HOUSEHOLD CARBON FOOTPRINTS IN 2030 AND 2050 FROM SUPPLY-USE TABLE SCENARIOS

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OUR MOTIVATION

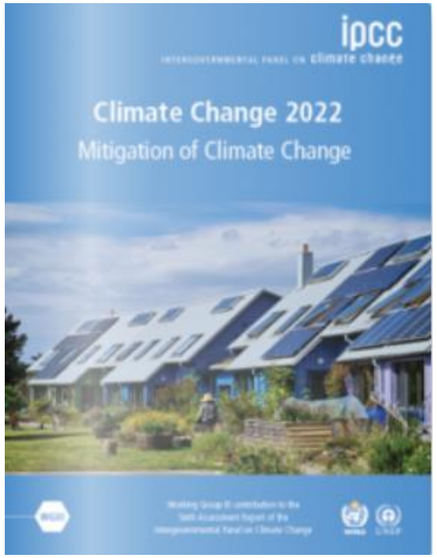
Is it possible to limit global warming to 1.5°C?

What would be required of society?

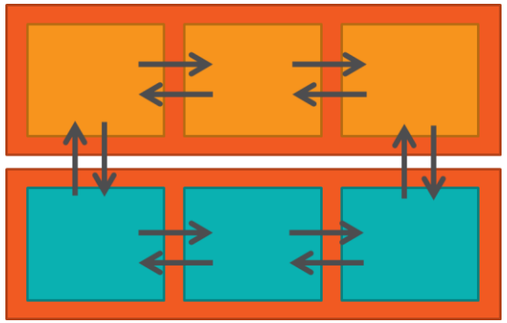
What magnitude of household behaviour change would be necessary?

How much would we overshoot 1.5°C without household efforts?

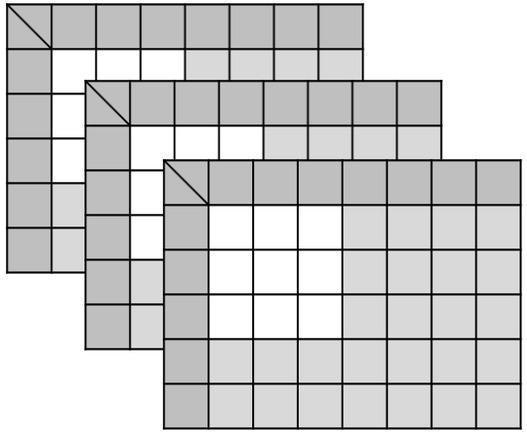
ISOLATING POTENTIAL IMPACT OF CONSUMPTION CHANGE FROM OTHER DECARBONIZATION ACTIONS IS CHALLENGING



IPCC AR6 highlights magnitude of mitigation potential from behaviour change



IAMs typically include behaviour change as part of scenario development



Scenario development in IO uncommon; IOA excellent for household GHG footprinting

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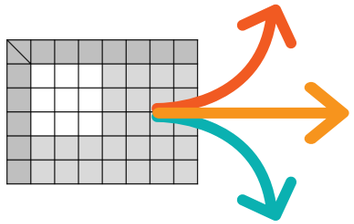
SCENARIO: A SUSTAINABLE BACKGROUND SYSTEM WITHOUT HOUSEHOLD BEHAVIOUR CHANGE

Our scenario development



Method

- Adapted from de Koning et al. (2016)

Focus

- Greenhouse gas emissions overshoots in the EU27 in 2030 and 2050, isolating household behaviour impact from background changes

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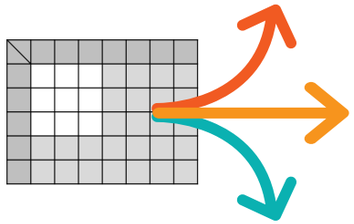
SCENARIO: A SUSTAINABLE BACKGROUND SYSTEM WITHOUT HOUSEHOLD BEHAVIOUR CHANGE

Our scenario development



Includes

- Ambitious industrial decarbonization
- ‘Green growth’ paradigm

Excludes

- Sustainability-oriented household behaviour change

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METHOD

Start **Input data**

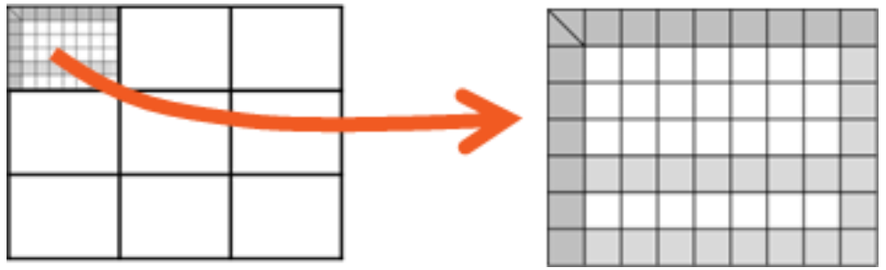
EXIOBASE 3.8
Supply and use tables, 2015

IMAGE 3.2
SSP1-RCP1.9
SSP1-RCP2.6

SSP Database
SSP1-RCP1.9
SSP1-RCP2.6

Income elasticities of demand
Bjelle et al. (2021)

1 **Disaggregate MR-SUT to single-region SUTs**



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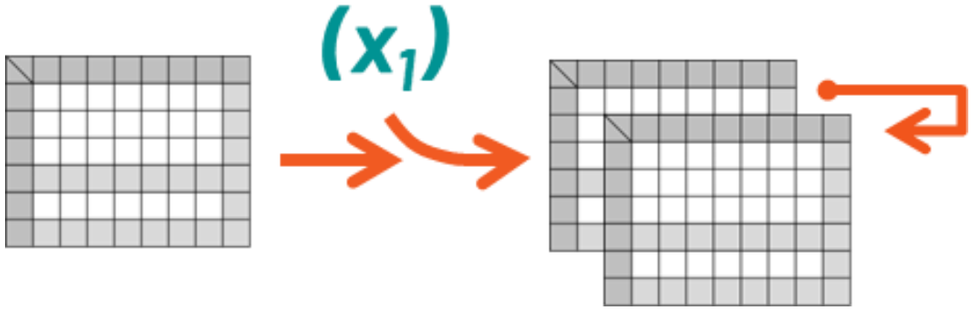
METHOD

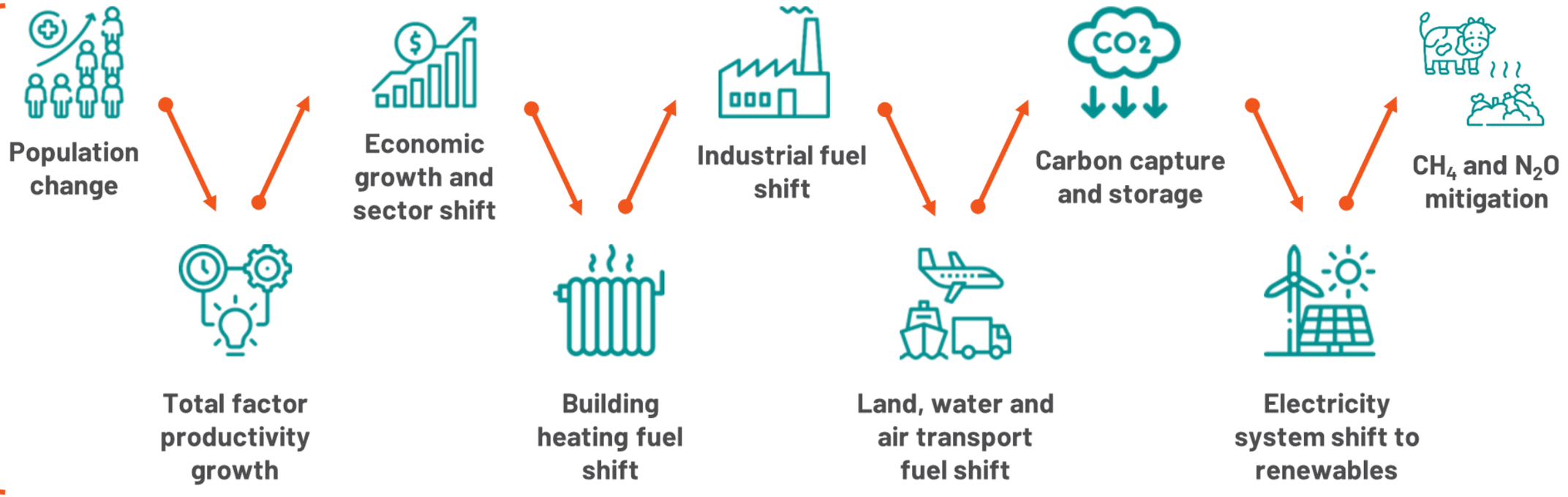
2 Perturb SUTs in steps following SSP1 parameters



Balance via SUT-RAS (Temurshoev & Timmer, 2011) after each step

(x_1)

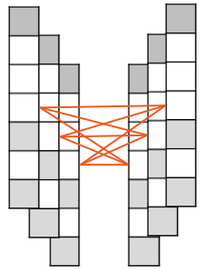
Downscaled from SSP1, IMAGE



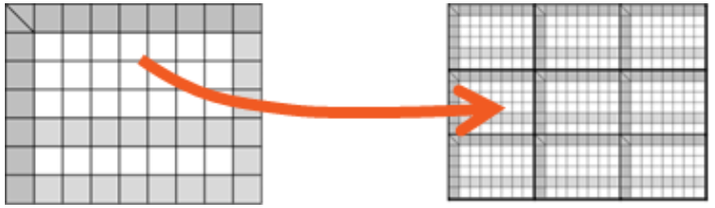
Icons by Freepik from www.flaticon.com

METHOD

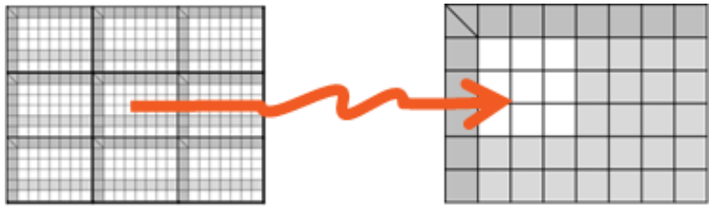
3 **Trade linking: match imports and exports**



4 **Re-build MR-SUT**



5 **Convert MR-SUT to product-by-product input-output tables, industry technology assumption**



6 **Adjust final demand**

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METHOD

7 **Calculate household GHG emissions targets per country based on 1.5°C-compatible pathways (IPCC SR 1.5)**

8 **Consumption-based footprints and overshoots (for EU27)**

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RESULTS

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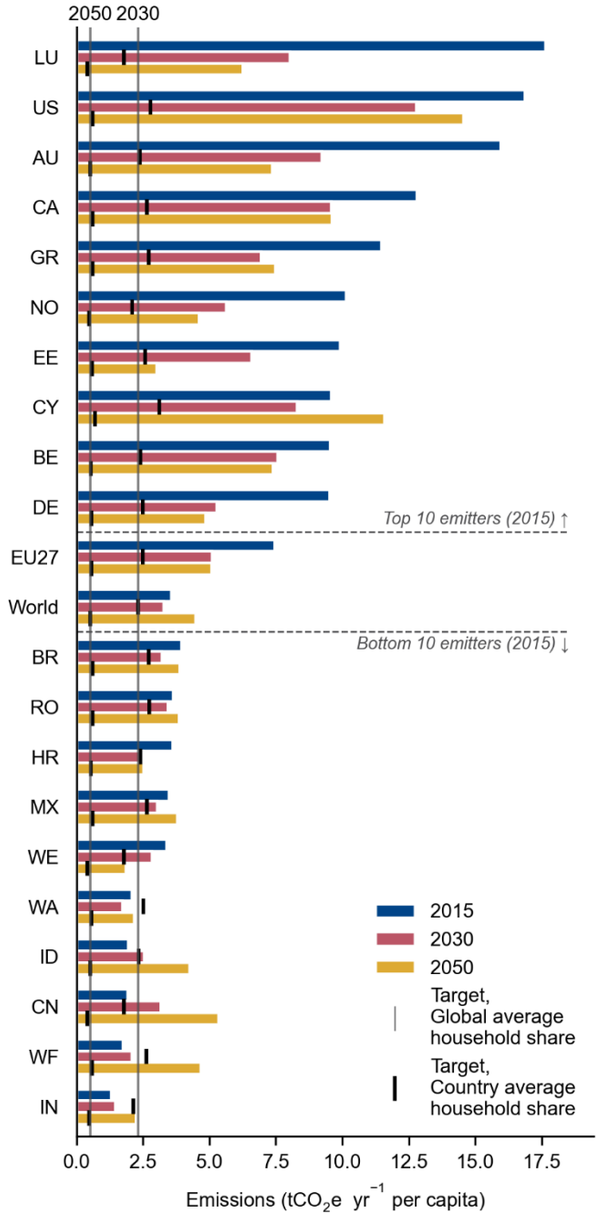
HOUSEHOLD CARBON FOOTPRINTS IN 2015, PROJECTIONS AND TARGETS IN 2030, 2050



1.5°C household emissions targets (global)

2030: 2.33 tCO_2e/cap

2050: 0.52 tCO_2e/cap

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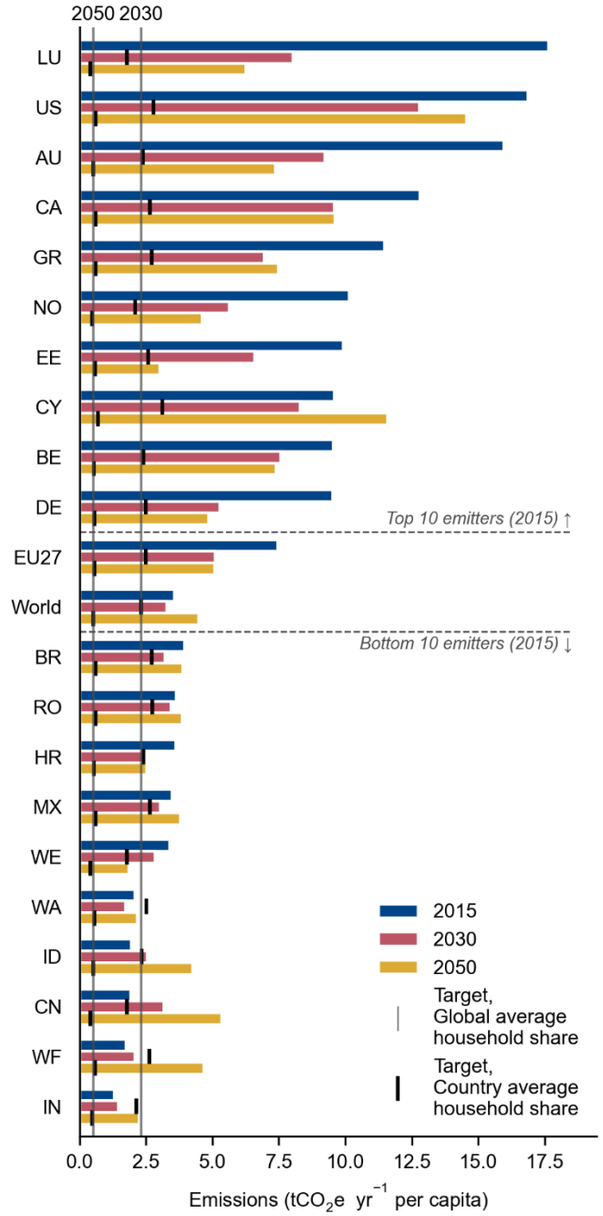
HOUSEHOLD CARBON FOOTPRINTS IN 2015, PROJECTIONS AND TARGETS IN 2030, 2050



1.5°C household emissions targets (global)

2030: 2.33 tCO_2e/cap

2050: 0.52 tCO_2e/cap

No EU27 countries meet 2030 or 2050 targets

→

EU27 overshoots:

2030: 2.46 tCO_2e/cap

2050: 4.55 tCO_2e/cap

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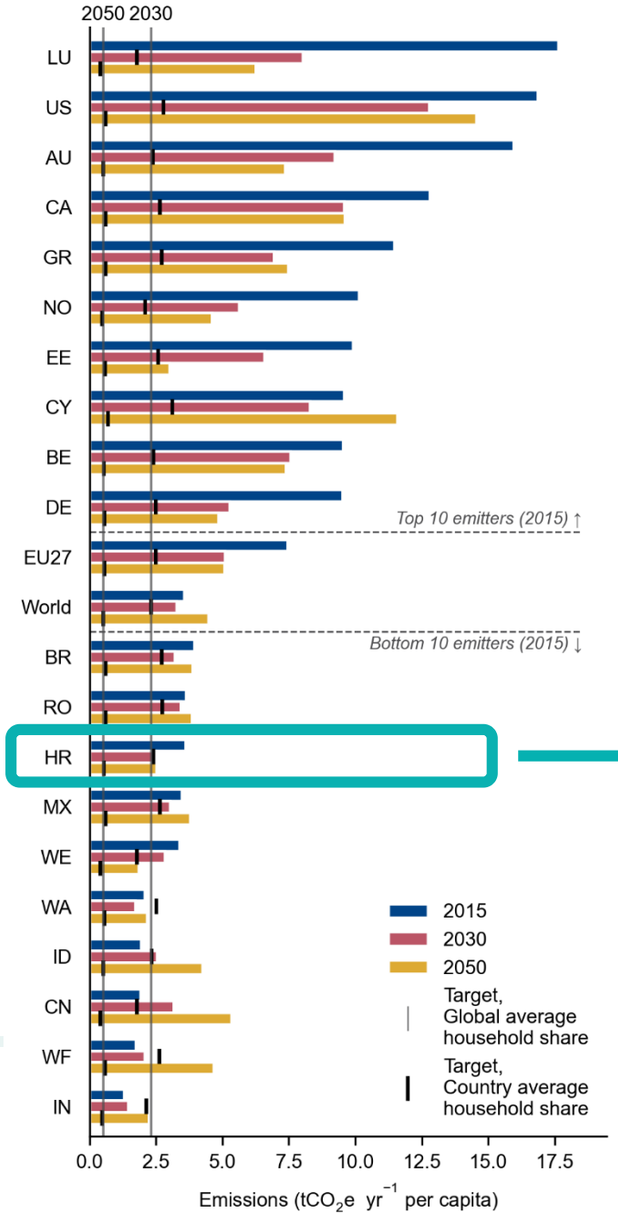
HOUSEHOLD CARBON FOOTPRINTS IN 2015, PROJECTIONS AND TARGETS IN 2030, 2050



1.5°C household emissions targets (global)

2030: 2.33 tCO_2e/cap

2050: 0.52 tCO_2e/cap

Croatia (2.49 tCO_2e/cap) and Slovakia (2.46 tCO_2e/cap) within 10% of 2030 target

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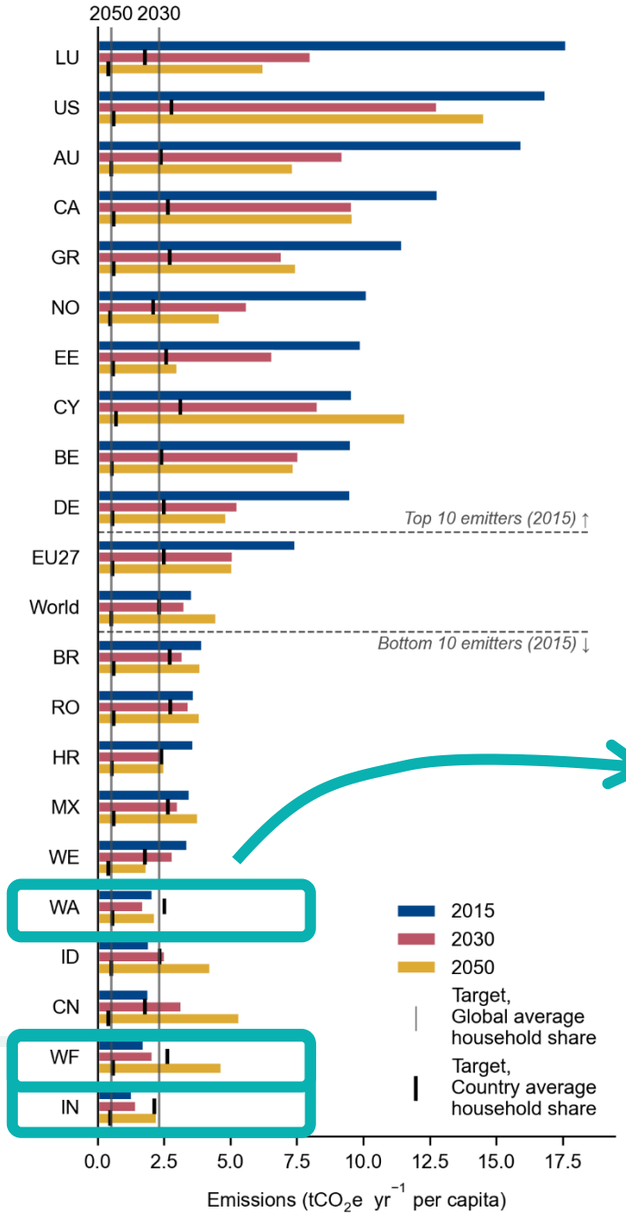
HOUSEHOLD CARBON FOOTPRINTS IN 2015, PROJECTIONS AND TARGETS IN 2030, 2050



1.5°C household emissions targets (global)

2030: 2.33 tCO_2e/cap

2050: 0.52 tCO_2e/cap

India, RoW Africa, RoW Asia meet 2030 target

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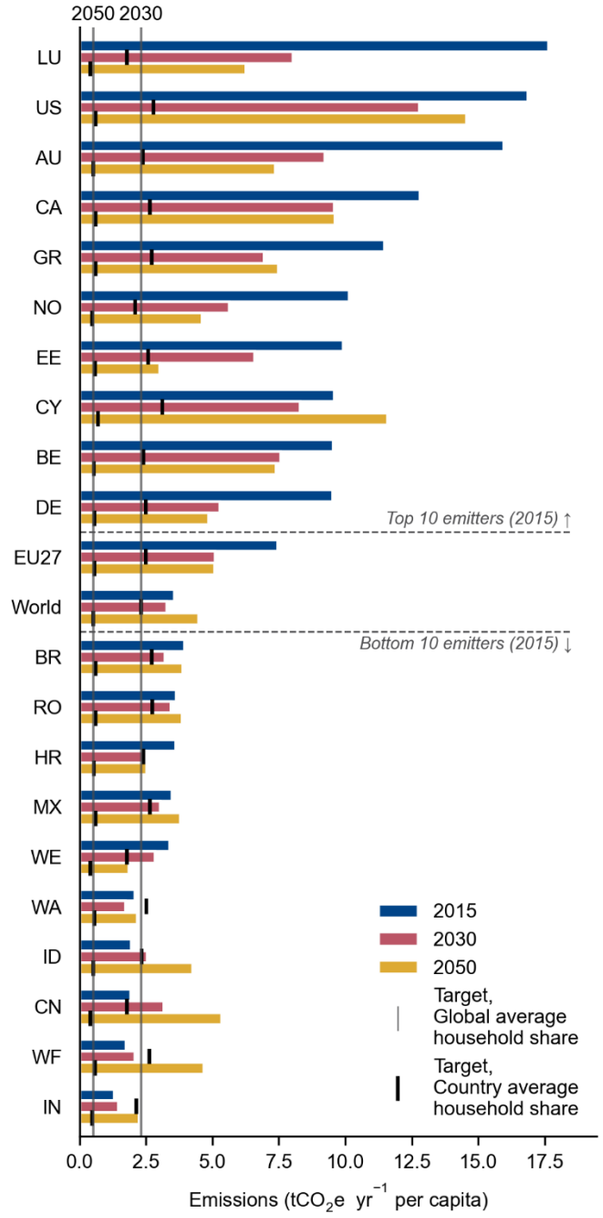
HOUSEHOLD CARBON FOOTPRINTS IN 2015, PROJECTIONS AND TARGETS IN 2030, 2050



No countries meet 2050 target

Household carbon footprint projections (global)

2030: 3.28 tCO_2e/cap

2050: 4.47 tCO_2e/cap

→

Global overshoots:

2030: 0.96 tCO_2e/cap

2050: 3.95 tCO_2e/cap

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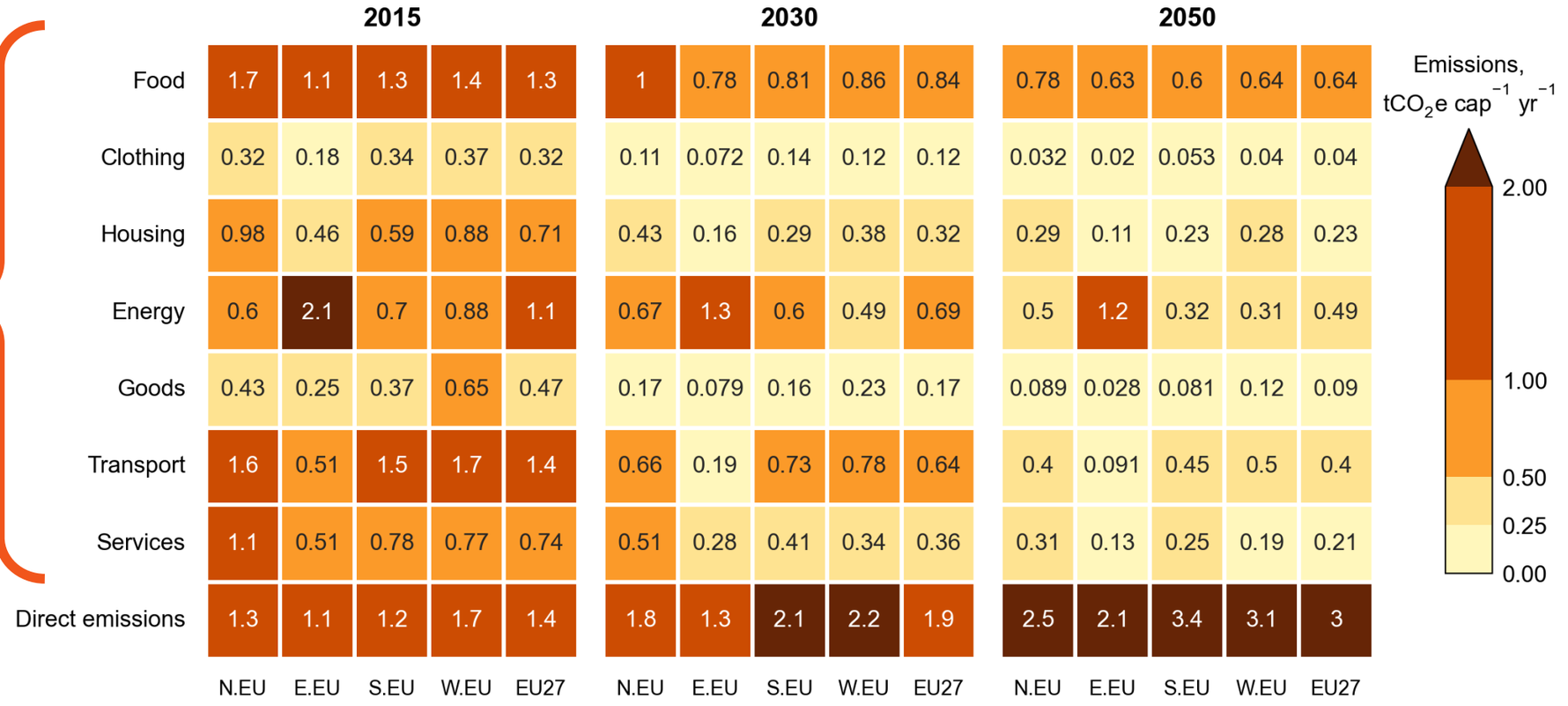
INDIRECT EMISSIONS FROM HOUSEHOLD CONSUMPTION DECREASE SUBSTANTIALLY

Reduction in indirect emissions in the EU27

- **-48% in 2030**
- **-65% by 2050**



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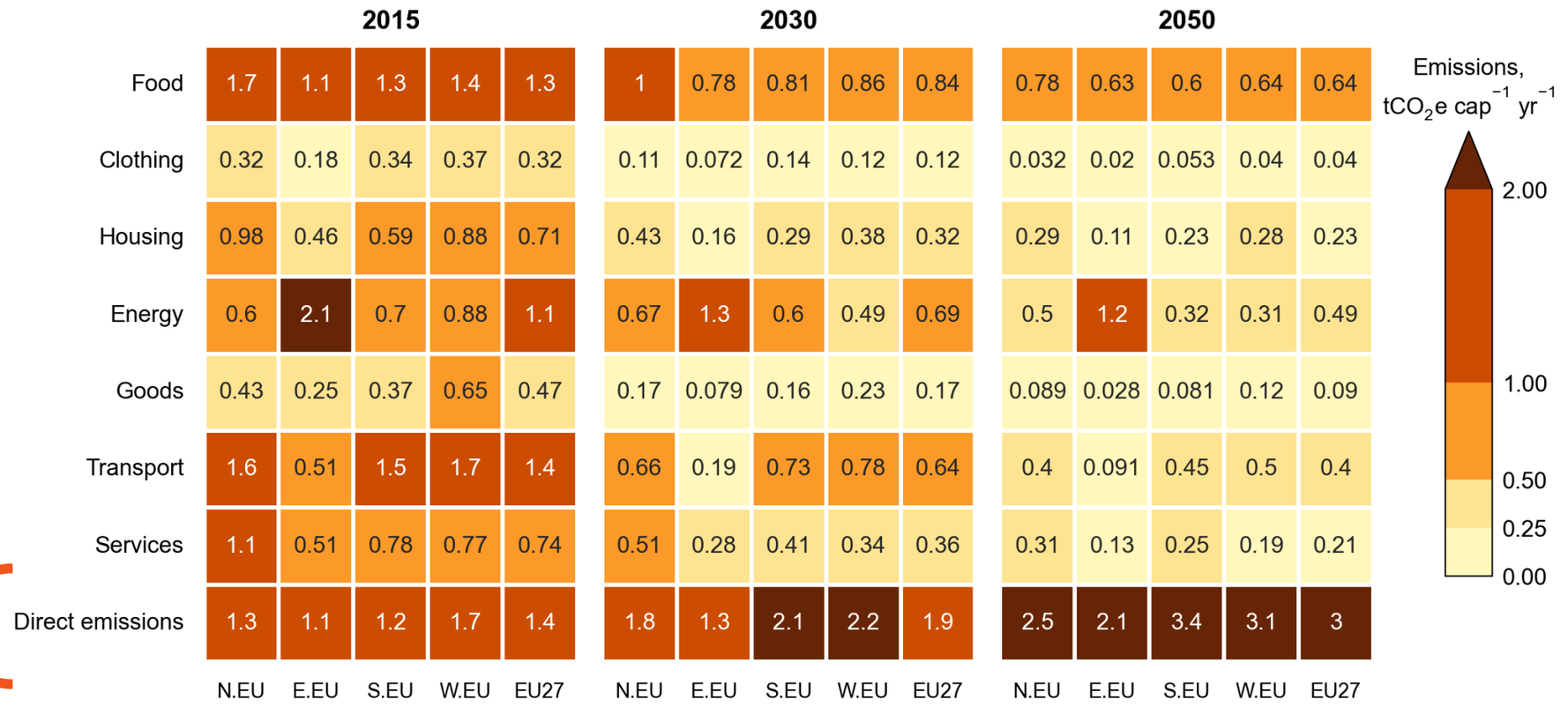
DIRECT EMISSIONS INCREASE CONSIDERABLY, DRIVEN BY RISING WEALTH

Increase in direct emissions in the EU27

- +55% in 2030
- +110% by 2050



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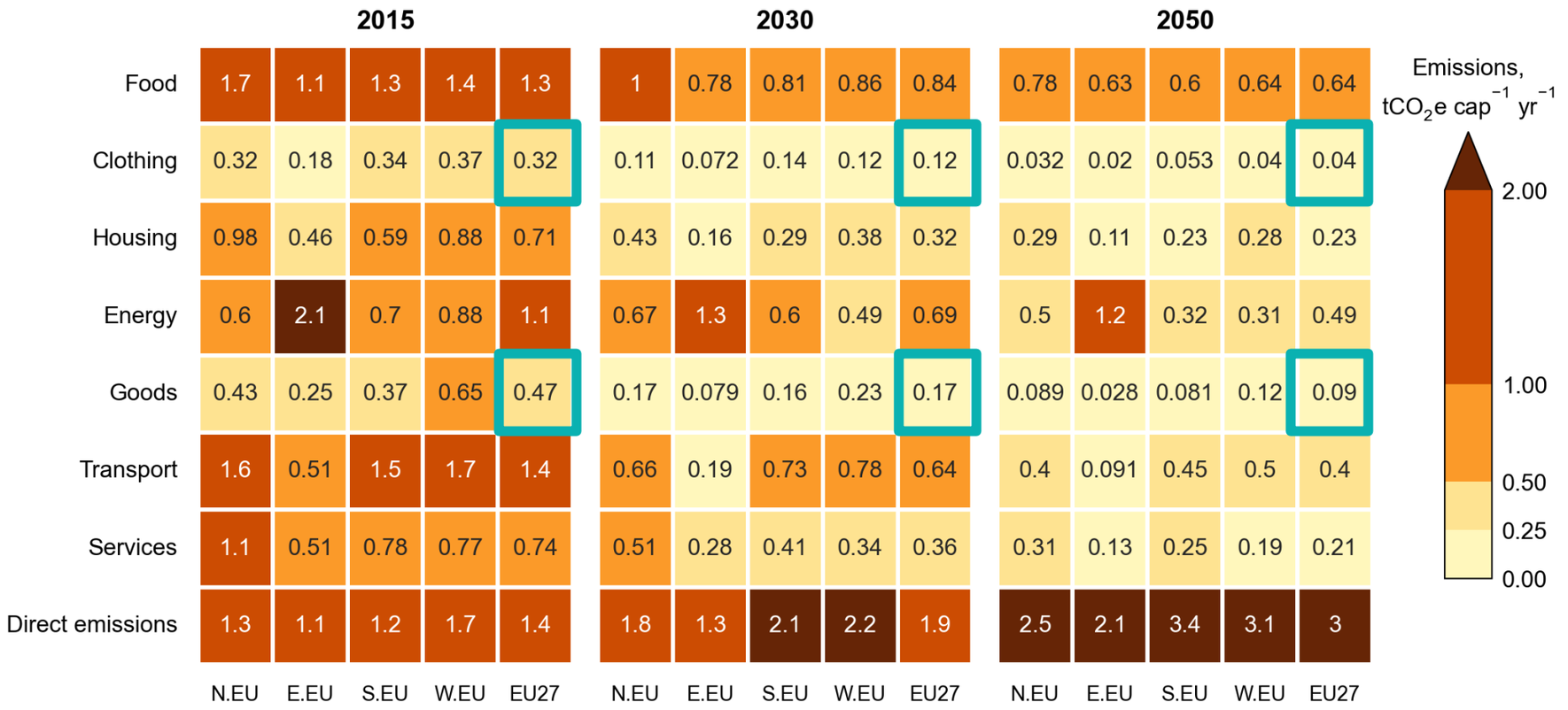
ENERGY AND FOOD SECTORS MOST DIFFICULT TO DECARBONIZE; CLOTHING AND GOODS HAVE LARGEST REDUCTIONS

- **Greatest decarbonization of clothing (88%) and goods (81%) footprints**



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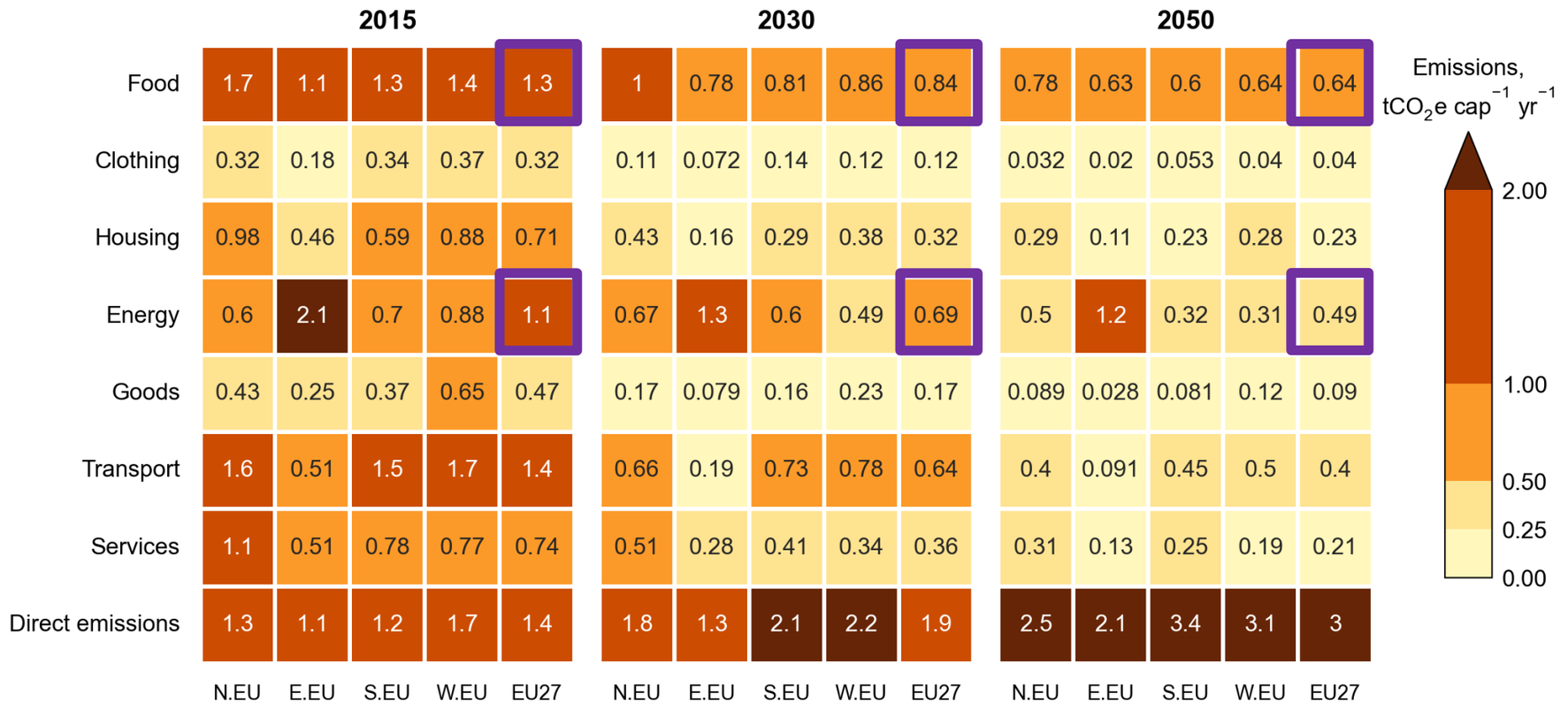
ENERGY AND FOOD SECTORS MOST DIFFICULT TO DECARBONIZE; CLOTHING AND GOODS HAVE LARGEST REDUCTIONS

- **Greatest decarbonization of clothing (88%) and goods (81%) footprints**
- **Energy and food only ~50% reduction in emissions**



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OUTLOOK

- **Industrial change alone not sufficient for 1.5°C → Lifestyle changes will be required**
  - **Ongoing work on changes & rebounds; coming soon!**
- **More wealth associated with more direct emissions → direct emissions reduction promising; ‘green growth’ consumption uncertain**

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Thank you!

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