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Opening and closing the future: climate change, adaptation, and scenario planning

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Abstract. The gales of climate change blow the future open and closed. In response, we are having to learn to live with a renewed notion of limits and a novel level of uncertainty. One emerging governance response is a turn to scenario planning, which generates narratives about multiple futures refracted out from the present. Like climate change itself, scenario planning, and the broader field of futures studies it is part of, is historically and socially positioned, belying its application as a mere method or tool. This paper discusses the growing turn to scenario planning within government climate change adaptation initiatives in light of parallel shifts in governance (eg, interest in efficiency and wicked problems) and adaptation efforts (eg, framed as risk management or resilience) and their shared roots in the ambiguities of sustainable development. It provides an extended introduction to a theme issue that provides, overall, a nested discussion of the role of scenario planning by government for climate change adaptation, noting how governance, climate change adaptation, and scenario planning all fold together the motifs of openness and closedness. This paper engages with the emerging field of future geographies and critical interest in future orientations to highlight the way society's growing engagement on climate change adaptation exposes, critiques, replicates, and amplifies our existing orientations to the future and time and their politically contested and embedded character. It points to the way the motif of open futures can be both progressive and conservative, as political and economic interests seek to open up some futures while closing down others in the name of the ambivalent goals of adaptation and sustainable development.

Keywords: climate change, adaptation, scenario planning, governance, sustainable development

“It would seem that there are moments in which the future is future no more, but present—in other words, when the future acquires a presence and requires urgent action. We are living through such a moment today.”

Andersson (2012, page 1430)

The future is here

Anthropogenic climate change demands that we engage consciously with the future in order to both prepare for and shape it. But it is a future that seems to flicker on the horizon, closing and blowing open as the climate change storms gather force. In some lights, the direction, causation, and arrival of climate change loom large as a certainty on the horizon—the ‘latent future’ (Adam, 2005) created by our ongoing inaction and climate system inertia. Representing our failure to acknowledge environmental limits, this situation draws attention to the familiar ideal of arming ourselves with reliable information and shaping our decisions and policies to fit. In other lights, the meanings, manifestations, and implications of climate change swirl before us like a kaleidoscope. Large uncertainties stemming from ignorance and indeterminacy mean we cannot know exactly what lies ahead. Climate change from this angle dramatically cleaves open the future, leaving it dizzyingly wide, hazy, and uncertain. Here, its emergence and our ongoing responses to it speak to the failures of overly rationalistic thinking and demand a new deep appreciation of the subjectivity, plurality, and complexity of modern existence.

This introductory paper introduces a theme issue that arises from a research project in Victoria, Australia. The project was one of many funded by the Victorian Centre for Climate Change Adaptation Research (VCCCAR), a recently discontinued five-year experiment in coproduction of climate change adaptation knowledge. While the now-conservative state government is largely antagonistic to climate change, it recently released the *Victorian Climate Change Adaptation Plan*. One of the aims of this megaplan for adaptation, which draws on much VCCCAR research, is “to guide future adaptation planning” (Victorian Government, 2013, page 8). The emphasis on planning is characteristic of both current climate change adaptation efforts and government. Formal planning is a prime way that we bring an anticipated future into the present (Anderson and Adey, 2012). Which futures we bring into the present is something *scenario* planning tries to make us more reflexive about. The theme issue consists of four papers that together provide a nested analysis of the role of scenario planning by government for climate change adaptation. Described in more detail below, they discuss the contemporary governance situation (Head, 2014), the framing of adaptation in policy (Fünfgeld and McEvoy, 2014), the use of scenario planning for adaptation by government (Rickards et al, 2014), and the scenario planning process—or *scenarioing*, as the authors (Ison et al, 2014) call it. The remainder of this paper loosely follows this structure, discussing in turn governance, climate change adaptation, and scenario planning. In doing so, it provides an extended introduction to situate the contemporary future-making practices of scenario planning and adaptation in historical and social context, reflecting the fundamental questions about time and society that adaptation raises—and which academics are yet to engage seriously (Lockie, 2014). It highlights both the recurring tension between closedness and openness that climate change has brought so powerfully to the fore and the social roots of climate change adaptation, scenario planning, and government itself. More specifically, we seek to initiate discussion on the way society’s growing engagement on climate change adaptation exposes, critiques, replicates, and amplifies our existing orientations to the future—historically specific orientations embedded in broad agendas such as sustainable development which shape our perceptions of and actions in the present. We begin with a discussion of how the future has been conceived in the past in order to better understand the conceptions we are performing through climate change adaptation efforts.

Historicising the future

Facing uncertainty about the future and the limits of human knowledge is an ancient concern. Over history, how societies have operated and organised themselves reflects in large part how they have explained this condition to themselves (Reith, 2004). An explicit focus on

‘the future’ helped distinguish modernity from earlier temporalities in which it was bracketed off as a known teleological endpoint, a recurring divine pattern or random matter of fate. Fostering this future turn was the rise of merchant capitalists in the 17th century as trade-related concerns demanded an active engagement with uncertainty and future outcomes—as Reith describes, “the creation of profits depended on foresight and planning” (page 388)—which in turn led to a new vision of time as “a commodity to be used, saved or sold to create profits, rather than something that was simply doled out by the creator” (page 388). Underpinning this nascent foresight were advancements in calculation capacities, particularly within the new insurance industry. Such calculation—what Max Weber characterised as ‘rational enterprise’ (calculated risk taking)—came to symbolise capitalism (Appadurai, 2012). An orientation to the future thus emerged hand-in-hand with a positive orientation to risk. Giddens (1999, page 1) asserts that risk:

“only comes into wide usage in a society that is future-oriented—which sees the future precisely as a territory to be conquered or colonised. Risk presumes a society that actively tries to break away from its past—the prime characteristic indeed of modern industrial civilisation.”

Through this process, the future became a space of competition and appropriation as different visions competed for attention and creative effort (Reith, 2004): a process that is continuing today.

New calculative capacities, combined with a sense of limitless human potential, fuelled not only the rise of modern capitalism but also modern bureaucracy. Originally an Enlightenment ideal of rationalism, the bureaucratic government institutionalised a hierarchical worldview that celebrated the controllability of nature, the transcendence of environmental limits, and the human capacity to (one day) predict the future (Argyriades, 2010; Reith, 2004). As mercantile capitalism and colonial expansion began to leave their mark on the environment, the idea that industrialisation needed to be contained and carefully managed bolstered the purpose of the bureaucracy (Grove, 1990). In the 1970s, however, advances in cybernetics and complex adaptive systems science produced modelling and scenario-based visions of future worlds that raised questions about the rationality and desirability of the industrial progress model. The iconic scenario-based report—*Limits to Growth: A Report for the Club of Rome on the Predicament of Mankind* (Meadows et al, 1972)—proposed that growth was inescapably limited by the physical facts of existence and that voluntary ‘limits’ should be placed on capitalist ‘growth’ to avoid disastrously transgressing them (Meadowcroft, 2013). Many observers at the time found the report’s conclusions heretic and strongly derided it for its purported environmental determinism, crisis thinking, and idealism (Turner, 2008). Others, however, felt liberated by the reflexivity about modern progress it demonstrated, enabling economic growth to be recategorised from naturalised truth to a question of politics. For although the future imagined by bureaucracy and business at this time was open in the sense that it was about human civilisation becoming increasingly *unrestricted* by natural factors like climate, it was closed in the sense of being a single technology-centred trajectory (Torgerson, 2013).

The Future We Want (UN, 2012) report produced by the 2012 UN Conference on Sustainable Development (UNCSD) (Rio+20) illustrates that the vision of ongoing technology-driven progress is highly resilient. Its focus on ‘green economy’ contrasts to the early more conservative interpretations of sustainable development influenced by the *Limits to Growth* report and institutionalised by the 1985 Brundtland Commission. Widespread disappointment about *The Future We Want* plus growing interest in the idea of planetary boundaries (cf Rockström et al, 2009) is contributing to a revitalised interest in *Limits to Growth*. Recent analysis indicates the report was broadly prescient, with the world tracking

its ‘business-as-usual’ or ‘standard run’ scenario, “which results in collapse of the global system midway through the 21st century” (Turner, 2008, page 397).

Assisted by the rise of systems modelling, scientific understanding of the global environment has escalated since the mid-20th century as advanced technologies, international collaborations, and the professionalisation of the green sphere have contributed to the emergence of ‘impact science’ or environmental science, including that on climate change (McCright and Dunlap, 2010). While today impact science is still marginal relative to the more mainstream ‘technoscience’, it has been key in highlighting uncertainties, new certainties, and failures of anticipation associated with industrialisation, giving it the difficult role of modern-day prophet (Kool, 2013). At the same time, the relationship with technoscience has blurred as the latter has countered many of the environmental problems impact science identifies with apparent technical solutions (Ely et al, 2013), helping incorporate environmental degradation into capitalism as a new profit-making opportunity, in keeping with *The Future We Want* vision.

Partly driving the shift to market-based environmental solutions is frustration at the apparent failure of top-down institutional initiatives to tackle sustainability problems despite growing scientific evidence. In recognition of the need for alternatives, international bodies such as the UN and democratic governments are increasingly trying to include a diversity of voices in their decision-making processes. As Head (2014) discusses, a characteristic of wicked issues such as climate change adaptation (discussed below) is contestation over how to define them, especially given ongoing scientific uncertainties. Beyond a problem-solving role, more inclusive dialogue is encouraged by democratic ideals and a shift to a more distributed, networked governance model aimed at enhancing self-government by others (Head, 2007). Overall, many governments are undergoing what Argyriades (2010) refers to as ‘debureaucratisation’: the dramatic but messy “conversion of administrative systems from closed to open systems” in order to replace “centralised, hierarchical, control-oriented structures” and their “mechanistic models” (page 289) with ones more in tune with societal values and more relevant to contemporary conditions. Almost as fuzzy a term as ‘sustainability’ or ‘adaptation’, ‘debureaucratisation’ is an umbrella term that captures a range of convergent moves to open up government into a more responsive, innovative, adaptable entity.

Becoming adaptable

One commonly proposed way of dealing with the adaptation challenge is to make government organisations more like the private sector. Represented by the so-called new public management (NPM) paradigm, this has resulted in efforts to transform government into a leaner, less directive, more flexible entity (Diefenbach, 2009). As the framing of climate change adaptation issue illustrates (discussed below), this effort further illustrates the contemporary neoliberal celebration of being adaptable and responsive to economic if not environmental signals (Felli and Castree, 2012). But whereas the neoliberal ideal of good climate change adaptation and resilience aims to protect one’s existing goals and identity—as encapsulated in the phrase *The Future ‘We Want’* (quotation marks added)—the adaptation of government to the private sector NPM model has sought to deliberately transform the agenda and identity of government, encouraging it to simply foster the market (as the new green economy push into and by the UNCSD illustrates). The result is what Žižek (2011, page 353), following Lacan, calls governance as “power turned into administration, relieved of its radical responsibility.”

Relieving government of its overarching directive role allows individuals to be self-determining and ‘go with the flow’. This ‘neoliberal flow’ includes individuals experiencing life as it really is, testing and unleashing their potential in the marketplace, exemplifying the ideal of the unimpeded, natural, capitalist economy. Such exposure amplifies a sense that

both the economy and environment are becoming wilder and more unpredictable. For, in contrast to earlier assumptions about the knowability and controllability of the world, climatic extremes, the global financial crisis, pandemics, and terrorist attacks are now generating a sense of radical indeterminacy. In today's world, ongoing dreams of prediction butt up against a celebration of the 'future as surprise' (Anderson, 2010). This latter interpretation of reality resonates with the principles of complex adaptive systems: an area of science that now explicitly shapes modelling and futuring efforts across economic and environmental systems (eg, May et al, 2008). Through this 'complexity theory' lens, life is characterised as emergent from the molecular to global scales (Lansing, 2003) and is lived, Dillon and Lobo-Guerrero (2009, page 1) argue, "as the continuous emergency of its own emergence".

Some of the felt urgency arises from the accelerating pace of interactions. The 'space–time compression' (cf Harvey, 1989) of a globalised economy and continuous contact with media and information technology mean we feel as if we are immersed in a cloud of instantaneous interaction in which all we can see is the 'extended present' (Reith, 2004). Captured in Beck's world risk society idea, the speed and complexity of interactions blur cause and effect into one, creating an escalating potential for cascading catastrophic risks and a vision of a future characterised not just by complexity but by chaos. Combined with the 'time–space distantiation' (cf Giddens, 1990) of many modern causes and their effects, it is argued that we cannot even imagine the threats that will or could characterise the future as they have "*not yet even emerged*" (Massumi, 2007, page 7, italics in original). This is not just an epistemic or cognitive problem; it "is an ontological premise, the nature of the threat cannot be specified" (page 7). Although in some readings this potential for chaos and catastrophe seems to exert an inexorable pull on the present (eg, Aravamudan, 2013), to others it leaves the future radically open. Beck and Levy (2013, page 9) assert that we are now witnessing the birth of a whole new conception of time itself, a new imaginary based on "fragmented times and the absence of a dominant, let alone hegemonic, conception of temporality and attendant views of futurity." There is no formal future, no official time line, only a churning array of competing images.

What is not surprising is that 'adaptability' is being adopted as a new motif for life. Argyriades (2010, page 292) concludes about modern government that the new:

"value accorded to improvisation—'creative problem solving', as it is often called—bespeaks the growing feeling that adaptation to new social conditions is a *sine qua non* of survival."

In other words, adaptability is not simply a norm that government needs to encourage in citizens so that they can contain the impacts of climate change and get on with business as usual; adaptability now *characterises* business as usual. A similar statement could be made about the related concept of resilience, which critics note is being applied to a wide range of contexts with a wide range of intentions (eg, McEvoy et al, 2013). Such is the pervasive uptake of resilience—given its own inherent adaptability to different contexts, including neoliberalism (Evans and Reid, 2013)—that Stumpp (2013) suggests it has now replaced sustainability as a core guiding concept in contemporary society, despite significant tensions between the individualistic subjectivity and adaptation rationale of dominant interpretations of resilience and the collective subjectivity and precaution rationale of sustainability (at least in its original formulation). The extent to which the enthusiastic uptake of the notions of adaptability and resilience reflect appropriate responses to novel environmental conditions, or their integration into notions of good entrepreneurial neoliberal subjects, is open to debate.

Framing adaptation

How, then, is the task of adapting to climate change conceived in this setting—and why is there a growing turn to using scenario planning to inform it? The history of climate change adaptation discourse, and much of the contestation and confusion that characterise the new

field, reflects the swirling interaction of many of the influences mentioned above. Like sustainability, adaptation is an ambiguous concept, framed strategically if unconsciously by different actors. Reflecting contestation among frames, one meta-frame of adaptation is that it is a “wicked problem par excellence” (Termeer et al, 2013, page 27). The idea of ‘wicked problems’ was introduced by Rittel and Webber (1973) [or, more precisely, by Churchman (1967) about a lecture by Rittel] as first-wave environmentalism and related antinuclear and peace movements were becoming established. At the time, the authors asserted, American’s long-standing faith in Progress and the Enlightenment was eroding and discordant beliefs were emerging among the public that the future was both infinitely malleable and perfectible and, more pessimistically, “that there will be no future history” (page 158). They asserted that this ambivalence about the future was fuelling ambivalence about the “professionally designed governmental programs” (page 155) that the public were increasingly railing against. Drawing on the complexity thinking that was becoming popular at the time—and reflecting the growing turn at the time towards more interpretivist, behaviouralist perspectives on decision making (eg, Simon, 1972)—the authors introduced ten reasons planning problems are ‘wicked’, beginning with the fact that such problems have no single, definitive formulation [see Head (2014) for further discussion].

As illustrated by Fünfgeld and McEvoy (2014), framing clashes are an increasingly well-recognised problem for climate change adaptation efforts, with the issue becoming an academic subfield in its own right, in keeping with widespread interest in how climate change is framed. While the focus of the latter literature is how to (best) communicate climate change, the notion of framing more generally refers to the often-implicit choices that are made about issues in terms of, for example, what and who is relevant; how risks, causes, and effects are distributed; and where problems and solutions are seen to lie, leading to ‘interpretive packages’ that present an issue a certain way and privilege some responses over others (Gasper et al, 2013). From a systems thinking point of view, a ‘problem’ is always an abstraction of a far more ‘messy’ real situation [Ison (2010, page 126) on Ackoff], and wicked problems such as adaptation are often worsened by unreflexive and overly rigid problem framing. As Head (2014) discusses, this makes managing wicked problems and adaptation in particular exceedingly difficult, particularly within the confines of government bureaucracies.

For various reasons, climate change adaptation is often framed in ways that reflect pre-existing perspectives. First, its higher order framing as ideally and simply neutralising climate change impacts serves to preserve current ways of life. Second, the spatial, temporal, and social variability of climate change experiences encourages a sense that adaptation is a strongly localised, private good issue. Third, the adaptation of climate change adaptation to existing priorities is encouraged by the idea that adaptation is applicable to all and so, like sustainability, needs to be ‘mainstreamed’ across present-day decision-making contexts (eg, Lasco et al, 2009). While this is true and important in a sense (Heazle et al, 2013), it runs the risk that “the adaptation agenda is open to abuse” (Brouwer et al, 2013, page 134) by those wanting to legitimate existing approaches. While some existing approaches may be deeply valuable, as illustrated by sustainable development, others may be actively unhelpful. Along with Fünfgeld and McEvoy (2014), the growing number of governmentality critiques of adaptation (eg, Grove, 2014) suggest that not only is climate change adaptation being conceived and implemented through the adaptation of ideas from other contexts—namely, vulnerability, resilience, and risk management—but that also through the promotion of these ideas under the adaptation label these ideas are subsequently being combined with certain stances to the future and governance in order to serve different purposes including, in most cases, the perpetuation of economic growth and neoliberalism, of the sort widely agreed to underline climate change itself.

Adaptation is variously framed to include or exclude other issues such as climate change mitigation, water security, habitat loss, poverty, or justice. A growing number of scholars (eg, Eriksen and Brown, 2011) are calling for adaptation initiatives to incorporate such challenges, pushing beyond climate impact-centrism, or what Hulme (2011) calls “climate reductionism”. These calls for a more holistic approach to adaptation align with the so-called ‘contextual vulnerability’ approach (rather than ‘climate science approach’) to understanding adaptation needs (see, for example, O’Brien et al, 2007), which highlights some groups’ ongoing ‘adaptation deficits’ in adapting well to present-day climatic stressors (Burton, 2009). A holistic approach to adaptation also, somewhat differently, aligns with a reading of adaptation as ideally a route to societal transformation, reflecting a first-wave environmentalist sense of climate change as the epitome of industrialism undermining species survival (Rickards and Howden, 2012) and more recent questions about the underexamined fundamental contradictions inherent to the win–win notion of ‘sustainable development’ (Bulkeley et al, 2013).

As in earlier sustainability discourse, initial efforts to fix the definition of adaptation are giving way to a pluralist, subjectivist approach that presents adaptation as a process and intention more than an outcome. Nevertheless, beneath this pluralism is an implicit but discernible sense of what good adaptation behaviour (if not outcomes) looks like. In particular, priority is placed on *anticipatory* or planned adaptation over ‘mere’ animalistic reactive adaptation, whether the end goal is for people to prepare for inevitable catastrophe (the ‘securitisation’ framing), become responsible risk managers (the ‘risk management framing’), or build their resilience and capacity to profit from the new turbulence (one ‘resilience’ framing) (eg, McEvoy et al, 2013). To date, the promotion of anticipatory adaptation has, like the climate change education project in general, focused on simply trying to get people to break out of their near-term focus on the hectic ‘extended present’ and to think about the future. In advanced liberal governance, being anticipatory is a broad ideal evident across all areas of government policy (Anderson, 2010). From sustainability to financial management, health to education, anticipation is generally presented as part and parcel of being a valid, modern political subject (eg, Javidan, 2007).

Despite the perceived desirability of adopting an anticipatory outlook, in climate change adaptation complications soon set in when anticipation is applied. Over the longer term, the future under climate change can be anticipated to be one shaped by relatively invariable and irreversible global warming. Thus, anticipation in this sense demands acceptance and understanding of projected climate change and its broad impacts [acknowledging that even among these certainties lurk residual uncertainties about, for example, the pace and rhythm of change (Lockie, 2014)]. Over the medium term, however, the future is coloured by unprecedented levels of uncertainty as the planet enters an unfamiliar climatic space and our predictive power breaks down below the aggregate global level. Combined with deep uncertainty about society’s responses, anticipation at this level is about preparing to be surprised (Anderson, 2010). It is about preparing to be reactive, unsettling the simple opposition between anticipatory and reactive adaptation, and strengthening the neoliberal and democratic ideals of local-led adaptability and resilience. Oels (2013, page 17) argues that internationally adaptation efforts to date are a mix of a “traditional risk management” approach based on climate science projections (ie, based on certainties) and “risk management through contingency” (ie, based on uncertainties). As illustrated by the project discussed by Fünfgeld and McEvoy (2014), variants on these two broad types exist.

Also at work are knowledge politics. The complex mix of certainties and uncertainties that characterise climate change have helped to fuel a broader reaction against science, as Beck (1994) asserts in his reflexive modernisation thesis. Directed first at technoscience and

its use by military and big business, suspicion has now extended to impact science, especially when, as in the case of climate change research, it utilises similar computer-intensive, global-scale modelling practices (eg, Jasanoff, 2007). Reactions against the high-level institutional structure and methodologies of climate change science have contributed to reactions against its actual messages, which some have rejected as overconfident dictatorial pronouncements about overdetermined futures. What this politicisation of climate change science means is that, over and above a preference for locally specific and creative approaches to climate change adaptation, the imperative for adaptation—that is, looming futures and the unfolding present of climate change—has to be discussed in a way that is deliberately open about scientific uncertainties and explicitly humble about certainties. As evident in the literature about postnormal science—which is based on “assumptions of unpredictability, incomplete control, and plurality of legitimate perspectives” (Funtowicz and Ravetz, 1993, page 739)—it is a small step from more open acknowledgment of deep uncertainties within science to an epistemologically plural approach to policy making (Frame, 2008). Recognition of a wide range of knowledges as legitimate both increases the range of information to hand and helps demonstrate a participatory deliberative ethos of the sort encouraged by the debureaucratisation of government, mentioned above (Cash et al, 2003), although decentralised government is also favoured as a way of increasing policy makers’ engagement with *scientific* knowledge (Lalor and Hickey, 2014). Accommodation of people’s different knowledges and worldviews is an explicit characteristic of so-called ‘clumsy solutions’ to wicked problems: dynamic satisficing approaches that achieve loose agreement and incremental change (Frame, 2008). In the spirit of Lindblom’s (1959) argument that policy making is a case of “muddling through” (page 79), clumsy solutions replace the dominant image of decision making as linear, rational, and an event ‘authored’ by an identifiable decision maker, with an image of decision making as a distributed, relational, incomplete process in which different senses of past, present, and future are folded in complex ways (Anderson and Adey, 2012). How this relativistic stance and muddling approach intersects with the ‘known knowns’ and urgency of climate change is itself uncertain.

Studying futures

To help people know or imagine alternative futures is the self-designated role of futurists. The distinction between ‘know’ and ‘imagine’ reflects one of a number of long-standing divisions in the would-be profession. While terms vary, ‘futurology’ generally refers to that side of the field focused on calculative anticipatory practices, and ‘futures studies’ refers to that side focused on imaginative (and enactive) anticipatory practices. The two broad approaches reflect the geopolitical history of their development, with futurology emerging out of Cold War competition between the US and Russia to anticipate each others’ nuclear strategy and future studies emerging later in reaction to the hubris and dangers some perceived in the new-fangled computer modelling of the former. These perceived dangers were not only of an intellectual kind, overcommitting adherents to a single fallible picture of the future, but also of a moral and political kind. Strongly influenced by the horrors of World War II and a belief not that the future *would* necessarily differ from the past but that it *must*, emerging European futurists advocated a focus on preferred futures.

The “struggle ... over representations of the future of the world” (Andersson, 2012, page 1413) was also waged along two further lines of difference. First, images of the future became part of the ideological tussle between the East and West during the Cold War. All ostensibly based on forecasts, strongly political images of ideal future societies were produced by both sides, with the West rushing to articulate an American liberalism map of progress as detailed as that of Marxism but based on free markets and democracy (Connelly et al, 2012). Second, related competition in future worlds arose in the 1970s (eg, with the

Limits to Growth report) as advances in forecasting supported the development of earth system science modelling and a ‘planetary’ perspective, leading to a competition between the dominant view of Nature as an ordered, stable, and controllable entity, and a newer sense of Nature as interconnected, complex, and limited—and requiring more precautionary, future-oriented management (Andersson, 2012). What this history suggests is that futuring work does not just reveal different worldviews, but actively helps to generate and support them, contributing among other things to the rise of the sustainable development paradigm in its various guises. Today, it is striking that all global environmental assessments (GEAs) (van Vuuren et al, 2012), and many global scenario exercises more broadly (eg, Wilkinson and Kupers, 2013), feature a ‘market-centric’ future world and an ‘ecocentric’ future world. As discussed below, the desirability of and emphasis on either varies between settings.

Making futures present

The keystone methodology of futures studies and the focus of this theme issue is scenario planning. Scenarios “help to render the Earth as a co-evolving human-ecological system both thinkable and governable” (Lockie, 2014, page 101), shaping as well as shaped by our ideas about and responses to climate change. Scenario techniques adjust a set of variables to refract multiple futures out from the present, generally presenting a suite of two to five possible narratives or images that together encapsulate a range of trajectories and present contrasting depictions of possible future worlds. In doing so, they simultaneously bound and release our future imaginary, organising and categorising “while affirming the openness of the future” (Anderson, 2010, page 785). One of various computer-based and dialogue-based tools that Rittel and others helped to develop to assist managers to work with wicked problems, scenario planning is increasingly being applied in the public sector to encourage a long-term view and manage associated uncertainties.

Scenarios are themselves defined in various, contested ways, involving a wide range of methodologies and philosophies. Somewhat reflecting the spatiality of the broader schools of futuring mentioned above, scenario approaches range from near-predictions (the ‘American approach’) to explicitly normative stories of the future (the ‘French approach’), with the characteristic exploratory approach (the ‘UK approach’) in between. Mulvihill and Kramkowski (2010) assert that the “essential criteria of powerful scenario development” are “analysis, imagination and engagement” (page 2462). These three criteria are articulated in the well-known “Great transitions” report of the Global Scenarios Group about global futures, initiated in 1995 following the Rio Earth Summit (Raskin et al, 2002). Incorporating the economy–environment tension mentioned above, it explores three pairs of scenarios, named: conventional worlds (market forces, policy reform); great transition (ecocommunalism, new sustainability paradigm); and barbarisation (breakdown, fortress world, presented as an outcome of a market forces world). As the name of the project suggests, it was explicit about favouring the most ecocentric alternatives, the great transition worlds. Beyond this explicit normative element, the scenario project served as a political and intellectual intervention by simply illustrating that the conventional world was not inevitable, helping to raise “questions that otherwise might not be asked” (Mulvihill and Kramkowski, 2010, page 2461). Nevertheless, twenty years later, it appears that its vision or warnings have not been heeded, in keeping with reported difficulty in applying scenario insights to present-day decision making. Instead, the ‘green economy’ turn of the UNCSD suggests that reality most closely reflects the market forces scenario, with even the term ‘transition’ now generally used to refer to “futures that reconfigure, but do not transform, assumed neoliberal futures” (Brown et al, 2012, page 1607). This is despite the fact that, in the great transitions modelling, the market forces scenario leads to barbarisation.

The three criteria that Mulvihill and Kramkowski (2010) and Raskin et al (2002) emphasise as key to strong scenarios—analysis, imagination, and engagement—map closely to the ‘anticipatory practices’ that Anderson (2010) argues now characterise much futuring labour: calculating, imagining, and enacting. These practices represent not just different forms of knowledge but different learning processes and researcher–practitioner relations. Associated with the calculative approach to the future that emerged in the 17th century (mentioned above), calculating in scenario processes refers to empirical and modelling work, gathering together a wide range of information—including that about ‘weak signals’—to inform understanding of the past and present and imagination of ‘plausible futures’. In climate change work, this process is dominated strongly by the authoritative climate scenarios produced by the Intergovernmental Panel on Climate Change (IPCC) and related institutions that act as a ‘gateway’ to many climate change assessments and decisions (Mahony and Hulme, 2012). For although futures studies has had little input to the IPCC (Nordlund, 2008), the IPCC has had a powerful input to futuring around climate change. It has not only served as an ‘ambassador’ for scenario processes, introducing them to many who would otherwise not know about them, but it has also implicitly promoted its particular approach to scenarioing which uses scenarios as ‘predictive judgments’ about climate futures [Anderson (2008, page 785) citing Hulme and Dessai (2008a; 2008b)], illustrating the way some variants of scenario planning are contiguous with prediction (Rickards, 2013). While climate change scenarios are not predictive per se, or even usually probabilistic, they do emphasise the way climate change is inexorably shaping our long-term future. To do this, they draw on complicated and careful calculations commensurate with the complexity of the topic, the powerful influence of the resultant products, and the critical scrutiny they attract. This allows them to present the futures they “evoke without predicting” (Anderson, 2010, page 785) as an authoritative (not ‘imaginative’) form of knowledge, albeit one more explicitly uncertain than many decision makers or scientists prefer.

Climate change scenarios are based in part on social and economic scenarios, which are “among the most controversial elements of the IPCC process” (Edwards, 2010, page 421). Edwards asserts that the resultant web of models and scenarios creates a “shimmering” image of a future characterised by “proliferation within convergence” (page 436). Recent analysis suggests that in practice there may be more convergence than proliferation. A limited number of ‘scenario families’ (of the sort presented by the Global Scenario Group mentioned above) are repeatedly used in different GEAs, developed by a relatively small community of physical scientists with little sophisticated social science input (Garb et al, 2008; van Vuuren et al, 2012). In IPCC processes an exceptionally high level of user (policy-maker) involvement has been used to increase their legitimacy with this group. But because “government approval can also constrain the scenarios” (van Vuuren et al, 2012, page 888) (that is, constrain which possibilities are considered), the IPCC has turned the task over to the (more independent) modelling community. The IPCC has also tried to enhance the credibility of their scenarios by deliberately including recognised scenario experts (including some from Shell) and labelling their scenarios with numbers rather than the usual descriptive names. Although the latter may have helped avoid controversy, it has also objectified the scenarios and reduced discussion about the choices involved. Finally, most scenarios used in GEAs are ‘surprise-free’ in that they eschew extreme futures and emphasise continuities between the present and future in order to increase their perceived relevance to decision makers and allow scientists to adhere “to the scientific norms of restraint, objectivity, skepticism, rationality, dispassion, and moderation” (Brysse et al, 2013, page 327). The resultant sense of an ‘extended present’ (Reith, 2004) is strongest in scenario exercises that use a ‘policy–baseline’ approach (mapping out variants of a presumed baseline of policy options) rather than a more open exploratory approach. This policy approach as characterised

all GEAs since 2005 (van Vuuren et al, 2012). Overall, the in-built conservatism of IPCC climate change scenarios may partially explain why existing emission trends and climate change impacts are, as in keeping with the Limits to Growth report mentioned above, ahead of the ‘expected’ curve—that is, the middle-of-the-range IPCC climate change scenarios.

Focusing on the ‘most likely’ or ‘middle-of-the-road’ scenarios reduces scenario processes to an approximation of prediction, especially if quantitative probabilities are attached. Yet this is precisely what the increasingly popular, decision-centred risk management approach to climate change adaptation tends to do (Dessai et al, 2005). How to respond to pressure from ‘clients’ for probabilistic information is a contentious topic among climate scientists (Turnpenny, 2012). For some, low levels of scientific agreement about what numbers to attach makes the practice scientifically unjustifiable, posing the serious risk of underplaying uncertainty about precise futures. Despite yearning for predictions, the decision-centred risk management approach to adaptation aligns with scenario practice in other ways, reflecting the fact that scenario planning is coloured by its predominantly risk-based approach in the private sector. This includes displacing the focus on climate and using scenarios to develop elaborate, more-than-climate, more-than-science stories about the future that better reflect decision makers’ concerns (Foran and Lebel, 2012).

We come, then, to the second of Anderson’s anticipatory practices, for which he presents scenarios as an exemplar: ‘imagining’ the future. Here, the goal is to step beyond the data and envisage the future in different guises, generating and sharing stories about how events may unfold. Yusoff and Gabrys (2011, page 529) suggest that:

“Imagination can be thought of as a way of seeing, or rather a constellation of a way of thinking and sensing that become typified or consolidated in images and social actions, what might be thought of as a collective social mapping.”

They note that futuring, and scenario planning in particular, is an increasingly prominent way of folding imagination into climate change decision making in a relatively explicit fashion. Often conducted through processes of storytelling (Foran and Lebel, 2012), this is especially the case if such processes are participatory rather than conducted by distant others. Imagining is informed and enriched by dialogue, reflection, and local and professional knowledge. One of the key perceived advantages of scenario planning is not only that it helps to ‘surface’ and question participants’ existing beliefs, attitudes, and worldviews, but also that it is open to the unpredictable insights and ideas that participants bring.

Participation is *especially* key to the third anticipatory practice Anderson suggests: enacting. Here, certain futures are not just imagined, but aspects of them are ‘played out’ in the form of simulations or games. Reflecting the early focus of scenario planning on helping organisations prepare for (nuclear) crises through ‘war games’, this focus on scenario planning as practice and performance often positions it within contingency planning, reflecting what could be called the ‘deep risk’ or resilience attitude discussed above. It is no coincidence that following 9/11 there was “an abrupt and sustained surge” (Rigby and Bilodeau, 2007, pages 21–22) in scenario and contingency planning, taking such tools from some of the most popular corporate management tools. This interest in scenario planning likely jumped further following the global financial crisis. McCormack and Schwanen (2011, page 2812) present scenarios in this light—as an example of:

“techniques for generating ‘artificial’ situations in which decisions can be rehearsed in advance of their actual making.”

One of the reasons scenario planning is proving popular in climate change adaptation work is that not only can it be performed in a way that fits the predominant risk management paradigm (discussed above), but that also its interest in unexpected disturbances, incubating disasters, and tipping points aligns it with resilience science (Mulvihill and Kramkowski, 2010) and thus with the resilience framing of adaptation as well. In performance mode the main outcome of

scenario processes is cognitive and affective learning by those involved, rather than textual products that represent envisaged futures for potential subsequent consideration by others, which may or may not lead to the scenario developers' desired effects. Across all exploratory and normative forms of scenarioing, a frequently perceived benefit is the generation of a forum for dialogue, reflection, and social learning, as Ison et al (2014) discuss. Seen in this light, scenario processes can provide a new deliberative space of the sort associated with participatory governance and new modes of public engagement (Macnaghten and Chilvers, 2014).

Despite the many celebrated benefits of scenario planning, there are doubts about the extent to which it actually shapes subsequent decision making, especially in the public sector (Volkery and Ribeiro, 2009). In part, this reflects the assumption that, contra Lindblom, scenario projects will inform decision making in an immediate, significant, and attributable manner, despite the fact that, as social-science-type knowledge, often scenario projects designed to be 'counterintuitive' (Mulvihill and Kramkowski, 2010) are more likely to have a diffuse, pedagogical, 'enlightenment' effect (Owens et al, 2006). If we accept that scenario outputs should adapt to the existing decision-making context and 'inform' it with 'evidence', difficulties quickly become apparent. To begin with, the distant time horizon of scenarios contrasts to the near-term focus of most decision makers, leading Lockie (2014) to assert that climate change scenarios implicitly bias decision making against adaptation relative to mitigation. Scenarios are also complex and ambiguous, especially being speculative and political. To observers, they can appear as black boxes, difficult to assess or understand. Combined with the unfamiliarity of thinking hard about the distant future, scenarios can be an uncomfortable and unhelpful form of knowledge, especially for those under pressure to make definitive decisions. As McCormack and Schwanen (2011, page 2809) discuss, decision making is not about only "opening up of the world" but also the "cutting off and foregoing of possible futures through the process of actualisation." Deciding on such cuts can be challenging when possibilities and conversation have been opened wide through scenario processes. The problem is, as Rickards et al (2014) discuss, that a poor fit between scenarios and existing organisational contexts can mean that their content is ignored or inapplicable, allowing decision makers to delay decisions or deny the validity or relevance of unwelcome information or alternatives. By excluding most futures as too utopian and dystopian (Hjerpe and Linnér, 2009), the recent turn to using only 'policy-relevant' scenarios in the IPCC and other GEAs mentioned above, and the recent promotion of a close-to-business-as-usual vision for sustainable development at the Rio+20 conference, arguably reflect such conservatism.

Thinking futures

With notable exceptions, social scientists and humanities scholars are among those who have not yet engaged seriously with the way climate change and other Anthropocene processes are bounding and opening up the future. Futuring approaches and practices would be much strengthened by their input at all levels (Garb et al, 2008). This includes paying close attention to the assumptions, precommitments, and contributing factors that are shaping not only our futures but also our approaches to imagining, understanding, and representing them. Just like the wicked problems such as climate change adaptation to which futuring is being applied, deliberately and collectively anticipating the future is a deeply historical and cultural process, drawing in our shifting ideas about time and certainty, humans and our relationship to our environment, and the desirability and inevitability of existing aspects of the world, among other things. Yusoff and Gabrys (2011, page 518) call for work that reconsiders "the political and temporal logics that underpin current scenario trajectories, and examine the descriptive crafts that produce them as spaces for the imagination." Such work will reveal scenario processes—and sustainable development tools in general (Jordan, 2008)—as

noninnocent, historically specific, and performative framing acts. Churchman warned back in 1967 (page B-142) that trying to “tame a part of a wicked problem, but not the whole, is morally wrong”, at least if one does not admit the partiality of one’s attempt. All “arts and technologies of imagining the actionable future” (de Goede and Randalls, 2009, page 860), such as futuring practices and climate change adaptation, help to generate specific futures, folding particular futures into the present as the present and past are folded into them. Given society’s difficulty to date in imagining, let alone creating, alternative trajectories for society, critical analysis of how we imagine the space of the future, why, and to what effect is badly needed. The aim of this theme issue is to take a step in this direction.

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