Comparing energy use by gender, age and income in some European countries

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Sammanfattning

Skillnader i hushållens totala energianvändning i olika länder har framförallt förklarats av skillnader i inkomst/utgiftsnivå. Studier av kvinnors och mäns konsumtion har dock visat att män äter mer kött än kvinnor och de kör längre sträckor, än kvinnor något som borde leda till en högre total energianvändning för män än för kvinnor. I den här studien har vi analyserat den totala energianvändningen för mäns och kvinnor konsumtionsmönster i fyra Europeiska länder (Grekland, Norge, Tyskland och Sverige) genom att studera singelhushåll. Vi fann signifikanta skillnader i total energianvändning i två länder, Grekland och Sverige. Boende, mat och transport stod för 61-76% av den totala energianvändningen i de fyra länderna, oberoende av kön. De största skillnaderna mellan kvinnor och män fanns inom transporter och utemåltider, tobak och alkohol där männen använde mycket mer energi än kvinnorna i alla de undersökta länderna. Män gjorde av med 70-80% mer energi än kvinnor på transporter i Tyskland och Norge, med 100% mer i Sverige och med 350% mer i Grekland. Skillnaderna kunde framförallt förklaras av att män spenderar mer på sin bilanvändning, vilket inkluderar bränsle, reparationer och reservdelar. När det gäller varor som medicin, textilier, möbler och mat så använder kvinnor mer energi än män, men skillnaderna var inte särskilt stora.

Vi räknade också ut den totala energianvändningen för singelhushåll med och utan barn samt för singelhushåll med olika inkomst och ålder i Sverige och Tyskland. Singelhushåll med barn gör av med mer energi än singelhushåll utan barn. Skillnaderna mellan svenska singelmän och kvinnor blev mindre då de hade barn medan den blev större när singlar i Tyskland var i samma situation. En jämförelse av energianvändningen för olika åldersgrupper visade att unga singlar (födda efter 1979) använde minst energi (bara hälften av den genomsnittliga singelmannen eller kvinnan) och att andelen energi för bostaden ökar med åldern. Energianvändningsnivån ökade också linjärt med utgiftsnivån medan energiintensiteten i olika inkomstgrupper var densamma. En uppskattning av koldioxidutsläppen från svenska singelhushåll visade på utsläppsnivåer för singelmän på 10 700 kg/år medan singelkvinnor orsakade utsläpp på 8 500 kg/år.

Mat, transporter och boende stod för omkring 75 % av de totala utsläppen och koldioxidintensiteten ökade med inkomst.

Trots en del tillkortakommanden med de energiintensiteter vi använt för beräkningarna tror vi ändå att resultaten är robusta. Fler beräkningar krävs för att avgöra om mönstret med högre manlig energianvändning än kvinnlig går igen i fler länder. Fler studier krävs också för att kunna kvantifiera storleken på genuskomponenten i hushållens energianvändningen. Befintliga data i nationella utgiftsundersökningar kan användas för att undersöka hur pass mycket kön som bakgrundsvariabel kan förklara jämfört med andra variabler såsom ålder, utbildning och boendeort. Våra resultat är relevanta för EU som vill inkludera genusaspekter i alla sina verksamheter och som vill minska energianvändningen och koldioxidutsläppen.

Nyckelord: energi, genus, konsumtion, ålder, inkomst

Summary

Differences in household total energy use in different countries have mainly been explained by levels of income/expenditure. However, studies of gender consumption patterns show that men eat more meat than women and drive longer distances, potentially leading to higher total energy use by men. This study examined the total energy use for men's and women's consumption patterns in four European countries (Germany, Norway, Greece and Sweden) by studying single households. Significant differences in total energy use were found in two countries, Greece and Sweden. Housing, food and transport constituted 61-76% of total energy consumption in the four countries, regardless of gender. The largest differences found between men and women were for travel and restaurants, alcohol and tobacco, where men used substantially more energy than women. Men consumed 70-80% more energy on transport than women in Germany and Norway, 100% more in Sweden and 350% more in Greece. These differences were mostly explained by men's higher operating costs for cars, including fuel, repairs and spare parts. For items such as medicine, household textiles, furniture and food, women used more energy than men, but the differences between male and female households were rather small.

We also calculated the total energy use for single households, with or without children, in different age and income groups in Germany and Sweden. Singles with children used more energy than singles without children. The differences between Swedish men and women decreased when they had dependent children, while the opposite was true for German men and women. A comparison of the energy consumption for different age groups showed that the youngest singles (born after 1979) used the least energy (about 50% of that used by the average single man or woman) and the proportion of energy for housing increased with age. Furthermore, energy use increased more or less linearly with expenditure, while energy intensity remained constant. Assessment of CO_2 emissions from Swedish single households showed emission levels of 10 700 kg/year for men and 8 500 kg/year for women. Food, housing and transport contributed about 75% of all emissions and there was a consistent tendency for CO_2 intensity to increase with income.

Despite shortcomings with the energy intensities used, the results for men's and women's energy consumption seemed robust. Further calculations for other countries can determine whether the pattern of higher male energy consumption is replicated there. Further studies are also recommended to determine the size of the female gender component in household energy use. Existing data in national consumer expenditure surveys can be used to test how gender as a background variable compares with factors such as age, education and geographical location. Our findings so far are policy-relevant for the EU, which aims to mainstream gender issues into all activities and to lower its total energy use and greenhouse gas emissions.

Keywords: Energy, gender, consumption, age, income

Acknowledgements

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Innehållsförteckning

1 Introduction

1.1 Estimating the total energy use of households

It is now acknowledged that indirect energy (the energy needed to produce goods and services used in industry, transport and retail due to consumer demand) is as important as direct energy (the fuel and electricity used by consumers for e.g. heating, lighting and transportation) in terms of total household energy use. Numerous studies have therefore sought to quantify and define patterns of total energy use in households.

In early studies, Herendeen & Tanaka (1976) found indirect energy use to be 66% of the total in affluent US households, but only 33% in poor households. Similar fractions of direct and indirect energy use have been reported for rich and poor households in Norway (Herendeen, 1978). In other studies, indirect energy was reported to be 54% of the total average energy demand for a Dutch household (Vringer & Blok, 1995), 30% for an Australian household (Lenzen, 1998) and 50% for the average Swedish household (Carlsson-Kanyama et al., 2005), while Weber & Perrels (2000) reported indirect use to be less than 50% of total energy use for households in France, West Germany and the Netherlands. Reinders et al. (2003) matched energy intensities for goods and services in the Netherlands against national household expenditure data from 11 EU countries and found that 36-66% of the energy used was indirect. Similar values have been presented by Pachauri & Spreng (2002) for Indian households (50% indirect energy), Park & Heo (2007) for households in the Republic of Korea (60% indirect energy) and Cohen et al. (2003) for households in Brazil (61% indirect energy).

1.2 Reasons for differences in household energy use

Total energy use differs between households due to differences in the level of disposal income/expenditure, with a strong correlation reported between energy and income/expenditure (Herendeen & Tanaka, 1976; Herendeen, 1978; Pachauri & Spreng, 2002; Reinders et al., 2003). This creates problems for countries world-wide as they attempt to lower their energy use while maintaining their economic growth. However, the effect of increasing income varies considerably across countries, even allowing for socioeconomic and demographic variables (Lenzen et al., 2006). An additional variable explaining levels of total energy use is lifestyle, with urban living 10-15% less energy-intensive than rural (non-farming) living (Herendeen & Tanaka, 1976; Herendeen, 1978). Recent studies

of the carbon footprint of UK households (Druckman & Jackson, 2009) and total energy use of Swedish households (Alfredsson, 2002) reached similar conclusions. Local support systems are another possible determinant of household energy use, with the potential for reductions in energy use depending largely on improving such systems, e.g. by improving access to environmentally friendly transportation (Carlsson-Kanyama et al., 2005).

1.3 Calculation of total household emissions

Recent studies have shown that the carbon dioxide (CO_2) emission intensity of household consumption is decreasing with increasing income in some countries (Netherlands and the UK), while it is increasing in others (Sweden and Norway) (Kerkhof et al., 2009). This difference has been attributed to differences in the intensity of CO_2 emissions from the national energy supply. Emissions of greenhouse gases are positively correlated with increasing household expenditure in the Netherlands (Kerkhof et al., 2008); while in the UK CO_2 emissions are strongly correlated with affluence (Druckman & Jackson, 2009).

1.4 The role of gender in energy use and emissions

Gender may be a determinant of total energy use or greenhouse gas emissions from household consumption patterns. A study by Carlsson-Kanyama et al. (2003) calculated the energy requirements for producing foods 'from farm to table' and used these to estimate the embodied energy for food consumed by men and women. The results showed that the energy inputs were 14-21% higher for food consumption by men than for women, with men's higher meat consumption partly explaining the difference. Another study examining travel patterns among men and women in different age and income classes and related energy use found that men used more energy for travelling than women in most classes studied, a difference attributed to women travelling shorter distances than men and using more fuel-efficient vehicles (Carlsson-Kanyama & Linden, 1999).

1.5 Consumption pattern differences due to gender

Studies in fields other than environmental science have frequently demonstrated that consumption patterns differ among women and men. For example, women consume more high-brow culture (theatre, literature, political discussion) than men, who prefer more low-brow activities (eating out, cinema) (Bihagen & Katz-Gerro, 2000; Lizardo, 2006), regardless of the individual's education, income,

age and class. Such differences may also translate into differences in energy consumption, since leisure time activities have different energy intensities (*e.g.* Vringer & Blok, 1995; Räty & Carlsson-Kanyama, 2007).

A range of studies carried out in order to issue appropriate nutrition guidelines have reported significant differences in eating patterns between women and men, with men eating more meat and other protein-rich foods and consuming more processed beverages than women, and women eating more fruit, vegetables and cereals than men. In a UK study, elderly men were found to eat less fruit and vegetables than elderly women, partly due to their poorer knowledge of nutrition (Baker & Wardle, 2003). This gender difference in terms of fruit and vegetables, and also of men eating more meat, was confirmed for middle-aged people in the UK (Fraser et al., 2000). In rural communities in the USA, women had higher intake of fruit and vegetables (except for potatoes) than men, while men had higher intake of soft drinks and super-sized portions (Liebman et al., 2003) or general beverages (Storey et al., 2006). In Sweden, average intake of fat from meat makes up a greater proportion of total fat intake for men than for women (Elmståhl et al., 1999), while unemployed males and male pensioners in Bulgaria eat more meat than females in corresponding categories (Moon et al., 2002) and educated urban men in Ukraine prefer fatty and processed meat, whole milk and lard to a greater extent than women (Biloukha & Utermohlen, 2000). Adult men in the United States consume eggs and other protein-rich products for breakfast more commonly than women (Siega-Riz et al., 2000), while women in the US armed forces (Cline et al., 1998) and young adolescents in Canada rate vegetarian food more highly than men (Greene-Finestone et al., 2005). The differences listed above may translate into different levels of energy use and greenhouse gas emissions, as the ‘farm-to-table’ emissions and energy use for various foods have been shown to vary substantially (Carlsson-Kanyama et al., 2003; Carlsson-Kanyama & Gonzales, 2009).

There are substantial differences between the travel patterns of men and women in the European Union, despite the fact that most women are now in the paid labour force. Women make shorter work trips, are more inclined to use public transport and make more trips to serve another person’s travel needs, while they also drive far fewer miles per year than men (Wachs, 1987; Turner et al., 2006; McGuckin & Murakami, 2007; Oldrup & Romer Christensen, 2007). This affects their overall energy use for travel and CO_2 emissions (Carlsson-Kanyama & Lindén, 1999; Johnsson-Latham, 2007; Gender cc, 2009).

2 Objective of the study

The objective of this study was to determine whether consumption differences between men and women result in differences in total energy use and emissions of greenhouse gases. Such studies are interesting because:

- When devising and applying policy instruments for energy efficiency or emission reductions, it is important to know the target groups. If women and men differ regarding their energy use and emission profiles, policy instruments should perhaps be differentiated in order to achieve maximum impact.
- There is a general goal to achieve gender equity in the EU.
- It is important to know whether patterns are similar across the EU when it comes to gender-based energy consumption, etc.

The results of the Swedish component of this study are reported in detail by Carlsson-Kanyama & Räty (2008).

3 Method and data

In this study, we estimated the total energy consumption (including both direct and indirect energy use) of men and women by combining household expenditure data with existing data about energy intensities. To discriminate between male and female energy consumption, we opted to only study single women and single men, as averages and according to income, age and the presence of children in the household.

The expenditure data necessary for the calculation of energy use were purchased from, or donated by, the German (DESTATIS), Greek (NSSG), Norwegian (SN) and Sweden (SCB) statistics offices.[1] The data for Germany were for 2003, for Greece the average for 2004-2005, for Norway the average for 2001-2003 and for Sweden the average for 2003-2005. The household expenditure data obtained contained detailed information about money spent on a large number of items, classified for different types of households using the COICOP[2] classification scheme (Statistisches Bundesamt, 2005; Statistics Sweden, 2006; National Statistical Service of Greece, 2009; Statistics Norway, 2009).

The following types of households (for numbers see Table 1) were studied in Germany, Greece, Norway and Sweden:

- Single female households
- Single male households

Table 1. Number of single female and male households for which expenditure data were available in the four countries

Country	Number of single female households	Number of single male households
Germany	1784/8311[3]	1066/4656
Greece	8 563	9 243
Norway	218	206
Sweden	538	556

For Germany and Sweden we also studied:

[1] DESTAIS = Statistisches Bundesamt, NSSG =National Statistical Service of Greece; SB= Statistics Norway and SCB = Statistics Sweden.
[2] COICOP = Classification of Individual Consumption According to Purpose.
[3] The sample for the German data is different for food and for other goods.

- Single female parents with dependent children
- Single male parents with dependent children
- Single female households in four different age groups (women born before 1945, 1945-1959, 1960-1979, or after 1979)
- Single male households in four different age groups (men born before 1945, 1945-1959, 1960-1979, or after 1979)
- Single female households in five different income groups (<10 300 Euro/year, 10 300-14 400 Euro/year, 14 401-18 500 Euro/year, 18 501-22 500 Euro/year, >22 500 Euro/year)
- Single male households in five different income groups (<10 300 Euro/year, 10 300-14 400 Euro/year, 14 401-18 500 Euro/year, 18 501-22 500 Euro/year, >22 500 Euro/year).

Energy consumption values were obtained by multiplying the household expenditure data by data about energy and CO_2 intensities (MJ/Euro or kg CO_2/Euro) for different products and services. The intensities used applied for Sweden in 2003-2005 and were calculated by a Swedish version of the Energy Analysis Programme EAP (Carlsson-Kanyama et al., 2005; Räty & Carlsson-Kanyama, 2007). EAP is a hybrid method for quantifying energy use and emissions over the life-cycle of any product or service. It combines input-output analysis and process analysis (cf. Benders et al., 2001). In total, we had 319 energy and CO_2 intensities and these intensities were matched with the 600-800 categories of products and services available in the household expenditure data files. We calculated the energy and CO_2 emissions for all purchases except for taxes and other 'common resources' that yield no energy consumption for the household in this model. Both the expenditure data and the energy and CO_2 intensities are associated with uncertainties, expected to be in the order of ±10% for each data set. Due to different levels of detail in the data, the matching of the categories with the intensities was not 100% identical between the countries, resulting in minor differences in the data.

The resulting energy consumption for different goods and services was aggregated into the following ten categories:

- Food
- Restaurants, alcohol, tobacco
- Hygiene – soap, toilet paper, etc.
- Household services – insurance, childcare, etc.
- Clothing and footwear
- Housing – rent, electricity, mortgage, etc.
- Household effects – furniture, etc.
- Health – pharmaceutical products, etc.
- Transport – fuel and all transport except holiday trips
- Recreation and culture – books, TV-charges, sports equipment, recreational travel, etc.

4 Results

4.1 Energy use among all single households

According to the results, the average single man consumed more energy than the average single woman in all four countries studied. Total annual energy consumption for women was 194 GJ in Germany, 105 GJ in Greece, 295 GJ in Norway and 160 GJ in Sweden. For men the corresponding energy use was 210 GJ in Germany, 146 GJ in Greece, 313 GJ in Norway and 196 GJ in Sweden. Men thus used 8% more energy than women in Germany, 39% more in Greece, 6% more in Norway and 22% more in Sweden. For Greece and Sweden the difference was greater than the uncertainty in the data, while for Germany and Norway it was less.

The higher male energy use can be partly explained by the level of expenditure, which was higher for men than women in single households in all four countries studied here (see also Appendix 1). However, the higher male energy can also be partly explained by differences in consumption patterns, such as differences in food and fuel consumption. The average energy intensity for Swedish women was 10 MJ/€, as opposed to 12 MJ/€ for Swedish men, while for Norwegian women it was 12 MJ/€ and for Norwegian men 13 MJ/€. In Germany the energy intensity for women and men did not differ greatly and was about 12 MJ/€ for both, while in Greece it was higher for women than for men, 12 MJ/€ as opposed to 11 MJ/€. The total energy consumption in the ten different product categories studied is presented in Figure 1.

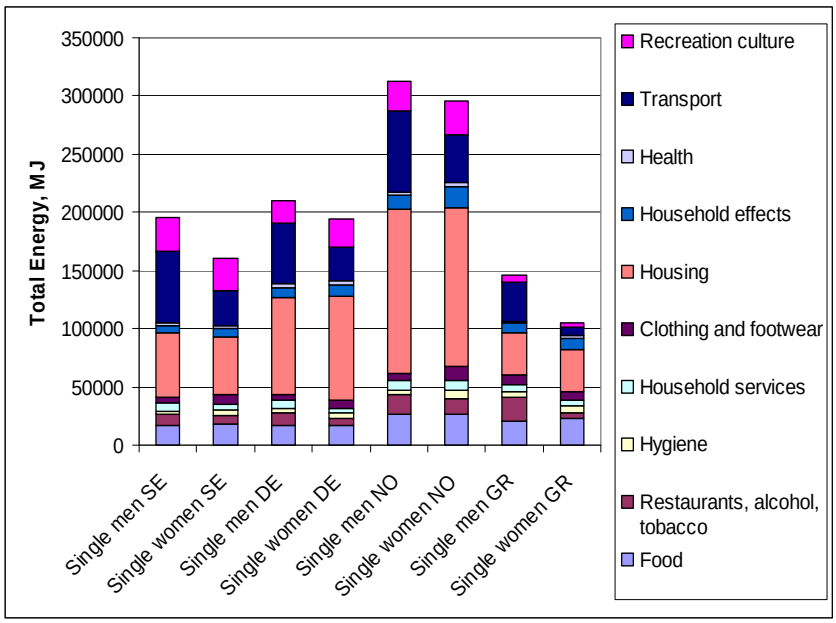

Figure 1. Total energy consumption and consumption in different product categories (MJ) for average single women and men in Sweden (SE), Germany (DE), Norway (NO) and Greece (GR). (Räty and Carlsson-Kanyama, 2009)

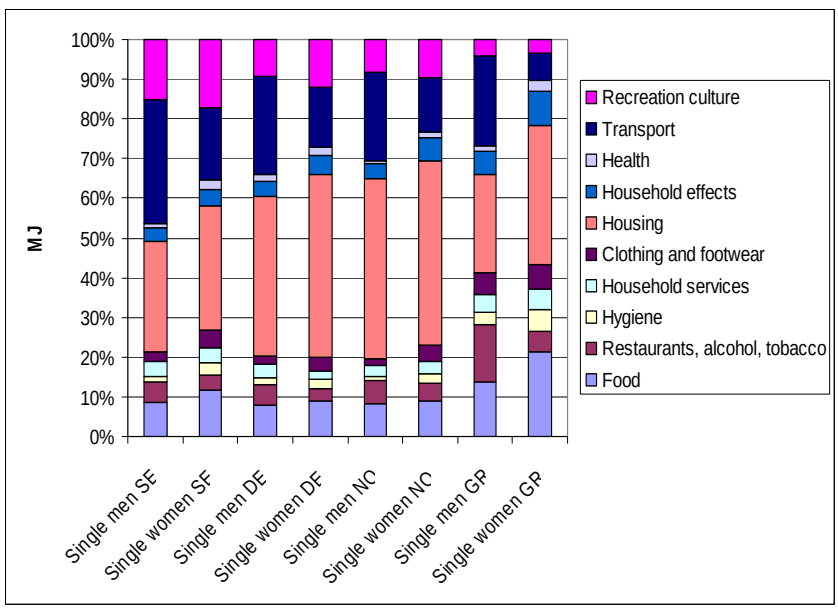

Figure 2. Percentage of total energy consumption in the ten different consumption categories studied for average single women and men in Sweden (SE), Germany (DE), Norway (NO) and Greece (GR)

The four main consumption categories for both men and women were housing, transport, food and recreation & culture (Figure 1), with housing, transport and food constituting 61-76% of total energy consumption in the four countries (Figure 2). The largest *differences* in absolute energy use between single men and women was for transport (Table 2), where the *difference* was 23 000-32 000 MJ (Table 2 and Figure 3). Another consumption category where men consistently used more energy than women was restaurants, alcohol & tobacco, with *differences* from 3 800 to 16 000 MJ. Greek men used more energy on restaurants, alcohol & tobacco (21 000 MJ) than any other type of household.

Women consistently used more energy than men in consumption categories such as food, hygiene, household effects and health. In the food category, men used more energy for meat than women in Germany, Sweden and Norway while the opposite was true for Greece. However women spent more energy than men on items such as fruit and vegetables, resulting in higher total energy consumption for women's food purchases. When it came to items such as medicine, household textiles and furniture, women also used more energy than men.

Table 2.Difference in total energy use for single households (men minus women) in ten different consumption categories for Sweden (SE), Germany (DE), Norway (NO) and Greece (GR)

	SE	**DE**	**NO**	**GR**
Food	-1824	-1 013	-531	-2 567
Restaurants, alcohol & tobacco	3799	5 149	4 978	15 835
Hygiene	-2330	-1 216	-3 898	-1 321
Household services	1536	3 448	-838	1 353
Clothing and footwear	-2557	-2 375	-6 119	1 124
Housing	4888	-4 457	4 759	-572
Household effects	-546	-1 435	-5 449	-309
Health	-1507	-831	-1 750	-1 298
Transport	32 276	22 656	28 872	25 863
Recreation & culture	1978	-3 736	-2 146	2 487

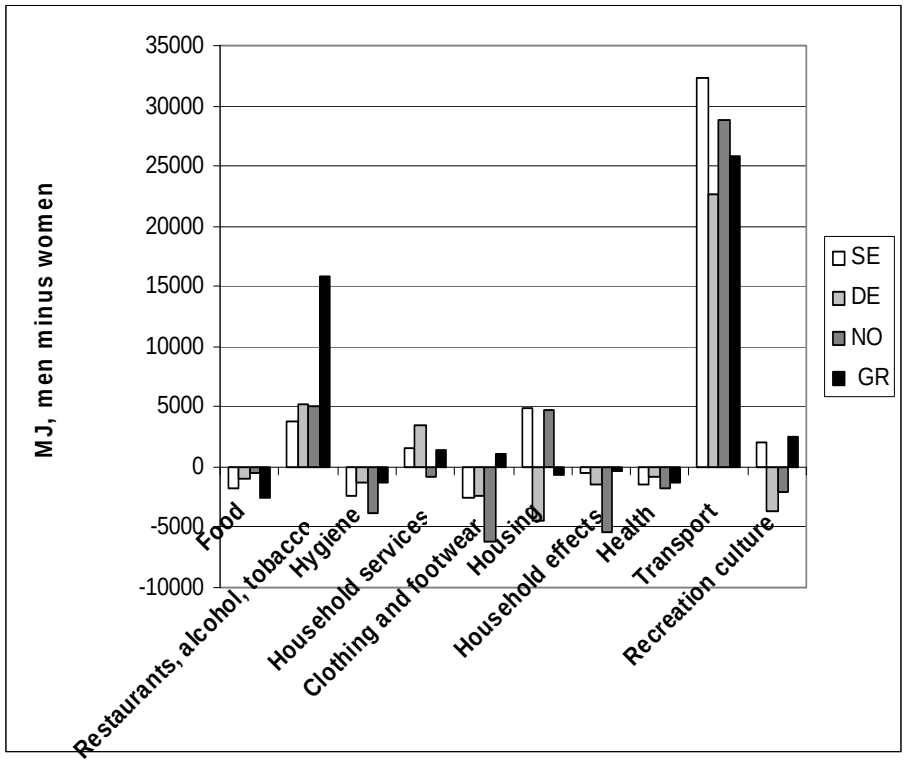

Figure 3. Differences between men's and women's energy use (men minus women) in ten consumption categories for Sweden (SE), Germany (DE), Norway (NO) and Greece (GR). (Räty and Carlsson-Kanyama, 2009)

Since energy use for transport differed substantially between women and men in all four countries studied, this aspect is discussed in more detail below (see also Figure 4). German men consumed 25% of their total energy use on transport, Greek men 23%, Norwegian men 22% and Swedish men 31%. In contrast, German women spent 18% of their total energy use on transport, Greek women only 7%, Norwegian women 14% and Swedish women 18%. The percentage difference in absolute numbers was also striking in that men consumed 70-80% more energy on transport than women in Germany and Norway, 100% more in Sweden and 350% more in Greece. The largest contribution to the transport category was operating costs for cars, which included fuel, repairs, spare parts, etc. The gender difference was largely due to the average single man spending more money on vehicles and fuel than the average single woman. Men also spent more money on buying cars and other vehicles than women, resulting in higher indirect energy use for men.

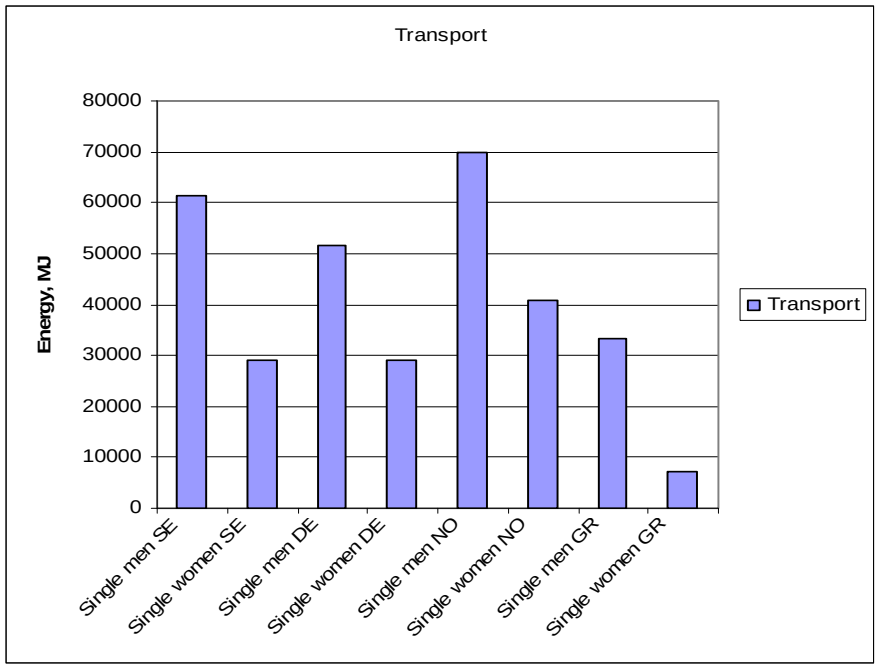

Figure 4. Average amount of energy (MJ) consumed in transport by single women and men in Sweden (SE), Germany (DE), Norway (NO) and Greece (GR).

4.2 Energy use among singles with children in Germany and Sweden

Singles with children used more energy than singles without children (308 GJ for men and 277 GJ for women in Germany, 259 GJ for men and 240 GJ for women in Sweden). In Sweden the difference between men and women decreased when they had dependent children, mostly due to single Swedish women with children increasing their energy use for transport. In Germany, on the other hand, the difference between men and women with children increased when they had dependent children, mostly because German single men with children increased their energy use on transport considerably (+75%) compared with German single men without children. However, in terms of energy use per person or consumption unit[4] the energy use was lower for the singles with children than for the singles without.

[4] A consumption unit is the size of the household-dwelling unit as the sum of the weights of its members. In this the first adult is counted as 1, subsequent adults as 0.7 and children as 0.5 consumption units.

4.3 Energy use according to age for singles without children in Germany and Sweden

A comparison of the energy consumption for different age groups showed that the youngest singles (born after 1979) used the least energy – about half the energy used by the average single man or woman. The youngest age group also had the lowest income and expenditure. In Germany, women and men used similar amounts of energy in all age groups except the oldest (incorporating those born before 1945), where men used about 20% more energy than women. In Sweden, men used about 20% more energy than women in all age groups, mostly due to their higher energy consumption for transport, as mentioned before.

There were some significant differences in how energy use was partitioned across categories between age groups, the most important being that the proportion of energy consumed in housing increased with age. It is interesting to note that the differences between men and women in energy use for transportation were present even in the youngest age group, i.e. those born after 1979. These differences were more pronounced in Sweden (Figure 5) than in Germany (Figure 6).

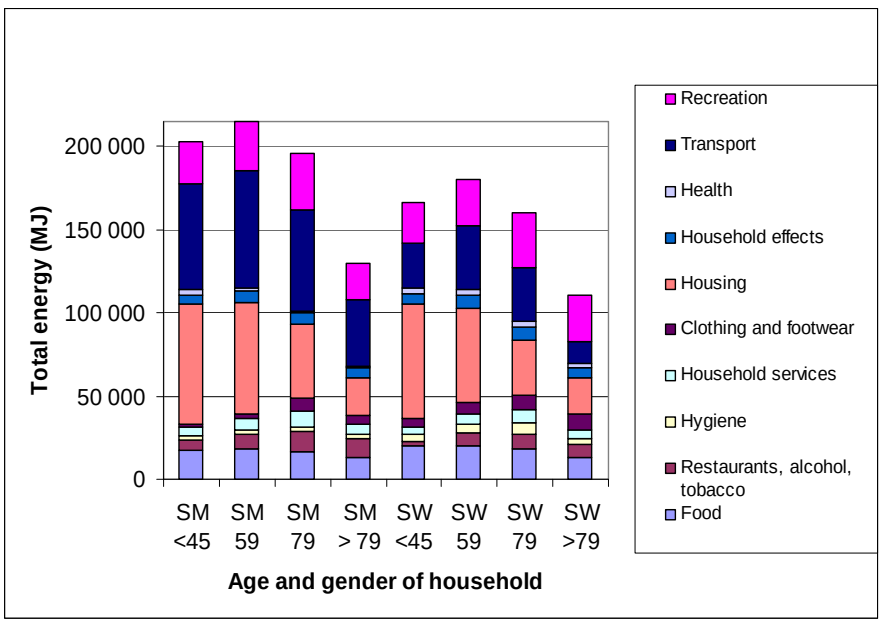

Figure 5. Total energy consumption (MJ) for average single women (SW) and men (SM) of different ages in Sweden (SE). The age groups are: <45 = born before 1945, 59 = born between 1945 -1959, 79 = born between 1960 -1979, >79 = born after 1979.

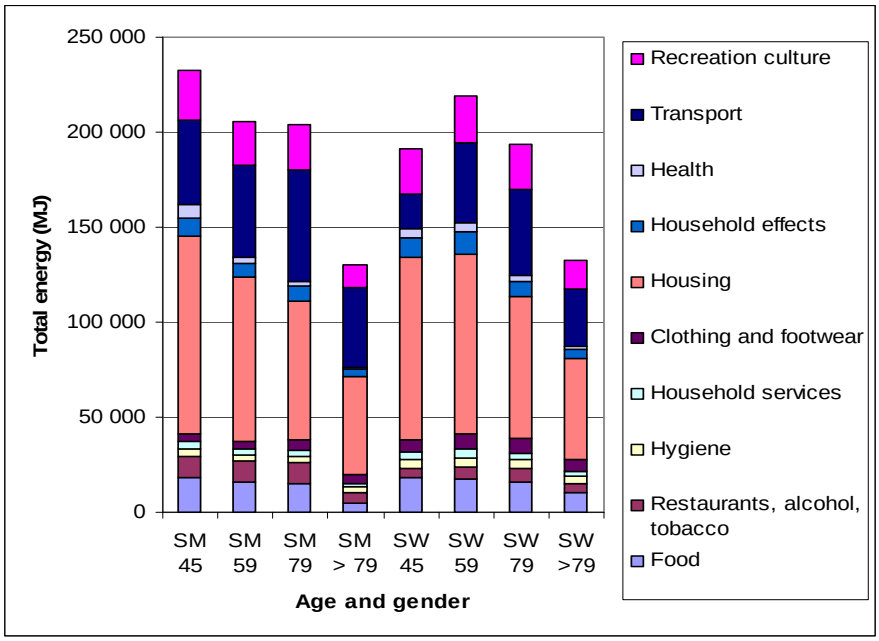

Figure 6. Total energy consumption (MJ) for average single women (SW) and men (SM) of different ages in Germany (DE). The age groups are: <45 = born before 1945, 59 = born between 1945 - 1959, 79 = born between 1960 - 1979, >79 = born after 1979.

4.4 Energy use according to income for singles without children in Germany and Sweden

Energy consumption increased more or less linearly with income, confirming previous findings on average households (Herendeen & Tanaka, 1976; Herendeen, 1978; Pachauri & Spreng, 2002; Reinders et al., 2003). However, the energy intensity remained more or less constant (Table 3). The amount of energy used for food remained relatively constant with income, whereas the energy use for housing, transport and recreation increased in absolute terms. For the German singles, the differences between men and women were small (~5%) in most income groups, and in one income group (Inc 2) women even used more energy than men (Figure 7). In Sweden, single men used 5-15% more energy on average than women in all income groups (Figure 8).

The share of indirect energy use increased with income in Germany, from 47% of the total for men and women in the lowest income group to 55% for men and 58% for women in the highest income category. No such trend could be discerned in the Swedish data, although here the share of indirect energy consumption was highest among those with the lowest income.

Table 3. Energy intensity (MJ/Euro) for single men and women depending on income in Germany (DE) and Sweden (SE) Inc 1 = <10 300 Euro/year, Inc 2 = 10 301-14 400 Euro/year, Inc 3 = 14 401-18 500 Euro/year, Inc 4 = 18 501-22 500 Euro/year and Inc 5 >22 500 Euro/year)

Energy intensity	Inc 1	Inc 2	Inc 3	Inc 4	Inc 5
Single men, DE	12.9	12.2	12.7	12.2	12.1
Single women, DE	13.0	12.7	12.4	12.2	11.8
Single men, SE	7.5	6.8	6.9	7.1	7.8
Single women, SE	7.8	6.9	7.2	7.2	7.3

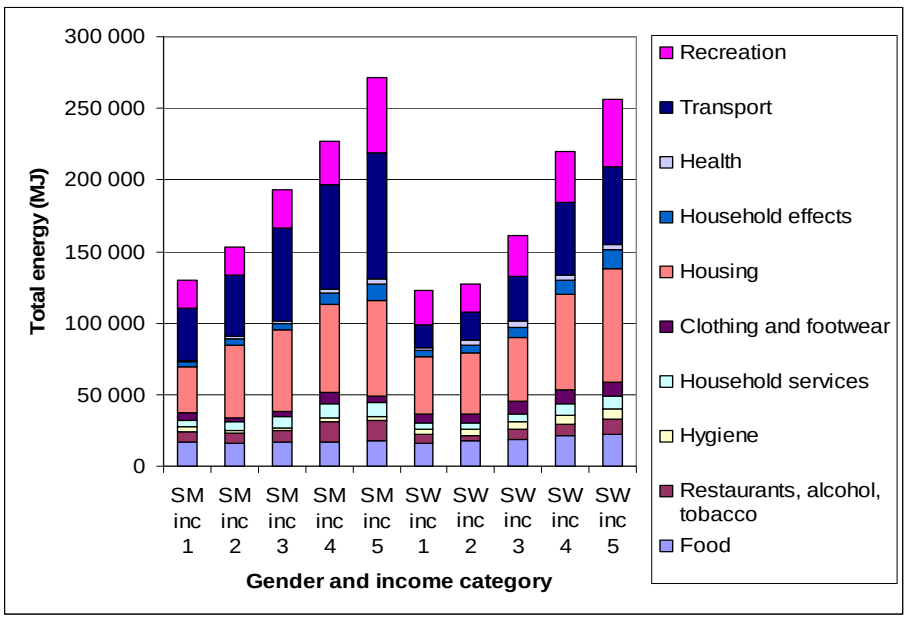

Figure 7. Total energy consumption (MJ) for average single women (SW) and men (SM) in different income groups in Germany. For key to income groups Inc 1-5, see Table 3.

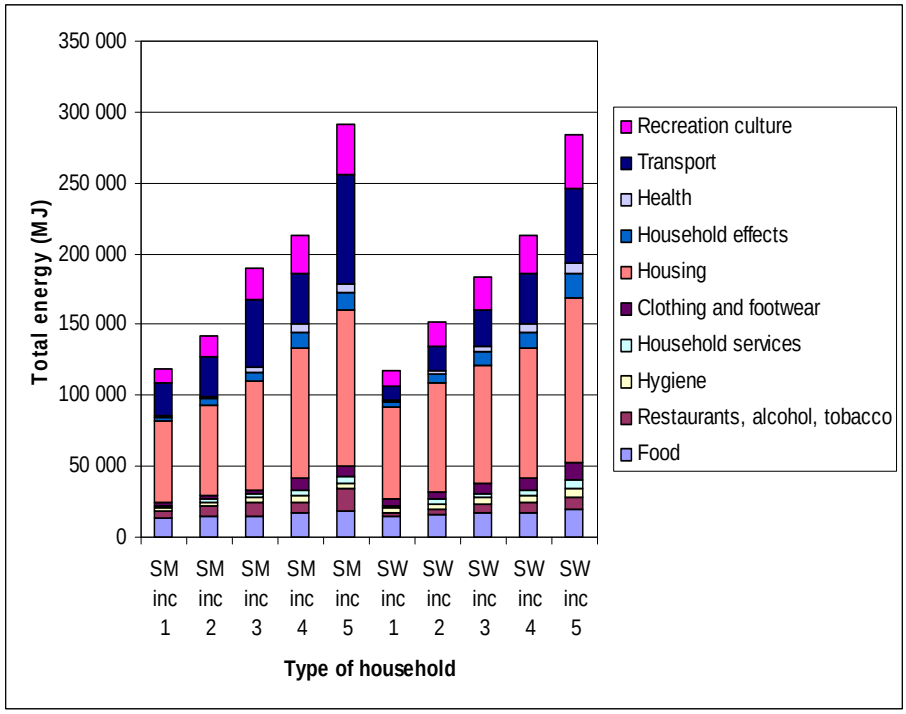

Figure 8. Total energy consumption (MJ) for average single women (SW) and men (SM) in different income groups in Germany. For key to income groups Inc 1-5, see Table 3.

1.1.1. CO_2 emissions for single households in Sweden

The CO_2 emissions for Swedish single households were calculated using EAP (Figure 9). The total annual CO_2 emissions caused by household consumption were estimated at 10 700 kg for the average single man and 8 500 kg CO_2 for the average single woman. I.e. about 0.06 kg CO_2/SEK for men and 0.05 kg CO_2/SEK for women. For CO_2 emissions the categories food, housing, transport and recreation were even more dominant than for energy use. Food, housing and transport contributed about 75% of total CO_2 emissions.

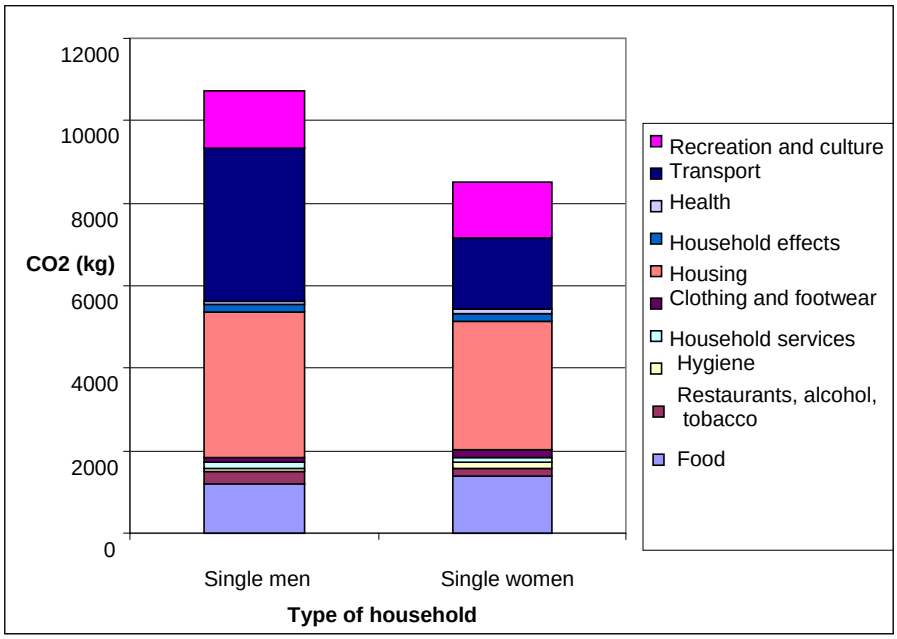

Figure 9. Total CO2 emissions (kg) from average single households in Sweden.

For single men and single women in Sweden, there was a consistent tendency for the CO_2 intensity ($kgCO_2$/Euro) to increase with age (Table 4).

Table 4. Change in CO2 intensity (kgCO2/Euro) with age for Swedish single men and women

	Single men	Single women
Born >79	0.053	0.040
1960-79	0.056	0.045
1940-59	0.069	0.056
Born <45	0.074	0.064

The CO_2 intensity also increased with income (Table 5). This was mainly attributable to the recreation category increasing with income, but an increase also occurred for housing and food. In these categories, more CO_2-intense products were evidently purchased with higher income.

Table 5. Change in CO2 intensity (kgCO2/Euro) with income for Swedish single men and women. For key to income groups Inc 1-5, see Table 3

CO_2 intensity	Inc 1	Inc 2	Inc 3	Inc 4	Inc 5
Single men	0.054	0.062	0.067	0.065	0.062
Single women	0.054	0.052	0.052	0.055	0.060

5 Discussion

5.1 Reliability of the results

In this investigation we used energy intensities and CO_2 emission intensities calculated mainly from Swedish data, meaning that the conditions assumed concerning energy use for production, retailing, transportation[5] and recycling were relevant for Sweden. Assumptions about the energy mix were also based on Swedish data, i.e. a high proportion of hydro- and nuclear power for electricity generation and a high proportion of bio-fuels for heating purposes. In reality, however, products are produced all over the world and electricity generation differs between countries, as does the fuel mix for generation of heat. It would therefore be desirable to develop intensities relevant for a number of countries for further calculations of household energy use in order to portray emissions and resource use in a more accurate way for different nations. In fact previous studies show that when Swedish per capita emissions of CO_2 are calculated based on emissions data from Sweden's trading partners, levels of 12 tonnes of carbon dioxide per year are obtained, as opposed to 6 tonnes when only national data are used (Carlsson-Kanyama et al., 2007). Developing a tool by which the energy intensity of any item can be calculated, irrespective of country of origin, is a tremendous task. In addition, the expenditure data for households have to be improved in order to increase the accuracy of calculations for different types of households. No information about country of origin is recorded at present when these data are being collected by the various national statistical agencies.

In spite of these shortcomings in our present calculations, we believe that the Swedish data are sufficiently accurate as an approximation of gender differences in energy use in certain countries. As can be seen from the results, in two cases (Sweden and Greece) the differences in total energy use were larger than the estimated uncertainties, while in the other two cases (Germany and Norway) they were smaller. Further calculations can quite easily be carried out to establish whether the gender differences found here are replicated for households in other countries. For transportation, the consumption category with the largest gender differences, the calculations are also fairly robust and more reliable than for other consumption categories. The energy intensity (MJ/Euro) of fuel, such as petrol, is well known and does not differ greatly between countries. Fuel is one of the main items purchased in the transportation category.

[5] We used energy intensities (MJ/tonkm) relevant for Swedish vehicles but transportation distances (km) were assumed to be international whenever warranted.

5.2 Is there a significant gender component in household energy use?

All the results in our study showed that men used more energy than women. Single male households in Germany, Greece, Norway and Sweden consumed 6-38% more total energy than the average single woman in the respective countries. Differences in expenditure levels were negligible in Norway and 7-8% in Germany and Sweden, while they were large (47%) in Greece. The differences in energy use were larger than the differences in expenditure levels in three of the four countries, implying that in some countries there seems to be a gender component in total energy use that is independent of expenditure level. Further analyses that include other background variables commonly recorded in household budget surveys, such as age, education and geographical location (urban versus rural living), could shed further light upon the role of gender as a determinant of total energy use.

The differences in energy use for transportation (including purchases of vehicles, spare parts, repairs and fuel) were too large to be statistically non-significant in all four countries. In this category, men used from 70% more energy than women (Norway) up to 350% more (Greece). Differences in energy use for restaurants, alcohol & tobacco were also large, with men using over 30% more energy than women in all four countries. There were differences in energy use between men and women in other consumption categories too, but none of these were of comparable magnitude to the differences in the energy use from transportation and restaurants, alcohol & tobacco.

5.3 Suggestions for policy implications

The EU has committed itself to cutting its greenhouse gas emissions by 30% of the 1990 levels by 2020, provided that other developed countries commit to making comparable reductions under a global agreement. EU leaders are in the process of transforming Europe into a highly energy-efficient, low-carbon economy and have e.g. set a target of a 20% reduction in energy consumption to be met by 2020 (European Commission, 2009a). The EU also has far-reaching goals for equality between women and men, with efforts to integrate equality between women and men into all EU policies and activities (European Commission, 2009b). Against this background, our results are highly relevant for EU policy:

Current European analyses of per capita energy use and greenhouse gas emissions ignore gender aspects (see e.g. European Environment Agency, 2009). Separate statistics for women’s and men’s energy consumption and greenhouse gas emissions could be compiled using existing data on household expenditure and data on energy and emission intensities. This would reveal differences

between women and men and contribute to integrating equality between women and men into all EU activities.

The substantial differences in energy use for transport between women and men in all four countries studied highlight the importance of continued gender mainstreaming in the transport sector (e.g. Oldrup & Romer Christensen, 2007). Transport energy use and emissions mainly relate to men's travel patterns, a fact that may be of use when devising for energy efficiency policies using information campaigns, legislation or economic policy instruments. Important issues include how men will react to e.g. information about fuel-efficient driving or legislation about lower speed limits to lower emissions of greenhouse gases. The results presented here concerning transport energy showed that gender differences were substantial even in the younger generation, and this means that they will not disappear quickly.

Future policy proposals for energy efficiency in the restaurant, tobacco and alcohol sector must take account of gender differences, since this study showed that men used considerably more energy than women for such purposes in all four countries. However, there is little or no energy policy for the restaurant sector, gender-aware or otherwise.

Single households are a common household type in many European countries (about 37% of households in Germany, 20% in Greece, 17% in Norway and 47% in Sweden It is thus important to analyse the potential of such households to lower energy use and greenhouse gas emissions, and in such analyses the gender component is central.

6 References

Alfredsson, E. 2002. Green consumption energy use and carbon dioxide emissions. The Spatial Modelling Centre (SMC), Department of Social and Economic Geography, Umeå University, Umeå

Baker, A.H. & Wardle, J. 2003. Sex differences in fruit and vegetable intake in older adults. Appetite 40(3), 269-275.

Benders, R.M.J., Wilting, H.C., Kramer, K.J. & Moll, H.C. 2001. Description and application of the EAP computer program for calculating life cycle energy use and greenhouse gas emissions of household consumption items. International Journal of Environment and Pollution 15, 171-182.

Bihagen, E. & Katz-Gerro, T. 2000. Culture consumption in Sweden: The stability of gender differences. Poetics 27(5-6), 327-349.

Biloukha, O.O. & Utermohlen, V. 2000. Correlates of food consumption and perceptions of foods in an educated urban population in Ukraine. Food Quality and Preference 11, 475-485.

Carlsson-Kanyama, A. & Lindén, A-L. 1999. Travel patterns and environmental effects now and in the future: Implications of differences in energy consumption among socio-economic groups. Ecological Economics 30(3), 405-417.

Carlsson-Kanyama, A., Pipping Ekström, M. & Shanahan, H. 2003. Food and life cycle energy inputs: Consequences of diet and ways to increase efficiency. Ecological Economics 44, 293-307.

Carlsson-Kanyama, A., Engström, R. & Kok, R. 2005. Indirect and direct energy requirements of city households in Sweden - options for reduction, lessons from modelling. International Journal of Industrial Ecology 9 (1-2), 221-235.

Carlsson-Kanyama, A., Asefa, G., Peters, G. & Wadeskog, A. 2007. Koldioxidutsläpp till följd av Sveriges import och konsumtion: beräkningar med olika metoder. TRITA-IM: 2007:11, KTH, Stockholm.

Carlsson-Kanyama, A. & Räty, R. 2008. Kvinnor, män och energi; makt produktion och användning. FOI report FOI-R- 2513-SE.

Carlsson-Kanyama, A. & Gonzales, A. 2009. Potential contributions of food consumption patterns to climate change. The American Journal of Clinical Nutrition 89 (5), 1704-1709.

Cline, A.D., Allen, H.R., Patrick, K. & Hunt, A.E. 1998. Gender differences in food preferences of young men and women in the armed forces. Journal of Dietetic Association 98(9), A104.

Cohen, C., Lenzen, M. & Roberto Schaeffer, R. 2003. Energy requirements of households in Brazil. Energy Policy 33, 555-562.

Druckman, A. & Jackson, T. 2009. The carbon footprint of UK households 1990-2004: A socio-economically disaggregated, quasi-multi-regional input-output model. Ecological Economics. In press.

Elmståhl, S., Holmqvist, O., Gullberg, B., Johansson, U. & Berglund, G. 1999. Dietary patterns in high and low consumers of meat in a Swedish cohort study. Appetite 32, 191-206.

European Commission. 2009a. Information from http://ec.europa.eu/environment/climat/home_en.htm in June 2009.

European Commission. 2009b. Information from http://ec.europa.eu/social/main.jsp?catId=421&langId=en in June 2009

Euro stat data on household characteristics extracted 2008-10-30 from http://epp.eurostat.ec.europa.eu

European Environment Agency. 2009.

Fraser, G.E., Welch, A., Luben, R., Bingham, S.A & Day, N.E. 2000. The effect of age, sex, and education on food consumption of a middle-aged English cohort—EPIC in East Anglia. Preventive Medicine 30 (1), 26-34.

Gender cc. 2009. Gender, climate change and transportation. Available at http://www.gendercc.net/action/transport.html in June 2009.

Greene-Finestone, I.S., Campbell, K.M., Gutmanis, I.A. & Evers, S.E. 2005. Dietary intake among young adolescents in Ontario: Associations with vegetarian status and attitude toward health. Preventive Medicine 40 (1), 105-111.

Herendeen, R. & Tanaka, J. 1976. Energy cost of living. Energy 1 (2), 165-178.

Herendeen, R. 1978. Total energy cost of household consumption in Norway, 1973. Energy 3 (5), 615-630.

Johnsson-Latham, G. 2007. A study on gender equality as a prerequisite for sustainable development. Report to the Environment Advisory Council, Sweden 2007:2.

Kerkhof, A.C., Nonhebel, S. & Moll, H.C. 2008. Relating the environmental impact of consumption to household expenditures: An input-output analysis. Ecological Economics 68 (4), 1160-1170.

Kerkhof, A.C., Benders, R.M.J. & Moll, H.C. 2009. Determinants of variation in household CO2 emissions between and within countries. Energy Policy 37, 1509-1517.

Lenzen, M. 1998. Energy and greenhouse gas cost of living for Australia during 1993/94. Energy 23 (6), 497-516.

Lenzen, M., Wier, M., Cohen, C., Hayami, H., Pachauri, S. & Schaeffer, R. 2006. A comparative multivariate analysis of household energy requirements in Australia, Brazil, Denmark, India and Japan. Energy 31, 181-207.

Liebman, M., Propst, K., Moore, A.S., Pelican, S., Holmes, B., Wardlaw, M.K., Melcher, L.M., Harker, J.C., Dennee, P.M. & Dunnagan, T. 2003. Gender differences in selected dietary intakes and eating behaviours in rural communities in Wyoming, Montana, and Idaho. Nutrition Research 23 (8), 991-1002.

Lizardo, O. 2006. The puzzle of women's “highbrow” culture consumption: Integrating gender and work into Bourdieu's class theory of taste. Poetics 34(1) 1-23.

McGuckin, N. & Murakami, E. 2007. Examining trip-chaining behaviour: Comparison of travel by men and women. Transportation research record. Journal of the Transportation Research Board 1693, 79-85.

Moon, W., Florkowski, W.J., Beuchat, L.R., Resurreccion, A.V.A., Paraskova, P., Jordanov, J. & Chinnan, M.S. 2002. Food intake patterns of the unemployed and pensioners in Bulgaria Journal of Policy Modelling 24 (7-8), 621-637.

National Board of Housing Sweden and Ministry for Regional Development of the Czech Republic. 2005. Housing statistics in the European Union 2004. Karlskrona.

National Statistical Service of Greece. 2009. Data obtained from the Population and Labour Market Statistics Division, Helena Katsorche.

Oldrup, H. & Romer Christensen, H. 2007. Gender mainstreaming European transport research and policies. Building the knowledge base and mapping good practices. University of Copenhagen, Co-ordination for Gender Studies. Available at www.sociology.ku.dk/koordinationen/transgenin in June 2009.

Pachauri, S. & Spreng, D. 2002. Direct and indirect energy requirements of households in India. Energy Policy 30 (6), 511-523.

Park, H.C. & Heo, E. 2007. The direct and indirect household energy requirements in the Republic of Korea from 1980-2000. An input-output analysis. Energy Policy 35, 2839-2851.

Räty, R. & Carlsson-Kanyama, A. 2007. Energi och koldioxidintensiteter för 319 varor och tjänster. FOI report FOI-R-2225-SE.

Räty, R. and Carlsson-Kanyama, A. 2009. Energy consumption by gender in some European countries. Energy Policy, available online August 29, 2009.

Reinders, A.H.M.E., Vringer, K. & Blok, K. 2003. The direct and indirect energy requirement of households in the European Union. Energy Policy 31 (2):139-153.

Siega-Riz, A-M., Popkin B.M. & Carson, T. 2000. Differences in food patterns at breakfast by sociodemographic characteristics among a nationally representative sample of adults in the United States. Preventive Medicine 30(5), 415-424.

Statistics Norway. 2009, Data from http://www.ssb.no/familie_en/ in June 2009

Statistics Sweden (SCB). 2006. Household budget survey (HBS) 2003-2005. HE 35 SM 0602.

Statistisches Bundesamt. 2005. Wirtschaftsrechnungen, Einkommens- und Verbrauchstichprobe – Aufgabe, Methode und Durchfürung der EVS, Fachserie 15/Heft 7, 2005.

Storey, M.L., Forshee, R.A. & Andersson, P.A. 2006. Beverage consumption in the US population. Journal of the American Dietetic Association 106, 1992-2000.

Turner J., Hamilton K. & Spitzner M. 2006. Women and transport study. European Parliament, Policy Department Structural and Cohesion Policies, Transport and Tourism, IP/BTRAN/ST/2005_008.

Vringer, K. & Blok, K. 1995. The direct and indirect energy requirements of households in the Netherlands. Energy Policy 23 (10), 893-910.

Wachs, M. 1987. Men, women, and wheels: The historical basis of sex differences in travel patterns. Transportation Research Record. No 1135. Working Women and the Aging: Impact on Travel Patterns and Transportation Systems.

Weber, C. & Perrels, A. 2000. Modelling lifestyle effects on energy demand and related emissions. Energy Policy 28, 549-556.

7 Appendix –Tables summarising the results

Energy consumption of German average single men and women

	Expenditure (Euro)		Total energy (MJ)		Distribution		Indirect energy (MJ)		Distribution	
	Single men	Single women	Single men	Single women	Single men	Single women	Single men	Single women	Single men	Single women
Food	121	131	16 483	17 496	8%	9%	16 483	17 496	15%	17%
Restaurants, alcohol, tobacco	120	65	11 071	5 922	5%	3%	11 071	5 922	10%	6%
Hygiene	22	31	3 331	4 547	2%	2%	3 331	4 547	3%	4%
Household services	41	49	7 282	3 834	3%	2%	7 282	3 834	7%	4%
Clothing and footwear	48	70	4 738	7 113	2%	4%	4 738	7 113	4%	7%
Housing	485	493	84 208	88 665	40%	46%	16 605	16 801	15%	16%
Household effects	73	85	8 086	9 521	4%	5%	8 086	9 521	7%	9%
Health	26	33	3 459	4 290	2%	2%	3 459	4 290	3%	4%
Transport	204	119	51 711	29 055	25%	15%	20 844	11 841	19%	11%
Recreation culture	240	215	19 662	23 397	9%	12%	19 662	23 397	18%	22%

Energy consumption of Greek average single men and women

	Expenditure (Euro)		Total energy (MJ)		Distribution	
	Single men	Single women	Single men	Single women	Single men	Single women
Food	2 211	2 258	26 240	26 772	8%	9%
Restaurants, alcohol, tobacco	2 386	1 714	17 504	12 526	6%	4%
Hygiene	283	632	3 381	7 279	1%	2%
Household services	1 554	1 823	8 424	9 262	3%	3%
Clothing and footwear	655	1 370	5 581	11 700	2%	4%
Housing	8 291	8 223	141 686	136 927	45%	46%
Household effects	1 298	1 802	12 252	17 701	4%	6%
Health	624	789	1 965	3 716	1%	1%
Transport	4 657	3 279	69 758	40 886	22%	14%
Recreation culture	3 062	2 989	26 196	28 342	8%	10%

Energy consumption of Norwegian average single men and women

	Expenditure (Euro)		Total energy (MJ)		Distribution	
	Single men	Single women	Single men	Single women	Single men	Single women
Food	1 671	1 880	20 022	22 590	14%	21%
Restaurants, alcohol, tobacco	2 722	723	21 088	5 253	14%	5%
Hygiene	376	491	4 440	5 761	3%	5%
Household services	1 189	887	6 750	5 397	5%	5%
Clothing and footwear	960	795	7 874	6 750	5%	6%
Housing	2 121	1 581	36 301	36 873	25%	35%
Household effects	964	926	8 540	8 849	6%	8%
Health	909	935	1 636	2 934	1%	3%
Transport	1 726	492	33 193	7 330	23%	7%
Recreation culture	789	403	6 136	3 650	4%	3%

Energy consumption of Swedish average single men and women

	Expenditure (SEK)		Total energy (MJ)		Distribution		Indirect energy (MJ)		Distribution	
	Single men	Single women	Single men	Single women	M	W	Single men	Single women	M	W
Food	15712	17313	16729	18552	9%	12%	16729	18552	14%	16%
Restaurants, alcohol, tobacco	14393	9140	10065	6267	5%	4%	10065	6267	8%	6%
Hygiene	2120	4137	2526	4856	1%	3%	2526	4856	2%	4%
Household services	15334	13611	7429	5894	4%	4%	7429	5894	6%	5%
Clothing and footwear	6093	9360	4753	7310	2%	5%	4753	7310	4%	6%
Housing	45042	45710	54837	49949	28%	31%	12617	12910	10%	11%
Household effects	7706	8352	6326	6872	3%	4%	6326	6872	5%	6%
Health	1705	4448	1982	3489	1%	2%	1982	3489	2%	3%
Transport	28260	15213	61343	29067	31%	18%	33502	22645	27%	20%
Recreation culture	31553	28062	29705	27726	15%	17%	27420	24872	22%	22%

Energy consumption of German average single men and women with dependent children

	Expenditure (SEK)		Total energy (MJ)		Distribution		Indirect energy (MJ)		Distribution	
	Single men w ch.	Single women w ch.	Single men w ch.	Single women w ch.	M	W	Single men w ch.	Single women w ch.	M	W
Food	159	205	21 208	28 128	10%	15%	21 208	28 128	19%	27%
Restaurants, alcohol, tobacco	71	77	7 522	6 744	4%	3%	7 522	6 744	7%	6%
Hygiene	38	44	5 704	6 553	3%	3%	5 704	6 553	5%	6%
Household services	56	76	4 132	5 839	2%	3%	4 132	5 839	4%	6%
Clothing and footwear	86	111	8 810	11 358	4%	6%	8 810	11 358	8%	11%
Housing	666	612	128 105	121 461	61%	63%	22 088	19 987	20%	19%
Household effects	80	104	9 258	11 738	4%	6%	9 258	11 738	8%	11%
Health	32	24	4 288	3 311	2%	2%	4 288	3 311	4%	3%
Transport	378	192	90 184	52 522	43%	27%	39 488	17 547	35%	17%
Recreation culture	306	296	28 712	29 645	14%	15%	28 712	29 645	26%	28%

Energy consumption of Swedish average single men and women with dependent children

	Expenditure (SEK)		Total energy (MJ)		Distribution		Indirect energy (MJ)		Distribution	
	Single men w ch.	Single women w ch.	Single men w ch.	Single women w ch.	M	W	Single men w ch.	Single women w ch.	M	W
Food	25573	28925	28211	31185	14%	19%	28211	31185	23%	27%
Restaurants, alcohol, tobacco	12623	9991	8976	6515	5%	4%	8976	6515	7%	6%
Hygiene	3019	6201	3856	7717	2%	5%	3856	7717	3%	7%
Household services	21817	25339	10825	11504	6%	7%	10825	11504	9%	10%
Clothing and footwear	7807	14813	6112	11640	3%	7%	6112	11640	5%	10%
Housing	64688	66945	87555	75612	45%	47%	18120	19168	15%	17%
Household effects	14257	11010	11291	9073	6%	6%	11291	9073	9%	8%
Health	1425	4880	1359	3850	1%	2%	1359	3850	1%	3%
Transport	32359	23214	73226	48151	37%	30%	28999	29073	24%	26%
Recreation culture	33571	38230	27573	34288	14%	21%	26492	32754	21%	29%

Energy consumption of German average single men and women in different age groups

Total energy (MJ)	SM <45	SM 59	SM 79	SM >79	SW <45	SW 59	SW 79	SW >79
Food	18 013	15 902	15 447	4 989	17 969	17 481	15 667	10 206
Restaurants, alcohol, tobacco	11 534	11 213	10 940	5 553	5 271	6 251	6 966	4 515
Hygiene	3 404	3 429	3 270	3 015	4 300	5 158	4 834	4 109
Household services	4 126	2 469	2 899	1 693	3 972	4 087	3 653	2 227
Clothing and footwear	4 357	4 443	5 154	4 293	6 470	8 268	8 007	6 557
Housing	103 639	86 472	73 713	52 240	96 413	94 795	74 141	53 719
Household effects	10 061	6 956	7 823	3 638	9 716	11 970	8 108	4 355
Health	6 677	3 032	1 848	470	5 053	4 714	2 872	1 345
Transport	44 541	48 646	59 195	42 127	18 486	41 712	45 495	30 290
Recreation	26 189	22 999	23 580	12 513	23 681	24 627	23 896	15 254

Indirect energy (MJ)	SM <45	SM 59	SM 79	SM >79	SW <45	SW 59	SW 79	SW >79
Food	18 013	15 902	15 447	4 989	17 969	17 481	15 667	10 206
Restaurants, alcohol, tobacco	11 534	11 213	10 940	5 553	5 271	6 251	6 966	4 515
Hygiene	3 404	3 429	3 270	3 015	4 300	5 158	4 834	4 109
Household services	4 126	2 469	2 899	1 693	3 972	4 087	3 653	2 227
Clothing and footwear	4 357	4 443	5 154	4 293	6 470	8 268	8 007	6 557
Housing	20 577	17 073	14 595	9 022	18 304	17 759	14 345	9 423
Household effects	10 061	6 956	7 823	3 638	9 716	11 970	8 108	4 355
Health	6 677	3 032	1 848	470	5 053	4 714	2 872	1 345
Transport	20 726	17 994	23 452	10 723	9 130	17 226	15 692	7 388
Recreation	26 189	22 999	23 580	12 513	23 681	24 627	23 896	15 254

Energy consumption of Swedish average single men and women in different age groups

Total energy (MJ)	SM <45	SM 59	SM 79	SM >79	SW <45	SW 59	SW 79	SW >79
Food	17 646	18 045	16 165	13 367	19 710	20 424	18 228	12 873
Restaurants, alcohol, tobacco	6 181	9 124	12 920	10 629	3 251	7 186	9 005	7 702
Hygiene	2 105	2 577	2 632	2 956	3 701	5 532	6 395	3 942
Household services	5 554	6 851	9 421	5 710	4 564	6 199	7 953	5 108

Clothing and footwear	1 893	2 549	7 649	6 065	5 570	7 088	8 614	9 933
Housing	71 676	67 445	44 726	21 933	68 113	56 211	33 234	21 695
Household effects	5 708	6 153	6 756	6 564	6 155	7 556	7 957	5 611
Health	3 411	2 487	1 073	840	3 801	3 439	3 498	2 718
Transport	63 313	69 832	60 147	39 509	26 980	38 412	32 090	13 180
Recreation	25 247	30 199	34 089	22 129	24 157	27 755	32 877	27 665

Indirect energy (MJ)	SM <45	SM 59	SM 79	SM >79	SW <45	SW 59	SW 79	SW >79
Food	17646	18045	16165	13367	19710	20424	18228	12873
Restaurants, alcohol, tobacco	6181	9124	12920	10629	3251	7186	9005	7702
Hygiene	2105	2577	2632	2956	3701	5532	6395	3942
Household services	5554	6851	9421	5710	4564	6199	7953	5108
Clothing and footwear	1893	2549	7649	6065	5570	7088	8614	9933
Housing	12426	13731	13046	8576	13757	14279	12346	9364
Household effects	5708	6153	6756	6564	6155	7556	7957	5611
Health	3411	2487	1073	840	3801	3439	3498	2718
Transport	30728	36778	35532	23779	16481	27701	29208	18388
Recreation	21122	26785	33087	22129	18592	25235	32091	27665

Energy consumption of German average single men and women with different income

Total energy (MJ)	SM inc 1	SM inc 2	SM inc 3	SM inc 4	SM inc 5	SW inc 1	SW inc 2	SW inc 3	SW inc 4	SW inc 5
Food	12 873	14 307	14 585	17 463	18 373	14 413	15 836	17 095	17 463	19 502
Restaurants, alcohol, tobacco	5 431	7 167	9 894	6 787	15 891	3 011	4 125	5 945	6 787	8 968
Hygiene	2 468	2 717	3 303	4 834	3 995	3 198	3 767	4 543	4 834	6 114
Household services	1 490	2 365	2 369	4 143	4 648	1 901	2 725	3 082	4 143	6 117
Clothing and footwear	2 511	3 252	3 350	8 076	6 814	3 852	4 824	6 738	8 076	11 397
Housing	57 533	63 760	77 181	92 338	110 222	65 354	77 808	84 308	92 338	117 380
Household effects	2 483	4 251	6 151	11 174	12 632	3 603	5 659	9 012	11 174	16 513
Health	1 040	1 634	2 865	5 147	5 798	1 757	2 942	3 726	5 147	7 410
Transport	23 584	28 302	48 442	36 517	77 319	9 972	17 193	26 166	36 517	52 380
Recreation culture	8 953	14 040	21 085	26 300	35 514	10 315	16 750	22 376	26 300	38 475

Indirect energy (MJ)	SM inc 1	SM inc 2	SM inc 3	SM inc 4	SM inc 5	SW inc 1	SW inc 2	SW inc 3	SW inc 4	SW inc 5
Food	12 873	14 307	14 585	17 463	18 373	14 413	15 836	17 095	17 463	19 502
Restaurants, alcohol, tobacco	5 431	7 167	9 894	6 787	15 891	3 011	4 125	5 945	6 787	8 968
Hygiene	2 468	2 717	3 303	4 834	3 995	3 198	3 767	4 543	4 834	6 114
Household services	1 490	2 365	2 369	4 143	4 648	1 901	2 725	3 082	4 143	6 117
Clothing and footwear	2 511	3 252	3 350	8 076	6 814	3 852	4 824	6 738	8 076	11 397
Housing	9 085	11 996	13 719	18 653	24 227	9 944	12 663	15 009	18 653	26 209
Household effects	2 483	4 251	6 151	11 174	12 632	3 603	5 659	9 012	11 174	16 513
Health	1 040	1 634	2 865	5 147	5 798	1 757	2 942	3 726	5 147	7 410
Transport	9 657	7 748	19 713	14 835	33 245	3 478	5 806	8 968	14 835	24 398
Recreation culture	8 953	14 040	21 085	26 300	35 514	10 315	16 750	22 376	26 300	38 475

Energy consumption of Swedish average single men and women with different income

Total energy use (MJ)	SM inc 1	SM inc 2	SM inc 3	SM inc 4	SM inc 5	SW inc 1	SW inc 2	SW inc 3	SW inc 4	SW inc 5
Food	16 654	15 977	16 548	16 785	17 958	16 121	17 480	18 769	21 495	22 469
Restaurants, alcohol, tobacco	7 801	7 161	8 246	14 014	14 067	5 718	4 202	6 844	7 882	10 592
Hygiene	2 809	2 106	2 311	3 193	2 569	4 180	4 025	5 196	5 794	6 884
Household services	4 727	5 522	7 800	9 458	9 590	4 182	4 908	6 128	8 115	9 020
Clothing and footwear	5 559	3 471	3 219	7 784	5 036	6 400	5 491	8 151	9 748	10 011
Housing	32 061	50 765	56 857	61 960	66 623	39 700	43 152	45 029	67 494	79 449
Household effects	3 458	3 991	4 724	8 149	11 568	4 310	5 113	7 192	9 805	12 973
Health	576	1 919	1 775	2 113	3 097	2 556	3 744	4 226	3 116	3 370
Transport	36 480	42 644	65 019	73 279	88 413	15 292	19 407	31 301	50 606	54 464
Recreation	19 814	19 173	26 916	30 551	52 905	24 056	19 965	28 373	35 946	47 586

Indirect energy (MJ)	SM inc 1	SM inc 2	SM inc 3	SM inc 4	SM inc 5	SW inc 1	SW inc 2	SW inc 3	SW inc 4	SW inc 5
Food	16 654	15 977	16 548	16 785	17 958	16 121	17 480	18 769	21 495	22 469
Restaurants, alcohol, tobacco	7 801	7 161	8 246	14 014	14 067	5 718	4 202	6 844	7 882	10 592
Hygiene	2 809	2 106	2 311	3 193	2 569	4 180	4 025	5 196	5 794	6 884
Household services	4 727	5 522	7 800	9 458	9 590	4 182	4 908	6 128	8 115	9 020

Clothing and footwear	5 559	3 471	3 219	7 784	5 036	6 400	5 491	8 151	9 748	10 011
Housing	11 783	11 476	12 967	11 624	15 202	9 816	12 274	12 659	15 731	17 825
Household effects	3 458	3 991	4 724	8 149	11 568	4 310	5 113	7 192	9 805	12 973
Health	576	1 919	1 775	2 113	3 097	2 556	3 744	4 226	3 116	3 370
Transport	22 236	23 717	30 860	35 076	55 764	16 372	14 372	21 697	38 830	42 671
Recreation	18 546	18 549	24 620	29 996	46 177	24 056	19 300	26 197	28 072	37 188

$C0_2$ emissions of Swedish average single men and women

	CO2 emissions (kg)		Distribution	
	Single men	Single women	Single men	Single women
Food	1187,61	1390,41	11%	16%
Restaurants, alcohol, tobacco	300,43	179,72	3%	2%
Hygiene	80,05	147,63	1%	2%
Household services	167,38	133,79	2%	2%
Clothing and footwear	111,50	170,06	1%	2%
Housing	3523,47	3108,86	33%	36%
Household effects	191,04	209,57	2%	2%
Health	45,89	84,55	0%	1%
Transport	3737,74	1752,69	35%	21%
Recreation culture	1380,45	1348,35	13%	16%