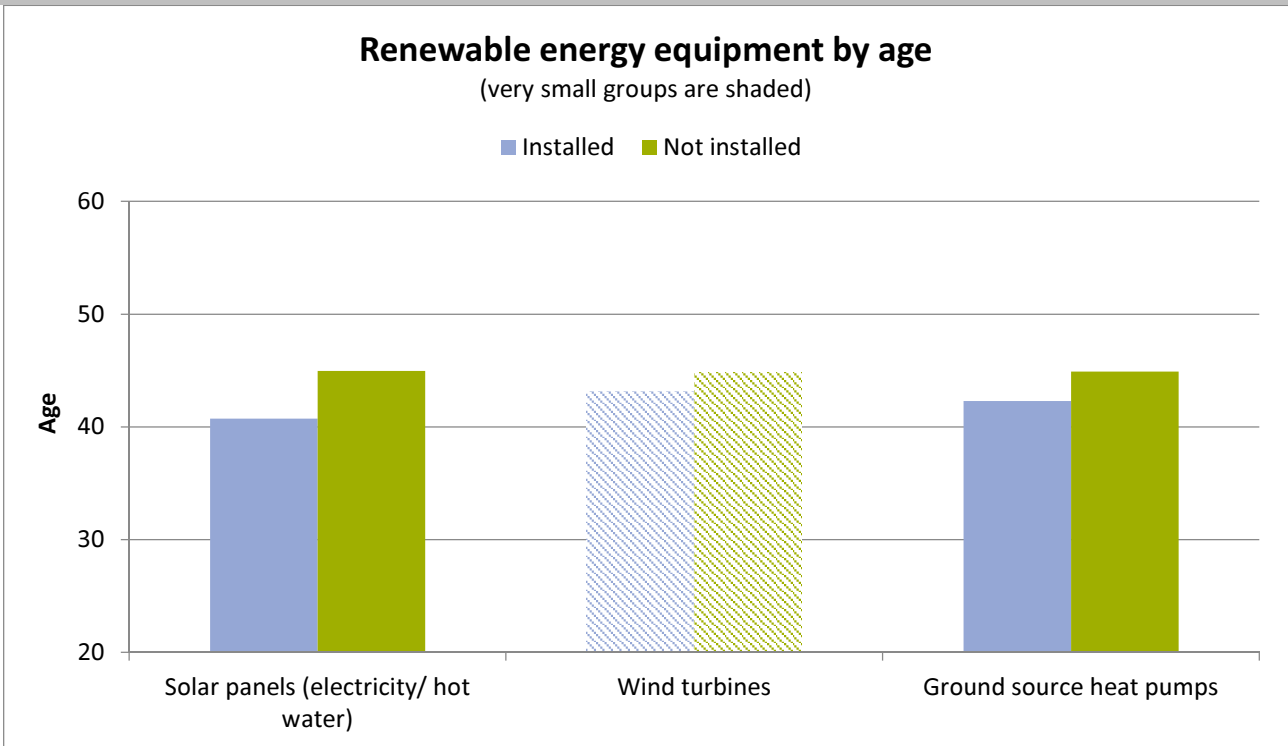
Mapping decision

E10 and E10a match this question best.

Renewable energy equipment was compared between several demographic variables.

There are not many participants who installed renewable energy equipment. 39 solar panels, 6 wind turbines and 52 ground source heat pumps were installed. The results for wind turbines in particular cannot be interpreted normally and could be random despite the statistical significance.

Graphic(s)



Results

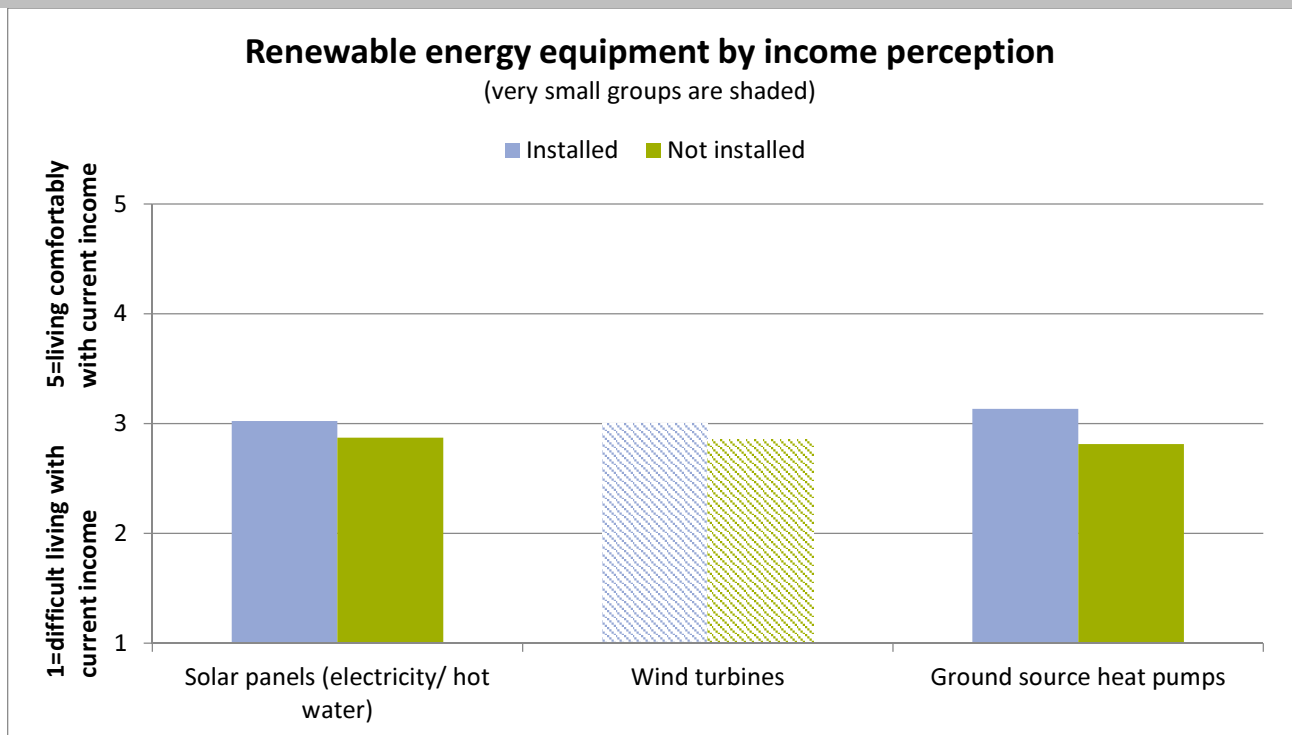
Participants who installed renewable energy equipment were slightly younger than those who did not. The age difference was not significant in any of the renewable energy installation types.

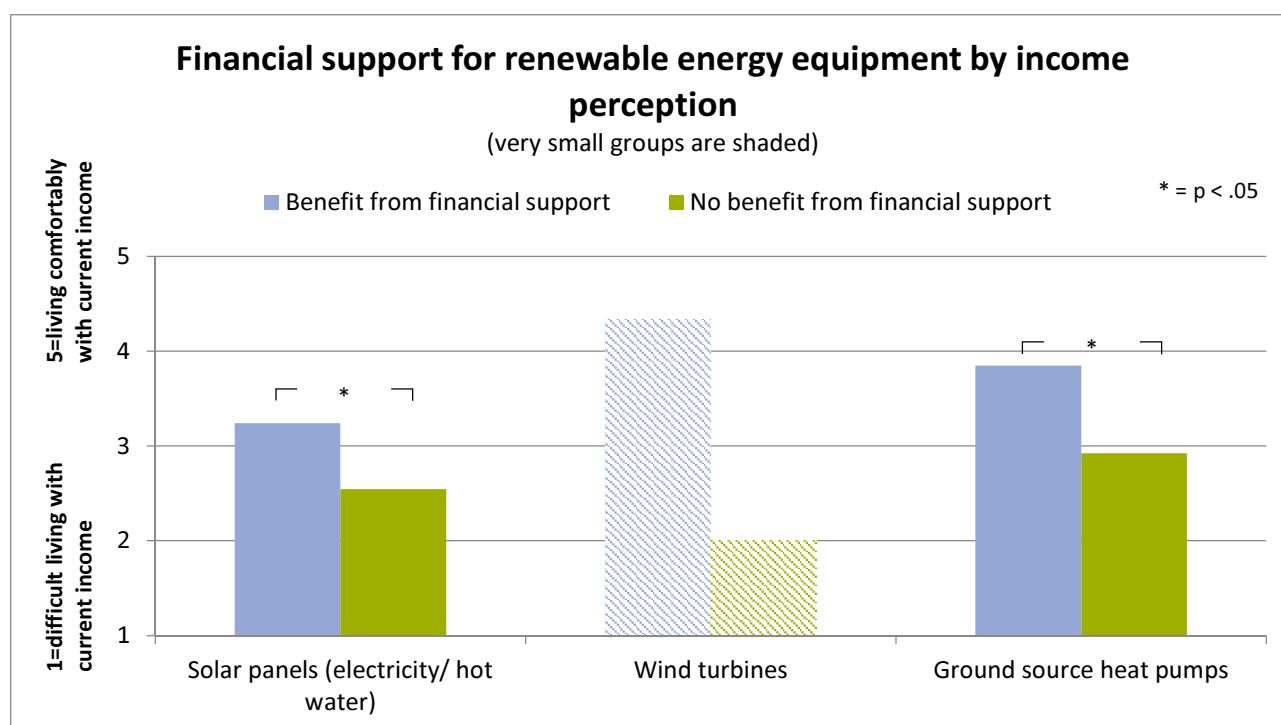
Participants who benefited from financial support for renewable energy equipment were older on average than participants who did not. The age difference was significant in solar panels and highly significant in wind turbines.

Interpretation

The age differences could be coincidental since the group sizes are very small and therefore the statistical test could have failed.

Graphic(s)





Results

Participants who installed renewable energy equipment had slightly less difficulty living with their current income than those who did not.

The difference in income perception was not significant in any of the renewable energy installation types.

Surprisingly, income perception is much higher with participants who benefited from financial support. Participants who benefited from financial support for renewable energy equipment are living more comfortably with their current income than participants who did not.

The difference in income perception was significant in the case of solar panels and ground source heat pumps.

Interpretation

The difference in benefits from financial support by income perception is counter-intuitive and could be coincidental although it was statistically significant. Analysis with such small groups is not robust and research should focus on qualitative methods.

3.5.4 Energy efficiency labeling for appliances

Research question

How effective is energy efficiency labeling for appliances and for buildings?

OECD questionnaire

E10. Has your household installed any of the following items over the past ten years in your current primary residence?

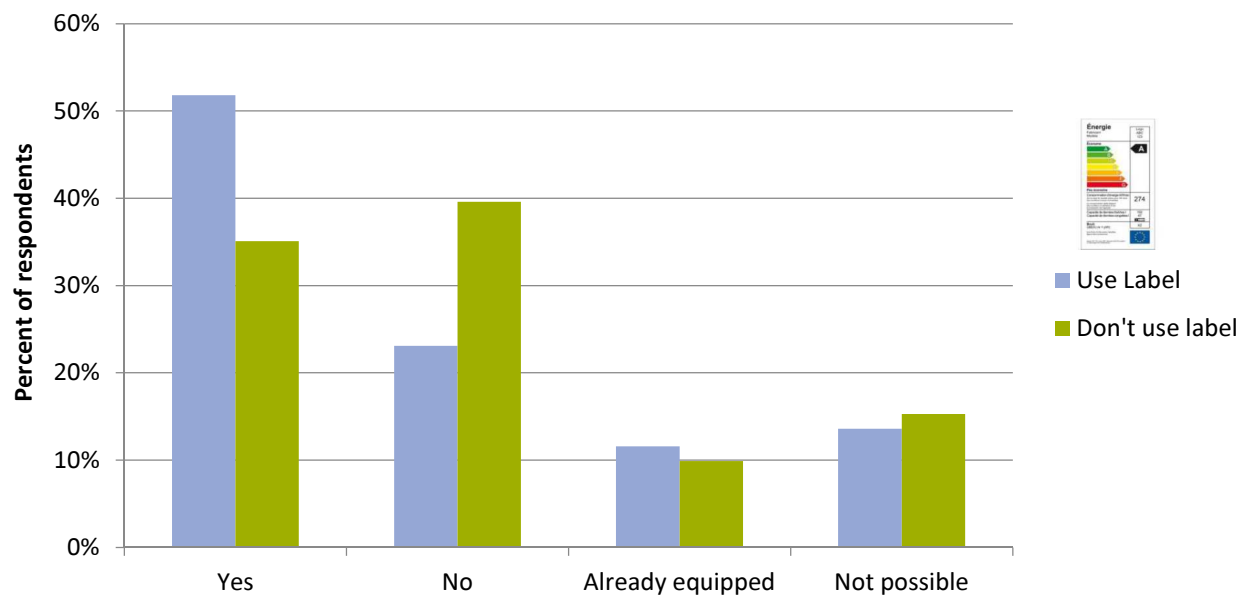
- Top rated energy-efficient appliances (e.g. top rated washing machines, refrigerators)
- Low-energy light bulbs (compact fluorescent, LED)

Mapping decision

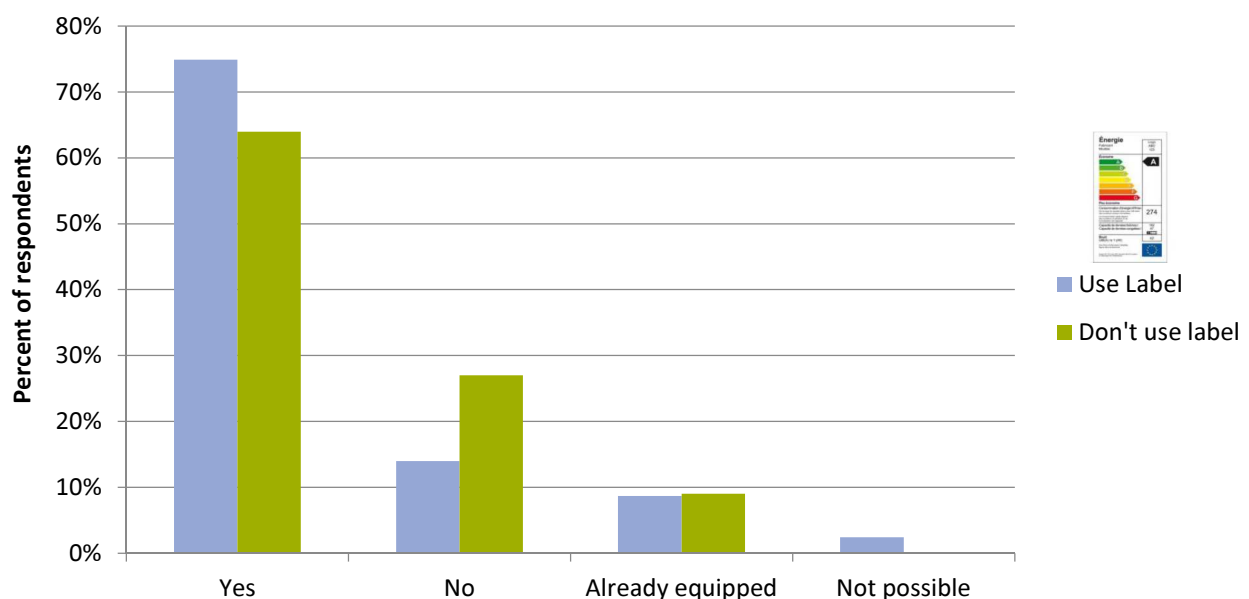
A combination of item E10 and L1 match this question best.

Energy efficiency labeling for buildings was not part of the questionnaire.

Has your household installed energy-efficient appliances?



Has your household installed low-energy light bulbs?



Results

Energy efficiency label	Frequency	Percent
Do not recognize label	244	22.4%
Recognise label	845	77.6%
Total	1089	100%
Do not use label	111	13.7%
Use label	701	86.3%
Total	845	100%

78% (845) of all respondents recognized the energy-efficiency label. 86% (701) of these use the label in purchasing decisions.

50% of those who installed energy-efficient appliances also use the energy efficiency label in their purchasing decisions, 35% do not use it. Those who did not install energy-efficient appliances, more often do *not* use the label in their purchasing decisions.

For low-energy light bulbs the effectiveness of labeling is smaller than for appliances (roughly 10%).

Interpretation

Recognition and use of the energy efficiency label is relatively high and it seems that it is roughly 20% effective when it comes to actual purchasing decisions. The label has been established successfully and enjoys a high trust and acceptance.

3.5.5 Willingness to pay for renewable energy

Research question

How much are households willing to pay to use only renewable energy? Does WTP vary significantly across household groups?

OECD questionnaire

E5. What is the maximum percentage increase on your annual bill you are willing to pay to use only renewable energy?

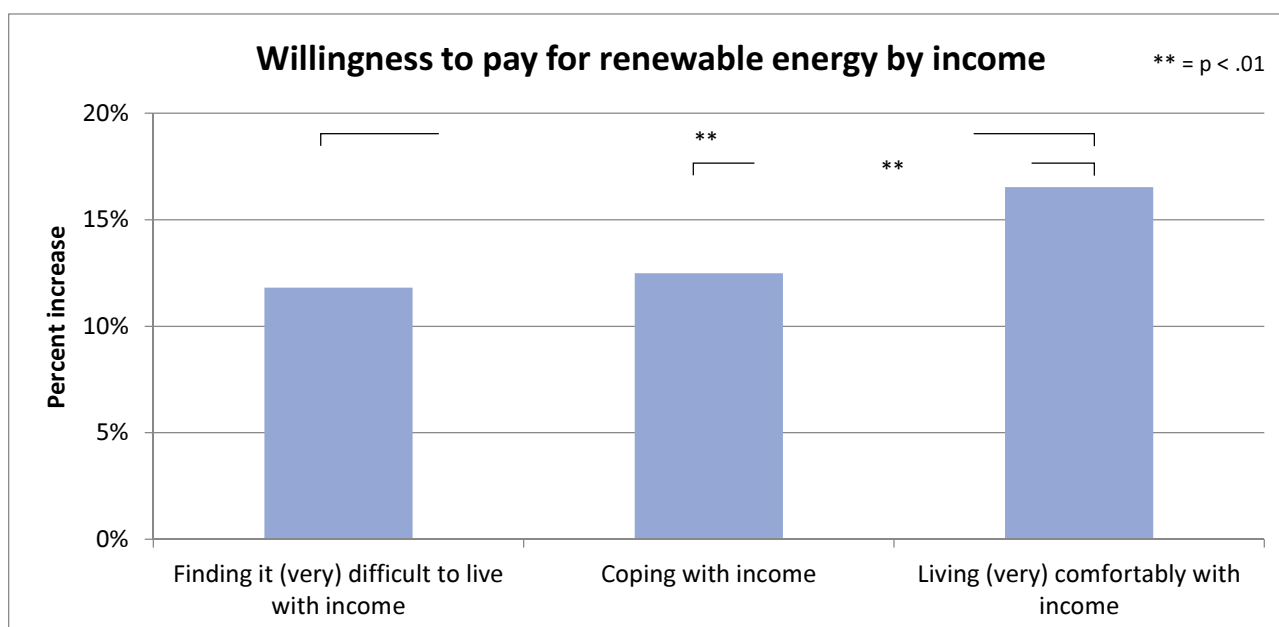
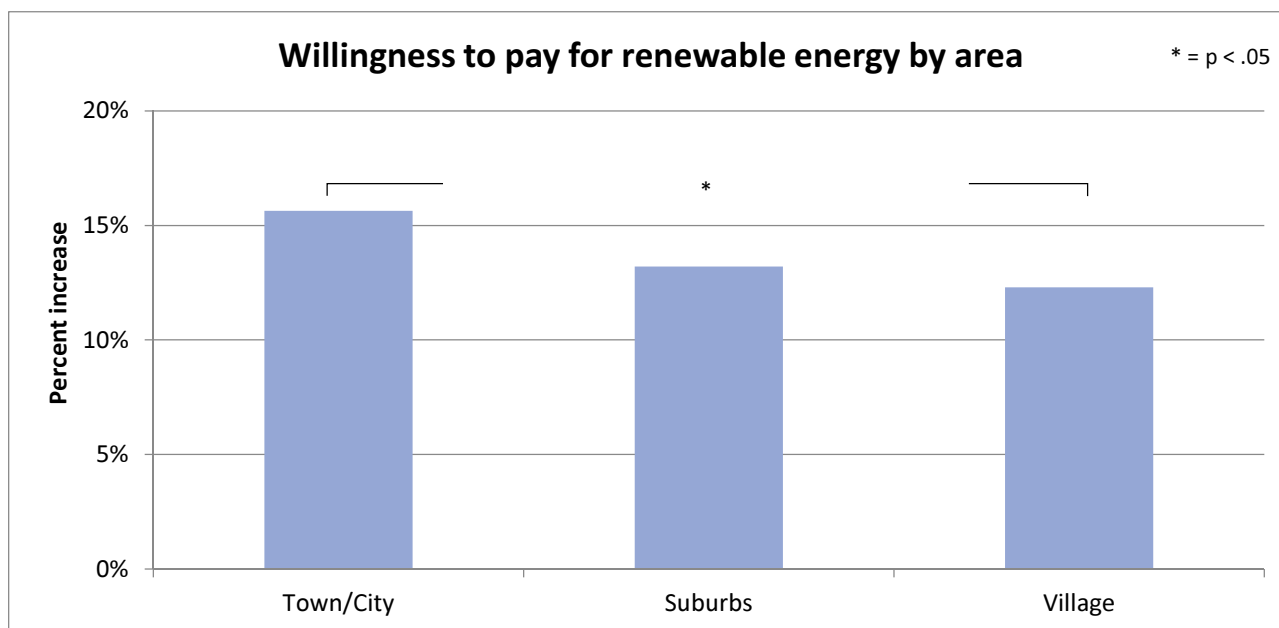
Mapping decision

A combination of item E5 with items A9 and A13 matches this question best.

Willingness to pay is compared with the area where households reside (A13) and the perception of household income (A9).

Item A13 and A9 were re-categorized from 4 into 3 categories for better display.

Graphic(s)



Results

On average, participants are willing to pay a 13% increase to use only renewable energy. Standard deviation was 16% and the median was 10%. Since the standard deviation is higher than the mean, interpretation with the median would be more accurate.

27% (247) of the participants were not willing to pay more for renewable energy at all.

Willingness to pay more to use only renewable energy varies significantly across different areas where households reside, with highest levels occurring in major towns/cities.

Perception of income also makes a difference in the willingness to pay more for renewable energy. The more positively people perceive their income situation, the more they are willing to pay for renewable energy.

Interpretation

Most participants are willing to pay more for renewable energy. The perceived value is roughly 10% higher than for conventional energy. Not surprisingly, willingness to pay for renewable energy is linked to income perception.

3.6 Food

3.6.1 Consumption of organic foods

Research question

What more strongly encourages consumption of organic foods and are there significant differences across different household groups?

OECD questionnaire

F10. How important would the following factors be in encouraging you to increase your consumption of organic food?

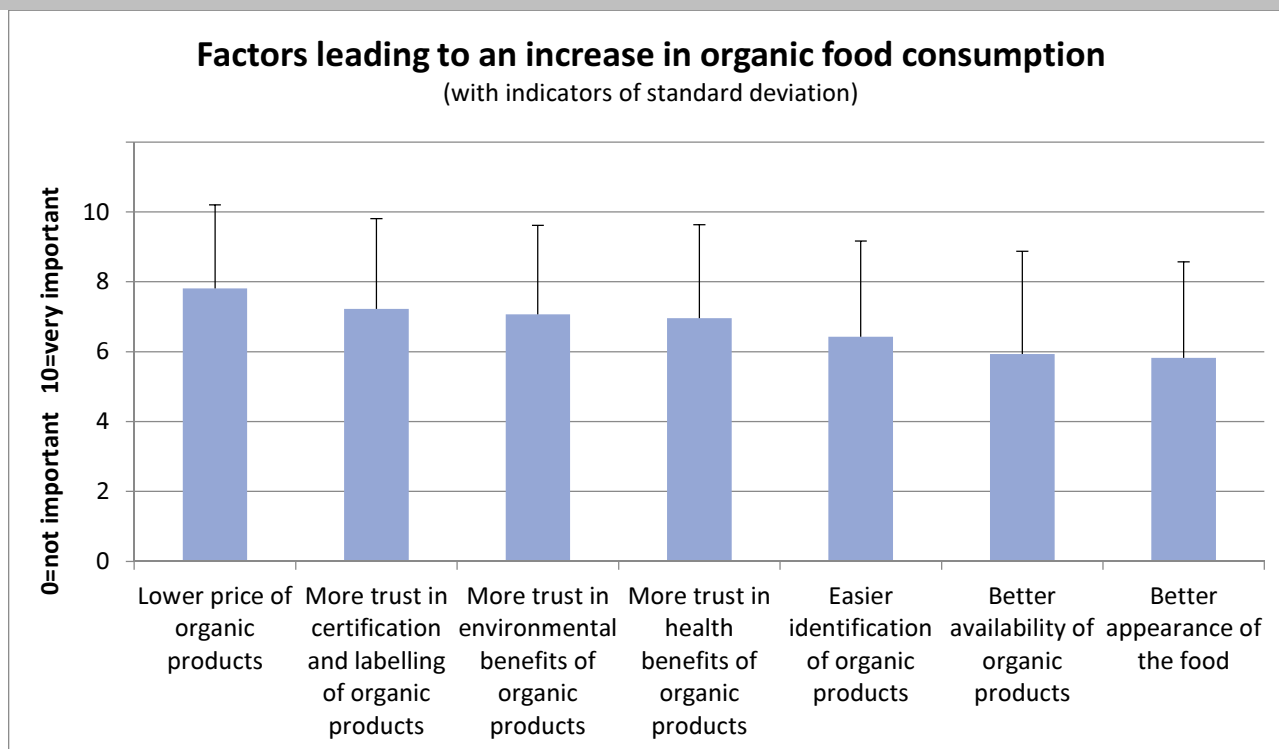
- Better availability of organic products
- Lower price of organic products
- Better appearance of the food
- Easier identification of organic products
- More trust in health benefits of organic products
- More trust in environmental benefits of organic products
- More trust in certification and labelling of organic products

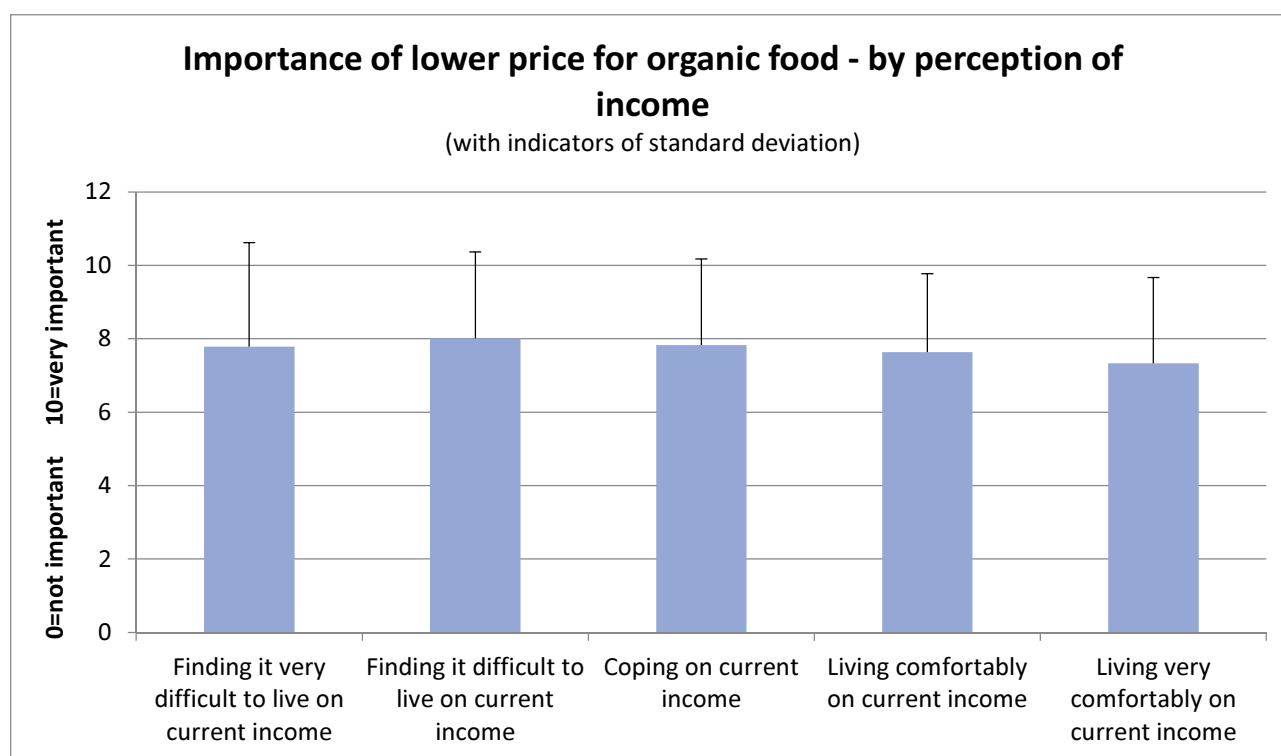
Mapping decision

Item F10 matches this question best.

Factors for increase of organic food consumption were compared between several demographic variables.

Graphic(s)





Results

Lower price was the most important factor leading to an increase of organic food consumption with a moderate gap to the three next important factors, which amount to different variants of trust in organic food.

There were only few random significant differences between household groups (income perception, household size). The area in which the household resides leads to no significant differences.

Income perception correlates with lower price for organic food ($r = -.11^{**}$), which means that the more comfortably someone lives, the less important lower prices for organic food are.

Interpretation

Lower prices and more trust in certification and environmental and health benefits of organic food mainly encourage its consumption. It seems that organic food is perceived as too expensive although the link between income and price is not very strong. Perhaps the price of organic food does not correspond with its quality, health benefits, environmental benefits or other aspects.

3.6.2 Organic food consumption and animal welfare meat

Research question

To what extent do households' general attitudes towards the environment affect organic food consumption and consumption of food which take animal welfare into account?

OECD questionnaire

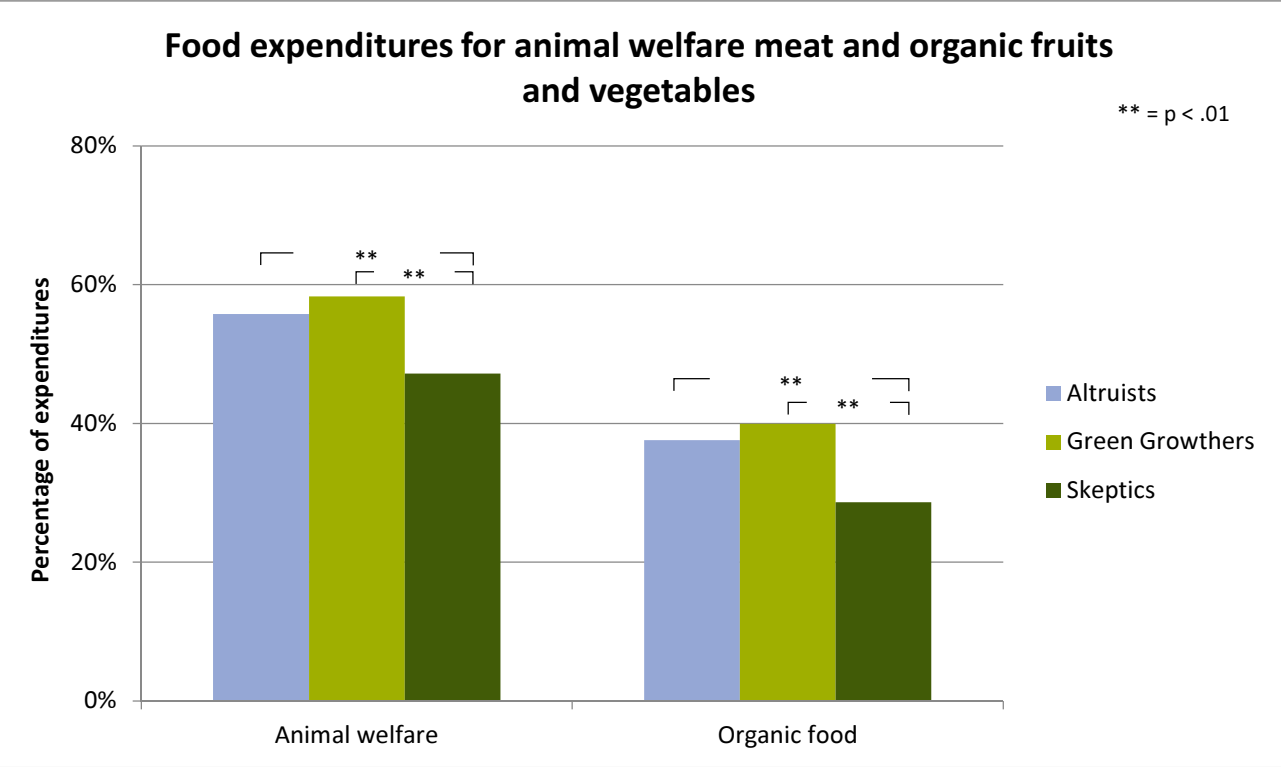
F6. Please estimate the percentage of your household's food expenditures for meat and poultry which are labeled as taking animal welfare into account.

F8. Please estimate the percentage of your household's food expenditures for fresh fruit and vegetables which are labeled as being organic.

Mapping decision

A combination of item F6 and item F8 with clusters of item B6 (attitudes to the environment) matches this question best.

Graphic(s)



Results

Participants spend on average 53% of their meat and poultry expenditure - on meat and poultry which are labeled as taking animal welfare into account and correspondingly, 35% for fresh fruit and vegetables which are labeled as being organic.

Skeptics spent substantially less money on organic food and animal welfare meat than both Altruists and Green Growthers.

Interpretation

General attitudes to the environment affect organic food and animal welfare meat significantly. Skeptics are less willing to pay for organic food and animal welfare meat, which seems plausible, because Skeptics are generally less willing to make compromises in lifestyle.

3.6.3 Willingness to pay for organic food

Research question

How much are households willing-to-pay as a price premium to purchase organic foods? Does the willingness-to-pay vary significantly across household groups?

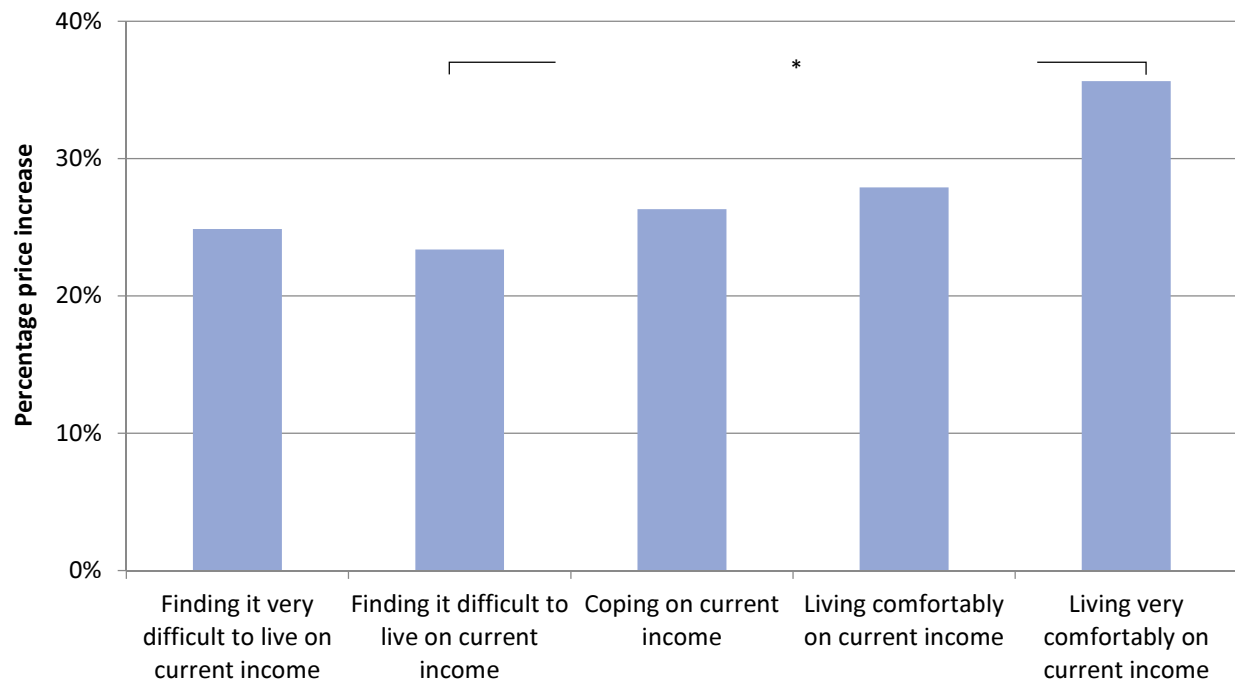
OECD questionnaire

F9. What is the maximum percentage price increase you are willing to pay for organic fresh fruit and vegetables compared to conventional substitutes?

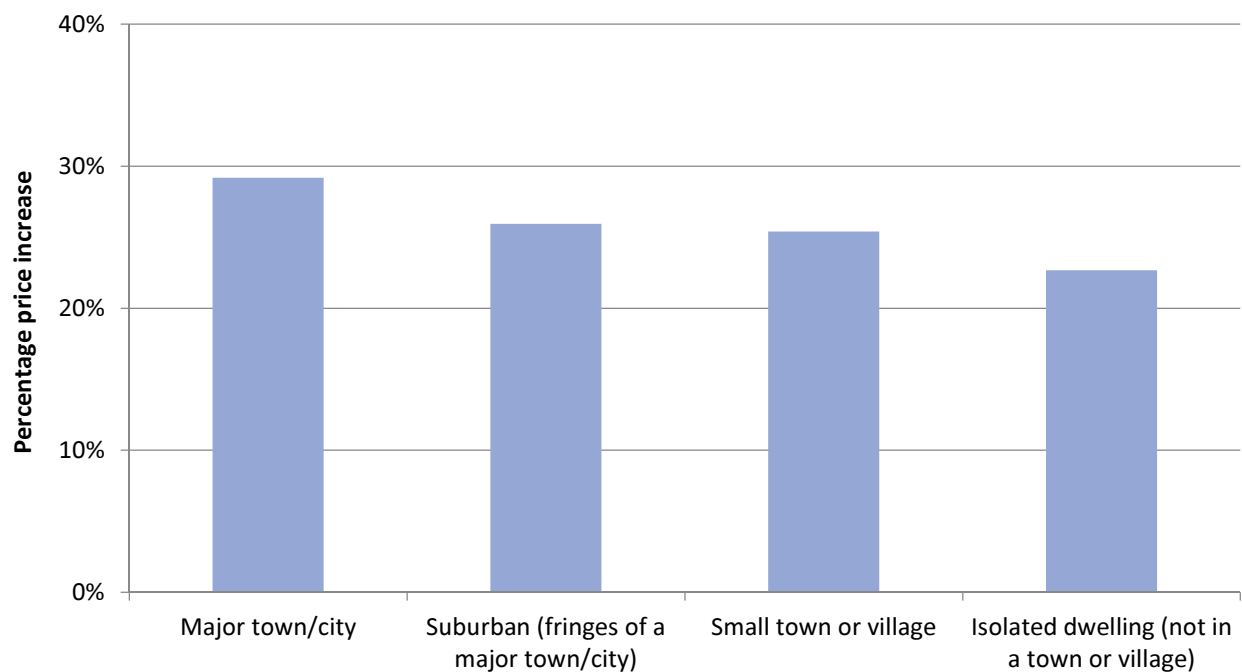
Mapping decision

A combination of item F9 with items A9 (income perception) and A13 (area) matches this question best.

Willingness to pay more for organic food by perception of income



Willingness to pay more for organic food by area



Results

Willingness to pay more for organic food	Mean	Median	Standard deviation
Percentage	26.2%	16%	30.7%

On average, participants were willing to pay a 26% increase for organic fresh fruit and vegetables compared to conventional substitutes. Median was 16%, standard deviation was 31%. Since the standard deviation is higher than the mean, interpretation with the median would be more accurate.

21% of the participants were not willing to pay more for organic food at all.

Willingness to pay varies only with respect to income perception. Households who live very comfortably with their current income were also willing to pay significantly more than those who do not.

It seems that people in rural areas are less willing to pay for organic food, but the differences were not significant. Household size does not seem to be a factor in the willingness to pay more for organic food.

Interpretation

The price increase that participants are willing to pay in general is - at 16% (median) - remarkably high and could be explained by the perceived variety of benefits of organic food (health, environment, taste).

Willingness to pay more for organic food is linked to income perception, although the differences were small. This would suggest that even participants with income difficulties are willing to pay more for organic food than conventional food.

3.6.4 Labeling of organic food

Research question

How effective is labeling for organic food? For which type of household? Which labels are the most effective at inducing organic food consumption?

OECD questionnaire

F8. Please estimate the percentage of your household's food expenditures for fresh fruit and vegetables which are labeled as being organic.

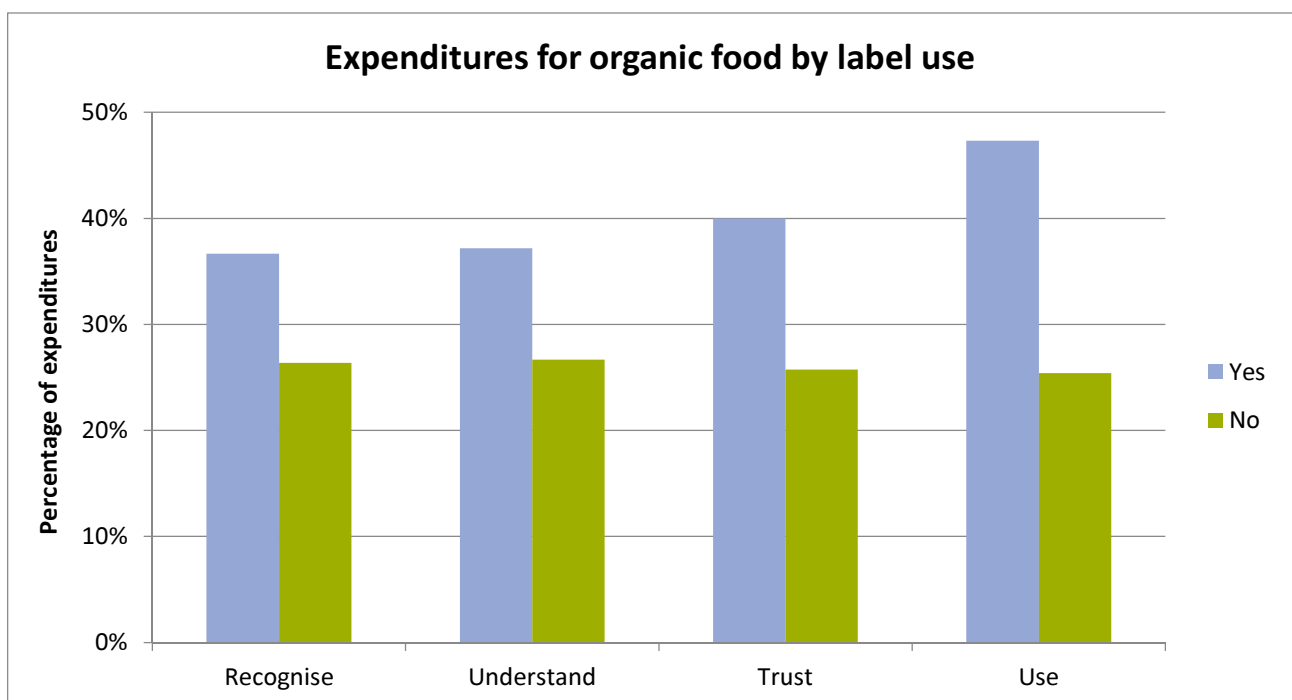
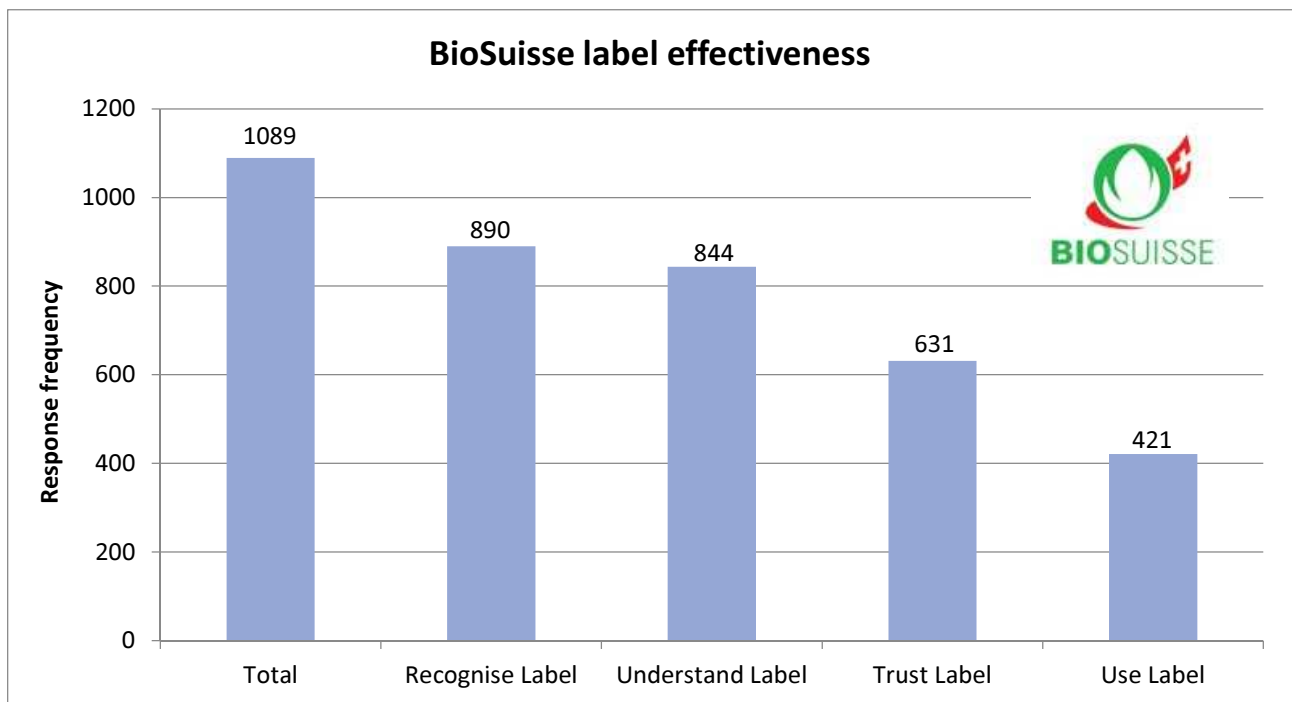
Mapping decision

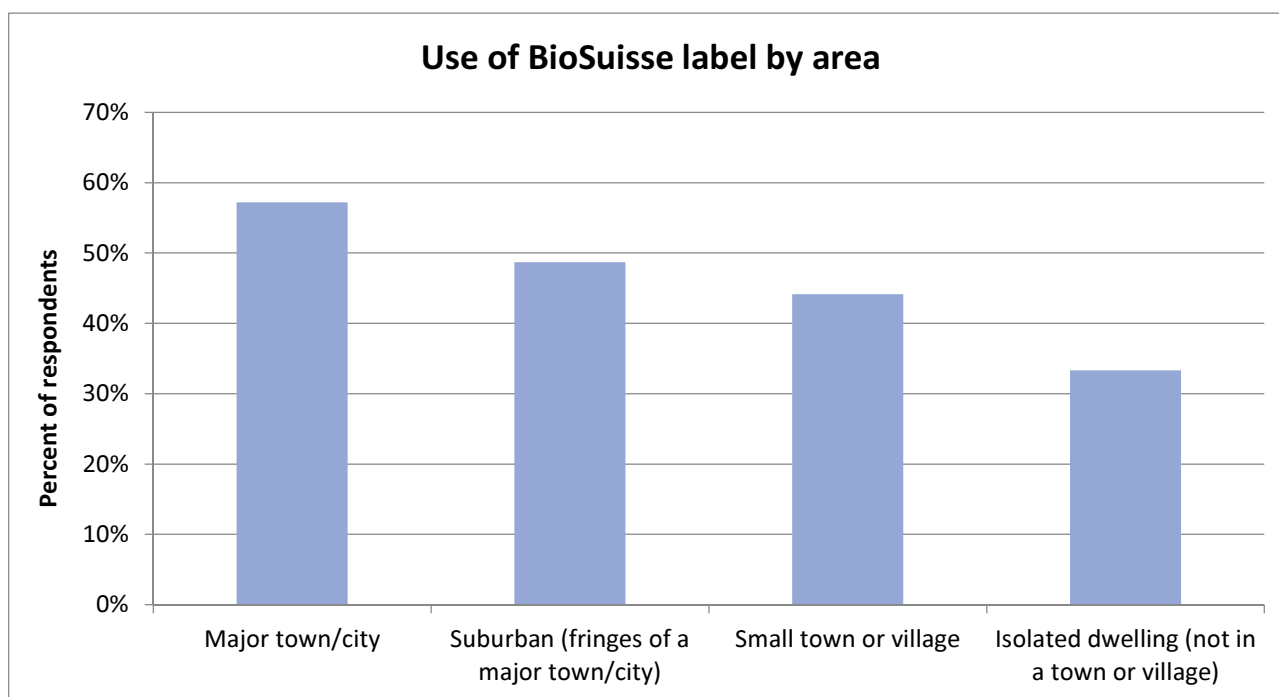
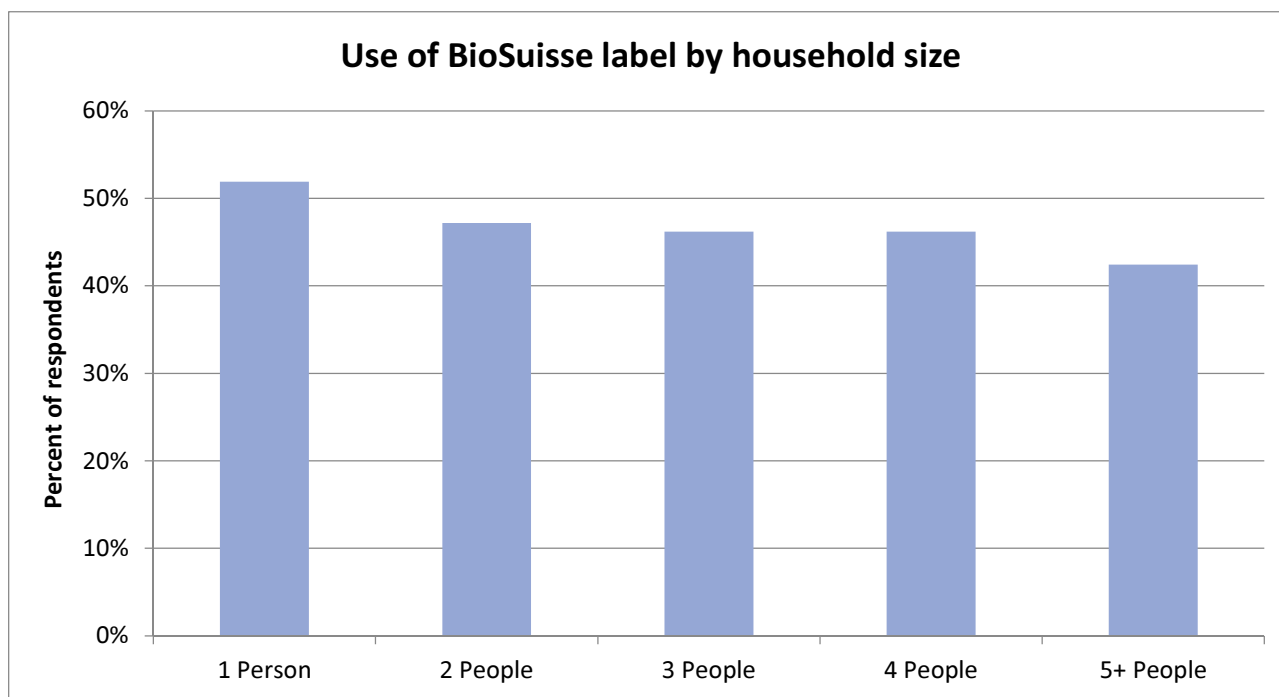
A combination of item F8 with L3 (BioSuisse label) matches this question best.

Label use was compared between different household sizes and different areas.

There was only one label for organic food, so comparison of label effectiveness was not possible.

Graphic(s)





Results

82% of all the respondents recognized the BioSuisse label and almost half of them use it in purchasing decisions.

Participants who recognize, understand, trust and use the BioSuisse label have a higher percentage of organic food expenditure than those who do not.

The use of the BioSuisse label in purchasing decisions decreases with household size but stays on a high level of between 40% and 50%.

The same applies for urbanity: the more urban the household, the greater the use of the BioSuisse label in purchasing decisions. Income seems to have no impact on the use of BioSuisse label.

Interpretation

The BioSuisse label is roughly 50% effective. It seems to be a well-established label which is easy to understand and mostly trusted.

It is more effective with decreasing household sizes as well as urban households.

One reason for the impact differences in the case of household sizes could be the smaller amount of food for the same price compared to conventional food, which can be an issue, especially in bigger households.

Availability of organic food could be different in rural areas than in urban areas and could be an explanation for the rather large differences in the use/recognition of the BioSuisse label.

3.7 Cross-Cutting Topics

3.7.1 Willingness to pay

Research question

Willingness to pay

OECD questionnaire

Energy: E5. What is the maximum percentage increase on your annual bill you are willing to pay to use only renewable energy?

Transport: D5. How much more would you pay for an electric car (only electric motor) compared to a conventional car?

B9. To what extent would you support the following government actions to reduce motor vehicle CO₂ emissions? - Higher taxes on fuels

Waste: B10. To what extent would you support the following government actions to reduce household waste generation? - Charge for waste collection by volume or weight

Food: F9 What is the maximum percentage price increase you are willing to pay for organic fresh fruit and vegetables compared to conventional substitutes? F7. What is the maximum percentage price increase you are willing to pay for meat and poultry which take animal welfare into account compared to conventional substitutes?

Water: n/a

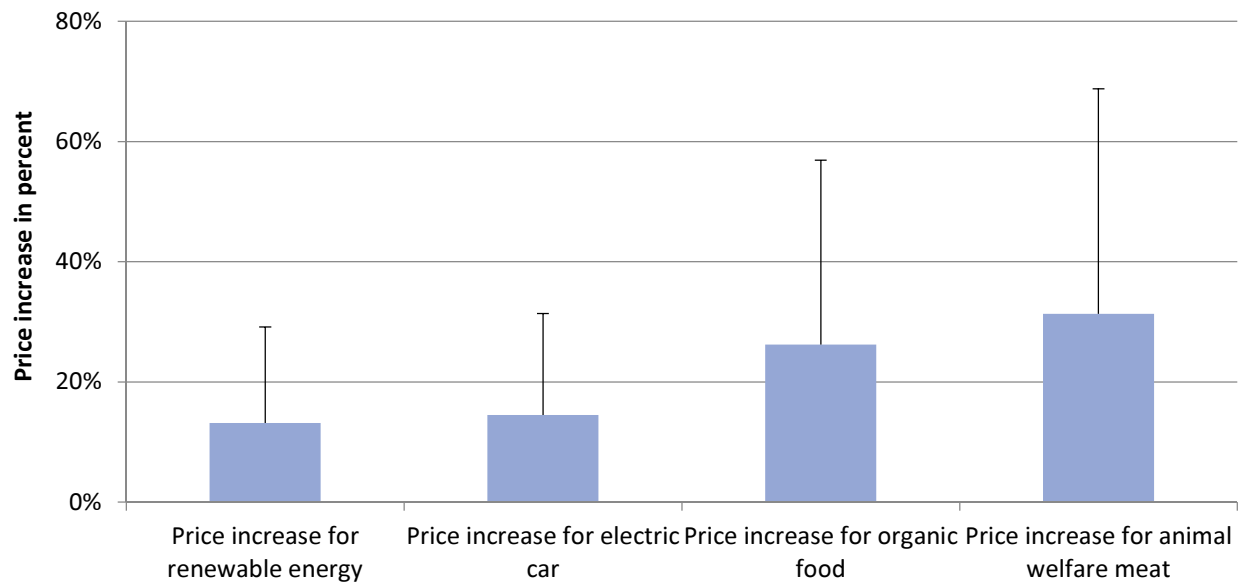
Mapping decision

For the three dimensions energy, transport and food there were explicit questions about willingness to pay.

For waste, willingness to pay was matched with support of government actions to reduce waste.

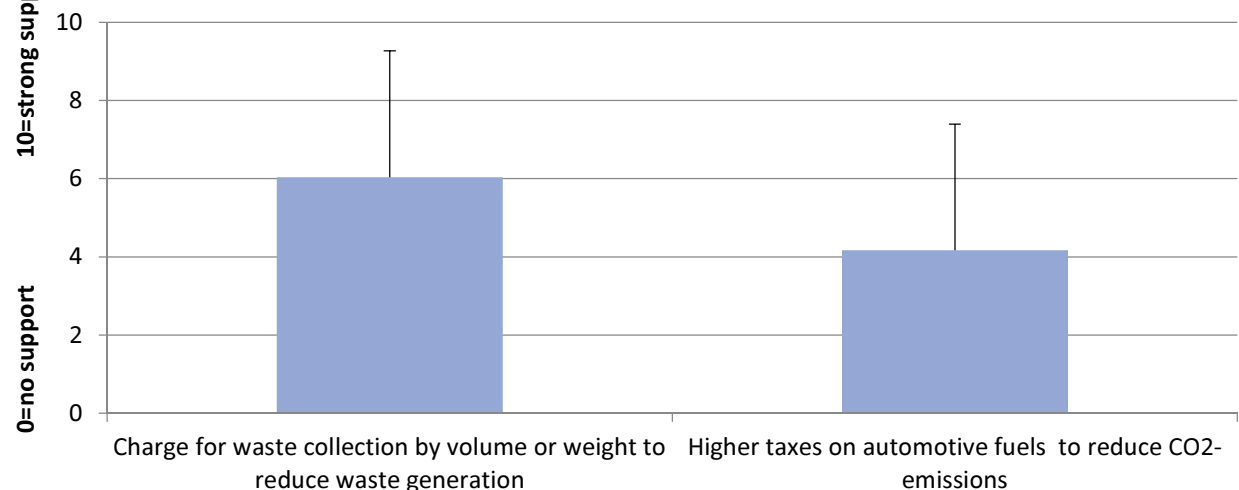
Willingness to pay more

(with indicators of standard deviation)



Willingness to pay for the reduction of waste generation and CO₂-emissions

(with indicators of standard deviation)



Results

Participants were willing to pay 31% (median: 20%) more for animal welfare meat, 26% (median: 16%) for organic food, 15% (median: 10%) for electric cars and 13% (median: 10%) for renewable energy. Since the standard deviation is higher than the mean, interpretation with the median would be more accurate.

Participants are mostly willing to be charged for waste collection by volume or weight, but most participants do not support higher taxes on fuels to reduce motor vehicle CO₂ emissions.

Interpretation

Willingness to pay for the improvement of the environment depends on the purpose of the charge/tax/price increase.

Additional results

Willingness to pay is slightly correlated with age. Correlations are between $r=-.09^{**}$ for willingness to pay more for organic food and $r=-.17^{**}$ for renewable energy. All correlations are significant.

Income perception is also correlated with willingness to pay, but not as much as age. Correlations are between $r=.06$ for willingness to pay more for animal welfare meat and $r=.11^{**}$ for willingness to pay more for renewable energy.

Gender has an influence on the willingness to pay more for organic food and animal welfare meat. Women are willing to pay 10% more for animal welfare meat and 8% more for organic food. The differences were highly significant. For electric cars and renewable energy there were no significant differences in gender.

Interpretation

Older participants were less willing to pay more for renewable energy, electric cars, organic food and animal welfare meat than younger participants. The reasons for this small but consistent age effect are not obvious and could be part of further research.

Surprisingly, income perception (which could be expected to be correlated with the willingness to pay more for something) has only little influence on willingness to pay more for renewable energy, electric cars, organic food and animal welfare meat. Apparently there are other/stronger motivations for environmental friendly behavior than money.

It is interesting that women are willing to pay considerably more for organic food and animal welfare meat than men. One possible explanation could be that organic food has also health benefits and women are – arguably – usually more concerned about their health than men. An explanation for the gender gap in the willingness to pay more for animal welfare meat could be that women usually inclined to care more for animals than men. It is unlikely that the gender gap results from an attitudinal difference to the environment, because there were no significant differences in willingness to pay more for renewable energy or electric cars.

3.7.2 Motivations to conserve resources

Research question

Motivations to conserve resources

OECD questionnaire

Transport: D9. How important are the following factors in encouraging you to drive (car/motorcycle) less?

- Increased cost of car/motorcycle use (e.g. fuel, parking and tolls)
- Improved public transport (e.g. better or cheaper)
- More and safer cycling paths
- Fewer parking spaces
- More information on the environmental impacts of driving relative to other means of transport

Waste: C4a. How important are the following factors in motivating your household to recycle?

- It is beneficial for the environment
- Reduce waste charges or collect refunds
- I think it is my civic duty
- I want to be seen by others as a responsible citizen

Water/Energy: G6. How important would the following factors be in encouraging you to reduce your household's water/energy consumption?

- More practical information on things you can do to save water/energy at home

- Higher water/energy prices
- More information on the environmental impacts of water/energy consumption
- More information on the water/energy consumption of my household
- Finding that my household uses more water/energy than similar households
- Easier identification of water/energy efficient appliances
- Less expensive to invest in water/energy-efficient equipment

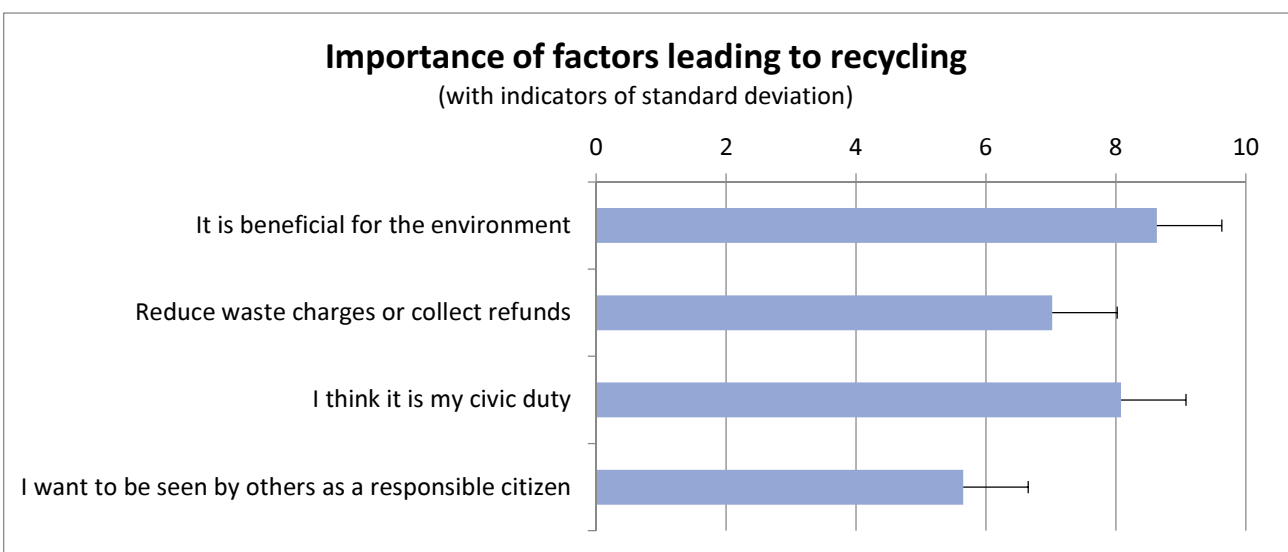
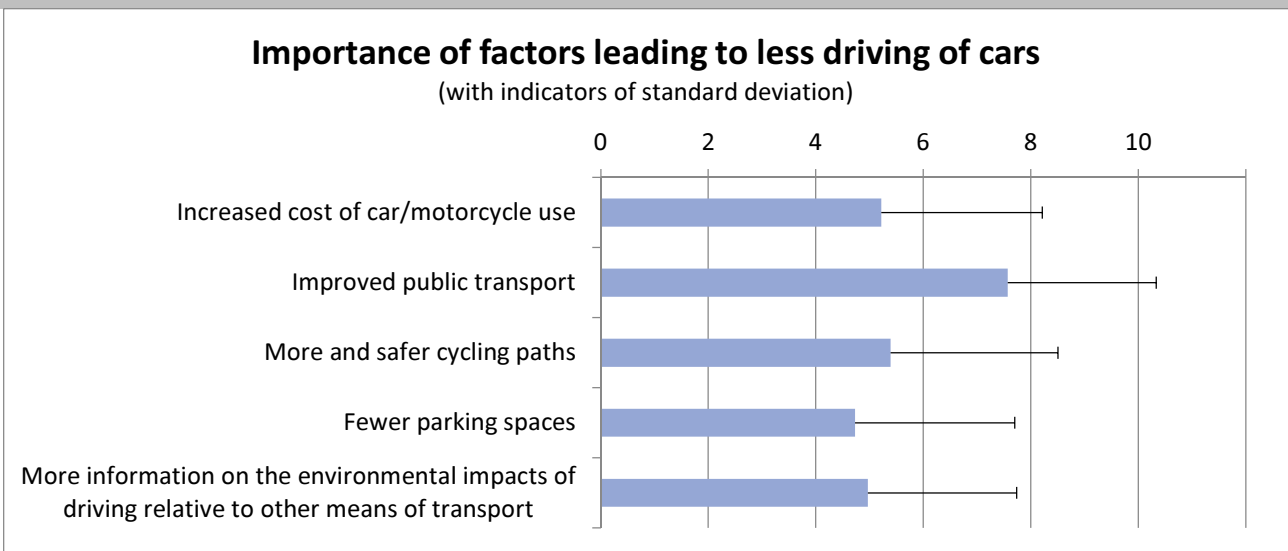
Food: n/a

Mapping decision

Transport and waste had no related questions concerning the conservation of resources. Instead, descriptive results of items D9 (driving less) and C4a (recycling) are displayed.

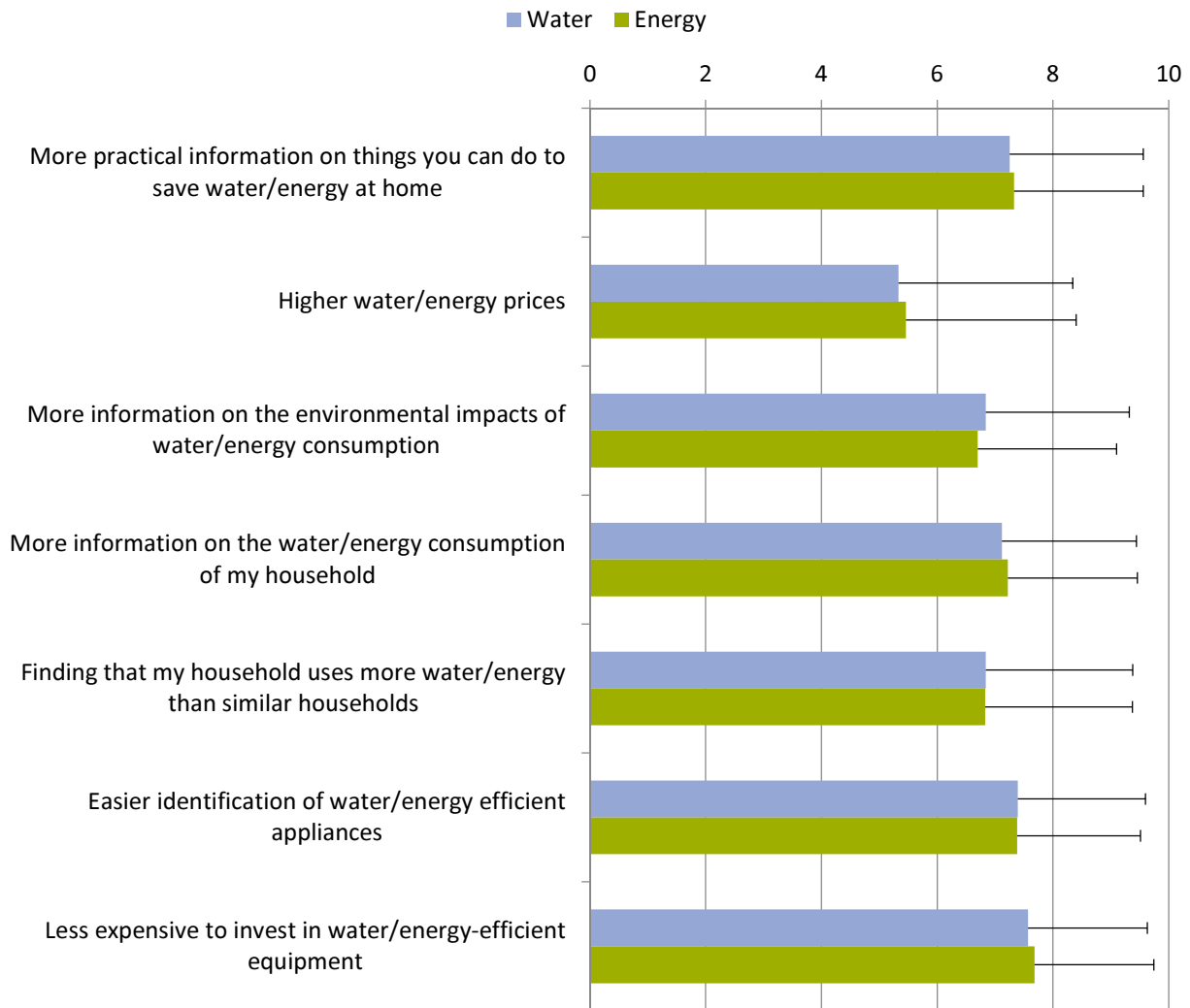
For energy and water, motivations to conserve resources were asked similarly in items G6 and E11.

Graphic(s)



Importance of factors leading to the reduction of water/energy consumption

(with indicators of standard deviation)



Results

Motivations to drive less (and conserve resources) would mostly be encouraged if public transport were to be improved. Standard deviation concerning this question was unusually high, which means that opinions differ a lot between participants.

Environmental benefits and civic duty were the most important factors impacting recycling behavior.

Motivations to conserve water and energy related resources were almost identical. Higher prices seem to be the least important factor for both water and energy conservation.

Interpretation

Although Switzerland has one of the best public transport systems worldwide, participants of this study would mostly drive less if public transport was conceivably improved. The specific improvements are analyzed in the Transport section.

Motivation to recycle seems to be part of a conscious effort to improve the environment and is seen to be an act of civic duty rather than to money saving measure.

Energy and water efficient equipment seems to be perceived as expensive, although it saves money in the long run, therefore it is surprising that this option was most pronounced.

3.7.3 Understanding of labels

Research question

Understanding of labels

OECD questionnaire

Energy Efficiency for appliances

Energy Star

Organic food label

Car efficiency label

Label for sustainable seafood

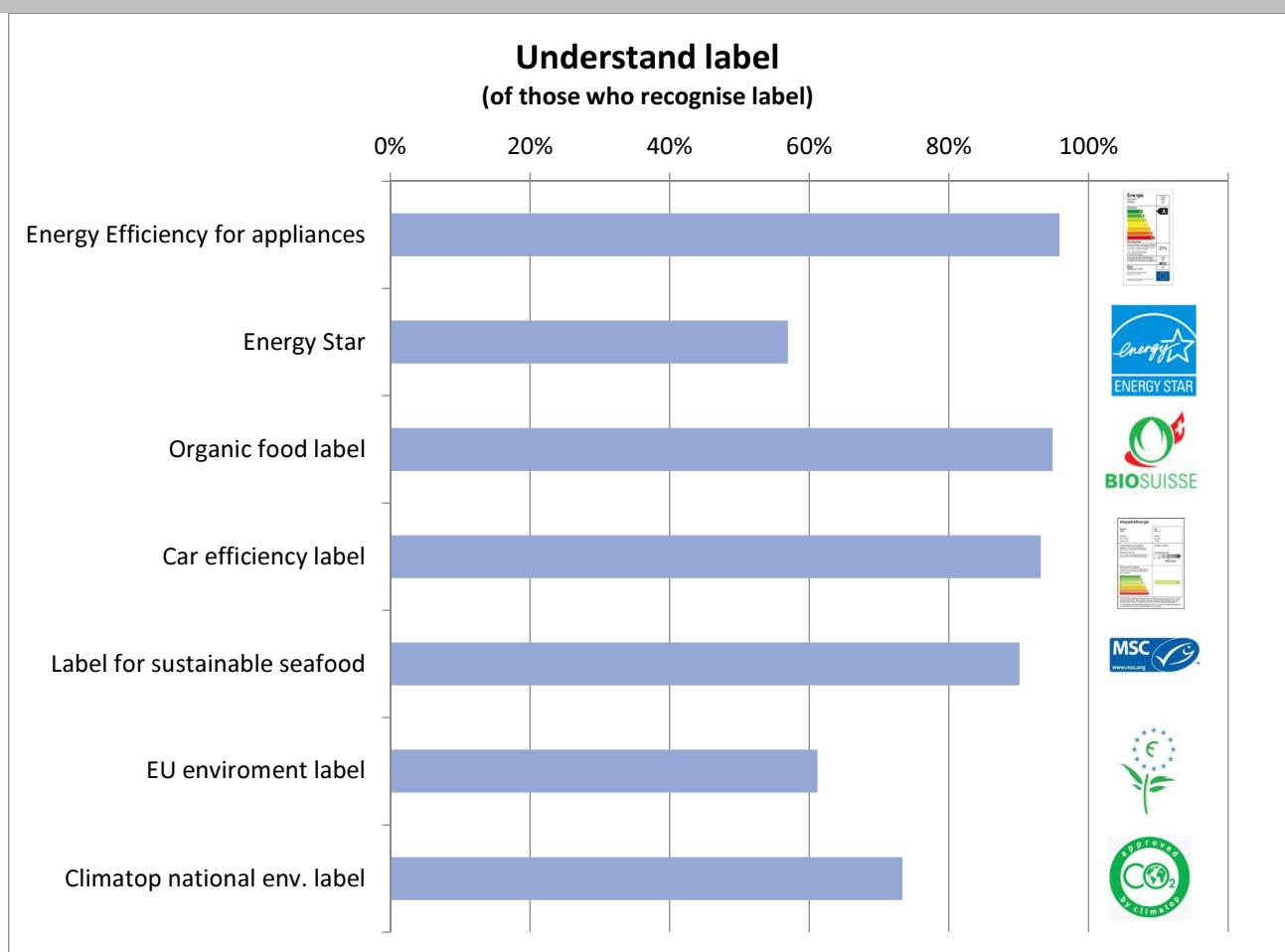
EU environment label

Climatop national environmental label

Mapping decision

Understanding of labels was part of the label section and was asked only when participants recognized the respective label.

Graphic(s)



Results

The BioSuisse label was recognized the most, the EU environment logo least of all. Of all the participants who recognized the respective label, Energy Efficiency for appliances was understood the most, and Energy Star least of all.

There were some significant differences in age and gender, but not systematically so. It can be assumed that the trust in - and the use of - labels is distributed equally across the population.

Interpretation

Energy star and EU environmental label have some explaining to do.

3.7.4 Stated and actual behavior

Research question

Stated and actual behavior

OECD questionnaire

Stated behavior: B6. To what extent do you agree with each of the following statements?

- I am willing to make compromises in my current lifestyle for the benefit of the environment

Actual behavior:

Waste: C4. Please indicate approximately what percentage of the following waste items that your household recycles.
Glass, Plastic, Metal, Paper, Green

Transport: D10. What is your main mode of transportation for each of the following activities?

- Public transport for food shopping

Food: F4. Does your household usually?

- Eat food that is in season and locally grown
- Limit or avoid consumption of meat

Energy: E9. How often do you perform the following in your daily life?

- Cut down on heating/air conditioning to limit energy consumption

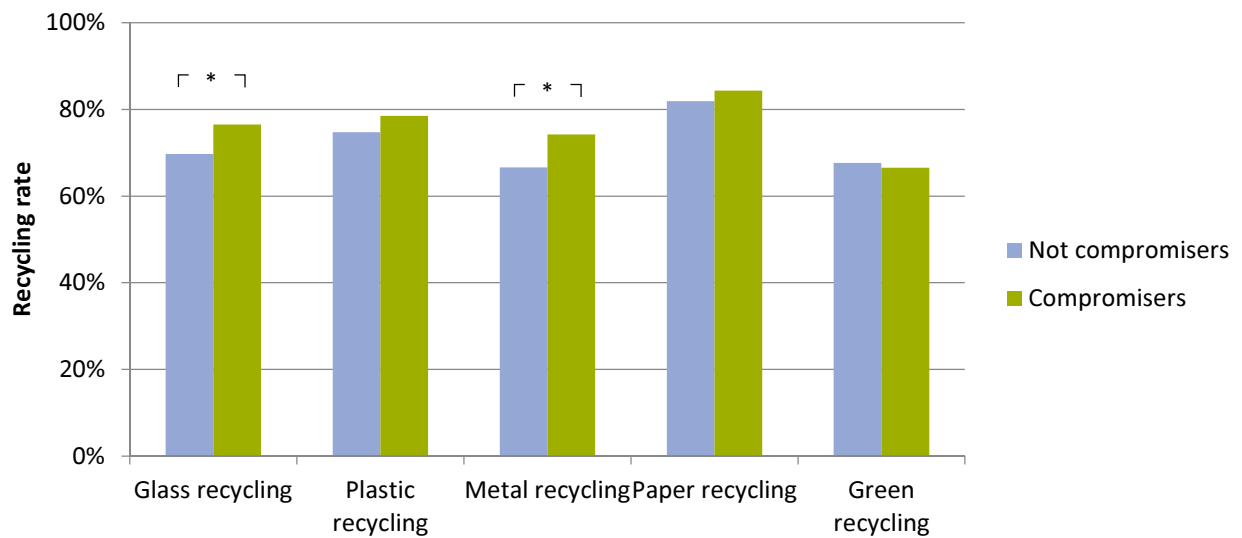
Mapping decision

Stated behavior was measured with one statement of item B6 (I am willing to make compromises in my current lifestyle for the benefit of the environment)

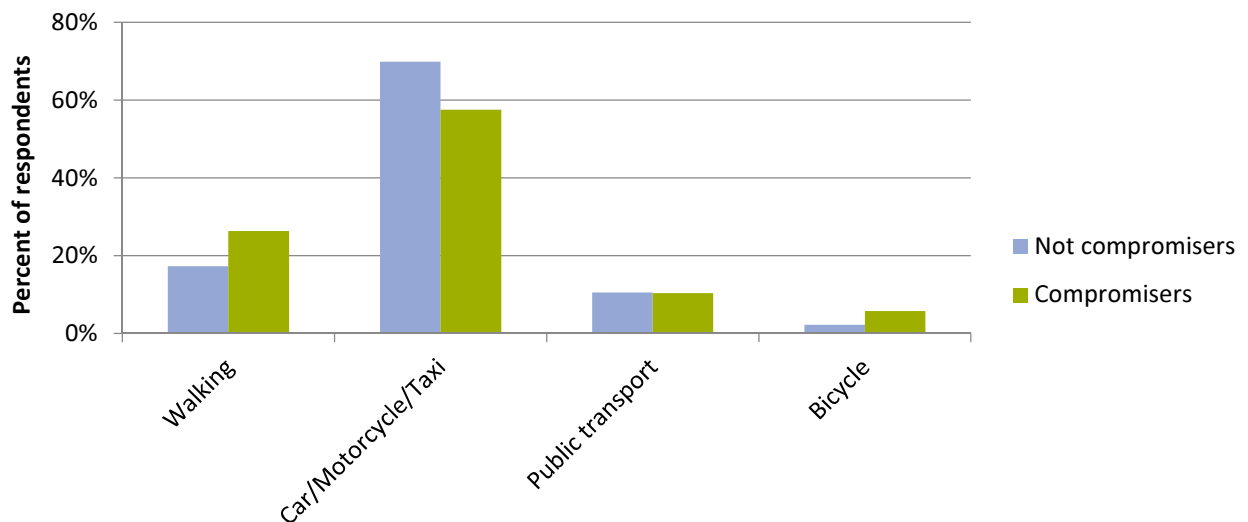
Actual behavior was measured for waste with item C4, for transport with item D10, for food with item F4 and for energy with item E9

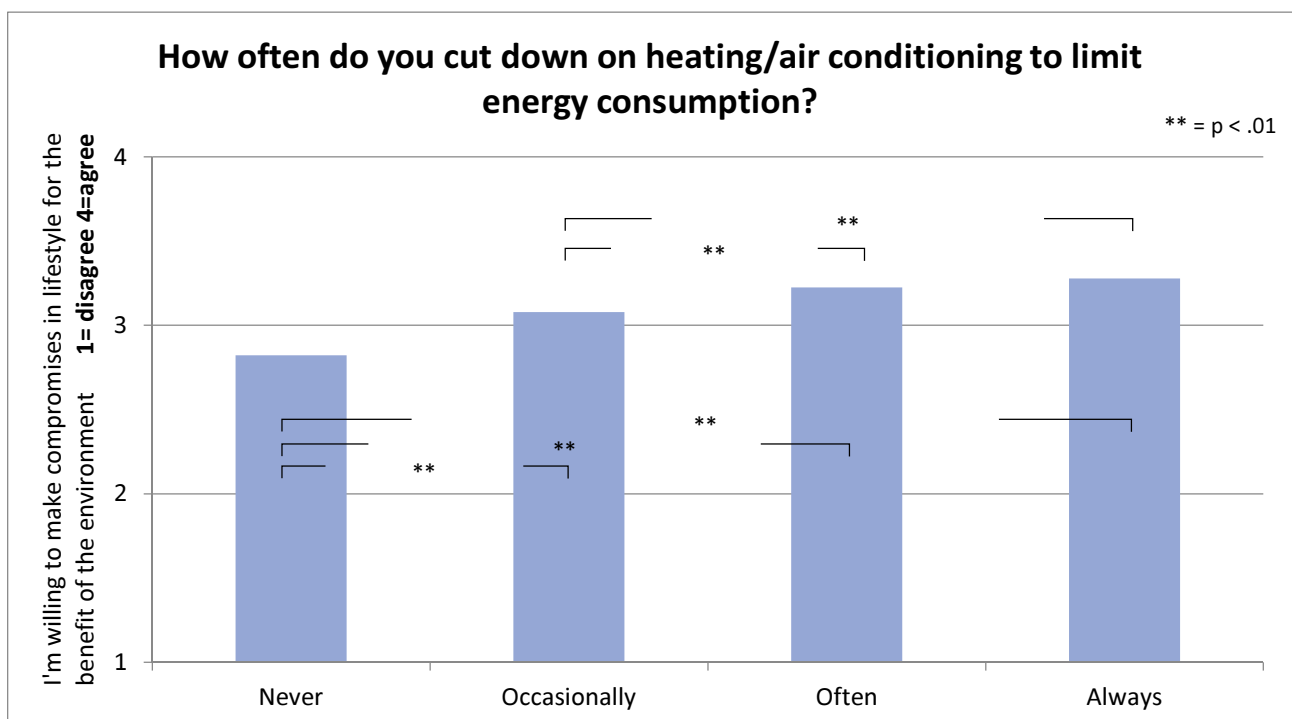
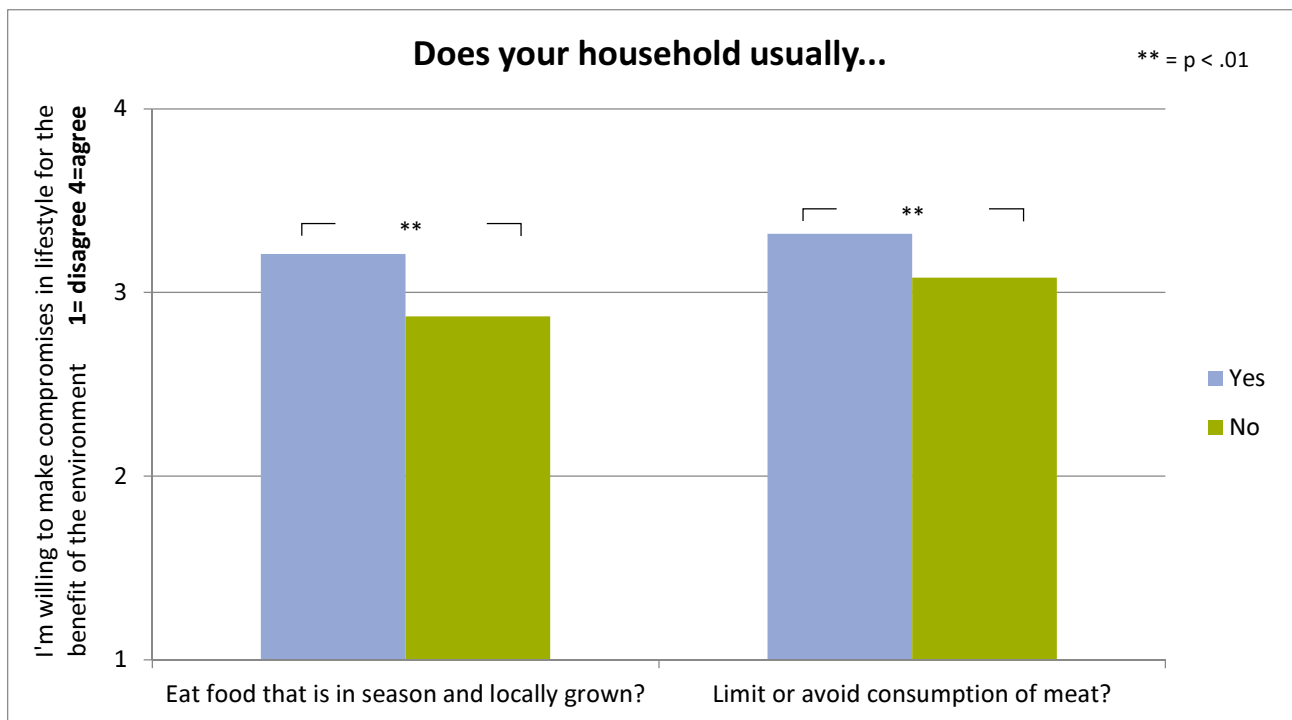
Item B6 was re-categorized from 4 into 2 groups. 'Compromisers' agreed with the statement I am willing to make compromises in my current lifestyle for the benefit of the environment and 'not compromisers' disagreed.

Level of agreement with the statement "I'm willing to make compromises in lifestyle for the benefit of the environment" by recycling type $* = p < .05$



Level of agreement with the statement "I'm willing to make compromises in lifestyle for the benefit of the environment" by means of transport for food shopping





Results

All calculations show that participants who are willing to make compromises in lifestyle for the environment - actually make compromises. They recycle more, use environmental-friendly means of transport, eat food that is in season as well as locally grown, limit or avoid consumption of meat and cut down on heating/air conditioning to limit energy consumption.

Interpretation

At very least, when asked about willingness to make compromises in lifestyle for the environment, stated and actual behavior matched.

3.7.5 Adoption of new technologies

Research question

Adoption of new technologies

OECD questionnaire

Energy: E10. Has your household installed any of the following items over the past ten years in your current primary residence?

- Solar panels for electricity or hot water
- Wind turbines
- Ground source heat pumps

E4. Has your electricity provider proposed the following services to your household?

- Smart electricity meters allowing you to monitor consumption by viewing electricity usage in real time

Transport: D1a. Are they any of your cars?

- Hybrid car (combined electric motor + diesel/petrol engine)
- Pure electric car (only electric motor)
- Flex-fuel car (allows higher biofuel blends than conventional cars)

E8. Does your household have the following items?

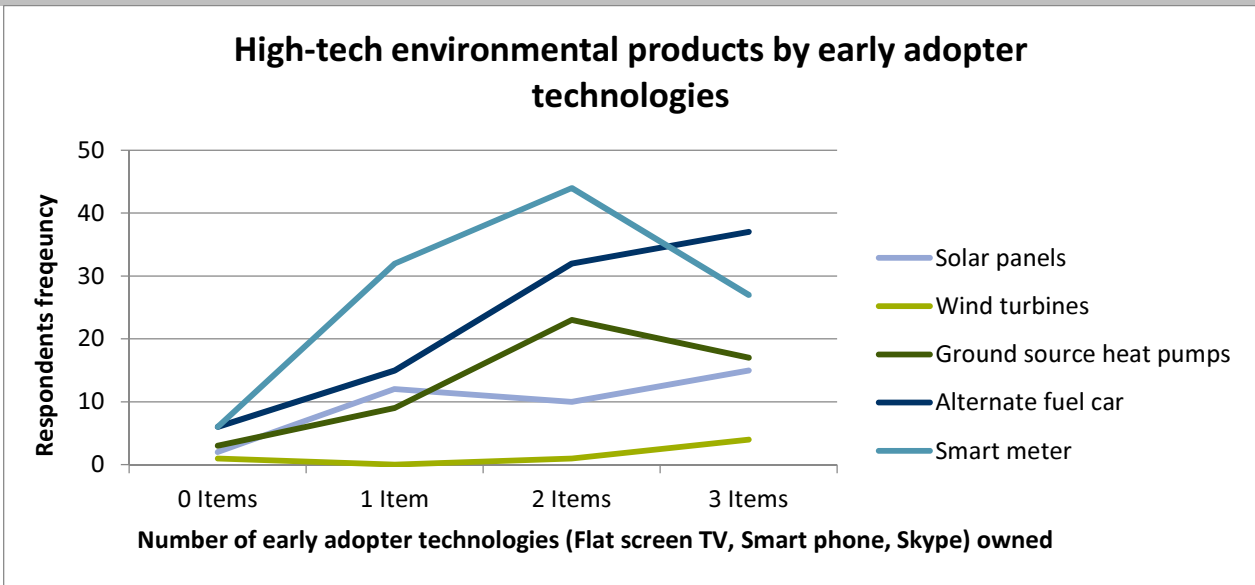
- Flat screen TV
- Mobile phone with connection to the internet
- Internet telephony

Mapping decision

Solar panels, wind turbines, ground source heat pumps, alternate fuel cars and smart meters are considered new environmental technologies.

Flat screen TVs, smart phones and internet telephony are considered early adopter technologies. Flat screen TVs, smart phones or internet telephony were already standard technologies in Switzerland by 2011. Perhaps the result would have been much more distinct with different early adopter technologies.

Graphic(s)



Results

Participants who owned 2 or 3 items, classed as early adopter technologies, used more environmental technologies than those who owned 0 or 1 items.

Interpretation

People who adopt new technologies relatively early on, generally install more environmental technology.

4 Swiss Policies Overview

4.1 Objective

This overview seeks to give a **brief** outline of the prevalent Swiss policies – or “political instruments” at hand - pertaining directly to the said dimensions:

- Water (consumption)
- Energy (generation and consumption)
- Transport
- Waste (generation and recycling)
- Food (consumption - organic / animal welfare)

4.2 Definition “political instruments”

Political instruments – as outlined in the 2nd OECD report – comprise the following instruments:

1. Economic Instruments
 - 1.1. Charging systems (taxes & surcharges)
 - 1.2. Provision of grants & subsidies
2. Direct Regulation
 - 2.1. Performance / Technology standards
 - 2.2. Mandates and bans
3. Information based measures
 - 3.1. Use of eco-labels
 - 3.2. Information campaigns & education programs
4. Supply measures
 - 4.1. Infrastructure access
 - 4.2. Provision of services
 - 4.3. (Partaking in) international organizations

4.3 Sources

In order to avoid an unnecessary level of detail – only the following three authoritative sources were consulted for this listing:

- i. The formal, topic-related FOEN web pages (www.bafu.ch) (<http://www.bafu.admin.ch/themen/index.html?lang=en>)
- ii. The Environmental Report 2011 (<http://www.bafu.admin.ch/umwelt/10822/10823/index.html?lang=en>)
- iii. The “Green Economy Action Plan” (Aktionsplan Grüne Wirtschaft) outlining the Federal Council’s mandates to the administration – was initiated in October 2010: (<http://www.bafu.admin.ch/wirtschaft/11350/11721/index.html?lang=en>) – and formally approved in March 2013 (for an intended revision of the Environmental Protection Act): (<http://www.bafu.admin.ch/wirtschaft/03736/12721/index.html?lang=de&msg-id=48071>)

4.4 Policies / Instruments overview per dimension

4.4.1 Instruments - Water (consumption)

Water, being the precious resource that it is, is closely regulated by way of well-established acts and ordinances (that extend far beyond water *consumption* per se):

- Water concessions and usage
- Waste water disposal and treatment (highly relevant to building permit procedures)
- Surface and subterranean water bodies' protection – with a special focus on ground water as this is the main supply source of drinking water (80%).
- Federal financing (investment in sustainable measures)
- Swiss households are essentially made to pay for this resource in accordance with consumption levels (i.e. at very least - continuously re-adjusted flat rates)

4.4.2 Instruments - Personal Transportation

Swiss transport policy is geared to combining the advantages of various environmentally friendly transport modes – by promoting public and non-motorized transport – and by relocating freight traffic to rail.

Economic Instruments - charging systems (taxes & surcharges):

- In 2001 a so-called Heavy Vehicle Fee (HVF) was introduced. The proceeds are used to finance major railway projects - and particularly - to shift freight from road to rail.

Economic Instruments - provision of grants & subsidies:

- By 2018, the federal government will have invested approximately two billion francs in noise reduced roads (including structural measures such as noise emission barriers and coverage).
- This includes the related investment in research and development.
- Realizing noise reduced rail infrastructure is also underway.

Direct Regulation - performance / technology standards:

- The exhaust regulations for vehicles in Switzerland have been harmonized with those of the EU. They are intensified periodically.

Supply measures - infrastructure access:

- In the past few years, concerted investments have been made into establishing wildlife bridges over major roads.

4.4.3 Instruments - Waste (generation and recycling)

The waste policy of the federal government has led to a significant reduction in the (negative) environmental impact of waste disposal. This progress is due, in part, to:

- i) the introduction of high waste disposal standards;
- ii) advanced infrastructure - particularly waste incineration facilities (which is subsidized);
- iii) more effective, separated waste collection (incl. aluminum & metals; batteries, chemicals & obsolete medication, electronic scrap; glass & PET, paper & cardboard, bulk goods, excavation materials, building debris, oil, cork, textiles, Styrofoam, synthetic materials – and so forth)
- iv) wholesaler and retailer take-back and recovery obligations for prescribed products; as well as
- v) financing in accordance with the polluter-pays principle.

Economic Instruments - charging systems (taxes & surcharges):

- The tried and trusted (as well as accepted) pay-as-you-waste principle has been implemented in most cantons to date.

Direct Regulation - mandates and bans whereby waste is by and large formally regulated (TVA – “Technische Verordnung über Abfälle”)

- Wholesaler and retailer beverage container take-back regulations
- Wholesaler and retailer electronic equipment and gadgets take-back regulations
- Regulations pertaining to the disposal of dangerous substances
- Landfill related directives
- Regulations pertaining to polluting air emissions
- Regulations pertaining to animal waste by-products
- Conventions that regulate the cross-border handling of dangerous waste products.

Information based measures – information campaigns & education programs:

- Within the cantons - at municipal level - various initiatives have been launched to curb littering, including education and awareness campaigns, as well as cooperation between authorities and industry (codes of conduct).

Supply measures - infrastructure access:

- Robust municipality-level cooperation with waste recycling providers

Supply measures - Provision of services:

- A long standing tradition of door-to-door paper & cardboard collection.

4.4.4 Instruments - Energy (generation and consumption)

The energy policy of the Swiss federal government rests on four pillars: i) **energy efficiency**; ii) **renewable energy**; iii) **replacement and construction of large power plants** for electricity production; and iv) **energy foreign policy**. The consumption of fossil fuels is to be reduced by 20% between 2010 and 2020.

Economic Instruments - provision of grants & subsidies:

- Mandatory, minimum requirements for granting **tax exemption** for biogenic fuels such as bioethanol, biodiesel and biogas - whereby rainforest biodiversity and the core conventions of the International Labor Organization (ilo) are to be observed.

Direct Regulation - performance / technology standards:

- The Swiss cantons have introduced a countrywide, uniform, albeit voluntary building energy certification (GEAK – “Gebäudeenergieausweis der Kantone”) which shows how much energy any given residential building requires in terms of standardized heating, heated water, lighting and so forth.
- As of September 2009, the regulations pertaining to household lighting were aligned to those of the European Union (EU). By gradually tightening up the energy efficiency requirements, the worst classes (F and G) completely disappeared from the market by the end of 2012.
- As of January 2010, energy regulations have been amended so that only devices that meet clearly defined energy efficiency requirements may be sold.
- Furthermore, a series of recommendations relevant to the planning of wind energy installations and small hydropower plants was introduced.
- Water consumption for energy generation purposes is fully regulated

Information based measures - use of eco-labels:

- The use of eco-labels is most prevalent with respect to energy efficient appliances, buildings, and cars.

Supply measures - provision of services:

- Peak & off-peak electricity rates

- Green electricity tariffs
- Smart metering – the provision of electrical meters that record the energy consumption in intervals of an hour or less and subsequently communicate this information (at least daily) back to the given utility for monitoring and billing purposes.

4.4.5 Instruments - Food (consumption - organic / animal welfare)

The most important measures to ensure the conservation and promotion of biodiversity are enshrined in a number of international laws, including the Convention on Biological Diversity - as well as several federal laws.

The FOEN is committed to enabling environmentally friendly as well resource-conserving consumption patterns. Paramount to environmentally conscious consumer decisions, are informed consumers who thus require accurate information on the environmental impact of goods and services throughout their life cycle.

Agricultural policy has been placed on a new footing, whereby the federal administration signed off the agricultural policy 2014-2017 in earlier on, this year. Enabling innovation, competitiveness as well as cooperation on sustainability issues is deemed to be of central importance.

Information based measures - use of eco-labels:

- The use of eco-labels is primarily concerned with the promotion of organic foods and biodiversity – as well as animal welfare.

Economic Instruments - provision of grants & subsidies:

- Incentive schemes for the cultivation of organic foods (incl. milk production) and animal friendly meat & poultry production.

4.4.6 Current focal points (Green Economy Action Plan)

In October 2010, the Federal Council initially gave the administration mandates for building a green economy resulting in six areas of action in order to improve the conditions for managing natural resources in the interest of both the environment and the economy. The stated goal was to lower resource consumption to sustainable levels while increasing Swiss competitiveness and welfare.

By **March 2013** the resultant **“Green Economy Action Plan”** (Aktionsplan Grüne Wirtschaft) was formally approved and issued, whereby 27 existing, as well as new measures were finally incorporated into **four focal areas of action**:

- i) Consumption & Production;
- ii) Waste & Resources (raw materials);
- iii) overall instruments; and
- iv) Objectives definition, performance measurement, information dissemination & reporting.

4.4.6.1 Consumption and Production

Improved information, innovation - and cooperation with industry - build the cornerstones of all policies and initiatives here. This includes:

Direct Regulation - mandates and bans:

- Ensuring less food waste (resource efficient nutrition)

Supply measures - provision of services:

- A wide range of federal legislation may potentially have a huge influence on resources. Federal government bodies should in the future be required to investigate the impacts that legislation has on resource efficiency and sustainability.

Information based measures – information campaigns & education programs:

- Environmental information on the product range as well as environmentally harmful products.

Supply measures – infrastructure access / provision of services

- Competence center and network for promoting resource efficiency
- Voluntary agreements with industry with respect to products

Direct Regulation - performance / technology standards:

- Resource-efficient information and communication technologies

4.4.6.2 Waste and Raw Materials

Goods are to be produced using less raw materials - while generating less waste. This includes:

Direct Regulation - performance / technology standards:

- Increased efficiency of waste facilities and production plants

Direct Regulation - mandates and bans:

- Take back obligation for packaging in the consumer sector
- Use of secondary gravel from excavated material
- Requirements for new materials and construction methods as well as optimized recycling of rare metals

4.4.6.3 General Instruments

Of central importance here are the Cleantech Masterplan, the “greening* of the tax system, as well as international (cross-border) engagement and cooperation. This includes:

Direct Regulation - Performance / Technology standards

- **Cleantech:** this amounts to the promotion of new environmental and energy technologies. The Cleantech master plan analyses Switzerland's innovation and relative position in the global market. It sets goals, defines areas of action and provides recommendations on making improvements.

Economic Instruments - charging systems (taxes & surcharges)

- **Environmentally-friendly tax system:** appropriate incentives for sustainable resource use - whereby existing disincentives should be removed.

Supply measures - provision of services:

- Involvement in international organizations – e.g.: Organization for Economic Co-operation and Development (OECD); United Nations Environment Program (UNEP).
- Continued investment in research e.g. ETH Zurich: Centre for Energy Policy and Economics (cepe); and ETH Zurich: Institute for environmental decisions (IED) as well as;
- Cooperation and agreement on future environmental program goals between the federal and cantonal authorities.

4.4.6.4 Objectives definition, measurement, information dissemination and reporting:

To continuously assess and ensure that Switzerland is moving towards a green economy, whereby stakeholder dialogue and promoting awareness play a central role. This includes:

Supply measures - provision of services:

- Setting targets, measuring progress and reporting – whereby the integration of social, economic and environmental information in the GDP is considered key to being able to measure the development of a green economy.

- Dialogue incorporating business, science and society

Information based measures – information campaigns & education programs:

- Increased awareness activities

5 Findings & Recommendations

5.1.1 Recommendations - Attitudinal characteristics

- Skeptics consistently showed less than optimal behavior than Altruists and Green Growthers with respect to environmental issues - and are less willing to make compromises in lifestyle. They are arguably less willing to be educated, so that consistently applied bans and mandates (direct regulation), or indeed, charging systems (economic instruments) remain an effective option.
- The knowledge level pertaining to climate change is very poor - mainly because of a misconception regarding the greenhouse effect. Information campaigns and education programs (information based measures) appear to be vital. After all, environmental and social issues were attributed much importance by the (Swiss) respondents so that they should be responsive to corresponding measures. Moreover, people are generally willing to make compromises to benefit the environment. They tend to trust scientists, so these are the people who should be disseminating noteworthy information.

5.1.2 Recommendations - Water use

Water shortage is not such an important issue in Switzerland. The benefits of saving water mostly concern potential energy reductions with respect to hot water consumption. Nevertheless it is important that water consumption stays on a low level (like it does since 1970: the total amount of water decreased although the population has grown). To achieve this goal, following measures are recommended:

- Water efficient devices should arguably be promoted even more by ensuring i) that these are less expensive to acquire by way of incentives (economic instruments: provision of grants & subsidies); and by ensuring ii) that they are easy to identify (information based measures: regulated use of eco-labels); as well as ensuring iii) that people understand the positive impacts of using such devices (information based measures: information campaigns & education programs).
- Often water efficient devices are already equipped, but not perceived as such. Measures could be to inform people about the (energy- rather than water-) efficiency of devices by labels or information campaigns (information based measures: information campaigns & education programs).
- Increase accessibility to information about own-household, and even third-party-household water consumption (i.e. particularly in the case of apartment dwellers - so common to Switzerland) - by way of water consumption meters that clearly indicate actual consumption levels or if possible, consumption of hot water (direct regulation: performance / technology standards).

5.1.3 Recommendations - Personal Transportation

- The evaluation of the Swiss data has shown that the decision to purchase a car is strongly linked to the availability of public transportation options. Strategically extending the public transportation network – where appropriate and effective – certainly would make sense (supply measures: infrastructure access / provision of services).
- Complimentary to extending public transportation reach, private vehicle transportation may be hindered by further mobility management measures (e.g. by reducing parking possibilities in central business district areas or by reducing income tax deduction for private car use). However, cross-regional coordination is vital and is to be strongly encouraged (supply measures: extension of services and incentives by the federal administration to the cantons). Furthermore, a concerted effort to educate the public on the environmental impacts of private

transportation is commended especially with regard to the daily use of transportation when commuting to work (e.g. the benefits of living close to the work place, or occasionally work at home) (information based measures: information campaigns & education programs).

- Price appears to play a major role when it comes to choosing public transportation over and above other modes of transport. It may be argued that particularly car owners do not calculate the true cost of owning and using a private vehicle (essentially taking only fuel consumption into account). Awareness with respect to the true cost of using one's own vehicle, as well as the benefits of using public transportation means, may indeed lead to constructive behavioral change (information based measures: information campaigns & education programs).
- It is assumed that some car owners are biased about the benefits of public transport. To improve the perception of public transportation, special offers could be implemented so car users can experience its advantages (provision of grants & subsidies).
- Rural areas – where respondents appear least interested in CO₂ reducing initiatives or policies – should be targeted in particular using information campaigns & education programs. Promotion of flexible mobility options (such as “mobility car sharing”) could lead to a more environmental awareness (provision of services; partaking in cross-regional organizations).
- Complementary to the existing economic instruments, such as the CO₂ Act, it may be considered awarding consumers a price bonus for purchasing a more energy efficient car (economic instruments: provision of grants & subsidies) - or indeed - imposing a surcharge for purchasing a less energy efficient car (economic instruments: charging systems (taxes & surcharges)). The findings indicate that people would clearly welcome the former of the two options.
- If and when recognized, car energy efficiency labels appear to impact car purchasing decisions significantly, so that intensifying / extending their implementation – and informing the public even more with respect to these labels ought to bear fruit (information based measures: use of eco-labels / information campaigns & education programs).
- It was found that most people are willing to pay more for an electric than for a conventional car and that the perceived value of an electric car is roughly 10% higher than that of a conventional car. With this in mind, the federal administration may wish to consider facilitating related sales actively (economic instruments: provision of grants & subsidies). In this context it is desirable to facilitate electric mobility together with the use (or even production) of green electricity to avoid using fossil energy.
- Fostering more and safer cycling and pedestrian paths: besides enabling people to lead a healthier life style, these would arguably help reduce the strain on the public transportation system. It would be interesting to glean information from regions or countries that actively seek to extend their cycle- and pedestrian-path networks.

5.1.4 Recommendations - Waste and Recycling

- Unit-based waste fees appear to secure the largest waste reduction levels – whereby charging by volume remains the most practical option (i.e. size related waste disposal bag charges). If not already the case, this approach should be applied consistently throughout Switzerland (economic instruments: charging systems (taxes & surcharges)). Price increases of waste fees ought to be explored more fully. This may be achieved by investigating the correlation between price hikes and the potential increase in illegal dumps.
- Findings show that, the more often mixed household waste is collected, the more waste volume is produced. The least amount of mixed waste is produced when mixed waste is retrieved less than once a week. One may conclude that more waste sorting takes place. This should be investigated more fully.
- Although door-to-door collections appear to lead to the most recycling taking place (probably due to the level of convenience), drop off centers (manned or unmanned) seem to have a very similar effect - leading to high recycling rates. It seems that by increasing the convenience of waste disposal, recycling rates could be raised. To increase convenience, drop off centers should accept all kinds of recycling materials (e.g. plastic, paper). Cooperation between municipalities and private waste processing enterprises should be reviewed - and in appropriate instances (as determined by demographic considerations) – actively encouraged (supply measures: infrastructure access / provision of services).
- There are still people who flush hazardous materials, including medication, down toilets. Although this appears to be a very small percentage of the population at large, water quality is impacted in a not insignificant manner. The

disposal of hazardous waste should be simple and anonymous. Possible measures could be independent drop-off points. Nonetheless, education remains indispensable (information based measures - information campaigns & education programs).

- Collection or disposal options of green waste are less readily available than in the case of other waste types (such as paper, metal, glass etc.). Public and private stakeholders should be encouraged to cooperate more with respect to this (supply measures: infrastructure access / provision of services).
- Support for waste prevention (especially to reduce product packaging) is very high in this study and probably applies for all people in Switzerland. Product packaging may be reduced by way of coordinated packaging regulations (considered as long-term goal) (direct regulation: performance & technology standards, as well as mandates and bans).
- Educate the public on the impacts of waste in general (information based measures: information campaigns & education programs).
- Inform households about the average amount of produced waste and recycling rates of their village/city and its development over time (comparison with other villages/cities could lead to waste prevention or more recycling).

One big problem with waste reducing measures is international interdependence, which can only be solved in a common effort with other countries or organizations.

Information campaigns are desirable but should be as specific as possible in terms of target groups and information needs.

5.1.5 Recommendations - Energy use

- It was generally found that energy efficiency is considered to save money – so that there is a keen interest in smart meters. The impact of a large scale implementation of this device ought to be considered more closely (direct regulation: performance / technology standards). Furthermore, the use of energy efficient devices should be encouraged even more by ensuring that such devices are readily identifiable (information based measures: use of eco-labels that will impact the purchasing decision – as well as information campaigns & education programs)
- Measuring and comparing energy use are powerful tools to reduce energy consumption (same applies to water consumption). Such a measure could be implemented with smart meters, where comparison of energy consumption between similar households would be possible and lead to a stronger awareness of energy consumption (Performance / Technology standards).
- Renewable energy tariffs are generally regarded an additional cost factor. However, the more positively people perceive their income situation, the more they are willing to pay for renewable energy and interest therein remains high. An effective measure would be to encourage energy providers to set the default option to “renewable energy sources” – backed with adequate information - with the purpose of convincing the user that this option is justified. The user would have to actively deselect this option if opting for more conventional energy mixes.
- Communicate that the relative costs of energy to the total costs of living are rather low. This could be illustrated on the energy bill to convince people that the higher renewable energy tariffs are not a burden on the household's budget (information campaigns & education programs).

5.1.6 Recommendations - Food

- The willingness to pay more for organic food is high (26% on average). The better consumers know, understand and trust labels, the higher their consumption of organic food. Intensifying the information/education on labels (environmental benefits), their value and their credibility, ought to bear fruit (information based measures: information campaigns & education programs).
- Even though consumers are willing to pay more for organic food, consumption thereof remains price sensitive. Lowering prices by increasing subsidies for organic products or introducing surcharges for non-organic food (internalization of external costs) may be considered (economic instruments: provision of subsidies & charging systems optimization (taxes & surcharges)).

- Although consumption of organic food can improve the environmental impact of food production, it would be more beneficial to abstain from consumption of meat now and then. In this study only one third of the participants limits or avoids consumption of meat. Measures could be information campaigns and education programs to reduce meat consumption, especially beef and pork (information based measures: information campaigns & education programs).
- Food waste could be reduced by informing people that food can be eaten past the date of expiry (information based measures: information campaigns & education programs).

6 Glossary

Term	Definition
Correlation	Statistical relationship between two random variables or two sets of data
Mean	Arithmetic average; the sum of the values divided by the number of values
Median	Numerical value separating the higher half of a data sample from the lower half
Mode	Value that appears most often in a set of data
Significant	The probability that the observed data would occur by chance in a given hypothesis
Standard deviation	Shows how much variation or dispersion exists from the average (mean), or expected value. High standard deviation indicates that the data points are spread out over a large range of values.
$p < 0.1\%$	Probability of the difference between two means to be stistically significant on three different levels: 5%, 1% and 0,1%

7 Further Information

More detailed Information on the results of the analysis are available in separate Documents. These comprise general attitudes, the five dimensions concerning environmental behavior, and cross-cutting issues. An overview of the investigated topics is given in a readme-File:

- EPIC_CH_Appendix1_Attitudes_20130808.pdf
- EPIC_CH_Appendix2_Water_20130808.pdf
- EPIC_CH_Appendix3_Transport_20130808.pdf
- EPIC_CH_Appendix4_Waste_20130808.pdf
- EPIC_CH_Appendix5_Energy_20130808.pdf
- EPIC_CH_Appendix6_Food_20130808.pdf
- EPIC_CH_Appendix7_Cross-Cutting Issues_20130808.pdf
- EPIC_CH_Read_me_20130808.pdf