# What to expect of integrated assessment models: insights from philosophy

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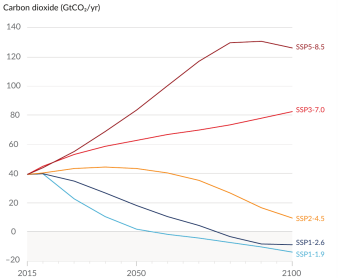
DER FORSCHUNG | DER LEHRE | DER BILDUNG

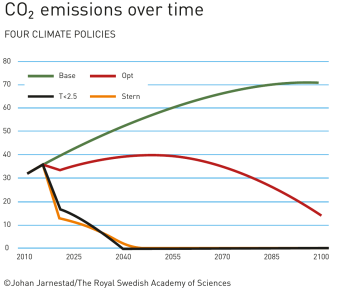
# IAMs are influential

## IPCC



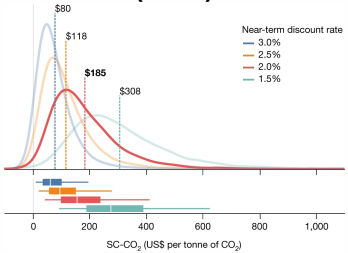

IPCC (2021)

## Nobel Prize




Nobel Prize Outreach (2018)

## Social cost of carbon (SCC)




Rennert et al. (2022)

# IAMs are influential & controversial

The appallingly bad neoclassical economics of climate change

Steve Keen

The Use and Misuse of Models for Climate Policy

Robert S. Pindyck*

Economic Models of Climate Change

A Critique

Wrong tool for the job

KEVIN ANDERSON

The failure of Integrated Assessment Models as a response to 'climate emergency' and ecological breakdown: the Emperor has no clothes

Salvi Asefi-Najafabady[a], Laura Villegas-Ortiz[b] and Jamie Morgan[c]

Current climate models are grossly misleading

**Nicholas Stern** calls on scientists, engineers and economists to help policymakers by better modelling the immense risks to future generations, and the potential for action.

editorial

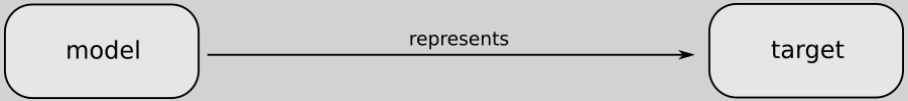
IAM helpful or not?

Distorting the view of our climate future: The misuse and abuse of climate pathways and scenarios

Roger Pielke Jr.[a,*], Justin Ritchie[b]

# How to evaluate IAMs?

## Received view of model evaluation:




## Some more sophisticated views:

- models as credible constructions (Sugden, 2000)
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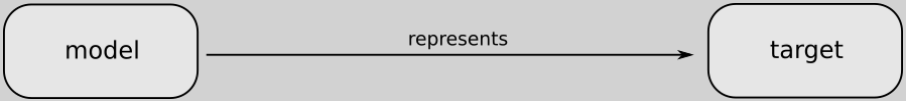


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# IAMs are different because they are . . .

## . . . heterogeneous

- cost-benefit IAMs vs.
- detailed-process IAMs

## . . . normative

- descriptive and normative elements not clearly separable
- inevitable questions of weighting
- e.g.: discounting, welfare framework

## . . . policy-focused

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# The IAM evaluation conundrum

**What is the conundrum?**

- traditional model evaluation reaches its limits
- IAMs are special kinds of models
- diversity of models, applications & users
- normative and policy aspects at the core

→ address it by looking at **expectations for IAMs**

- allows for heterogeneity
- several expectations per model
- sometimes only implicit

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# Looking at expectations for IAMs

## Example 1: Controversy about IAMs and SCC

"*[E]conomists should not claim that IAMs can forecast climate change and its impact or that IAMs can tell us the magnitude of the SCC.*" (Pindyck, 2017, p. 112)

## Example 2: What to expect of REMIND?

"*REMIND is a numerical model that* ***represents the future evolution of the world economies***" (PIK, 2022)

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"*The central strength of REMIND with its perfect foresight is its ability to [. . . ]* ***provide benchmark development scenarios***"

(Baumstark et al., 2021, p. 6590)

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1. look at model expectations and model capabilities
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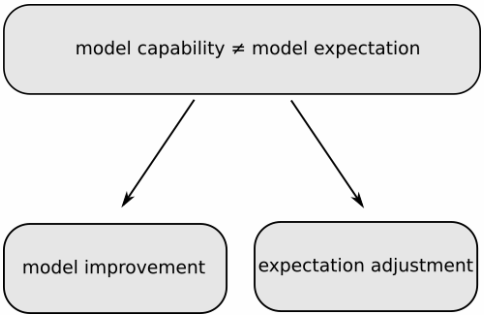

# What is a model commentary . . .

## . . . about? (Māki, 2018)

- assumptions
- uncertainties
- interpretations
- normative aspects
- political implications
- . . .

## . . . in practice? (Māki, 2009)

- model documentation
- journal articles
- oral presentations
- . . .

- "failure of model commentary in case a model is applied to domains to which it does not properly apply" (Māki, 2013, p. 12)

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# Conclusion

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- diversity of models, applications & normative and policy aspects

## How could tackle the conundrum

- evaluate IAMs based on expectations for them
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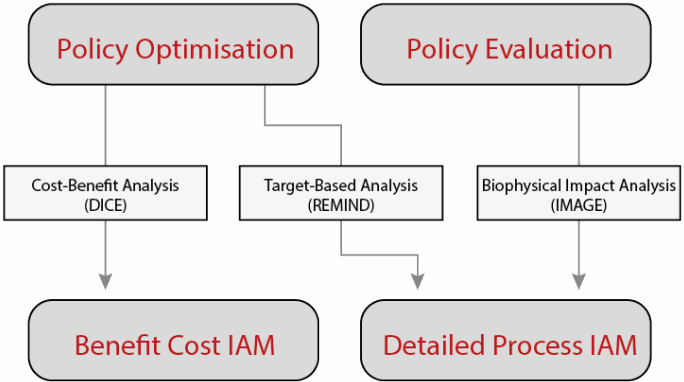
# Different types of IAMs

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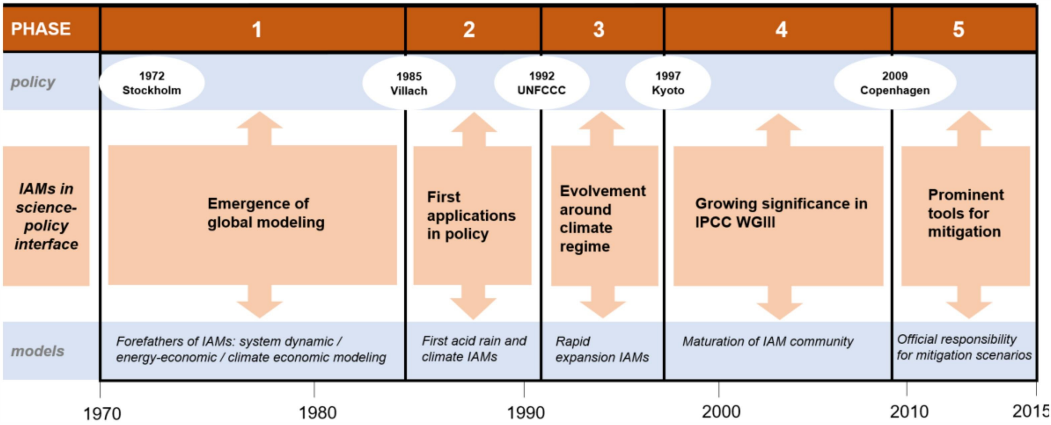
# IAMs and climate policy




van Beek et al. (2020)

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# Model conceptions in philosophical literature

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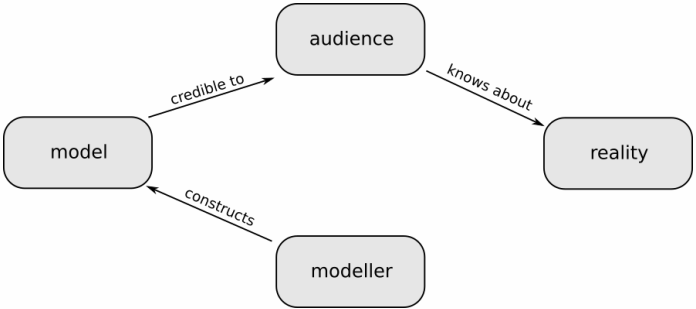


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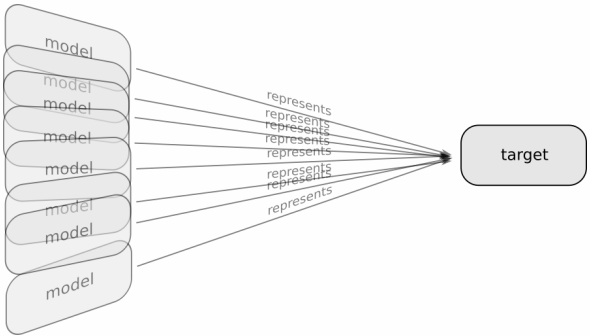


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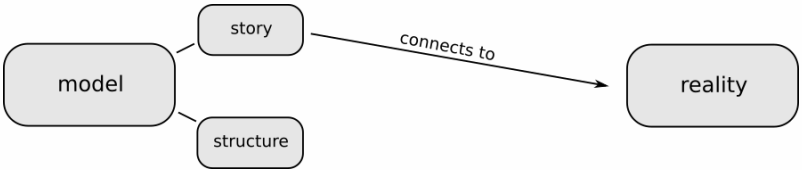


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