



# NET ZERO BY 2050: FROM WHETHER TO HOW

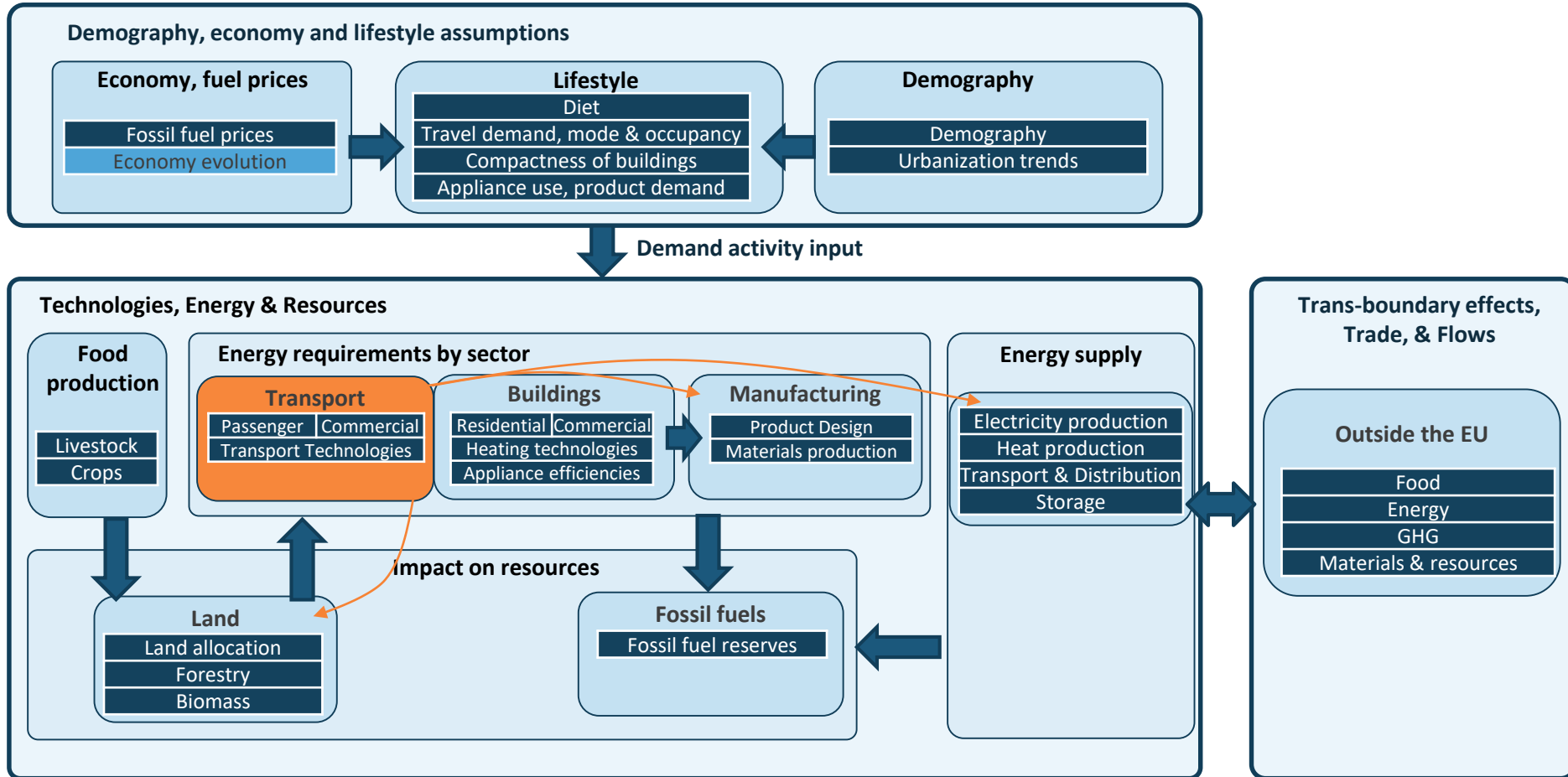
Zero Emissions Pathways  
to the Europe We Want

T&E panel  
November 2018

## ▪ Context

- Decarbonizing transport is key to reach net-zero emissions
- But transport is linked to other sectors: trade-offs & side-effects

# Structure of the ECF EU CTI 2050 Roadmap model



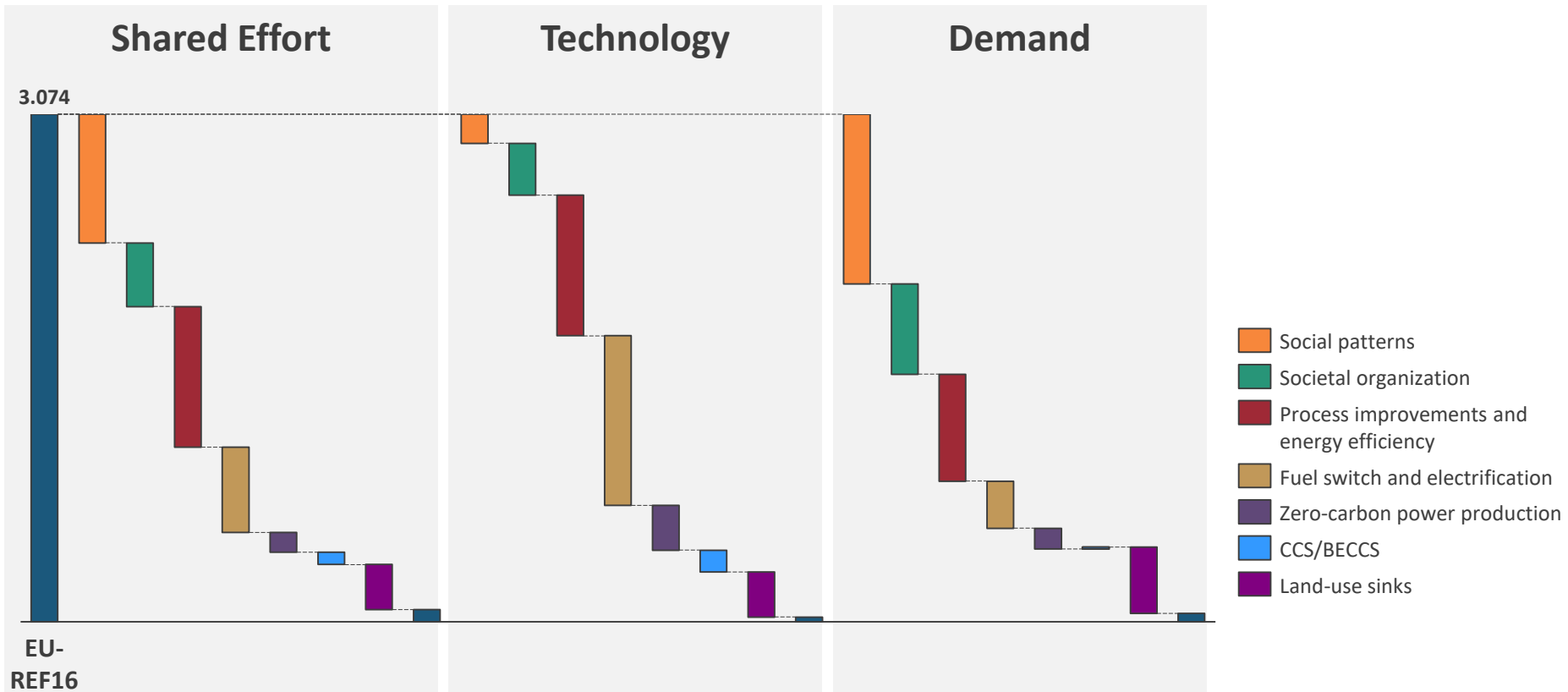
# Levers are grouped in 7 categories to discuss scenarios implications

| Category  | Description  |
|---|--|
| <b>Social patterns</b>                            | Demand-side levers driven by social context and lifestyles       |
| <b>Societal organization</b>                      | Demand-side levers driven by infrastructures and business models |
| <b>Process improvements and energy efficiency</b> | Technologies to improve processes and energy efficiency          |
| <b>Fuel switch and electrification</b>            | Switching to low-carbon fuels                                    |
| <b>Zero-carbon power production</b>               | Power supply specific levers                                     |
| <b>CCS/BECCS</b>                                  | Carbon Capture & storage potentially combined with bioenergy     |
| <b>Land-use sinks</b>                             | Increasing natural sinks through land use                        |

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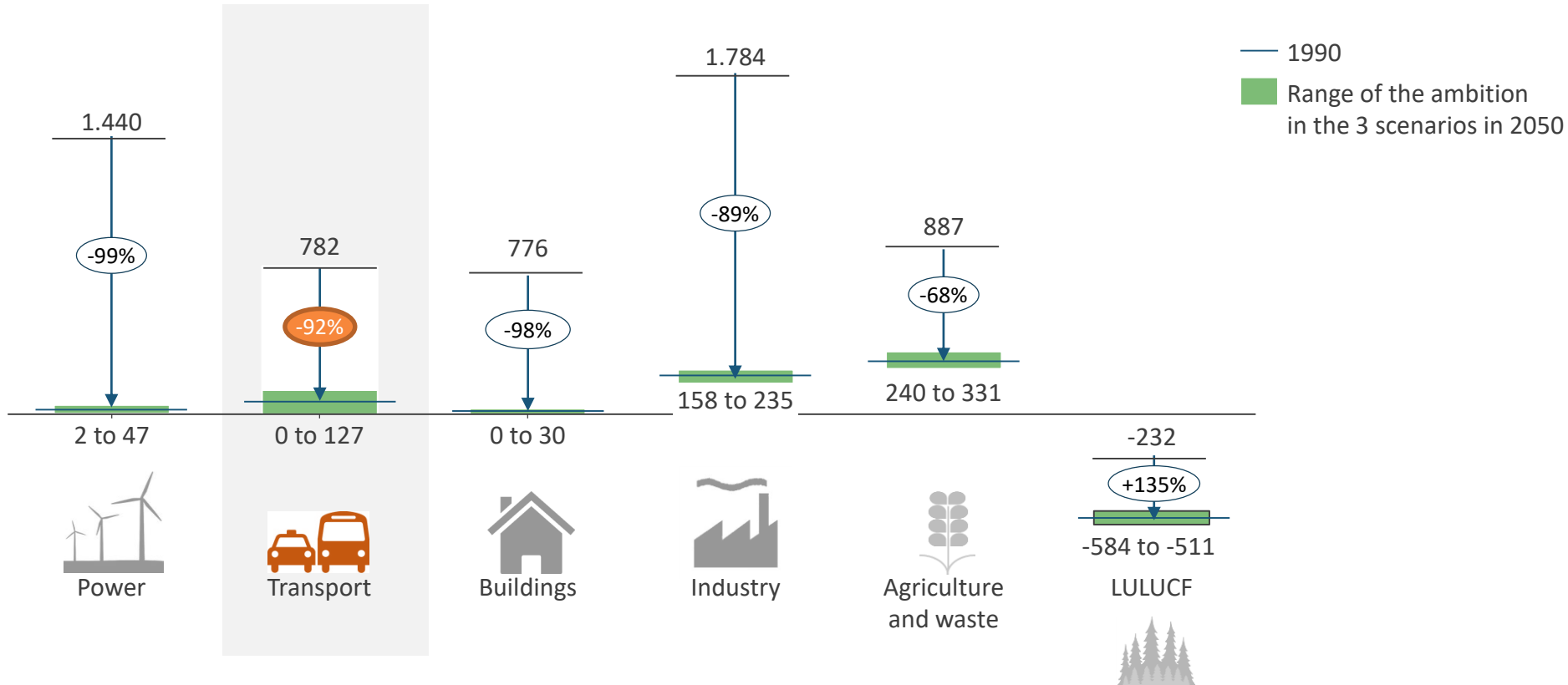
# The impact of key lever groups differs significantly across the three scenarios

GHG emissions by lever category in the 3 net-zero scenarios  
[MtCO<sub>2</sub>e]



# ~90% emissions reduction is required for transport in average

**GHG emission reductions by sector between 1990 and 2050 in the 3 net-zero scenarios (Shared efforts, Technology, Demand)**  
[MtCO<sub>2</sub>e/year]

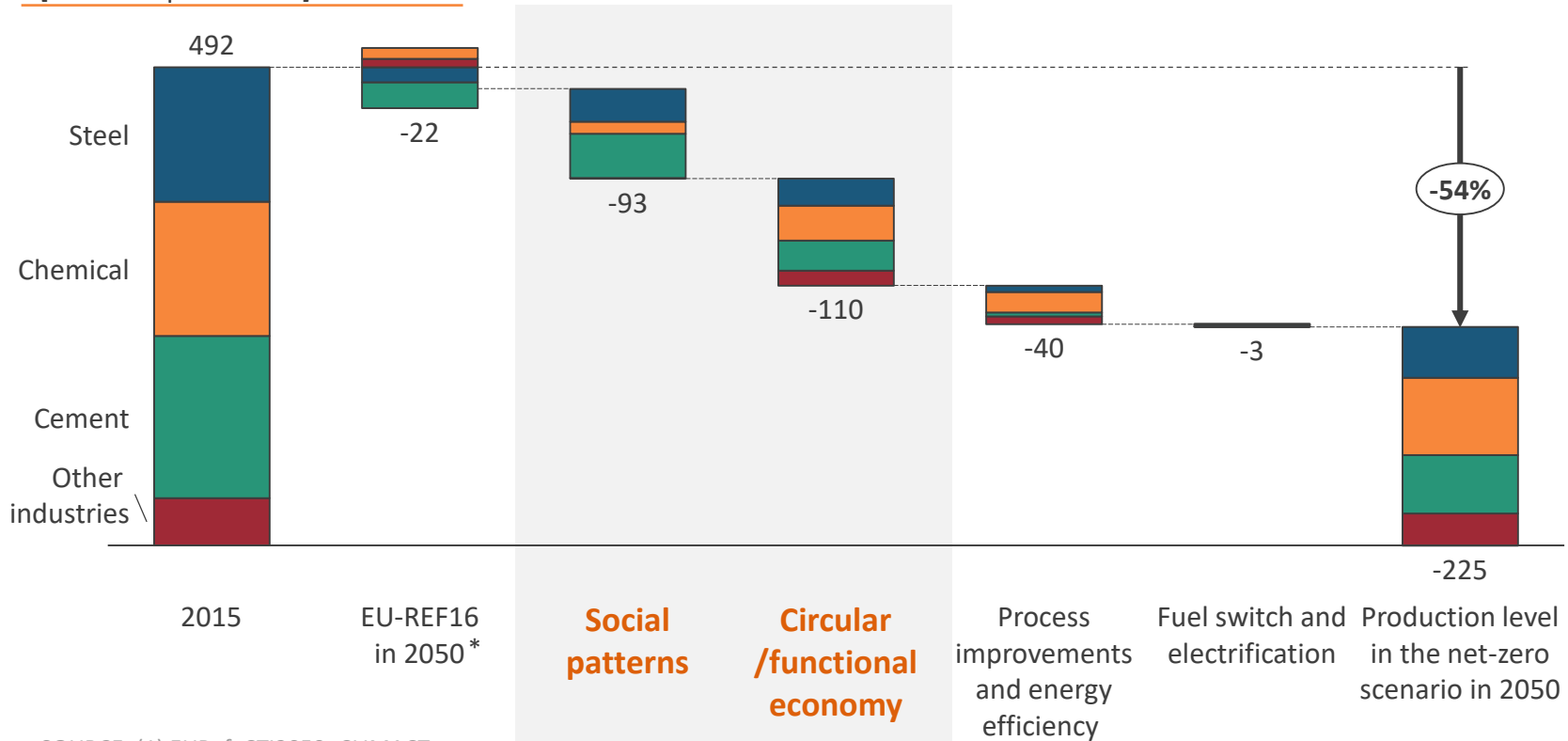


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  - **Transport and the (low-carbon) circular economy**
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# The European industrial production is expected to decrease by 2050 as a result from new consumption patterns, business models and production technologies

**Production volumes per sector**  
[Mtons of production]

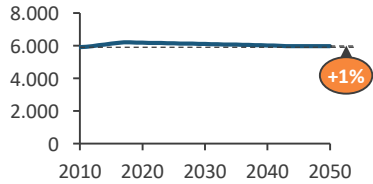


SOURCE: (1) EUREf, CTI2050, CLIMACT  
\* As modelled in the EU CTI Roadmap tool

# Impact of societal changes on the transport sector

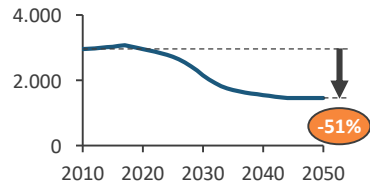
## Total transport passenger demand

[Bn km.passengers]



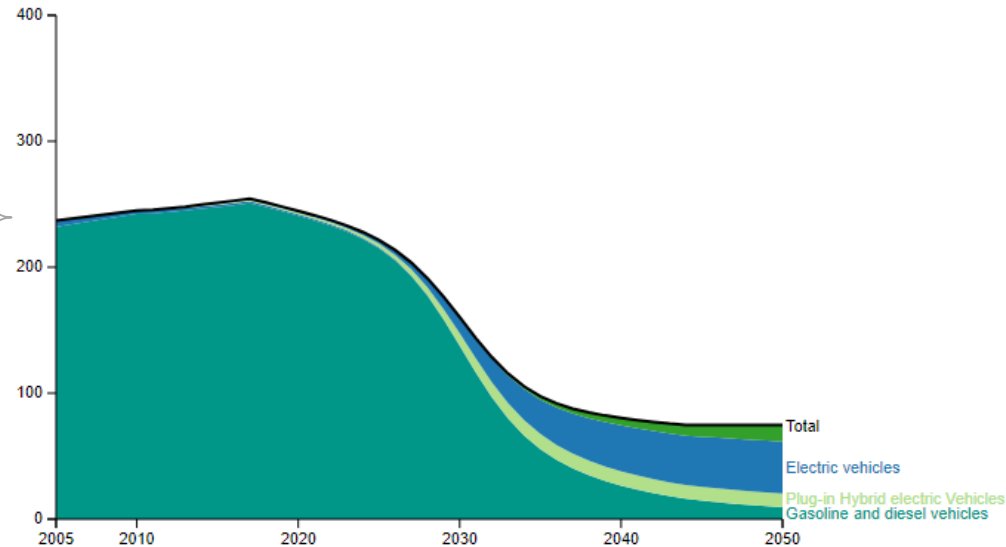
## Transport demand for LDVs

[Bn km.vehicles]



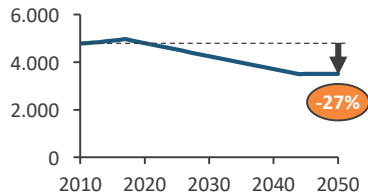
## Number and technology mix of private cars (LDVs)

[Mios of vehicles]



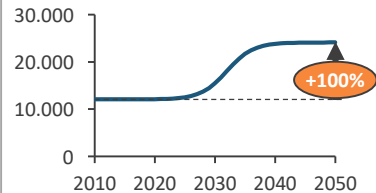
## Share of LDVs in transport passenger demand

[Bn km.passengers]



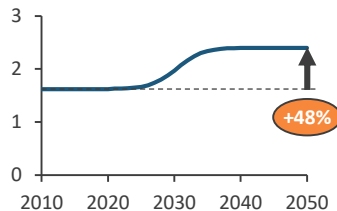
## LDV utilization

[km per vehicle]



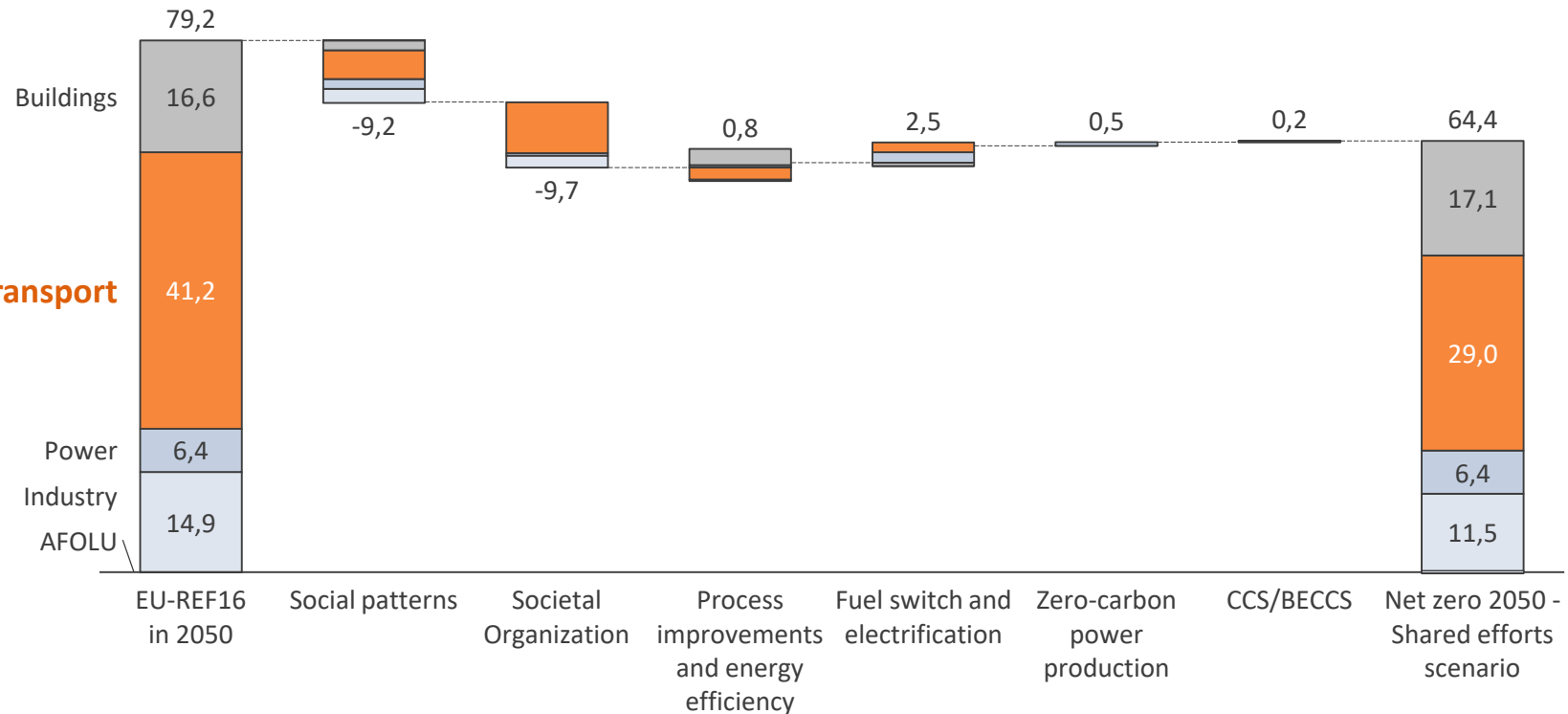
## LDV occupancy

[passengers per car]



# Net zero pathways can cost less than business-as-usual, with a strong impact from the demand-side levers

Undiscounted cumulated total costs\* by lever and sector  
[x10<sup>3</sup> billion €]

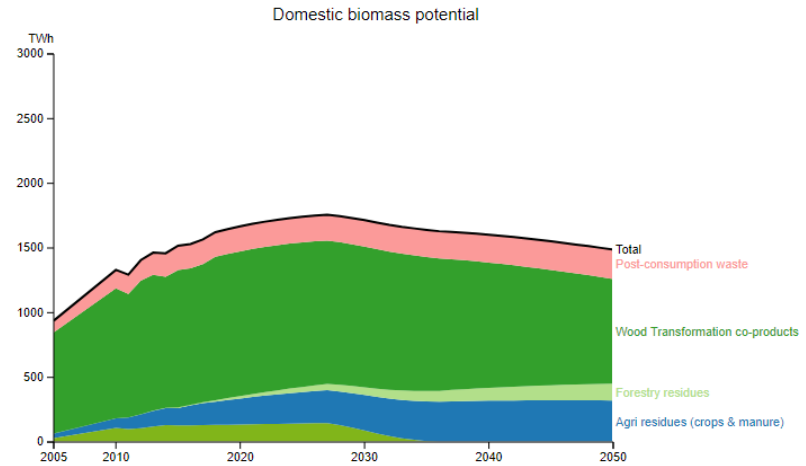
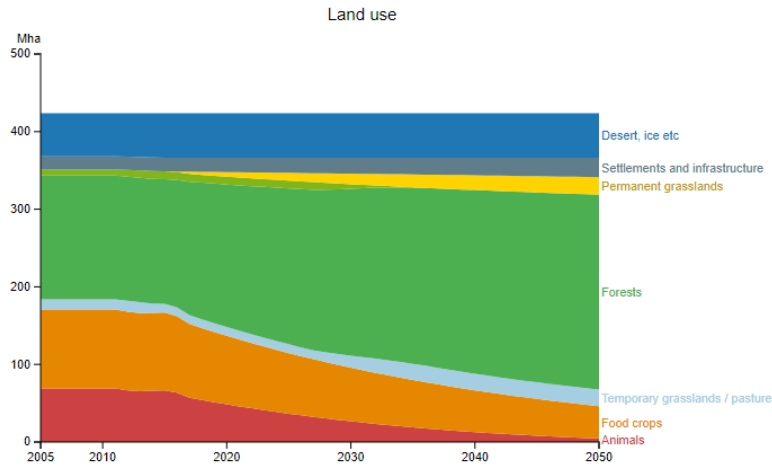


\* Total costs include CAPEX + OPEX + Fuel Costs (excluding co-benefits and externalities)

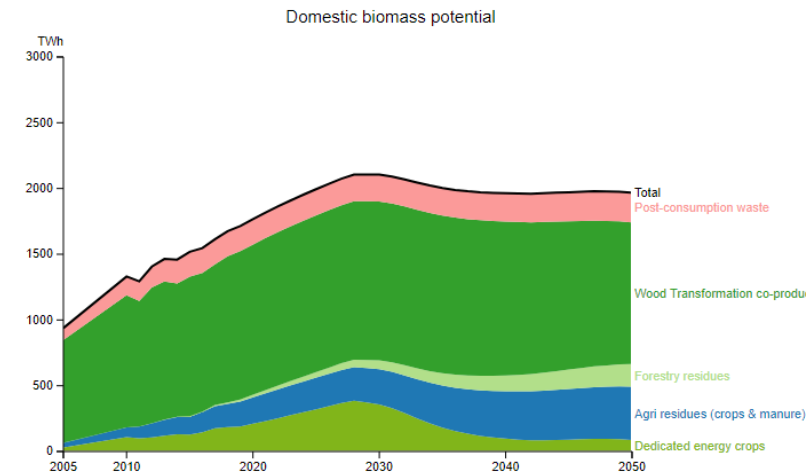
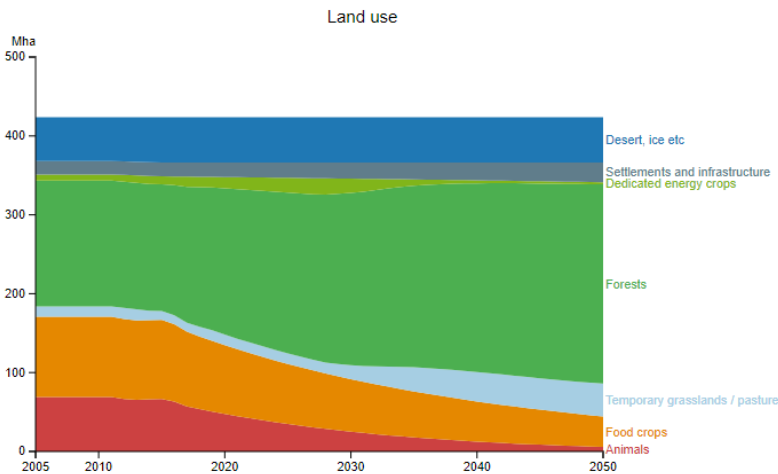
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# The sustainable bioenergy potential depends on the chosen pathway

Demand scenario

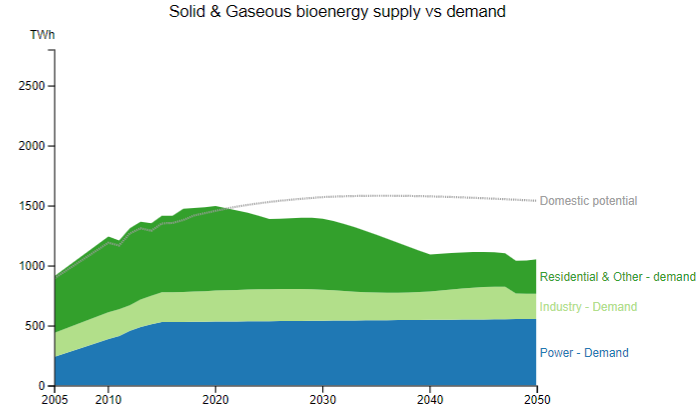
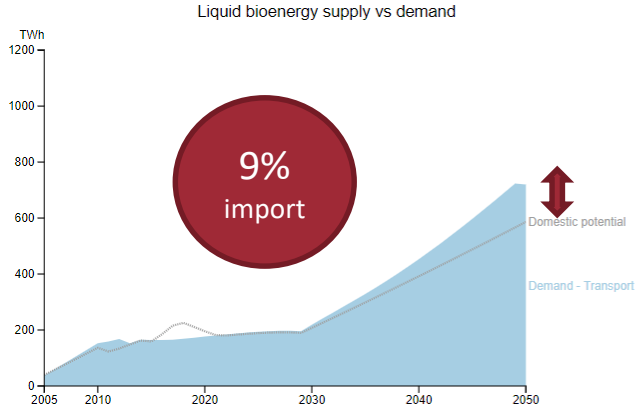


Technology scenario

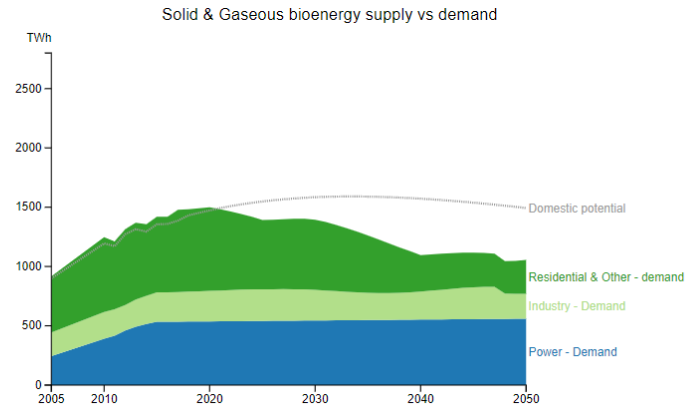
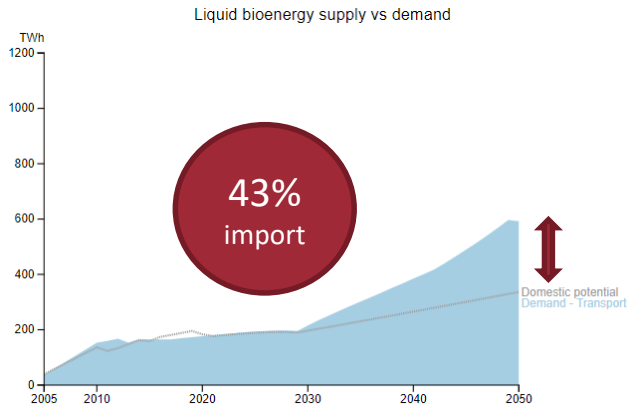


# The sustainable liquid bioenergy potential is limited matching only part of the possible demand from aviation

Aviation at Level 2 of biofuel (67% of demand low EE) + bioenergy crops

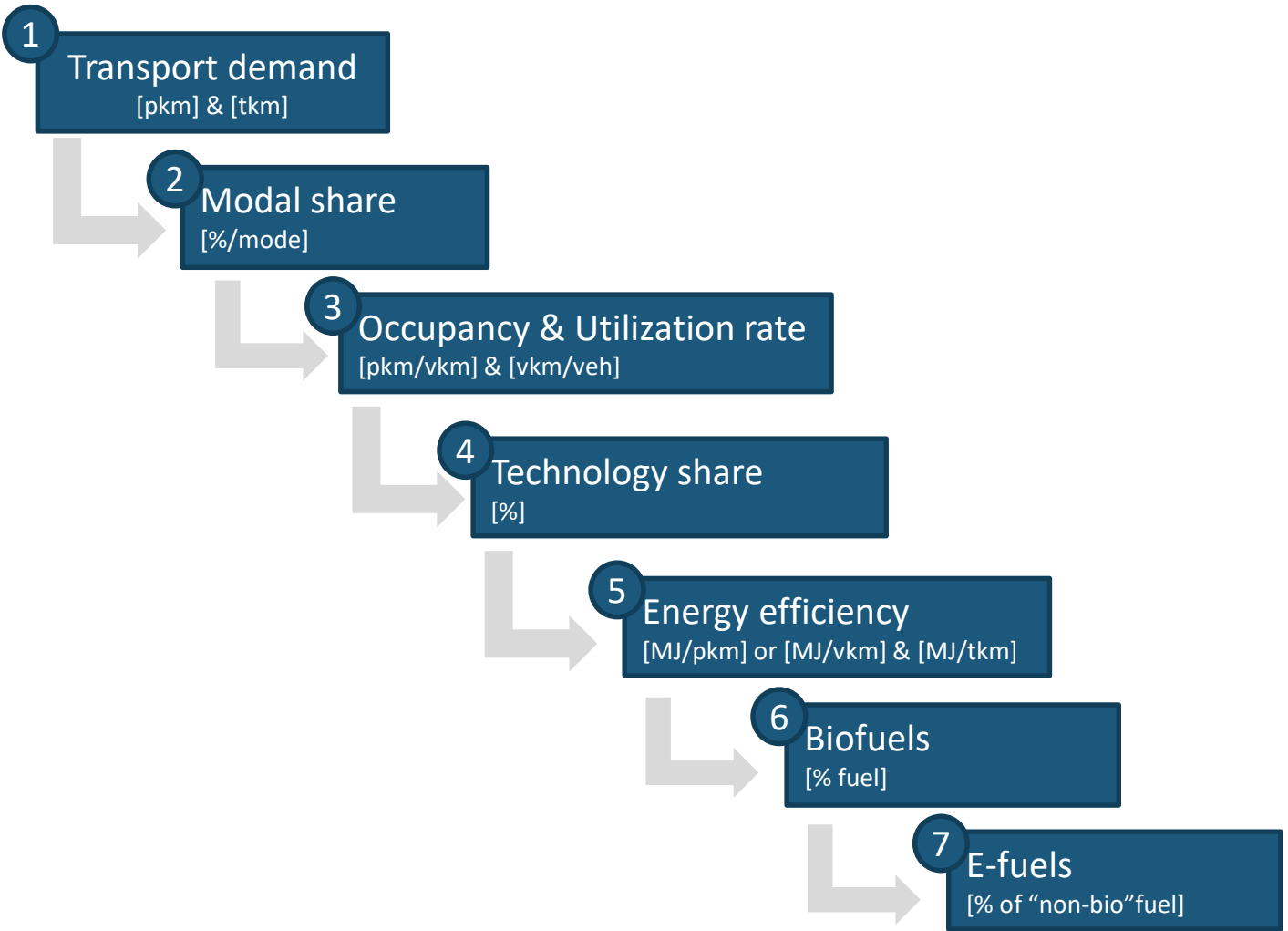


Identical scenario but without bioenergy crops



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# Hierarchy of levers is key





## Online demonstration of the simulation tool

<https://stakeholder.netzero2050.eu>

- [Electric vehicles scenario](#)

# Thank you



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Climate  
Foundation



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