

CSIRO

SUSTAINABILITY NETWORK

Holmes Building
CSIRO Waite Laboratories
PMB 2 GLEN OSMOND, SA 5064

Ph: (08) 8303-8406
Mob: 0417 611 244
Fax: (08) 8303-8750
Hm Fax: (08) 8298-9790
Email: Elizabeth.Heji@csiro.au

17 February 2003

Members
CSIRO Sustainability Network

Feature “thought” :

“The quality of the urban environment – our public realm – is, in fact, the true measure of civilisation.”

Professor Sir Colin Buchanan, quoted in a presentation on Urban Sustainability Indicators by Dr Peter Newton of CSIRO.

Dear Networkers:

SUSTAINABILITY NETWORK UPDATE – No 22E

In Update 20E, I linked water and urbanisation as two of the most pressing sustainability issues for the new Century. In that Update we looked at urban water. Here we move to issues of urban planning.

If cities are to be the major human habitat for the 21st Century, can they be made more habitable? Can they be made more sustainable?



“On the wall” (2002) by Chinese photographer Weng Peijun – part of a series that captures the anxieties associated with changing cityscapes.

From the Shanghai Art Museum,
featured in the Weekend Australian, Dec 21-22, 2002, p. R19.

The urban environment – its health and sustainability – are vital concerns for Australians. Although the urban environment has, at various times, featured as a key platform issue for all major political parties, we are, if anything, still moving away from, rather than towards, sustainable cities.

Cities are complex, economic, environmental and social systems with many interlinked issues involved in their 'evolution':

- The vast majority of Australians live in cities and major regional towns. Cities are where over 95% of jobs are located, and where some 90% of Australia's GDP is generated.
- Energy consumption by the residential sector has increased by 60% since 1975, "charging ahead" of a population increase of 35% in the same period.
- Contemporary urban design holds Australia hostage to wasteful, private automobile transport. Solutions that might work are not popular, and those that might be popular don't work.
- Globalisation of manufacturing, and the delivery of increasing quantities of goods purchased over the internet, are rapidly increasing demand for freight transport on urban as well as inter-city routes.
- Australians currently dispose of 810 kg of domestic waste per person per year. Among the developed countries, we are "rubbishing our cities" at the second-highest rate (after the USA).
- Urban air pollution is quietly insidious health issue, believed to account overall for more deaths than the road toll.
- Indoor air quality in public transport, offices, and new or refurbished buildings and homes is often even more polluted than the air outside, a "suffocating issue" for urban dwellers, who spend 96% of their time 'indoors.'
- Cities and their fringes are biodiversity "disaster zones," with "tomorrow's new weeds" and over 40% of nationally listed threatened ecological communities occurring in urban fringe areas, such as the Swan Plains near Perth, for example.
- Quality and quantity of urban water are growing issues. We flush toilets, clean cars, and water gardens with drinking-quality water, but fail to recover re-usable 'greywater.' Meanwhile, polluted stormwaters run to waste off sealed, impermeable city surfaces, endangering coastal marine and river systems.

Only by understanding how the different components of the city system interact with each other will we be able to improve the system as a whole. We need an integrated, multidisciplinary, whole-of-system approach to better cities, including a broader awareness of the interlinkages between components such as:

- Cleaner production of goods and services
- Low-energy, low-pollution transport options
- People-friendly urban designs with room for slow and fast circulation modes
- Urban water resource management
- Energy efficiency – in production, distribution, and industrial & domestic consumption.
- Data communications – functional, affordable & ubiquitous
- Domestic and industrial construction systems with inbuilt resource efficiency and high liveability
- Better protection of urban coastal and river systems
- Management of urban footprints
- Healthier urban and peri-urban ecosystems
- Better health outcomes for the urban community
- Options for future development – and community participation in choices

Although Australia has the world's most urbanized society, we have invested relatively little in integrated approaches to urban improvement. Overall we appear to be thinking more about the sustainability of our vast rural landscapes than our cities. This is understandable in that we have some very pressing landscape problems, such as dryland salinity and the declining health of major river systems. However, the stresses are also showing in our urban environments and, if cities are increasingly the "human environment of the 21st century", their ecological footprints

and their sustainability as human life-support systems are going to need much more work. Encouraging the best international thinkers in this area to assist us in developing whole-of-system vision for our own cities, could be a wise investment.

Towards Sustainable Australian Cities

Megan Antcliff of Woods Bagot, Adelaide, addresses some of the unsustainable features of Australian cities, including the suburban sprawl that so compromises their functionality. Megan has recently returned from Architectural studies in Europe and is involved in an urban renewal research project in Adelaide in affiliation with L'Ecole d'Architecture de Versailles, in France. She says, "My impression is that, at a very strategic planning level, one of the keys to sustainable Australian cities will lie in our willingness to integrate density into our existing housing models. Australian planners will need to accept that density is not a phenomenon restricted to the large European cities (those we look to for the "true city experience" whilst abroad), but is in fact a tool at our disposal. I believe that well planned and managed urban density will offer new opportunities for creating an improved Australian city life experience, at the same time as it will help our cities move towards sustainability. The benefits are both cultural and ecological."

You can contact Megan at – megan.antcliff@woodsbagot.com.au

As pointed out in the introduction to this Update, the vast majority of Australians live in cities and major regional towns. Cities are where over 95% of jobs are located, and where some 90% of Australia's GDP is generated. As such, Australia has the world's most urbanised society.

However, the domestic debate on sustainability remains largely focused on the very serious issues facing our rural and natural environments rather than those, equally threatening, affecting our urban environment. Meanwhile the unsustainable manner in which our cities are built and operated and the implications this holds for our capacity to become a sustainable society goes unchecked.



Megan Antcliff

Urban design has not featured strongly in the greenhouse debate to date; the ecological footprints of our cities and the sustainability of their systems are yet to be given the consideration they deserve.

Refusing to see cities as the human life-support systems that they are will cost Australia dearly, not only at an environmental level as we strive to achieve sustainability whilst maintaining the ideal of a certain 'quality of life', but also at a cultural level as we discover that the urban (and suburban) models we have cherished for the past 50 years may not nourish the diverse and fair society in which we expect to live for the coming 50 years.

"There are few people who do not enjoy the magic of a great city. But urban sprawl takes it away from everyone except the few who are lucky enough, or rich enough to live close to the largest centres."

Alexander (1977)¹ explains the mechanism which creates a single isolated city core: "Urban services tend to agglomerate; as the nucleus keeps growing, the downtown becomes enormous. It becomes rich, varied, fascinating. But gradually, as the metropolitan area grows,

¹ In 'A Pattern Language: Towns, Buildings, Construction', C. Alexander, Oxford University Press, 1977.



the average distance from an individual house to this one centre increases and land values around the center rise so high that houses are driven out by shops and offices until soon no one – or almost no one – is any longer genuinely in touch with the magic which is created day and night within this solitary centre.”

The city as a Central Business District, housing principally commercial activity, and its negative, the sprawling, peripheral suburbs for isolated residences is, to a large extent, the Australian urban experience.

In the self-perpetuating system that is urban sprawl, more and more people settle or relocate to the fringes of established metropolitan centres and to non-metropolitan growth centres, only to increase the demand for infrastructure – particularly roads, sewerage, cabling and waste disposal – to service the growing population. With the improved infrastructure, the new urban area becomes even more attractive as a residential investment option or for business. Eventually, the attributes which attracted settlement in the first place – cheaper land, cleaner air, less traffic congestion, open space and general quality of life – are eroded in turn and the push is on to find more space out on the ever expanding fringe and do it all again.

The push for suburbia has been experienced in a number of cities across the world, and each example illustrates a unique set of motivating factors, historical, social, cultural and economic. In Australia, by the start of the 20th Century, major cities had already developed a low density urban fabric or sprawl at the edges of an older, compact city core. The 20th Century saw the consolidation of the ‘commuter society’ and steady decentralisation of housing and employment, made possible through improvements in public transport. The creation of new suburbs was, even then, fast approaching its limitations and the situation was further exacerbated when increasing levels of private vehicle ownership shifted emphasis from the provision of public transport infrastructure to the development of extensive road networks. Suburban development in Australia went on unabated until the 1950’s. General economic prosperity and support at a government policy level sustained a system of development which did not begin to show signs of slowing until the mid 1970’s and early 1980’s.

As concerns about the social and environmental costs of our much cherished suburbia begin to find an audience, and as we begin to see a push for re-densification of urban environments, we are confronted with the legacy of our planning past.

Australians have come to expect that the proliferation of suburbia will continue, despite the exaggerated investment in infrastructure and services it demands from the outset, and the resource intensive operations and management regimes to which we are held hostage, once the next suburb is established.

The paradox of the Australian situation is that this resource-intensive urban model of city core and spreading suburban fabric is often perceived as a ‘green’ way of living. We have accepted a detached private dwelling placed on a small a patch of green far from the city centre as a reasonable response to the Australian urban condition. We imagine that our far flung but leafy suburbs, dependant on the proliferation of private motor vehicles, are a responsible alternative

to the big city model based on mixed use urban fabric (no zoning) with higher housing densities and mass transport systems.

Despite a growing body of knowledge on the virtues, both social and environmental, of a well managed dense and mixed urban fabric, there seems to be continued reluctance to challenge Australia's dispersed urban morphology. Whilst there is a huge engagement with the 'green agenda' at both intellectual and practical levels, among individuals and planning professionals, there is a continuing reluctance to challenge our extremely outdated suburban model.

Coordinated action to address the issues of 'green' architecture and the even greater challenge of 'green' cities are in their infancy in Australia at the same time as the need to use urban land more efficiently is becoming evident. We are faced with the very real need to reduce the rate of urban sprawl in an effort to reduce residential-sector energy consumption and therefore greenhouse gas emissions, but also in recognition of the fact that Australian cities are fast approaching their geographical growth limits.

A number of authors have addressed the issues surrounding the urban-suburban typology in urban planning literature. From Alexander who proposes an urban village model based on community structures, to Koolhaas who investigates nodes of urban intensification as a means of restructuring Holland's built fabric and infrastructure systems.

For Alexander 1977, the answer lies in creating numerous urban centres², each catering for a population of around 300 000 habitants, each with a pedestrian and local transport area, and with good transit connections from the outlying areas. About 300,000, he believes is the minimum population that can support a central business district with rich urban functions, complexity, and the 'magic' of the city – magic that comes from the enormous specialisation of human effort concentrated there. Furthermore, he suggests that centres should be spread out widely among the population so that every person in a region is relatively close to a centre, and that each centre should develop its own character." A specialised core, although small, would then, according to Alexander, serve several million people, and could therefore generate all the excitement and uniqueness which becomes possible in such a vast city. A key to Alexander's model is the balance between local activity and the interaction of different localities such that "every person is within reach of at least one 'downtown' and also that all of the downtowns are worth reaching."

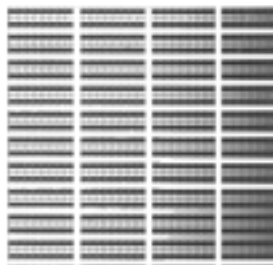
The 'Puntstad' (Point City) investigated by the Office of Metropolitan Architects for their 1993 project "Unlearning Holland: Project for Redesigning Holland"³, offers a different response to the issues associated with a highly dispersed population at a national scale. The 'Puntstad' project proposes urban centers with "all the advantages of concentration – optimum, efficient infrastructure networks; dense, truly urban conditions (finally); highly developed planning; and concentrated power of decision instead of an opaque system of decentralisation that looks more and more like cell division gone haywire. Instead of taking a position of permanent hand-wringing, we can systematically, deliberately, intentionally fabricate an effective Western metropolis, and at the same time create emptiness – a reservoir of void – in the rest of the country."⁴

Urgent! Suburbia is not Sustainable

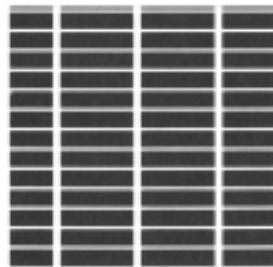
² A similar "City of Cities" concept has been discussed in work by the Warren Centre for Advanced Engineering, University of NSW, in their project on "Sustainable Transport in Sustainable Cities. See www.warren.usyd.edu.au and click on "Activities".

³ In, "S, M, L, XL" Rem Koolhaas & Bruce Mau, 1995, The Monacelli Press, New York, ISBN 3-8228-7743-3]

At present levels of consumption, the human population will require the resources of about three Earths to sustain itself. We are exceeding the carrying capacity of natural systems by a factor of three on average, six in the 'west' and one to one-and-a-half in Africa.



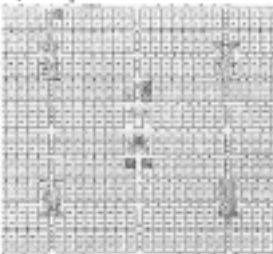
Los Angeles density
2500 persons/km²



Manhattan density
25,000 persons/km²



Dutch density
8,000 persons/km²



Adelaide density
800 persons/km²

While simplistically it may appear as though the growing human population could run out of resources and energy, the constraints on achieving sustainability are rarely a direct result of resource scarcity. What limits human action is waste (pollution) and its consequences – i.e., it is the 'sink' not the 'source' that tends to curtail the system. At the root of pollution lies consumption.

As the human population becomes more urban, we also consume more and pollute more. This, as Richard Rogers pointed out in his Reith lectures in 1996⁴, shifts the emphasis up-scale from buildings to urban design, and from simple choices (such as energy efficiency) to complex ones (such as ecological sustainability). With this change in emphasis comes a clear new agenda for building design. Architecture which accounts for roughly half of all the world's resource consumption (materials, energy, water and the loss of fertile agricultural land), has to come to terms with the fact that the wastes from buildings are increasingly polluting the planet and destroying the health of people and other species.

The recognition, albeit only partial as yet, that the objective should be a move to more sustainable development, focuses attention on three key issues: renewable energy, urban design, and sustainable transportation systems. "Over the past decade we have moved from a fairly focused concern for global warming, with its associated international agreements (Rio, Kyoto), to a wider concern for the state of cities, the environment, and ecological health. This shift is central to the notion of 'sustainability'. For architects such as Yeang and Foster of Future Systems⁵, it is the challenge of our age – "the first unifying basis for a new architecture since Le Corbusier's 'Towards a New Architecture' was published in 1927."⁶

Lamenting the lack of focus on urban planning issues in the context of the larger sustainability debate, Samuels and Prasad (1994)⁶ note that "how we build, the design, placement and grouping of buildings, and the consequent transportation patterns required, make a major impact on the production of greenhouse gases." Within the planning professions there is strong evidence of a move towards densification – concentrating on building those urban forms with the lowest energy usage: for Samuels and Prasad, "urban villages" are the key urban design component which will enable the re-building of cities with reduced automobile dependence."

Boyd (1968) proposed that cultural baggage and the misappropriation of European architectural styles were responsible for delaying the understanding of more appropriate and sustainable

⁴ See the publication by Richard Rogers (1995) entitled "Cities for a small planet."

⁵ In, *Architectural Design, 'Green Architecture'*. Brian Edwards, (ed), Wiley Academy, 2001

⁶ 'Global Warming and the Built Environment', R. Samuels, D.K. Prasad (eds), E&FN Spon, 1996

building practices in the context of the Australian climate and environment. Sprawling suburbs, with their inappropriately built homes of brown brick veneer on timber frames and dark tiled roofs, are the unhappy result. Architecturally, Australians have since come to embrace our 'vernacular' materials such as corrugated iron – a symbol that we have moved beyond the cultural need to emulate European architectural aesthetics. And we are fast embracing intelligent design (integrated passive environmental design through factors such as: orientation, building form and organisation, use of thermal mass, buffer zones and efficient airflows); intelligent building fabrics (responsive facades to maximise natural daylight and ventilation and control solar gain and loss); and more appropriate use of materials (concern for embodied energy and life-cycle issues, transferring technologies from other industries, etc)⁷. On an urban planning level, however, real progress is yet to be made in the application of sustainable planning methods to our ever-sprawling cities – cities largely inappropriately designed for our climate and based on high usage of private cars.

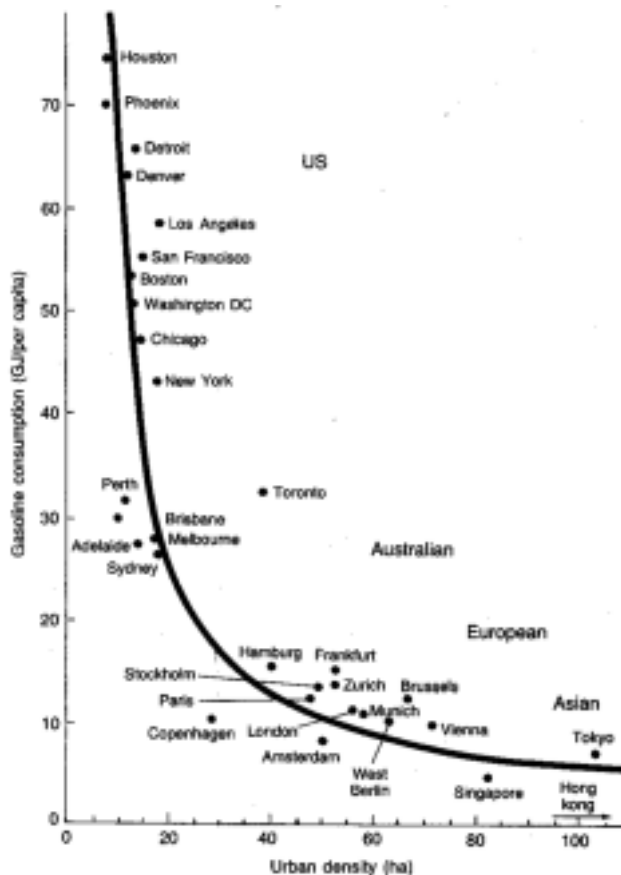
The issue is as environmental as it is socio-cultural

Trends set in motion at the UN Kyoto Conference on Climate Change (1998) and the World Climate Change Conference at The Hague (2000) threaten to break the monopoly of established universal architectural solutions (based on Western cultural primacy and High Technology). With carbon quotas and emissions targets to meet, we will have to burn less fossil

fuel – in our cars, in our industries, and, most importantly, in our buildings – climate sensitivity will become an unavoidable criteria of design. Buildings will change radically, and in time, so will cities.

A positive yet indirect outcome of International agreements such as Kyoto, may be the opportunity it could afford cities to rediscover their depth of place, time and function as cities – to once again become identifiable places based on a synthesis of cultural and environmental values. The antithesis, as Mark Peel describes it, of a 'Los Angeles of uncontrolled urban sprawl, dispossession and despair'⁸

The different regional perspectives on sustainability are well illustrated by the different nature of 'sink limits' in different parts of the world. In the industrialised 'West', air pollution is becoming a major constraint on development. The EU estimates that air pollution from traffic is the second biggest killer in Europe, leading to 60,000 deaths per year from bronchitis and heart disease. In Africa, on the other hand, water pollution is the killer. Unsafe drinking water kills more people than AIDS, and according to the UN only a third of the population has clean water to drink.



⁷ For more information on intelligent design, visit the Australian Greenhouse Office web site www.greenhouse.gov.au

⁸ 'The Urban Debate: From 'Los Angeles' to the Urban Village', M. Peel, in "Australian Cities: Issues, Strategies and Policies for Urban Australia in the 1990's" P. Troy (ed), 1995 Cambridge University Press, ISBN: 0 521 48167

So whereas in the West the strategy for sustainable development focuses on energy conservation (and hence less air pollution), in much of Africa and Asia it revolves around water supply issues. In this context, one should expect regional differences in both the philosophy of sustainability and its practice. It is essential to appreciate that sustainable practice, although working towards a common goal, is responsive to local and regional imperatives.

The issue is as socio-cultural as it is environmental

There is no tenable argument which can separate environmental action from cultural action. 'Place' is a statement about attitude to geography, history and resources. 'Placelessness' – the prevalent 20th-century mode of development – was indifferent to all three. To meet new CO₂ emission targets we need to value fossil fuels as scarce and diminishing resources; and we need to exploit renewable energy sources, develop new technologies, and devise new solutions on which to base building programs. Since each place is different (resources, climate, exposure), building solutions will need to be differentiated more effectively than in the past.

In a world of globalised space and increasingly standardised values, sustainability is a driver that presents the opportunity to develop specific place-related design. In Australia's multicultural society, sustainability offers the chance to unify a diversity of cultural values around common environmental goals, creating shared environmental agendas while preserving a mix of creative cultural contributions.

The compact city, an emerging imperative in sustainable urban design, has its own social fabric, it is mixed, dense, and full of surprise; it has life after dark. Like so many older European cities, it is a city to discover on foot, a place rich in detail which can only be appreciated when seen at the reduced speed of walking. The compact city encourages a sense of place – it does not entirely reveal itself to motorists, nor does it disappear at the close of business each day. The compact city discourages the isolation and inequity of the suburbs.

The idea is that if we respond to the environmental necessity of each place and re-densify our cities, we will, in the same gesture, bring back to them their life and social fabric.

"What is often ignored in architectural circles is the way sustainable development as a concept bridges two central agendas of building design: technology and social purpose. Many recent movements in architecture have played to only one side of the equation. 'High Tech' was high architecture with little social justification. 'Community Architecture' ignored the power of technology to solve human problems. But sustainability brings the two camps together: it not only reinvigorates architecture, it gives fresh moral validity to the creation of human settlements. And here lies the basis of a new flowering of architectural talent after the 'dark ages' of much of the 20th century. The marriage of technology and social sustainability brings a need to understand materials and their details on one hand, and the agents of community well-being (and hence urban design) on the other."⁹

Re-densification of the city: why and how

The compact city needs to provide an environment where people will want to live, and which provides the services, facilities and transport that will encourage them to change to more ecologically sustainable lifestyles, particularly in relation to the use of their cars.

⁹ Architectural Design, 'Green Architecture'. Brian Edwards, (ed), Wiley Academy, 2001

A number of urban forms are emerging as sustainable, and future development should follow the combination of those forms which are most sustainable in a given local, regional or national context. The approach must be flexible.

When the compact city is to be brought about by the intensification of existing towns and cities, the balance between acceptable, sustainable compaction and overcrowding needs to be understood. This will be largely influenced by historical, social, economic and cultural values and as such, will vary from place to place.

The housing development models, which facilitate 'decentralised concentration', include medium density housing, dual occupancy, mixed-use development, traditional neighbourhoods and urban villages. There will not be one solution, but many site-specific, culturally sensitive solutions working towards a common goal: the re-densification of cities and suburbs to ensure their sustainable future and justify their very existence as human habitat.

The implementation of intensification needs to be sensitive, not just to the ecological imperative, but also to social and economic needs. This is the challenge of urban renewal through re-densification in the Australian context.

Reinventing an Australian urban morphology may commence with the creation of small, dense urban centers among the existing suburban continuity, like small strategic jewels punctuating and animating an ancient fabric. (See, for example, the conceptual Figure on the next page.) This may be followed by the re-invention of the suburbs themselves. Just as the OMA 'Punstad' concept (1993) proposed that the arc of existing Dutch cities become the periphery of a great new metropolis, only to, one day, "resume their historic status, encircling the capital".

In a first phase, during the establishment of true urban centers, sparse suburbs would continue to exist in their time-warp. They may or may not take on relic status; they may even be reabsorbed by the nature that surrounds the city. In a second phase of development, in remaining suburbs (i.e., those not designated 'suburban relic' or returned to nature), new forms of residential growth would be explored – a more sustainable yet attractive model of individual living en masse combined with high-quality public spaces.

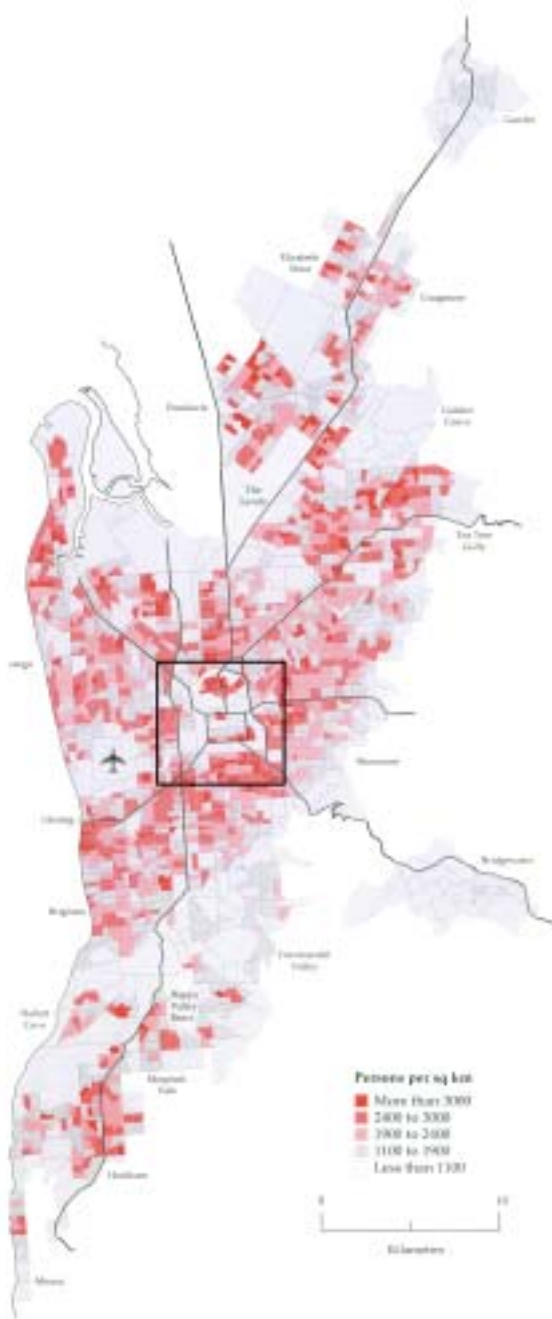
Australian suburbia and the importance of the 'Aussie backyard'

Suburban sprawl was, in its time, the most ample and democratic realisation of the common dream of living in a detached, private and sanitary house in a suburban setting. Today, it seems that part of the battle against urban sprawl and the excesses it represents might already be won – by the fact that such a 'common dream' is no longer definable in today's demographically diverse Australian society.

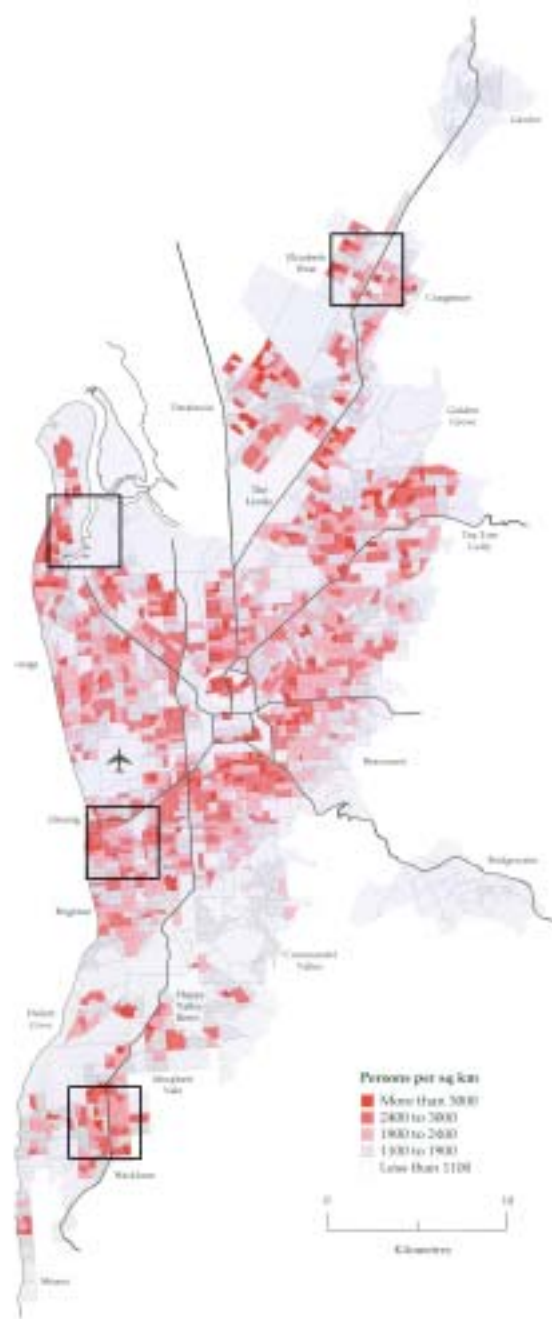
The low-density suburban model of detached, single storied houses set on a large lots (approximately 20m street frontage by 50m depth), in the 'New frontier Towns' of Adelaide, Melbourne and Perth, was undeniably assisted by its coming of age at the same time as technical advances in public transport. It also proved itself a city model less vulnerable to the spread of fire, but one that demanded massive capital investment in infrastructure and services.

Despite its excesses, such a city made up of an expanse of low-density suburbs as could be found in Los Angeles, Denver, Vancouver, Auckland and Adelaide was the realisation of the worker's dream.

Suburban spread was not exclusively for the upper classes and, in Australia, the working classes shared in suburbanisation from the outset.



The entire population of the Adelaide region could be accommodated in 51km² if a density equal to that of Paris was imposed



If Adelaide were to consolidate around four urban centres, each housing 300,000 people at a density of 150 persons per hectare (Paris houses 235), the amount of land liberated opens up a myriad of possibilities

Abstract as it may be, the above illustration, based on the 1991 National Commonwealth Census results, illustrates the potential for land use reform if Adelaide were to adapt a dense, mixed urban model.

A symbol of the very prosperity of the Australian worker, the sprawling suburbs did have their critics at the time, as one commentator noted: “Adelaide has been laid out on a scale of unwise magnitude...the unnecessary size of the town has augmented the cost and difficulty of providing an adequate water supply for the whole city...by so inflating the cost of paving streets and laying pipes to serve the city’s houses, far-flung suburbia might easily encourage a situation of public squalor amid private affluence.”

One might argue that this is the crux of the problem today. The private interest of individual owners in protecting their low-density leafy suburbs, enormous backyards and sparsely populated streets, blinds them to the larger issues – that beyond their personal battles against development (in whatever form it may take) in the name of protecting their environment is the greater issue of true sustainability.

The ‘squalor’ of the Australian example is that whilst we live in green, spacious suburbia, and fight vehemently to conserve *this* tree and *that* nature reserve from the clutches of developers, we ignore the fact that Australia has one of the highest per capita carbon emission levels in the world, largely due to overuse of the automobile – a necessary accessory to life in far-flung suburbia.

It is easy to find fault in the Australian suburban model – the costs of servicing such a low-density community – the fact that it makes public transport grossly uneconomic and leads to car-dependence with all its problems, including the isolation of those without a car who become locked in their ‘green prison’. On the other hand, however, the private outdoor spaces afforded to each suburban homeowner room for a garden, a shed, a barbeque, entertainment areas for adults, and children’s play spaces – all now highly valued cultural expectations.



Once the necessary adjunct of the house and serving domestic needs, the suburban backyard was essentially rural, a gesture towards functional self-sufficiency; and it remains today a fiercely guarded icon of Australian culture. Despite transformations in function, the backyard space itself remains. A passion for our own outdoors is a very real element of Australian culture.

This constitutes a very real challenge for planners looking to achieve a level of sustainability for Australian cities. As planners, if we are to successfully adopt a denser housing model with reduced private outdoor living spaces, we will also have to establish more human, more usable, more easily appropriated public open spaces within our urban fabric.

Provision of a range of high-quality public spaces (urban landscapes, streetscapes, sporting facilities, squares, promenades, urban parks, public transport, natural bush land areas, etc) offers great scope for planners and designers to better respond to an increasingly diverse Australian population

In establishing strong and dense urban centres we will at once be responding to the need to make our cities sustainable, and to changing residential and recreational demands. Our urban population are less likely now to be the nuclear family with 2.3 children for whom the suburban backyard was perfectly conceived, and quite likely to be single people, childless couples, or elderly. In our response, however, we must ensure that the various solutions to sustainable urban form ensure a real quality of life, at a level to which the Australian population has become accustomed. It is this that will make the goal of sustainability attractive and achievable.

The arguments for developing a sustainable approach to city building are overwhelming. If Australian cities are to become sustainable, if we are to assure their future, we will need to see a revolution in our land-use practices. Suburbia, a once valid response to a social, cultural and economic Australian environment, is no longer an appropriate urban model for Australia. The massive consumption of space and resources by individuals, manifest in our sprawling suburban carpet, is no longer acceptable.

The task is twofold: We must develop, on the one hand, new urban centers to refocus communities – mixed compact cities with high-quality public spaces and high-density living, and on the other, flexible, locally adapted models for the reclamation and re-densification of existing low-density suburbs.

“Sustainable urban forms will only be achieved if they are underpinned by a supportive policy background, one which commits to global sustainability goals but leaves room for local solutions to be formulated and implemented.”¹⁰

“This Century [20th] has been a losing battle with the issue of quantity... In spite of its early promise, its frequent bravery, urbanism has been unable to invent and implement at the scale demanded by its apocalyptic demographics... Modernism’s alchemistic promise to transform quantity to quality through abstraction and repetition has been a failure, a hoax: magic that didn’t work.”¹¹

An additional point that occurred to me while working with Megan to present this feature relates to the issue of bushfire. The low-density interface between bushland and suburbia that rings our cities may seem attractive, but it can be a disastrous place to live. Fire has been a natural part of the Australian environment from time immemorial, and our bushland will continue to burn, even without the assistance of mishaps and human arsonists. It might not be such an issue if we still lived in caves and temporary shelters like our distant ancestors – but we don’t.

If we build in bushland in Australia, then essentially we take a lifetime of our working effort (our actual and prospective monetary income), translate it into a large immobile edifice of flammable physical materials and consumer goods (a home), and place it in a combustible environment. Bushfire is not only a danger to human life, and a financial loss and severe emotional trauma for the homeowners affected, it is also enormously wasteful of all the energy, natural resources, and knowledge inputs embodied in the materials consumed. For every building burned, the whole community loses.

‘Redensification’ of the city offers a real and practical solution. Smaller, denser cities could potentially be separated more effectively from surrounding combustible bushland. True – individuals would not be able to appropriate chunks of bushland scenery for private use; but also true that the entire community might well have better access to the best bushland areas for recreation and enjoyment. Rather than becoming the all-too-familiar ‘disasters’, bushfires could return to being just ‘fire’ – a natural phase in the regenerative cycle of the Australian bush.

E. G. H.

¹⁰ “The Compact City: A Sustainable urban form?” M. Jenks, E. Burton, & K. Williams (eds), E&FN Spon, 1996

¹¹ “S, M, L, XL”, Rem Koolhaas & Bruce Mau, 1995, The Monacelli Press, New York, ISBN 3-8228-7743-3]

Young Australians search for a sustainable future...

A team of young Australian engineers and scientists are developing a publication to respond to the overwhelming need for reliable, peer-reviewed information on sustainable development – a source that will cover cost-effective best practise nationally and globally.

The main aim of this *'Natural Edge'* project is to produce a documentary-styled publication entitled *'Towards a Sustainable Future'*, and an associated online companion database highlighting current pioneers and future directions for sustainability in Australasia.

Collaboration with a range of peak organisations and bodies is the core strength of the project, which is driven by young professionals and mentored by many groups, bodies and institutions. These organisations include: the Institution of Engineers Australia (IEAust), the Environmental Engineering Society, the Commonwealth Science and Industrial Research Organisation (CSIRO), the World Federation of Engineering Organisations (WFEO), environment industry advocates, and the Rocky Mountain Institute, USA.

"The achievement of sustainability objectives will require holistic actions by all sections of society, and will require considerable cultural change to societal customs and aspirations. This necessitates the development of transitional pathways from the present situation to the preferred future."

IEAust Sustainable Energy Taskforce Report, August 2001, page 12.

The *Natural Edge* project will seek to improve communication among innovators in science, engineering, social sciences, government, and business. It will provide options and solutions for many of the key issues and challenges that we face in this century, and will show how holistic, systemic approaches are already delivering significant outcomes to companies, governments, educational systems, and societies. The publication, *'Towards a sustainable future'* will show how science, engineering, business and institutions are working in innovative ways, through cluster groups, national, state and local councils, and offices for sustainable development, to meet these challenges constructively and cost effectively.

The project core team are very keen to hear from people interested in possibilities for contributing to the development of the project. Check the Project Website at: www.naturaledgeproject.net and contact: secretariat@naturaledgeproject.net

Eureka! Let's ensure rewards for outstanding sustainability science!

A record \$210,000 will be awarded to outstanding Australian science in the 2003 **Australian Museum Eureka Prizes**, Australia's most comprehensive national science awards. Many, if not all, of the twenty-one \$10,000 prizes on offer have potential relevance to issues of sustainability and sustainable development:

- Australian Museum Eureka Prize for Industry
- Engineers Australia Eureka Prize for Engineering Innovation
- British Council Eureka Prize for Inspiring Science
- GRDC Eureka Prize for Research to Improve the Environmental Sustainability of Graingrowing
- Royal Botanic Gardens Sydney Eureka Prize for Biodiversity Research
- Royal Societies of Australia Eureka Prize for Interdisciplinary Scientific Research
- Sherman Eureka Prize for Environmental Research
- University of New South Wales Eureka Prize for Scientific Research

- Education, Science and Training Eureka Prize for the Promotion of Science
- Environment Australia Peter Hunt Eureka Prize for Environmental Journalism
- Engineers Australia Eureka Prize for Engineering Journalism
- Reed New Holland Eureka Science Book Prize

The Australian Museum Eureka Prizes are prestigious rewards for outstanding Australian science, and an excellent vehicle for profiling research and other activities relevant to sustainable development.

Thinking caps on, please. Nominations are needed to help ensure a high profile for sustainability in this year's awards. Candidates for prizes can either enter themselves or be nominated by others. Details and entry forms are available from the Australian Museum's website at www.amonline.net.au/eureka or from eureka@austmus.gov.au Entries in most prizes close **Friday 16 May 2003**, with winners announced at a gala award dinner at Fox Studios on 12 August 2003.

Other Information Resources

SUSTAINABLE HOUSING – Papers and Reports

The Healthy Home: A step towards greening paradise. By: **Ted Gardner**, Richard Hyde, Grant Millar, & Alison Vieritz. 4th Queensland Environmental Engineering Conference, Brisbane, May 2002.

The paper describes the design, construction and operation of a Healthy Home on the Gold Coast in terms of the energy for construction and operation, and the degree of self sufficiency that can be achieved from rainwater capture, greywater recycling, and energy generation from photovoltaics. Overall the Healthy Home used 50% less energy to build, 30-50% less mains energy to run, and achieves up to 70% self-reliance in water demand compared with a traditional home. If the rainwater concepts were applied to all new houses on the gold coast, an \$80M dam upgrade could probably be deferred well beyond 2025 – the projected year in which it is required for the “business-as-usual” case. Limitations to the widespread adoption of the Healthy Home innovations are essentially financial, and most could be overcome by innovative subsidies, and implementing the concepts at a suburb scale.

*Thanks to Network Member **Ted Gardner** of the Queensland Department of Natural Resources and Mines for an electronic PDF copy of the above paper. If you would like a copy, send an email request to Ted – Ted.Gardner@dnr.qld.gov.au or myself Elizabeth.Heij@csiro.au Ted, who has been working with the Architecture Department at the University of Queensland for several years, has a wealth of other information on sustainable housing initiatives, and is involved in developing a website encompassing data on climate, energy, water consumption, and thermal comfort. Contact him if you have an interest in being kept “in the loop.”*

Sustainability and Housing: More than a roof over head. By: **Peter Newman**. Text of the 2002 Barnett Oration, Melbourne, October 2002.

Housing continues to be critical to how Australians secure their future. Sustainability is defined as a global process that also tries to help create an enduring future where environmental and social factors are considered simultaneously with economic factors. Principles are used from the Western Australian State Sustainability Strategy to help define what sustainability could mean for housing. These are distilled into three major tasks:

- Ensuring there is a ‘roof overhead’ for the housing disadvantaged,
- Ensuring housing is more eco-efficient, and
- Ensuring housing is well located or is part of a project to improve locational amenity.

Network Member **Peter Newman** is the Director of the Sustainability Policy Unit, Department of Premier & Cabinet, WA Government, and Professor of City Policy, Institute for Sustainability & Technology Policy, Murdoch University, WA. You can find the above paper at www.sisr.net/housing/obo/pdf/EHIOration9_2002.pdf (607KB, 29pp) or link to it from the website of the WA Sustainability Policy Unit at www.sustainability.dpc.wa.gov.au under 'Sustainability Information.'

Sustainable Building and construction: Implementing Green Building in Western Australia. By: **David Beyer** (2002).

Buildings and their construction are the main structural elements of human settlements and are therefore intrinsically linked to all our lives. Creating sustainable human settlements is essential for human and ecological well-being. The building and construction sector is examined through its component parts and key elements, at both organisational and structural levels, to determine the requirements and pathways for creating sustainable building and construction, specifically in Western Australia. An analysis is included of the sector from the global perspective, the benefits of sustainable building to the occupants and users – and also to the environment – and an assessment of two buildings to determine their sustainability characteristics. Sustainability is advocated as a fundamental requirement of human existence, and a framework is suggested whereby the local West Australian sector can create an 'all of sector' sustainable building programme.

The document is Network Member **David Beyer's** Honours Thesis, submitted through the Institute for Sustainability & Technology Policy at Murdoch University. You can find it at www.sustainability.dpc.wa.gov.au/docs/sustainablebuildingconstruction.pdf (1,183KB, 147pp) or link to it from www.sustainability.dpc.wa.gov.au under 'Sustainability Information.'

Websites of interest

Independent Review of the Australian Greenhouse Office www.ea.gov.au/about/ago-review/index.html

The Australian Greenhouse Office (AGO) is the world's first government agency dedicated to cutting greenhouse gas emissions. It was established in 1998 as a separate agency within the environment portfolio to provide a whole of government approach to greenhouse matters.

On 4 February, the Government released the report of the Independent Review of the AGO by former Federal Minister (Lib.) Warwick Smith. The purpose of the review was to examine the scope, efficiency and effectiveness of the AGO, taking into account national and international policy and program dimensions. Sections of the Review can be viewed on the above site, and the full report downloaded as a PDF file (229 KB)



The report finds that:

- Formation of a central Commonwealth agency has been an effective means of developing and implementing the government's climate change agenda;
- Delivering outcomes while managing a diverse range of stakeholders presents a significant challenge to the AGO;
- Perceptions remain that the AGO is still not pursuing a whole-of-government agenda and has a bias towards environment at the expense of industry interests; and
- While the AGO has received criticism regarding the pace of its program delivery, this delivery pace is acceptable.

Key recommendations include:

- The AGO's status as an Executive Agency should be revoked in favour of it becoming an agency within the Department of Environment and Heritage, but retaining a distinct identity from its parent department.
- The AGO should continue to be the lead Commonwealth agency on domestic greenhouse policy, but take a subordinate role on international greenhouse issues to the Department of Foreign Affairs and Trade.
- The AGO should develop for Cabinet consideration a strategic framework for Commonwealth action on climate change that includes longer-term objectives and activities.
- A Secretaries Sustainable Environment Committee should be formed to support the Sustainable Environment Committee of Cabinet and also to progress whole-of-government approaches to greenhouse policy and program implementation.
- This body should also be tasked with evaluating all AGO funding programs and determining whether any would be better delivered by agencies outside the AGO.
- The Minister for Foreign Affairs and Trade should be invited to attend meetings of the Sustainable Environment Committee of Cabinet when greenhouse matters are on the agenda.
- The 2002 review of the National Greenhouse Strategy should investigate the effectiveness of current consultation and coordination mechanisms between the Commonwealth and the States/Territories on greenhouse matters, including the role of Ministerial Councils.
- A small advisory group should be established to provide greenhouse advice to the Chief Executive Officer of the AGO and the Secretaries Sustainable Environment Committee. The group would be chaired by the Ambassador for the Environment, and include representatives from science, industry and the environment.

Thanks for the alert to Megan Antcliff (Woods Bagot), Damien Leclercq (Research Fellow at Adelaide Uni and Member of the Aust. Wind Energy Assn.), and Geoff Mc Alpine (CSIRO).

Green Building Council of Australia

www.gbcaus.org

Green buildings have minimum adverse impacts on the built and natural environment, in terms of the buildings themselves, their immediate surroundings and the broader regional and global setting. A green building is designed to minimise the total environmental impact of its materials, construction, operation, demolition and recycling, while maximising opportunities for indoor environmental quality and performance. Green buildings are constructed and operated in ways that seek to enhance their impact on the environment and on the building occupants. Compared with more traditional buildings, they save money, reduce waste, increase worker productivity and create healthier environments for people to live and work. **The Green Building Council** aims to define and develop a sustainable property industry for Australia, and to drive the adoption of green building practices through market-based solutions. To do this, the Council promotes the creation of building rating tools, economic incentives, government initiatives and programs, new technologies, and industry knowledge. Through the website, you can join the Council and/or gain access to extensive local information on green building in Australia:

- | | |
|---|---|
| - energy efficiency | - reduced natural resource consumption |
| - greenhouse gas emission abatement | - productive and healthier environments |
| - water conservation | - useable buildings |
| - waste avoidance, reuse and recycling | - social amenity |
| - pollution prevention - water, air, soil & light | - transparent reporting |
| - enhanced biodiversity | |

BuildingGreen – and a Checklist for Environmentally Responsible Design & Construction

www.buildinggreen.com

BuildingGreen (USA) is an independent company committed to providing accurate, unbiased, and timely information to help building-industry professionals and policy makers improve the environmental performance, and reduce the adverse impacts, of buildings. On a subscription basis, they offer both print and electronic resources to assist design and construction projects from a whole-systems perspective that minimizes ecological impact and maximizes economic performance. BuildingGreen publishes the monthly subscription newsletter *Environmental Building News (EBN)* featuring practical information on a range of topics related to sustainable building – from energy efficiency and recycled-content materials to

land-use planning and indoor air quality. Since EBN carries no advertising and no sponsorships, it retains editorial freedom and an objectivity that has earned respect from both environmental activists and industry groups.

To access a useful **checklist for green building** (updated this month) – covering siting, design, materials, equipment and building practices: Enter the above site, click “Details” in the frame at top left, then type “Green Building Checklist” into the search facility at the top of the page. This will get a large number of hits (I got several hundred), but the Checklist was readily located at 6th on page 1.

Events of interest

John Elkington returns ‘Down Under for a 2003 Conference Series – “Boards, Brands & Business Models: Beyond the Triple Bottom Line”

Auckland – 31 March; Sydney – 1 April; Brisbane – 2 April; Melbourne – 3 April; Perth – 4 April. John Elkington and four international speakers look at issues of corporate governance, reputation, trust, and evolving business models on the path to sustainability. Information: www.edmondsmgt.com.au or murray@edmondsmgt.com.au

ISOS Online Conference – “In Search of Sustainability”

February – November 2003. An innovative and progressive Internet Conference open to Australians from all walks of life. 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

Water Conferences listed by the International Water Association (IWA):

See: www.iwahq.org.uk/template.cfm?name=events

Western Australia: Beyond Oil?

Perth, 21 February. A Conference jointly organised by the Australian Institute of Agricultural Science & Technology (IAST; WA Branch) and the Sustainable Transport Coalition. Information: Dr David Bennett, Convenor, Sustainable Transport Coalition, nrmc@ozemail.com.au (Ph 0438-210-251); or James Fisher, IAST WA, jfisher@agric.wa.gov.au (Ph 0419-350-912).

Third World Water Forum

Kyoto, Japan, 16-23 March. Information: <http://www.worldwaterforum.org/eng/index.html>

2nd Regional Government Network Conference for Sustainable Development

San Sebastian, Spain, 27-31 March. Organisation established at the WSSD to represent state & regional governments in the UN system and facilitate best practice in sustainability at this level. Information: www.nrg4sd.net (and click on “Events for Reg. Govs.”) or Andrew Higham – ahigham@dpc.wa.gov.au

Efficient 2003 Conference – Efficient use & management of urban water supply

Tenerife, Canary Islands, Spain, 2-4 April. Information: www.iwatenerife2003.org

Innovations in Water - Ozwater Convention

Perth, 6-10 April. Information: <http://www.enviroaust.net/>

Eco-Innovation & Sustainable Development -- Professional Development short course

Canberra, 28-30 April. Information available from convenor, Dr Janis Birkeland: (02) 6201 2693 or Janis.Birkeland@canberra.edu.au

National Landcare Conference - Respecting Values - Working and Learning Together

Darwin, NT, 28 April –1 May. Sponsored by NT Dept Infrastructure Planning & Environment and the Tropical Savannas CRC. Pre-registration at www.landcareconference.nt.gov.au and information from the secretariat at: dcem@desliens.com.au

Inaugural national workshop of the Economics & Environment Network at ANU (ANZSEE Affiliate)

Canberra, 2-3 May. Information: Wendy.Proctor@csiro.au, <http://een.anu.edu.au> or http://een.anu.edu.au/eenationalworkshop_callforpapers.pdf

Sustainable Development Indicators in the Mineral Industries (International Conference)

Aegean Island of Milos, Greece, 21-23 May. Information: www.heliotopos.net/conf/sdimi2003/

International Society for Industrial Ecology – 2nd International Conference

Ann Arbor, Michigan, USA, 29 June – 2 July. Information: <http://css.snre.umich.edu/isie2003/>

Ninth International Conference on River Research – sponsored by the CRC for Freshwater Ecology

Albury, NSW, 6-11 July. Information: www.conlog.com.au/NISORS/overview.html

Integrative Modelling of Biophysical, Social and Economic Systems for Resource Management Solutions – the MODSIM 2003 International Congress on Modelling and Simulation

Townsville, Qld, 14-17 July. Information from: <http://mssanz.cres.anu.edu.au/modsim2003.html> or David.Post@csiro.au

Environment, Planning & Law in the Coast Zone – Short Course

Sydney, **21-25 July**. Information: www.fbe.unsw.edu.au/news/enews/ProfDev/registration.pdf

Rangelands in the New Millennium – VII International Rangelands Congress

Durban, South Africa, **26 July – 1 August**. Information from : delegates@sbconferences.co.za or www.ru.ac.za/rqi/irc2003/IRC2003.htm

Farming Systems in the Future – First National Farming Systems conference 2003

Toowoomba, Qld., **7-10 September**. Information: www.afsa.asn.au and stewartc@usq.edu.au

GIN2003: Innovating for Sustainability – 11th International Conference – The Greening of Industry Network

San Francisco, **12-15 October**. Information: www.greeningofindustry.org/gin2003.htm

International Conference on Water-Saving Agriculture & Sustainable Use of Water & Land Resources

Yangling, Shaanxi, P.R. China, **26-29 October**. Working language, English. Information from local Australian contact: Lu.Zhang@csiro.au

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. Information from iccs@aie.org.au or www.aie.org.au/iccs

And Finally – Notes and Reminders

Check our web site at www.bml.csiro.au/sustnet.htm

The site is maintained by Lyndon Hirst at CSIRO's Black Mountain Library. Your suggestions are 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 over 500 members.



That's it for this Update.

Sincerely,
Elizabeth G. Heij
Network Facilitator