Damage curves and uncertainty assessment

NAVIGATE Expert Workshop, 20 September 2021

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Climate impacts and policy

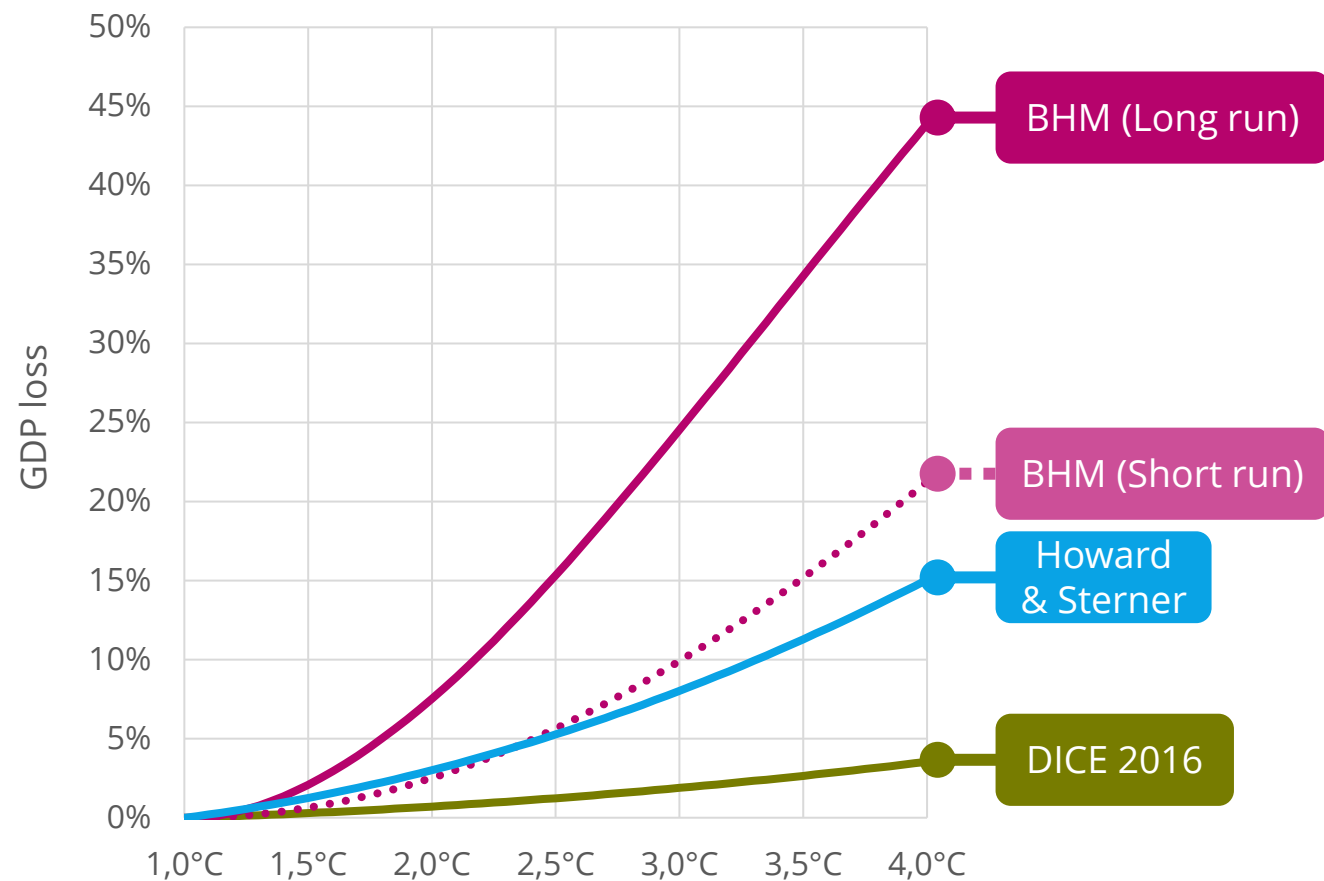**Damage estimates** → **Damage costs** → **Integrated Assessment Models** → **Policy tool:**
- Temperature target
- Carbon budget
- Social Cost of Carbon
- …
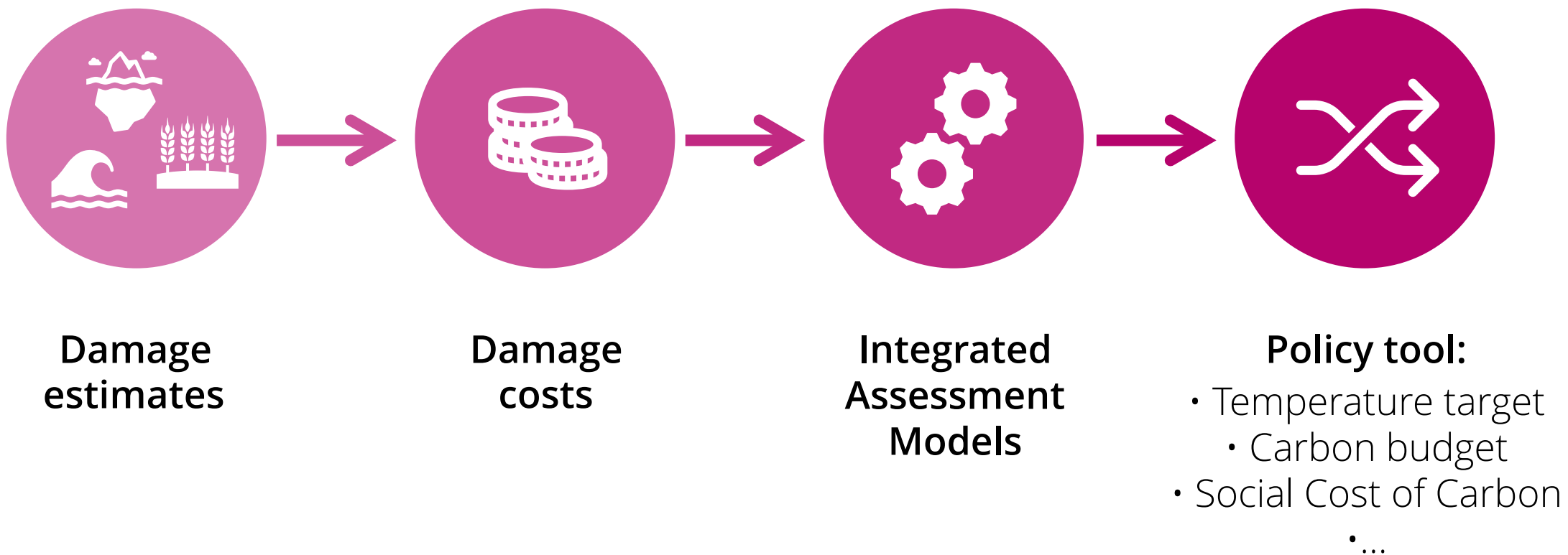
Climate impacts and policy

Damage functions → **Integrated Assessment Models** → **Policy tool:**
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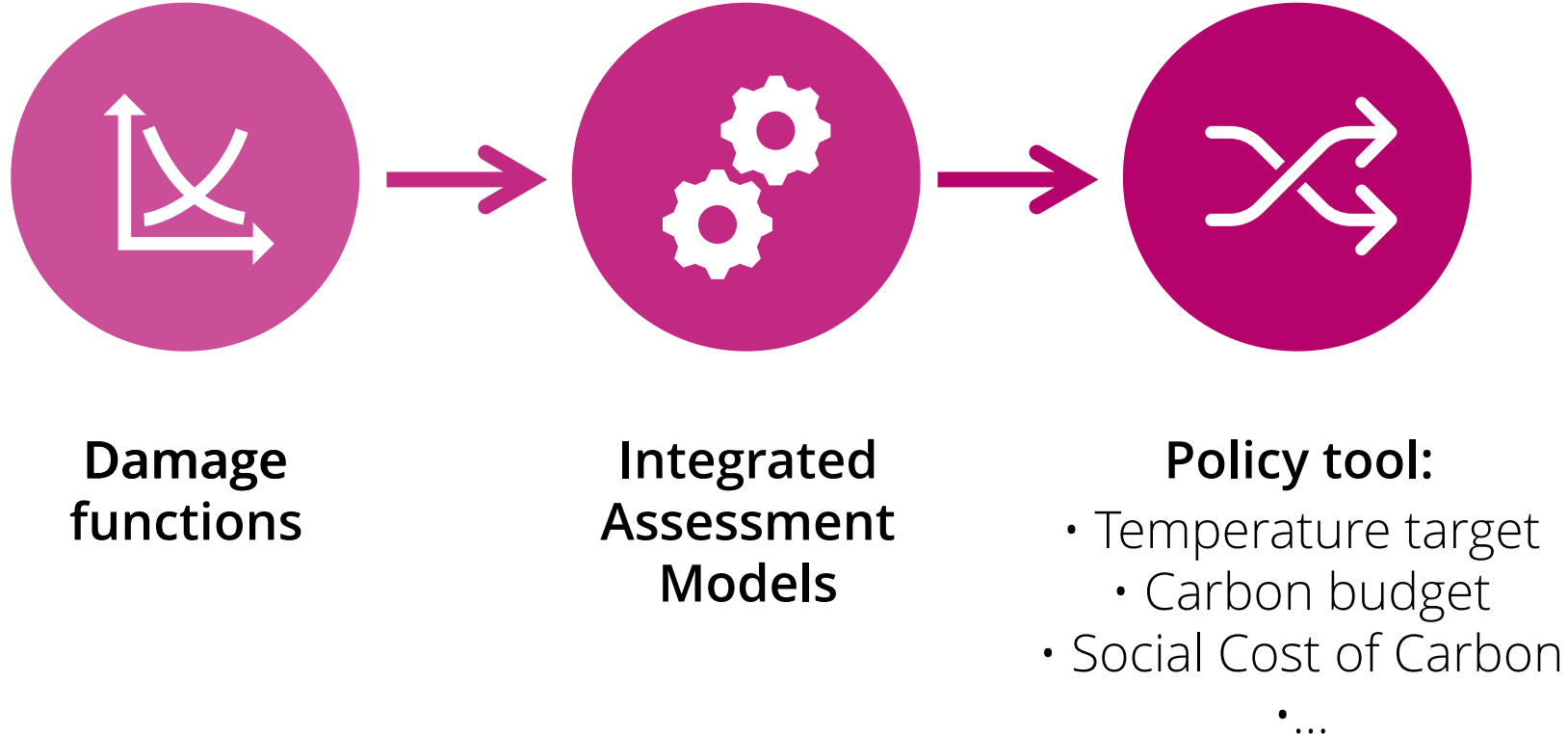
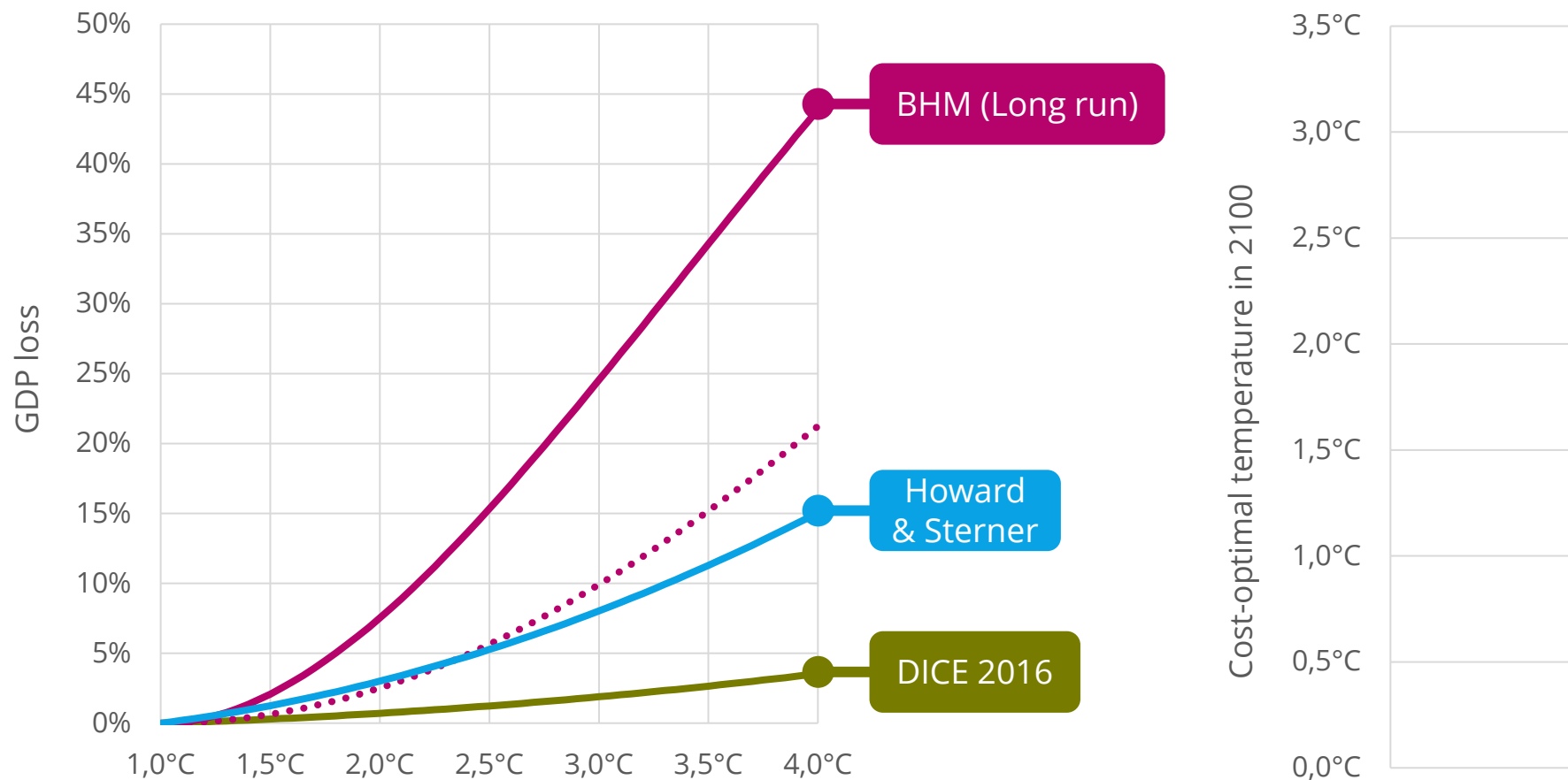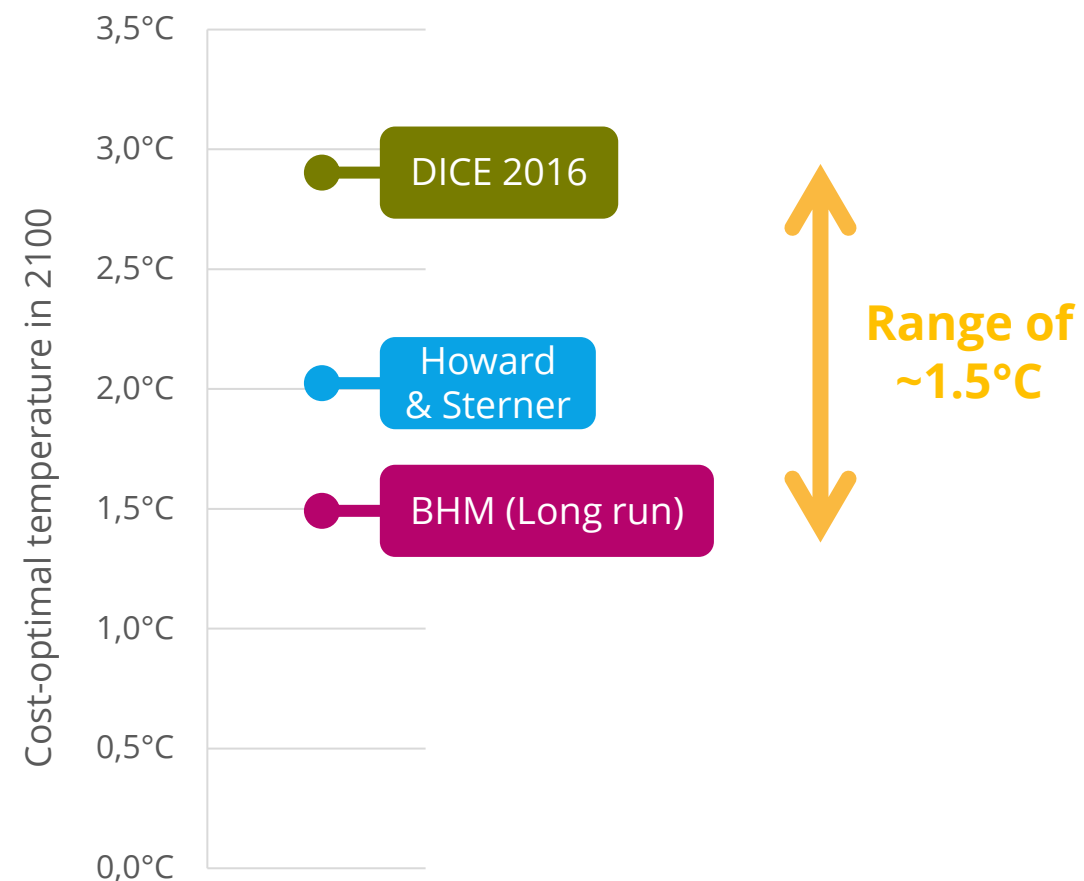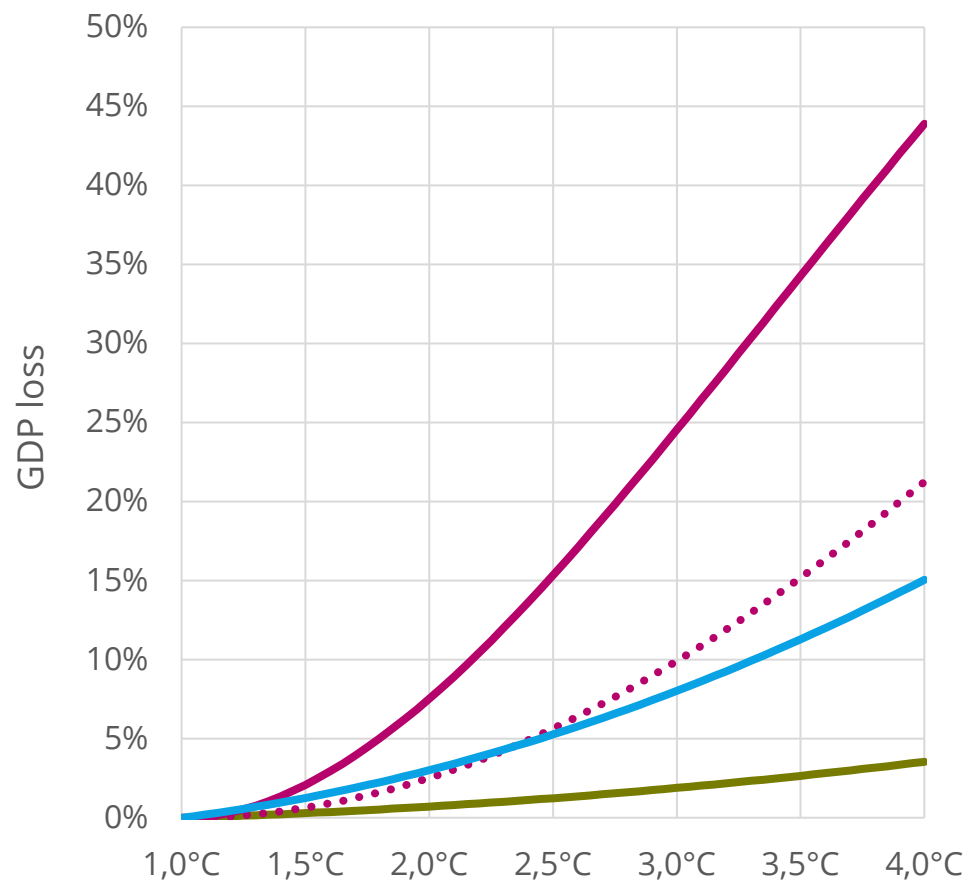# Damage functions: uncertainty

› Traditional CBA models

› Empirical: Burke et al
(from GDP growth relation to
GDP loss relation)

› Meta-analysis: Howard

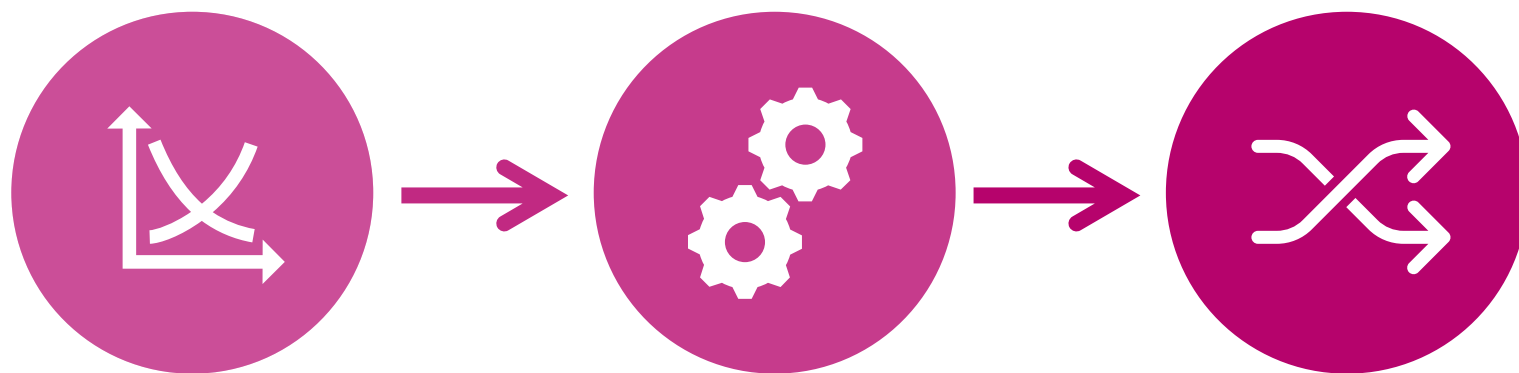› Bottom-up sectorally modelled:
COACCH (**nog toevoegen**)

Damage functions: cost-benefit temperature target

PBL Netherlands Environmental Assessment Agency

GDP loss

- BHM (Long run)
- Howard & Sterner
- DICE 2016

Cost-optimal temperature in 2100

Damage functions: cost-benefit temperature target
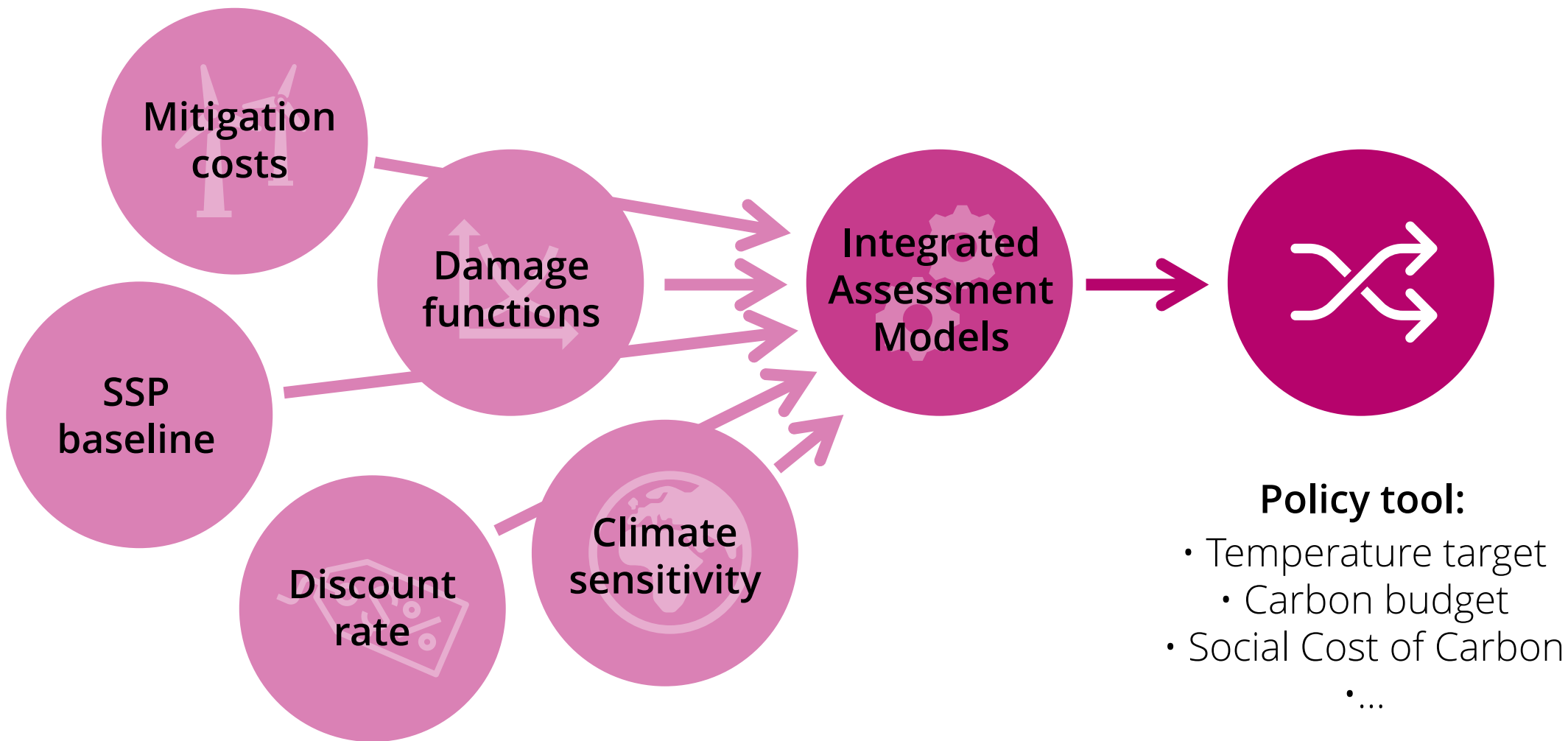
What about other uncertainties?
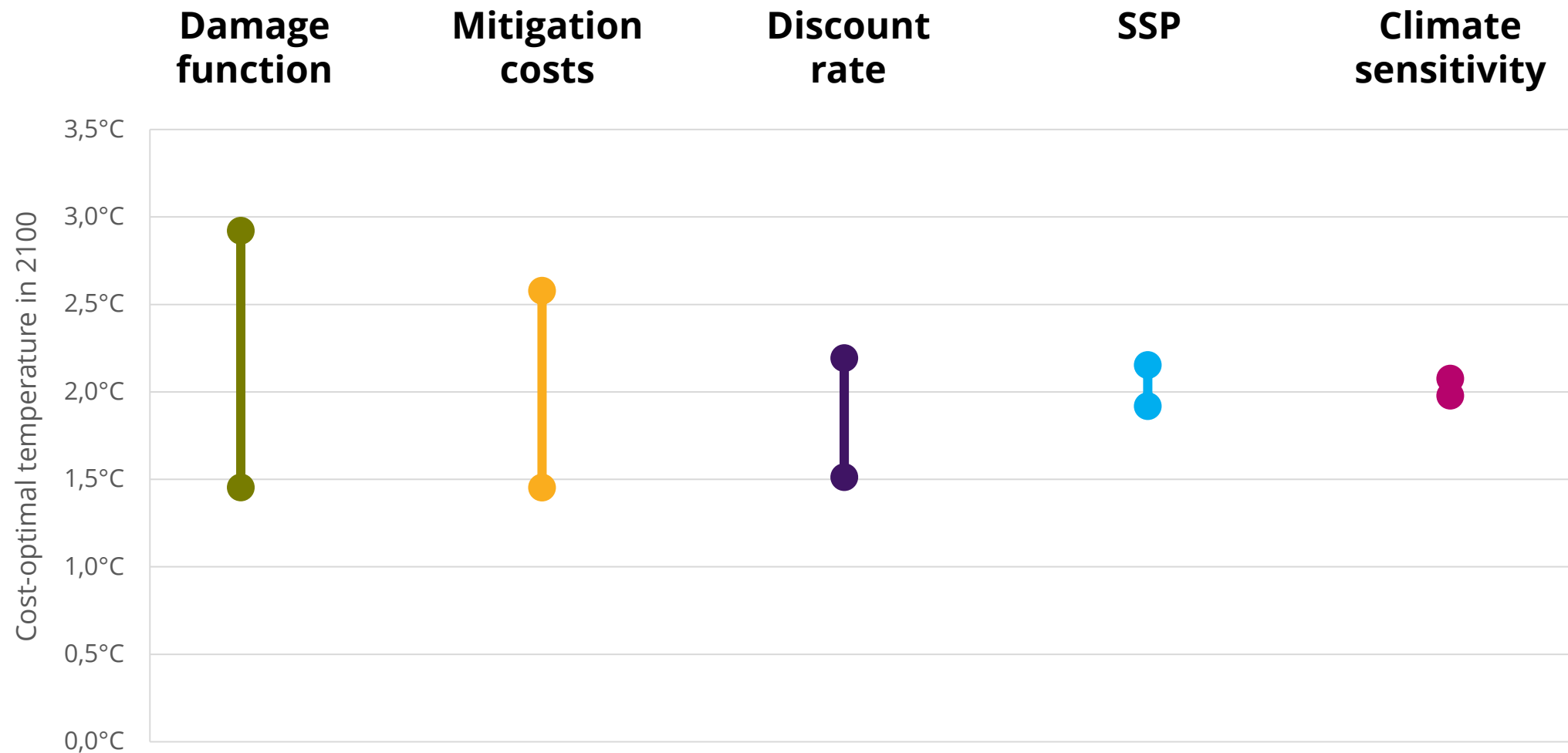
Damage functions → **Integrated Assessment Models** → **Policy tool:**
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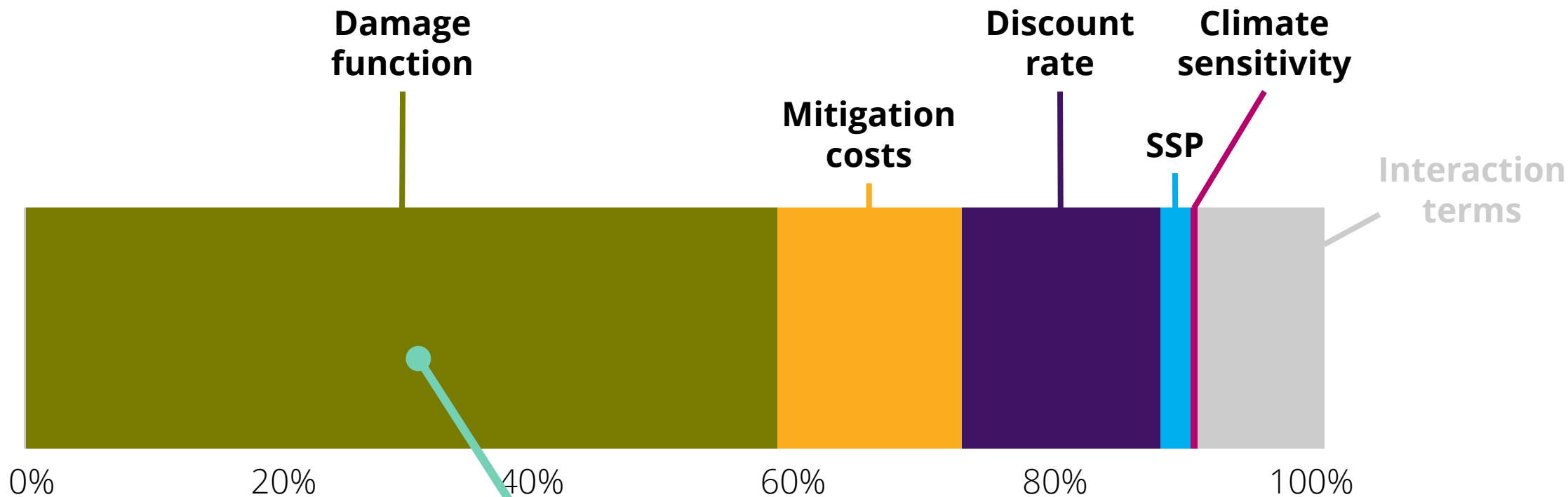- …

What about other uncertainties?

Mitigation costs

Damage functions

SSP baseline

Discount rate

Climate sensitivity

Integrated Assessment Models

Policy tool:
- Temperature target
- Carbon budget
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- ...

Cost-benefit with other uncertainties

Cost-benefit: variance decomposition

Damage function

Mitigation costs

Discount rate

SSP

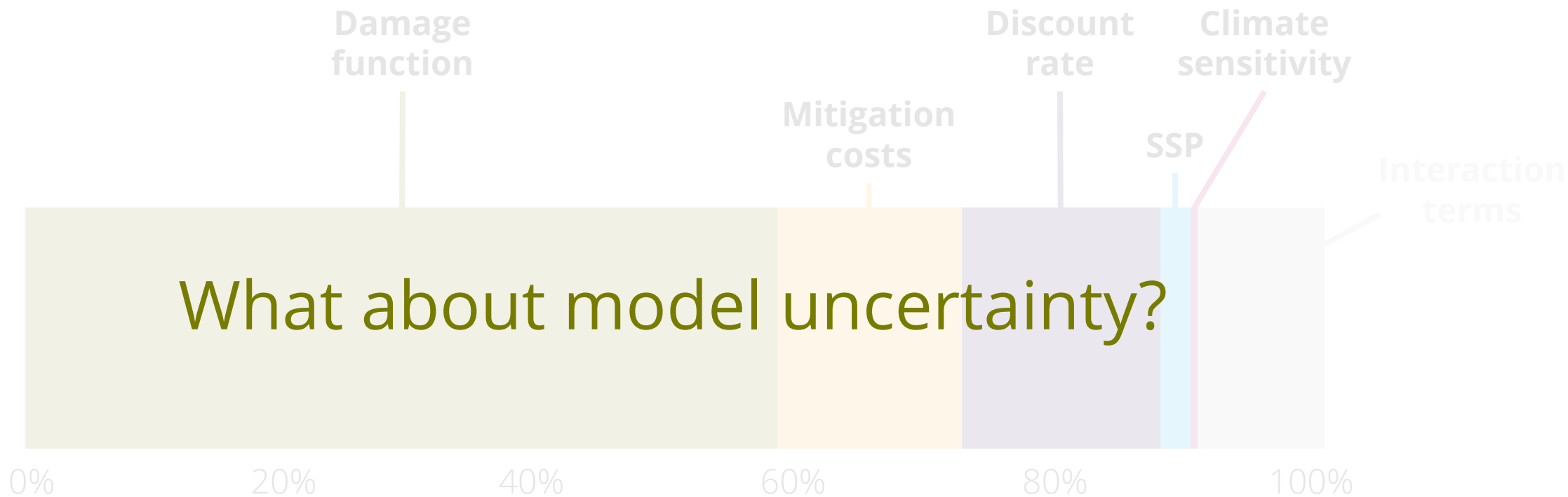**Climate sensitivity**

Interaction terms

0%　　20%　　40%　　60%　　80%　　100%

Large, but note:
- Interaction terms
- Uniform distribution
- Variance vs std dev

Cost-benefit: variance decomposition

Damage function

Mitigation costs
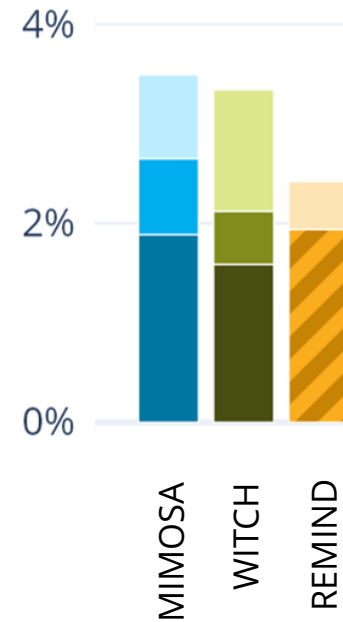
Discount rate

SSP

Climate sensitivity

Interaction terms

What about model uncertainty?

0%   20%   40%   60%   80%   100%

Model uncertainty: fixed temperature path

RCP 6.0:
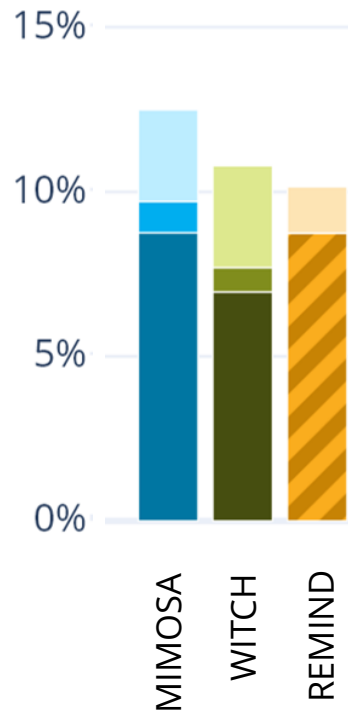
RCP 2.6:

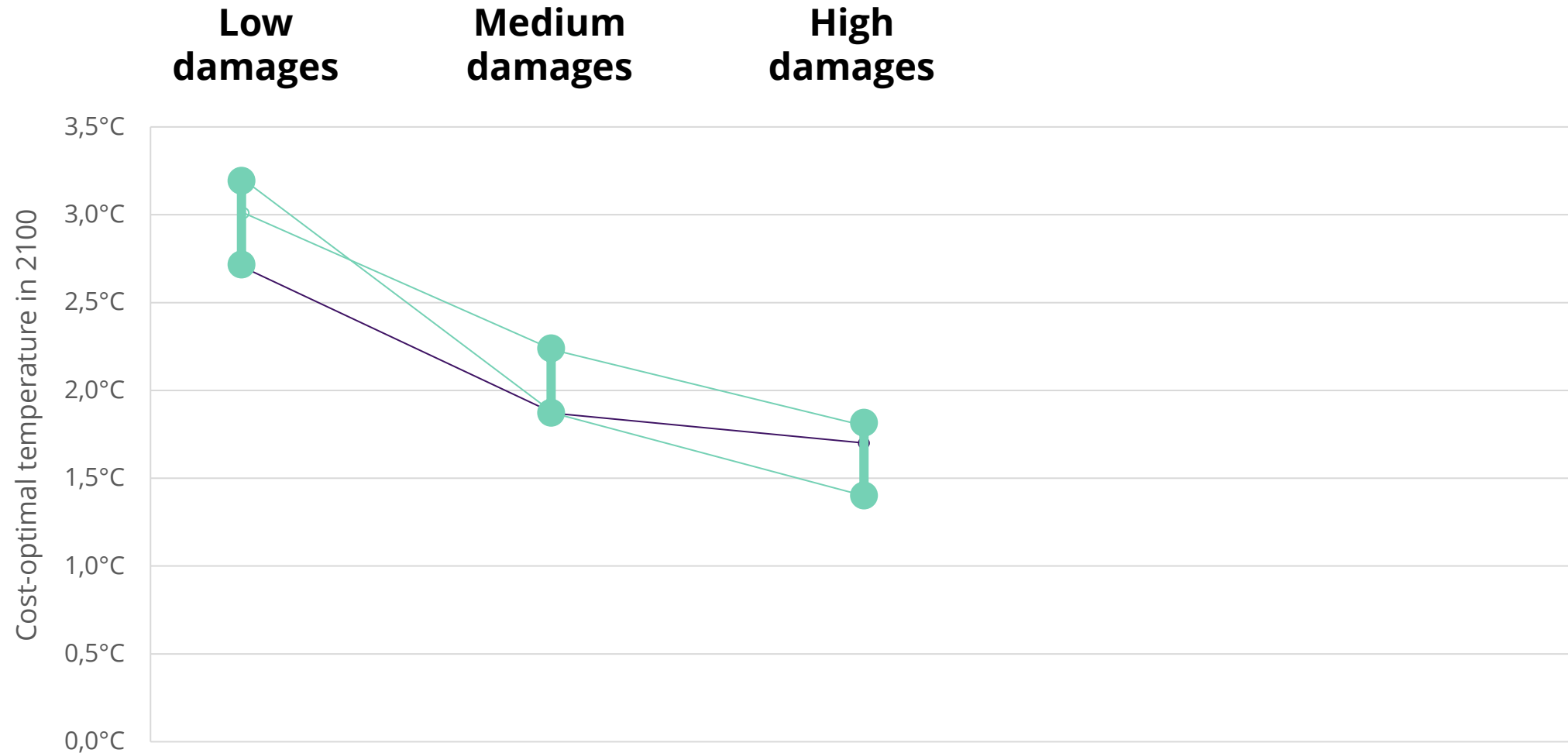**Damage type:**
- Indirect
- SLR
- Non-SLR

Model uncertainty: cost-benefit

Model uncertainty: cost-benefit

Model uncertainty: cost-benefit

Damage function uncertainty is important

› But maybe a bit stretched