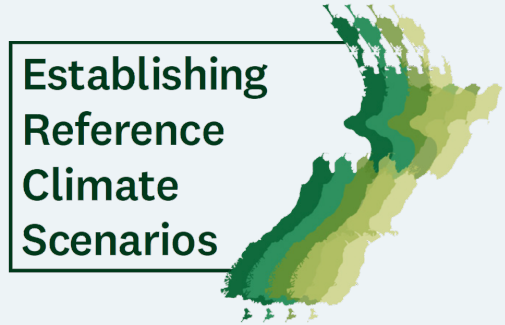

Establishing Aotearoa New Zealand reference climate scenarios

Presented by Wendy McGuinness
Wednesday, 18 August 2021

Part of the McGuinness Institute
2021 Discussion Series on Climate Change

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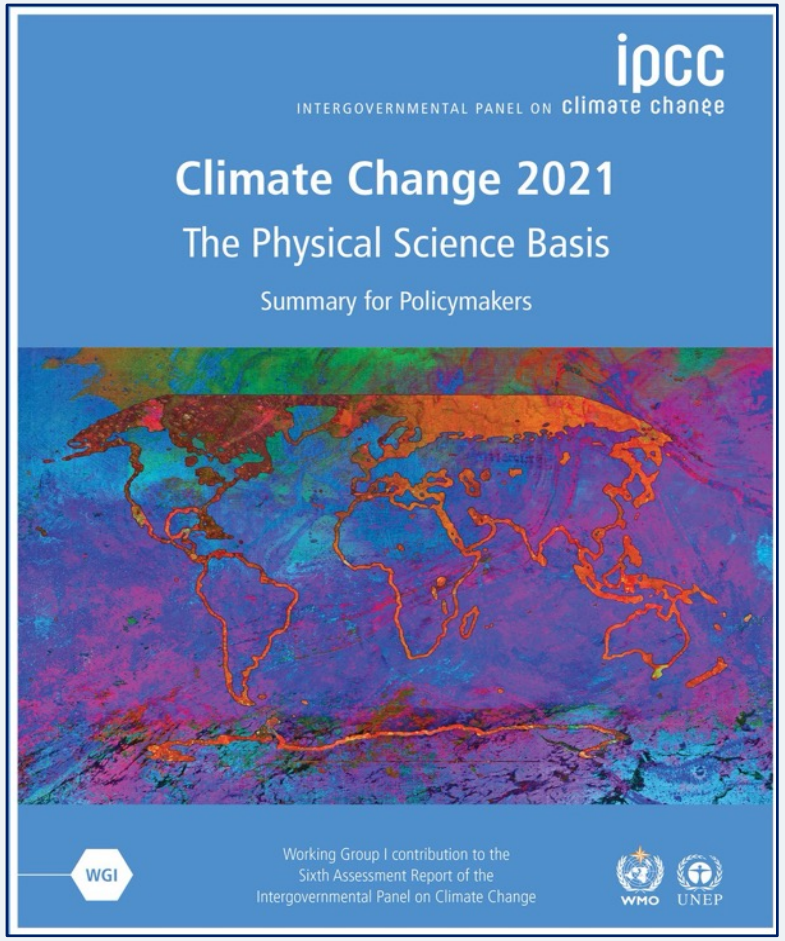
Agenda

12.00 – 12.05	A: Welcome – Wendy McGuinness
12.05 – 12.20*	B: Professor Nick Golledge
12.20 – 12.25	Questions for Nick
12.25 – 12.45	C: Overview of Foresight – Wendy McGuinness
12.45 – 1.30	D: Why, when, how and whom?
1.30 – 2.00	E: Next steps

*Note: This will be recorded for YouTube, so we will mute everyone for the full 15 minutes and then please unmute yourself so you can ask questions.

B: Professor Nick Golledge

Professor Nick Golledge
Antarctic Research Centre | Te Puna Pātiotio,
Victoria University of Wellington | Te Herenga Waka



**IPCC Sixth Assessment Report –
Climate Change 2021:
The Physical Science Basis**

C: Definition of reference climate scenarios?

Reference climate scenarios refer to three or four synthesised narratives that describe plausible futures for Aotearoa New Zealand based on the latest science and how we might respond.

- Each scenario will recognise a diverse range of uncertainties and assumptions about the future.
- Together they will deliver a shared understanding of what the future might look like, and by doing so, provide more certainty over policy, improve public discourse and debate through developing a common language, establish a platform for reporting climate risks, support urgent action, shape decision-making and create a more cohesive and equitable Aotearoa New Zealand.

Adaption preparedness: 2021/21 baseline

Ministry for the Environment (August 2021)

1. **Overall response rate was relatively poor.**

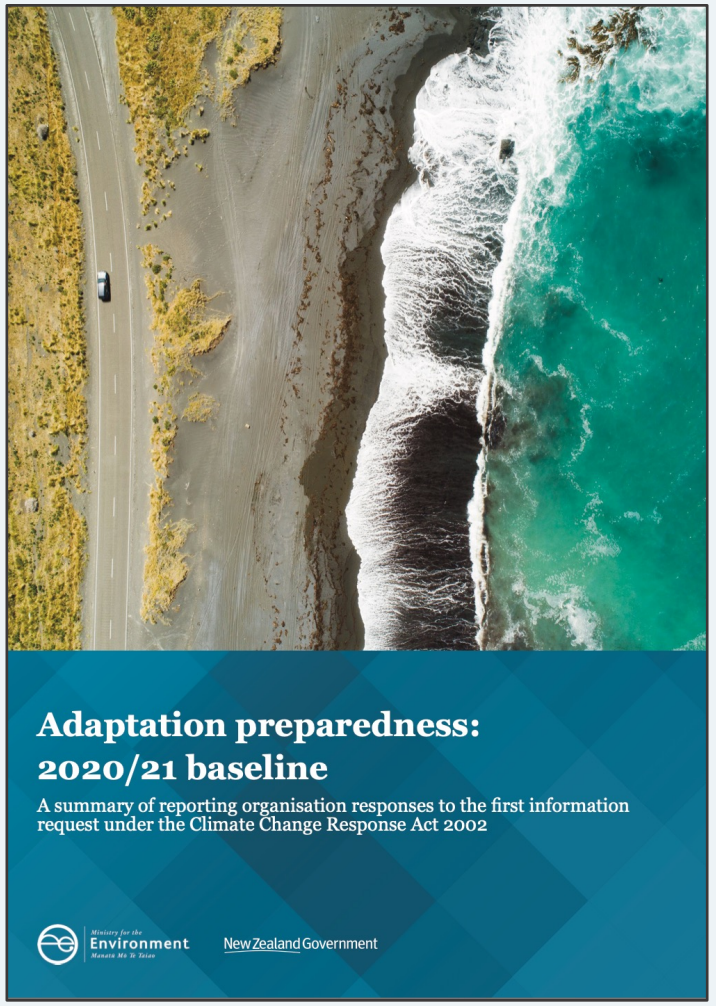
   The information request received responses from 220 organisations of the 400 which were sent a request (56%) (see Table 2, p. 6).

2. **While the majority of respondents did consider climate change impacts, very few are documenting them.**

   92% of respondents consider how climate change will impact their ability to carry out functions and deliver services. Only 15% of respondents currently document these impacts (see p. 7).

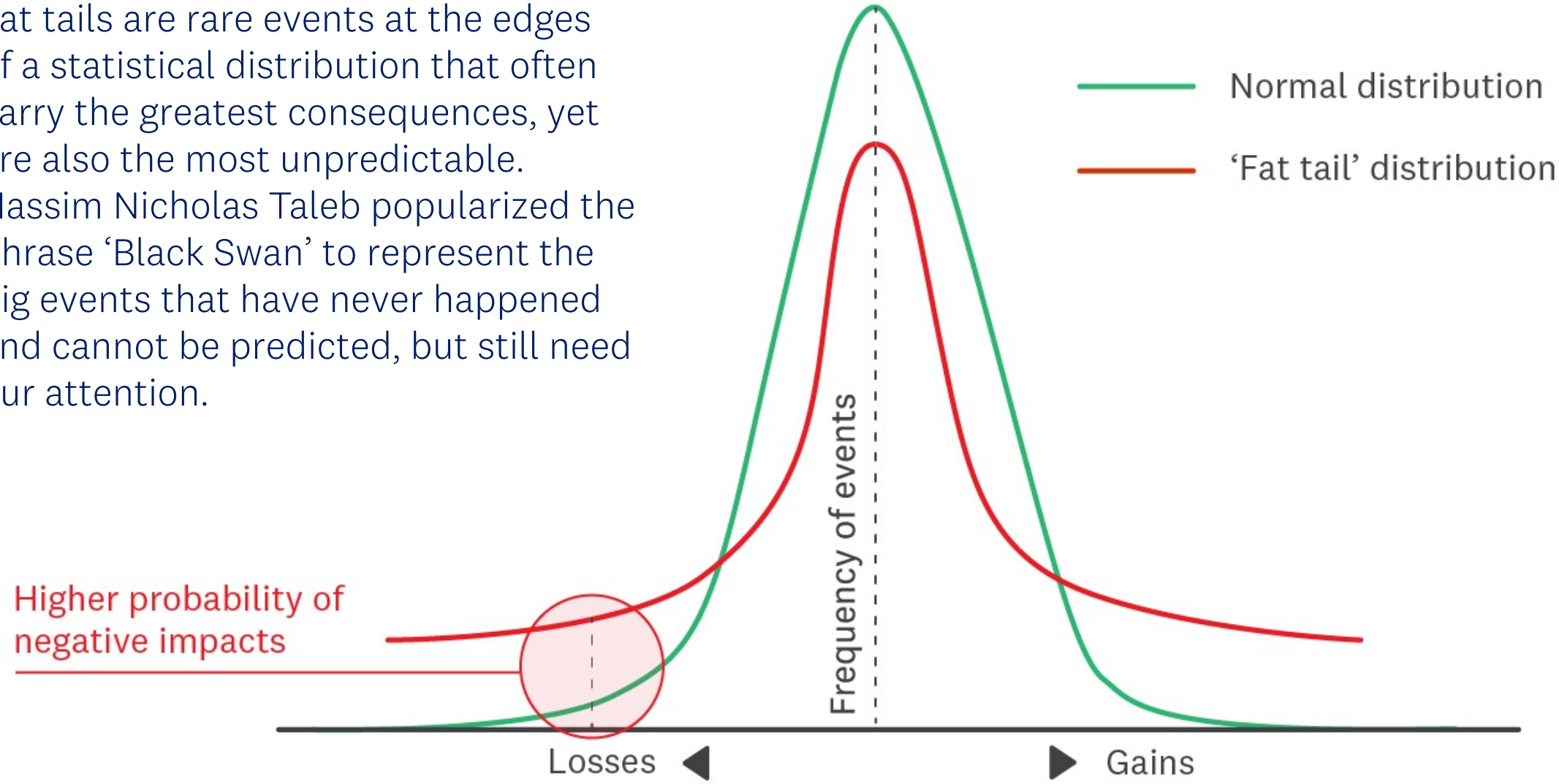
3. **Central government indicated the greatest need for actions and resources.**

   Out of all reporting organisations, lifeline utilities and council-controlled organisations expressed the least need for resources or actions to assist in preparing for the impacts of climate change. Central government indicated the greatest need for actions and resources (see p. 26).

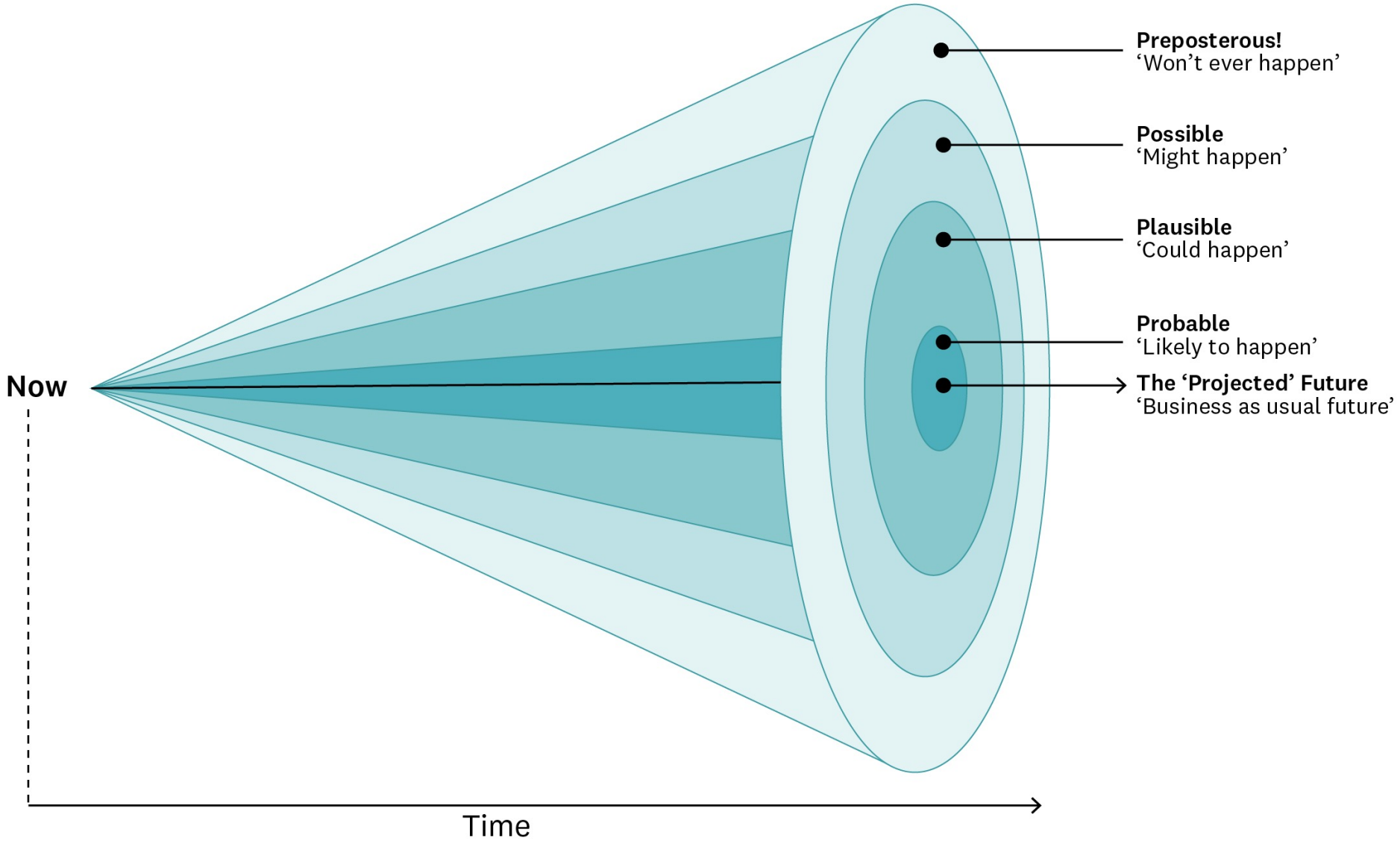


The fat tail distribution problem

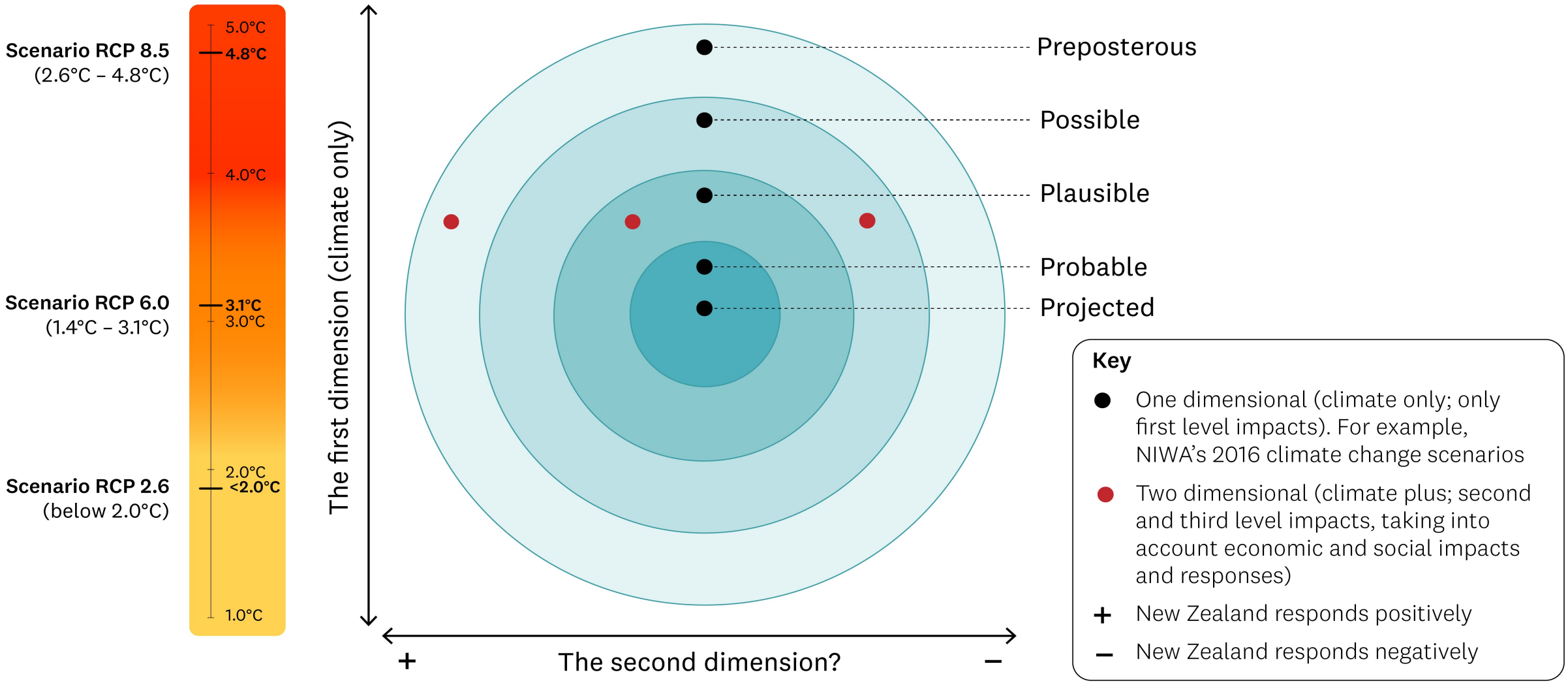
Fat tails are rare events at the edges of a statistical distribution that often carry the greatest consequences, yet are also the most unpredictable. Nassim Nicholas Taleb popularized the phrase ‘Black Swan’ to represent the big events that have never happened and cannot be predicted, but still need our attention.



Cone of plausibility



RCP ruler and the cone of plausibility



Changes in global temperature

IPCC Sixth Assessment Report – Climate Change 2021: The Physical Science Basis (p.18)

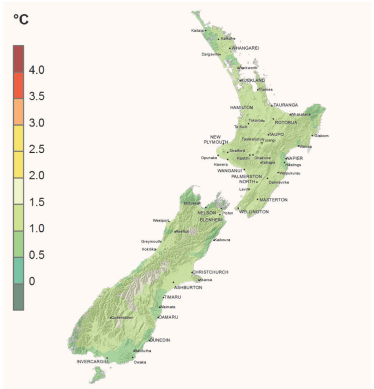
	Near term, 2021–2040		Mid-term, 2041–2060		Long term, 2081–2100	
Scenario	Best estimate (°C)	*Very likely* range (°C)	Best estimate (°C)	*Very likely* range (°C)	Best estimate (°C)	*Very likely* range (°C)
SSP1-1.9	1.5	1.2 to 1.7	1.6	1.2 to 2.0	1.4	1.0 to 1.8
SSP1-2.6	1.5	1.2 to 1.8	1.7	1.3 to 2.2	1.8	1.3 to 2.4
SSP2-4.5	1.5	1.2 to 1.8	2.0	1.6 to 2.5	2.7	2.1 to 3.5
SSP3-7.0	1.5	1.2 to 1.8	2.1	1.7 to 2.6	3.6	2.8 to 4.6
SSP5-8.5	1.6	1.3 to 1.9	2.4	1.9 to 3.0	4.4	3.3 to 5.7

TCFD ‘Strategy’ Exercise (2019)

Resource 1: Brief Overview of Scenario RCP 8.5

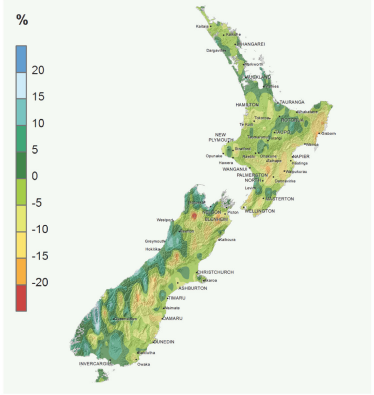
Effort to curb emissions (E)	Effort to adapt (A)	Energy generation	New technology	Transport	Representative Concentration Pathway	Temperature (average increase by the end of the 21st century relative to 1986-2005)	Sea level (average rise by the end of the 21st century relative to 1986-2005)	Extreme weather
High / Med / Low; A, E; 2010, 2050, 2100		Coal-fired power	N/A	Cars, trucks	RCP 8.5	2.6 °C–4.8 °C	0.63 m	Large increase

Temperature Change Between 1995 and 2055

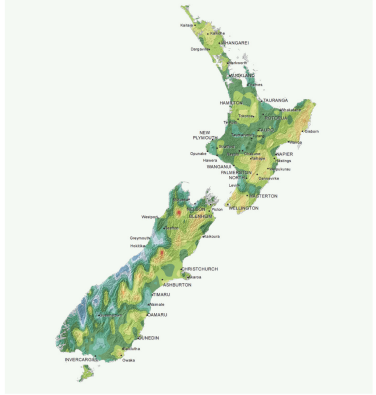


Temperature Change Between 1995 and 2090

Rainfall Change Between 1995 and 2055



Rainfall Change Between 1995 and 2090



Note: The New Zealand maps (above) are from NIWA's *NZ Climate Change Maps* – which use data from the IPCC's *Fifth Assessment Report* (AR5) based on three representative concentration pathways (RCPs): RCP 2.6, RCP 6.0 and RCP 8.5. As explained on the additional information section of NIWA's Our Future Climate New Zealand website, RCPs 'provide an indication of the rate and amount of global greenhouse gas emissions over the coming decades'. These projections use the climate model BCC-CSM1 and indicate the potential impacts of climate change in New Zealand. Our infographic has been inspired by CoastAdapt's *Climate Change Infographic*.

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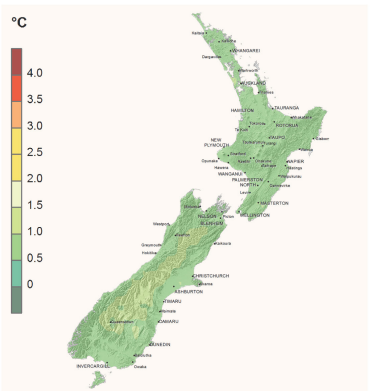
3

Resource 1: Brief Overview of Scenario RCP 6.0

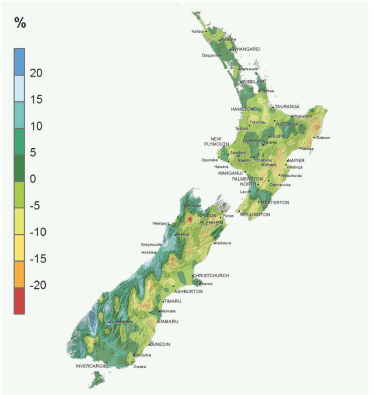
Effort to curb emissions (E)	Effort to adapt (A)	Energy generation	New technology	Transport	Representative Concentration Pathway	Temperature (average increase by the end of the 21st century relative to 1986-2005)	Sea level (average rise by the end of the 21st century relative to 1986-2005)	Extreme weather
High / Med / Low; A, E; 2010, 2050, 2100		Mix	N/A	Mix	RCP 6.0	1.4 °C–3.1 °C	0.48 m	Moderate increase

Temperature Change Between 1995 and 2055

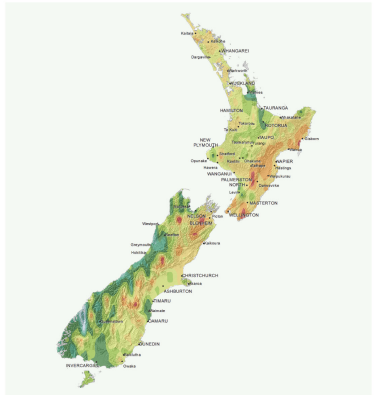


Temperature Change Between 1995 and 2090

Rainfall Change Between 1995 and 2055



Rainfall Change Between 1995 and 2090



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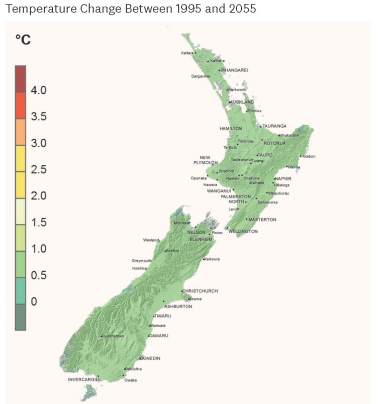
4

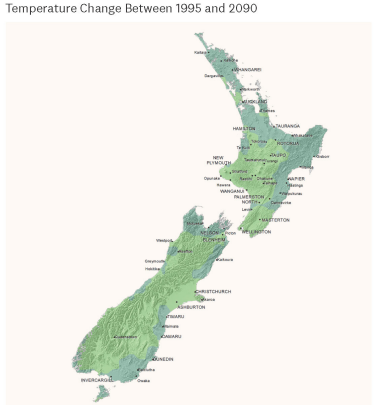
Resource 1: Brief Overview of Scenario RCP 2.6

Effort to curb emissions (E)	Effort to adapt (A)	Energy generation	New technology	Transport	Representative Concentration Pathway	Temperature (average increase by the end of the 21st century relative to 1986-2005)	Sea level (average rise by the end of the 21st century relative to 1986-2005)	Extreme weather
High / Med / Low; A, E; 2010, 2050, 2100		Renewable	Emissions capture	Bicycles, public transport, e-cars	RCP 2.6	0.3 °C–1.7 °C	0.4 m	Small increase

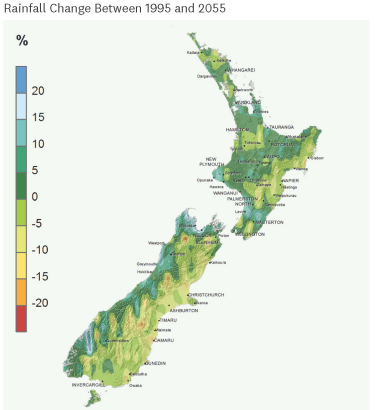
Temperature Change Between 1995 and 2055



Temperature Change Between 1995 and 2090



Rainfall Change Between 1995 and 2055



Rainfall Change Between 1995 and 2090

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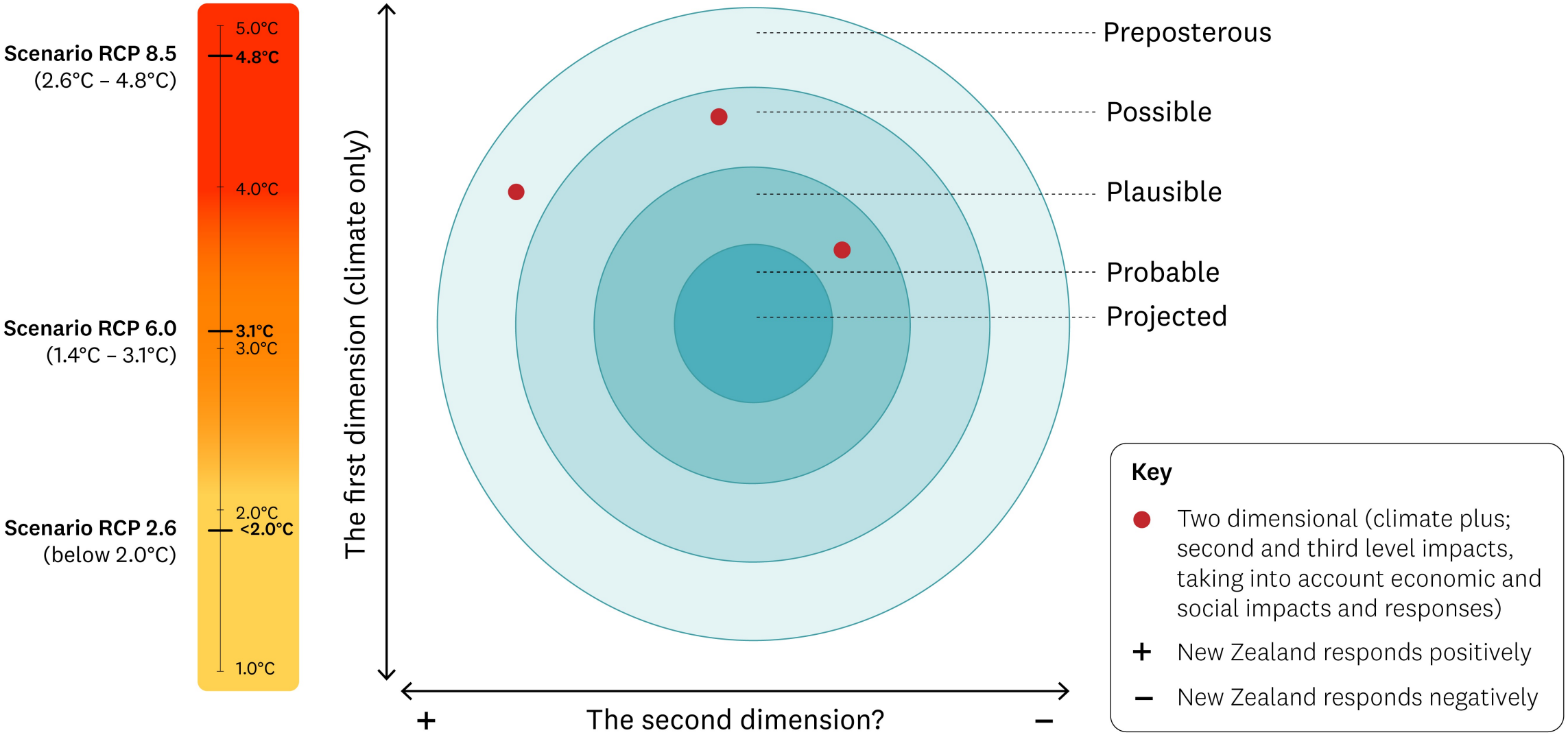
5

Why dystopic scenarios matter

‘Dystopic scenarios (rather than utopic scenarios) are extremely useful as they “nullify yesterday's logic and open our minds to completely new and unexpected territories for creating a resilient world”.’

– Nikolas Badminton, global futurist (p. 16)

This leads the McGuinness Institute to suggest the following three scenarios may be best to explore



D: Why, when, how and whom?

1. Why/do we need reference climate scenarios? Who is the audience?
2. When are they needed by? Mid-2022? 2025?
3. What would the reference climate scenarios be called? Does the definition work?
4. Should they be (i) one dimensional (climate only; only first level impacts) or (ii) two dimensional (climate and our response; including second and third level impacts and responses)?
5. What time horizon should be used? Are they until 2030, 2040 or 2050?
6. How would they be developed? Based on what information and what level of consultation?
7. Who would develop them? Would it be a collaboration?

‘F-E-A-R has two meanings:
“Forget Everything and Run”, or,
“Face Everything and Rise”.
Fear is something we all have faced, and
will face again. It's inevitable, and it rears
its ugly head in our life, career, or business.’

– American author Hilary Hinton
(known as Zig Ziglar)

Upcoming event

Thank you

Ngā mihi

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