The Uncertain Future
A Route Map

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Resource Efficiency - The Second Industrial Revolution

- The first Industrial Revolution used machinery to increase labour efficiency.
- These techniques are now readily available throughout the world.
- The second Industrial Revolution is happening now.
- The second Industrial Revolution is about using ‘Cleaner Design’ to improve Resource Efficiency.
The Uncertain Future – A route map

Resource Efficiency - The future ‘BIG’ issue

Manufacturing — Use — End-of-life

Improving Resource Efficiency

Why is Resource Efficiency important?

- 93% of production materials do not end up in saleable products.
- 80% of products are discarded after a single use.
- 99% of materials used in the production of, or contained within goods, are discarded in the first six weeks.
## The Uncertain Future – A route map

### The timescales for what will matter

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<tr>
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### Manufacturing – Targeting Efforts

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Manufacturing - Targeting Efforts

- Targeting actions to reduce the cost of materials - Accept responsibility for materials costs.
- Acting to reduce the cost of materials.
- Targeting actions to reduce the cost of controllable overheads - Accept responsibility for the controllable overheads.
- Acting to reduce the controllable overheads.

Keep the labour.

Sack the kilogrammes and kilowatt-hours.

Drivers
- Continued profitability and survival.
- Increased resource costs (e.g. Climate Change Levy).
- Increasing disposal costs (e.g. Landfill Taxes).
- Increasing environmental legislation.

Strategies
- Improve relative resource efficiency for all resources used.
- Reduce the amount of resources used in absolute terms.
- Introduce Cleaner Design concepts to reduce future costs.
The Uncertain Future – A route map

Manufacturing - Targeting Efforts

Tactics
➢ Survey and measure resource usage costs.
➢ Work with customers to reduce materials usage.
➢ Benchmark resource costs to set targets for reduced usage.
➢ Invest in technology to reduce resource usage.

Results
➢ Real cost savings from improved resource efficiency.
➢ Energy bills reduced by 10-20%.
➢ Cost of waste reduced by 25%.
➢ Profits improved by 25-30%.

Use - Optimising Usage

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## Use - Optimising Usage

### Drivers
- Increased profitability.
- Continued growth of ‘push-pull’ taxes and legislation, such as CCL and Landfill Taxes.
- Increased market demands for improved and documented environmental performance.

### Strategies
- Improve the design process and outputs to reduce the usage cost of products.
- Improve manufacturing processes to reduce the usage cost of products.
### Use - Optimising Usage

**Tactics**
- Integrate ‘cost of use’ into product costing.
- Design products to be resource efficient in use.
- Use techniques such as: Design for Manufacture, Design for Assembly and Life Cycle Analysis.
- Implement cleaner design as part of design process.

**Results**
- Improved focus on customer needs for reduced cost-in-use.
- Achievement of real cost savings from Cleaner Design.

### Internalising the external costs

**Changing the focus**
- ‘Manufacturing’ and ‘Use’ are largely internal actions. They are driven by internal costs and the need to reduce them.
- In the medium and long term future the balance will change. The drivers will become largely external, delocalised and driven by legislation and the cost/market impacts of legislation.
- Legislation is a tool increasingly used to internalise social costs.
### End-of-life - Minimising Outputs

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### Destination shortages

- Disposal is becoming increasingly expensive at any stage of manufacture.
- Disposal will become increasingly expensive at the end-of-life stage.
- Medium term destination shortages are currently being internalised, e.g. landfill, CO₂, effluent.
- Producer responsibility for end-of-life costs.
### End-of-life - Minimising Outputs

#### Drivers
- Increases in disposal regulations.
- Increase in cost of disposal.
- Market effects of product disposal costs.
- EMS will become an essential qualification for business continuity.

#### Strategies
- Improve resource efficiency/reduce resource usage to minimise effects of rising disposal costs.
- Active management of tradeable resource credits, e.g. carbon trading, PRNs.
- Development of a ‘take-back’ strategy.

#### Tactics
- Monitor resource intensity and use legislation as a tool for success.
- Change accounting systems to enable resource credit trading.
- Form partnerships for ‘take-back’ plans.
- Remove hazardous parts.

#### Results
- Minimising the inevitable effects of increasing disposal and end-of-life costs.
- Environmental design and control becomes an essential cost control tool.
### The Uncertain Future – A route map

#### Raw materials - Minimising Inputs

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#### Planning for scarcity

- The main challenge is to design for scarcity by reducing the use of virgin materials and increasing the use of recycled materials.
- Design, manufacture and marketing to allow recycling and re-use.
- Design and manufacture using recycled and reused materials.
- Design for limited raw materials and scarce supplies of crucial parts.
The Uncertain Future – A route map

Raw materials - Minimising Inputs

Drivers
- Raw material shortages will increase prices of products and utilities.
- Increasing competition and price for recycled materials.
- Legislative requirement for environmental design standards.

Strategies
- Strategy for purchase of recycled materials and renewable energy.
- Long term and sustainable corporate environmental plans.
- Full implementation of cleaner design principles.

Tactics
- Define real product needs, reduce the amount and number of materials used and introduce recycled and renewable materials.
- Work with customers to gain acceptance of new life cycles of all products.

Results
- Winners and losers.
- Transformation of the marketplace.
The markets are changing - both internally and externally - to reflect the needs of sustainable development and continued profitability.

The key to the future will be increasing total resource efficiency and the major technique will be Cleaner Design.

Companies that are pro-active will benefit and prosper.

Companies that are reactive will see their competitive advantages and markets disappear.