Economically sound solutions to climate change

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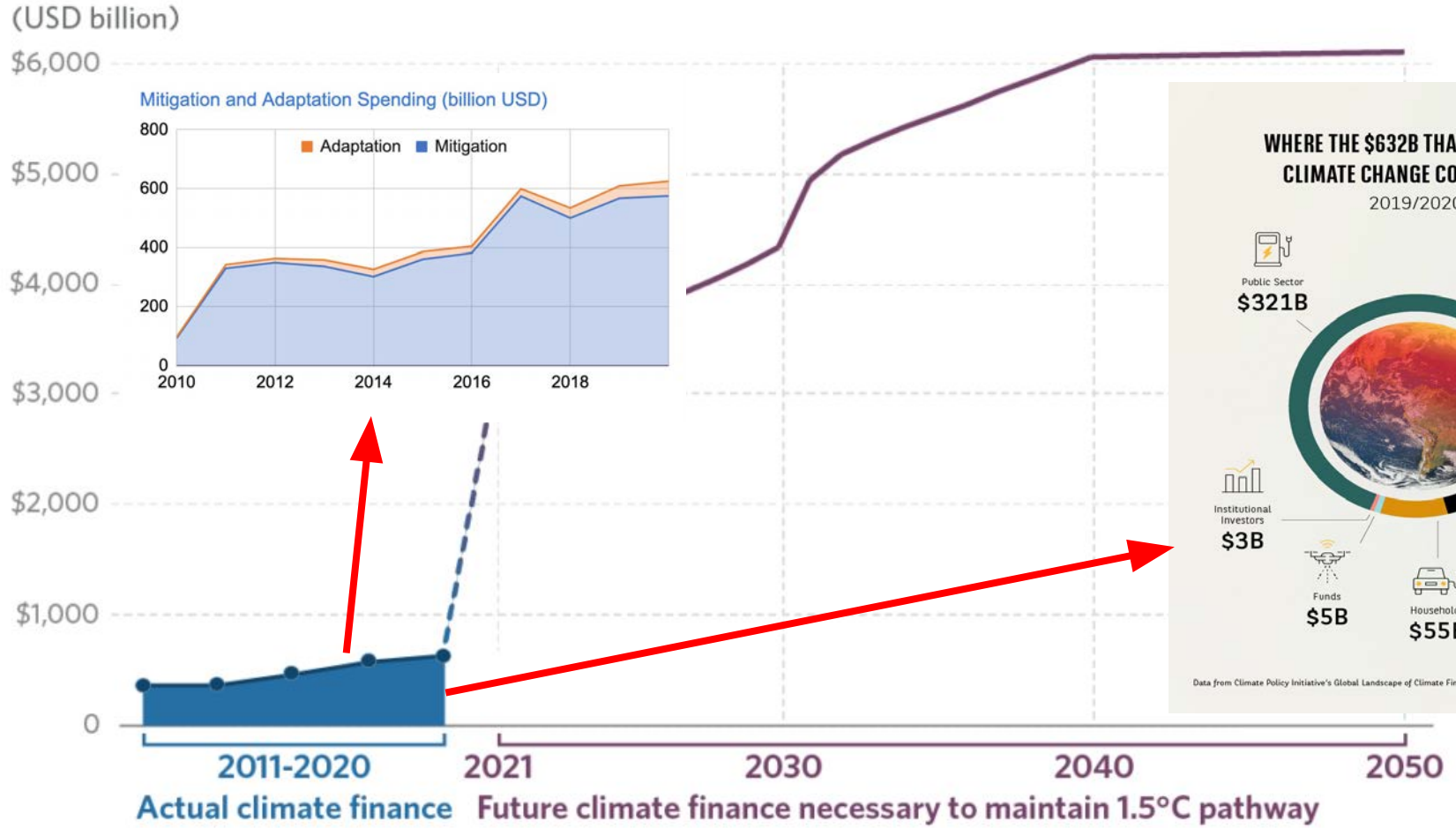
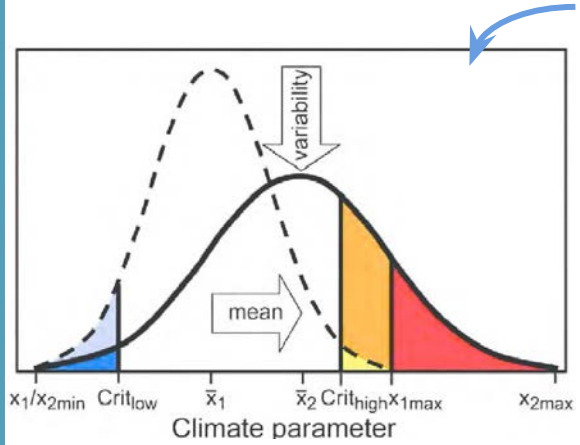
How much funding is needed for climate solutions? Who is to pay?

Fairness. Private sector financing is necessary.

Figure 3: Global tracked climate finance flows and the average estimated annual climate investment need through 2050

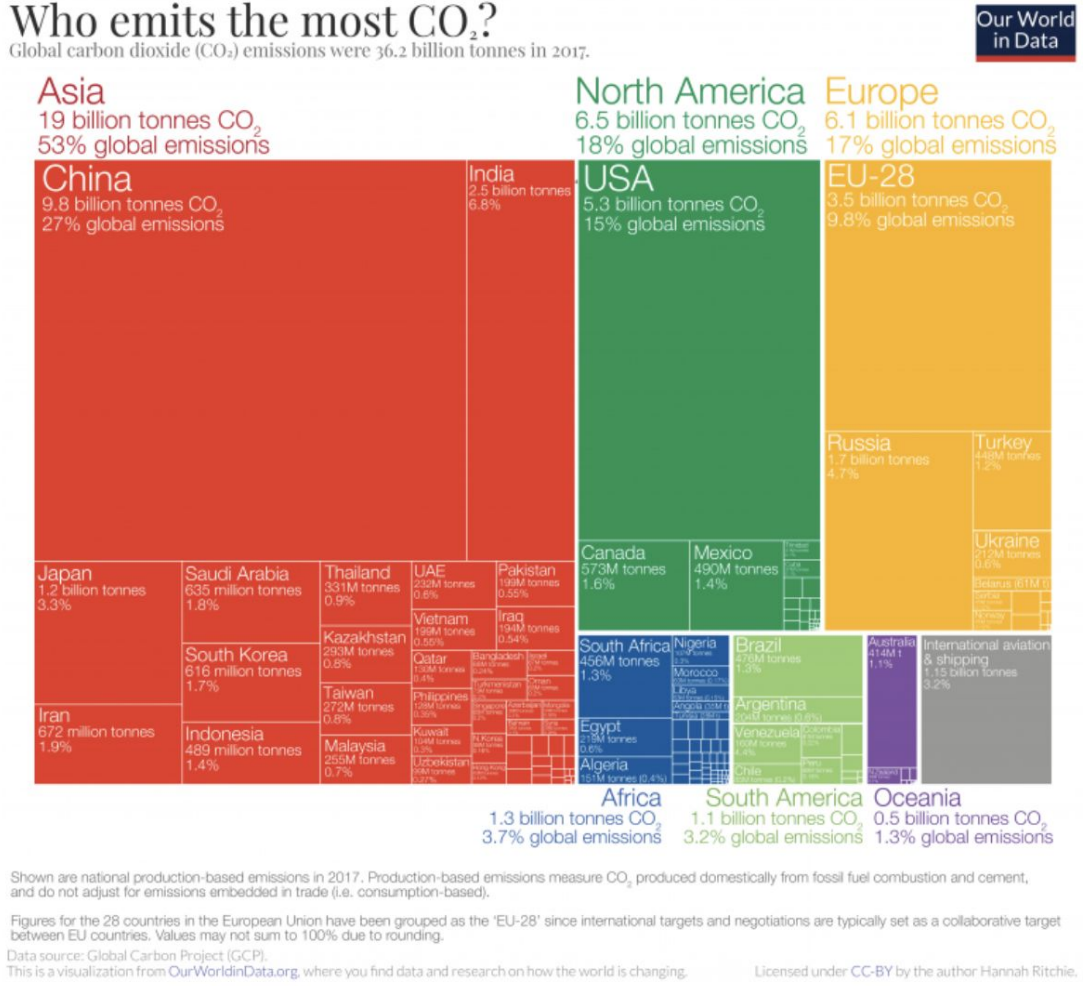


How much should government invest? Fundamental uncertainty of the estimates



- Double CO2 concentration => warming [2 - 4.5] C - that's a wide range!
- Global temperature rise leads to fatter tails in local temperatures and precipitation
- "Optimal" policy or path are not well defined -> "Robust" policy is a more reasonable approach
- ***Robust policy: low cost of over-spending relatively to cost of under-spending => invest a lot to limit probability of the worst outcome***

Wrong way to look at it: Emission flow

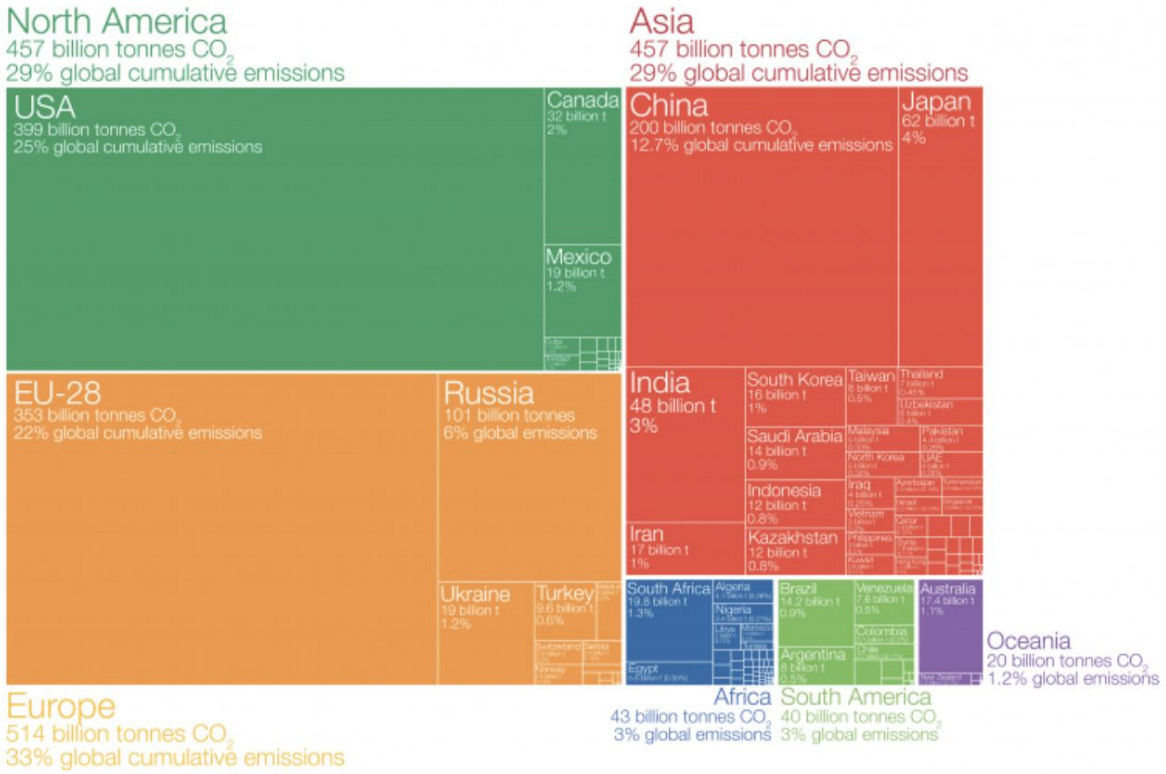


Right way to look at it: Cumulative emissions

Who has contributed most to global CO_2 emissions?

Our World in Data

Cumulative carbon dioxide (CO_2) emissions over the period from 1751 to 2017. Figures are based on production-based emissions which measure CO_2 produced domestically from fossil fuel combustion and cement, and do not correct for emissions embedded in trade (i.e. consumption-based). Emissions from international travel are not included.



Figures for the 28 countries in the European Union have been grouped as the 'EU-28' since international targets and negotiations are typically set as a collaborative target between EU countries. Values may not sum to 100% due to rounding.

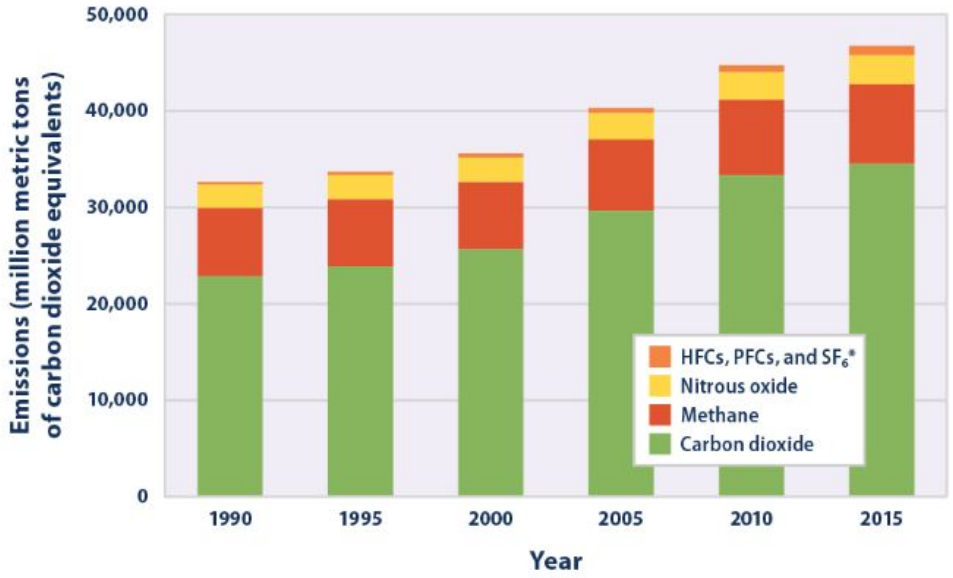
Data source: Calculated by Our World in Data based on data from the Global Carbon Project (GCP) and Carbon Dioxide Analysis Center (CDIAC).
This is a visualization from OurWorldinData.org, where you find data and research on how the world is changing.

What solutions?

CO2 is not the only GHG.
Mitigation is still needed, but adaptation is becoming more urgent.

Insufficient focus on non-CO2 mitigation

Figure 1. Global Greenhouse Gas Emissions by Gas, 1990–2015



Methane - shorter half-life, more immediate effect of reduced emissions
Main source: animal agriculture

Solutions:

- Preference shift (cf. energy saving)
- Alt. protein (cf. green energy)
- Increased efficiency (e.g. reduce food waste)

Mitigation solutions (from Project Drawdown)

** Gigatons CO2 Equivalent Reduced / Sequestered (2020–2050)*

SOLUTION	SECTOR(S)	SCENARIO 1 *	SCENARIO 2 *
Onshore Wind Turbines	Electricity	46.95	143.56
Utility-Scale Solar Photovoltaics	Electricity	40.83	111.59
Plant-Rich Diets	Food, Agriculture, and Land Use / Land Sinks	78.33	103.11
Reduced Food Waste	Food, Agriculture, and Land Use / Land Sinks	88.50	102.20
Tropical Forest Restoration	Land Sinks	54.45	85.14
Clean Cooking	Buildings	31.38	76.34
Family Planning and Education	Health and Education	68.90	68.90
Distributed Solar Photovoltaics	Electricity	26.65	64.86
Refrigerant Management	Industry / Buildings	57.15	57.15

“Grey”: man-made solutions

“Green”: Nature-based solutions (mitigation co-benefits)

Current adaptation spending: **$46 bil.**

Necessary adaptation spending: **$155-330 bil.**

How best allocate government funds?

Catalyze private sector investment
Provide anti-greenwashing regulation
Require appropriate disclosures
Create adaptation marketplace in addition to mitigation

Green investment can be viewed as a hedge for climate risks (it is not enough to divest from high-emission assets)

- Physical risks
  - Physical risks are generally non-diversifiable
  - Physical risks can be reduced for a given amount of GHG concentration through investment in adaptation
  - Financial institutions can hedge physical risk through exposure to adaptation projects
  - *Need adaptation credits analogous to carbon credits*
- Transition risks
  - Hedged through carbon credits and offsets

Climate solutions marketplace - a way to use government funding as a catalyst

Attractive investment profile	Needs de-risking, ROI boost, or both	No hope for private investment
Traditional or impact investment	**G insurance**	G or NGO funding
Green investment	**G or NGO grant**	Climate justice goals
Regulation helps, but not need for direct G or NGO involvement	**Can help attract private investors**	

Conclusions

- Advanced economies are to pay for most climate finance
- Private sector involvement is unavoidable
- Agriculture sector is extremely important
- Need to focus on both mitigation and adaptation
- Best use of government funds is to incentivize and leverage private investment through regulation, de-risking, co-investing, and creating mitigation and adaptation markets