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SUSTAINABILITY NETWORK

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Feature thought:

“The evolution of culture is ultimately determined by the amount of love, understanding and freedom experienced by its children ... Every abandonment, every betrayal, every hateful act towards children returns tenfold a few decades later upon the historical stage, while every empathic act that helps a child become what he or she wants to become, every expression of love toward children, heals society and moves it in unexpected, wondrous new directions.”

Lloyd de Mause¹

Dear Networkers:

SUSTAINABILITY NETWORK UPDATE – No. 41E

The three main features of this Update relate to the three main elements of the “triple bottom line” – social, economic and environmental. In the first, with considerable help from Jeff Kenworthy, I tackle the social issue of children’s quality of life. The second, from Richard Saunders, gives a wonderfully succinct summary of why our current economic system is actually incapable of delivering sustainability; and the third, from Peter Fisher introduces geopolymers as a technology for reducing the environmental impact of the building industry and helping society to address the effects of hyper-materialism.

Are we impoverishing tomorrow’s leaders?

“Children can’t mix as readily as in days gone by when they could play in the streets.”

This seemingly innocuous quote from Robyn Monro-Miller² of the National Out-of-School-Hours Services Association actually encapsulates a threat – a sadness – an entrenched, long-term trend that comes with a “frisson” of fear for the future of our society. She points out that the growing importance of outside-school-hours care is not just because of the trend for both parents to work, but also because, increasingly, formal outside-school-hours care provides children with their main form of social contact.

Those of us who have been around long enough can, intuitively, sense something very unhealthy in this trend. Out-of-school hours are not just more time to be structured and controlled by adults – they are an enormously important resource for *independent learning*. The precious freedoms of childhood are increasingly unavailable to today’s city children. A mix of parental fear, long working hours, decline of public transport, and lack of true “community” – with its attendant ills of crime and violence – is depriving city children of something precious that

¹ Thanks to Network member Andrew Gaines for the quote.

² Quoted in “Quality tests on outside-school care” by Caitlin Fitzsimmons, *The Australian*, 27/6/03, p. 3.

we seem almost unaware of. Today's children are our future leaders. They may be wizards on computers, experts at programming the VCR, and endlessly interactive by mobile phone – but what will the lack of unstructured time and the risk-aversion of our “nanny” society do to the way they face the difficult issues of the future? How can we expect them to lead us out of the looming “fortress world” scenario to a more humane, globally-inclusive, sustainable society if, from earliest childhood, decisions are made for them and they perceive a fortress culture of exclusion and risk-aversion as the norm?

I can remember, from my own primary-school days, independently exploring a whole city and its semi-rural and coastal surroundings – on foot, by bicycle, and on public transport. I played on the street in front of our home. I swam on deserted beaches with only other children (and once each fur seals and dolphins) for company. Daily, I wandered freely in urban streets, parks, reserves, bushland, and old cemeteries (reading interesting historic gravestones). I went to shops, movie theatres, sporting events and other entertainments by public transport on my own. A friend and I took a sailing dinghy to an off-shore island and distant bays for picnics. We camped for a weekend in the bush and caught our own food from the beach with a fishing net. I was never “taxi-ed” to school by parents. I made “adventures” out of the daily journey – meeting various friends and swapping public transport modes to vary the route from week to week and extend our network. I even used to go down into an old abandoned goldmine on my own with nothing but a torch, a jar to catch cave crickets, and a ball of string to unravel behind me to find my way if the torch went out. What city child today get the experiential richness of such freedom?

Yes, I did have some nasty moments. I thought the dolphins were sharks to begin with; I had frights with “undertows” in surf; our dinghy capsized several times in heavy weather; occasional rocks fell from the roof of the old mine reminding me of what might happen if it caved in; I missed the last public transport on several occasions and had to walk home through the city at night; I was once “lost” for several hours in bushland; I cut my hand severely with a fishing knife while snorkel diving for abalone; I was hassled by drunks and “louts” a few times, and once accosted by a “flasher” (who couldn't run as fast as I could).

Yes, obviously there were major risks inherent in all this freedom. When I look back, however, all these experiences are parts of a rich tapestry of freedom and personal growth in which even the bad moments were reinforcing because they gave me the confidence of having dealt with them “OK” – reducing ongoing fears of “what might happen if ...”

Today's city children are having important elements of the quality of their lives eroded, even as we take more care to keep them safe, occupy them, supervise them, and provide them with our own adult conception of a “good education”. How did this situation come about?

Jeff Kenworthy, Associate Professor in Sustainable Settlements at the Institute of Sustainability and Technology Policy (ISTP), Murdoch University in Perth, sees it as an important aspect of the generally declining quality of life that the young, the elderly and the poor are subjected to in automobile dependent cities.³ Here's a condensed version of how he describes the history and significance of the trend:

The suburban home, and later the automobile, appeared to offer unprecedented freedom and amenity to the residents of cities, especially families with small children. Separated from the

³ If you would like to read more of Jeff's paper entitled “*Building more livable and sustainable cities through overcoming automobile dependence: An international comparative review*”, let me know (Elizabeth.Heij@csiro.au) as Jeff has provided a copy for Network use. Also see Jeff's feature “Transport & Urban Planning for the Post-Petroleum Era” in Update 25 at www.bml.csiro.au/SNnewsletters.htm.

noise, air pollution and perceived crowding of the old central and inner cities, and freed from the need to rely on public transport, it seemed that cities could become healthy, livable, enjoyable places to live, despite industrial development.

However, the unfettered use of the automobile and the design of modern cities around its movement and storage requirements, have brought a new era of environmental decay to cities. Many cities again have bad air pollution from car exhausts. Traffic noise affects nearly everyone. Traffic accidents kill and maim thousands of people every year, particularly children. Natural areas and rural landscapes recede as suburbs advance. The sense of urban community has declined and social isolation has become a norm for many single parents, elderly people, young people of non-driving age, and those with disabilities. The city's public spaces, its streets, squares and parks, have become dominated by dangerous levels of traffic. For fear of traffic, many parents don't allow their young children independent mobility, not even in suburban neighbourhoods."

Cities have evolved essentially through three stages: "Walking Cities", "Transit Cities" and "Automobile cities". The old walking cities which existed up until the latter half of the 19th century were small, compact places with activities strongly mixed together. Many activities took place in the city's public spaces and nearly everybody walked. Transit cities developed in the mid-to-late 19th century as trains and trams allowed the city to grow beyond the old walls. Cities were still very communal places with lots of activities in the streets and with compact communities built in nodes within walking distance of rail stations or as strips along the tram lines. The advent of the diesel bus and the car allowed the previously inaccessible spaces between the rail tracks to begin filling in. The automobile city with its footloose urban development was born.

In urban North America and Australia, ever since the transition to automobile cities, the car has increased its role in urban transport every year and the other modes have withered. As a result, the car has gradually eaten away the independence of others in the community, particularly children, the elderly, those with disabilities, and the poor.

"A difficult-to-quantify area that is negatively impacted by automobile dependence is the quality of neighbourhoods and community life. Traditionally in cities that were based around walking, cycling and public transport, housing was more densely developed. Frontages and entrances to dwellings and business were arranged in such a way along the street or in courtyards so as to allow for the possibility of friendly interaction and "accidental" meetings which are the stuff of urban community. Businesses were mixed with housing, and streets were lively, human places. Streets were for social interaction and for children to play in, not just for movement. This



changed as the automobile took over. Streets became passages for motor traffic rather than places. Houses became separated, other activities were zoned out, people entered and left properties by car and streets became deserted – and certainly not places where children were expected to play.

The gradual or not so gradual switch in cities from urban living to suburban living has gone hand-in-hand with increased privatism and a weakening of the connections between people at a local level. The negative consequences of this trend are felt in many areas such as increased need for formal policing, vandalism,

youth problems, increased crime, problems of social isolation for those without direct access to cars and so on.”

To achieve more sustainable cities, there is a real **need to reduce automobile dependence**. “The low density nature of suburbia, with its lack of interspersed other activities such as work places and corner stores, means that a large proportion of trips are difficult to serve by public transport, walking or cycling. Trying to provide for transport needs across generations and different activity patterns is hard without neighbourhood-based services and facilities or without good public transport. Older people, children, those with disabilities, those who cannot afford a car, and people stuck at home without the household car, find it extremely difficult to maintain independent access to their everyday needs. People with cars are placed in the role of chauffeurs and the burden of responsibility for providing expensive transport resources falls on the household unit. This can create both economic hardship and stress. What is more, the design of urban environments around the car means greater dangers especially for children and older people – this comes about both from traffic and a lack of people in the streets to help maintain security.

A second, vitally important need is a **restoration of community**. The focus in automobile-dependent cities on the sanctity of the suburban, detached house as the only acceptable living environment, has shaped a highly privatised view of the world in which 'isolation' rather than 'connectedness' has become a norm; the importance of 'community' for both adults and children has been severely downgraded. As this has happened our public spaces have been downgraded, not only streets and other interstitial spaces, but also public transport systems. There is an irony in this for the institution of the family, the one social institution deemed to gain most from suburbia. The obsession with the privatised, suburban family can lead to enormous extra pressures on family life. This is because the burden of responsibility for most of the needs of everyday life (material, social and spiritual), falls heavily on individual households, whereas some of these needs are inherently a function, or even responsibility, of the larger community within which family life should be grounded.

*[This reminds me of a quote attributed most recently to a speech by Hilary Clinton: “Good parenting is great, but it is not enough. **It takes a Village to bring up children.**” E.G. H.]*

When it comes to the linkages between cities, density and community, much of the research has focussed on the alleged negative effects of higher density in terms of stress, social breakdown and other disorders. Life in rural areas and the bush has been romanticised and viewed as uplifting and purifying, while the city has been seen as a corrupting influence on moral virtues. The suburbs were seen as an escape from most of what was bad about city life, and achievable without actually leaving the city. There are fallacies in such views, however, as many of the results are explainable in terms of other factors that have little to do with urban density *per se*.

For example, developmental psychologists have been primarily concerned with the quality of parent-child relationships and the effects of siblings and peers. They have not considered urban density in terms of how few or how many interactions children have with *other people*, yet some authors have suggested that such factors are 'far from negligible'. What is important here is that the first approach tends to focus on the development and welfare of individuals in isolation from the broader community setting in which they exist. By contrast, the latter begins to recognise broader environmental influences...the influence of 'others' on children's development – “the rate of encounter with other unspecified individuals”.

There is a paradox here. The emphasis in past research and discussions of density has been almost entirely on high density or crowding ... Yet possible effects of low rates of social

interaction have rarely been considered. (Curiously, this situation is just the reverse of what has happened in the field of sensory stimulation, where virtually all of the work has been concentrated at the low-stimulation end – i.e., the effects of sensory deprivation.) What does low density mean in cities, and to what extent is it equivalent to physical and social isolation?

So, “what value do we place on community in our thinking about city livability and sustainability, and how might more communitarian environments assist in creating more livable and sustainable cities? Jacobs (1961)⁴ is unashamed in her support for big, dense, diverse cities and claims that places such as the North End of Boston with its busy street life present more interesting and complex environments for human development. In a discussion of liberalism and civic virtue, Lasch (1991)⁵ takes Jacobs work in such cities and shows the link between the communal life of cities and the stability of family life. After a discussion of the failure of the school system (or more generally, “formal systems of socialization”) to replace the physical, mental and social training of the child that should occur in families, Lasch goes on to explain the importance of informal associations in developing social trust and human potential. These are the very associations that are to a strong degree dependent on the density at which people live and which have been grossly neglected in modern conceptions of what is good in city planning.

“The informal associations that have been allowed to wither...include not only the family but the neighbourhood, which serves much more effectively than the school as an intermediary between the family and the larger world. Jane Jacobs speaks of the ‘normal, casual manpower for child-rearing’ that is wasted when city planners and other well-meaning reformers seek to get children off the streets into parks, playgrounds and schools where they can be professionally supervised.” (Lasch, 1991).

Lasch goes on to talk about the way in which city streets teach lessons available nowhere else. This can include, perhaps, the way in which a child scolded by a local shopkeeper for running onto a road learns that adults unrelated to each other, except by propinquity, maintain certain civic standards by assuming responsibility for a neighbourhood. Jacobs again:

“The myth that playgrounds and grass and hired guards or supervisors are innately wholesome for children and that city streets, filled with ordinary people, are innately evil for children, boils down to a deep contempt for ordinary people...people must take a modicum of public responsibility for each other even if they have no ties to each other” (quoted in Lasch, 1991).

Los Angeles epitomises the breakdown of what Jacobs calls “casual public trust” with devastating results on many levels. There is a pervasive sense of fear in the city’s public environments despite a majority of people living in the suburban homes that are the hallmarks of the Australian and American dream. Davis (1990)⁶ in *City of Quartz* talks of the “militarization of city life”, the “ecology of fear” and of “Fortress LA” – a city of secured gated communities, of high-tech surveillance and para-military style action to repel intrusion.

Lasch explains that Los Angeles demonstrates the logical extreme of liberal philosophy, the most important pillar of which is privacy – “the privatization of the good life” and relief from most civic obligations. But this has been with disastrous results because public order must be largely by self-policing and cannot be just ‘handed over’. To sum up, Lasch again refers to the important role Jacobs assigned to city streets:

“City streets, as Jacobs reminds us keep the peace and instruct the young in the principles of civic life. Neighbourhoods recreate many features of village life celebrated in American folklore...Neighbourhoods provide the informal substructure of social order, in the absence of which everyday maintenance of life has to be turned over to professional bureaucrats. In Los Angeles, a

⁴ Jacobs, J. (1961) *The death and life of great American cities*. Random House, New York.

⁵ Lasch, C. (1991) Liberalism and Civic Virtue. *Telos* 88:57-68.

⁶ Davis, M. (1990) *City of Quartz: Excavating the Future in Los Angeles*. Vintage, London.

city deliberately designed to maximize privacy, we see how this hyperextension of the organizational sector is the necessary consequence of the retreat from the neighbourhood." (Lasch, 1991).

It is instructive to remind ourselves that the world of Los Angeles can be seen in microcosm in many cities, in:

- the call for more and more police to patrol city streets; the retreat from public transport systems by women, especially after dark;
- fears for personal security in central areas after office hours;
- a retreat by families from the traditional centres and sub-centres which are the civic focal points of our urban communities;
- a trend towards more centralised electronic surveillance of public spaces such as rail stations, trains and city squares;
- the walls that go up around just about every new suburban development, ostensibly for exclusivity and status, but at root to create a sense of enclosure and retreat from the rest of the city;
- the tendency towards higher levels of domestic security systems;
- the increasing lawlessness in suburban streets, epitomised in the public's mind by the increasing incidence of car theft and car chases.

And the list goes on. Even the Mayor of a large suburban municipality in Melbourne has been quoted as saying that "the only safe place left is my house and the cocoon of my car".

In 1992, the Community and Family Commission found in a survey that a significant number of people in Perth, Western Australia wanted to see more local community resources and activities, and more local involvement to break the anonymity of suburban living. In essence they expressed a desire for more village-like qualities in suburban environments. Similarly, Hugh Mackay, in an article about what life in Australia might be like in the 21st century, made some powerful points about the deterioration of community in our cities. A major thrust of his piece is the way we all help to change the nature of neighbourhoods through relatively simple choices such as saving a few cents at the regional supermarket versus buying from small local shops. But his major attack is on the car and its role in the deterioration of neighbourhoods.

"If you've decided to be a two or three-car household, you've already established some fundamental patterns for your own life in the 21st century. For a start, you've increased the probability that you will continue to be a stranger to neighbours you never meet on the footpath. We may complain about the loss of a sense of belonging to a local community but, by our perfectly understandable enthusiasm for the car, we've taken such giant strides away from a communal life that we can hardly expect the community to re-emerge all by itself...The fear of urban violence...has already gripped many older people and many parents of young children...But many of us have already decided to create a climate of fear, which is conducive to violence, by teaching our children to avoid eye contact with strangers and by staying away from public spaces, such as streets and parks, which if only we thronged them would remain safe." (Mackay, 1994).⁷

He goes deeper into the phenomenon of community decline in Australian cities, referring to the idea of "caving", which he uses to characterise suburban life in Australia in the 90s. He describes "caving" as an:

"...ultimately defensive form of escapism: a retreat to the comfort, privacy and, above all, security of home base...There is a growing emphasis on entertainment and recreation equipment being installed in the home, to minimise the need to go out...as the sense of neighbourhood community gradually broke down in the '70s and '80s, we developed a compensatory obsession with the notion of privacy which, in turn, further fuelled the fortress mentality." (Mackay, 1993).⁸

⁷ Mackay, H. (1994) The future stops here. *Weekend Australian*, Weekend Review, Sept. 3-4, p. 16.

⁸ Mackay, H. (1993) *Reinventing Australia: The mind and mood of Australia in the '90s*. Angus & Robertson, Sydney.

The major point here is that it is extremely difficult to maintain any sense of community or togetherness in an urban environment if the very physical structure essentially builds out any possibility of casual interaction. In other words, it is difficult to have a livable and sustainable city if unplanned encounters which do not constitute an invasion of privacy, but which help maintain a sense of belonging and can lead to unexpected loose social connections and mutual support systems, are eliminated.

This conclusion regarding density, or at least the style of urban environment, is borne out in a different way by authors who have looked at issues to do with cognitive development of children, a feeling of belonging and the development of competent functioning in the urban environment.

Lynch (1977)⁹ summarised the results of a cross-cultural examination of how adolescents (13-14 year olds) function in and perceive their urban environments. The study involved communities in six cities covering four nations - Melbourne in Australia, Salta in Argentina, Cracow and Warszawa in Poland, and Mexico City and Toluca in Mexico. Bearing in mind that the actual survey work was conducted in the early seventies when all cities were significantly less dominated by cars and traffic, the study still has some interesting results. Results relevant to the present discussion are summarised below, focussing particularly on Melbourne.

- Major barriers to movement were not distance but fear, dangerous traffic, a lack of spatial knowledge, cost of public transport and parental control.
- Melbourne children had by far the biggest physical range but were exposed to a restricted variety of people, were less at ease in areas unlike their own and were less familiar with their central city.
- Melbourne children spoke of their own room or the homes of friends as the best places to be, to meet friends or be alone. While children in other cities gave similar responses, they also added significant public places such as streets, the plaza, local street corners and woods.
- Melbourne children spoke constantly of boredom and the lack of new things to see or do, and seemed to suffer from experiential starvation. Contrasting statements by Melbourne and Polish children highlight the point: Melbourne - "Nothing much. Just messing around; there's nothing else to do." Cracow - "I like to be in the Old Town. I look at historic monuments. I like window shopping"; "My street is the best to live in. It's in the center, you don't have to go anywhere by train."
- Asked to draw maps of their own area and the central city, most drawings from the overseas cities were either rich with a sense of place and familiarity, or endowed with minute detail of the activities and places lining the streets. By contrast, Melbourne adolescents did not provide much detail, mainly just streets and main roads.

"Every map is essentially a street map. The streets are drawn large; other locations are appended as small rectangles along them...They have difficulties in recording the neatly planned, basically rectangular, but frequently interrupted, layout of streets...they have no vivid image of that central district [CBD], while the Salta and Cracow children display a clear conception of their downtown plaza with its historic buildings. The Melbourne home region has no definite boundary, no center...The social facilities are the conventional sports fields and schools. The playgrounds are featureless and empty. The asphalted, treeless streets are equally empty. The houses seem solid and comfortable, but the yards appeared unused, except for sheds. The Australian scene is almost perfectly unmanipulable by its children, except that they can move through it." (Lynch, 1977).

The original survey work for this study reports that low density is an important variable in explaining some of the results, and that raising densities could improve the situation, particularly in relation to children's access to more activities and lessening boredom. It provides a particularly damning summary of Australian suburbia for adolescents:

⁹ Lynch, K. (ed.) (1977) *Growing up in cities: Studies of the spatial environment of adolescence in Cracow, Melbourne, Mexico City, Salta, Toluca and Warszawa*. MIT Press, Cambridge, Mass. (UNESCO Paris).

"The effect of the physical environment on these children is primarily one of limiting their experiences severely...The chances for self-development, broadening of outlook, and contact with a variety of people and ideas are all very poor...The resultant inhibited thinking of the children was extremely evident in the interview." (Lynch, 1977).

The general questioning of suburbia as an environment for children, has been well-documented by a number of authors. The degree to which children are given free range over their city environs has gradually been reducing because of a number of factors, but the growing use of cars and associated traffic dangers is high on this list. Nevertheless, independent mobility by children is still considerably higher in European cities today than it is, for example, in Australian cities such as Canberra, despite the reputation of this latter city for excellence in suburban planning. For example, in 1993, 9 to 11 year olds in German cities visited twice as many places alone than those in Canberra; 58% of German children were allowed to catch buses alone, compared to 25% in Canberra; and only 13% of German children were driven by car to school, compared to 43% in Canberra.

In terms of changes over time in children's mobility, 88% of 9 year olds in England went to school unaccompanied in 1971, but by 1990 it was only 27%. Some traffic engineers attempt to show through statistics on reduced deaths per capita, that on the whole roads have become safer for children over the years. However, it can also be shown that people are simply reducing their exposure to increasing road danger by restricting children's activities and taking more precautions themselves.

Such a dramatic reduction in independent mobility would not have been allowed to occur in a short space of time, but because it has occurred over a long period, it has been accepted as the norm. Adults join in an unconscious conspiracy against their children's opportunities for independent access to their city. They accept unwittingly that parks, playgrounds and play and social events organised by adults will somehow replace the freedoms that were once enjoyed in the street and other informal meeting places outside the home. Children in different types of urban environment obviously enjoy different levels of independent mobility and this has implications for them and their parents, as well as the physical sustainability of the city.

A 1983 study by van Vliet¹⁰ of city and suburban environments in Toronto provides further evidence for differences in children's independent mobility due primarily to the physical form of their environments (see Table 1). Suburban adolescents have to travel a total of nearly twice as far as their city counterparts to reach the multitude of activities they require. They are considerably more dependent on chauffeurs and their level of walking is below the city dwellers, though bicycling is higher in the suburbs. Public transit use is higher in the city than the suburbs. (The difference is not as high as it would be in Australia or the US, however, because Metropolitan Toronto has an exceptionally good, safe and cheap public transit system accessible to children in the suburbs and city alike.) Children in the suburbs nevertheless made frequent complaints about poor accessibility and the lack of 'something to do' in their own neighbourhood. The suburbs contained few or no land-use activities other than residential, and as the Table shows, there were less than one-quarter as many children per square kilometre in the suburbs than there were in the city.

Table 1. – Travel characteristics of 14-16 year olds in Toronto (van Vliet 1983)

Factor	City Environment	Suburban Environment
Mean total distance (all trips)	25.57 km	48.23 km
% trips by public transit	30%	25%

¹⁰ Van Vliet, W. (1983) Children's travel behaviour. *Ekistics* 298:61-65.

% trips by walking	52%	42%
% trips by bike	3%	9%
% trips by car	14%	23%
Density of 15-17 year olds	520/squ.km	124/squ.km

One of the most important points made by van Vliet in the present context has to do with the self-esteem and independence of children.

"There is no question...that spatial mobility plays a crucial role in children's physical, social and intellectual development. In order to mature, children need to explore opportunities in their environment. The specialization and separation of land uses has dispersed those opportunities and has increased children's need to travel."

Children in van Vliet's studies were also asked to draw mental maps of their neighbourhood. There was a striking difference between children with a small independent travel range and those with a large one based on public transport, walking and cycling. The former typically drew a grid of streets with nothing much more than street names, while the latter were rich with buildings and the names of individual shops and establishments. Such independent travel was shown as linked to greater independence and maturity, satisfaction with their neighbourhood and greater number of friendly people known.

The need for higher densities, less car dependence and greater freedom, especially for children and those without cars is aptly summarised in an empirical way in a 1992 study which compares the qualities of two new towns, one in England – Milton Keynes – and one in The Netherlands – Almere.¹¹ Milton Keynes is designed as a low density residential environment, heavily zoned, with a big emphasis on roads and car parks. People in public spaces are notable by their absence. Almere is more typical of the European compact planning tradition, designed on a human scale with lots of activity in the public spaces, and a great deal of walking and cycling. Table 2 summarises the differences in urban form, transport characteristics and the degree to which the environment encourages independence in the child population. It shows that Milton Keynes, with its lower density, zoned land use, greater car orientation and retreat from the public sphere, has over half of households with children under 12 years of age always being supervised outside home; only 8% are never supervised. In Almere, with its community atmosphere, lots of walking and cycling and mixed-use environment, only 16% are always supervised outside home and 48% never supervised. The Dutch new town is clearly better designed for people – especially children – and for lower car use.

Table 2. Differences in land use and transport between Milton Keynes and Almere

	Milton Keynes (UK)	Almere (Neth.)
Density (dwellings/ha)	20	35-40
Urban form	Scattered, separated	Organic, mixed use
% trips by car	59%	35%
% trips by public transport	17%	17%
% trips by walk and bicycle	24%	48%
% of trips < 3km	45%	85%
Households with children under 12 years who are always supervised outside home	52%	16%
Never supervised outside home	8%	48%

¹¹ Roberts, J. (1992) *Changed travel – Better world? A study of travel patterns in Milton Keynes and Almere*. TEST, London.

So, in conclusion, low-density suburbs not only appear to have negative implications in terms of children's development and their perception of the environment, but they also make public transport, walking and cycling impossible for most trips. This means people are seldom on the streets without driving or being driven in a car. But what can be done? How, for example, can the benefits of denser cities that work better in a communal sense and provide a richer more diverse place to live, be balanced with the desire for open space, especially in auto-oriented cities in Australia and North America, where this is such a major issue? Increasingly, it seems the answer lies in “urban-village” style developments that can provide some balance between the private needs of 'home' and the need for an engaging and cared-for public realm. Such developments encompass:

- more compact housing arrangements that have a greater variety of facilities closer at hand and provide traffic-free, shared open spaces, both natural and man made;
- revitalisation of the public realm in recognition that a good city must provide for useable, healthy public spaces in all areas, and not just pander to the desires for private space;
- commitment to curbing use of the private car and to providing excellent public transport systems that are accessible to all people, *including children* at most times of the day;
- providing more infrastructure for walking and cycling, and the kind of land use planning that brings activities closer together so that they can be conveniently accessed by these modes.

Such strategies will assist in creating a more communitarian atmosphere in cities by providing the opportunities for people to come together in constructive ways. They will be *particularly positive developments for children*, the elderly and the disadvantaged. The changes will, however, require a community pressure and commitment.

Let's return briefly now to where we began, with the trend towards increasing supervision and structuring of children's time by adults. While there is not the space to explore the connection in detail here, we can see that both automobile dependence and the increased structuring of children's “free” time are working together to reduce opportunities to learn by personal experience. While formal compulsory education enforces social norms and provides information about how adult society wants children to view the world, free experiential learning through a variety of contacts with the broader community outside school hours allows children to discover how the world *really* works. Is the “virtual” world of the Internet and television a complete and adequate substitute? I don't think so!

When I look back on my schooldays, I have to acknowledge that lessons based on book-learning were often a bore – an invitation to stare out the window and daydream about out-of-school activities. Experiential lessons, involving field trips and forays into the enterprises and environments of the local community around the school, made a much more lasting impression. Unfortunately, risk aversion, fear of litigation, lack of transport options, and general “hyper-busy-ness” in the community have made the sorts of local field trips I enjoyed a rare event for today's children. Is this vicious circle of auto-dependence, risk aversion, and excessive formal structuring of children's time depriving our future leaders of vital experiential learning? If we are serious about our vision of a more humane, sustainable, global society, then I believe this is something we need to ask ourselves – urgently!

For more on the children's quality of life and education, see “Children” and “Education” under “Other Information Resources on p. 21]

Only when the last tree has died ... will we realise we cannot eat money!



Network member Richard Sanders – Richard.Sanders@nrm.qld.gov.au – is an ecological economist, futurist, and environmental scientist whose passion is to help facilitate the transition to a sustainable society. He is engaged in initiatives such as the “Great Transitions” project (Tellus Institute, Boston). Trained as a transdisciplinary thinker, he has spent the past 20 years grappling with the problem of sustainability, researching what a sustainable society would necessarily look like and how to get there. Before joining the Queensland Department of Natural Resources, Mines and Energy where he works as Senior

Policy Officer specialising in sustainability issues, he also worked as a research fellow at Griffith University on sustainable agricultural systems.

The following feature is adapted from Richard’s presentation to the 2003 ISOS (In search of Sustainability) Conference www.isosconference.org.au. It presents an arrestingly clear summary of why our present world order and economic system are unsustainable, and sets out the main steps of a straightforward, ultimately optimistic pathway to a better future. The headline is a piece of folk wisdom, attributed to the Cree Indians of North America. Increasingly, it seems, we are finding that the World’s so-called “primitive” and “under-developed” peoples have had many of the sustainability answers all along!

The sustainability problem is analogous to the early explorers grappling with the problem of ocean navigation. Locating one’s position in the ocean could not be solved within the pre-Copernican context of a flat earth. The solution could only be found by making a paradigm shift to the realisation the Earth is spherical.

Almost all approaches to the sustainability problem take the current economic system as a given. Economic imperatives dictate ecological and social outcomes. Here, I argue that sustainability cannot be achieved within the current economic system because the financial system and the market structurally lock us into depleting the ecological and material basis of our existence. We need an alternative approach. We need to redirect much of our sustainability research effort ‘outside the box’ of conventional economic thought. The sustainability challenge is to adapt our social and economic institutions to ecological reality. It is time for a paradigm shift!

For three centuries the imperatives of the financial system and the market have structurally locked humanity into extracting material wealth from the planet at an exponentially growing rate. This material wealth, consisting of renewable, replenishable and non-renewable forms of natural capital, is being rapidly depleted.¹² Once useful in a world far from ecological limits, these institutions now threaten the survival of humanity by continuing to deplete the ecological and material basis of our existence.

Sustainability requires humanity live within the carrying capacity of the planet. This requires remaining stocks of renewable and replenishable natural capital be liquidated no further so humanity can meet its material needs from the sustainable flow of natural income these stocks can generate without being further liquidated.¹³ Indeed, sustainability will require that some of these critical stocks be replenished.

¹² World Resources 2000 – 2001: *People and Ecosystems: The Fraying Web of Life*, United Nations Development Programme (UNDP), United Nations Environment Programme (UNEP), World Bank, and the World Resources Institute. <http://www.wri.org/wr2000/index.html>; also: UNEP, (2002). *Global Environment Outlook-3*, Earthscan, London.

¹³Daly, H.E., (1996), *Beyond Growth: The Economics of Sustainable Development*, Beacon Press, Boston.

In economic terms, sustainability requires humanity to live off the relatively limited and fixed sustainable flow of 'interest' or natural income generated by each type of critical natural capital so the stock of each type does not diminish through time. This ensures each successive generation, indefinitely into the future, will have no less natural capital to meet their material needs than each preceding generation (intergenerational equity). Policy-wise, sustainability requires humanity to live within an ecological/material 'budget constraint' limited to the sustainable flow of each type of critical natural capital.

Reasons why this cannot be achieved within the above-mentioned institutions are now addressed. Further reasons lie beyond the length constraint of this paper. Suffice to say, they arise out of inconsistencies between the abstract world of neoclassical economic theory and the thermodynamic and biophysical realities and laws of nature.¹⁴

All money in the world's financial system for the past 3 centuries (fractional reserve banking) exists as interest-bearing debt so the money supply grows exponentially at around 6% compounding based on the empirical data.¹⁵ This locks the economy into exponential growth so the interest on debt can be paid – otherwise the economy collapses. Essentially the financial system is a pyramid scheme.

The absurdity of this system is such that if one cent were compounded at 6% for 1992 years it would grow to $\$2.5 \times 10^{48}$ in 1992 years - equivalent in value to 100 000 galaxies, each of 1 billion stars made of pure gold at \$328 US an ounce!

Money (i.e. debt) is not wealth but simply a claim on wealth. Wealth is the natural capital of our planet. **In the simplest analysis the root of the sustainability problem is an exponentially growing set of claims (money) on a finite (and indeed diminishing) pool of natural capital.**

In 1926 Frederick Soddy explained the delusion on which our economic system is based: "The ruling passion of the age is to convert wealth into debt in order to derive a permanent future income from it" in the illusion "people can live of the interest of their mutual indebtedness".¹⁶

The market enables people (with money) to demand (and receive) natural capital embodied in the goods and services they consume. The only limitation on the size of this demand is the availability of money. As the world's money supply grows, as people's incomes rise (particularly in less developed countries), and as markets become more liberalised (deregulated) and global, the total human demand for natural capital continues growing far beyond the carrying capacity of the planet. Because 'free' and globalised markets ensure that this escalating level of demand is met, the result is the accelerating liquidation of natural capital. Together, the financial system and the market lock us into this unsustainable outcome.

The standard environmental economic response is to see this problem as a market failure to be corrected by 'getting the prices right' so as to 'internalise the externalities'. Sustainability demands that the 'right price' will have to be sufficiently high to exclude some people from the market so the total demand of the remaining population is no more than the sustainable level. The proportion of the global population excluded will depend on how much demand the richer proportion chooses to exercise with its money. The market is highly inequitable and is therefore unsustainable given equity (within and between generations) is a fundamental condition for sustainability.

¹⁴ Davies, G., (2004), *Economia: New Economic Systems to Empower People and Support the Living World*, ABC Books, Sydney.

¹⁵ Blain, R., (1987) United States Public and Private Debt: 1791-2000, *International Social Science Journal* 114, November: 577-591.

¹⁶ Daly, H.E., (1996), "The Economic Thought of Frederic Soddy" in *Beyond Growth: The Economics of Sustainable Development*, 173-190, Beacon Press, Boston.

Ecological economists propose another solution. First, impose a sustainability constraint to limit the global supply of natural capital to the sustainable level. Then ensure an equitable (not equal) distribution of money amongst the world's population. Finally, let the market efficiently allocate this constrained supply of natural capital. Again, because demand will exceed supply, only the wealthier, those who pool their money or those who get in first will have their material needs met to the exclusion of the rest. Within the market context the only way to ensure the needs of all can be met is to liquidate natural capital. The only way to ensure the needs of all can be met sustainably is through some form of sharing to prevent the wealthier from cornering the supply.

Market imperatives also promote socially and psychologically unsustainable outcomes. Economic efficiency requires people to be competitive and to maximise their individual welfare (i.e. consumption). The commodification of just about everything and the cult of the individual are breaking down our sense of community and family. The growth imperative of the economy means people are continually persuaded to consume more and more. Advertising persuades us we are inadequate unless we consume this product or that brand. We have become defined by what we consume leading to increasingly meaningless, stressful lives and depression.¹⁷

So what is the alternative? The starting point is to ask what people want. Three studies (Australia,¹⁸ UK,¹⁹ and USA²⁰) all come to essentially the same conclusion – people want a simpler, less materialistic lifestyle with a greater sense of meaning and purpose. They don't want the 'stress and spend' lifestyle and yet they find themselves doing it because everyone else is.

Next we need to ask how to squeeze the most from the limited sustainable supply (or flow) of natural capital. Two ways of doing this are sharing and making extremely durable goods. If a lawnmower used for an hour every two weeks is shared amongst 20 households, a twenty-fold reduction in the natural capital embodied in lawnmowers can be achieved. Light bulbs using a mat rather than a single filament could last hundreds if not thousands of years giving eco-efficiency improvements of 100- or 1000-fold (one of Edison's still burns after 100 years!). The market fails to deliver such eco-efficiencies through sharing because it is based on individual ownership; and through durability because private, profit motivated companies would go broke.

Ultimately, we consume natural capital for economic services such as light from a bulb, water from a tap, transport from a vehicle, etc. The best way to squeeze the maximum flow of service from limited natural capital is for society to cooperatively build and co-own (to ensure equity), a highly durable solar powered physical economic infrastructure that provides flows of service into the community. This would be a 25-year project. Public ownership would ensure the limited supply of natural capital was shared and promote a cooperative (rather than competitive) approach to life. Fossil-fuelled power stations could be retrofitted to solar thermal to run electrified public transport systems, the highly durable light bulbs, and the whole durable infrastructure.

Once built, much of the production/consumption economy could be closed down. The durable infrastructure would provide much of our needs. Each community would have the incentive to maintain its infrastructure because the services would stop if they didn't. Rather than 'going to work', people could engage in purposeful livelihood pursuing their dreams and passions and working together to make a qualitatively better community and world and allowing the better

¹⁷ Hamilton, C., (2003), *Growth Fetish* (esp. Ch 3 "Identity"), Allen & Unwin, Crows Nest.

¹⁸ Mackay, H., (1999), "The Mind and Mood of Australia '99", Mackay Research Pty Ltd, Sydney.

¹⁹ VSO, (2000), *Material World*, Voluntary Service Overseas, London. [No longer available on VSO website but I can send you an electronic copy if you wish. Email request to Elizabeth.Hejj@csiro.au]

²⁰ The Harwood Group, (1995), *Yearning for Balance: Views of Americans on Consumption, Materialism and the Environment*, <http://www.iisd.ca/linkages/consume/harwood.html>.

side of human nature to flourish. Because the whole enterprise is co-owned, there would be little need for money although there would be local markets and 'small change' so people could trade things they had or made.

How can we make this happen? The first requirement is a desirable Vision of a future sustainable society spelling out a destination some 25 years into the future and articulating feasible technical and political pathways to get there.²¹ Second, the people would need to make democracy work and demand we go down such a path. Otherwise corporate power would prevail and nothing would change. Third, under a 100% reserve financial system (with no growth imperative), confirmed by Reserve Bank of New Zealand as a workable system, the Reserve Bank (as opposed to private banks) could create the necessary money free of interest and debt to fund the transition to sustainability. Wars and big projects were often funded in this way prior to financial deregulation. All countries, especially the less developed, could fund the building of their durable new physical economic infrastructure this way. The prospect of 25 years of growth and full employment would make it politically attractive from the current perspective.

Transforming society to sustainability would be an exciting adventure all people can participate in. Through an empowered citizenry we can transform economy into society and turn consumers into citizens, we can reinvigorate democracy, rebuild community, create a more meaningful, cohesive and equitable society, and heal the planet's ecosystems on which our existence ultimately depends. This could be seen as a reversal of Polanyi's Great Transformation – rather than meeting needs through economic relations based on never-ending acquisition, they could be met through new equitable forms of social relations.

Our plight as passengers of Spaceship Earth is akin to that of Apollo 13 – life support is rapidly ebbing away. We need to wake up and realise we are right in the middle of an emergency situation and that we need to act quickly and cooperatively across the globe. A global 'Marshall Plan' for Spaceship Earth is urgently required. We have little choice but to envision a sustainable future and work together to realise it before it is too late.

For more on the economics in the sustainability context, see "Socio-Economic Systems" under "Other Information Resources on p. 23]

Renouncing materialism: Geopolymers as new-old medicine for waste in our material world

Dr. Peter Fisher – pmjfisher@bigpond.com – Network member and regular newsletter contributor, is an environment industry specialist who lectures in environmental management at Central Queensland University, Gladstone, Australia. In this short commentary, Peter shows us that while giddy levels of waste are undoing industrial societies, one new (old) technological development offers some relief for the environment.

Marine scientists in the North Atlantic were aghast a few years ago when they found six times more plastic flotsam by weight in their ocean-current samples than zooplankton. Foremost in their minds was the impact on fish and birds through ingestion, and also how creatures like molluscs, hitching a ride on this stuff, could invade distant habitats. Beyond that it was a salutary signal of waste out of control on terra firma.

²¹ Sanders, R. (2001), A Vision of Hope for the Future, <http://members.dodo.net.au/rlsanders/index.htm>

Feral litter and hard waste are unsightly reminders that the throwaway society is still powering along more than ten years after *The Economist* first censured it in a celebrated article “Throwing things away” published on 5 October 1991.



**Tragedy on the tideline:
Remains of an albatross killed
by the accumulation of trash
in its gut.**

Next door to the Atlantic, Americans mired in ‘affluenza’, are creating more waste than ever before, despite a rise in recycling, with municipal solid waste increasing by 1.5% per annum. For plastic alone, the EPA claims that all but 5% of the 24.2 million tonnes produced each year are discarded. This stuff is taking up a disproportionate amount of landfill space, and studies show that the glut is likely to worsen with around 500 million computers due to be dumped in the next five years.

These excesses might have been curbed if the world had heeded Frederick A. Talbot, onetime author of *“The great Canadian Railway – inventions and discoveries”* and *“The steamship conquest of the world”*. In 1919 he improbably published the tome, *“Millions from Waste”* which informed the somewhat incredulous readers of his day that “Waste is merely raw material in the wrong place. We have failed to appreciate that what may be of no immediate value to ourselves may, indeed can, with judicious and scientific handling be persuaded to serve in the capacity of indispensable raw material to other ranges of endeavour. It may even go so far as to supply the wherewithal for the creation of new industries, widening the possible fields of employment, and contribute pronouncedly towards the wealth of nations.”

Back in 1919 “greenhouse” simply meant a conservatory tucked down the bottom of the garden, so Talbot can be excused for overlooking the energy embodied in discarded products – part of the 45 to 85 tonnes per capita of natural resources extracted or harvested each year just to maintain ‘western’ lifestyles and industrial activity. This transfer unleashes an enormous amount of landscape rearrangement, soil erosion and consumption of energy and water.

A decade or so ago, a small group of scientists and engineers disconcerted by the frantic materials spiral came up with a novel response to meet the competing demands of “boosters” and environmentalists.

The trick was to unhitch the tight coupling between materials usage and GDP growth that has proven so damaging to the environment because resources flow through economies to planetary sinks as wastes and pollutants. This uncoupling, called “dematerialisation”, is about closing resource loops (that means both production-line and beyond-factory-gate recycling) and lowering materials intensity (that means using less materials, including fossil fuels, per unit of output). Dematerialisation burst onto the public stage with the 1994 book *Factor 4* and the idea has spread far and wide with the best seller, *Natural capitalism*.

The Factor 4 concept – “living twice as well on half as much” – looked to cut the environmental burden from consumption of materials and energy to a quarter of present levels, and was an estimate of what it would have taken to bring the 1990’s global environment system back into some sort of balance. Factor 10 came along in 1996 because it was felt that the level of consumption in advanced economies necessitated them doing even more if an overall global “factor 4” outcome was to be accomplished. There are tougher still versions, such as Factor 20, Factor 50 and even Factor 100. These were originally pitched at a 2030 timeline, but a UNEP-IE cleaner production roundtable in Prague a couple of years ago resolved that Factor 30 is already needed.

Factor 4, 10, 30, 50 or more generally 'x' form part of a raft of measures cobbled together under the banner of dematerialisation. A science of "environmental metrics" has even arisen where "core sustainability indicators" permit businesses and industry sectors to be rated according to their materials intensity, energy intensity, service intensity, toxics content, recycling, etc.

But, despite its growing sophistication and sanction by governments and significant parts of the international business sector, the concept of dematerialisation doesn't seem to have really caught on. In the powerful German, Netherlands, Japanese and United States economies the tight coupling between growth in materials usage and GDP loosened for a while in the early nineties but then resumed. Did somebody overlook the fact that the concept doesn't appeal to the influential producers of materials?

The failure of 'Factor x' to make a significant impact on materials flow at source means working harder – much harder – at waste recovery and reuse. By closing resource loops here and there we can inch towards a more sustainable economy.



You don't have to look far to finger concrete for big-volume material throughputs: It's the 'shop front' of economic development – new buildings, stadiums, bridges, freeway viaducts, pipes, tunnels and railway sleepers. Twice as much concrete is used in construction around the world than the total of all other building materials, including wood, steel, plastic and aluminium.

But the carbonaceous material used in making the cement for this massive construction effort releases 1500 million tonnes of CO₂ every year into the atmosphere. The industry's climate-change effects are so severe that cement companies themselves put up the money for a study by The World Business Council for Sustainable Development (WBCSD) to seek solutions (see www.wbcscement.org). Critics acknowledged the work as long overdue but continue to worry about its impartiality considering who put up the money.



Suggestions from the study have focused mainly on easing the industry's environmental burden by using alternate fuels, including things like waste tyres, and improving the monitoring and control of CO₂ emissions and energy usage. The industry is also being encouraged to develop comprehensive performance indicators. Less injurious substitutes for conventional cements, however, aren't fully integrated into the strategic considerations, so even their benefit to conventional cement manufacture in lining kilns is overlooked. Stephen Singer of WWF's Climate & Energy Policy Unit received the study outcomes with the comment that "the report offers no sense of key priorities". In fact, the cement companies couldn't agree on these! Even Chris Boyd, Senior Vice President of Environmental Affairs at the major American company, Lafarge, thought that "the report could have been more progressive" on climate-change issues.

For those less injurious materials, the WBCSD could have looked to antiquity. French scientist, Dr Joseph Davidovits, through analysis of ancient mortars, contends that the builders of the pyramids of Giza used not hewn natural stone but a hard-setting stuff with all the features of modern concrete – such as air bubbles, dispersed aggregates, and signs of successive pours.



**The Pyramids of Giza:
Man-made geopolymers?**

As it turned out, Ukrainian Victor Glukhovsky beat Davidovits to the punch half a century earlier with his pioneering research into the differences in durability between ancient cement and modern concretes. One way or the other, chemical engineers have rediscovered a “geopolymer” chemistry lost for a 1000 years – the production of mineral polymers.

These can be made from just about anything that contains certain common silica and aluminium compounds such as fly ash from coke, mine tailings, building rubble, and even incinerated plastics – see, e.g., www.geopolymer.org/what_is_a_geopolymer/

Looking at geopolymers, they convey the impression that, given time to mature, they would have become fully crystalline – forming a regular lattice structure containing aluminium, silicon and oxygen – but because they formed so fast, the lattice structure crashed in on itself and became jumbled. Being a crystalline drop-out, however, has done everything to help their versatility. Melbourne University researchers, for example, succeeded in producing exciting new variants, gaining considerable advantage by access to durability data relating to structures built in the Ukraine from the 1950’s.

The University ‘spun-off’ this IP into a private company, Siloxo – www.siloxo.com – with a range of products such as fire-resistant steel coatings (in the wake of the 9-11 disaster); composite polymers to replace fire-prone linings in aircraft cabins; and geopolymer ceramics as insulating materials in space shuttles.

All can be poured like concrete but set much faster, are more than three times stronger, need less curing time, and are impermeable to water. The relative ease of making them is borne out by their widespread use in ancient times. And, they’re “greener” than concrete because they rehabilitate embodied energy; involve much lower process temperatures in their production than cement; and can immobilise toxic metals against leaching, offering a means of transforming hazardous waste into added-value products. All these have big environmental ticks – subject to the silica &/or aluminum materials not being shipped long distances (whence transport emissions can exceed the local cement equivalent).

Geopolymers have applications in many areas, including capping mine-tailing deposits, lining landfill sites and tailings dams, or encapsulating radioactive waste in decommissioned nuclear power stations. And, they can clearly be used in many construction industry applications. If we can shift to thinking ‘outside the cement mixer’ a total re-evaluation of the way buildings are constructed and cement flows are handled begins to unfold.

Meantime, will “big cement” get into geopolymers in the same way BP and Shell have done with solar power and hydrogen? So far the majors have effectively signaled indifference, but their hand could be forced by the entry of carbon emissions trading and dramatic evidence of global warming. Environmental policy makers are exploring ways of obtaining more environmental benefits per dollar expended, and various forms of emissions trading have been on the cutting edge of their efforts. Even car companies are sitting up and taking notice, with Ford joining other companies in pioneering a carbon-dioxide trading exchange. Ford have said that they “wanted to get in on the ground floor so (they) could understand the business case”.

Large emitters in the automotive and other sectors are looking around for carbon offsets, and they could be lining up to invest in low-emission alternatives. It’s a matter of the attractiveness of the technology not always being in the product itself. Investors around the world have spotted an opportunity in a market where it is possible to build substantial returns from developing environmentally superior products and services. They have looked at geopolymers and like what they see. There is increasing excitement, with geopolymers actively under research in many institutions around the world and increasingly the subject of international conferences and collaborative forums exploring their commercialisation.

As for that big ticket item – dematerialisation – why haven't we seen a greater response? Could it be fear that livelihoods and profits might be eroded by new approaches, new enterprises? It certainly hasn't helped that the concept was crafted outside the temple of orthodox economics and has received little if any advocacy from these quarters. Society has to cop some flack too. It has still to convince itself that it should be facing up to the problems of run-away affluence and population growth, detailed for example in the 2003 environmental audit by New South Wales EPA. A recent report on *Sustainable consumption* has had little impact on Britain's Blair government – what chance for China's?

The real sticking point is that the benefits of dematerialization largely fall on future generations who will otherwise face the debilitating effects of disturbed landscapes and major climate change.

The flotsam garnishing the North Atlantic is a sign that things are seriously amiss. But our attention spans have got notoriously short of late. Can we focus on the waste problem long enough to do what's needed? If we are not willing to 'turn down' material flows at source, are we at least willing to take on new-old technologies such as geopolymers that close more loops and are more environmentally benign? Peter Allen's refrain "everything that is old is new" is far from immaterial.

[See also the additional references for geopolymers, eco-cements and sustainable construction materials under "Other Information Resources" on p. 21-22.]

"Little Morsels" – Food for Thought

Ratting on green promises

Network Member Malcolm Wilkie – malcolm.w@telstra.com – is a Melbourne sustainability consultant specialising in ecologically sustainable design in the built environment. No wonder he was fired up lately when he read in the Melbourne Age of 19 May, under the headline "Broken green promise riles council", that BHP and Developer Grocon had failed to keep their promise to the Melbourne City Council of delivering a four-star "green" building to house BHP's new head office.

The Council had originally allowed Grocon to swap plans for a hotel and residential development in the Queen Victoria Village development for a much larger building housing the BHP head office. In return, Grocon and BHP promised a four-star green rating for the building, encompassing among other things a dual façade and natural ventilation system. What they actually delivered was nowhere near four-stars. In spite of a hugely opulent office fitout, costing more per square meter than the building itself, the environmental components of the building were dumped as "too expensive". Here's what Malcolm has to say about it:

In the *Year of The Built Environment* it is disheartening that our own "Big Australian" has seen fit to abandon a commitment to incorporating ecologically sustainable design principles in the construction of its new corporate headquarters. Apparently there was an agreement between the developer Grocon and the Melbourne City Council that, in allowing the substitution of a taller building with a changed use, the developers undertook to achieve a four star green rating for the building that would include a dual skin wall and natural ventilation.

That the developers have broken the agreement raises the question of what form the agreement took. Was it a gentleman's agreement or was it included more properly as a condition in an amended planning permit (usually making compliance compulsory)? But, quite apart from the legalities, the decision to drop the green features was shortsighted to say the least.

The decision was apparently justified on the basis of cost. Grocon managing director Daniel Grollo was quoted as saying that the building has "...to be commercially viable and commercially workable". That a four-star rated green building could not be commercially realized sounds like an admission of failure by this project team.

For local Melbourne examples of how this can be achieved the project team could have consulted the developers of 60L in Carlton or indeed the Melbourne City Council whose new state-of-the-art office building CH2 is currently under construction. Or, in an example more like Grocon's own proposal, the new corporate headquarters of Lend Lease at 30 The Bond, Miller's Point, has achieved a *five-star* Australian Building Greenhouse Rating. According to Michael Brown general manager of Deutsche Office Trust, owners of the building, the implementation of environmental initiatives "...makes the project a very powerful benchmark for future developments by advancing ESD principles considerably **without compromising commercial objectives** (my emphasis) and in some instances enhancing them."

Mr. Grollo, however, goes on to say that with natural ventilation "the office temperature would vary between 19 and 25 degrees when the optimal office temperature was 21. So it means that, at 25 degrees, you're not going to work in a suit and tie." This is also outdated thinking!

Healthy indoor temperatures are those that vary as little as possible from outside temperatures within a comfort range of between 18 and 25 degrees (depending on activity). This is to reduce the impact of thermal shock when moving between indoor and outdoors.

Temperature, however, is of lesser importance than overall indoor air quality. Research suggests that concentrations of many toxic air pollutants are higher inside than outside. These pollutants are emitted by building materials such as paints, adhesives, carpets, wood panels and furniture and by equipment such as photocopiers and printers. Some are recognised carcinogens, such as formaldehyde, and others cause or exacerbate respiratory diseases such as asthma. Apart from eliminating (difficult at present) or reducing the use of these toxic materials in construction, their effects on indoor air quality can be minimized by naturally ventilating the space.

The benefits of a well designed and constructed green building, on the other hand, are also well documented and include increased productivity through a happier, healthier workforce. The effects of poor indoor air quality on occupant health are now so well known that employers, architects, builders and developers are on notice that if they fail to take steps to improve the work environment they will, I believe, leave themselves open to future litigation.

Spot-on, Malcolm! And this gives me a chance to get up on one of my own soapboxes – the enormous waste of energy in over-chilling commercial buildings in summer. I frequently find going into office buildings or shops in summer an intensely unpleasant experience because, in my light summer clothes, I am quickly chilled to the bone and can't wait to escape. Even the female members of Federal Parliament have been known to complain that they shiver in their offices if they wear summer dresses. When building managers are queried on this, they generally refer to comfortable working temperatures for "men in suits". Can't we get over this idiotic "suits" problem? C'mon, guys – suits are so boring anyway. Learn to love the summer and the feel of air on your skin. What about some more imaginative colourful clobber more suited to our summer climate? Former Premier of South Australia, Don Dunstan, had the right idea when he turned up to a sitting of Parliament in that famous pair of pink shorts! Seriously though – we must learn to live more in harmony with our environment if we are to make significant saving in energy and greenhouse emissions. [E.G.H]

Feedback from Network Members

More thoughts on durability

Dr Phillip Law A.C., C.B.E., of Melbourne, is a scientific explorer who has seen more adventure than you could find in 100 ordinary lifetimes. As founding director of the Federal Government's Antarctic Division, Phillip led the team that established the first Australian Antarctic base at Mawson Station in 1954 – and nearly went to the bottom of the sea when the icebreaker Krista Dan was hit by a hurricane on the voyage

home. Fortunately he survived that and many other Antarctic adventures to lead the Antarctic Division into the forefront of international polar science. Here Phillip takes on less weighty matters with a few of his own comments on durability.

I liked the durability feature. I am reminded of my own experience of “built-in obsolescence”. I once bought a foreign-made coffee grinder and, within four months, it would no longer function. The two blades that crunch the beans were of flat steel with turned-up short bits at the ends. The end bits soon broke off and thereafter the blades just whirled the beans around harmlessly. Unfortunately, the blades were fixed in place with no way of replacing them! I complained to the importing agency and, after an argument,²² received a whole new replacement grinder as a “once-off” compromise. Of course the replacement suffered exactly the same fate after a similarly short period.

Years ago, as a young man, I was an avid reader of American short story writers – O. Henry, Bret Harte and Jack London. I remember one story about a carriage builder who continued to strive for perfection in his product. The trouble was that, in general, his vehicles eventually became useless because some single vital component broke down. Finally, however, he produced the perfect “one-hoss shay” – a horse-drawn “gig” in which every component was designed to last for exactly the same time. After a lifetime of 60 years, the whole carriage collapsed in a heap!

Thanks, Phillip. That carriage builder had really done some smart thinking on what durability means for a multi-component product!

Bryan E. Pierce, *Fisheries Innovation Strategies*, is a fisheries management consultant and author of the feature on sustainable fisheries in Newsletter 40. Here he takes up the theme of education as a defence against rampant consumerism.

For what it’s worth, I think much of the problem with “durability” in western society is its irrelevance. Humans (and other things) need/want, in priority order: protection/safety, essential resources – air, water, food, arguably sex, and lastly comfort. The vast majority of us truly have everything we “need” and most of our consumption is based on “wants”. Wanting “more” is a natural drive, inextricably linked (genetically embedded?) to the achievement of selective advantage – and, when leveraged with fossil fuels, produces some spectacular and never-ending “conspicuous consumption” (in the eternal words of Veblen).

Anyway, I hope to contribute a little to David Ness’s call for education concerning the value of durability and the antisocial nature of waste. There is an excellent video, aimed at secondary/tertiary students, called “The Ad and the Ego” (1997, 57 minutes). It partly decomposes modern advertising, points out its impacts on the environment, and looks at the incentive regimes that create this whole industry – all in a positive and fun manner. The important take for me was the concept that most consumption is now “wants” and that, rather than rely on obsolescence of the product, **manufacturers now rely on advertising to make all past products continually obsolescent in the minds of consumers.** It’s a sort of extension of “fashion” across all consumer goods. Essentially, all you have to do is link strong emotions with the latest iteration of a product, and even the unit you bought last month becomes obsolescent – can’t wait to get the latest. Look at the perfectly good mobile phones that get turfed out each month! After viewing this video, I now consider advertising as the biggest enemy of sustainability (after population size) in our society.

For me, the only major connection missing in this video is that it fails to make the link with the discovery that watching television shifts most people into alpha-level brain function – i.e., a hypnosis-level brain activity/receptivity – hence the power of advertising in this medium; and why use subliminal advertising when overt, hypnotic suggestions are perfectly legal. Meanwhile, everyone says “but it never affects me!”

If you are interested in this, there is lots of detail at: www.parallaxpictures.org/AdEgo_bin/AE002.01.html and the video can be sourced (in Australia) at www.learningessentials.com.au/Products/product.asp?id=6742 [Note that this site assumes you are

²² I’d back Phillip any day! E.G.H.

buying on behalf of a school. You can purchase a copy for about 50% as an individual if you are not going to use it for mass showings; but you have to enquire to get the reduced price.

Thanks Bryan. David Ness and others with fashion-susceptible family members might well find this an interesting investment in psycho-war on waste!

Other Information Resources and Links of Interest

CHILDREN

Other People's Children: Why their quality of life is our concern – Book

www.demos.co.uk/catalogue/default.aspx?id=208

The middle classes are retreating from the public sphere, and have taken their kids with them. This book, by authors **Gina Hocking and Gillian Thomas**, shows that *all* children's quality of life is suffering as a result. Children in today's Britain have become 'invisible citizens' whose lives are lived in a privatised world controlled increasingly by adults. At the same time, childhood stress and the 'diseases of affluence' such as anorexia and asthma are on the increase. Children now have fewer chances to experience the wider world, which their parents often view anxiously. Exaggerated fears about risk mean that parents are more likely to try to run their children's lives. With this 'privatisation' of family life, the social networks that can look out for children are diminishing. This only fuels parental fear. Yet without a collective response, attempts to improve children's quality will have limited effect. Children rely much more than adults on public goods and services such as a clean air, transport and open space which cannot be provided by parents alone. New research in the US has shown the link between 'neighbourliness' and children's well-being. Although children are at the heart of many local communities, the privatisation of family life and an aging population with very different priorities mean they are becoming more disconnected. The authors argue that children should be empowered to win back their public voice. By putting quality of life for children first, we have an opportunity to reconnect with shared values that are being lost to individualism. We should all be concerned about other people's children. [Published 2003 by Demos, UK. ISBN 1 84180 104 6]

EDUCATION

Student Engagement at School: A sense of Belonging & Participation from PISA - Book

http://www.oecd.org/document/13/0,2340,en_2649_201185_16407181_119690_1_1_1,00.html

[Use the above URL to access a news release on the book.]

This Book from the OECD Program for International Student Assessment (PISA) examines a number of aspects of student engagement at school. How widespread is student disaffection with school in different education systems? What practices are most effective in fostering students' sense of belonging and participation? There is an important link between individual engagement and learning outcomes, and the variation within and among schools is not attributable solely to students' family backgrounds. [Published Oct 2003 by OECD and available from the OECD Online Bookstore at www.oecd.org; OECD Code 962003131P1; ISBN 9264018921]

Learners for Life – Student Approaches to Learning – OECD Book

http://www.oecd.org/document/51/0,2340,en_2649_201185_15481523_119690_1_1_1,00.html

[Use the above URL to access a news release on the book.]

What are students like as learners as they near the end of compulsory education? The answer matters greatly, not only because those with stronger approaches to learning get better results at school but also because young adults who are able to set learning goals and manage their own learning are much more likely to take up further study and become lifelong learners. This report analyses the results, focusing on students' motivation, self-beliefs and use of various learning strategies. In particular, it looks at those characteristics that together make it more likely that a student will become a confident and self-managed learner. [Published 2003 by OECD and available from the OECD Online Bookstore at www.oecd.org; OECD Code 962003101E1; ISBN 9264103910]

GEPOLYMERS, ECO-CEMENTS & SUSTAINABLE CONSTRUCTION MATERIALS

The Geopolymer Institute and Geopolymer Network

www.geopolymer.org and www.geopolymer.net

This Institute website provides access to information and resources on geopolymer science and applied technologies, the Institute Bulletin, research projects, geopolymers in archaeology, a reference library, event notices, bulletin board, and product advertising and sales. The Network website lists names and contacts of people, institutions and companies that are involved in the development and/or commercialisation of geopolymer products worldwide. It also offers a route to affiliation with the "Géopolymère" label indicating a high level of quality and technology.

'Pharoah Crete' – Further Information

www.abc.net.au/quantum/scripts98/9818/pharaohsctpt.htm

Accesses the script of the ABC Quantum science show that introduced geopolymers to a general audience.

TecEco Pty Ltd – Sustainable Technologies

www.tececo.com

TecEco was incorporated in 1999 to research, develop and deploy sustainable construction technologies. Managing director John Harrison is a SustNet member who contributes to this newsletter. Shareholders include academics, business people and a masonry business based on eco-cements. TecEco have developed and applied for international patents for a new materials technology with two main applications – carbonated eco-cements containing magnesite and a high proportion of recycled industrial materials and modified hydraulic cements containing brucite. Such eco-cements are the building material of the future. Many formulations are recyclable, sustainable in every way and contain large quantities of wastes as well as magnesia produced from magnesite found all over the world. Eco-cement technology is important because it offers partial solutions for global warming, climate change, waste problems and the need for cost effective housing. A technology that provides cheap housing and uses large quantities of waste is more attractive than trying to limit emissions. The TecEco website gives access to a regular newsletter featuring sustainability topics relevant to building and construction.

Association for the Advancement of Sustainable Materials in Construction (AASMIC)

New sites: <http://www.aasmic.org/> and <http://www.sustainablematerials.org/>

(NOTE: If the links do not function from this text, try entering the URLs by hand in your browser.) These are the newly registered URLs of the forming new association, AASMIC. A conference is being planned for 21st October 2004. If you are interested in the Association and would like more information, contact Robert Cameron, Sustainability Engineer of Manningham Project Management at (03) 9846 0581 or Robert.Cameron@manningham.vic.gov.au.

CSIRO Sustainable Built Environment

www.cmit.csiro.au/brochures/core/sbe/

Within CSIRO's Division of Manufacturing & Infrastructure Technology (CMIT), the core research capabilities in "Sustainable Built Environment" (SBE), use knowledge of engineering and computational techniques for analysing and modelling whole-of-life performance of infrastructure systems, including buildings, building materials and major urban networks (e.g. transport, utilities, telecommunications). Key strengths lie in integrating socio-economic, environmental, informational, engineering and design sciences into system solutions for ecological sustainability and economic efficiency.

GLOBAL ECOLOGY

Encyclopedia of Life Support Systems (EOLSS)

<http://greenplanet.eolss.net/EolssLogn/default.htm>

This is a subscriber service giving access to papers and reports on global "life support systems" – defined in this context as "any natural or human-engineered system that furthers the life of the biosphere in a sustainable fashion. The fundamental attribute of life support systems is that together they provide all of the sustainable needs required for continuance of life. These needs go far beyond biological requirements. Thus life support systems encompass natural environmental systems as well as ancillary social systems required to foster societal harmony, safety, nutrition, medical care, economic standards, and the development of new technology. The one common thread in all of these systems is that they operate in partnership with the conservation of global natural resources. Free trial access to the site can be arranged by prospective subscribers through the "Home" page.

SOCIO-ECONOMIC SYSTEMS

Economia - New Economic Systems to Empower People and Support the Living World

<http://shop.abc.net.au/browse/product.asp?productid=159924>

[Review by Richard Sanders] Published by the Australian Broadcasting Commission (ABC) Bookshop this year, this work by **Geoff Davies** has one of the best analyses of the sustainability problem that I have so far encountered. The book provides a fascinating and illuminating insight into the complex subject of sustainability - sustainability being primarily concerned with the long-term viability of the relationship between human socio-economic systems and the ecological systems that underpin all life (including humans). The reader is taken on a journey of discovery that revolves around an excellent critique of economics, counterpoised against truly amazing insights into how all of life has self-organised from the simple origins of life through to the current complexity of the biosphere. Further information can be found at the above website, which says in part : "Drawing on his scientific background, he describes the way the natural world operates and argues that there is no reason why economies can't operate according to the same principles as the human societies and the living systems from which they have emerged." In my view, its lucid analysis from a systems perspective provides an excellent insight to the main dimensions of the sustainability problem, particularly the often overlooked systemic role of the current financial system in driving unsustainability. I thoroughly recommend this work to anybody interested in the thorny issue of sustainability. A longer review/overview is available at:

<http://www.change-management-monitor.com/fullreviews/040201Davies.html>.

Ecological economics and political ecology: towards a necessary synthesis – Paper

R. Michael M’Gonigle (1999) Ecological Economics 28:11-26.

In this scholarly paper, brought to our attention by Richard Sanders, the author looks to converge two potentially divergent themes: (1) ecological economics – in which a thermodynamic foundation is assumed upon which the prevailing system of valuation and wealth creation based on growth and linear throughput is inevitably running down; and (2) political ecology – which situates the whole inquiry about wealth and value in a broader consideration of the power dynamics of the social institutions that embody these economic processes. Political ecology provides the framework for understanding the operation of the thermodynamic principle at the institutional and larger socio-cultural levels. The author discusses the two tendencies that predominate in the system dynamics of social institutions – the tendency to social centralization and the tendency to organizational hierarchy. These are kept in check to varying degrees by countervailing ‘territorial’ forces related to regional and peripheral self-sufficiency. In a spatial sense, the world’s resources are “out there” but power is also “up there”. ‘Development’ of the modern world system can be seen as characterized by the rise of centralized hierarchies of power that are sustained by a one-way inwards and upwards flow of non-local resources. Organising the world’s social institutions to maintain the continuous flow of resources to, and up, these central hierarchies is what modern political systems – capitalist, socialist or communist – have always been about. In this light, a ‘territorialist’ perspective throws new light on the problem of how to get control of an entropic society that is based on too much resource throughput. Above all, it points to the inherent limits to solutions that depend on continuing centralized, state-based regulation to constrain the very sources of economic flow on which those regulatory structures themselves depend. Instead the issue becomes a quasi-constitutional one of state design, with a host of accompanying strategic implications for the shape of policy initiatives. Yet, in spite of lip-service paid to the importance of ‘community’ and ‘regionalisation’, the essential importance of fashioning territorial authorities to provide an ecologically-based counterbalance to extractive centralist powers remains poorly recognized in theory and abrogated in practice. Looking ahead, a ‘territorialist’ political ecology, with the potential for revision of state power will not seek simply more regulatory intervention to guide growth (as envisioned in “sustainable development”), nor will it seek to secure territorial resources every more tightly for an overextended centre (the purpose of free trade). Instead, it will redesign the institutions of central power for the purposes of protecting ‘territorial integrity’. The author discusses various aspects of how the convergence of ecological economics with political ecology can help to inform the overall character of economic development away from free-trade-based regimes towards community-based forms of territorial self-maintenance and, in doing so, also inform a wide range of cutting-edge technical-scientific innovations – eco-forestry, ecosystem-based management, demand management, precautionary principle, clean technology, industrial ecology – which embody starting sets of power elements, processes, and principles very different to the ‘laws’ of the competitive market. *[If you*

are interested in reading the full paper but are not readily able to access the journal, let me know. I can help: Elizabeth.Heij@csiro.au]

SUSTAINABLE DEVELOPMENT

Implementing Sustainable Development – OECD Summary Report

www.oecd.org/dataoecd/25/35/31683750.pdf [10 pp; 188Kb]

This summary presents key results for 2001-2004 on work covering the range of work on sustainable development issues, particularly the interfaces of environment with economy and society.

URBAN LIVING

Megacity Future?

www.abc.net.au/rn/science/ockham/stories/s1112963.htm

In this Ockham's Razor transcript (23/5/04), Robyn Williams interviews David Singleton, Chairman Global Infrastructure Business for Arup, a Global engineering and consultancy firm, who believes that our future cities should be imagined in collaboration. He gives us a fascinating glimpse into the life of 'David', a 46 year old man living in the year 2050, as he goes about daily life in a sustainable megacity of the future. See how it matches with your vision of the future.

Bouquet

Congratulations to Metals and mining companies BHP Billiton Limited and Rio Tinto and banks National Australia Bank and Westpac who have made it onto a list of 50 international companies which have best responded to the challenges of climate change. See: www.smh.com.au/articles/2004/06/02/1086058914454.html



Events, Workshops & Courses

ACEL Courses in Environmental Law

A selection of courses can be taken as PD short courses or as part of a graduate degree in the Law Faculty at ANU. See: <http://law.anu.edu.au/accel>

Master of Social Science in Rural & Regional Sustainability

For more information on this new postgraduate program at RMIT, contact Roger.Trowbridge@rmit.edu.au

First Steps in the Search for Sustainability: What does the future hold for your children and grandchildren?

Papers for last year's interactive online conference can be downloaded from www.isosconference.org.au The official 6000-word Communique covers the 9 conference themes: Water, Health & Wellbeing, Land Use & Sustainable Ecosystems, Energy, Economic Systems, Equity & Peace, Climate, Labour Force & Work, and Transport & Urban Design.

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

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

Conferences and courses listed by the Australian Centre for Groundwater Studies

See: www.groundwater.com.au/conf/content.asp

Electricity Generation Conferences listed by Power Generation World

See "Events" at: <http://www.terrapinn.com/tmpl/TerrapinnEvents.aspx?U=4>

International Events listed by the Harvard University Forum on Science & Technology for Sustainability

See: <http://sustsci.harvard.edu/events.htm>

Environmental Management Short Courses at Uni SA

Environmental Compliance - 28 Sept 2004. **Wastewater Management** - 19 Oct 2004. **Energy Management in Industry & Business** - 23 Nov 2004. **Tailored courses** – also available to suit particular industries or organisations. Details: http://business2.unisa.edu.au/intbusiness/Short_courses/env_mangt.htm

Sustainability Engineering & Science – NZSSES International Conference

Auckland, New Zealand, **7-9 July**. www.nzsses.org.nz/Conference/

Eco-Design and Innovation – 5-day short course at ANU on eco-innovation & sustainable development

Canberra, **7-11 July**. Contact Janis.Birkeland@anu.edu.au

Environment, Planning & Law in the Coastal Zone – A 5-day Short Course

Sydney, **19-23 July**. www.fbe.unsw.edu.au/courses/EP&L/ or ProfDev@fbe.unsw.edu.au

International Conference on Water Security for Future Generations
 Changchun, China, **26-31 July**. www.neigae.ac.cn/conference/20030227.htm

Wetlands Science & Water Resources Management: 7th INTECOL International Wetlands Conference
 Utrecht, NL, **25-30 July**. www.bio.uu.nl/intecol

AUSWIND 2004 – Industry Conference of the Australian Wind Energy Association (AusWEA)
 Launceston, **28-30 July**. www.auswea.com.au

Salinity Solutions Conference 2004
 Bendigo, Vic., **2-5 August**. www.cdesign.com.au/salinity2004/

Complex Systems Science – 3rd Annual CSIRO Symposium and Workshop
 Coffs Harbour, NSW, **10-12 August**. www.dar.csiro.au/css

Fish, Aquaculture & Food Security: Sustaining Fish as a Food Supply – ATSE Crawford Fund Seminar
 Canberra, **11 August**. www.crawfordfund.org/events/seminar.htm

Electricity 2004: The next 80 years. EESA 80th Annual Conference
 Sydney, **11-13 August**. www.tmm.com.au

Water Infrastructure Conference
 Brisbane, **24-26 August**. www.iir.com.au/infrastructure

Good Water Governance for People & Nature: What Roles for Law, Institutions, Science & Finance?
 Dundee, Scotland, **29 August – 1 September**. www.awra.org under “Conferences”

Anaerobic Digestion – 10th World Congress – Anaerobic bioconversion ... Answer for Sustainability?
 Montreal, Canada, **29 August – 2 September**. www.ad2004montreal.org

Waste & Manufacturing 2004: Waste minimisation, cleaner production & the bottom line
 Sydney, **30 August – 1 September**. www.iir.com.au/infrastructure or info@iir.com.au

Harnessing the potential of Horticulture in the Asia-Pacific Region – AusSHS/NZSHS Conference (Includes a session on “Reaching the Potential for Sustainable Horticulture”)
 Sunshine Coast, **1-3 September**. www.aushs.org.au/conference/index.htm

19th World Energy Congress – Delivering Sustainability: Opportunities & Challenges for the Energy Industry
 Sydney, **5-9 September**. www.tourhosts.com.au/energy2004

Improving the Quality of Life in Coastal Areas – Coastal Zone Asia Pacific Conference ‘04
 Brisbane, **5-9 September**. www.coastal.crc.org.au/czap04/

7th International Conference on Greenhouse Gas Control Technologies (GHGT7)
 Vancouver, Canada, **5-9 September**. www.ghgt7.ca

International Conference on Security & Sustainability in Water Resources
 Kathmandu, Nepal, **6-9 September**. www.seepwater.org/

The Chartered Institution of Water & Environmental Management – 2nd National Conference
 Bretton Hall, UK, **13-15 September**. www.ciwem.com or ciwem@aquaviro.co.uk

World Water Congress & Exhibition
 Marrakech, Morocco, **19-24 September**. www.iwa2004marrakech.com

4th International Crop Science Congress (with 5th Asian Crop Science Conf. & 12th Aust. Agronomy Conf.)
 Brisbane, **26 September – 1 October**. www.cropscience2004.com

9th International Conference on Wetland Systems for Water Pollution Control
 France, **27-30 September**. www.iwahq.org.uk/template.cfm?name=wetland_systems

6th International Conference on Waste Stabilisation Ponds
 France, **28 September – 1 October**. www.iwahq.org.uk/template.cfm?name=waste_stabilisation_ponds

Solar Power & Chemical Energy Systems – 12th Solar PACES International Symposium
 Oaxaca, Mexico, **6-8 October**. www.solarpaces.org

Partnerships for Sustainable Development – Greening of Industry Network 12th International Conference
 Hong Kong, **7-10 November**. www.greeningofindustry.org/gin2004.htm

Sustainability in Water Limited Environments – 2nd IWA Leading Edge Conference on Sustainability
 Sydney, **8-10 November**. www.LES2004.iwa-conferences.org

Buying Green Means Business – 2nd National Buying Green Conference & Exhibition
 Sydney, **10-12 November**. www.impactenviro.com.au/buyinggreen2004/

Solar 2004: Life, the Universe & Renewables – Aust. & NZ Solar Energy Society Ann. Conf.
 Perth, **1-3 December**. <http://energy.murdoch.edu.au/Solar2004/>

1st IWA-ASPIRE Conference & Exhibition – Intl Water Assn, Asia-Pacific Regional Group
 Singapore, **10-15 July 2005**. www.aspire2005.org

Geopolymer 2005 – World Congress (France) & international Workshops (Perth)
 Perth, **September 2005**. www.geopolymer.org/conference/world_congress_2005/index.html

Parting Shot²³

Automobile dependence degrades the environment and ultimately impoverishes everyone except vested interests. See: http://stcwa.org.au/news/1084846646_23484.html

See also the latest “High Moon” cartoon from JFS at: www.japanfs.org/en/cartoon/index.html



And Finally – Notes and Reminders

Our web site at www.bml.csiro.au/sustnet.htm has CSIRO’s “P@NOPTIC” search facility installed.

The *SustNet* website is maintained by Lyndon Hirst at CSIRO’s Black Mountain Library – Comments and suggestions welcome. Contact Lyndon at Lyndon.Hirst@csiro.au

- **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.



The Network Community: Our Sustainability Network has 750 members.

Sincerely,

Elizabeth Heij

Network Facilitator

LAST WORD:

Today’s mighty oak is yesterday’s nut that held its ground.
Be a sustainability “acorn”.

²³ Acknowledgments to the Sustainable Transport Coalition of WA (STC) – <http://stcwa.org.au> – for the cartoon