
From trash
to Treasure
Theories and tools for a circular economy

From trash to treasure

– CIRCUS –

CIRCUlar and Sustainable tools for adults

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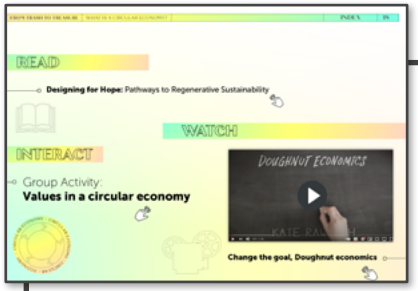
HOW TO USE THIS BOOK

This is an interactive book, click, enjoy and discover

To access to each chapter click on it at the Index

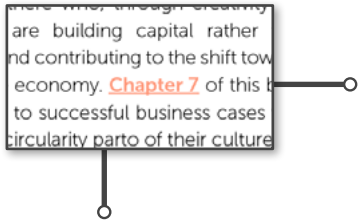


The interactive pages at the end of each chapter contain a summary with the additional resources used in this book.

Click on the play button to watch the videos

In the header, click on the word 'INDEX' to come back to the main Index

Click on the items to visit the web pages



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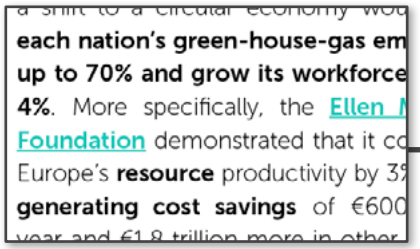

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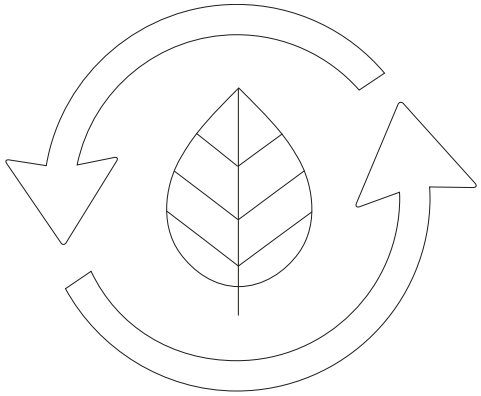
ABOUT THE BOOK

The book is intended for youth, youth workers and any other groups worldwide interested in learning about circular economy, applying its principles to youth projects and fostering non-formal education for global change. Through interactive explanations as well as related videos, articles and group activities (see annex), the book can be used as a practical tool to develop youth trainings through innovative methodologies as well as new educational material suitable to all learning styles.

More specifically, the concept of circular economy is introduced together with the processes used to achieve its principles of designing out waste, optimizing resource yields, decreasing resource dependence and developing the systems' effectiveness by revealing and designing out negative externalities. Despite presenting challenges such as the loss of quality in time, the high price of recovery and the lack of recycling and repurposing infrastructure as well as incentives, it is demonstrated that a shift towards circular economy increases employment, productivity rates and cost savings, in addition to providing the chance for innovation and reduced obsolescence, greenhouse gas emissions and environmental damage.

Firstly, in order to understand the big picture, the book presents the evolution from linear economic patterns to an emerging worldview whereby profit and consumerism must be



replaced by social and environmental justice, ecosystems restoration and true wellbeing if our civilization is to survive.

Key to the paradigm shift is the understanding that all living beings and all ecosystems on planet Earth are interconnected as well as the context within which governments, businesses and consumers operate. Therefore, an overview of the Systems Thinking theory is included together with the European regulatory frameworks that affect the transition to a circular economy.

Considerations on the power to influence the economy held by consumers with every single purchase are also critical.

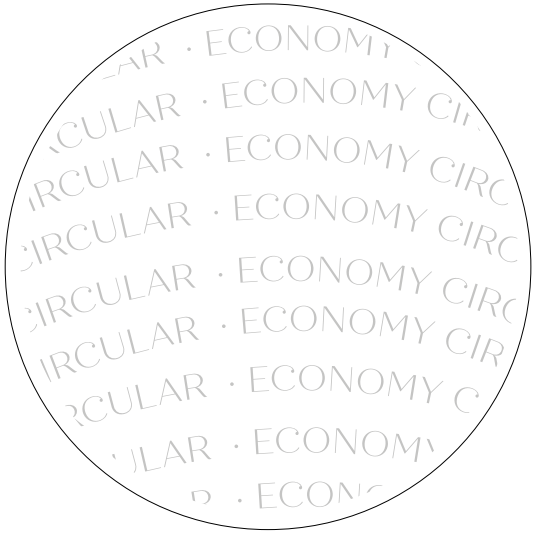
Existing business models are then provided to clarify how the circularity process is applied at organisational level in addition to two of the investment analysis available to put figures on sustainability indicators and calculate the returns on certain social and environmental interventions.

These have been complemented with examples of existing successful businesses within the textile, food, packaging, mobility, building and reprocessing industries.

The second part of the book aims to provide theories, practical solutions and tools that can be applied to a variety of projects based on circular economy principles, as well as to inspire to experiment different approaches depending on the related contexts, groups and topics. So, it offers an overview of the schools of thought that support nature's cycles such as Biomimicry and the Performance Economy; Permaculture Design solutions which can be applied at personal and community level; and finally tools for collaborative development of sustainable project taken from the Dragon Dreaming and ABCD Strategic Planning methods.

Although the group activities provided in the final chapters do not integrate both processes due to the amount of variables they present and the length involved, enough information on the steps to follow as well as extra exercises have been provided so that small trials can be organised with groups.

Group Activities



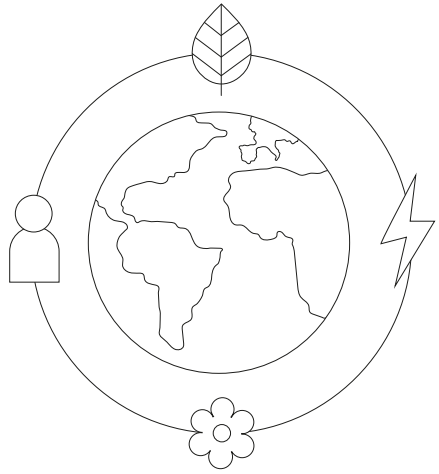
1 WHAT IS A CIRCULAR ECONOMY?

1.1 The evolution of definitions and practices

The word "economy" comes to us from the Greek root *oikos*, which designates a self-sustained unit or "home" - as in the terms ecology and ecosystem, and the suffix *nomos*, meaning management, law or principle. Thus *oikonomos*, **the original form of economics, meant "management of the hearth and home".**

With time, this meaning has expanded not only to include the management of wider communities but also of needs and wants of entire nations (first mentioned by James Stuart in 1767). 18th century English Economist Adam Smith, termed economy as the **"Science of Wealth"** - in other words, how wealth is produced and how it is used.

Modern times definitions focused on **how to use limited resources to satisfy needs and wants on a global scale.** This concept centred around money-based flows of goods and services between households (providing consumer expenditure and labour) and firms (supplying goods, services and wages) which resulted in the mainstream linear economic system most of us grew up with.



Linear economy traditionally refers to the **"take-make-dispose"** industrial model. This means that raw materials are extracted, then transformed into products that are used until they are finally discarded as waste. Value is created in this economic system by producing and selling as many products as possible.

In past decades however, new economic worldviews have emerged (Robert Costanza, Diane Elson, Pierre Bordieu) acknowledging the impacts of the model above on planet Earth, which is ultimately our "oikos/home", as well as its interconnection with resources such as social capital and unpaid care which contribute significantly to our welfare but fall outside the monetised economy.

Theorists such as Max-Neef and Sen argue that **the goal of the economy should not be GDP growth but human wellbeing.** Increased crime rates do not raise living standards, but they can lift GDP by raising expenditures on security systems (Nature, 2014).

Stahel adds onto this explaining that societal wealth and well-being should be measured in stock instead of flow, in capital instead of sales. Growth then corresponds to a rise in the quality and quantity of all stocks — natural, cultural, human and manufactured. For example, sustainable forestry management augments natural capital, deforestation destroys it; recovering phosphorus or metals from waste streams maintains natural capital, but dumping it increases pollution; retrofitting buildings reduces energy consumption and increases the quality of built stock.

Theorists such as Max-Neef and Sen argue that the goal of the economy should not be GDP growth but human wellbeing.

“The principles of economics should be based on five postulates and one fundamental value principle. One, the economy is to serve the people and not the people to serve the economy. Two, development is about people, not objects. Growth is not the same as development and development does not necessarily require growth. Four, no economy is possible in the absence of ecosystem services. Five, the economy is a subsystem of a larger finite system, the biosphere, hence permanent growth is impossible. And the fundamental value to sustain a new economy should be that no economic interest, under no circumstance, can be above the reverence of life.”

Manfred Max-Neef

1.2 Embracing the cycle

Increasing concerns over resource security, ethics, climate change and sharp volatility surges in the current economic system are shifting our approach to seeing materials as assets to be preserved, rather than continually consumed (Lacy, 2020).

In light of this, **circular economy represents an alternative in which resources are used as long as possible, their maximum value is extracted whilst in use, then recovered or regenerated as different products at the end of each life cycle.** Its aim is to optimize the flows of energy, use resources efficiently, minimize waste generation and increase resilience.

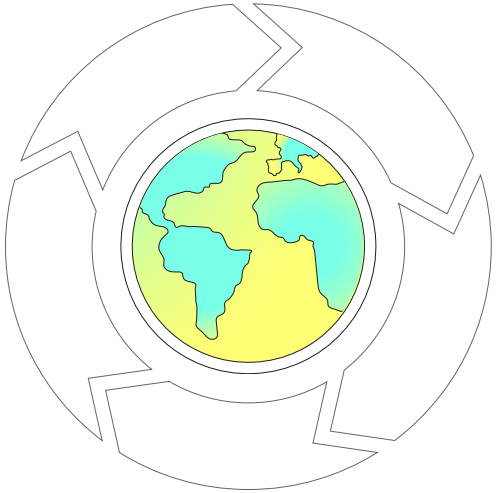
In order to achieve this, products must be designed and optimized for a cycle of disassembly and reuse which saves large amounts of embedded energy and labour, and renewable energy is required to fuel this cycle.

Circular economy represents an alternative in which resources are used as long as possible, their maximum value is extracted whilst in use, then recovered or regenerated as different products at the end of each life cycle.

Circular economy rests in several principles (Ellen MacArthur Foundation, 2020):

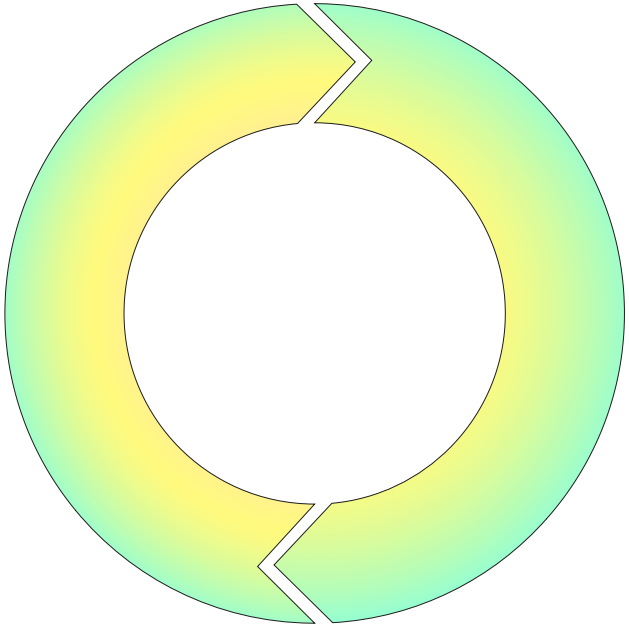
- **Eco-design:** it considers and integrates in its conception the environmental impacts throughout the life cycle of a product. It ensures renewable, reusable, non-toxic resources are utilised as materials and energy in an efficient way.
- **Industrial and territorial ecology:** it is about the establishment of an industrial organizational method in a territory characterized by an optimized management of stocks and flows of materials, energy and services.
- **Functionality or performance economy:** it favors the use versus possession, the sale of a service versus a good.
- **Second use:** it reintroduces in the economic circuit those products that no longer correspond to the initial consumers' needs.
- **Reuse:** it is about reusing certain products or parts of them that still work to elaborate new artifacts.
- **Reparation**: it is about finding damaged products a second life.
- **Recycle:** it makes use of materials found in waste.
- **Valorization:** it harnesses energy from waste that can't be recycled.

In the scheme below you can compare the linear and the circular economic systems.

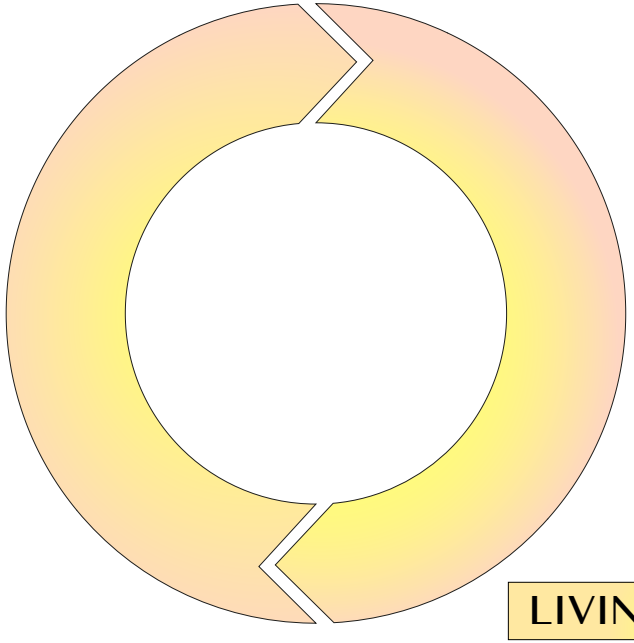


CIRCULAR ECONOMY

TECHNICAL NUTRIENTS



BILOGICAL NUTRIENTS



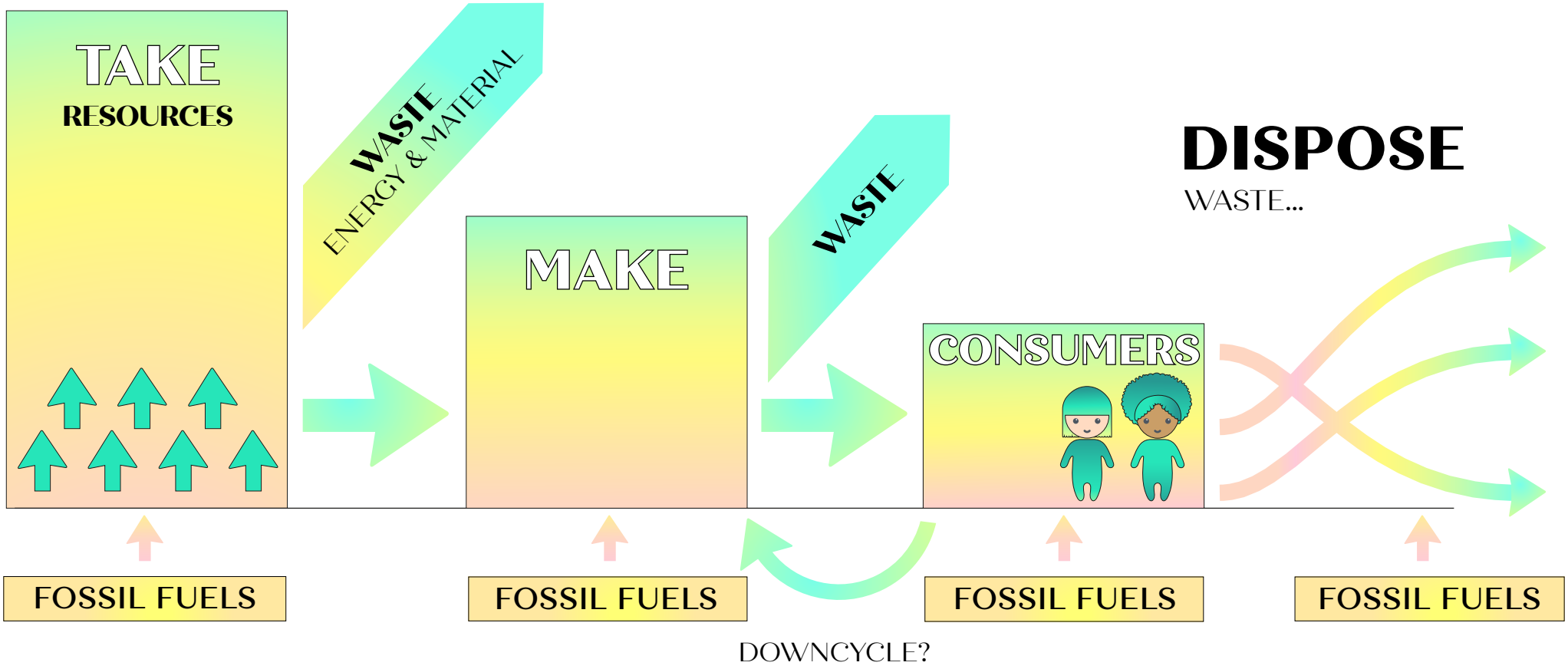
LIVING SYSTEM

ENERGY FROM RENEWABLE SOURCES

RETHINK: > REDUCE > REPAIR > RECYCLE

The rule of the three Rs (3R): Reduce, Reuse and Recycle

LINEAR ECONOMY



The circularity introduces a differentiation between consumable products (made of biological ingredients that can safely be returned to the biosphere) and durable products (made of technical ingredients such as plastics or metals designed to be reused from the start) (Stahel, 2016).

For technical nutrients, the circular economy largely replaces the concept of a consumer with that of a user. This calls for a new contract between businesses and their customers based on product performance. Unlike in today's buy-and-consume economy, durable products are leased, rented or shared wherever possible. If they are sold, there are incentives or agreements in place to ensure the return and thereafter the reuse of the product or its components and materials at the end of its period of primary use (WFO, 2014).

There is a world of opportunity to rethink and redesign the way we make stuff. Through a change in perspective we can redesign the way our economy works - designing products that can be "made to be made again" and powering the system with renewable energy.

In the natural world there is no landfill - nutrients, energy and materials cycle back into a diversity of ecosystems that continuously sustain themselves.

The good news is that there are already businesses out there who, through creativity and innovation, are building capital rather than reducing it and contributing to the shift towards a restorative economy. Chapter 7 of this book is dedicated to successful business cases who have made circularity parto of their culture and management.

"Circular economy is a way to design, make, and use things within planetary boundaries"

READ

Designing for Hope: Pathways to Regenerative Sustainability

WATCH

Change the goal, Doughnut economics

INTERACT

Group Activity 1:

Values in a circular economy

2 WHY A SHIFT TOWARDS A CIRCULAR ECONOMY IS NECESSARY?

2.1 How did we get here?

Only 250 years ago the Earth was populated by less than one billion people. For the majority, life was frugal and the materials needed for survival were sourced mainly within communities. Rapidly, societies started to be designed and run based on the understanding that the Earth was a source of unlimited resources. This way of perceiving the world laid the foundations for our current scientific, economic and business paradigms of "take-make-consume-waste" as a way to achieve economic and social welfare.

The Industrial Revolution not only brought about new manufacturing processes resulting in increased productivity, changes in living standards and population growth, but also paved the way for a rapid pace of technological progress which has continued to this day.

The emergent innovations mean that many now have access to products from all over the world at affordable prices. These products have brought many of us levels of material comfort unimaginable to previous generations.

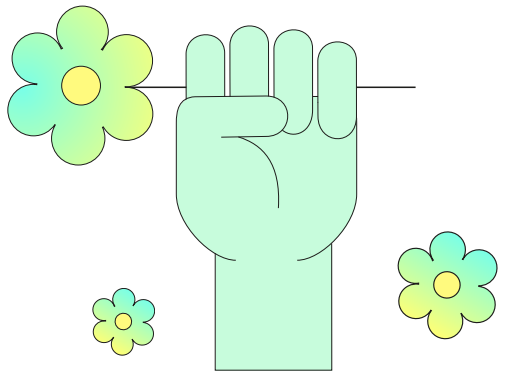
However, **the current linear economic system relies on unrestrained exploitation of finite natural resources from our planet.** Most of our modern lifestyle from transport, energy supply and goods production to food industry and packaging, is fuelled by oil and gas - which are rapidly becoming not only harder to extract, but also limited in their availability. We are currently consuming about 1.75 times the Earth's carrying capacity, meaning we are using 75% more natural resources than we are regenerating each year (Earth Overshoot Day, 2020).

86 million barrels of crude oil are produced everyday, however as a planet, we are using around 88 million barrels a day drastically increasing the need for unsustainable fossil fuel extraction practices such as fracking, coal gasification, tar sands, mountain-top removal, opencast coal mining, deep ocean and Arctic drilling (The World Counts, 2020). **Peak oil** is the point in which the world's crude oil production rate reaches its maximum output, and then declines.

In addition to depletion of natural resources, there are other negative social and environmental impacts scientifically proven to be caused by human activity. These include the 6th mass extinction of species occurring 1000 times faster than in the past, 25% of rivers no longer getting to the ocean, 18.8 million people having fled their homes due to armed conflicts or climate change since 2017, an island of accumulated garbage in the Pacific Ocean measuring 1.6 million Km^2 – equal to the size of Mongolia, $^1/_3$ of the food produced globally going to waste and income inequality being at its highest for the past 30 years (The World Counts, 2020).

This system is clearly no longer viable for businesses, people or the environment. If radical changes are not implemented soon, modern civilization could decline or even collapse, as others have done in the past (Ponting, 1991).

Circular economy has emerged as an alternative to the current system that is restorative or



regenerative by intention and design. People of all ages and skills are central to the model, ownership gives way to stewardship, consumers become users and creators.

However, the current linear economic system relies on unrestrained exploitation of finite natural resources from our planet.

2.2 Benefits of a circular economy

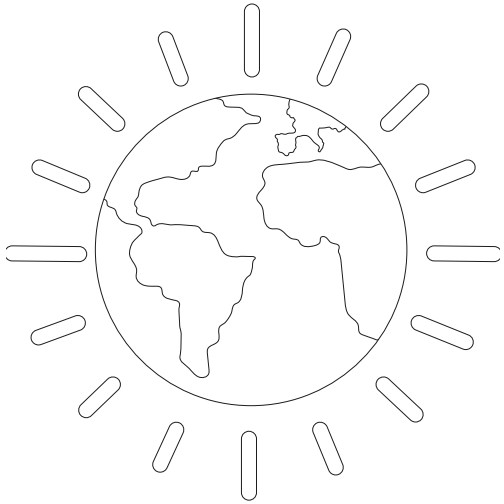
A study from 7 European nations found that a shift to a circular economy would **reduce each nation's green-house-gas emissions by up to 70% and grow its workforce by about 4%**. More specifically, the **Ellen MacArthur Foundation** demonstrated that it could **boost** Europe's **resource** productivity by 3% by 2030, **generating cost savings** of €600 billion a year and €1.8 trillion more in other economic benefits.

For example, the cost of remanufacturing mobile phones could be reduced by 50% per device—if the industry made phones easier to take apart, improved the reverse cycle, and offered incentives to return phones. High-end washing machines would be **accessible** for most households if they were leased instead of sold—customers would save roughly a third per wash cycle, and the manufacturer would earn roughly a third more in profits. Over a 20-year period, replacing the purchase of five 2,000-cycle machines with leases to one 10,000-cycle machine would also yield almost 180 kg of steel savings and more than 2.5 tonnes of CO2e savings.

Additional benefits for companies include **reduced material bills and volatility related to their changing prices, less warranty risks, improved customer interaction and loyalty, as well as less product complexity, value creation and chance for innovation.** New business opportunities may also arise to provide logistic and redesign services.

It is finally believed the real customer benefits go beyond the **price effect** and extend **to reduced costs of obsolescence, wider and healthier choices.**

Last but not least, the collective adoption of circular economy principles would ensure **improved management of natural resources, risk prevention and reduction of negative externalities** if correctly supported by environmental policies.



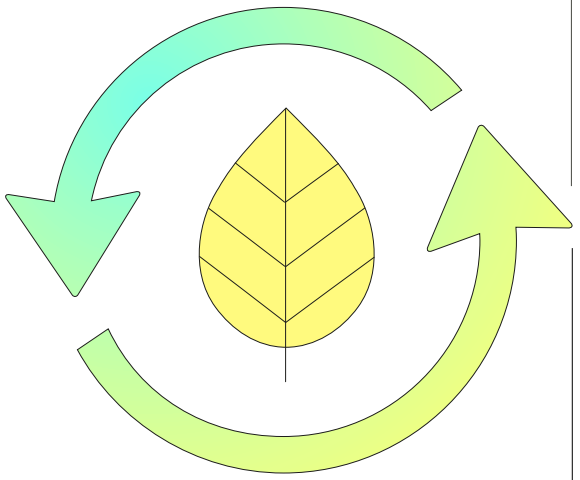
2.3 Challenges of a circular economy

One challenge faced by the circular economy framework is related to the achievability of the concept. At the core of the framework, is the idea of designing out waste. If in certain sectors, such as manufactured goods, the vision can be globally implemented and materials be used longer, reused, before being dismantled and remanufactured, in other sectors however, existing limits might make it difficult to close the loop indefinitely such as for paper recycling or specific hazardous waste, like mercury or asbestos which cannot be recycled but must be contained off the cycle. As the second law of thermodynamics states, **"all spontaneous processes irreversibly disperse energy into ever more chaotic states"**, result-

ing in loss of quality and quantity of substances and making a complete closure of loops hardly achievable (Korhonen et al. 2010). Also, when selecting materials in a production process, circular economy principles might exclude not fully recyclable materials. However, the environmental benefits of certain materials (e.g. lightweight components, less corrosive materials) could outweigh the disadvantage of **non-recyclability.**

Beyond the question of achievability is the notion of desirability for businesses whereby reaching a 100% recyclability rate might prove counterproductive, if for instance, the price of recovery remains higher than the value of the materials recovered. Lack of incentives in the existing regulatory landscape does not necessarily make it desirable for all to pursue circular economy objectives.

Moreover, people's basic needs at a global level may still be further undermined by abuses of power, unhealthy or unfair labour and living conditions or a disrespect of human rights. As such, the circular economy framework does not yet fulfil all the dimensions of sustainability.



2.4 How do we move forward?

To support the shift towards a circular economy is taking concerted action on several fronts.

Social, technological and commercial research combined with communication strategies are needed to raise awareness about responsibility and products life-cycle. For instance, it should be fashion magazines, not science journals, that encourage jewellery sharing, leasing jeans and renting designer handbags.

Stahel (2016) suggests that policymakers should use indicators such as value-per-weight and labour-input-per-weight ratios rather than GDP. Policies should focus on performance and internalization of external costs such as emissions and pollution.

Most importantly, as stated by De Decker (2018), **an authentic circular economy demands that we use less fossil fuels** (which is not the same as using more renewable energy), and make less stuff: fewer cars, fewer microchips, fewer buildings. That is because the current low efficiency of recycling processes still requires huge energy inputs, and technology to harvest and store renewable energy still relies on difficult-to-recycle materials.

A recent study of the modular Fairphone 2 – a smartphone designed to be recyclable and have a longer lifespan – shows that the use of synthetic materials, microchips, and batteries makes closing the circle impossible. Only 30% of the materials used in the Fairphone 2 can be recuperated. A study of LED lights had a similar result. The more complex a product, the more steps and processes it takes to recycle.

So, since we are using more raw materials in

Most importantly, as stated by De Decker (2018), an authentic circular economy demands that we use less fossil fuels.

the system than can be made available through recycling, stopping the continuously expanding extractive economy will be possible only by reducing total use. To enable this, a change in the consumerism paradigm and the emergence of a new worldview is needed.

Assadourian (2010) defines consumerism as a cultural pattern that leads to people to find meaning, contentment, and acceptance primarily through the consumption of goods and services. This takes different forms in different cultures although research shows that consuming more does not necessarily mean a better quality of life.

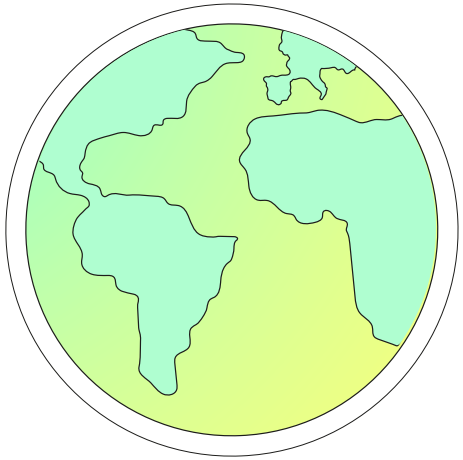
In State of the World (2010), Assadourian argues that six institutions play an essential role in shaping cultures, namely: business, government, media, traditions, social movements, and education. Most businesses design products to have short lives or to go out of style quickly; effective marketing and the media transmit cultural symbols, norms and stories that promote materialistic aspirations; governments reinforce consumerist orientation by subsidizing particular industries and leaving unregulated air and water pollution so that manufacturers are not required to internalize the environmental and social costs of production; students are not taught how to critically interpret marketing, and to understand ecological principles whereby humans depend on a functioning Earth system for its survival and that of all other species.

So undoubtedly, a shift of paradigm is not a simple task but, according to Thomas Kuhn (1962), it occurs when the "normative science" is challenged by one that is more successful at solving current acute problems. One led by social and ecological restoration where it would be "natural" to find value in life through how much a person helps restore the planet rather than how much that individual owns and

where the equitable distribution of resources within society help reduce crime, illness and illiteracy rates.

According to Glattfelder (2011) around 1318 transnational corporations currently control the majority of the planet's informational, material, energy, financial, food and water stocks and flows. Yet, an increasing number of social enterprises are challenging the assumption that profit is the primary or even sole purpose of business and hundreds of thousands of organizations are working, often quietly, at grassroot level on social and environmental justice, corporate responsibility, restoration of ecosystems, circular economy and government reform. Examples include the **Transition Network**, **la Via Campesina**, **Too Good To Go** and **Helpfulpeeps**.

Ethan Roland and Gregory Landua further propose that money isn't the only form of capital driving the human economy. In order to guide holistic and regenerative enterprise development, they identified and mapped the complex flows of **Eight Forms of Capital**. More specifically, influence and connections are social capital - a person or entity who has 'good social capital' can ask favors, influence decisions, and communicate efficiently; raw and processed non-living physical objects form material capital; living capital is made up of the animals, plants, water and soil of our land, the true basis for life on our planet; intellectual capital is best described as a 'knowledge' asset; we accumulate experiential capital through actually organizing a project in our community, or building a strawbale house, or completing a permaculture design; as one practices their religion, spirituality, or other means of connection to self and universe, one may accumulate spiritual capital which contains aspects of intellectual and experiential capital, but is deeper, more personal and less quantifiable; lastly, cultural capital describes the shared internal and external



processes of a community – the works of art and theater, the songs that every child learns, the ability to come together in celebration of the harvest or for a religious holiday. Cultural capital cannot be gathered by individuals alone.

We are trained to believe that money is the sole acceptable medium for exchanging value, and as a result, we neglect the numerous other meaningful ways we could connect and share. Yet, by opening our eyes to and engaging in activities and interactions that bring all kinds of abundance to our lives, a paradigm shift will happen inevitably. As anthropologist Margaret Mead says: "Never doubt that a small group of thoughtful, committed citizens can change the world. Indeed, it's the only thing that ever has."

"Sustainability is a revolution with a new value system, consciousness and worldview"

Andres R. Edwards

READ

52 Climate Actions - Changing the status quo

WATCH

The Impossible Hamster

INTERACT

Group Activity 2:

Current challenges and possible solutions exercise

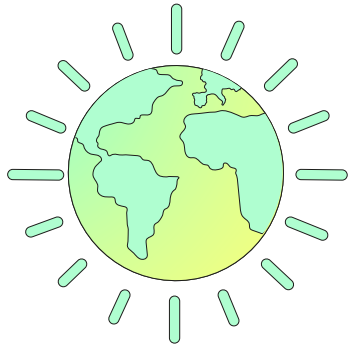
3 SYSTEMS THINKING FOR THE CIRCULAR ECONOMY

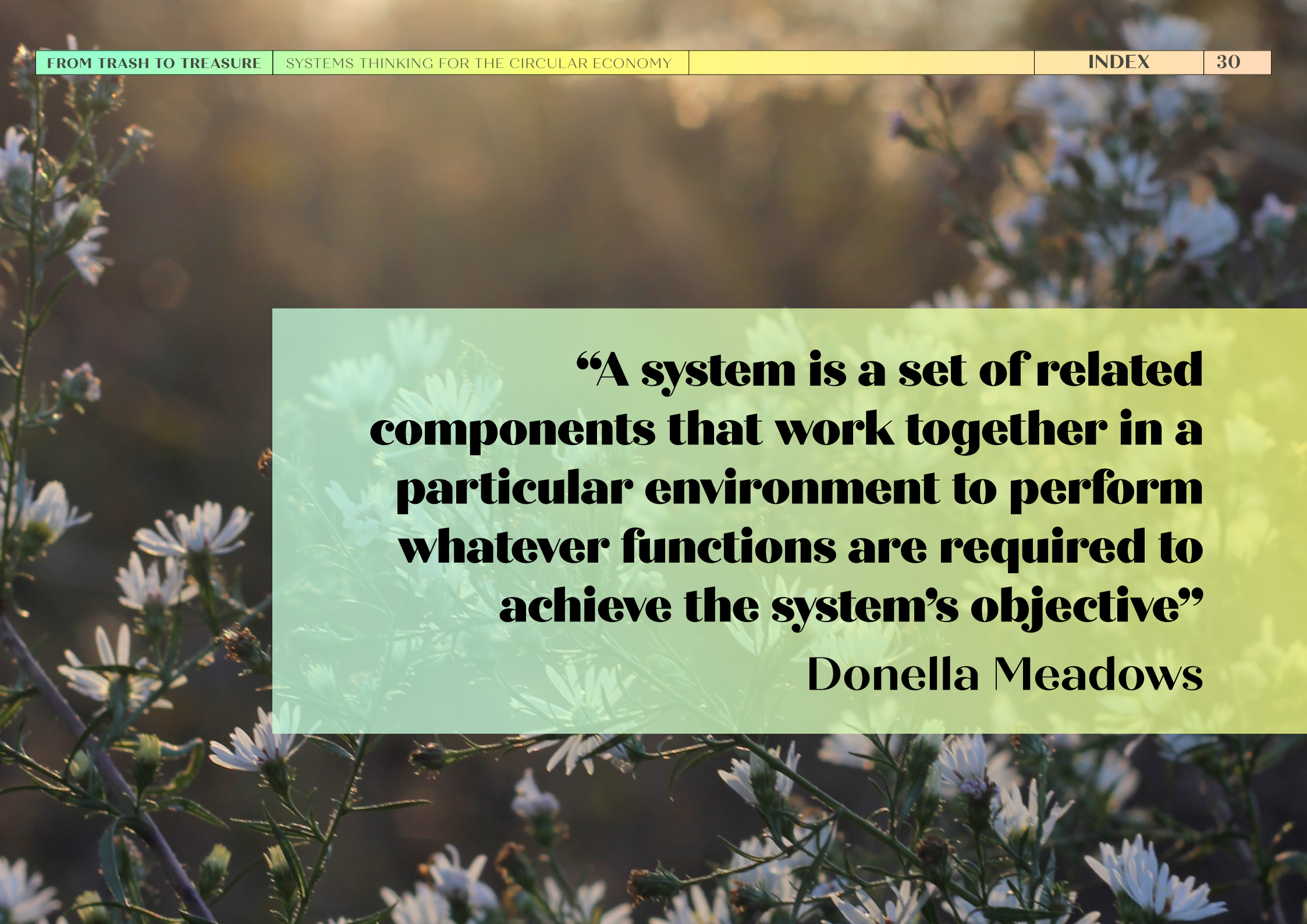
At the core of the paradigm shift explored in Unit 2 is the understanding that everything is interconnected to everything else in some way. Nothing living is in isolation, and we need other systems to thrive in order to survive. Humans are a part of nature, one species among many, and all life forms have their own intrinsic value, and need to be respected for the functions that they perform – even if we don't see them as useful to our needs. Although humans are very powerful, ultimately we are not in control.

Scientific discoveries and theories from the 20th century such as Arne Næss' Deep Ecology, David Bohm's Hidden Variables and James Lovelock's Gaia Theory, confirm the beliefs of indigenous and ancient teachings that the **Earth operates as a self-regulating system striving towards conditions that support the existence of life.**

In fact, everything in the world functions as part of systems interacting through different types of relationships. These result in flows of matter, information and energy that allow evolution through networking, feedback, adaptation and self-organisation.

Because of their complexity and non-linear dynamics, the behaviour of systems is ever-changing and largely unpredictable.





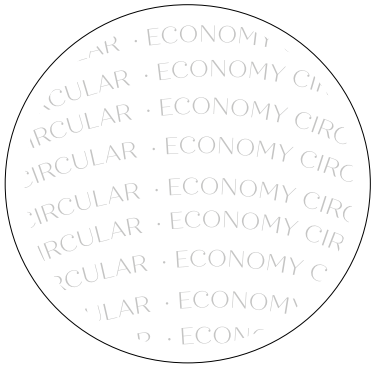
“A system is a set of related components that work together in a particular environment to perform whatever functions are required to achieve the system’s objective”

Donella Meadows

This understanding of the world is what has given birth **to the holistic science of "Systems Thinking".**

Systems thinking is an approach to integration that is based on the belief that **the component parts of a system will act differently when isolated from the system's environment or other parts of the system.** As opposed to positivist and reductionist thinking (whereby in the former, information derived from sensory experience, interpreted through reason and logic, forms the exclusive source of all certain knowledge; and, in the latter, every complex phenomenon, especially in biology and psychology, can be explained by analyzing the simplest, most basic physical mechanisms that are in operation during the phenomenon), this science sets out to view systems in a holistic manner, and it encourages us to explore inter-relationships (context and connections), perspectives (each actor has their own unique perception of the situation) and boundaries (agreeing on scope, scale and what might constitute an improvement).

Systems thinking is particularly useful in addressing complex situations as they cannot be solved by any one actor or fully understood from only one perspective. Thus, it helps us to see the big picture, and then identify leverage points that can be addressed to support constructive change. It also helps us see the connectivity between elements in the situation, so as to support joined-up actions.



According to Stahel (2010), modern day sustainability must be based on several independent but interrelated systems, or pillars, which also include technology and culture, essential for human survival. They are listed below:

- The first pillar **"nature conservation"** recognises the need to conserve nature and the natural environment as a base for life on Earth.
  Man's life is based on the resources supplied by the global ecosystem (i.e: biodiversity, the atmosphere, seas etc.), and the regional carrying capacity of nature with regard to populations and their lifestyle (including the water cycles, land-use patterns and waste assimilation).
  A lack of water, for instance, can lead to mass migrations.

- The second pillar **"limiting toxicity"** recognises the need to conserve the individual health and safety of people and animals, which are jeopardised by man's economic activities.
  This is a qualitative issue that involves measuring the presence of toxic agents (such as mercury, lead, nickel, DDT or thalidomide) in tiny quantities (nanograms) as well as nature's absorption capacity.

- The third pillar **"resource productivity"** is based on the need of industrialised countries to dematerialise their lifestyle.
  This is a domain of innovation, creativity and corporate strategies that lead to higher resource productivity over long periods of time.
  In addition, there is a factor of disequilibrium between over-industrialised and less industrialised countries.

Nature conservation

Limiting toxicity

Resource productivity

Achieving the objectives of the first three pillars will create a sustainable economy. However, in order to reach the objective of a sustainable society, nations will also need to tackle the following pillars of social and cultural ecology:

- The fourth pillar **"social ecology"** encompasses the fabric of societal structures, including peace and human rights, dignity and democracy, employment and social integration, security and safety, the constructive integration of female and male attitudes. Keywords here are: the commons, 'prisoners dilemma', sharing and caring, barter economy.

- The fifth pillar **"cultural ecology"** comprises education and knowledge, ethics and culture, attitudes towards risk-taking, values of 'national heritage' and other assets, at the level of the individual, the corporation and the state.

Designing for circular economic systems is about considering the full perspective of how natural, industrial, and social systems play out, and then uncovering ways of shifting these to facilitate circular and regenerative outcomes.

In some cases this is extremely complicated (like how to circularize spent nuclear rods, for example), and in others, it's a no-brainer (like how to change our collective addiction to disposable items like coffee cups). But all of the systems changes we need to design have the same basic elements: **people, products, places, and processes.** They can all be redesigned to maximize benefits and minimize negative externalities (Acaroglu, 2017).

There is a level of complexity to this approach. But everything worth doing requires work, and purpose-driven creatives in this world are at the forefront of helping to activate this change from linear to circular design. The next chapters present models and examples.

Social ecology

Cultural ecology

WATCH

Systems thinking for a better world, Peter Senge

INTERACT

Group Activity 3:

System Awareness Activity

READ

The 6 fundamental concepts of systems thinking, Leila Acaroglu

4 CIRCULAR ECONOMY AND THE EUROPEAN COMMUNITY

In order to take action, we need to know the context we operate in as well as the regulatory frameworks and policies that enable or hinder the adoption of circular approaches. For the purpose of this book, the European arena is explored in this paragraph.

The 1987 book "Our Common Future", published by the UN World Commission on Environment and Development under the chairmanship of Gro Harlem Brundtland, published the most common definition of sustainability:

"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs"

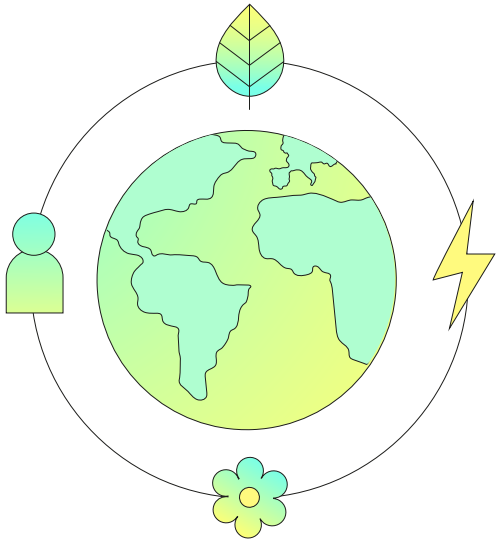
Since then, all European environment policies aim to rest on the principles of precaution, prevention and rectifying pollution at source, and on the 'polluter pays' principle.

The precautionary principle is a risk management tool that may be invoked when there is scientific uncertainty about a suspected risk to human health or to the environment emanating from a certain action or policy. For instance, should doubts arise about the potentially harmful effects of a product, and should, following an objective scientific evaluation, uncertainty persist, instructions may be given to stop the distribution of the product or to remove it from the market. Prevention and rectifying pollution at source avoids cascading negative impacts, while the "polluters pay" principle obliges operators of certain occupational activities such as the transport of dangerous substances, or of activities that imply discharge into waters, to take preventive measures in case of an imminent threat to the environment. If damage has already occurred, they must take the appropriate measures to remedy it and pay for the costs.

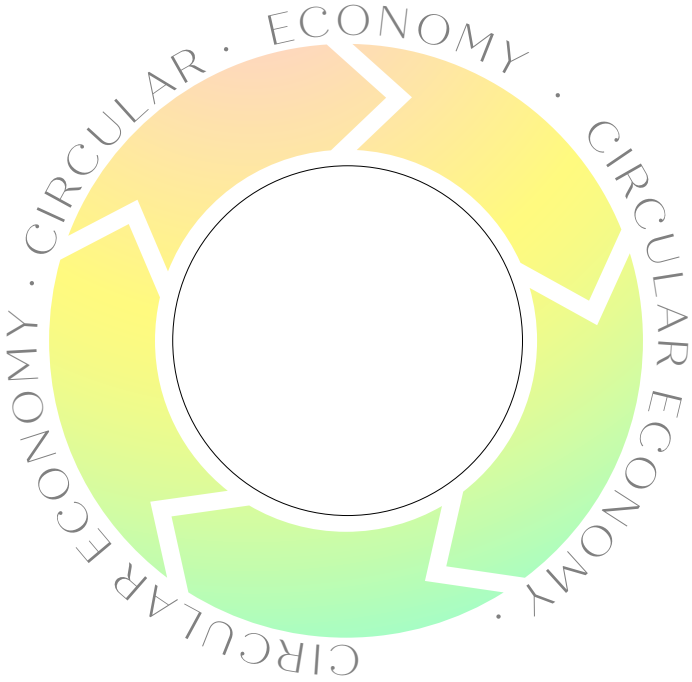
These principles are applied through action programmes, horizontal strategies, international cooperation, impact assessment, public participation and monitoring systems.

In 1992, the Agenda 21 of the UN Declaration on Environment and Development at Rio de Janeiro urged countries to 'develop indicators of sustainable development' in a way that would 'contribute to a self-regulating sustainability of integrated environment and development systems'.

And lastly, in 2003, the UN Marrakech Declaration on South–South Cooperation formulated five objectives as a follow-up to Rio and Johannesburg. Two of these are to uncouple economic growth and resource consumption and to create a circular economy.



In 2020, the EU Commission adopted the **Circular Economy Action Plan** in order to ensure that the regulatory framework is streamlined, to foster circular processes, make sustainable products the norm in the EU, and ultimately to implement the **2030 Sustainable Development Goals**, shown in the picture below (Link a la imagen).

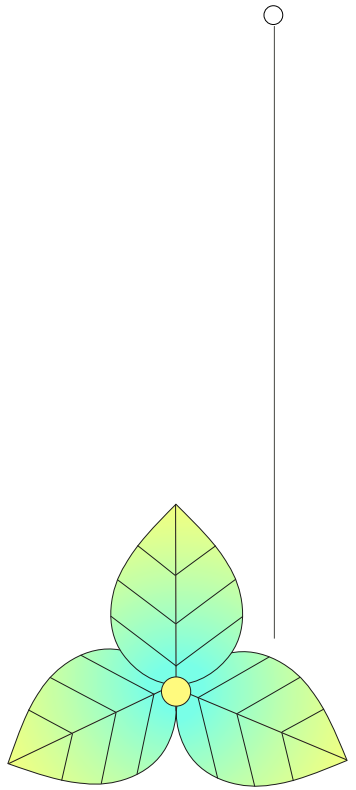



SUSTAINABLE DEVELOPMENT GOALS
1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
17 PARTNERSHIPS FOR THE GOALS
SUSTAINABLE DEVELOPMENT GOALS

This plan aims also at ensuring that the circular economy works for people, regions and cities, fully contributes to climate neutrality and harnesses the potential of research, innovation and digitalisation.

In practice, **through the Action Plan specific waste reduction targets for certain waste streams, with a heavy focus on electronics, textiles, plastics and construction will be implemented; a ban on the destruction of unsold durable goods will be introduced while incentives will be created to promote product-as-a-service ownership models and take-back schemes for select product streams; the adoption of ecodesign and energy labelling plans for the "broadest possible range of products" by 2024 will be facilitated; the use of microplastics will be restricted; companies will be required to update previously obsolete software; and finally, the Industrial Strategy will decarbonise high-carbon, energy-intensive sectors and develop a smart and sustainable transport network.**

The Action Plan fails however to address Europe's overall consumption of natural resources and raw materials as well as to establish measures for energy-intensive industries like steel, cement and chemicals. In fact, Sustainable Development Goal n.8 "Decent work and economic growth" ignores the fact that the planet can no longer support economic growth. According to the Post Carbon Institute (2020), in order to get back within Earth's limits, we need to shrink the global economy by at least 37%. The challenge however, lies in the resistance found at societal and corporational levels towards the effective elimination of many traits of the consumer materialist economy implied by multiple reuse, high recycling and longer service life. Regulatory frameworks that can get translated into practical steps that all stakeholders, entities and people can take towards an authentic paradigm shift are needed in order to achieve the Circular Economy Action Plan's objectives.



4.1 Regulatory Frameworks across European Countries

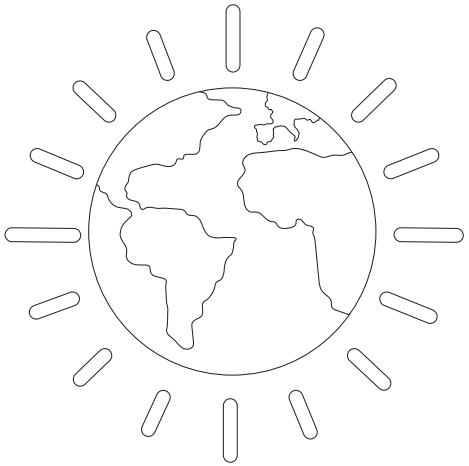
In the attempt to remove the existing barriers presented by some legislative and juridical contexts to the efficient use and management of resources, the European Commission is establishing measures that enable the development of ecological design, the creation of secondary markets for repurposed materials, the increase of financial investments into circular operations, improved support for small and medium enterprises and consumers.

Similarly, individual European countries, albeit with significant differences, have adapted these to regional contexts.

For example, the Dutch government initiated a **national programme on Circular Economy** in 2016 aiming for the Netherlands to become 100 % circular by 2050. Therefore, a strong commitment and ambition to be in the lead in the circular economy is politically manifested.

Whereas Germany's policy focuses on resource efficiency and waste issues; still, german businesses applying circular economy models have a total annual turnover of about 76 billion € and employ about 290,000 people (European Circular Economy Stakeholder Platform, 2016).

According to the Italian **Circular Economy Network** and its national report 2019, 4.24 billion€ will be allocated to foster circular economy, carbon sequestration, urban regener-



ation, sustainable tourism and adaptation to climate change between 2020 and 2023.

Public policy and tax reductions will favour innovative investments among small and medium enterprises as well as packaging reuse and recycling. Finally, the budget law 2020 introduced a plastic tax of 0.45€ per kg of plastic discarded as well as incentives for the production of compostable packaging.

Circular economy is gradually winning political support in Slovakia and framework conditions have been created to facilitate progress such as the "Bratislava Green Economy Process" which enables discussion about progress towards circular economy and **Circular Slovakia online platform** was created in October 2019 to share opportunities, barriers and good practices in the transition and foster new partnerships.

In 2017, the Spanish Government also approved a **Strategy for Circular Economy** which establishes guidelines and objectives to reach within 2030 at both national and regional level and counts on 836 million € for its implementation. New policies include:

- **Introduction of environmental criteria in the preparation of State Budgets.**
- **Introduction of seals and certifications as evaluation or award criteria.**
- **Taxes on pollution, overuse of resources, or poor waste management (including landfill or incineration).**
- **Fostering of programs such as Empleaverde to enhance workers' skills.**
- **Improved information to the consumer using labeling.**

- **Facilitated market access for products and services that meet the minimum criteria for environmental and public health.**
- **Promoting the sustainability of nature tourism and organic food production.**
- **Boosting consumption of tap water and defining new criteria for the wastewater treatment sector.**

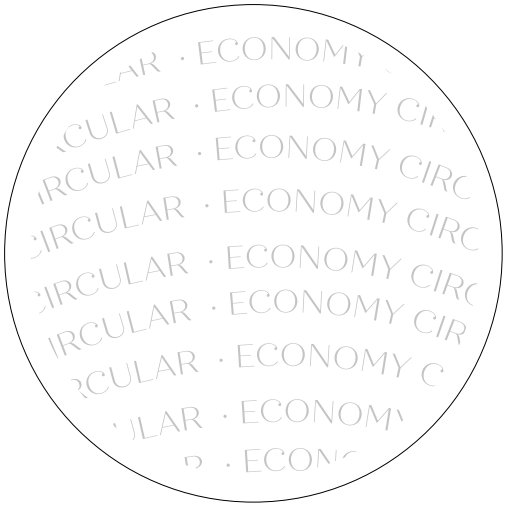
French authorities recognise that the challenge lies in mass mobilization, they have therefore attempted to shake up habits, show good practices and convince communities, businesses, development actors, associations and government agencies through the **"Circular Economy Roadmap"**. The aim is to speed up the progress towards the Climate Plan goals with regulatory and legislative measures, community initiatives and the drafting of future public budgets.

The Roadmap presents concrete steps that citizens, state/local authorities and companies can take towards better production, consumption, waste management and mobilization of all actors. Examples include strengthening the obligations of manufacturers and distributors to provide information on the availability of spare parts for electrical and electronic products and furniture, adapting taxation to make waste recovery cheaper than waste disposal and fighting against advertising that encourages the premature scrapping of products.

In order to ensure everyone's long-term engagement, the development of the roadmap drew from consultations with different actors and stakeholders (e.g: communities, businesses, NGOs, etc.), to identify the most relevant tools and confirm citizens' strong interest in the circular economy.

On a similar note, Finland has been refining a **Roadmap 2.0** which includes the most effective circular economy measures and solutions

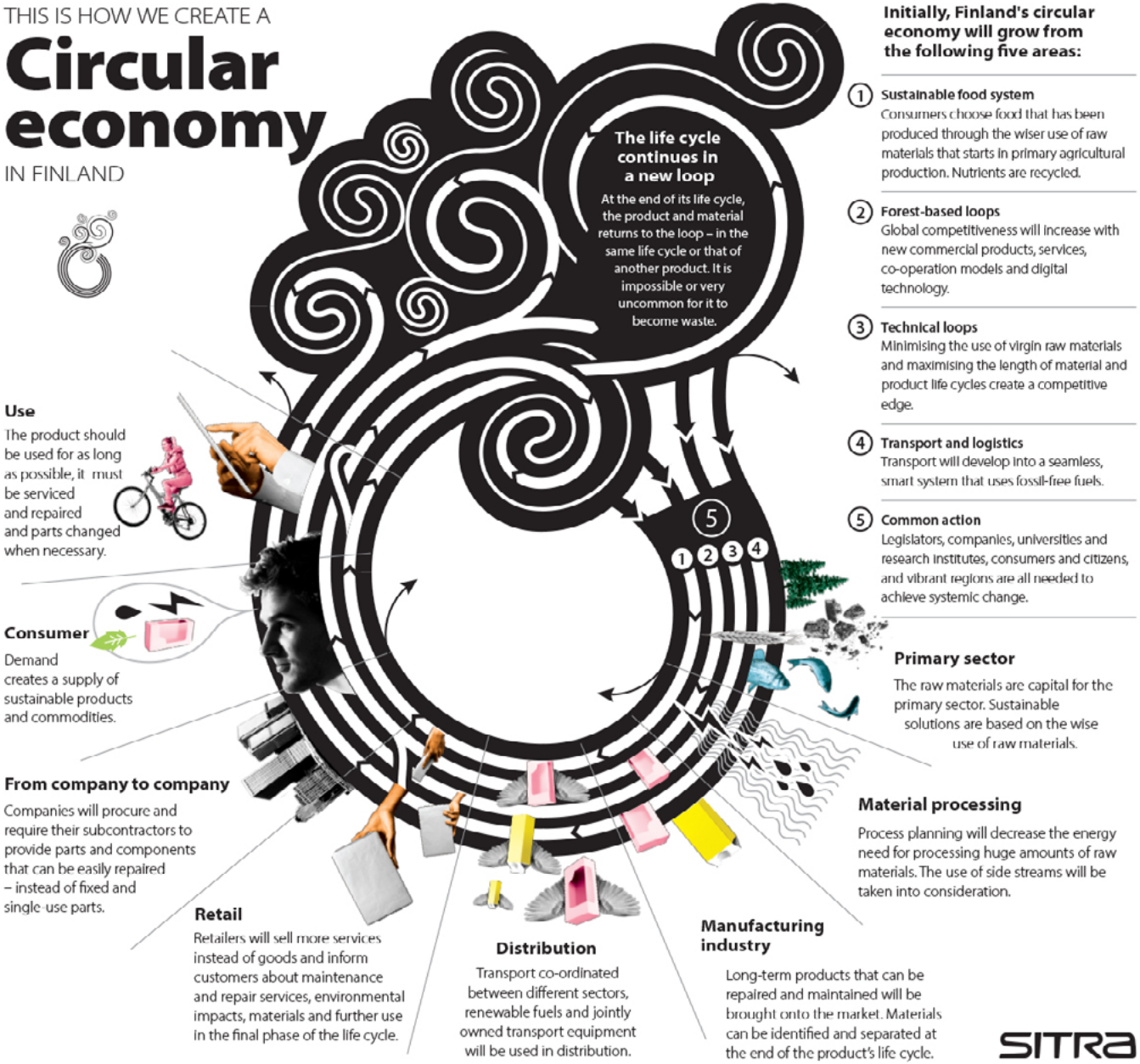
to tackle the challenges of climate change, the depletion of natural resources and urbanisation. The roadmap has been developed in close cooperation with government ministries, as well as almost 50 other representatives from the public, private and third sectors, 350 ideas and comments from stakeholders, and 25 specialists from different sectors. The result is presented in the infographic below:



THIS IS HOW WE CREATE A

Circular economy

IN FINLAND



Use

The product should be used for as long as possible, it must be serviced and repaired and parts changed when necessary.

Consumer

Demand creates a supply of sustainable products and commodities.

From company to company

Companies will procure and require their subcontractors to provide parts and components that can be easily repaired – instead of fixed and single-use parts.

Retail

Retailers will sell more services instead of goods and inform customers about maintenance and repair services, environmental impacts, materials and further use in the final phase of the life cycle.

Distribution

Transport co-ordinated between different sectors, renewable fuels and jointly owned transport equipment will be used in distribution.

Manufacturing industry

Long-term products that can be repaired and maintained will be brought onto the market. Materials can be identified and separated at the end of the product's life cycle.

Material processing

Process planning will decrease the energy need for processing huge amounts of raw materials. The use of side streams will be taken into consideration.

Primary sector

The raw materials are capital for the primary sector. Sustainable solutions are based on the wise use of raw materials.

Initially, Finland's circular economy will grow from the following five areas:

1. **Sustainable food system**
Consumers choose food that has been produced through the wiser use of raw materials that starts in primary agricultural production. Nutrients are recycled.

2. **Forest-based loops**
Global competitiveness will increase with new commercial products, services, co-operation models and digital technology.

3. **Technical loops**
Minimising the use of virgin raw materials and maximising the length of material and product life cycles create a competitive edge.

4. **Transport and logistics**
Transport will develop into a seamless, smart system that uses fossil-free fuels.

5. **Common action**
Legislators, companies, universities and research institutes, consumers and citizens, and vibrant regions are all needed to achieve systemic change.

SITRA

Based on Finland's traditional strengths, the focus areas include a sustainable food system, forest-based loops, technical loops, transport and logistics, as well as joint actions. In addition, six key projects cover all focus areas:

1. Regional cooperation provides sustainable locally produced food in the daily life of Finns with the help of kitchens in public institutions.

2. A demo plant for new techniques in the processing of electric and electronic devices helps to test thorough re-use of valuable and rare materials.

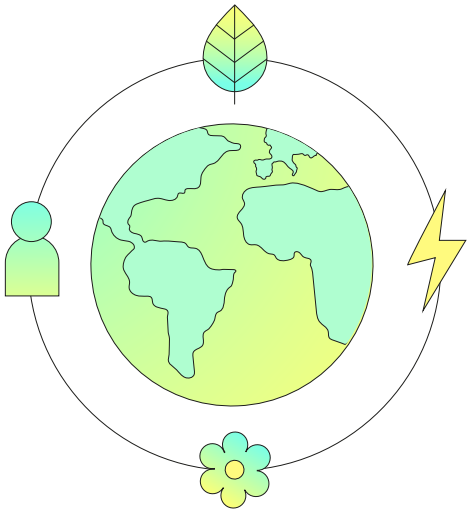
3. The Helsinki Metropolitan Smart & Clean project creates export concepts based on smart low-carbon transport that exploits open data.

4. In forestry, the development of bioproducts to replace fossil materials is accelerated with extensive industrial-scale projects.

5. An extensive cooperation model for the ecosystem of Arctic industry is being trialled elsewhere in Northern Finland to enhance industrial symbioses.

6. Finland took the role of the circular economy host country by organising the World Circular Economy Forum in 2017.

The World Circular Economy Forum fostered the need for coordinated action in order to build a strong foundation for the circular economy. Shifting to a circular economic model will affect all sectors, policy domains and relations between countries. McKinsey (2016) identified four priorities: **learn about, research and identify opportunities across Europe; develop systems to preserve the value of materials;**



create initiatives at the European, national, and city levels to facilitate the development of profitable circular business opportunities at scale; and finally design a new governance system to steer the economy toward greater resource productivity, employment, and competitiveness.

And finally design a new governance system to steer the economy toward greater resource productivity, employment, and competitiveness.

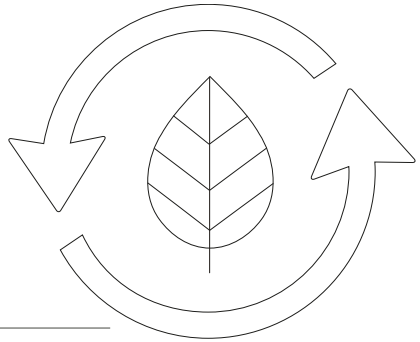
4.2 Consumers - what role do we play?

The **Eurobarometer 2019 Survey** reveals that citizens believe that environmental responsibility should be shared by big corporations, national governments and the EU, as well as citizens themselves by 'changing the way we consume' and 'changing the way we produce and trade'.

In the attempt to provide a detailed explanation of what circularity means for consumption, Tunn et al. (2019) states that **significant changes in consumer behaviour are required in addition to a net reduction in original acquisitions.** These behaviours are quite different to those needed in a linear economy and may be beset by low acceptance depending on demographic, psychological, economic and cultural factors as well as socio-material conditions.

To potentially achieve wide consumer acceptance, circular offerings cannot only compete with their sustainability proposition but need to offer additional benefits such as convenience (Tunn et al., 2019), minimal effort to repair, swap or upcycle.

The European Commission has proposed a revision of EU consumer law to ensure that consumers receive trustworthy and relevant information on products at the point of sale, including on their lifespan and on the availability of repair services, manuals and spare parts. The Commission will also consider further strengthening **consumer protection against green-washing and premature obsolescence,** setting minimum requirements for sustainability labels/logos and for information tools. Lastly, a new **'right to repair'** will be established with

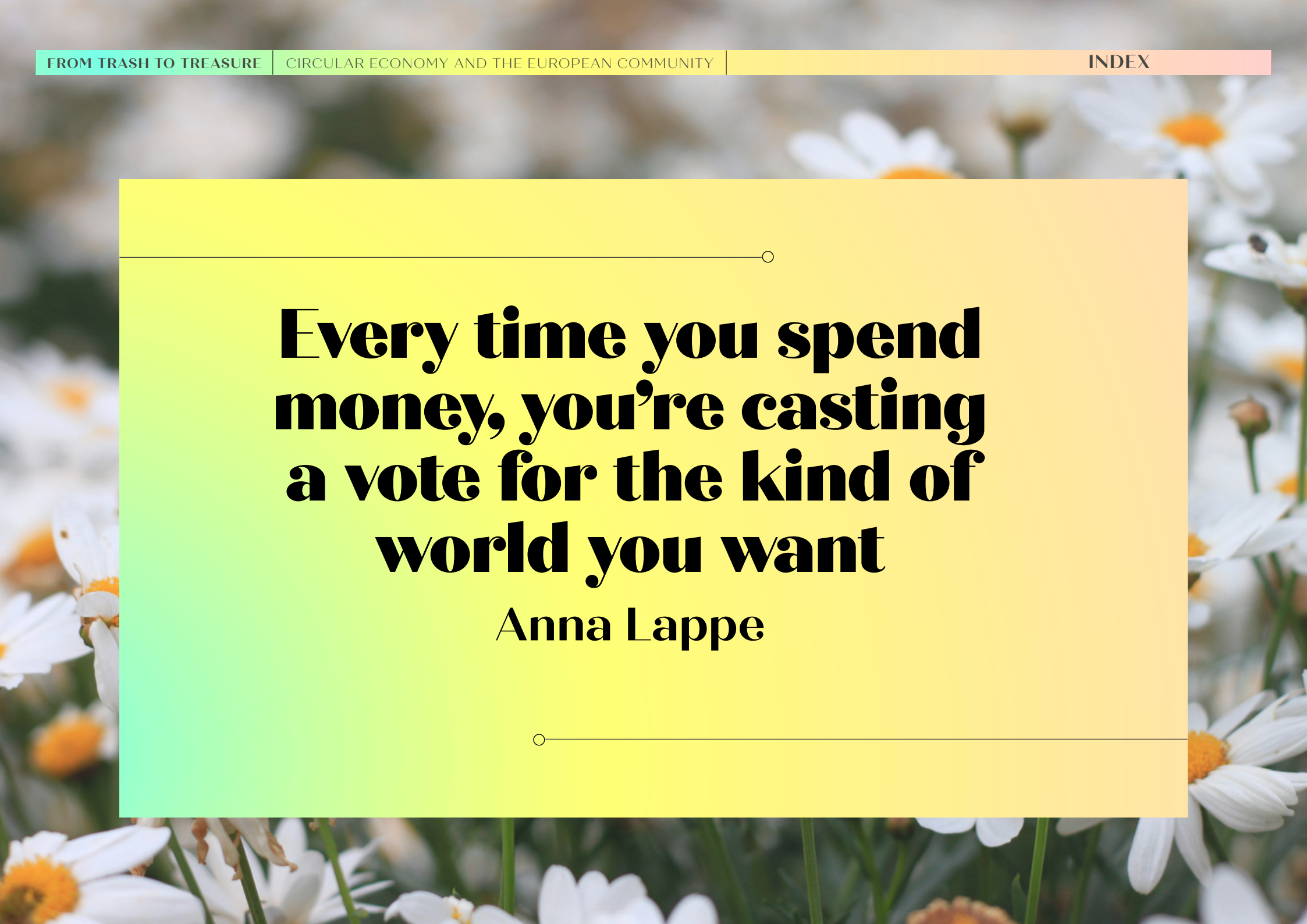


new horizontal material rights for consumers for instance with regards to availability of spare parts or access to repair.

Indeed, through local initiatives such as **repair cafes** and peer-to-peer sharing, the circular economy would be actively propelled by consumers who retain control over, and responsibility for, their products. But in the case of suppliers retaining ownership of the goods some form of safety net for consumers is needed in order to prevent debt accumulation and loss of essential services in times of unemployment and difficulty (Cherry and Pidgeon, 2018).

The **EU consumer survey 2020** found that most consumers claim to frequently engage with the Circular Economy. The majority of survey respondents reported that they keep things they own for a long time (93%), recycle unwanted possessions (78%), and repair possessions if they break (64%). However, the level of engagement differs with the nature of the product. Consumers are more likely to buy a durable product, repair or lease a product, for more expensive and less "fashion-dependent" items and only a limited proportion of respondents had ever leased products or purchased second hand.

It is therefore time to realise that **through our market power, we can significantly support or hamper a transition towards a circular economy.**



Every time you spend money, you're casting a vote for the kind of world you want

Anna Lappe

READ

The effects of consumer behaviour on the Circular Economy

WATCH

Moving towards a circular economy, EU Environment

INTERACT

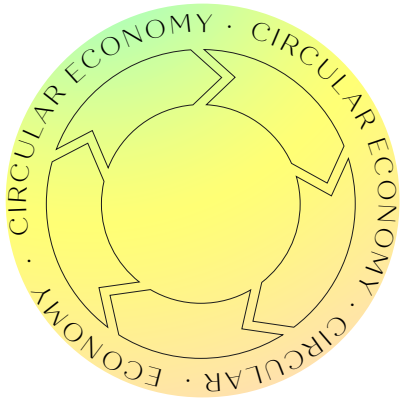
Group Activity 4:
Abundance Game

5 FROM LINEAR TO CIRCULAR ECONOMY MODELS

Osterwalder et al. (2005) state that business models describe the way companies conduct business. In the circular economy context, new business models allow for:

- **Greater control of resources streams through the value chain so the added value can be identified and captured.**
- **Innovation through the supply chain so new entities can be generated such as business in waste handling, refurbishment and reverse logistics.**
- **Enhanced collaboration within the supply chain amongst all actors.**
- **Creation of services that capture valuable products/resources.**

Circular business models differ in how they influence consumption patterns and resource flows. In particular, Tunn et al. (2019) found four elements have a significant impact: **Resource Strategy, Revenue Model, Consumer Effort, and Objective to Shift Consumption Levels.**



On the one hand, companies can offer alternatives to high impact products and services that do not require a change in consumption behaviour. One example is the company **Leapp** that aims to reduce purchases of new smartphones and laptops by offering refurbished ones with a 2-year warranty, thereby improving sustainability and giving consumers certainty. On the other hand, some companies aim to actively shift from traditional models and consumer behaviours. **Homie** for example, provides washing machines in a pay-per-use scheme and actively tries to influence consumer behaviour through pricing, feedback and other interventions. Lastly, **OV-fiets** tries to make the use of public transport more convenient by providing rental bikes at Dutch railway stations and thus potentially reducing the use of cars. The concept of "no ownership" gives the supplier a motivation to innovate on electric bike use, material use, design for a better quality, etc.

SMEs are a substantial part of the business environment, with over 99% of European enterprises belonging to the SME category and generating around two-thirds of European employment. Yet, several barriers hinder their transition to a circular economy such as lack of capital and support from supply and demand networks.

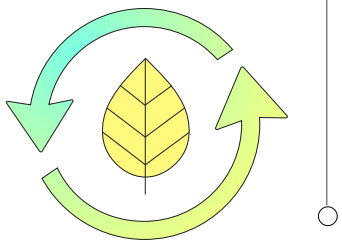
According to Rizos et al. (2016), those who succeeded counted on a strong sustainability-focused company culture; supporting multipliers to enhance information sharing; and the benefits of having a "green" image. In addition, the Ellen MacArthur Foundation (2020) demonstrates that collaborative partnerships can make circularity more accessible.

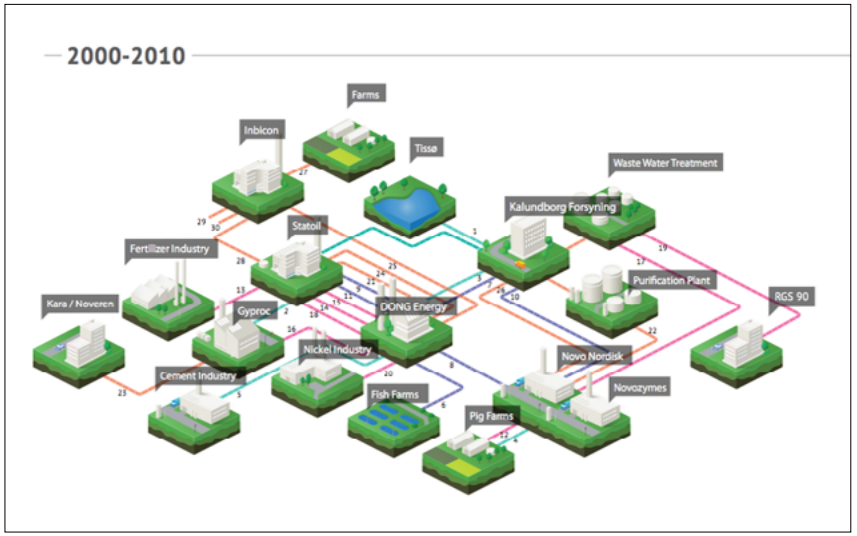
One example is **Kalundborg Symbiosis**, the world's first functioning example **of industrial symbiosis.** This is a Danish public-private local partnership, where partners provide, share and reuse energy, water and materials to create

shared value. **The purpose of industrial symbiosis is to create closed loops of technical or biological materials while minimising the leakage and waste, thus demonstrating some key parts of a circular economy, at a local scale.**

This cooperation began in Kalundborg in 1961, initially with the area's water supply. It was not officially referred to as 'industrial symbiosis' until 1989, because of the participants' philosophy and values: working together is just smart business based on trust, confidentiality, openness and equality. Several projects have been completed over the years, from algae production facilities to bio-ethanol production, with some projects already being implemented at scale. Several startups have also located themselves in Kalundborg to benefit from the cooperative nature and innovative mindset.

McKinsey (2016) explains this circularity process in the "RESOLVE" Framework, which presents six actions that businesses and government can take to transition towards circular economy: Regenerate, Share, Optimise, Loop, Virtualise and Exchange.





REGENERATIVE

- Shift to renewable energy and materials
- Reclaim, retain, and restore health of ecosystems
- Return recovered biological resources to the biosphere

SHARE

- Share assets (eg cards, rooms, appliances)
- Reuse/ secondhand
- Prolong life through maintenance, design for durability, upgradability etc

OPTIMISE

- Increase performance/efficiency of product
- Remove waste in production and supply chain
- Leverage big data, automation, remote sensing and steering

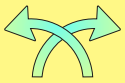
LOOP

- Remanufacture products or components
- Recycle materials
- Digest anaerobically
- Extract biochemicals from organic waste

VIRTUALISE

- Dematerialise directly (eg books, CDs, DVDs, travel)
- Dematerialise indirectly (eg online shopping)

EXCHANGE



- Replace old with advanced non-nenewable materials
- Apply new technologies (eg 3D printing)
- Choose new product/service (eg multimodal transport)

Regenerate:

a broad set of actions that maintain and enhance the Earth's biocapacity. That includes the transition from finite fossil fuels to renewable energy; reclaiming land and restoring or protecting ecosystems; and returning biological resources to nature through composting for example.

Share:

the 'sharing economy' is a concept that overlaps with the circular economy. Sharing gets the full use out of goods and eliminates waste and duplication.
The average European car is only driving for 5% of the time, for example, spending the vast majority of the time parked up and out of use.
Car-sharing schemes, tool hire, or libraries all help get more value out of products by sharing them.
The second-hand market and repair are also filed under 'share', as they similarly reduce the 'loop speed' of goods passing through the economy, ensuring that they're only sent back for recycling or reprocessing when they really need it.

Optimise:

this is about removing waste energy and materials in the manufacture of goods, and in the use of them as well. It also entails using technology to maximise resource use.

Loop:

where organic materials are composted in a circular economy, inorganic (or 'technical') materials are reused. They may be recycled, or even better, goods or parts can be remanufactured. Either way, resources are processed, looped around and put back into the economy, rather than lost to it through landfill.

Virtualise:

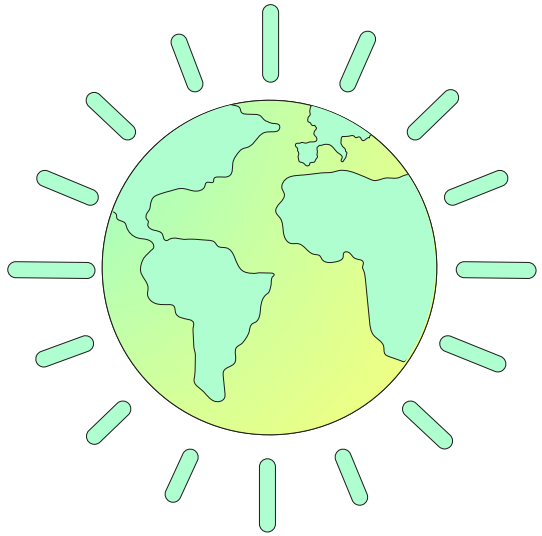
if you have an e-reader or a Netflix subscription, you're taking part in the virtualisation of the economy.
Think how many different gadgets have been displaced by the apps on your phone – alarm clocks, maps, a daily newspaper.

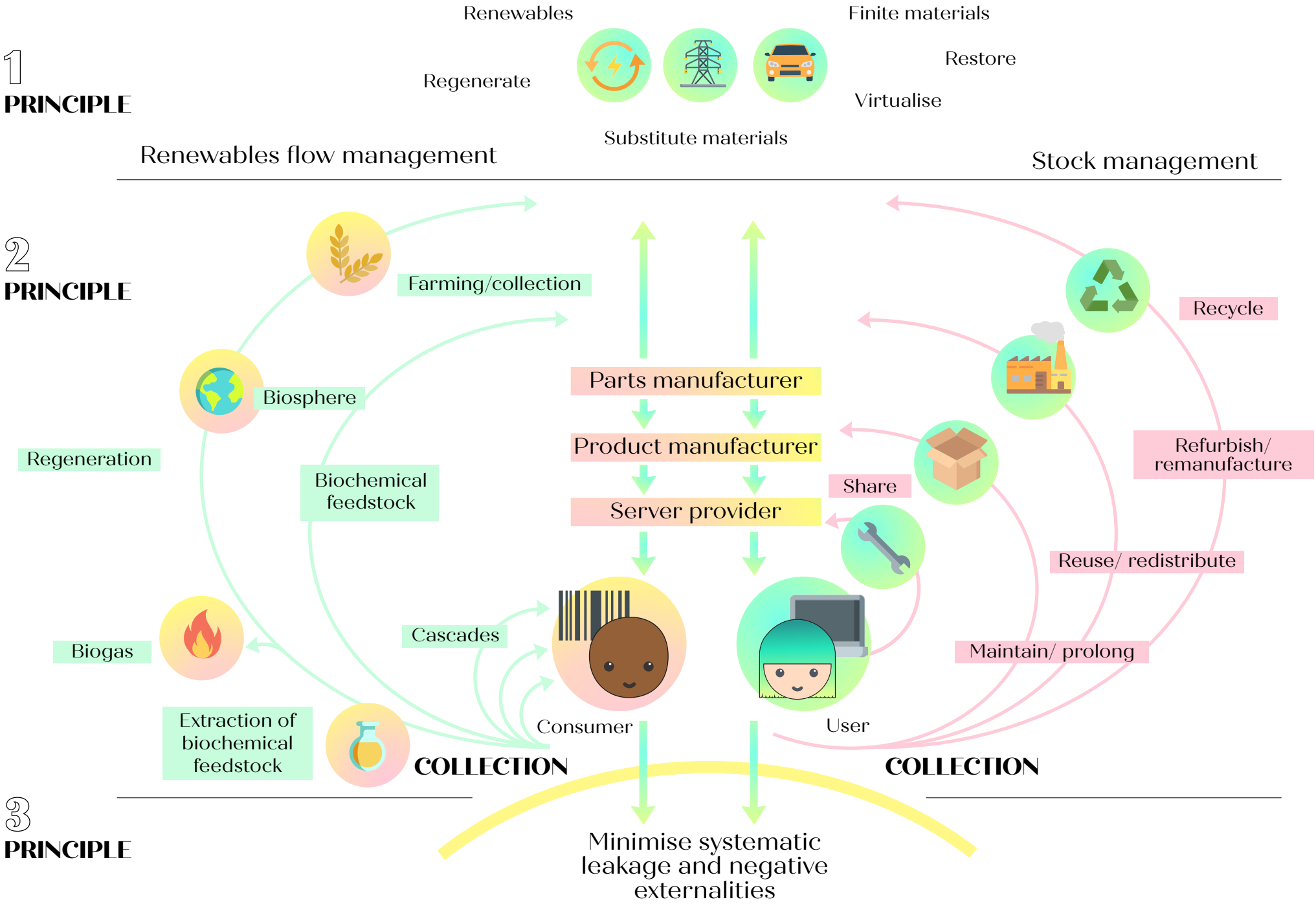
Exchange:

the final category describes the processes of swapping in new technologies, upgrading or replacing older ways of doing things. Electric motors will replace internal combustion engines, for example. We may exchange ways of doing things too – perhaps swapping out private motoring, electric or otherwise, in favour of public transport and autonomous car-sharing.

In different ways, these actions all increase the utilization of physical assets, prolong their life spans, and shift the use of resources from finite to renewable ones. Moreover, each action reinforces and accelerates the performance of the others.

To develop the concept further, the Ellen MacArthur Foundation (2020) places these actions into a model that includes the continuous flow of technical and biological materials through the 'value circle'.




1
PRINCIPLE
Renewables
Finite materials
Regenerate
Restore
Virtualise
Substitute materials
Renewables flow management
Stock management
2
PRINCIPLE
Farming/collection
Recycle
Biosphere
Parts manufacturer
Product manufacturer
Server provider
Refurbish/
remanufacture
Regeneration
Biochemical
feedstock
Share
Reuse/ redistribute
Biogas
Cascades
Maintain/ prolong
Extraction of
biochemical
feedstock
Consumer
User
COLLECTION
COLLECTION
3
PRINCIPLE
Minimise systematic
leakage and negative
externalities

1
PRINCIPLE

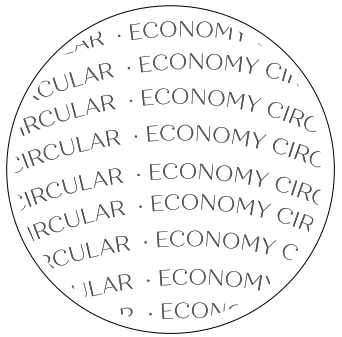
Preserve and enhance natural capital by controlling finite stocks and balancing renewable resources flows ReSOLVE levers: regenerate, virtualise, exchange.

2
PRINCIPLE

Optimise resource yields by circulating products, components and materials in use at the highest utility at all times in both technical and biological cycles ReSOLVE levers: regenerate, share, optimise, loop.

3
PRINCIPLE

Foster system effectiveness by revealing and designing out negative externalities. All ReSOLVE levers.

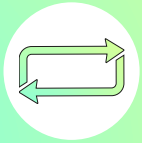


On the left is the biological circle, and on the right is the technical circle. Nowadays many products get recycled, but the further inside of the circle, the more product value will be preserved.

To sum up distinct types of loops can be identified as ways to create circular value and related to a specific strategy. The scheme below simplifies this. Although the focus is primarily on one aspect of the product/service entire life cycle, their consequences are spread throughout the business process.

On the left is the biological circle, and on the right is the technical circle. Nowadays many products get recycled, but the further inside of the circle, the more product value will be preserved.

CIRCULAR BUSINESS MODEL TYPOLOGY

CIRCULAR BUSINESS MODEL TYPOLOGY	DESCRIPTION	DESCRIPTION OF KEY STRATEGY	SUB STRATEGY
 Clean loop	■ The product is designed not to harm the environment (toxic free). ■ The product is designed to be fully recyclable. ■ The Product does not rely on scarce materials.	■ Use of clean and renewable resources. ■ The product is 100% biodegradable/ recyclable.	■ Green process. ■ Separation of biological and technical nutrients.
 Short loop	■ The product remains in user hands, but is maintained, repaired or upgraded to extend its lifetime.	■ Extend life of product.	■ Maintenance. ■ Repair. ■ Upgrade.
 Access loop	■ Product is used by several users. ■ The business model seeks maximization of use.	■ Maximization of product use.	■ Reuse/redistribute ■ Rent/lease ■ Product as a service
 Long loop	■ Resource is reused for same or different product, for same of different function.	■ Extend material use.	■ Refurbishment ■ Remanufacture ■ Recycle ■ Energy valorisation
 Cascading loop	■ The product is designed with a view to create multiple value creation. ■ Product is using resources that can be recovered for another use.	■ Extend material use.	■ Cascading ■ Industrial symbiosis

In order for these models to work, substantial changes are needed by all actors involved in the process. Moreover, alongside the above responses to businesses' economic resilience, Lemille (2018) further invites to add a social dimension as well as a holistic value-based method to the current model. This would ensure respect towards the Earth's boundaries, the genuine well-being of all, whilst providing the opportunity to rethink the origins of our societal negative externalities. Only by making the new models fully inclusive, everyone will benefit.

Nature has been innovating for more than 4.5 billion years now and with an ingenuity that is incomparable. So it's time to take nature into account and embrace all aspects in our business models.

"You never change things by fighting the existing reality. To change something, build a new model that makes the existing model obsolete."

Richard Buckminster Fuller (1895-1983).
Systems theorist, architect and inventor of the geodesic dome.

READ

One of our favourite word: Usership

WATCH

The Light Bulb Conspiracy: planned obsolescence

INTERACT

Group Activity 5:

Circular/Linear card activity

6 SUSTAINABILITY VS. RETURN ON INVESTMENT

6.1 The concept of sustainability in business

At the beginning of the 80s, the term and concept of "sustainability" were known and popular only by a small group of environmentalists and environmental economists. Nowadays, the increased use of the term has taken place, often without the underlying concept and in many fields.

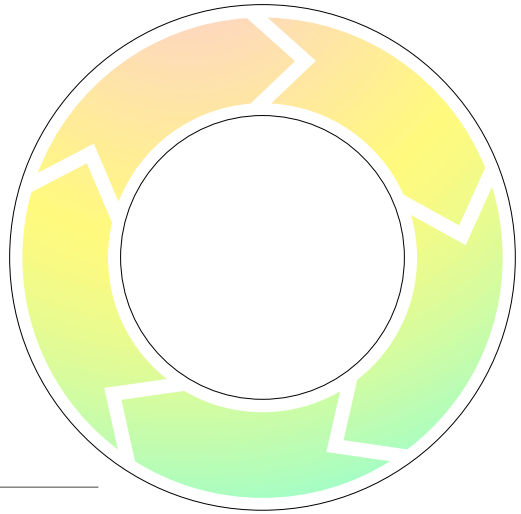
Within the entrepreneurial context, it is said that an increasing number of organizations are incorporating sustainable practices into their business strategies, implementing analytical techniques like Life Cycle Assessment (LCA), taking steps to reduce waste and use resources more efficiently. But what exactly does it mean to be "sustainable" in business?

Sustainability in business generally addresses two main categories:

- **The effect business has on the environment.**
- **The effect business has on society.**

The goal of a sustainable business strategy is to make a positive impact on either one of those areas. When companies fail to assume responsibility, the opposite can happen, leading to issues like environmental degradation, inequality, and social injustice.

According to Harvard Business School (2018), **beyond helping curb global challenges, sustainability can drive business success.** The infographic below offers a summary of why sustainability matters for businesses as well as the wider environment.



WHY SUSTAINABILITY?

Longer life-cycle better UX

Innovation New technologies, products and customers

A better working enrironment and business culture for your staff

Improved functionality and quality of products

Improved customer and supplier relationships

Human

PEOPLE

Reducing the environmental impacts from distributing products

Using fewer materials overall in the manufacture of products

Subtitutes hazardous substances

Reduce use of raw material and energy

Producing less pollution and waste

Using materials with less environmental impact

Anticipate regulation

Ecological

PLANET

Reduce costs Monetize waste material

Increase market shares full lifecycle revenues

Product equivalent of higher margin

Improve competitiveness

Lower production and labor costs and greater efficiency

Join forces Industry symbioses

More profitable than regular products

Reduced material and resource costs lower waste disposall costs

Lower costs of compliance with legislation

Industrial

BUSINESS

McKinsey's survey shows that larger shares of executives say sustainability programs make a positive contribution to their companies' short- and long-term value; this is especially true in the areas of growth and risk management that, along with return on capital, are three ways in which sustainability can create value based on McKinsey research.

Several investors today use Environmental, Social, and Governance (ESG) metrics to analyze an organization's ethical impact and sustainability practices. Investors look at factors such as a company's carbon footprint, water usage, community development efforts, and board diversity. However, there is not one "right" or commonly agreed method of measuring sustainability and many still wonder about the return on their sustainability efforts as they strive to remain profitable.

Furthermore, the potential social impacts are frequently ignored during planning for facilities, infrastructure etc. So, when impacts emerge, they create unforeseen expenses, hardship and disruption for stakeholders and businesses alike. If a fishing ground has to be closed because of a toxic mishap, it can devastate hundreds of families and businesses, and create potentially huge liabilities.

Return on Investment (ROI) analysis is a performance measure commonly used to evaluate the efficiency of an investment or compare the efficiency of a number of different investments.

If a project costs X up front, saves you Y over its useful life, then your return on investment is positive if Y is greater than X. ROI is therefore the ratio of a profit or loss made in a fiscal year expressed in percentage of increase or decrease in the value of the investment during the year in question. For example, if you invested 100€ in a share of stock and its value rises to 110€ by the end of the fiscal year,

the return on the investment is a healthy 10%, assuming no dividends were paid.

While traditional ROI models focus on the short-term gains of a capital investment, business strategies centred around sustainability need to take into account the long-term gains and several variables such as water use, CO^2 emissions, waste etc.

In this chapter we briefly touch on two different approaches attempting to measure return on investment from another perspective, **Energy Return on Energy Invested (EROEI)** and **Sustainable or Social ROI (S-ROI)**. In addition, there is a huge array of sustainability projects that require little financial capital and either can save money or increase sales (or both). The recycling of waste is a simple example. One can go from paying for waste removal to actually selling waste, which means it is no longer a waste.

Due to the introductory nature of this book, we will not dive deep into the analysis calculation methods which are available in the extra reading section instead.

Return on Investment (ROI) analysis is a performance measure commonly used to evaluate the efficiency of an investment or compare the efficiency of a number of different investments.

6.2 Energy Return On Energy Invested (EROEI)

o what would happen if new businesses were judged on Energy Return on Energy Invested (EROEI) rather than on their monetary Return on Investment? For example, industrial agriculture, with its use of chemical fertilizers, pesticides, heavy machinery and transport of products, uses 15 calories of fuel to produce 1 calorie of food. While it may be profitable financially to the big corporations that supply chemicals, pesticides and fuel, its EROEI is clearly not viable.

The concept of EROEI or EROI was originally derived in ecology and has been transferred to analyse human industrial society further to understanding that the prosperity of humanity depends upon the efficiency with which we gather energy. 50 years ago, high EROEI ratios (in the range of 20:1 to 50:1 or more) for society's energy-obtaining efforts meant that relatively little capital and labor were needed in order to supply all the energy that society could use. As a result, many people could be freed up from basic energy-producing activities (like farming), their labor being substituted by fuel-fed machines. Channeled into manufacturing and managerial jobs, these people found ways to use abundant, cheap energy to produce more goods and services (Post Carbon Institute, 2015). As time passes the EROEI of new resources is steadily falling. This translates to a higher oil price, the need to replace high ERoEI fossil fuels with new renewable energies like solar PV and biofuels, a shrinking flow of manufactured goods and a reduced ability to construct high energy-input structures.

The table below shows the ratio of energy

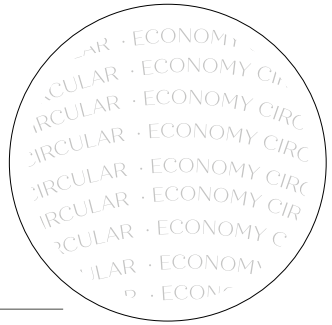
currently required to gather different energy sources. The world's infrastructure for transportation and commerce was built for oil and coal power which are relatively easy to store and use at will. Most renewables however lack these attributes.

	Net Energy Radio								
	0	10:1	20:1	30:1	40:1	Renewable	Easily Storable	Not Intermittent	Carbon Intensity (Lifecycle)
Conventional Oil (1930)						100:1	●	●	MED
Conventional Oil (present)							●	●	MED
Offshore Oil							●	●	MED
Unconventional Oil							●	●	MED
Coal						80:1	●	●	**HIGH**
Conventional Natural Gas							●	●	MED
Shale Gas	UNKNOWN						●	●	MED
Nuclear							●	●	MED
Hydropower						●		●	LOW
Industrial Wind						●			LOW
Solar Photovoltaic						●			LOW
Biomass Electricity						●	●	●	MED
Geothermal						●		●	LOW
Concentrated Solar						●			LOW
Liquid Biofuels						●	●	●	MED

Characteristics of energy resources (source: David Murphy).
"Net Energy Ratio" in this chart is essentially the same as EROEI.

On a practical level, measuring total energy output is often easy, for example through electricity meters. However, researchers disagree on how to determine energy input accurately and therefore arrive at different numbers for the same source of energy. Site energy consumption, energy embedded in materials used at the construction, operational and decommissioning stages, energy consumed by labour and auxiliary services such as energy cost of the highway network, power distribution network and services like schools and hospitals are usually taken into account (Mearns, 2016). Yet, there is no single accepted way of calculating EROI, because it depends in part on what is counted as an input and on type of energy source.

Despite the debate around EROI values, Bardi (2017) concludes that because the EROEI of renewables is smaller than that of crude oil, considering also the expense of the infrastructure needed to adapt our society to the kind of energy produced by renewables, "renewables cannot sustain a civilization that can sustain renewables". Unless, as suggested by Den Bergh et al. (2014), a carbon price is imposed to discourage coal use more than oil, and oil more than gas, in addition to greatly accelerated investment in renewable energies, dramatic improvements in energy efficiency and drastically reduced demand.



6.3 Sustainable or Social ROI (S-ROI)

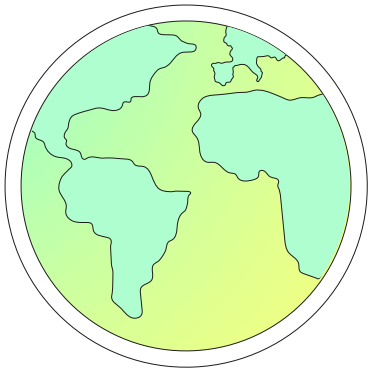
Another way for businesses and organizations to prepare for a renewable future is to incorporate environmental and social value into cost-benefit equations through the Social or Sustainability-ROI analysis. This demands an understanding of the amount of positive change that has occurred because of their intervention that would not have occurred otherwise. And it gives a framework for understanding how much impact value has been created.

Estimating the impact of future events always entails uncertainty. But assigning monetary values to change being created by the activities of an organization (whether environmental, social, or otherwise) as well as the knowledge of stakeholders inside and outside an organization can help to model our response to uncertainty, assess the consequences and provide guidance for decision-making. Below are the analysis principles suggested established by Social Value International:

1. **Involve stakeholders–** Inform what gets measured and how this is measured and valued in an account of social value by involving stakeholders.

2. **Understand what changes –** Articulate how change is created and evaluate this through evidence gathered, recognising positive and negative, intended and unintended changes.

3. **Value the things that matter –** Making decisions about allocating resources between different options needs to recognise the preferences of stakeholders.



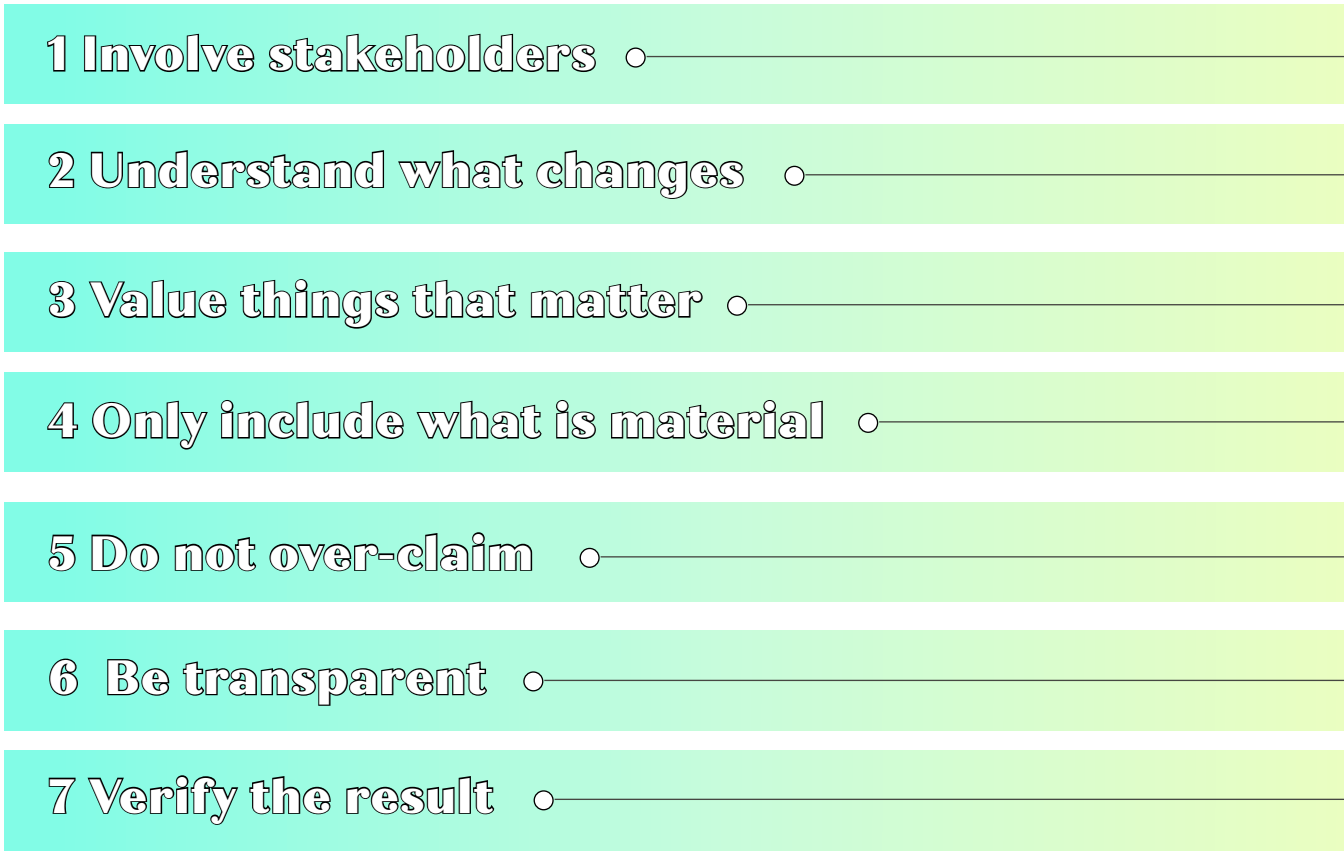
4. **Only include what is material –** Determine what information and evidence must be included in the accounts to give a true and fair picture, such that stakeholders can draw reasonable conclusions about impact.

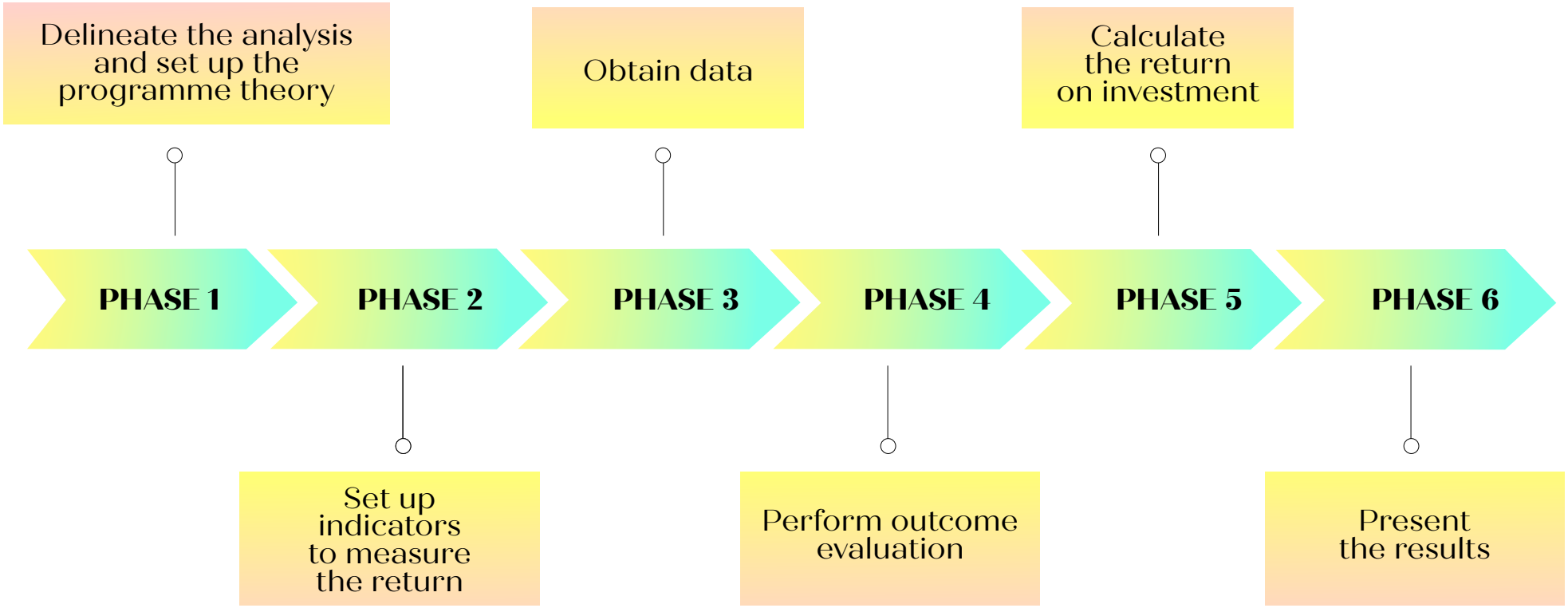
5. **Do not over-claim –** Only claim the value that activities are responsible for creating.

6. **Be transparent –** Demonstrate the basis on which the analysis may be considered accurate and honest, and show that it will be reported to and discussed with stakeholders.

7. **Verify the result –** Ensure appropriate independent assurance.

In practice, S-ROI analysis follows the six continuous phases shown in the figure below, which together constitute the actual SROI method and help to ensure validity and systematisation.





Adapted from "Is it Worth it?" Lindgaard et al. 2015

The following example shows how the overall delineation can be performed, so as to create a framework for ongoing analysis that can pinpoint the potential for similar interventions to be disseminated in other areas.

Bybi is a socio-economic enterprise that produces honey in different areas of Copenhagen. Today, there are more than 25 apiaries across the city, including in numerous courtyards and on the roofs of buildings such as Copenhagen City Hall, producing more than five tonnes of honey per year.

The aim is to improve the local ecosystem, offer meaningful employment to a number of socially vulnerable groups, as well as sell honey and products based on honey and beeswax produced in the enterprise's own beehives. Bybi handles the entire value chain: from setting up and managing the apiaries, to centrifuging, packing and then selling back to the companies. Bybi also trains beekeepers, provides nature guides in the local area, as well as various information events.

Phase 1 of an SROI analysis for Bybi might include:

Purpose:
to demonstrate the effects of its activities for the socially vulnerable people in the urban quarters, and for the residents in general.

Objectives:
to create sustainable development, meaningful employment for vulnerable people, economic value in society, and security and well-being in vulnerable residential areas.

Returns:
Citizen-experienced returns from the intervention.

Recipients of the analysis:
Partners, including enterprises and the City of Copenhagen.

Time frame for the analysis:
Short and medium term.

Available resources:
There are sufficient resources to perform an analysis of relevant elements of the intervention.

It is essential to state why one analysis focus has been chosen rather than another, and which perspectives have been opted in or out of. In this case, the outcome for the local enterprises that sell the honey, for consumers and for local schools and garden owners were not included as the significance of the project for these groups lies outside the focus of the relevant analysis.

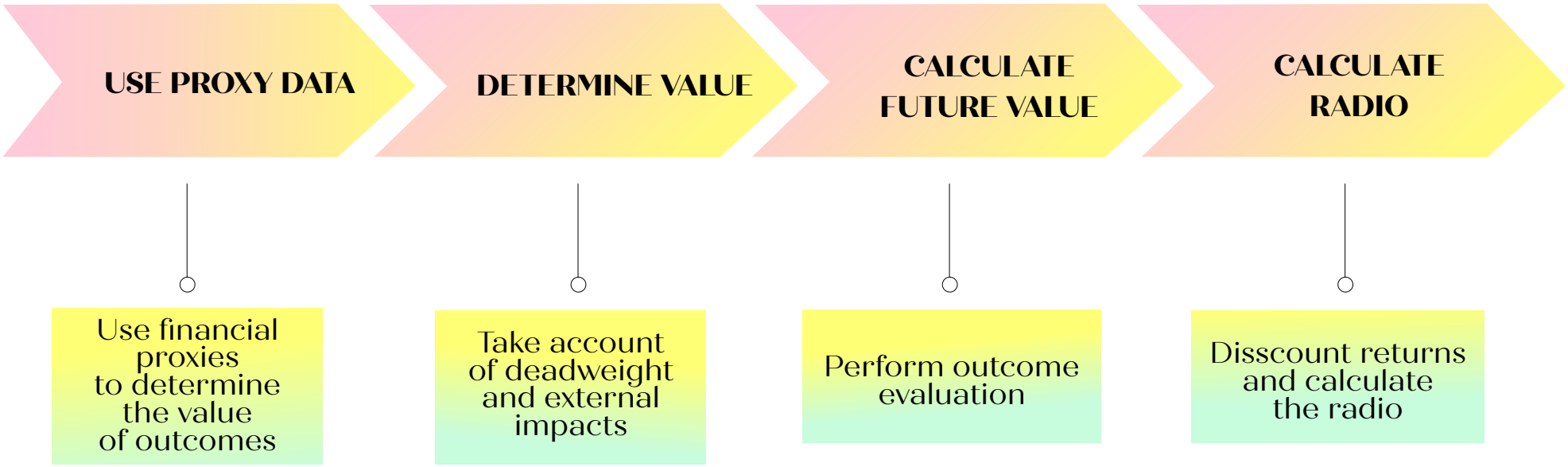
The following step is about establishing a programme theory to describe how we expect the activities to lead to the required results.

In the phase 2, indicators are set up as a tool to measure various aspects of the programme theory. The indicators might, for example, be the target group's health, function level or readiness to work.

After this, data is collected using a series of qualitative and quantitative methods that together can elucidate the intervention's outcomes and costs, and support the indicators that have been set up. Across these stages it is customary to use stakeholders to gather knowledge, while proxies are used to calculate the economic returns. Proxies are replacement price measures of outcomes that do not have an immediate market value, such as better health or less crime.

Based on the outcome evaluation, it is possible to calculate the actual social return on investment and finally have a clear picture of whether the intervention is a worthwhile investment.

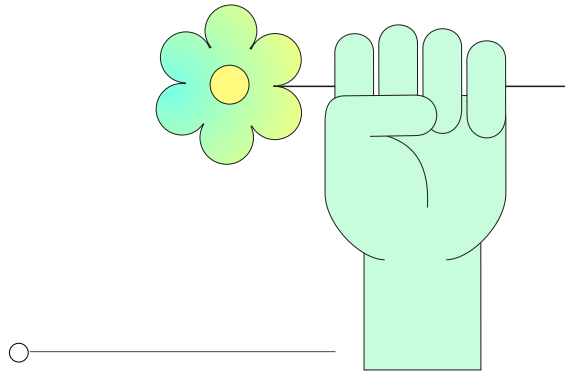
The classical S-ROI ratio calculation is based on the knowledge already collected and is made in four consecutive steps as shown below:



Adapted from "Is it Worth it?" Lindgaard et al. 2015

According to Pearce (2018), challenges to the implementation of a S-ROI strategy include setting up monitoring systems, well-developed theory of change models and a process of interpretation, allocating adequate funding and selecting the right measures/indicators. Still, Lindgaard et al. (2015) identified several reasons to use these instruments. First of all, social welfare and environmental activities concern so many people that we need to know what works, and what we get for our money. In other words, we have both an economic and an ethical obligation to deliver the best possible interventions and create most value for money.

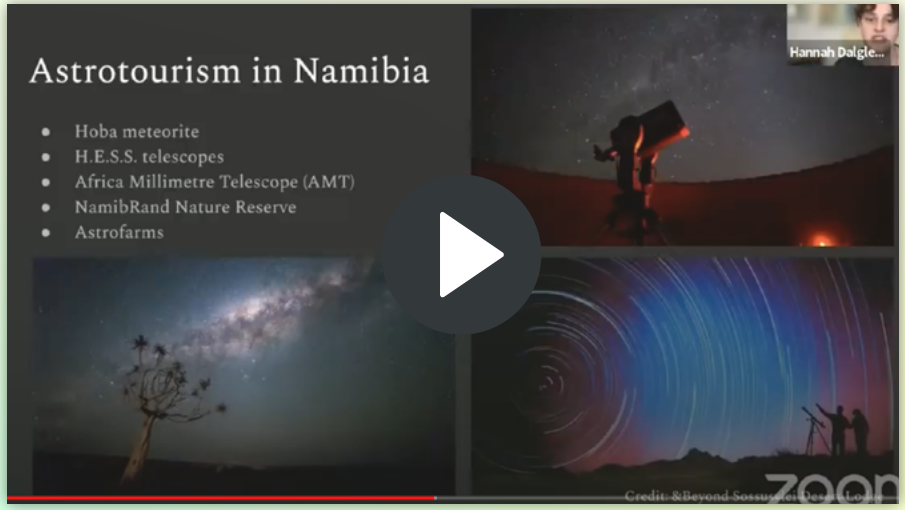
Secondly, the demand for social and environmental interventions is increasing year by year. Thirdly, new methods are increasingly being integrated into programmes and interventions to facilitate the S-ROI analysis. Last, but not least, documentation of outcome is a universal language that not only unites the social welfare area, but also extends to other professional groups and cross-disciplinary research, plus it gives employees insight into other professional groups' areas of expertise, so that shared programme theories, objectives and procedures can be developed which are all necessary in order to create more value.



“Sustainability is not a goal to be reached but a way of thinking, a way of being, a principle we must be guide by.”

Giulio Bonazzi –
Chairman, Aquafil group

WATCH



The Sustainability Advantage ROI Workbook

INTERACT

Group Activity 6:

The Branded T-Shirt Case

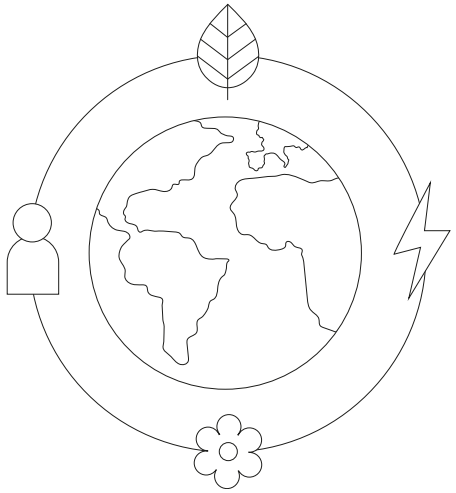
READ

The SROI Network: A Guide to Social Return on Investment

7 LEARN FROM OTHERS – SUCCESS CASES

Across industries, a compelling financial case is emerging for the move from linear to circular models of production and consumption. To capture circular value and pivot to new growth areas, most industries are adopting a dual focus: applying circular models to their existing value chains, while also incrementally altering the way they do things today. We are seeing used shoes recycled into sports flooring or car interiors, unwanted plastics transformed into superior road surfaces, and wastewater becoming fuel for public fleets. Although the crossover of circular inputs is still limited by technical feasibility, inadequate infrastructures, and unintended impacts, the potential is huge.

Below we explore examples of both enterprises and public entities that have successfully made a change to products, processes, services or organisational methods, that improve operational performance, productivity, efficiency, reduce environmental risk and resource use, and facilitate compliance with environmental regulations.



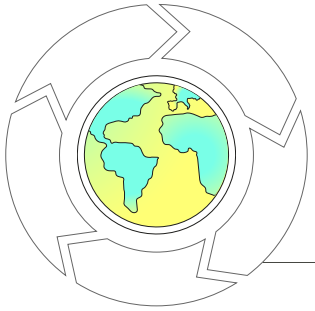
Food & Agriculture

In 2017, there were over 110 million people in the EU who lived in households at risk of poverty or social exclusion, equivalent to 22,4 % of the entire population. On the other side, around 88 million tonnes of food are wasted annually in the EU, with associated costs estimated at 143 billion € (EU Fusions, 2016). Some products don't even make it to the supermarkets due to overproduction or odd sizes and looks. Some customers prefer the prettiest products, even though a crooked cucumber tastes the same as a straight one. So what happens to the surplus of food? Businesses have started to find ways to recover food waste and in 2018, the European Food Banks provided 781,000 tons of food - equivalent to 4.3 million daily meals - to 45.700 charitable organisations for the benefit of 9.3 million deprived people (EU Fusions, 2016).

COOMIDA is an innovative technological and cooperative tool aimed to ease food donation (including surplus food). COOMIDA connects local donors, food banks, volunteers and charities through a collaborative network for an efficient and sustainable management of food donations, thus reducing time, emissions and expenditure. It also allows to recover little and remote donations that otherwise could exceed the Food Bank capacity. In 2018, COOMIDA recovered 6,000 kg of surplus food.

Brewers' grains are the solid residue of malt left after the process of brewing beer. It often goes to waste, but **Instock** identified an opportunity to repurpose them to produce granola. They also changed the "best before date" on the package into "at least delicious until" date to raise awareness about food waste occurring at home, partially due to a misinterpretation of the best before and expiration dates.

Lufa Farms are a Montreal food company who are pioneers in the area of urban farming. In 2011, Lufa planted the first seeds in the world's first commercial rooftop hydroponic greenhouse. One year later, the vegetables harvested from this 0.75 acre area were sufficient to feed 2000 local inhabitants. Producing food on previously underutilised urban roof spaces not only contributes an effective solution to the critical challenge of feeding the world's growing cities, but also benefits the built environment more broadly by reducing building energy demands and attenuating flows into stormwater drains.



Packaging

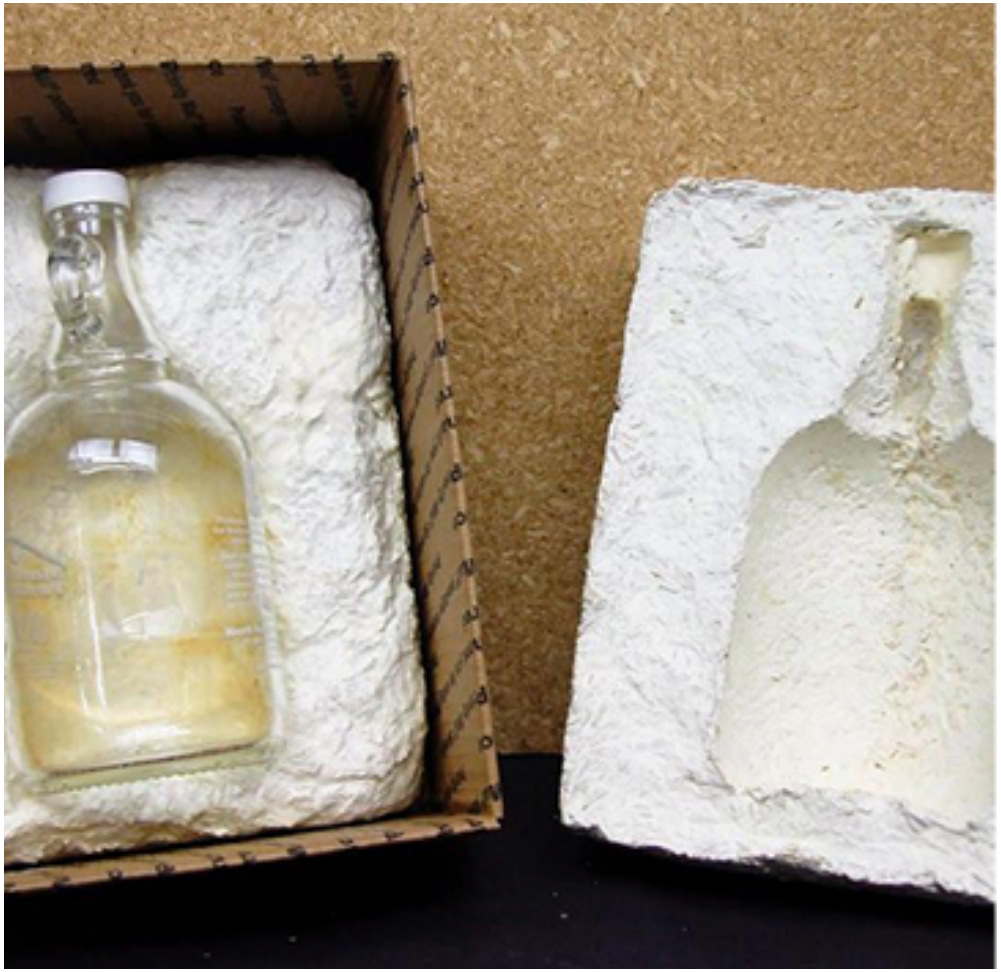
The EU estimates that in 2017, 172.6kg of packaging waste was generated per inhabitant in the EU. This quantity varied between 64.1kg per inhabitant in Bulgaria and 230.9kg per inhabitant in Luxembourg. Recycling is the first option of plastic packaging waste and since 2006 the quantity of plastic post-consumer packaging waste sent to recycling has increased by 92%.

Some companies understand that recycling and using recycled content is about trying to do the best you can with waste, but it is not solving the foundational reason we have waste.

RePack is an e-commerce packaging innovation aiming to eliminate waste. When you receive an online order packaged with Repack, you unpack your item and then you simply fold the package and drop it in a post box anywhere in the world. Some bags go back directly to RePack but others are returned to RePack using brands as prepaid customer returns and get used up to (at least) 20 times for new deliveries. The direct return rate is 75%. Some users keep the packaging and reuse it themselves or return it at a later stage.

Saltwater Brewery in Delray Beach, Florida, recently released edible six-pack rings, a brand-new approach to sustainable beer packaging. These six-pack rings are 100% biodegradable and edible, constructed of barley and wheat ribbons from the brewing process. This packaging can actually be safely eaten by animals that may come into contact with the refuse.

Tired of the amount of plastic piling up around the planet as well as the treatment of farm animals, Eben Bayer founded **Ecovative Design** and began growing mycelium to replace plastics in clothing, skincare, textiles and packaging. Rather than being reliant on petroleum, these products use local feedstock from crop waste such as seed husks and woody biomass (which means the material can be grown anywhere and is 100% compostable). Mycelium is the root structure of mushrooms and it is a wondrous and versatile product performing at least as well as current state-of-the-art synthetics, but at a lower cost to people and the environment.



Textile

McKinsey's studies (2017) show that apparel sales have risen sharply in recent years, as businesses have used "fast fashion" design and production systems to cut prices and introduce new lines more often. From 2000 to 2014, global clothing production doubled and the number of garments sold per person increased by 60%. In Brazil, China, India, Mexico, and Russia sales grew eight times faster than in the EU though the average EU resident still buys more clothing each year reaching a total consumption expenditure of 520 billion € in 2018. Narrowing that gap represents a big opportunity for clothing companies, but the environmental consequences are clear. Making and laundering clothes typically requires large quantities of water and chemicals. Fluence (2020) estimated that around 2000 liters of water are needed to grow, dye, and process the cotton for just one pair of blue jeans. In addition, fiber farms occupy vast tracts of land and produce significant greenhouse-gas emissions. After consumers discard old garments, something that happens ever more quickly, current technologies cannot reliably turn them into fibers for new clothes. Without improvements in how clothing is made, cared for, and disposed of, apparel's environmental impact will worsen.

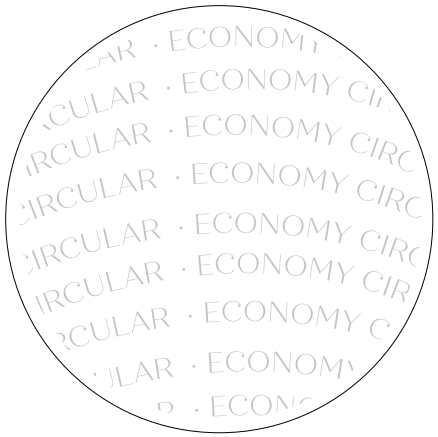
Wieland Textiles has been buying quality used clothing and shoes on a massive scale since 1982. Everything is sorted by type, size and material, then sold on the global market at very attractive prices. In this way, countless people benefit from clothing and footwear in their second phase of life.

VIGGA is the first brand ever to combine organic children's fashion with the circular

economy. Vigga's customers pay a monthly fee for the subscription service. A week before the baby's birth, the first bag with clothes arrives. When the clothes become too small they are sent back to VIGGA, and a new collection in the next size up arrives. The clothes go through a rigorous quality control and environmentally friendly washing process before being shipped out to another customer.

Teemill has developed a circular production process that turns old t-shirts into new ones. The company began as a fashion brand called Rapanui, but after working many years to design a circular supply chain, they re-launched Teemill in 2018. The new company, a software platform for all fashion brands, allows the positive impact of the circular supply chain to be scaled up and accessible to anyone with an internet connection that wants to sell branded garments.

New technology allows printing of the precise t-shirt product that each customer requires, avoiding the need to carry pre-printed stock. Every product produced by Teemill is designed to be sent back when it's worn out or the customer no longer wants to wear it. Although the printer ink used is slightly more expensive than normal ink, the composition allows it to be removed more easily. Scanning a QR code in the wash-care label generates a free post label, which can be used to send the garment back to Teemill, earning credit towards the next purchase. Importantly, this keeps the t-shirt, and the value of the materials, within the system.



Reprocessing

Each year in Europe, an average of 16 tons of materials per person are used to stimulate our economy. According to EU Stats 2016, 2500 million tonnes of waste was produced by economic activities and households in the EU and 38.8% was landfilled. This means that around 6 tonnes per person becomes waste and almost half of that ends up in landfills.

A landfill is a designed structure built into or on top of the ground in which trash is isolated from groundwater, air and rain with clay and plastic liners and daily covering of soil. Drains and pipes are supposed to collect the contaminated fluid released which then gets treated as wastewater.

Eventually, the mound is capped with an impermeable liner and soil, before being grassed over.

Waste decomposes slowly and in a sealed, oxygen-free environment. Because of the lack of oxygen, bacteria in the waste produce methane gas, which is highly flammable and dangerous if allowed to collect underground. It is also a potent greenhouse gas. In some cases it is used for electricity generation.

Reports on municipal waste generation and treatment in the EU from 1995 to 2018 show a distinct trend towards less landfilling as countries move steadily towards alternative ways of treating waste such as recycling, composting and incineration with energy recovery. According to EU Stats (2019) the landfilling rate in the EU dropped from 64 % to 23 % in the last twenty years.

While the importance of protecting the ecosystem is well understood, the costs of dealing with waste can be burdensome. Solutions for aggregating and organizing solid-waste flows already exist at various levels, providing some instructive examples that show how this can be done in a way that creates significant economic value and changes the material supply chain.

Taking empty bottles back to the shops has been a German habit since 2003. All these bottles have the words Pfand (deposit) or Pfandflasche (returnable bottle) on the label, accompanied by a symbol. The deposit varies from 8 to 25 cents, based on the type of container: glass, metal, plastic, recyclable or reusable. The glass bottles are recovered by the distributor and returned to the manufacturers for refilling and returning to the recycling loop. Single-use bottles are deposited for recycling. The deposit has made it possible to achieve a collection rate of 90% for drinks containers in Germany.

At the time of its entry into force, a majority of Germans were opposed to a deposit on disposable containers, but in 2016, 82% of them approved of the system and a majority wanted to extend it to other disposable products, such as cups.

Finding a niche where not even the smallest part is left behind, **Wasteboards** manufacture high quality skateboards from plastic bottle caps collected from visitors of music events, schools, companies etc.

On a different note, **Ioniqa** has developed a game-changing technology to produce high-grade raw materials from PET waste (Polyethylene terephthalate - the most common thermoplastic polymer resin of the polyester family used in fibres for clothing, containers for liquids and foods, thermoforming for manufacturing, and in combination with glass fibre for engineering resins) and was awarded the 2016 Accenture Innovation Award in the circular economy category.

Stena Recycling aims to find the most resource-efficient way to get the most value from industrial waste and increase the proportion that can be used as new raw material. A platform to exchange know-how and to learn new practises is also available on their website. Similarly, **Renewi**, is a leading waste-to-product business that operates across nine countries in Europe and North America to supply recycled paper, metal, plastic and glass, woodchips, compost, energy, fuel etc.

In order to encourage sorting and the reduction of waste, several municipalities across Europe implemented an incentive charging scheme "by weight and collection". Based only on the residual waste bin, the bill includes a fixed amount calculated using the number and volume of bins provided and a variable incen-

tive amount calculated using the weight of the bin and the number of times it is put out for collection. Users very quickly bought into the system and France registered a 34% decrease in residual waste between 2008 and 2017 (EU Commission, 2020). This however also resulted in more trash being thrown in nature.

In Telangana, a state in southeastern India, a group of young entrepreneurs founded **Waste Ventures India**, which turns municipalities' organic waste into compost. While, **Dycle** produce compostable diapers and collect used ones to make into terra preta, a very fertile black soil which is then used at tree planting and community building events.

The Regional Association of Solid Waste Management Agencies of Central Macedonia in collaboration with the Hellenic Ministry of Environment and Energy implemented a pilot action with the slogan "No Christmas tree in landfill". Its scope was the conversion of Christmas trees into wood chips, as it is a secondary raw material for pellets, biofuels and chipboards manufacturing as well as a potentially added material in the organic waste composting process. To support this initiative, once the pilot action announcement was published the operators of the landfill banned the disposal of Christmas trees on-site. As a result, 3 tonnes of Christmas trees corresponding to 2800 items were shredded instead of being disposed of in the municipal landfills and there is a significant potential for replication of the action as well as wider outreach.

Built environment

The Ellen MacArthur Foundation (2020) envisions a built environment based on a circular mobility system of high-quality spaces where buildings would generate, rather than consume, power and food. They would have fully closed water, nutrition, material and energy loops. They would be highly utilised, thanks to shared and flexible office spaces and flexible, smart, and modular homes. This could lead to a reduction in the cost per square metre of more than 30% versus today.

Overall, €30 trillion turnover is generated in the built environment, contributing almost 40% to global GDP (ING Economics Department, 2015). According to EMF (2013), only between 20% and 30% of the construction and demolition waste is recycled or reused, mostly because of the lack of focus on design for disassembly and reuse, which results in a "signifi-

cant loss of valuable materials for the system". Yet, there is huge potential for reuse of materials, a 1% increase in resource efficiency is worth as much as €23 billion for businesses.

An example is the work carried out at Queen Elizabeth Olympic Park, in London, a sporting complex built for the London 2012 Olympic and Paralympic Games. **The London Legacy Development Corporation (LLDC)** are responsible for the ongoing regeneration of the Park after the games with an ambitious waste target for contractors is 95% diversion of non-hazardous waste direct to landfill with an additional target of 50% materials reuse.

Here, among other solutions, timber frames were changed to cross-laminated timber as this can be manufactured off site in controlled conditions which reduces re-working and onsite waste; deep foundations were changed to a shallow raft foundation, thus reducing the amount of excavated material to be disposed of; 104.000 tonnes of recycled crushed concrete was reused after being used onsite for a temporary platform, eliminating the need to import this quantity of virgin aggregate and saving £1 million and more than 20,000 lorry movements.

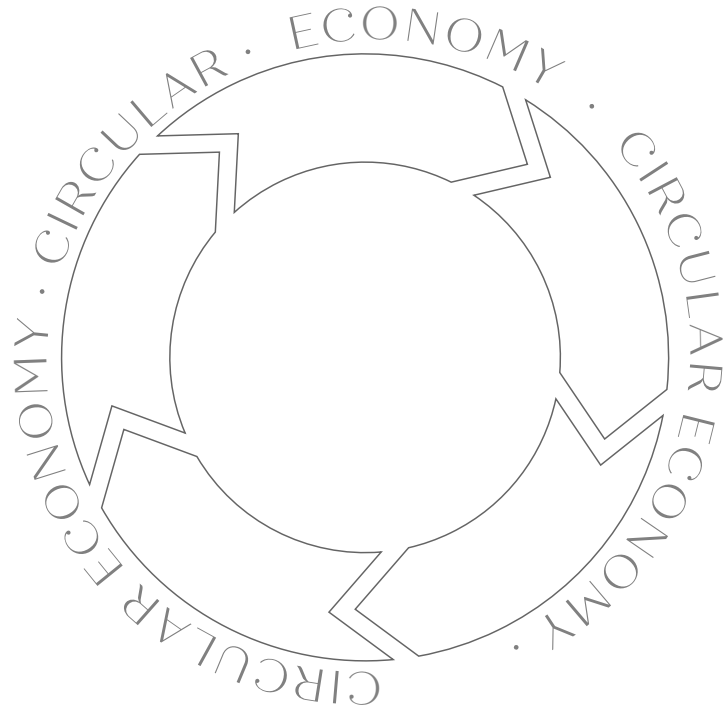
Lastly, one of the key points of the regeneration work is the ability to gift assets to the community. Over 40 community organisations have been gifted assets ranging from the Aquatics Centre's temporary seating to a telephone box to timber thus benefiting from the regeneration process as well as extending the life of materials through upcycling, reuse or refurbishment.

The Bus Boarder Platform, developed by the Spanish company **Zicla,** is a raised platform that improves accessibility at bus stops made of several prefabricated highly resistant, durable, 100% recycled and recyclable PVC plastic obtained from electric cable sheathing, pipes, hoses, etc. All elements can be easily assem-

bled and disassembled, replaced when broken or transported in parts. Other advantages over precast concrete include lower consumption of resources, minor acidifying and eutrophication effects.

When a bus boarder platform for any reason comes to its end of life, ZICLA will accept it at zero cost to be reused as a raw material again.

The project has been developed by Zicla in Barcelona but the platforms have been installed in Barcelona itself, Palma de Mallorca, Málaga, Sevilla, etc. in Spain and Reims, Strasbourg, etc. in France. Between 2010 and 2015, Zicla sold more than 265 bus boarder platforms; a surface equivalent to five olympic swimming pools.



Mobility

Electrification of vehicles is an important step in enabling a transition to renewable, low-carbon energy. The adoption of new service models also incentivises manufacturers to design vehicle components that are maintained and kept in use, retaining value. Further work is also underway to improve battery technologies which encourage reuse, charging speeds, and suitability for a wider range of vehicles.

In 2017, Shenzhen became the first city in the world to reach a goal of 100% electrically run buses. The national piloting scheme has encouraged the development of the local electric vehicle industry, which is expanding to a global market.

In Italy, further to the launch of the National Plan for the installation of a charging infrastructure for electric vehicles, Enel aims to install 14 thousand charging columns (the equivalent of 28,000 charging points) all over the country by 2022. Up to 300 million euro will be invested in the project. In addition, thanks to the **Vehicle to Grid (v2G) technology**, which was introduced by Enel in Denmark and then rolled out in the United Kingdom, France, Germany and Italy, electric cars can also be used as mobile batteries that can contribute to balancing the grid by emitting or withdrawing energy from the system as required.

When it comes to mobility as a service, Michelin Fleet Solutions are operating a customized tire leasing program for transit vehicles and any type of trucking fleet. The tire manufacturer offers a "pay by the mile" service to reduce emissions and accidents, save fuel and keep an operator's vehicles running.

As the case examples have shown, there are many nascent ideas on how to innovate and serve users better with new offerings based on circular economic business models. Individuals, companies, and customers can now fast-track adoption by exercising their right of choice to demand, take up, and, together with the provider, continually improve products and services. Why not ask for a lease-based or performance-based model when you next consider purchasing a piece of furniture? Or try pre-loved clothes?

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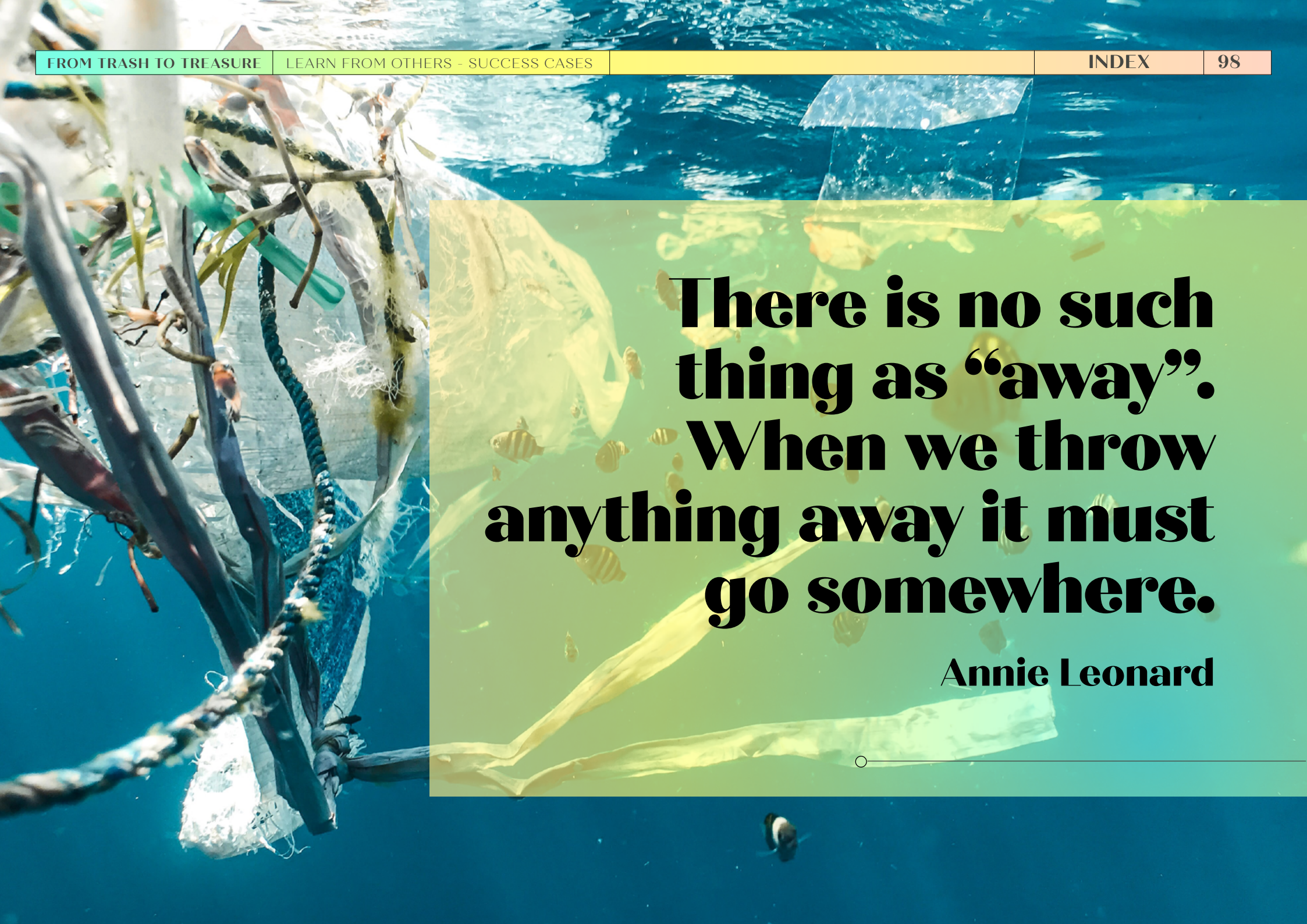


There is no such thing as “away”. When we throw anything away it must go somewhere.

Annie Leonard

WATCH

The magic of materials,
Disruptive Innovation Festival

READ

National Geographic -
Is a world without trash possible?

INTERACT

Group Activity 7:
World Cafe

8 THEORIES AND PHILOSOPHIES FOR FUTURE PROJECTS

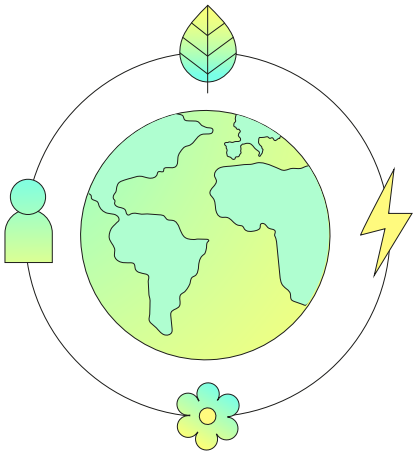
The circular economy concept has deep-rooted origins and cannot be traced back to one single date or author. Its practical applications to modern economic systems and industrial processes, however, have gained momentum since the late 1970s, led by a small number of academics, thought-leaders and businesses who adopted various approaches and theories. The ones with most significant impact are listed here below:

Cradle to Cradle & Performance Economy

A certification process and design philosophy initiated by Walter Stahel as early as the 1980s and further developed by German chemist and visionary Michael Braungart with American architect Bill McDonough. **All material involved in industrial and commercial processes are divided into technical and biological nutrients.**

Nature's "biological metabolism" is used as a productive, positive and efficient model for developing a "technical metabolism" flow of industrial materials. The aim is to design product components that can be designed for continuous recovery and reutilisation as biological and technical nutrients within these metabolisms resulting in product-life extension, long-life goods, reconditioning activities, and waste prevention. It also insists on the **importance of selling services rather than products,** an idea referred to as the 'functional service economy', now more widely subsumed into the notion of 'performance economy'.

A student at Virginia Tech, created MODS, a modular shoe, in response to the millions of pairs of shoes that end up in landfills each year, where they can take 30-40 years to decompose. MODS shoes can be customized and updated as the shoe deteriorates without using glue. Made with bamboo and wool textiles and recycled PET fiber, MODS consist of 5 modular units that use the minimal amount of material needed for maximum comfort and security while giving the user full control of the shoe's aesthetic and functionality.



Blue Economy

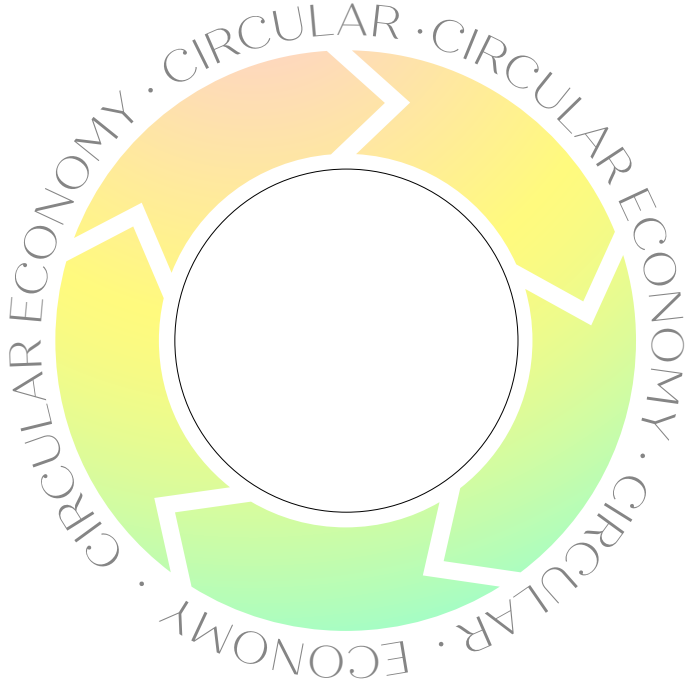
An open-source movement bringing together concrete case studies whereby solutions are determined by their local environment and physical/ecological characteristics and aim to evolve from a core business based on a core competence to a portfolio of businesses that generate multiple benefits for business, society and puts nature back on its evolutionary and symbiotic path. A coffee company for example, can generate income from the coffee, its core business, and now can also generate revenue from the mushrooms farmed on the waste, and whatever is left over after harvesting the protein rich fungi is excellent animal feed. One revenue model is now transformed in a three revenue model.

Its founder, Gunter Pauli (2015) further explains that the drive towards ever cheaper products has resulted in an increased deprivation of cash in local economies, which have less employment but also less purchasing power, thus leading to less money circulating in the communities and this results in an economic contraction as is being experienced in numerous countries.

The power of the Blue Economy is that it injects money back into the local economy, it uses locally available resources and it is dedicated to eliminate whatever is not needed. A battery is not replaced by a green battery, it is simply substituted by an energy system for mobile electronic devices and power storage that does not rely on metal-based (and mining driven) batteries. This represents massive savings in material and costs, while reducing the ecological footprint on the environment and the health risks to the citizens of this world.

As an example, while soap makers put their research teams on the quest for less toxic optical brighteners, more efficient enzymes, soaps that work in cold water and detergents that require less water, Vivian Stars, from Naturally Yours Inc., set out to find an alternative use for the left-over orange peels from the local orange juice factories by extracting limonene and testing it as cleaning agent. As consumption of orange juice increased, the processing left-overs, which used to be animal feed, are now turned into waste.

Vivian successfully entered the institutional markets based on a different type of life cycle analysis (LCA). Instead of simply arguing for price and performance, producing a highly concentrated product in an effort to reduce packaging, she argued that the use of a raw material extracted from waste peels which would otherwise rot and generate methane gas, created a major "systemic" advantage.



Biomimicry

A discipline, popularized in 1997 by scientist and author Janine Benyus, that studies nature's patterns and processes and imitates them to solve human problems. Studying a leaf to invent a better solar cell is an example of innovation inspired by nature. Biomimicry relies on three key principles:

- **Nature as model -** to emulate its systems and strategies to solve human problems
- **Nature as measure -** to use ecological standards to judge the sustainability of our innovations
- **Nature as a mentor -** to value nature not based on what we can extract from the natural world, but what we can learn from it.

For instance, in order to produce kevlar, high-tech jacket insulation material, we pour petroleum-derived molecules into a pressurized vat of concentrated sulfuric acid, and boil it at several hundred degrees Fahrenheit. We then subject it to high pressures to force the fibers into alignment as we draw them out. The energy input is extreme as well as the toxic byproducts.

Nature takes a different approach. Because an organism makes materials like bone or collagen or silk right in its own body, it doesn't make sense to "heat, beat and treat." A spider, for instance, produces a waterproof silk that, ounce for ounce, is five times stronger than steel! But the spider manufactures it in water, at room temperature, using no high heats, chemicals, or pressures. Best of all, it doesn't need to drill offshore for petroleum; and can even eat part of its old web to make a new one.

Imagine what this kind of a processing strategy would do for our fiber industry! Renewable raw materials, great fibers, and negligible energy and waste. We obviously have a lot to learn from an organism that has been making silk for some 380 million years.

The technologists who invent products and systems need to interact with biologists so they can match human needs with nature's solutions.

Regenerative Design

A principle that calls for products or services to contribute to systems that renew or replenish themselves. This ultimately means the materials and energy that go into a product or process can be reintroduced into the same process or system, requiring little to no inputs to maintain it. At the heart of regenerative design, there's a strong connection to the place in which a product or process is extracted, produced, used and disposed of at the end of life. There are four key premises to regenerative design:

- **Understanding the product's or processes' relationship to place throughout its life cycle.**
- **Determine goals that recognize regenerative capacity.**
- **Become a partner to place instead of purely extracting from it.**
- **Strive to achieve harmonization between people and place.**

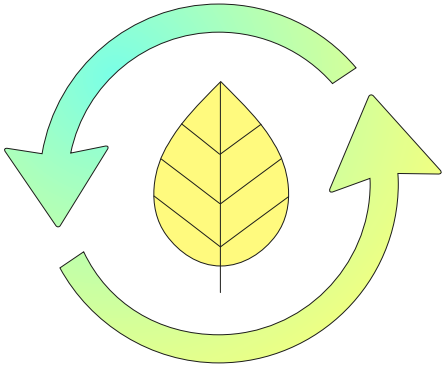
To achieve true regenerative design, you must incorporate systems thinking, interdisciplinary collaboration, and recognize dependence on natural capital.

For example, within the agriculture field, holistic land management and holistic planned grazing, developed by Allan Savory, offers tested methodologies for the regeneration of degraded grasslands and prairies. The Australian permaculture designer Darren Doherty helped to promote this approach globally, along with organizations like the **Savory Institute**, the **Rodale Institute** and Eugenio Gras of **MasHumus**.

Natural Capitalism

Natural capitalism recognizes the critical dependency of the global economy on natural resources and ecosystem services that nature provides. Only through recognizing this essential relationship with the Earth can businesses, and the people they support, continue to exist. Natural Capitalism is a critique of traditional "Industrial Capitalism", saying that the traditional system of capitalism "does not fully conform to its own accounting principles. It liquidates its capital and calls it income. It neglects to assign any value to the largest stocks of capital it employs – the natural resources and living systems, as well as the social and cultural systems that are the basis of human capital." (Hawken, 1999).

Dr. John Todd's biological ''Living Machines'' for example, make sewage treatment plants that look like a garden — because they are. They make sewage into clean water, plus valuable flowers, an attractive tourist venue, and other byproducts, with no toxicity, no hazard, no odor, and lower capital costs. The plant can easily be small enough to serve an urban neighborhood or even a single building. Such ''Bioneers'' are also using living organisms to ''bioremediate'' toxic pollutants into forms that are harmless or salable or both.



Industrial Ecology

An approach that applies the ecosystem metaphor and model to suggest that industrial systems should be restructured in order to make them compatible with the way natural ecosystems function. It is promoted as an approach to close industrial production loops and reduce waste, thereby making better use of resources and preventing the overuse of raw materials. Industrial ecology aims at transforming industries to resemble natural ecosystems where any available source of material or energy is consumed by some organism. The managerial approach of IE involves analyzing the interaction between industry and the environment, through the use of tools such as **life cycle analysis** (LCA). The technical approach, on the other hand, involves implementing new process and product design techniques such as cleaner production and eco-industrial parks.

The company Interface for example, is leading the way to this next frontier of industrial ecology. While its competitors are "down cycling" nylon-and-PVC-based carpet into less valuable carpet backing, Interface has invented a new floor-covering material called Solenium, which can be completely remanufactured into identical new products. This fundamental innovation emerged from a clean-sheet redesign. Solenium lasts four times longer and uses 40% less material than ordinary carpets. In addition, it is free of chlorine and other toxic materials, is virtually stain proof, doesn't grow mildew, can easily be cleaned with water, and offers aesthetic advantages over traditional carpets.

At the core of all these schools of thought lies a way of doing business that is of a trans-sectoral and trans-disciplinary nature, that rec-

onciles environmental stewardship with business concerns, and can achieve value creation within strong planetary boundaries. While being inspired by nature principles, the advocates of circular economy have achieved to materialize the benefits of the circular economy into clear business opportunities (Lacy, 2015).

The following chapters provide examples of practical measures and tools that can help apply these theories throughout our projects.

“A sustainable system is any system that in its lifetime can produce more energy than it takes to establish and maintain it.”

Bill Mollison

READ

What are the benefits of interacting with nature?

WATCH

Dirt Cheap

INTERACT

Group Activity 8:

Listening to nature

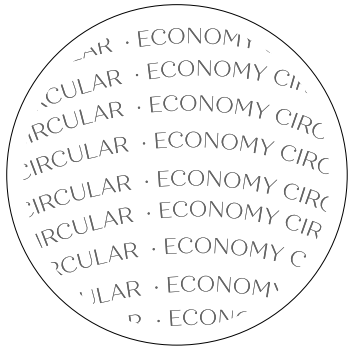
9 DESIGN FOR PARADIGM SHIFT - A PERMACULTURE'S PERSPECTIVE

On a grassroots level regenerative measures which enable a shift towards sustainable lifestyles have been implemented by permaculturists worldwide. **Permaculture is a design process based on whole-systems thinking that mimics the beneficial relationships found in nature to create diverse, productive and resilient ecosystems and livelihoods.**

Permaculture principles resonate with the concept of circular economy in terms of reducing waste, cyclic considerations, efficient use of renewable resources, optimization of space and materials and yield generation. They can be applied to any aspect of human life and place to assemble conceptual, material and strategic components in designs which function to benefit life in all its forms (Mollisons, 1988).

Throughout the process the focus is on positive and creative solutions which increase resiliency in an era of change and three ethical norms: care for the earth, **care for the people and set limits to consumption and reproduction, and redistribute surplus.**

Many of the pioneers of the regenerative design revolution are permaculture designers. Applying permaculture principles, ethics and attitudes to the redesign of the human pres-



ence on Earth offers effective strategies and tools which are proving to be essential in the adaptation to fight against climate change and in the transition towards diverse regenerative cultures everywhere.

Below is a comprehensive overview including practical solutions that can be adopted anywhere and invitations for policy makers.

Energy & Technology

In permaculture energy storage is defined broadly to include batteries but also capturing flowing water and rainfall for use as needed, passive solar techniques, wood for the log pile and construction, wind energy for pumping or power generation, food preservation and saving seeds for the next growing season.

Permaculture design seeks to take energies flowing through a site and to divert them into ‘cycles’ in order to be recycled, captured and stored. Examples include capturing energies such as wind and sun to generate electricity, gathering fallen leaves to be used for mulch or compost, redirecting domestic grey water into the garden, using animal manure for compost

or biogas, and capturing rainwater in an elevated spot so gravity can carry it onto plants later (Permaculture Association, 2020).

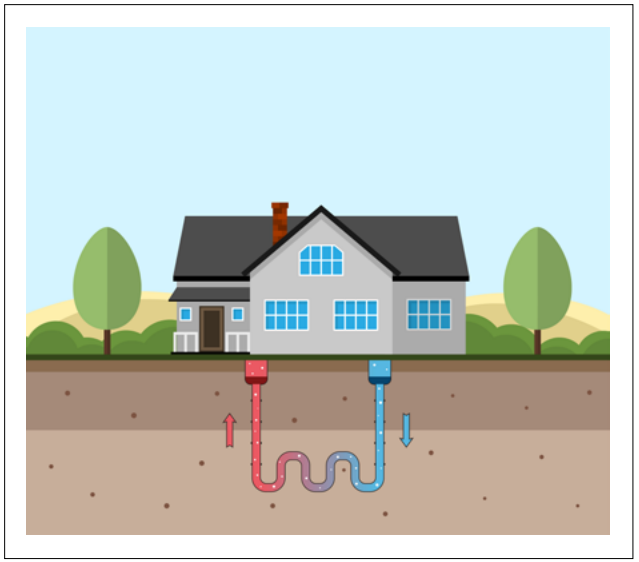
In an effort to enable the transition between fossil fuels exploitation and renewable energy systems and technology, permaculture advocates that alternatives to fossil fuels exist, they are already viable and rapidly becoming less expensive.

For example, **solar water heating** systems use free energy from the sun to heat domestic hot water, while **micro-hydro schemes** generate renewable electricity from streams and small rivers. They don't need large dams to store water so the set-up and running costs are relatively low and damaging environmental and social effects can be avoided (Permaculture Association, 2020).

An increasingly popular alternative are **photovoltaic panels** which produce electricity from sunlight. Although they degrade by approximately 20% over 25 years, most reputable suppliers are investigating ways to optimize their life cycle. Germany, not the sunniest place on Earth, now gets 19% of its electricity from solar panels (Clean Energy Wire, 2019).

Geothermal heat pumps are energy efficient heating systems that utilize heat from the ground, rock, air or water where solar energy is stored. Sadly, the energy we consume in our homes makes up about 25% of CO2 emissions and a lot of it is wasted. Efficient **insulation and retrofitting** are ways to avoid tonnes of carbon emissions, save money on fuel bills, and make homes more comfortable and healthy by reducing draughts, damp and condensation.

Green building methods are becoming increasingly popular for making use of natural, recycled and sustainable materials; efficient



designs energy use. The Centre for Alternative Technology in Wales is an educational charity dedicated to researching and communicating positive solutions for environmental change and a low-impact building demonstration site.

Lastly, **Lithium-ion batteries** is a developing energy storage technology offering the potential for low maintenance, highly efficient energy storage.

Transition Engineering is a cross-disciplinary field that addresses the issues of future resource availability and identifies solutions which promote resilience and design simplicity; thus playing a key role in the transition from a high speed, high energy, high impact economy to a slower, lower energy, low impact economy.

Thus playing a key role in the transition from a high speed, high energy, high impact economy to a slower, lower energy, low impact economy.

Carbon Sequestration

Excess carbon in the atmosphere is largely due to burning of fossil fuels and industrial agricultural practices. Tilling the ground or forest clear-cutting leaves the soil exposed and causes the release of carbon dioxide in the atmosphere. This also kills the rich, interlocking ecosystem of bacteria, fungi, micro-organisms and worms who work together in symbiosis to produce soil health and fertility.

The permaculture approach to carbon sequestration looks no further than to **plants and trees, the masters of pulling carbon out of the atmosphere and storing it safely in the soil.** Planting more is not only safer than untested geo-engineering schemes, but it also regenerates damaged ecosystems, improves food security, prevents erosion and restores compromised water cycles.

Research shows (Doick & Hutchings, 2013) that trees in cities regulate temperature in the summer heat in addition to providing beauty, forage, recreation areas and scientifically proven health benefits.

A moratorium of clear-cutting old growth forests and a strict regulatory system for tree felling which promotes sustainable practices, selective harvesting and ancient techniques such as coppicing would ensure huge sinks for carbon and irreplaceable sources of biodiversity.

In addition, policies that support researchers such as Dr. Elaine Ingham and Paul Stamets would provide invaluable knowledge about useful processes and organisms that break down toxins in soil and restore health and fertility.

On a different note, alternatives to travelling by plane and daily use of cars that avoid or reduce carbon emissions in the first place are becoming increasingly popular. Examples include car sharing schemes, improved cycling infrastructure in cities, incentives to take public transport, use of electric vehicles and online meeting facilities.

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Waste Management

With 1/3 of the world's food going to waste (FAO, 2011), learning how to compost - that is, decompose organic material such as food scraps, fallen leaves or grass cuttings - is a no-brainer.

Benefits of composting include reduction of methane emissions; increase of soil health and agricultural yield; help with aid reforestation, wetlands restoration, and habitat revitalization efforts by improving contaminated, compacted, and marginal soils; enhancement of water retention and carbon sequestration; and jobs creation.

Permaculture supports not only the creation of community composting systems but also the supply of free learning tools to schools and the wider public to learn how to compost. This is facilitated further by the introduction of worm banks to encourage vermiculture, support the composting process and the production of compost tea where natural fertilizers are needed.

Community-scale composting is often perceived as having limits to its processing capacity, growth, equipment use, etc. Increasingly, however, composters and collection enterprises have developed innovations to provide their service to as many members of their community that wish to engage with them, no matter the size of that community.

For example, Compost Pedallers in Texas, pedal materials from the subscribers' collection point to the nearest "CompHost" — anyone in the community who is interested in growing food or growing soil, and has the ability to process a certain volume of organic material through

POLICIES TO CONSIDER

- Encourage a decentralized composting infrastructure.
- Establish a 75% food recovery goal by 2030.
- Ensure small-scale operators can compete.
- Support master composter train-the-trainer programs.
- Require compost-amended soil for disturbed land.
- Implement a moratotium on new trash burners.
- Institute pay-as-you-throw trash burners.
- Ban yard trimmings and food scraps from landfills and incinerators.
- Implement a healthy soils and green infrastucture initiative.
- Provide grants, loans, and technical assistance to compost projects.
- Establish performance-based standards for compost sites.
- Support small facilities.
- Implement a per-ton surcharge on all disposal facilities to fund composting.

composting. Each subscriber can access statistics on how many pounds they have diverted to composting; how many pounds of finished compost that equates to; the amount of money that compost saves local growers; the amount of methane diverted from the atmosphere as a result of their participation; and how many calories that they have burned for a Compost Pedaller.

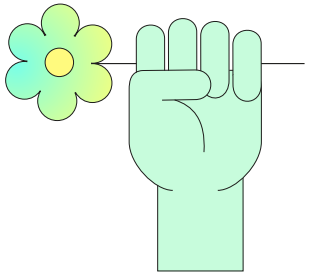
The non-profit Spanish Association FeA Residuos has years of experience in fostering decentralised management models for organic waste, through training and consulting with an environmental and social approach based on the concept of circular economy.

In terms of **policy reform** instead, the Institute for Local Self-Reliance presents a thorough list of policies to consider at local and national level which would allow the implementation of efficient community composting schemes.

Food scraps, wood waste, paper, cardboard and grass cuttings are not the only things that can be composted. Human and animal manures are known to feed micro-organisms that convert it into soil building material. Proper composting ensures the destruction of pathogens (disease-causing microorganisms) and it can be done using and managing composting dry toilets where humanure is mixed with material high in carbon such as sawdust or leaf mould and left to decompose for at least six months. So, where possible, **the use of compost toilets helps to save water, sewage costs and to regenerate soil** (Jenkins, 1996).

Forest waste, cardboard and wood scraps can produce **biochar**, charcoal made under special conditions that preserves carbon in its source, increases soil fertility, provides habitat for beneficial microorganisms and helps retain water.

Making biochar kilns available both in cities and rural communities could help not only to process some of the waste streams but also generate heat for buildings, water or electricity production (Bates, 2010).

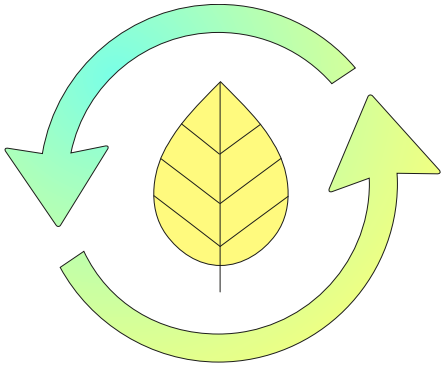


Agriculture

Financial support and incentives are essential to support the change towards organic agriculture and regenerative growing techniques that avoid use of chemical fertilizers and pesticides at all costs.

Among the key techniques it is essential to highlight **no-tilling**, known to help avoid erosive soil disturbance; **perennial food systems**, which save recurring labour and costs by selecting thousands of perennial grains and vegetable species available, from tree crops to berries to herbs; **agroforestry**, a system of interplanting that mimics natural forests and produces food, fodder, fiber and medicine; **holistic management**, whereby livestock graze small areas and move frequently, mimicking the way wild herds behave when predators are present, not only allows for more livestock per acre than conventional methods but it helps bioremediate barren land into thriving grassland and ultimately reverse desertification; and finally **local food systems** in both cities and rural areas which support farmers' markets, CSA partnerships, roof gardens, school garden programs and community allotments are all strategies to help shift food production.

La **Via Campesina** is an international movement advocating for food sovereignty - that is people's right to healthy, sustainably produced and culturally appropriate food, and to define their own agriculture systems - climate justice and agrarian reforms.



Water

Water is a necessity for life in all its forms, key to the survival of healthy ecosystems, and a human right, it should therefore not be privatized or viewed as a source of profit. In a world where water is becoming ever more scarce and precious due to climate change, polluting water should not be allowed. For example, practices such as fracking which endanger underground aquifers should be banned.

Permaculture offers powerful tools for harvesting and conserving water as well as restoring its cycles.

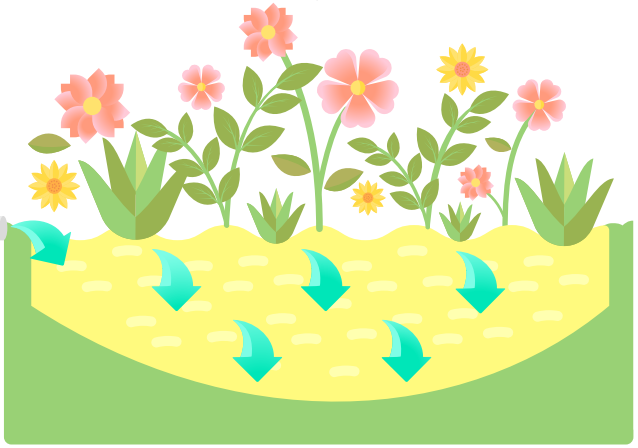
Earthworks such as swales, ditches, ponds, keyline systems as well as **mulching**, can slow, spread, and sink the water that falls on the land, infiltrating the soil, replenishing aquifers and preventing erosion by capturing runoff.

In urban areas, **rain gardens and porous pavements** can harvest rainfall and penetrate excess into the land, reducing the need for watering and preventing the overload on sewers during storms. Additionally, roofs should be fitted with **gutters** to capture rainwater and direct it into storage tanks, making it available for gardens and other uses.

HOW DOES A RAIN GARDEN WORK?

NATIVE PLANTS

Native plants are adapted to local conditions and are easy to maintain once established. Plus, they attract birds, butterflies and other pllinators.



GUTTER & DOWN SPOUTS

Assist with directing rain water from your roof to your rain garden.

BERM

A berm holds water in the garden during heavy rains.

DEEP ROOTS

Plants with a deep root system encourage infiltration and help absorb nutrients

Greywater from laundry, showers and sinks can be captured, filtered with simple systems and used for growing purposes or to water lawns and ornamentals. **Constructed wetlands** are an ecological low-cost solution for effective sewage and water waste treatment that mimic a natural wetland. They can treat both blackwater (water containing fecal matter with or without urine) and/or greywater (laundry, dishwashing and bathing water).

In some places, rainwater catchment or greywater reuse are illegal so changes in laws and regulations are needed to enable this process.

Greens and fish can be produced in systems that recirculate the water known as **aquaponics.** The fish wastes fertilize the plants, the plants clean the water. These systems use 70-90% less water than conventional farming and can produce large amounts of food in small spaces. In greenhouses, they can produce greens all winter in cold climates.

In some places, rainwater catchment or greywater reuse are illegal so changes in laws and regulations are needed to enable this process.

Economy

Since permaculture focuses on the connections between things more than the individual parts, the design of resilient economies relies on each contributor to build a strong network. Many small businesses supplying their local community are valued over a few larger corporations.

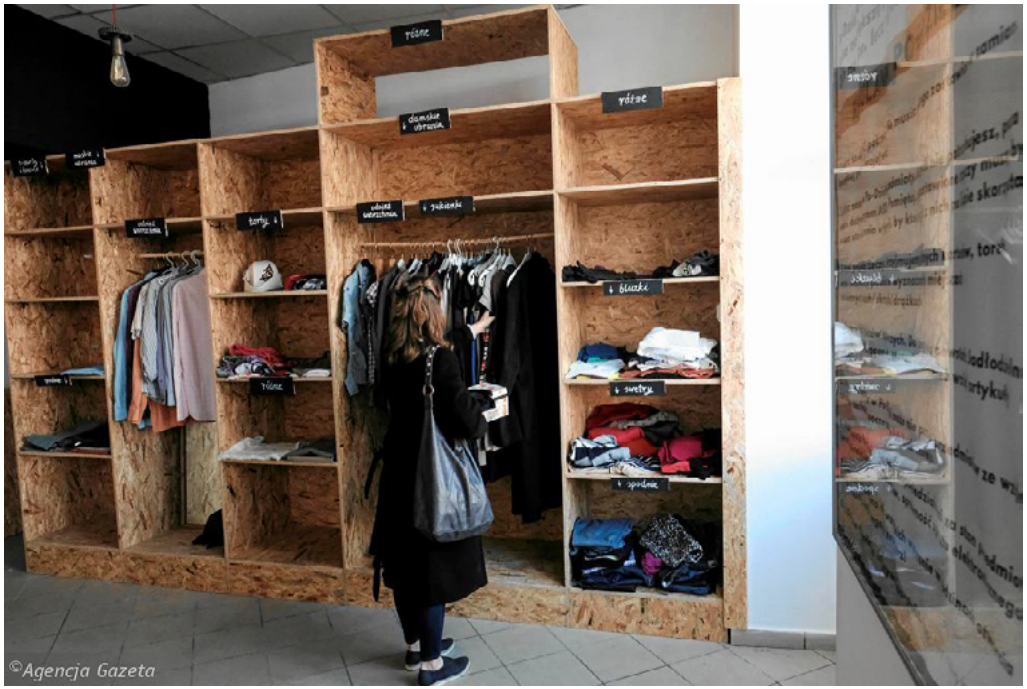
Decentralization of money flow allows money exchange a chance to slow, spread, and benefit local communities. **Complementary currencies** such as the Bristol Pound, the Italian Sardex or the Swiss Wir are known to facilitate this web weaving.

Further steps to be undertaken in to favor and reward economic practices which lead to a healthy ecology and a thriving community include requiring financial and legal liability from corporations poisoning and exploiting natural resources; governments, private investors and funders **putting their resources into regenerative practices;** and empowering consumers to discerning wisely their purchase choices, so to support businesses that care for the Earth, the people and the future.

Fair trade should be the norm while **second-hand shopping** already provides new lives to a vast array of products.

Finally, alternatives such as time banks, barter markets, open access resources and gift economies allow many access to non-monetised exchange of goods and services which plays a big role in the capital of any community. In Poland, a team of activists and volunteers decided to take the idea of sharing economy to the next level and create **Po-Dzielnia**, the first freeshop and sharing economy center in

the country and one of the first ones in Europe. A freeshop is a place where you can bring preloved goods such as clothes, accessories, household items, books or home décor and take whatever is in stock at the moment that was left there by others. In addition, Po-Dzielnia also functions as a sharing economy center, organizing meetings and debates on zero waste philosophy and promoting upcycling through workshops and repair cafes.

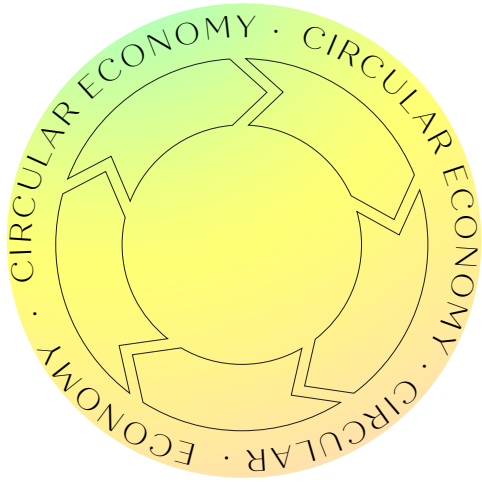


Community

Last but not least, solutions to many social and ecological challenges lie within our own communities and their intrinsic power generated when connection and mutual support are restored and fostered.

We can all benefit from deepening community links. I may not have the skills to grow all my food or eco-renovate my house, for example, but by developing good networks I can expand my capacity to live more sustainably and become more self-reliant. This is a decentralised, democratic vision of social transformation where initiatives like the **Transition Towns movement** can begin to plan for a low carbon 'energy descent' on a community level. Ecovillages and cohousing communities who can significantly reduce their ecological footprint by sharing resources are other good examples.

Although systemic changes and immediate reforms seem overwhelming, if we partner with nature and people in our communities, we find the strength to step into positive action to recreate thriving livelihoods for ourselves, for the life around us and for future generations.



“An economy that’s aligned with permaculture would be an economy in which the best business decision is the same as the best ecological decision“

Charles Eisentein

INTERACT

Group Activity 9:

Input/Output Analysis

WATCH

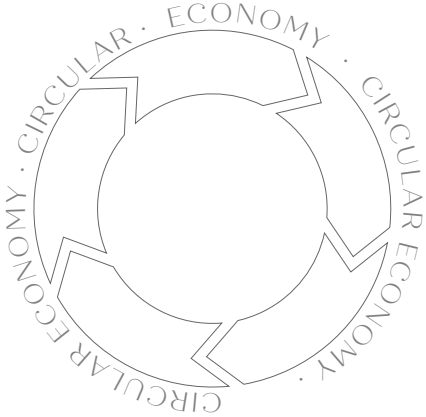
How Cuba survived Peak Oil

READ

Rethink, retool, reboot - evidence and analysis towards Technology Justice

10 TOOLS OF COLLABORATIVE WORK FOR THE DEVELOPMENT OF SUSTAINABLE PROJECTS

The tools presented in this chapter aim to support the process of applying the theories above to our projects and daily lives and of designing practical solutions in harmony with the ecosystems we live in.



10.1 Dragon Dreaming

Dragon Dreaming is a living systems approach, created around 1990 by Australian John Croft and his wife Vivienne Elanta, to build successful organisations and projects for the paradigm shift we are experiencing. It is based upon principles of **personal growth (commitment to the healing and empowerment of all participants), community building (strengthening and resilience of the communities of which we are part) and service to the Earth (working for the regeneration, wellbeing and flourishing of life itself)** and uses holistic tools for visionary initiation processes, planning, implementation, evaluation and celebration.

Dragon Dreaming is inspired by social and environmental activism, the new physics, Gaia and Earth sciences, living systems, chaos and complexity theory and the ancient sustainable wisdom of indigenous Aboriginal culture, the oldest civilisation on Earth. It is based on liberating **collective intelligence,** creativity, cooperation and the sleeping power within ourselves and inherent in our communities in the attempt to replace the current anthropocentric worldview with one in which human beings are part of an interconnected living system of planet Earth.

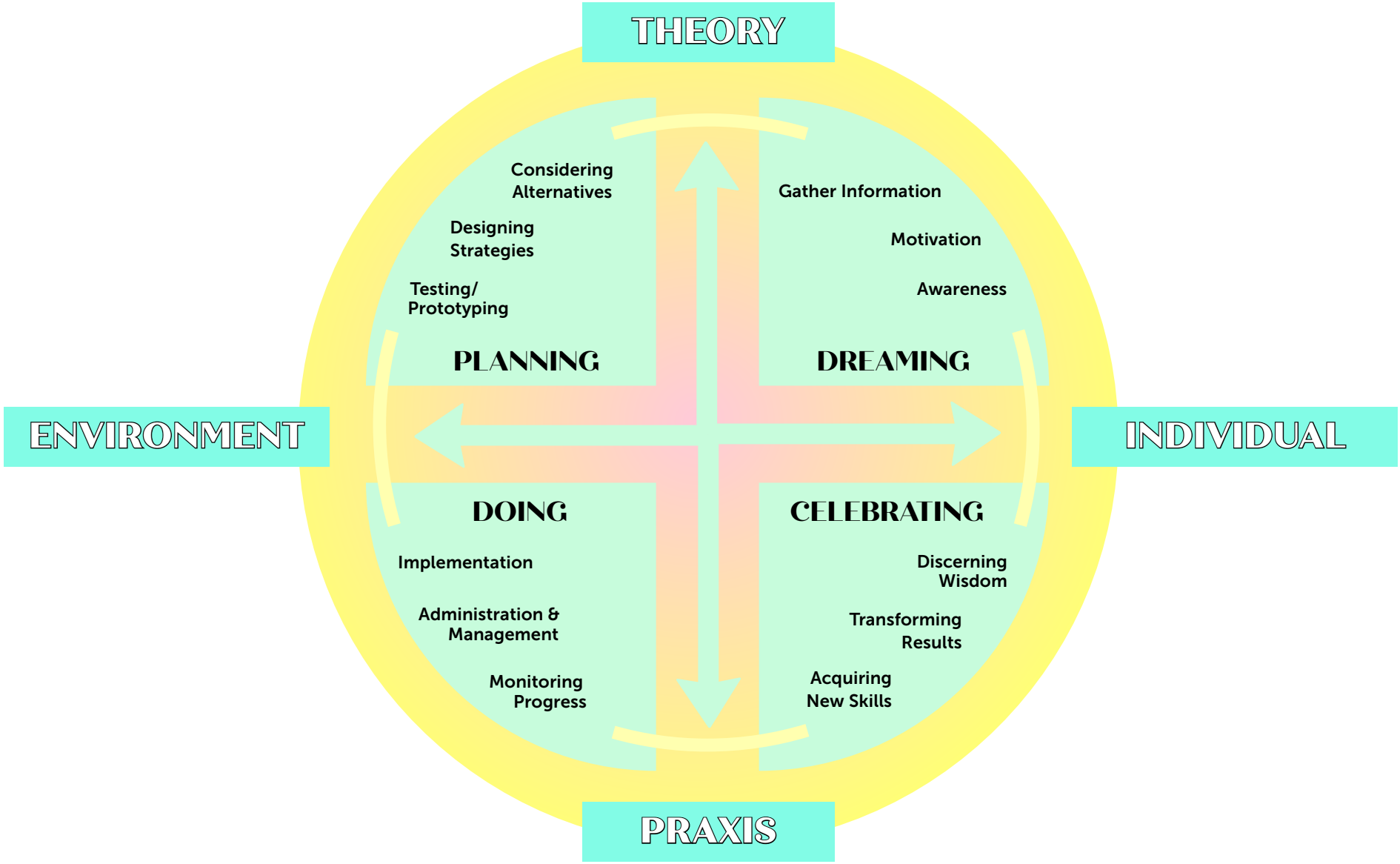
The Dragon represents our fears and also the strength to overcome them, while Dreaming refers to the creativity and life stories unleashed during Dreamtime, as believed by the Aborigines. Dancing with dragons, or dragon dreaming, is a process of graceful transformation from dreaming stage to celebration of success.

In our conventional world of win-lose competitive enterprises, of every 1000 dreams, only 100 become plans, only 10 plans work according to plan and only 1 survives longer than three years. As people know this, they easily give up on their dreams. But, for Aboriginal Australians, loss of one's dreaming is a form of "soul loss" resulting in apathy, powerlessness, blaming, aggressiveness and depression. Every project starts with the dream of a single person. But no one can realise a dream on their own. Dragon Dreaming is meant to create **Win-Win-Win** collaborative, collective and connected relationships which benefit on personal, community and global levels (Croft, 2014). This process also aims to maximize the moments when we discover something which we did not even know that we did not know: so called Aha-moments which leads to a new perception of some aspect of the world.

Generative questions are central to Dragon Dreaming as they have emotional power in the life of both the questioner and the person questioned and help to uncover what is missing, the presence of which would make a difference.

Every project is an encounter between an initial individual and his or her environment as well as practice and theory influencing each other in a reciprocal process.

These elements form the four quadrants characterizing the four different stages of a project (shown in the picture below): Dreaming, Planning, Doing and Celebrating. This also relates to 4 characters every person feels represents them the most: Dreamer, Planer, Doer and Celebrator. It is good to have a balance of all four types in a dream team.


THEORY
Considering Alternatives
Designing Strategies
Testing/ Prototyping
PLANNING
Gather Information
Motivation
Awareness
DREAMING
ENVIRONMENT
INDIVIDUAL
DOING
Implementation
Administration & Management
Monitoring Progress
CELEBRATING
Discerning Wisdom
Transforming Results
Acquiring New Skills
PRAXIS

In the **Dreaming stage** we need to build a team around our dream, and this starts by telling others about it.

If I am working on *"your project"* there is a different energy than if I am working on *"our project"*. It is only after this that everyone can identify equally with the idea and will commit to it 100% or openly say that is not their cup of tea.

After presenting the idea and choosing the team, this is achieved through a "Dream Circle" where participants answer the "Generative question": *"What should this project be like so that I can say it has been the best time spent?"*

The method for collecting this vision through the Dream Circle, lets everyone answer that question, without critique, until all participants pass. This vision is then read back to those present in the past tense to create a "dream manifesto", an animate living document that can always be changed, and creates a very strong motivational attraction from the vision to the implementation.

A communication tool you may wish to use during your Dream Circle is a **"talking piece"** – a stone or a stick or some other thing you can pass around in circles. Whoever has the talking piece will have the undivided attention of the whole group. Talking pieces are useful in answering a question, exploring a theme, sharing, debriefing or introducing a new topic or idea.

In the **Planning stage** we consider alternatives, develop strategies and test the project in various ways. Dragon Dreaming especially aims to facilitate the emergence of collective intelligence, through joint setting of the project Goal and SMART Objectives (specific, measurable or memorable, accepted or achievable or affordable, realistic or responsive, and time-bound), through the Generative Question: "What things

need to happen to enable 100% of our collective dream to come true?"

The ideas generated are then grouped and sorted through a normative group process that finishes with the writing of between 6-8 objectives for the project. A poll is then conducted in answer to the Generative Question: "Which objective, if given attention to first, will facilitate the achievement of the other objectives?".

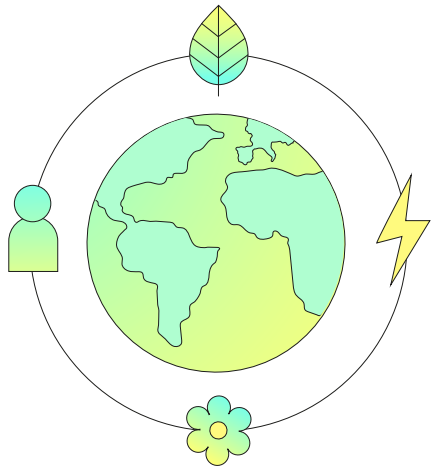
The main tool for the Planning stage (and later the Doing stage) is the **"Karabirrdt"** word from the Noongar Aborigines of Western Australia meaning spiderweb. It represents a project plan, a guide to all the tasks and the gateway from theory to practice.

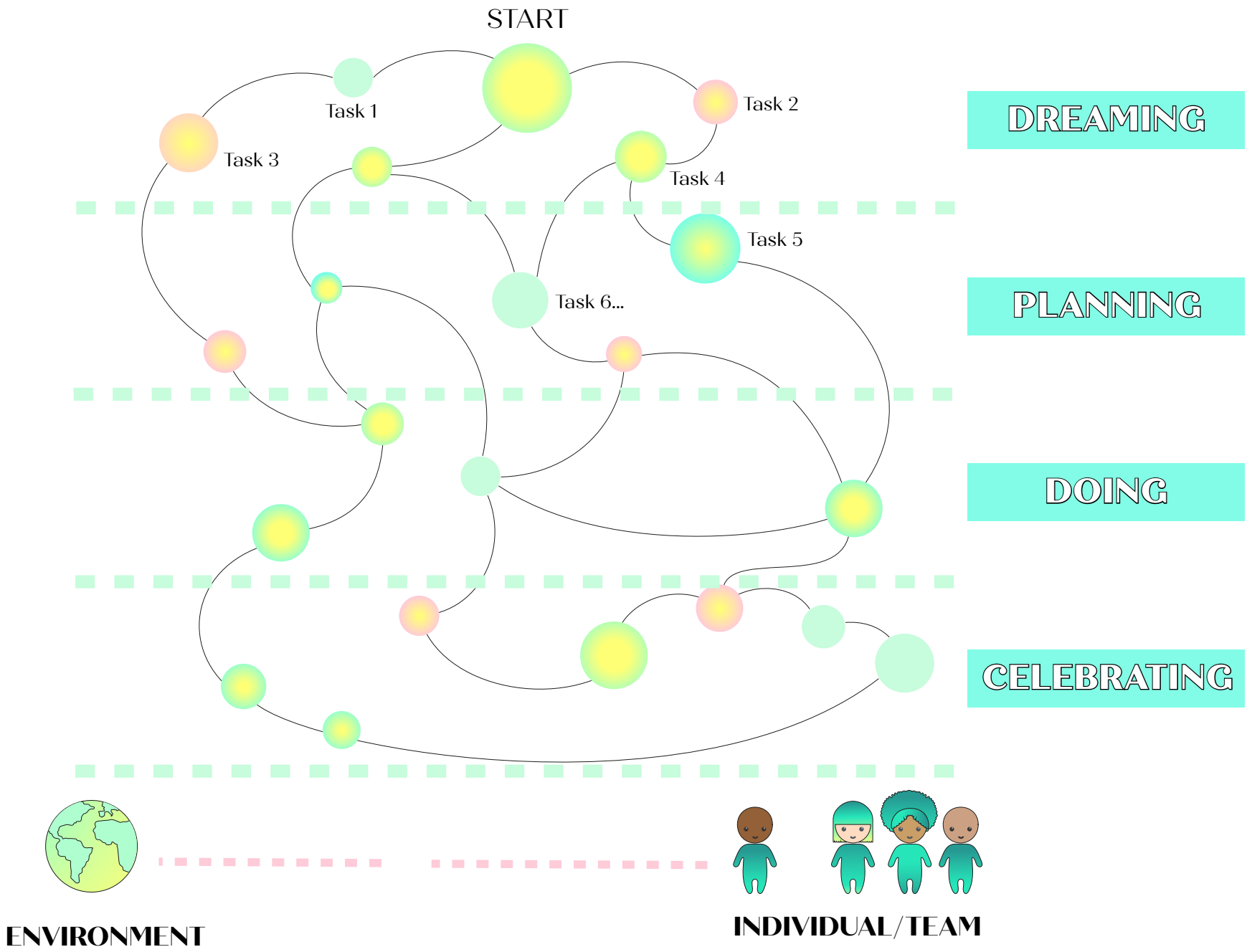
Through the Generative Question: "Which key tasks should we focus on in order to make our goal come true?"

Each task is then placed in the related stage and side of the Dragon Dreaming Wheel (see diagram below, making sure they are summarised in small circles with related numbers. All the interconnected tasks are then connected among each other from the beginning to the end of the project. Those with a high number of lines coming in and going out represent the project's milestones. Highlighting which tasks have been already started or even completed may surprise you!

In order to distribute the tasks, note with different colours who is enthusiastic about carrying out specific tasks, who is willing to but needs some support and who can train others to do it. Tasks with no names may be tasks that require a decision of all in the project or someone might be recruited to take care of them.

The **Doing stage** is where we administer and manage the project, work creatively with conflicts, learn how to manage stress and risk and




START
Task 1
Task 2
Task 3
Task 4
Task 5
Task 6...
DREAMING
PLANNING
DOING
CELEBRATING
ENVIRONMENT
INDIVIDUAL/TEAM

extend the limits of your personal and collective potential. It is also where things can most easily seriously go wrong. It's about monitoring progress and adapting to changes: Are we still on time? Are our costs still covered? Do we need to adapt our planning? Are we actually still realizing the original dream or have we been so busy that we have blindly moved into a completely new direction? We constantly monitor our progress.

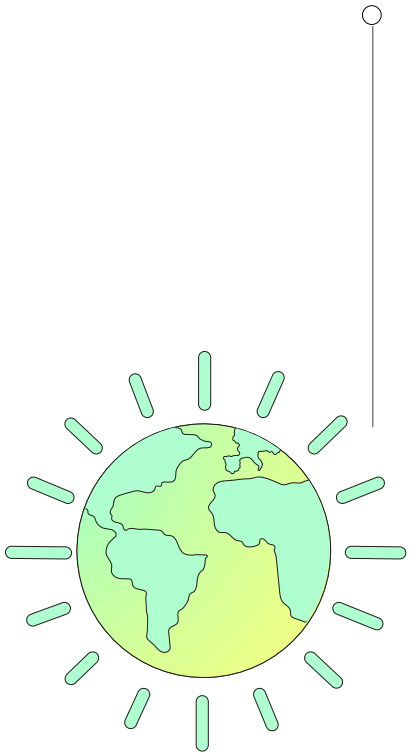
The aim of Dragon Dreaming is a self-organising and non-hierarchical project implementation (such as an Empty Centered Organisation), in which no member of the team invests more time and energy than feels good to them.

Through tools such as **Pinakarri, Nonviolent Communication,** and **Check-in circles** help facilitate group processes like conflict resolution, emotional management and empowerment as the way we communicate with other people is key.

Pinakarri is the Aboriginal word for **Deeper Listening,** a skill of emphatically listening to each other without judgements involved. Call for a Pinakarri at any given time. At the signal everyone will stop what they are saying or doing, and remain silent for a short while. The intention is to feel where the body is now, its weight, to breathe deeply, to feel the heartbeat, and to find where the tension in the body is strongest.

This exercise represents a great chance to cool down and to double check the intentions and desires of the group.

It is important to remember that projects are of a fractal nature so in each of the four quadrants the dreaming, planning, doing, celebrating can be found. Dragon Dreaming projects can only be sustainable when we integrate each of these stages in each step. In the Doing stage, the Dream Circle helps with the monitoring of a project is based on the answers to



the Generative Question:

"What evidence would show us that we are completing our tasks, achieving our objectives and making 100% of our dreams come true?"

It is the importance of Celebration that makes Dragon Dreaming different from many other project management tools. This is intended as reflection, gratitude, recognition of effort and acknowledgment of the skills, results and wisdom acquired during the project. So last but not least, the **Celebration stage** is about the response coming from the whole system, the people, the processes and feedback is its main source of information. This phase is vital and gives the boost to start a new round of the project cycle so, like the other stages, 25% of the resources should be spent on celebrating.

In Celebration gatherings ask yourself the Generative Questions: *"How can we gather people together in a way that is fun, interesting and motivates them to be part of what is happening? How can we create an environment that nurtures those involved and their connections?"* Examples of celebrations throughout the project can include: **Storytelling, Dancing, Singing, Rituals** (celebrating individual, community, earth) and, of course, good food.

As a conclusion, the outcome for the first quadrant is the building of relationships, relationships between you and the possible project, between all people who come to hold and accept the intention of the project, and a relationship between you and the environment in which the project Dragon Dreaming will be working. The outcome of the second quadrant will be a better understanding of the environment, its available human, material and financial resources that can be tapped, and hopefully mobilised for your project. The outcome of the third quadrant will show in the degree

of commitment the people have to undertake the actions required, whilst the outcome of the fourth quadrant will show up in the amount of satisfaction the individuals working on the project gain from their involvement.

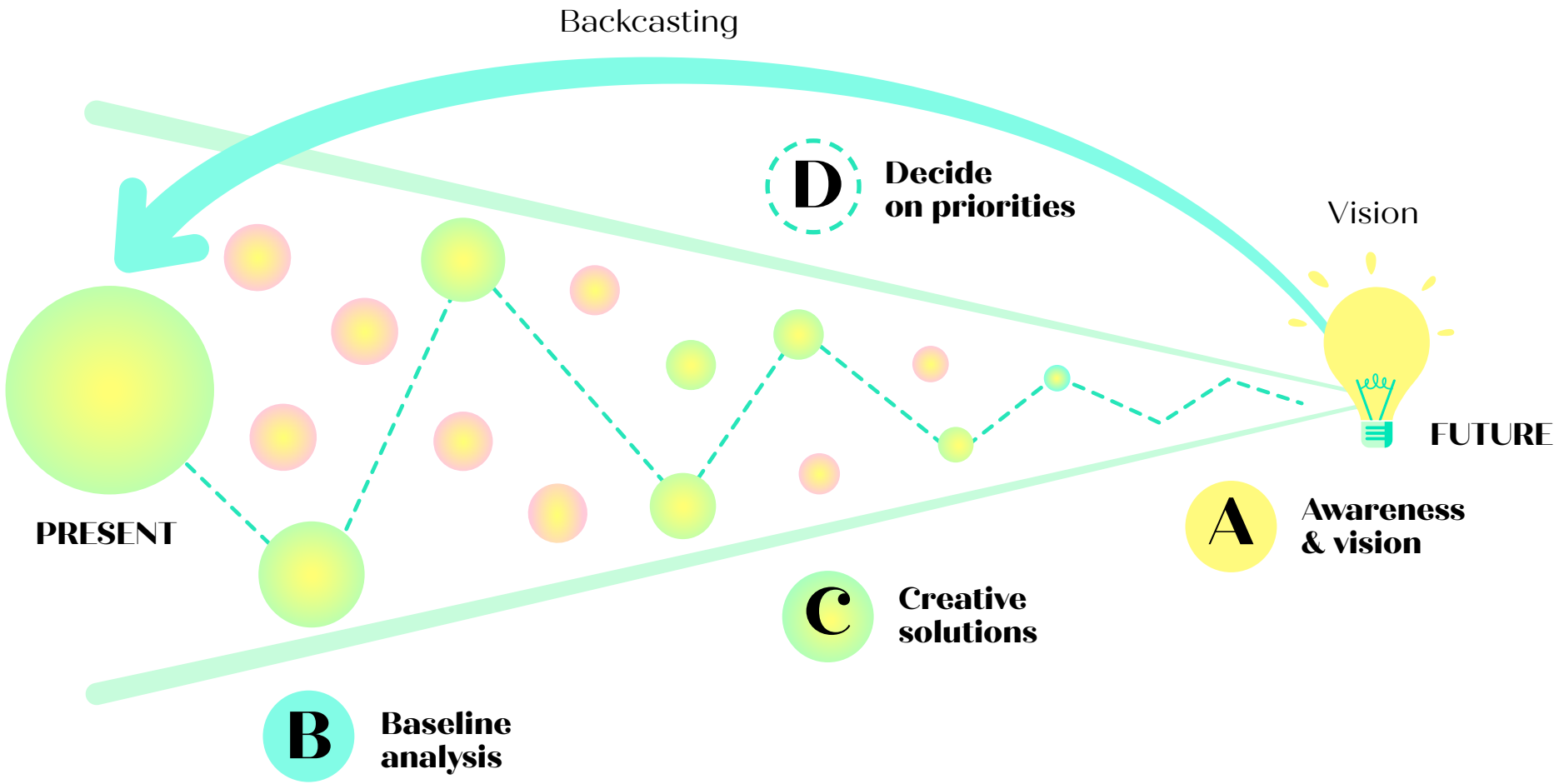
“What evidence would show us that we are completing our tasks, achieving our objectives and making 100% of our dreams come true?”

10.2 ABCD Strategic Planning Method:
Implementing Sustainability and the Circular Economy

The ABCD Strategic planning method is a tool developed by the international non-governmental organisation (NGO) **The Natural Step** in collaboration with scientists internationally, as part of the "Framework for Strategic Sustainable Development", a comprehensive model for planning in complex systems; recognizing that what happens in one part of a system affects every other part. The framework is openly published and has helped hundreds of different organizations around the world integrate sustainable development into their strategic planning and create long lasting transformative change.

The ABCD model is based on backcasting, that is just the opposite of forecasting. Forecasting has been for many years the most used tool in project planning for organisations. Forecasting works with the organisation´s current situation and plans accordingly given those circumstances for an "expected" future. But, as the problems we are facing have unforeseeable consequences, backasting is essential to plan for major changes and face uncertainty with innovation and creative solutions. Backcasting is a planning procedure by which a successful planning outcome is imagined in the future, followed by the question: "what do we need to do today to reach the successful outcome?". In other words, it allows us to place our organisation in the future by visioning the reality we want to create and therefore plan to reach our vision.

The process is shown in the infographics below:


Backcasting
D
Decide
on priorities
Vision
FUTURE
PRESENT
A
Awareness
& vision
C
Creative
solutions
B
Baseline
analysis

A Awareness & vision

This step is about building awareness and envisioning a future we want. A shared understanding of the systems we depend upon, the challenges, potential benefits, principles and guidelines is created in order to convey context and meaning to participants in the planning process. According to Senge (2006), building a shared vision is an ongoing process where people at all levels of the organisation should take part in and feel safe to express what is really important for them; this will empower the results.

The vision should answer the questions: Why does this organisation exist? What is the service that we provide to society?

B Baseline analysis

The Baseline Analysis examines the organisation's current activities through the lens of sustainability principles identifying compliances and challenges. The PESTLE analysis helps to find out the Political, Economic, Technological, Legal and Environmental factors that might influence our project to reach its vision while a SWOT analysis presents an overview of Strengths, Weaknesses, Opportunities and Challenges.

Internal operational aspects and stakeholders should also be taken into consideration in order to identify what helps or hinders the process towards the envisioned future.

C Creative Solutions

Having identified the gap between where we are today (B) and where we want to be (A), a brainstorm of intelligent ideas and innovations in order to come up with creative solutions aims to close the gap. Long-term as well as short-term aspects are considered and key challenges are transformed into opportunities to become truly sustainable and to create real value.

D Decide on Priorities

In this step the key questions to answer are: Does this measure proceed in the right direction with respect to all principles of sustainability? What are the most intelligent next steps to accelerate change? Is this measure likely to produce a sufficient return on investment to further catalyze the process? Who should be involved? How can we motivate our partners and stakeholders to support us? How can we make it happen?

Therefore, the measures identified during the visioning process are strategically selected and prioritised (Ny et al., 2006). These should bring the organisation (or community, sector, etc.) and society closer to sustainability, provide technically feasible stepping stones towards future actions and generate enough economic, socio-political and ecological resources (i.e. capital) for the continuation of the process. Depending on the ABCD iteration process, this will be a high-level roadmap or a detailed action plan that allows to design prototypes and pilots to test and establish for a sustainable future.

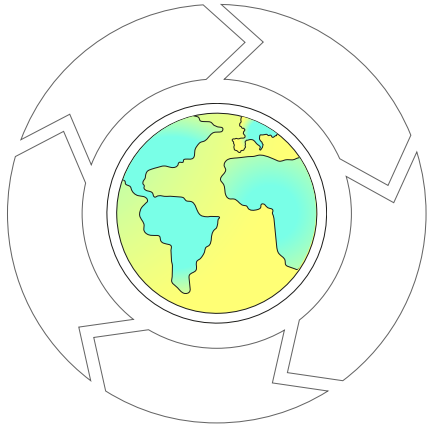
But what do sustainable principles actually imply for an organization or our projects?

According to Robert et al. (2005) an organisation that does not want to be a problem in the system, the term "our contribution" should be added to the phrasing of the basic principles, so:

- **To eliminate our contribution to systematic increases in concentrations of substances from the Earth's crust.**
- **To eliminate our contribution to systematic increases in concentrations of substances produced by society.**
- **To eliminate our contribution to systematic physical degradation of nature.**
- **To eliminate our contribution to the systematic undermining of human's ability to meet their needs worldwide.**

This means for instance, to substitute certain minerals that are scarce in nature with others that are more abundant, using all mined materials efficiently, and systematically reducing dependence on fossil fuels; to substitute certain persistent and unnatural compounds with ones that are normally abundant or break down more easily in nature, and/or use all substances produced by society more efficiently through dematerialisation; to draw resources only from well-managed ecosystems, systematically pursuing the most productive and efficient use both of those resources and land, and exercising caution in all kinds of modification of nature e.g. avoiding over-harvesting and introductions of exotic species.

This brings us back to circular economy principles previously explained, which, in addition to the strategic planning proposed by the ABCD method and the holistic, collaborative and empowering dimension offered by Dragon Dreaming help to build a strong, com-



mon vision for our projects and to transform it into goals and concrete actions.

“I think that there are good reasons to suggest that the modern age, the industrial era, has ended. Today many things indicate that we are going through a transitional period, when something is on the way out and something else is painfully being born. It is as if something is crumbling, decaying and exhausting itself while something else still indistinct, is arising from the rubble.”

Vaclav Havel

READ

Towards collective intelligence

INTERACT

Group Activity 10:
Time Machine

WATCH

4 Principles to win the Sustainability game

11 CLOSING THE LOOP

This book has introduced the concept of circular economy, its principles, processes as well as theories and tools to inspire the creation of sustainable projects.

It is argued that the circular economy does not challenge norms and conventions such as economic growth that have heretofore supported the expansion of a consumerist economy and created threats to the health of Earth's ecosystems (Hobson and Lynch, 2016). Another implication of shifting to circular economy is high upfront costs due to the need to invest in redesigning products and reconfiguring materials. But, this pricey pivot begs the question: will expenses cause companies to go for quick fixes rather than longer-term sustainable practices?

McKinsey researchers have continued to maintain that by using and reusing natural capital as efficiently as possible, manufacturers will ultimately extend the value throughout the life cycles of finished products - and helping companies get more value out of the energy, materials and other resources they use is at the heart of the circular economy.

In the process, a profound reorientation of science and technology as well as consumer behaviour is required. Scientific or technological 'solutions' which poison the environment or degrade the social structure and man himself are of no benefit, no matter how brilliantly conceived or how great their superficial attraction. At the same time, reducing our needs

decreases our dependence on outside forces which one cannot control, and therefore the existential fear which is often at the roots of most social and environmental issues.

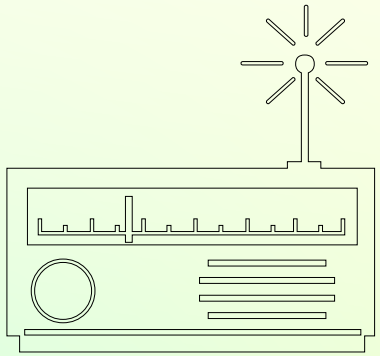
As a consequence, we find we need to purchase fewer items of clothing and furniture, and fewer electronic devices, and inhabit smaller spaces. We might also use old goods longer, and re-use and re-purpose whatever can be repaired. We might need to get used to buying more basic foods again, rather than highly processed and excessively packaged food products.

A healthy future lies in creating a simpler society and, as the Post Carbon Institute (2016) puts it, this overall shift would constitute the end of consumerism (i.e., our current economic model that depends on ever-increasing consumption of consumer goods and services).

In the emerging worldview, ecosystems have intrinsic value and do not exist only for humans to exploit. So, as nature provides us with resources, we should give back to nature in our business models and projects. What are you waiting for?

LISTEN

Circular Economy In Practice: Time Travel to 2050 – What Will the Future Look Like Exactly?



Group Activities

Group Activity 1

Values in a circular economy

What you need:

Ten discussion cards,
post-it notes, pens.

Time:

1 hour.

People:

12+.

Aims:

to use a series of discussion cards to explore the values and worldviews that underpin different people's perceptions/ interpretations of a circular economy.

Introduction:

The circular economy appears to offer a positive systemic model or framework for addressing some of the serious global and local economic and wider societal challenges confronting us in the 21st century – in ways that make sense. But, in reality, everybody understands and deals with a circular economy in a different way depending on personal values and worldview.

Process:

1. Brief the participants about the activity and split up in groups of ideally 6-8 participants.

2. Take one card, read it out loud and start answering it. It is important to indicate that there is no right or wrong but it is a prompt for discussion.

3. Ask the participants to start the discussion using the cards. Take about 15 minutes per card. Ask them to pick a new card when the discussion could benefit from new input again. Inform them that they need to write down three main 'takeaways' from their discussions.

4. Finally debrief, cluster and elaborate on the group feedback. Possible questions include: why was that important? Can you say more? Does this look like a pattern is building up? Similarities/differences? What is this perhaps telling about ourselves?

Group Activity 2

Current challenges and possible solutions

What you need:

A whiteboard, sticky notes of three different colours (depending on the amount of participants), pens.

Time:

1 hour.

People:

10+.

Aims:

to encourage discussion about current issues, brainstorm about possible solutions as well as free expression of feelings arising from the topic.

Introduction:

It is overwhelming to live at times of extreme disruption of the balance of the world as we know it. Mass extinction, soil erosion, desertification, pollution, waste, social inequality are some of the challenges humanity is facing.

It is therefore clear that if radical changes are not implemented soon, modern civilization could decline or even collapse, as others have done in the past. This activity represents a seedling to brainstorm and generate ideas of possible steps that can be implemented toward creative and possible solutions.

Process:

1. Invite participants to write on sticky notes of three different colours the economic, social, environmental challenges they think we are currently facing.
2. Divide the whiteboard into three different areas, one for each sector.
3. When the time is up invite the participant to place their notes in the right column one by one, explaining what they wrote and why they think it is important.
4. Once all the sticky notes have been placed open up a conversation about the points made.
5. Then invite the group to reflect on some of the solutions to these issues if there were no money, resources and power limits.
6. Close the activity by collectively picking out some of the most creative and effective solutions.

Group Activity 3

System Awareness

What you need:

A place where people can walk freely without bumping into anything.

Time:

30 minutes.

People:

10+.

Aims:

To understand how systems relate with one another, to learn about feedback loops and how change can be activated systemically.

Introduction:

Everything in the world functions as part of systems interacting through different types of relationships. This demonstration shows how changes in one element can affect the whole system.

Process:

1. Ask the participants to walk randomly in the room.
2. Tell them to choose two people in the room, without saying who, and try to keep the same distance from the two chosen persons.
3. Tell one person to walk faster.
   Then ask another to slow down.
4. Tell them to stop and ask how it was to keep different paces and focus on two different persons at the same time, and what happened when one of them walked faster or slower.
5. Inform them that while they keep walking equidistant to their chosen people, you are now going to tap on someone's shoulder and that person has to count to 5 in their head and then sit on the floor. On this occasion, if one of their persons of reference stops people will also start to slow down or stop.
6. Ask to share their observations.
7. Then inform them about the last next step: the person who is being tapped on the shoulder will count to 5 outloud and other people in the group will be able to stop her from sitting down by tapping him/her again.
8. After a minute or so, stop the group and ask them to share their observations. To some, maintaining the right distance will have lost priority over "saving one element of the system from collapsing", others will raise their voice while counting in order to be heard.
9. Comment on people's innate instinct to help each other when needed, and how delicate the balance of a system is when outside threats occur.

Group Activity 4

Abundance Game

What you need:
3 post-its and a pen per participant.

Time:
approx. 30 minutes, depending on the amount of people in the group.

People:
6+.

Aims:
to discover more about each others' knowledge and skills, to learn which beneficial connections can be made and how people can be resources for each other, to explore how it feels to realise the abundance of resources that exists within a group.

Introduction:
Following up on examples of how consumers can shape circular approaches, this exercise can be used to explain the context of a repair cafe' whereby people with specific skills help those who want to fix, learn or learn how to fix something. The context is not limited to practical competences but also foreign languages, philosophy or any kind of knowledge and expertise.

Process:

1. Ask participants to write 3 skills, fields of expertise or knowledge they are happy to share with the rest of the group (eg: I am good at sewing, I do macrame jewellery, I speak French, I can fix bikes etc.)
2. Ask them to stand in two lines facing each other so they can pair up.
3. Ask them to decide who will talk and who will listen first. Then the person listening will choose one topic of interest written on the other participant's sticky note.
4. Give the people talking three minutes to explain freely what they know about the chosen topic and how they can help the other person.
5. After the three minutes have passed (or less depending on the time available and the amount of people), ring a bell and ask the pair to swap. So, the person who was talking first will now choose a topic of his/her interest from the other participant's sticky note and they will talk about it for three minutes.
6. After three minutes, all the participants standing on one of the two lines will take a step to the left so they pair up with a different person to pair up with.
7. Repeat the process for about 5 or 6 minutes in total.
8. Comment with participants on the experience. Was it hard to stop talking after 2 or 3 minutes? How was it to find out about all the resources in the group?
9. If possible, re-create a repair or skills-sharing cafe' situation whereby people can explore those topics deeper or help each other in more practical ways. Alternatively, encourage them to continue the conversations during breaks and free time to make the most out of the abundance discovered and create connections for the future.

Group Activity 5

Circular/Linear cards

What you need:

a space where people can sit down comfortably in small groups, decks of circular/linear cards depending on the amount of people (one per group).

Time:

30 minutes.

People:

6+.

Aims:

To introduce the concept of circular economy.

Introduction:

Applicable in many classes and with many age groups, students work in teams to arrange cards that tell the story of a plastic bottle and a leaf. Slowly, a pattern emerges: our industrial system is wasteful and linear, but natural systems are complex, interconnected and waste-free.

Process:

1. Depending on the amount of people and the card decks available, divide people into small and distribute the cards.
2. Introduce the concept of linear economy and discuss together the challenges associated with it.
3. Ask the groups to arrange the cards in a pattern that recreates the life cycle of a plastic bottle.
4. After around 15/20 minutes stop them and go through the outcomes together: ask them to describe the system they put together, what roles could be played to close the loop, what are the costs involved, what are the the choices made throughout the process, prompt them to imagine how it would look like if it was about a more complex item such as a mobile phone.
5. Ask the groups to use the cards to show the life cycle of a leaf.
6. Reflect on the circularity of the system and how that can be reflected into the first one.

Group Activity 6

The Branded T-Shirt Case

What you need:

as many tables or defined areas where groups can gather, paper sheets or posters, pens, the activity booklet from the Ellen MacArthur Foundation.

Time:

2 hours.

People:

small groups of up to 5 people.

Aims:

To introduce the creation of a circular value proposition and to give hands-on experience of the challenge of re-designing a current real linear sales/ownership/dispose model to a potential circular model.

Introduction:

The move from linear to circular economy is enabled by circular design, circular business model innovation, management of reverse logistics/cycles and harnessing of various system enablers through a range of forms of collaboration.

The case is a real-world example, a UK SME that imports, brands and sells fair trade cotton workwear and branded T-shirts into UK Higher Education. The company is concerned that, despite its ethical/fair trade credentials, the clothing that they are selling is often only worn once (for charity events, 'freshers week' etc.) and therefore generating waste. Workwear items (such as university bar staff or security) are also often discarded and replaced well before the item has reached the end of their material life span.

The challenge for the company therefore, is whether it is possible to generate a new circular value proposition that will continue to deliver the required function of the T-shirt, but also allow the product and materials to be re-circulated in repeat cycles and still make a profit.

Process:

1. Introduce the groups to circular economy value propositions, how to create, capture and distribute value as well as definitions of business models.
   The Power Point presentations provided by the Ellen MacArthur Foundation can be used to set the context for the exercise in addition to the previous chapters.
2. Divide the participants into groups and introduce the business case.
3. Consider in groups the linear approach to manufacture, retail and use of T-shirts and how this linear approach generates waste in the value chain.
4. Ask the groups to consider the prerequisites for the T-shirt circular business model to perform at least as well as the current linear case.
5. Run a plenary to address unanswered questions and reflect on the circular economy as a systems perspective.

Group Activity 7

World Cafe

What you need:

as many tables or defined areas where people can gather per topic selected, the same amount of paper sheets or posters, pens.

Time:

up to 1 hour.

People:

6+.

Aims:

to help stimulate discussion around circular economy practices, to practice systems thinking and group work, to explore CE initiatives within the participant's communities and daily lives, to create a ripple effect of best practices.

Introduction:

If needed, run a short summary of CE principles before starting the exercise. The World Cafe involves people gathering around tables or areas where topics are discussed, brainstorming can occur and they can come up with initiatives already occurring or new projects and ideas. For the context of an introduction to circular economy course, topics such as food, transport, energy, housing, fabrication, recycling and fashion could be used and related to the questions below for further discussion:

- Do you know of any functioning projects locally or worldwide that apply circular economy principles?
- Which challenges and opportunities do you see to develop a circular economy in your own community?

- Which techniques could you easily apply at a community or individual level? What do you need to achieve this?
- Are you interested to help shape this economic transformation? If so, what's your interest area and what could be your contribution?

Process:

1. Write the different topic titles and related questions on the posters and place them on each table/area used for the exercise.
2. Introduce all the topics to the participants and explain that they can choose two of them.
3. Then invite them to join the preferred table/area and elect a notekeeper per group.
4. They can then start to discuss the topic among each other using the prompts presented on the posters. Remind them to write down ideas, notes, comments coming up.
5. After 15/20 minutes, depending on the time available and the amount of conversation happening, tell them they can now join another table/topic.
6. After 15/20 minutes, gather everyone up and ask the groups to share ideas born from the exercise, inspirations, Aha moments and any comment written down on the posters.

Group Activity 8

Listening to nature

What you need:

An outdoor location that features natural scenery, especially plants and trees; a pen and notebook per person.

Time:

50 minutes.

People:

individual exercise so the group size does not influence.

Aims:

To practice focusing on all senses, to awaken to the critical nature of observation as the basis of sustainable design, to learn about natural patterns.

Introduction:

Deepening the relationship with nature is at the core of sustainable design and intentional observation has the power to provide knowledge that no research can offer. Pattern recognition is the root of intuition, therefore we train our body senses to perceive as much of the world possible. Within and without. As the body becomes used to focus on certain details and patterns of the natural world, the mind does the same thus helping us reflect those teachings into our projects.

Process:

1. Explain to the group that their task is to walk around the park/area and fully immerse themselves into the observation and listening of the surrounding nature. A relaxed mind and an absence of expectations are key during this time. They must keep silent and do this exercise individually. If safe to do so, they may want to walk barefoot in order to feel the subtle textures, temperatures and vibrations of the ground.
   Tell them to try and tune into all their body-based senses, be receptive and notice what they see, listen, smell, taste and feel.
   When it comes to vision they can experiment with the wide angle vision technique which is about allowing the mind to focus upon the peripheral vision, rather than the tunnel-vision that most modern people use so dominantly.
   As they observe plants, animals, water, people and whatever surrounds them they should keep as little judgment as possible.
2. Tell them that after 20 minutes you will ring a bell and they will start to search for patterns in their surroundings. For example, the common shapes of tree branches and leaf veins, spirals in snails, shells and roses or the web of a spider and a tree stump. If needed, they can write down in a notebook every emotion they sense regardless of its origin, draw anything that inspires them and express those emotions as needed.
3. Ring the bell after 20 minutes in a place where everybody can hear you.
4. After 20 more minutes ring the bell again and gather the group into a circle.
5. Hold the space for personal reflections on the experience. If necessary prompt feedback about what was heard, smelt, felt.

6. Ask the group to comment which emotions were elicited by the sorted location and which were elicited by other sources. Our emotional reactions refer to tangible and intangible, present and non-present experiences, yet they are all relevant. A basic recognition of emotions is vital to nature awareness so we can turn our beings into tools for the observation of nature.

7. Relate your comments to what we can learn from nature, how this relates to waste reduction (in nature there is no waste) and circular economy processes. Reflect on the natural patterns they identified and where they can be linked to human and industrial patterns.

Group Activity 9

Input Output Analysis

What you need:

pens, 1 poster per group as shown in the infographic below.

Time:

1 hour.

People:

6+.

Aims:

to get people thinking about beneficial connections created within a group or a system and the resilience created when "closing the loop".

Introduction:

this analysis helps to look at the intrinsic characteristics of individual elements within a system and then find out all the beneficial connections between them.

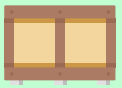
After listing all the outputs/products/energy generated by the group/system and the needs/inputs reflect on how can the needs be met by the system? How can the outputs be re-utilised? How can you make use of its behaviour productively? This exercise can also be used to establish what a system needs overall and what it produces and to measure the viability of a plan. The image below can be used for the activity but it can be adapted with elements related to group dynamics (eg: what are all the energies, resources, skills, needs, money, time, legalities, support etc that go into the

group and what outputs does the group
have – products, services, social values, learnings,
waste, empowerments, employments etc.)
or other elements that are relevant to the context.


ORCHARD

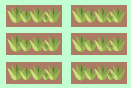

POND


HOUSE

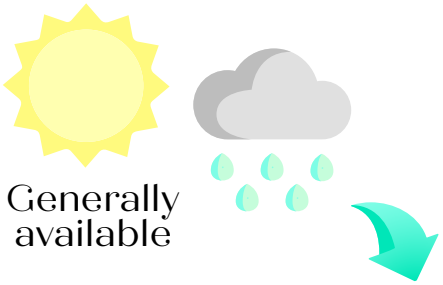

COMPOST BIN


PEOPLE


CHICKENS


VEG PLOT


OUTPUTS

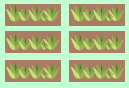

Generally available


INPUTS


PEOPLE

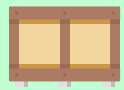

CHICKENS


HOUSE


VEG PLOT


POND


ORCHARD


COMPOST BIN

Process:

1. Split the participants into small groups.
2. Give each group one poster folded in half to show only the outputs side of the page above.
3. Ask the groups to write 3 outputs (products or energies) that each element generates.
4. When they have finished, tell them to swap the poster over to show only the inputs side of the page and write down 3 things that the elements listed need in order to function properly and be healthy. For example, what goes into the compost bin? What do the chickens need?
5. When they have finished, ask the groups to unfold the posters and connect the inputs and outputs that match up. For example, the vegetable patch needs water which is an output of the pond and of the house gutters.
6. Comment on how placing the elements can influence the amount of work/time/energy needed to make connections. For example, if the compost heap is far away from the kitchen or the vegetable plot it will take longer to bring food scraps there or it might not get used at all.
7. You can also comment on similar functions of those elements which can be used as replacement if needed.

Group Activity 10

Time Machine

What you need:
chairs or a comfortable place for people to sit on.

Time:
20 minutes.

People:
4+.

Aims:
to explore possibilities, use imagination and five senses to visualise projects and ideas, to share in groups hopes and dreams, to find confidence and sense of possibility.

Introduction:
tell the group that you are about to do something historic, that you are going to attempt the first act of time travel in the history of that place.

Process:

1. Invite the people to make a pair with someone who they haven't engaged a lot with, and to close their eyes.

2. Explain that they are going to use their imagination with all its senses, sight, smell, sound, feeling. Then tell them that when the time machine gets switched on they are going to travel forward 10 years, to 2030. They are not going to a utopia. They are travelling to a future where the 10 years between now and then were the most remarkable social and economic transformation in history. Positive change built in amplifying cascades. Resources and policy-making unlocked bold and decisive action. Industries were transformed, biodiversity decline began to reverse. Cultural stories and narratives changed. It was a time that those who followed told great stories about, and sang great songs about. The bravery and vision of those people went down in history.

3. Then, using something that signals the turning on of a time machine (a physical step forward in small groups, a collective hum in large groups), start to travel forward.

4. Let people sit in silence for 2 minutes then, keeping their eyes closed, invite them to share with their partner what they are seeing.

5. Then after some time come back together as a group and have people sharing their experiences.

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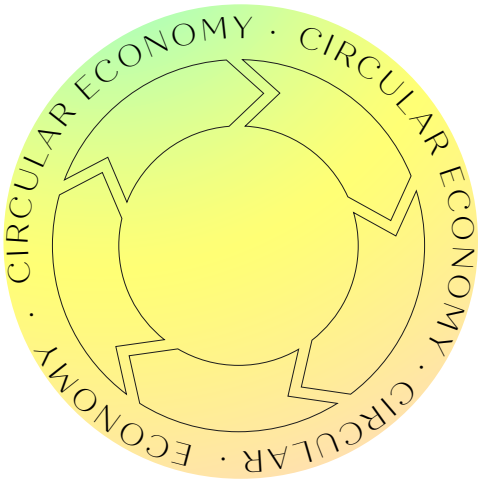

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