London Borough of Brent Pension Fund

Climate change risk analysis

Douglas Green FFA
Laura McInroy FFA

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Background

- This paper is addressed to the London Borough of Brent in its capacity as Administering Authority (in effect the trustee) to the London Borough of Brent Pension Fund ("the Fund"). The Fund is part of the Local Government Pension Scheme ("LGPS"), and its assets are held separately from the Council;
- The Fund has obligations under LGPS Regulations to pay benefits to members as and when they retire, and to their dependants as and when members die, details being defined in those Regulations;
- The Fund holds assets to pay those benefits, although the benefits are not affected by market movements. The assets are derived from contributions paid in by the employers (mainly the Council) and members (set by Regulations), plus investment returns achieved;
- A shortfall in the assets available (i.e. a funding level below 100%) means that, all other things being equal, the employer will need to pay more into the Fund to ensure the Fund can pay the benefits;
- Hymans Robertson is the actuary to the Fund, and one of our Regulatory responsibilities is to advise how much employers need to pay in to the Fund to ensure there are sufficient assets available in the future to pay benefits.

Climate change: a hot topic

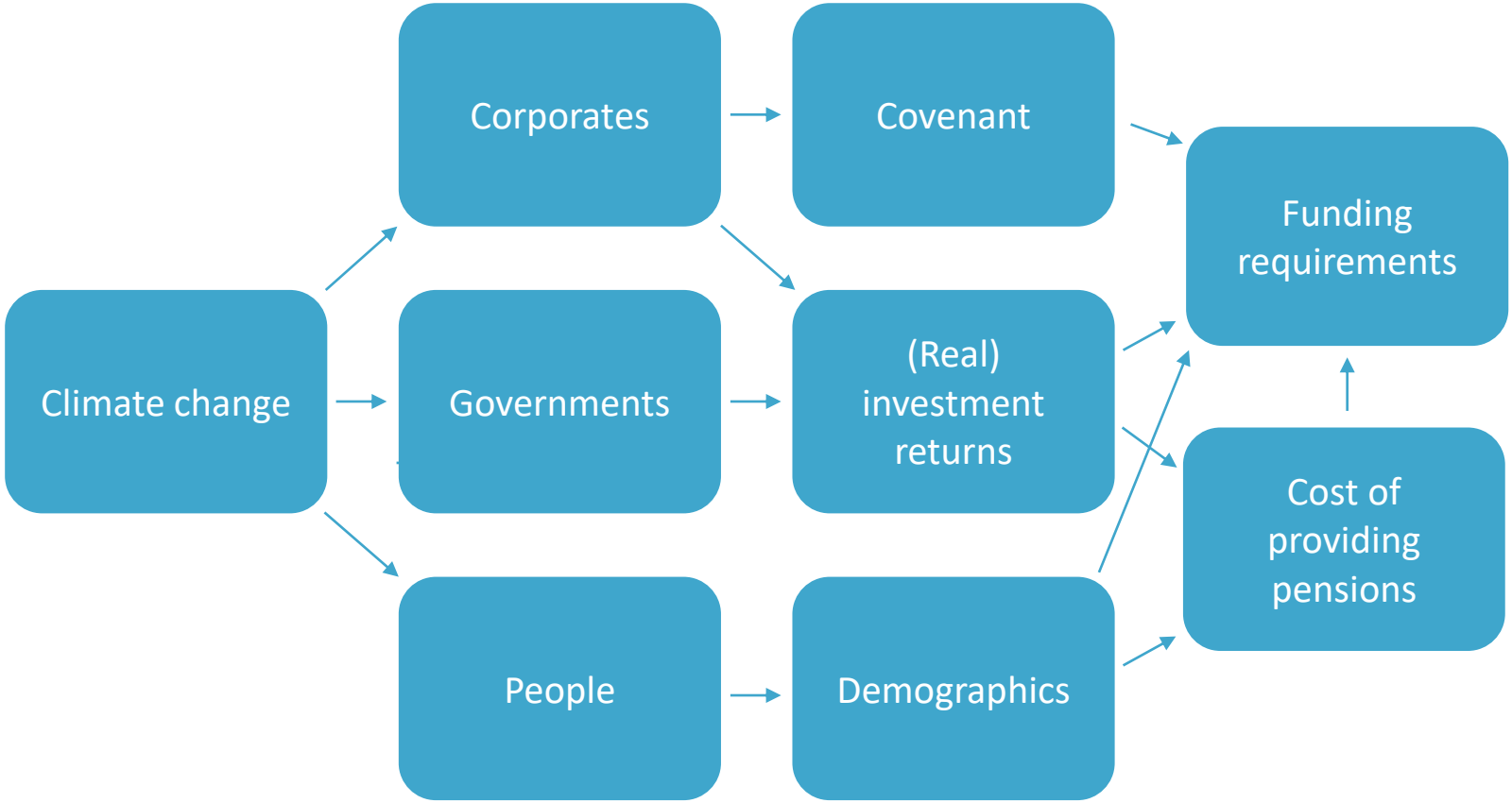
- Climate change has the potential to affect the benefits which the Fund needs to pay:
  - if it affects the longevity of members in retirement, then it needs to pay more if members live longer, and less if members die sooner;
  - if it affects price inflation, then members' pensions in payment will rise faster (meaning higher pay-out needed) or slower (meaning lower pay-out needed).
- Climate change also has the potential to affect the assets available to meet these benefits, if it affects:
  - economic growth and inflation,
  - shares & property values,
  - interest rates,

  then this can speed up or slow down the growth in the Fund's asset values (or even reduce the Fund's asset values).
- See slide 10 for details of some of these potential impacts, which we have modelled.
- We have measured how some of these potential impacts might affect the Fund in the short, medium and long term.

Professional notes

- This paper is addressed to, and has been requested by, the London Borough of Brent in its capacity as Administering Authority (in effect, trustee) to the Fund. The paper may be made publicly available;
- The paper is not formally addressed to, or intended to be taken as advice by, any other party such as Fund employers, members of the Fund, or Council tax-payers;
- The purpose of the paper is to identify to the Fund some of the potential long term funding impacts of different climate change scenarios. It is not intended to be part of the contribution-setting decisions in the 31 March 2019 formal funding valuation;
- Hymans Robertson does not accept responsibility for, nor can be held liable for, this paper being used by any other party than the Administering Authority or for any other purpose.

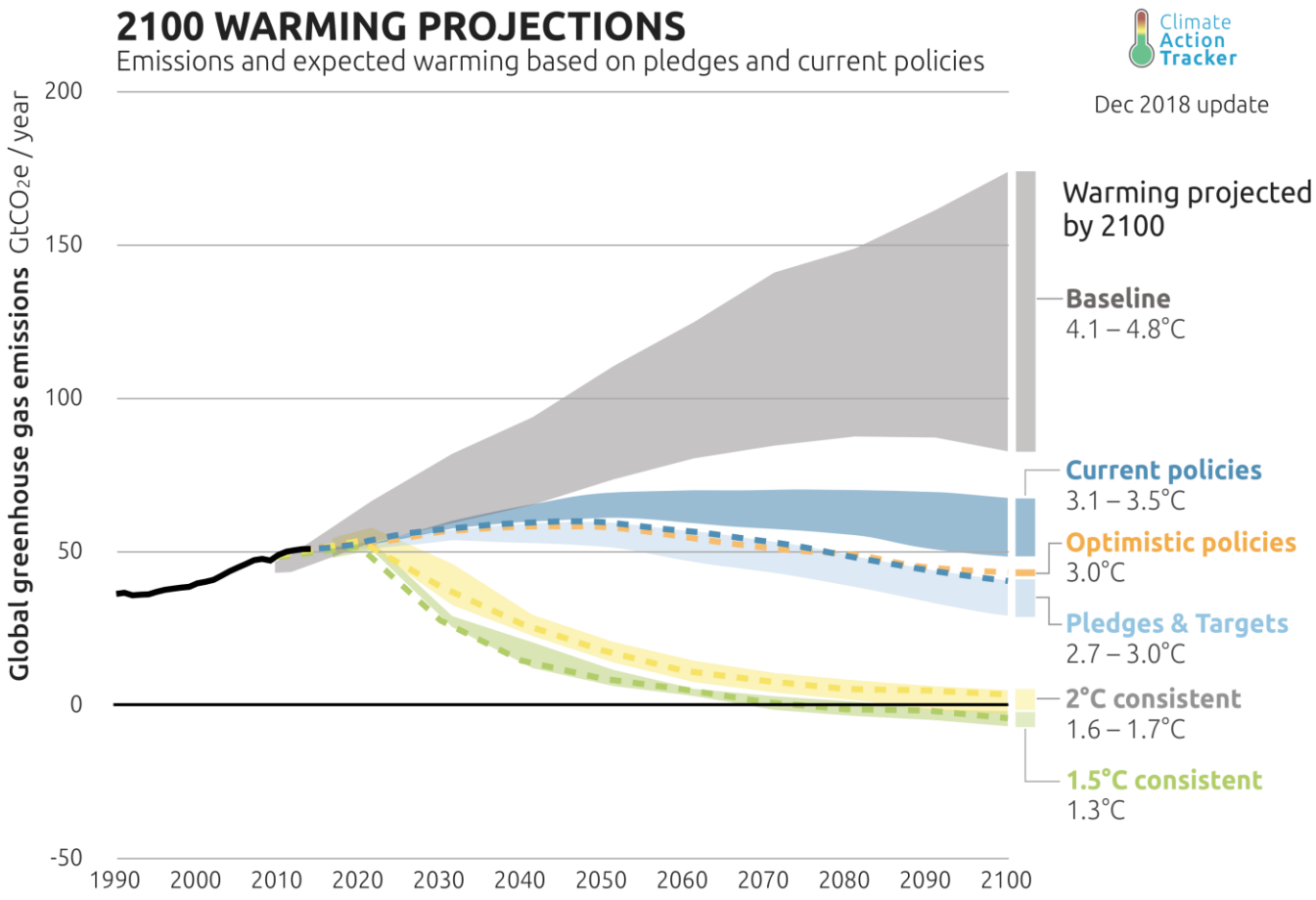
Climate, economy and pension funds are linked



Policy and market responses controlled by Corporates and Governments

Scenarios modelled

Measuring climate change risk



Pension impact will depend more on Government policy and market reactions, rather than on degree of warming

Building on longevity impacts

Head in the sand

A range of disastrous outcomes resulting from a total lack of response to climate risk.

Global crop failures, influx of new diseases, severe temperature fluctuations resulting in harsh flu epidemics. Antibiotic resistance rises as new discoveries are limited.

Challenging times

Some adaptation achieved. "Peak oil flow" is reached constraining economies of the future.

Increasing fuel prices, constrained government finances, difficulty obtaining access to imported foods. More/less severe for lower/higher socio-economic groups.

Green revolution

Rapid technological advances leading to positive adaptation to climate change.

Healthier lifestyles prevail (walking, cycling etc), diets improve with less processed food consumption, homes protected against extreme temperatures.

Club Vita analysed the impact on longevity (and hence on liability values: reduced longevity means higher liabilities and vice versa) under these three scenarios

Source: Club Vita- Hot and Bothered?: https://www.hymans.co.uk/media/uploads/ClubVita_Booklet_UpdatedStats.pdf

Economic, financial and longevity impacts

Markets impact

Longevity impact

Head in the sand

GDP growth & equity returns continue to rise in short term but then fall significantly.
Inflation stable in short term then rises.
Gilt yields rise short term then fall significantly.
Credit spreads widen significantly.

Challenging times

GDP growth & equity returns flat in short term then fall (especially in medium term).
Inflation stable in short term then rises.
Gilt yields fall significantly in medium term.
Credit spreads widen significantly (especially in medium term).

Green revolution

GDP growth & equity returns fall in short term but then improve.
Inflation continues to rise then stabilises long term.
Gilt yields rise short term then stabilise long term.
Credit spreads widen significantly then stabilise long term.

Modelling shows **combined** impact of markets and longevity changes

Source for longevity impact:
Club Vita- Hot and Bothered?

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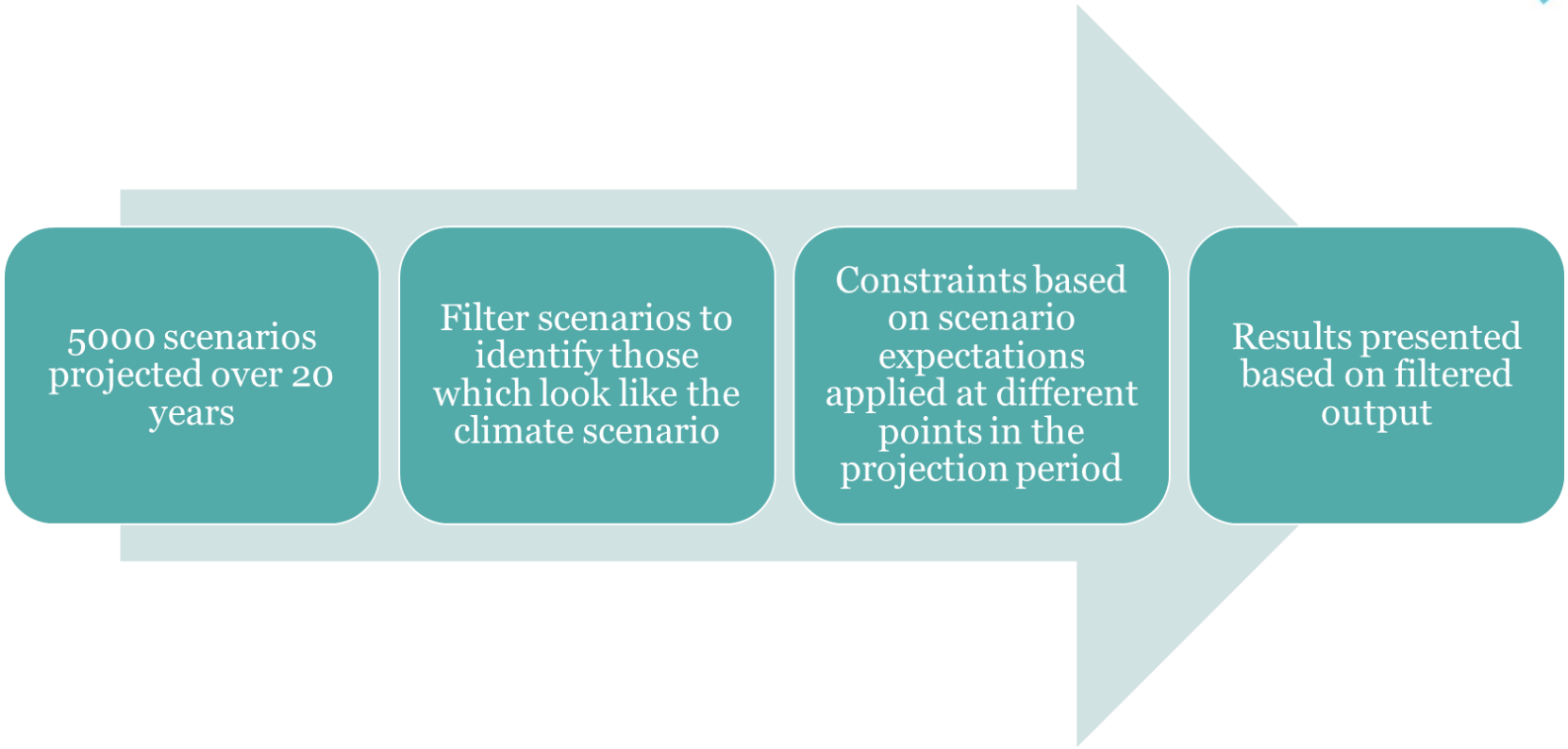
Modelling approach

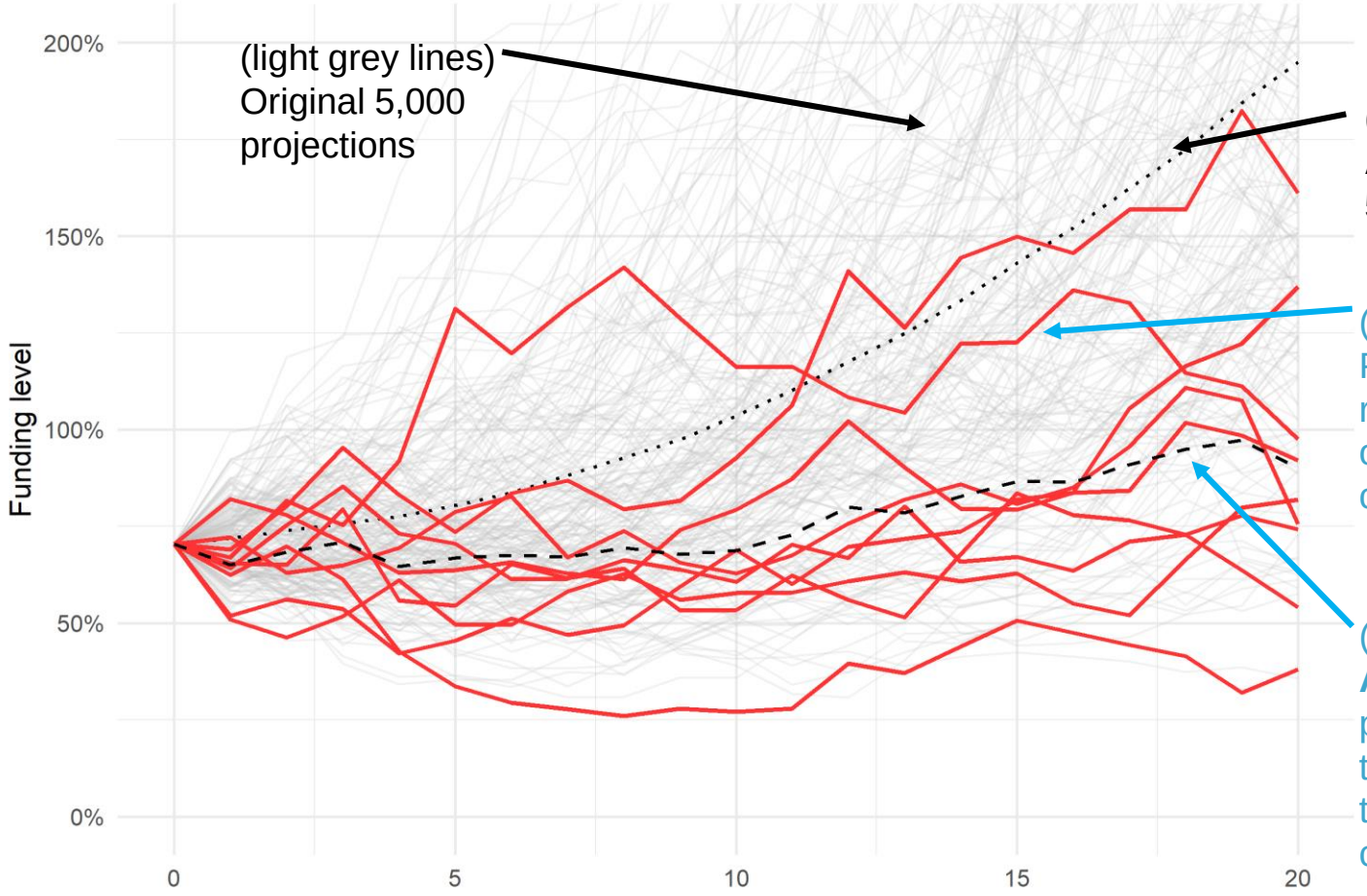


Outcomes filtered by each scenario's parameters

We have used the existing modelling data/parameters for the Council

Modelling results

Format of results:
(shown separately per scenario on next three slides)



All figures relate to funding level
(based on discount rate of prevailing gilt yields + 1.6%)

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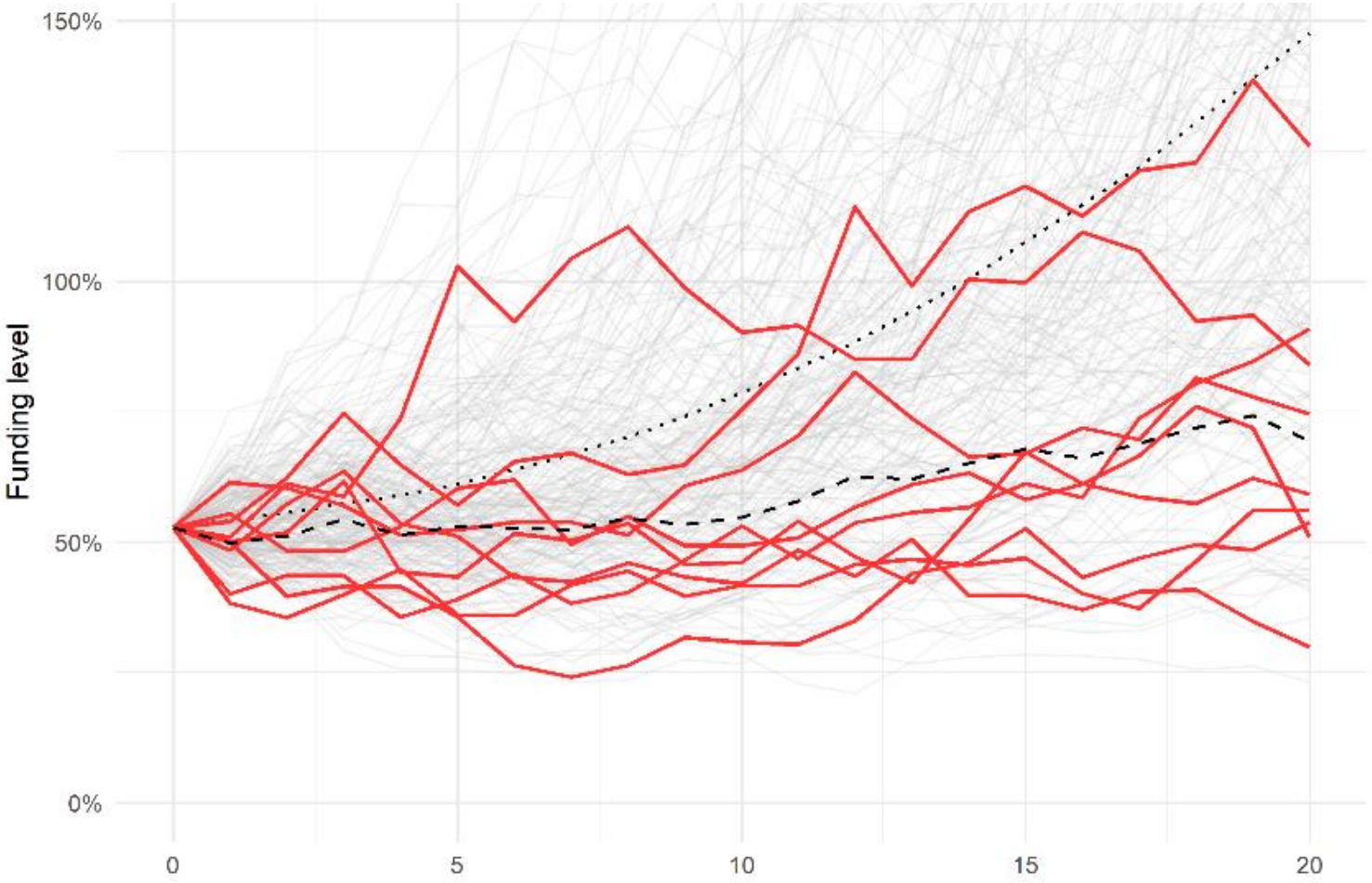
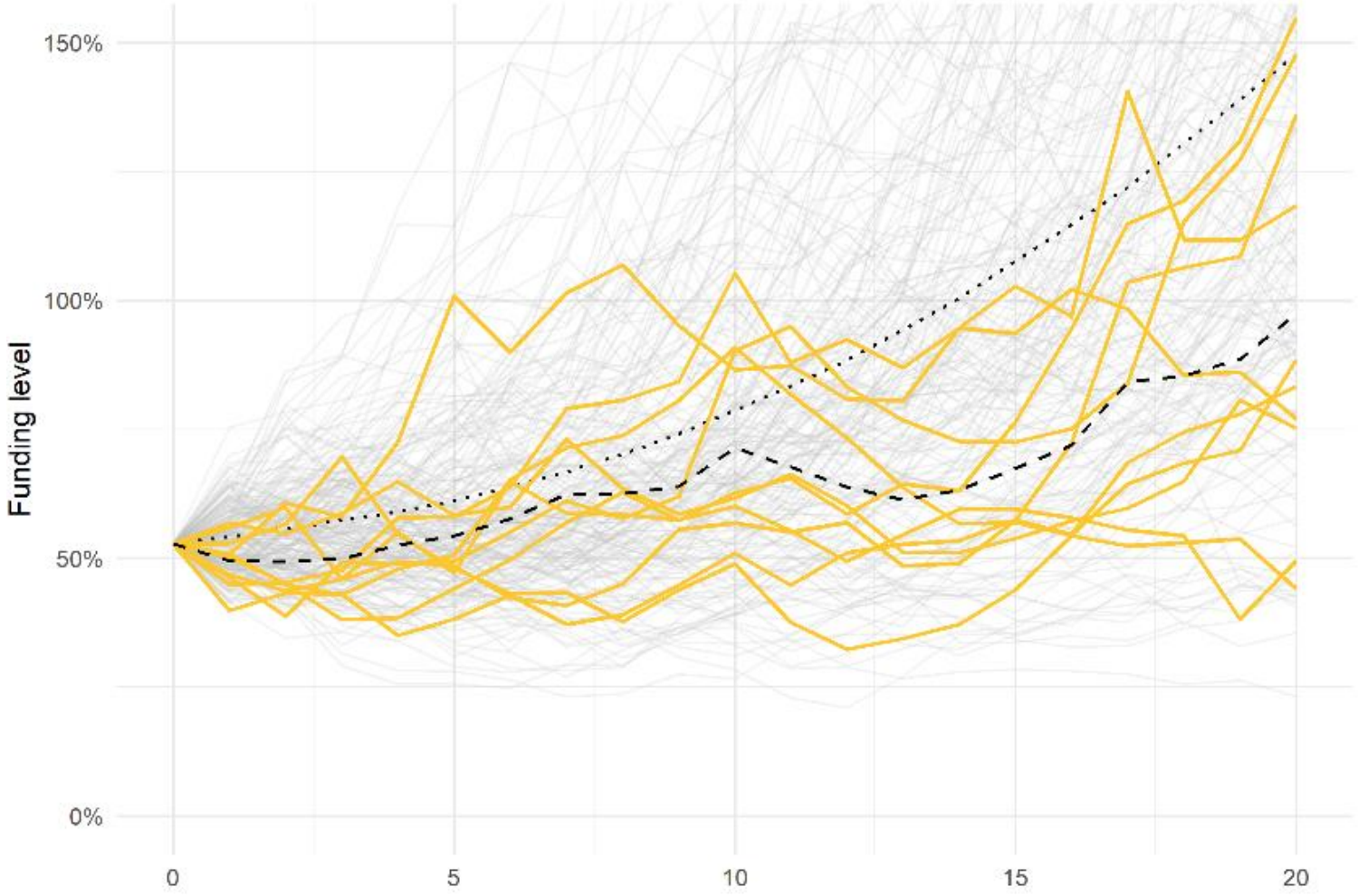
Results: Head in the sand



Expected to give poorer funding outcomes than current funding plan anticipates

Results:

Challenging times



Still likely to give poorer funding outcomes than current funding plan anticipates

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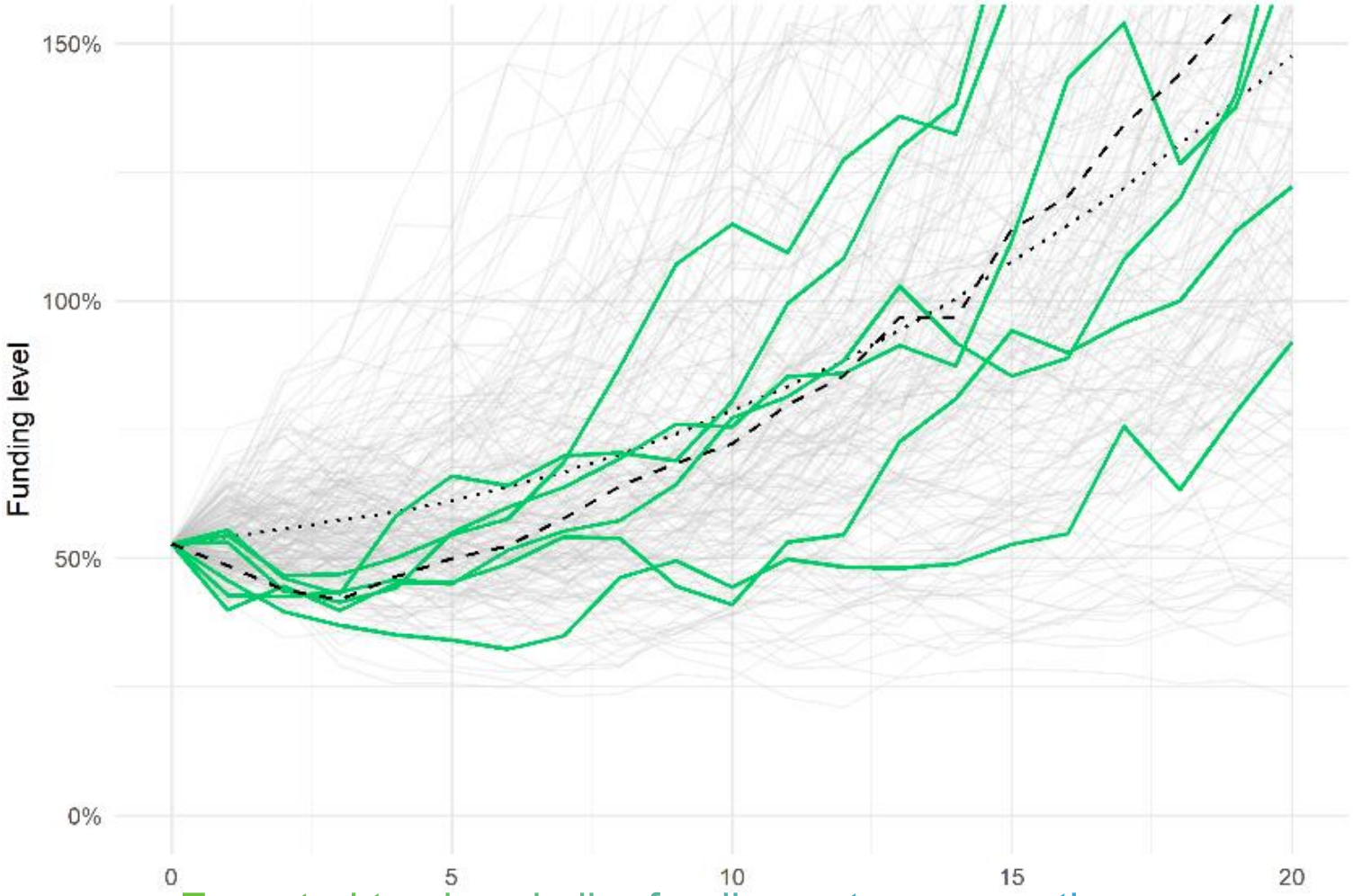
Results:

Green revolution



Expected to give similar funding outcomes as the current funding plan anticipates

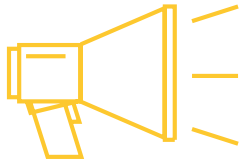
High level comments

- The Fund is exposed to climate risk on the asset and liability side
- This modelling illustrates the range of future funding outcomes we might see as a direct result of government/business action and inaction
- Some of these outcomes are very negative

What could be done to reduce the impact on the Fund?

Lobby government to take action against adverse scenarios

But may not want to take credit for this in funding plans



Ask employers to pay higher contributions

But affordable increases may be not make much of a difference

Reduce exposure to investments at risk

Or invest more in assets expected to perform well in adverse climate scenarios

Next steps – becoming climate friendly

Action	Requirements
Beliefs	• Review your current investment beliefs
Governance	• Consider your climate risk policy
Asset allocation	• Can you bias towards prevailing opportunities?
Carbon risk exposure	• Review your equity portfolio and frame appropriate targets
Manager benchmarks	• Look at different types of index benchmark
Engagement programmes	• Speak to your fund manager/pool about actions they are taking to drive change
Reporting	• Think about summary reports including objectives, actions taken and results achieved

Draw up a plan of action and speak to your advisors

Appendix - Technical & Professional Notes

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Technical & professional notes (1)

Climate change scenarios – purpose

The purpose behind the modelling is to show the impact of three preconceived climate change scenarios and to promote engagement and discussion around the possible outcomes and impacts for the Fund around these scenarios. The modelling does not provide a framework for testing different courses of action by the Fund (via its funding and investment strategy) to mitigate against the risks discussed in this paper, due to the way in which the analysis has been constructed.

Climate change scenarios – method

We have used the Fund's ComPASS modelling (see paper entitled Contribution Rate Modelling, dated 5 April 2019) to explore the impact on the Fund's solvency in the event that three pre-specified climate change scenarios occur. The Reliances and Limitations that apply to the Fund's ComPASS modelling also apply here.

The climate change scenario modelling assumes that economic and financial relationships are not broken and that climate outcomes exist within the extremes of the 5000 scenarios modelled for ComPASS (as generated by our Economic Scenario Service (ESS)). Although the ESS captures a wide range of future financial conditions, it has not been calibrated to allow for climate change explicitly. **Importantly, this modelling does not place a likelihood of each of these scenarios occurring and the number of simulations captured under each scenario shouldn't be used as such.**

The longevity impact has been included approximately by scaling the liabilities linearly such that by time 20 the full impact is realised. In each year of the projection, this means that the liabilities are being adjusted to reflect updated beliefs about future longevity but the projected cashflows being paid out are not being modified away from the base ALM scenario. The longevity impacts are assumed to be the same in 20 years' time as they are today.

Technical & professional notes (2)

Data – Cashflows

In projecting forward the evolution of the Scheme, we have used estimated cash flows generated using our actuarial valuation system, based on information provided as at 31 March 2019 by the Fund.

Data – ESS

The distributions of outcomes depend significantly on the Economic Scenario Service (ESS), our (proprietary) stochastic asset model. This type of model is known as an economic scenario generator and uses probability distributions to project a range of possible outcomes for the future behaviour of asset returns and economic variables. Some of the parameters of the model are dependent on the current state of financial markets and are updated each month (for example, the current level of equity market volatility) while other more subjective parameters do not change with different calibrations of the model.

Key subjective assumptions are the average excess equity return over the risk free asset (tending to approximately 3% p.a. as the investment horizon is increased), the volatility of equity returns (approximately 18% p.a. over the long term) and the level and volatility of yields, credit spreads, inflation and expected (breakeven) inflation, which affect the projected value placed on the liabilities and bond returns. The market for CPI linked instruments is not well developed and our model for expected CPI in particular may be subject to additional model uncertainty as a consequence. The output of the model is also affected by other more subtle effects, such as the correlations between economic and financial variables.

Our expectation (i.e. the average outcome) is that long term real interest rates will gradually rise from their current low levels. Higher long-term yields in the future will mean a lower value placed on liabilities and therefore our median projection will show, all other things being equal, an improvement in the current funding position (because of the mismatch between assets and liabilities). The mean reversion in yields also affects expected bond returns.

While the model allows for the possibility of scenarios that would be extreme by historical standards, including very significant downturns in equity markets, large systemic and structural dislocations are not captured by the model. Such events are unknowable in effect, magnitude and nature, meaning that the most extreme possibilities are not necessarily captured within the distributions of results.

Technical & professional notes (3)

Assumptions

We have used the whole Fund's membership (actives, deferred and pensioner) and assets in the Pension Fund, all as at 31 March 2019, as the starting point for our modelling. We assume continued payment of the current Council contribution rate of 35% of pay indefinitely, to enable like-for-like comparison between different projections and scenarios; this is not to assume that contributions will follow that pattern in practice.

For calculation of the funding level under each of the 5,000 future projections we assume:

- Discount rate based on prevailing gilt yield plus 1.6% (i.e. this is not as per the presentation as at 31 March 2019, but is adopted consistently throughout the 20 year projection for ease of consideration);
- Other financial assumptions (e.g. salary growth, CPI inflation of benefits in payment) as per 31 March 2019 actuarial formal valuation;
- Demographic assumptions other than longevity (e.g. rates of withdrawal and ill-health early retirement) as per 31 March 2019 actuarial formal valuation;
- Longevity assumptions in retirement as per 31 March 2019 actuarial formal valuation but adjusted for the each scenario as identified earlier in this paper.

We have estimated future service benefit cash flows and projected salary roll for new entrants after the valuation date such that payroll remains constant in real terms (i.e. full replacement).

There is a distribution of new entrants introduced at ages between 25 and 65, and the average age of the new entrants is assumed to be 40 years. All new entrants are assumed to join and then leave service at State Pension Age, which is a much simplified set of assumptions compared with the modelling of existing members

A judgement always has to be made as the most appropriate assets from the ESS to model the strategy under consideration. We have agreed this with yourselves during the scoping stage and further details are in the appendices.

TAS Compliance

The models used to carry out this modelling, and this presentation, comply with Technical Actuarial Standards 100 (Principles for Technical Actuarial Work) and 300 (Pensions).

General risk warning

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