



WEALTH
FROM WASTE

SECOND INDUSTRIAL ECOLOGY WORKSHOP
“SHIFTING THE AUSTRALIAN RESOURCES
PARADIGM”

2 DECEMBER 2014

BRISBANE, AUSTRALIA

SUMMARY AND FINDINGS REPORT

CITATION

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BACKGROUND

'Wealth from Waste Cluster' is a major 3-year (2013-2016) research collaboration that aims to identify economically viable options for the recycling of metals from existing products in Australia. It focuses on 'mining' above ground resources, namely metals contained in collections of discarded manufactured products and consumer goods.

The University of Queensland's Centre for Social Responsibility in Mining leads one of the core research streams – Program 1 "Recycling Systems: Barriers and Opportunities for Industrial Ecology in Australia". The overall cluster project is led by the University of Technology Sydney, and also includes Swinburne University of Technology, Monash University and the Center for Industrial Ecology at Yale University, along with an International Reference Panel of experts and CSIRO.

The Second Industrial Ecology Workshop is a part of Program 1 research activities, aimed to provide initial input for detailed investigation into barriers and enablers for higher uptake of leading practices in metal recycling in an Australian context.

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WORKSHOP OVERVIEW AND OBJECTIVES

The workshop was part of the research being undertaken in the Wealth from Waste Cluster (www.wealthfromwaste.net), funded by the university partners and CSIRO Flagship Collaboration Fund, supported by the Mineral Resources Flagship and Manufacturing Flagship. The partner universities in the Cluster comprise:

- The University of Technology Sydney
- Monash University
- The University of Queensland
- Swinburne University of Technology
- Yale University (USA)

The workshop follows on from the Industry Ecology Forum held with the Cluster launch in Sydney on 28 March 2014.

The workshop objectives for the second workshop were to:

- Outline the current thinking from the Wealth from Waste Cluster in progressing industrial ecology concepts in Australia.
- Seek input from engaged stakeholders on the future drivers to bring about higher levels of metals and minerals recycling, re-use and recovery.
- Set the goals and supporting frameworks to achieve a transformational change in the Australian recycling industry.

Participants were encouraged to attend for the following reasons:

- The workshop was an opportunity to contribute and influence the research program of the Wealth from Waste Cluster.
- To understand the developments in the project since the first workshop held in early 2014.
- To exchange the experiences in the area of recycling between representatives of the Queensland government, industry, and academia.
- To contribute support for the planned paradigm shift in Australian recycling, reuse, and recovery of metals and minerals from end of life products and processing waste.

WORKSHOP FORMAT AND AGENDA

The workshop was held in two sessions: the morning session was focussed on the Queensland waste strategy, and the afternoon session was focussed on options to advance metal recycling in Queensland and Australia. There were three presentations by guest speakers from the government and industry. Group discussions were held in the morning and afternoon sessions and summaries of the main findings from these discussions were presented at the end of each session. A short summary on Program 1 research outcomes to date was presented by Glen Corder at the beginning of the workshop, and details on Program 1 research are available in the references listed in Appendix A.

The workshop agenda is presented in Table 1.

Table 1: Workshop Agenda (2 December 2014)

| Part I. Waste strategy and value chain for metals recycling | |
|---|---|
| 10.00 – 10.20 | Welcome – Wealth from Waste Overview and Workshop Aims – Glen Corder, UQ |
| 10.20 – 10.40 | New Queensland Waste Strategy – Ariane Milinovich <i>Department of Environment and Heritage Protection, Qld Government</i> |
| 10.40 – 11.00 | Waste Collection & Separation – Christine Blanchard <i>Brisbane City Council</i> |
| 11.00 – 11.30 | Group work: |
| 11.30 – 12.00 | <ul style="list-style-type: none"> • What are the drivers in the new policy? • What are barriers and enablers to collection & separation? |
| 12.00 – 12.30 | Outcomes from group work – Groups report to workshop |
| 12.30 – 1.15 | Lunch |
| Part II. Classifying options to advance metal recycling in Queensland and Australia | |
| 1.15 – 1.35 | Industry case study – Graham Muir <i>SIMS Recycling Solutions</i> |
| 1.35 – 2.05 | Group work: |
| 2.05 – 2.35 | <ul style="list-style-type: none"> • How can the industry use the Qld waste policy as a driver for change? • How does public opinion influence the metals recycling industry? |
| 2.35 – 3.00 | Outcomes from group work – Groups report to workshop |
| 3.00 – 3.10 | Summarise workshop outcomes & next steps – Glen Corder, UQ |

KEY POINTS AND MESSAGES IN PRESENTATIONS

The presentations at the workshop provided invaluable insights into the topic from government and industry perspectives, raised additional questions from the audience and helped to facilitate the discussion. A summary of the key points raised in each presentation is presented below.

Ariane **Milinovich** **(Department of Environment and Heritage Protection, Qld Government)**

Ariane holds the position of Principal Policy Officer in Waste Policy and Legislation, Environmental Policy and Planning Division. Ariane's presentation focussed on the draft Queensland Waste Strategy and covered the following topics:

- Needed to develop a new waste strategy due to Queensland Government 2012 election commitment to repeal waste disposal levy.
- There are challenges for managing waste in terms of the amount in Queensland each year e.g. 14.9 million tonnes generated annually from heavy industry.
- There is an expected 30% increase by weight of waste over the next 13 years in line with population increase.
- Proposed targets for 2024 across different waste streams, and in some cases different targets for rural area compared to urban areas.
- Priority wastes are wastes that have a regional impact (e.g. agro plastic, mining); organic waste; high-volume wastes (such as concrete); and key hazardous wastes (including developing complementary measures for national product stewardship schemes).
- There are existing stewardship programs in place for some wastes e.g. ChemClear, DrumMuster, MobileMuster, National Packaging Covenant.
- Action plans will be developed as part of the new Queensland Waste Strategy.
- Interstate movement of waste does occur due to difference in waste levies, but also due to the need to find solutions for disposal or recovery of different wastes.
- Recycling, including in regional areas, can create new jobs but the sector is sensitive to commodity market volatility.

Christine Blanchard **(Brisbane City Council)**

Christine holds the position of Waste Minimisation Manager in the Brisbane City Council. Christine's presentation focussed on the collection and separation of metals in the Brisbane City Council area:

- Metals collection occurs through transfer stations (ferrous/non ferrous, e-waste), normal kerbside collections (steel/aluminium) and bulk kerbside collections (ferrous/non ferrous, e-waste) and all ferrous, non-ferrous, and e-waste are sent to third parties for recovery.
- Metals are a small part of municipal solid waste, accounting for about 2.4% in yellow bins (recovered), and 4.8% in red bins (not recovered).
- Commercial and Industrial waste contains about 5% metals.
- Educational issues for the public on what to put into the yellow bin (e.g. 'clean' cans, aerosols).

- Metals from kerbside collection, in general, represent a small stream of recyclables and typically comprise steel cans, aluminium cans, other packing – foil, and other – aerosols, paint cans.
- Lack of storage capacity on site at transfer stations (versus plenty at landfills) may prevent/limit metals and other materials recovery.
- Current problem with a lack of allocated federal funding for 2014/15 for rising amount of e-waste, collected by authorised e-waste handlers (“legacy issue”).
- The most significant problems: tyres in regional Queensland, mattresses, and hand-held batteries.

Graham Muir (Sims Recycling Solutions)

Graham holds the position of Senior Manager E-waste ANZ in Sims Recycling Solutions. Graham’s presentation focussed on e-waste recycling at Sims Recycling Solutions:

- Sims Recycling Solutions is the world’s largest integrated electronics recycler and part of Sims Metals Management, one of the world’s largest metals recyclers.
- E-Waste facilities operational in 4 states in Australia, 1 in NZ and 1 in Singapore.
- In 2009, established Australia’s Automated E-Waste Recycling Process in NSW - only full e-waste shredding and downstream separation process in Australia and New Zealand.
- Have 33 E-Waste processing sites worldwide.
- The challenges for e-waste recycling are volume and complexity.
- There are also a lack of standards and policies in the sector.
- Sims Recycling Solutions activities include reuse of assets through recovery, refurbishment and reuse services, conducting e-waste recycling, and assisting parties to meet their producer responsibility obligations.
- E-waste issues relate to size and complexity of materials, safety, separation of many complex materials, offsite outlets for recovered commodities and compliance costs.
- Barriers include volume constraints, costs for proper compliance processing, investment costs in an uncertain market, inadvertent environmental issues, and lack of standards and policies in the sector and the ‘policing’ of standards that do exist.
- The lack of entry barriers to e-waste sector results in some companies not operating responsibly.
- Main costs for e-waste processing are covered by service fees, not by recovered and sold materials.

WORKSHOP FINDINGS

This section summaries the key points that were raised in the two group discussion sessions. For each group session there were two questions to prompt discussion.

It should be noted the points below are only a record of the participants' perspectives or views on particular aspects from discussion resulting from the group work.

Session 1. Waste strategy and value chain for metals recycling

Questions:

1. What are the drivers in the new policy?

2. What are barriers and enablers to collection & separation?

- Policy stability is essential for business development but changes in political parties in government result in changing policy.
- Governments favour soft regulation approaches which can lead to top-heavy schemes.
- There is little consultation with industries for developing and introducing new regulation at the federal level.
- Uncertainty is a big issue for investing in recycling, both in terms of available materials for recycling and changes in regulations.
- Enablers include recycling/recovery technologies that have flexibility to treat different waste streams and better design of products to allow for easier recovery (easy disassembling).
- New and emerging technologies can improve recovery and can be assisted by “public good” research (i.e. publicly funded).
- “Free riding” and old legacy waste problems with stewardship schemes. How to control/monitor this?
- Landfill mining reduces legacy material but need to show ‘value’ through cost benefit analysis studies.
- Need product stewardship policy to include legacy materials c.f. The National Television and Computer Recycling Scheme – Operational Review.
- Send transfer vouchers to each household (not just rate payers) for waste recycling.
- Need to “build volume” as industry will respond if there is reliable throughput.
- Barriers include storage space problems and efforts required at source for sorting waste into appropriate categories.
- Source separation is critical but low volumes and insufficient storage creates transportation costs (e.g. problem in rural areas).
- Regulation is not enough, public will recycle if convenient and business will recycle if financial settings favourable.
- Introduce financial incentives to process “waste” (that is recycle) in Australia to reduce risk to exchange rate fluctuations.

- Specialised waste managers and recycling companies versus combined operators (i.e. waste recovery plus landfill operations).
- Private sector versus recycling managed by the local government (in regional Queensland).
- Monopoly versus competition. There is no price regulation at the regional level for different waste treatment and disposal (the waste operator can charge any rate).
- “Milk run” in the regional centres and remote locations: recycling companies would prefer to take only valuable/needed materials, while the local government/industry has to stockpile and manage all waste materials.
- Information, awareness and education are needed – such as visual demonstrations of recycling and reduce ‘single serve mentality’.

Session 2. Classifying options to advance metal recycling in Queensland and Australia

Questions:

- 1. How can the industry use the Queensland waste policy as a driver for change?**
- 2. How does public opinion influence the metals recycling industry?**

- Need a radical change for a paradigm shift in the recycling industry.
- Five factors for change are below. Without all of these in either government or industry, change in the recycling industry is difficult to achieve.
 - legal and statutory power
 - authority and influence
 - skilled people
 - knowledge and expertise
 - money
- Reputation, social licence to operate and international accreditation are ‘drivers’ for change.
- Action plans for change hinge on industry waste participation and industry needs to see ‘value’ and this ‘value’ will likely change from sector to sector.
- Improved state-based data collection and standards (which is in progress).
- Infrastructure is an important aspect for increasing recycling rates.
- Purchasing policies can drive up usage of recyclables e.g. road construction; this is already happening with office stationery such as recycled paper.
- End-of-life product ‘takeback’ through a federal recognition and accreditation scheme – a Data Atlas could assist with this.
- Moving from a product to a service focus could help increase recycle and re-use.
- Copying innovative business models, such as Interface carpets, Fuji Xerox, Caterpillar, and Tesla Motors, could be an enabler for new recycling businesses.
- Compliance issues are barriers to greater levels of recycling.

- Consistent compliance to discourage and prevent ‘backyard’ operators undercutting compliant quality operators.
- Create electronic data platforms for waste generators to help recyclers and re-users source feedstock. Could a national waste database with standard units of measure and definitions be a solution?
- Create/expand market for recycled materials.
- Quality of recycled materials to meet the market requirements.
- Is the recycling industry fully utilising tax incentives or “breaks”?
- Is a co-ordinating mechanism between federal and state levels of government (e.g. COAG) a way to drive recycling initiatives?
- Can the power of “society leaders” (e.g. Prime Minister and Media) promote recycling initiatives that could strongly influence public opinion?
- Is there potential to provide an economic benefit through jobs creation by developing new local recycling industries/companies?
- Recycling sector can create new job opportunities in regional areas.
- Different business models are in place, e.g. for e-waste handling – from small scale run by local councils (with free labour costs) to big automated plants run by multinational companies.
- There is a need to always consider the full life cycle impacts and costs of products whether they are produced from raw materials or recycled materials.

FEEDBACK FROM PARTICIPANTS

About 30 participants attended the workshop. A separate feedback form was used to collect participants' opinions about the success of the event, its format and findings, as well as other recommendations.

- 92% of respondents recognised the workshop's presentations as excellent or very good.
- 83% of participants found table discussions being productive.
- 67% of people assessed the workshop's findings as highly valuable and original.
- The majority of respondents (83%) considered the workshop as a worthwhile experience that fully or almost met their expectations.
- The participants expressed a very strong interest to be involved in any future workshop.

Selected responses (the most important ideas raised during the workshop)

- Government vs Corporations on recycling efforts.
- How to use the waste policy as a driver for change.
- Technology, availability of info for a solution.
- The policy or lack there of supporting 'wealth from waste'.
- How regulation can impact/enhance recycling.
- Education, that is "use yellow bins if in doubt".
- New business models for recycling.
- Innovative business model examples on end-of-life product take back and "product providers becoming service providers".
- How to influence decision makers.

Other suggestions or comments

- Involve more (diverse) stakeholders representatives, and inform research updates that look into recycling economy.
- Could have been broadcast to attract a wider audience.
- National standard for packaging labelling recyclability.

CONCLUSION AND NEXT STEPS

Two industrial ecology workshops were held as part of Program 1 in the Wealth from Waste Cluster, one in Sydney (28 March 2014) and one Brisbane (2 December 2014). The main aim of the workshops was to bring together different stakeholders and share the experience on the existing state of recycling activities in Australia, and to facilitate a pathway to deliver substantially higher levels of metals and minerals recycling, reuse and recovery in Australia utilising industrial ecology concepts and practices.

The main findings from the second workshop are:

- The recycling industry is currently recognised as a potential sector to create new jobs at the regional level. However there are significant factors such as high commodity markets volatility and changes in the regulation that could impact the number and longevity of jobs in the sector. Federal and state governments could assist this aim by providing incentives to encourage potential long-term viable recycling business to establish in appropriate regional areas.
- There are several established product/waste stewardship programs in Australia, including ChemClear, DrumMuster, MobileMuster, National Packaging Covenant, National Television and Computer Recycling Scheme, Tyre Stewardship Australia. While some of them are successful, others are still meeting difficulties and require further development and government support. Currently public submissions have been requested for the Operational Review document for the National Television and Computer Recycling Scheme.
- A better informed public is critical for ensuring higher recovery rates for municipal waste streams (kerbside collection). The amount of metal in the mixed waste stream (red bins) is significantly higher than in the recycling stream (yellow bins) in Queensland, which may require further investigation and interstate comparison.
- The major challenges for e-waste recycling in Australia are volume and complexity of feedstock. While the complexity issue is similar to other countries, the lack and uncertainty of feedstock rates (and complexity) currently prevents the viable establishment of recovery facilities in Australia.
- There is still a lack of standards and policies in the e-waste recycling sector, which results in some companies not operating responsibly such as not being complaint or engaging in the export of waste illegally.
- New and improved technologies at a cost-effective level could open opportunities for new recycling businesses. These technologies have not only improved recovery equipment but also better data platforms for managing waste information/data and greater and enhanced infrastructure to enable higher flows of material in the recycling value chain.
- More innovative approaches for businesses and making use of appropriate tax incentives could help make recycling companies more competitive and viable. Learning from other innovative companies, which have applied successful novel approaches, is a good way to attempt this.
- National approaches are necessary to create viable recycling business across the nation. A similar finding was identified in the first workshop. Government initiatives should be the catalyst to develop new recycling businesses that, once operating, are then self-sustaining – as per initial point above.

The key findings from this workshop will help guide the future research agenda for Program 1 “Recycling Systems: Barriers and Enablers for Industrial Ecology in Australia” in the Wealth from Waste Cluster. We will keep workshop participants informed of the developments in the project and would welcome the opportunity to engage more closely with any participants or their organisations if they believe that they can contribute to the project or conversely the project research and resulting outcomes could assist them or

their organisations, e.g. through better understanding the value chain enablers for higher levels of recycling, assistance with setting specific targets for voluntary or co-regulated schemes or for government regulation and/or policy, utilising the outcomes from metal stocks and flows modelling in society, reviewing examples of innovative current or emerging business models from other parts of the sector or other industrial sectors.

APPENDIX A. ADDITIONAL MATERIALS

Golev, A., Corder, G.D. 2014. Global systems for industrial ecology and recycling of metals in Australia: Research report. Prepared for Wealth from Waste Cluster, by the Centre for Social Responsibility in Mining, Sustainable Minerals Institute, The University of Queensland. Brisbane, Australia. – Available at http://wealthfromwaste.net/?page_id=71.

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Golev, A., Corder, G.D. 2015. Modelling metal flows in the Australian economy. Submitted to the Journal of Cleaner Production.

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