A visual guide to

The Value Chain Map of Current Level of Circularity in the EEE Sector

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Who we are

PolyCE is a European Commission funded project enabling recycling of plastics from electronic waste for a more sustainable future.

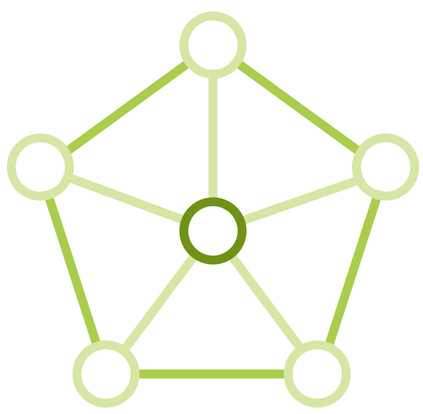
Behind it are 20 of the leading European and international expert organisations in the field of the circular economy and plastics representing top universities, companies, civil society and an international organisation.

https://www.polyce-project.eu/about/

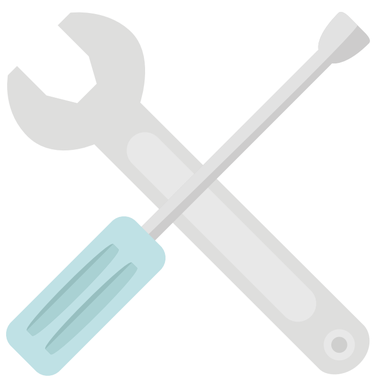
Insights into Circular Consumption

The successful application of circular economy principles in companies is closely related to the profitability of circular resource use, the companies' capacity to change their business models into sustainable and competitive ones, and the companies’ capacity to respond to market demands, meaning to meet the customers’ needs and expectations.

The European services sector will be worth **€570 billion** by 2025. Key sharing economy sectors each forecast to deliver over €100 billion of annual transactions in the next 10 years.(PwC 2017)



Nearly **a quarter of Europeans** have used services offered via collaborative platforms. (Eurobarometer 2018)



Almost **70%** of respondents claim they prefer repairing an old tech product, rather than buying a new one. (PolyCE 2019 online consumer survey)

When made aware of the positive effects on the environment and human health, **95%** confirm they would consider buying a tech product if it was clearly labelled it contains recycled plastics. (PolyCE 2019 online consumer survey)

Embracing Circularity

What's in it for me?

1. Opportunities for companies

New profit streams encouraged

Reduced volatility and greater security of supply

New demand for business services

Improved customer interaction and loyalty

2. Opportunities for individuals

Increased disposable income

Greater utility: customer choice increases as producers tailor products to meet their needs

Reduced obsolescence

3. Environmental and system-wide benefits

Carbon dioxide emissions: could be reduced by half by 2030

Primary material consumption: possibly reduced by 32% by 2030

Land productivity and soil health: Higher land productivity, less waste in the food chain, and the return of nutrients to the soil will enhance the value of land and soil as assets.

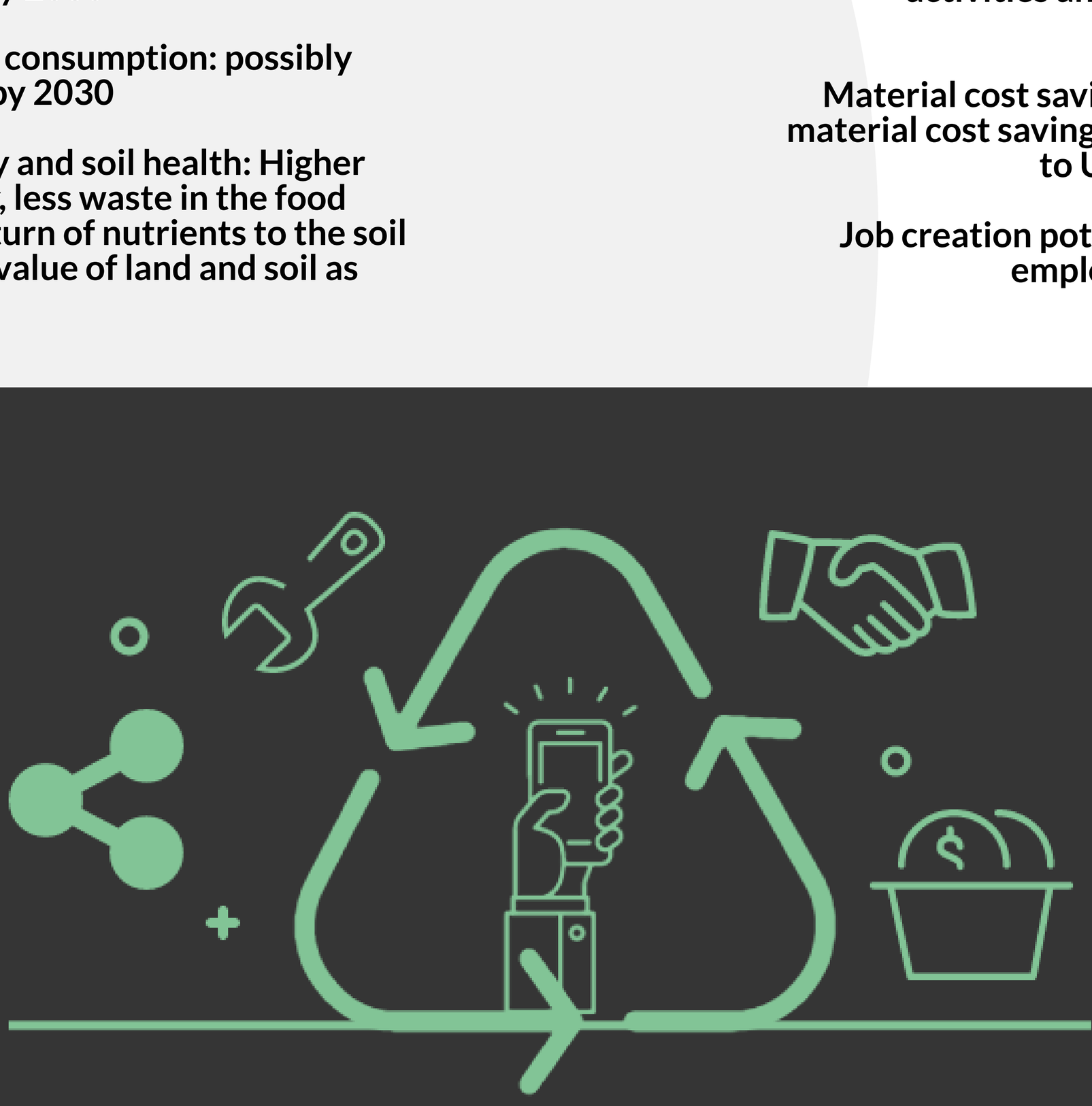
4. Economic benefits

Economic growth: increased revenues from emerging circular activities and lower cost of production

Material cost saving: annual-net material cost savings estimated up to USD 630 billion

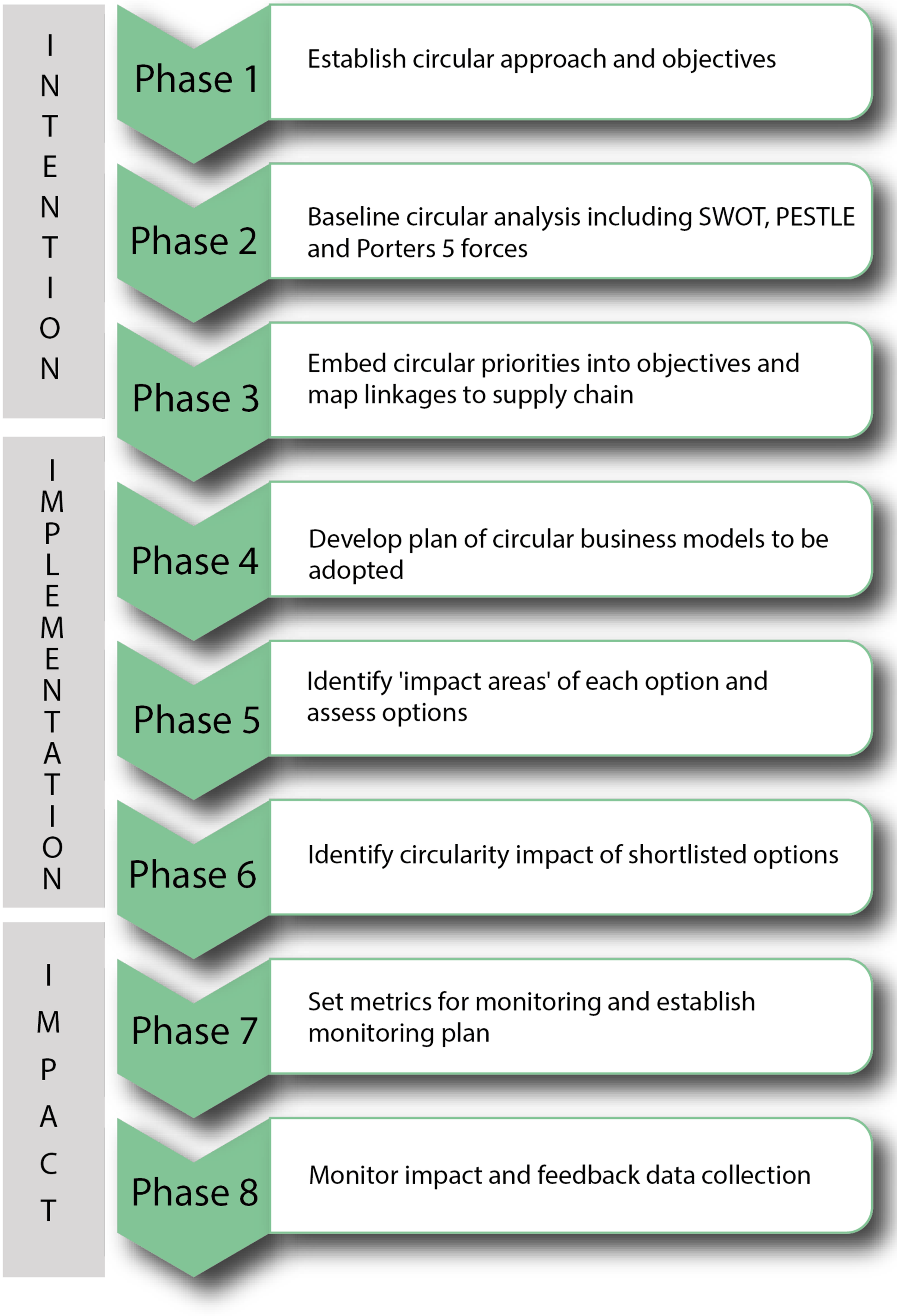
Job creation potential: positive employment effects

Source: EMF 2019



Phased development towards circularity for products

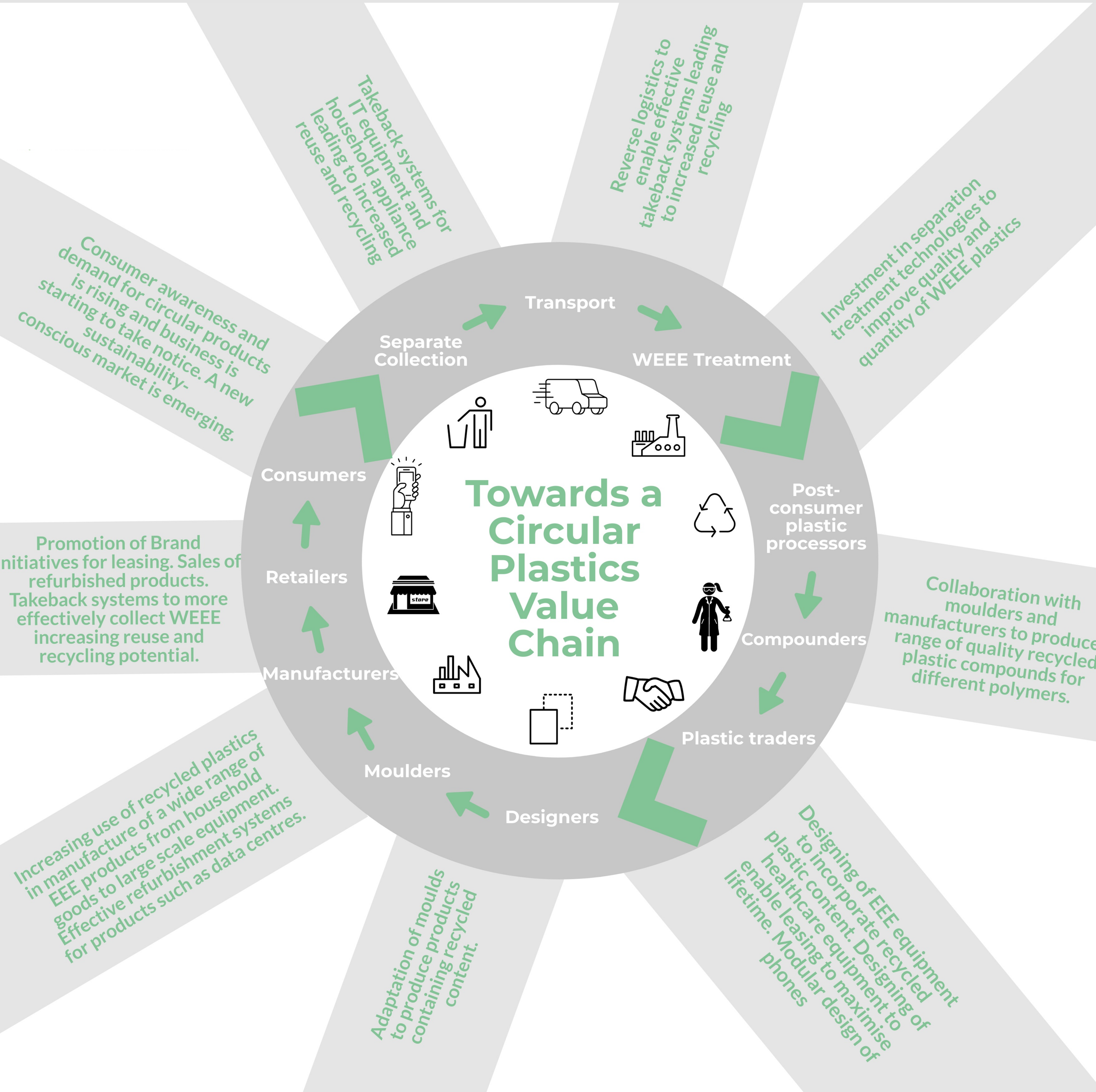
An interpretation of current best practices



Lessons from Business

A visual guide to current best practices in the circular plastics value chain

Levels of adopting a circular business model throughout the plastics value chain according to leading OEMs: Dell, HP, Philips, Whirlpool and a plastic recycler, MGG Polymers



PCR Plastics: A Business Case

All-round perspective of the macro- and micro-economical environment and conditions to take into consideration when planning to adopt any disruptive circular business model or circular components, such as PCR plastics

SWOT

Strengths

- Better price predictability of more stable PCR plastic prices and potential cost savings when PCR prices are lower compared to virgin material
- Manufacturing of new products within the legal framework in the future (ErP-Directive)
- Sustainability and Corporate Social Responsibility (CSR) of the company
- Saving of CO2 emissions and energy helps mitigating global warming
- Respond to increasing environmental awareness on plastic waste from consumers
- Reduce dependency on imported materials

Weaknesses

- Lack of experience in producing and moulding with PCR material
- Young and still immature market for recycled plastic compared to virgin plastics
- Limitation in material characteristics (colour, gloss, odour or food contact considerations) and constraints in the application of outer parts
- Rearrangement of some process parameters due to differences in material properties (melting points and processing temperatures) of recycled plastics
- Technical data sheets of PCR plastics not always are reliable: need of retesting the material before using it (cost implication)

Opportunities

- Improved material experience and improved company resilience due to flexibility in material use
- Constantly improving recycling will help to boost high quality PCR plastics in the future
- Actively working in line with current EU policy to support the use of PCR-plastics in EU circular economy strategy
- Rapidly developing markets and material availability with increasing WEEE waste streams in Europe
- Taking on a pioneering role in sustainable business strategy and waste reduction
- Establishment of strong European recycling industry in response to the China ban

Threats

- To fulfil several regulations (WEEE-Directive, RoHS-Directive, POP-Regulation, REACH-Regulation, etc) with difficult minimum thresholds
- Consumer perception of recycled plastics in some social groups remain critical
- Stable PCR market still lagging behind
- Instability of material volume and availability
- Reduced oil prices may lead to cheaper virgin plastics

PESTLE

Political

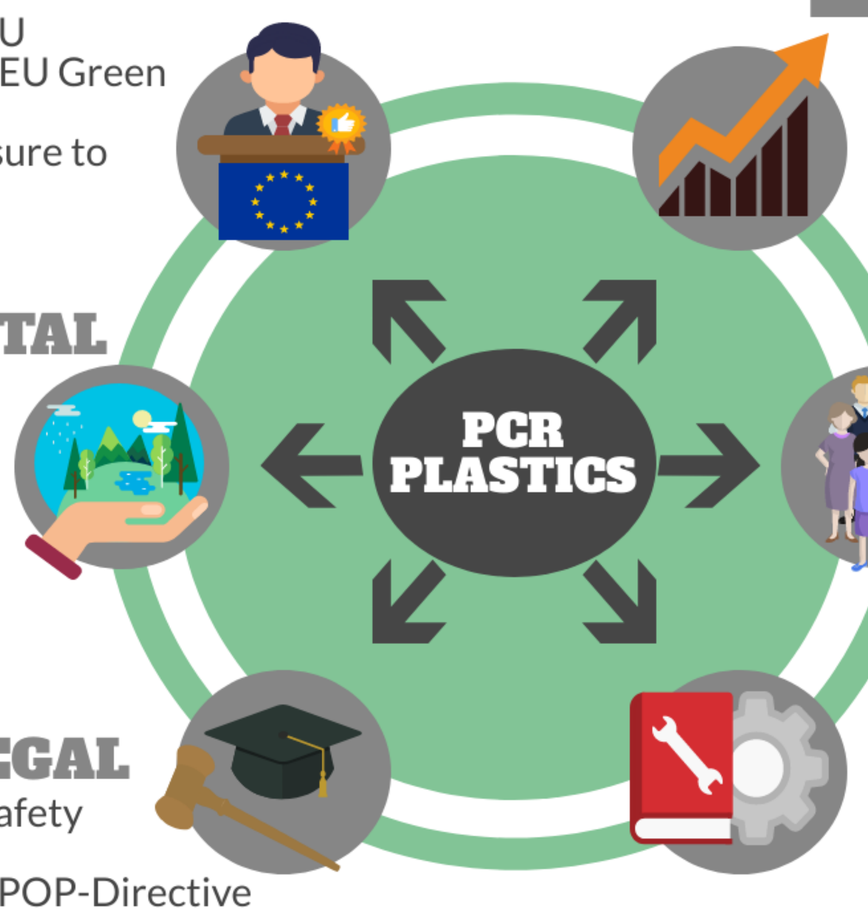
- Current EU initiatives (EU Circular Plastic Alliance, EU Green Deal, CE Action Plan)
- Increasing political pressure to reduce plastic waste

Economic

- Increasing PCR plastic market due to fast growing WEEE stream
- Market resilience
- Stable market price of PCR material with lower fluctuations

Environmental

- Saving CO_2 emissions
- Less global warming potential (GWP) than virgin plastic
- Reduced resource depletion



Social

- Increasing consumer awareness on sustainability aspects (plastic waste)
- Positive company record
- Sustainability and Corporate SocialResponsibility (CSR) of the company

Legal

- Stricter health and safety regulation
- Fulfilling RoHS- and POP-Directive and REACh regualtion
- Changing requirements in future legislations (ErP-Directive)

Technological

- Requirements for the integration of PCR-plastics into new products (aesthetics, function, colour, smell)
- Improving innovations in recycling technologies
- Color separation becoming more reliable

Circular E-Plastics in 8 Steps

A simple guideline on how to successfully integrate recycled plastics into new EEE products as shared by Philips based on own experience and lessons learned

Step 1
Overview of plastic consumption
Create an overview of all plastics consumption in your company to determine where to focus on

Step 2
Focus on high volume polymers
Focus on the high volume polymers are these will also be recycled in high volumes so supply of material should be easy

Step 3
Focus on non visible and dark colour
Focus on standard plastic types, black/dark gray plastics and on invisible parts (Difficult to implement food contact, transparency, complex mechanical properties, colored plastics and visual parts)

Step 4
Identify suppliers
Identify possible suppliers of recycled plastics and considering looking at external certification such EuCertPlast to ensure a high quality supply base. Look for partners that are willing to innovate with you, co-creation is essential to the succes of a project

Step 5
Define Critical to Quality Measures (CTQs)
Testing the materials for important product properties and requirements

Step 6
Start in lifecycle management
New product launches are always under great time preasure to reach the market on time. A first introduction of recycled plastics may couse delays, so instead of risking a delay of go to market it may be better to intrduce recycled plastics in a product as a lifecycle change which often do not have very strict deadlines

Step 7
Design for recycled plastics
When the company progresses towards introducing recycled plastics in new products that still need to be launched, do ensure that the mold is optimized for recycled plastics

Step 8
Trial mold and test parts
Once the product and recycled material is selected, trial the material in a production run of sufficient size. After the trial run test parts on all critical parameters to ensure the recycled plastics meet all requirements

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