Redirective Practice in Action: The Boonah Two Project

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One of the expected effects of climate change highlighted by Al Gore's film 'An Inconvenient Truth' is that of growing numbers of environmental refugees. The prospect of whole coastal populations – most dramatically in places like Bangladesh – being displaced by rising sea levels is indeed alarming, nevertheless such a scenario is but the extreme end of a more diffuse process of climate change displacement already underway. Severe droughts, rising temperatures, more frequent floods and cyclones in many parts of the world, including Australia, are forcing people off their lands into new places and ways of life. Environmental refugees, people displaced by 'natural disasters', people abandoning once viable agricultural land and shifting to cities, internal migrants – the categories blur.

Boonah, a small cattle and farming town in south east Queensland, is exactly the kind of place that would be deemed appropriate for 'resettlement' by people abandoning regions affected by the coming climate extremes. An hour's drive south west of state capital, Brisbane, Boonah is located on the eastern slopes of the Great Dividing Range one hundred kilometres inland, in a

shire with a viable water catchment. It is protected from the more extreme coastal weather expected in the future, as well as from the increasingly hot and dry weather of the west.

In April 2007 Team D/E/S and the Brisbane architectural practice, Gall & Medek, jointly entered 'Building a Sustainable World: Life in the Balance' – an international architectural design competition organised by the California Chapter of the Royal Institute of British Architects. The brief required designing a self sustaining city for 50,000 people. Our submission was based on a process of developing Boonah as a reproducible model of such a city, using a scenario method centring on designing from the future to the present. Inspired by lines from Skinner's Walden Two, our submission was named Boonah Two.[1]

The design team regarded the competition as an opportunity to explore what it means to design a city now, in the defuturing present, and what kind of design processes are appropriate in this situation. The competition brief – to design a concept for a sustainable city – was complied with, but extended in two ways. First, the idea was to develop a process of designing a city that could generate other cities different from each other, but with similar climatic conditions. And second, the exercise was taken on as a means to practically advance **redirective practice** – a method for transforming how and what we design.

The Thinking that Informed the Design Strategy

Two theoretically informed ideas underpinned the total approach: (i) designing that which ontologically designs (that is: the structuring of structure of *habitus*[2]), and (ii) designing relationally.

These ideas are central to **redirective practice** which is profoundly political. It adds up to working to change the world we humans are born into by design, so that we and it can have a mutually sustaining future. For this to happen, what structures the structure of design practice has to change so that the design agenda and design practice can be reconfigured to:

- counter the unsustainability of the world we currently make for ourselves and others (human and non human);
- design away that which has been, or is being, brought into existence that threatens the possibility of sustainment; and,
- redirectively prefigure, by design, what is coming to shape the future (recognising here that it is vital to transform/retrofit 'what is' – be it an industry, product, structure, environment, medium or process – as much, if not more so than, creating the 'sustainable new').

Unquestionably, redirective practice, grounded as it is in a relational approach, makes designing more complex as it connects much that is often held apart, especially the biophysical, the economic and the cultural, as well as the material and the immaterial elements

of our everyday world. Designing is deferred by thinking what is actually already designing the 'to – be – designed'. Additionally, redirective practice aims to transform the practice the designer inhabits as much as the application of this practice.

Seven Key Assertions that Underpinned the Design Approach to Boonah Two

1. Unsustainability is fundamentally caused by the myopia of our human-centredness, our anthropocentrism. We simply do no see what we do and its consequences. Therefore, much of what we name as causes of planetary environmental problems is *de facto* symptoms of this condition of perceptual limitation.
2. We are inducted into life in an economy in which we enact our propensity to be unsustainable by design. We continue to create that which we believe we want within cultures that have lost any consensually grounded view of the needs of all upon which our future depends. Effectively we are materially 'supported' by a nihilist productivist system unable to comprehend finitude and almost totally incapably of replenishing the resources it utilises. This disposition is supported by a blind faith in the salvational capabilities of science and technology.
3. Our technological capabilities have outstripped our cultural development. A simplistic and wilfully misguided view of evolution, especially 'technological evolution' underpins this dangerously unbalanced situation.
4. We reject the view that somehow, environment is discrete (existing as 'the environment' or 'the natural environment'). There is nothing but environment: it has no inside or outside; it is 'natural' and 'artificial' and an indivisible fusion of both. We can never not be in the environment, just as we can never be outside of an ecology it accommodates – in so far as we dwell in the environment, it is space, matter, mind and image.
5. The crisis is not something we await, it is here already. It is a crisis because it is not yet deemed to be sufficiently critical. This means we effectively exist within a crisis of crisis.
6. All humanity can justifiably demand realisable visions of sustainment – encompassing equity, justice and peace as well as viable ecologies. Such a demand should reject all utopias that lack means of realisation.
7. Design needs to be remade with new intellectual tools and practices that go beyond the existing design community so that it can be far more broadly seen as a key to sustainable futures.

Global Contextualising of the Design Strategy

The global population which is expected to peak at somewhere between 9 and 11 billion within a century is still locked into a productivist economy that continually amplifies human impacts on

the bio-physical environment.[3] This can only be dealt with by a new economic paradigm that elevates global equity, the quality and sustaining ability of goods, material and immaterial services over unsustainable quantity. The gargantuan challenge for the West is to reduce the conventional model of standard of living while improving social cohesion, the common good and the general quality of life. For this to happen, the culture industries have to cease being a lapdog of capital and become affirmative change agents.

Historical Contextualising of the Design Strategy

To ask 'how can we start to build a sustainable world?' in these general and particular circumstance is indivisible from asking 'what is it we have to do to overcome the unsustainable?'

The unsustainable arrives from both the past and the future. Greenhouse emissions illustrate this point. For example, the atmospheric life of CO_2 is about 200 years. This means the afterlife of the smokestacks of the industrial revolution is still present in the atmosphere and contributing to today's climatic problems. Likewise, today's emissions of CO_2 are building the global warming of the future. We are still in the early days of critical climate (although the patterns that created this problem were established long ago). It is therefore critical that we learn to design far more effectively in time as well as in space.

Therefore, the inexact science of informed predictions of unsustainability needs to be far more directive of what is actually designed. What this actually means is that **we have to learn how to design from the future to the present.** This requires developing an imagination driven by new knowledge appropriate to what is very likely to be a new age. A quick historical back-track can give a sense of what this means.

For perhaps 100,000 years or more homo sapiens were nomadic hunter gathers. Then twelve thousand years ago in the Fertile Crescent of the Middle East the transition to permanent settlement and agriculture began as a result of a changing climate (it was getting colder in the West and drier in the East, so people converged on where food was available). Today, the very way of life that settlement enabled has led to a collective mode of planetary occupation that puts a question mark against the long term viability of the human species.[4] We are on the verge of an age that can be perhaps be characterised as 'the age of unsettlement'. The coming national and internal redistribution of human populations due to climate change will be prefigured by the need to abandon low lying islands, the low lands of many countries, major coastal cities and many other settlements, plus parts of the world that become either too hot or too cold. Not only will this be unsettling for the people involved, but it will more generally act to psychologically unsettle vast numbers of the global population. The notion of geographical rootedness, already undercut by rapid urbanisation and labour market mobility, will all but disappear.

National Contextualising of the Design Strategy

Beyond it being just a resettlement city of the future for internally and internationally displaced environmental refugees, we also need to place Boonah in the ambiguity of Australia's relation to some of the more significant unsettling global factors.

The global environmental impact of Australia is in no way indicated by its small population (20 million). As a massive exporter of minerals, it feeds the unsustainability of other nations. Australia is one of the world's largest exporters of coal it well illustrates the complexity of the point.

Around 70% of China's energy is generated from coal and currently it is building two coal fired power station per week. Its constantly growing demand for energy is, of course, partly driven by a massive manufacturing industry making goods for the world. Australia, as a major supplier, cannot get its coal out of the ground, onto bulk carriers and off to China fast enough. There are bottlenecks at the coal ports. The political investment in the coal industry has been the main reason why the nation fails to take advantage of its enormous renewable energy potential. Just in Queensland alone the estimate is that there is 800 years supply of coal. In contrast, with only 25 years supply, Australia is poised to become the world's largest exporter of uranium.[5]

Local Contextualising of the Design Strategy

More specifically and immediately, the design concept had to engage local circumstances in Queensland. Here there are drought-stricken towns where water is being trucked in and which could be abandoned anytime in the next few years. We have cities, farms, power stations and factories with just a few weeks of water supply remaining. Queensland is also a catchment for the Murray-Darling, the nation's most important river system, which has been on the verge of ceasing to flow.

Following a pattern climatologists have been articulating for some time, much of Australia veers between severe drought and occasional big rain dumps and flash floods. While overall rainfall may or may not vary annually, longer gaps between rain events, increased drought and hotter weather mean low soil moisture (a big problem for agriculture) and increased evaporation from water storage dams. Likewise the risk of bush fires will continually increase: they are expected to be more frequent, hotter and larger.

Boonah is in a region that has experienced the worst drought in 1000 years. It can expect to be impacted by climate change. It will get warmer – by the end of the century by 3 to 5 degrees Celsius.[6] This will mean a gradual shift in its climate zone (even with exposure to weakening cyclones) and increased frequency of drought. The region already has a water crisis, with some large dam levels as low as 14% (at 12% the water becomes too alkaline for potable use) and with many farm dams dry.

The Design Strategy

Our analysis of projected global, regional and local environmental impacts was used to create narrative content to enable designing from the *future back to the present* – this was the methodological motor of the Boonah Two submission. A detailed year-by-year scenario was created for fifty years based on currently available empirical information, informed projection and precautionary action. The scenario carefully considered slow and fast moving 'impact events' and appropriate defensive design responses to them.

Solutions sought were not singular, and certainly not just technological; they aimed to be rich, plural, complex and interwoven. They included: deploying old and new sustainable practices and technologies; designing systems and structures that conserve natural and fabricated resources; initiating adaptive social, cultural and community structures and processes able to cope with coming, unwelcome change; and, creating organisational and political models appropriate to advancing and supporting a culture and economy of sustainment.

A Metabolic City

The transition from the existing settlement of Boonah to Boonah Two was conceived of metabolically. This was not restricted to the biological. Besides organic matter, a city inducts and excretes inert materials, goods, services, information, images, cultural forms, people and more.

Designing a metabolic city requires managing the city as much as possible within the settlement of its immediate catchment. The city has to be directly connected to its region's ecological carrying capacity and natural resources. The form of the city, the goods and services it employs, the human capital it selects and recruits, the industries and businesses it attracts or creates, the cultures it forms – all are essential to create and maintain its metabolism. But more than this, such a city also has to have the capability of adaptive self reproduction.

The move from Boonah to Boonah Two included retrofitting the catchment to make it largely self sustaining in terms of food, energy, water and common utility materials. From such comparatively high base level of self-sustainment, all growth would have to equate with improved performance upon this base.

The design strategy is relational: seeking to inject life and movement into all the interconnected elements of the metabolic city within its catchment. To take four examples:

1. Feeding and Watering the City

The design imperative to feed the city would be a driver of land use planning. Conservation of agricultural land becomes a priority within an overall geological and topographic land use management plan. Foodscapes would be designed to integrate rural and urban

areas, maximise local food production, reduce food miles and create local employment. Food crops would be protected from extreme weather by the planting of wind breaks/shelters (of appropriate trees) and the design and construction of fabricated structures, including for hail protection.

The plan would consider water catchment in terms of maximising topographic surface and sub-surface water movement advantage, as well as harvesting from built structures. All stored water would be covered to eliminate evaporation. Experimental means of water conservation, like the use of condensers, would be explored. Likewise, all urban landscaping would be designed for ultra low water requirement. Commercial and domestic water consumption would be regulated.

2. Climate Defensive Architecture
All of city's architecture would be informed by this mode of design which seeks to (a) protect and adapt existing valued built structures from coming environmental and climatic impacts; (b) protect human life, the natural and artificial means that sustain it and its interdependent life forms; and, (c) protect and conserve vital resources (this includes civic, commercial and domestic dwellings, their ability to harvest water and function within energy and communication networks). Responding to constantly increasing fire risk in Australia (both frequency and intensity of fires), measures would be taken to protect the city against fire. This includes: the encirclement of the city by a fire barrier several hundred meters wide (constructed from a low grade paving material, like slag); and the design of the water supply to facilitate comprehensive fire-fighting.

3. Design for Elimination
Designing 'unsustainable needs away' will inform the initial design of the city (in relation to what comes into it, its transport, its retail sector); on the basis of the tenacity of the unsustainable, this principle would be sought to be inscribed consensually as an aspect of everyday city life (including educationally).

4. Moving from the Quantitative to the Qualitative
Economy
At its simplest, this means focussing on 'better but less' and transforming the means by which wealth is generated. Incentives would be provided for the creation of new kinds of technologically advanced craft based local industries in Boonah Two in areas like furniture, lighting, footwear, technologically amplified human powered transport, etc.

The Construction Economy
The setting up of a local, flexible and sustainable commercial and domestic systems buildings industry was adopted as a key

means to: (i) to establish the short term core of a nascent local economy as a catalyst for social and economic development; (ii) to provide the basis of an industry with long term potential to contribute to manufacturing and exporting Rapid Assembly Sustainable Structures (RASS); and, (iii) to enable a convergence of the efficiencies of industrial production while reducing transportation energy and financial costs of such a materially intensive project.

Combined with the design methodology for the city, the RASS approach and many other elements of the design strategy were seen as the means to make Boonah Two a nationally and internationally exportable model of a sustainable city. The design methodology was not based on a specific master plan but rather, on a series of interconnected design principles together with the means of their material realisation. Thus exportable cities would be created in similar ways but have varied forms. At the same time, the model is not universal – it would not, for example, be appropriate for cold climates without major modification.

Providing Power

The competition brief required the city to generate all its own power. Our approach was two staged and based on upfront demand reduction. As much infrastructure, commercial and domestic buildings as possible would be designed with low energy load requirement. Phase one would introduce a mixed palette of currently available renewable energy technologies like wind power, biomass and photovoltaics. Boonah has good solar radiation, its wind speeds make wind turbines feasible (especially the bladeless silent spiral type designed by the Finnish Windside company) and there is locally available biomass. The second, overlapping stage would be to phase in solar thermal and geothermal electricity generation. Some of phase one would remain in localised situations, some would be phased out (in 10 to 15 years) and a network of grid connected solar thermal and geothermal systems would establish the ongoing generation system.

Generating Knowledge

A lot of knowledge about how to create a self-sustaining city already exists, but it is still insufficient. Much of the additional knowledge has to come from three sources: practical experimentation; the creative community involved in the project in every context and at all levels; and, historical research.

This can be illustrated with just one issue – system building.

First, there is substantial, technically sophisticated knowledge of system building within the building, construction and engineering industry. Yet there is also a vast store of ancient and early modern knowledge that begs investigation (ranging from ancient Chinese modular methods[7] that enabled the same building to be

recycled in different forms by new combinations of standardised components to the rail and cart shipped kit homes of the USA and Australia of the nineteenth century). Second, there is merit in trialling ideas on the factory floor, as well as via sample user feedback from prototypes. And, third, there is learning from the often tacit craft knowledge of all the workers involved in the production process.

The cultural figures strongly in other design elements. For instance, it was present in how 'care' for the self, other people, things, together with the biophysical and the built environment were all addressed. It had a strong presence in how the city was contemplated as a place to generate attraction – the proposition here being that the more people that visited the city, viewed it electronically, or read about it the more the idea of a city of sustainment became disseminated. Cultural action also linked to practices to generate and document new knowledge – in this respect making the city a 'living experiment' could be directly linked to 'creative community development.'

Conclusion

What we set out to do with Boonah 2 was not to try to design the architectural form of a sustainable city, and certainly not to design a master plan. Rather our concern was to explore appropriate ideas and a process.

On becoming one of the 12 world finalists, we, representing our respective companies, were invited to present at the finals in Los Angles in early June 2007. In competition with teams from China, Brazil, Greece, Fiji, Netherlands, the UK, USA/Germany and five teams from the USA we gained second place. What was so encouraging about this result was that they were a panel of distinguished competition judges willing to give serious consideration to ideas presented in a text dominated presentation that privileged a narrative of process over imaged product. This is not to imply any criticism of making images, not least by drawing, or that such activity does not have and ongoing and crucial place in all design practices and in the rise of redirective practice. Rather it is to suggest that meeting the demand for change that is such a significant (if still underplayed) feature of the present requires a response that mobilises whatever means of communication most appropriately tells the story.

It should be said that the aim of entering the competition was a redirective practice 'professional development learning exercise' for the design team – doing well was a big bonus. A great deal was learnt, especially on complexity.

Notes

1. B.F. Skinner published *Walden Two* 1948 – a book itself inspired by Thoreau's *Walden: Life in the Woods* (1854). This is what

Skinner said on writing on the American way of life – "Not only can we not face the rest of the world while consuming and polluting as we do, we cannot for long face ourselves while acknowledging the violence and chaos in which we live." Preface from the 1976 edition.

2. See Bourdieu, Pierre (1977) Outline Theory of Practice (trans Richard Nice) Cambridge: Cambridge University Press.

3. With the projection that China and India will 'enjoy' the same standard of living as the USA and Europe by the end of the century. Contrasted against the ecological footprint of a European in 1900, when the world population was 1.3 billion, this footprint has already increased by a factor of 20. Just projecting this to 2100, with say 8 billion 'globalised consumers', as using 20 as the multiplier, we get at 200 year comparison of 1.3 to 160 billion. While crude this picture gives a sense not just of the demands on the planetary carrying capacity but of the inappropriateness of quantity based economic 'development'.

4. Surely the environmentalist call to "save the planet" is seriously wide of the mark – is it not the case humanity and its kindred animal species that are most at risk from unsustainable practices?

5. How does one measure to environmental impact of uranium at a moment when it is reported that we are on the edge of a new nuclear arms race? This development equally being a time when military strategic planners tell us that conflict over access to, and competition for, natural resources will dramatically increase. Even when viewed as applied to exclusively peaceful purposes are not nuclear power station likely to be part of the targeted infrastructure of warring nations in the next 50, 100, 200 or more years?

6. Australia is at the higher end of IPCC temperature increase projections. The 2007 Reports indicates a 3, 4 or even 5 degrees warming by 2100.

7. The key text here, especially for architectural historians and archeologists, is the Ying Zao Fa Shi (a massive building manual and the oldest existing book on architecture among ancient Chinese scientific literature). Published in 1103 it was rediscovered in 1919. Written by Li Jie. it was aimed to reduce corruption and to introduce standards in architectural construction. From the year of 1931, and for nearly twenty years, Prof. Liang Si Cheng worked on annotations of the book. Even so still only part of the original work has been published (after being kept in hiding during the 'cultural revolution') – this in China in 1980.