



POTSDAM INSTITUTE FOR  
CLIMATE IMPACT RESEARCH

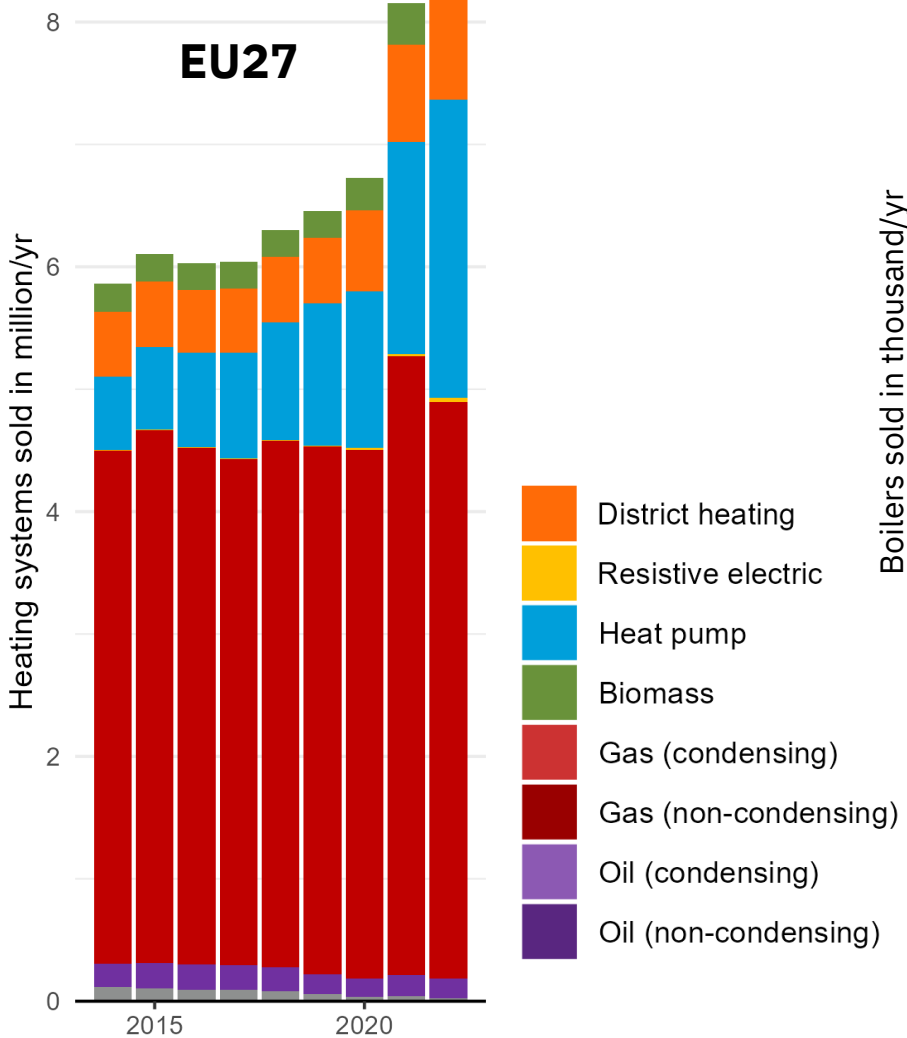


# Carbon pricing or installation ban

## How to decarbonise space heating in the EU?

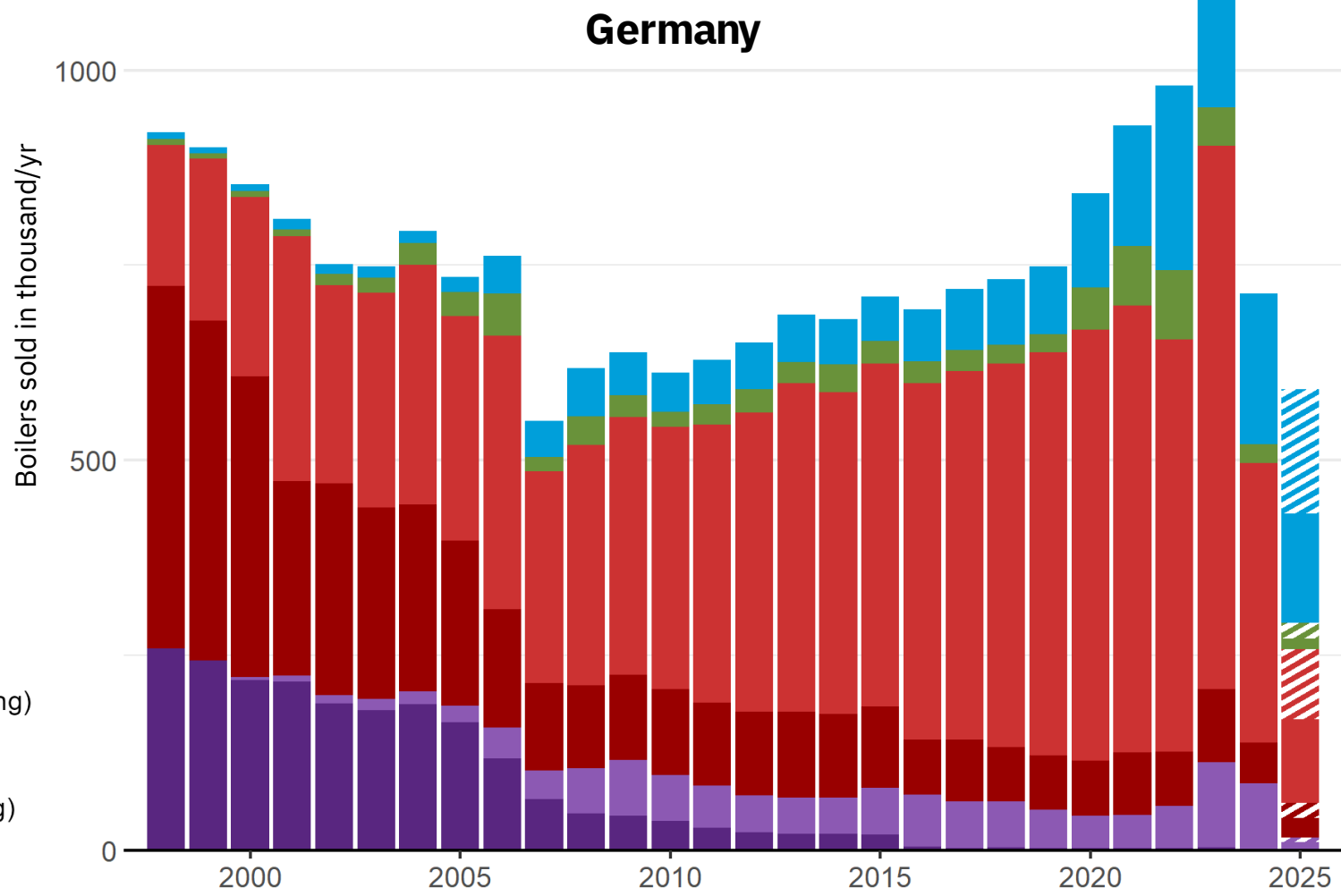
**Robin Hasse**, Ricarda Rosemann, Robert Pietzcker, Gunnar Luderer

# Fossil boilers dominate in recent sales



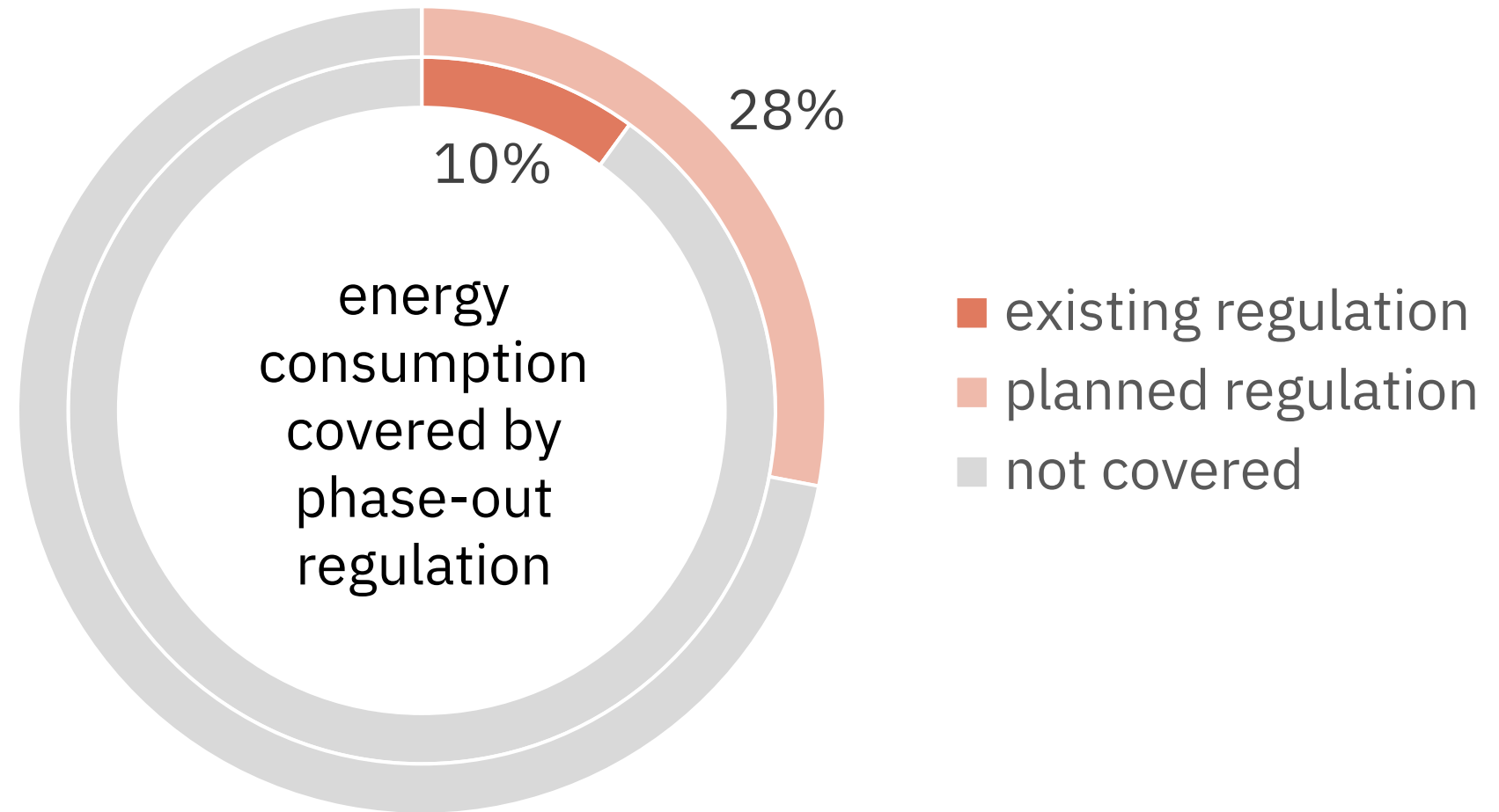
own estimation with data from EHI, EHPA, Assotermica, BDH, Uniclimate, SPIUG, FEGECA, VÖK

**Carbon pricing or installation ban**  
Robin Hasse



own illustration with data from Bundesverband der Deutschen Heizindustrie (BDH)

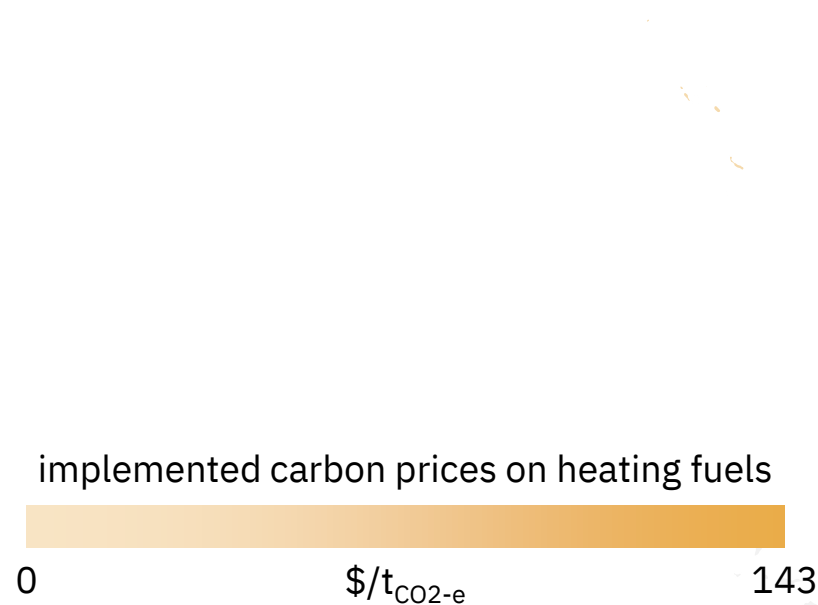
# Phase-out policies in the EU



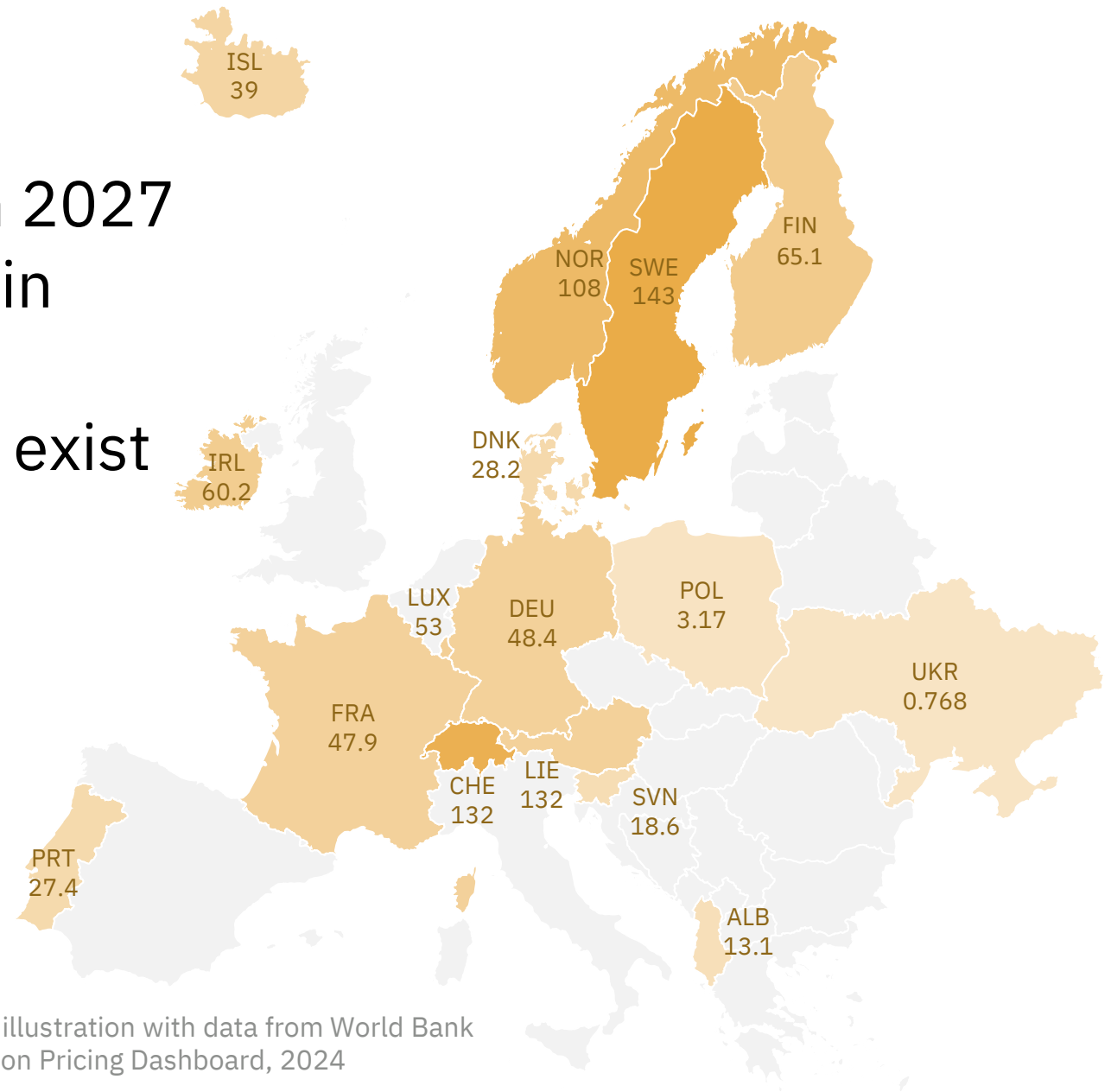
Braungardt, S., Tezak, B., Rosenow, J., Bürger, V., 2023. Banning boilers: An analysis of existing regulations to phase out fossil fuel heating in the EU. Renewable and Sustainable Energy Reviews 183, 113442. <https://doi.org/10.1016/j.rser.2023.113442>

# Carbon price on heating fuels

- EU ETS II scheduled to start in 2027
  - covers i.a. direct emissions in buildings
- Carbon prices on heating fuels exist in multiple countries

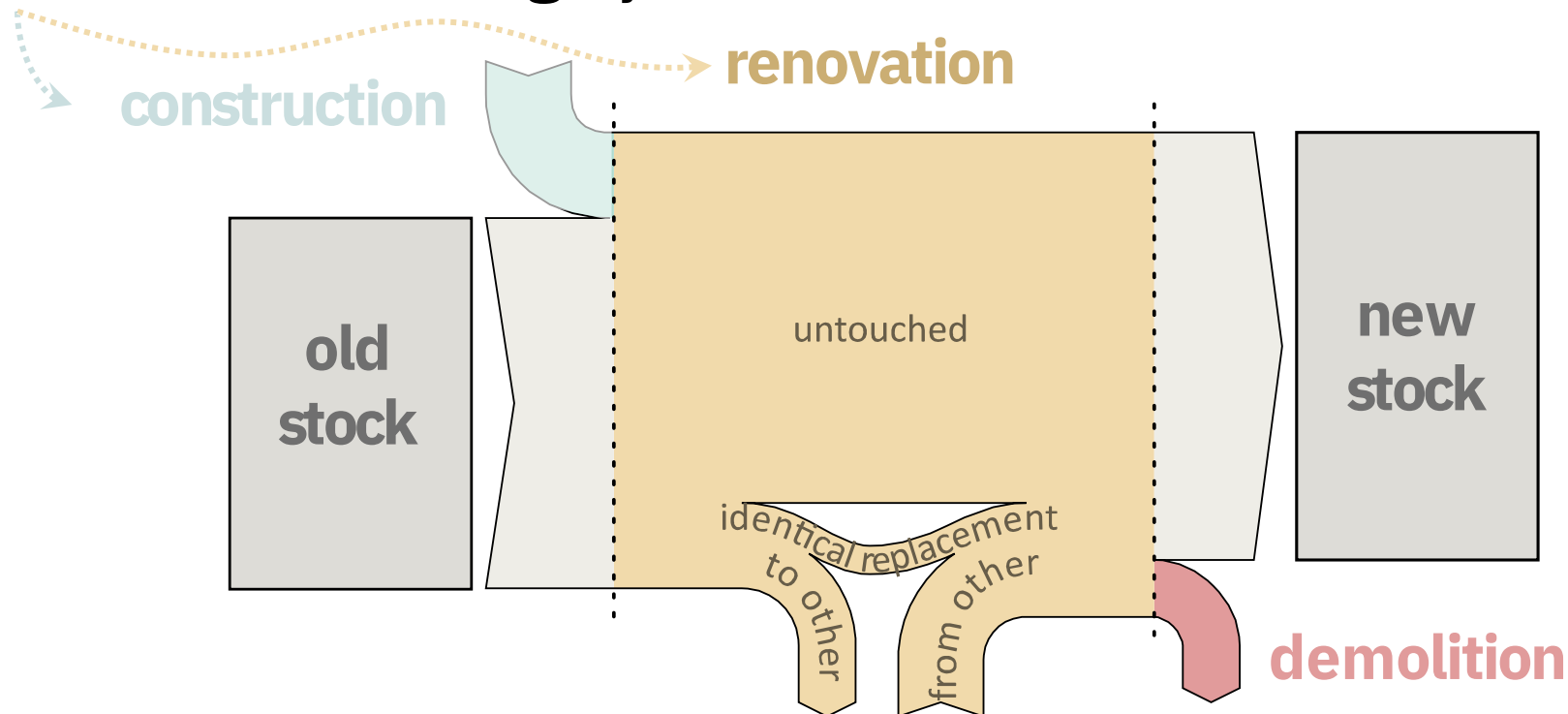


own illustration with data from World Bank  
Carbon Pricing Dashboard, 2024

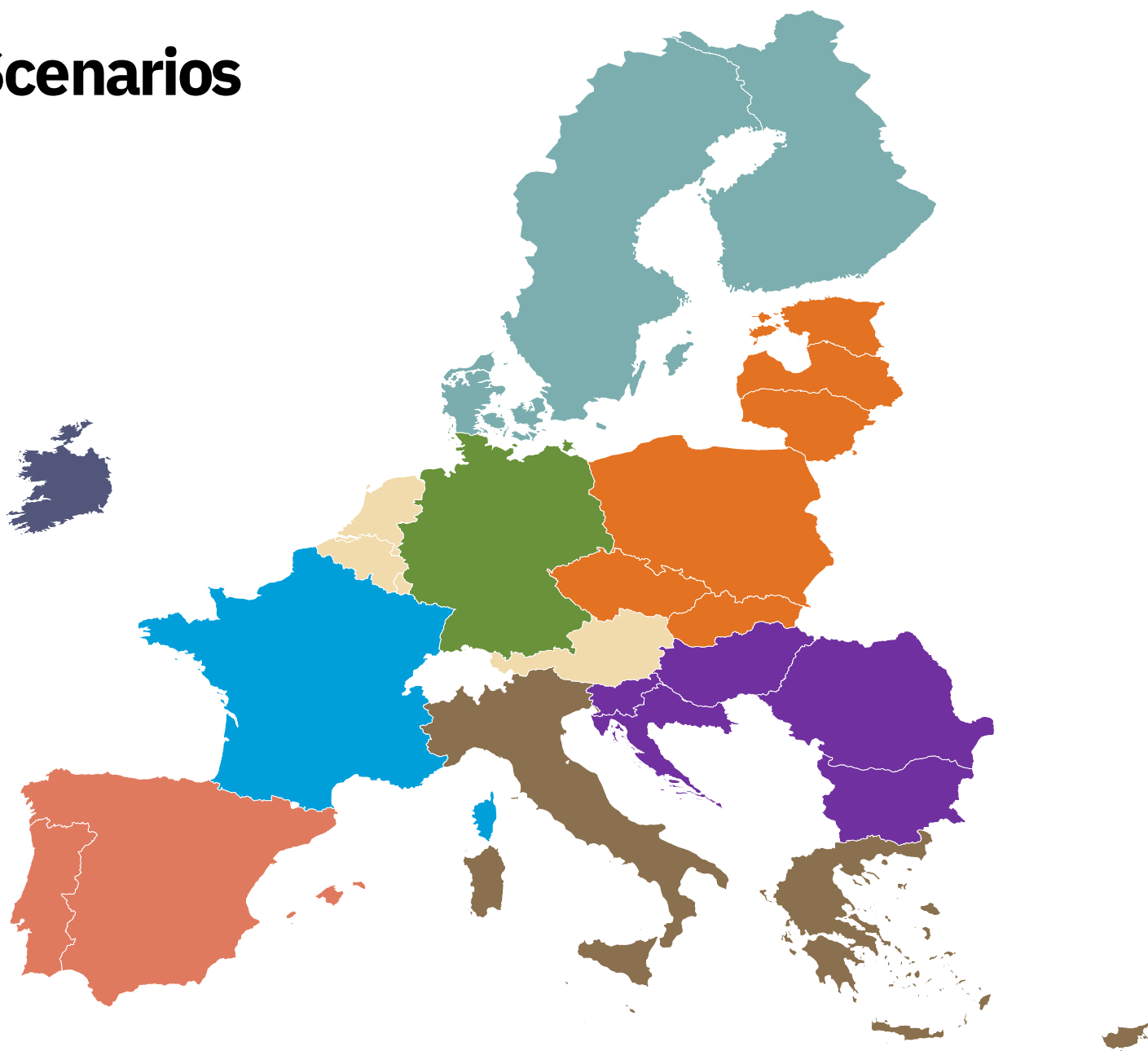


# The model

- Inter-temporal cost minimisation
- Life time of building & heating system  
→ demolition & renovation
- Discrete choice: heating system



# Scenarios



EU 27



Residential sector





Space heating



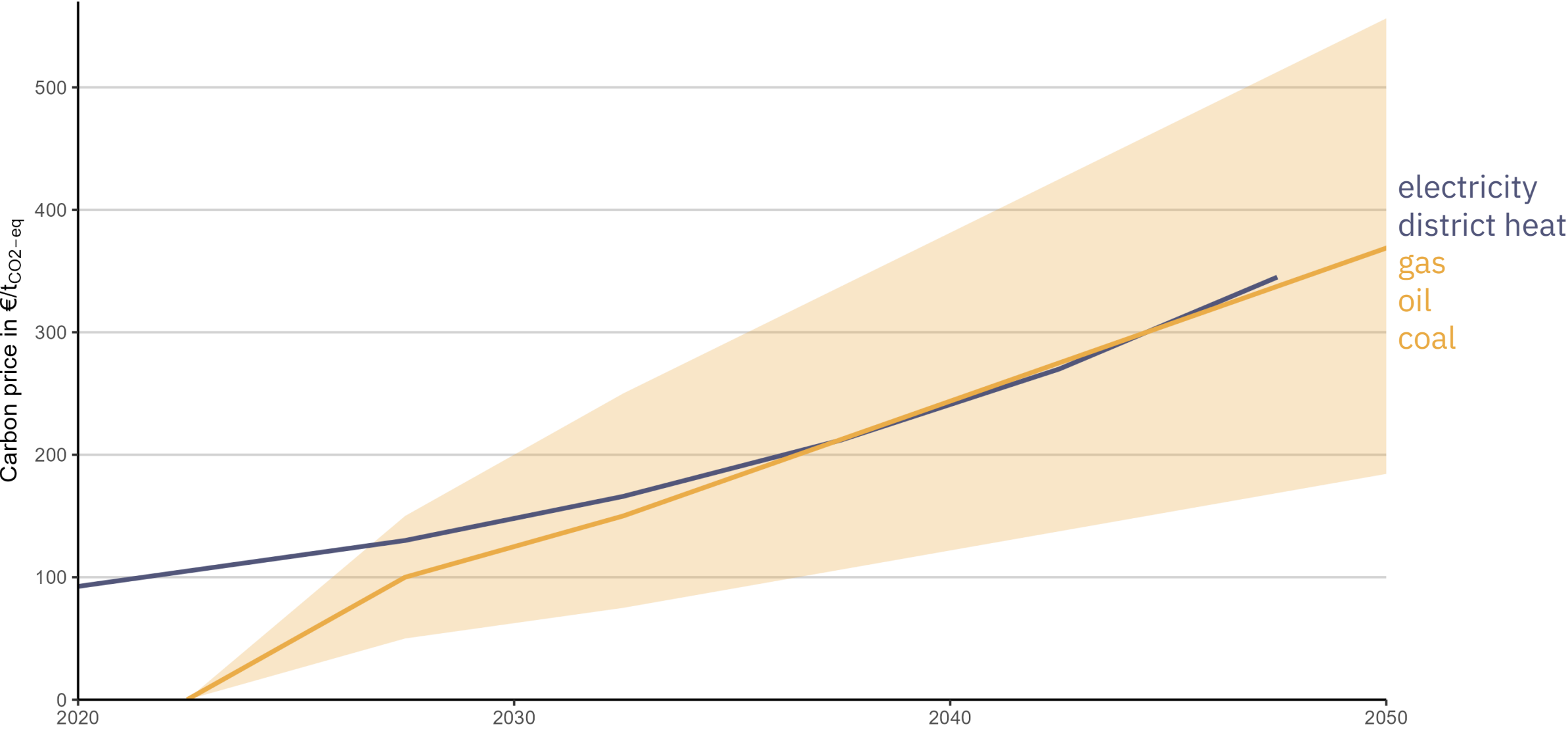
2005 – 2050

# Scenarios

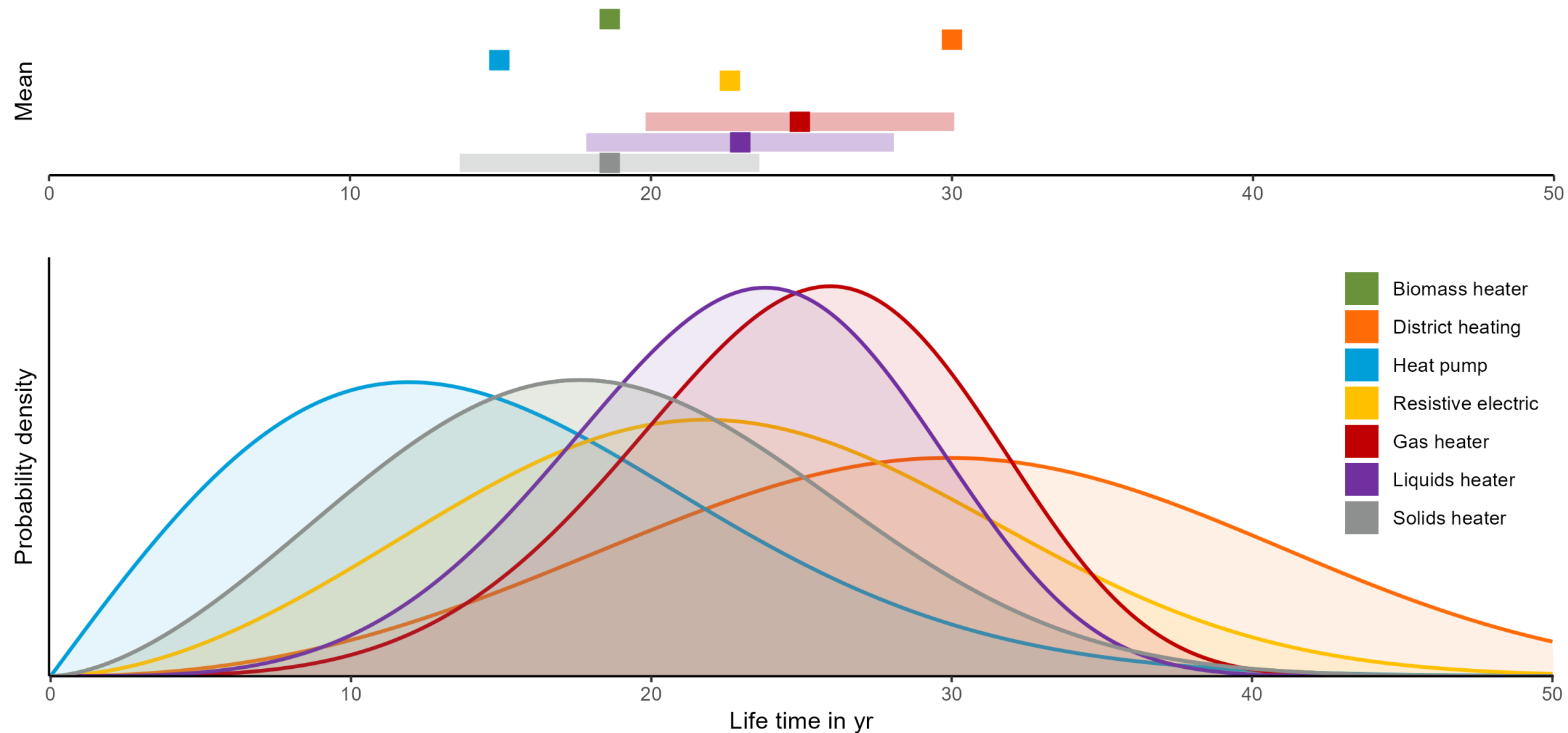
	baseline	 carbon price	 Installation ban
Carbon price	ETS I (electricity, district heat)		
	-	linear between <ul style="list-style-type: none"> <li>■ 2020: 0</li> <li>■ 2030: 150 €/t<sub>CO2</sub></li> <li>■ 2050: 400 €/t<sub>CO2</sub></li> </ul>	-
Installation ban	-	-	no installation allowed after <ul style="list-style-type: none"> <li>■ liquids boiler: 2025</li> <li>■ gas boiler: 2030</li> </ul>
Supply side	linear decarbonisation until <ul style="list-style-type: none"> <li>■ electricity: 2035</li> <li>■ district heat: 2040</li> </ul>		
Life time	Weibull distribution <ul style="list-style-type: none"> <li>■ heating system: Ø 16 - 30 years</li> </ul>		



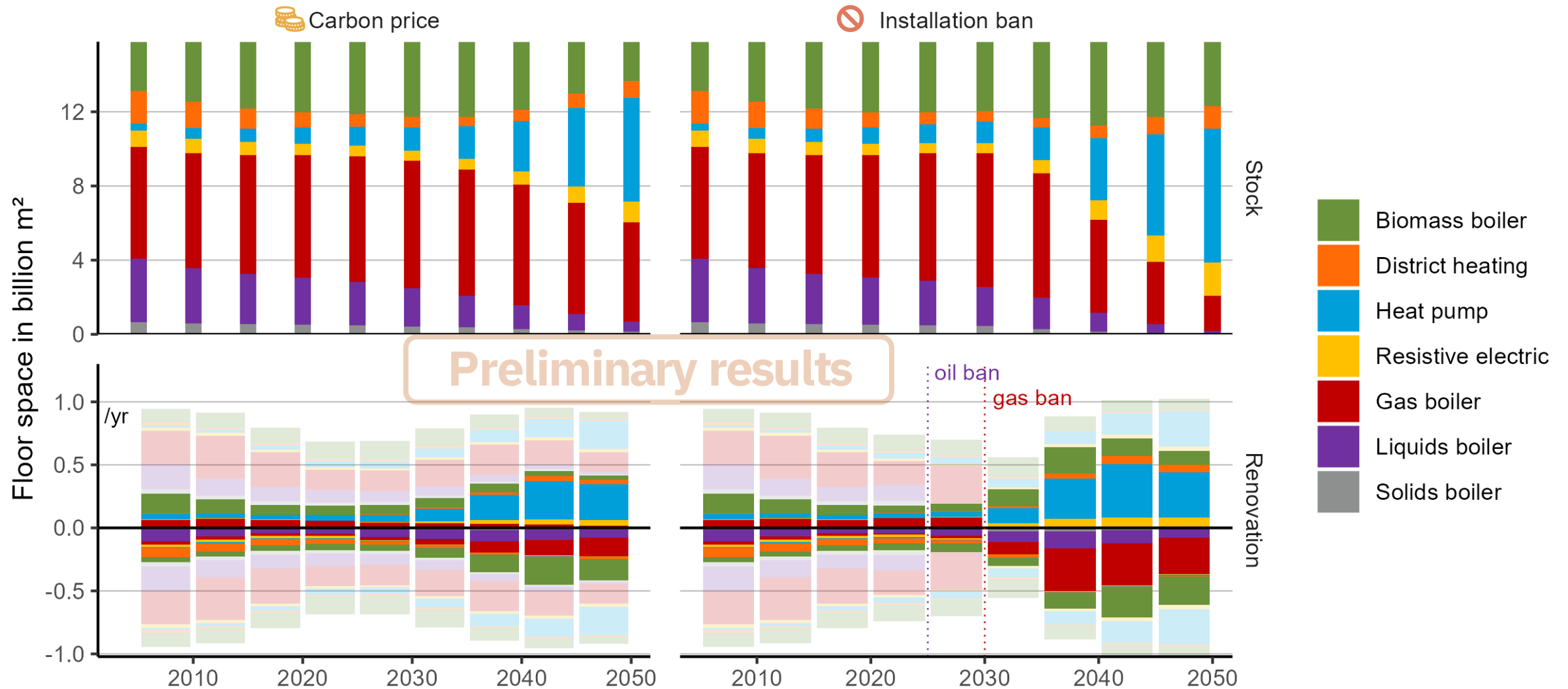
# Scenarios – Carbon price



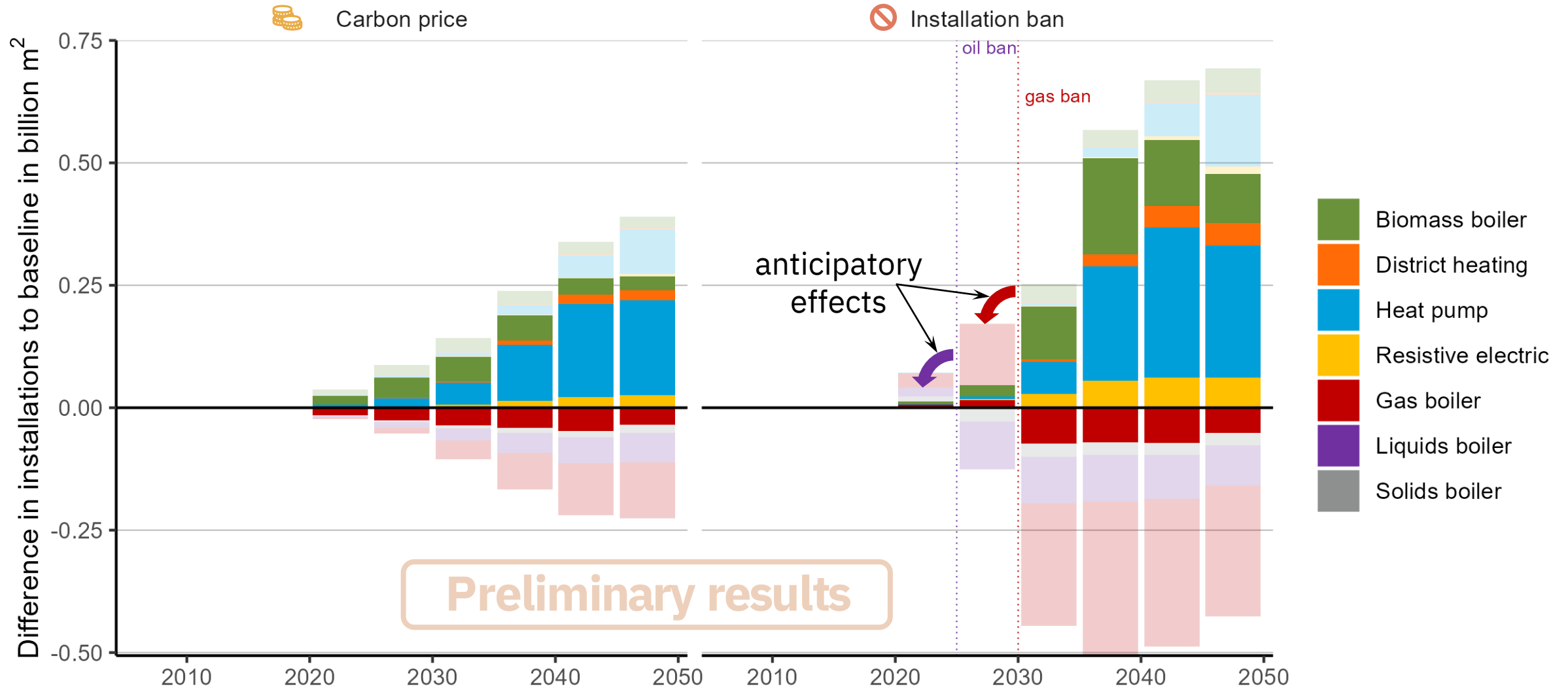
# Scenarios – Life time of heating systems



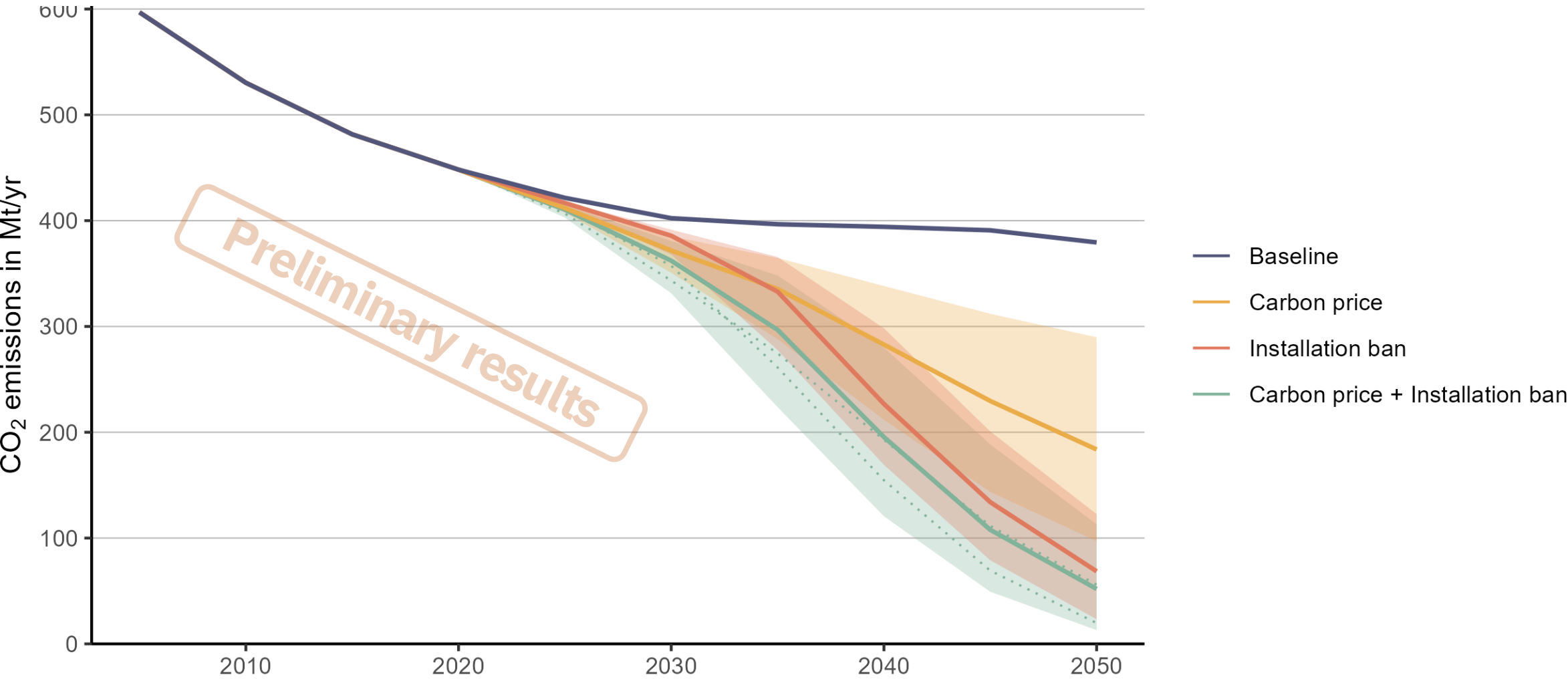
# Stock and flows



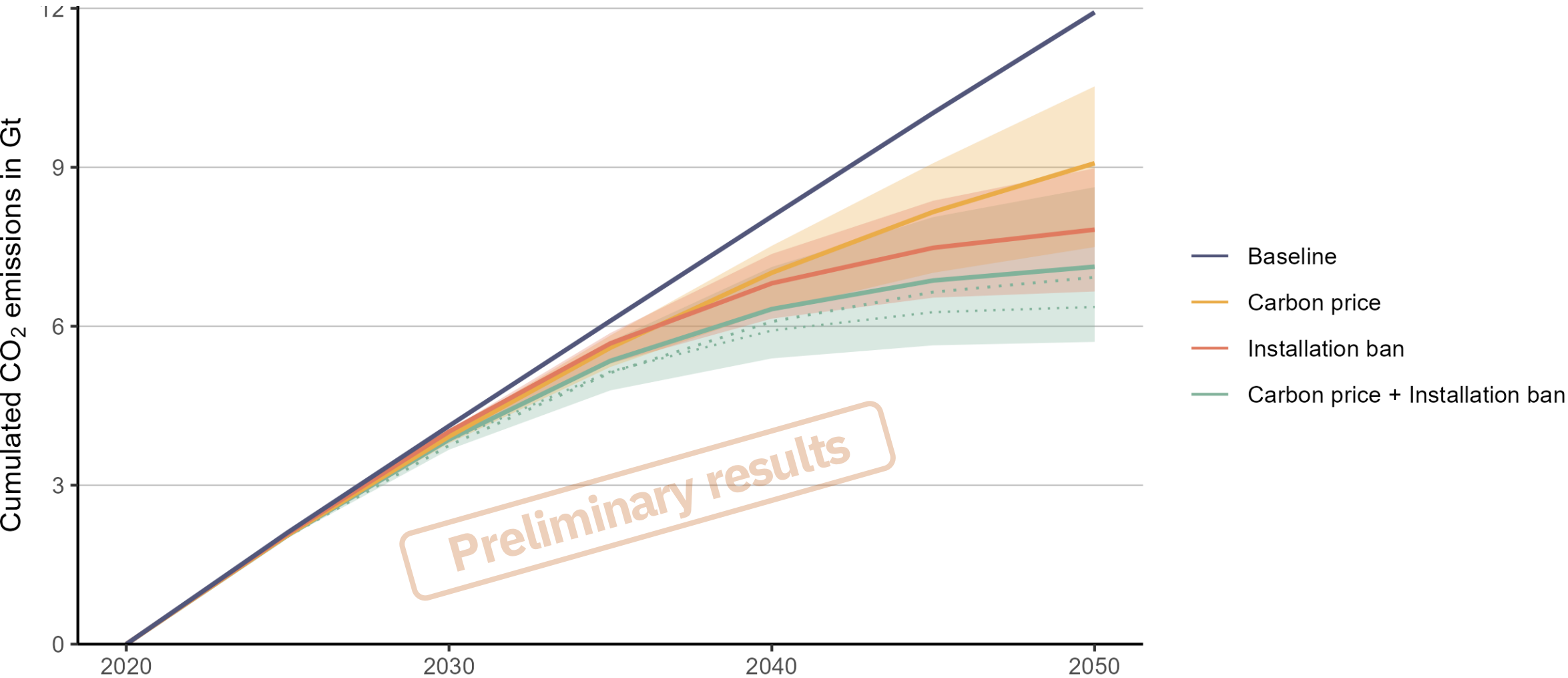
# Stock and flows



# Emissions



# Emissions



# Insights

Based on preliminary version, update of preference factors will likely change results

- Carbon price takes immediate effect (with perfect foresight)
- Even with high carbon price, fossil-fuel boilers remain in stock until 2050
- Installation ban can remove most fossil-fuel boilers from stock until 2050
- Long-lived fossil boilers can remain in stock until 2050
- Adding the carbon price to the installation ban can suppress anticipatory effects
- Next step: investigate different levels of foresight

# Thank you for your attention!



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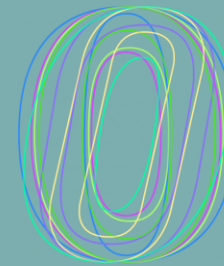
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