# Eco-Design (Design for the Environment) towards total life-cycle waste prevention/reduction


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# Advances in Environmental Management

*"The world we have created today as a result of our thinking thus far has problems that cannot be solved by thinking the way we thought when we created them"*

- Albert Einstein

# Environmental Management

"Business As Usual" X

"Think Differently" ✔

“Business As Usual” X

**Waste**: “unwanted or unusable material, substance or bye-product”

“Think Differently” ✔

**Waste**: “resources not positioned at their maximally effective location”

i.e. waste is a resource at the wrong place

# OPPORTUNITY

Waste Management hierarchy:

1. Prevention
2. Minimization
3. Reuse
4. Recycle
5. Energy Recovery
6. Disposal

Eco-Design

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*Eco*nomically Viable

+

*Eco*logically Sound

Design

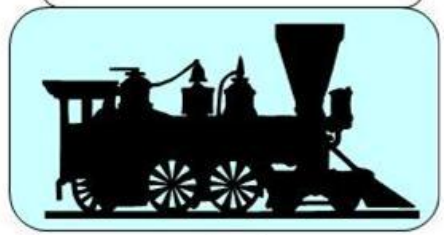
# Product Life-Cycle Management

Supplier

Design

Manufacture

Transport



Use

EOL Product

Landfill, Incinerate

Reuse, Repair, Remanufacture, Recycle

EcoDesign includes:

Design for recovery and reuse

Design for disassembly

Design for waste minimization

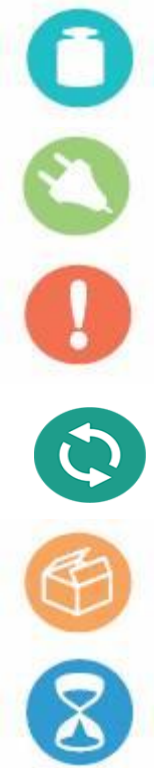
Design for energy efficiency

Design for material efficiency

Design for risk reduction

Design for accident prevention  etc.

# Six Focal Areas:



Mass and  Material

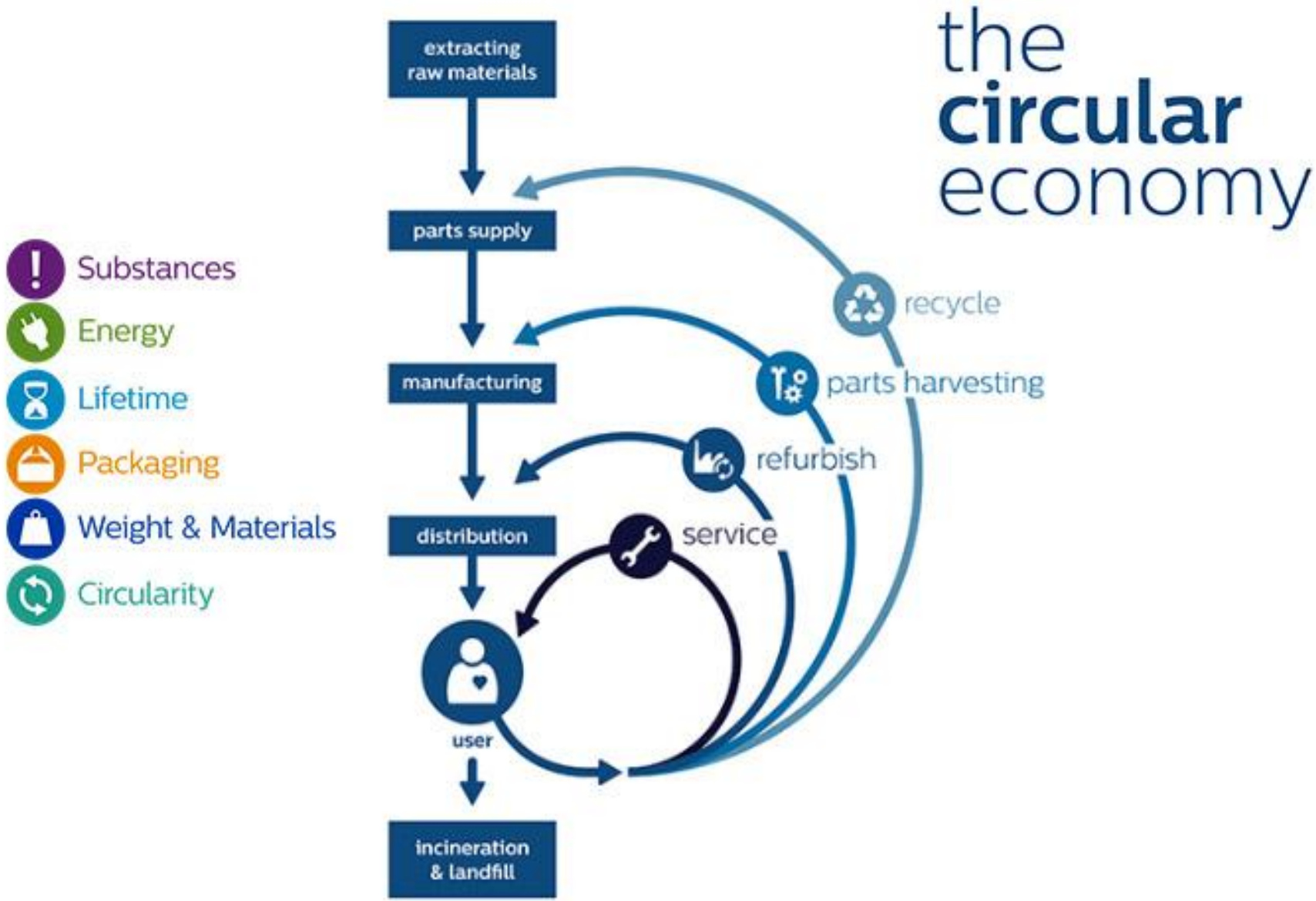
Energy

Hazardous Substances

Circularity

Packaging Mass

Extended/Long Life




*From www.philips.com*

# Reduced Mass means

Less use of natural resources

Less use of processing chemicals

Less pollution during processing

Less waste (including EOL)

Less Packaging

Less transportation pollution

Selection of right material helps in circularity

# Less Energy Consumption means

Low Natural Resources Consumption

Less GHG emission (Global Warming)

Less consumption of Chemicals (Battery)

Low waste generation (Battery)

Eliminating Hazardous Substances means

Reduced health effects during

manufacturing,

use and

disposal

## Circularity Facilitates

Extended material use

Extended component/part use

Reduction in depletion of resources

Reduction in EOL waste

Reduction in pollution

# Packaging Mass Reduction Means

Reduced consumption of resources

Reduced transportation pollution

Reduced Waste

# Extended/Long Life means

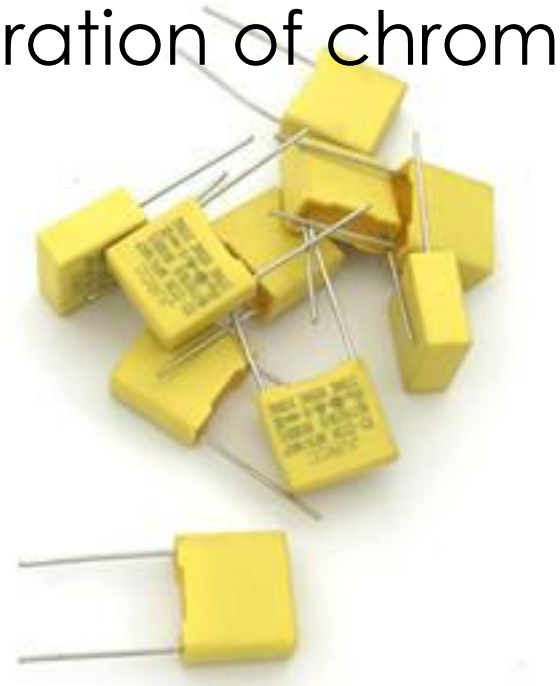
Extended use of resources

Less EOL waste per unit time

# Example of Eco-Design in a Manufacturing process

Etching of polypropylene casings – use of Chromium (vi) and generation of Chromium (vi)/(iii) waste and effluent

Plasma Etching – eliminated the use of chromium (vi) and generation of chromium (vi)/(iii) waste



# Examples of new energy saving Lighting technology

| Area of lighting | Energy improvement last 15 years | CO2 savings per lamp per year |
|---|---|---|
| **Road lighting** | HPL  **225%**  CosmoPolis | **109 kg $CO_2$** |
| **Shop Lighting** | Halo  **80%**  CDM | **115 kg $CO_2$** |
| **Office & Industrial Lighting** | T8  **61%**  T5 | **77 kg $CO_2$** |
| **Home Lighting** | Incand.  **80%**  CFLi | **34 kg $CO_2$** |
| **LEDs** | Incand.  **82%**  LED | **34 kg $CO_2$** |

# Impact of Eco-Design - an example…….

Potted to open construction EM TL 40 W ballast……

25 % Reduction in Power Loss

50 % Reduction in Mass

For India alone this means a saving of:

390 tons of Copper per year
2460 tons of Iron per year
1020 tons thermoset PE resin per year
35 MW Power (approx 150 tons of $CO_2$)

The Point is:

A small change at the Design stage has far reaching environmental and economic consequences during the life cycle of the product; Eco-Design enables the integration of this concept into the product creation process

# Thank You