

**DESIGNING BETTER FUTURES:
21st Century imperatives and pathways
for organizations and cities**

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Extract: Prologue and Chapter 1

Version: 14 February 2008. V10

Designing better futures: 21st Century imperatives and pathways for organizations and cities

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PROLOGUE

TOWARDS AN AGE OF SUSTAINABLE DESIGN

History's pages tell us that when people have access to education, technology and abundant raw materials, they have created societies that are healthier, more prosperous and longer living than those that went before them. Such has been the story of the last 100 years and the industrialized world that we have come to call the *Age of Progress*.

But what happens if there is a range of future shifts suggesting that if we are to continue to progress then we will have to completely change our behaviours and our societies substantially? What if this means that we simply can't project an extension of what has been successful up until now into the future? What if we do nothing, or do too little too late? Will we witness a collision between the age of progress and a set of future forces that in turn will set in motion a whole group of negative consequences that will last for generations to come and may well reverse many of the benefits that we currently enjoy?

My view is that it makes sense to anticipate when and how such collisions might occur, and then develop the ways and means to either avoid them or to at least minimize their effects. There is significant evidence that such a future collision is close and therefore we should rethink many things; design in much smarter ways than we do now, and utilize all the technologies we have available as quickly as possible. If we were to do so, then within a decade we will have avoided the future collision, left the *Age of Progress* behind and ushered in a new age of sustainable design.

A colleague of mine told me that if I wanted this book to be read, particularly by people who ran organisations, and I do, then I needed to be very clear about 'the money question,' or why spending time with this book would be of benefit to willing readers. What I hope to show in the first part of this book is that "the future collision" will profoundly reshape markets and consumer behaviours, and show how current value will be eroded and new value created in the near future. We call this collision the end of *the Age of Progress*.

If this is the case then future success will come from redesigning, rethinking, and thus navigating, organisations and communities away from collision points. It will be important that in the process

we do so in a way that creates better value and a more sustainable sense of prosperity than is the case now. However this new value must be developed within limits that the planet can support. This shift can be seen as a journey towards *an Age of Sustainable Design*. To me, we are standing at a crossroads or what some call a 'hinge of history.' We can either ignore the reality that future collisions will happen, and perpetuate *the Age of Progress* for a short while, or we can begin to navigate towards a very different future.



CHAPTER 1.

COLLISION POINT: THE CHANGING FACE OF REALITY

Learning to cope with a new world of big ideas and significant change

A few years ago I watched with mild concern as a very old man made his way slowly to the stage podium at, of all things, a World Futures conference. Why, I wondered, would someone so old be interested in the future? I resigned myself to a regurgitation of learned wisdoms that could or should endure forever. To my surprise his ideas were very different.

The world has changed so much he argued, and everything is now so interconnected that “nobody can possibly know enough to be in general charge of anything important or interesting.”ⁱⁱ He went on to say that in this ‘Nobody in Charge’ world we are in a macro-transition, we need to make the world safe for diversity and that new ideas would (surprise surprise!) originate outside government. Challenging and big ideas indeed! His name was Harlan Cleveland and his life story is impressive. He had managed post World War II relief for the UN in Italy, was involved in the Marshall Plan, was an assistant secretary of state for the US at the UN, was the US ambassador to NATO, and has a list of postings and leadership positions that are quite stunning.ⁱⁱ

Harlan Cleveland comes from a generation, known as the ‘Civics.’ In this generation they were prepared to contemplate, and act on, big ideas. And they needed to, as they had to face, and navigate past, the fall of the monarchies following the Great War, a world economic depression, the tyranny of Hitler and a moral commitment to reconstruct a post World War II Europe when confronted with an aggressive Soviet Union. As I digested Harlan’s ideas I wondered if my generation, the boomers, or those that came after us, would be as clear and as bold in our twilight years about navigating in uncertain times. Will we be prepared to contemplate both the unspeakable and the unthinkable, or will we go into denial if this challenges all that has made us successful?

And what might that mean? Will we, and are we, prepared to contemplate both the unspeakable and the unthinkable especially if they challenge all the things that have made us successful up until now? What if we are on a collision course with an emerging future that suggests that really we have no choice?

<i>Six Generations Alive!</i>	Born between...	Age in 2008 is between	Age in 2018 is between
Civics	Before 1922	86 and 92+	96 and 102
Matures	1922 and 1946	62 and 86	72 and 96
Baby Boomers	1946 and 1964	44 and 62	53 and 71
Generation X	1965 and 1980	28 and 43	38 and 53
Generation Y	1981 and 2000	8 and 27	18 and 37
New Millennials	2001 and 2020	0 and 7	0 and 17

Three central ideas

I suggest that there are three ideas coming towards us from the future that will soon demand us to think through and make a number of very significant choices. If these ideas hold true then they will need to become central to all the conversations of organisations, public and private, and communities everywhere. They will frame and define what is both important and urgent and will test what we value.

Idea 1: The social foundation has shifted

Cities and organisations are what matter. For the first time in history more people globally live in cities than live in the countryside and the gap will continue to increase. This shift, coupled with the development of the modern organisation, was one of the defining features of the 20th Century. Its impact and the rise of the organisation is everywhere. Private organisations, or corporations as they are sometimes called, control what we buy, and influence us more than we think, including where we live and how we work. The influence of the organization mindset is extended by the large and sophisticated ‘not for profit’ organizations which underpin many significant religious

and social causes, and for all intents and purposes operate in the same way as their private sector counterparts. In most parts of the world government goods and services are delivered through similar vehicles. Therefore if we are to confront the uncomfortable issues that face us then the need to change, and the journey to make it happen, must make sense to organisations and cities.

Idea 2: The Environment Footprint disconnect

Our environmental footprint is a measure of how much of the earth's resources each of us uses to maintain our lifestyles. Until now we have assumed that we can blithely keep consuming without thought. However, we are now faced with a vicious blending of ecological and social factors that, if they are to be contained, will require all of us to do more with less. There is now sufficient evidence to suggest that unless we take action these factors will reshape our world in a way that is more unstable, less supporting of human existence and significantly more costly to maintain in anything like its present condition.

Idea 3. The *Age of Progress* is over and we need to create an *Age of Sustainable Design*

The severity and the complexity of this footprint disconnect has spilled over into our economic and social fabric. Its effects are so dramatic that we now need to design our way out of it and we need to do so quickly, as many of the negative effects we are now witnessing will be undoable in a decade or so from now. The upside, however, is that the ability to design and implement rapidly is not just possible, but highly desirable given the amazing current and emerging technologies at our disposal. With some thought and care we can create a set of conditions that will not only halt the progress of these challenges, but develop better environments and lifestyles that are less stressful, more satisfying and, most importantly, more durable. I say this conscious of the fact that our track record in using technology to solve issues has not always been successful! Digital promised us the paperless office but we have yet to see it although small USB drives are starting to make an impact. When we tried to duplicate the conditions of earth in a contained atmosphere, in a 1990's project called Biosphere 2, we couldn't maintain an atmosphere and in a remarkable feat of art imitating reality the whole thing fell over as vested interests fought over ownership. ⁱⁱⁱ

Some of you, having gotten to this point, may find yourselves rejecting these ideas because they are fanciful, too scary, or not relevant. You may even be angry. Before you shut the book may I respectfully ask why?

- Is it because the ideas themselves are uncomfortable?
- Is it because they challenge all the work and effort that has gone into getting things to where they are now?
- Is it because you don't want to acknowledge the emerging stresses and strains?
- Is it because the idea of change seems all too hard?

Before you shut the book think about this: what if it is possible, despite the challenges, to build organisations that are more valuable and even more successful than the ones we have now? What if we could resolve the very things that are concurrently destabilizing both our societies and our environment? What if focusing on strategies that reduce footprint becomes the main game? What if the failure to make the footprint-reduction change is the first step to rapid irrelevance?

In making the case, the first chapter focuses on the evidence suggesting that we simply can't continue doing what we currently do. Thinking through some ideas that will help us make the transition, or navigate, is what the rest of the book is about. That said, this stuff about the environment and society for those of us sitting inside the world of organisations is very challenging and in a sense, somewhat depressing. At the risk of repetition I suggest that with the right kinds of conversations, and if cities and organisations can rise to the challenge through partnership – and there is evidence that this is starting – then this is a time for cautious optimism.

Unpacking the evidence

Cities and organisations come first - a social revolution

In a sense I have started with the easiest idea first. In as far as we can gather reliable statistics, it would seem that now, for the first time in human history, more people live in cities than in the countryside and this trend is set to increase on a global scale in both the developed world and the developing world. As our global population blooms the numbers are truly staggering. There are already 20 cities with populations of more than 10 million and the number of mega cities are growing. The inland city of Chongqing has an estimated population of 50 million and Tokyo, 34 million. Today's global population is estimated at around 6 billion and it will grow to between 8 and 9 billion by 2030. Most of the young people in this growth will live in the cities of Asia or Africa.^{iv}

These cities of the 21st Century are powerful and strange attractors. Almost inexorably they draw in everything within reach – people, especially the young, food, water, fuel and power. No longer are they just service and social centres for their hinterlands. These cities provide jobs, lives and values that seem to exist with total disregard to the existence of almost anything outside themselves. They seem oblivious to those that complain of the disconnect between them and the countryside, and many think in a self obsessed way that they can sustain themselves through technologies and work that has little to do with the development of actual goods and services.

But all is not well with our cities. Many have been designed with the idea that fossil fuels are cheap. The vast sprawl of suburban living is testament to this. Still others are victims of their own success. There is evidence that they are being loved to death with declining air quality, overloaded infrastructures, pressurized social services and emerging tensions around key necessities such as water.

However, these vast centres of power and technology have spawned a love child. They are the natural home of the modern organisation, which in turn is the de facto conduit for growth and wealth creation in most parts of the world. With hindsight, the development of the modern organisation and the extension of its influence into almost every part of our lives has been one of the defining features of the 20th Century. By the year 2000 some were larger, and had more influence than many countries*. Others are simply the trading front for families. Irrespective of values and cultures, love them or hate them, organisations have become the vehicle of choice for the hopes and aspirations of much of the developed and developing world's population.

It is really unclear how their influence became so pervasive. Perhaps it's because organisational thinking has infiltrated every part of our lives. Perhaps it's because their adoption of 'machine-based thinking' has made them a very efficient way to get things done. Whatever the reason the 'psyche of organisations' permeates not just our working life but all other aspects of life as well.

Successful people, we are all too often told by the 'personal motivation' industry, have clear goals. So do most organisations. Most of us try to manage our lives with budgets, so do organisations. We have investment portfolios and so it goes on. Indeed our lifestyles have generated a vast industry that manages the outsourcing of washing, cleaning and child care so that we can spend more time in organisations or doing those 'lifestyle things' we all crave! What is less certain is

whether the pursuit of organization-centric lives has made us any happier than our predecessors who lived in more structured, conventional communities. Indeed there seems to be some evidence that there is a negative correlation between gross domestic product, and emerging measures like social domestic product - the measure of the rate of increase or decrease in our personal satisfaction – which focuses on things like safety, traffic congestion, sense of community, youth suicide, service standards, and pollution.

The Environmental Footprint Disconnect – a convergence none of us want

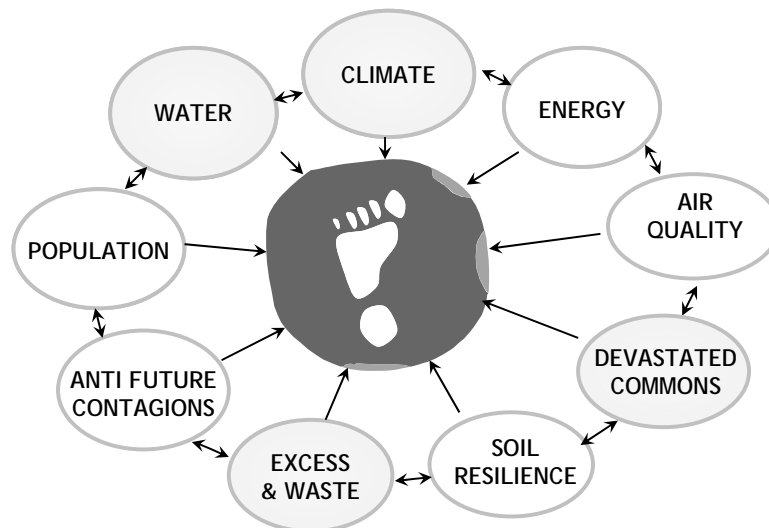
Very few now contest that the way that human beings live and work has an impact on the planet and that the planet itself is changing. At least that is the sense that I have of what I read. The concern about the negative consequences of this impact and planetary change is reflected in an ever increasing number of reports and scientific opinions.^v In many senses it is not the science that's at issue; it's the proliferation of disturbing questions that point to a future that sits uneasily within our current view of reality.

The Environmental footprint disconnect

The idea of environmental footprint is a calculation about how much resource a person, an organization, or a city needs to support them in what they do. It is normally expressed in hectares. Environmental footprint advocates calculate that given the number of people on the earth and the ability of the planet to renew itself it can sustainably support one person for every 1.8 hectares [4.5 acres]. However, it is estimated that currently we need a footprint of 2.2 hectares a year [5.4 acres], and in some countries the footprint demand is even higher. The USA demand, for example, is 9.3 hectares [23 acres], and Australia about 6.6 hectares [16.3 acres]. China is interesting because of the high variation between its rural population and its cities. It is estimated that the rural footprint is below the sustainable level at 1.6 hectares [3.95 acres], but the Shanghai footprint is about 7 [17.3 acres]! What this means is we are no longer connected to the earth in terms of its ability to support us in a sustainable way. If we are to continue to live as well as we do, we will need to rethink how to create more with less and how to use what are now unwanted by-products in more creative ways.

This illustrates in a very stark way how the issues of resource use and the growth of cities are inextricably intertwined, and nowhere is the disconnect more visible than in our cities. Although they occupy only approximately 2% of the world's landmass, they consume 74% of the world's resources. The city of London, for example, has 7.5 million people. If one calculates what it needs in terms of water, food, fuel, waste disposal and so on, it requires an estimated 125 times its surface area to support itself. That's equivalent to the entire productive area of the United Kingdom!^{vi} In my own country, Australia, the five cities that almost all Australians live in could not exist if they had to rely on the reproductive capacity of the hinterland.^{vii} As cities become more powerful the demand for food, clean water and fuel of all kinds not only stretches capacity but it is becoming increasingly expensive, thus reinforcing the systematic effects of the convergence.

THE ENVIRONMENTAL FOOTPRINT DISCONNECT



In the end it creates a kind of nonsensical math. If the Chinese were to use as much oil as the USA, by 2031 they would need 99 million barrels of oil a day and that's 20 million more than has ever been produced on a daily basis. The story with coal is similar. China again, if it matched the USA, would need 2.8 billion tonnes annually, which is some 300 million more tonnes of coal than has ever been produced, to say nothing of the pollution effects.

The question of course is how long can this continue? What does this disconnect really mean? What happens when China attains the first-world standards it is striving for and which, like the rest of us, it is entitled to? Could we create and sustain an economy that by itself will double the entire world's resource use? Can we live with the impacts of such growth, or will it be that

economic growth coupled with the ability to control environmental footprint will be the only real competitive advantage?

I am suggesting that there are at least nine [or perhaps even more] factors that, acting together, could be called a convergence of ecological and social crisis. It is this interaction or convergence that creates the footprint disconnect. The first three – climate change, more expensive rather than cheaper energy, and water – are an ‘unholy trinity’ that challenge the fundamentals of the *Age of Progress* paradigm, as they are the foundations on which it has been built. The next five are in a sense unwanted by-products of our very success. They are air quality, the devastation of the Commons, soil resilience on which we rely for food, excess consumption and waste, and population pressures. Finally there are a whole bundle of factors that I term anti-future contagions.

The climate change crisis.

There is now a widespread acceptance that climate change is occurring and that it will have a significant impact on global temperatures, crop yields, human health, sea levels and extreme weather events. If we do nothing the projections are that from 1955 to 2055 we will have at least tripled the amount of CO² released in the atmosphere since pre-industrial times.^{viii} The largest contributors to the ongoing increase are cities everywhere and resource-intensive industries. Until now we have been unwilling to constrain economic growth with concerns for things like carbon. The effect of this increase in CO² has been rapid global warming. We are now experiencing the hottest temperatures in 12,000 years and the change is occurring quickly.^{ix}

Somehow cities and organisations must, by definition, take responsibility for and at a minimum stabilize, and then reduce, the amount of CO² they produce. I would note that almost all the technologies that we need to achieve the reductions are known but somehow there is a gap between technology availability and industry will. The size of the threat should not be underestimated. Sir David King, Britain’s Chief Scientific Adviser, issued a chilling statement that should have been a defining moment. On Oct. 15, 2005 he said that:

“the scientific evidence of climate change is irrefutable and the need to reduce greenhouse emissions is pressing...by 2080 something like 50 to 100 million people will be displaced in Asia alone as a result of global warming if we don't do something now”^x

His concerns are backed up by Nicholas Stern, the British chief economist who suggests that *“if nothing is done the economic costs of climate change will cost upwards of*

\$9 trillion. This is more than the cost of the two world wars last century and the great depression.” If that weren't bad enough he goes on to conclude that *“we have ten years to make the changes before the system effects of climate change become irreversible.”^{xi}*

Maybe the British are wrong, although the rest of the European Union doesn't think so. A recent European Union report^{xii} maintained that climate change would create a seismic shift in European tourism. It suggests that there would be fewer tourists travelling from the north of Europe to the Mediterranean. This has profound economic and social implications as currently the flow of tourists from the north to the south of Europe accounts for almost 15% of all tourist trips globally. They go on to forecast that not only will tourist numbers decline, but crop yields will drop because of drought, there will be more frequent forest fires and the cost of coping with sea-level rise will run into billions of Euros.

My issue is not about the right or the wrong thing, but rather about the risks of doing too little too late if the evidence turns out to be true. Now is the time to get serious about changing the remorseless upward graph of releasing more carbon into the atmosphere. We need to reverse the trend through actions that either reduce or mitigate carbon. Both strategies from an organisation perspective make really good sense because they ask us to control and reduce our inputs in relation to our outputs.

The cheap energy crisis

The Age of Progress was developed with cheap and ubiquitous fossil fuels. We have as a result built a world that is dependent, and some say addicted, to electricity and fuels. The effects of this addiction are obvious. For example, modern cities almost everywhere have been designed to reflect and accommodate a bewildering array of internal combustion vehicles. These vehicles have had a profound impact on how commerce is transacted, where people and their families live, how

they spend their recreation time and what we all put into the atmosphere. Put simply, there are old industrial cities that have failed to adapt and urban sprawl everywhere.

All of this has been built with cheap oil that for the most part seems to be produced in some of the less politically stable parts of the world. Now this is changing. Prices are rising and many people believe that we have used at least half of the easily available oil in the world. Some believe that we can replace this oil with renewable fuels and this is in part true. However, the sheer volume required to meet the demands of increasingly affluent developing countries suggests that the renewables are only part of the solution and therefore the days of cheap energy are over. We will need to accept that in the future the price of oil and related products will steadily increase and the unthinking use of vehicles will need to be rethought.

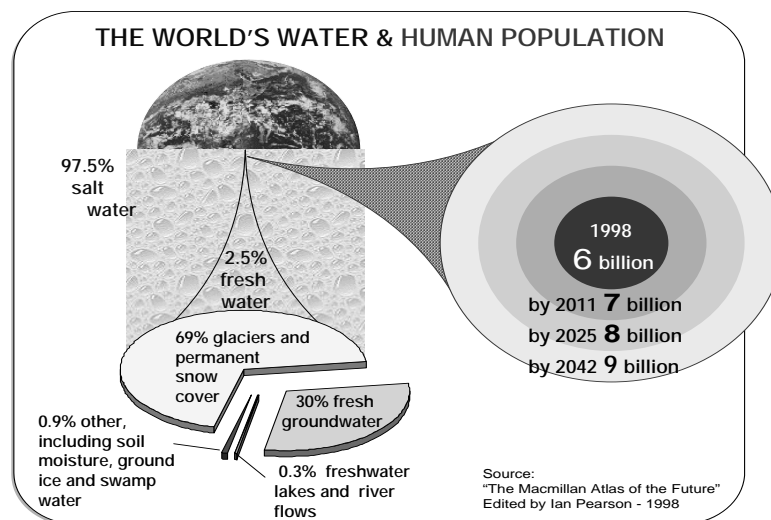
As dependent as we are on oil, we are more dependent on electricity. Some people estimate that as much as 75% of all fossil fuel consumed is used to produce electricity. In the main we have used hydro, coal and oil to power the wonderful technologies that we have created and to provide the opportunity for a relatively affluent lifestyle that our predecessors could scarcely dream of. But these fossil fuels and coal in particular come at the price of increased CO² emissions and are responsible for the globalizing of atmospheric and water pollution. A recent *New Scientist* report^{xiii} showed a wonderful picture of the earth from space at night and illustrated just how reliant we are on electricity. With the exception of notable dark spots in much of Africa, Central Asia and the Amazon rainforest, it shows light everywhere. Just how pervasive this is, is well illustrated in statistics that show that some 85% of the European Union is light polluted, 62% of the USA is the same, and for Japan the percentage is in the high nineties. Light pollution measures the upwards effects of light on the visible night sky.^{xiv}

Much of the electricity we need comes from coal, and coal is the one resource that the world has in abundance. The problem is that coal is a prime contributor to greenhouse gases and it seems likely that its price will rise as we use technologies to 'clean' the coal before we use it, or find ways to trap the less than desirable gases that it produces. Some would argue that nuclear power is a solution. That may well be, but leaving aside the ethical debate, the time frames for building nuclear power plants are very long and there are questions about the amount of high grade uranium [or perhaps thorium] available to even support the plants proposed now.

We already know that the world can live with more expensive energy. A recent report in the *New York Times*^{xv} adroitly noted that the State of California, one of the world's most advanced economies, has, by the use of careful energy pricing and emission control, reduced per capita energy consumption and has been able to keep its carbon emissions at near 1990 levels, without a fundamental change in lifestyle and still keeping its love affair with the automobile.

Scarce Water – what happens if the tap runs dry?

As we discuss in an almost spellbound way the issues of climate change and energy, we in the developed world have almost lost sight of what many in the 20th Century thought would be 'the issue of the 21st Century' – water. Few people realize that only 2.5% of the water on earth is fresh and that only 0.3% of that fresh water is in usable form.^{xvi} Our neglect to take care of what little we have is shocking. The Food and Agricultural Organization (FAO), for example, estimates that by 2025 almost two-thirds of the world's population will live with water scarcity.^{xvii} We have reduced some of the world's rivers, like the Jordan, to little more than open drains, the Dead Sea is almost really dead, and lake levels in many parts of the world are dropping in an alarming fashion. Lake Mead in Nevada is now 80 feet below its expected levels.



Of the water we use, 70% is utilized in agriculture to grow food for our ever-increasing and often affluent populations. But not all foods are equal. One kilogram of wheat uses between 1,000 and 2,000 litres of water. A similar weight in grain-fed beef uses between 13,000 and 15,000 litres. In the rush to provide for thirsty agriculture, and equally thirsty cities, we are rapidly despoiling many of the world's great underground aquifers. There is no doubt that we will have to come to terms

with living in a world of significantly degraded water quality – water that is more expensive and probably for many of us more scarce.

Desalinization has often been suggested as a remedy for the crisis. The problem is that some 40% of the costs of desalinization are energy costs,^{xviii} and some of that energy production, in turn, requires water. This is very high in the case of coal turbines or hydro electricity. There are a whole range of current and emerging technologies that will help us address the solution and perhaps we may see a time when the conversion costs are more affordable. But the message I suggest is very clear. Water, along with carbon and energy, must be in the forefront of the consciousness of governments, organisations and individuals for otherwise we humans - who physically 65% water - will have our further evolution totally compromised.

Air quality - What many of us breathe isn't just pure air anymore.

Any air traveler to the continents of North America, Asia or Europe cannot help but notice the change in the air quality from blue to brown as they near the coasts. It's called air pollution and when the moisture falls it becomes acid rain. We have learned to live with it, but the reality is that particulate matter in the air, be it in California or in Hong Kong, Kuala Lumpur or Mumbai, together with insecticides, pesticides and herbicides are killing not only birds and fish but in increasing numbers, human beings. In cities like Hong Kong it is now a key political and social issue. Smog levels regularly rise above dangerous levels and poor air quality reduced visibility to less than one kilometer (about half a mile) on more than 50 days last year.^{xix} What is perhaps of most concern is that while many of these toxic chemicals have persisted in the environment for a long time, the health effects are only just beginning to be understood,^{xx} and the clean-up costs are increasing.

The devastation of the commons

A phrase that is often used when we survey the destruction of the environment is 'the tragedy of the commons'. What this means is that we have in our world a number of food sources and environments that are in a sense owned by no one. As a result each of us is determined to get our fair share, and because no one takes responsibility for control, we end up getting our fair share of nothing. Perhaps the best illustration of this is in the globe's wild fisheries. It is estimated that there are now less than 10% of the fish in the sea than were there in 1985. We now know that we are likely to lose up to 50% of the world's sea reefs by 2030. This comes from a combination of

rising water temperatures, run-off from land and increasing ocean acidity. To accommodate our demand for urban space and food production close to the cities, the world has now lost more than 50% of its wetlands and many of our coastal mangroves have disappeared as we make ocean frontage more habitable. All of this matters because the cradle of oceanic wildlife is the reefs, and the mangroves. The same percentages reflect the sad state of original forests, which in some areas are under real threat from clearing to create biofuels.

Soil Resilience.

Much of our attitude to the Commons is driven from our thinking about agricultural production. With mechanization and with what we now call precision farming, we have learned how to farm both the commons and arable soils in a way that has seen production double and double again. Farming practice now largely mimics other industrial manufacturing processes. But it has come at a price. Degradation^{xxi} affects 80% of soils worldwide and half of that is erosion. Our rural communities are now very different from what they were 50 years ago, which is unsurprising since worldwide it is estimated that there are now only 2 million farmers commercial farmers compared with 7 million in 1940. And we *are* paying a price. Agricultural land has lost 75% of its genetic diversity. More and more fertilizer is being required to maintain the same levels of production. The reality is that our degraded soils cannot cope with more of the same. They are losing their resilience, or their ability to adapt and nowhere is this greater than in the developing countries. This is of real concern as one of the consequences of the rural urban drift is that diets change and therefore so do the foods we produce. This means that agricultural production moves “away from roots and tubers and lower quality staple grains to higher quality cereals such as rice and wheat, livestock products and vegetables.”^{xxii} All of this means that in the future we are unlikely to be able to produce food anywhere near as cheaply and easily as we have done in the past, which is concerning as it is anticipated that in the next 50 years the demand for food crops will grow by more than 75% and the demand for water by somewhere between 35% and 85%.^{xxiii}

Excess consumption and waste.

We live in a world where our every want and need is carefully themed and nurtured by the ‘all singing all dancing’ multimedia advertising industry. For many, shopping is now a recreational experience, one that is really not as exciting as it used to be because franchising has reduced the diversity of retail outlets. This cloning phenomenon was graphically illustrated in a recent UK study that showed that more than 40% of all British cities appeared to be (looked?) exactly the

same and another 25% were heading that way.^{xxiv} This global consumer explosion has had some unexpected consequences. Many people's homes have products that will never be used and some of us are obese because of the amount, and types, of food we eat. There are now about 1 billion overweight people, which is 200 million more than the total number of malnourished.^{xxv} And in the process we are producing more and more waste with fewer places to put it. The US' Environmental Protection Agency estimates that the average American generates 4½ pounds [about 2 kgs.] of waste a day. There are now a whole range of design and technology solutions to the waste issue, but could it be that we are starting at the wrong end of the issue? Could we overcome our issues of consumption and waste by rethinking the way that we create and then dispose of them? William McDonough, an ecological architect, suggests that we need to shift from an *Age of Progress* 'cradle to grave' approach to goods and services, and instead rethink much of what we do so that it more closely resembles an *Age of Sustainable Design* 'cradle to cradle' model.^{xxvi} The idea of 'cradle to cradle' – a fundamental design principle of all natural systems - requires careful thinking about the way that a product or service can be created, used and then disassembled so that it can be easily used again in the same or other production cycles.

The population crisis.

While the rate of growth in world population is slowing the actual numbers are still increasing. It is estimated that there will be another 2 billion people [up from 6 billion] in the world by 2030. Most of this growth will be in cities and most of it will be in Asia. As we grow, the shape of our population profile is also shifting and has some profound implications. Firstly, one-third of the population will be over 60 and one-third under 25. Of those under 25 some 500 million will live on less than \$2 a day, and right now there seem to be few strategies to deal with this globally aware but restless generation. Secondly, this population intensification simply exaggerates much of the environmental disconnect. It is very hard to care about the larger environmental issues when you are poor, uneducated and at risk of mindless violence, and diseases like AIDS. This projection in population growth will test the integrity of a resource-intense future. On this crowded planet, how will we accommodate this growth while recognizing that all peoples aspire to decent living standards, and indeed that it is both right and proper that they do so? How do we find mechanisms whereby they can attain such living standards but in ways that are different than the ones we used in the 20th Century?

Anti-future contagions defocus what is urgent and important.

One of our great challenges is how we reconcile what we all aspire to, given the emergence of a range of diseases and debilitating practices that affect our capacity to govern, maintain public safety and life itself? These diseases and practices I term ‘anti-future contagions’. In an interconnected world they can and do spread quickly. While there are many of these, I wish to highlight just four. The first is what might be termed biological globalization. What this means is that in a world where we move seamlessly from place to place and country to country, so do organisms that are alien to local environments. Some of these are beneficial and some not. For example, almost everywhere we can now enjoy a locally grown shellfish called a Pacific Oyster that has, one way or another, been carried on the hulls of ships to many a foreign harbour. We can also eat carp, which is so adaptable that it overruns most native species. The second of the anti-future contagions is the spectre of new diseases like Bird Flu; cities everywhere could be changed dramatically should it become widespread.

But the two that I worry most about are corruption and drugs. In the case of both of these poisons, people act in cynical ways to protect their own short-term interests and have no thoughts whatsoever toward tackling the large issues that I have canvassed so far. Indeed they often use militias or start local wars to protect these interests. Further, there are a number of countries, close to where I live, where endemic corruption serves to keep a privileged few in amazing luxury while significant populations stay at, or just above, the poverty line. In cities everywhere these traders-in-misery can always find enough people, mostly young men, to support their twisted aims.

Stewardship of the future needs to become an imperative for cities and organisations.

The unholy trinity of climate change, expensive energy, and scarce water, together with their unwanted by-products say three important things:

- Any one of these factors by themselves is sufficient to negatively impact our cities, as they experience exponential economic and social growth.
- As they act on each other these impacts are reinforced and amplified and the timeframe required to mitigate their systemic effects is increasing.
- We have, for the most part, the knowledge and the technologies to make the changes required should we think that is a good thing to do, but the window of opportunity to do so is closing.

We are now at a time when how we choose to deal with these many issues matters. The decisions we make, or don’t make, will test our stewardship of the planet and our moral duty to leave a better world for generations to come – be that from a city or organisation perspective, or a

personal point of view. Rapid change to an *Age of Sustainable Design* makes more sense than keeping on doing what we do now.

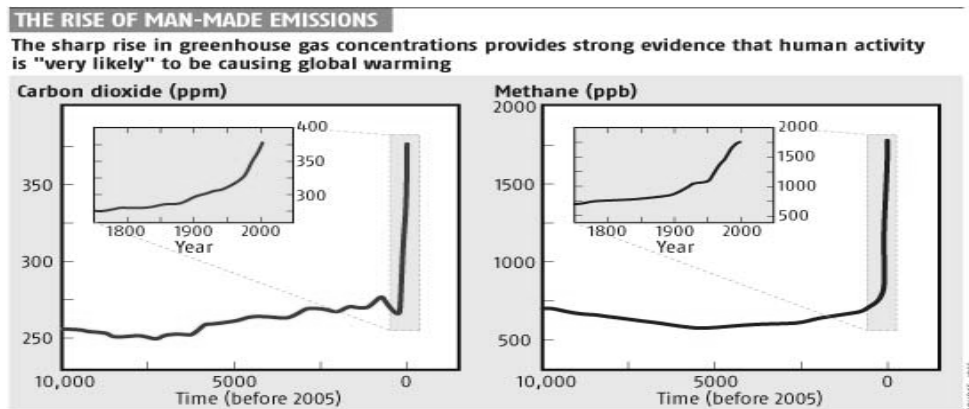
Using design and technology to create an *Age of Sustainable Design*.

While these environmental effects are for the most part an unintended consequence of the modern society we have created, our ability to progress has provided us with many benefits. Many diseases have or can be controlled; we can all live longer and in better health than previous generations; we have access to wonderful foods that were previously the sole province of kings; we are the first generations to experience widespread home ownership and benefit from investment; and we can customize our world so that it meets our every want and need. Indeed we have become so attached to, and have invested so much in, the material benefits that our modern world provides us, that we find it hard to let go. And indeed some of us experience denial and/or anger when anyone suggests that we should.

I guess we could sit back and do nothing but that is not what we humans do. The idea of consciously designing a world that is less reliant on our carbon-emitting, polluting and wasteful ways is driven from two things. The first is a self-preservation concern. The mounting evidence suggests that if we don't change our behaviours soon, the system effects arising from *the environmental disconnect* will impose more and more cost on current cities and organizations, and will change the planet so dramatically that future generations will find it difficult to support themselves both numerically and in terms of quality of life. But that is left-brain, logical thinking. The second driver comes from our right brain: it is that part of us that inspires a deep and innate desire to try to create a better world both for ourselves and our families. What we can't do, however, is build a future world based on increasing use of the planets' physical resources. *The Age of Progress* is over!

Once this reality is accepted the issue that confronts us is time. Nowhere is this more graphically illustrated than with the rate of carbon being pumped into the atmosphere. Most of the current science suggests that if carbon levels were to reach 450 ppm. it would trigger climate changes that would melt the ice shelves of West Greenland and Antarctica. But as the graph below^{xxvii} suggests the rate of carbon increase is near vertical. What this means is that developed and developing countries, rich and poor alike, have to find ways to abate the rate of carbon seeping into the atmosphere now. No longer will it be sufficient to sit back and say; "I will only do something

when others do.” No longer can we say; “I will do something only if I can keep my lifestyle.” In this ‘nobody in charge’ world we are all in charge of the need to reduce carbon and many of the other environmental challenges as well. Each of us needs to see ourselves as a designer of this very different future.



The idea of design is an important one as it implies deliberate and conscious acts to create something that is different. At the risk of repetition, it requires an acceptance of the end of *the Age of Progress*. Having said that, good design always incorporates past wisdom, but it has a sense of newness, of embracing difference, as well as of creating new reality. In later chapters, I suggest that this sense of conscious design will require us to disrupt many of our cherished thinking patterns, redefine many of the structures that have underpinned our society, focus more on seeing things in a holistic or systems way, and create a wave of change that will move us rapidly away from the collision point.

Design is another word for strategy. Yet, in many ways it is much more. Design is a multidimensional concept. It is about more than the ‘what.’ It is about the ‘how’ and the structure, and all kinds of soft elements such as values, elegance and integrity. Perhaps it is time for the idea of ‘strategy’ to morph into the more multidimensional idea of ‘design’, and to have features more suited to the challenges of the 21st Century. The mere substitution of the word ‘design’ for ‘strategy’ will create a much richer conversation in the boardrooms of our cities and organisations, and will engender a heightened sense of engagement by the ordinary people who have to make these designs work.

Fortunately we now live in a world where it is easy to share knowledge and deploy a range of both existing and emerging technologies that make it easier to get off *the Age of Progress* curve. Most of the creators of knowledge are alive right now but too much of their effort is in unconnected silos and very little is focused on the impacts of the environmental challenges. It is unthinkable that this won't change soon as the levels of alarm increase. As we search for answers in this networked world we are creating a sense of connectedness our future interdependent humanity requires.

We have all witnessed the power of the digital technologies. With very little development they will provide us with an easy and almost ubiquitous way to measure and monitor our attempts to mitigate the environmental challenges. Such measurement in my view is at the heart of fundamental systems change.

There are emerging technologies from the nano world, biotech, and the cognitive sciences, that acting in concert with the digital technologies, provide us with the best hope of redesigning a world less dependent on resource intensity. Increasingly, they will enable smart use of 'stuff' so we maximise benefits and reduce harm. These new technologies will require cities and organisations to refocus on, and invest more in, the knowledge and science that is required to support a reduced-footprint world. It will require new post partisan visions to overcome and dismantle the suffocating layers of political correctness, and an emphasis on leadership styles that go beyond fear, petty bickering and self aggrandisement.

What is interesting about the development of these technologies is that many have immediate market application and are relatively easy to sustain in small-scale laboratories. However, these same technologies that are our greatest hope might, if their processes are perverted, be used to create significant harm. Bioterrorism for example is already on the radar of nations everywhere. But our fear of misuse should not outweigh the urgent need to deploy what we know. How sad would it be to stand in a disastrous future and know that we had the answers but for competitive, or friend/foe, reasons we chose not to use them?

Thinking about design and technology together connects the hard [physical] technologies with the soft or behavioural technologies. One cannot succeed without the other. Together they shape five key principles for this *Age of Sustainable Design*. These are:

- A need to start from a view of the whole before we focus on the parts.
- Design approaches that begin from an understanding of the environment and what future success looks like rather than from an incremental improvement on what exists now.
- Making sure that we are measuring the changes that are needed.
- Planning changes by focusing not just on what needs to change but on how we are going to do it.
- Finally, ensuring that what we are doing day in and day out is reducing our footprint or, as others have so eloquently put it, making us ‘tread more lightly on the planet.’

In summary, our cities and organisations must confront the uncomfortable future through better design and the deliberate deployment of technology. The failure to do so imperils all the good things that have come from the *Age of Progress* and exposes us to a series of destabilising future possibilities. It means that the name of the game is changing. No longer can we put economic good first and everything else second. Now the environment must be central. This reversal in thinking is the essence of the difference between the *Age of Progress* and the *Age of Sustainable Design*.

Such a shift in our patterns of thinking will require us to use all our knowledge, science and technology in a very different way. This move to an *Age of Sustainable Design* shifts the debate from just efficiency to optimization. It suggests that more money can be made if the true costs of resource use are identified, and it speaks to a deep instinct for self preservation that is telling many of us that there is mounting evidence that we just can't keep going as we are. It will require us to rethink and redesign many of our processes and systems. Finally, I want to point out again that most of the knowledge and technology to make this transition is already here. This is a time for cautious optimism as there are many companies, cities, and even the great State of California, already on this journey.

FootNotes:

Chapter 1.

ⁱ Harland Cleveland; *Nobody in Charge* - Jossey-Bass; 1st edition April 17, 2002 p45

ⁱⁱ Ibid

ⁱⁱⁱ <http://www.biospheres.com/>

^{iv} Ecocities special. Ecopolis Now. New Scientist. 17 June 2006

^v Note on the Intergovernmental panel of climate change – this is just one of many.

^{vi} Eco-cities special~ Ecopolis now - NewScientist.com - 17 June 2006

^{viii} <http://www.princeton.edu/~cmi/resources/stabwedge.htm>

^{ix} *NASA study finds world warming edging ancient levels.* NY Times 25 Sept. 2006.

^x <http://news.bbc.co.uk/1/hi/sci/tech/3381425.stm>

^{xi} <http://www.hm->

treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/sternreview_index.cfm

^{xiii} EU Policy on Climate change January 2007

^{xiii} *Imagine Earth without people.* New Scientist.com 12 Oct 2006.

^{xiv} “Light pollution measures the upward light flux of sources on the Earth surface based on DMSP satellite data and then we compute the effects on the night sky modeling the light propagation in the atmosphere. Depending on the kind of map, we account for many details like the scattering of light by molecules and aerosols, the extinction along light paths, the atmospheric aerosol content, the Earth curvature, the altitude of each area, the mountain screening, the observed sky direction, the natural sky brightness, the stellar extinction, the eye capability.” <http://www.lightpollution.it/dmsp/>

^{xv} Paul Krugman. *Colorless green ideas.* pub New York Times Feb 23 2007.

^{xvi} Ian Pearson ; *The MacMillan Atlas of the Future*, edited 1998.

^{xvii} <http://www.fao.org/newsroom/en/focus/2007/1000521/index.html>

^{xviii} <http://www.technologyreview.com/microsites/spain/water/p6.aspx>

^{xix} “Survey finds little confidence on Hong Kong smog” – AFP – 3 October 2006

^{xx} Kearney; “Twice as many people died in Sydney in 2000 from air pollution than from road accidents (Australian Bureau of Regional Economics Report, September, 2003). The cost of health impacts from vehicle pollution in Sydney alone is between \$2 billion and \$3 billion annually. Children are more susceptible than adults (except the elderly) to the adverse effects of air pollution (CATF Report, February, 2005). Yet, perhaps because these effects are less visible and dramatic than road accidents, very little seems to be done to address this deplorable situation.” <http://www.onlineopinion.com.au/view.asp?article=3861>

^{xxi} Soil degradation is defined as the decline in the physical, chemical and biological quality of the soil resource. Soil degradation is an important variable in global change studies because of its aerial extent and its effect on input, transport and stabilization of OM and other essential nutrients from or in the soil matrix. It is believed that about 43% of the world’s vegetated land area has experienced some form of degradation over the last half of the 20th century alone. In the United States, anthropogenic activities have caused degradation of 90% of croplands and 54% of pasturelands. More than 12 million hectares of arable land, 0.8 percent of the land under cultivation, is degraded and abandoned every year. Soil erosion is the most prevalent form of degradation. Over 15% of the Earth’s ice-free land surface or about 80% of the global arable land is experiencing some form of erosion. Accelerated soil erosion by water and wind are responsible for 56% and 28% of all soil degradation, respectively

(Daily, 1995; GLASOD, 1990; Nadakavukaren, 1995; Pimentel et al., 1995). as reported in

<http://repositories.cdlib.org/cgi/viewcontent.cgi?article=1009&context=ucias>

^{xxii} Alex F McCalla: *Agriculture and Food needs to 2025: Why we should be concerned.* pub World Bank CGIAG Oct 1994.

^{xxiii} Frederick L Kirschenmann; *Potential for a new generation of Biodiversity in Agroecosystems of the Future*, Agronomy Journal – Jan-Feb 2007 www.eurekalert.org/pub_releases/2007-02/asoa-ibt021607.php

^{xxiv} http://www.neweconomics.org/gen/news_clonetownbritainresults.aspx

^{xxv} *Livestock’s Long Shadow* – FAO – Nov 2006

^{xxvi} *Designing the future:* Newsweek May 16 2005 <http://www.msnbc.msn.com/id/7773650/site/newsweek>

^{xxvii} Fred Pearce; *Climate Change – what the IPCC didn’t tell us*, New Scientist 09 February 07