

6. CLOSING THE LOOP FOR SOLID WASTE

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The purpose of this report is to provide information on a solid waste management conference in Sydney attended by the City Water & Waste Manager.

BACKGROUND

In June 2001 the City Water & Waste Manager (Mike Stockwell) together with the Chairman (Councillor Denis O'Rourke), attended a solid waste management conference in Sydney sponsored by the New South Wales (NSW) branch of the Waste Management Association of Australia together with the New South Wales Waste Boards. There are currently nine waste boards in NSW which were established by the NSW (State) Government. Each wasteboard has established a regional waste plan for the next decade. These regional waste plans are designed to coordinate the activities of the various rural and urban councils. The nine waste boards report to the NSW Environmental Protection Authority. Currently Australian solid waste management legislation, is under review and rewrite and little information is available concerning what the new requirements will say.

MAIN LEARNING POINTS FROM CONFERENCE

The value of attending conferences like this is to see what others are doing and to use that information as a benchmark to firstly verify what we are doing right and secondly what we can improve on in terms of future direction and development. Learning points were as follows:

- (a) General agreement that there is a mood in the community to fix the waste problem(s) and that in areas where we need to take major steps to do this, then we should simply get on with it (ie more doing, less talking). In this regard setting overarching waste reduction targets (eg zero organics by 2010 etc) is regarded by the community as useful in showing commitment and direction. However, it is the implementation of practical steps (eg more kerbside collection, composting of putrescibles) that they really want to see.
- (b) Generally the community's will (or buy-in) to sort the solid waste problem is well ahead of political perception, or, put another way politicians often underestimate what the public will support.
- (c) Closing the loop for solid waste (meaning all aspects of reduction, reuse, recycling leading to best sustainable waste practice) is not simply about solving the technical issues but about getting the political, business, commercial, and above all social issues appropriately satisfied.
- (d) Closing the loop activities must be sustainable in terms of ongoing triple bottom line measurement (ie sustainable in economic, environmental, social terms).
- (e) Our decisions on closing the loop activities must be based on a holistic approach, not simply what is the cheapest option at first sight (meaning that environmental and social costs, which are sometimes intangible, need to be factored in).
- (f) In this regard we need to remember that industry has historically run to the lowest cost option and needs to be encouraged to adopt a 'natural capital' approach. For example a non-polluting detergent used to wash down a car into the stormwater system may cost more but can gain a competitive commercial advantage on its clean environmental (natural capital) image. Note that here, there is very little natural capital branding on supermarket products and this needs to be promoted nationally like the Heart Foundation tick of approval (or perhaps a sustainable Christchurch environmental tick of approval could be developed).
- (g) Government legislation is needed to force errant businesses to comply where their activities are damaging the environment. Complaining about 'can't afford it' is no longer acceptable.
- (h) Pilot projects tend to remain as boutique operations often not expanding into anything sufficiently big enough to make a practical difference. Hence if possible design your project so it can be expanded in a modular fashion up to a size that will produce an effective result (for example as we are planning to do with our proposed start-up in-vessel compost plant).

- (i) Innovative, joint venture closing the loop projects, require a risk sharing approach with industry. In this regard 'new' technology will be funded by 'risk investment capital whereas proven technology will attract 'conventional' investment capital.
- (k) Financing for solid waste projects will come from a mixture of sources such as waste minimisation levies, commercial investment (eg joint venture Canterbury Landfill) and rates.
- (k) Closing the loop necessitates people's behavioural change and this will involve education, participation and legislation. Each of these areas is huge and ongoing.
- (l) There is no 'right answer' to any one solid waste activity. Solutions must be appropriate to local circumstances which will include population density (rural/urban), per capita income (poverty/affluence), energy availability (hydro, fossil, wind, solar), political stability (change of government), social/cultural issues (for example do people get a living from waste scavenging).
- (m) Advanced technology for processing solid mixed waste such as anaerobic digestion, pyrolysis, gasification, energy generation has come of age in Australia. Inevitably it will only be a matter of time before these technologies start to make a solid dent in the waste stream entering New Zealand landfills. It is essential that this Council remain pro-active in keeping abreast of these technologies (note here that several will be tendering for the in-vessel compost plant).

OVERALL PERCEPTION AND SUMMARY

The overall perception from this conference is that our Council has to date adopted the right approach in dealing with its solid waste issues through a considered and gradually enhanced waste reduction programme. The measures we have introduced (ie kerbside recycling, Recovered Materials Foundation, Compost Plant, recycling centres etc) have been relatively low cost and have got it right. We need to continue to build on what we have done well (eg increase kerbside collection of recyclables, expand/enhance composting etc). However we also need to pursue a raft of new options such as these listed below: (note this is by no means a comprehensive list)

- **Technical matters**, such as separation and streaming of wastes in discussion/partnership with industry (eg timber, building site metal and gib board) and the community (eg kitchen waste);
- Treatment for mixed residual waste so as to reduce final disposal to landfill (eg by anaerobic digestion, pyrolysis etc);
- **Educational matters**, such as combined education and training of our solid waste professionals. Appropriate tertiary education/training in this field is of huge importance;
- **Community engagement matters**, such as the addition of a social planner with a sociology background (community understanding), to the solid waste team who can work on a daily basis to bridge the gaps in engagement with the community. A mindset shift is required in our technical people to see this as equally important (probably more so) to successful waste minimisation outcomes as solving the technical issues.

The Chairman comments:

I attended the solid waste management conference last month in Sydney, along with the City Water and Waste Manager, Mr Stockwell, and Graham King of The Recovered Materials Foundation.

Morning 6 June

I attended a panel discussion on alternative waste technologies.

Tony Wright of Wright Strategies Corporation, made the point that technologies were needed which produced commercially viable products rather than just producing elegant technical solutions. Given the risks involved, he also thought that contracts for such solutions should be constructed as partnerships.

Peter Gesling (a Councillor) thought that alternative technologies should be based on risk sharing arrangements with operators (especially for hazardous wastes). With regard to Councils which had claimed high diversion rates from landfill, he observed that no such claims had been properly verified, and that the terms "waste" and "diversion" had not been acceptably defined.

Gregg Haustorfer (Babcock and Brown) said that the availability of government money, and the quest by companies for market share, are supporting new technologies to deal with waste; and that although these are "quite speculative", banks are beginning to see opportunities, and are becoming involved. He said that there were two markets: a high risk venture capital market, and a market for proven

technologies, more of which we are becoming commercialised (although state government policies were having an impact on viability).

Jeff Angel (Total Environment Centre) referred to the increasing community pressures to solve "the waste problem", which was driving new technologies. He made the point that Sydney's ecological footprint had been estimated at 37 times its actual area, and that 30 percent of recyclable materials collected still went back to landfills. He stated that his organisation believed that 69 percent of the waste stream could be diverted to from landfill "over the next few decades". *This is an interesting comment from an environmental NGO, given our recent debate over waste targets.* He also made the point that the cost of landfilling in New South Wales (currently \$94 Australian per tonne, or about \$118 NZ) is now the major driver for the adoption of new technologies for waste diversion. He thought that a greater share of government money could be targeted at waste avoidance and commercial cleaner production initiatives.

Leanne Philpott (Nolan ITU) said that diversion targets had become much less relevant, and that instead, a more holistic approach was needed for environmental sustainability purposes. She stated that "avoidance of irreversible harm" should be the guiding principle. She said that waste plans should address resource inputs, waste outputs, and their effects on causes of irreversible harm to the environment. *It was from this speech that I formulated the proposal for the vision statement in the amendments to our waste plan adopted last month, which now includes reference to "avoidance of irreversible harm" to the physical environment.* Philpott's theme was that available technologies should be targeted at avoidance of irreversible harm, and that not all technologies being applied to waste diversion where meeting this target. She made the point that some recycling technologies being used in Australia were adding 15 to 20 percent of emissions to air. She also thought that cost benefit analyses were not been properly applied in some cases.

Paul Pearce (mayor of Waverley) thought that not much progress had really been made in Sydney on the application of new technologies, and that most had simply refined "what we already do", although some good diversion rates had been achieved. He said that little additional infrastructure had been established, even though some advanced new technologies had become available. He asked "what is the problem?" He thought there were many constrains to the introduction of new technologies: government policy, the leaders of both private and public enterprises, lack of good strategic planning, and far too much bureaucracy (a plethora of waste advisers, waste boards, etc.).

In the discussion which followed the panel members speeches, speakers made the following points:

- * waste disposal options in Sydney are running out
- * people think that because there are recycling collections, the job is done
- * there is a crisis, with only about five years left to make decisions on new infrastructure to deal with residual waste, before communities and governments lose patience
- * the issue is not lack of availability of land for landfills, but the need for 'best practice' for both environmental security and resource productivity reasons
- * there are more than enough new technologies there right now "to make a real dent on where we are now"
- * there is plenty of community support for large scale investment
- * if the target is zero waste to landfill, then this must refer to "usable waste", and the target period is "20 years at best", and that a better target than a period of years is "to be amongst the best"
- * Philpott (Nolan ITU) said that NSW should target a 20 to 30 year "transitional phase" to find "sustainable means" to both divert and avoid residual waste
- * Wright said that "inerts" should not be regarded as waste since they could still be safely landfilled
- * Pearce said that New South Wales must be wary of "industry running to the lowest cost state" as a result of waste disposal costs arising from the fact that New South Wales was "well ahead" of other states in waste diversion policies and practices - therefore the federal government had to play a part to "level the playing field"
- * Haustorfer said that because of the long-term costs required to commercialise new technologies, there must be more concentration on "prudent technologies" which had a market, rather than new technologies per se
- * Gesling said that his municipality had justified the contract for a bio-converter based on the "true cost" of landfilling
- * As a result of large capital investment, 80 percent of waste produced at the recent Olympics had been diverted from landfill, but the cost was a lot higher than would be feasible for municipal waste, and the composition of the waste was quite different from ordinarily municipal waste
- * Philpott postulated that new technologies are not really the answer - changes to community attitudes to waste avoidance is more important in the long term - there are huge numbers of technologies and people and organisations working on them - few on avoidance issues
- * Philpott thought that the best new technology overall was the Bedminster system - but there is no "quick fix" - recommended delegates also see the Woollongong SWERF (the Bedminster system is a highly mechanised bio-digester) - Stockwell, King and I did visit the Woollongong SWERF (solid waste to energy recycling facility)

- * Haustorfer had been impressed by the Camellia system - \$25 million (AUS) - an anaerobic digester for putrescibles
- * Philpott: "we're a better to wait and see how European and American technologies work out" for cost effective new methods of residual disposal or recovery (eg gasification, pyrolysis)
- * 40 percent to 65 percent diversion of household waste has been achieved in some American community's (ie not including industrial waste) - hence Wright considered that 40 percent recycling of household waste should be targeted in New South Wales (currently 25%) - ultimately 70 percent could be possible with "an aggressive approach" - a \$250 million (AUS) investment would be needed for Sydney to achieve this
- * there was general discussion as to where this \$250 million would come from: waste levies, private investment in new technologies implemented through state legislation, conditional upon federal government reversing "the current deregulation policies" and on other measures such as better labelling of products to facilitate consumer choice in favour of recyclable products.

Afternoon 6 June

I attended a session on behavioural change. The speakers were:

Dr Roberta Ryan

The objective is to facilitate political action for change by engaging people in political decision-making. The priority must be for waste avoidance.

This involves - information / education programmes - participation / engagement processes - regulation / enforcement - incentives and disincentives - strategy, especially linkages for the foregoing. She outlined the findings of the survey she had conducted in the Charing Cross and Bondi Road areas of Sydney:

- only 20 per cent of concerns in respect of waste management related to care of the environment
- 40 per cent would change behaviour for this reason
- this was only partly confirmed by observation of behavioural change
- business people said that improved waste management practice was good for business
- the survey generally confirmed increasing commitment to an understanding of issues relating to the need for improved waste management practices
- this adds to pressure for possible in political changes of attitude (hence the value of such surveys)

Rob Curnow (consultant)

Behaviour results from community attitudes - needs to be predicted - in order to identify how to influence changes of attitude, therefore of behaviour.

Should use the desire of people to do the right thing - based on the desire to protect the environment.

Interventions are needed if targets are to be met.

Targets must be measurable, and the measures must not be based on surveys of what people say, but of what they do (behaviour).

This is best done by observation ("spying") eg at events - concerts, sports events, etc.

There is a need to use "encouraging" infrastructure eg refuse bins should not be separated from recycling bins (otherwise everything goes into the refuse bins) - cluster refuse and recycling bins together.

Grahame Collier (NSW EPA)

Perception and Behaviour - factors are:

- * peer pressure and community norms
- * perceived desirability and acceptance
- * health considerations - perceived dirtiness / cleanliness
- * regulation
- * cost
- * availability of support
- * time and effort

Education:

Has a major role in changing perception and therefore in influencing behaviour, but only if the other factors (above) are addressed too (ie it must not be seen to be "too hard").

There is a community-wide perception that it is okay to consume if you also recycle (kerbside). Therefore it is important for people to know that not all waste is economically recyclable.

Lara White (C4ES)

Spoke on a project to reduce contamination in kerbside recycling:

Contamination is: dirty items, wrong items, use of wrong (unauthorised) bags, leaving lids and caps on recyclable containers, comingling / not separating recyclables.

Methods:

1. Gain information on public understanding by way of street surveys
 - few people understand the results of contamination in recyclables
 - yet most people said they had been educated about the issues well enough
 - 33 per cent of respondents said they did not believe that what they put out for recycling on the kerbside was in fact recycled and that instead most of it would be landfilled (Note: the three of us agreed RMF to do more to tell Christchurch what we do with kerbside recyclables - need to budget).
2. Define key messages
 - tell people what contamination is
 - tell them what the effects of it are
 - assure them that materials collected are in fact recycled - what happens to recyclables
3. Decide how to reach the audience
 - use of cinema, brochures, advertisements, etc.
 - the use of cartoons and attractive graphics is recommended
 - develop cartoon characters identified with recycling objectives (White demonstrated use of the character she had created called 'Mirfy' and what happens at a MRF).

Morning 7 June Integrated Waste Management Systems.

Andreas Pichler:

Integration of collection, processing and marketing is essential.

An example is timber - difficult to collect and transport - but has high potential value - a wide variety of different timbers with different values.

Processing requires sorting, separating out metals, followed by reuse or crushing / chipping.

Use can be made of both automatic and manual sorting.

Best end uses include composting, particleboard manufacture, and palletised fuels.

Other values: reduction of organics and landfills
avoidance of landfill costs.

Note: Thoughts as a result of this presentation - we should have different processing streams in our new composting system, eg

- a process including biosolids with green waste to produce a compost for non-food production purposes (to avoid negative reactions by horticulturists, the dairy industry, and their customers)
- a process without biosolids - greenwaste only for a compost product for food production purposes
- a process targeting high calorific wood waste for the production of palletised fuels, perhaps including some plastic.

Tom Wetherill

Tom gave a summing up of global developments.

1. Factors influencing waste options:
 - Land availability for landfill
 - Local climate concentrations
 - Accessibility to resources, for example whether there is a need to import fuels
 - Population density: rural v urban v very highly density urban.
 - Per capita income: there are few economic options for poor countries.
 - Energy situations: What are the hydroelectric resources?
Are renewable energy resources required to be used as a matter of policy?
 - Social and cultural issues:
Scavenging can be a way of life in poor countries.
There are cultural barriers in some countries.
2. Issues and trends: -
 - * Inconsistent definitions (eg is C & D clean filled, counted as waste?)
 - * Affluence generates waste.
 - * Education concerning waste issues is improving at all levels.
 - * Institutional / governance issues are receiving more attention.
 - * Wheelie bins are being used more and these encourage waste.
 - * Safety, noise, odours, etc. are growing issues everywhere.
 - * Transfer stations - trend is towards simplicity and to include materials recovery facilities and hazardous waste facilities.
 - * Dirty MRF's - sorting / scavenging - are becoming more popular.
 - * More regionalisation is appearing, to secure economies of scale.
 - * Much more composting is happening, but there is an increasing struggle for markets.
 - * More in-vessel composting is happening to avoid odours etc.

- * Waste to energy incineration is no longer favoured in the USA or most of Europe
 - many are closing, especially in the USA, and in parts of Europe, mostly because of fear of dioxin contamination, and because of ash disposal problems, and because of huge costs, and because of competition for waste streams, and because of improved highly secure landfills, and because of strengthening waster pays policies, and because of social and political considerations.

Margaret Nicholson

Canberra ACT

About Canberra's waste plans:

- * Goal is "waste free" by 2010
- * Canberra has little industrial base - residential and office / retail.
- * Strong community support generated by such things as
 - annual progress report,
 - 'secondhand Sunday',
 - kerbside recycling has now reached 25,000 tonnes - civic pride in this,
 - green waste drop-off centres,
 - C & D recycling for road base (300,000 tonnes),
 - recycling drop-off centres at transfer stations,
 - drop-off points for oil and metals,
 - 'Revolve' (same as our Supershed).
- * Trials are being conducted on the use of kerbside bins for the collection of organics
- * A new landfill is being established which includes on site sorting of wastes into different compartments
- * New collection arrangements are to concentrate on recycling of current residual waste - registrations of interest being advertised for this
- * There is a strong move towards more regulation (previously depended on voluntary co-operation with policies)
- * 66% diversion to date (but note this is from a very high landfilling starting point – they still landfill more than Christchurch).
- * Canberra will in future concentrate more on reduction of consumption.

Matthew Morris (Sydney Waste Boards)

Morris reviewed trials and audits being carried out in Sydney, and showed the value of trials before investment.

Afternoon 7 June

Spent visiting the exhibition area and discussing products and services with exhibitors. One interesting product was a collapsible plastic bin for green waste (see attachment).

Visit to Woollongong SWERF 8 June

This was an all-day technical tour. While I had seen this facility on a previous visit, it was clear that it had undergone significant further development.

This facility is designed and built and operated by BrightStar International who will soon be making presentation to the compost subcommittee as part of CCC's registrations of interest process for our new in-vessel composting facility. It was therefore particularly worthwhile seeing this facility in its fully developed state, first-hand.

The facility incorporates an autoclave, recyclables extraction, a gasification unit, and the use of the resulting gas for electricity generation.

The facility was clearly highly technically advanced, and operationally reliable.

It was equally obviously very expensive.

There was a toxic residue produced equalling approximately 10 percent of the input volume.

Comprehensive briefing was given, followed by a detailed inspection of the plant.

A very worthwhile visit.

OVERALL CONCLUSIONS

Christchurch is still doing well compared to Australian cities.

Christchurch's efforts are being noticed in Australia, with some admiration or the results we are getting on a very low budget.

Much more money there for not much better result than Christchurch.

We need to further develop closer relationships with Australian waste organisations. As a result of discussions, there will be a visit to Christchurch, hosted by RMF, by representatives of Hunter Waste Board in the near future.

Much more investigation, trialling, technical research, legislative change, etc. is going on in Australia. We need to keep abreast of this - visits such as this are well worth the effort.

The visit was just as important for learning what not to do as it was for learning about new developments.

- Recommendation:**
1. That the City Water & Waste Manager together with the Chairman of the City Services Committee discuss the development of a solid waste masters qualification (or similar) with the appropriate tertiary personnel.
 2. That subject to the City Manager's approval for overseas travel and funding availability, two appropriate staff from City Water & Waste attend the two day Integrated Solid Waste Management Professional Development training course in Sydney run by Wetherill Environmental consultants (sponsored by the NSW Waste Boards, refer attachment for details).

Chairman's Recommendation: That the above recommendation be adopted.