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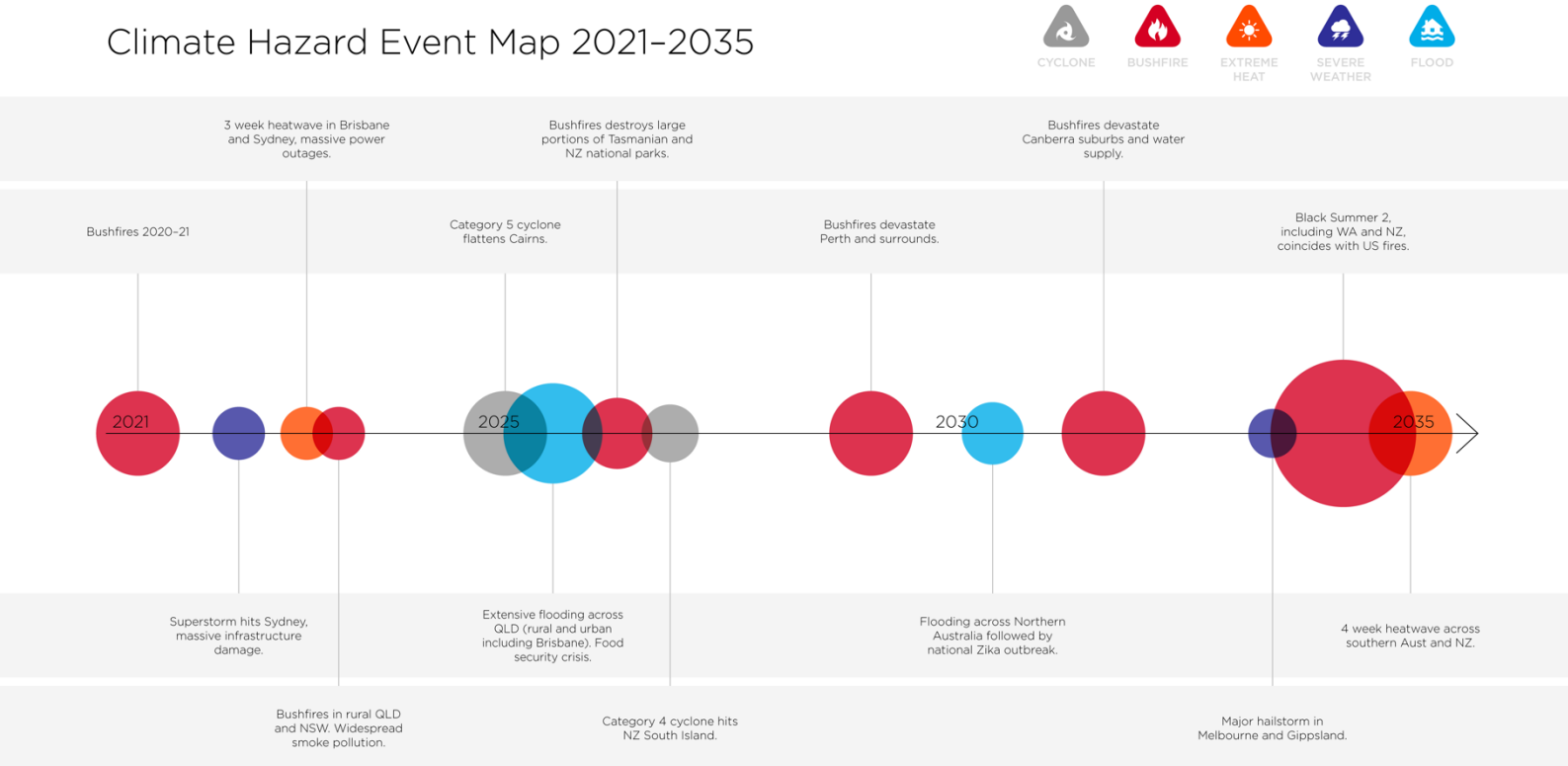
TRANSFORMATIVE SCENARIOS IN A CLIMATE-CHALLENGED WORLD

A guide for using scenarios in the emergency management sector

Reos Partners

Climate Hazard Event Map 2021–2035



ReosPartners

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CONTEXT AND PURPOSE

During 2020 and 2021, under the stewardship of BNHCRC and AFAC and led by Reos Partners and RMIT University, a select group of leaders and professionals from across the Australia and New Zealand emergency management sector (EMS) and related organisations worked together to better understand the driving forces in the world that interact to shape the future in unpredictable and volatile ways; ways that humans cannot reliably forecast or predict.

Using these driving forces, the team constructed a set of plausible futures that invite the EMS and the organisations within it to examine their current thinking about the future and challenge their existing assumptions. These scenarios explore what might happen over 2021-2035 in a climate-challenged world and how these futures might plausibly come about.

While this Guide references the breadth of ways in which scenarios can be applied in practice, the core purpose of this Guide is to outline one practical way for EMS organisations to start using these scenarios. The Guide outlines a simple, yet powerful way (wind tunnelling) for organisations to test and improve decision making and planning in an uncertain world where the volatility, frequency and magnitude of climate events will challenge the sector like never before. Experimenting with this "wind tunnelling" approach and becoming familiar with its use in the context of one's own organisation, will provide leaders and decision-makers with the strategic insights required to strengthen and improve their strategy work and support their organisations to more effectively adapt to and influence the future.

This Guide is designed to be used in conjunction with the other documents in the *Transformative scenarios in a climate-challenged world: workbook,* which includes:

- *An introduction to alternative futures (2021-2035) for planning and decision making in the emergency management sector*
- *Emergency management sector case studies as worked examples*

You will also need to access *Transformative scenarios in a climate-challenged world: research and methodology,* which includes:

- *Preparing emergency services for operations in a climate-challenged world: summary report*
- *Implications of climate change for emergency services operations: insights from the literature*
- *Research methodology for scenario development*

All of these documents can be found at www.bnhcrc.com.au/research/climatescenarios.

The Guide draws on the global experience of Reos Partners in developing and applying scenarios in many different contexts, the climate change research conducted for the project by RMIT University, the wisdom and hands-on experience of the sector-wide scenario team and a little bit of collective imagination.

INTRODUCTION TO USING SCENARIOS

For an in-depth introduction to transformative scenarios, first read *Transformative scenarios in a climate-challenged world: an introduction to alternative futures (2021-2035) for planning and decision making in the emergency management sector*.

WHAT ARE SCENARIOS

Scenarios are relevant stories about alternate futures and how they might plausibly come about.

Scenarios provide a powerful tool for engaging and opening the minds of leaders and decision-makers to pay attention to novel, less comfortable, and weaker signals of change, and prepare for discontinuity and surprise in the future ahead.

> *"The ability for which managers are most celebrated — the ability to get things done — was only one part of their necessary skills. Equally important, and much harder to come by, was the ability to see ahead."*

By considering futures beyond those we predict are likely, to those we believe could plausibly unfold in unexpected ways, we are able to strengthen our strategic and operational planning to be more agile and resilient. As leaders, teams, organisations and as a sector, we become more capable of not only adapting to the uncertain future, but proactively influencing the future as it emerges.

PUTTING SCENARIOS TO USE

Scenarios become valuable in their application. The general and common objectives of scenario planning are to:

- Provoke strategic insight;
- Expand the assumptions of decision-makers;
- Develop the foresight capacity to spot major discontinuities before it is too late; and
- Enable us to more adaptably and more effectively, achieve our missions of creating safety and resilience in a climate-challenged world.

These objectives can be achieved through a number of scenario applications from testing a new theory or business idea, to analysing and improving strategic or operational plans, to building leadership capacity for scenario thinking and strategic foresight.

Common to each scenario application, is the objective of being able to shift the thinking *outside one's organisation* or usual frame of reference to generate new insights and breakthroughs in thinking and translating these insights into business and operational improvements.

The world around us is often dynamic, ambiguous and uncertain. This contextual environment outside our sector, often seems outside of our day-to-day frame of attention, outside of the relevance of our organisational objectives, and outside our ability to understand or influence. Yet what happens in this contextual environment is of crucial importance in influencing what happens in our sector, and consequently in our own organisations. Scenarios are helpful in condensing and making sense of this complexity by organising and structuring this uncertainty in logical, plausible and understandable ways (Tighe, 2019).

"*…scenarios are, in effect, a complexity simplifier*."

USING SCENARIOS IN PRACTICE

Scenarios have been used by organisations to support their strategic and operational planning since the 1950's, first applied by the US Military and later in commercial settings at the RAND Corporation. By the 1970's many large corporations began using scenario planning in more sophisticated ways, including by Royal Dutch Shell as a way to reduce uncertainty and complexity in its long-range forecasts and enable managers to "see ahead". Since then, the application of scenarios has deepened and become more sophisticated over time. Scenarios have been applied across whole countries, governments, industry sectors, organisations and teams, as a way of better understanding the dynamic context within which they operate, and how this context might impact on their ability to succeed and thrive as they intend.

Scenarios are often applied initially at the level of **team or organisation**, by providing counter-cultural perspectives or alternative views to the "group think" of leadership teams who are too busy operationally to be as strategic or forward thinking as they might need to be. Scenarios are a powerful and efficient way to open teams and organisations to the outside world. Royal Dutch Shell famously used scenarios to "rehearse the future" of plummeting oil prices. In doing so, they took early preventative action in reducing operational expenses, which enabled their organisation to be incredibly successful when the scenario became a reality and chaos of the Oil Shock of 1973 actually occurred against prevailing industry predictions.

Scenarios also work well at the level of the **individual leader or decision maker**, by helping leaders and decision makers question their assumptions and beliefs about the world and how they think the future will unfold. There are many cases in history where the leaders' assumptions about the continuation of current trends have led to the undoing of many exceptional organisations, such as Kodak or Nokia. Managers too focused on their own immediate concerns, couldn't or wouldn't pay attention to external changes emerging, and when they finally did, it was too late. Scenarios help leaders guard themselves and their organisations against what Warren Buffet describes as the dangerous "ABC" risks: arrogance, bureaucracy and complacency.

Scenarios have also proven to be very useful at the **sector, country or regional** level, enabling groups of stakeholders to see together what might need to be done to succeed in future. In a number of cases, scenario have been attributed to helping shape the future direction of countries, such as peaceful transition out

of Apartheid in South Africa or the direction of Colombia under President Juan Manuel Santos, for example.

> *"I never really believed a future like that was possible, until I explored the scenario. What an insight! Now I have to stop and re-think what we're planning and doing."*

The challenge in effective scenario work is to go beyond the usual strategic focus on current trends or projections to find the right scale of observation. The next challenge is to look for some degree of fit between the organisation's core capabilities and the variety of plausible future conditions.

Pierre Wack of Royal Dutch Shell (1985) argued that strategic vision is not driven top-down by a corporate leader but involves a capacity to ask the right questions and to be amazed. He saw the organisation as an animal that can prosper within a particular habitat. The success of the strategic vision thus depends on matching capabilities and context. Scenarios can help that vision evolve and become a source of dynamism.

What does seem clear is that a sustained scenario practice can make leaders comfortable with the ambiguity of an open future. It can counter hubris, expose assumptions that would otherwise remain implicit, contribute to shared and systemic sense-making, and foster quick adaptation in times of crisis. Scenarios can build social capital within and beyond the organisation. They can aid in navigating complexity and conflict—managing disagreement while avoiding the extremes of groupthink and fragmentation. At Shell and elsewhere, scenarios have helped leaders prepare for futures that *might* happen, rather than the future they *expect* will happen.

> *Scenarios provide the right framework for appreciating fundamental long-term choice, which is not the same as next year's annual plan.*
>
> Peter Voser, Shell's CEO 2009 (in Wilkinson and Kupers, 2013)

GETTING STARTED IN OUR OWN ORGANISATIONS

PIVOTING THE CONVERSATION FROM "SO WHAT?" TO "NOW WHAT?"

How scenarios are used is often the crux of scenario planning. As Chermack (2011) says, it is wise to dedicate significant resources in developing a strategy for implementing and using the scenarios. For it is here, in their use, that scenarios become highly valuable.

The scenarios included in *An introduction to alternative futures (2021-2035) for planning and decision making in the emergency management sector* have been designed to be useful. Being useful in this context means that the scenarios are relevant to leaders and decision-makers within and around EMS, they are challenging enough to stretch current thinking and assumptions, and they are plausible. That is, they could actually happen. These scenarios shift our thinking from "so what?" to "now what?" This shift requires bridging the key messages within the scenarios and the climate challenges upon us, and the strategic implications and opportunities the scenarios present to our organisations and the sector.

NOW WHAT?

At the organisational level, scenarios provide a tool for improving our strategies.

Scenarios raise numerous strategic questions for EMS organisations, such as:

- What specific challenges arise for urban operations, rural operations, land management, and state emergency services in these different scenarios?
- What implications emerge in each scenario for planning, preparedness, response and recovery?
- In which scenarios does our organisation have the best chance of success?
- Which scenarios challenge our underlying assumptions and our capability to succeed?
- What can, and must, we do to make our strategies and operations as robust as possible?
- Do we have the resources, capability, workforce, leadership, relationships, culture, diversity of thinking to succeed in each scenario? If not, what then might we do to figure out "what" might we need to do and importantly "how" we might do it?
- How do we fill any gaps in our capacity? How can we mitigate future risks to improve the robustness of our planning?

Creating highly effective strategies lies in our ability to understand three domains of strategy and factor these into our strategy work (see Figure 1), they are the:

- Domain of control – our **organisational environment** – where our values, our culture, our identity, our assets, our capability, etc. reside;

- Domain of influence – our **transactional environment** – the sector and related actors within and around it, with whom we interact; and
- Domain of appreciation – the broader **contextual environment** – factors and driving forces largely outside our direct influence or control, that can significantly influence the sector and consequently our own organisation.

Importantly, *scenarios are not about the sector or the organisations within it.* Scenarios exist outside the sector in the contextual environment. That is, the domain consisting of driving forces (social, technological, economic, environmental and political trends) that influence what happens to the sector itself.

While organisational strategy and planning primarily relates to the organisation and how it chooses to act and interface within its transactional environment (see Figure 1), it is often at the interface of the sector and the contextual environment that higher leverage system transformation can also be nudged forward as actors within the sector work together in new ways.

This is an important point to emphasise, as it is at both of these two interfaces that scenarios are most powerful in their application.

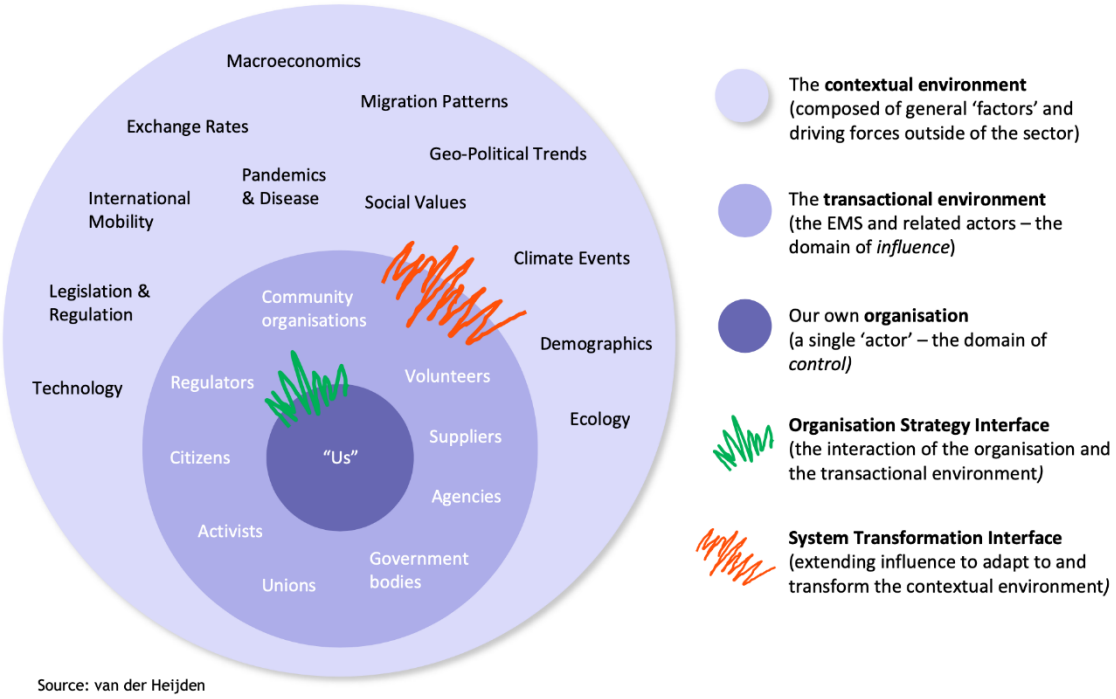


FIGURE 1: THREE DOMAINS OF STRATEGY.

Scenarios allows us to step out of our transactional, day-to-day environment and consider what is happening in the world around us. Why is this important? Because it allows us to learn to "see" how this contextual environment might be influencing the sector, and subsequently impacting our capacity as an organisation to succeed in what we are attempting to do. As the world around us changes, so does both the context within which we operate, and the sectoral and organisational priorities and capabilities required for our success. In matters of risk and safety, looking up and out of our current day-to-day operations is more than important, it is essential.

WIND TUNNELLING YOUR STRATEGY

A powerful way for organisations to begin applying scenarios is through a process referred to as "wind tunnelling". Wind tunnelling enables organisations to test their existing strategies and improve their robustness and responsiveness to future uncertainty and turbulence.

Wind tunnelling is the basic idea behind scenario application in organisations. Wind tunnels first appeared in aerodynamic research to test airplanes and simulate the environment of free flight. They have since been used on cars, motorbikes, buildings etc. In EMS, scenarios function as conceptual wind tunnels in which to measure a variety of decisions, strategies, business ideas etc.

As we move into more "turbulent" environments, the concept of wind tunnelling becomes even more important. "Turbulence occurs when there are sudden changes in the environment and the structural properties of objects begin to show their inadequacies." Chermack (2011). In such situations, the characteristics of the plane can be redesigned by experimenting with new and more aerodynamic designs, or an organisation can test existing or proposed strategies or operations. In practice a pilot can change altitude to fly into a different environment. Organisations cannot always readily do the same, so designing strategies and operations to withstand such stresses help to build agility and resilience to turbulence.

Scenarios create a way to analyse the organisation under different conditions. The basic premise of scenario planning is that the turbulence and uncertainty in the environment changes too unpredictably for many traditional strategic planning methods to be useful. By including turbulence and uncertainty in planning processes as a basic structural feature, much more robust strategies and approaches can be learned and developed over time. Wind tunnelling tests decisions for robustness and exposes opportunities and risks. The different scenarios also enable leaders to continually adjust their assumptions as they immerse in the different possible futures. Leaders and their teams are exposed to a wealth of critical learning opportunities along the way.

Wind tunnelling is a rigorous and iterative process and can take significant time and resources. In developing a more robust and useful strategy, you will also need to use the scenarios and these exercises to engage within and across organisational teams and potentially outside stakeholders and communities.

Wind tunnelling can allow teams to test a range of ideas, operational plans, strategies, capabilities, work culture, questions, projects, collaborations and discovering what can be learned.

WIND TUNNELLING STEPS

There are five key wind tunnelling steps which are outlined in Figure 2, below.

Getting started on the wind tunnelling steps in this Guide will require you to have access to the following documents:

- *Transformative scenarios in a climate-challenged world: an introduction to alternative futures (2021-2035) for planning and decision making in the emergency management sector*
- *Transformative scenarios in a climate-challenged world: emergency management sector case studies as worked examples* (which provides examples to how this Guide can be applied to strategies from organisations within the Emergency Management Sector – urban operations, rural operations, SES and land management)
- *Implications of climate change for emergency services operations: insights from the literature* (included in *Transformative scenarios in a climate-challenged world: research and methodology*)
- Your own organisational strategies documents that you would like to test and strengthen. Please note: We recommend in the first instance that the strategies you apply to this process not be too detailed.

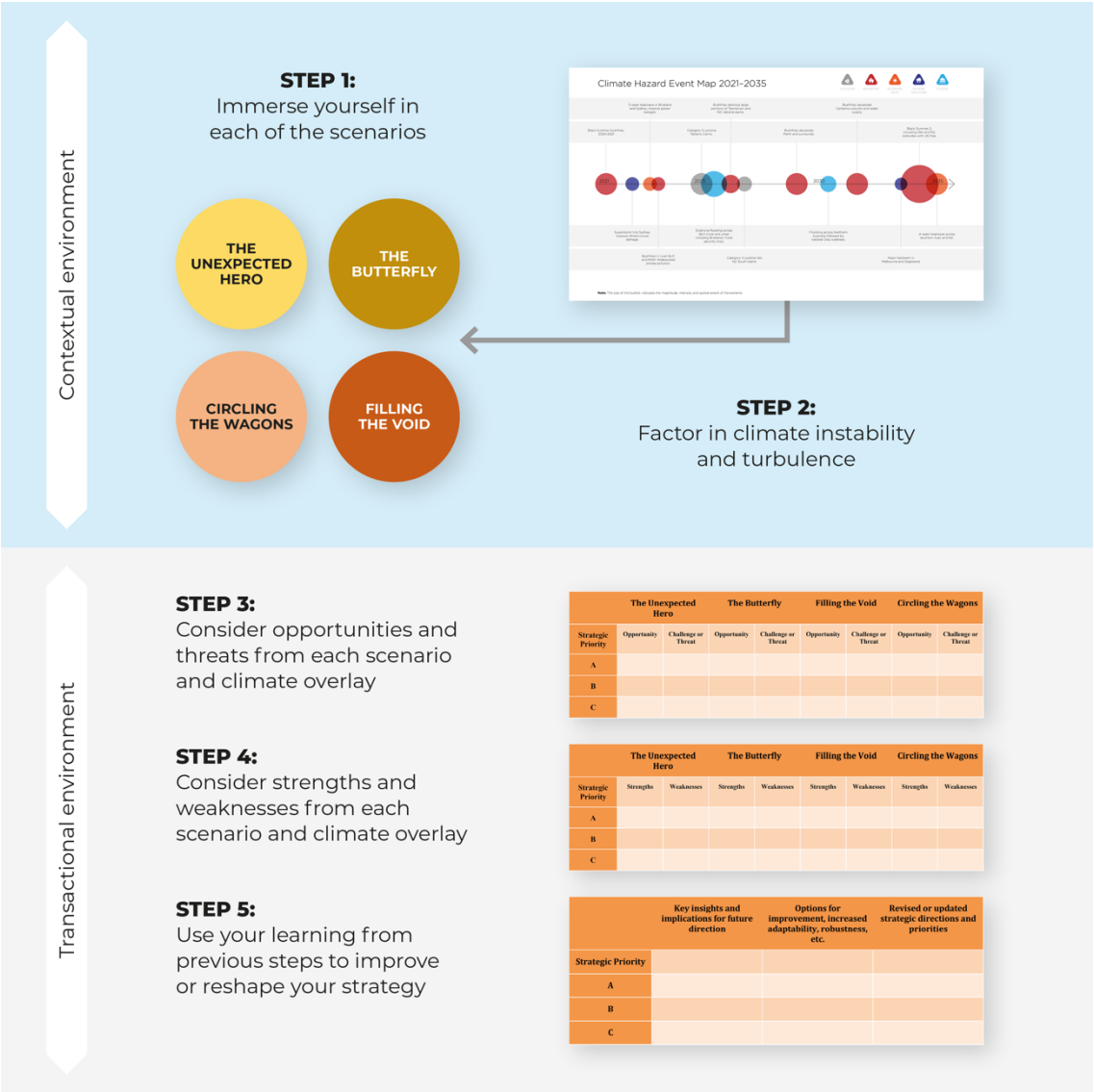


FIGURE 2: STEPS TO USING THE SCENARIOS AND THE CLIMATE HAZARD EVENT MAP (PAGE 20) TO IMPROVE YOUR STRATEGY.

Step 1: Immerse yourself in each of the scenarios

Step 2: Factor in climate instability and turbulence

Step 3: Consider opportunities and threats from each scenario and climate overlay

Step 4: Consider strengths and weaknesses from each scenario and climate overlay

Step 5: Use your learning from previous steps to improve or reshape your strategy

Steps 1 & 2 commence by providing an exploration in each of the scenarios and a consideration of what it might be like to inhabit these different worlds. This also includes an analysis of the climate instability and turbulence that could exist from 2021-2035 and the different risks that these hazards pose in different scenarios. **Steps 3 & 4** then provide a series of steps to determine how your key organisational strategies or plans stand up to the different conditions presented in each scenario. **Step 5** then builds on the previous steps and explores how the strategies could be strengthened or improved to be more robust, agile and resilient to different futures should they emerge.

The remainder of this section walks through each of these steps in more detail.

STEP 1: IMMERSE YOURSELF IN EACH OF THE SCENARIOS

This step needs to be conducted in conjunction with the resource, *Transformative scenarios in a climate-challenged world: an introduction to alternative futures (2021-2035) for planning and decision making in the emergency management sector.*

The primary purpose of scenarios is to lift us up and out of the EMS, and out of your own organisation into the broader, larger, more uncertain and unpredictable contextual environment.

This involves immersing yourself in each of these different scenario worlds, suspending your belief about what we think will happen, and be open to considering how these future scenarios could plausibly come about. By parachuting into each scenario, exploring and visualising what is going on, it is possible to experience a cognitive and visceral sense of what the future in each scenario may hold. By immersing yourself in each scenario we can begin to feel what's it's like to live in there as a leader or worker, a citizen, a neighbour, a spouse, parent, etc. as if each scenario were alive and we were experiencing it today.

The first step in any strategic conversation is, therefore, to enter and inhabit the world of the scenarios, to explore and understand more fully, the future contextual environment.

The four scenarios detailed in *Transformative scenarios in a climate-challenged world: an introduction to alternative futures (2021-2035) for planning and decision making in the emergency management sector* (summarised below) have been designed to challenge our assumptions and stretch our current

thinking about what could actually happen and to shift our thinking from "so what?" to "now what?"

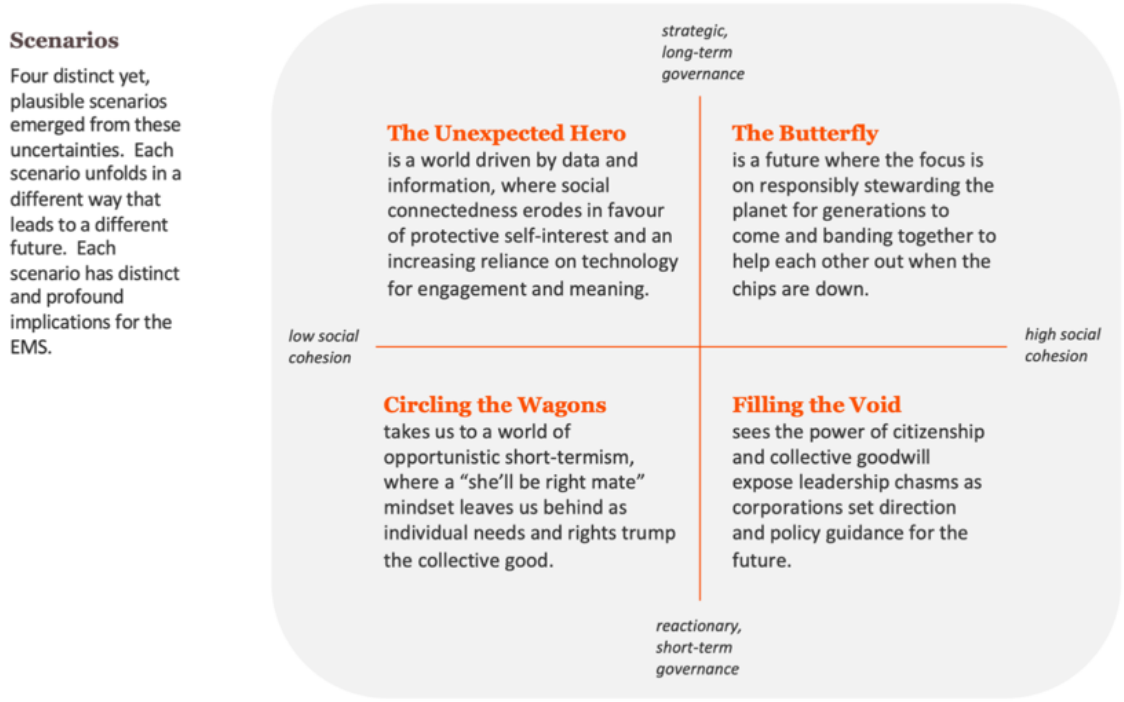


FIGURE 3: SCENARIOS IN A CLIMATE-CHALLENGED WORLD.

Immersing yourself in the world of these scenarios enables you to experience what these futures might be and feel like for Australia and New Zealand, for your communities, your organisations, your environment, your families and homes, your health, and way of life.

Exploring the future together takes courage and vulnerability to test your assumptions, examine your thinking and reconsider your perspectives and courses of action.

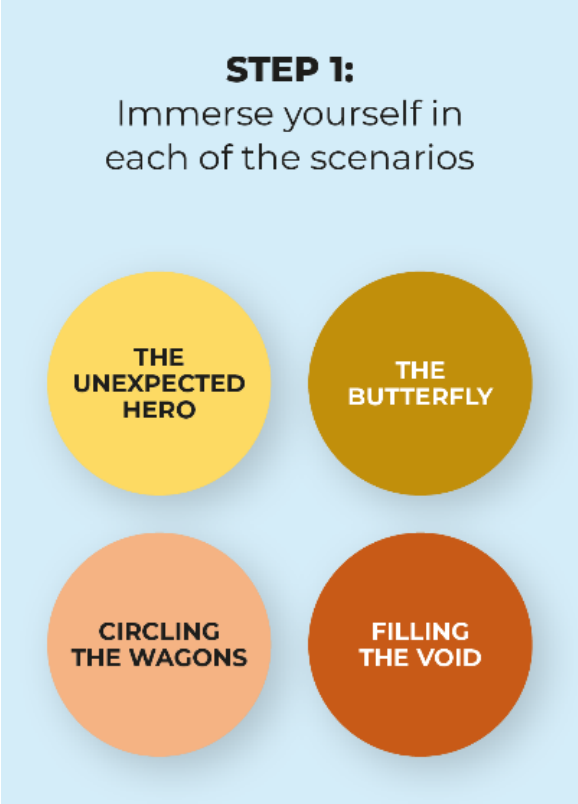
Wind tunnelling step

The first step in the wind tunnelling process, therefore, is to read each scenario slowly and completely, visualising what is going on, with a mind open to the possibility that it could plausibly happen.

Imagine what is happening and what it's like to inhabit each of the future worlds depicted in the scenarios. Use the table below to make notes on "**What is it like to inhabit this world?**"

- What is it like for you as a human being to inhabit this world? What are its implications for you personally?
- What do you see? What does it feel like? What do you notice about your hopes and fears?
- What is it like for you as parent, a child, or a grandparent? What is like for your friends, your community?
- What do you notice about each of these worlds?

Notice too, the pull to want to choose between which is your preferred world. All scenarios are plausible, and therefore, in a strategic sense, your strategy and your relevant planning, preparedness, response and recovery actions, should ideally be as adaptive and effective as possible in each of these possible future worlds.



	The Unexpected Hero	**The Butterfly**	**Filling the Void**	**Circling the Wagons**
Make notes on "What is it like to inhabit this world?"				

STEP 2: FACTOR IN CLIMATE INSTABILITY AND TURBULENCE

This step is best conducted in conjunction with the report, *Implications of climate change for emergency services operations: insights from the literature*, written by RMIT. This report details the potential impacts and risks of climate change that should be factored into each scenario.

Risk is defined as: "The likelihood, over a specified time, of severe alterations in the normal functioning of a community or a society due to hazardous physical events interacting with vulnerable social conditions, leading to widespread adverse human, material, economic or environmental effects that require immediate emergency response to satisfy critical human needs and that may require external support for recovery." (Rickards and Keating, 2021, p15.)

As Figure 4 below shows,

"Risk is often understood as the intersection of a hazard (e.g. bushfire weather), exposure to the hazard (e.g. settlements in the urban fringe), and pre-existing vulnerability (e.g. physical vulnerability such as susceptibility of structures to combustion, and social vulnerability such as socioeconomic disadvantage). Figure 4 represents this concept of risk together with climate and socioeconomic drivers that influence risks. Each one of these, especially vulnerability, is an emergent outcome of many dynamic factors. This means that identifying impacts in a given situation or projecting them in the future is full of uncertainty." (Rickards and Keating, 2021, p15.).

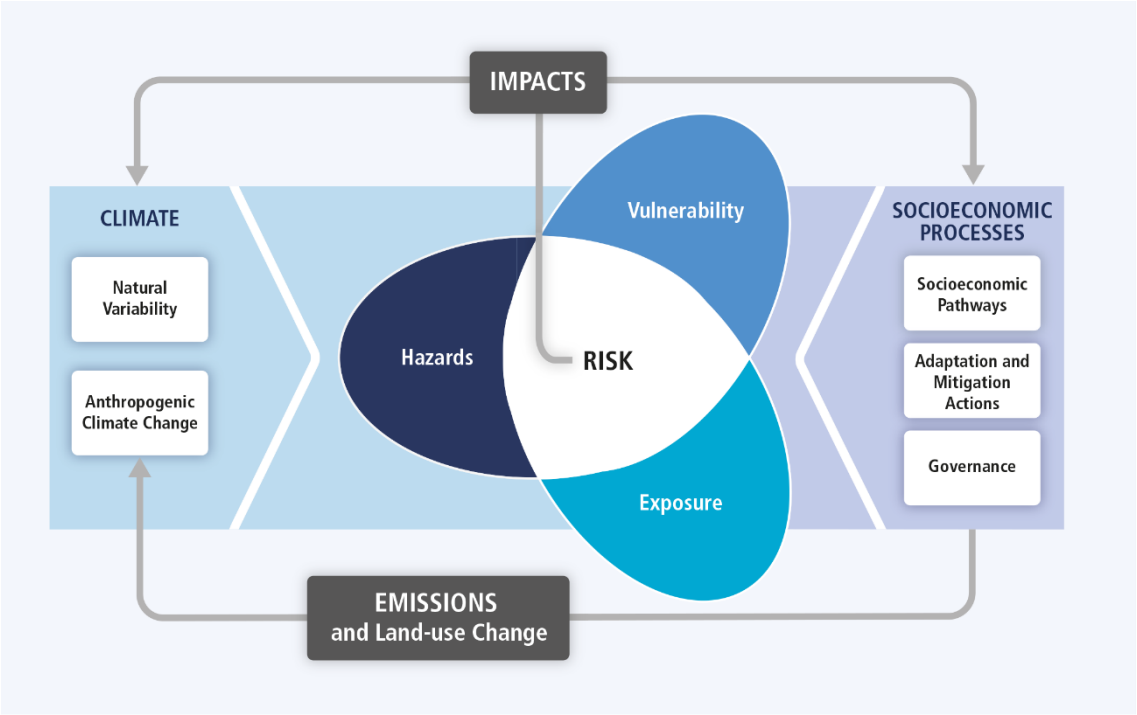


FIGURE 4: THE IPCC AR5 CONCEPTUAL FRAMEWORK WITH RISK AT THE CENTRE.

Hazard is defined as: "The potential occurrence of a natural or human-induced physical event or trend or physical impact that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems and environmental resources." (Rickard and Keating, 2021, p16.)

Exposure is defined as: The presence of people, livelihoods, species or ecosystems, environmental functions, services, and resources, infrastructure, or economic, social, or cultural assets in places and settings that could be adversely affected." (Rickard and Keating, 2021, p22.)

Vulnerability is defined as: "The propensity or predisposition of an individual or system to be adversely affected. Vulnerability encompasses sensitivity or susceptibility to specific harms (e.g. a biological sensitivity to smoke or food-borne pathogens), and more generic factors such as a general lack of capacity to cope and adapt. Differences in vulnerability mean any hazard affects people and systems differently." (Rickard and Keating, 2021, p27.)

The following table identifies examples of observed and projected trends in exposure, vulnerability and climate extremes based on the RMIT report and Table SPM.1 in the IPPC report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation.

This table can assist in imagining the kinds of climatic events, their direct and possible flow-on effects in the contextual environment, that can be then overlaid onto the scenarios.

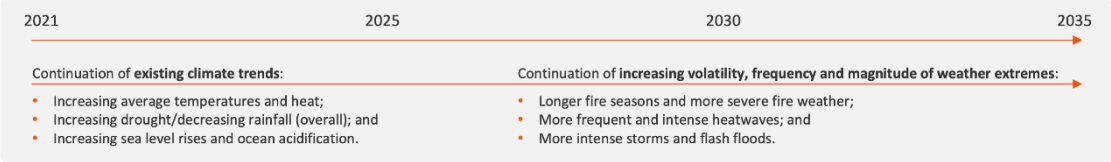
Climate change factor	Exposure and vulnerability
Sea level rise	Areas with low elevation are particularly vulnerable to rising sea levels and storm-surge with direct impacts such as erosion, inundation, shoreline change, and saltwater intrusion into coastal aquifers. These impacts can result in ecosystem disruption, loss of coral reefs, loss of biodiversity, decreased agricultural productivity, changes in disease patterns, loss of species, direct and aggregate economic impacts and losses such as in tourism industries, and population displacement, increased insurance costs – all of which reinforce vulnerability to extreme weather events.
Heat waves	Factors affecting exposure and vulnerability are related to direct impacts from heat or lack of water to cope, stress, illness and death of humans, other animals and plants. Heat waves can be compounded by associated storms and/or fire. Other factors include age, pre-existing health status, level of outdoor activity, socioeconomic factors including poverty and social isolation, access to and use of cooling, physiological and behavioural adaptation of the population, and functionality of urban infrastructure (such as the electricity grid).
Extreme low rainfall and drought	Factors affecting exposure and vulnerability are related increased evaporation, increased risk of algal blooms, loss of snow fields and reduced water quality. If water demand exceeds supply, humans, other animals and plants will be severely impacted. Extended periods of low rainfall can result in physical equipment and infrastructure degradation. Storms, fire, flood after extended periods of low rainfall can lead to greater runoff into water bodies and reduce water quality, Agricultural practices are vulnerable to increasing variability in seasonal rainfall, drought, and weather extremes, resulting in declining agricultural and livestock yields or complete collapse bringing risks to food security. Vulnerability is exacerbated by population growth, degradation of ecosystems, and overuse of natural resources, as well as poor standards for health, education, and governance.

Heavy rainfall and flooding	Factors affecting exposure and vulnerability are related to direct impacts from flooding stress, injury, illness and death of humans, other animals and plants. Damage to natural and built environment and infrastructure. Heavy runoff and flash flooding, causing further damage Blockage of natural drainage areas also increases exposure and vulnerability Heavy rainfall can also be associated with high winds during storms or cyclones. Prior drought or fire can compound risk, leaving ground bare and increasing erosion and runoff into water bodies. These impacts can result in ecosystem disruption, loss of biodiversity, decreased agricultural productivity, changes in disease patterns, loss of species, direct and aggregate economic impacts and losses such as in tourism industries, and population displacement, increased insurance costs – all of which reinforce vulnerability to extreme weather events.
Extreme storms	Exposure and vulnerability factors are related to increasing frequency, magnitude and. Also, historic wind patterns appear to be changing. Direct exposure to extreme storms is life threatening to humans, other animals and plants and can severely damage the natural and built environment and infrastructure Extreme storms can be associated with heavy rainfall, fires or sea inundation compounding damage and aggregate knock-on effects to interdependencies (loss of electricity, water supply or supply chains) as identified earlier.
Fire	Exposure and vulnerability factors are related to increasing frequency, temporal and spatial extent, magnitude and severity of fires. Risks include human injuries, illness and death from flames and smoke, damage to plants, animals, water bodies, and built environment and infrastructure. Events are often associated with high heat and winds adding to physical stress and impacting response. Associated with extended period of low rainfall there can be a lack of water for response and recovery These impacts can result in ecosystem disruption, loss of biodiversity, decreased agricultural productivity, increasing pests, weed and disease issues changes in disease patterns, loss of species, direct and aggregate economic impacts and losses such as in tourism industries, and population displacement, increased insurance costs – all of which reinforce vulnerability to extreme weather events.

TABLE 1: EXAMPLES OF DIRECT AND FLOW-ON EFFECTS FROM EXTREME CLIMATE EVENTS.

Overlaying climate onto scenarios

The planet is already on a fixed trajectory of changing weather and climate. Across all scenarios from 2021-2035, it is clear from the research (Rickards and Keating, 2021) that the following will occur:



However, by their very nature, increasing volatility, frequency and magnitude of weather extremes cannot be reliably predicted. The impact of hazard events is dependent on the context and world we live and work in. While the same hazard event (such as, a bushfire) might occur in any future scenario, the risks that a particular hazard event poses and the impacts it could have, might be profoundly different across different scenarios. It is by overlaying hazard events on the scenarios that this "interaction" can be seen. It is important to factor this interaction into our exploration of the scenarios and our thinking and decision-making processes for the future.

For example, if responding effectively to bushfires demands a significant proportion of the workforce be recruited from a community volunteer base, how might the ability to recruit and train members (and hence effectively respond to fire) be impacted in **Circling the Wagons** (a world of lower social cohesion) versus **The Butterfly** (a world with higher social cohesion and community engagement)? It is highly likely it won't be the same in different scenarios. As such, our decision making, planning and priority setting will necessarily need to be adaptable to this difference. If adapting to a **Circling the Wagons** world is deemed insufficient in itself, the EMS might even need to consider what role it can collectively and strategically play to influence an increase in community social cohesion in the future (IPCC, 2012).

While there will be **increasing volatility, frequency and magnitude of weather extremes** over the next fifteen years, we cannot accurately predict how and when these events will occur. As such, a hazard map is indicative of one way these events might play out.

To capture the effect of climate change on the impacts caused by natural hazards, you can either use the indicative **Climate Hazard Event Map** included (page 20) or create your own hazard map using the **Blank Climate Hazard Event Map** included in the workbook (see Powerpoint file).

The Climate Hazard Event Map is used to depict a range of possible hazards over the timeline of the scenarios provides an "overlay" that makes it possible to explore the same hazard events in different future worlds. In doing so, it will highlight the different extent of exposure and vulnerability that these same hazard events pose in the different scenarios that might emerge.

As an example, the hazard events on the following map:

1. Extend across the geographies of Australia and New Zealand
2. Apply to different aspects of the EMS: urban operations, rural operations, land management and SES
3. Represent a range of hazard types that vary in volatility, frequency and magnitude.

Over time, as agencies become more familiar with building these considerations into their strategic and operational planning, they can replace this Climate Hazard Event Map with alternate maps that include different stretches and challenges to each agency, using the Blank Hazard Event Map or one you have created internally. This can be done by mixing and varying the event volatility, type, frequency and magnitude as it relates to the specific context of each

organisation. The Climate Hazard Event Map also enables the organisation to have strategic conversations about the adaptive capacity of an organisation to climate change (Cinner, et al., 2018).

You can use the Climate Wildcards (pages 22 and 23) to further brainstorm climate impacts.

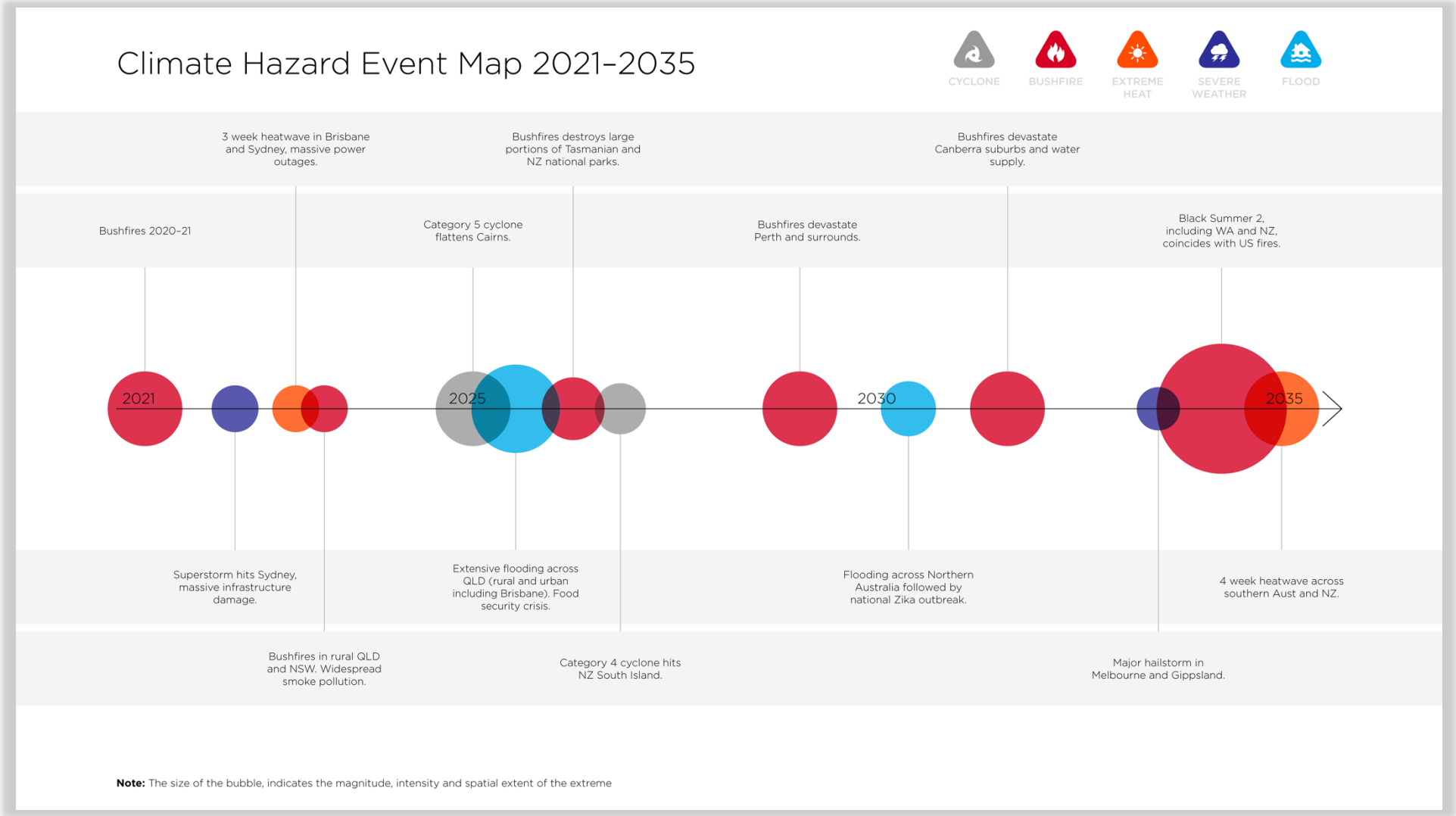


FIGURE 5. CLIMATE HAZARD EVENT MAP: 2021 – 2035. THIS IS A SAMPLE MAP, BUT YOU CAN CREATE YOUR OWN USING THE BLANK CLIMATE HAZARD EVENT MAP INCLUDED IN THIS WORKBOOK (SEE POWERPOINT FILE).

CLIMATE WILDCARD

The catchment has received its average annual rainfall in the last 48 hours.

The rainfall was forecast, but not the volume, or intensity of the rain. BoM forecasters described the weather pattern as completely new and not predicted in any of their models.

This comes after 24 months of severe drought, and associated loss of crops and vulnerable vegetation.

bushfire&natural HAZARDSCRC

CLIMATE WILDCARD

A major biosecurity program is in place to protect Australia's crop from a disease that will wipe out production and immediately terminate export supply agreements.

A series of significant uncontrollable bushfires have already breached the boundaries of the exclusion zone and there are significant communities being threatened within the exclusion zone.

bushfire&natural HAZARDSCRC

CLIMATE WILDCARD

Bushfires have been raging in forests and grasslands across 5 states and the ACT for 2 months. Fires at the border have joined and are have effectively encircled the border towns of

Medical supplies, food, and fuel have run dangerously low because of the disruption to major transport routes.

Exhausted firefighters are being asked to keep going, as the extent of the fires means that the National Resource Sharing Centre is unable to locate additional firefighters

bushfire&natural HAZARDSCRC

CLIMATE WILDCARD

The city of

has been in drought for 5 years, and is now into the 23rd day of a heatwave that continues to create daytime and nighttime high temperatures.

Energy consumption is at record highs, and water supplies are critically low. A recent discovery of *giardia*[1] in the drinking water supply has caused a medical emergency. Bottled water was discontinued 5 years ago.

1. *Giardia* infection is an intestinal infection marked by stomach cramps, bloating, nausea and bouts of watery diarrhea. Giardia infection is caused by a microscopic parasite that is found worldwide, especially in areas with poor sanitation and unsafe water.

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CLIMATE WILDCARD

Create your own wildcard

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CLIMATE WILDCARD

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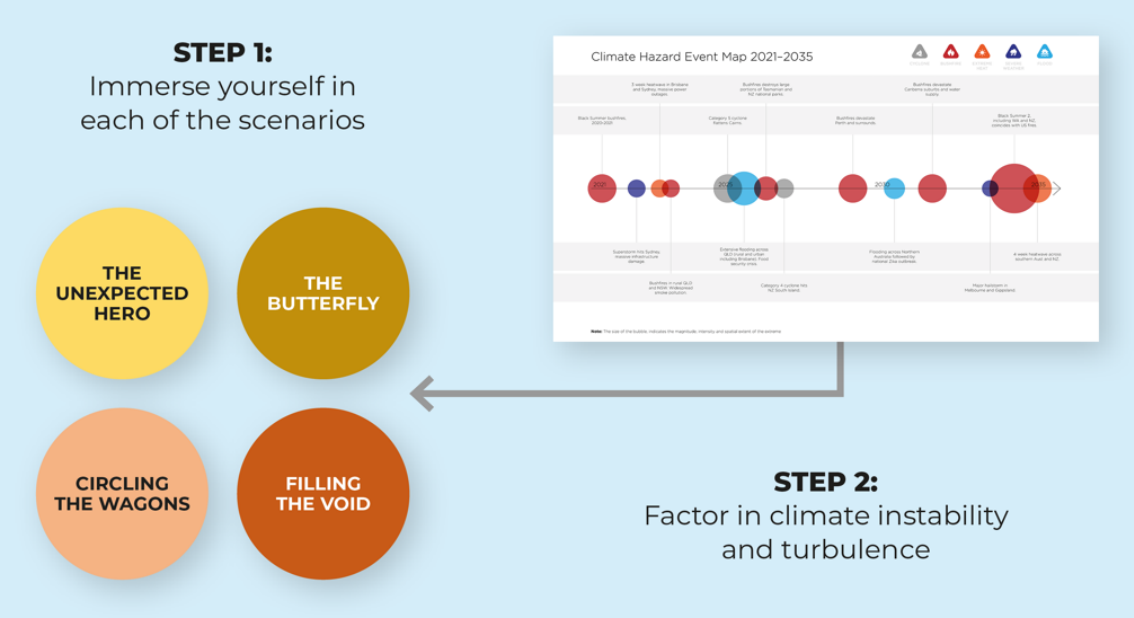
Wind tunnelling step



Hazards

Firstly, consider *What hazards related to climate change could occur in the timeframe of the scenarios?*

Use the *Blank Climate Hazard Event Map: 2021–2035* (included in the *Transformative scenarios in a climate-challenged world: workbook)* and select the particular extreme weather events that could occur in the timeframe of the scenarios, and that have implications for your strategy.

Consider:

- What are the extreme events, their magnitude, intensity and spatial extent?
- To what extent are they compounding events?
- To what extent could there be compounding impacts?
- To what extent could there be cascading impacts?

For example, if your strategy is related to bushfire management in Victoria, then select the 2034, 'Black Summer 2' event, which is shown as three times larger than the Black Summer of 2020-21, effecting SA, WA, Victoria and NZ. Note also that the event is closely followed by a 4-week heatwave event across southern Australia and coincides with extreme fires in US which have implications for sharing resources and personnel. In an event or series of events of this magnitude, there are likely to be extensive compounding and cascading impacts that will look different in each of the different scenarios.

Exposure and vulnerability

Secondly, consider what subsequent *exposures* and *vulnerabilities* related to these extreme events and their impacts are evident in each scenario?

Use *Implications of climate change for emergency services operations: insights from the literature* and the examples of observed and projected trends in exposure, vulnerability to climate extremes from Table 1 above to identify:

- What direct effects are possible from these events (e.g. health effects from heat stress)?
- What indirect effects are possible from these events (e.g. over-burdened health system)?
- What system disruptions are possible (e.g. disruption to power supplies)?
- What systemic impacts are possible (e.g. lost productivity, workforce capability, economic knock-on effects)?
- What in each world is sensitive or susceptible to harm?
- In what ways are people and systems and people affected differently?
- Who fares better, who fares worse?

Answers to these questions will look very different in each scenario. For example, heat stress affects people disproportionately depending on age, pre-existing health status, socioeconomic factors including poverty, social isolation and access to cooling infrastructure. A bushfire management strategy responsive to the needs and circumstances of low income or socially isolated communities might look very different in a future world where there is low social cohesion driven by self-interest versus one where there is high social cohesion and inclusiveness.

Adaptive capacity

The adaptive capacity of systems, institutions, human society and other organisms to adjust to the future scenarios and selected climate hazard events can have a significant bearing on your strategy.

The report *Implications of climate change for emergency services operations: insights from the literature* identifies five interlinked domains of adaptive capacity: assets, flexibility, social organisation, learning and agency (Rickard and Keating, 2021, p.27).

For example, in each scenario and selected climate hazard events ask:

- Assets: How might the natural, financial, technological and service resources be distributed and accessed? To what extent might this be equitable?
- Flexibility: How likely or unlikely in this scenario is society able to flex, diversify and switch between options to respond to a volatile and shifting context?
- Social Organisation: How well is society set-up, inter-connected and able to cooperate to plan, prepare, respond and recover from extreme events?
- Learning: How likely or unlikely is there capacity to detect, understand and apply new data and information at multiple scales, including about emergent shifts in the environment and feedbacks on past actions?

- Agency: How likely or unlikely is there the ability to enact a positive course of action despite constraints, mobilising the other domains of adaptive capacity, both as individuals and groups?

In your wind tunnelling exercise consider, what adaptive capacity might already exist or be lacking in each of these scenarios that can have implications for your strategy?

The table below provides a tool to move through the steps of identifying the relevant hazards from the Climate Hazard Event Map, through to identifying potential exposures, vulnerabilities and the extent of adaptive capacity that could exist through the lens of each scenario.

	Hazards	Exposure and vulnerability	Adaptive capacity
	Select from the Climate Hazard Events Map the particular extreme weather events that could occur in the timeframe of the scenarios and have implications for your strategy, for example: • Bushfires • Heat waves • Extreme storms • Extreme low rainfall and drought • Heavy rainfall and flooding	Identify what subsequent exposures and vulnerabilities are evident in each scenario.	Identify what adaptive capacity might exist or be lacking in each of these scenarios?
The Unexpected Hero			
The Butterfly			
Filling the Void			
Circling the Wagons			

STEP 3: CONSIDER OPPORTUNITIES, CHALLENGES AND THREATS

The next step involves taking your immersive experience in the world of the scenarios and the selected climate hazards events, together with the associated exposures and vulnerabilities, and moving back into the transactional and organisational environment to consider what this means for your organisations and your strategy.

Using a form of SWOT analysis, start first with the external interface of opportunities and threats.

Wind tunnelling step

For each scenario and selected climate hazard events (steps 1 and 2 above), and for each strategic priority in your strategy or plan, ask:

- What opportunities for our future direction can we see in each of these scenarios and selected climate hazard events?
- What challenges or threats are posed within each of these scenarios and selected climate hazard events?

The table below provides a tool to sequentially move through each of the questions and organise your responses.

	The Unexpected Hero		The Butterfly		Filling the Void		Circling the Wagons	
Strategic Priority	**Opportunity**	**Challenge or Threat**	**Opportunity**	**Challenge or Threat**	**Opportunity**	**Challenge or Threat**	**Opportunity**	**Challenge or Threat**

STEP 4: CONSIDER STRENGTHS AND WEAKNESSES

Building on the opportunities, challenges or threats in each scenario, consider next what strengths and weaknesses could be demonstrated or exposed if a scenario and selected climate hazards were to occur.

Wind tunnelling step

For each scenario and selected climate hazards (steps 1 and 2 above), and for each strategic priority in your strategy or plan, ask:

- What organisational strengths can we see in each of these scenarios and selected climate hazard events?
- What organisational weaknesses (or gaps) are exposed or potentially exposed in each of these scenarios and selected climate hazard events?

The table below provides a tool to sequentially move through each of the questions and organise your responses.

	The Unexpected Hero		The Butterfly		Filling the Void		Circling the Wagons	
Strategic Priority	Strengths	Weaknesses	Strengths	Weaknesses	Strengths	Weaknesses	Strengths	Weaknesses

STEP 5: USE LEARNING TO IMPROVE YOUR STRATEGY

Use the responses captured in the tables above to generate insights and meaning (implications) and conclusions for how to improve, grow, shore up, change, replace, transform your strategy to maximise its robustness and utility *across all scenarios and selected climate hazard events*.

Then, build these new insights, implications and conclusions into developing options, strategic directions and priorities for a revised planning model or strategy.

Wind tunnelling step

There are two kinds of meanings and conclusions you can draw from your wind-tunnelling exercise. The first, and the one covered in this Guide, is what's known as the *adaptive stance*, which assumes that you cannot or are unable to change the system you are part of and extends into the contextual environment, and therefore you must accept and adapt to it.

Adaptive stance

The key questions in the adaptive stance conversations are: "*what is happening in the world that could have an impact on us?*" and with this knowledge and understanding, "*how best can we develop our capability and effectiveness in planning, preparedness, response and recovery to extreme climate events?*"

The table below provides a tool to organise your responses to an adaptive stance.

	Key insights and implications for future direction	Options for improvement, increased adaptability, robustness, etc.	Revised or updated strategic directions and priorities
Strategic Priority			

Transformative stance

The second is the *transformative stance*, which assumes that you can change the system you are part of, and your strategy is developed in alliance with others. While traditional scenario planning provides a framework for "adapting" to different possible futures as they might emerge, the transformative stance also enables actors to work together and separately to not only adapt to the future but help create it. For further detail refer to the book by Adam Kahane (2012), *Transformative Scenario Planning: Working Together to Change the Future*.

The transformative stance invites leaders to consider the question: *what is it that we want to change that can't we change alone?*

For example, as well as being subject to and adapting to the driving forces of social cohesion or the different models of governance described in the scenarios, we might ask:

- How can we work together to help create a more socially cohesive society?

Or:

- Who do we need to work with and how to ensure a strategic long-term approach to governance?

Work of this nature requires leaders to engage more broadly and directly with other actors in the contextual environment. The scenarios and selected climate hazard events provide a resource for stakeholders from across the system to understand and work together to transform the driving forces that are impacting the system (as shown by the red line on the diagram in Figure 6 below).

Choosing the transformational stance may also require new capabilities (e.g. new forms of leadership, more advanced skills in collaboration) and identification and engagement of new players with a stake in the system you are seeking to transform.

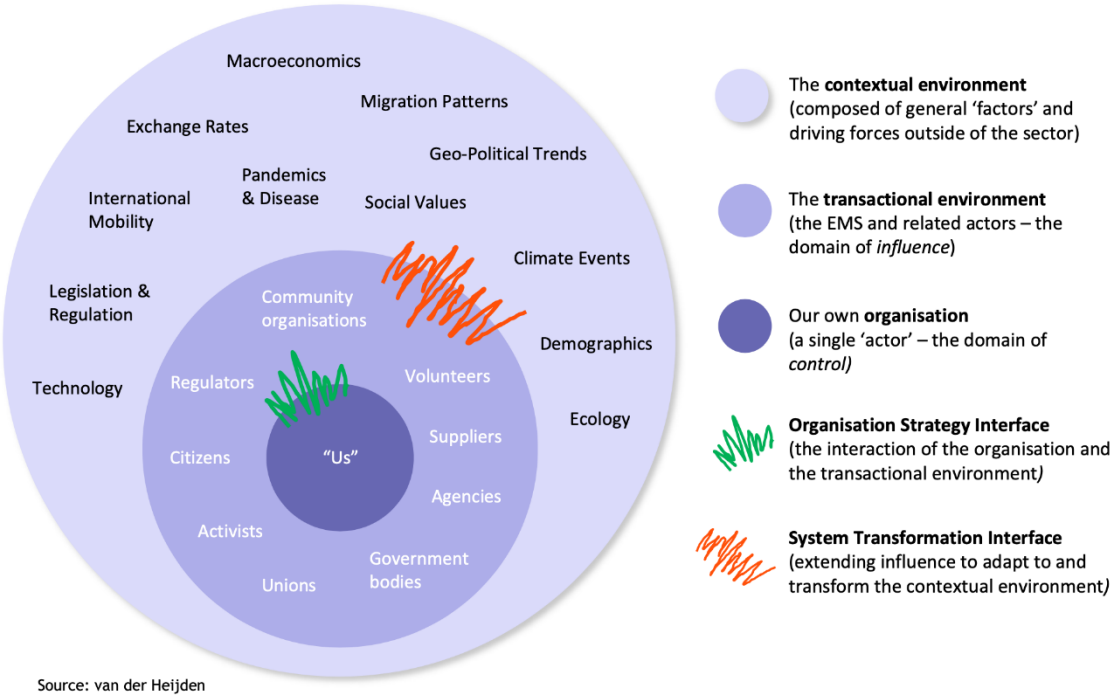


FIGURE 6: THREE DOMAINS OF STRATEGY.

The table below provides a tool to begin to organise your responses to exploring a transformative stance.

What is it that we want to change that can't we tackle alone?	Who do we need to work/ collaborate with to take transformative action?	What are the capabilities we need to make transformative change?

EARLY WARNING SIGNS

Lead indicators, signals, signposts

A key element of strategy development or wind tunnelling is determining what information is required to give you an early indication of which of your plausible futures is emerging or trending. Investing in the capacity to look ahead and catch early signals can help the organisation to develop an effective, responsive and agile strategy.

Weak signals are existing things or phenomena that can be interpreted as an indicator of potential greater change. Weak signals comprise the following characteristics:

- *Novelty*: a weak signal is an indicator of something new or a new perspective on a known subject
- *Surprising*: a weak signal is surprising to its interpreter
- *Challenging*: a weak signal forces one to challenge existing assumptions and is therefore often difficult to detect or easy to overlook
- *Significance*: a weak signal describes something that may have an impact on the future
- *Delay*: a weak signal describes something that is not yet significant but requires time to mature

What are the weak signals (or leading indicators) that are present in the current state that signify actual events and circumstances are beginning to unfold as the scenarios suggest? These are the signals to pay attention to suggest the future is emerging in a particular way.

What current events might signal that major changes are on the horizon?

What weak signals might indicate that the degree of social cohesion is trending or shifting one direction or another?

What weak signals might indicate changes towards more strategic long-term governance or towards more reactionary short-term governance and where might we look for those signals?

How do we observe and monitor these as part of our planning processes and how they might impact the organisation/sector should they continue to unfold in different ways? What's needed to put these on our "radar screens"?

Conversations around current weak signals often leads us to form new and different insights and increase the "anticipatory capacity" of decision makers.

What would we do if this reality hit us unprepared? What could we mitigate if prepared? How much more effective would this make us?

Wind tunnelling step

The table below provides a tool to develop a deliberate and systematic approach to identifying and monitoring weak signals. It requires you to research

and select your sources for discovering, observing or monitoring weak signals and developing a resourcing plan to sustain a long-term approach.

Sources		**Selected sources**	**Resourcing plan** (how you will keep an eye on these sources)
Signals collected by others	This might include think tanks, universities, research bodies		
Magazines and reports	Particularly different and unusual journals that present different ideas about what is trending or might be emerging		
News and blogs	Newsfeeds, news monitoring services, newsletters and blogs that focus on foresight		
Social media	LinkedIn groups, especially those that focus on strategic foresight		
Extended networks and events	Both formal and informal networks through conferences, workshops, etc. to leverage broader sources of knowledge and perspectives		
Text Mining	Using software to monitor the occurrence and frequency of key terms or phrases)		

FURTHER SCENARIO APPLICATIONS

Transformative scenario planning

Transformative Scenario Planning provides a methodology for people to work with complex problematic situations that they want to transform but that they cannot do so unilaterally or directly. While traditional scenario planning provides a framework for "adapting" to different possible futures as they might emerge, the Transformative Scenario Planning method used in this work, also enables actors to work together and separately to not only adapt to the future but help create it. The process provides a unique space for actors to work cooperatively and creatively to get unstuck and to move forward. For further detail please refer to the book by Adam Kahane (2012), *Transformative Scenario Planning: Working Together to Change the Future*.

What do these other applications actually look like in practice?

Working with scenarios can be daunting at first. It takes courage and resolve to open ourselves to challenge our assumptions and world views and admit that we don't actually have all the answers we need – either as a team or organisation, an individual leader or as a sector. Working with scenarios requires openness, a learning mindset, an acknowledgement that we cannot reliably predict or control the future and that we don't and can't have all the answers.

The application of scenarios can make an enormous difference to our current effectiveness and future success as we translate new learnings about possible futures into our planning, decision making, learning and operational priorities. The applications can extend from building capacity of individual leaders through to whole- industry and even country or region-wide initiatives. Scenario applications generally fall into three broad categories:

Teams or Organisations – Applications can involve a range of programs, workshops and exercises that can be integrated into day-to-day operations and standard ways of operating for improving decisions and outcomes. For example:

- **Strategic planning processes** – processes and workshops for opening teams to the outside world and integrating scenarios into strategic processes for strengthening existing plans or priorities.
- **Building leadership and team capability** – in-house development programs to build leadership agility, foresight capacity, strategic thinking for future risk mitigation for improving planning and operations.
- **Innovation programs** – "safe spaces" for bringing different leaders or teams together to examine and explore what could be done to improve operations and adapt to alternative futures.
- **Implementation and BAU alignment** – aligning scenarios, strategy and operations as business-as-usual – providing a clear line of sight between planning and action.

Individual leaders or decision makers – programs provide safe and confidential learning spaces for leaders, individually or with peers, to build confidence and capacity and explore what works in practice. For example:

- **Leadership development programs** – sector-wide open programs to build networks, strengths and capacities for leading teams and organisations effectively in complex and uncertain contexts.
- **Executive leadership coaching** – tailored, confidential one-on-one coaching to support leaders adapt to leading in complex contexts where there are no easy solutions and no precedent answers.
- **Action learning journeys** – a robust methodology for small groups of industry peers to share, explore and resolve key challenges together in a confidential manner.

Sectors, countries or regions – Events, processes or ongoing platforms for driving system-wide transformation across a sector, jurisdiction, country or region. These involve proven processes for making progress when stakeholders face common challenges but have neither the resource, capacity nor authority to solve them alone. For example:

- **Transformative scenario processes** – wider scenario engagement to connect with broader stakeholder groups and encourage immersion and insight. These processes building shared understandings and create new system-wide relationships, new insights, new capacities, new commitments and new experimental initiatives.
- **Innovation labs** – Strategic and collaborative innovation processes that bring together key stakeholders from across a given system to work on specific systemic challenges together – to collaborate and experiment on what can and must be done to best adapt to and transform our current situation.

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