

Transitioning towards more effective circular and sustainable solutions

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Agenda

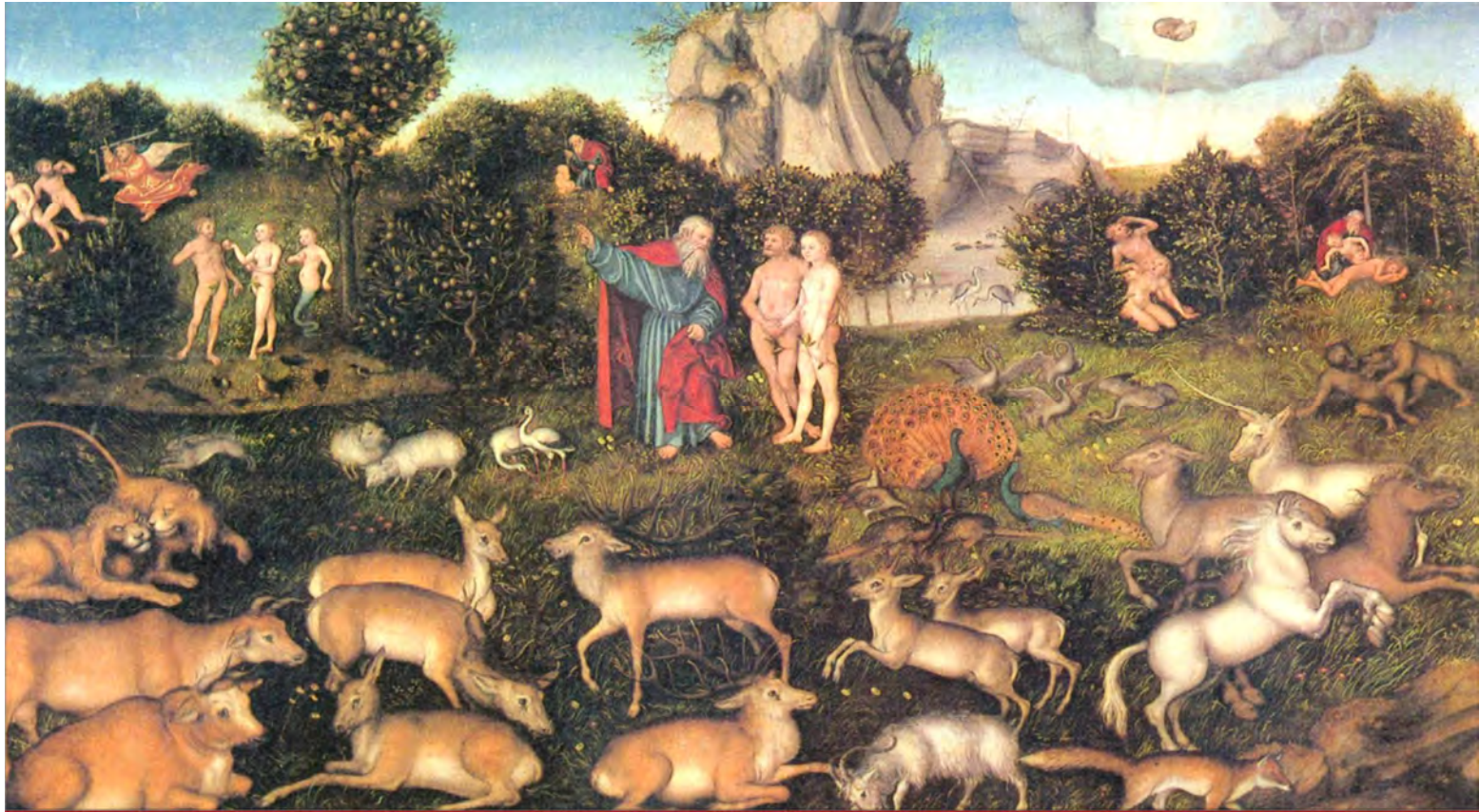
- Historic background
- Turn the pyramid around
- Our language affects our ways of thinking and acting
- The Circular Economy and its core principles
- Mistra REES
- Business cases and activities in Sweden
- Questions

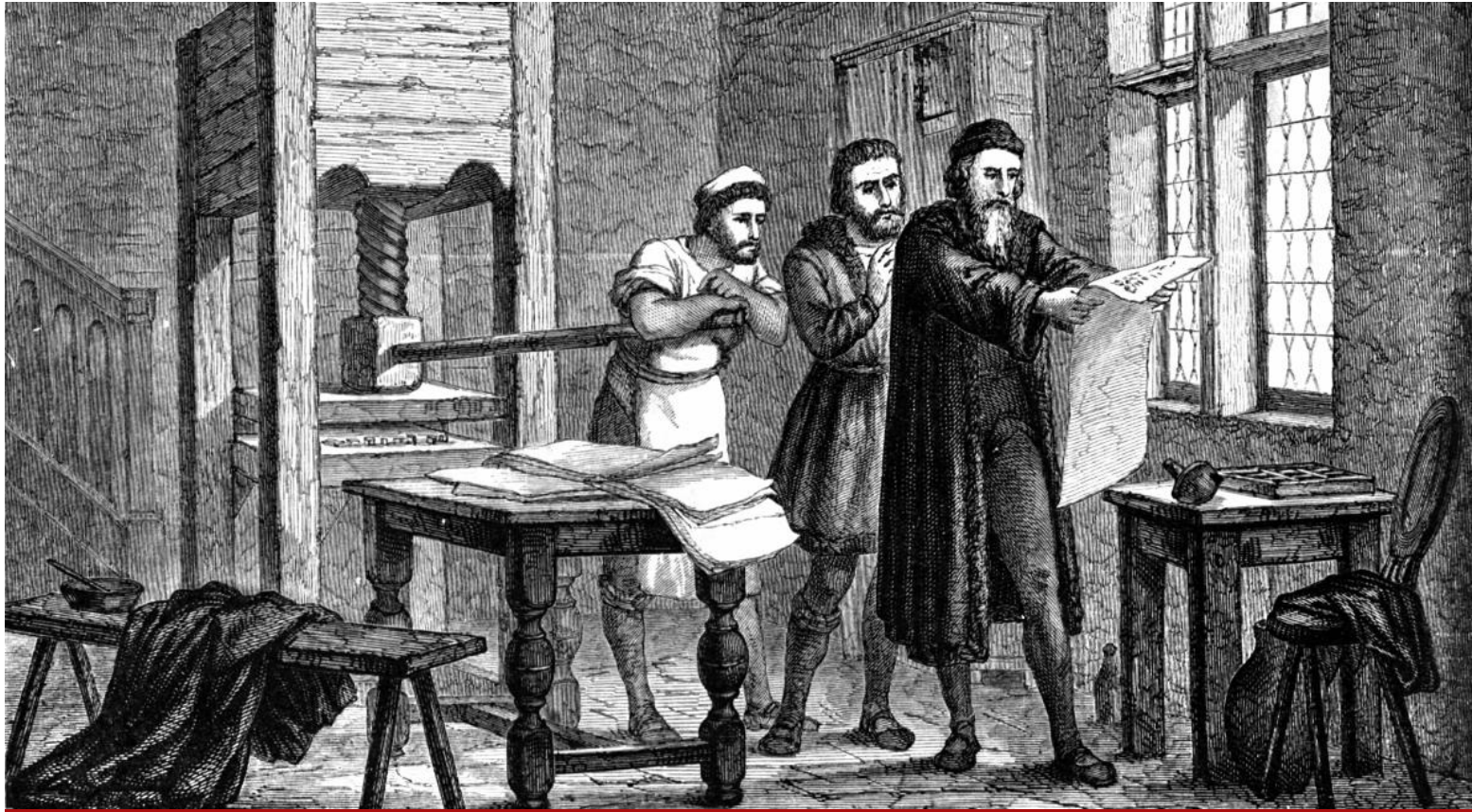


“The greatest danger in times of turbulence is not the turbulence; ***it is to act with yesterday’s logic.*”**



Peter Drucker
1909-2005









Easter Parades in New York City

Year 1900: One Motor Vehicle Year 1913: One Horse & Carriage





Crowd of people gather outside the New York Stock Exchange following the Crash of 1929

Ending the Depression

Through
Planned Obsolescence

By Bernard London, 1932

Frank V. Vanderlip, former President of the National City Bank of New York, characterized this as a stupid depression. He emphasized the fact that millions were suffering amidst glutted markets and surpluses.

The new paradox of plenty constitutes a challenge to revolutionize our economic thinking. Classical economics was predicated on the belief that nature was miserly and that the human race was constantly confronted by the spectre of shortages. The economist Malthus writing in 1798 warned that the race would be impoverished by an increase in population which he predicted would greatly exceed gains in the production of foodstuffs.

However, modern technology and the whole adventure of applying creative science to business have so tremendously increased the productivity of our factories and our fields that the essential economic problem has become one of organizing buyers rather than of stimulating producers. The essential and bitter irony of the present depression lies in the fact that millions of persons are deprived of a satisfactory standard of living at a time when the granaries and warehouses of the world are over-stuffed with surplus supplies, which have so broken the price level as to make new production unattractive and unprofitable.

Primarily, this country and other countries are suffering from disturbed human relationships.

Factories, warehouses, and fields are still intact and are ready to produce in unlimited quantities, but the urge to go ahead has been paralyzed by a decline in buying power. The existing troubles are man-made, and the remedies must be man-conceived and man-executed.

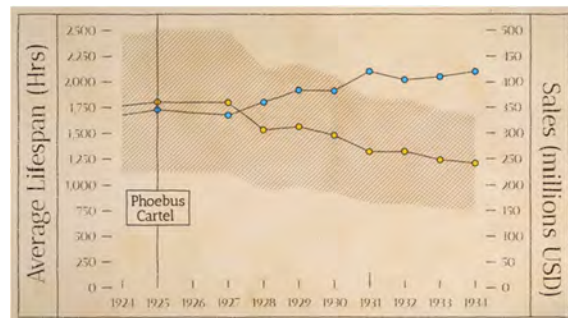
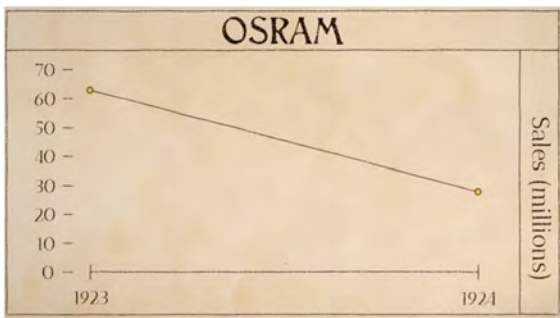
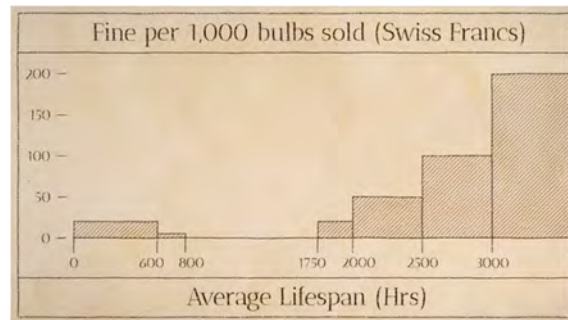
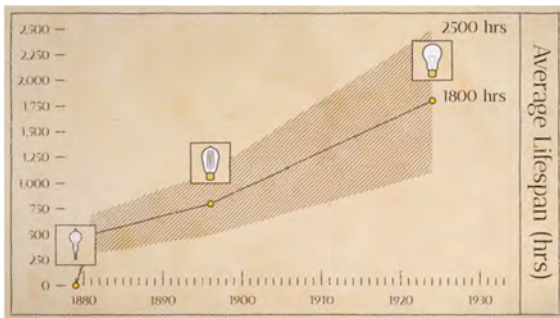
In the present, inadequate economic organization of society, far too much is staked on the unpredictable whims and caprices of the consumer. Changing habits of consumption have destroyed property values and opportunities for employment. The welfare of society has been left to pure chance and accident.

In a word, people generally, in a frightened and hysterical mood, are using everything that they own longer than was their custom before the depression. In the earlier period of prosperity, the American people did not wait until the last possible bit of use had been extracted from every commodity. They replaced old articles with new for reasons of fashion

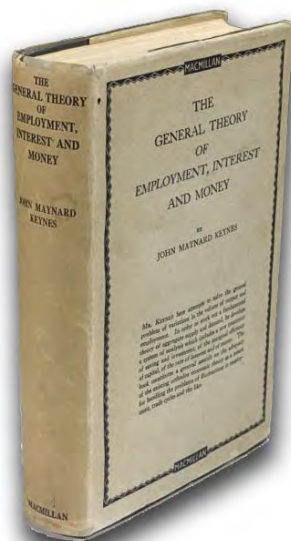
“Briefly stated, the essence of my plan ... is *to chart the obsolesce of capital and consumption goods* at the time of their production. I would have the Government assign a lease of ... all products ... when they are first created, and they would be *sold and used within the term of their existence* ...

After the allotted time had expired, these things would be legally “dead” ... and destroyed if there is widespread unemployment. New products would constantly be pouring forth from the factories and marketplaces ..., *and the wheels of industry would be kept going and employment regularized and assured for the masses.”*

The Phoebus Cartel – Planned obsolescence



Source: www.youtube.com/watch?v=j5v8D-aiAKE



“I should support at the same time all sorts of policies for *increasing the propensity to consume*. For it is unlikely that *full employment* can be maintained, whatever we may do about investment, with the existing propensity to consume.”



John Maynard Keynes, 1936

“Our enormously productive economy ... *demands that we make consumption our way of life, that we convert the buying and use of goods into rituals*, that we seek our spiritual satisfaction, our ego satisfaction, in consumption ... *we need things consumed, burned up, replaced and discarded at an ever-accelerating rate.*”

Victor Lebow
Economist and retail analyst (1955)



Source: Lebow, V. (1955), "Price competition in 1955", Journal of Retailing, Vol. 31 No. 4

Planned Obsolescence Types

- **Technical or functional obsolescence** – built weaker, less durable products that are impossible to repair.
- **Technical design** – artificially age older products by making them seem old-fashioned and out of date.
- **Style obsolescence (Aesthetic)** – Aesthetically drab, faded, dirty and worn out fashion.
- **Legal** – Lobby for new legal requirements and standards that mean customers have to buy a new product to stay within the law.



NO LONGER COMPATIBLE



PLANNED OBSOLESCENCE

STOPS WORKING AFTER 18000 PRINTED COPIES

PRINTER MAKES TONERS OBSOLETE

PLANNED OBSOLESCENCE BY NOTIFICATION

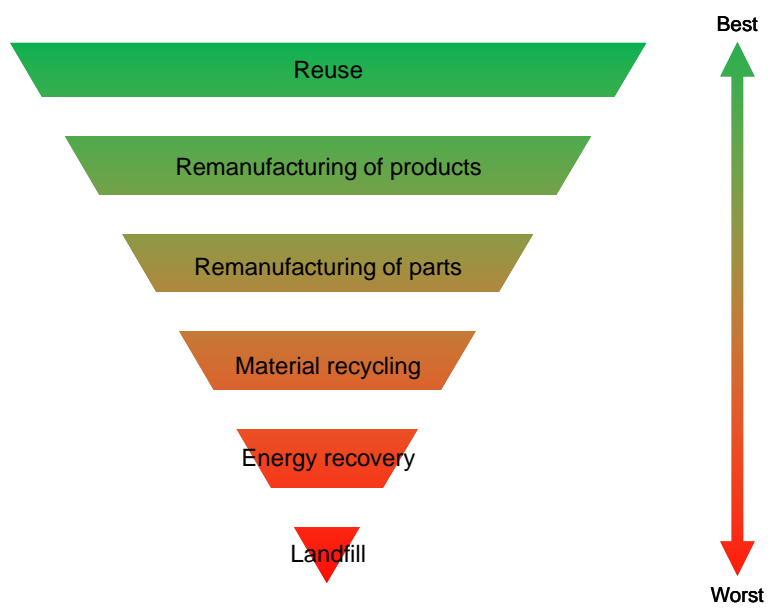
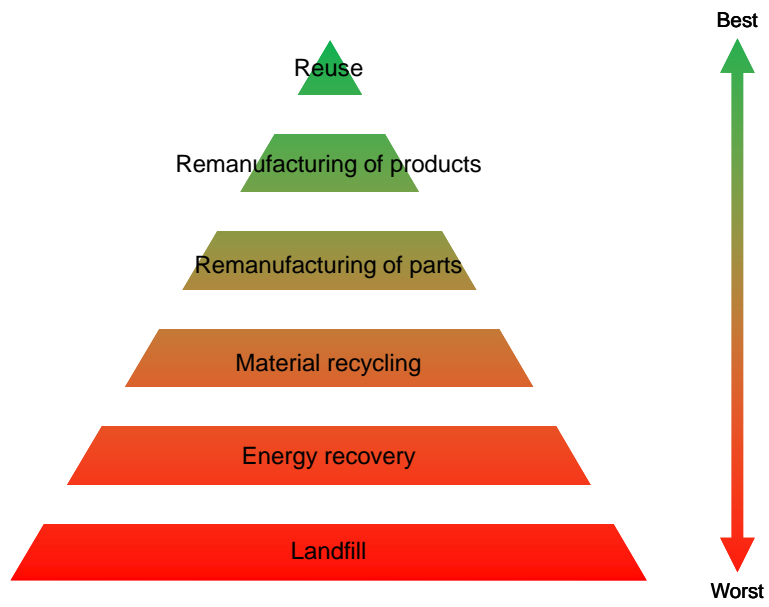


Disposable razor blades are one more example of wasteful consumer policy. With over 90% of the body made of materials like plastic that can be used for weeks rather than days, companies are just adding waste to landfills and garbage piles around the world.

Swedish average household

1900	1930	1960	1990	2020
<ul style="list-style-type: none"> ▪ Housing (7 m²/person) ▪ Food (self-sufficiency) 	<ul style="list-style-type: none"> ▪ Bike ▪ Housing (15 m²/person) ▪ Food 	<ul style="list-style-type: none"> ▪ Cross country skis ▪ Camera ▪ TV ▪ Phone ▪ Bike ▪ Car ▪ Fridge Freezer ▪ Electric cooker ▪ Washing machine ▪ Toaster ▪ Housing (28 m²/person) ▪ Food 	<ul style="list-style-type: none"> ▪ Slalom skis ▪ Cross country skis ▪ Computer ▪ Camera ▪ TV ▪ Video ▪ Cellular phone ▪ Phone ▪ Mountain Biking ▪ Car ▪ Flights ▪ Household Assistant ▪ Microwave oven ▪ Dishwasher ▪ Fridge Freezer ▪ Electric cooker ▪ Washing machine ▪ Summer cottage ▪ Toaster ▪ Housing (47 m²/person) ▪ Food (exotic fruits etc. - all year round) 	<ul style="list-style-type: none"> ▪ ? ▪ ? ▪ ? ▪ ? ▪ ? ▪ ? ▪ ? ▪ ? ▪ ? ▪ ? ▪ ? ▪ ? ▪ ? ▪ ? ▪ ? ▪ ? ▪ ? ▪ ? ▪ ? ▪ ? ▪ ? ▪ ? ▪ ? ▪ ? ▪ ? ▪ ? ▪ ? ▪ ? ▪ ? ▪ ? ▪ ? ▪ ? ▪ ? ▪ ? ▪ ? ▪ ? ▪ ? ▪ ? ▪ ? ▪ ? ▪ ?





“If you want something *new*, you have to stop
doing something *old*”



Peter Drucker
1909-2005





The language affects how we think

- | | | |
|------------------------|---|-------------|
| • Consumers | → | • Users |
| • Consume | → | • Use |
| • Ownership | → | • Access |
| • Waste | → | • Resources |
| • Second-hand products | → | • Products |
| • Reuse | → | • Use |
| • Etc. | → | • Etc. |



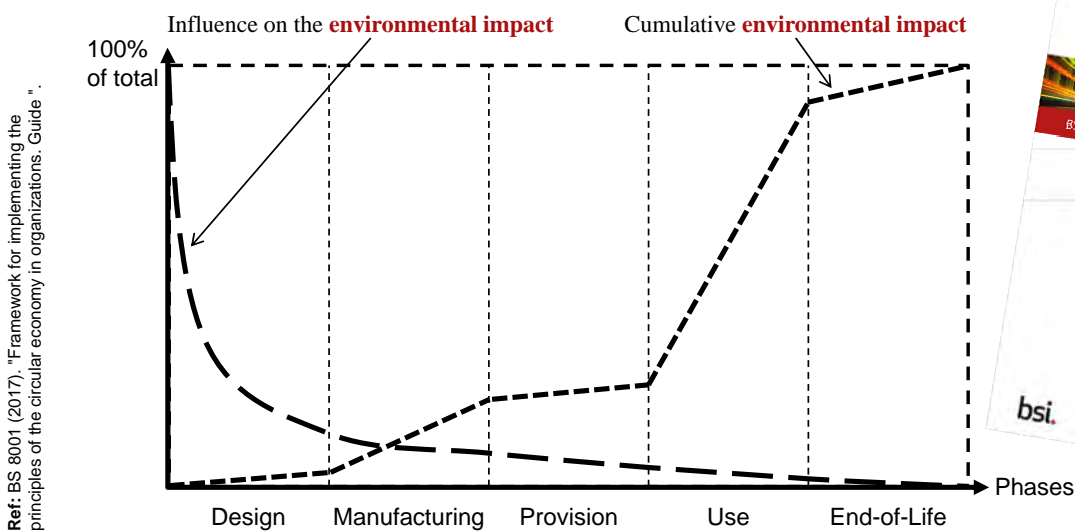
A lifecycle perspective – total cost!
Life length requirements

“The relevant question is not simply what shall we do tomorrow, but rather what shall we do today in order *to get ready for tomorrow.*”



Peter Drucker
1909-2005

Extended lifecycle perspective



Circular Economy

An **economic system** that uses a **systemic approach** to maintain a **circular flow of resources** by recovering, retaining or adding to their **value** while contributing to **sustainable development**

- 1 – Resources can be considered concerning both stocks and flows.
- 2 – From a sustainable development perspective, the inflow of virgin resources is kept as low as possible, and the circular flow of resources is kept as closed as possible to minimize emissions and losses (waste) (of resources) from the economic system.



Prolong the use phase!

Resources Waste

Six interlinked circular economy principles

- **Systems Thinking** – Apply a long-term systems perspective considering the impacts over time and among different actors, i.e., considering the life-cycle perspective of solutions.
- **Value Creation** – By providing effective solutions that efficiently use resources and contribute to meeting the needs
- **Value Sharing** – Collaborate along the value chain or value network inclusively and equitably by sharing the value created with the provision of a solution.
- **Resource Availability** – Manage and regenerate stocks and flows of resources to secure their availability for present and future generations.
- **Resource Traceability** – Manage and track stocks and flows of resources in a transparent and accountable way over time.
- **Ecosystem Resilience** – Develop and implement practices that contribute to the resilience of ecosystems.



100% recycling is not environmentally beneficial!

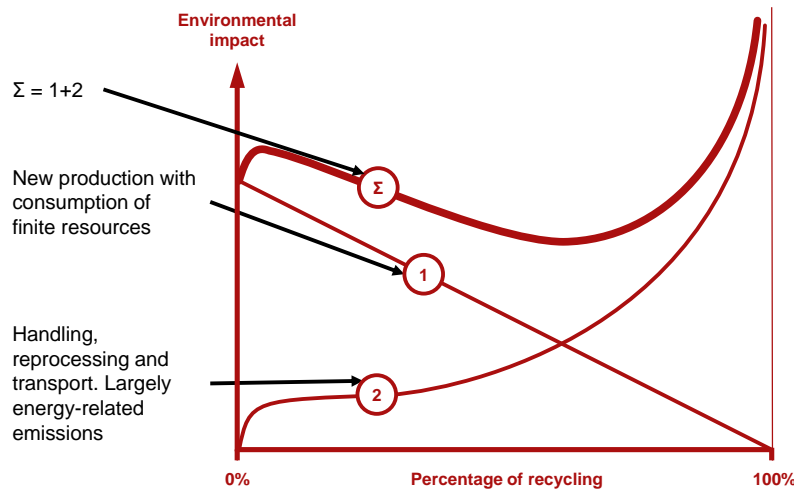
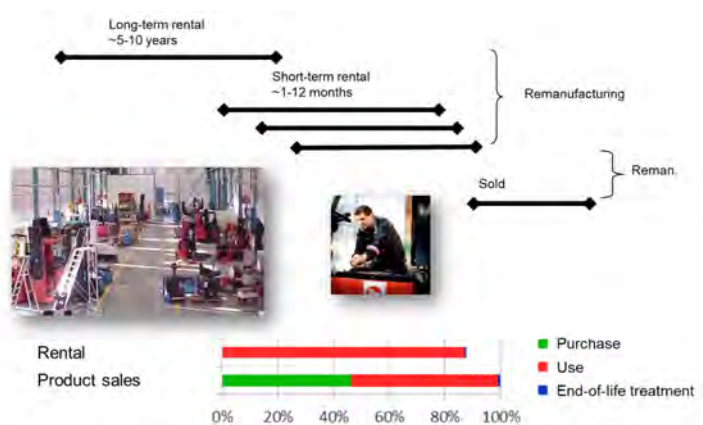


Illustration of total environmental impact as a function of recycling share

Toyota Material Handling

Toyota Material Handling in Sweden receives more than 90% of used forklifts from rental agreements that run from one month up to 10 years.

Remanufactured forklift trucks, given with a warranty of 3 months or 6 months, are respectively sold at a price of 60% or 80% of newly manufactured forklift trucks, with a warranty of 1 year.



Source: Sakao, T. and Lindahl, M. "A method to improve integrated product service offerings based on life cycle costing." CIRP Annals - Manufacturing Technology(2).

Don't buy trucks



It makes sense to use a fleet of trucks to facilitate efficient materials handling

- but you don't have to own it to use it

What happens if the supplier takes full responsibility?

- Traditionally, service and spare parts are important income for companies. Vital for profit!
- However, if the supplier takes all responsibility and gets paid for the function, then:
 - All spare parts and service become a cost – something that ought to be reduced.
 - If the offer doesn't work, e.g., because of malfunctions in a product – the supplier loses money – and gets paid for the function.
 - The focus is shifted from selling new products to **satisfying the customer** and utilizing the offer as long as it is economically viable.



Driving forces for circular business models

- **Increased profitability!!!!**
- Demographic changes
- **Increased competition**
- Changed actor requirements
- **New technology, such as the Internet of Things – Big Data!**
- Servicification of actor needs
- Financing and insurance issues
- Increased focus on social issues
- Higher raw material prices
- **Increased focus on environmental issues**
- Environmental legislation (WEEE, RoHS, ELV, ErP, etc.)
- The EU's circular economy strategies, etc.
- Etc.





MISTRA

Resource-Efficient and Effective Solutions



LUND UNIVERSITY



CHALMERS



The vision of the Mistra REES program ...

... is to *advance Swedish manufacturing industry's transition towards a circular and sustainable economy* and to enhance its capability to *develop world-leading, resource-efficient and effective solutions based on circular economy thinking* through close collaboration, knowledge co-production and mutual learning between industry and academia.

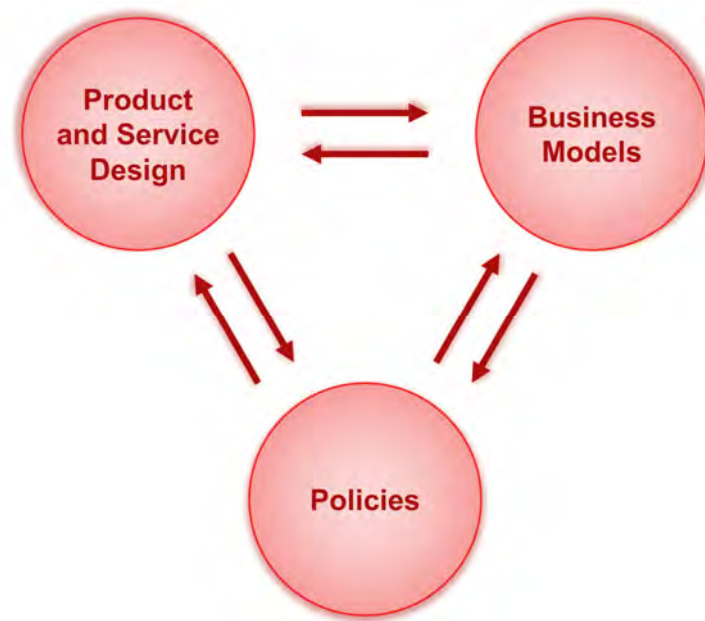
Teknikföretagen

(the Association of Swedish Engineering Industries)

"We support Phase 2 of Mistra REES because we can see that Mistra REES research results actually benefit companies in their operational activities."



Elinor Kruse, Responsible for Environmental Issues



A bottom-up and case study-focused approach

Mistra REES has a *bottom-up* and *case study-focused approach*, with a special emphasis on manufacturing companies in Sweden.

With this approach, REES researchers are able to *gain a deeper understanding of the practical application and results of resource-efficient and effective business models*, as well as related policies and product and service design methods.

"The evident need for a transition to a circular economy is matched by the business opportunity. This won't happen as quickly as it might unless a solid bottom-up approach is manifested, not just to resource efficiency but in thinking through the whole products, components and materials cycle. Mistra REES is one of the few programmes able to use a developing knowledge base to take the next steps and articulating the potential in these bigger, effective systems."



Ken Webster,
Circular Economy Pioneer,
formerly Head of Innovation
EllenMacArthur Foundation

Non-academic partners



Teknikföretagen



A strong research team

Project 1 Design Support	Project 2 Policy	Project 3 Environment	Financial	Project 4-5 Management

Linköping
University

Chalmers

Lund
University

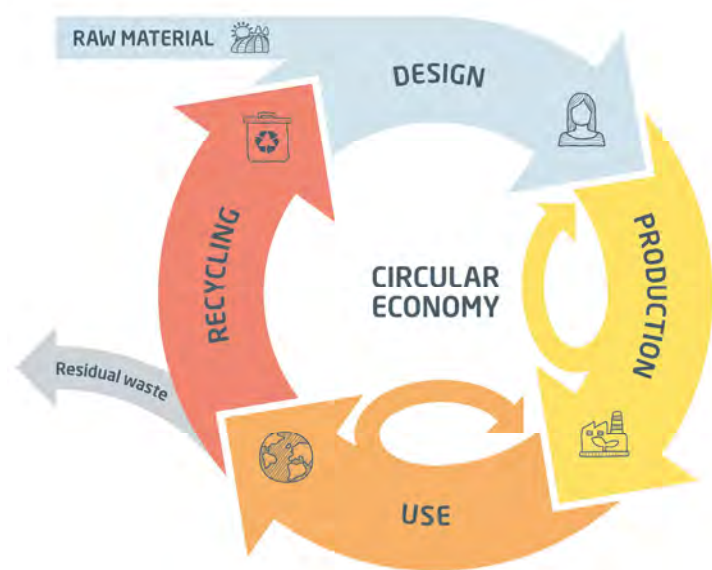
“*Doing the right thing* is more important than doing the thing right.”



Peter Drucker
1909-2005

Focus on creating favourable market conditions for the circular business models

- For a successful transition to a circular economy, circular materials, products and services ***need to be profitable and competitive.***
- The focus needs to be on ***improving and creating favorable market conditions*** for the circular business models – then, the transition will come on a large scale.



Confederation of Swedish Enterprise

1. A well-functioning single market and a global focus are key
2. Develop the application of the current regulatory framework to support the circular economy
3. Update waste legislation to promote resource efficiency
4. Adapt legislation and application to enable the management of chemical substances in circular flows
5. Ensure effective financial instruments to facilitate circularity
6. Invest in research and create conditions to encourage innovation
7. Promote the development of “product as a service” and business models based on extending product life
8. Invest in increased education, knowledge and skills in the circular economy

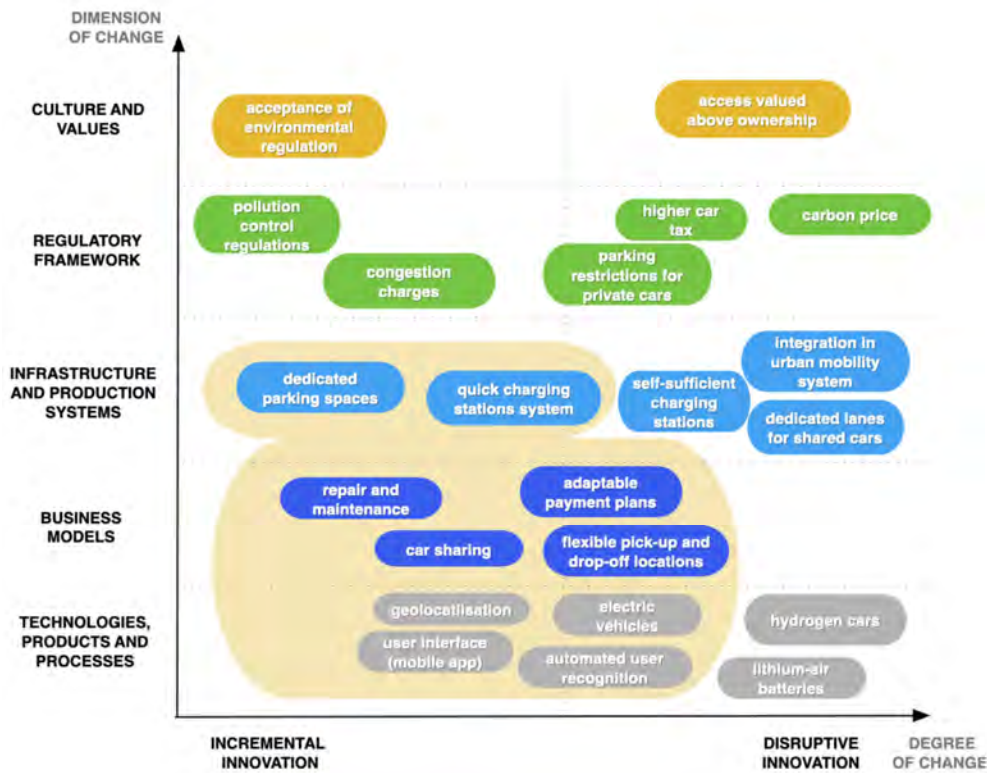
Policy document on how to:
Create good market conditions for the growth of the circular economy



Obstacles to a circular economy

Cultural	Technological	Market	Regulatory
Company culture	Circular design	High upfront investment costs	Obstructing laws and regulations
Willingness to collaborate in the value chain	Ability to deliver high quality remanufactured products	Limited funding for circular business models	Limited circular procurement
Consumer interest and awareness	Lack of data, e. g. on impacts	Low virgin material prices	Lacking global consensus
Operating in a linear system	Too few large scale pilot projects	Standardisation	

■ Most pressing barriers
 ■ Intermediate pressing barriers
 ■ Least pressing barriers



Source: Miedzinski (2017)

The screenshot shows the Epiroc website header with navigation links: PRODUCTS, APPLICATIONS, PARTS & SERVICES, DIGITAL SOLUTIONS, and More. The location is set to UNITED ARAB EMIRATES. The main content area features a large image of a yellow mining truck with a glowing battery pack and associated icons (battery, Wi-Fi, and a gear). The text reads:

Batteries as a Service

All the power you need

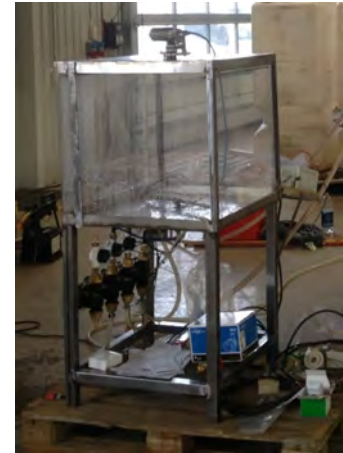
- ⊕ Safety
- ⊕ Availability
- ⊕ Predictability

[Contact us](#)

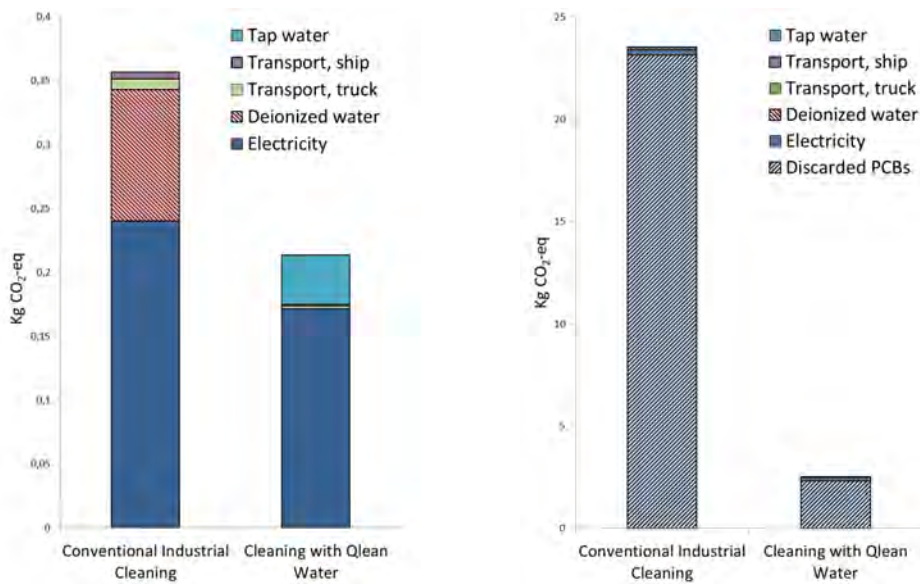
Identify Actors Values



Qlean Scandinavia, Linköpings universitet, Electrolux, SECO Tools, etc



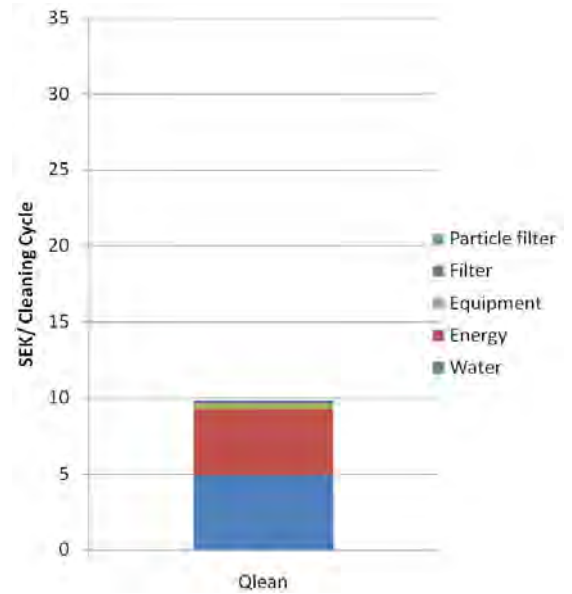
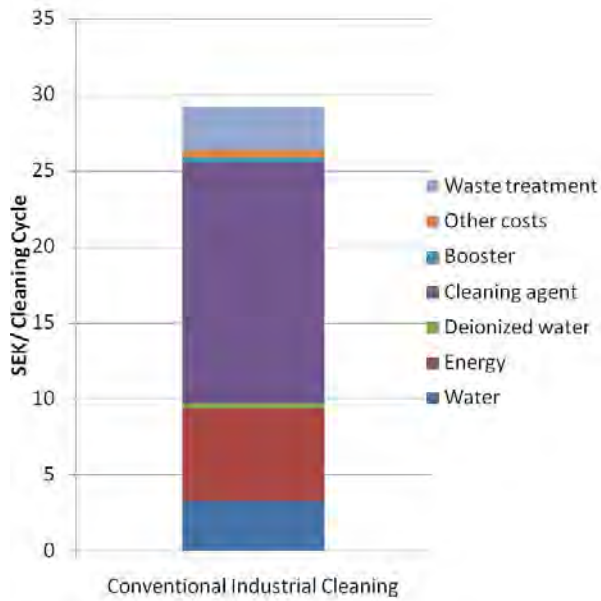
<https://www.sciencedirect.com/science/article/pii/S0959652613000371?via%3Dihub>



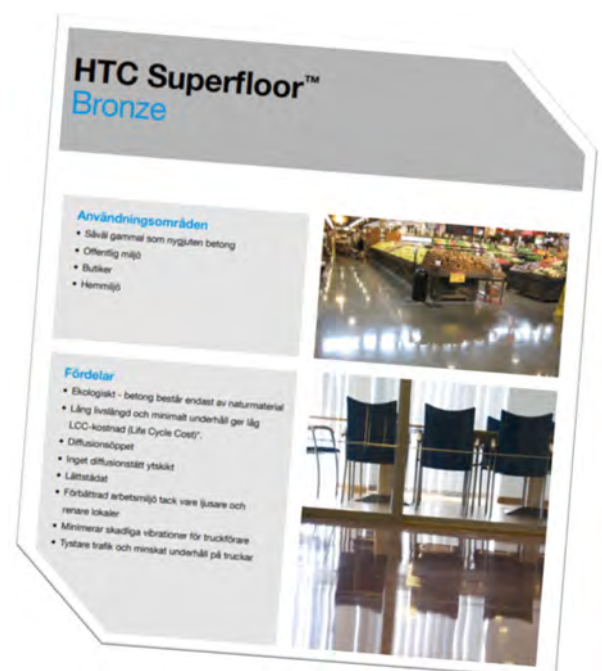
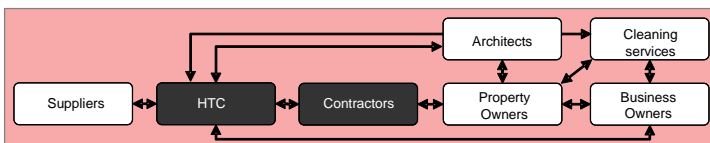
A) The direct GHG emissions from the cleaning process in the Flextronics case.

B) Climate emissions from the cleaning process, including emissions from discarded PCBs in the Flextronics case

[Svensson, 2010].



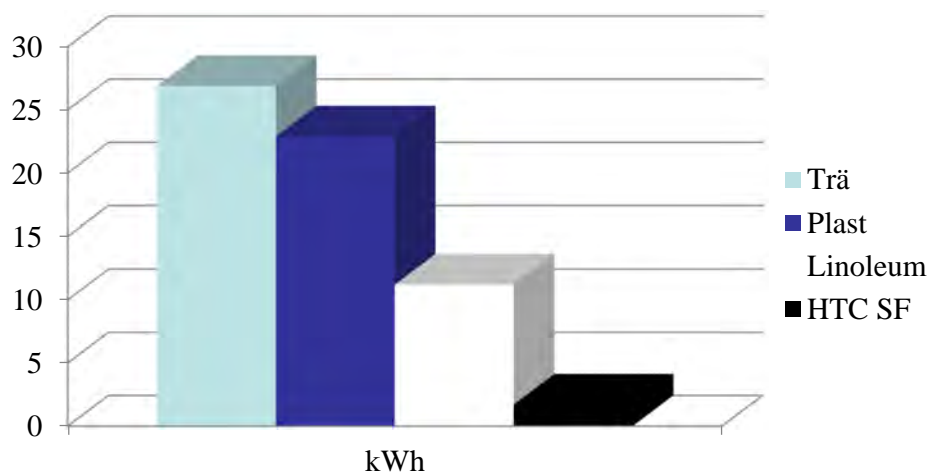
HTC Sweden AB



Where is the greatest environmental benefit?



Comparison of traditional floors vs. HTC Superfloor



BRIGHTCO

100% FUTURE PROOF™
LIGHT AS A SERVICE

MORE LIGHT WITH LESS

li.u LINKÖPINGS
UNIVERSITET

SUBSCRIBE



Instead of buying new lamps, your customer subscribes to the light they need

They pay per sqm/year

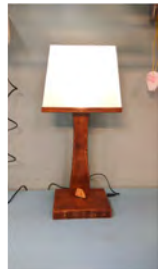
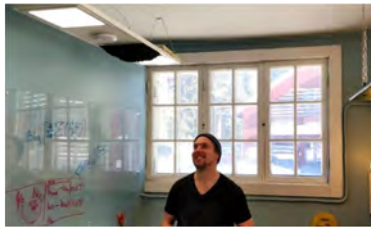
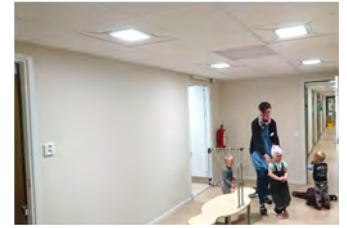
The customer always gets the right light regardless of how needs change over time, without paying more.

On average, we use 97% less virgin materials for lighting

You can adapt lighting to a diminishing energy budget



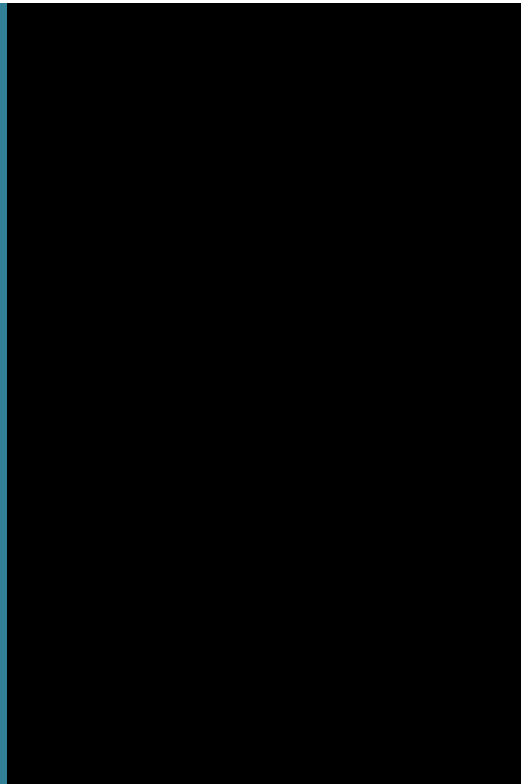
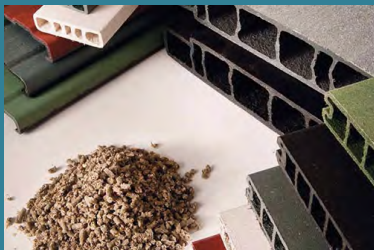
10 000 SOM ETERNAL LIGHT, CONTINUOUSLY
DELIVERED SINCE 2015



FIRST PROCUREMENT 2018

PolyPlank

”Circular from the beginning”



PolyPlank

WHAT

PolyPlank offers **composite products** made from **recycled plastics** and **wood fibers**.

Through a unique manufacturing process, the composite material is given the best material properties from two worlds;

moisture and rot resistance from the plastic as well as **aesthetic and mechanical values** from the wood fibers.

Products that fulfill their function without consuming the earth's finite resources.

Minimal maintenance with maximum durability.

MADE IN
ÖLAND!

WHAT



Extruded profiles



Mounted systems



Injection moulded products

HOW



PolyPlank buys recycled PE and wood shavings and makes their own composite pellets on site. The material can be used in extrusion and molding processes. The products can then be recycled in the process again if damaged.

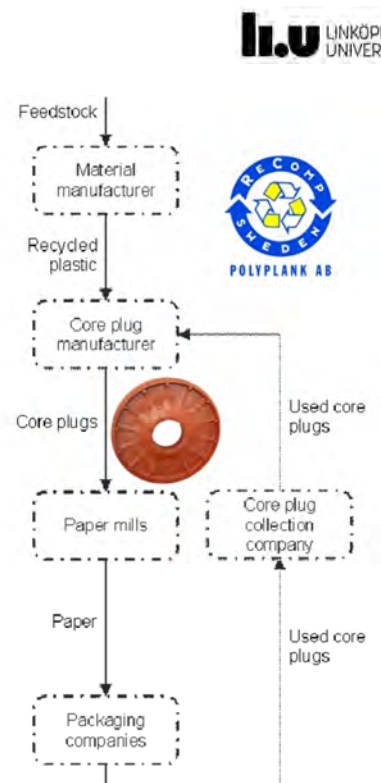
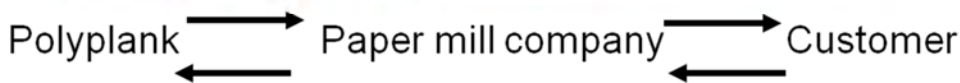
HOW

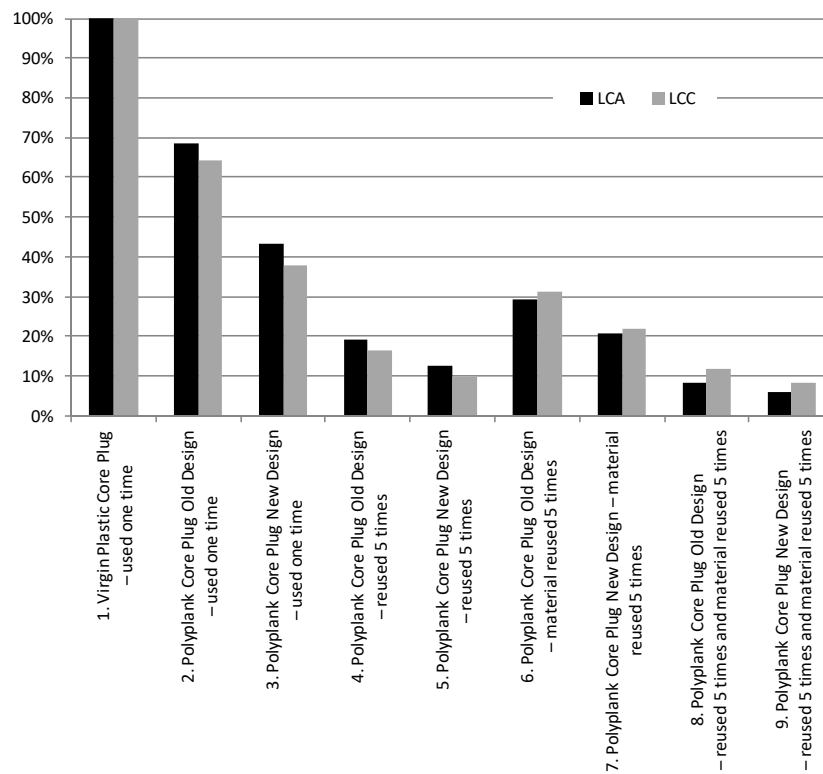
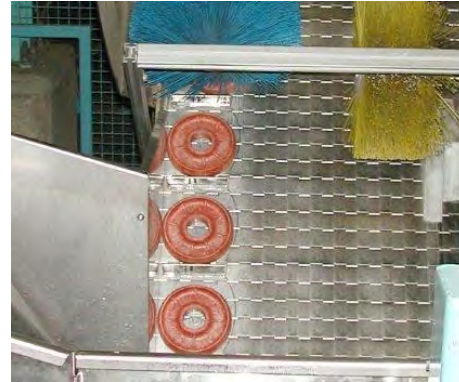
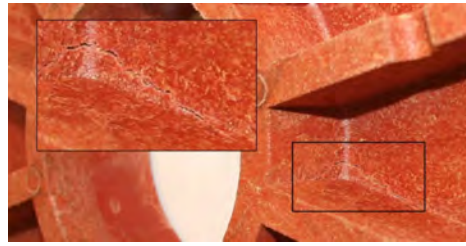
How PolyPlank works through circular business models:

- Non-virgin raw materials
- Recyclable products
- Long service life and high quality
- Green electricity is used in production
- Recall of used products for reuse or Recycling



Polyplank – Core plugs





Noise barrier



Fence



Bicycle storage



Environmental house



