Understand it

Apply it

Generate quick win ideas

Check an existing concept

More detail …

Design wheel

Explore

Create

Evaluate

Manage

Impact map

Performance dashboard

Role-based guidance

Topic-based guidance

See examples

Waste impacts

What key issues exist for my business?

When something is thrown 'away', most people don't see where this 'away' is. A by-product of global consumerism supported by built-in obsolescence is driving the growth of waste mountains and flotsam around the globe. Not reprocessing waste has **People, Profit and Planet** costs. With cost for most materials for manufacture increasing, waste legislation tightening and materials recovery technology advancing, not having a materials and waste strategy with a goal of zero waste makes no economic sense. In energy (carbon) terms, materials recovery is nearly always more efficient. Most recycled plastics use around three times less energy than processing from crude oil, often much less.

Examples of economic and environmental success stories for waste repurposing can be found in the **examples** section to the left.

Why is this an issue for my business?

Waste and materials' security are interwoven issues, certainly for the Circular Economy approach. For waste electronics (WEEE) – the fastest growing waste stream on the planet and the hardest to reprocess – there are a number of mined conflict elements for manufacture, and resource demand from other growing markets, such as neodymium. It is not unlikely that greater quantities of neodymium will exist in electric cars than in mines globally in the not too distant future, competing directly with ICT industry needs. Potential brand implications from association with such **People/Planet** waste and resource conflicts are a very real business threat, with at least one household name falling foul of this every quarter. Secure access to key materials in ones supply chain should start to focus on waste streams too rather than just the commodities markets and mining operations.

Intense pressure on key materials leads to a change in focus on what is regarded as 'waste' and its value. Lead stolen from church roofs used to be the only commonly reported material theft; now many kinds of material are being targeted this way, with perhaps copper and catalytic convertors (platinum, palladium, rhodium) theft being the most high profile examples in recent years.

What steps can I take to address this?

It's no longer advisable to leave materials supply risk to someone else in the supply chain, even with thorough Performance Bonds or Title and Risk contract terms. This is especially true when considering the recovery of EoL product, and a means of returning some of this material back into ones own manufacturing chain. New business relationships will need to be developed.

- A materials strategy is required, both to roadmap the risks of supply on the horizon and the phasing in of more secure materials and processes as the technology and costs evolve.
- Secure access to key materials in ones supply chain may also start to focus on waste streams rather than just the commodities markets and mining operations. New relationships may need to develop with your existing waste handlers – and end users.
- Considering how your waste might be repurposed into a useful resource can provide stimulus for innovation within concept design.

Further reading

The impact on businesses can be considerable when even 'waste' starts to be stolen, with considerable pressure applied on the UK government to act on the UK scrap metal trade in 2012. There is now more indium and gallium in use than in proven possible reserves, and more gold in a tonne of waste mobile smart phones than in typical ore mined for it.

In 2006 the DTI produced an outline UK Materials Strategy which included a key section on 'materials for sustainable production and consumption' and had invested nearly £0.5bn in collaborative R&D for materials from 2004-2006. In 2008 the TSB released its Advanced Materials Key Technology Area strategy 2008-2011 and in March 2012 DEFRA released 'A Review of National Resource Strategies and Research. This report makes reference to the Circular Economy and the University of Cambridge's department of Materials Sciences and Metallurgy.

This last report describes the European Resource Strategy and supporting reports including:

- The Raw Materials Initiative
- The EU14 Critical Materials
- EU Strategy on Raw Materials
- Critical Materials in Strategic Energy Technologies (SET)

And a number of other international reports on the same threats. Other references:

- The Guardian have produced an interactive resource How ethical is your smart phone, which shows problems caused by the mining of materials used.
- High-value plastics from complex waste streams
- UK Government website on Environmental Regulations.
- Full product transparency, an e-book by Ramon Arratia of InterfaceFLOR.
- The Ecodesign Directive 2009/125/EC has been transposed in the UK by the Eco-design for Energy-related Products Regulations 2010 (SI 2010 No.2617). It aims to improve the environmental performance of products throughout the life-cycle, by integration of environmental aspects at a very early stage in product design. The original Directive was recast in 2009 and was previously known as the Energy-Using Products (EuP) Directive 2005/32/EC. This was transposed into UK law under Statutory Instrument (SI 2007 No.2037) which is now revoked.
- PAS 141: 2011 for reuse of UEEE and WEEE (2012 Recast)
- WRI's Greening the supply chain
- Eco Design For Packaging & Packaging Waste Directive (94/62/EC)
- BS 8887-1:2006 Design for manufacture, assembly, disassembly and end-of-life processing (MADE). General concepts, process and requirements.
- BS PAS 2060 (carbon neutrality)
- BS 8887-2:2009 Design for manufacture, assembly, disassembly and end-of-life processing (MADE). Terms and definitions.
- IEEE 1680.1-2009 Standard for Environmental Assessment of Personal Computer Products.
- EU Batteries Directive 2006/66/EC
- In California in August 2010 Senate Bill 1454 went under consideration to ban all biodegradable claims on plastic bottles, with the intention to extend this to all plastic products, because of numerous marketing eco-claims that were confusing at best.
- In May 2011 the European Commission began a call for views on whether requirements around biodegradable and compostable packaging are fit for purpose as laid out in the Eco Design For Packaging & Packaging Waste Directive (94/62/EC) for the same reason.
- Note: There are two main types of biodegradable plastics: oxo-biodegradable and hydro-biodegradable. Both will first undergo chemical degradation by oxidation and hydrolysis for oxo- and hydro-biodegradable plastics respectively. This results in their physical disintegration and a drastic reduction in their molecular weights. These smaller, lower molecular weight fragments are then amenable to biodegradation by microbes.

- Hydro-biodegradable plastics tend to degrade and biodegrade somewhat faster than oxo-biodegradables but the end result is the same – both plastics are converted to carbon dioxide, water and biomass.
- Oxo-biodegradable plastics are generally less expensive, possess better physical properties and are easier to process on current plastic processing equipment than hydro-biodegradable plastics.
