



Rising waste costs – what are the legislative drivers and what are the opportunities

Presenter: Alison Dilger
Team Manager – Resource Efficiency

Legislative drivers

- Waste avoidance and resource recovery strategy 2007
 - maximise conservation of our natural resources; and minimise environmental harm from waste management and disposal of solid waste
 - Targets:
 - Increase recycling of C&I waste to 63% by 2014
 - 38% in 2004-05
 - 44% in 2006-07
 - C&I waste to landfill per person was increasing up until 2006-07
 - C&I waste accounts for the majority of waste disposed of to landfill in Sydney

Legislative drivers

- Waste and environment levy
 - Aim: reduce waste disposal and stimulate alternative waste technologies.
 - Applies to the ‘regulated area’ of NSW
 - \$70/tonne – SMA
 - \$65/tonne – ERA (Illawara, Central Coast and Hunter regions)
 - \$20/tonne – RRA (North coast, Blue Mountains, Wollondilly)
- Coal washery rejects levy
 - Aim: to stimulate improved environmental management of coal waste by making disposal more expensive
 - \$15/tonne

What is waste?

- Waste
 - 1. to consume, spend, or employ uselessly or without adequate return; use to no avail; squander:



What is resource efficiency?

“Proactively minimising the amount of resources used and wastes generated to manufacture a product or provide a service”



'Value' of waste - Case study 1

- Parts manufacturing facility
 - ~ 500 t/year of general solid waste
 - ~ **\$75,000** /year to dispose
- Carbon fibre
 - ~ 5% of total waste to landfill
 - Disposal cost ~ \$4,000 /year
 - Equivalent raw material costs ~**\$1,350,000** /year

'True' cost of waste

- Disposal costs
 - Treatment costs
 - Rising landfill levies and gate fees
 - Tip of the ice berg
- Generation costs
 - Labour
 - Materials
 - Energy
 - Water
 - Plant capacity



Applying resource efficiency principles

Step 1

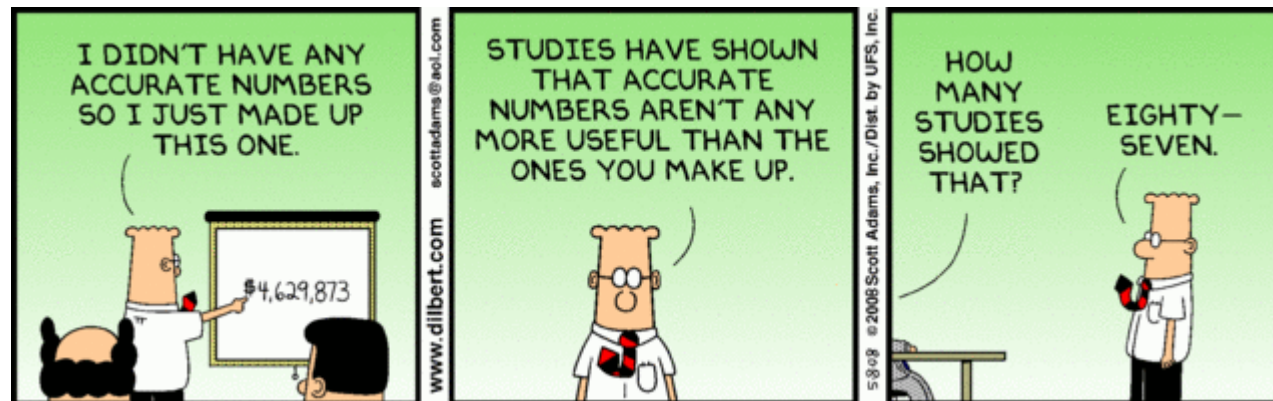
- What is the problem?
 - Be specific
- What is the objective?
- What is the target?



Applying resource efficiency principles

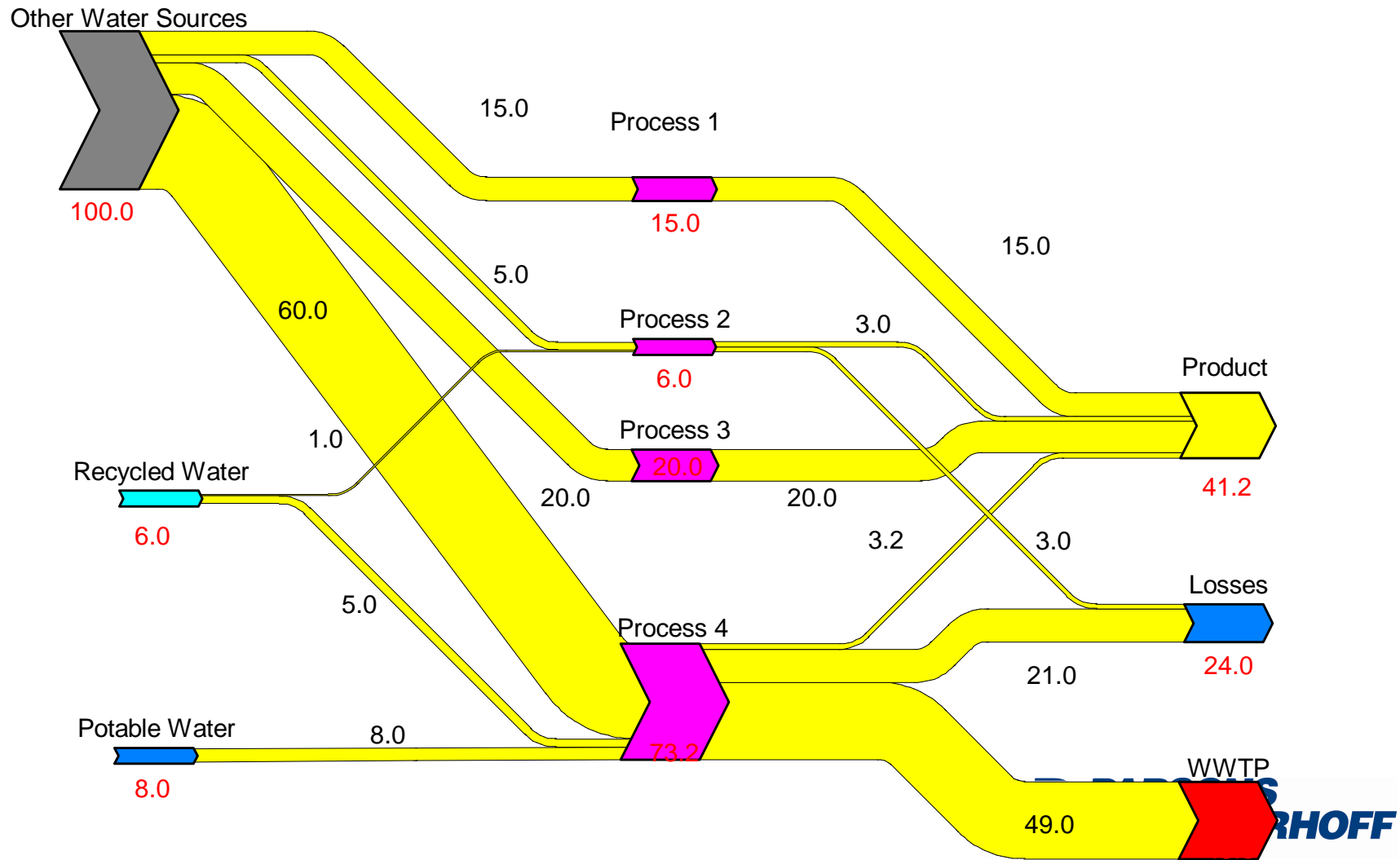
Step 2

- Understand how resources are used and wastes are generated
 - (Manage) and analyse the data
 - Talk to staff and conduct walk-a-rounds
 - Process mapping
 - Mass and energy balances
 - Benchmarking



NS
KERHOFF

Sankey diagram – mass balance



Understanding how resources are used and waste is generated – Case Study

- milk manufacturing site looking to identify opportunities to reduce TDS in trade waste
- Study initially focussed on the CIP systems
 - Could only account for 50% of TDS in trade waste
- Developing a total mass balance showed that the other 50% was actually from milk losses
- Milk losses contributed
 - ~\$800k/year in trade waste quality charges
 - ~ \$3m/year in raw material input costs

Applying resource efficiency principles

Step 3

- Identify opportunities
 - Question how you do things
 - Talk to staff
 - Talk to suppliers
 - Site observations
 - Root cause analysis
 - Design it out
 - ‘Research’
 - Internet searches
 - Case studies
 - Published papers



Waste hierarchy

From the Waste Avoidance and Resource Recovery Act 2001

1. Avoidance

- Includes reduce

2. Resource recovery

- Reuse, recycle, reprocessing and energy recovery

3. Disposal

- Start at the top and work your way down
 - Cheaper and easier to avoid and reduce
 - Increasing number of reuse, recycling and recovery options

Some waste reduction tips

- Avoid / reduce
 - Design it out
 - Reduce stops and starts
 - Eliminate changeovers and bottlenecks
 - Ensure procedures drive efficiency and consistency
 - Work with purchasing to minimise waste entering the site
- Reuse / recycling
 - Waste exchange database - <http://www.wasteexchange.net.au/>
 - Segregate streams to enable reuse/recycling
 - Contamination and mixed materials limit recycling
- Energy recovery
 - Does your 'waste' have a calorific value?
 - Reduce moisture content
 - Anaerobic digestion \Rightarrow biogas \Rightarrow natural gas replacement



Root cause analysis – Polymer product manufacturer

- Uses a caustic scrubber to remove materials from vent streams prior to discharge
 - ~ 600 kL/year of spent caustic solution sent to a waste treater
 - kL of waste/ t of polymer much higher than other sites
- Started ‘focus’ teams to work on waste issues
 - Brainstormed reasons for higher caustic waste generation
- Installed a differential pressure indicator on scrubber
 - Identified certain products that resulted in pressure spikes
 - Reduced batch sizes for these products
- Achieved a 20% reduction in waste generation and improved yield
- Now looking to reuse the remaining ‘waste’ caustic in their wastewater treatment plant

Looking outside the 'square' (site)

- Industrial ecology
 - the study of material and energy flows through industrial systems
 - sharing of resources, looking for synergies
 - Kwinana, WA is Australia's most recognised IE example
- WMAA NSW has an industrial ecology chapter
 - Promotes and encourages the development of activities, processes & relationship between entities
 - convert surplus, spent or unwanted materials, energy and services into valuable resources
 - regular meetings and an annual conference
- 'One man's trash is another man's treasure'

Assess the opportunities

Step 4

- Estimate the impact on:
 - Waste disposal
 - Raw material purchasing costs
 - Production efficiencies and labour costs
 - Greenhouse gas emissions (Scope 1, 2 and 3)
 - Energy and water costs
 - OH&S
 - Staff engagement and morale
- Determine the payback period and the business risk
- Prioritise options and develop an action plan
 - Assign responsibilities and time frames

Behaviour and waste

- Why do we generate waste?
 - “because its easier ”
 - “because its quicker”
 - “because that was how I was shown”

 - “because the process is inconsistent and the quality system encourages me to be conservative”
 - “because I don’t understand the link between my actions and the cost of waste to the business”
 - “because there is no incentive for me to reduce waste”

Waste and culture change

- Elements of changing a 'waste' culture:
 - Set a goal, objective or target
 - Nominate a champion
 - Education and awareness training
 - Team work
 - Dedication – from the top and the bottom
 - Rewarding the good, admonishing the bad
 - Progress reporting
 - Constant communication



Thankyou

Alison Dilger
Parsons Brinckerhoff
Level 15, 28 Freshwater Place
PO Box 19016
SOUTHBANK VIC 3006
AUSTRALIA

Direct: +61(0)3 9861 2320
Mobile: +61 (0)3 438 743 215
Fax: +61(0)3 9861 1144
Email: adilger@pb.com.au

