European Commission: H2020

Decarbonising household energy consumption

ENABLE.EU
Enabling the Energy Union

How close will it come to meeting the EU's energy-climate targets?

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Methodology: a novel modelling framework was applied

- Cambridge econometrics (CE) and REKK generated a modelling framework to assess households' contribution

- CE utilised a suite of FTT models to measure the household energy technology choices in the three key areas.
- CE's macroeconomic model E3ME assessed the wider economic impacts of these choices
- and REKK's electricity and gas market models were used to estimate the impact on the energy market and on consumer prices

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The ENABLE.EU scenario: modelling the role of consumers in the low-carbon transition

- To assess the ability of households to transition to a low-carbon economy, the ENABLE.EU scenario was designed
- Time horizon: 2050
- It combines ambitious policy measures which considerably alter household decision-taking in three key areas, mobility, energy consumption and energy production:
  1. Reduced use of passenger vehicles and transition to e-Mobility
  2. Zero local emissions from heating and cooling by 2050
  3. Democratisation of electric production for household consumption via deployment of rooftop solar PV
- No measures in other sectors of the economy

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The following EU energy-climate targets where considered

1. Reduce greenhouse gas emissions by at least 40% (compared to 1990)

2. Increase the share of renewable energy in final energy consumption to at least 32%

3. Achieve energy efficiency improvements of at least 32.5% (compared to the EU Reference Scenario 2007 baseline projections)

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Energy demand: changing consumer decisions leads to large scale electrification

- Total household (incl. mobility) energy demand falls driven by:
  - take up of energy efficient and renewable technologies (e-Mobility, renewable heating technology) and
  - take up of solar PV
- As most new technologies are powered through electricity, the share of electricity grows: to over half of total energy demand in 2050

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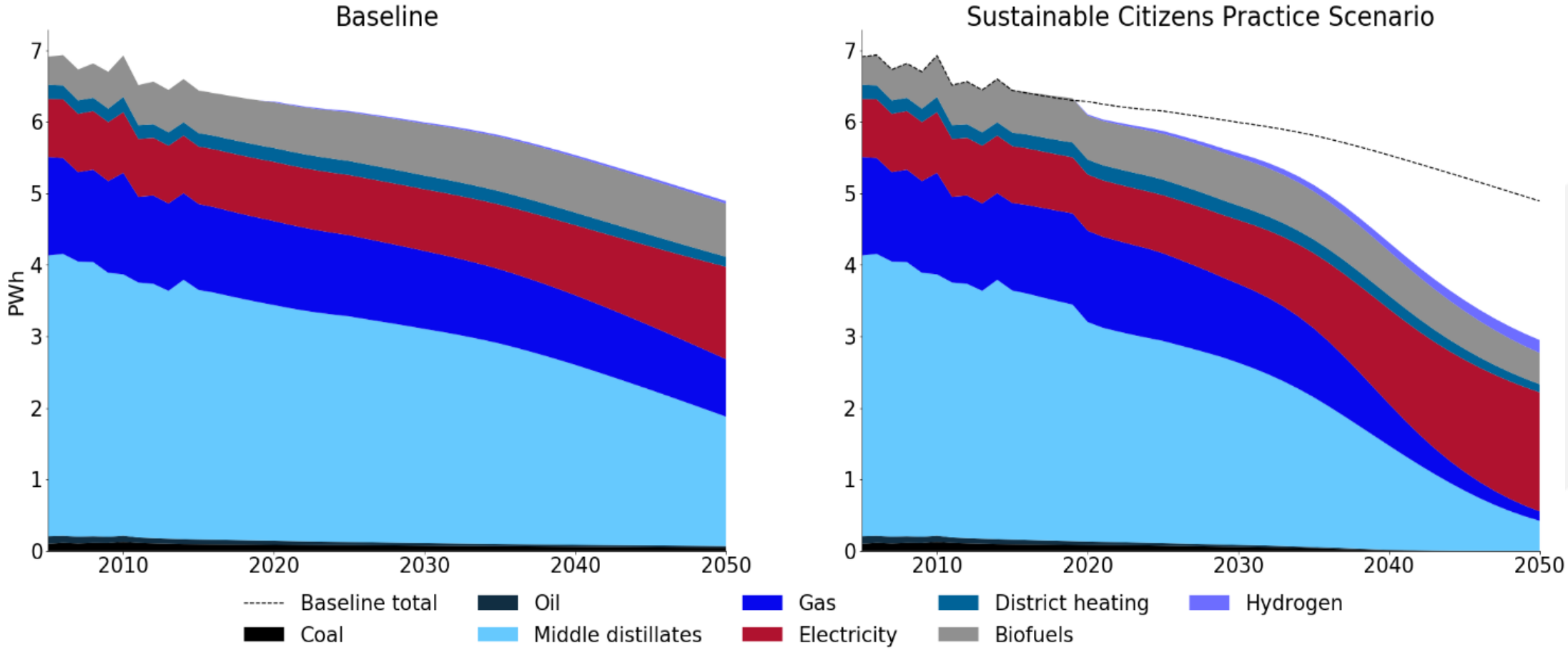
Energy demand: changing consumer decisions leads to large scale electrification



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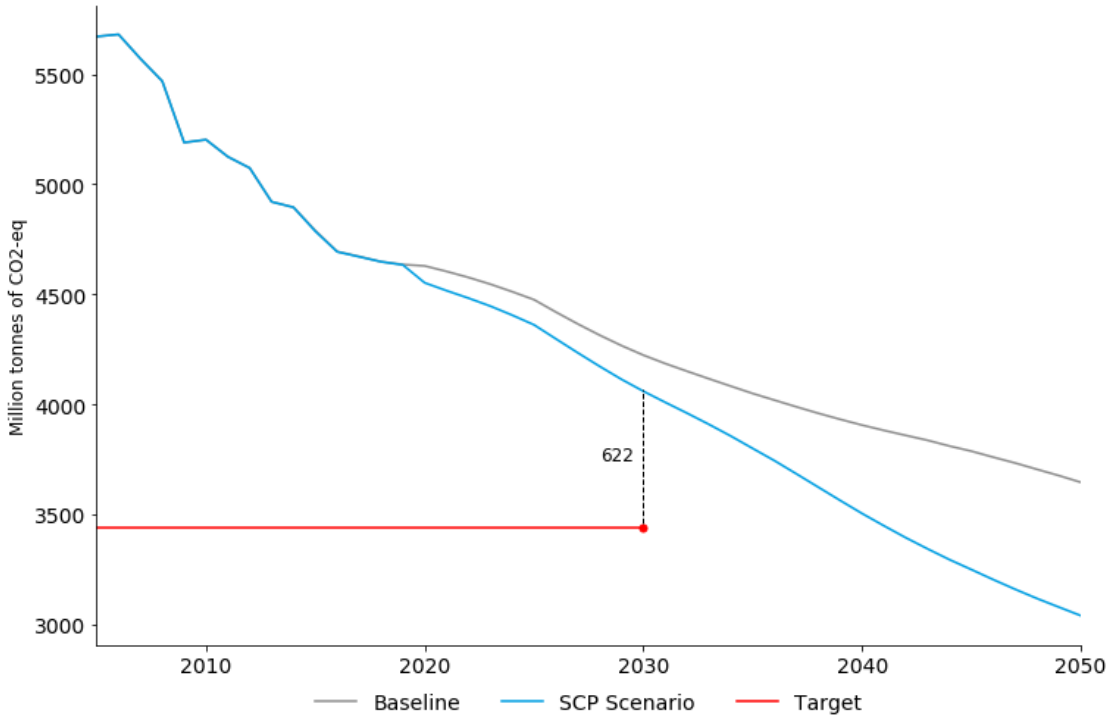
The GHG emissions reduction target cannot be met by households alone

- The modelling suggests that by 2030, households can help achieve a reduction in GHG emissions of 29% compared to 1990 levels
- Although considerable reductions are achieved, the efforts by households falls short of the target
- Policy in other areas of the economy will be needed to help reduce emission by a further 622 million tonnes of CO2-eq



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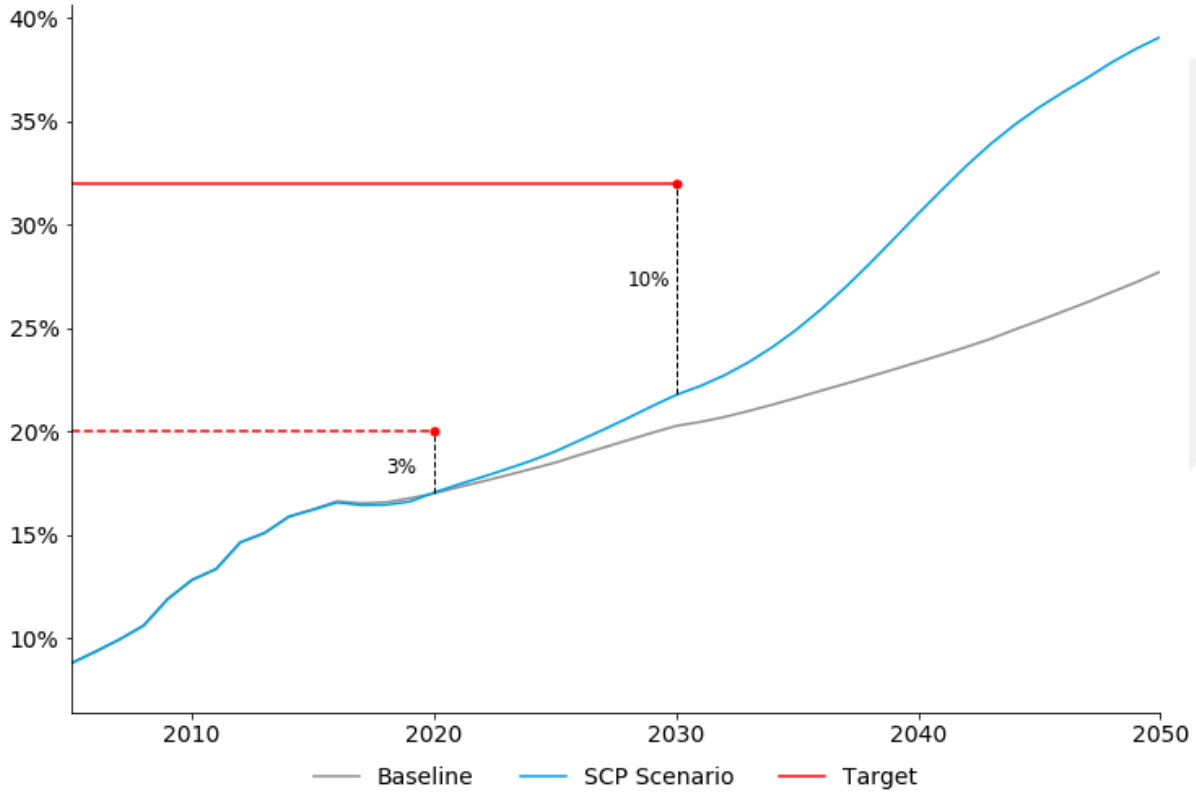
Households can help to increase the penetration of renewable technologies

- By 2030, changes in household sector can lead to 22% share of RES in final energy consumption.
- Again there is a considerable effort made by households, but much more is needed
- The scenario does not take into account any changes to the power sector or industry



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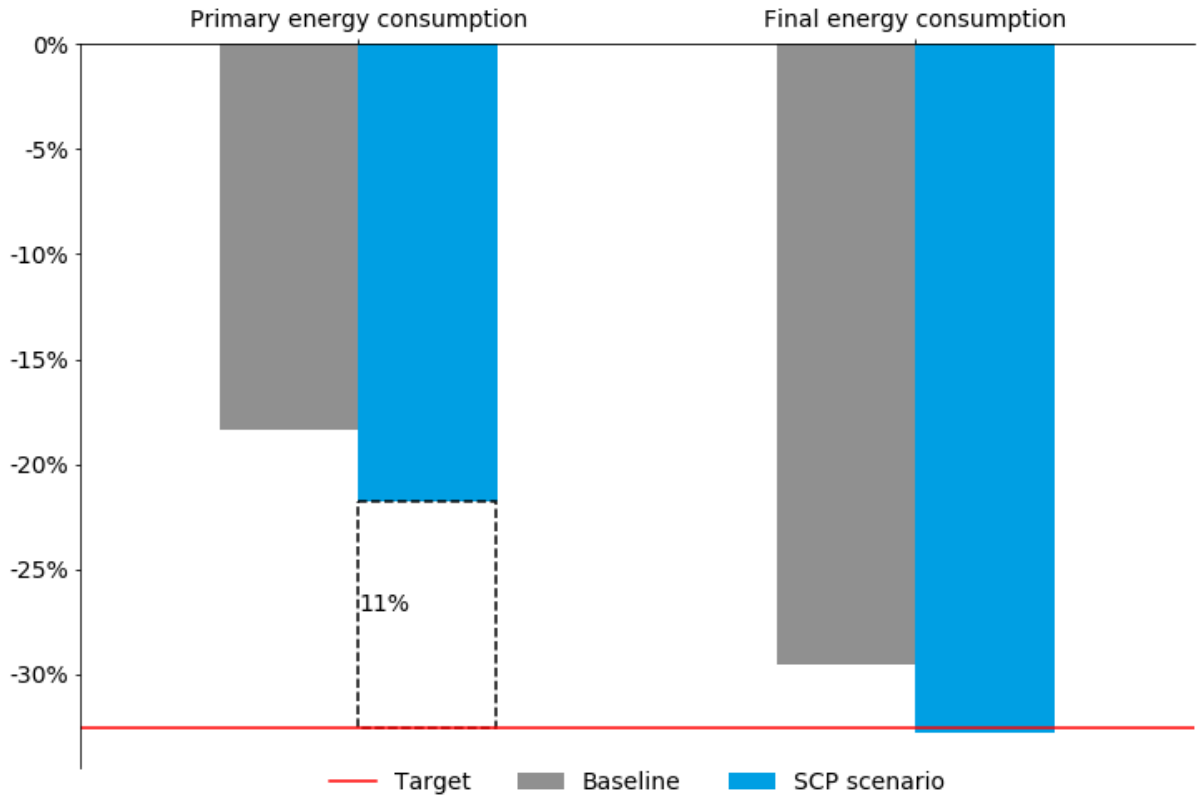
Households can meet an aspect of the energy efficiency target

- Energy efficiency target are for primary and/or final energy consumption
- No policies in primary energy consumption means this part of the target is not met
- But final energy consumption energy efficiency is achieved via:
  - e-Mobility
  - renewable heating technologies, and
  - energy efficient appliances



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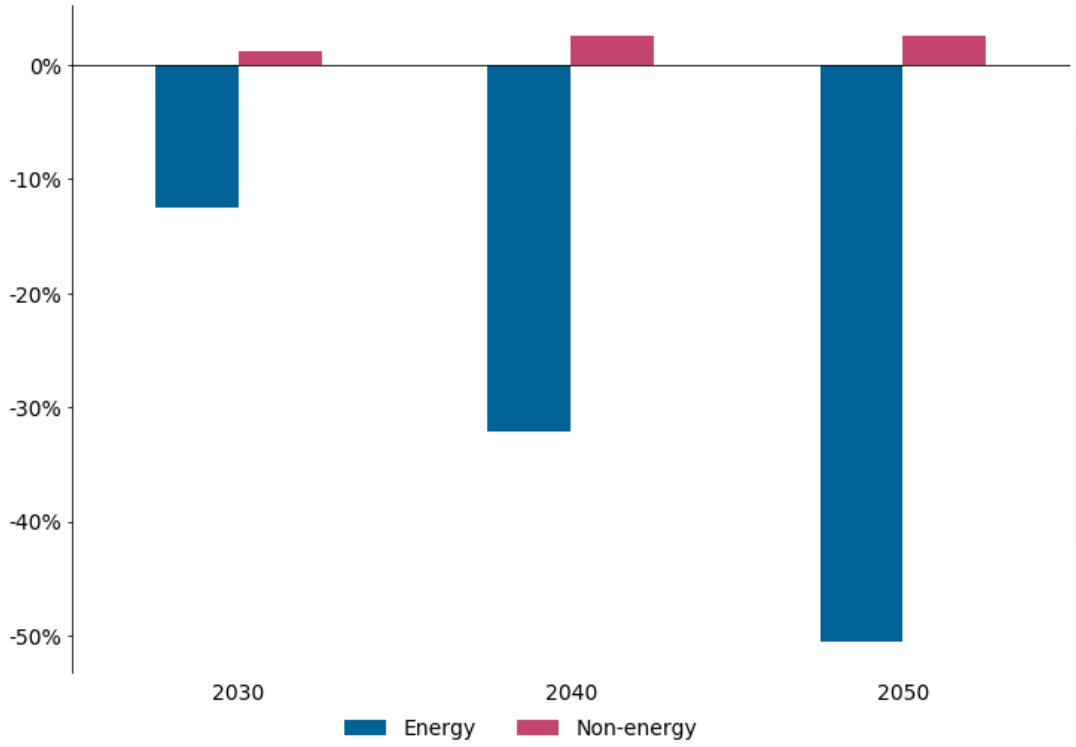
Economic impact: changing consumer choices also changes their expenditure patterns…

- Decarbonisation means households will spend less money on their energy bill (on average 50% less in 2050)
- This results in more consumption elsewhere in the economy
  - spending on other goods and services
  - part of this is higher expenditure on new technologies (for the transition)
- Overall, in 2050 there is a net increase in consumer expenditure of €130 billion



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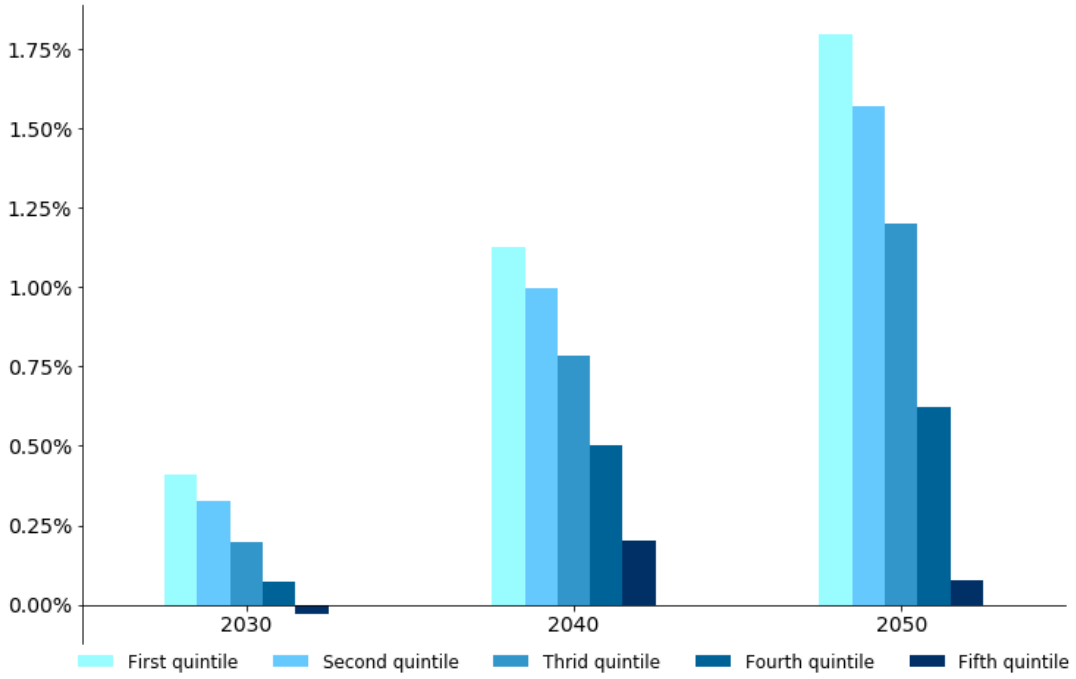
…while real incomes are increased

- The greatest increase in incomes is attributed to low income households
- This is because energy bills make up a larger share of their total expenditure…
- …and because the modelling assumes an even split of the funding through VAT, income tax and employer's social contribution
- Different funding mechanism, e.g. wholly through VAT, could reduce the benefit to lower income households



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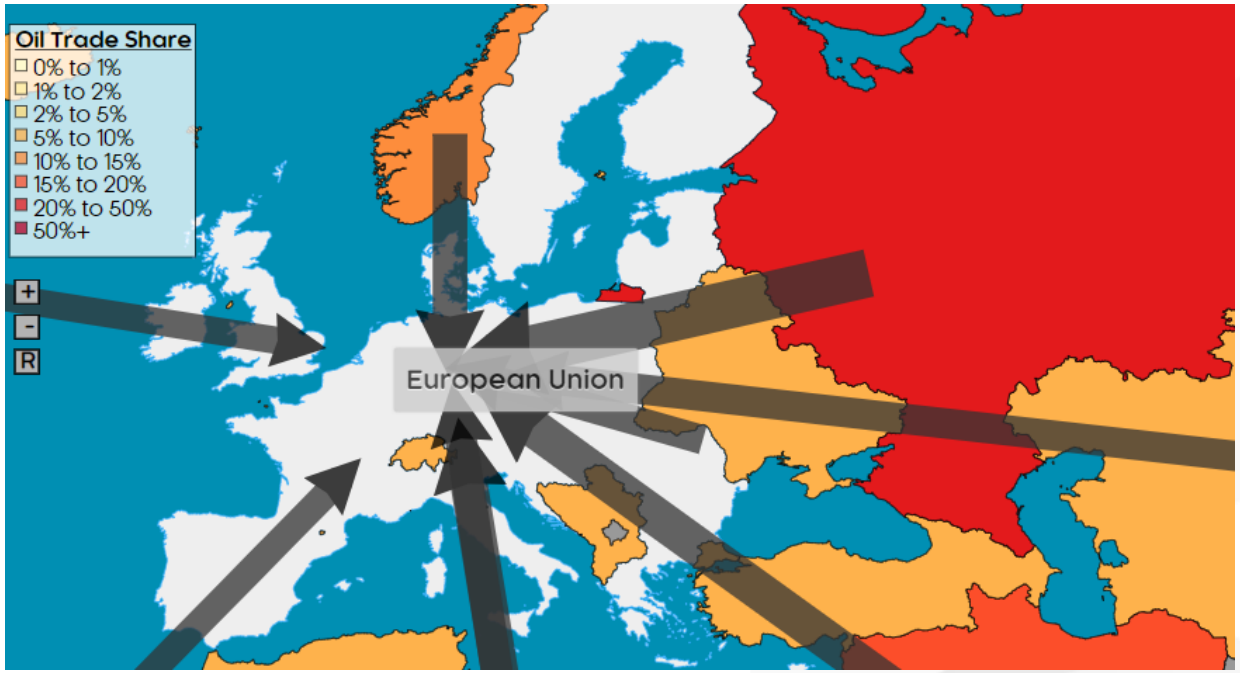
The economic impacts are driven by a shift away from imported fossil fuels

- The majority of EU fossil fuels are imported, therefore decarbonisation reduces the leakage from the EU economy
- Instead the money is spent on goods and services where more value is captured within the EU, which generates more valued added along EU supply chains and boosts GDP and employment in the European economy



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Concluding remarks

- Ambitious policy action engaging households in the energy transition can provide a significant household contribution to reducing greenhouse gas emissions, increasing renewables deployment and increasing energy efficiency in Europe
- Substantial contributions from households are possible, but they are not sufficient to meet the EU energy-climate targets; additional policy measures targeting other areas of the economy (e.g. the power sector) are needed
- There is economic benefit from the transition, via increased on domestic supply chains and multiplier effects
- Low income households can benefit considerably if careful attention is paid to:
  - The choice of policies
  - The distributional impacts of government funding mechanisms

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