Policy Brief #2

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European climate change mitigation targets: *Exploring the potential contribution from behavioural change*

At a glance

Thematic area: Climate Change, Energy consumption, Food consumption, Lifestyle, Transport, Circular Economy, Agriculture

Key words: Climate change mitigation, behavioural change, transition pathway, co-benefits, food, mobility, housing, waste

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Priority issue: Climate mitigation pathways

Target audience: Policy makers in environmental departments of the EU and its member states

Key Points

1. Given the large challenge of reducing EU GHG emissions by 80-95% by 2050, "green behaviour" should be encouraged together with "green technologies".

2. Rigorous and instant behavioural change could mitigate up to one third of targeted greenhouse gas reductions until 2050, whereas more realistic and gradual changes in behaviour could reduce the burden by 20 to 25% without any upfront investment costs.

3. "Green behaviour" in the form of changing preferences and attitudes in food, mobility and housing demand can yield multiple co-benefits:

    a. Improving personal health and well-being.

    b. Improving society health by reducing ambient air pollution.

    c. Significantly reducing GHG emissions related to avoiding deforestation and energy production outside the European Union.

    d. Improving energy and food security within the European Union.

    e. Reducing animal suffering in husbandry industries.

1. LIFESTYLE CHANGES TO REDUCE EMISSIONS AND IMPROVE WELLBEING

The European Union has submitted ambitious greenhouse gas (GHG) reduction targets in the Paris Agreement, promising a 40% reduction of GHG emissions by 2030 and at least 80% by 2050, compared to 1990 levels. Achieving such high targets in a relatively short time-frame requires large-scale transformations of, predominantly, the energy system. However, such technological transformation paths might not be enough and come at very high marginal costs when approaching deep decarbonisation levels. Lifestyle changes might therefore be an attractive alternative for achieving climate change mitigation targets.

Throughout the past century, the surge in European living standards has developed alongside specific attributes in the average European lifestyle that can be seen as unsustainable. For example, the amount of animal-based calories in the average European diet, and the quantity of car-driven kilometres per person, have surged to levels that might be incompatible with high GHG mitigation targets. Therefore, instead of aiming for the use of different technologies to do the same things in the same ways, we can also look at doing different things or the same things in a different way.

Several behavioural change options can be identified that reduce GHG emissions, without significantly affecting an individual's final energy service or final calorie consumption. Table 1 provides an overview of 16 such changes that are related to food, mobility and housing demand. It shows the average reduction in GHG emissions until 2050 if this lifestyle change was brought in practice immediately.

Table 1: GHG reduction and co-benefits related with different behavioural options

	GHG reduction	Co-benefits		
Behavioural option	**Total in % 2011 to 2050 ***	**Own health**	**Public health**	**Animal well-being**
Food:				
Healthy diet	-5.3%	++	+	+
Vegetarian diet	-7.0%	~	+	++
Vegan diet	-8.2%	~	++	++
Avoiding consumer food waste	-2.4%		+	+
Mobility:				
Public transport commuting	-0.7%		+	
Carpool commuting	-1.2%		+	
Tele-working	-0.3%		+	
Urban Cycling	-0.6%	~	++	
Car sharing / Car club	-1.1%		+	
Avoid short flights	-0.5%			
Closer holidays	-0.5%			
Eco-driving	-0.6%	+	+	
Housing:				
Reduce home heating / cooling	-0.6%			
Organic waste recycling	-1.1%		+	
Paper waste recycling	-0.6%		+	
Plastic, Metal, Glass waste recycling	-1.7%		+	+

** Includes all types of GHG emissions, both within and outside the EU, as a percentage of total baseline GHG emissions within the EU*

~ Co-benefit depending on specific details of behavioural change

+ Certain co-benefit

++ *High co-benefit*

As can be seen in Table 1, behavioural options in food demand include diet changes and avoiding food waste. Most of the related GHG emission savings stem from avoided land use change and methane emissions, and only half to one-third of these emission savings come from within the European Union. Aside from saving significant amounts of emissions, changing diets is often good for people´s health, while avoiding the consumption of animal products can reduce animal suffering in the husbandry industries.

Behavioural options in mobility demand generally focus on avoiding the use of cars and airplanes, or using the existing car stock more intensively (carpooling or car sharing). The majority of saved emissions (around 90%) due to changing mobility behaviour is carbon dioxide emissions emitted within the European Union. Most of these behavioural changes significantly improve public health by improving air quality thought reduced emissions of car-related pollutants.

In housing, GHG emissions can be cut by slightly reducing home heating and cooling and by separating different categories of household waste. These behavioural changes effectively reduce emissions within the European Union. Separating household waste significantly helps the process of recycling materials and composting organic waste. This reduces the need for incineration or landfilling of household waste, and improves public health due to reduced pollutant emissions from these activities.

In short, small and costless behavioural changes can significantly reduce GHG emissions and improve well-being at the same time. Behavioural change alone is not enough to reach the European GHG emission targets, but it can help reduce the policy costs and increases the probability of reaching emission reduction targets.

2. The potential of lifestyle changes for GHG reduction targets

The full potential of behavioural change for GHG reduction targets is not easy to estimate and is subject to many uncertainties. Using the results in Table 1, some estimates can be made. However, the impacts of the different behavioural options in this table cannot be simply be added up, as some options are mutually exclusive (for example the diet options), while other options limit the impact of each other (for example carpooling, teleworking and eco-driving). Instead, different lifestyle profiles can be created that include a selection of these behavioural options. Table 2 describes three possible lifestyle profiles, ranging from an active adoption of green lifestyle features to a more passive adoption.

This table shows that the most ambitious package of lifestyle changes, called the enthusiastic profile, would reduce GHG emissions by 16.2%. A relatively passive form of lifestyle changes, represented as the convenient profile, reduces GHG emissions by 6%, while an intermediate form of lifestyle changes, representing a typology of a citizen who is conscious of climate change and their personal footprint, reduces GHG emissions by 12%. On overall, about three-quarters of these emission savings are from within the EU.

Many of these behavioural changes reduce emissions in sectors where GHG emission abatement is relatively expensive. For example, from a technological point of view mitigating one ton of carbon in the electricity sector is significantly less costly than mitigating one ton of carbon in the food,

transport or waste sector. Therefore, as Table 2 shows, relatively small domestic GHG reductions (i.e. within the EU) lead to significant savings in the policy costs of an 80% GHG emission reduction by 2050. In other words, combining technological and behavioural measures seems an efficient way to reach GHG mitigation targets.

Table 2: Description of lifestyle profiles and impact on GHG emissions and policy costs

Lifestyle profile	Enthusiastic	Conscious	Convenient
Food options	Vegan diet Avoiding food waste	Healthy diet Avoiding food waste	Avoiding food waste
Mobility options	Public transport commuting Tele-working Urban Cycling Car sharing / Car club Avoid short flights Closer holidays Eco-driving	Public transport commuting Tele-working Car sharing / Car club Avoid short flights Eco-driving	Carpool commuting Tele-working Eco-driving
Housing options	Reduce home heating / cooling Organic waste recycling Paper waste recycling Plastic, Metal, Glass waste recycling	Organic waste recycling Paper waste recycling Plastic, Metal, Glass waste recycling	Paper waste recycling Plastic, Metal, Glass waste recycling
GHG emission savings *	16.2 % of which 12.1 % within EU-27	12 % of which 8.5 % within EU-27	5.9 % of which 4.5 % within EU-27
EU NDC policy cost savings **	29.7%	22.4%	13.6%

** Includes all types of GHG emissions, as a percentage of total baseline GHG emissions within the EU up to 2050 if lifestyles were to be adopted immediately*

*** On total of 2 trillion €(2010) of policy costs to reach 80 % GHG emission savings by 2050, as promised in the Paris Agreement*

3. POLICY POTENTIAL TO BOOST PRO-ENVIRONMENTAL BEHAVIOUR

Boosting Pro-Environmental Behaviour (PEB) is not a straightforward task, since execution in the hands of individual citizens. A traditional way for policymakers to influence individual choices is by consumer taxes, making 'bad' products or services relatively more expensive. For example, EU-wide consumer taxes on energy are already in place, which should boost behavioural change around car usage and home heating. In a similar way, consumer taxes could be applied on GHG-intensive food products, such as meat and dairy. However, such taxes could have a disproportinate impacct on low income groups (García-Muros et al. 2017) and be subject to significant societal resistance. Ultimately being taxed away from the consumption of a certain good is not the same as a preference change.

Alternatively, consumers could be convinced to change their preferences. There is a great quantity of academic literature about the psychological factors and barriers that determine the adoption of PEB. Apart from sociodemographic variables, adoption of PEB seems to be strongly determined by environmental attitudes. These are in turn influenced by environmental awareness and risk perception, and also by personal and social values such as social justice, community, frugality and personal integrity.

Consistent public awareness campaigns about climate change could help to raise awareness and risk perception. It is important that such campaigns are not based on encouraging fear, but rather link to individuals' everyday emotions and concerns in the context of climate change. In terms of mitigation, it has been shown that a way of doing this is by relating climate change to local environmental issues and personal concerns,

emphasising the additional benefits of PEB. Voluntary mitigation by the public via behavioural change can be maximised only if the general public and other stakeholders see the benefits of such sacrifices, which requires legislative and regulatory measures from industry, commerce, and government (Semenza et al. 2008). Ultimately, effective mitigation of climate change requires both structural (technological and institutional) and behavioural changes towards a more sustainable society. Therefore, policymakers are recommended to take advantage of the significant potential of behavioural change, and to raise public awareness on climate change in a consistent way.

4. References

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5. More information

- This policy brief was developed from a TRANSrisk report on the implications of "heterodox" mitigation policies. You can read the full case study context at: http://transrisk-project.eu/virtual-library/transrisk-results
- TRANSrisk's 'work package 4' is studying synergies and conflicts between different energy system pathways. There is more information on this work, and on TRANSrisk as a whole, on our website http://transrisk-project.eu

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TRANSITION PATHWAYS AND RISK ANALYSIS FOR CLIMATE CHANGE POLICIES

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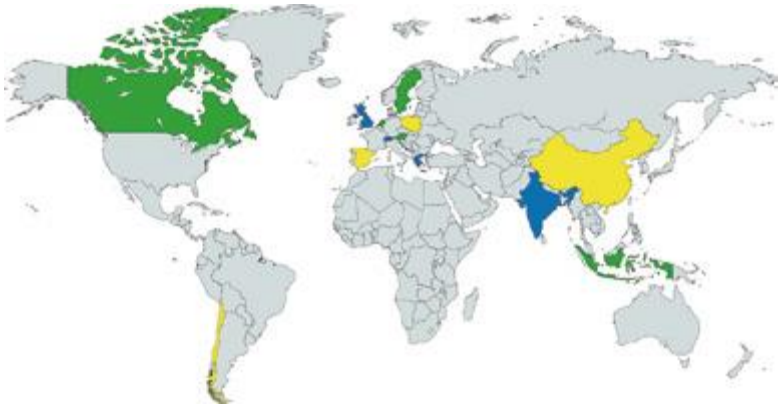
About TRANSrisk

TRANSrisk is studying the *risks and uncertainties* within *low carbon transition pathways*, and how transitions can be implemented in ways that are *technically*, *economically* and *sociably* feasible. The project's objective is to produce a new *assessment framework*, and an accompanying *toolbox, for policy makers*.

TRANSrisk's unique approach sees us combining *economic computer models* with *input from people working in the area of study* (*"stakeholders"*). Models provide a useful means of predicting the future impacts of decisions we take now, but *factors such as political opinion and public acceptability* are very difficult to predict via a purely numerical approach. TRANSrisk is using *stakeholder input* to feed our *models*, and is presenting the results *back to stakeholders* to see how this affects their views.



14 country case studies lie at the core of TRANSrisk's work. To fully understand the range of transition pathways our *case studies encompass the globe*, as presented in the adjoining map. In alphabetical order they are: *Austria, Canada, Chile, China, Greece, India, Indonesia, Kenya, the Netherlands, Poland, Spain, Sweden, Switzerland and the United Kingdom*.

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