

# Sydney Industrial Ecology Network

Bringing businesses together across NSW to foster reuse of  
C&I waste



**This project is a NSW EPA Waste Less, Recycle More initiative funded from the  
Waste Levy**



# Industrial ecology

**Industrial ecology (IE)** is the study of material and energy flows through industrial systems. The global industrial economy can be modeled as a network of industrial processes that extract resources from the Earth and transform those resources into commodities which can be bought and sold to meet the needs of humanity.

**Industrial ecology - Wikipedia, the free encyclopedia**

[en.wikipedia.org/wiki/Industrial\\_ecology](https://en.wikipedia.org/wiki/Industrial_ecology) ▼





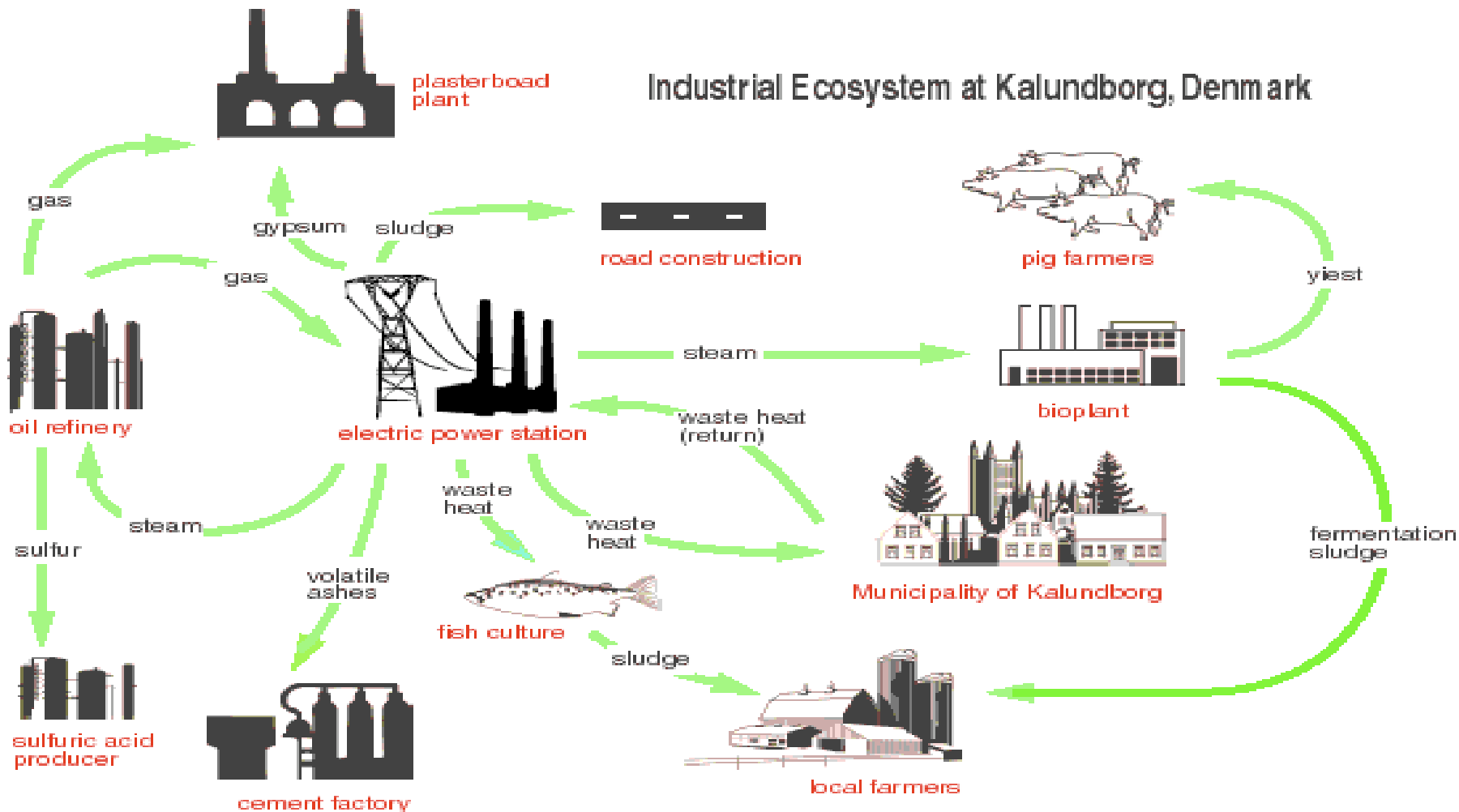
edge environment

JORIS

NIEUWE MASTER "INDUSTRIAL ECOLOGY"  
NIET GEHEEL OVERTUIGEND...



# What is Industrial Ecology?



# What is Industrial Ecology?

**One industry's wastes or by-products becomes another industry's feedstock**

- **Mimicking the efficiency patterns found in natural ecosystems**
- **Closing the material loop of industrial systems**
- **Optimizing material and energy flows**

# What is Industrial Ecology?

Industrial Ecosystem at Kalundborg, Denmark

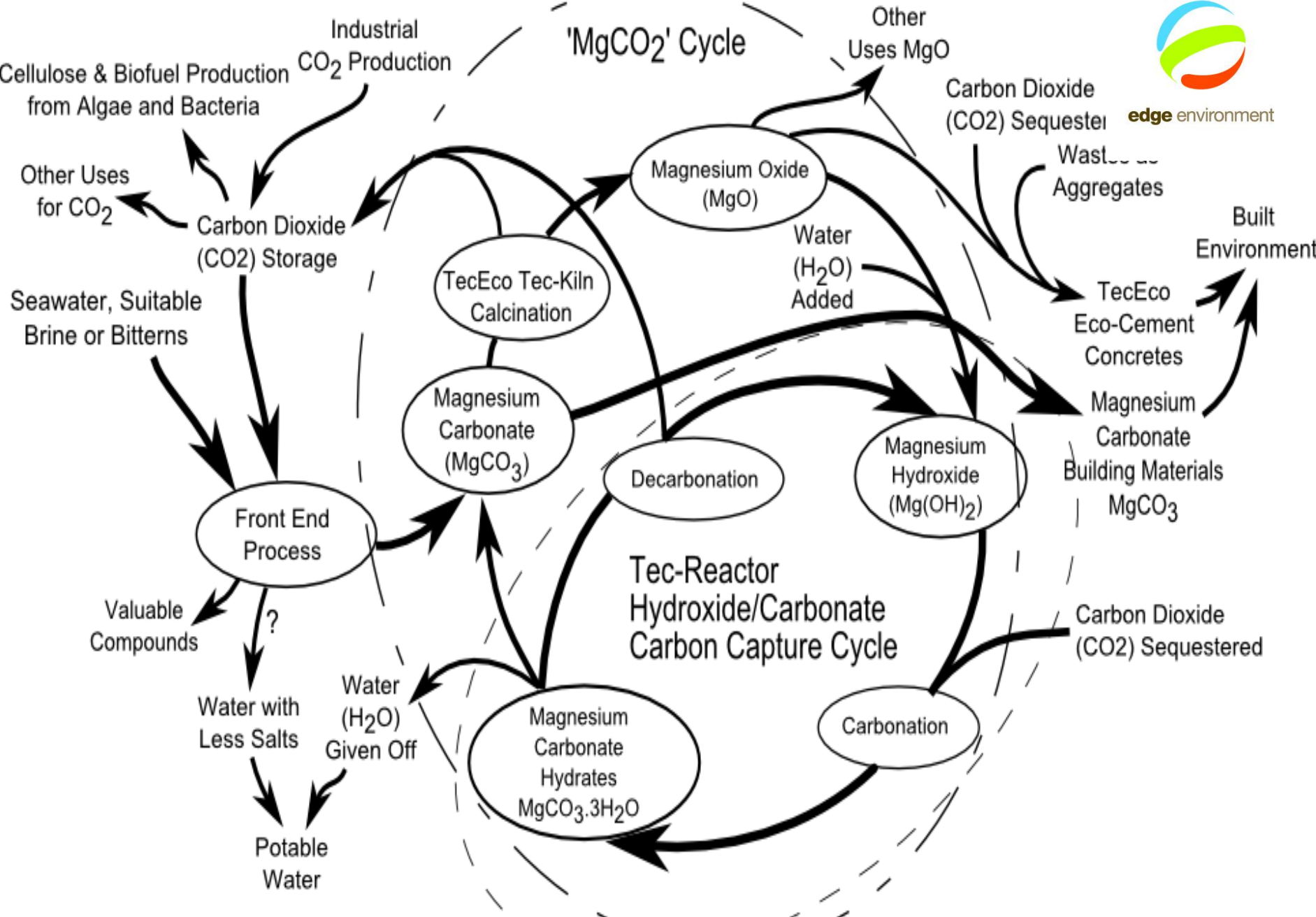
## SIMPLY GOOD BUSINESS

- Mimicking the efficiency patterns found in natural ecosystems
- Closing the material loop of industrial systems
- Optimizing material and energy flows



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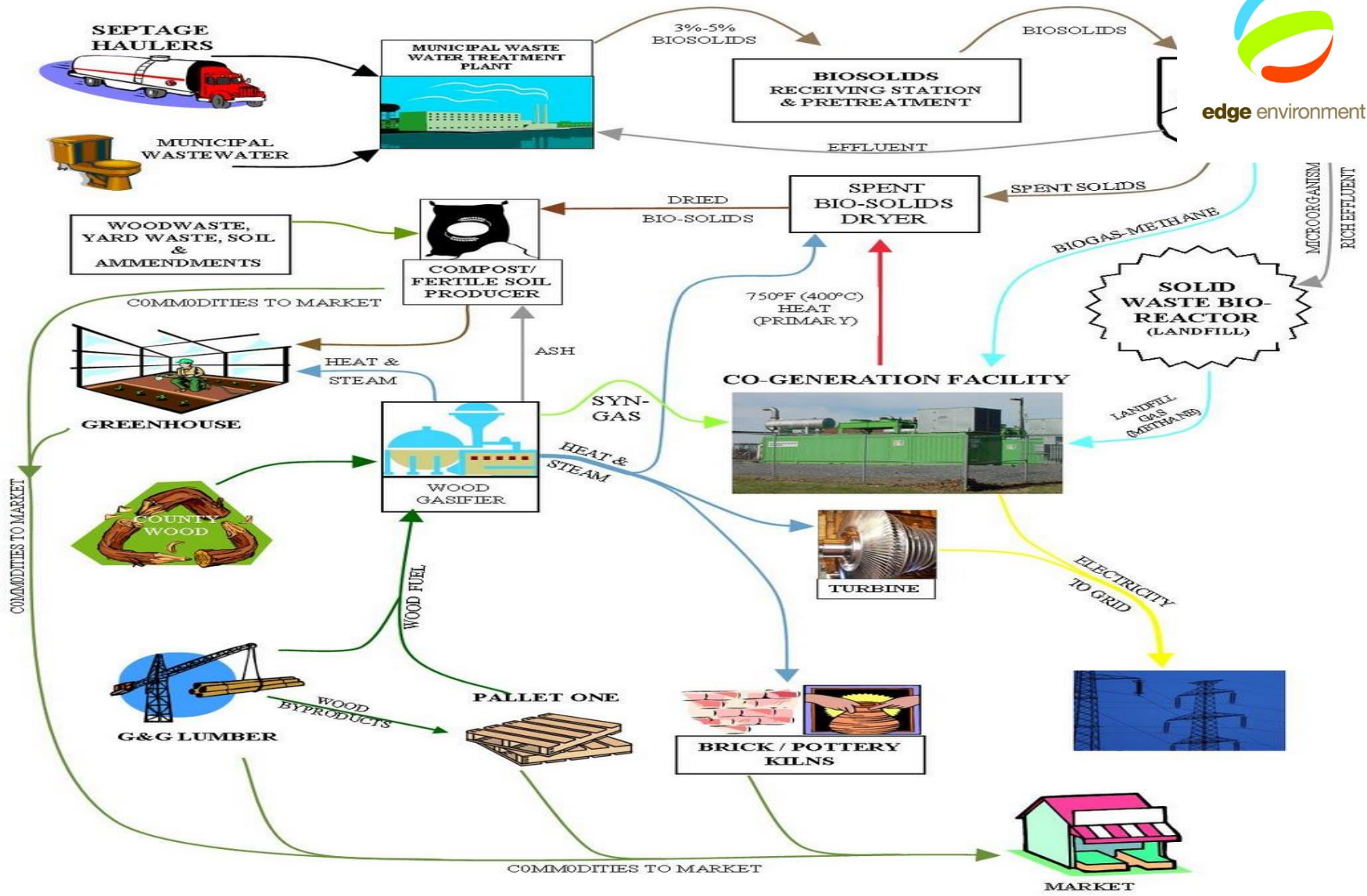
# 'MgCO<sub>2</sub>' Cycle







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**UNIVERSITY PARTNERS: APPALACHIAN STATE UNIVERSITY BIOFUEL RESEARCH FACILITY; UNIVERSITY OF NORTH CAROLINA-CHARLOTTE ALGAE-TO-BIOFUEL & CELLULOSIC ETHANOL RESEARCH; NORTH CAROLINA AGRICULTURAL & TECHNICAL STATE UNIVERSITY; NORTH CAROLINA STATE UNIVERSITY**





SEPTAGE HAULERS

3%-5% residuals

# INDUSTRIAL ECOLOGY

SECOND EDITION

Yale University

Center for Industrial Ecology

# International Society for Industrial Ecology

For more information, visit [www.wileyonlinelibrary.com/journal/jie](http://www.wileyonlinelibrary.com/journal/jie)



IN THE NEWS



Many of the metals needed to feed the surging global demand for high-tech products cannot be replaced according to a new Yale study. [more>>](#)

LECTURE SERIES



on Industrial Ecology

UNIVERSITY PARTNERS: APPALACHIAN STATE UNIVERSITY OF NORTH CAROLINA-CHARLOTTE ALGAE-TO-BIOFUEL & CELLULOSIC ETHANOL RESEARCH; NORTH CAROLINA AGRICULTURAL & TECHNICAL STATE UNIVERSITY; NORTH CAROLINA STATE UNIVERSITY

Regional EcoComplex and Resource Recovery Facility

ent.com.au



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# What is Industrial Ecology?

## SIMPLY GOOD BUSINESS

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- Closing the material loop of industrial systems
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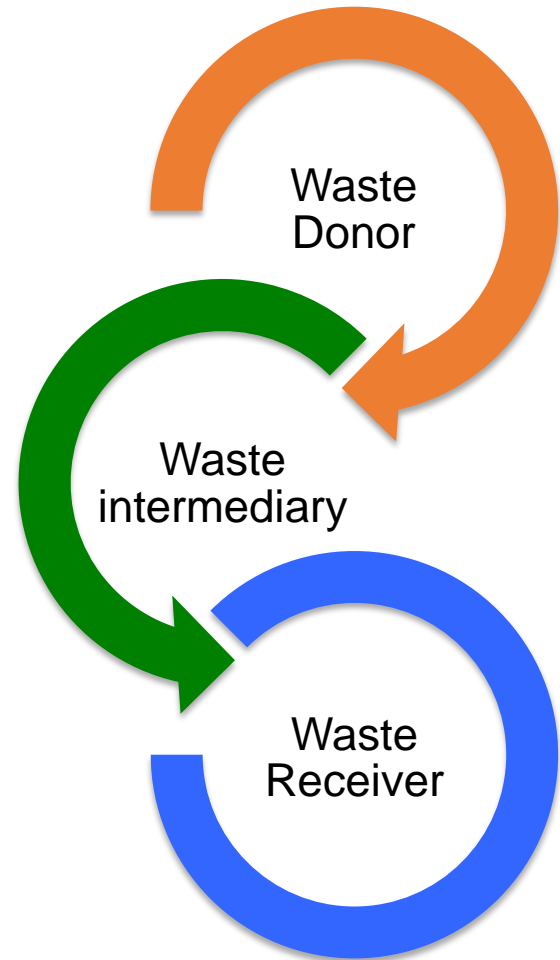


# Industrial Ecology Fundamentals



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- Industries must be different and yet **must fit each other**.
- Arrangements must be **commercially sound and profitable**.
- Development must be **voluntary**, in close **collaboration with regulatory agencies**.
- A **short physical distance** between partners for economy of transportation.
- **Openness** between partners.



# The Sydney Industrial Ecology Network

- Overcome information barriers to B-2-B recycling:
  - bringing like minded business together
  - identify barriers to material recycling
  - establish realistic business cases to make it happen
  - minimise project risk





# Introduction



- Est 2008
- Practical Solutions for Sustainability
- Built Environment, Food, Finance
- Team
- Industrial Ecology Network



# Objective



...to establish Industrial Ecology as a business as usual method of reducing waste going to landfill.

...we will develop nodes of businesses to identify and facilitate B-2-B waste transactions in the Sydney Metropolitan Region, dealing with C&I waste.

# NSW REGIONS



# SYDNEY





# Targets



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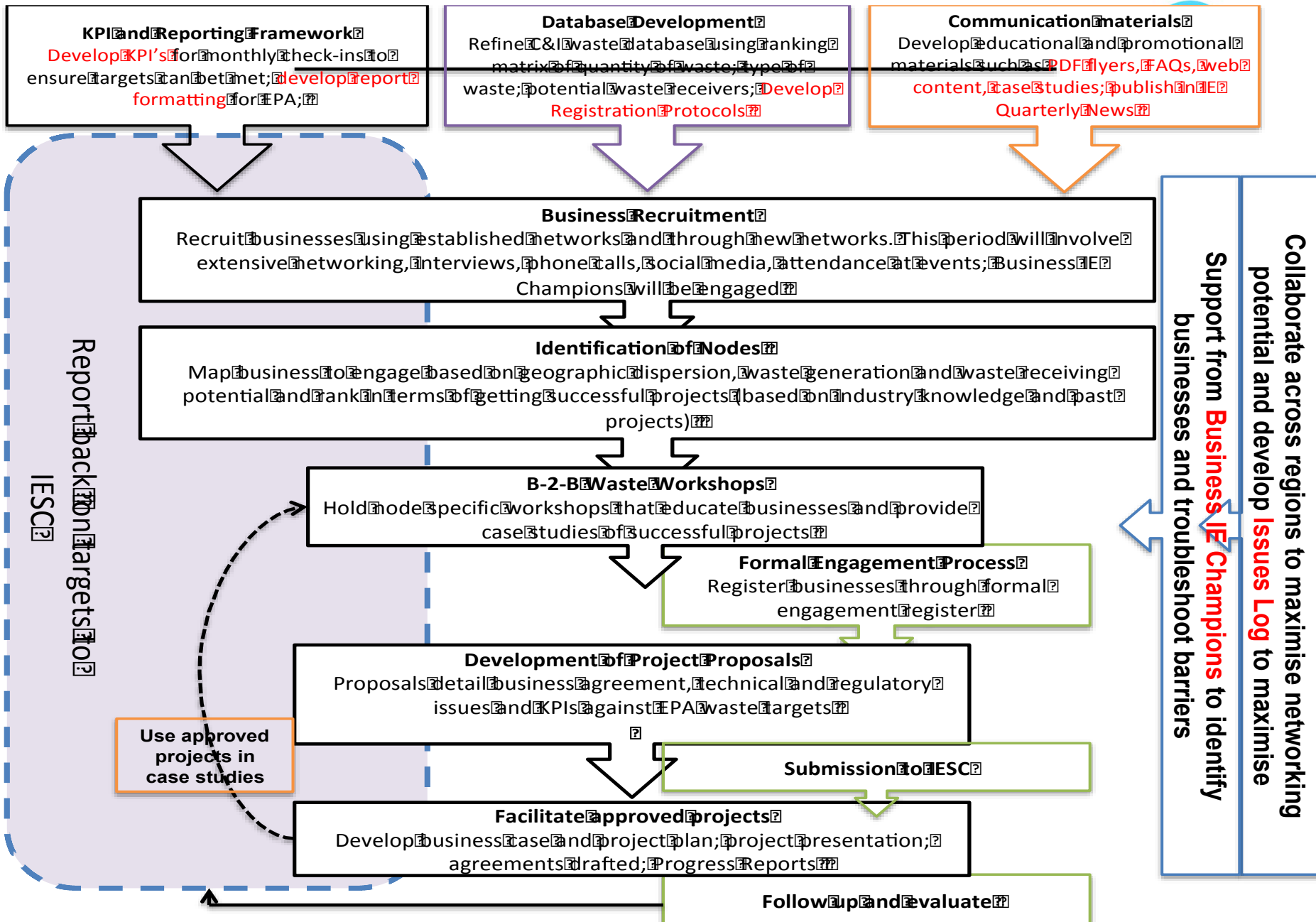
- Businesses engaged: 150
- Proposed projects: 30
- Approved projects: 15
- Tonnes diverted: 12,500

# Outcomes

1. Reducing waste going to landfill by 12500 tonnes.
2. Educating businesses about alternatives to landfill.
3. Producing jobs and services in new areas (such as the building fit-out recycling industry).
4. Establishment of sustainable industrial ecology relationships across NSW.









# Plan



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SYDNEY





30<sup>th</sup> July

Aug

Sept

Oct

Building Fit-Out  
Churn

Health & Aged  
Care

Manufacturing

Food Supply Chain

Better Building  
Partnerships

Bupa

Industry  
Associations

Yum!

Attendees: 150

Attendees: 50

Attendees: 50

Attendees: 100



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**BETTER  
BUILDINGS  
PARTNERSHIP**

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**Brookfield**



**CITY OF SYDNEY**

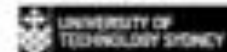


**DEXUS**  
PROPERTY GROUP

**FRASERS PROPERTY**



**INVESTA**





# Why Buildings?



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“The global building stock represents the greatest challenge and the biggest opportunity in tackling rising energy use and GG gas emissions”





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Worldwide buildings use....  
32% of worlds resources



Use 40% of global energy (includes embodied)



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Generates 40% GHG emissions





Makes up 40% of waste to landfill



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# Building Fit-out Churn



- City of Sydney Partnership
- 2M m<sup>2</sup> Net Lettable Area, 10% churn
- Plasterboard, glass, furniture, timber, ceiling tiles, packaging, metals





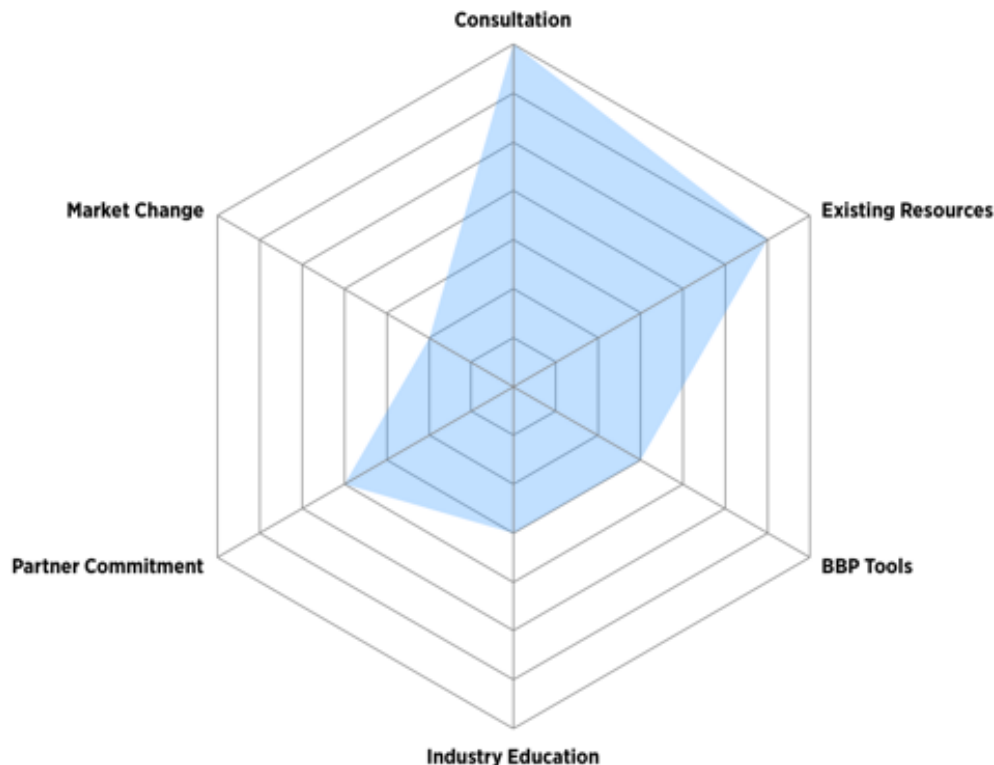
# Waste from Fitout

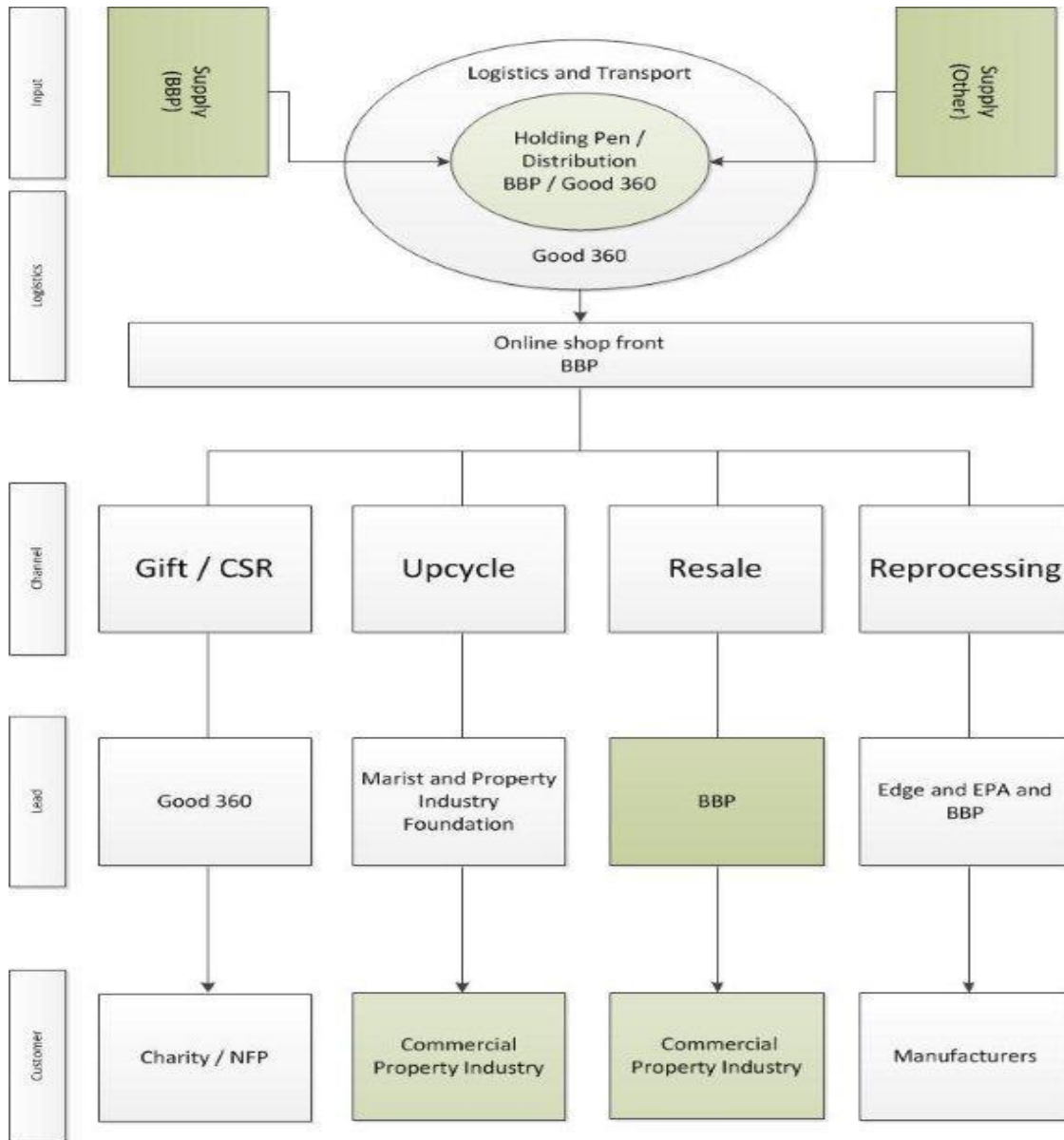
## Forging a new approach to waste generated from office tenancy design and construction

The Better Buildings Partnership is working with the industry to measure, minimise and re-imagine the waste that occurs when tenants move in and out of commercial office buildings. Leading experts note the issues are systemic, like complex contracts and lack of 'ownership' of waste, make good arrangements, large volumes of small amounts of waste, and market failures for refurbished and reused fitout materials like workstations.

**The BBP is releasing *Market Research: Tenancy Fitout Material Procurement Attitudes and Practices*. Stay tuned for the full report.**

### Project Progress





# Furniture Workshop: Outcomes

- With 50 of the industry's top experts, from industrial designers to chemical engineers, architects, leasing agents and product suppliers, the aim of the workshop was to reimagine better end of life options for these materials.
- Facilitated by Tom Davies and with presentations from the BBP waste working group chair Jon Collinge amongst others, the speakers provided context on the definition of ecology; of existing work in this space from BBP; and global best practice from WRAP (Waste & Resources Action Programme) in the UK.



# AWRE Workshop: Outcomes

- With 30 attendees from manufacturers, building owners, builders, GBCA and material reprocessors, the workshop identified issues in the current BAU scenarios and work-shopped solutions.
- Group work indicated a high degree of overlap of thinking in the room – this provides a mandate to explore the projects.
- 2 additional building de-fit projects likely to be established.



# Building Fit-Out Workshop: Top projects.....

- **Further deficit trials targeting diversion of materials** - we are progressing a trial to divert partitions/gyprock, seeking other trials
- **Creating a visionary reuse showroom** - design an established showroom with repurposed furniture to show prospective tenants the possibilities, understand the average cost differences
- **Testing energy recovery from waste .....**Grocon, 101 Castlereagh Street
- **Making key resources and tools available in one place** - identify and collect key resources on the topic (see [BBP Fitout project](#)), [further projects tbc](#))



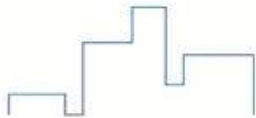




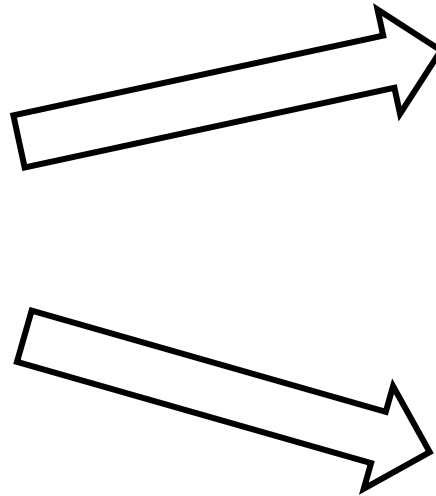
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# Priority Project: GMT Exemplar Defit

Plasterboard being recovered at Governor Macquarie Tower following a new fit-out



**DEXUS**  
PROPERTY GROUP



Gypsum reprocessed as soil conditioner



Reprocessed into new plasterboard



# Food Supply Chain



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# Supply Chain Best Practice: Farm to Fork

KFC Meal and Benchmark



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Differentiation in practice

# Food Supply Chain

- Champion: YUM!  
Sarah Collier
- IE Event Nov 12
- Engaging supply chain
- Donors and Receivers
- Likely Projects:
  - Food Waste
  - Equipment
  - Plastics



**SYDNEY  
INDUSTRIAL  
ECOLOGY  
NETWORK**

**FOOD SUPPLY CHAIN  
WORKSHOP**

9am – 12pm  
Wednesday 12<sup>th</sup> November 2014  
Yum! 20 Rodborough Rd  
Frenchs Forest NSW 2086

Join us at this event to establish viable channels for the recovery of resources in the food supply chain


Edge Environment and KFC Australia are collaborating to establish an industrial ecology network for the recovery of resources in the food supply chain.

The food supply chain has a wide range of material inputs and outputs to process, transport and distribute food to the population. The global population is expected to grow to 9 billion and demand for food by 77% by 2050. Over the same period food production will be under threat from climate change, competing land uses, erosion and diminishing supplies of clean water. One of the solutions to this dilemma is increased efficiency and waste reduction in the food supply chain (RMIT, 2013).



Using case studies to showcase successful resource recovery projects and connecting suppliers and receivers of waste, we will facilitate sustainable and commercial viable relationships between businesses.

*This project is a NSW EPA Waste Less, Recycle More initiative funded from the waste levy.*

For more information contact  
Tom Davies, Industrial Ecology  
Facilitator - Edge Environment  
0409 110 095



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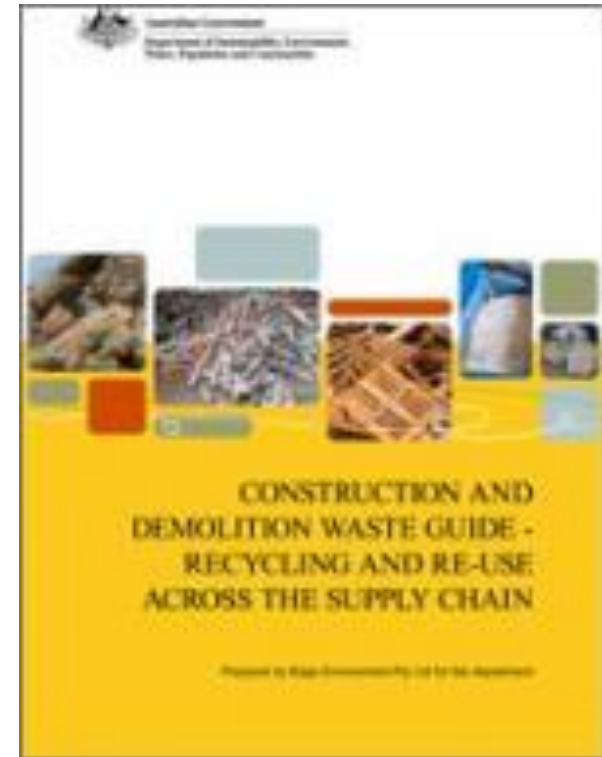






# Lots of it going on....

Profiles 15 case studies of innovations in Production and Consumption with Building Products supply chain.









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3ders.org



CCTV

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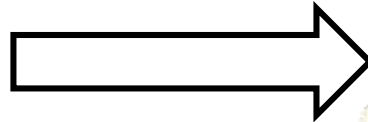




# Priority Project - Auspost Minchinbury Site:

10,000 used pallets  
a month

Going to landfill





























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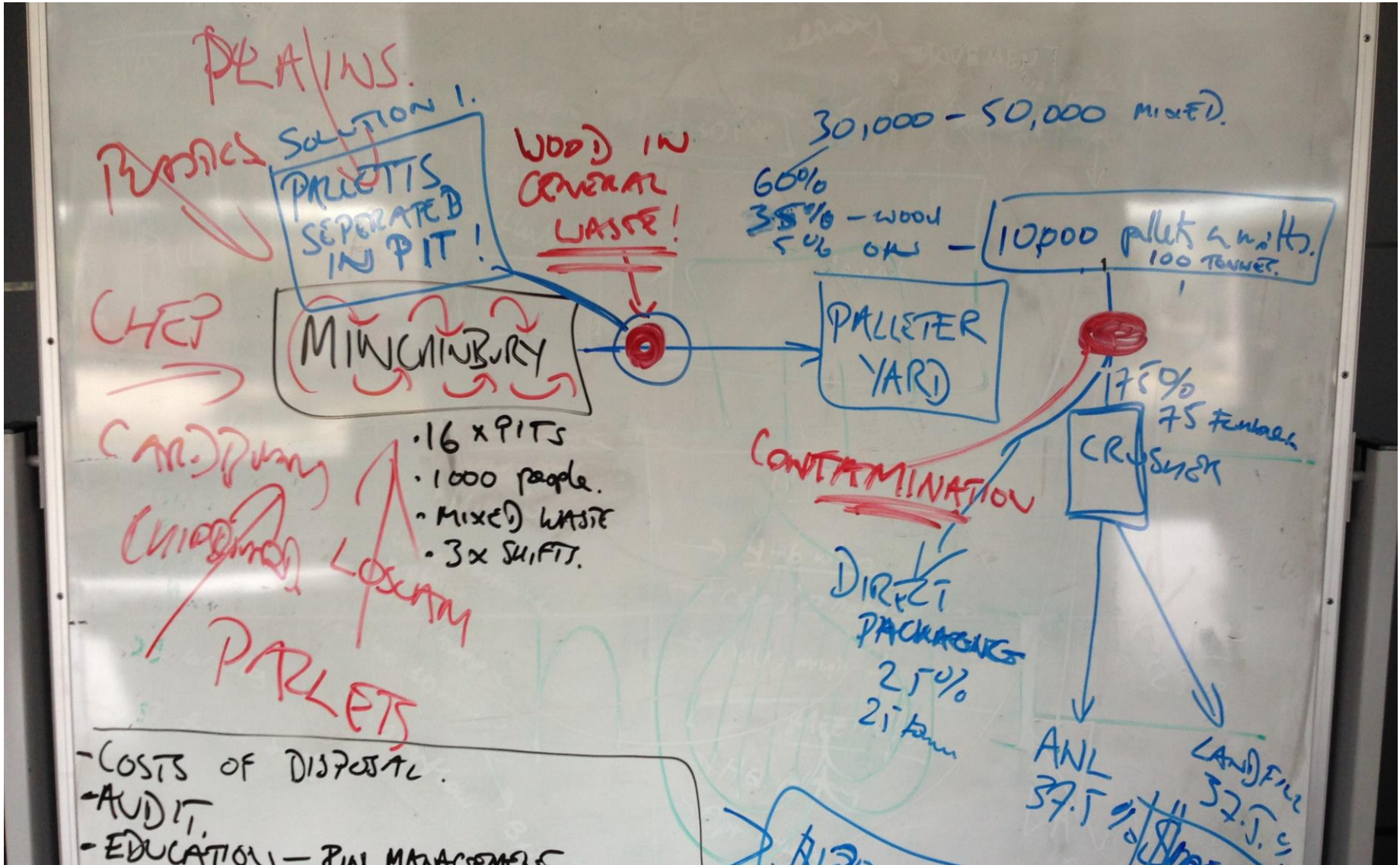














# Case study: Refurbished timber pallets

10,000 used pallets  
a month

Reprocessed as  
refurbished pallets



**Saving \$12,000 per month on waste management costs (estimate)**





# Case study: Refurbished timber pallets - the numbers



- Approx 23 loads being collected by Direct Packaging and Pallets per week – these are being refurbished.

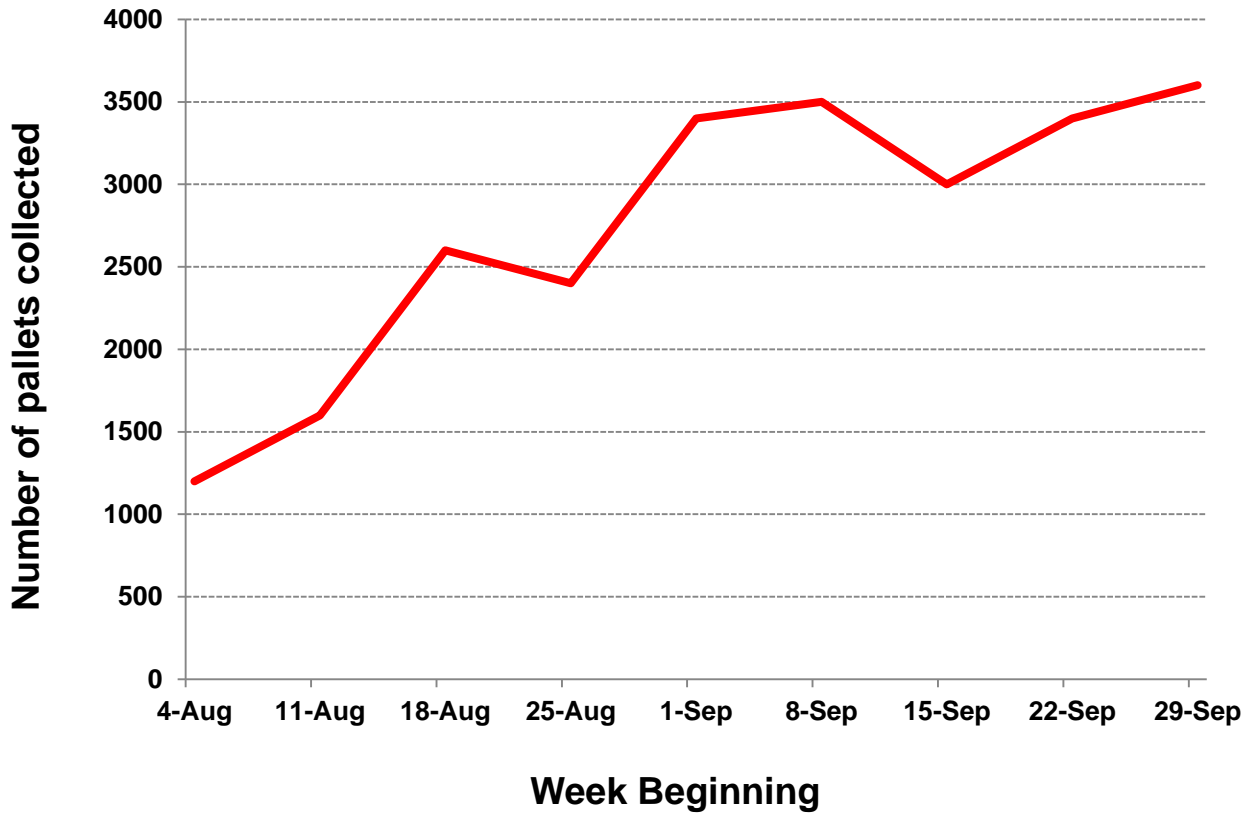
➔ approx. 115 tonnes of pallets per week

- Approx 3 loads of timber scrap per week – this material is going to D&R Henderson for chipping and reprocessing into particle board

➔ approx. 15 tonnes per week



# AusPost Pallets in Numbers







# Conclusion

- 6 months into establishing Sydney IE network
- Tracking well against targets (primary target 12,500 tonnes)
- Challenge: Economics
- Innovation and behavioral change is key to realising opportunities