



Government
Actuary's
Department

Actuarial reflections on climate uncertainty & the Green Book

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Climate uncertainty & project appraisal



Climate uncertainty & project appraisal

- **Micro level climate uncertainty**
*dependant on project specifics –
arguably most relevant for
environmental projects*
- **Macro level climate uncertainty**
*alter the landscape in which ALL
project appraisal applies*
- **Focus for today's talk is macro
climate uncertainty and appraisal
of all projects**



Limitations of current analysis techniques

- Most analysis is data driven – future predictions informed by past experience
- The implications of climate change, including the increased uncertainty it brings, may not yet be factored in to processes and assumptions

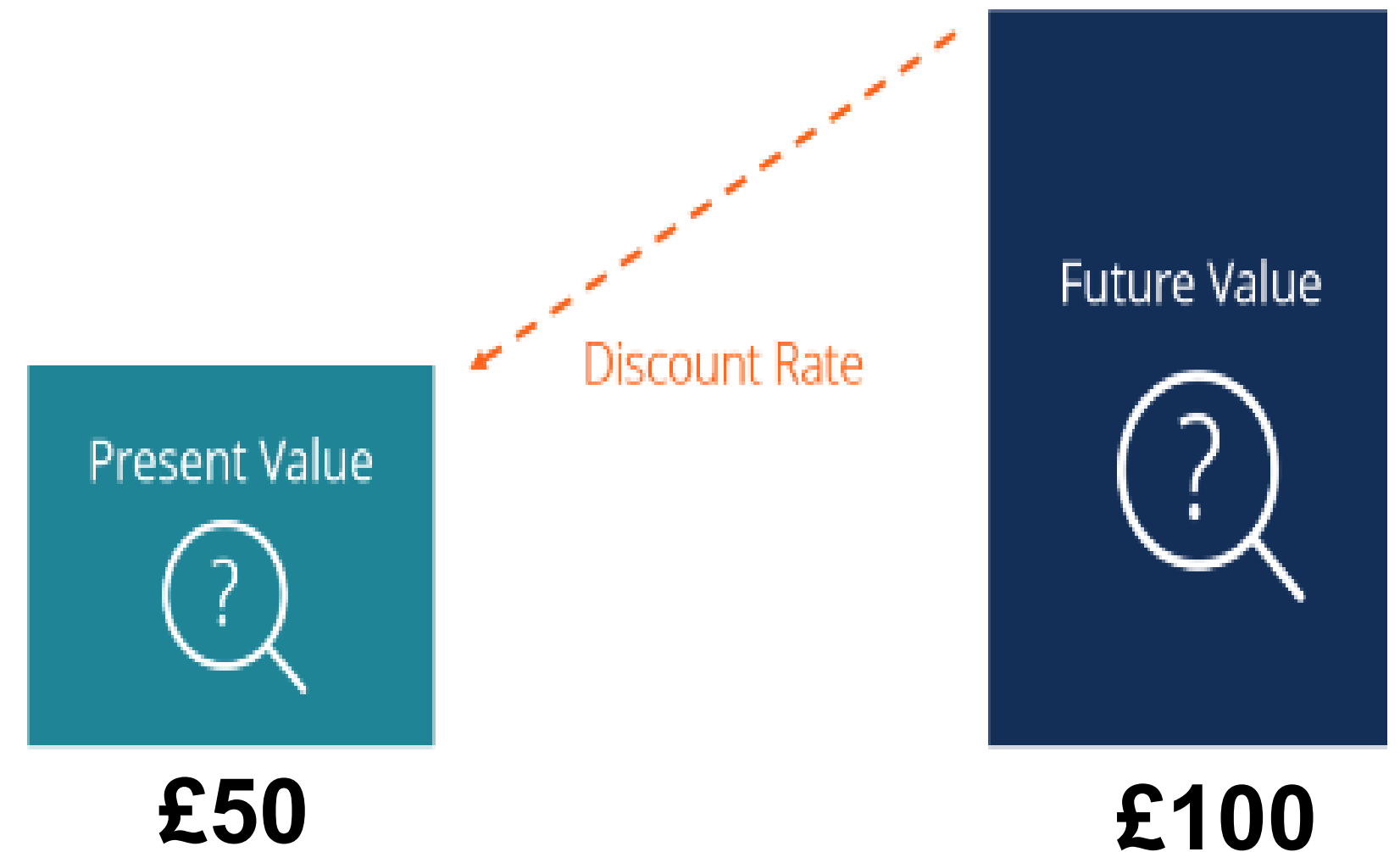


The Social Time Preference Rate and climate uncertainty



Discount rates – what and why

- Allows us to compare values over different time horizons
- Key assumption for cost benefit analysis
- Analysis is often very sensitive to discount rate chosen - important to understand its limitations
- Social Time Preference Rate is used for most Green Book appraisals



Green book - Social Time Preference Rate

Description	Current Green Book %
Pure time preference	0.5%
Catastrophic risk	1.0%
Wealth effect	2.0%
Total	3.5%



Catastrophic risk = 1%

Sources of catastrophic risk may include:

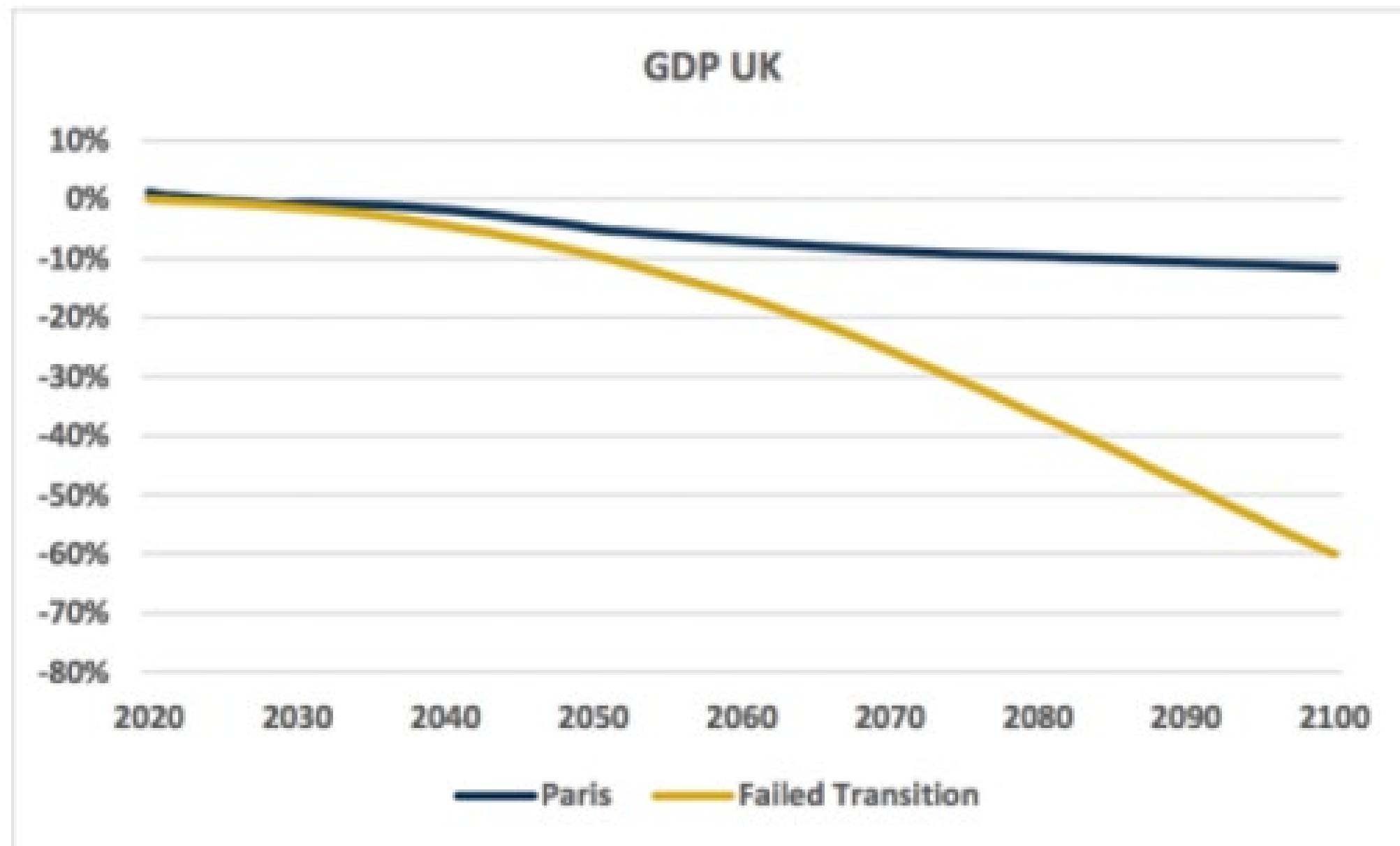
- Unforeseen changes in social and political objectives / priorities
- wider changes in the economy, society and technology



...Impact of risks external to the project which may have material impacts and / or lead to project failure



Wealth Effect = 2%

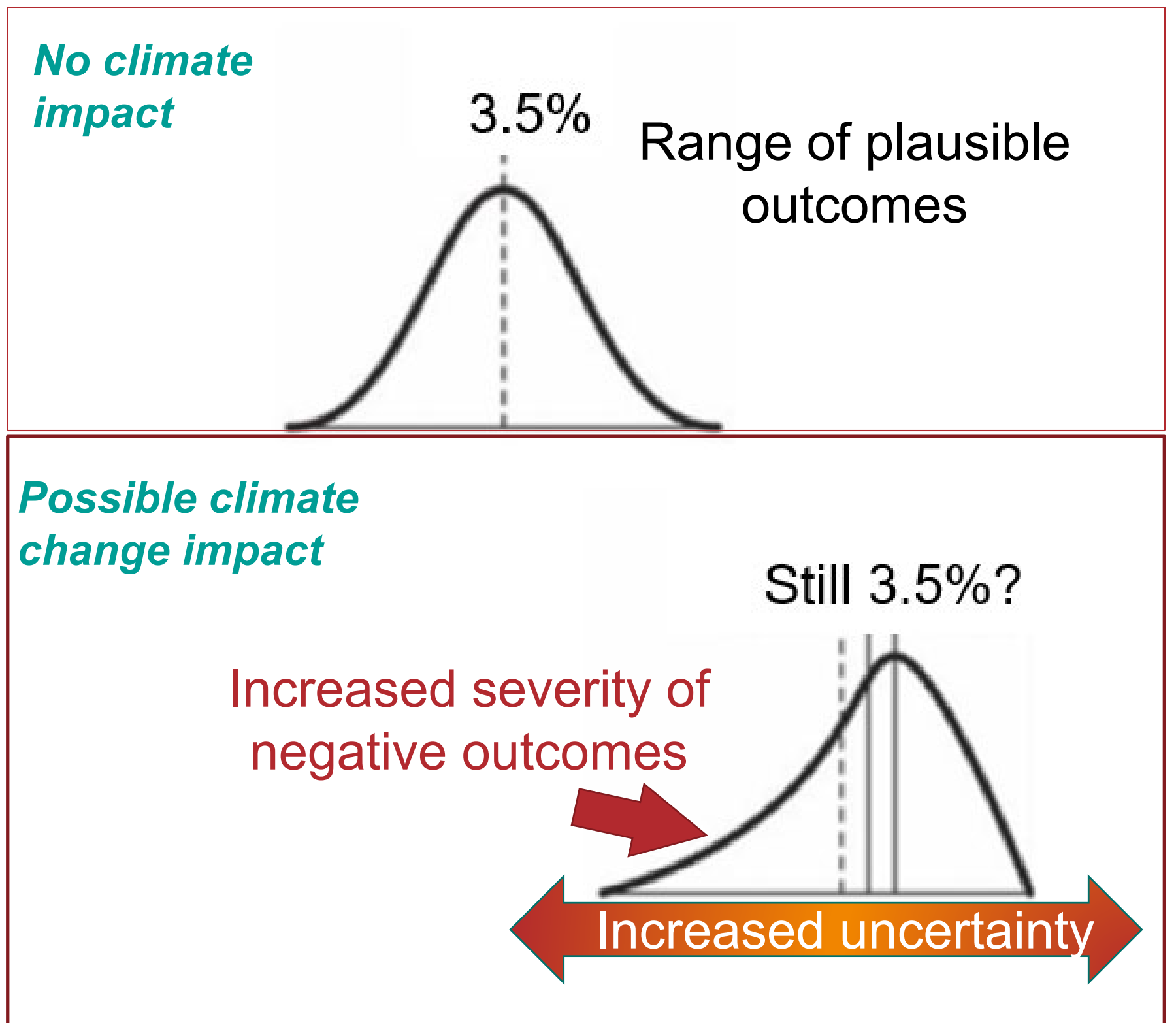


- The wealth effect is based on projected economic growth
- Climate change could have material impacts on GDP – particularly over long term

...Assumes that future costs will be easier to afford, and there is diminishing marginal utility as we consume more

Overall discount rate (STPR) = 3.5%

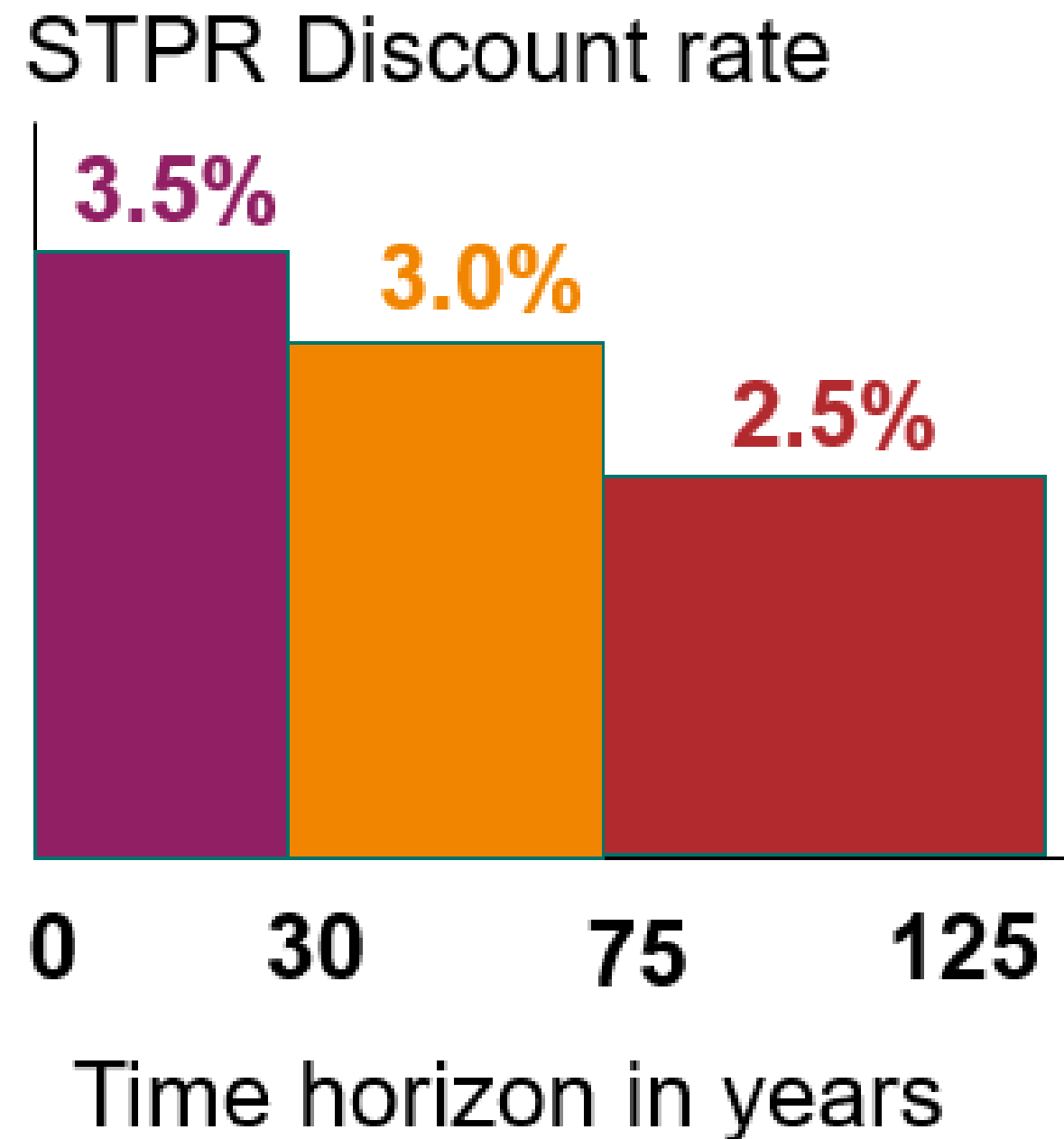
- A single discount rate is a pragmatic approach but does not reflect the range of possible outcomes
- Climate change may increase overall uncertainty – and severity of negative outcomes
- **Is the current rate still suitable in light of climate uncertainty?**



Reflecting uncertainty in the Green Book



Uncertainty at long term time horizons

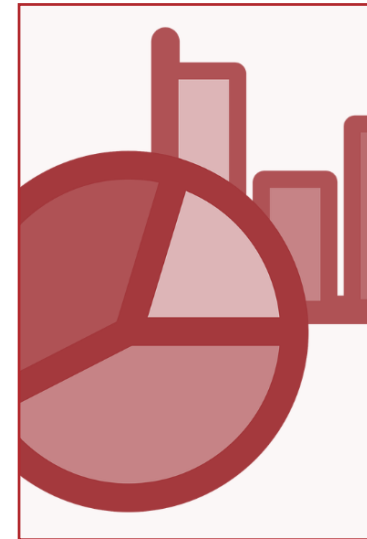


“...The standard STPR of 3.5% applied in appraisal should decline over the long term due to uncertainty about the future values of its components...”

Approaches for reflecting climate uncertainty...



Understand limitations of analysis



Stress tests, sensitivities, scenarios



Margins for prudence?



Refine application of methodology?



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