Dealing with normative uncertainty
Making value judgments in DP-IAMs more transparent, plural & democratic

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My Page

How can IAMs provide reliable assessments of feasibility in light of deep normative uncertainty?

Normative uncertainty seems to threaten objectivity

IAMs are increasingly used to "assess feasibility" (cf. Brutschin et al. 2019). This framing of IAM research emphasizes objectivity and value-neutrality in assessments of pathways. However, normative aspects of IAMs are "the most fraught by uncertainty and yet the least understood" (Tavoni/Valente 2022). The questions thus is **how to handle implicit value judgments in DP-IAMs**.

Handling normative uncertainty in general

Value judgments are not necessarily in conflict with objectivity if they are democratically endorsed or made explicit as a separate premise. With divergent value positions in society, objectivity demands making value judgments...

- **T** ... **transparent** (stating them as a separate premise in communicating the results),
- **P** ... **plural** (to represent the whole array of plausible value positions) (cf. Weber 1904; Carrier 2022),
- **D** ... **deliberated** upon with stakeholders and the public (Kowarsch 2015; Lenzi/Kowarsch 2019).

Problematic are value judgments when they stay implicit and one-sided, especially in policy-relevant studies. Transparent value judgments can be understood and scrutinized by the users, increasing the objectivity of pathways in the long term.

Wait, but why?

Value-laden aspects have a **large impact** on results. *E. g. a* SDR of 2% instead of 5% *doubles* current efforts in pathways.

Values in the political sphere must ultimately be determined by policymakers and the public. If values find their way into decisions through feasibility facts, this undermines the **legitimacy** and **reliability** of expert advice.

In Short

Deep normative uncertainty in DP-IAMs seriously challenges the promise of IAMs to "*assess feasibility*". To provide relevant and reliable knowledge IAM research needs to explicitly and actively engage with ethical questions in mitigation scenarios. The goal must be to make scenarios transparent, deliberative, and subject to greater plurality concerning currently implicit values judgments.

What this implies for IAM research

- IAMs should be seen as tools to deliberate on **feasible and desirable** futures. **Scenario design** therefore needs to be made with value questions in mind.
- Modelers should **communicate** results conditional on the most influential values judgments in DP-IAMs.
- The current framing of feasibility and the focus on making IAMs more realistic ("model validation") risks concealing normative uncertainty instead of engaging with it.

Value Transparency and Plurality in the Case of Carbon Dioxide Removal in IAM-pathways

Interdisciplinary and public debate helped to achieve progress concerning the transparency and plurality of value judgments involved in relying on negative emissions in mitigation pathways.

Is 1,5C feasible?

PARIS

Global Warming of 1.5°C
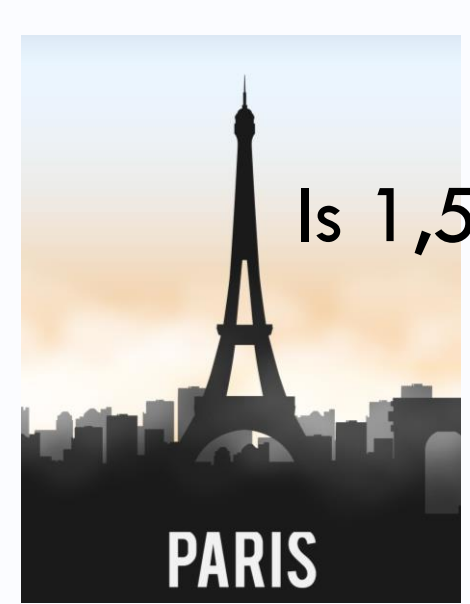
The IPCC Special Report on 1.5C had only limited value transparency and value diversity. **D**

Interdisciplinary and public debate highlights the value judgments involved in reliance on large-scale CDR in shifting risk to the future fueled by high SDR. **T D**

ARTICLE
A new scenario logic for the Paris Agreement long-term temperature goal
Joeri Rogelj, Daniel Huppmann, Volker Krey, Keywan Riahi, Leon Clarke, Matthew Gidden, Zebedee Nicholls & Malte Meinshausen

nature climate change — ARTICLES
Cost and attainability of meeting stringent climate targets without overshoot

Environmental Research Letters
LETTER
The role of the discount rate for emission pathways and negative emissions
Johannes Emmerling, Laurent Drouet, Kaj-Ivar van der Wijst, Detlef van Vuuren, Valentina Bosetti and Massimo Tavoni

New **scenario logic** proposed by Rogelj et al. 2019 turns "questions of inter-generational equity into **explicit design choices**". **T**

New **pathways** are created with alternative value judgments: **P T**
- No-overshoot scenarios (Riahi et al. 2022)
- Sensitivity analysis of discount rate (Emmerling et al. 2019): SDR of 2% instead of 5% *doubles* current efforts

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But what about other value judgments in DP-IAMs?

- Framework of Cost-Efficiency vs. e.g. modeling different explicit distributions of Paris budget in pathways (cf. Dooley et al. 2021)
- "Costs": equating welfare with consumption vs. other welfare concepts
- Sensitivity analysis and discussion of inequality parameter in SWF
- Other value judgments

Deep (value) transparency demands inter-disciplinary collaboration, public deliberation, and co-production of IAM scenarios and pathways. **IAMs cannot do it all:** structural limits concerning values.

Conclusions

IAMs assess *desirable* and *feasible* climate futures.

Values implicit in mitigation pathways must be made **transparent,** subject to greater **plurality,** and engaged **deliberatively.**

This means...
- more focus on exploring normative uncertainty.
- engage in co-production of scenarios with stake-holders, ethicists, and democratic agents (Lenzi/Kowarsch 2019).

Literature
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My paper on CDR: