

Supporting the Great Transformation. Science as a Social Tipping Intervention?

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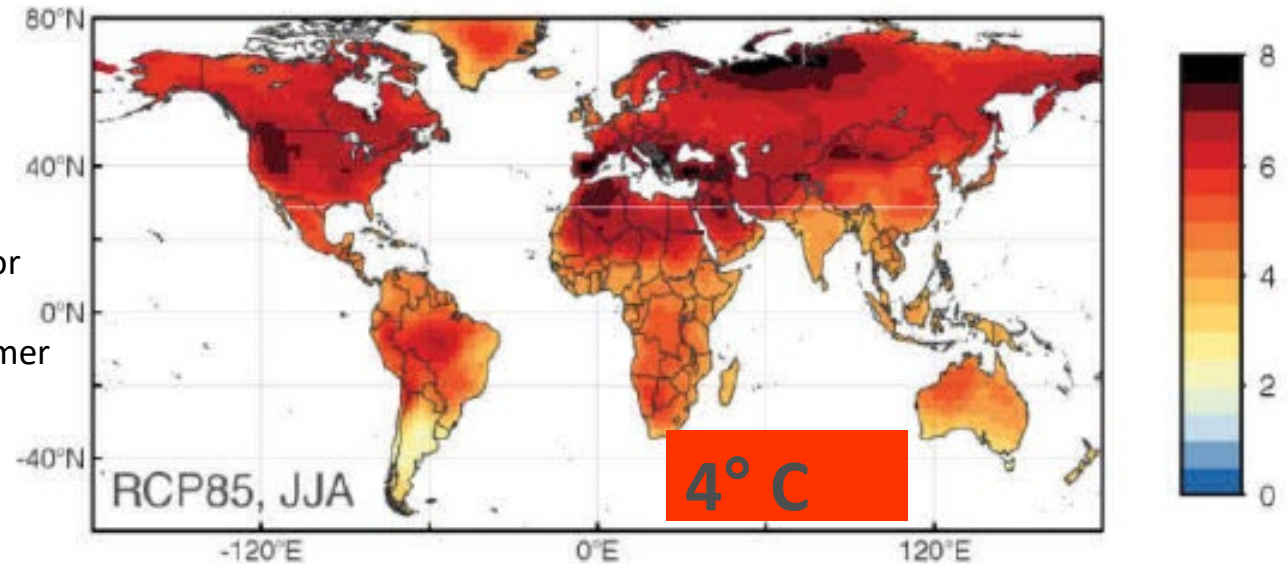
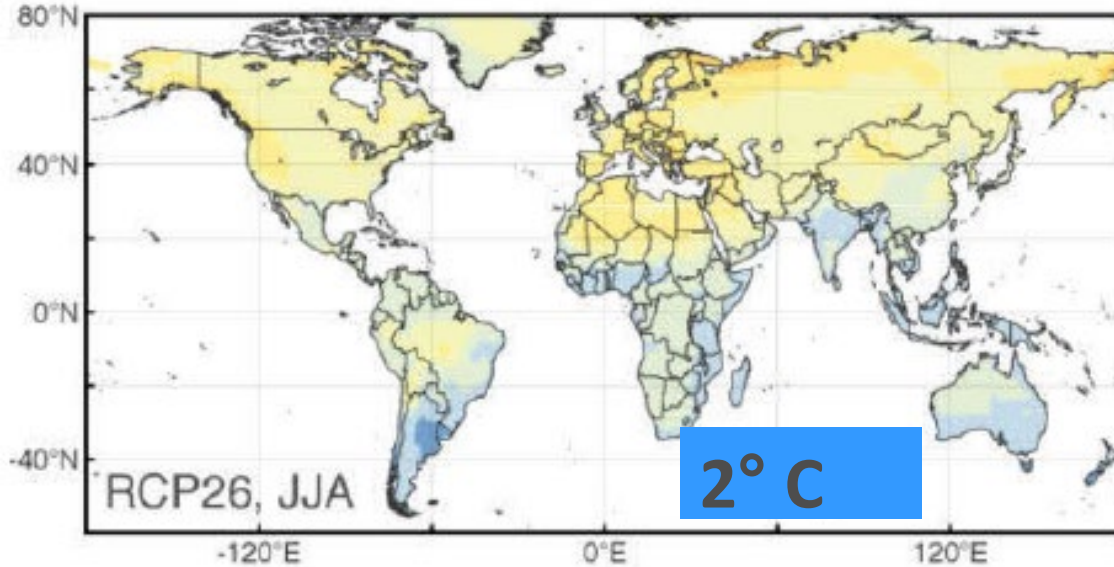
Social Complexity and System Transformation
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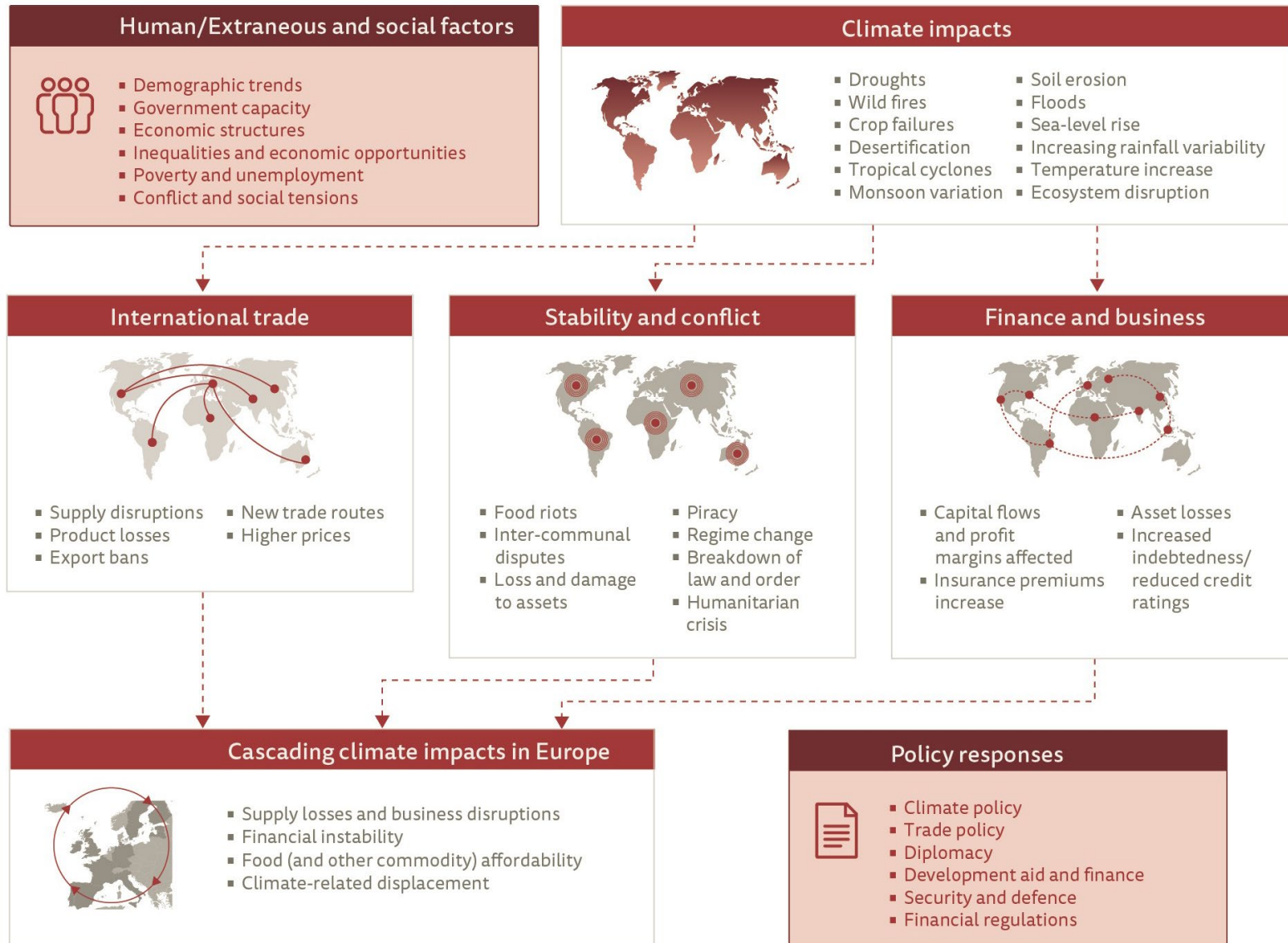
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Challenges ahead

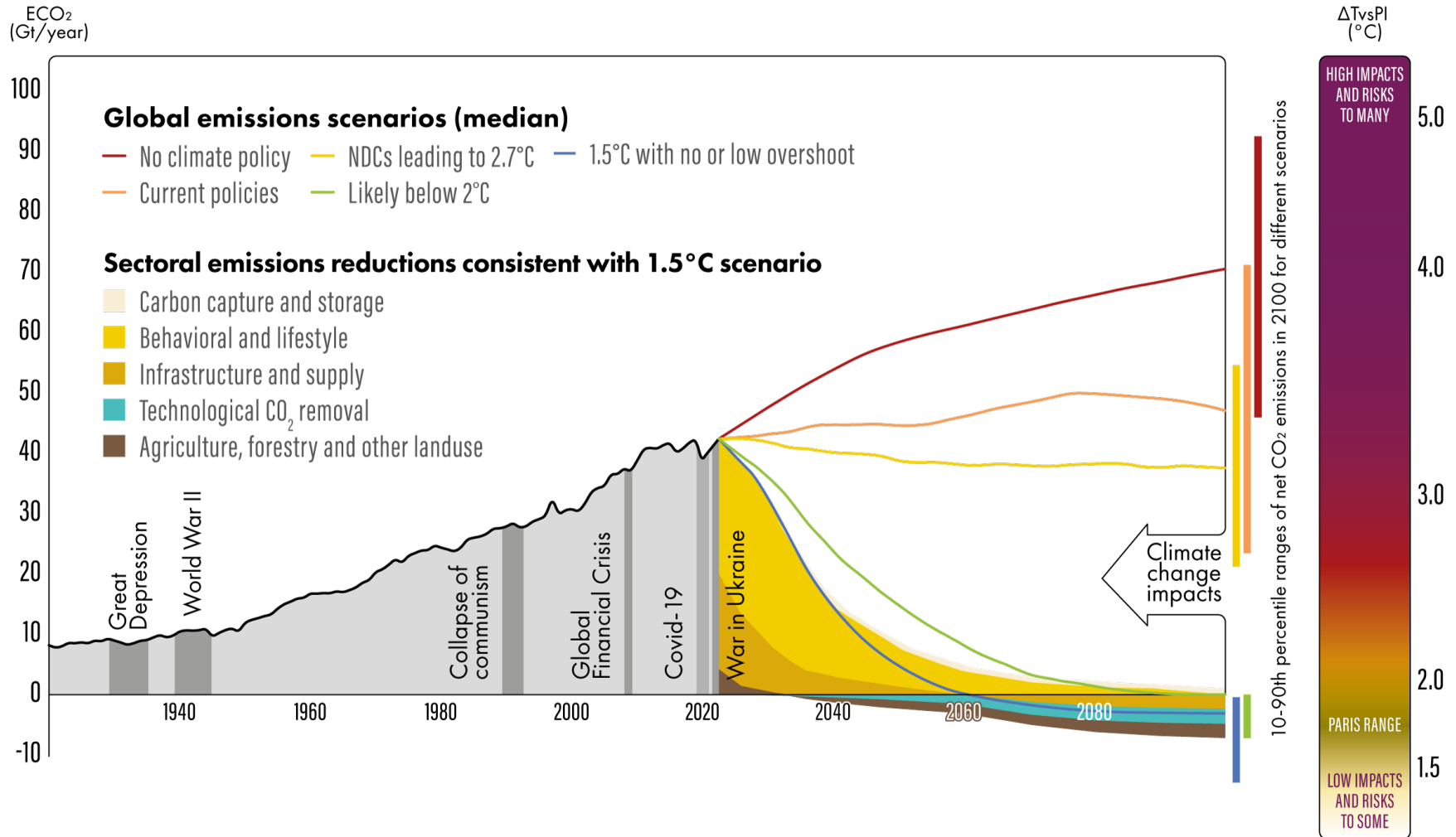


Multi-model mean global temperature anomaly for RCP2.6 for (2°C world, top) and RCP8.5 (4°C world, bottom) for the boreal summer months Source: World Bank 2014

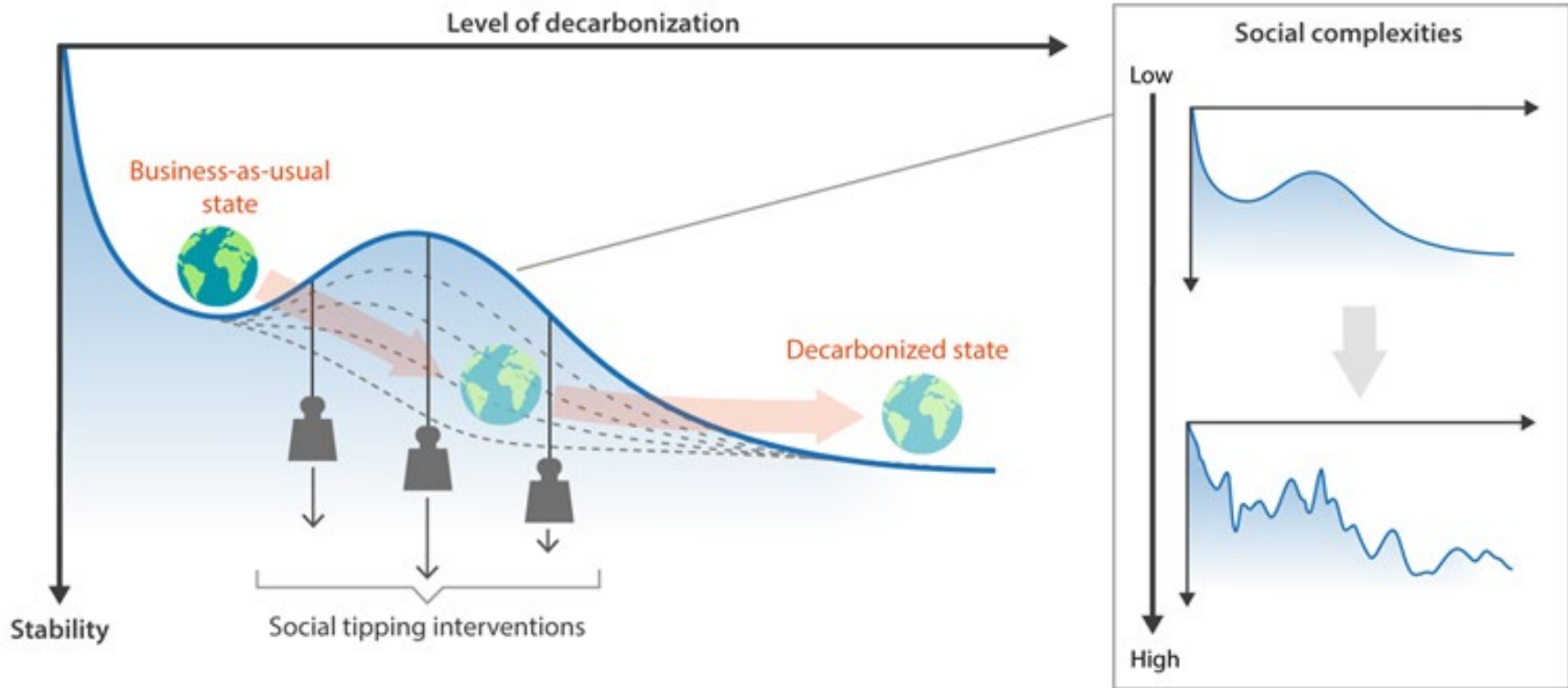
Cascading climate risks



Net-zero emissions by the mid-century

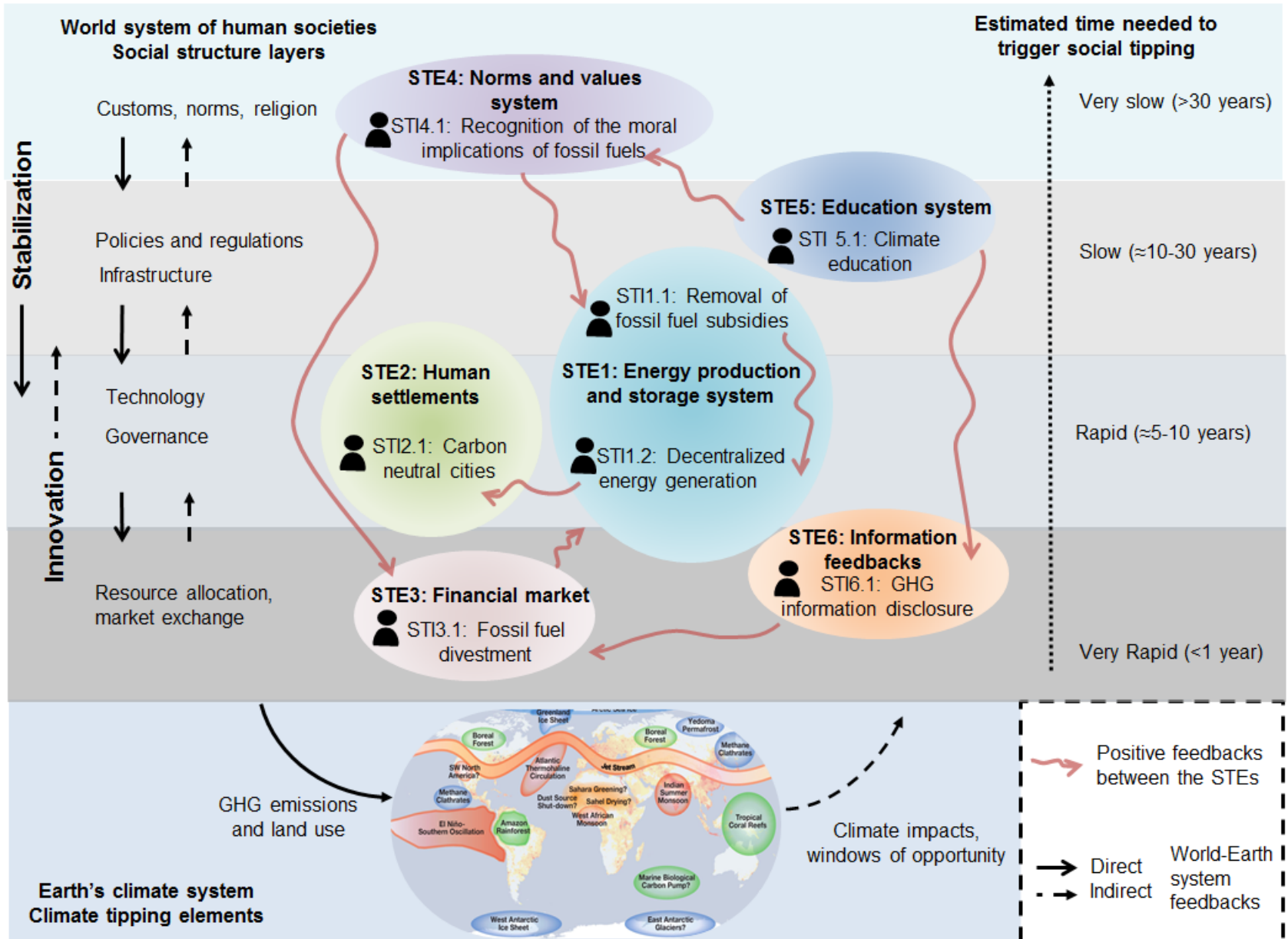


Social tipping dynamics

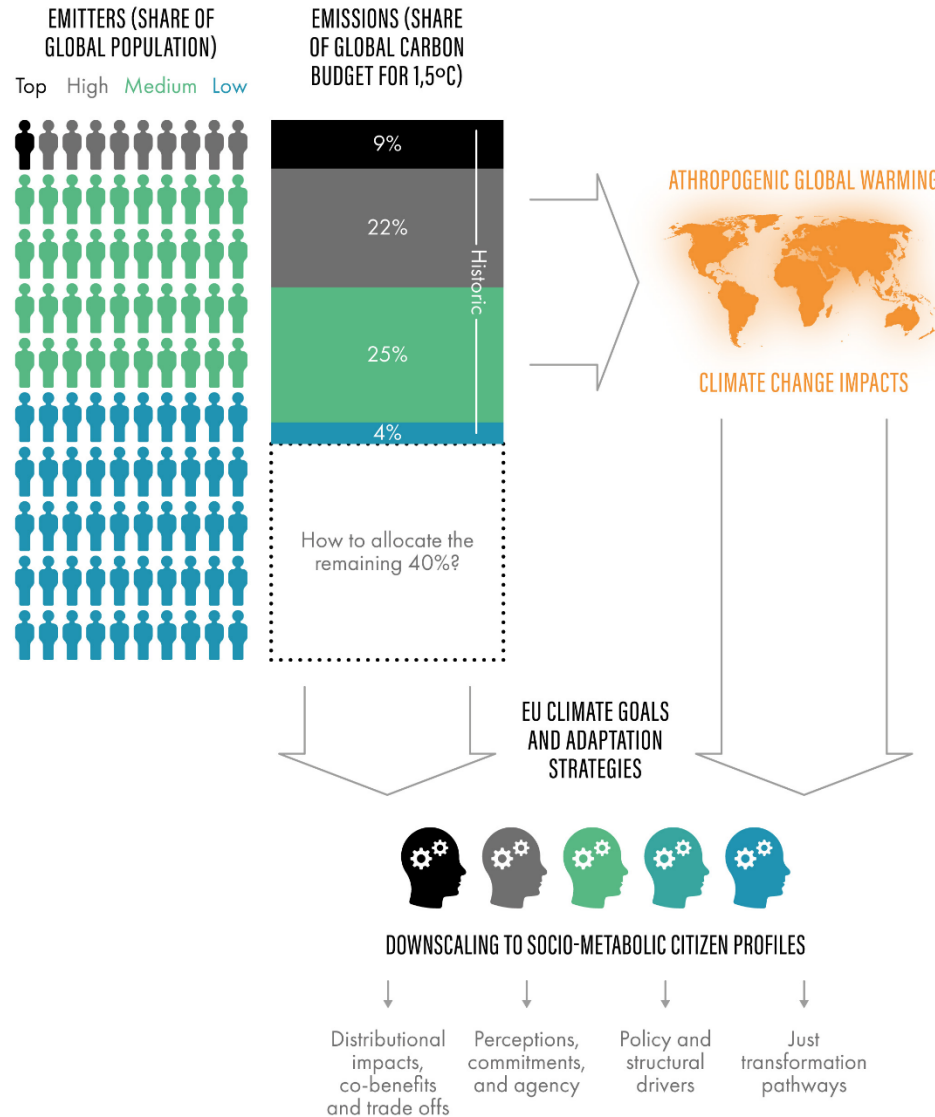


Source: Otto, Donges, et al. (2020)

Inducing a global social tipping



Carbon inequalities



Science as a social tipping intervention?

- 1. An active role in shaping and changing mental models that are used to describe and interpret the environment; Science based evidence and solutions, driving innovation;**
- 2. Bridging across different stakeholder groups, relatively high trust in the society:**

“EU citizens have a positive view of scientists and their defining characteristics, such as intelligence (89%), reliability (68%) and being collaborative (66%). More than two-thirds (68%) believe that scientists should intervene in political debates to ensure that decisions take into account scientific evidence.” (Source: EU Commission, 2021);
- 3. Benefiting from public education and research funds;**
- 4. Social responsibility, high agency of the academic community;**
- 5. There are about 8.8 million scientist worldwide (0.11% of the global population), global research spending grows;**
- 6. Fossil-fuel and status quo lobby groups are not neutral;**
- 7. How to reach the relevant audiences? Only 22% respondents use online news platforms, 30% get news on social media** (Source: Reuters Institute 2023).



SOCIAL
TIPPING

15c NOW!

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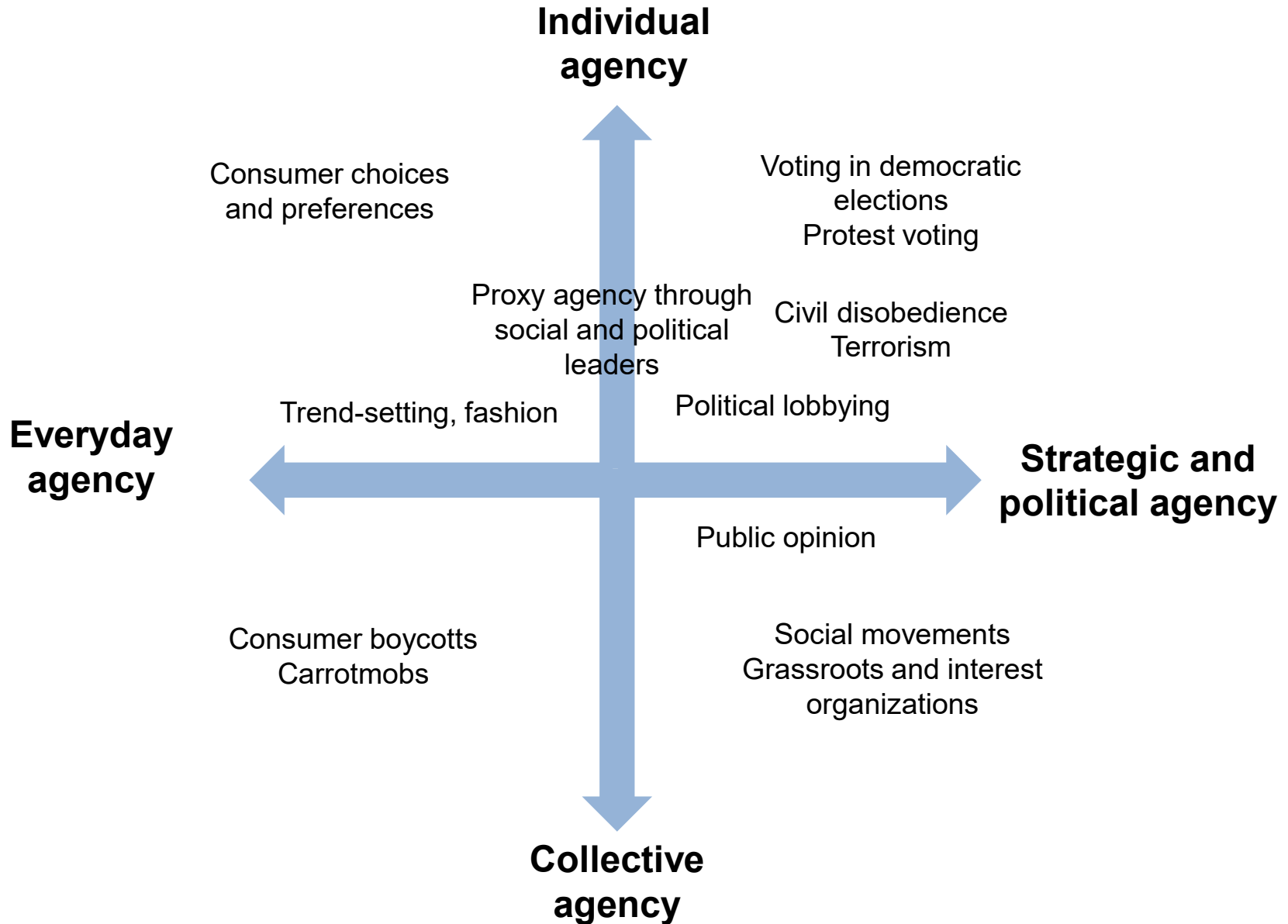


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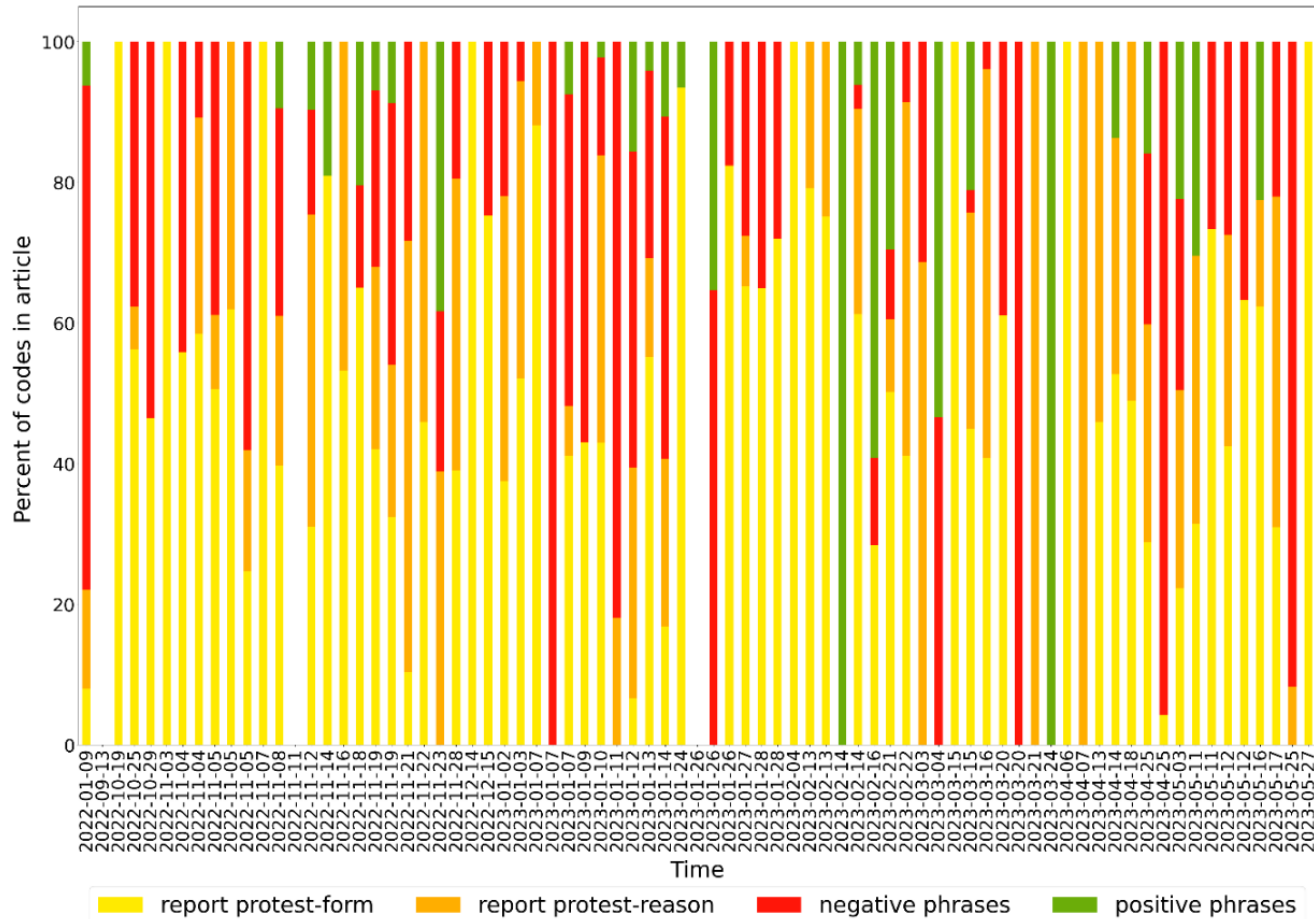
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Human Agency dimensionen



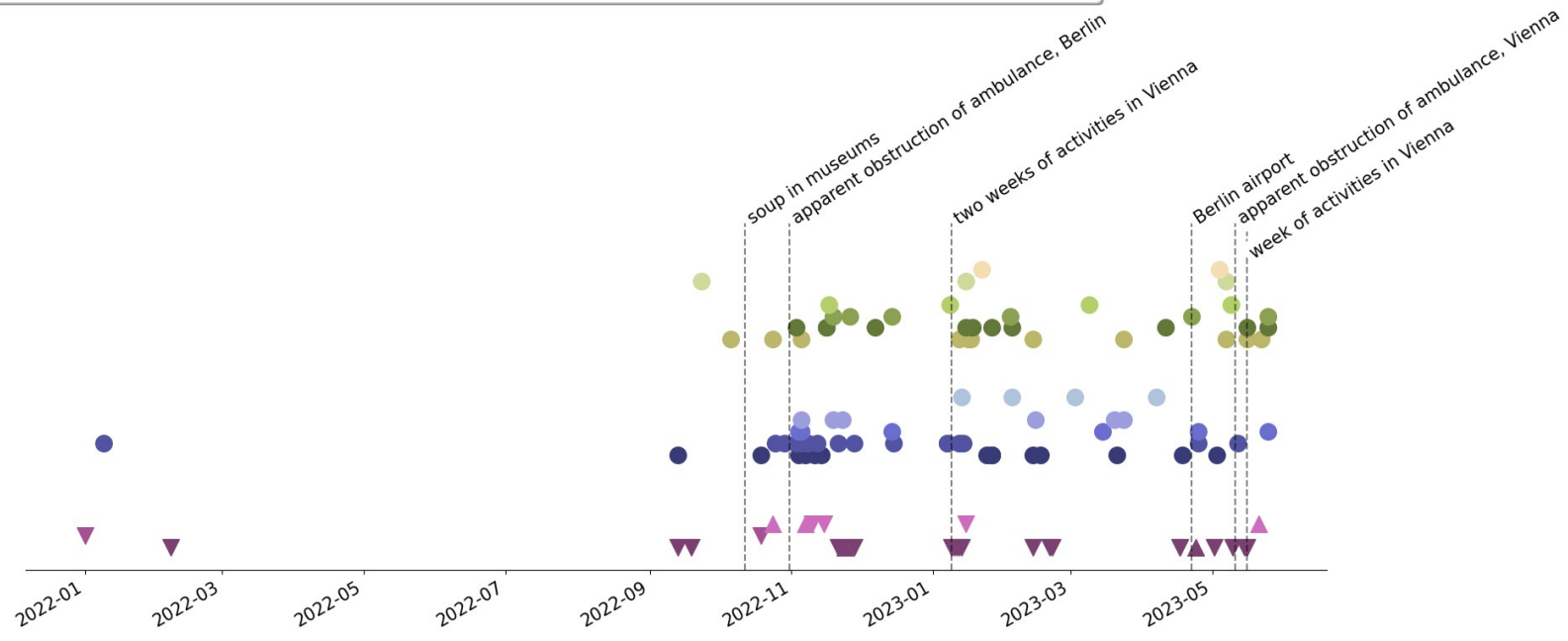
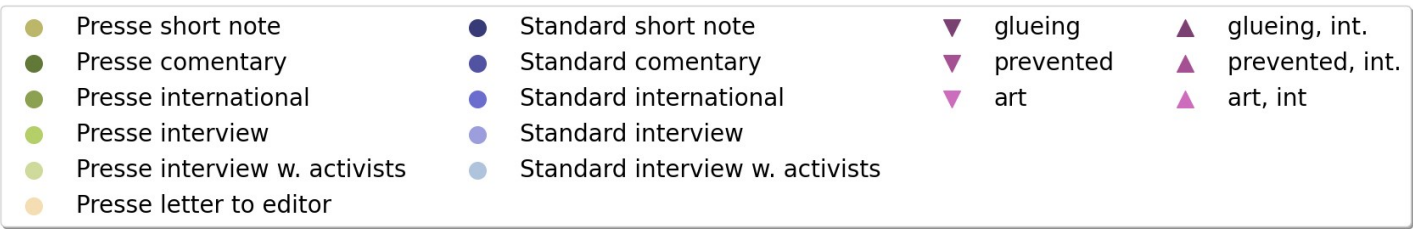
Perception of the last generation protest in media. Precent of phrases in press articles (n=77)

Coding of "Der Standard" Articles, containing the phrase "Letzte Generation"
January 2022 to May 2023



Source:
Pieler,
Savanovic,
et al. in
progress

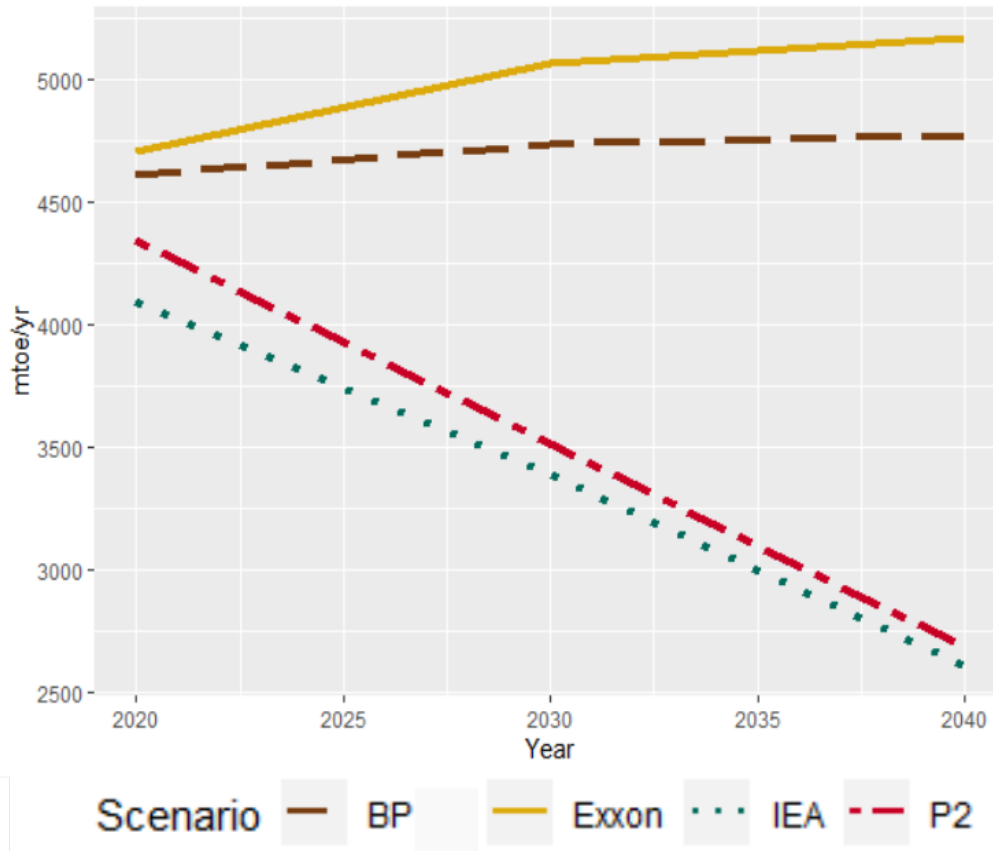
Media reactions to the Last Generation protests (n=77)



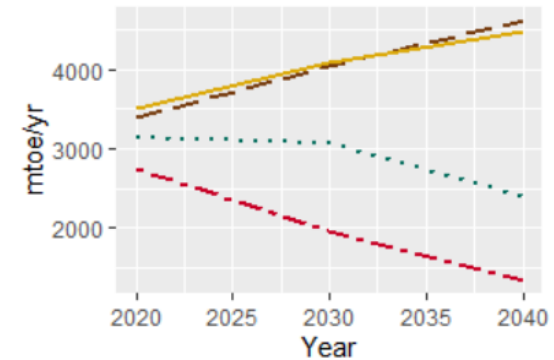
Source:
Pieler,
Savanovic,
et al. in
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The ambition gap

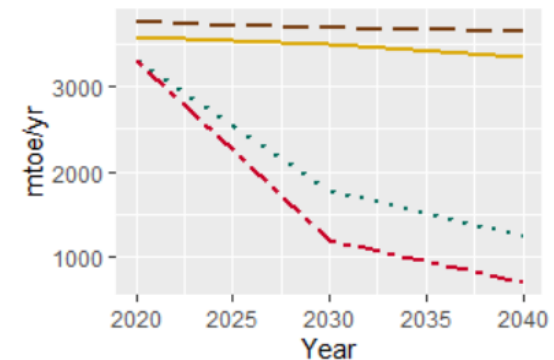
Oil production



Gas production



Coal production

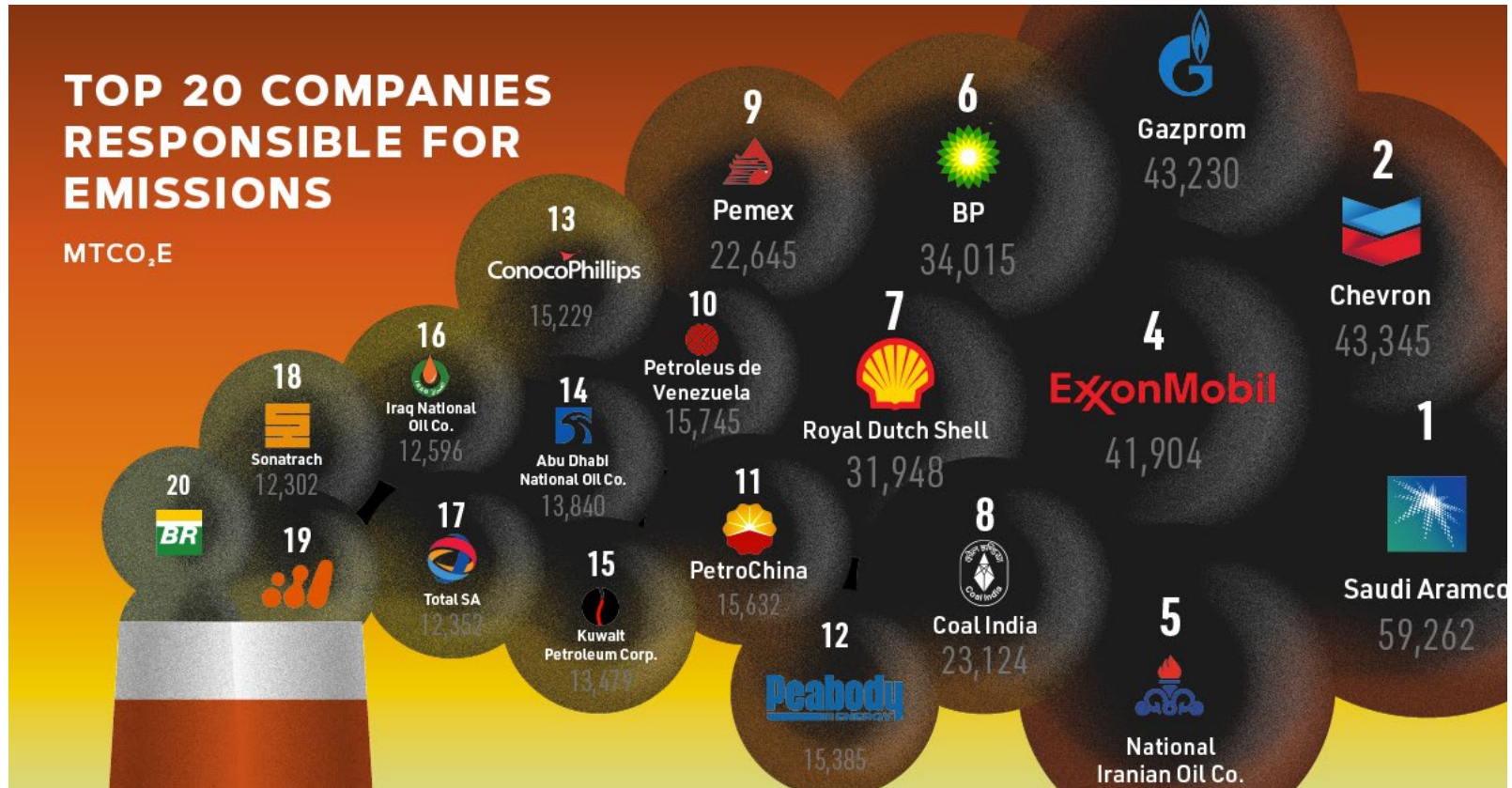


Oil, gas, and coal production scenarios up to 2040: B.P.'s "Evolving Transition" (2019) and ExxonMobil's "Outlook for Energy" (2019) compared to scenarios compatible with Paris Agreement used by IEA "B2DS" (2017) and given in the 1.5°C IPCC special report "P2" aka "AIM/CGE2.0, SSP1-1.9" (2018). Source: Deweert, Otto et al. unpublished

Expert elicitation results

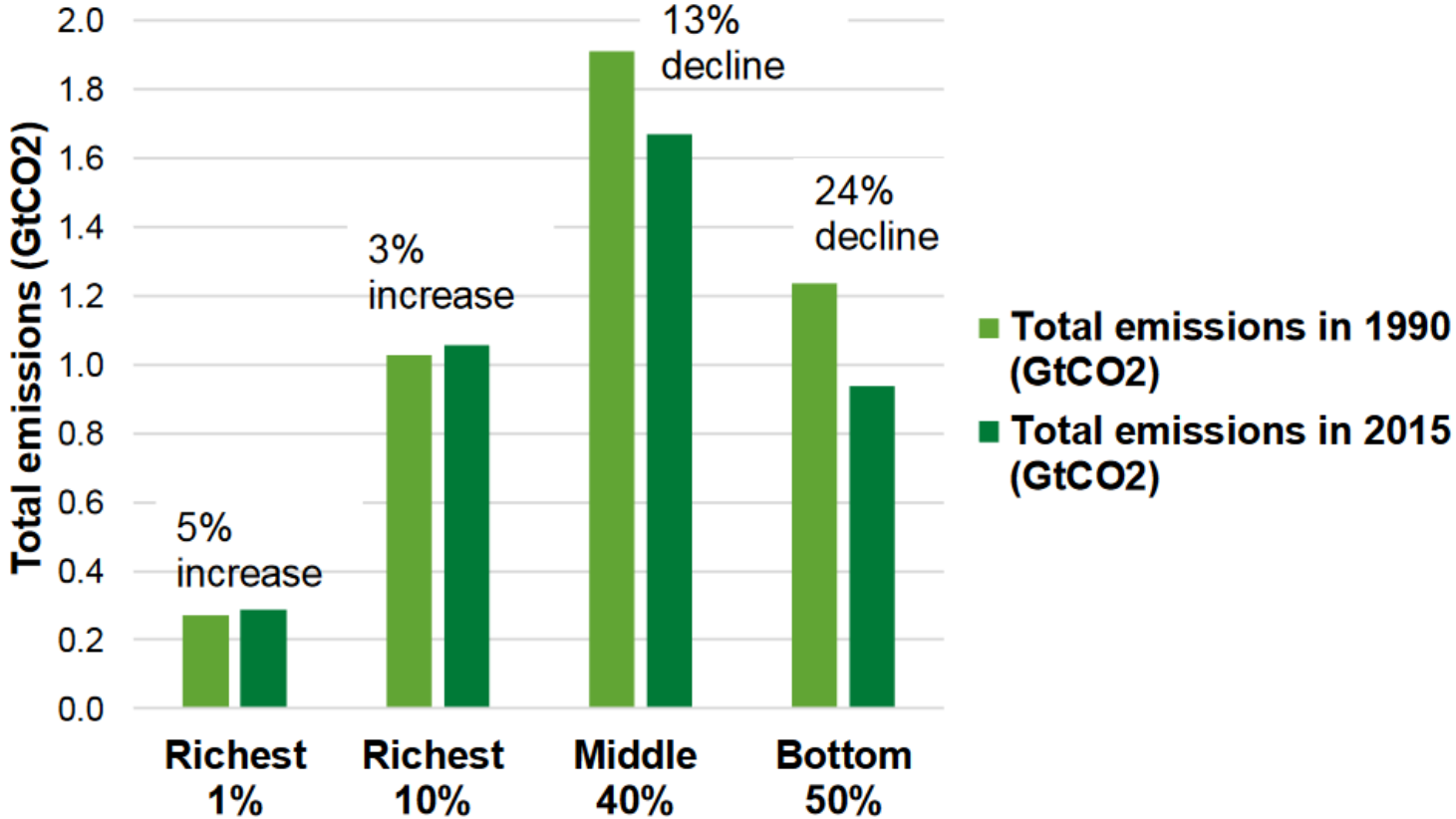
Social tipping element	Tipping intervention	Control parameter	Potential to reduce GHG emissions	Dominant social structure level	Estimated time need to trigger tipping
STE1: Energy production and storage	TI1.1: Subsidy programs	The price of fossil-fuel-free energy	Up to 21% globally in one year (Coady et al. 2015)	National policy (Coady et al. 2015)	10-30 years (Williamson 2000)
	TI1.2: Decentralized energy generation		Up to 100% in power supply (Dalton, Lockington, and Baldock 2009)	Community / town governance (Yadoo and Cruickshank 2012)	Less than 10 years (Aylett 2013)
STE2: Human settlements	TI2.2: Carbon neutral cities	The demand for fossil-fuel free technology	Reduction by 32% in 14 years (Energy Cities 2010)	Urban governance (Energy Cities 2010).	Approx. 10 years (Energy Cities 2010).
STE3: Financial market	TI3.1: Divestment movement	Profitability of fossil fuel exploitation	26% emissions tied to investments of a Canadian large university (Ritchie and Dowlatabadi 2013)	Market exchange, enterprise Carrington 2016)	Very rapid, could occur within hours (Kotz 2009)
STE4: Norms and values system	TI4.1: Recognizing the immoral character of fossil-fuels	The perception of fossil-fuels as immoral	Unprecedented	Informal institutions, enforcement through peer-groups (Padilla and Perez 2003)	30-40 years (Nadelmann 1990)
STE5: Education system	TI5.1: Climate education	Climate change and impacts awareness	Up to 30% reduction in two years in the emissions of the included in the study Italian households (RACES 2011)	National policy (Story, Nanney, and Schwartz 2009)	10-20 years (Story, Nanney, and Schwartz 2009)
STE6: Information feedback	TI6.1: Emission information disclosure	The number of products and services disclosing their carbon emissions	Up to 10% reduction of emissions in UK households grocery consumption in a year (Upham, Dendler, and Bleda 2011)	Market, exchange (Fraser 2017); enterprise (Banerjee and Solomon 2003)	A few years (Siró et al. 2008)

20 companies are responsible for 35% global CO2 emissions

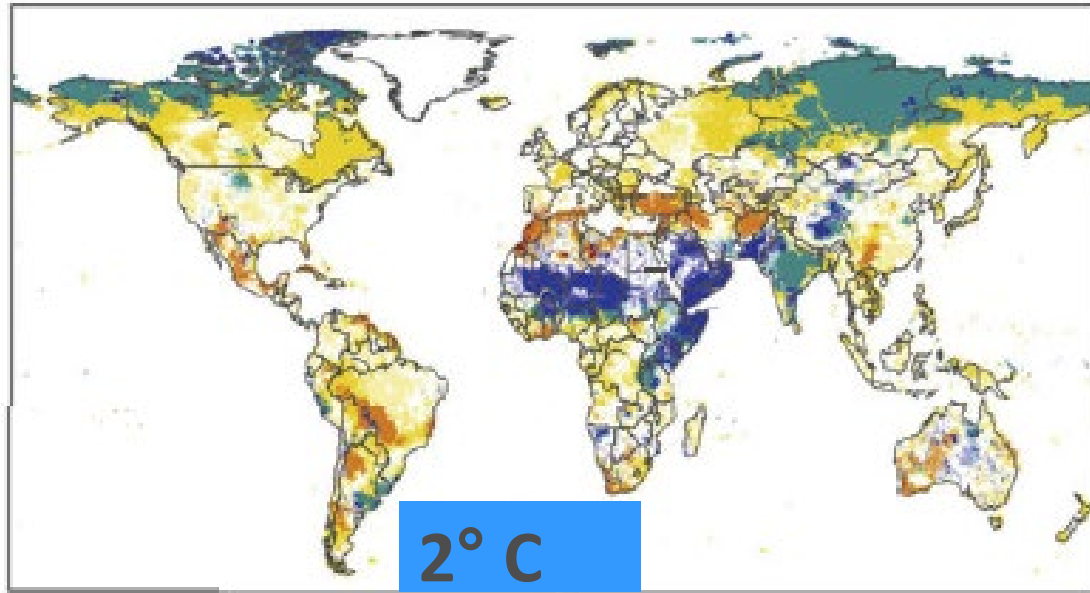


Source: <https://www.visualcapitalist.com/companies-carbon-emissions/>

Carbon emissions (GtCO₂) in EU income groups in 1990 and 2015



Water availability



20% less drinking water

50% less drinking water

