

**Imperial College
London**

Centre for Environmental Policy

The Role of Policy in Shaping a Circular Economy: A Corporate Tax on use of Virgin Materials

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Background

Natural capital and economic activity are highly linked. . .

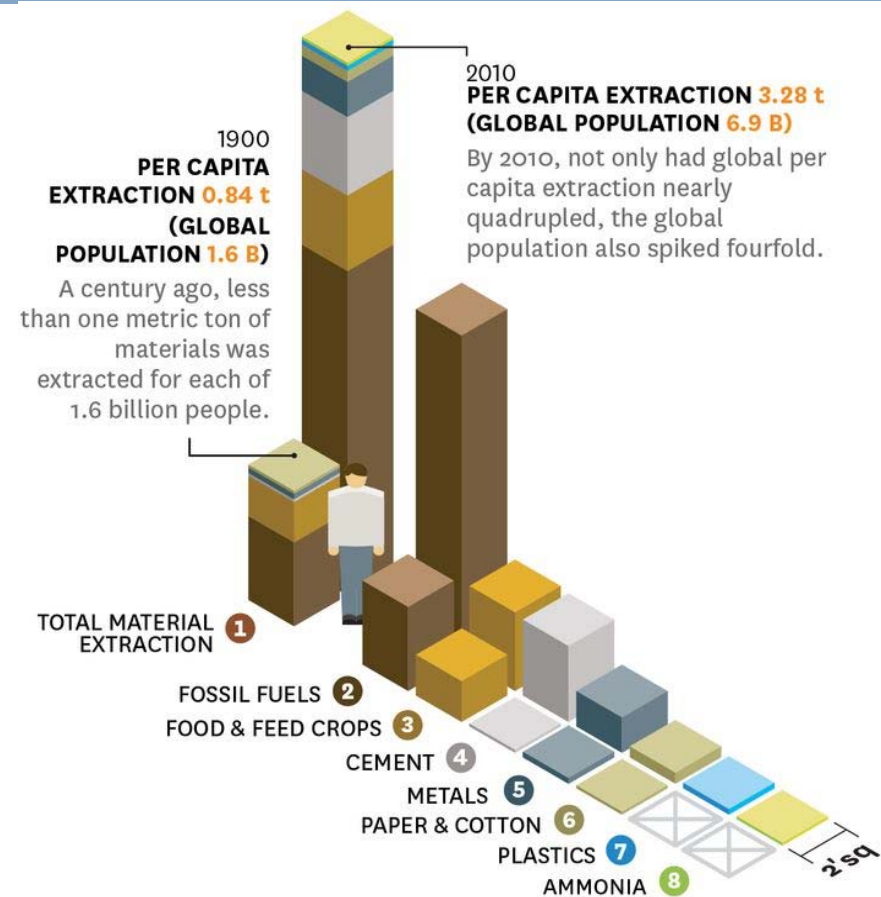


. . . if we extract too much from nature or cause environmental damage,
we degrade our natural capital and put our economy at risk

Primary materials extracted from the Earth

Their amount rose from

- **22 billion tonnes in 1970** to
- **70 billion tonnes in 2010,**
- The **richest countries** consume on average **10 times as many materials as the poorest ones** and twice as much as the world average.
- If the world continues to provide housing, mobility, food, energy and water in the same way as today, **by 2050 the planet's nine billion people would require 180 billion tonnes of material every year to meet demand.** This is almost **three times today's amount.**



Material efficiency globally has declined

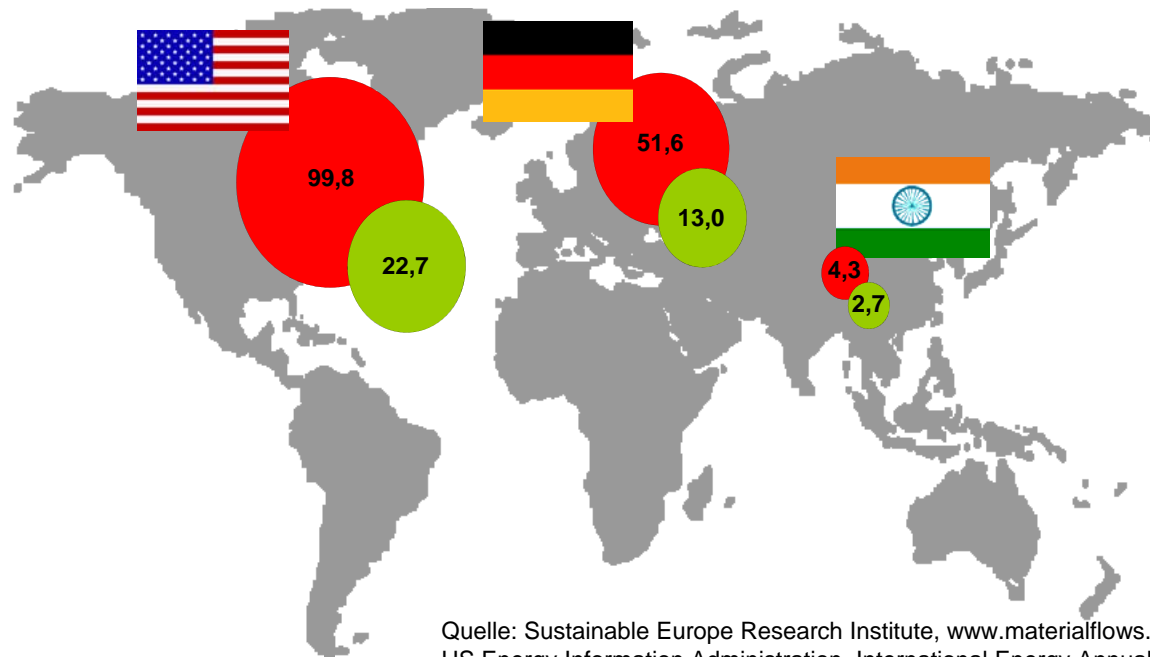


**WORLDWIDE EXTRACTION
OF MATERIALS TRIPLES IN
FOUR DECADES,
INTENSIFYING CLIMATE
CHANGE AND AIR
POLLUTION**

- Global material use has **rapidly accelerated since 2000** as emerging economies like China undergo industrial and urban transformations that require unprecedented amounts of materials.
- Since 1990, there has been **little improvement in global material efficiency**. In fact, efficiency started to decline around 2000.
- The global economy now needs **more material per unit of GDP** than it did at the turn of the century because **production has shifted from material-efficient economies** such as Japan, South Korea and Europe to far **less material-efficient economies** like China, India and South East Asia.
- This has led to an **increase in environmental pressure for every unit of economic activity**.

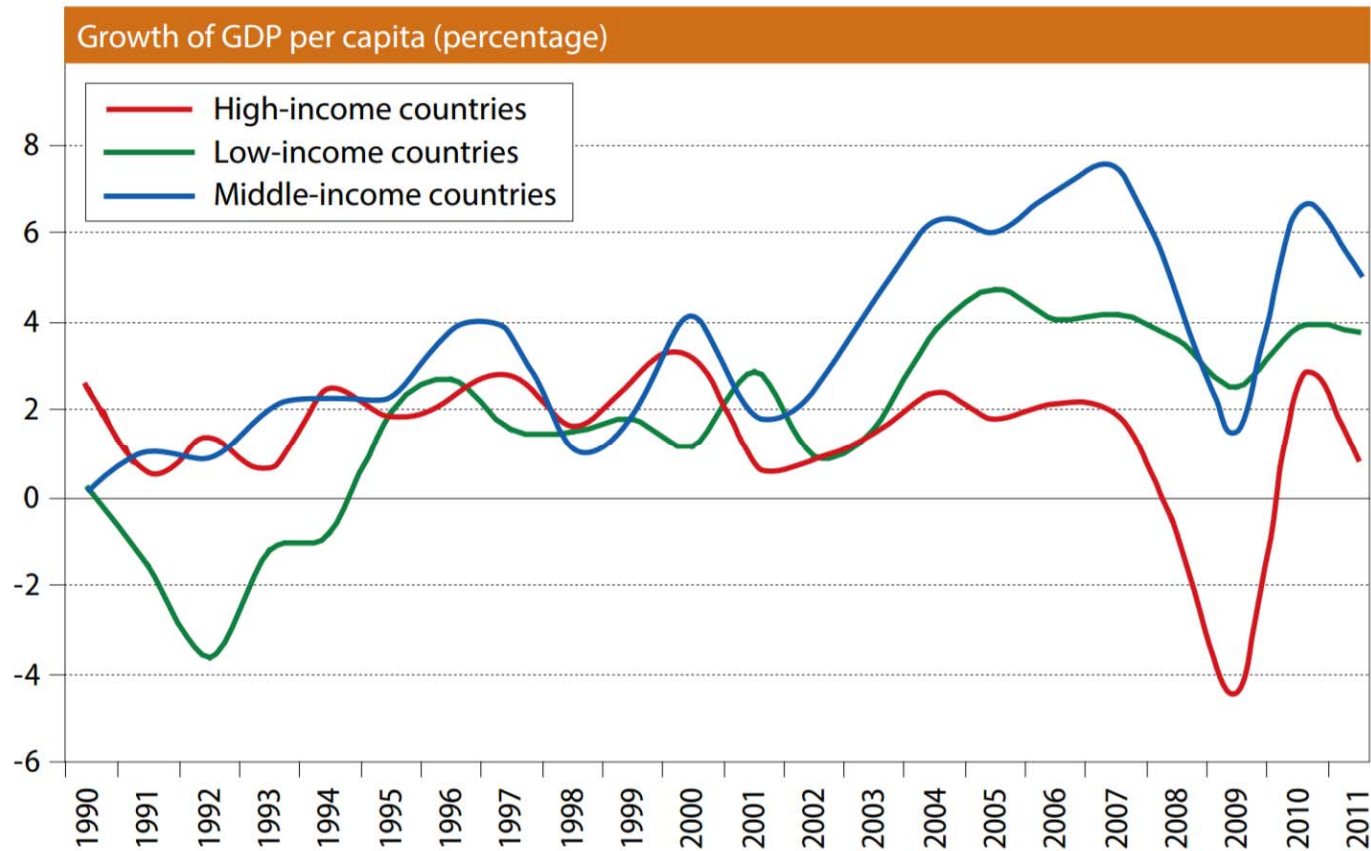
Consumption inequality

Energy consumption in MWh/Person/Year
Resource consumption in Mg/Person/Year



Quelle: Sustainable Europe Research Institute, www.materialflows.net, 2005,
US Energy Information Administration, International Energy Annual, 2005

Annual growth of GDP per capita, high-, low- and middle-income countries, 1990-2011



Source: World Bank World Development Indicators.

Business as usual not an option...

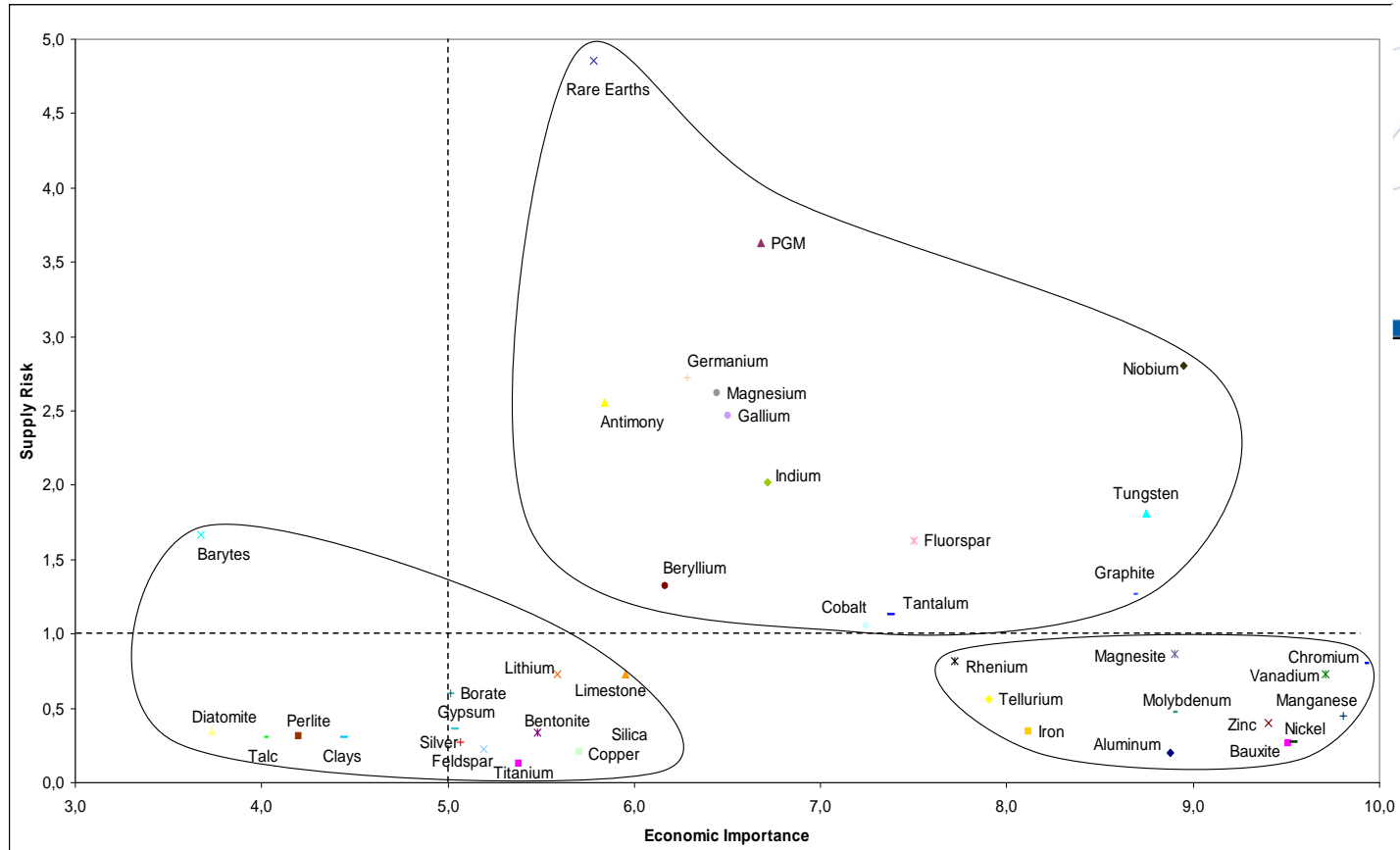
- **Resource scarcity** and **environmental pollution** challenges
- And a number of economic, social, technological, demographic and environmental megatrends underlying these challenges:
Urbanization is proceeding **rapidly** in developing countries, **globalization** and **financialization** are perpetuating **inequalities**, while exposing countries to greater risks of contagion from crises
- These trends influence and reinforce each other in myriad ways and pose enormous challenges.
- **Food and nutrition as well as energy security is threatened** by competing demands on land and water, as well as environmental degradation.

Critical raw materials

The ad-hoc Working Group is a sub-group of the Raw Materials Supply Group and is chaired by the European Commission

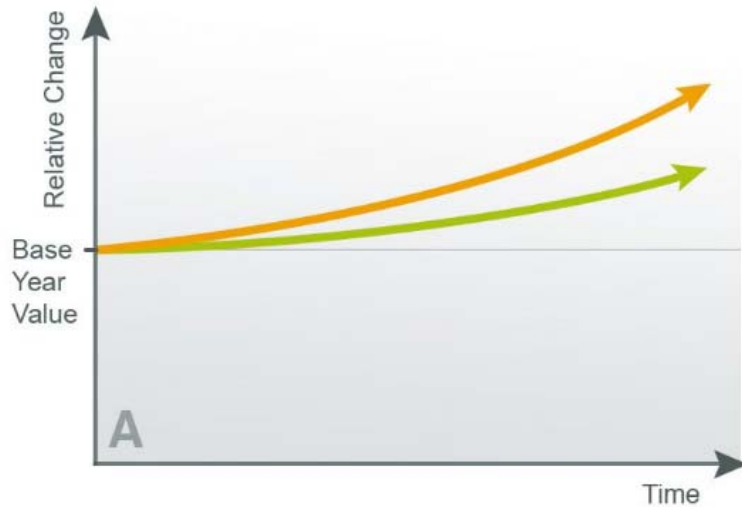
Version of 30 July 2010

Note: The full report will be available on the Enterprise and Industry Directorate General website: http://ec.europa.eu/enterprise/policies/raw-materials/documents/index_en.htm



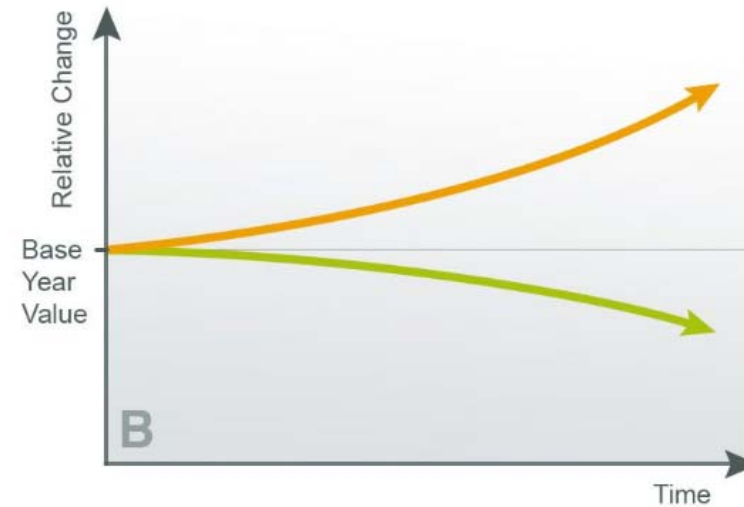
Decoupling as the answer

Relative Decoupling



Relative decoupling requires that the economy grows faster than resource use. The economy becomes more resource-efficient, but in absolute terms, resource use is still increasing.

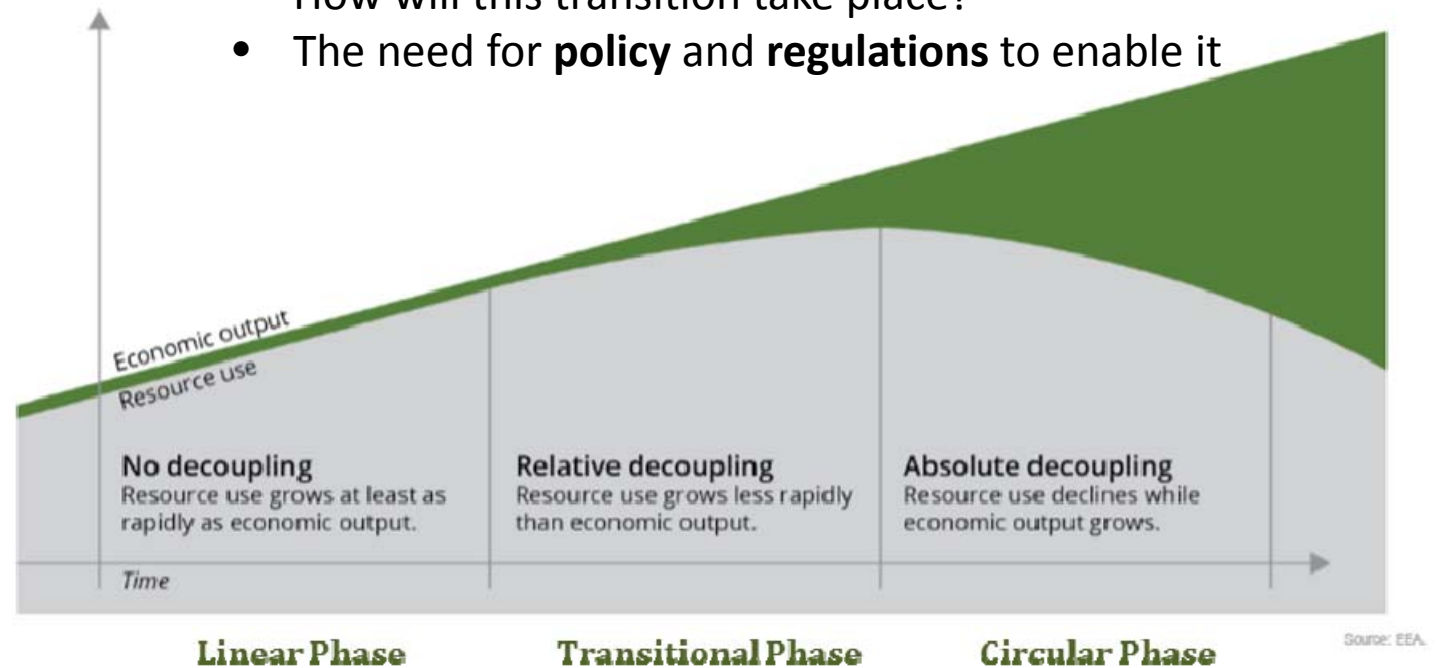
Absolute Decoupling



Absolute decoupling occurs when resource use remains stable or declines in absolute terms, in relation to the chosen base year level, while the economy continues to grow.

The Circular Economy: decoupling

- The business case for the transition to a circular economy is compelling
 - **Economic output**
 - **Jobs**
- How will this transition take place?
- The need for **policy** and **regulations** to enable it



The Role of Policy

- Protection of the environment requires **collective action** normally led by **government**
- **Environmental policy**
 - designed to tackle market failures by **controlling pollution, regulating resource use and protecting and managing the natural environment.**
- It aims to achieve a more **efficient use** of **resources** in the **economy**, maintaining the **environmental assets** which people value and which **support a healthy economy and society**, while **reducing the costs** to citizens and businesses of **environmentally damaging activities**
- Government intervention provides a **market incentive** for firms and households to take into account environmental damage.

The Role of Policy: Environmental Taxes

Reasons for the **increasing use of environmental taxes**

- Economic efficiency – to raise sufficient revenues without distorting economic activities
 - Environmental effectiveness
 - The ability to raise public revenue
 - Transparency
-
- Environmental taxes have been successfully used to address a wide range of issues including **waste disposal, water pollution** and **air emissions**
 - Taxes directly address **market failure** by “pricing in” **environmental costs**.

Circular Economies

Various stages of decoupling – visions of circularity

Turning waste into a resource of value

- The circular economy requires a shift from 'waste' to resource'. Both energy and materials need to flow in the economy, and what is normally perceived as waste is raw materials of value and market demand. To start key raw materials can be recovered from the waste stream including: biomass, plastic, wood, paper, metal, glass and also energy can be extracted. These materials all have a value to sectors in the economy, and can therefore be sold back into the production cycle as secondary raw materials, which help to generate GDP.

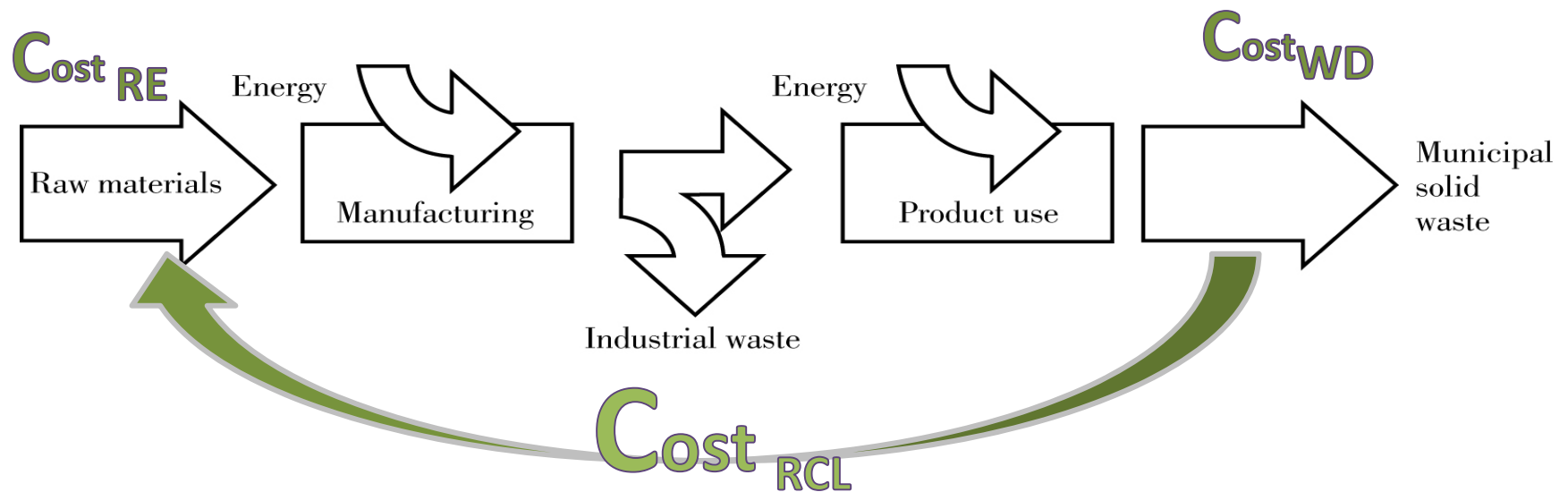
Trade Shift & Symbiotic Relationships

- A symbiotic approach – using, recovering and redirecting resources for reuse – aims to keep them in productive use in the economy for longer. This in turn creates business opportunities, and reduces demands on resources. It offers opportunities for cooperation and synergy, resource efficiency, in production and optimization of services and products. In symbiotic conditions, consumption and production ecosystems become closed loops, eliminating the waste of outputs throughout the product lifecycle.

Products to services

- A shift from users to consumers. Service provision is often an economic activity where the buyer does not generally, except by exclusive contract, obtain exclusive ownership of the item purchased. Such a shift would not only allow companies to retain product ownership for easier repair, reuse and remanufacture, but might result in producer responsibility obligations being extended to users as part of the purchase agreement. Service/leasing business models offer additional opportunities for economic growth.

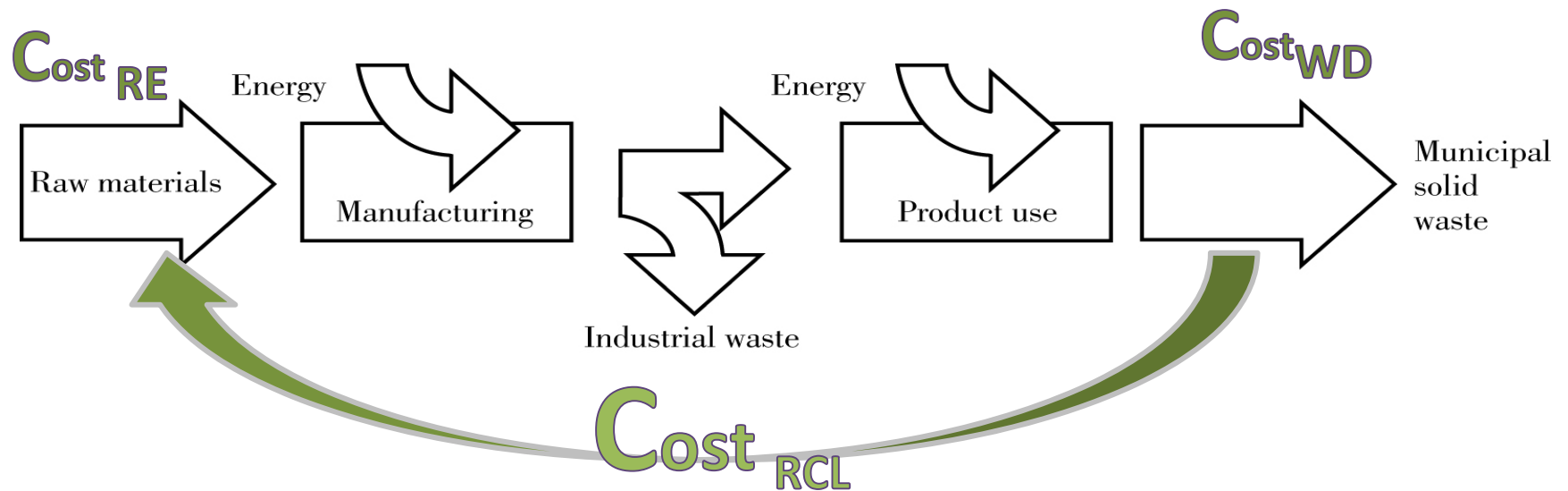
Recycling in the circular economy



$$Cost_{RE} + Cost_{WD} > Cost_{RCL}$$

Cost of recycling lower than the sum of the costs of disposal plus cost of raw materials

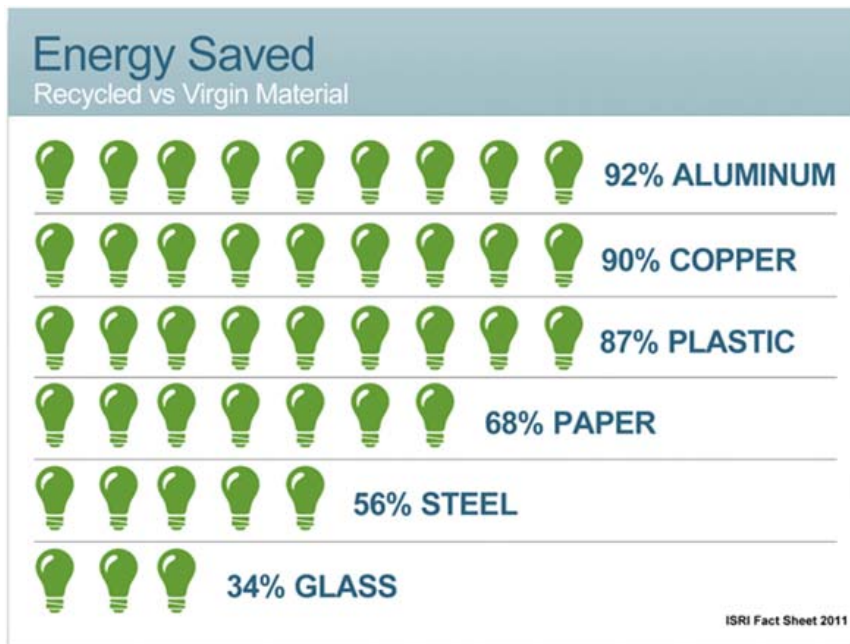
Recycling in the linear economy



$$Cost_{RE} + Cost_{WD} > Cost_{RCL}$$

Cost of recycled materials higher than cost of virgin materials

Taxes on Virgin Natural Resources



- The use of **virgin material taxes** can be an efficient method to **encourage the use of recycled materials**
- A **tax on virgin materials** is a better instrument than a **tax on waste**, since in the former case the environmental aspects are **integrated at the beginning of the production process**, while still **influence waste disposal behaviour**
- In general virgin materials are often associated with more negative externalities than recycled materials.
 - the **processing of secondary materials** tends to be **less energy intensive**

The Case of Recycling: Investment

- From a marketing perspective, use of **recycled products** or investment by industry in new technologies that use recycled feedstocks will help win new customers and retain old ones
- Reassessing procurement policies to determine if there are subtle prejudices against recycled products calls into question more general quality standards and buying practices that may cost more than management had assumed
- **Investment in recycled products** also means more competition and will inevitably force **design innovations** and **new technologies** that can **further lower production costs**.

The vision of a Circular Economy

- A **transition towards a sustainable and circular economy** should combine ambitious **environmental goals** with **strong social requirements** and establish a more **coherent legal framework** for **sustainable production** and **consumption**

These require

- Both **legislative measures** and **economic incentives**
- The internalisation of external costs and further funding of research and innovation
- As well as social and lifestyle changes



The role of a Resource Tax

- By influencing the **use of resources**, environmental policy affects the way in which economic activity develops
- It encourages **more efficient use of energy and materials** and the **development of new, cleaner products and services** while **discouraging activities that are environmentally damaging**
- In doing so it **encourages product and process innovation** and the development of **new products and services designed primarily to enhance the environment**, and the **integration of environmental considerations into wider economic activity**

A corporate tax on use of virgin resources

- An **incentive for businesses** to look towards more **sustainable technologies, renewable energies and resource security**
- Alongside **encouraging businesses to produce less waste and pollution**, this incentive will **increase material flow**, while funding the necessary **infrastructure needs**
- Such a scheme has the potential to make the **transition to a circular economy possible at scale**



