

Versnellen van systeemtransities

En de rol van
'sufficiency

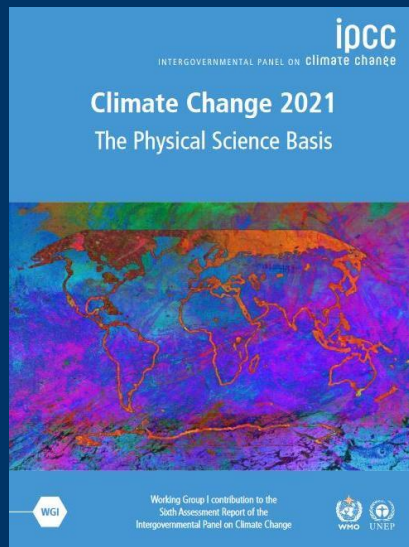
Heleen de Coninck
TU/e & RU

TNO symposium, Den Haag
26 januari 2023

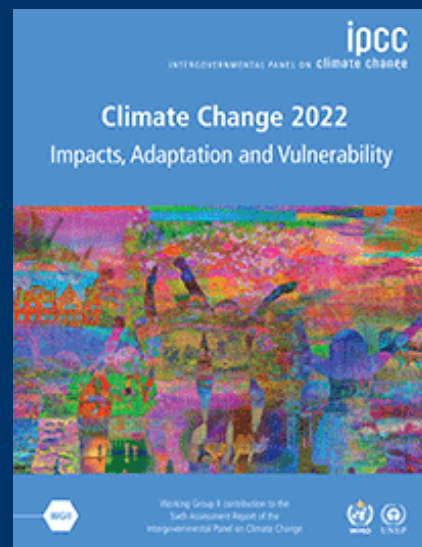




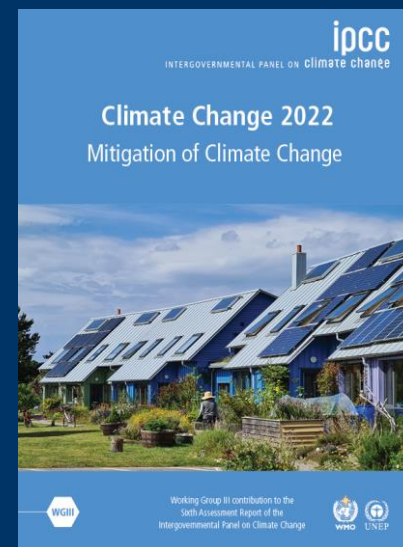
2018



2021



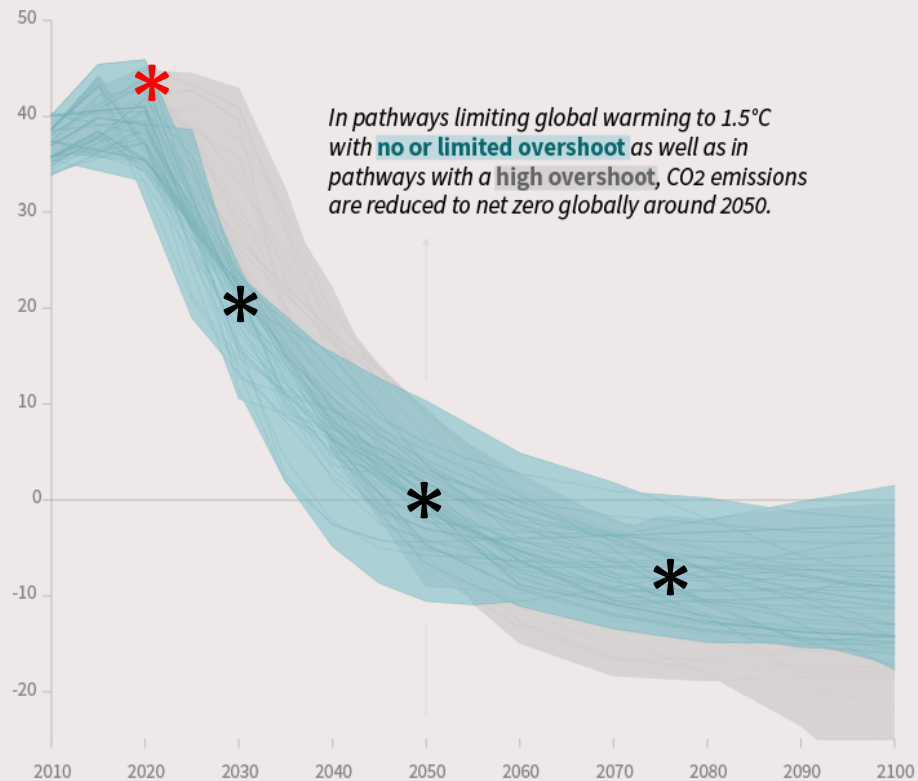
2022



2022

Global total net CO₂ emissions

Billion tonnes of CO₂/yr



*In pathways limiting global warming to 1.5°C with **no or limited overshoot** as well as in pathways with a **high overshoot**, CO₂ emissions are reduced to net zero globally around 2050.*

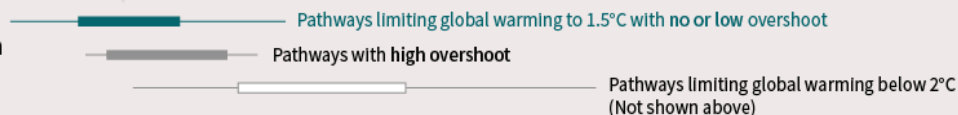
Peak GHG emissions before 2025

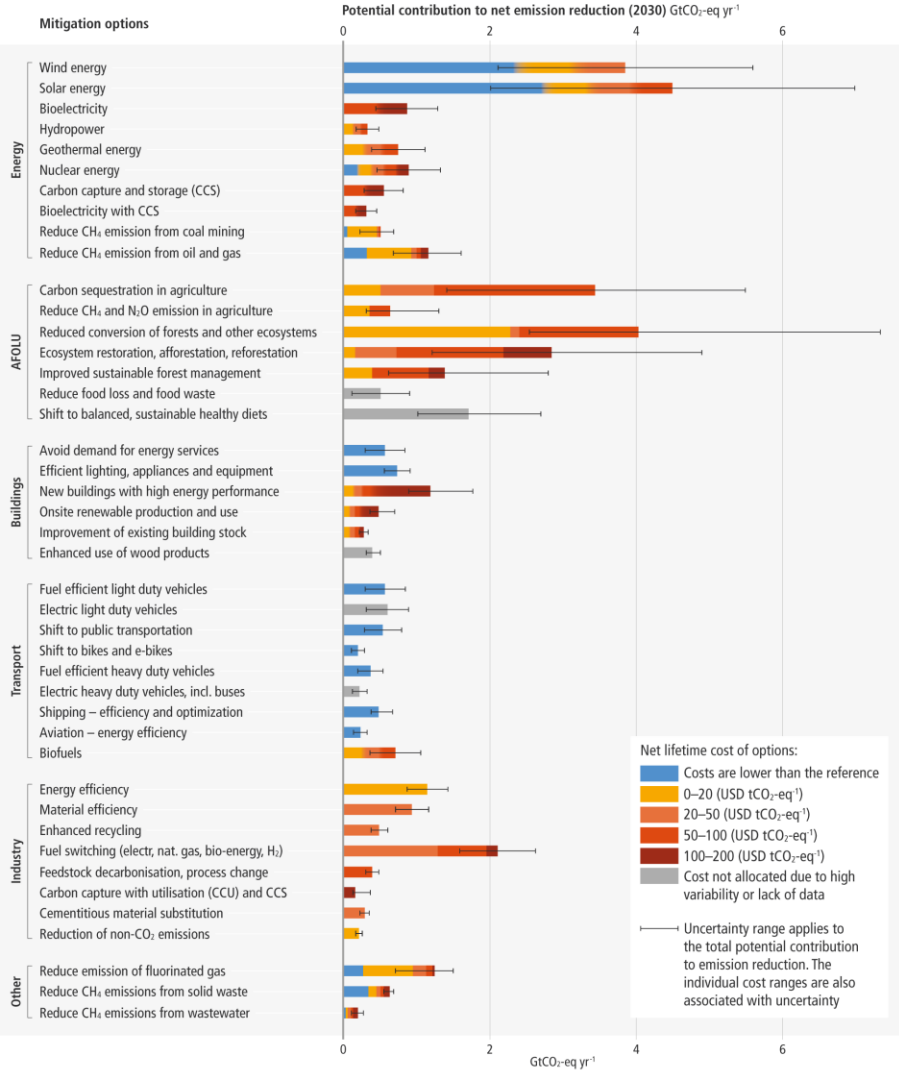
Halving CO₂ in 2030

Net zero CO₂ in 2050

Carbon dioxide removal

Timing of net zero CO₂
Line widths depict the 5-95th percentile and the 25-75th percentile of scenarios





Veel acties op de korte termijn zijn haalbaar

Mondiale emissies kunnen in 2030 worden gehalveerd met opties die minder kosten dan 100 USD/tCO₂e

‘Sufficiency’-opties komen positief uit de bus:

- Kosten-efficient
- Synergie met SDGs

Maar bijna alle opties hebben institutionele barrières

A photograph showing several blue solar panels in the foreground and several white wind turbines in the background against a clear blue sky.

Energy

An aerial photograph of a coastal landscape featuring a wide, sandy beach, a line of green trees, and a road or path running parallel to the shore. The sea is visible in the distance under a cloudy sky.

Land & ecosystems

A street-level photograph of a city street. In the foreground, many bicycles are parked along the sidewalk. People are walking and riding bicycles. In the background, there are multi-story brick buildings, one of which has a shop sign that says "oppio".

**Urban &
Infrastructure**

An aerial photograph of an industrial area. The scene is filled with various industrial buildings, structures, and infrastructure. There are large storage tanks, pipes, and a complex network of roads and tracks. The area is surrounded by green fields and some residential buildings in the distance.

Industry

**Multilevel
Governance**

**Institutional
Capacities**

**Behavioural
Change**

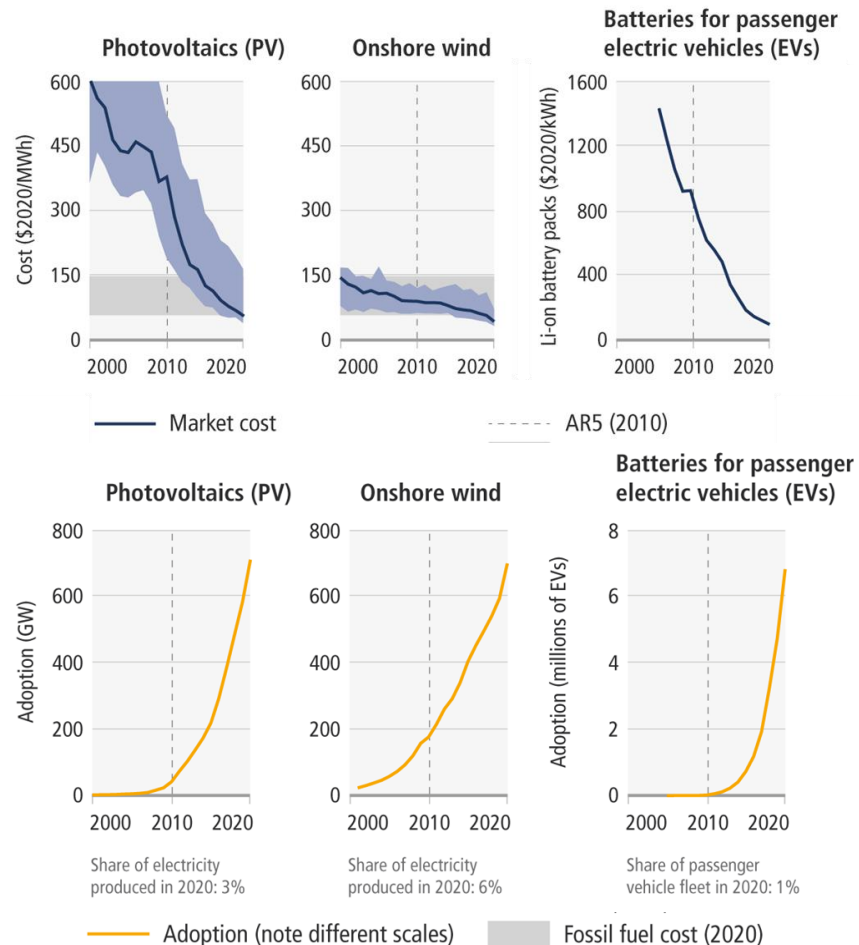
**Technological
Innovation**

**Policy
Instruments**

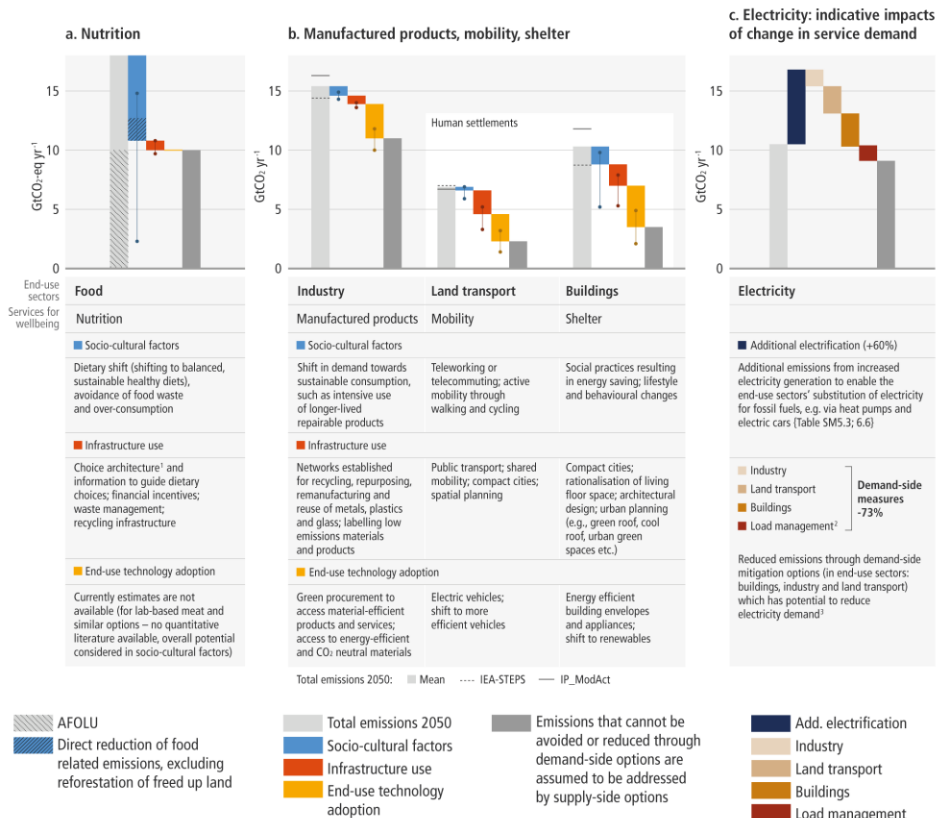
Finance

Technologie en innovatie

- **Investeringsen en beleid** hebben voor technologische innovatie gezorgd
- **Sommige opties zijn** technisch haalbaar en kosteneffectief en geliefd bij het publiek, maar gebeuren toch niet vanwege institutionele barrières
- Technologie is ongelijk verdeeld: **langzamer** in de meeste ontwikkelingslanden, met name de armste landen
- Terugveereffecten voorkomen met CO₂ beprijzing



Demand-side mitigation can be achieved through changes in socio-cultural factors, infrastructure design and use, and end-use technology adoption by 2050.



Gedragsverandering en vraag

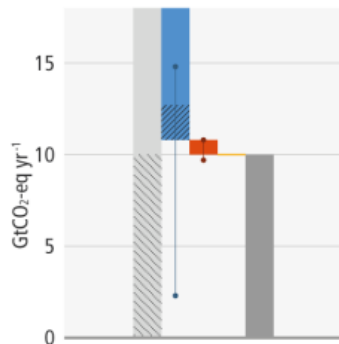
- Kan mondiaal emissies in 2050 reduceren met **40-70%**
- Wandelen, fietsen, elektrisch (openbaar) vervoer, verminderen vliegverkeer, en aanpassingen in huizen leveren grote bijdragen
- **lifestyleverandering vergt systeemverandering** door de hele maatschappij
- Sommige mensen hebben nog extra woonruimte, energie en hulpbronnen nodig

¹ The presentation of choices to consumers, and the impact of that presentation on consumer decision-making.

² Load management refers to demand-side flexibility that cuts across all sectors and can be achieved through incentive design like time of use pricing/monitoring by artificial intelligence, diversification of storage facilities, etc.

³ The impact of demand-side mitigation on electricity sector emissions depends on the baseline carbon intensity of electricity supply, which is scenario dependent.

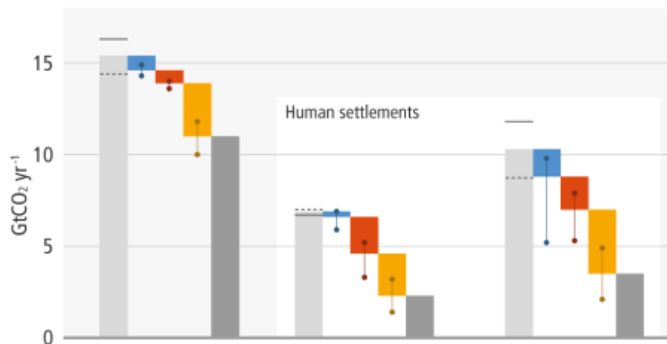
a. Nutrition



End-use sectors
Services for wellbeing

Food
Nutrition
Socio-cultural factors
Dietary shift (shifting to balanced, sustainable healthy diets), avoidance of food waste and over-consumption
Infrastructure use
Choice architecture ¹ and information to guide dietary choices; financial incentives; waste management; recycling infrastructure
End-use technology adoption
Currently estimates are not available (for lab-based meat and similar options – no quantitative literature available, overall potential considered in socio-cultural factors)

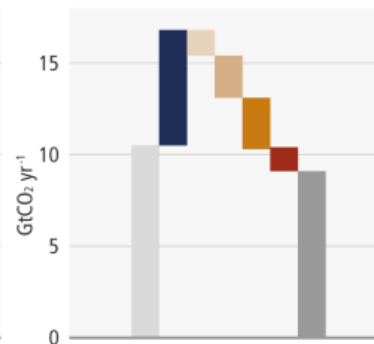
b. Manufactured products, mobility, shelter



Industry	Land transport	Buildings
Manufactured products	Mobility	Shelter
Socio-cultural factors		
Shift in demand towards sustainable consumption, such as intensive use of longer-lived repairable products	Teleworking or telecommuting; active mobility through walking and cycling	Social practices resulting in energy saving; lifestyle and behavioural changes
Infrastructure use		
Networks established for recycling, repurposing, remanufacturing and reuse of metals, plastics and glass; labelling low emissions materials and products	Public transport; shared mobility; compact cities; spatial planning	Compact cities; rationalisation of living floor space; architectural design; urban planning (e.g., green roof, cool roof, urban green spaces etc.)
End-use technology adoption		
Green procurement to access material-efficient products and services; access to energy-efficient and CO ₂ neutral materials	Electric vehicles; shift to more efficient vehicles	Energy efficient building envelopes and appliances; shift to renewables

Total emissions 2050: ■ Mean ---- IEA-STEPS — IP_ModAct

c. Electricity: indicative impacts of change in service demand



Electricity
Additional electrification (+60%)
Additional emissions from increased electricity generation to enable the end-use sectors' substitution of electricity for fossil fuels, e.g. via heat pumps and electric cars (Table SM5.3; 6.6)
Demand-side measures -73%
Industry
Land transport
Buildings
Load management?
Reduced emissions through demand-side mitigation options (in end-use sectors: buildings, industry and land transport) which has potential to reduce electricity demand ³

Wat kunnen we met de enabling conditions for sufficiency?

