Virtual City Experimentation: A Critical Role for Design Visioning

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Virtual City Experimentation: A Critical Role for Design Visioning

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VIRTUAL EXPERIMENTATION AND THE TRANSFORMATION OF CITIES

In this book, Sengers et al. (2016) define transition experiments as '*an inclusive, practice-based and challenge-led initiative designed to promote system innovation through social learning under conditions of deep uncertainty and ambiguity'*. Here we introduce the idea of *virtual city experimentation*: a design approach to catalyse action in the context of rapidly emerging disruptive challenges to the fabric and life of cities. In the meaning we give to the term, the concept of *virtual* experimentation owes little to the contemporary association of 'virtual' with 'digital', or 'on-line'. Independent of any technology used in the process, *virtual* here speaks about evoking the critical human ability to conceptualise alternative realities, to imagine and to explore *in the mind* other sets of relationships (social, physical, technological) than those currently evident in the lived-in world.

Any realistic assessment of the multiple challenges of climate change suggests that human society is facing a period of revolutionary transformation, as significant as any in history. Compared to past revolutionary shifts, such as the first industrial revolution that lasted 80-100 years (Landes 1972), the response to anthropogenic climate change has to be rapid as well as fundamental, involving the transformation of technologies as well as lifestyles and social practices. If this revolutionary period happens without major social dislocation and contestation it will be because of creative innovation, an acceptance of uncertainty and ambiguity as a condition of knowledge, and an engagement with the idea and value of experimentation as a social, cultural and economic objective. Here we explore the possibilities of *virtual* experimentation as one answer to the looming societal question: *how can we stimulate enough experimentation, rapidly enough, to deal with the pace as well as the scale of change*?

The ability to envisage something new and to 'test' its possibilities before bringing it into being, might well define what it is to be human[i]; it certainly defines the process of design and the skills of designers. The projects explored in this chapter developed from design-based research and education programs; virtual city experimentation builds on one essential feature of all design activity – the visioning of new potentialities and concepts. Two programs of design activity at the University of Melbourne within its Victorian Eco-innovation Lab (VEIL) have explored and refined a methodology for virtual experimentation involving design visioning aimed at stimulating rapid innovation. There is a six year long program known as Eco-Acupuncture (EcoA) and a four year national city program known as 'Visions and Pathways 2040' (VP2040). Both programs bring together environmental researchers, academics, masters students and professional designers with the aim of accelerating innovation in response to the challenges of

climate change. The focus is on urban life and the city, reflecting a growing consensus that this is probably the critical context in which the social, cultural and technological transformation of a 'post-carbon' economy will be negotiated.

CLIMATE, CITIES AND THE NEED FOR RAPID TRANSFORMATION

We are almost halfway through the period referred to as 'the critical decade' (Hughes and Steffen, 2013), being the time in which our decisions and actions on climate change will determine the success or failure of a post-carbonaceous transition to avoid severe implications for global society. This is not just a technological issue (though that is the way that it is often cast) any more than it is solely a social, economic or governance challenge; addressing climate change requires fundamentally different systems, structures and practices in all those areas combined. The response to climate change will also have to embrace both mitigation and adaptation as a simultaneous objective; the impact of the atmospheric carbon and heat already in the global system means that the climate is changing and will continue to do so for a long time regardless of the pace of de-carbonisation.

At the strategic level it is increasingly recognised that the focus for action in this decade will be *cities.* More than half the world's population now reside in cities and the contribution to global greenhouse gas production from cities is estimated at 75%*,* even though they occupy only around 2% of the global land area (Satterthwaite and Dodman 2009; UNEP 2011; Hajer and Dassen 2015). Nearly half of the world's cities are considered to suffer from the direct effects of changing climate (UNEP 2011). The critical challenge for cities in this period of climate transformation is that they are complex adaptive systems with significant embedded dependencies built-in over the years of their construction.

It is useful to think of the post-carbonaceous transformation of the city as a process of 'dis-embedding' all of its energy underpinnings: decoupling resource and energy consumption from economic development and, at the same time, switching to non-carbonaceous energy sources. That is challenging enough, but the transformation challenge for cities does not stop at their energy system; the infrastructure and morphology of any city has been shaped (directly and indirectly) by its prevailing climatic conditions. There is mounting evidence that changes in climate patterns and extreme weather events can introduce new vulnerabilities for existing city infrastructure (UNEP 2011; Stone 2012). As climate patterns move beyond their historical envelope and as energy production and consumption is transformed, the *infrastructures of provision* for cities – the systems on which the life of the city depends (e.g. energy, water, food, transport, shelter, waste, products and services and information) – will have to change.

Historical relationships between the city and nature are also under pressure; cities have impacts well beyond their borders, shaping local, regional and continental production systems and transforming landscapes, natural ecosystems and even weather (Marcus and Colding 2011; Stone 2012). Some of those effects stem from what is termed the 'heat island effect' created by the absorption and re-radiation of heat of the sun from the

dark surfaces of the city; this city-heat interacts with rising summer temperatures and heat-waves, placing additional pressure on infrastructure (Stone 2012). There is increasing rejection of the conception of the city as a 'refuge from nature' (Kareiva and Marvier 2007; Grimm et al. 2008) acknowledging both the bio-physical dependence of the city on natural eco-system services and psycho-social dimensions of human interaction with nature. Approaches to the transformation of cities include some that start from the core idea of dissolving the boundary between city and country[ii] (Beatley 2011; Beatley and Newman 2013).

Importantly, the interest in cities and their place in action on climate change extends beyond their contribution to the global problem and their vulnerability. When it comes to *agency* – the interest, willingness and ability to make changes – there are critical characteristics of cities that appear to offer hope for transformation. Cities (and networks of cities) are active in adopting reduction targets and investing in programs to reach them (McCormick et al. 2013; Kautto and Ryan 2015). The contribution of cities to national economies in most nations is very significant; they can be instrumental in generating the political will and the innovation and creativity necessary for the transition to a post-carbon economy (Bettencourt, et al. 2007; Glaeser 2011; Bettencourt and West 2011; Katz and Bradley 2013). The (bio)physical challenges to cities have to be viewed in the light of the fundamental *cultural* role of the city; cities are a cultural invention, they result from human social and cultural needs – for association, belonging and exchange, but also for the display and structuring of relationships of power. As cities develop, these social and cultural relationships become intermingled with the layering of the physical form of the city, reproducing systems of meaning that underpin institutional and individual practices and ideas of nature and the social order (Ryan 1985; 2013b; Hajer 1995; Harvey 2012; Hajer and Dassen 2015). Given that the transformation required for a sustainable future will involve significant changes in patterns of consumption for urban citizens, understanding the ways in which existing patterns of consumption are embedded and reproduced in the urban context will be critical, (particularly the interplay between structurally determined consumption (such as car dependency, or heating and cooling of poorly insulated dwellings) and socially, culturally or emotionally based consumption learnt as part of life in an urban community).

DIMENSIONS OF TRANSFORMATION AND THE VALUE OF EXPERIMENTATION

The tight and embedded interconnections between the critical systems of provision of the city and patterns of living (including consumption) means that trying to re-engineer the city one sub-system at a time is bound to fail (because new, often unpredicted, problems are likely to arise in another sub-system). Ultimately, the transformation of cities requires a (rapid) transition from one *set* of socio-cultural-technological-physical systems to another set. The embedded (inter)relationships of these systems suggests that transitioning to a resilient non-carbonaceous city involves a *whole-system re-conceptualisation* – a creative re-imagining of the future city (Ryan 2013a). This is in every sense of the word, a *design challenge* – a process that can be considered to have three components. First, envisaging new systems that could support a thriving, culturally satisfying and productive, urban future, supported by renewable energy. Second,

selecting systems from the above that could increase social and physical resilience even as the climate changes. Third, negotiating processes of transition towards those future systems with relevant citizens and other stakeholders[iii]. Finally, it has to be expected that no process of creative design, engagement and modelling of future possibilities will be able to achieve more than to suggest plausible new possibilities that *could work*. Given the complexities of socio-cultural-technical-(bio)physical interactions in urban life and the urgency for change-making, potentially the only real hope for successful transformation will emerge from *widespread experimentation* – testing plausible transformed futures *in the real, messy, living world.*

The approach of virtual experimentation, using design research, visioning and engagement, has evolved in response to all the challenges of transforming today's cities. Both projects described in this chapter - Eco-Acupuncture and Visions and Pathways 2040 - take a design approach to research and engagement focused on envisioning twenty-five year non-business-as-usual futures for urban neighbourhoods or whole cities. On the basis of that work, they explore policy and design interventions that re-orient the trajectories of current development towards those futures. Great emphasis is placed on the visualisation of possible futures to build support for action necessary to realise them; 'action' encompasses policy, investment in new research innovation and built environments, as well as on-the-ground experimentation (often referred to as living laboratories; see: Evans and Karvonen 2014). Through the experience of six or more years of this work, it has become clear that the core of the process rests on the interrogation and interpretation of *visualised futures* as the basis for *generating a wide-ranging dialogue with local citizens*. It is this that we characterise as *virtual city experimentation*.

The methodology of the two projects builds on a field of practice that addresses the negotiation of complex technical and social change often collectively referred to as 'back-casting' – a process that begins with generation of desirable futures and then 'casting' back from those futures to define trajectories of change (Robinson 1988; Dreborg 1996; Quist and Vergragt 2000; 2006; Vergragt and Quist 2011). Such work depends on generating sufficient community 'ownership' of the envisaged futures and participatory visioning has become increasingly accepted as a way to develop such support (Quist and Vergragt 2006; McCormick et al. 2013; Ryan 2013b). Participatory visioning is closely related to what is often called 'participatory design', where designers work with clients (often the community) to co-design outcomes. Whilst some interpretations of that process present the designer as a mere facilitator or translator of the 'voice' of the participants, there are other interpretations of the designers' role as more active; the latter is the stance taken in VEIL projects. Manzini (2013), in a critique of the 'passive' approach to participatory design (which he labels 'post-it-note design'), argues for a more active role for designers as 'triggers', to create new conversations and new scenarios of possibilities. There is knowledge and skills that designers can bring to such a process with cultivated openness and dialogic capacity, involving the use of images, prototypes, mock-ups, games, and so on.

In EcoA and VP2040 the role of designers is tuned to triggering new conversations, to widening the territory to be explored and to interpreting multi-disciplinary research (on impacts of climate change, technologies, processes for mitigation and adaptation, and so on) (Gaziulusoy and Ryan, 2015). Through this process, the participants' perceptions of 'desirability' and 'plausibility' can be made more transparent, either reaching towards consensual visions or articulating other valid ones. Designers work to visualise 'in-the-mind' reflections on new potentialities, breaking from 'realistic' expectations that assume the continuation of past ('business-as-usual') trajectories. Visualised concepts and images of alternative urban systems are used in an iterative way to generate new conversations about different desirable futures, with feedback from those conversations used to refine propositions. Exhibitions of visualised futures and workshop processes are structured to bring an ever-widening cohort of citizens to review and reflect on alternative futures and pathways. What transpires in that process is virtual experimentation. What has been learnt over time is that the best form of visualisations to engage that in-the-mind interrogation are those that have been defined as *glimpses*: evocations of possible future states that are sufficiently 'open' that they encourage interpretation and translation for the context of the viewer to 'experiment with', rather than a highly defined futures that could be interpreted as a blueprint for what *will* unfold (Moy and Ryan 2011).

CASE STUDIES

The Eco-Acupuncture (EcoA) Program

Eco-Acupuncture was launched in 2008 as a 'design-research-engagement-action' program to assist business, communities, towns and cities develop innovations relevant to the de-carbonisation of the economy and the development of climate resilient infrastructure. EcoA brought the research capacities of (initially) four universities (all in the metropolitan Melbourne) with the post-graduate teaching programs of the design schools of those universities to the consideration of future challenges and opportunities with a twenty-five year horizon. The urban precinct and the city became a critical focus for partnerships with local government, to:

- examine emerging problems for the future resilience of a specific urban location;
- consider any complex system interactions that form part of those problems;
- visualise future possibilities to resolve identified problems and increase resilience
- and, most critically,
- design a series of interventions as 'transformation points' towards a resilient low-carbon future (Ryan 2013b).

The first experimental investigation of the urban focused work was in central Melbourne; in contrast to later work, this was not a 'retrofit' of an existing urban precinct but a schematic master-plan vision and framework for a new 'eco-city' on a very large brownfield site close to the central business district. That project gained a great deal of attention, firstly as it was (initially) carried out as an exercise independent of government and private development agencies charged with strategic oversight of the development (who were taking a 'cookie-cutter' approach with little innovation). Media attention focused on the vision/images of the future for the site (VEIL-EBD 2008). From

2009, as the imaginative power of future visions with community engagement became clear, EcoA has developed as a set of partnerships with cities and communities where interest in the opportunities of transformation is high. Over the period 2009-14 the program has engaged with five suburbs of metropolitan Melbourne and two country towns in the state of Victoria (Anglesea and Creswick) - all exploring possibilities for de-carbonisation and resilience to very extreme weather events (Ryan et al. 2010; VEIL-Broadmeadows 2010; Larsen 2012; Biggs et al. 2014). In 2012, an EcoA team travelled to the City of Florence, Italy at the invitation of the city and New York University, Florence for work on the 'Greenaissance' of the UNESCO area of the city (again with resilience and de-carbonisation objectives). A similarly sized EcoA project was conducted with the City of Rotterdam in the Netherlands in early 2014 and another project in the city of Leeuwarden in the province of Friesland in the Netherlands commenced in early 2105 with a strong cultural overlay, as this city is the EU Cultural Capital for 2018.

Each EcoA project brings together university researchers, design academics, design masters students and design professionals, to work closely for and with local communities. It involves the establishment of highly visible *design ateliers* in a community space; in a sequence of design-workshops over a year or more, visions of medium-term (25 years) futures are co-developed, places for near-term interventions are investigated and small-scale (low cost) propositions for those places are designed. The atelier space, regular exhibitions and discussions of visions, are used to build shared ownership of futures and trajectories of development.

The Visions and Pathways 2040 (VP2040) Project

VP2040 is a four-year multi-partnered research and engagement project, with funding from the Australian Cooperative Research Centre for Low Carbon Living, to examine the potential for four capital cities in southern Australian states to increase their resilience and reduce their greenhouse gas emissions by 80% by 2040. VP2040 involves a small team of researchers at three universities (Melbourne and Swinburne universities in Melbourne Victoria and the University of New South Wales in Sydney) with the collaboration of multi-national businesses in design, planning and engineering services and construction, as well as the city councils of Melbourne, Adelaide and Sydney and a number of government departments.

VP2040 builds on the methodological approach of EcoA, projecting visions and scenarios for the future of the cities; it aims to identify intervention points to reach the envisaged futures - in this case for policy and investment for technology, lifestyles, built form and future research. VP2040 works with a loose reference to the framework of the multi-level model of system innovation (Geels 2005) with its three dynamically interacting layers (i.e. landscape, regime, niche). As with the EcoA project, visualised images of future conditions play a significant role in the process – as a way of emphasising the driving forces at the landscape level (not only climate related), projecting possible alternative structures for (future) regimes and implicitly, or explicitly, connecting to niche level developments that have some emerging relevance. In another framing of the project this is a normative vision process (the re-configuration of

transformed systems of provision and patterns of consumption that, together, could de-carbonise city life by eighty per-cent) with 'back-casting' (Vergragt and Quist 2011) to create narratives and pathways for a trajectory linking the future 2040 conditions to today.

In the 2015 Australian context, the idea of cities reducing their greenhouse gas emissions by eighty per-cent in twenty-five years is a radical deviation from the current political consensus (with a national commitment, as of mid 2015, to a reduction of only five to eight per-cent by 2020 and no targets beyond that date). Thus it is clear that any of the future visions or scenarios - to be plausible - have to emerge from some processes of change that are outside the current (mainstream) political imagination. Potential disruptive changes (social and technological) thus form part of the VP2040 research program and act, in the framing of the project, as niche forces from a multi-level perspective or as a way of structuring the narratives in the back-casting scenario model. Examples of technological disruption include the cost-curve of solar photovoltaic cells, wind power and systems of energy storage; social innovations include various forms of localisation, and voluntary sufficiency movements (Alexander 2014); mixed socio-technical innovations include social-media platforms for collective consumption (Botsman and Rogers 2014) as well as distributed manufacturing and 3D printing; and new organisational models for business and governance (Gaziulusoy and Twomey 2014). All of these involve complex dynamics of change that are sometimes instanced only as niche experiments but sometimes as rapidly growing forces. Envisioning the contribution that these disruptive forces (singularly or in combination) could make to the future is a task that involves speculation, projection and negotiation in the process of co-designing desirable future states; i.e. a process of virtual experimentation.

For this virtual experimentation, the VP2040 project brings together policy makers, professionals niche-innovators, activists, designers and researchers, in participatory workshops for facilitated future visioning. These workshops aim to get the participants to 'dream' beyond business-as-usual futures[iv] and to encapsulate such dreaming in an expanding set of rich visualisations - glimpses - of complexly transformed futures that also suggest possible transition narratives and pathways. The dual aim of this process is to expand the understanding of the field of emerging innovations that have the potential to disrupt existing socio-technical regimes (as an input to the research side of the project) *and* to explore, encapsulate and communicate what such futures could plausibly look like as a result of those emerging innovations. Finally, communicating these visual encapsulations of ideas becomes one way to widen engagement in the project of experimenting future cities. Two images below are offered as examples of these future imaginings in the VP2040 project (selected in part to illustrate the range of forms 'glimpses' may take).

As dialogic objects the two glimpses shown (images 1 and 2) are intended to open up possibilities, to challenge expectations about the fixity of the future. Both these images are immediately understood by Australian viewers. They show plausible alternative systemic changes within 2040 cities; they evoke transformations that extend beyond the bio-physical qualities of future city life, reflecting social, cultural, economic and lifestyle

changes. These glimpses are produced by professional designers who attended the visioning workshops. When the glimpses are opened to public gaze they are accompanied by short interpretive statements that will evolve based on dialogue and as the project team constructs more systematic categorisation of future scenarios[v].

Image 1: The transition of a typical Australian street from 2014 to 2040

Workshop participants returned to a second workshop session after the glimpses were produced to critically reflect on their plausibility; these glimpses are freely accessible to the public (from the website) and they are being used by project partners with their (various) community members. These processes have enabled VP2040 team to identify potential convergences and divergences of ideas about system reconfigurations and value-sets that could affect the trajectories or pathways of change. A widening process

of expert consultations is underway to focus in on various aspects of the transformation process.

Image 2: The Sydney Harbour Bridge in 2040

LEARNINGS AND REFLECTIONS

The process of virtual experimentation through design visioning is presented here as a strategy to address the challenges of rapidly transforming cities, a process to draw-in citizens, researchers, designers, planners – as individuals and as institutions – to experiment with different expectations for the future. VEIL has developed a framework to shape the conceptual terrain of that experimental visioning; this includes: optimal time horizons (twenty-five years); the selection of optimistic, desirable changes; the value of distributed systems of provision (more localised, networked, diverse) for resilience; the representation of trajectories of change as well as new future possibilities (Biggs et al. 2010; Ryan 2013b). However, it is a reasonable question to ask of such approaches: *Can virtual experimentation contribute to the establishment of real-life, on the ground, experimentation?*

There have been various attempts to track the impact of this process in the longest running EcoA project collaboration. However, tracking the seeding of ideas about the future is complex and problematic. For the longest local government engagement there have been four EcoA ateliers over a period of five years. At an international conference in Melbourne in 2011 that council's senior urban designer cited four broad changes in

planning and urban design that, in his view, had been enabled by the process of community deliberations using the EcoA visioning process (Wilson 2011). Two of these interventions in particular – bike paths and community gardens – had seen a reversal of previous community attitudes to those proposed areas of development. At the time of that paper and from follow-up meetings with council officers there is a growing support for the process as a significant contribution to the council's strategic urban planning and community development projects. That council has committed to a more thorough and open exploration of the impact of such work to begin in 2015.

For the higher profile projects, such as Florence and Rotterdam, assessment of impact is potentially even more complex and difficult because of significant differences in the political, cultural and regulatory underpinnings of existing regimes. However, both of those projects arose from the desires of the city administration for future thinking that could break from the embedded cultural biases that were seen as limiting the responses to emerging challenges. For Florence, the idea of 'fixity' – that the city is, and must remain, a global treasure, a built museum, preserved from change for global posterity – was recognised by the administration to be in conflict with the growing need to deal with changing climatic conditions. Summer temperatures in mid-tourist season appeared to be regularly reaching around and beyond 40^{o}C and recent winters had brought severe (transport crippling) snow falls; the city had been experiencing extended drought conditions with altered rainfall patterns that included intense storm events with frequent local flooding. Buildings were being left vacant as they became uninhabitable and Florentines from the rest of the city were reported as surrendering the historic zone to tourism.

Future visions and proposals for intervention did provoke strong local debate and even opposition. Two dominant cultural ideas, in particular, were challenged: as a response to the rising heat impacts in the city, the EcoA visions introduced trees in public places – in squares and streets – and, in order to reconnect the city inhabitants to its original water source, the Arno, the visions proposed a new physical access to the river via a long floating pontoon-walkway. Both those propositions were seen by some sections of the community as having violated some core of the UNESCO heritage ideals. The Arno access is widely accepted as 'off-limits' to ensure that its fortified walls (that create a physical as well as visual barrier along its path through the UNESCO domain) provide protection against flooding from the river. The EcoA proposals seemed to be the first that challenged the idea of the river as a storm-channel, proposing large up-stream 'sacrificial' wetlands (as a tourist park) and a floating pontoon access which left the walled fortifications of the banks unchanged. This 'use' of the river was proposed to begin as temporary for spring/summer when water levels are low; its first 'occupation' would be for the revival of the city's lost status as a fashion capital, having the main catwalk for the fashion festival floating on the river just below the Ponte Vecchio.

Throughout the development of those ideas – in the co-creation, visioning process – some local historians pointed to a history that was much more nuanced than the tourist representations of the city's 'renaissance' fabric. Florence has a great history of waves of innovation that included transformation of its urban conditions. There is a wealth of

images and stories about the role of the Arno in the making of the city - for waste disposal for industry and for river transport of goods. Those images also illustrate the progressive loss of the vegetation that once spread outwards from the Arno banks to feed the city. The large open stone-paved piazze that seem now to characterise the fabric of the old city were actually remodelled in the mid eighteen hundreds to reflect the city's status as Italy's capital, embracing new ideas of metropolitan planning. This included the removal of their markets and the widening of some of the central streets of the city.

Another prominent representation of the city's era as capital was its grand cast-iron central market designed and constructed in the eighteen seventies. This building had fallen from use as locals shunned the UNESCO area, frequenting other food markets instead, leaving a strange and often problematic tourist facility that operated for limited hours each week. The most successful of the EcoA re-imaginings of the city involved proposals for the re-functioning of that building and its square, to re-establish a site within the old town that was truly Florentine. The evocative visual images for that revitalisation were quickly taken up and became the basis for a tender for the redevelopment of the facility – a redevelopment completed in 2014. The system connections that were proposed for that redevelopment in the EcoA visions have not so far had any impact. The new tram network (that had stalled after a prolonged and difficult completion of the first of five proposed lines) was (re)visioned as a mixed mode transport link, amongst other things carrying organic waste from the city centre during the night.

Based on the evaluation of four years of EcoA design visioning there appears to be strong support for glimpses that generate curiosity (often seen as amusing as well as challenging); glimpses that draw the viewer into engaging with *ideas*, requiring them to *transpose the re-aligned conditions depicted, into their own street, neighbourhood or daily life*. However there is the need for on-going experimentation about the optimum form for visions that can successfully stimulate virtual city experimentation. The effectiveness of visioning resides in achieving a balance between adequate representation, or the 'fidelity' of a glimpse or vision, and some level of ambiguity or lack of resolution to invite a dialogic response. Visions must act as a provocation for a conversation where the viewer feels curiosity as well as comfort in interpreting the image rather than merely being subject to its authority. However too little detail or resolution in the glimpse or vision can lead to confusion and a lack of engagement. This balance is not set or universal. Different audiences and viewing contexts require different levels of resolution. Adjusting this balance between openness and fidelity, to provide a sufficient framing of new system possibilities is part of the on-going collaboration with some of the participating Melbourne councils; this will extend to testing some of those representation skills of designers beyond the two dimensional format for glimpses; 'story-boarding' or sketches of daily life and spatial changes over time have regularly been incorporated in glimpses, testing of three-dimensional representations of futures may well be the next step.

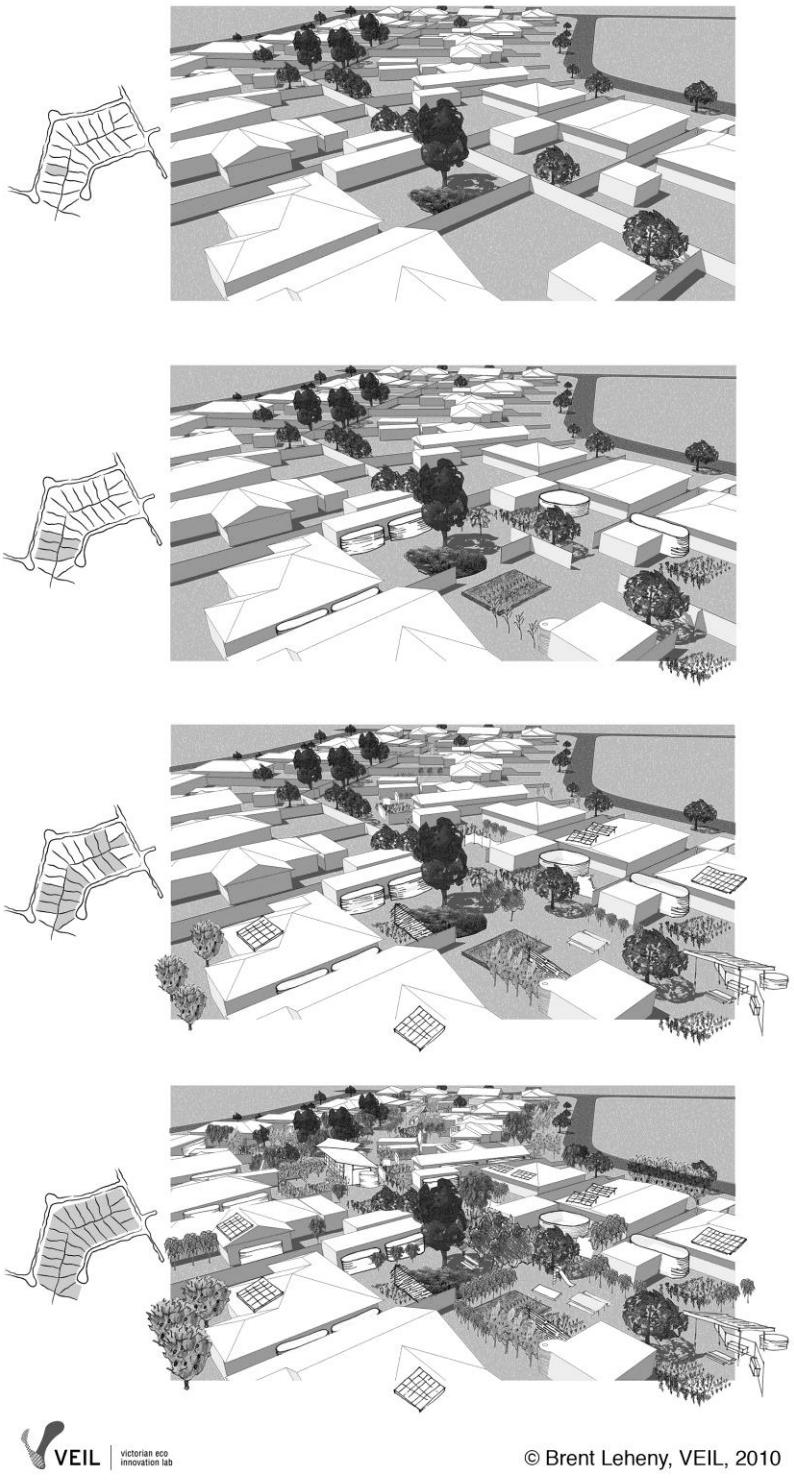

Image 3: Change over time in the transformation of suburban space and the ‘collapse’ of private backyards

CONCLUSIONS

The virtual experimentation approach discussed in this chapter defines three categories of glimpses that seem essential to the process. First, glimpses for inspiration that aim to shift the boundaries of what is considered permissible, desirable and possible for future conditions and systems (Ryan 2013b). Second, glimpses of (possible) trajectories of change that open up a discussion of how a non-development-as-usual-future might unfold. Third, glimpses of niche interventions that are intended to build a constituency for their realisation soon. The overarching design objective for these is that they evoke possibilities for new system architectures (distributed water, food, energy, transport, shelter, etc). For EcoA and VP2040 it is considered paramount (by local councils and community representatives) that these should be low in cost and therefore low in risk should they fail. This suggests an important new parameter for 'living laboratories' and real-life experimentation.

Visioning transformative futures is a difficult process, more so for people without any experience of systematic scenario building. One challenge that frequently arises is overcoming deeply ingrained perceptions about the future and the nature of change processes. From the experience of EcoA and the VP2040 projects, it is apparent that the public conception of the future reflects their perception of how the world works and how and at what *rate* change *can take place*. The VEIL visioning processes frequently reveal the tendency of participants to project the status-quo (development-as-usual) well beyond its feasible lifespan. In the absence of processes that assist participants to become sensitive to disruptive forces in the flow of change, people's conceptions of the future will tend to involve only mild deviations from the trajectories of current development. Enabling participants to conceive non-linear depictions of the future requires an immersive, layered, iterative journey. Design visioning helps to catalyse a cognitive break from the present.

Virtual experimentation achieves two important outcomes relevant for enabling radical transformation of city systems. Glimpses can make explicit what changes a particular group of people (the vision creators) deem possible and how they are linked to present conditions and understandings of future challenges. This latter point is critical because it can help identify – or reveal – aspects of the present that could act as launching-pads for routes to a transformed world (a terrain of disruptive potential). Also, by making explicit a set of assumptions of the future, transformative visions can become an effective means for cultivating a dialog about the ways in which participants (and essentially 'system innovators') understand the possibilities of change. Virtual experimentation can create experiences of the future for developers and opportunities and space for real physical experimentation.

References

Alexander, S. (2014). *Disruptive Social Innovation for a Low-carbon World.* Victorian Eco-innovation Lab, University of Melbourne, Australia.

Beatley T. 2011. Biophilic Cities. Integrating Nature into Urban Design and Planning. Washington DC: Island Press.

Beatley T and Newman P. (2013). 'Biophilic cities are sustainable, resilient cities', Sustainability 5, 3328-45.

Beck, U. (2010) Climate for Change or How to Create a Green Modernity? Theory, Culture and Society, 27(2-3): 254-266.

Bettencourt, L. M., and West, G. B. (2011). Bigger cities do more with less. *Scientific American, 305*(3), 52-53.

Bettencourt, L. M., J. Lobo, D. Helbring, C. Kühnert and G. West, B. (2007). Growth, innovation, scaling, and the pace of life in cities. *Proceedings of the National Academy of Sciences of the United States of America*, Vol. 104, pp. 7301-7306.

Biggs, C., Ryan, C., Wiseman, J. (2010). Distributed Systems: A design approach for sustainable and resilient critical infrastructure. Melbourne, Victorian Eco-Innovation Lab.

Biggs, C., Ryan, C., Bird, J., Trudgeon, M., and Roggema, R. (2014). Visions of Resilience: Design-led transformation for climate extremes, Victorian Eco-Innovation Lab, The University of Melbourne. [Online]

Available: http://www.ecoinnovationlab.com/visions-of-resilience [25 June 2014].

Botsman, R., and Rogers, R. (2010). *What's Mine is Yours: The Rise of Collaborative Consumption*. New York: HarperCollins.

Dreborg, K. H. (1996). Essence of Backcasting. *Futures, 28*(9), 813-828.

Evans, J., and Karvonen, A. (2014). Give Me a Laboratory and I Will Lower Your Carbon Footprint! Urban Laboratories and the Governance of Low-Carbon Futures. *International Journal of Urban and Regional Research* 38 (2): 413–30.

Gaziulusoy, A. I., and Twomey, P. (2014). *Emerging Approaches in Business Model Innovation Relevant to Sustainability and Low-carbon Transitions.* Victorian Eco-innovation Lab, University of Melbourne, Australia.

Gaziulusoy, A. I., and Ryan, C. (2015). *Low-carbon, Resilient, City Futures - A Design-Mediated Approach: Visions and Pathways 2040.* Paper presented at the 8th Making Cities Liveable Conference, 6-7 July 2015, Melbourne.

Geels, F. W. (2005). *Technological transitions and system innovations: a co-evolutionary and socio-technical analysis*. Cheltenham, UK ; Northampton, Mass.: Edward Elgar.

Glaeser, E. (2011). Triumph of the City: how our greatest invention makes us richer, smarter, greener, healthier and happier. New York: Penguin Press.

Grimm, N. B., Faeth, S. H., Golubiewski, N. E., Redman, C. L., et.al. (2008). Global change and the ecology of cities. *Science* 319: 756-760.

Hajer, M. (1995). *The Politics of Environmental Discourse: Ecological Modernization and the Policy Process.* Clarendon Press, Oxford.

Hajer, M., and Dassen, T. (2015). *Smart About Cities: Visualising the Challenge for 21st Century Urbanism*. Rotterdam: NAI Publishers.

Harvey, D. (2012). *Rebel Cities: From the Right to the City to the Urban Revolution*. London, New York: Verso.

Hughes, L. and Steffen, W. (2013). *The Critical Decade 2013: Climate change science, risks and response.* Climate Commission, Canberra.

Kareiva, P., and Marvier, M. (2007). Conservation for the people. Scientific American 297: 50-57.

Katz, B., and Bradley, J. (2013). *The Metropolitan Revolution: How Cities and Metros are Fixing Our Broken Politics and Fragile Economy*. Washington DC: Brookings Institution Press.

Kautto and Ryan 2015. Cities as Agents of Disruptive Change – reflections on global cities with significant decarbonising strategies and programs. Visions and Pathways 2040. Foreground paper. [Online]. Available: www.visionsandpathways.com

Landes, D., S. (1972). The Unbound Prometheus: Technological change and industrial development in Western Europe from 1750. Cambridge University Press. UK.

Larsen, K. (2012). Can Food Hubs Catalyse Healthy and Resilient Local Food Systems in Victoria? Victorian Eco-Innovation lab. [Online] Available: http://www.ecoinnovationlab.com/research/current-research/520-food-hubs-in-victoria [21 June 2013].

Manzini, E. (2013). Against post-it design: to make things happen. [Online] Available: http://www.desis-network.org/forums/against-post-it-design-make-things-happen. [13 May 2015].

Marcus, L. and Colding, J. 2011. Towards a spatial morphology of urban social-ecological systems. Conference proceedings for the 18th International conference on urban form, ISUF2011, August 26-29 2011, Concordia University, Montreal.

Marx, K. Das Kapital. Volume 1 1867. English translation 1887, Progress Publishers, Moscow.

McCormick, K., S. Anderberg, L. Coenen and L. Neij (2013). Advancing Sustainable Urban Transformation. *Journal of Cleaner Production* Vol. 50, pp. 1-11.

Moy, D. and C. Ryan (2011). Using Scenarios to Explore System change: VEIL, Local Food Depot. In A. Meroni , A. and Sangiorgi, D. (eds), *Design for Services.* London, Gower.

Quist, J. N., and Vergragt, P. J. (2000). *System Innovations towards Sustainability Using Stakeholder Workshops and Scenarios*. Paper presented at the POSTI Conference 'Policy Agendas for Sustainable Technological Innovation', London, UK, December 1-3 2000.

Quist, J., and Vergragt, P. (2006). Past and future of backcasting: The shift to

stakeholder participation and a proposal for a methodological framework. *Futures, 38*(9), 1027-1045.

Robinson, J. B. (1988). Unlearning and backcasting: Rethinking some of the questions we ask about the future. *Technological Forecasting and Social Change, 33*(4), 325-338.

Ryan C. (1985). 'The Nature of Construction is the Re-Construction of Nature: Nature, Technology and Ideology in the Design of the Built Environment'. In Dovey,K. , Downton,P. , Missingham,G. (eds) *Place and Placemaking Conference*, the Third International Conference of the Association for People and the Physical Environment Research, Melbourne, Australia , June 1985. PAPER books, Melbourne, Australia 1985.

Ryan, C. (2013a). VEIL and urban 'eco-transformation'. Melbourne: Victorian Eco-Innovation Lab [Online]. Available: http://www.ecoinnovationlab.com/project_content/veil-urban-eco-transformation/ [25 June 2014].

Ryan, C. (2013b). Eco-Acupuncture: designing and facilitating pathways for urban transformation, for a resilient low-carbon future. *Journal of Cleaner Production*, 50: 1-11.

Ryan, C., Trudgeon, M. Moy, D. Larsen, K. Biggs, C. Archdeacon, A, Eales, R. (2010) Victorian Eco-Innovation Lab Annual Report. [Online] Available: http://www.ecoinnovationlab.com/content/publications/ [25 June 2015]

Satterthwaite, D., and Dodman, D. (2009). The role of cities in climate change. In Engelman, R., Renner , M. and Sawin, J. (eds.), *State of the World 2009: Into a Warming World*. Washington: Worldwatch Institute.

Stone, B. (2012). *The City and the Coming Climate.* Cambridge: Cambridge University Press.

VEIL-Broadmeadows. (2010). Vision Broadmeadows 2032. Eco-Acupuncture Enabling localised design interventions. Victorian Eco-Innovation Lab. University of Melbourne. [Online]. Available: http://www.ecoinnovationlab.com/content/publications/ [16 May 2014].

VEIL–EBD. (2008). EBD: Ecological Business District. Zero Carbon Eco City. Victorian Eco-Innovation Lab. University of Melbourne. [Online]. Available: http://www.ecoinnovationlab.com/content/publications/ [15 April 2014].

Vergragt, P. J., and Quist, J. (2011). Backcasting for sustainability: Introduction to the special issue. *Technological Forecasting and Social Change, 78*(5), 747-755. doi: 10.1016/j.techfore.2011.03.010

Wilson, M. (2011). Case Study: Vision: Broadmeadows 2032. Presentation to the International Thriving Neighbourhoods Conference, Melbourne 2011. [Online]. Available: http://www.thrivingneighbourhoods.org/presentations/2011-presentations/ [14 October 2012].

UNEP. (2011). *Cities: Investing in Energy and Resource Efficiency.* Paris: UNEP

[i] Marx (1867) is often quoted to this effect when he sought to distinguish between an architect and a bee – both create extraordinary structures but only humans can endlessly vary the design of the structures in their imagination - and consider their relative advantages and disadvantages - before committing to action. '*A bee puts to shame many an architect in the construction of her cells. But what distinguishes the worst of architects from the best of bees is this, that the architect raises his structure in his imagination before he erects it in reality.'*

[ii] See for example the Biophilic Cities movement: http://biophiliccities.org

[iii] This last step can present a significant hurdle. Beck (2010), has pointed to the urgent and critical problem for the greening of society – gaining everyday support 'from below', support for transformations that can appear to undermine current lifestyles, consumption habits and practices and established systems of social status. In the process of negotiating a viable future, the challenge is to embrace forms of engagement for current urban citizens that could give some hope that such futures would be seen as desirable.

[iv] See: http://www.visionsandpathways.com/about/vp2040-video/

[v] See for example: http://www.visionsandpathways.com/research/visions/