Climate Change Session: An Open Discussion

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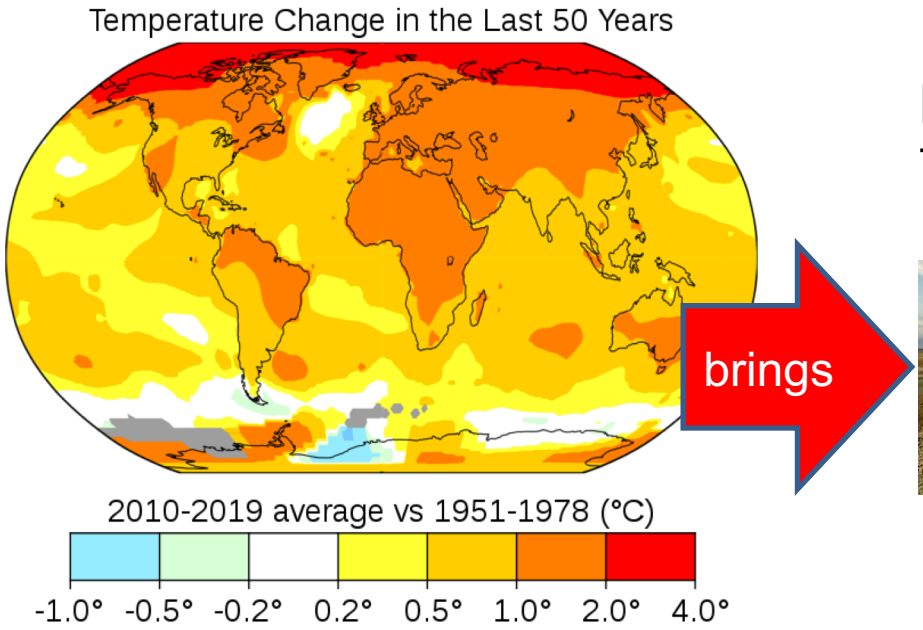
Goals & Structure

- Discuss the ongoing climate crisis and the role of EBDT/ICDT in this crisis.
- **Session Structure:**
  - Short introductory presentation by the session chairs.
  - Open discussion about the carbon footprint of the EBDT/ICDT conference.

Global Warming and Climate Change



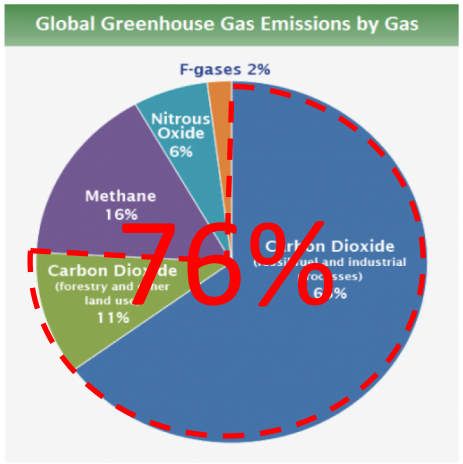
A) Global Warming: human-caused increase in global surface temperatures.

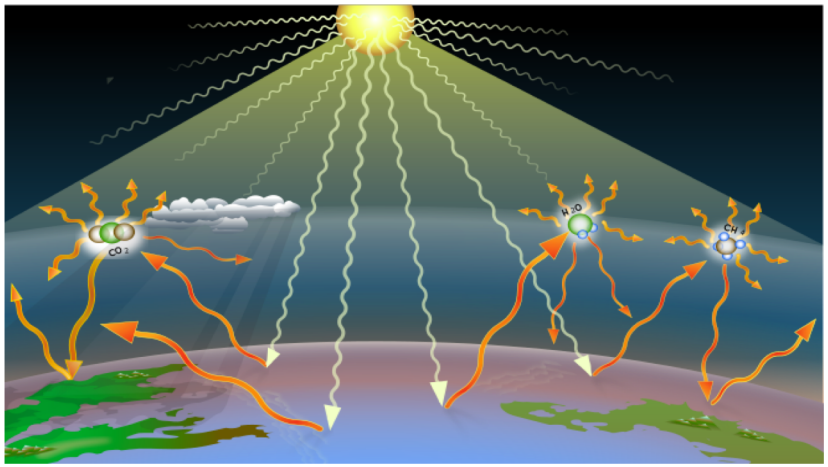
B) Climate Change: new weather patterns that remain for an extended time having an impact on **human health** and the **environment**.

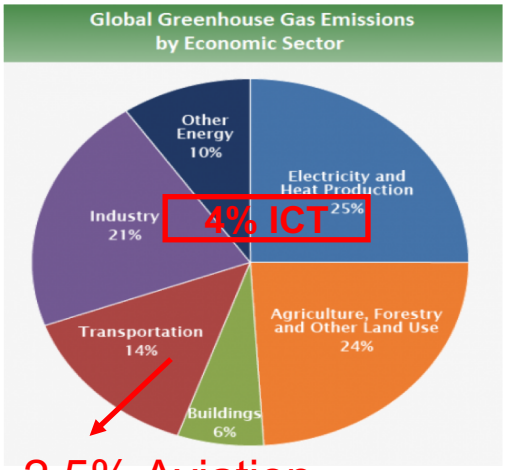
Rising Temperatures: ***a)*** *dryness, wildfires;* ***b)*** *tornadoes, hurricanes, earthquakes, tsunamis;* ***c)*** *ice-melting, sea-level risings, floodings, …*

CO2 - Global Warming Culprit

- **Why do we have Global Warming?**
  - Current Human activity (coal, oil, gas) generates **Carbon Dioxide (CO_2),** the predominant **Greenhouse Gas** (76%)!
  - **CO_2** traps **Solar Radiation** inside the **atmosphere** that eventually leads to Global Warming.
    - Oceans clean only ¼ of CO2 pollution while trees another ¼.





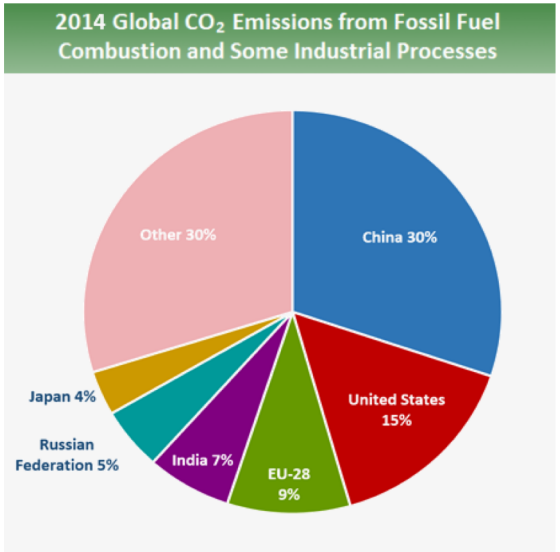


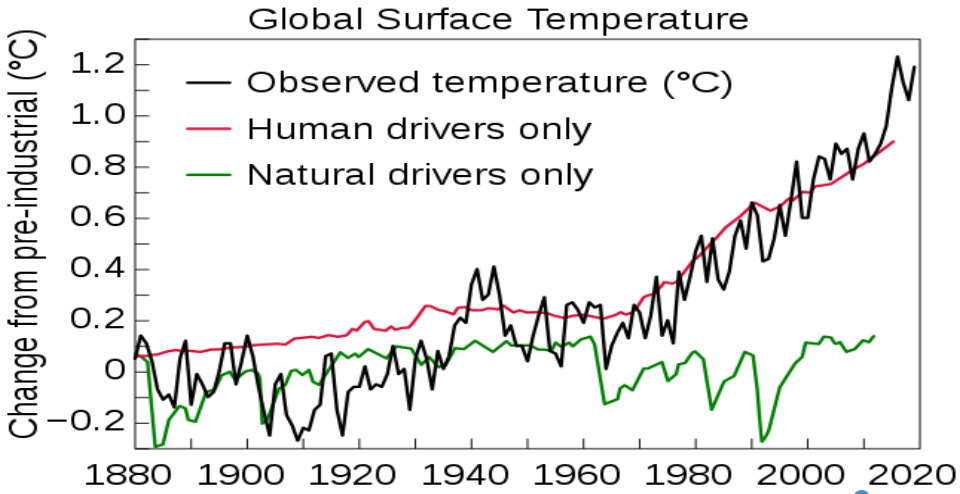
2.5% Aviation

US EPA: https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data

CO2 - Global Warming Culprit

- CO_2 emerging in all sectors and rising economies
- We are witnessing a steady increase in CO_2 since the Industrial Revolution (1760 – 1840 AD)
- **Global warming will continue if we don't act promptly!**

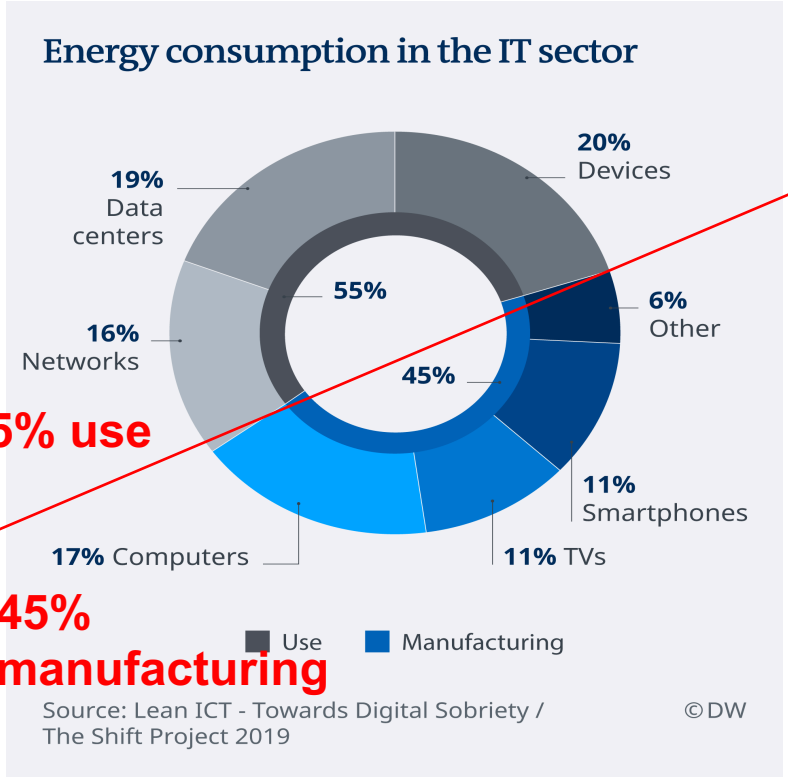




The **Intergovernmental Panel on Climate Change** (**IPCC**) is an intergovernmental body of the United Nations: World Meteorological Organization (WMO) United Nations Environment Programme (UNEP)

CO2 by Information and Communications Technology (ICT)

- ICT contributes **~2-4%** of world CO2 emissions and will increase to **8%** by 2025!



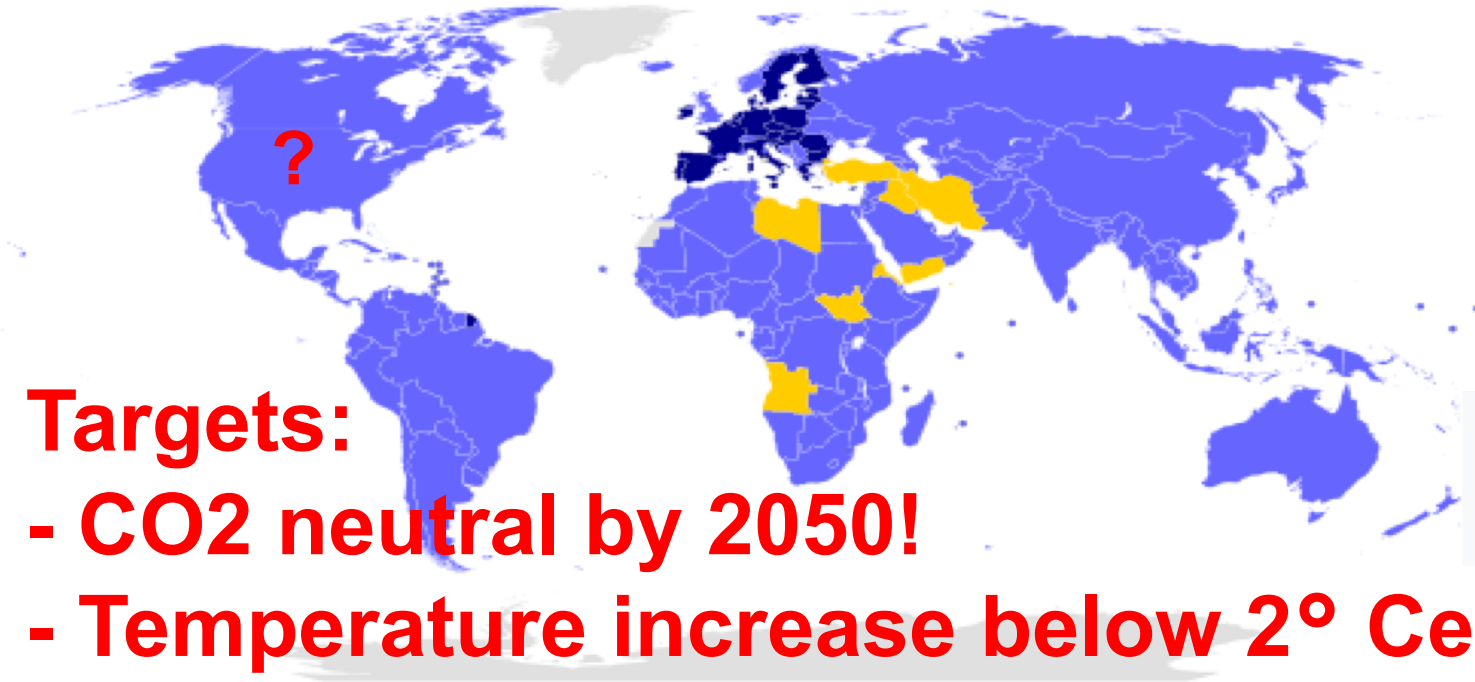
→ Are we **comfortable doing research** that (allegedly) contributes to CO2 increase?

→ How much CO2 **is technology saving anyway**? (Teleconferencing vs. Physical Meetings?)

→ How to make **impactful research** to reduce this increase from **4% to 8%?** (edge computing?, energy efficiency?, reusable systems?, transparency?)

The Paris Agreement

- The **Paris Agreement** within the **United Nations Framework Convention on Climate Change (UNFCCC),** dealing with **greenhouse-gas-emissions mitigation**, **adaptation**, and **finance**, signed in New York City, on April 22, 2016.



PARIS2015
UN CLIMATE CHANGE CONFERENCE
COP21·CMP11

State parties 194
Signatories
Parties covered by EU ratification

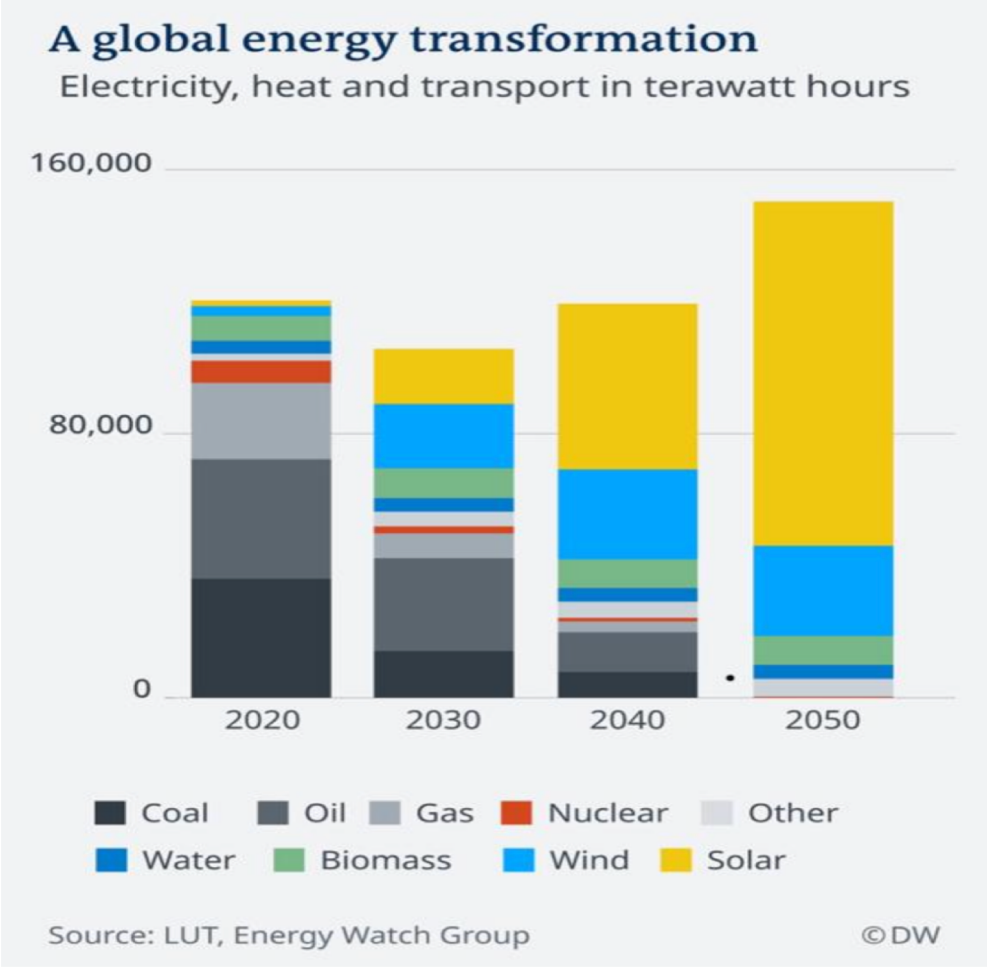
Wikipedia

Targets:

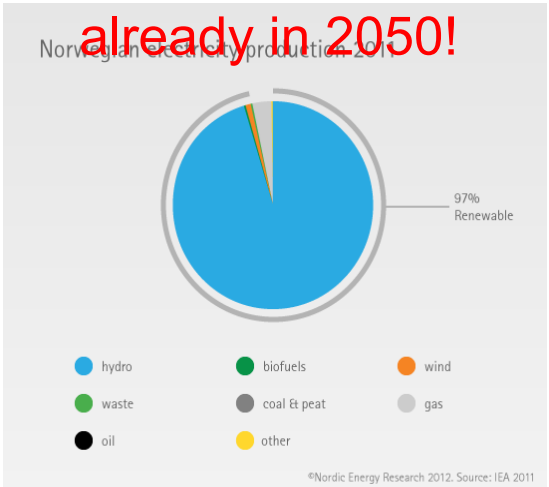
- CO2 neutral by 2050!

- Temperature increase below 2° Celsius

RoadMap to 2050!



Some countries almost already in 2050!



Norway's large water reservoir capacity is used to store and regulate a fluctuating supply of renewables … a 50 GWh battery!

Norway Hits 64.4% EV Market Share In January 2020.
https://cleantechnica.com/

CO2 Finance Issues

Offsetting CO2:

- Residential Photovoltaic System in Sunny country 1 year production (10kWp): **24 tons CO2 / 4 persons = 6 tons / person!**
  - i.e., **17MWh (~4000€)** for **heating**, **electricity** and **mobility**
- Lifetime PV Prod. (2 years): **600 tons CO2 (i.e., 150 tons/person)**

Will governments shift CO2 costs down to citizens as new taxes? Problem solved?

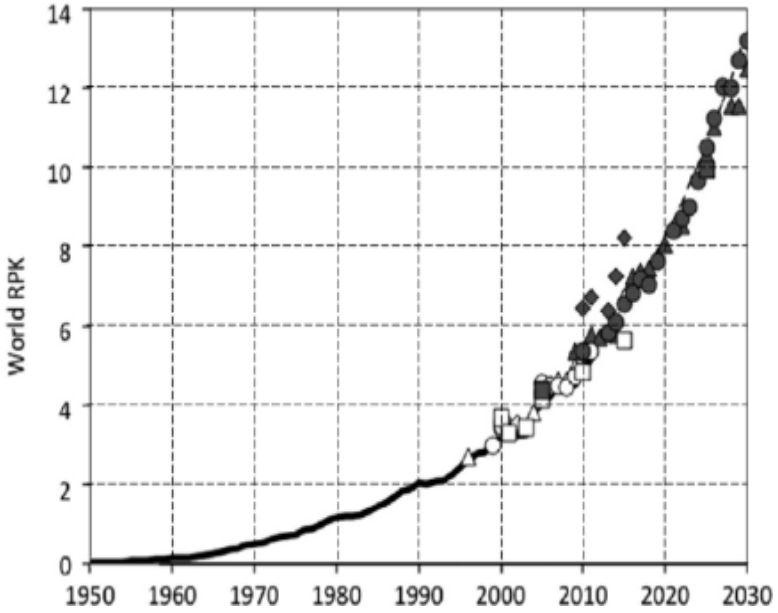
CO2 Penalties:

- **2020: 25.15 Euros / ton**
  - **Penalty:** 600 Euros / person /year!
  - https://markets.businessinsider.com/commodities/co2-european-emission-allowances
- **Future: 100 Euros / ton** (Herbert Diess, VW CEO)
  - **Penalty:** 2400 Euros / person / year!
  - https://www.electrive.com/2020/01/28/vw-boss-herbert-diess-gets-frank-about-co2/

How is EDBT/ICDT part of the problem?

CO2 Emissions from Air Travel

- Air travel: currently **~2-3%** of emissions, but on the rise, because people tend to travel more:
- i.e., **~100 gCO2/passenger-km**
  - But in fact **~250 gCO2eq** because of other pollutants
- Road and rail are **~60g CO2eq**
- Fly Lisbon ⟷ Copenhagen: **1 ton CO2eq!**
- Your lifetime carbon budget (for everything, not just travel): **200 tons CO2eq**



Trillions of revenue passenger kilometres per year, from Wild, Baxter, Sabatini, Sustainable Technologies for Aircraft Energy Generation, Storage, and Distribution, PRCC 2014

Reducing the Need to Travel

- To reduce emissions, avoid plane travel, and **travel more wisely and be more selective? Publish less?**
- First: **measure** the total travel footprint of attendees
  - Analyze the data, **choose places** minimizing travel?
  - Unfair advantage for only a few cities?
- **Colocation** with other conferences to reduce travel
- Improving **remote participation**:
  - **Live streaming** of talks?
  - Allow **remote talks** and questions?

Carbon Offsets

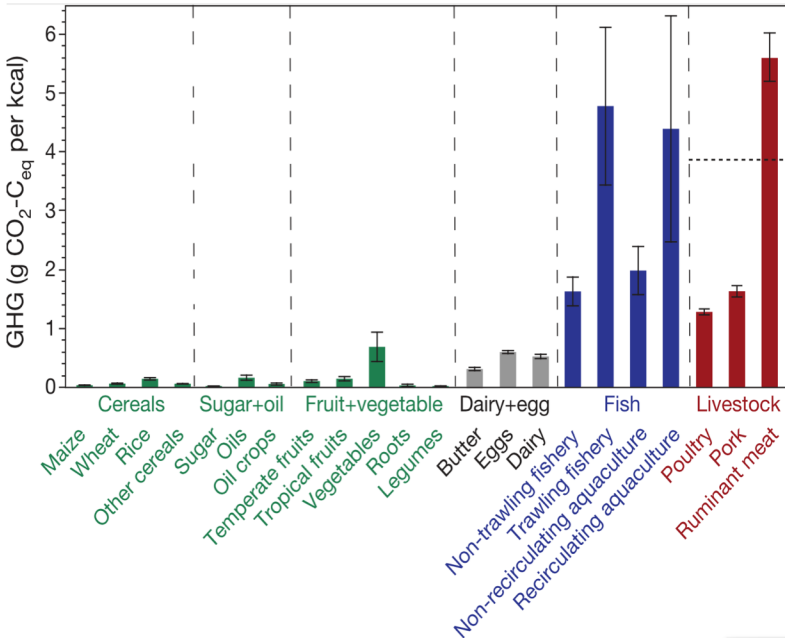
- **Idea:** support projects that reduce CO2 emissions
  - **Measure** your CO2 footprint, say 1 ton CO2
  - **Finance** projects whose expected outcome is to reduce CO2 emissions by 1 ton
- Nowadays: around **25 EUR / ton CO2**
- Could be included in the **registration fee**
  - Make EDBT/ICDT **carbon neutral**
- Not a perfect solution (still better not to travel)

VCS VERIFIED CARBON STANDARD
A Global Benchmark for Carbon

Green-e Climate CERTIFIED
Gold Standard

Other Ideas to Reduce Impact

- Producing **food**, especially **meat**, emits lots of CO2
  - **All-vegetarian** menus?
  - **Local producers**?



- Avoid **disposable dishware**
- Avoid **conference bags** and other gadgets?

Source: Tilman and Clark, Global diets link environmental sustainability and human health, Nature, 2014

Other initiatives and call to discussion

Other initiatives in CS

- **SIGPLAN Climate Committee**
  - https://www.sigplan.org/Resources/Climate/
  - Asks ACM to **charge conferences** for their footprint
- **Moshe Vardi's piece in CACM**
  - Asks ACM to **allow video talks** in its conferences
- **acm-climate mailing-list**
- **TCS4F.org** (theoretical computer science group)
  - **Conference manifesto** to commit to CO2 reductions

Climate Change Session: An Open Discussion

- **Should we care** about contributing to the climate crisis?
- **Can we help** with our research?
- Should we still do **in-person conferences**? How?

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