

It is more than three decades since man first walked on the moon. The Apollo 11 mission captured the imagination of the general public and was viewed at the time as an example of how far we had progressed as a people. In the following years, however, it also became a defining contrast: we were clever enough to put a man on the moon but we couldn't come up with the answers to our problems here on earth - poverty, hunger, disease, cross-border violence and so on. This requires a commitment from governments, industry and the community. But we need to go further. We often hear it said that the environment has become a mainstream political issue. What is now needed is for the environment to become a mainstream economic issue".

—**Senator Robert Hill**

(<http://www.ea.gov.au/minister/env/2000/sp6jul00.html>)

factor of ten a future worth having

The convenience of our daily lives is possible because of the combined resources and efforts of many people and places. Yet there is now overwhelming evidence that humankind needs to find ways to reduce its impact on the planet's ecosystems. It is also clear that almost our entire industrial system is based on energy sources that are harmful to the earth's biosphere.

For instance ecological footprint¹ studies show that it will be physically impossible for developing nations to achieve Western material living standards with existing technologies, as the ecological footprint is already greater than the carrying capacity of our planet.²

The world's total energy usage, largely based on the burning of fossil fuels, has doubled since the 1960's. Sir John Maddox, (previous distinguished Editor-in-Chief of the premier science journal, *Nature*) states, "There is no serious doubt that global warming will occur, if the addition of greenhouse gases to the atmosphere continues unchecked. Moreover the end point would be global catastrophe"³

Everyday items have an associated environmental impact stretching far beyond the obvious. Australians use three billion plastic bags per annum.⁴ Australian grain exports are effectively exporting precious topsoil. Producing a loaf of bread consumes two kilograms of topsoil. Gold for an average ring typically requires the movement and disposal of many tonnes of earth and rock. The making of a car

¹ The equivalent land and water area required to produce a given population's material standard, including resources appropriated from other places

² Wackernagel, M., & Rees, W. (1996) *Our Ecological Footprint*. Gabriola Island: New Society Publishers.

³ Sir John Maddox, "What remains to be discovered?" Papermac 1999, p362

⁴ <http://www.plasticbaglevy.com>, <http://www.lgib.gov.uk/news/story.html?newsId=254>

generates about fifteen tonnes of solid waste. Even a litre of orange juice involves the transfer of 100 kilograms of soil and water.

Factor of Ten explores these issues, engaging people both emotionally and intellectually in the quest for a sustainable future. The project brings together scientists, musicians, visual artists and creative writers to present ideas about the environment — and explore how people might create *a future worth having*.

The ‘efficiency revolution’ required for sustainability can be achieved through changes in technology development and design, changes in governance, and changes in consumption decisions. Possible changes include adopting biologically-inspired production models, developing more energy- and materially-efficient technology (e.g. alternative forms of transport), and making different choices (e.g. what we do in the home, our purchasing choices). Most importantly, since we all have a part to play, there is much each of us can do much in our homes, workplace, schools, etc as well.

To achieve a ‘Factor of Ten’-type transformation in our lifetimes is a challenge unlike anything humankind has faced, requiring multi-disciplinary and co-operative efforts not seen before. ANU, through bodies like the National Institute for Environment⁵, ANU National Institute of the Arts⁶, and ANU Green⁷, has unique multi-disciplinary expertise available to address this challenge. This booklet will attempt to pre-empt and answer some basic questions you may have.

For more information on *Factor of Ten - A Future Worth Having*, visit the websites: <http://www.anu.edu.au/factoroften/> and <http://www.acfonline.org.au/na/asp/pages/default.asp>

⁵ //ni.anu.edu.au

⁶ http://ni.anu.edu.au/institute_home.asp?iid=2&mi=-1

⁷ //www.anu.edu.au/facilities/anugreen

Factor 10 Frequently Asked Questions

What is the scientific reason for Factor Ten?

Ecological footprint studies show that we need a significant improvement in how we utilise resources (some argue as much as 90% less energy and materials intensity), to meet human needs *equitably* within our planet's carrying capacity.⁸ This may seem extreme but for instance within the next 100 years scientists believe that most of the world coral reefs will have died and already over 50% of the ancient forests have gone.⁹

Why do we need to so drastically improve our resource productivity?

Despite innovations dramatically increasing eco-efficiencies in recent decades, the net resource and energy flows are still increasing. This is due to factors such as increasing globalization of production, global uptake of Western consumption patterns in the East and South, and global population growth.

Even our renewable resources may not be able to cope with the demands of an increasing global population. Unless cheap forms of desalinating water can be found for instance, the outlook globally for water supplies is scary. According to the International Water Management Institute, global consumption of water is doubling every twenty years, more than twice the rate of human population growth. If current trends persist, by 2025 the demand for fresh water is expected to rise by 56 percent – which is more water in total than is currently available.

Nearly a third of the world's expected population would live in regions facing severe water scarcity by 2025. Hans van Ginkel, UN under-

We urge governments to take incisive action now and to adopt an integrated policy on population and sustainable development on a global scale. With each year's delay the problems become more acute. Let 1994 be remembered as the year when the people of the world decided to act together for the benefit of future generations.

—The World Academies of Science.

⁸ WBCSD, L DeSimone and F Popoff 1997, *Eco-efficiency: the Business Link to Sustainable Development*, MIT, Press, Cambridge, MA; Smidt-Bleek F, et. al 1997, "Statement to Government and Business Leaders", Wuppertal Institute, Wuppertal, Germany.

⁹ The Worldwatch Institute publishes reports annually on the state of the planet at: <http://www.worldwatch.org/>

secretary-general, has warned that conflicts over water could become a key part of the 21st century landscape. The World Bank warns that like oil in the previous century, water will be the cause of wars in this century. Humankind is already using a staggering 55% of all the world's renewable fresh water¹¹.

Australia has its own particular environmental issues such as salinity. In the lifetimes of our grandchildren, more than seventeen million hectares will be lost to salt. The cost of lost agricultural production and damage to the environment and built infrastructure are likely to climb above \$1 billion a year. Scientists estimate that 1,000 species of Australia's unique native plants and animals will become extinct due to salinity.

The concerns behind *Factor of Ten*, therefore will inevitably grow to become major visions, goals, and drivers for innovation in the 21st century.

Is 'Factor Ten' a new idea? Where did the idea come from?

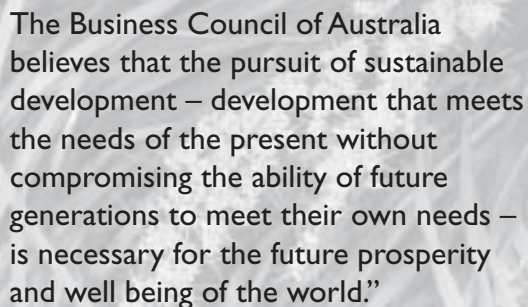
The idea of the need for a 'Factor Ten'-type change in resource use has emerged from the Human Ecology and Sustainability fields over the last decade. In the 1960s ANU's Steven Boyden was one of the first to argue that historically there has been a significant increase in both the rate and volume of material and energy flows through the major historical societal transitions. He was one of the first to systemically demonstrate the need for a new industrial revolution to reverse this trend and instead 'dematerialize'.

Boyden's pioneering work, along with Rachel Carson's, and numerous others' demonstrated that we need to live more sustainably in harmony, not at war, with nature. The OPEC oil crisis of 1974 brought with it the first wave of change as numerous companies embraced energy efficiency. In 1975, for instance, the company 3M began an energy efficiency program. Today that program saves 3M \$200 million per annum¹².

¹¹ <http://www.planetark.org/dailynewsstory.cfm/newsid/12012>, <http://tm0.com/sbct.cgi?s=55165916&i=377006&d=1640092><http://tm0.com/sbct.cgi?s=55165916&i=377006&d=1640095><http://news.ft.com/ft/gx.cgi/ftc?pagename=View&c=Article&cid=FT3HH5SLCQC&live=true&tagid=ZZZU21UKJ0C>; "Water in Crisis" (Gleick 1993); "Water: Rethinking Management in an Age of Scarcity" (Postel 1984); "Water and Sustainability" (Rskin et al. 1996).

The occasion that arguably brought the term *sustainable development* into common use world-wide, however, was the work performed by the World Commission on Environment and Development (WCED) which in 1987 defined *sustainable development* as “meeting the needs of the present without compromising the ability of future generations to meet their own needs”.

Sustainable development has now become such a misused term, however, that for many it simply means sustaining or development in its current,



The Business Council of Australia believes that the pursuit of sustainable development – development that meets the needs of the present without compromising the ability of future generations to meet their own needs – is necessary for the future prosperity and well being of the world.”

—The Business Council of

unsustainable, form. However academics and such experts as CSIRO’s Sustainable Ecosystems Unit argue that to achieve sustainability we need to ‘dematerialize’ by a factor of at least 70%, and hence close to a factor of four (a 75% ‘dematerialisation’).

The original ideas behind *Factor of Ten* come from a significant book published in 1997 (*Factor Four: Doubling Wealth, Halving Resource Use*¹³). The authors of this book subsequently formed the Factor Ten Club to broaden awareness (initially in Europe, but subsequently internationally, about these issues.)¹⁴

Factor Four demonstrated numerous examples across a wide range of industries, urban planning and transport of where a ‘Factor Four’ change could be achieved. It clearly demonstrated how the economy could still grow whilst homes, cars, public transport and other aspects of society were radically redesigned to take account of ‘Factor Four’ (and ‘Factor Ten’). These ideas have recently been developed for an Australian context by Janis Birkland *et al* in “*Design For Sustainability*.”¹⁵ This book was

¹² Washington Post, Firms Become ‘Green’ Advocates Global Warming Talks Near End, By William Drozdiak 11/24/00; For more information about 3M and for the best overview about Corporate energy efficiency programs <http://www.cool-companies.org/ads/featurestory.cfm>. For a good summary of key statements and commitments from Corporate America relating to global warming <http://www.campaignexxonmobil.org/shareholder/pdf/Financial.pdf>

¹³ <http://www.eddiem.com/fact4/fact4.htm>, http://www.bsdfglobal.com/tools/principles_factor.asp

¹⁴ <http://www.techfak.uni-bielefeld.de/~walter/f10/declaration94.html>

<http://www.factor10-institute.org/F10CStatm.htm>

<http://www.enpc.fr/cergrene/HomePages/tassin/envir2000/articles/club10.html>

motivated out of the understanding that comes from *Factor Four* and 'Factor Ten'. The important message is that, from the start, we need to design our technologies to be as resource efficient as possible. **We need technologies that will do more, for longer, with less.**

Increasingly this message is being understood.

The Millennium Project was set up to research thinking about the future. In a worldwide survey it identified fifteen global issues that will dominate the future. The foremost issue identified was 'achieving sustainable development.' They commented that 'Never before has world opinion been so united on a single goal as it is on achieving sustainable development.'¹⁶

"In the years since the formation of the Factor of Ten Club, Factor Ten (a 90 percent reduction in energy and materials intensity) and Factor Four (a 75 percent reduction) have entered the vocabulary of government officials, planners, academics, and businesspeople throughout the world. The governments of Austria, the Netherlands, and Norway have publicly committed to pursuing Factor Four efficiencies. The same approach has been endorsed by the European Union as the new paradigm for sustainable development. Austria, Sweden, and OECD environment ministers have urged the adoption of Factor Ten goals, as have the World Business Council for Sustainable Development and the United Nations Environment Program (UNEP). The concept is not only common parlance for most environmental ministers in the world, but such leading corporations as Dow Europe and Mitsubishi Electric see it as a powerful strategy to gain a competitive advantage."

**Can we manage a 'Factor Ten'-type change in our lifetimes?
Yes.**

a) Already scientists and companies are producing 'Factor Ten' innovations using the principles of *Design for Sustainability*. There are also new business models that are solving many of the inter-related problems. Interface Ltd is a remarkable case in point. A large billion-dollar multinational carpet company, they have replaced petrochemical-based carpets with carpets made from renewable biomass such as corn

¹⁵ <http://styluspub.com/books/book5584.html>

¹⁶ Glenn, J.R and Gordon, T.J 1998 State of the Future Report: Issues and Opportunities, American Council for the United Nations University. Millennium Project, Washington.

waste that can be recycled with little loss of quality. The new carpet is the first certified climate-neutral product in the world (that is, all the climate impact of making and delivering it has been offset before it gets to you). Rather than owning the carpet, one leases it from Interface who then collect the worn out squares for recycling. In the first four years of this business model Interface more than doubled its revenue, more than tripled its operating profit, and nearly doubled its employment - all at the same time. Overall they have achieved a 97% total reduction in materials used to provide a better service in every respect.

They are on their way to achieving a ‘Factor 100’ reduction in raw natural materials used.

b) Wise governance can also rapidly achieve ‘Factor Ten’.

Did you know that globally there are US\$700 Billion in “government subsidies for industries that either directly or indirectly harm the environment”?¹⁷ In the USA the Green Shears Campaign removed US\$23 Billion of these perverse subsidies from the federal budget.¹⁸

In addition local government is learning that it can easily improve the environment through eco-taxes whilst compensating voters/businesses through reductions in income and or payroll tax respectively.¹⁹

*For instance, in Ireland a small tax on plastic bags recently led to a 90% reduction in the number of plastic bags used - a tenfold reduction.*²⁰

For a complete fully costed free downloadable outline on *how Governments in partnership with Society and business can deliver a future worth having*, see Australian Conservation Foundation’s Blueprint For A Sustainable Australia.²¹

c) There is growing evidence that the shift of an order of

¹⁷ Myers, N. 1996, *The Ultimate Security: The Environmental Basis of Political Stability*, Island Press, Washington D.C.

WorldWatch Institute (1996), “Paying the Piper: Subsidies, Politics, and the Environment” Worldwatch Paper 133 by David Malin Roodman <http://www.worldwatch.org/pubs/ea/nwn.html>
UNEP: The State of Global Perverse Subsidies. <http://www.grid.unep.ch/geo2000/english/0138.htm>
UNEP: Energy Subsidy Reform Program. <http://www.unep.ch/etu/etp/events/recent/enind.htm>

¹⁸ For the 2000 report see <http://www.foe.org/eco/scissors2000/>, and follow the links to earlier reports

¹⁹ <http://www.acfonline.org.au/blueprint>, Chapter 3.

²⁰ <http://www.plasticbaglevy.com>, <http://www.lgib.gov.uk/news/story.html?newsId=254>

²¹ <http://www.acfonline.org.au/na/asp/pages/default.asp>,

magnitude (ie. tenfold or ‘a factor of ten’) in resource productivity can bring significant competitive advantage to businesses.

“Our central message is that the environment-competitiveness debate has been framed incorrectly. The notion of inevitable struggle between ecology and the economy grows out of a static view of environment regulation, in which technology, products, processes and customer needs are all fixed. In this static world, where firms have already made their cost-minimizing choices, environmental regulation inevitably raises costs and will tend to reduce the market share of domestic companies on global markets. Managers must start to recognise environmental improvement as an economic and competitive opportunity, not as an annoying cost or an inevitable threat. Environmental progress demands that companies innovate to raise resource productivity-precisely the new challenge of global competition. It is time to build on the underlying economic logic that links the environment, resource productivity, innovation, and competitiveness”²². (Professor Michael Porter, Institute for Strategy and Competitiveness, Harvard Business School)

d) Finally there is also great progress at some leading institutions towards the necessary training and capacity building in the education sectors. For instance ANU, in committing to the Talloires Declaration,²³ is determined to play its part and recognizes its unique opportunity to lead here. The next generation of graduates will leave the education system with practical experience in *Design For Sustainability* principles, ‘Factor Ten’ ideas, Life Cycle Analysis, and even increasingly Triple Bottom Line accounting. Globally the shift in the University sector is significant with UNESCO forming the Global Higher Education for Sustainability Partnership with over 1000 Universities worldwide. (www.unesco.org/iau/ghesp/) UNESCO is also co-ordinating a decade of education in Sustainable Development.

²² Michael E. Porter and Claas van der Linde, “Toward a New Conception of the Environment-Competitiveness Relationship,” *Journal of Economic Perspectives*, (IX- 4) Fall 1995, pp. 97-118. See also the Institute’s website: <http://www.isc.hbs.edu/>

²³ <http://www.anu.edu.au/facilities/anugreen/admin/talloires.html>

“We need a major public education effort. Understanding of these challenges we face is alarming low. Corporations and consumers alike need to recognize that their choices can have significant consequences. Schools and civil society groups have a crucial role to play.”
(World Environment Day, 2000).

—**Kofi Annan. Nobel Peace Prize
Winner 2001**

(David Suzuki, World Academies of Science,
Earth Time, pg 23, 1998)

How does ‘Factor Ten’ relate to the Greenhouse Effect?

The Kyoto Protocol is simply requiring nations to reduce their greenhouse emissions up to 10% below 1990 levels.

Yet experts warn that we need at least a 50% reduction to make a significant difference to long term greenhouse gas concentrations.

Therefore the world desperately needs ‘Factor Ten’ innovations, that is innovations that use 90% less energy for the overall economy to achieve anything near a 50% reduction in emissions. A 50% reduction may seem a lot but it is possible. For instance MIM, a major mining company, in Australia has already achieved it.²⁴

Why does global warming matter? Canberra is so cold in the winter.

The earth has gone through climate change before of one to six degrees. But in the past ecosystems could migrate across vast, connected areas of undisturbed landmass and thereby cope with that stress. By contrast our “wilderness areas” are increasingly tiny islands, largely unconnected. Hence if global warming is allowed to continue, and all the fossil fuel reserves are burnt, the CO₂ concentration will increase six-fold. Ecosystems will not be able to migrate as they did during the previous times of climate change. Already scientists forecast global warming of one to six degrees with a doubling of the concentration of CO₂. It will be impossible for ecosystems to migrate whilst we undertake this experiment with the planet.

Different pressures on the world’s ecosystems from different sources have a compound effect on each other. The impacts of Greenhouse alone can be mitigated but when these are combined with deforestation, the conversion of vast landmass to modern agriculture, increasing poverty, and urban waste streams, the stress on our remaining wilderness

²⁴ MIM Greenhouse reductions of 50% case study::<http://www.ea.gov.au/industry/eecp/case-studies/mim.html>

ecosystems can no longer be ignored. These same ecosystems provide numerous vital services for which we don't have replacements. These services have been costed at greater than the global GDP.²⁵

Clearly then addressing global warming is in our long term national and global interests.

As Bill Clinton stated on his recent tour of Australia, "What are you worried about just a few thousand refugees? [sic] With climate change you will have hundreds of thousands on your shores."

In June 1999, the Australian Prime Minister's Science, Engineering and Innovation Council, which draws together higher powered business interests and eminent scientists, issued a report that urged the Government in Australia to go from the defensive to an attacking position on climate change policy. It observed that 'Kyoto has created a new business environment in which new industries, markets and technologies can flourish'. and urged the Australian government to adopt policies, including emissions trading, that would see Australia capture at least 5% of the huge world market for greenhouse technologies. Clearly those nations that can innovate and create the most energy efficient and cost effective greenhouse technologies will have significant long term competitive advantage.

What will then be the main external driver to waking people up of the need to shift towards 'Factor Ten'?

Ironically, it may be from a very unlikely source, namely pressure from the insurance industry and the present insurance crisis.

Behind the present Insurance crisis of 2002 is a decade of crisis for the re-insurance industry due to exposure to natural disasters. Ironically this looks like being one of the main drivers for change. It has certainly caught the attention of the world's business community.

Andrew Dlugolecki, the director of general insurance development at CGNU stated recently that "Global economic losses from natural disasters have risen at an annual rate of ten per cent over the last four decades, reaching US\$100 billion in 1999. Extrapolated, the cost of damage would exceed global GDP by 2065".²⁶

²⁵ http://www.csiro.au/index.asp?type=activity&id=Ecosystem_Services

²⁶ <http://www.monitor.net/monitor/0012a/climatebankrupt.html>

Already insurance companies are retreating from insuring areas prone to natural disasters as they simply cannot afford it, nor can countries afford the increasing premiums. In 1998 alone, more than 700 “large-loss” natural disasters caused more than \$90 billion dollars in economic losses, far outweighing the insured tally, according to reinsurance firm Munich Re. In the case of Hurricane Mitch, only two percent of the estimated seven billion dollar economic burden was covered. The 1990s have been years of record weather-related disasters. Munich Re, issued a report in late 1998 suggesting that large areas of the world, including the south-eastern US and Indonesia, may become virtually uninsurable in the years ahead.

Munich Re, the world’s largest re-insurance company, in February 2001 with UNEP estimated that damage from climate change would amount to US\$300 billion per annum by the middle of the century.²⁷

But at the same time we cannot undo 300 years of fossil fuel based industrial infrastructure overnight.

The good news however is that if phased in over fifty years the cost to our economy of changes such as renewable energy infrastructure will be much less than people fear.

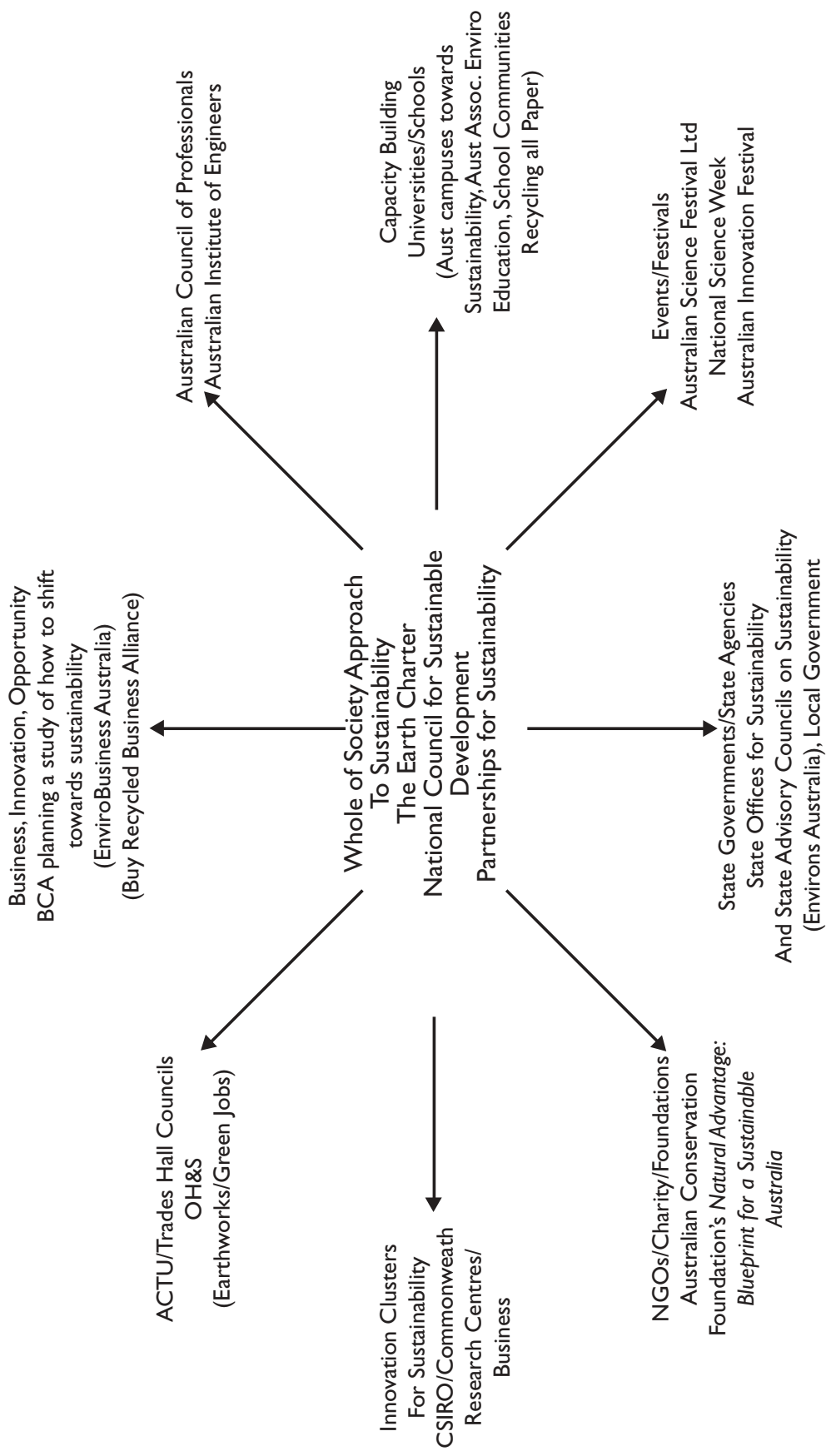
The bottom line has been investigated by Cambridge Econometrics.²⁸ Adair Turner, former Director General of the Confederation of British Industry quotes from their studies, “If renewable fuels, for instance, cost three times as much as present fossil fuel prices, the impact of Britain switching to a primarily renewable basis by 2050 would be to reduce national income in that year by just 4%. This would cut annual growth from now till then by only one-tenth of one percent - implying that we would reach in 2052 the standard of living otherwise attained in 2050. This is a choice we can afford to make, and a trade off we have no right to reject at the expense of vulnerable people elsewhere in the world”. The key here is that if renewable energy is phased in over time, this allows and motivates energy efficiency measures to be adopted, energy efficiency innovation to take place and thus the overall impact on most of the economy can be shown to be minimal.²⁹

²⁷ The Weekend Australian, April 14-15, 2001

²⁸ <http://www.camecon.co.uk/>

²⁹ http://www.findarticles.com/cf_0/m0FQP/4536_130/74939237/p1/article.jhtml?term=Adair+Turner

factor ten



What is stopping us?

Since 'Factor Ten' involves long term planning, our present political systems, with their short term focus, are not presently good at addressing such issues. But Just forty years ago, however, the US Government rose to their self-created challenge of putting a Man on the moon over a ten year period. Hence many believe that we can again meet this challenge.

All that is required is some governmental and institutional willingness to listen, learn, support (and in some cases lead), in order to overcome the obstacles of short-term, cut and thrust, politics and bring some strategic long-term perspective and planning. More and more countries recognize this.

- WA, ACT and SA are already doing this by forming Offices for Sustainability to co-ordinate the transformative process of 'Factor Ten' at a state level, and develop partnerships for sustainability to facilitate this.
- Already many countries already have National Councils for Sustainable Development to coordinate this process at a national level.
(www.ncsdnetwork.org/) Australia. is not

“As other nations have pushed ahead, U.S. trade has suffered. Germany has had perhaps the world’s tightest regulations in stationary air-pollution control, and German companies appear to hold a wide lead in patenting-and exporting-air-pollution and other environmental technologies. As much as 70 per cent of the air pollution-control equipment sold in the U.S. today is produced by foreign companies. Britain is another case in point. As its environmental standards have lagged, Britain’s ratio of exports to imports in environmental technology has fallen from 8:1 to 1:1 over the past decade. In contrast, the U.S. leads in those areas in which its regulations have been the strictest, such as pesticides and the remediation of environmental damage. Such leads should be treasured and extended. Environmental protection is a universal need, an area of growing expenditure in all the major national economies (\$50 billion a year in Europe alone) and a major export industry. The strongest proof that environmental protection does not hamper competitiveness is the economic performance of nations with the strictest laws. Germany has tough regulations. In America, many of the sectors subject to the greatest environmental costs have actually improved their trade performance, among them chemicals, plastics and paints.”

Professor Michael Porter

Harvard Business School, 1991.

New York Times, 5 April 1991, excerpt from

April 1991 Scientific American

among them.

Such new institutional bodies are needed to co-ordinate a 'Whole-of-Government' approach to sustainability, and in time a Whole of Society approach to Sustainability.

Most of Australia's peak groups, bodies, and NGOs are formally already committed and working towards achieving sustainability in practice.

This is shown in detail in the new Case Study

Folders of Australian Conservation Foundation's *Natural Advantage Blueprint For A Sustainable Australia*. (<http://www.acfonline.org.au> and click on the Natural Advantage icon, then the Case Studies folders which are on the following web site. [http://www.acfonline.org.au/na/asp/pages/publicationtyp.asp?IdPublicationTyp=15.](http://www.acfonline.org.au/na/asp/pages/publicationtyp.asp?IdPublicationTyp=15))

This Blueprint For A Sustainable Australia is endorsed by numerous people and bodies including the CEO's of BHPBilliton, BP Australia, Interface, Southcorp, Malcolm Fraser, Bob Carr, ACTU, ACOSS, AMA, Sir William Deane (the previous Governor General) to name a few.

Similarly *A Just and Sustainable Australia* publication is formally endorsed by The Australian Council of Social Services (ACOSS), the National Council of Churches of Australia (NCCA), the Federation of Ethnic Communities Council (FECCA), the Australian Conservation Foundation (ACF), the Australian Consumers Association(ACA), the Australian Council for Overseas Aid (ACFOA). It is freely downloadable from http://www.atsic.gov.au/issues/Australian_collaboration/
http://www.atsic.gov.au/issues/australian_collaboration/A_Just_and_Sustainable_

" I think whenever we eliminate waste or deal with waste, and a lot of what we deal with in the environment is wasting our resources, we use those resources more efficiently, or we nurture them and maintain them better, in the end increases GDP rather than decreases. So I remember in the 1980s when the Greens took power in Germany and industrialists were running round saying Oh it's only a Chicken Little, it was the end of the world, and the end of German industrialisation as we know it. The fact is, that they've ended up generating a huge multi billion-dollar Deutschmark export industry in environmental technology. Some of the things they used to do they can't do any more, but there's a whole lot of things they can do, and that's true for Australia, and we're uniquely placed because not only do we have that sort of technological edge, but we're sitting on the edge of the Asia-Pacific region where we can export that technology, bucketloads of it, and make a huge industry."

John Hewson, ex Leader of the Australian Liberal Party (2001).

<http://www.acfonline.org.au/na/asp/pages/publicationtyp.asp?IdPublicationTyp=15ext.pdf>

This shows that a significant number of peak bodies in Australia are already calling on government to act and who are willing to play their part. We have attempted to show (summarize) this in a “Whole-of-Society Approach-to-Sustainability” mind map.

Government will follow if the electorate leads.

The rest of this booklet provides a sample of the useful resources freely available to assist students, teachers, academics, public servants, policy makers, and everyone else. These online and published resources will help prove to even the most cynical and skeptical that a significant shift

Just some of the networks and organizations in Australia to help us achieve Factor of 10.

Buy Recycled Business Alliance. <http://www.brba.com.au>

Environment Business Australia - <http://www.environmentbusiness.com.au>

World Federation of Engineering Organizations and FEISEAP's partnership for sustainable development, representing 50 million engineers globally is housed on ANU's web sites. <http://sunsite.anu.edu.au/feiseap/index.htm>

Price Waterhouse Coopers Triple Bottom Line Accounting links

<http://www.pwcglobal.com/extweb/newcolth.nsf/docid/6F6B45C33E4E208F85256949006A0346?OpenDocument>

CPA Australia on Triple Bottom Line Accounting. http://www.cpaonline.com.au/03_publications/02_aust_cpa_magazine/1999/03_mar/3_2_3_31_reporting.asp

South Australian governments report on how to create Environment Industry Innovation clusters, http://www.industry.gov.au/library/content_library/11_Environment_Industry_Cluster_Development.pdf.

The National Local Government network committed to Agenda 21, Environs Australia, which begun 10 years ago originally from an ANU CRES collaboration with local government. <http://www.environs.org.au/aboutus/index.html>.

Australian Association of Environmental Education, <http://members.iinet.net.au/~aaee/>

School Communities Recycling All Paper (SCRAP) <http://www.nccnsw.org.au/member/scrap>.

towards 'Factor Ten' is possible this century. So, once you have finished with this booklet, why not lend it to a friend or better still your local politician?

Simple ways you can make a difference...

If you are an ANU Student:

The **Environment Collective** is your resource! Drop into the Environment Office in the Students' Association, next to Chifley Library. Or ring 6125 9869; e-mail enviro.collective@student.anu.edu.au <http://student.anu.edu.au/Dept/Environment> Dept (or <http://anusa.anu.edu.au> from on campus);

The Environment Collective meets on Tuesday, 5.30pm in the Students' Association, all are welcome.

If you are part of the ANU community, whether staff, student or administrator, **ANU Green** is there to help you.

ANU Green: <http://www.anu.edu.au/facilities/anugreen/>

http://www.anu.edu.au/facilities/anugreen/environmental_links.html

Other significant ANU bodies run regular seminars and public forums on many aspects of Factor of Ten such as the

- ANU's National Institute For Environment: http://ni.anu.edu.au/institute_home.asp?iid=5&mi=-1
- ANU's National Institute of the Arts: http://ni.anu.edu.au/institute_home.asp?iid=2&mi=-1
- ANU CRES: <http://cres.anu.edu.au/>
- ANU SRES: <http://geography.anu.edu.au/>

Resources, organizations to assist ACT residents work towards achieving 'Factor Ten':

ANU's ACT Green Guide provides information on everything from things you can do in your home, to which ACT environmental groups you could get involved with and everything inbetween.

http://bohm.anu.edu.au/Dept/Environment_Dept/GreenGuide2000/Green_Guide_home.html

ANU Green's web site links provide numerous links to useful information to help achieve 'Factor Ten' in the ACT.

http://www.anu.edu.au/facilities/anugreen/environmental_links.html

Why not become a member of the ACT Conservation Council and Environment Centre and or one of their member groups? <http://www.ecoaction.net.au/>

ACT Office For Sustainability

ANU NIE members will be contributing to the advisory panel for the new ACT Office For Sustainability. <http://www.act.gov.au/sustainability/>

Useful Resources/Books To Help Australia and the World achieve 'Factor Ten':

Free Downloadable Resources

Australia

Krockenberger, M., Kerade, P. and Thorman, R., *Natural Advantage, A Blueprint for a Sustainable Australia*. Australian Conservation Foundation, Australia, 2000.

<http://www.acfonline.org.au/docs/publications/bk01.pdf>

Smith, M. Brown, S. Krockenberger, M. Updated and new Online Folders, *Natural Advantage, A Blueprint for a Sustainable Australia*. Australian Conservation Foundation, Australia, 2002.

<http://www.acfonline.org.au/na/asp/pages/publicationtyp.asp?IdPublicationTyp=15>

Yenken, D. A Just and Sustainable Australia, It is freely downloadable from http://www.atsic.gov.au/issues/australian_collaboration/A_Just_and_Sustainable_txt.pdf

Edited by Byran Furnass “*Good Grub: food for healthy people and a healthy planet*”. 2002. Published by Nature and Society Forum and the Mulanggarri Foundation. Based on freely available conference proceedings <http://www.natsoc.org.au/html/conferences.html>

International

The Earth Charter, <http://www.earthcharter.org/>

Hawken, P., Lovins, A. and Lovins, H., *Natural Capitalism, Creating the Next Industrial Revolution*. Earthscan, London, 2000. Freely Downloadable from <http://www.natcap.org/sitepages/pid5.php>

Traditional Publications

Publications by ANU Academics

Dumaresq, D., Greene, R. & van Kerckhoff, L.(eds) 1997 *Organic Agriculture in Australia*. RIRDC 97/14. 220p. ISBN 0 642 24639 4

Warwick J. McKibbin and Peter Wilcoxon *Climate Change Policy After Kyoto:*

A Blueprint for a Realistic Approach, 225 pp./ 2002

Hamilton,C. 2001 *Running From the Storm, The Development of Climate Change Policy In Australia*. UNSW Press.

Gibbons,P. & Lindenmayer,D. 2002, *Tree Hollows and Wildlife Conservation in Australia*, NSW Parks & Wildlife/ANU 064306705 1

Mackey,B. Lindenmayer,D. Gill,M. McCarthy,M. & Lindesay,J. May 2002 *Wildlife, Fire and Future Climate:A Forest Ecosystem Analysis*. CSIRO Publishing, 0643067566.

Birkeland,J. et al, April 2002 *Design for Sustainability*

A Sourcebook of Integrated, Eco-logical Solutions, Earthscan.

Dovers, S. (ed) 2000. *Environmental history and policy: still settling Australia*. Oxford University Press.

Handmer, J. Norton, T. and Dovers, S. (eds). 2001. *Ecology, uncertainty and policy: managing ecosystems for sustainability*. Harlow: Prentice-Hall.

Dovers, S. 2001. *Institutions for sustainability*. Tela paper 7. Australian Conservation Foundation. Available at <http://www.acfonline.org.au/publications/tela/intro.htm>

Allan,R Lindesay, J. & Parker,D. 1996 *El Nino-Southern Oscillation & Climate Variability*, CSIRO/ANU/UK Meteorological Office.

McKenna,M. 2002 *Looking for Blackfellas' Point An Australian History of Place* UNSW Press

Nicholson, R., Stephenson, P., Brown VA, and Mitchell,K 2002. *Common ground and Common Sense: community-based environmental health planning. An Action Handbook*. Commonwealth Department of Health and Ageing. Canberra 250pp

Brown,VA, Love, D., Griffith. R, Mossfield A., and Benjamin,M. 2000 *Western Sydney Regional State of the Environment Report 2000* (Text, CD

and Web-page) Western Sydney Regional Organisation of Councils
Blacktown 200pp

Other International books of interest.

Anderson, R. *Mid Course Correction Towards a Sustainable Enterprise: The Interface model.* The Parnarizilla Press, USA, 1998.

Beryus, J. *Bio Mimicry: Innovation Inspired by Nature, How to mimic nature's advanced technology.* William Morrow and Co., Inc., New York, 1997.

Colins, J. and Porras, J. *Built to Last, Successful Habits of Visionary Companies — A message for the New Economy.* Random House, London, 1994.

Diamond, J. *Guns, Germs and Steel, A Short History of Everybody for the Last 13,000 Years.* Vintage, London, 1997.

Eldredge, N. *Life in the Balance, Humanity and the Biodiversity Crisis.* Princeton University Press, USA, 1998.

Elkington, J. *Cannibals with Forks,* New Society Publishers, Canada 1998

Hawken, P. *The Ecology of Commerce, A Declaration of Sustainability.* Harpers Business, New York, 1993.

Roddick, A. *Business as Unusual.* Thorsons, London, 2000.

Weaver, P. et al, *Sustainable Technology Development,* The Dutch national research program. Greenleaf Publishing, UK, 2000.

The time has clearly come for a broader business, political and public debate about ways to achieve 'Factor Ten'.

Here's why:

...Ecological footprint studies show that we need a significant improvement in how we utilise resources (as much as 90% less energy and materials - a Factor of Ten) to meet human needs *equitably* within our planet's carrying capacity.

...Despite innovations dramatically increasing eco-efficiencies in recent decades, the net resource and energy flows globally are still increasing.

...According to KPMG over 75 percent of Australians bought products in the last twelve months on the basis of social/ environmental issues.

...The Dow Jones Sustainability Group World Index was outperforming the ordinary group world index by more than 50 percent over a four-year period to December 1999.

...In the USA socially responsible investment portfolios in 1999 were worth US \$1,497 billion in comparison to US \$529 billion in 1997. This represents a growth rate twice that of the general market. In the UK socially responsible investments grew from \$1.7 billion in 1998 to more than \$7.2 billion in 1999.

...Sustainable energy in NSW had direct jobs growth of nine percent per annum in 1996-98 and growth of nineteen percent was expected in 1999-2000. Other (unsustainable) energy industries had substantial job losses in the 1990s.

...In the United States remanufacturing (reusing waste materials) is a US \$53 billion a year industry employing 480,000 people directly. Wind power supplies ten per cent of Danish electricity; and wind turbines are Denmark's fourth largest export, worth US \$1 billion a year and employing 12,000 people.

...Up to 320,000 new jobs in wind energy, 294,000 new jobs in photovoltaics and 250,000 new jobs in solar thermal are anticipated in the European Union by 2010.

...Only thirteen percent of Australians think that quality of life is improving, 52 percent getting worse, and 33 percent about the same.