

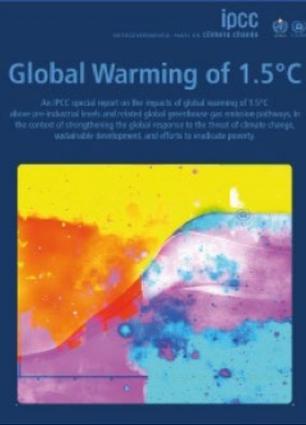
# Decarbonization of transport: A cross-sectoral perspective

Volker Krey



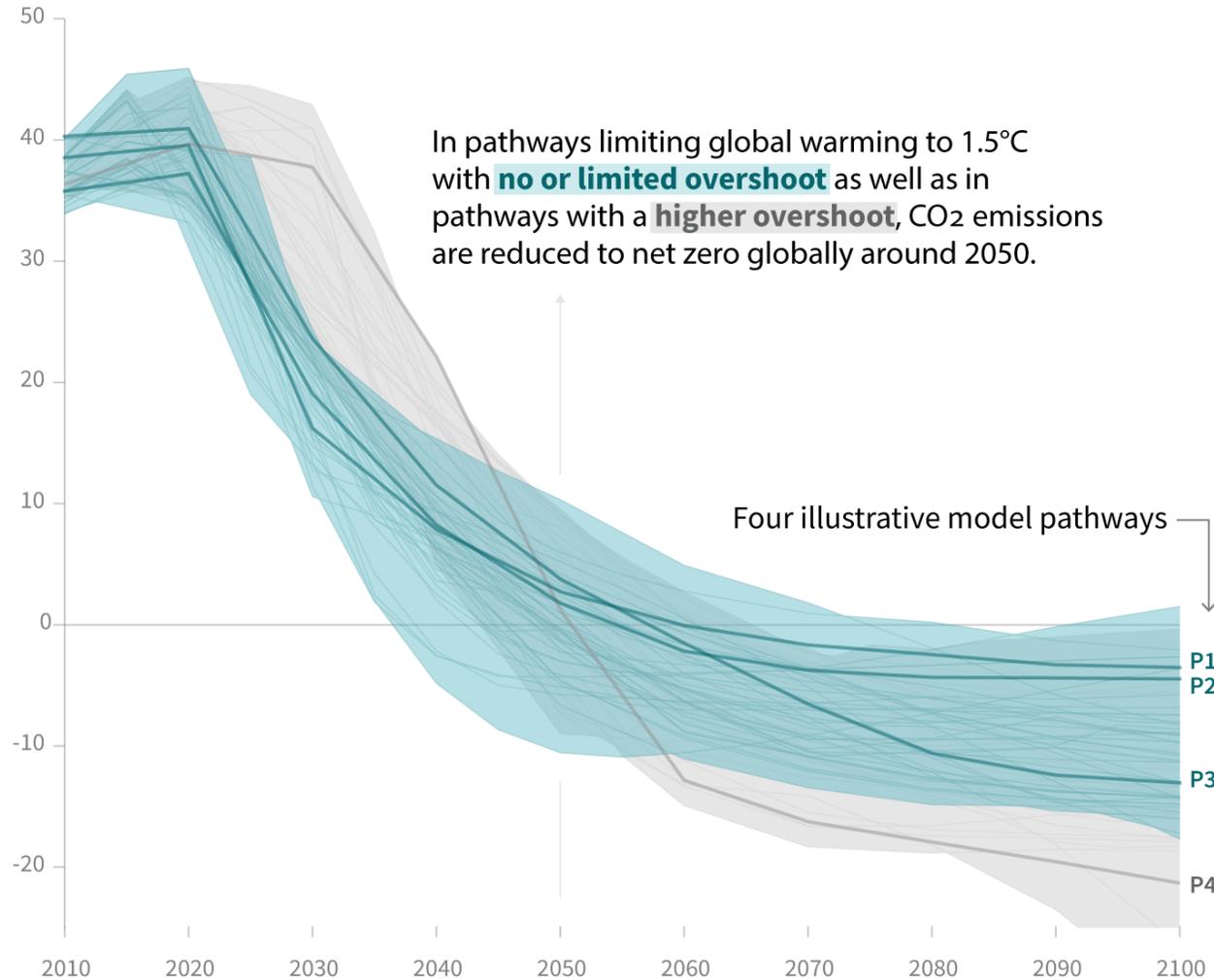
**Webinar on Decarbonisation of Transport, 9 September 2020**

# GHG emissions in 1.5°C (and 2) pathways



## Global total net CO<sub>2</sub> emissions

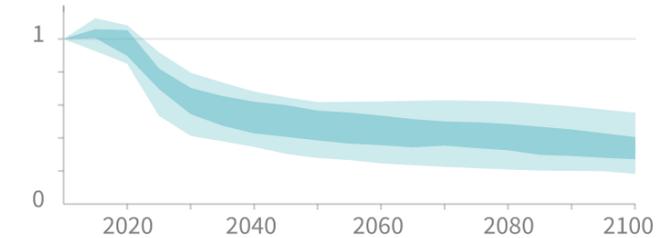
Billion tonnes of CO<sub>2</sub>/yr



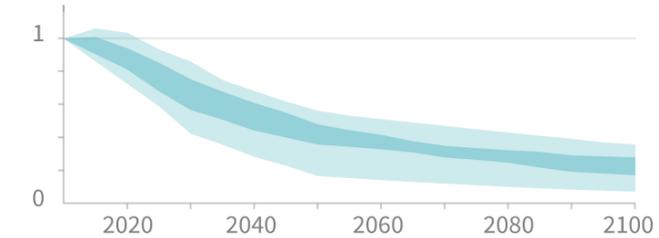
## Non-CO<sub>2</sub> emissions relative to 2010

Emissions of non-CO<sub>2</sub> forcers are also reduced or limited in pathways limiting global warming to 1.5°C with **no or limited overshoot**, but they do not reach zero globally.

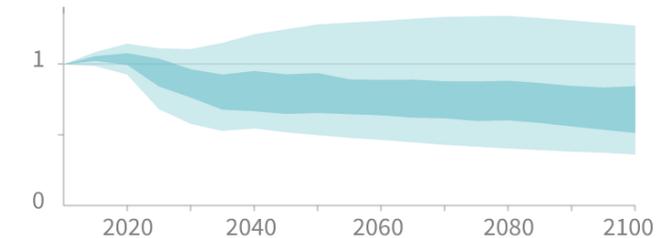
### Methane emissions



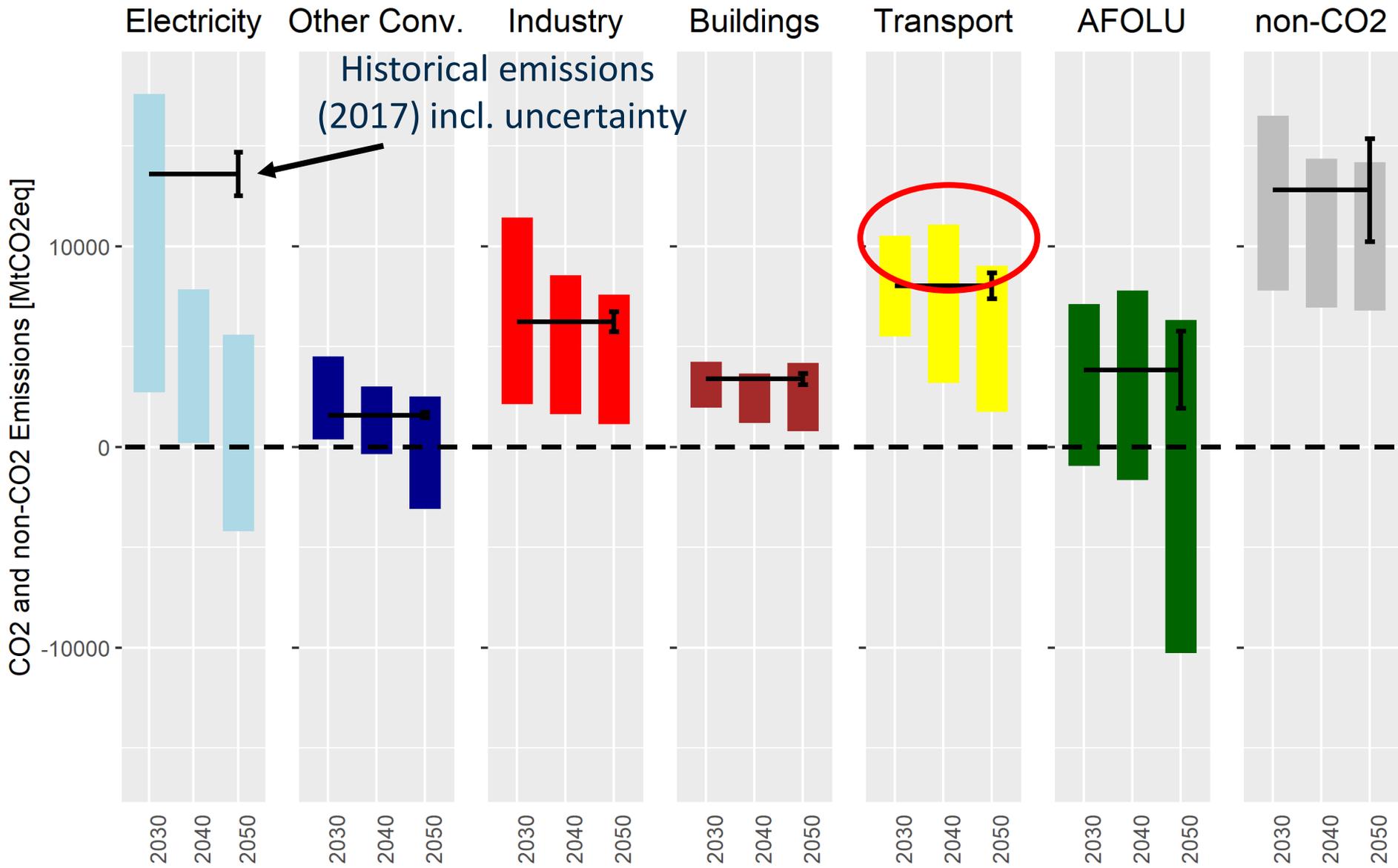
### Black carbon emissions



### Nitrous oxide emissions

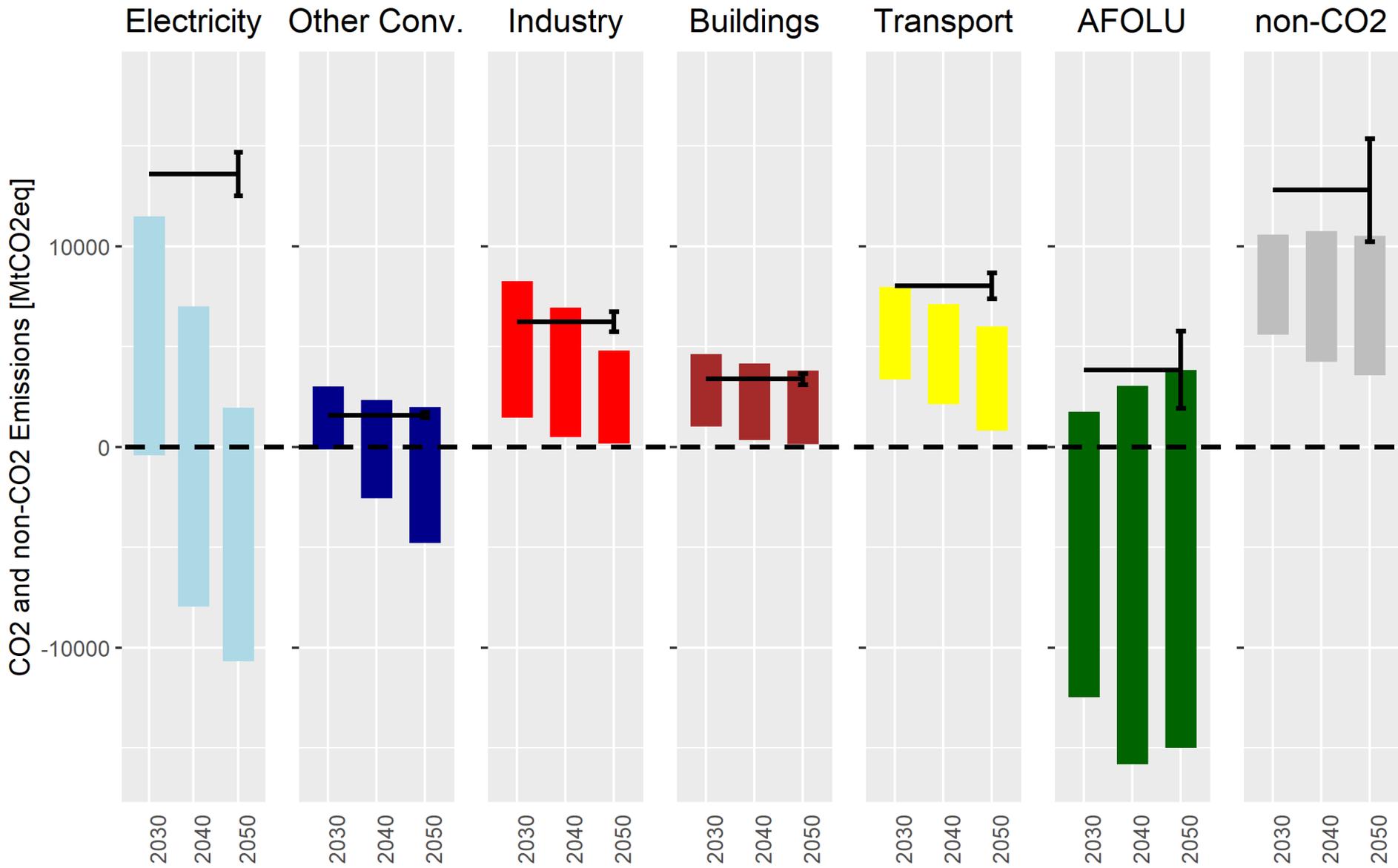


# Speed of decarbonization by sector: 2°C



- All sectors need to go to zero eventually
- Flexibility across sectors
- Peaking of transport emissions delayed due to service demand increase

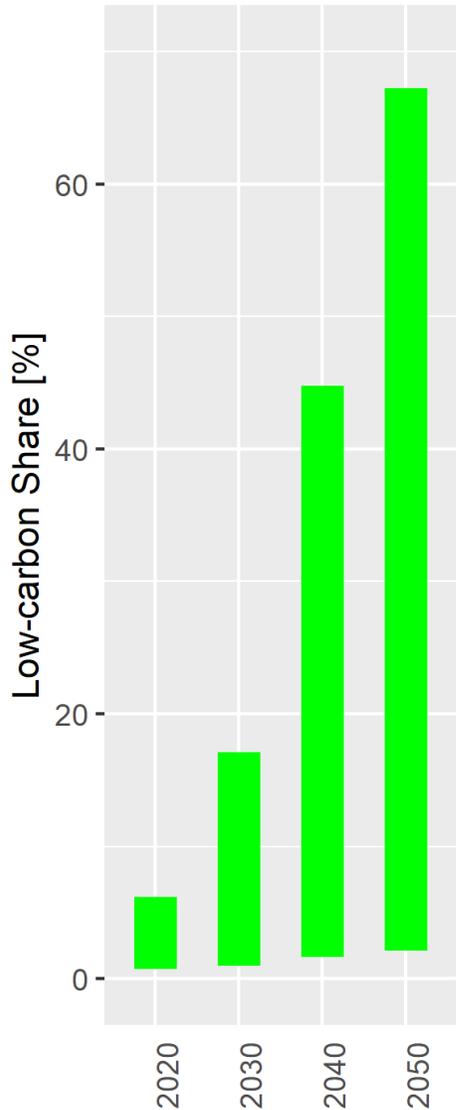
# Speed of decarbonization by sector: 1.5°C



- All sectors need to go to zero eventually
- Flexibility across sectors
- Peaking of transport emissions delayed due to service demand increase

# Transport low-carbon energy carriers: 2°C

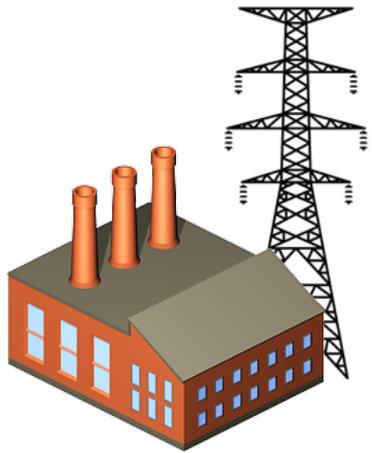
Low-carbon



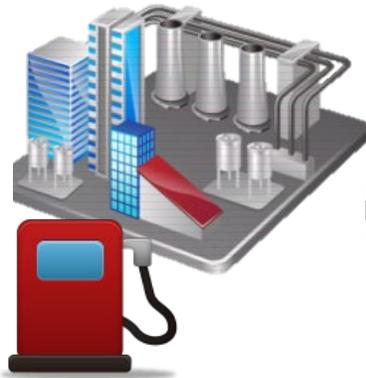
- No consensus on low-carbon energy carrier
- Different timing of deployment (biofuel > electricity > hydrogen)
- Competition for energy across demand sectors matters – in particular for biofuels

# Demand for biomass in low-carbon economy

Electricity/  
Heat



Liquid Fuels



Hydrogen

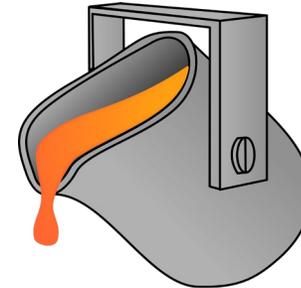


Pulp/Paper



Industry

Steel



Petrochemicals



Buildings  
(construction)



## Low-Carbon Alternatives

Nuclear, Wind,  
Solar, Hydro,  
Fossil CCS...

Power-to-  
Liquids

Electrolysis,  
Fossil CCS

Recycling,  
Digitalization

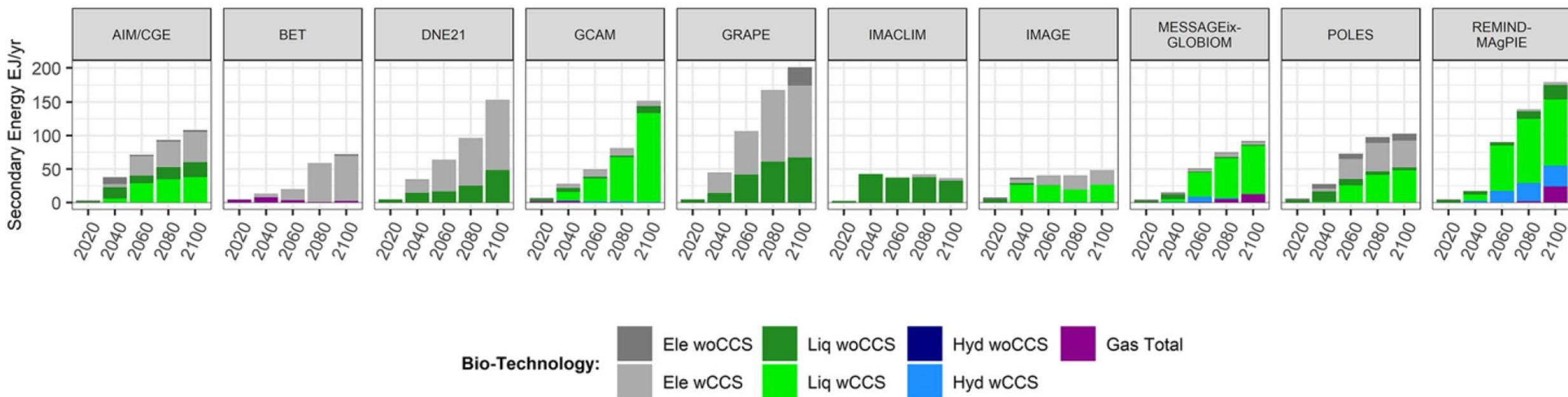
CCS,  
Hydrogen,  
Material  
Substitution

Recycling,  
Material  
Substitution,  
Power-to-  
Liquids

?

# No consensus about biomass use in 2°C pathways ...

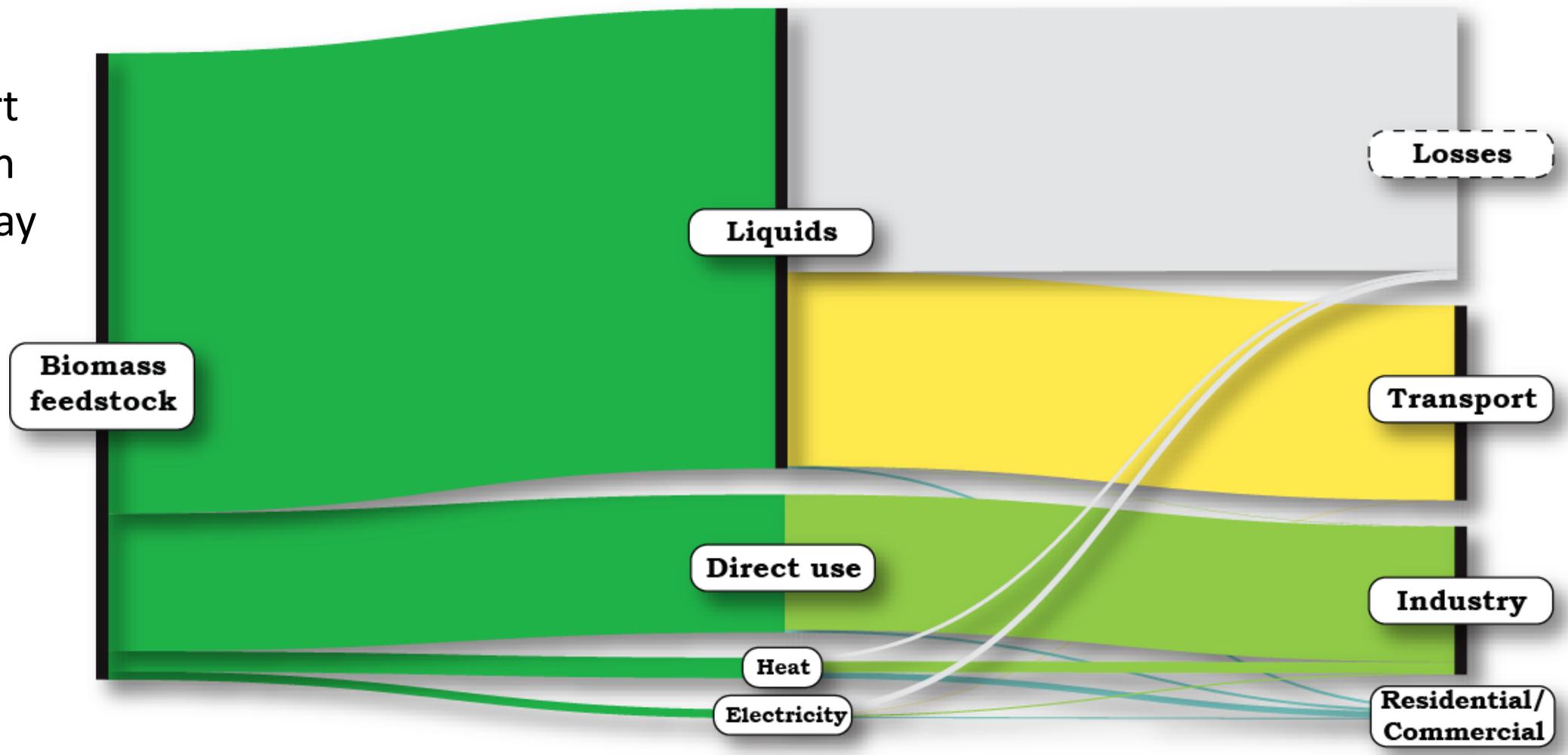
**a** DEPLOYMENT OF BIOENERGY TECHNOLOGIES



# ... but some insights

**Primary** → **Secondary** → **Final**

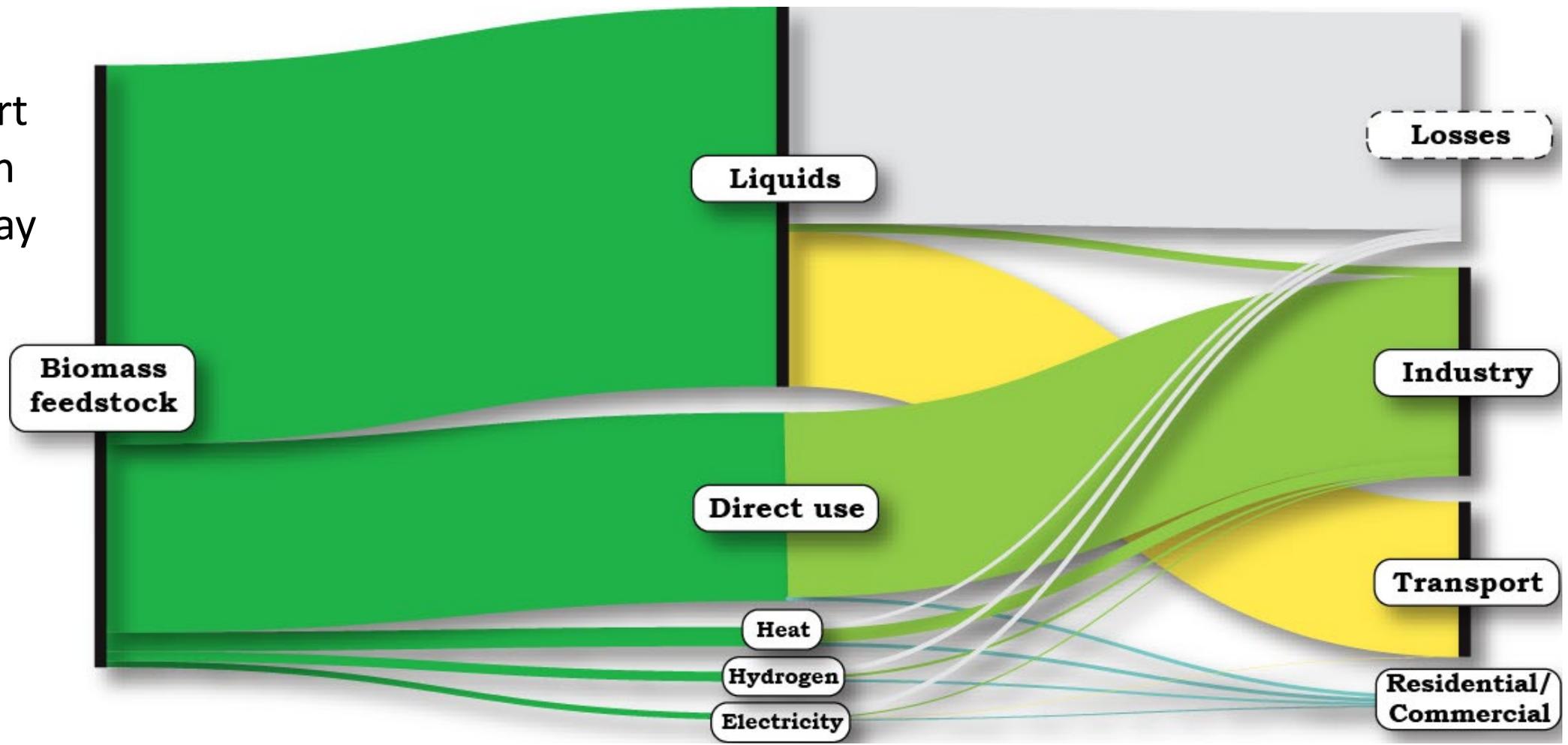
Low transport electrification  
in 2°C pathway  
(2050)



# ... but some insights

**Primary** → **Secondary** → **Final**

High transport electrification in 2°C pathway (2050)



# Final Remarks

- Pathways literature indicates wide range of decarbonization routes of transport sector under ambitious climate targets – including fuel switching, demand management, business models, etc.
- Competition for (sustainable) biomass with other sectors (energy and non-energy)
- Not only performance of measures within sector, but also interaction with other sectors important for their evaluation
- Reduced reliance on biofuels in transport, and the LDV sector in particular, enables low-carbon system transformation

*Thank you very much for your attention!*



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