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Feature thought:

"When we no longer know what to do we have come to our real work, and when we no longer know which way to go we have begun our real journey. The mind that is not baffled is not employed. The impeded stream is the one that sings."

Wendell Berry

Dear Networkers:

SUSTAINABILITY NETWORK UPDATE – No 31E

The first three of the four short features in this Update all reinforce how progress towards sustainability is an "inside job" – significantly dependent on changes in the way we conceive our interactions with technology and natural resources – and ultimately, on fundamental revision of personal values. While complementary changes are needed across the breadth of our social institutions – through government regulation as well as market-based incentives – it is the "inside job" of moral revision that will determine ultimate success or failure.

In discussing his feature in the last newsletter, Frank Fisher said, profoundly I thought, "My eco-house is in my head", emphasising how resource-efficient living depends not just on more efficient technologies, but on the whole way we approach our use of resources. Here he brings a revised values system to bear in looking at our mobility icon – the car. He is followed by Andrew Gaines, reflecting further on our need to invest in new societal values; and by David Holmgren, co-originator of the Permaculture concept, with a big-picture synthesis of how the transition to a sustainable society offers opportunities for positive change over the longer term.

Finally, the fourth short feature by regular contributor Peter Fisher takes a look at challenges to water suppliers inherent in the perverse links among water, energy consumption and pollution.

The myth of the efficient car[1]

*Network member **Frank Fisher** is Director of the Graduate School of Environmental Science (GSES) at Monash University in Melbourne, where he is an Associate Professor and the Founder of the Centre for Environmental Management. Driver-only private cars, argues Frank, turn out to be the most inefficient means of transport, when all the work of maintaining them and all the necessary infrastructure are taken into*

[1] Adapted from the original feature in *Engineering World*, a publication of the Institution of Engineers Australia.

account. Frank seeks his own efficiency by bike/rail commuting. You can contact him for discussion at: ***Frank.Fisher@arts.monash.edu.au***

The following essay is the second in a series of contributions. You can find Frank's previous essay on "Renewable Energy" in Update 30 (page 14) at: www.bml.csiro.au/SNnewsletters.htm

Efficiency in any sense seems not to enter the minds of our transport planners.

In light of the UN Climate Change & Human Health report one might be forgiven for thinking that the economic rationalists governing our society would take efficiency seriously. But in the case of urban commuting quite the opposite is the case. Efficiency in any sense (time, energy or dollars) seems not to enter the minds of our transport planners, let alone the minds of individual commuters who make billions of transport decisions every day.

The flight from objective rationality in considering the efficiency of our transport arrangements in the city must constitute one of the profoundest, and best hidden, contradictions of urban life today. Despite all the recent studies, impassioned letters, editorials, reportage and comment about pollution incidents, asthma, carcinogenesis etc, the Australian Bureau of Statistics has just shown us that the environmental situation is getting worse, not better. Melbourne for one, is joyously embarking upon a $2 billion freeway link extravaganza aimed at "improving" motoring conditions for driver-only private cars, and there is no doubt that the democratic majority is solidly behind it.

Somehow, just somehow, we will have to satisfy our transport needs in more efficient ways and communicate them to the Russians, Chinese, Indians, SE-Asians, Latin Americans and Africans who still aspire to commute the way we presently do. If we don't succeed, the inefficiency with which 10 billion humans then commute will snuff us all out in the *Autogeddon* (Heathcote Williams' 1991 book title) of Leakey & Lewin's *Sixth Extinction*.

Thirty years ago, in one of his punchy little books called *Energy and Equity*, Ivan Illich pointed out that if one factors in the time spent parking, servicing, washing, and doing paperwork for our urban commuter car, its average speed over the 20,000 km per year that most of them do, drops well below the average speed attained in actual driving. In addition to this, Illich pointed out that if we consider the time spent earning the money to pay for the car and its various parking, servicing and paperwork demands, the average speed declines again. If we now factor in the time taken to generate the infrastructure requirements of the car, such as road and street construction and maintenance services, police, EPA-recognised environmental services, hospital, medical, legal, political, roadside repair, tow truck, ambulance and insurance services, almost all of which are currently debited to our social and bureaucratic resources, the average speed of the commuter car comes down to something our shoes would be ashamed of and the average commuter cyclist would have no trouble exceeding. Coupled with an extensive and fully used metrorail network the potential average speed of bike/rail would take some beating. To underscore the point, factor in the currently unrecognised time spent on environmental, personal and social trauma, and efficiency in relation to the private car as a means of urban commutation becomes a complete *non sequitur*.

Substantial time-efficient responses to our commuting requirements need social, not technical changes. For instance, we might dispense with privately owning cars in favor of renting appropriate vehicles when needed, from a dense network of rental outlets provided by the market as demand rises. Renting could be arranged to complement public transport vouchers

in salary packages instead of providing a car. This would deal with the serious problem we all have of making our owned or leased vehicles pay for their keep. Expending all that time and money on our vehicles provides a serious incentive to use them. Their ready availability, sitting right there in their own special rooms in our homes and city offices doesn't help either: nor does knowing that they function best with regular exercise. Shared ownership within a company pool, say, is another, perhaps more difficult option. Whether rented or shared, such options would break some of the knots that lock us into our current irrational economies of commuting. Make no mistake, renting has its benefits: competition-induced cost efficiencies, a range of vehicles suitable for different duties, effective and policeable maintenance and so on.

Mechanical engineers tell us that cars convert roughly 20% of the energy available in petrol to motion. Cars are therefore said to be roughly 20% energy efficient. In practice however, this bald statement is criminally misleading. Other than Grand Prix drivers and car salespeople, most of us drive to move *ourselves* around and not the car or its 50 kg of fuel. The average car is roughly 20 times heavier than its driver, therefore its energy efficiency in moving one person around comes down to 1%. Take into account the energy costs of producing cars and the many elements of commuting infrastructure already mentioned above, and the efficiency associated with automobility declines much further.

It is hard to imagine a more extreme case of technological overkill, nor a better hidden one.

Just filling our cars with petrol involves energy expenditure, let alone the energy costs of servicing all their other needs. Add to these the costs of dismantling and recycling cars (and their infrastructures) when their useful lives are over, the energy costs of high speed police chases, slow speed legal procedures and even slower speed taxation infrastructures to provide refunds on the business use of our private cars say - not to mention the herculean efforts nations make or will make, to maintain access to oil, to make good damage caused by greenhouse-effect-based sea-level rises, cyclone and flood damage, and to overcome the inefficiencies of the psycho-social stresses all these will cause, and the efficiency of the car comes down to a few tenths of one percent. For each Joule taken to push us around then, hundreds will be spent providing infrastructure support and maintenance. Other than electricity from nuclear fission which actually produces no net energy at all (it is subsidised by fossil fuels from other peoples and the future), it is hard to imagine a more extreme case of technological overkill nor a better hidden one.

Take Melbourne's City Link project, the energy used just to construct it would drive the average car to the moon and back many times. Factor in repairing the damage its existence will cause as it extends the life of an urban transport mode so dramatically out of tune with biospheric realities, and our average car is on its way to Mars and back. Another revealing statistic: to provide all of Victoria's electricity you only need to couple some 50,000 cars - only 2% of the state's cars - to generators. Is this really efficiency - not to mention (economic) rationality? And are the consequences of changing these behaviours really more disastrous than the consequences of sticking with them?

Technical heroics are unwarranted. Driver responsibility can trivialise engineers' heroic efforts to improve automobiles' mechanical efficiency by just a few percent. For example, simply choosing an existing small-engined car can improve the efficiency with which we move ourselves by 100%, and putting a second person in that car can add an additional 100%. And these improvements can be made tomorrow with no capital outlays. Nicer still, both initiatives enhance the efficiency of all the infrastructure I've mentioned. Finally, there is simple nineteenth-century technology already in place: the bicycle combined with the train. There is a lot going for these

two humble machines. Together they offer a level of physical, social and environmental joy that can only be appreciated by trying them. We must be prepared to persist for a time but the more we do, the more joyous is the experience. Would it mean losing too much face to show the Chinese, Indians and Africans that *we* want to emulate the way *they* commute now - but with "attitude"?

Investment in Citizenship: A New Look at the Commons

Network Member ***Andrew Gaines***[2] *looks at how new patterns of self-regulating human behaviour will need to evolve if humankind is to protect and renew our common heritage of precious natural resources. Andrew is a member of* ***EcoSTEPS – www.ecosteps.com.au*** *, an environmental sustainability education and consulting group based in Sydney. His specialty is creativity training and personal development. He is author of Creativity Games, a manual of games that teach thinking and communication strategies used by great innovators. Andrew lives in Leura in the Blue Mountains – a perfect place to appreciate the "riches" of the natural environment. You can contact him for discussion at:* ***andrewgaines@bigpond.com*** *or* ***againes@ecosteps.com.au***

Back in 1968 biologist Garrett Hardin wrote a now-famous essay called 'The Tragedy of the Commons'[3]. Originally 'the commons' referred to grazing lands held in common by sheep herders. As long as sheep numbers were not too large, the commons renews itself. But it appears to be to each individual sheep herder's advantage to run as many sheep on commons as possible. The cumulative effect of pursuing individual advantage in this way is to destroy the commons itself. Thus, we can state a general rule: individual players will collectively ruin any commons if they act without restraint to maximise their personal advantage.

It follows that appropriate community regulation must be negotiated to protect any commons that is collectively important. And we are already doing this through mechanisms such as local environmental regulations and the Kyoto Protocol.

Today, however, regulation must evolve to a new level. It is not just a matter of regulating individual businesses, e.g. through anti-pollution laws or water permits. The larger system of consumer desire, advertising, excessive consumption, waste, and its associated environmental degradation must also be addressed. We are part of a complex whole system that includes psychology, attitudes, industry, the environment, economics, military expenditure and global finance – all interconnected with mutual influence for better or for worse. Therefore, if we are to transition to a world that works, we must undergo a whole system change, where all of these elements change to support ecological sustainability and social wellbeing. Such a whole system change is something vastly beyond piecemeal incremental changes that fall short of actually getting us to sustainability. The key to such a change is our way of thinking.

All of us, with a few exceptions, are deeply embedded in our current consumer economy. We are trained for it, we depend on jobs and careers within it, and we desire its fruits. The consumer economy, to put it in an unusual way, is embedded in our nervous systems, and is in turn the expression of them. Any major change in the external economy will require major

[2] You can find a previous essay by Andrew – "Partnership-Dominator: The psychological dynamics of sustainability" – in Update 19, pp. 1-8, at: www.bml.csiro.au/SNnewsletters.htm
[3] Hardin, G. (1968) 'The Tragedy of the Commons', *Science* 162:1,243-48, http://dieoff.org/page95.htm

changes in our personal emotional and mental organisation. We must, collectively, develop new orders of willing self-regulation such that material consumption becomes less interesting to us, and creativity, personal relationships, social responsibility and nonmaterial satisfactions become much more important.

Our minds, then, become the principal point of change for evolving a sustainable society. I suggest that a proper goal is to seek every available means to help people mature to become psychologically balanced autonomous people who think for themselves, and who develop the knowledge and active will to live sustainability. Some, aware and responsive, may also go on to contribute intentionally to the larger long-term transition to a sustainable society. There is reason to believe – despite American military might and the war on terrorism – that the direction of evolution for the human species is towards increased love and social responsibility. This is a planetary need in our time, and is consistent with the best ideals of democracy.

There are methods of parenting and of personal development that help people to make these internal changes, and increasing numbers of people are engaged in them today through their own initiative. This unorganised spontaneous movement towards partnership values finds expression through conflict resolution, mediation, self-directed work teams, intentionally reducing paid working hours in favour of more discretionary time for family and one's visions, personal development, and seeking to understand the 'big-picture' dynamics of global economics, social well-being and ecological deterioration.

The kinds of whole system change we need in order to transition to a world that works will affect all of us. No one person can bring about this change. Nor, contrary to a famous quote by Margaret Mead[4], can a small group of people do it, though small groups can be importantly influential. It will gradually emerge as a sort of group agreement that expresses itself in stages. The prerequisite for each stage to evolve is that prior to the change many people have an internal vision of the change such that they can combine to express it practically. If too few people agree to and understand the potential change, it will not happen.

"The more I get away from it all, the more I recognise I am a part of it all."

The kinds of changes I am indicating here do not happen through strict rationality and conscious planning. Rather, new levels of understanding arise through conversation and self education, as well as through things learned via the media and through training courses – all of which becomes background for a new way of understanding the world in which the next set of changes makes sense. So no conspiracy here, no fixed blueprint for the future.

Though we have no guarantee of success, and apparently only about 30 years to accomplish the change in Australia, there are many indications that we have already entered this process of transformation, albeit unconsciously. Faster positive changes will occur when transitioning to sustainability becomes a matter of public will and policy.

[4]Do not underestimate what a thoughtful, committed group of people can do to change the world. Indeed it is the only thing that ever has." Margaret Mead

Therefore, if we ourselves are committed to evolving a world that works, and have a vision that this would be ecologically sustainable and humane, operating democratically on partnership values, then we must help other people develop this vision for themselves. Not as a blueprint or fixed agenda, but as the development of a new way of being. Not our slogans, but our thinking, feeling and personal way of being must develop to more sophisticated levels.

This can be fostered through conversation, personal research into the dynamics of our economic system and ecology, and training in partnership thinking skills (e.g., Feldenkrais, psychotherapy and counselling, and interactive creativity), as well as through better parenting. Such training often goes beyond the immediate practical needs of our business or personal finances, and hence cannot be justified on strictly economic grounds. Rather, it is *investment in citizenship*.

Investment in citizenship is investing beyond our immediate self interest to make the commons work better. It is the primary need of our time. Who should pay for it?

Well, the rational answer is 'somebody else, of course!' The real answer is 'those of us who care about transitioning to ecological sustainability and social well-being.' The most basic investment is in our own self-development. This may lead to personal lifestyle changes, but it also prepares us to participate in the necessary larger whole-system changes that we need. Governments should also pay for investment in citizenship through special programs in partnership thinking skills. It pays for this with tax money, of course, but this is appropriate. Governments should be vehicles for community well being.

Finally, I suggest than businesses should 'invest in citizenship'. This will probably enhance business performance. But independent of direct business returns, investing in citizenship with a view to contributing to becoming sustainable is arguably the primary need of our time. So investing in citizenship adds a new dimension to corporate social responsibility. It is one thing to invest in local charities. It is another thing to invest in making the whole world work better.

What Is Sustainability?

***David Holmgren**, co-originator with Bill Mollison of the Permaculture concept, is an innovative environmental design consultant based at Hepburn Springs in central Victoria, where he maintains one of Australia's best-known permaculture demonstration sites. David has written several books, conducted numerous workshops and courses on sustainable living, and developed several properties using permaculture principles. His latest book, Permaculture: Principles & Pathways Beyond Sustainability[5], is the distillation of a life lived by the principles of permaculture. [I recently bought a personal copy. It's a great reference – relevant to all aspects of the current sustainability debate – and an excellent read. I thoroughly recommend it. E.G.H.]*

[5] David Holmgren (2002); published by Holmgren Design Services. ISBN 0 646 41844 0 www.holmgren.com.au

The following feature is adapted from David's presentation to the "Students of Sustainability" conference at Flinders University, Adelaide, July 2003.

You can check David's website at: ***www.holmgren.com.au*** *and contact him at:* ***holmgren@netconnect.com.au***

It seems that my role in discussions of sustainability is to be the iconoclast – a kicker of sacred cows. This is a role I enjoy, but most especially when it involves breaking icons that I myself have helped create. The title of my new book, *Permaculture: Principles and Pathways Beyond Sustainability* deliberately implies a serious problem with mainstream concepts of Sustainability. I hope the substance behind the title will now stir up the sustainability debate in positive ways.

Third Wave Environmentalism

A resurgence of environmentalism has occurred in recent years, despite the diversionary politics of fear and hatred, which presently dominate political discourse. This environmentalism has involved both 'oppositional' and 'developmental' activism.

By *oppositional activism,* I mean activism that aims to stop, ameliorate or mitigate adverse environmental impacts, especially those caused by the actions of corporations and governments. The anti-(corporate)-globalisation movement brings together the experience of oppositional activists on both the environmental and social fronts.

By *developmental activism*, I mean the process of constructing systems that produce positive environmental outcomes. These most typically operate at the personal and household levels, but also as community and entrepreneurial processes. This side of environmental activism I characterise as the 'third wave of environmental solutions'.[6]

The first wave of environmental solutions of the post World War II era emerged in the late 1970's. The concept of permaculture and initiation of the Permaculture Movement were milestones of this first wave, but permaculture action increased dramatically both nationally and internationally during a second wave in the late 1980's and early 1990's. What will happen to permaculture during the third wave is hard to predict but, in continuing to call the ideas in my new book "permaculture", I obviously want to build on, rather than break that heritage. Although I am vigilant against the development of any "Permaculture dogma", I still believe the concept itself and its very positive influence over the last 25 years are a good foundation for further influence and action.

Sustainability as 'virtue'

The word "sustainability" is broadly used to mean the collection of ideas, processes and elements in society that are currently seen as progressive, enlightened or even simply good. Sustainability has become a virtue by its perceived scarcity. But what is this virtue beyond a set of socially progressive current ideas and fashions, and what is its relationship to Permaculture?

Permaculture and Sustainability

Permaculture is a *design system for sustainable land-use and living* that emerged out of a brief working relationship between Bill Mollison and myself in the mid 1970's[7]. (We used the term 'permanent' rather than 'sustainable'.) It predates most mainstream sustainability literature, which came to the fore as part of the 'second wave'. Permaculture was, in part, a

[6] See: Permaculture and the Third Wave of Environmental Solutions at: www.holmgren.com.au
[7] Mollison, W & D Holmgren (1978) *Permaculture One*. Corgi.

response to the evidence for, and the implications of, continuing extraction and unsustainable use of non-renewable and biological resources. The Club of Rome's seminal report, *The Limits To Growth*[8], and the first and second oil shocks of 1973 & 1975, were obvious influences. Less well know to this day is the systems ecology language and energy accounting work of Howard Odum first described in his difficult but pivotal book, *Environment Power and Society* [9]. It was the first reference listed in our foundation work, *Permaculture One,* and his work since has continued to inform my development of the concept over the decades since [10].

Permaculture, like a number of other sustainability concepts, has focused on positive, creative actions, which are practical and appropriate without necessarily attempting to understand how it all adds up in the long term. This is, in part, a reasonable response to rapid change and uncertainty about the future. However, it is also a response to the difficulty of discussing the future in terms other a 'good and evil' polarity between growth and development on the one hand and decay and destruction on the other.

Energy descent

In addressing the question: What is sustainability? I want to emphasise how an understanding of the global energy peak and resultant energy descent defines and reshapes both environmental concepts and strategies. I use the term 'descent' as the least loaded word that honestly conveys the inevitable, radical reduction of material consumption and/or human numbers that will characterise the declining decades and centuries of fossil fuel abundance and availability. I believe the third wave of environmental solutions will be seen as a response to both the realisation of the limits to consumption (first wave) and the limits to pollution and global warming (second wave). Permaculture is the whole-hearted engagement with energy descent as the opportunity for a better world where less is better.

Sustainability: A Systems View

Beginning with "sustain" as provision of the necessities of life, sustainability could be defined as the 'ability to continually provide the necessities of life'. A systems perspective is useful for taking this definition further. Self-organising systems (such as those found in nature and society) all collect net energy from their surrounding environment. As well as nourishing their constituent parts, sustainable systems maintain and renew themselves over time without exponential growth, major collapse, or massive internal restructuring.

Times scales for assessing sustainability

Time scales for assessing sustainability are proportional to the physical scale or territory of influence of the system in question. Thus the sustainability of a household, business or community might be considered over years or decades while that of a nation state or culture might be considered over centuries or even millennia.

These abstract systemic principles were once understood as common sense. For example large powerful institutions such as the Catholic Church are long-lived while small and local ones come and go more quickly. Corporations have never been long lived, averaging less than a human lifetime, but as they have become more global and powerful, their average life expectancy has actually shrunk to a few decades. This suggests that global capitalism is heading for radical change rather than a long-lived golden age.

Maintenance of larger-scale support systems

[8] See D. Meadows et al., (1972) *The Limits to Growth*.
[9] Odum, HT (1971) Environment, Power & Society. John Wiley.
[10] See various articles in *David Holmgren Collected Writings 1978-2000,* Holmgren Design Services 2000

As well as nurturing its constituent parts and self-regulating growth, a sustainable system also contributes to maintenance of larger-scale environmental support systems. Thus, for households and businesses, there must be contributions to the larger systems of community, government and economy. In nature, local ecosystems contribute to maintenance of climate and landscapes. In indigenous societies, use and respect for resources helped maintain the whole surrounding natural system; and throughout history, large-scale human empire systems have declined when they failed to make that contribution or 'tithe' to back to nature. Thus the concept of ecological sustainability is based on this expectation that modern human systems must contribute rather than simply take from nature.

Are biological support systems really necessary?
Despite the evidence, and despite several decades of propaganda from scientists and environmentalists about the importance of biological support systems, the view persists that nature is an optional appendage to modern industrial societies rather than the foundation. Why does such a view persist? One of the reasons, is that there is not much direct evidence that the health of biological systems has determined the recent course of human affairs, especially in the richer nations. For example, without wanting to underestimate the problems, the parlous state of the Murray River has hardly brought the city of Adelaide to its knees. There is much greater concern about Adelaide's "viability" in relation to a decline in manufacturing and the ageing of its population.

Two important factors have contributed to ameliorating the impact of environmental degradation:

1. Bypassing of local negative feedback controls; and
2. The fossil and non-renewable resource base.

1. Bypassing of local negative feedback controls
In small, relatively autonomous economies and societies dependant on surrounding nature, failure in local ecosystem function leads to unavoidable economic, social and even cultural impacts, or even societal collapse. Over the last 6,000 years, warfare, slavery, and the resultant power of city-states and empires allowed the capture of foreign resources mostly as capital assets to be mined. These densely settled pre-industrial societies also staved off the impacts of local ecological failure by migration of surplus population and, to some extent, by export of pollution. For example, the great rivers on which most ancient cities were located not only delivered fertility but took away and purified pollution.

In modern, migratory, large-scale and globally connected human systems, local degradation of nature may not lead to collapse or even dramatic impacts. Without this negative feedback at the economic, social and personal levels, ecological impacts tend to accumulate up the geographic hierarchy to global scale, where they are remote from any direct cause. Acid rain, global warming, and biodiversity loss, for example, are all processes with large-scale impacts often remote from the place and time of their cause.

Thus, our global industrial systems are still underpinned by global ecological processes but the connection between the ecological sustainability of households, communities, businesses or nations and the condition of global nature is abstract, complex and remote.

2. The fossil and mineral resource base
Renewable biological resources, responsive to direct feedback, have not, however, been the primary driving force behind modern societies, at least since the depression of the 1930's. Mineral resources, most notably oil and increasingly gas have become the prevalent forms of energy sustaining humanity. The extent of this dependence is consistently underestimated, by economists and decision makers, and even by scientists and environmentalists. The greatest

mistake is to consider these resources as simply ‘commodities’, rather than looking at their net contribution of energy to supporting all other human systems and processes. In pre-industrial settled societies, agriculture was the primary process for obtaining net energy from the environment. Now, at the end of the industrial era, even agriculture has become a major net energy consumer, highlighting the degree to which we live from the oil well.

During a visit to Israel in the mid 1990's, after seeing the feeding of broad-acre irrigated crops to shed-housed dairy cows, I remarked that the Israeli glass of milk must be 80% oil. For comparison I suggested Australian milk from cows grazing rain-fed (albeit fertilised pastures) might be 20% oil, and European milk from shed-housed cows eating rain-fed crops might be 50% oil. This use of technology and innovation based on resource depletion to expand agricultural productivity (at least temporarily), reinforces the idea that agriculture is an appendage, rather than the foundation of the economy. Although these facts have been understood for thirty years, the situation has got far worse over that time.

More shocking is the realisation that most environmental policies, strategies and actions for protecting and maintaining local biological systems, both the in countryside and in the city, are generally at a cost of depleting non renewable resources elsewhere. For example, the financial savings from living in an energy efficient, passive solar house are quite likely to be spent on a more resource expensive and greenhouse gas intensive overseas trip. Such use of technology and innovation to reduce local environmental degradation simply moves problems elsewhere and, in so doing, reinforces the idea that nature is an appendage of society. This rebound effect has been noted by both systems theorists and permaculture practitioners.

Global Energy Peak and Cultures of Change

These and other factors reduce the usefulness of many mainstream sustainability concepts in explaining and addressing real-world processes. Without a serious attempt to understand the energy basis of nature and society, and the key issue of society’s global energy peak, sustainability concepts and the actions they inform may well be counterproductive.

Although the oil crisis of the 1970's triggered the first wave of modern environmental solutions (including Permaculture), the response and adjustments by global elites have had the effect of inoculating affluent society against the Limits to Growth argument. That is, a small dose made us resistant to the influence of more powerful doses. In similar vein, I have long argued[11] that over-promotion of permaculture in the early 1980's "inoculated" people against a more serious consideration of the concept because of a perceived failure to catalyse powerful changes in land-use and society in the short term.

With a global oil peak now unfolding all around us, the failure to recognise and understand its signs and symptoms pervades not only the anti-environmental reactionaries, but also much of the vanguard of sustainability. Discussions, workshops and other learning activities are needed to enable environmentalists to get up to speed on the evidence for the global energy peak, and to debate the implications.

Sustainability of Change Cultures

One of the consequences of our growing understanding of the larger-scale dynamics of the energy peak is that, within a single human lifetime, we are witnessing simultaneous transformative change in systems at many scales. In these conditions, steady-state models of sustainability are of limited use, other than to acknowledge that the bulk of human history is well

[11] See *The Development of The Permaculture Concept* (1991) in: David Holmgren Collected Writings 1978-2000, Holmgren Design Services 2001.

described by such models. Unless the pathway back to a low energy future is particularly catastrophic and abrupt, the future will deliver continuous change and novelty for hundreds of years.

Both our cultural inheritance, and any legacy we might leave for future generations, can be thought of as cultures of continuous change. How can we resolve the apparent contradictions inherent in stable, permanent and sustainable cultures versus those involving continuous change? Many sustainability thinkers have recognised the need to encompass continuous change, but few have acknowledged the key issue of directionality of change at the largest scales. While our cultural inheritance and our legacy could both be characterised as change cultures, the difference is in the directionality of the supporting energy base (energy ascent versus energy descent), as graphically illustrated in Figure 1.[12]

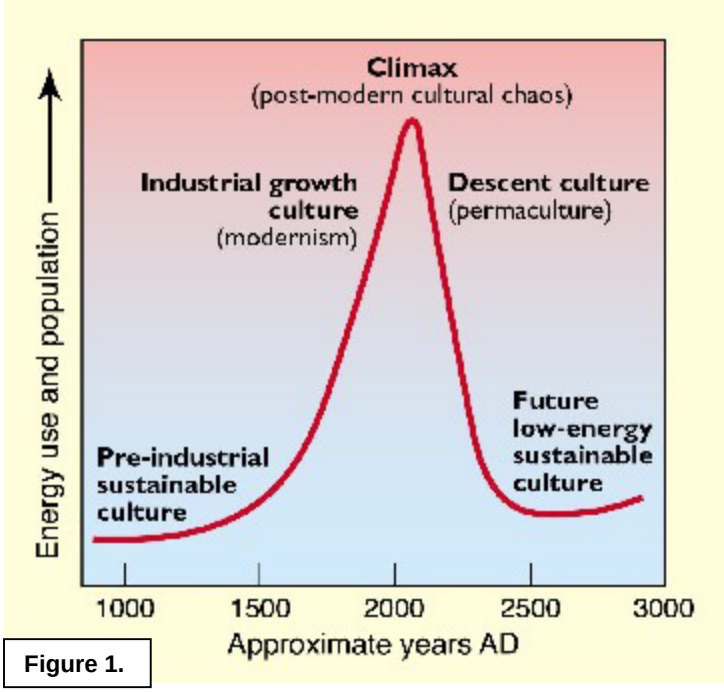


Figure 1.

Although only conceptual, the rough time scale shows continuity of the energy ascent culture for hundreds if not thousands of years. Similarly, it suggests continuity of the coming descent culture over many generations.

Most sustainability concepts and advocates imply some type of plateau model for transition beyond the fossil fuel peak. The ecological and historical models for establishment of this steady-state energy base are dubious, but generally little discussed as most arguments focus on the potential of this or that technology in isolation from the systems top down perspective.

Permaculture could be seen, somewhat cynically, as just my (and now many other people's) version of the enlightened ideas and actions that others gather under the 'sustainability' rubric. While there is some truth in this view, I would characterise those enlightened ideas and actions as all informed by ethical values and reflecting a set of system design principles that will be of enduring value over the long run of energy descent. This does not mean that those ideas and actions (strategies and techniques) which are useful in one context or at one point in time will necessarily have enduring value, but that the underlying principles will.

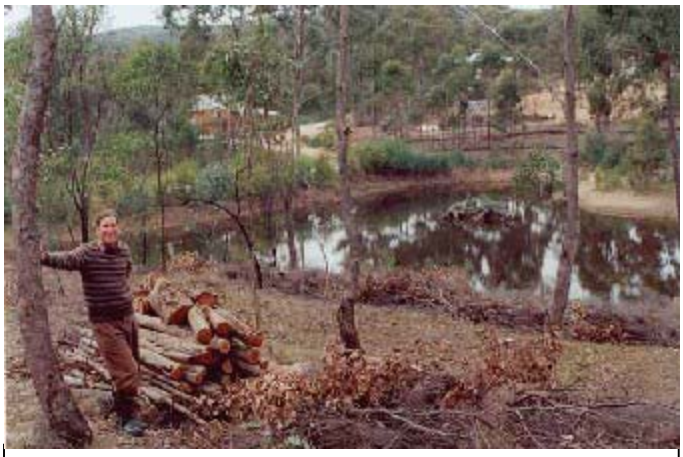
Further, Permaculture is the wholehearted and positive acceptance of energy descent, as not only inevitable but as a desirable reality. Energy descent delivered by a continuous global 'recession' has the potential to bring to fruition many environmental solutions and processes that have languished during the delusional decades since the evidence about global resource depletion became available. These positive aspects will exist side-by-side with negative expressions of energy descent, such as a 'techno-fascism' which is evolving through larger-scale economic and political processes.

[12] From: *Permaculture: Principles and Pathways Beyond Sustainability* 2002: Permaculture as design for energy descent.

Permaculture can be thought of as a hopeful 'orienteering map' for the pathways down from the energy mountain. Reflecting the multiple-function concept, this map is designed to generate new pathways as we move down and even to work as an emergency parachute for rapid energy descent.

The positive view of our cultural inheritance

The European enlightenment, industrialisation and modernity are all aspects of the culture of energy ascent that have persisted over the several hundred years of net energy growth. Despite the novel technological, economic and social conditions that have developed over this period, the underlying concepts and design principles of our human culture have actually changed little. That a consistent set of design principles can generate such diverse phenomena, is normal to the systems thinker, even if counter-intuitive to many. If we can see the underlying unity, strength and continuity of our shared culture, despite the novel outcomes in each generation, then we have part of the answer on which to base a new model of cultural sustainability.



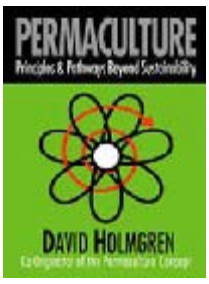
David Holmgren at Fryers Forest Ecovillage, Victoria.

In the same way that we might consider the culture of growth to have been sustainable for hundreds of years, any designed and evolved culture adapted to energy descent might similarly be "sustainable" if its underlying values and design principles were to remain intact over a similar period of human history.

Part of the positive message about energy descent relates to how we can best cope with a future where we have to map out and follow the pathways, backtrack when needed, and continuously reshape our activity and culture as we descend the energy mountain over not one or two, but a dozen or more generations. While we will have to discard most of the cultural baggage of our continuous energy ascent culture, the greatest asset we can take with us is our intimate familiarity with continuous change and our capacity for creative response.

Thus the apparent contradiction between stability and change at the core of sustainability concepts, including permaculture, can be understood and used a tool in designing and creating a positive future.

A summary of the basic principles on which Permaculture is based is shown below. For more detail, I thoroughly recommend David Holmgren's book, **Permaculture: Principles & Pathways Beyond Sustainability**. *(Footnote 5.)*



PERMACULTURE DESIGN PRINCIPLES

1: OBSERVE AND INTERACT

Beauty is in the eye of the beholder

2: CATCH AND STORE ENERGY

Make hay while the sun shines

3: OBTAIN A YIELD

You can't work on an empty stomach

4: APPLY SELF-REGULATION AND ACCEPT FEEDBACK

The sins of the fathers are visited on
the children unto the seventh generation

5: USE AND VALUE RENEWABLE RESOURCES AND SERVICES

Let nature take its course

6: PRODUCE NO WASTE

Waste not, want not
A stitch in time saves nine

7: DESIGN FROM PATTERNS TO DETAILS

Can't see the wood for the trees

8: INTEGRATE RATHER THAN SEGREGATE

Many hands make light work

9: USE SMALL AND SLOW SOLUTIONS

The bigger they are, the harder they fall.
Slow and steady wins the race

10: USE AND VALUE DIVERSITY

Don't put all your eggs in one basket

11: USE EDGES AND VALUE THE MARGINAL

Don't think you are on the right track
just because it is a well-beaten path

12: CREATIVELY USE AND RESPOND TO CHANGE

Vision is not seeing things as they are, but as they will be

Perverse links: The water industry burns too much energy!

*Network member **Dr Peter Fisher** is an environment industry specialist who teaches water management at Central Queensland University, Gladstone. He regularly contributes features to our newsletter. Here he delves into the pervasive energy subsidies supporting our lifestyles.*[13] *Even pure water runs on fossil fuels! Water suppliers are now beginning to work on ways of reducing energy use, but there are challenges ahead in dealing with pollution issues.*

*You can contact Peter for discussion at: **pmifisher@bigpond.com***

Energy and water saving go together like a horse and carriage, most of the time. The water industry – well at least that of Britain – is the third most energy-intensive sector per unit of product, spending 13% of its turnover on energy and using 6000 GWH per year. In America, electricity is the second-biggest budget item for drinking-water suppliers, of which 80-90% is used for pumping. Then there's the energy consumed by vehicular fleets and the production of chlorine and alum.

Energy use is also rising, however, because of the need to meet more stringent legislative standards for drinking water and wastewater. These have resulted in a 14% increase in power consumption by British water and sewerage companies over the five years to 1999. And Water UK says that some companies expect their consumption to jump 40% by 2005.

Fortunately, power bills can be cut by 10% per year through energy efficiency measures. Companies are thus giving increased attention to their pumps and pumping practices and exploring renewables to combat the rise and restrict greenhouse gas emissions of direct and supply-chain CO2 and methane from biogases.

Meanwhile, Brisbane Water has one biogas cogeneration plant and another to come by Christmas. This “green power” operates the Oxley Creek treatment plant as well as being sold into the grid. Brisbane Water is also examining ways to use the latest electric motors and to adapt the 40KW prototype CFCL fuel cell for biogas (rather than natural gas) producing electricity with no emissions.

In Gladstone, an engineering group is pursuing the use of seawater cooling and thermal desalination from waste heat. Down south, Melbourne Water is harnessing biogas from its treatment ponds, and Hydro Tasmania is promoting mini-hydros in lieu of pressure-dissipation valves. These range from 1.9MW in large mains to 300KW in distributor mains. Another way to peg back energy usage and greenhouse gas emissions is to save water through demand-management programs including water price increases – even capping population growth.

There are many examples of a synergistic relationship between energy saving and water conservation: The front-loading washing machine uses less water and less energy than its top-loading counterpart. Constant Tread Tillage on farms allows additional water to penetrate and be held with tractor-rolling resistance decreased by 40%, therefore saving on fuel.

However, the synergies often observed between energy and water savings in simple, single processes become scrambled when many processes are linked, as in industry. As supply shortages worsen, more water recycling is likely to occur. Many existing schemes are

[13] Feature adapted from the original publication in the *Australian Financial Review*, Supplement,14 August 2003, p16.

described in the Australian Water Map at: www.earthsystems.com.au/mapwater. There is also expected to be steady advancement to higher standards of treatment.

Higher standards are a first step in addressing an emerging concern – the effects of feral natural and artificial hormones, antibiotics, other pharmaceuticals and even illicit drugs. A sizable fraction of these compounds and their breakdown products are excreted and are turning up in waterways. Scientific understanding of their impact – disruption to sexual development being commonly cited – is still in its infancy, as are the means of detecting and removing them in treatment processes.

Wollongong Professor Andrea Schaefer has demonstrated that, with reverse osmosis and nanofiltration, the long-term capture of female hormones (estrone and estradiol) is low. Her colleague Stuart Kahn has found that reverse osmosis may be the best means for removal, but this is not complete for all compounds.

Unhappily, meeting Class A+ standards (certainly to avoid public liability) could lead to significant greenhouse gas emissions: for example, assuming a Water UK treatment benchmark of 450 KWH per megalitre, Melbourne's 20% annual recycling target of 60,000 megalitres could dump 28,000 tonnes of CO2 into the atmosphere. That's why it's critical to develop systems that have low energy demand but high drug-removal efficiencies and, where practicable, power them by fuel cells running on biogas. A good starting point might be the ship-derived MEP-Marisan system, which is non-membrane, uses no chemicals and has a very low energy demand of 121 KWH per megalitre.

One way or the other, this is an opportune time for the development of new water-energy conserving technologies and systems – a time to break new ground in environmental protection and human well-being in a world where there is an estimated 12,000 cubic kilometres of polluted water in streams, lakes and groundwater.

Calls for expressions of interest in National Collaborative research

Sustainable Development – How can it be measured and modeled in Australia?

As a nation, in 1992 we decided that all future development should be sustainable (National Strategy for Ecologically Sustainable Development). However, we do not have a clear and precise way to either measure or model sustainable development in Australia. Therefore, the simple questions such as ‘how sustainable have we been over the last decade?’ or ‘are we consuming too much?’ cannot be answered.

CSIRO is developing a new project that aims to pilot a framework for practically measuring and modelling sustainable development, at the regional scale, in Australia. Such a framework is needed so that we can ask questions about how sustainable current activites are, and how we can better use available resources to ensure non-decreasing resource stocks for all future generations. The project will draw on theoretical and conceptual thinking about sustainable development and its measurement through inclusive wealth.

Inclusive wealth
Inclusive wealth measures the components that contribute to human wellbeing, now and into the future. These include factors like health, access to potable water, shelter, security, fulfilment, happiness, etc. Ultimately these factors are determined by services such as agricultural productivity, housing, medical facilities, transport, communications, access to natural areas rich in biodiversity, etc. Using inclusive wealth as the basis for measuring sustainability moves the focus of analysis from flow to stock measures. *Flow* measures indicate how much is being produced or consumed (e.g. GDP is a flow measure). *Stock*

measures show what is happening to the underlying composition of assets from which our human wellbeing is derived.

The main components of a measure of inclusive wealth are the stocks or asset bases. The asset base is the sum of the various forms of capital – manufactured, human and natural – plus any international assets or debts. Changes in the various components of these three forms of capital, measured in their relative or shadow prices, represent changes in wealth. If we can show that there is non-declining net (weighted) capital stocks over some period of time, then the pattern of use of resources during that period has been sustainable.

Research objectives
The project objectives include:

- Progress a sustainable development measurement framework, based on international best practice
- Develop holistic production functions for key goods and services in each region
- Explore measuring different types of capital
- Incorporate the issues of critical capital, weak vs strong sustainability, and resilience into the assessment
- Explore ways to assign relative values to capital stocks.

Testing the model
The prototype model will be tested in the Goulburn Broken Catchment (Victoria) and the Murrumbidgee Valley (NSW). A parallel project in the Stockholm region, Sweden, will also allow us to compare and investigate urban issues.

Project participants
The project has many particpants including; Environment Australia, Treasury, AFFA, Bureau of Rural Science, ABS, ABARE, Productivity Commission, various universities, the Joint Australian Academies Committee on Sustainability, Goulburn-Broken Catchment Management Authority and the Pratt Water Project Office. The project team includes researches from CSIRO Sustainable Ecosystems and LaTrobe University. Funding is through the CSIRO Social and Economic Integration Program.

Interested in participating? **If you have ideas that could help us, or are interested in being kept informed about the project, please contact Dr Leonie Pearson, CSIRO Sustainable Ecosystems, at: Leonie.Pearson@csiro.au**

Australian Water Conservation and Reuse Research Program

Australia is the second-highest user of domestic water in the world. Urban areas take a similar volume of water per hectare from supply catchments as irrigation, but discharge a much greater volume as stormwater and sewage. There are great opportunities to improve water use efficiency and harvest this otherwise wasted water for sustainable cities, reducing demands on stressed catchments, leaving more water in streams and aquifers, and easing pollution. In the current political climate, widespread adoption of urban water conservation and reuse is a necessity, but the Australian research base is modest and fragmented. The AWCRRP has been created to offset this shortfall, and to provide a foundation for policies and practices. Stakeholders include water corporations and government authorities/agencies at national regional and local levels. Stage One activities will review and integrate: water issues in "the big picture", social acceptance, health and risk assessment, implementing new technology, agricultural and environmental issues, and economics and contractual arrangements. Outcomes will be delivered in a series of workshops with partners and stakeholders. Stage Two will develop a portfolio of innovative projects to advance technology, policy, and education.

Interested in participating? **If you would like to know more about the AWCRRP, see www.clw.csiro.au/priorities/urban/awcrrp or contact Program Coordinator, Dr Peter Dillon of CSIRO Land & Water at: Peter.Dillon@csiro.au**

Network Member seeks a job in environmental sustainability

Network member **Cameron Baldock** is a recent **graduate in Environmental Management** from Flinders University, SA, with practical experience in general environmental management, GIS and remote sensing, computer applications and communication skills. Says Cameron, "My passion is for our environment, and for helping us achieve ways of living in it in a balanced and sustainable manner. I am interested in all facets of the environment from urban living to land, coast and catchment care. I am prepared to give my hand to any step that will assist us reach sustainability, and am eager to learn and achieve outcomes within our environment. My ambition is to join the workforce in an entry-level position and develop my career further. I believe that continuous learning is imperative in the environmental field, and I am willing to better myself at any chance. I want to be someone who makes a difference!"
If you know of any vacant or impending positions for which Cameron might provide his Resume, please let him know at prelude1@chariot.net.au

Network Member in new Eco-business Venture

Network member and leading natural history author, Dr Mary E. White, has joined her son in a new eco-business venture, managing the Falls Forest Retreat at 318 Isaacs Lane, Johns River, NSW 2443. The property, comprising a conference center, six townhouses and a heritage farmhouse is 5 km off the Pacific Highway, halfway between Taree and Port Macquarie. Mary says, "I propose to covenant a large area of pristine rainforest on the edge of Middle Brother Mountain, an extension of the National Park Forests on the mountain. There are walking trails through the property into the Park, a 40-metre waterfall, a river with cascades, and platypus! The property is very handy to all the wonderful coastal places from Harrington (and further south) to Laurieton and Port Macquarie. Initially our main business will be leasing the self-contained accommodation, and some small conferences, workshops and functions. Over time we hope to develop it as an educational center also, and of course I intend to continue my writing in due course. Look us up at **www.fallsretreat.com.au** and think of sampling our peace and beauty sometime. Perhaps we can help with a workshop, retreat or gathering."

Contact Mary at Dr.MaryWhite@FallsRetreat.com.au

Other Information Resources and Links of Interest

AGRICULTURE & ENVIRONMENTAL ETHICS – eBook
Sustainability: Elusive or Illusion?: Wise Environmental Intervention
www.iid.org/pages/publications.html or **www.iid.org/publications/sustain.pdf**
Author and Network Member Lindsay Falvey is Chair of Agriculture at the University of Melbourne, and has worked in international consulting and development. He is deeply concerned with the fundamental design and ethics of modern agricultural systems and social institutions. The following is abridged from the Foreword to his new book published electronically by the Institute for International Development (IID)

For a few years, I was concerned that I was becoming cynical of the actions of agricultural science and its application around the world. Then I realised that, in fact, my unease was the result of a rising

consciousness of the confusion surrounding science as it related to sustainability. My perspective had been reinforced by a general tiredness with the righteous repetition of both development advocates and scientists – with both of whom I had long been one – that increased trade, technology and international aid would forestall environmental and social collapse. As I came to see that self-interest underpinned major policy and actions in the sphere, I further questioned our evangelical eagerness in expanding the very values that were apparently failing in our society.

So, what are we in the West doing wrong, for surely are hearts are in the right place? Well – it seems to me that our hearts may not be so well located! While we preach harmony with the environment, we continue to advocate the model of constant progress, for sustenance of our very financial base requires it – so environmental matters are treated as 'problems' to be 'solved' by research and developmental programs. We seek to ensure an excess of food for ourselves, enshrine fighting within competitive modes in which we retain an advantage, and flee challenging alternatives to our worldviews as we seek to reproduce our socio-economic system across the globe. Such actions just seem to be the same old undeveloped human behaviour of exploitation over nature – including fellow humans – that fills our history. We have dressed up this Emperorial enlightened self-interest in new clothes, which in our delusory state, we admire as omniscient human development – and yet a little child could tell us that this is but naked greed and ignorance.

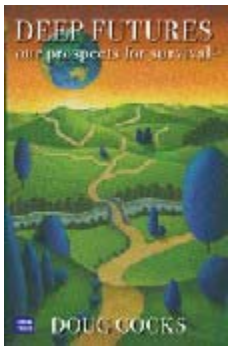
Don't miss this thoughtful, challenging, beautifully written and ultimately optimistic eBook. You can download it free of charge from the above IID website (876 KB)

OUR HUMAN FUTURE

Deep Futures: Our Prospects for Survival – Book

www.unswpress.com.au/isbn/0868404934.htm

Author **Doug Cocks** is a Fellow at the CSIRO Division of Sustainable Ecosystems. Here's how he introduces his latest book, launched last month by the University of NSW Press and McGill Queens University Press; ISBN 0868404934 DC:



"I wrote *Deep Futures* largely because I'm very curious about how our species will fare over coming ages. Will the human lineage survive, reasonably happily, into the far distant future? Indeed, will we survive another millennium in reasonably good shape? Will the next thousand years be just ordinarily difficult or, if the next ice age arrives suddenly, particularly difficult? Supposing we survive the next thousand years, will we eventually go extinct as most species do, or will we evolve into a new species with which one might empathise? – Or to a whole lineage of speicies as in Olaf Stapledon's great sci-fi novel, *Last men, first men*? And supposing we continue to evolve, will that new species or its descendants survive the death of the sun as an energy and light source in five billion or so years? Not to mention a clutch of other cosmic challenges ranging from asteroid strikes to 55-hour days? …"

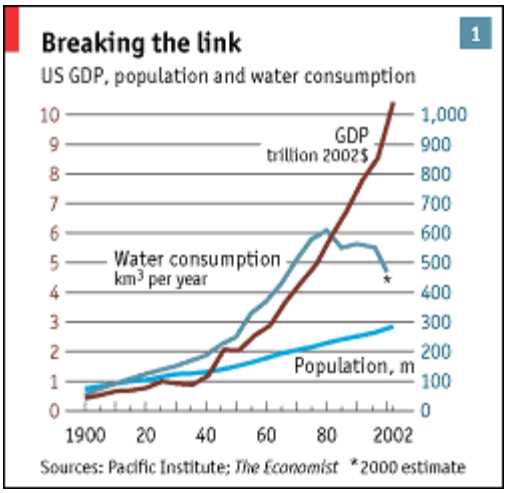
The book is about our prospects for survival. It reviews what scientists and other informed future-gazers have forseen for our lineage, analyses the factors shaping the future and, recognising that the future is unpredictable but basically imaginable, discusses a number of possible future scenarios. You can find out more from the Ockham's Razor interview (31 August 2003) – *Humanity's Distant Future* – with Robyn Williams and Doug Cocks at: **www.abc.net.au/rn/science/ockham/stories/s934017.htm** You can also link to more information about the book, as well as Doug's other writings and comments on social, political, economic and environmental issues relevant to the future of Australia, through his personal website at: **www.labshop.com.au/dougcocks/**

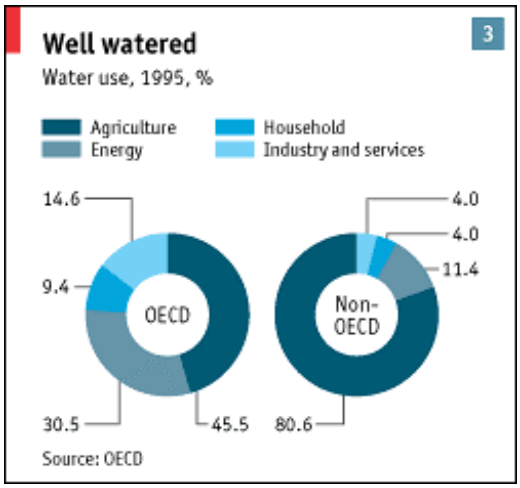
WATER

Priceless – *Economist* Survey of the World's water issues

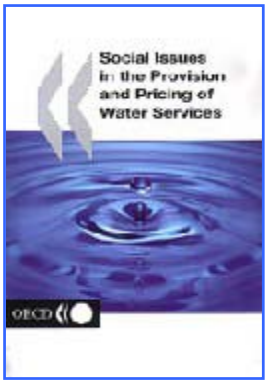
http://economist.com/printedition/displayStory.cfm?Story_ID=1906846

This short article discusses the issues associated with meeting WSSD targets for equitable and sustainable distribution and use of water. It is up-front with the challenges but ultimately optimistic that the targets are achievable if we act now.





Social Issues in the Provision and Pricing of Water Services - Book



This book explores the interface between environmental and social elements of water pricing policies in OECD countries. It focuses on the affordability of water services, as well as on the social measures aimed at resolving these affordability problems. The book also considers how environmental and social safeguards are addressed under different models of water utility ownership and management. For instance, it examines the potential role of the private sector in incorporating the social dimension into water policy decisions. Drawing on case study experience in Mexico, the book also explores the social problems associated with the transition from one level of water service provision to another. Published July 2003 by OECD and available from the Online Bookshop at: **www.oecd.org** [Code: 972003041P1; ISBN: 9264099913]

NATURAL RESOURCE MANAGEMENT

NRM-Changelinks: Focus on adaptive management – Web-based newsletter & resources
http://nrm.massey.ac.nz/changelinks/

This site, hosted by Massey University in New Zealand, aims to provide a practical resource for those who work with communities (in the wider sense of the term) to help them identify and adopt more sustainable, adaptive natural resource management practices. The home page provides a wealth of links to information and resources. The introduction sets the context based on the quotation: "Everything has been said about development, but almost everything remains to be said and therefore to be explored or rediscovered because incontestably, almost everything remains to be done." *(Vincent Cosmao. 1984)*

ENVIRONMENTAL ADVOCACY

www.environmentaladvocacy.org

Environmental advocacy is challenging and complex. Concerted and strategic action lies behind the proclamation of national parks, enactment of environmental legislation and shifts in public consciousness. This website promotes events, resources and links to enhance environmental advocacy. It is not about any particular environmental issue or campaign. It is about the process of advocacy and the learning involved in effective advocacy.

MONEY

Complementary Currencies for Social Change – Another interview with Bernard Lietaer
www.kuro5hin.org/story/2003/8/26/172939/637 or
www.nexuspub.com/articles/2003/july2003/interview.htm

What is money? And how well does it work to solve society's ills? Bernard Lietaer, author of the upcoming book *Access to Human Wealth: Money beyond Greed and Scarcity* (Access Books, 2003), has made a life's work of exploring these questions. Lietaer has been involved in the world of money systems for

more than 25 years, and his experience in monetary matters ranges from multinational corporations to developing countries. He co-designed and implemented the convergence mechanism to the single European currency system (the Euro), and served as president of the Electronic Payment System in his native Belgium. He also co-founded one of the largest and most successful currency funds. In this interview with Ravi Dykema, Lietaer shares his views on the shortcomings of our conventional currency system, the benefits of creating a complementary currency, and ways to effect lasting social change.

Lietaer says, "I'm trying to contribute to a consciousness shift regarding money. I believe that by a small change in the money system, we can unleash huge improvements in our social system. It's the highest leverage point for change in our society, and surprisingly few people are looking at it. If you start a new complementary currency system, it can become self-perpetuating and facilitate additional transactions forever. You know the saying, if you want to feed someone, give him a fish. If you want to really help him, teach him how to fish. This is just a fishing lesson—what you do with it is up to you. You can take big fish or small fish, or you can choose not to fish at all. You decide what issues you want to deal with in your community, and there is a currency system that can help you with it."

ENERGY

Warren Districts Renewable Energy Group Inc. (WDREG) – Energy Consulting services

www.wdreg.org.au

Network member and environmental consultant **Ben Rose** is a member of this active, incorporated, non-profit community body in south-west WA that aims to: support householders to reduce their energy consumption; demonstrate the availability and feasibility of various renewable energy options; and display the practical value of wastes as a resource at the local level. Ben and the group have produced some very useful, readable educational and assessment materials. Download their excellent *Energy Emissions Booklet* and *Households Emissions Calculator*. Contact Ben at: **biroses@westnet.com.au**

BUILT INFRASTRUCTURE

Sustainability Framework for the Future of Australia's Infrastructure

This **AusCID Handook 2003** is a practical guide for infrastructure developers, sponsors and operators to provide more effective tools for (1) identifying the sustainability context in which projects are taking place, (2) engaging stakeholders more effectively, and (3) implementing triple-bottom-line reporting and feedback. Copies of the Sustainablitly Framework are now available. See **www.auscid.org.au** and for a CD Rom phone (02) 9231 0722 or email **info@auscid.org.au**

GLOBAL DEVELOPMENT

Sustainable Development in a Dynamic World – World Bank Development Report 2003

http://econ.worldbank.org/wdr/wdr2003/

The next 50 years could see a fourfold increase in the size of the global economy and significant reductions in poverty but only if governments act now to avert a growing risk of severe damage to the environment and profound social unrest. Without better policies and institutions, social and environmental strains may derail development progress, leading to higher poverty levels and a decline in the quality of life for everybody. Misguided policies and weak governance in past decades have contributed to environmental disasters, income inequality, and social upheaval in some countries, often resulting in deep deprivation, riots, or refugees fleeing famine or civil wars. Today, many poor people depend on fragile natural resources to survive. Similarly, trust between individuals, which can be eroded or destroyed by civic unrest, is a social asset with important economic benefits, since it enables people to make agreements and undertake transactions that would otherwise not be possible. Development polices need to be more sharply focused on protecting these natural and social assets. New alliances are needed at the local, national and global levels to better address these problems.

BIODIVERSITY AND CLIMATE CHANGE

Climate Change Impacts on Biodiversity in Australia

www.ea.gov.au/biodiversity/science/bdac/greenhouse/index.html

This report (August 2003) from the Federal Department of Environment and Heritage represents the outcomes of a workshop sponsored by the Department's Biological Diversity Advisory Committee in October 2002. Download the full report as a PDF file (916 KB) or view sections independently. [ISBN 0 9580845 6 4]

TRANSPORT

TransScan – Quarterly journal of trends in mobility and the built environment

www.transscan.com

A useful trends resource published by the Western Australian Department for Planning and Infrastructure and Main Roads WA. Plenty of food for thought on mobility, urban design, environmental impacts etc.

FISHERIES

Review of Fisheries in OECD Countries: volume 1: Policies and Summary Statistics 2002

This publication describes major developments affecting fisheries in OECD countries, including changes in government policies, trade, and fisheries and aquaculture production. This edition also contains a special chapter on economic and social sustainability indicators for fisheries.

Also: Review of Fisheries in OECD Countries: volume 2: Country Statistics

Published July 2003 by OECD, and available through the Online Bookshop at **www.oecd.org** [Code: 532003031P1, ISBN: 9264101403 (V1.); Code: 532003043P1, ISBN: 9264102051 (V2.)]

Calls for Comment and Policy Inputs

GREEN BUILDING

RMIT Centre for Design, Survey of Developers and Builders

Survey inputs are sought by the end of September from builders and developers to benchmark current sustainability practices and intent. **Access the surveys at:**

www.cfd.rmit.edu.au/sustainable_buildings/ecohome_builder_survey

www.cfd.rmit.edu.au/sustainable_buildings/ecohome_developer_survey

SUSTAINABILITY OF AUSTRALIAN CITIES

Federal Government Inquiry into the Sustainability of Australian Cities

The House of Representatives Standing Committee on Environment and Heritage will inquire into and report on issues and polices related to the development of sustainable cities to the year 2025, particularly with respect to: (1) Environmental and social impacts of sprawling urban development; (2) Major determinants of urban settlement patterns and desirable patterns of development for the growth of Australian cities; (3) A 'blueprint' for ecologically sustainable patterns of settlement with particular reference to eco-efficiency and equity in the provision of services and infrastructure; (4) Measures to reduce the environmental, social and economic costs of continuing urgan expansion; and (5) Mechanism for the Commonwealth to bring about urban development reform and promote ecologically sustainable patterns of settlement.

Submissions are required by 31 October 2003. For information and copies of the Inquiry's discussion paper, see www.aph.gov.au/house/committee/environ

Project funding available

RENEWABLE ENERGY & COGENERATION IN NSW

NSW Renewables Investment Program – solar, wind, hydro, biomass, geothermal, wave, tide.

Commonwealth Renewable Remote Power Generation Program for diesel replacement:

www.seda.nsw.gov.au/ren_downloads.asp **Applications close on 26 September 2003.**

Events of Interest

ISOS Online and Face-to-Face Conference – "In Search of Sustainability"

Online: February – November 2003. Face to Face: Canberra, 14 November.

An innovative and progressive Internet conference open to Australians from all walks of life, concluding with a plenary face-to-face conference. Jointly managed by Australia 21 Ltd, Nature and Society Forum Inc, & Sustainable Population Australia Inc, in association with The Australian Collaboration. Information: www.isosconference.org.au **Themes:** February: **Water**. March: **Human health & wellbeing**. April: **Land use & natural ecosystems**. May: **Energy**. June: **Equity & Peace**. July: **Economic Systems**. August:: **Climate**. September: **Labour force & work**. October: **Transportation & urban design**.

Water Conferences listed by the International Water Association (IWA):
See: www.iwahq.org.uk/template.cfm?name=events

International Events listed by the Harvard University Forum on Science & Technology for Sustainability
See: http://sustsci.harvard.edu/events.htm

Transport & Land Use Integration: How to do it – Workshop with David Begg, UK.
Perth, 16 September. www.sustainability.dpc.wa.gov.au/preconferencea.htm

Sustainability & Corporate Objectives. CEDA Seminar with Prof Dexter Dunphy & Attracta Lagan
Sydney, 18 September. For registration form, email chrism@ceda.com.au

3rd Conference of the Regional Government Network for Sustainable Development: Regional Governance for Sustainability – and accompanying academic forum (nrg4SD).
Perth, 17-19 September. www.sustainability.dpc.wa.gov.au/conferences.htm

3rd National Conference of Sustainable Campuses
ANU Canberra, 24-26 September. www.anu.edu.au/acts2003

Energy Savings-Immediate Payback. Managing significant energy savings for new & existing buildings
Melbourne, 29-30 September. Training course. info@iir.com.au or www.iir.com.au/infrastructure or contact Jay Nair on (02) 9923 5082 & quote discount code BD02

Finding the Path from Johannesburg: Engaging Civil Society in Implementing WSSD Outcomes
Bangkok, Thailand, 29-30 September. http://www.asef.org/dir/ie/env/wssd

Working Together: Cultural Heritage & Native Title 2003
Brisbane, 29 September – 1 October. www.iir.com.au/resources or info@iir.com.au

Climate Change and Health – Symposium (29/9) and Short Course (29/9 – 2/10)
Canberra, 29 September – 2 October. http://nceph.anu.edu.au/Envir_Collab/Climate_Change_course.htm

Materials 2003 – IMEA Conference on Adaptive Materials for a Modern Ssociety
Sydney, 1-3 October. www.mateng.asn.au/mat2003

Eco-Innovation & Sustainable Development – Short Course: 3-day or 5-day option
Canberra, 1-3 or 1-5 October. Info from Dr Janis Birkeland – jlb@scides.canberra.edu.au

Organic Futures for Australia – OFA 2003 – 2nd National Organic Conference
Adelaide, 2-3 October. www.ofa.org.au or http://conference.ofa.org.au

Future of Ecolabelling in Oz – Aust. Environ. Labelling Assn., with ANU and UNEP – Conference
Canberra, 9-10 October. Info: management@aela.org.au or www.aela.org.au

GIN2003: Innovating for Sustainability – 11th International Conference – The Greening of Industry Network
San Francisco, 12-15 October. www.greeningofindustry.org/gin2003.htm

Sustainability: Are we making genuine progress? Canadian Society for Ecological Economics
Jasper, Canada, 16-19 October. http://www.cansee.org/docs/Conferences.htm

Wastewater Management Seminar 2003
Murray Bridge, SA, 22-24 October. Tony Farror (08) 8226 7161 or Mehlika.Kayaalp@dhs.sa.gov.au

International Conference on Water-Saving Agriculture & Sustainable Use of Water & Land Resources
Yangling, Shaanxi, P.R. China, 26-29 October. Working language, English. Info: Lu.Zhang@csiro.au

Sustainable Innovation 03: Towards Sustainable Product Design – 8th International Conference
Stockholm, Sweden, 27-28 October. www.cfsd.org.uk/events/tspd8

Emerging Transport Technologies – Future of the motor car – Greenfleet, World Solar Challenge & CSIRO
Adelaide, 28-29 October. www.greenfleet.com.au/transport/sustainable.asp

Building Maintenance & Management: Effective methodologies to achieve efficiencies
Sydney, 28-30 October. www.iir.com.au/property

NSW Infrastructure – Economic Infrastructure Investment Opportunities in NSW – Future trends.
Sydney, 29-31 October. www.iir.com.au/infrastructure

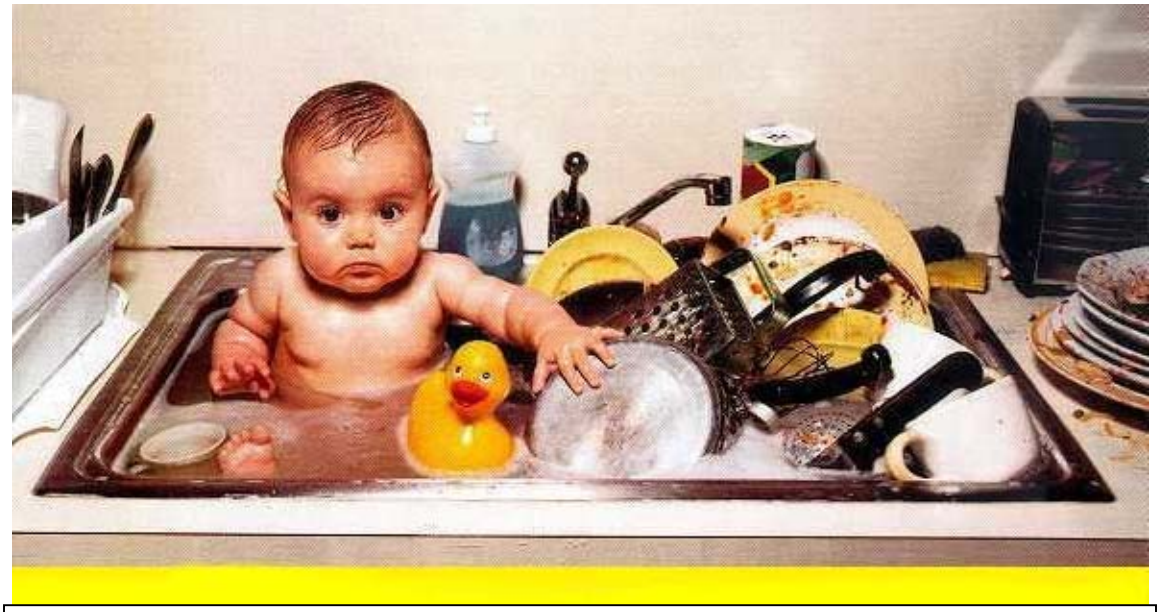
Coal – Contributing to Sustainable World Development – 12th International Conference on Coal Science
Cairns, 2-6 November. Hosted by Australian Institute of Energy, the International Energy Agency, and IEA Clean coal Centre. www.aie.org.au/iccs or iccs@aie.org.au

Development as a solution: Green Building – Short Course: 3-day or 5-day option
Canberra, 5-7 or 5-9 November. Info from Dr Janis Birkeland – jlb@scides.canberra.edu.au

Sustainability in a New World – International Solid Waste Association (ISWA) Congress 2003
Melbourne, 9-13 November. www.iswa2003.net

In search of Sustainability [Face-to-face component of the Online ISOS Conference listed at top]
Canberra, 14 November. www.isosconference.org.au/novconf.html
Greening Sustainability – Ecopolitics Conference – Ecopolitics Association
Melbourne, 27-29 November. www.ecopolitics.org.au or brian.coffey@rmit.edu.au
"Sustainability" and the Social Sciences: Theory and Practice – A one-day Round-Table
Sydney, Early December. Expression of interest to Lucy.Hall@uts.edu.au; enquiries to Convenors, Helen.Cheney@uts.edu.au or Fiona.Solomon@csiro.au
Sustainable Living Festival
Melbourne, 13-15 February 2004. www.slf.org.au and www.sustainablelivingfestival.org
HydroSalinity Abatement & Advanced Techniques for Sustainable Irrigated Agriculture – Training Wkshop
Lahore, Pakistan, 22-27 March 2004. Contact Wkshop Secretariat center@xcess.net.pk
Salinity Mitigation for Water Resources Management – International Seminar
Lahore, Pakistan, 26-28 March 2004. Contact Seminar Secretariat center@xcess.net.pk
Enviro 04 Convention & Exhibition
Sydney, 28 Mar – 1 April 2004. www.enviroaust.net or quitz@bigpond.net.au
Sharing Indigenous Wisdom – An international dialogue on sustainable development
Wisconsin, USA, 6-10 June 2004 (was 8-12 June 2003). www.sharingindigenouswisdom.org
13th International Soil Conservation Organisation Conference – ASSSI & IECA
Brisbane, 4-9 July 2004. www.isco2004.org or isco2004@icms.com.au
Sustainability Engineering & Science – NZSSES International Conference
Auckland, New Zealand, 7-9 July 2004. www.nzsses.org.nz/Conference/
World Water Congress & Exhibition
Marrakech, Morocco, 19-24 September 2004. www.iwa2004marrakech.com
9th International Conference on Wetland Systems for Water Pollution Control
France, 27-30 September 2004. www.iwahq.org.uk/template.cfm?name=wetland_systems
6th International Conference on Waste Stabilisation Ponds
France, 28 Sept – 1 Oct 2004 2004. www.iwahq.org.uk/template.cfm?name=waste_stabilisation_ponds
AgroEnviron-2004: Role of multi-purpose agriculture in sustaining global environment – Intl. Symposium
Udine, Italy, 20-24 October 2004. www.dpvta.uniud.it/~agroenv

Parting Shot



Future citizens need early training about water use efficiency – including multiple-use of domestic water resources.

And Finally – Notes and Reminders

Our Web Site: www.bml.csiro.au/sustnet.htm

The site is maintained by Lyndon Hirst at CSIRO's Black Mountain Library – Suggestions welcome.

- **To find back issues of Sustainability Network newsletters directly, go to our web archive at: www.bml.csiro.au/SNnewsletters.htm**
- **Pass it on!** The Sustainability Network is intended to be inclusive rather than exclusive. If you know someone who might be interested in this newsletter, by all means forward it to them or give them our web address.
- **Want to make contact with scientists?** If you can see an application for the science featured in these newsletters and need to contact the scientists involved, let me know by email.
- **Want to see a particular area of sustainability science featured?** If there is a particular area of sustainability-related science that you would like to see featured as a "spot" in a future newsletter, send me an email or call me by phone to discuss it.
- **Give me your feedback.** I would be interested in your comments as to whether these newsletters are interesting, useful, and pitched at the right level for your particular purposes. Do you have suggestions? Thanks to all those who have already sent in comments and alerts.

Milestone: Our Sustainability Network now has 660 members.

Sincerely,

Elizabeth Heij

Network Facilitator

Postscript: I recently wrote a short paper on knowledge networking, based on learnings from the Sustainability Network. If you have an interest in knowledge management, and would like to receive an electronic or hard copy of the article, let me know: Elizabeth.Heij@csiro.au

Next Update: At long last you can expect my summary of the wealth of interesting material sent by Network members in response to my call for information on conserving biodiversity in agricultural lands. I have been learning lots on the way through!