MCC

Mercator Research Institute on
Global Commons and Climate Change gGmbH

Coordinated CO_2 Prices and Strategic Transfers

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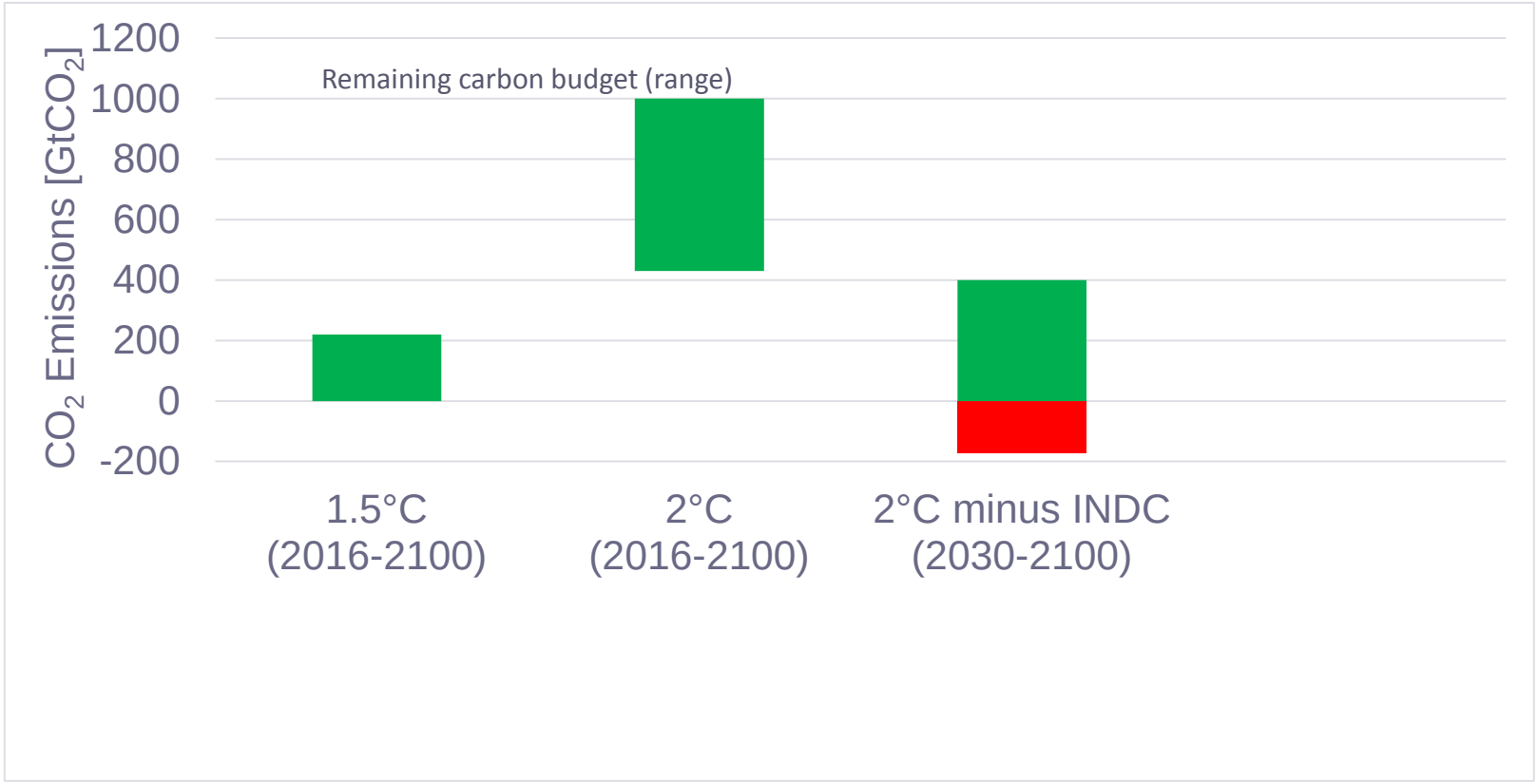
The global carbon budgets

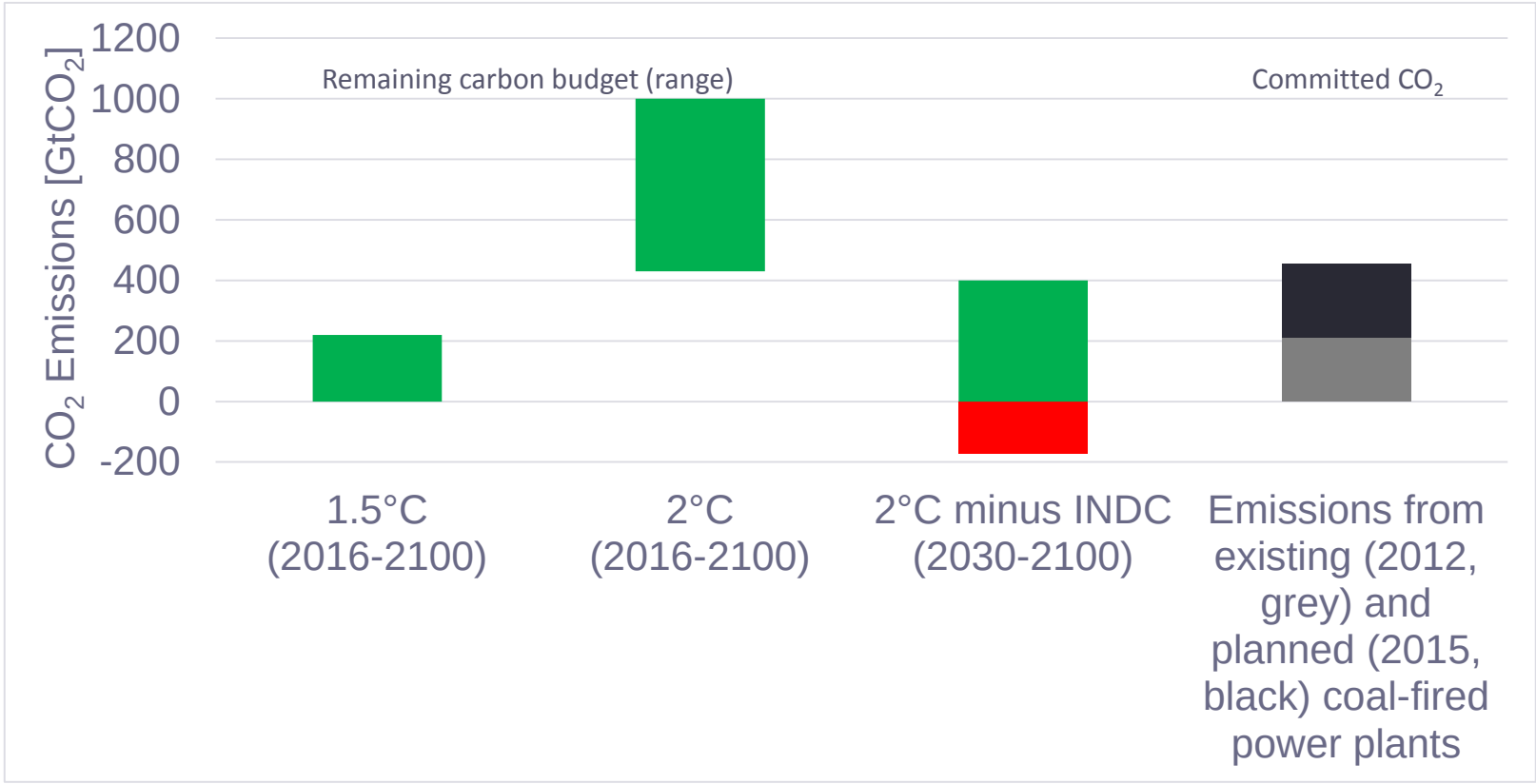
- Intended Nationally Determined Contributions are inconsistent with the temperature target.



Data sources: Rogelj et al. (2015), IPCC AR5 WGIII (2014), Minx et al. (2016), Davis and Sokolow (2014), Global Coal Plant Tracker (2015)

The global carbon budgets and coal

- Intended Nationally Determined Contributions are inconsistent with the temperature target.



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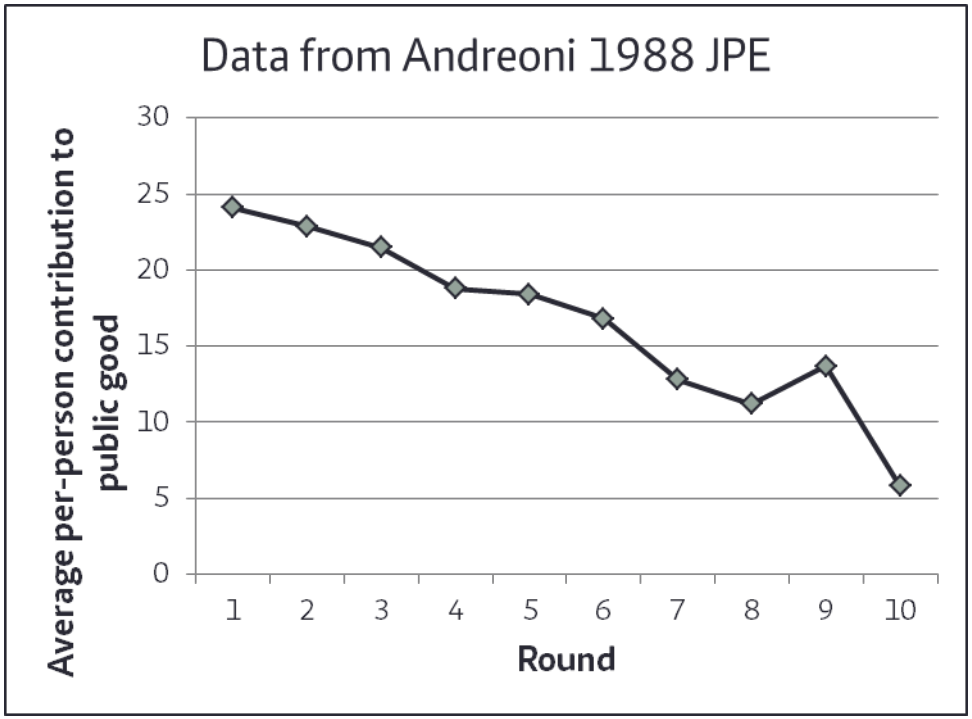
The public goods game and conditional cooperators



- Large group of people are willing to cooperate when others also cooperate – „I cooperate when you cooperate“
- People start out by giving something
- Contribution drops, when free-riding is observed
- How to sustain conditional cooperation for climate change mitigation?

The public goods game with strategic transfers

- How to ensure provision of emission reductions q_i?

National carbon price $p_i = MC_i\ (q_i)$

  - Induces economy –wide, cost-efficient reduction
  - Indicates level of ambition of a country

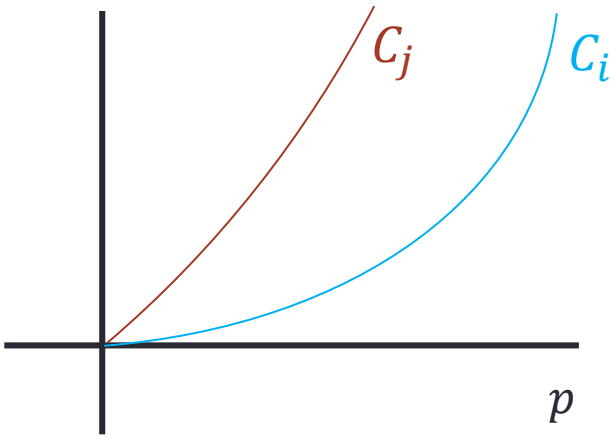
The public goods game with strategic transfers

- How to ensure provision of emission reductions q_i?

  National carbon price $\boxed{p_i = MC_i\,(q_i)}$

  - Induces economy –wide, cost-efficient reduction
  - Indicates level of ambition of a country

- Increasing carbon price → differently increasing costs



- Strategic transfers:

$$\boxed{\frac{\partial}{\partial p_i}\mathcal{T}_i \geq 0}$$

- Transfers compensate between heterogeneous countries
- Increased incentive to provide emission reductions

The public goods game with strategic transfers

- Implementation of strategic transfer through a compensation fund:

$$\mathcal{T}_i = T \quad \cdot size_i \cdot \underbrace{\left(\frac{C_i}{size_i} - \frac{1}{\sum size_j} \sum C_j \right)}$$

Compensation between countries based differences in per-size ($size = \mathrm{gdp}, \mathrm{pop}$)

mitigation costs C_i

The public goods game with strategic transfers

- Implementation of strategic transfer through a compensation fund:

$$\mathcal{T}_i = \underbrace{T \cdot size_i}_{\text{Magnitude of compensation}} \cdot \left(\frac{C_i}{size_i} - \frac{1}{\sum size_j} \sum C_j \right)$$

The public goods game with strategic transfers

- Implementation of strategic transfer through a compensation fund:

$$\mathcal{T}_i = T \quad \cdot size_i \cdot \left(\frac{C_i}{size_i} - \frac{1}{\sum size_j} \sum C_j \right)$$

- Strategic transfers enhance cooperation:

1. Increased incentive to reduce as countries anticipate that they only have to pay a fraction of their increase in mitigation costs

2. Countries either contribute through reducing emissions or through compensatory payments

Next steps

- Using carbon price can establish reciprocity
- G20: negotiate conditional carbon prices

- Strategic transfers can increase cooperation and ramp up ambition of NDCs

- Design of transfers critical to shape overall incentives

  - Transfers need to increase with level of ambition
  - Basing transfers on differences in mitigation costs is ideal, but how to measure?

Thank you for your attention!