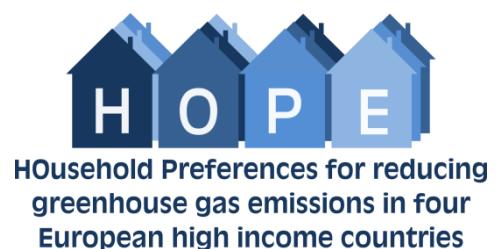




HOPE Briefing Sheet 2

Which mitigation actions are households willing to implement?

Findings on preferences in a voluntary and forced reduction scenario with a focus on differences between consumption sectors



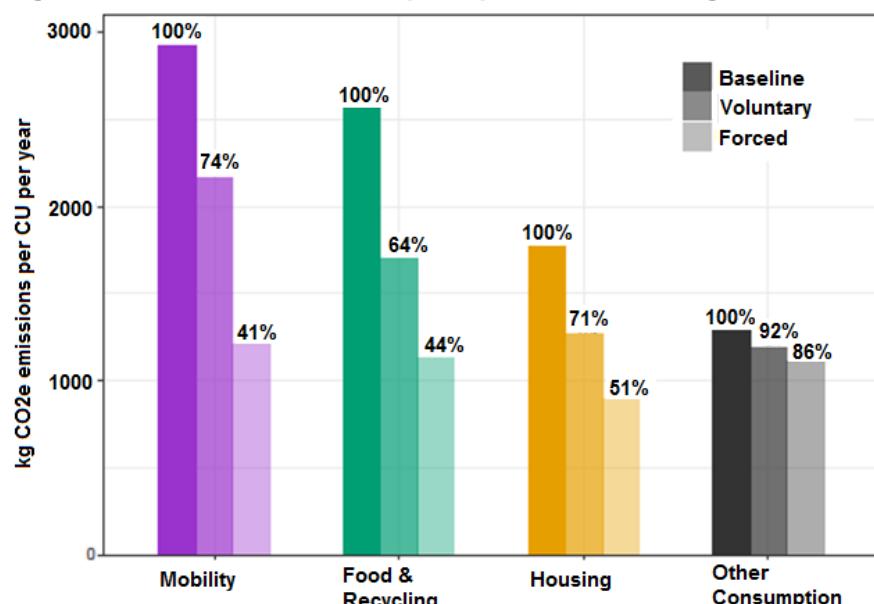
In line with the ambitious goal of the Paris Agreement to limit global warming to 1,5 °C, we asked households to reduce their current carbon footprint by 50% until 2030. In a first voluntary scenario of a serious game, households reduced their carbon footprint by 25 %. They reduced their footprint in all four sectors: *Mobility, Food & Recycling, Housing, and Other Consumption*. But the most popular actions were those in the area of *Food & Recycling*. When forced to halve their carbon footprint households achieved the highest reduction in the *Mobility* sector. This was also the sector with the highest share of the initial carbon footprint. In general, mitigation actions with the highest reduction potential were chosen least often by households. This means that households are willing to reduce their carbon footprint, but unlikely to reach a substantial reduction without additional policy support from all levels of government.

On a voluntary basis, households were willing to change their patterns of consumption to reach a 25% reduction in their carbon footprint

In the HOPE study, households were confronted with the task to reduce their carbon footprint by 50% by 2030 in a simulation game. The carbon footprint included all greenhouse gas emissions (GHG) of the household over one year (see Briefing Sheet 1). Households could reach this reduction by choosing up to 65 mitigation actions in the areas, *Food & Recycling*, *Housing*, *Mobility* and *Other Consumption*.

They first chose actions they would actually like to implement in a voluntary scenario. On average households accomplished a 25 % reduction of their baseline carbon footprint in the voluntary scenario. Afterwards they entered into a forced scenario, in which they needed to choose more mitigation actions until they had reached 50%.

Figure 1: Median carbon footprint per sector throughout the HOPE simulation



Median carbon footprint in mobility, food & recycling, housing and other consumption at baseline and in the voluntary and forced scenario of the simulation game in kilograms of CO₂ equivalents (CO₂e) per consumption unit (CU). Consumption units are based on an OECD equivalence scale to record emissions per capita.

Households preferred carbon saving actions in the areas of *Food & Recycling*

Figure 1 compares the carbon footprint reduction effect of the two scenarios, one can see interesting differences between the sectors. In the food sector households reduced more than half of their total reduction (56%) in the voluntary scenario (36% in the voluntary and 20% in the forced scenario). In the mobility sector, they reduced more than half of their total reduction (59%) in the forced scenario (26% in the voluntary and 33% in the forced scenario). This means that households were more willing to implement *Food & Recycling* actions, but had to be pushed to implement *Mobility* actions to halve their carbon footprint.

Moreover, the preference for actions in the food sector are revealing: in the voluntary scenario, households chose 40 % of all applicable food actions, while they only chose 22% - 24% of all applicable actions in the other three sectors. The most popular food actions were to buy food with less packaging, eat more unprocessed food, eat 30% more local, 30% more organic and 30% more vegetarian food. Thus, policies which reduce packaging and support more sustainable food production and consumption are promising to be supported by households.

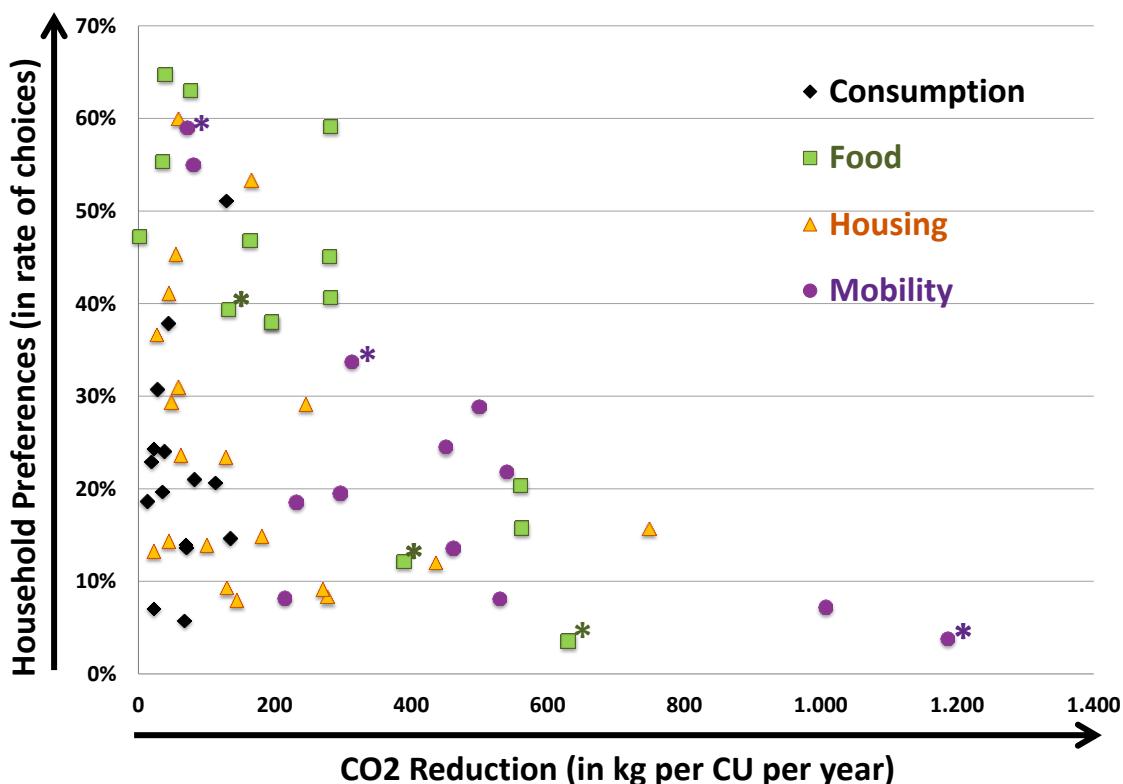
The greater the CO₂ reduction potential of mitigation actions, the smaller households' willingness to implement them

We analysed the association between the frequency of chosen actions in the voluntary and forced scenario with the CO₂ reduction potential of mitigation actions in a linear regression model. When looking at households' choices of action cards to reduce their greenhouse gas emission, a negative association was found between voluntarily chosen action and reduction potential. This pattern was clearest in the *Mobility* sector. This association disappeared in the forced scenario because households had to choose high reduction measures even if they had not done so in the voluntary round.

Figure 2 displays households' preferences of mitigation actions on the y-axis and the actions' CO₂ reduction potential on the

x-axis. One can see that many *Food* actions are located at the upper parts of the panel, meaning they were popular. However, they are also mostly located on the left side of the panel, which means that they yield rather low CO₂-reduction. Food actions that yield greater CO₂ reduction often mean a more profound behaviour change and are less popular. For instance, 38% of participants were willing to eat 30% more vegetarian food, yet only 4 % chose to become a vegetarian (see green *). Similarly, eco-driving was the most popular *Mobility* measure, buying a more eco-friendly car was chosen by 34% of households, yet only 4% were ready to give up their private car (see purple *).

Figure 2: Negative correlation of household preferences with CO₂ reduction of mitigation actions



Each symbol represents one mitigation action. The x-axis shows how much reduction of CO₂ equivalents an action yielded for households on average. The y-axis shows the percentage of households that chose an action in the voluntary scenario. The reference of 100 % are those households, which were able to choose the specific actions. For instance, 128 out of all 308 households had used intercontinental flights at baseline. 10 of those 128 chose the action *reduce your intercontinental flights by 90%*. Thus, the action was unpopular and is found on the lower part of the panel. At the same time the action is placed on the right side of the panel, as it yielded a large of CO₂ reduction per capita of about 1000 kg.




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Mobility generated most household emissions, but households were least willing to reduce these emissions

Figure 1 shows that *Mobility* had the greatest share in households' original footprint. At baseline, households in France and Germany used their car for longer daily distances (36 km and 27 km) and more often for commuting than households in Norway and Sweden (16 km and 14 km). Norwegian households in our sample used more inland flights than the rest of our sample.

Furthermore, Figure 2 displays that *Mobility* options often have high reduction potential. Households were willing to undertake moderate *Mobility* actions like eco-driving or substituting local public transport with walking and biking. More substantial changes, giving up their car, were less popular. Households who flew often were rather unwilling to replace even shorter flights with other transportation modes.

They were very unwilling to reduce intercontinental flights. Our qualitative interviews showed mobility to be a particularly sensitive issue. Many interviewees attached high values to long-distance travel for visiting friends and relatives or exploring the cultural and natural diversity. However, households were quite willing to switch to more eco-friendly private cars (electric/hybrid). But so far this was perceived as impractical due to infrastructure barriers (e.g. charging stations) and high investment costs. Yet, with fitting policies households may be more willing to change. Reducing car use and aviation are more difficult issues. Considering the substantial CO₂ impacts of these actions, strong and smart trans-sectoral policies are needed to reach substantial reductions.

Household preferences were the same across countries, but differed along some household characteristics

We analysed the data using multiple components analysis (MCA). To find connections between household preferences and their (socioeconomic) characteristics. The key finding is that the home country of the household did not have a significant effect on households' preferences. Rather, differences were subject-specific. Thus, there is tremendous potential for developing pan-European policies to reduce consumption-related greenhouse gas emissions.

One important characteristic influencing preferences was whether the household was renting or owning a house.

Actions in the housing sector, which carried a high mitigation potential, were not feasible for renters, mainly younger households living close to city centres. According to the qualitative interviews, renters often thought that it was hard to find an apartment meeting the highest energy efficiency standards and that renovation of their current apartment was up to their landlord.

Therefore, renters can be supported by programs for building or renovating apartment buildings with high energy efficiency standards. Owners wanted subsidies for their investments in energy efficiency and asked for simpler procedures.

Contact and further details

Germany: Rainer Sauerborn, rainer.sauerborn@urz.uni-heidelberg.de

France: Ghislain Dubois, dubois.ghislain@tec-conseil.com

Norway: Carlo Aall, caa@vestforsk.no

Sweden: Maria Nilsson, maria.nilsson@umu.se

For more information, visit our website www.hope-project.net