

Turning waste into a resource



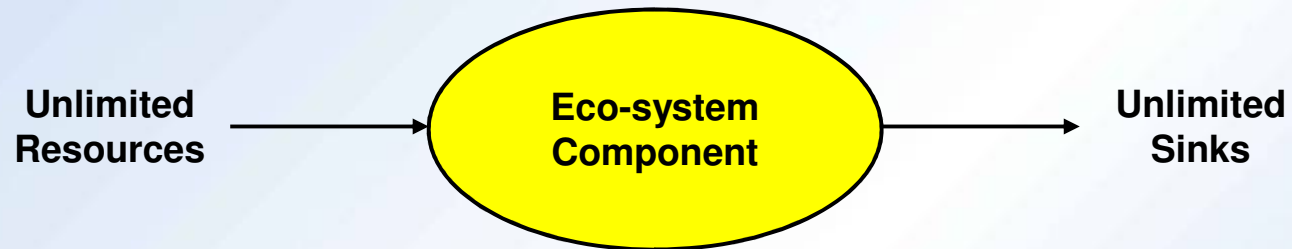
Kirk Bridgewood
NISP North East

Industrial Symbiosis

Marion Chertow, 2000

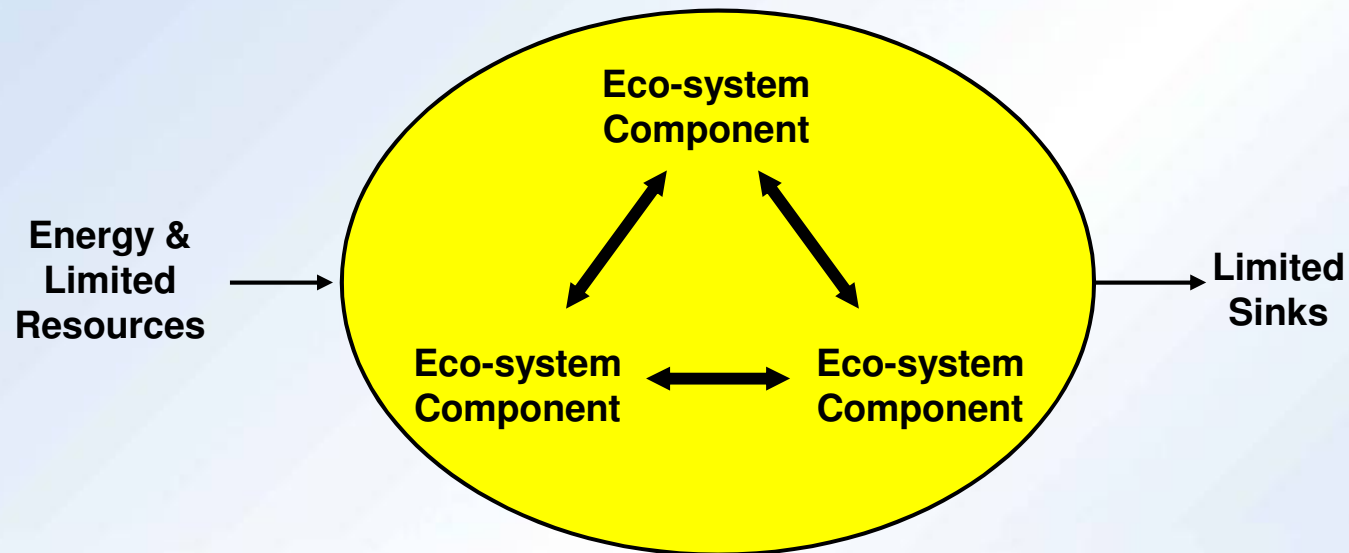
- is part of the emerging field of **industrial ecology**, and as such demands resolute attention to the flow of materials and energy through local and regional economies.
- engages traditionally separate industries in a collective approach to competitive advantage involving physical change of materials energy, water and/or by-products.
- The keys to industrial symbiosis are collaboration and the synergistic possibilities offered by geographical proximity.

Type I Ecosystem (Allenby 1992)



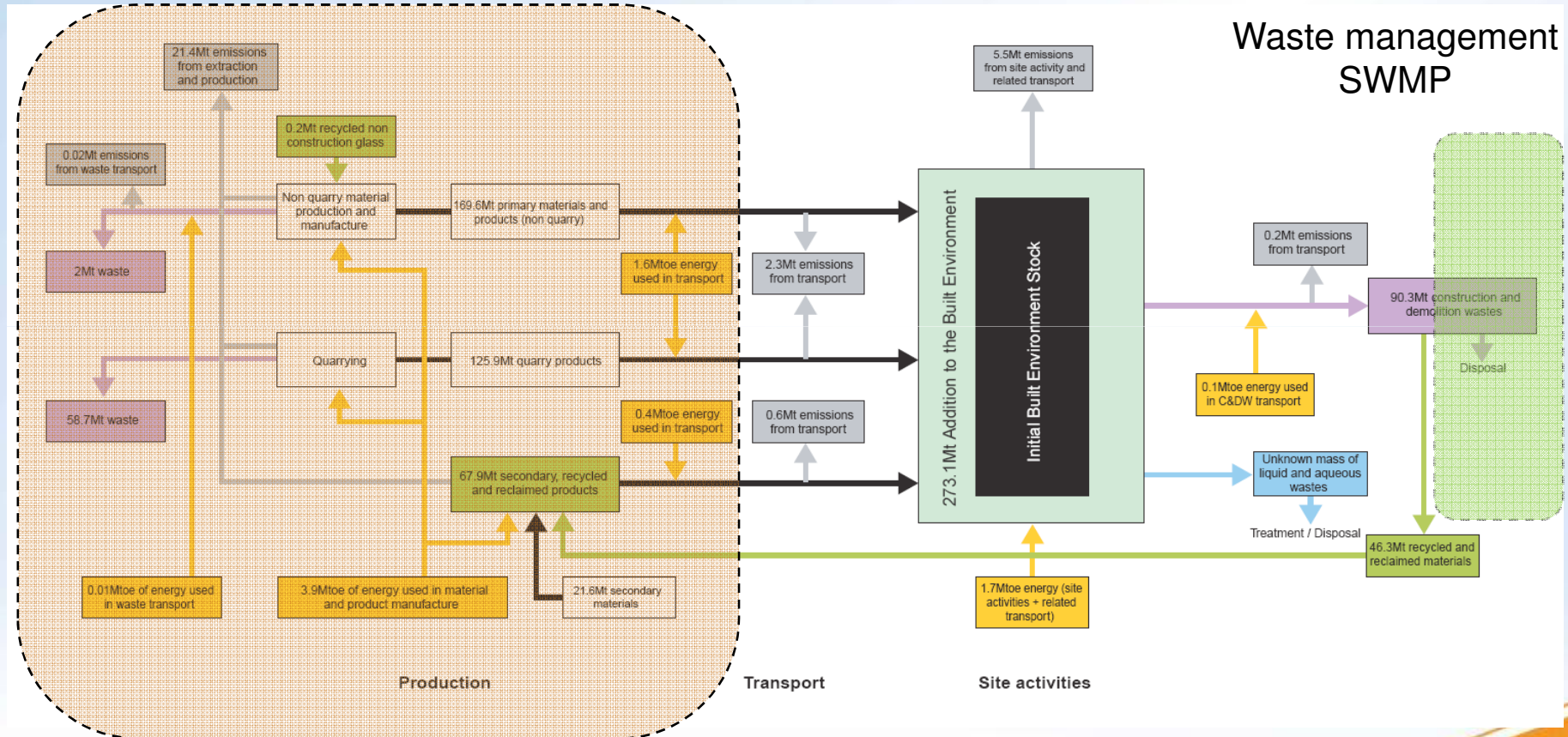
- Linear
- A large constant supply of raw materials is required
- This system is unsustainable

Type II Ecosystem (Allenby 1992)



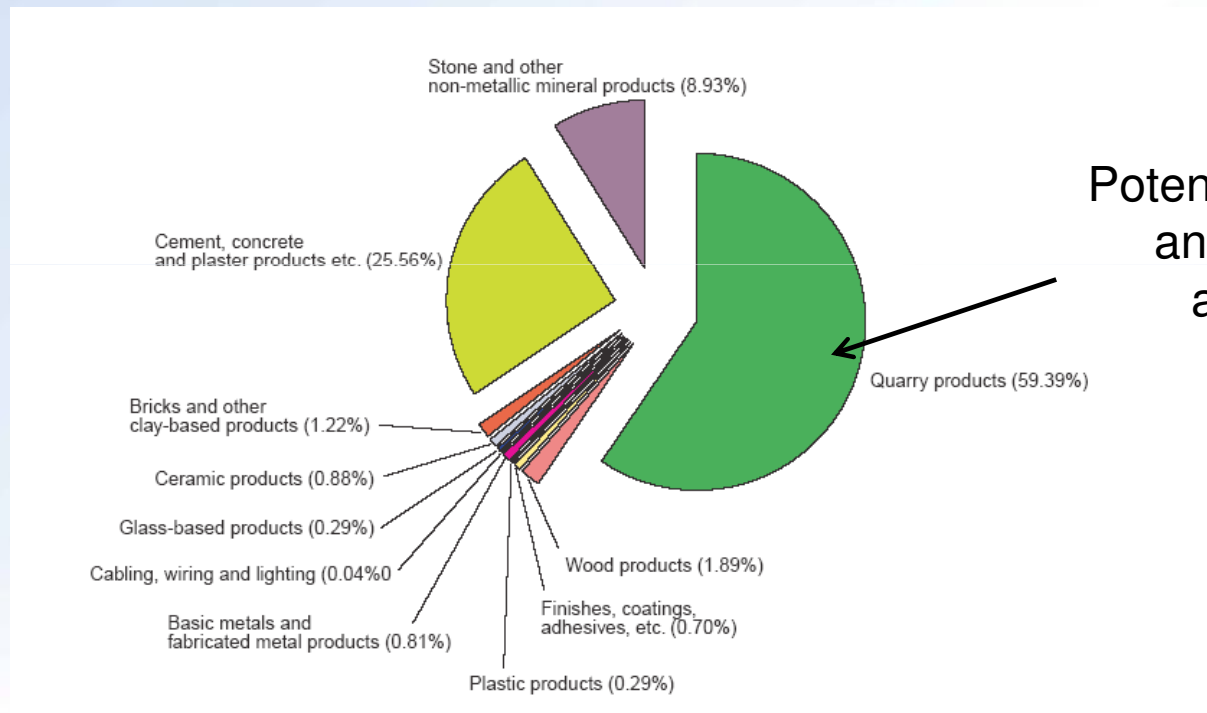
Valuable resources conserved

Resource flow in the construction Industry



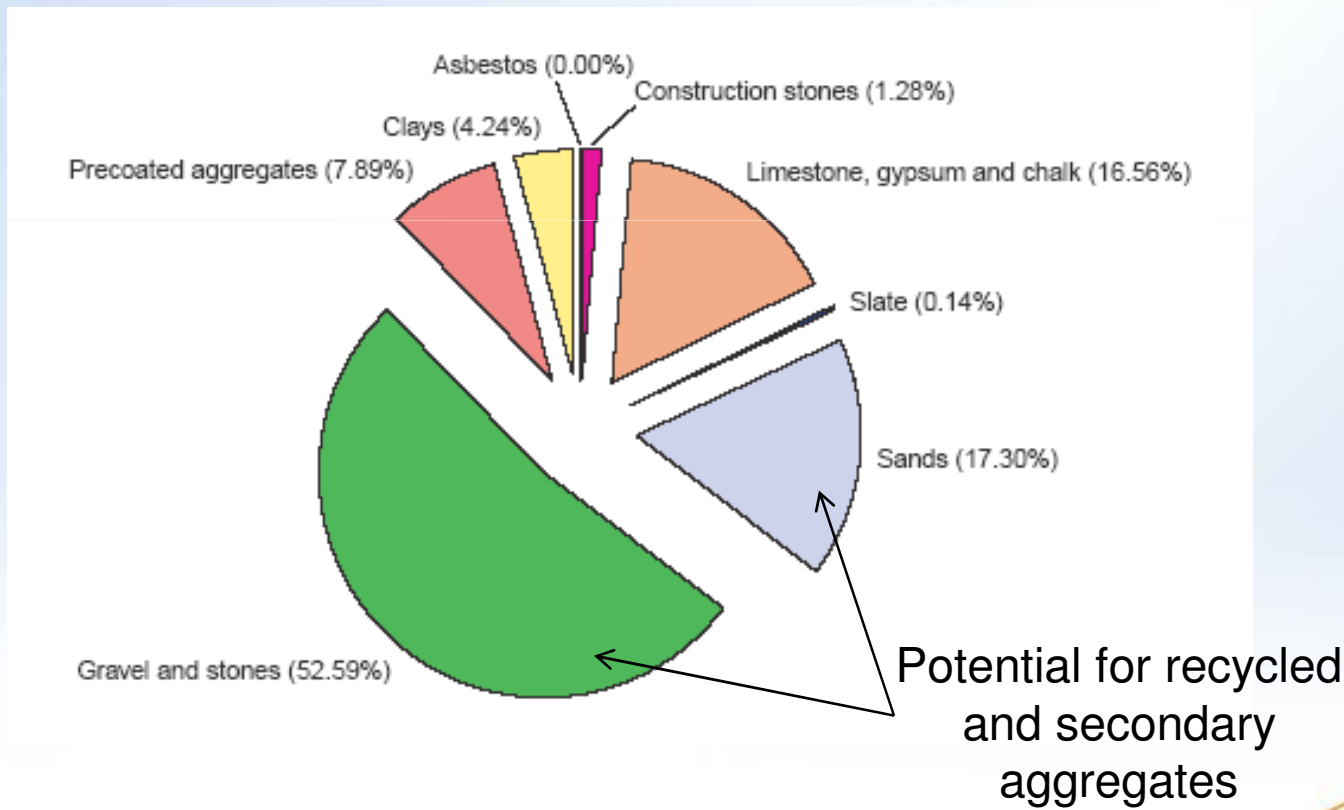
Recycled and Secondary aggregates

Distribution of primary material resources in construction



Potential for recycled and secondary aggregates

Distribution of Quarry products used in the construction Industry



Recycled, Secondary and reclaimed Aggregates

- Secondary products – waste materials or by-products often from outside of the construction industry which can be used as substitutes for primary materials
- Recycled products – waste materials transformed into useable materials and products after processing
- Reclaimed materials and products - those which can be re-used in the form in which they are recovered.

Incinerator Bottom Ash Aggregate (IBAA)

- Worked with Halcrow to use secondary aggregates/ alternative materials
- 22,000 tonnes of IBAA used
- 3382 tonnes CO₂ savings
- Cost savings over virgin aggregate 20%



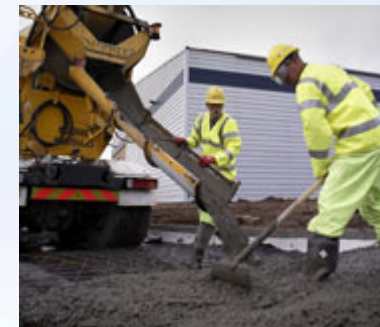
Waste Foundry Sand

- Blended for...
 - Topsoil additive (BS3882)
 - Asphalt (BS EN 13108)
 - Concrete (BS EN 12620)



Low Carbon Concrete

- Secondary additives...
 - Rubber crumb
 - Glass
 - Blast furnace slag
 - Pulverised Fuel Ash



Recycled aggregates

- Waste concrete and rubble previously sent to landfill now goes to various companies to be recycled
- Hardcore, broken brick and tarmac from demolition and construction sites, can be turned into high quality road stone material typically Type 1 sub-base and 6F5 capping layer material
- Secondary or recycled aggregates at one time were looked down on and thought to be inferior material to natural aggregates, now aggregates are produced to comply with a range of European and British standards such as the specification for highway works 2004 and BSEN 13285 2003

Reclaimed materials and products

- Site Waste Management Plans (SWMP)

In England, as of April 2008, SWMPs have been made a legal minimum requirement for construction projects valued more than £300,000 excluding VAT under the Site Waste Management Plan Regulations 2008.

“...improving materials resource efficiency, by promoting the economic use of construction materials and methods so that waste is minimised and any waste that is produced can be re-used, recycled or recovered in other ways before disposal options are explored.”

Cleaning up construction waste

- Hard material sent to a recycling centre for processing into aggregate 1200 tonnes
- Clean Wood for reprocessing 8 tonnes
- Dirty Wood for waste to energy incineration 12 tonnes
- Plastic for reprocessing 4 tonnes
- Metal for reprocessing 6 tonnes
- Rubbish that could not be segregated incl tree roots 20 tonnes
- The balance was subsoil that, once processed to a clean, inert condition was re-used on site to reprofile the ground 4750 tonnes

