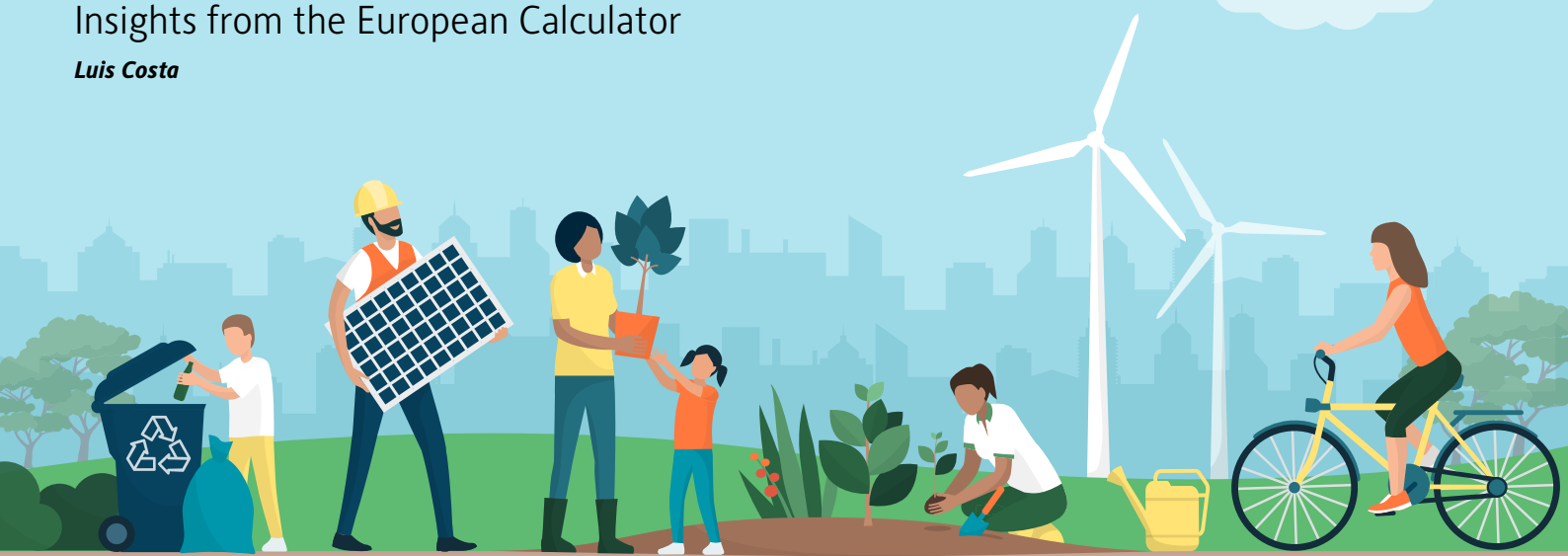


The role of lifestyles changes in EU climate mitigation

Insights from the European Calculator

Luis Costa



Headlines

- Societal change entails a considerable mitigation potential to assist with reaching the targets set in the Paris Agreement and the renewed ambition of the European Green Deal.
- Preliminary results of the EUCalc model indicate that ambitious changes in individual behaviour covering transport, homes, diet and consumption have the potential to lower greenhouse gas (GHG) emissions in the European Union by 38% in 2030 and 63% in 2050 relative to 1990.
- In transport, a lifestyle favouring moderate reductions of daily travel, increase of passenger occupancy and lower car ownership can lead to passenger transport emissions of 300 MtCO₂e in 2050, a 62% drop from those in 2015.
- With travel behaviour fixed on current trends, a policy attaining 100% electric car sales by 2050 and major efficiency gains would yield a 78% reduction in passenger transport GHG emissions.
- Changes in lifestyle further unlock important potentials in agriculture, a sector currently alienated from major transformative efforts.
- Curbing food over-consumption, eating healthier and reducing food waste has a combined effect of lowering European GHG emissions from agriculture by 55% in 2050 compared to 2015.
- Opting alternatively for the intensification of agricultural systems without dietary shifts would result in paltry emissions reductions of circa 10% by 2050 compared to 2015.
- The focus should be now placed on devising the best mechanisms to foster the decarbonisation potential of lifestyle changes. The EUCalc model with its user interface - the Transition Pathways Explorer - does its share by offering policy-makers in the EU the ability to evaluate GHG savings from lifestyles at the distance of a single click.

The EUCalc model and the Transition Pathways Explorer

The EUCalc model user interface - the Transition Pathways Explorer - is a tool that allows users to build a pathway to a net-zero carbon future at European and Member State level. Its scientific mission is to provide a sophisticated, yet accessible, model to fill the gap between integrated climate-energy-economy models and the practical needs of decision-makers. The model relates emission reduction with human lifestyles, the exploitation and/or conservation of natural resources, job creation, energy production, agriculture, costs, etc. in one highly integrative approach and tool which enables decision-makers to get real-time policy support underpinned by comprehensive trade-off analyses.

Politicians, innovators and investors can use the EUCalc Transition Pathways Explorer to create their own pathways to a low-carbon future online, in real-time and together. This tool can help policy makers in the EU28 + Switzerland explore the routes they can take to delivering climate protection, whilst securing energy and other important policy priorities.

Challenge

A scientific consensus exists stating that it is difficult to reach the targets of the Paris Agreement with technological and policy measures alone, without addressing social changes too (European Commission 2018a). While technology and market-based solutions have been effective in keeping EU emissions in check, their effectiveness in putting the EU on track to reach the 2030 and 2050 targets seems to be weathering out. Fuelled by economic recovery and road transport fondness, GHG emissions in the EU stagnated between 2014 and 2016 and increased in 2017 (EEA 2018). Energy efficiency was in 2017 lower than that in 2014 (EEA 2018) and recent increases in final energy consumption in some Member States are slowing down the pace of growth in the share of renewable energy across the EU (EURACTIV 2019). Changes in individual lifestyles have the potential to reduce GHG emissions and provide important leeway for Europe to meet its mitigation targets.

The challenge must therefore be placed on finding the key lifestyle dimensions that entail the largest GHG saving potentials. Failing to do so would resemble the strategy of Hermann, the hero of the novel Queen of Spades by Pushkin, who betted the same card sequence over and over again winning flawlessly, until the day he didn't. Given that the EU cannot afford to lose any climate target, **the purpose of this policy brief is to highlight the mitigation benefits of lifestyle change in Europe as an important ally of technological change in transport and has an effective GHG- reduction strategy in agriculture.** To do so, this brief employs a preliminary version of the EUCalc model available in 2019. Therefore, future updated versions may affect the results here shown. The EUCalc is a model with the flexibility to test individually the GHG implications of behaviour and technology change via a set of ambitions levers (see Figure 1).

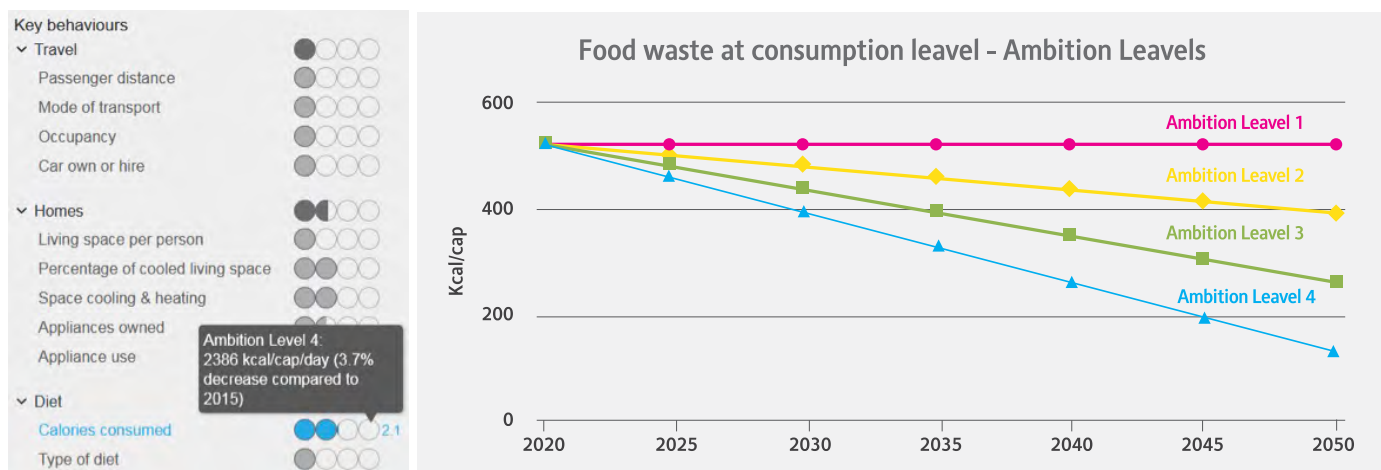


Figure 1: Example of key behaviour selection the EUCalc model and ambition levels for the case of food waste.

Less is less

In no other sector is the popular wisdom that “less is more” better applicable than in transport. Despite improving efficiencies delivering less GHG per km, emissions from transport (including aviation) have surged in 2017 to 1.100 MtCO₂e (EEA 2018). Under current technological trends, by 2050, a reduction in individual travel of 3.5 km/day across all types of transport for work, study and access to services can reduce passenger transport emissions by about 300 MtCO₂e compared to 2015 (see Figure 2). Additionally, increasing vehicle occupancy (e.g., 2.6 persons per car) pushes emissions savings to 440 MtCO₂e. Finally, the two behavioural changes combined with a modal share favouring public transportation and less car ownership result in emissions of passenger transport in 2050 that are down by 63% compared to those of 2015.

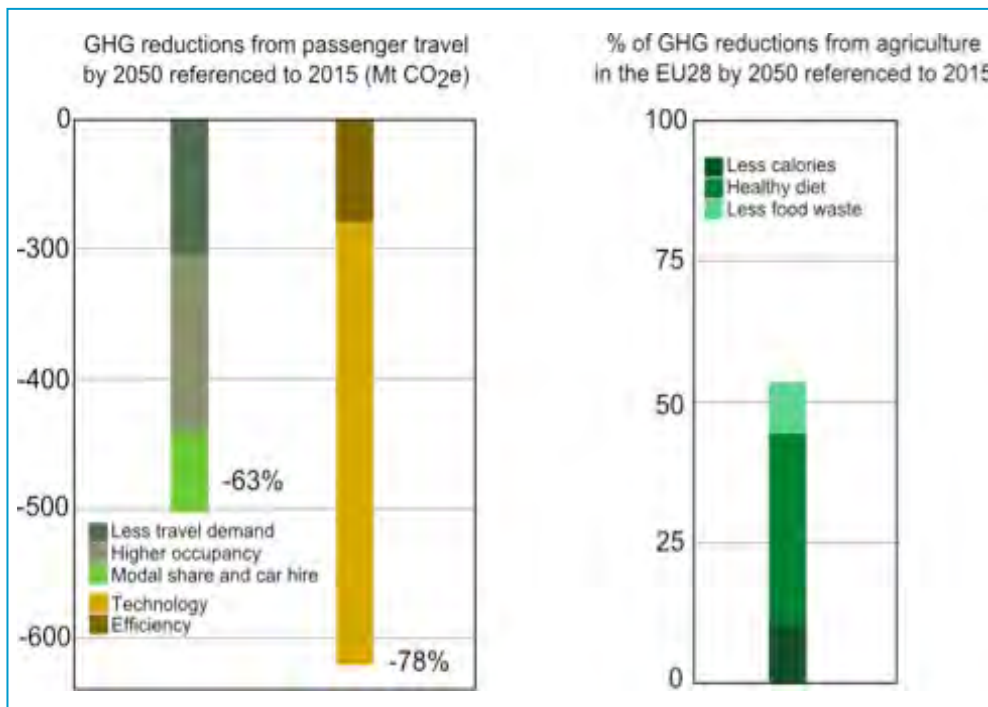


Figure 2: GHG emissions reductions in passenger transport and agriculture from behavioural and technology change in 2050.

Keeping the current travel behaviour trend constant while achieving 100% sales of Zero Emissions Vehicles (ZEV) by 2050 (for both cars and buses) and substantial gains of efficiency would decrease passenger transport emissions to circa 78% of those in 2015. Such scenario is associated with significant effects at the level of electricity demand. The latter is expected to increase by circa 30% (+8% for lifestyle changes), demanding for additional efforts from the power sector in deploying renewable energy which in turn increases the demand from materials like aluminium and steel. Importantly, both technological and behavioural change positively affect public health by yielding -1.8% and -2.3 % respectively in excess mortality due to PM_{2.5} concentrations compared to the EU Reference Scenario (European Commission, 2016).

Behavioural change can also bring about important GHG reductions in the agriculture sector. In 2017, emissions from Agriculture were of 437 MtCO₂e (EEA, 2018). Changing diets in order to mimics the animal, vegetable and sugar consumption prescribed in medical health standards plus reducing food waste in 2050 to a quarter of that in 2015 result in total EU agricultural GHG reduction of 55% by 2050 (see Figure 2). The numbers are comparable to those found in line with global numbers reported in literature (e.g., Springmann et al 2018). Opting for agriculture intensification while keeping present dietary trends would reduce GHG emissions by only circa 10%.

Changes in lifestyles are part of the solution but alone they are not sufficient

When operated across sectors and the all EU Member States, changes in lifestyles as currently considered in the EUCalc model can return GHG savings of 38% and 63% and by 2030 and 2050 respectively, referenced to the levels of 1990. Importantly these reductions are achieved without large scale deployment of transformational technologies. Accordingly, there is a case to make lifestyle changes a more relevant component of mitigation strategies as currently done in the Long-Term Strategy (European Commission 2018b) and assist on delivering the new ambition expressed in Europe's Green Deal (European Commission 2019). **The savings from lifestyle change alone are insufficient to bring the EU28 to net-zero by 2050, but they have the potential to ease some of the technological challenges towards a carbon-neutral society.** In addition, the benefits of changes in lifestyles can lead to unlock what is currently perceived as a trade-off choice between food and biofuel production. Less calorie consumption comes attached with less need for agricultural land which in turn frees space for biofuels to be grown. Having identified key behavioural change, researchers and policy-makers should now focus on devising the best mechanisms to foster each and everyone's individual decarbonisation potential.

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Further information on the EUCalc project:

The EUCalc project aims at providing a highly accessible, user-friendly, dynamic modelling solution to quantify the sectoral energy demand, greenhouse gas (GHG) trajectories and social implications of lifestyle and energy technology choices in Europe.

The novel and pragmatic modelling approach is rooted between pure complex society-energy systems and integrated impact assessment tools. The EUCalc model with its user interface - the Transition Pathways Explorer - has been designed to be both accurate but also accessible to decision-makers and practitioners. It covers all sectors and can be used by one or many people. The model is also open source so that experts can refine the model itself. The tool will have an e-learning version, the “My Europe 2050” tool as well as a Massive open online course (MOOC). See more on the EUCalc project, its scientific reports and all other outputs and access the Transition Pathways Explorer at:

www.european-calculator.eu

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Policy Briefs - Pathways towards a European Low Emission Society

The Policy Briefs on Pathways towards a European Low Emission Society, summarises key findings of the EUCalc project with a clear policy orientation, which provides practical climate change mitigation insights to both EU and individual Member States decision-makers. These policy briefs cover the following topics:

No. 1	The role of lifestyles changes in EU climate mitigation - Insights from the European Calculator
No. 2	Innovation and technology development - Decarbonisation pathways for manufacturing & production sector
No. 3	Long-Term Renovation Strategies: How the building sector can contribute to climate neutrality in the EU
No. 4	Avoid, shift, improve - Decarbonisation pathways for the transport sector in Europe
No. 5	Mitigating GHG Emissions through Agriculture and Sustainable Land Use - An Overview on the EUCalc Food & Land Module
No. 6	Decarbonizing the EU electricity sector - From ageing powerplants to renewable energy futures
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