



wbcasd education



Unlocking More Value with Fewer Resources

A practical guide to the circular economy



WBCSD Leadership Program 2016

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Executive summary

“The current linear economy is simply not sustainable. To deliver against our Unilever purpose of making sustainable living commonplace, we need to change the way we think and the way in which we do things. The circular economy offers an alternative model and a new way of thinking that inspires new innovation and growth in our business whilst protecting the world’s scarce resources.”

Paul Polman,
CEO of Unilever and WBCSD Chairman

This practical guide aims to help companies start the transition towards a circular economy to unlock more value with fewer resources. The methodology has been designed with the goal of achieving maximum impact on the triple bottom line (environmental, social and economic value).

The guide includes several concrete business cases to inspire action. It has been developed with input from expert interviews (for example, Yale University, Ellen MacArthur Foundation, WBCSD, company leaders) and literature research.

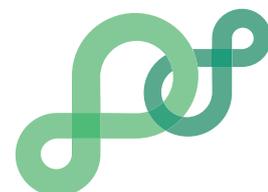
The value of a circular economy

Businesses need to grow but at the same time recognize that growth at the expense of people or the environment is both unacceptable and unsustainable. Sustainable growth is the only acceptable model for businesses. To achieve sustainable growth, companies need to be fully aware of the constant changes worldwide that impact their businesses, including climate change, population growth and the increasing scarcity of raw materials and commodities.

The current linear “take-make-dispose” economy mindset will need to shift towards a circular economy model in order to decouple value creation from the consumption of finite resources. Moving towards a circular economy represents significant economic, social and environmental opportunities for business. In Europe alone it could generate **€1.8 trillion by 2030** for the economy. For medium-lived products¹ and fast-moving consumer goods (FMCG) companies it could generate net material cost savings of more than **US\$ 600 billion**². Moreover, a circular economy could significantly reduce greenhouse gas (GHG) emissions and create more than 100,000 new jobs, leading to **positive social impact**². The case for circular economy approaches on a macro level is compelling, but the key challenge is to translate the vision into concrete action for businesses.

1. “Products that are in use for a short enough timeframe that they are subject to frequent technological innovation, but long enough that they are not subject to one-off consumption.” Source: Ellen MacArthur Foundation 2013.

2. Ellen MacArthur Foundation (2015a)





“Aiming at the needed decoupling of growth and consumption of finite natural resources takes a true paradigm shift beyond our traditional silos towards innovative partnerships and new opportunities. This guide will get you started.”

Laurent Auguste,

Innovation & Markets Director at Veolia and WBCSD Council Member

Five steps to make the transition to a circular business

1. Conduct an assessment to identify what the company is already doing. Companies are often already pursuing circular economy activities without knowing it. The assessment's 15 questions help to define the company's current capabilities. Concrete examples from other companies are included to inspire the thinking. Using a tool such as the Circular Economy Opportunity Matrix (to measure impact versus effort) will help identify quick wins or scale-up existing initiatives.
2. Integrate circular design principles supported by social and environmental life cycle assessments (LCA) into innovation processes to ensure the result delivers maximum impact on the triple bottom line. The guide describes the methodologies and how and when to use them.
3. Build business cases that justify specific circular economy initiatives by combining tangible and intangible benefits considering a longer term horizon than traditional investments.
4. Ensure stakeholders support circular economy initiatives by communicating success stories in various creative forms of communication.
5. Walk the talk and talk the walk. Lead by example and show that it can be done.



1. Introduction

1.1 Objective

This practical guide aims to help companies start the transition towards a circular economy to unlock more value with fewer resources. The methodology has been designed with the goal of achieving maximum impact on the triple bottom line (environmental, social and economic value).

The guide includes several concrete business cases to inspire action. It has been developed with input from expert interviews (for example, Yale University, Ellen MacArthur Foundation, WBCSD, company leaders) and literature research.

1.2 Context

We are living in a world where temperatures are rising, water shortages are more frequent, food supplies are increasingly scarce, and the gap between rich and poor is increasing. Demand for products and services continues to grow unabated as a result of growing populations, the rise of middle classes in emerging markets, and technological developments. The changes will pose significant challenges for businesses due to commodity cost fluctuations and market instability as raw materials become harder or more expensive to source.

Research indicates that **only a limited number of companies have a comprehensive strategy to address supply risks in a world of scarcity.**⁴ At the same time, significant waste is prevalent across the global value chain. For example, in Europe material recycling and waste-based energy recovery capture only 5% of the original raw material value, one-third of food is wasted, and an average office is used only 30-50% of the time, even during working hours.⁵

4. KPMG 2012.

5. Ellen MacArthur Foundation (2015a).

What is a circular economy?

In simple terms, a circular economy ensures products do not quickly become waste but are reused to extract their maximum value before safely and productively returning to the biosphere. It covers models such as reuse, remanufacturing and recycling.

“In a circular economy the value of products and materials is maintained for as long as possible; waste and resource use are minimised, and resources are kept within the economy when a product has reached the end of its life, to be used again and again to create further value.” (European Commission 2015)

The Ellen MacArthur Foundation adds that a circular economy is restorative and eliminates waste by design through better materials, products and systems design, enabled by innovative business models. Circular economy principles are to embrace systems thinking, design out waste, embed biodiversity, use waste as food and run closed-loop systems on renewable energy.

“The principles of [a] circular economy which focuses on eliminating waste is very complementary to the LEAN manufacturing principles and continuous improvement methodology in our daily operations. Such focus in our operations underpins the 4C operating model—doing what is good for the community, doing what is good for the country and doing what is good for climate... which will also enhance the sustainability of our forestry and manufacturing operations. Only then it is good for the company.”

Bey Soo Khiang,

Chairman of APRIL Group and WBCSD Council Member



Businesses need to adapt and innovate to respond to the impending risks and opportunities posed by these challenges. This response will likely include creating new products and services to meet the increasing demands of a growing population in a world of scarcity and moving from the current linear “take-make-dispose” economy mindset towards a circular economy model.

The circular economy presents an opportunity to inspire business to act in new, sustainable ways using many familiar concepts, such as reuse, remanufacturing and recycling. It provides multiple value creation mechanisms that are decoupled from the consumption of finite resources.

1.3 The value of a circular economy

A circular economy approach can create significant economic, social and environmental opportunities:⁶

- For Europe alone, a circular economy could result in **overall benefits of €1.8 trillion by 2030** and generate more than 100,000 new jobs, leading to positive social impact⁷.
- In the medium-lived products⁸ sectors in the European Union, the annual **net material cost savings** amounts to around US\$ 630 billion in an advanced circular economy scenario. There is an additional US\$ 700 billion in potential cost savings for fast-moving consumer goods (FMCG) companies⁹.
- GHG emissions would be halved by 2030, relative to today’s levels¹⁰.

Circular economy approaches also have multiple benefits for businesses, including:

- Reduced price risks (for example, material cost savings) and supply risks (contributing to the sustainable supply of raw materials and fossil energy);
- Decreased resource dependency (such as energy) and increased business resilience;
- Contributions to the local economy, license to operate and better acceptance by the stakeholders;
- Enabling of new innovations and new profit opportunities through new ways of thinking;

- Reduced GHG emissions and other negative externalities and their financial impacts on the company;
- Company proactivity in respect to changing regulation (something that is already happening in Japan (2000), China and The Netherlands (2009), Germany (2012), France (2015)).

A circular economy provides a unique angle for businesses to seize at a time when consumer behaviors are changing—adapting to technology trends, sharing assets (for instance, sharing in the rental sector, digitization of services)—and as such preparing for alternative and new business models. Advanced technologies (such as big data and analytics) allow circular economy opportunities to rapidly scale-up as it is an economy of flows, an act that was previously not possible.¹¹

“For sustainable development to be achieved, it is crucial to harmonize three core elements: economic growth, social inclusion and environmental protection. These elements are interconnected and all are crucial for the wellbeing of individuals and societies.”¹²

A circular economy is also a unique opportunity in the context of the United Nations Sustainable Development Goals (SDGs), which aim to end poverty, protect the planet and ensure prosperity. Circular economy approaches would help with several of the UN SDGs as they look “beyond the industrial revolution-inherited, linear, extractive model of ‘take, make, dispose’, to shape positive solutions.”¹³

6. Ellen MacArthur Foundation (2015a).

7. Ellen MacArthur Foundation (2015a)

8. “Products that are in use for a short enough timeframe that they are subject to frequent technological innovation, but long enough that they are not subject to one-off consumption.” Source: Ellen McArthur Foundation 2013.

9. Ellen MacArthur Foundation (2015a)

10. Ellen MacArthur Foundation (2015a)

11. Ellen MacArthur Foundation 2016a.

12. United Nations 2015.

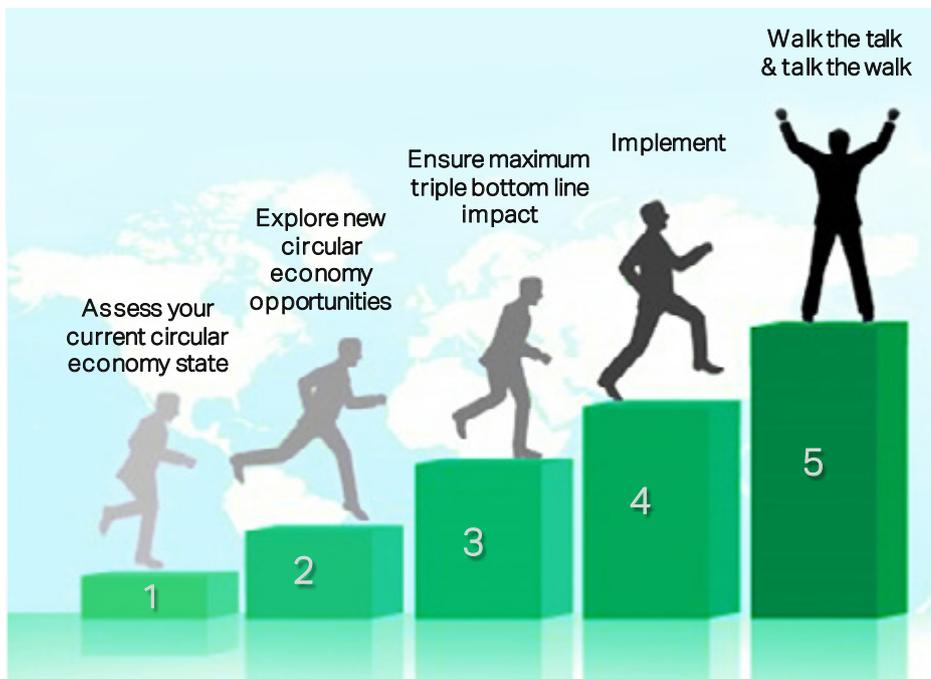
13. MacArthur, Ellen 2015.

2. Five steps to achieve a circular business

“The principles of Circular Economy provide great inspiration to improve environmental, economic and social performance of our business. Nestlé applies Life cycle thinking to ensure that innovation hits this triple bottom line of sustainable development.”

José Lopez,
former COO of Nestlé and WBCSD Council Member

Figure 1: The five steps to achieve a circular economy



Step 1: Assess your current circular economy state

First, take a look at what your company is already doing that follows the principle of a circular economy. You can use an assessment tool such as the one on the next page to start evaluating your company's current circular economy position (methods of evaluating circular economy initiatives are standard techniques in business so you can rely on what you already know).

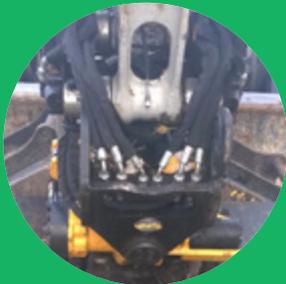


Does your company / business unit:¹⁴

1. Recover its waste and map flows and have reporting and objectives on material/resource consumption?
2. Reuse its byproducts for its own processes and remove waste from its production and supply chains
3. Remanufacture its products and encourage maintenance and upgradability?
4. Have a program for energy/water consumption reduction or design products that help customers save energy/water?
5. Optimize and increase the performance and efficiency of products and of the organization?
6. Engage circular economy and LCA experts (internal employment or external contracting)?
7. Ensure sustainable procurement/supplies?
8. Initiate a dematerialization principle?
9. Adopt reverse logistics or share assets (e.g. appliances, cars, offices)?
10. Leverage big data and new technologies?
11. Integrate eco-design (for refurbishing, recycling, etc.), extend product life against obsolescence, design for durability?
12. Implement industrial symbiosis (exchange materials with industrials nearby)?
13. Adopt strategic partnerships contributing to circular economy development?
14. Develop new offers or business models from ownership to service or to performance-based payment models?
15. Work with public authorities on policies that enable the circular economy (lobbying)?

¹⁴. See glossary for definitions of the items above.

Business examples of transition towards circular economy



3. Based in the UK, **JC Bamford Excavators Ltd** (JCB— one of the world’s top three manufacturers of construction equipment) has developed the JCB Service Exchange to reduce plant ownership and operating costs, thanks to a range of 1,650 remanufactured parts across all its machines. These remanufactured parts meet the same standards as new parts, are protected by the same warranty conditions and are also upgraded to use any relevant new technologies. Machines can be restored to their optimum condition at a price 40 to 50% lower than new parts.¹⁴



©sedibex

2, 7. In the Netherlands, at **DEMB’s** (formerly Sara Lee’s) Joure plant, coffee ground byproducts produce renewable energy. This onsite closed loop solution reduces the amount of natural gas needed to produce the vast quantities of steam required to make coffee (saving €1 to €2 million). The innovative drying and combustion system, in which spent coffee grounds from the plant’s processes are burned in a biomass boiler to produce steam, also reduces the site’s carbon footprint).

www.veolia.com/en/our-customers/achievements/industries/food-beverage/netherlands-demb



5, 6, 7. **Firmenich** has delivered sustainable procurement initiatives at the source in emerging markets (Patchouli, Vetiver, Citrus, etc.) enabling the company to secure a fair price for smallholder farmers. The objective is to expand the coverage to 80-90% of the total natural ingredients used, thereby improving the livelihoods of 250,000 smallholder farmers. An environmental and social valuation analysis, which models the positive and negative impacts of the sourcing, manufacturing, use and disposal of products, has brought a more comprehensive vision of value creation.

www.firmenich.com/en_INT/sustainability/environmental-and-social-valuation-study.html



photo courtesy of APRIL Group

1, 2, 4, 5, 7. In Indonesia, **APRIL Group** reuses 90% of its general water usage of the pulp and paper making process, thanks to collection, treatment and recycling technologies. Waste is also transformed into energy; 85% of APRIL Group’s total fuel energy consumption is derived from biofuels. The most significant contributor in the biofuel production, is the world’s largest recovery boiler that captures energy from black liquor (a product of the pulp making process) and converts it into energy, equating to 390 MW per year. It is used to produce steam for power generation and in the drying process for paper production.

www.aprilasia.com/en/sustainability/water-energy-efficiency



11. **AkzoNobel** develops more durable outdoor paints and coatings by increasing the lifetime of the paints as well as the lifetime of the materials they are protecting. By lasting longer, the overall amount of resources required over the lifetime of a building can be reduced. For example, one of its innovative decorative paint products to coat exterior wood could last up to 16 years, which is 25% longer than the standard product.

www.sustainablebrands.com/news_and_views/chemistry_materials/hannah_ritchie/akzonobel_creates_longer_lasting_self_cleaning_pai



© Photolibray Veolia
- Taco van der Eb/Polaris/
Interlinks Image

1, 6, 7, 12. In France, Sedibex, a plant operated by SARP Industries, a **Veolia** subsidiary, is one of the largest industrial waste energy recovery plants in Europe. Through its “Siroco” research project, the plant managed to capture, concentrate and recycle some of the CO₂ present in the plant’s flue gases (12,000 tonnes of CO₂/year). The recovered CO₂ then goes through a gas transport network to two industrial sites nearby (Le Havre port’s industrial area) which use it as a raw material in the production of lubricant additives.

www.veolia.com/en/cop21/what-if-we-recycled-co2



1, 15. In Brazil, **Unilever** worked with Consumer Goods Forum companies and NGO CEMPRE to increase recycling via consumer awareness, drop-off points for used packaging, and cooperatives to sort materials. The partnership supports 141 recycling stations across 42 cities and 45 cooperatives, generating income (directly and indirectly) for over 5,800 people. Through the initiative, more than 95,600 tonnes of material have been collected since the program began. Unilever is now replicating this with TIMPSE in Thailand and CEMPRE in Colombia and Uruguay.

<https://www.unilever.com/sustainable-living/what-matters-to-you/recycling-and-moving-to-a-circular-economy.html>



1, 2, 6, 15. In Switzerland, **Nestlé** created the first unique capsule recycling program for the Nespresso brand and has collaborated with global partners to find market-appropriate solutions focusing on consumer convenience, environmental efficiency and improving existing local infrastructure. Nestlé also created CELAA, a French group committed to improving small aluminum and steel packaging recycling. Today Nespresso can retrieve 80% of all capsules sold.

www.nespresso.com/positive/ch/en?icid=Ik_CHFR_MenuOurValues_Positive-Cup#!/sustainability/never-ending-capsule

15. European Remanufacturing Network 2015.

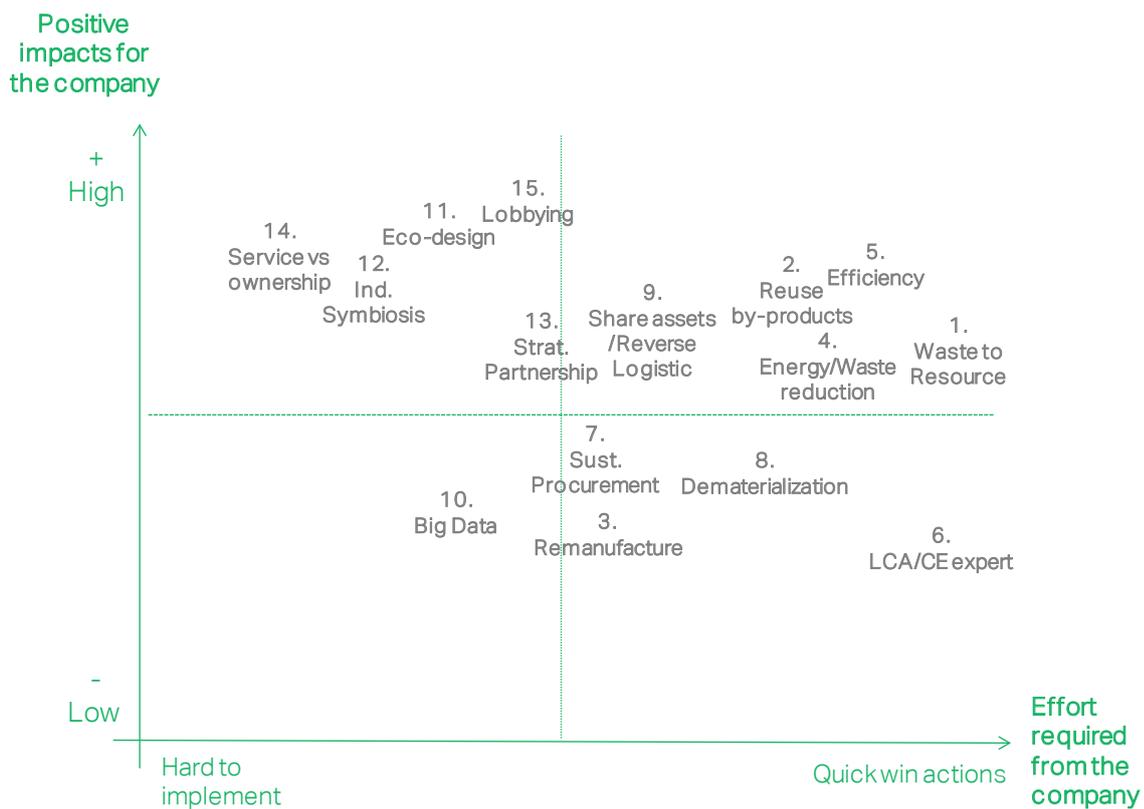


Once you have completed your analysis based on the 15 questions on p.8, you can generate a list of initiatives to scale up and new opportunities and put them into a matrix that maps the impact versus the effort in order to help you define and prioritize actions. A circular economy opportunity matrix gives an indication of the effort required to implement each initiative versus its likely effectiveness.

The opportunity matrix below is illustrative and generic, so you will need to map and rank your specific business activities, impacts and opportunities according to selected items, for example:

- Benefit: cost reduction, increase of revenue, better performance, reputation, customer loyalty, etc.
- Effort: risk (impact, frequency, control level), financial input, management, organizational changes, people skills, etc.

Figure 2: Sample circular economy opportunity matrix





Step 2: Explore new circular economy opportunities

There are multiple methods and business models that could be used to develop new opportunities. Based on the review of extensive resources and literature (such as the **Ellen MacArthur Foundation**, **Accenture**, **Forum for the Future**, etc.), the most common opportunities that will help the company become more circular are summarized here.

- Start with design (product development)
Opportunities to make an impact are greatest earlier on in the product design phase and diminish further along the life cycle. Thus companies should start at the product and production design phase in order to minimize negative impacts from the beginning. For example, companies should aim to design products to consume less energy in both the production and use phases. AkzoNobel's Decorative Paints business has developed **Weathershield products** that keep buildings cooler by reflecting sunlight. This means less electricity is needed for air conditioning.

The eco-design principle could be embedded in the product development and innovation process. Modular design, for instance, which divides a product into smaller parts that can then be independently created, used and replaced, could also efficiently improve a product's life cycle.

- Optimize circular supply chains and procurement

At each step of the supply chain, companies could strive to incorporate circular opportunities into operations. Upstream of the supply chain, for instance, companies could use renewable resources that can remain in the economy after use and serve as input for other (or the same) applications. A good example of a circular supply chain is **DEMB's** Joure plant in the Netherlands.¹⁶ Additional supply chain opportunities are listed below, drawn from sources such as the Ellen MacArthur Foundation, Accenture, and Forum for the Future.

Supply chain step	Circular economy opportunities
Extraction (Raw material)	<ul style="list-style-type: none"> • Conduct sustainable sourcing, such as by using bio-based materials, reusing by-products, and preserving natural capital • Use renewable energy
Product manufacture	<ul style="list-style-type: none"> • Prolong product life and use modularity in the design phase • Develop industrial symbiosis to share utilities and services, etc. • Optimize energy use in operations
Retail	<ul style="list-style-type: none"> • Conduct circular logistics and procurement
Consumption	<ul style="list-style-type: none"> • Move towards "product as service" business model • Make shared use, access and ownership of product possible • Use big data to meet customer needs
End of life, waste treatment	<ul style="list-style-type: none"> • Remanufacture, reuse, refurbish, recycle, recover • Use downcycling, upcycling, closed loop recycling

16. Further details on the DEMB example are available in the circular economy business examples on p.9.



- **Reduce, reuse and recycle**
Companies could follow the basic 3R principle (reduce, reuse, recycle) and capture the value from waste streams. All material streams could be regarded as valuable resources and used in the best possible way. In this way, the waste value chain could be moved into a positive spiral of value for your company (there is more value at the reuse and remanufacture stages than the recycling stage). For instance, **Nestle's** unique capsule recycling program is a best practice example of waste product recycling.
- **Extend product life**
From a product development perspective, companies could not only prohibit planned obsolescence but also aim to extend product or component lifetime. At **AkzoNobel**, one of its innovative decorative paint products to coat exterior wood could last up to 16 years, which is 25% longer than the standard product.
- **Share platform and use product as a service**
Companies could move from "owning" to "using when needed" as much as possible and share in order to optimize the ratio of resources invested per use of an object/product. Product as a service could internalize the benefit of circular resource productivity. **Phillips** has set a good example, transforming its lighting business from a product to a service model.
- **Collaborate and share**
Taking a broader perspective, companies could keep reaching out for opportunities, such as using other companies' byproducts, providing waste streams as raw materials to other companies, sharing production sites, working with consumers to reduce waste, etc. Even though many cases will take time to scale up economically, collaboration across companies still remains a key success factor in achieving a circular economy in the long term. Swedish denim company **Nudie Jeans** offers free denim repair at its shops. Instead of discarding old worn-out denim, customers bring it in to be renewed.

Step 3: Circular economy assessments: Ensure maximum triple bottom line impact

It is recommended that you use tools like environmental, economic and social assessments to make sure that your new circular business models hit the triple bottom line. The following chapters briefly describe the most common methodologies and tools that can be used. Most of the tools are widely known but each one needs to be carefully considered based on a circular economy initiative.

Environmental assessments

Life cycle assessment (LCA) is a common methodology to estimate the environmental performance of new innovations. It could be particularly useful for circular economy initiatives as it takes a systems perspective. Greenhouse gas (GHG) emissions, water use, loss of biodiversity, land use, use of non-renewable materials, and impacts on human health are a few of the life cycle metrics that are commonly used. LCA¹⁷ accounts for all environmental impacts of a product or process, from material extraction through end of life. It is important to look at a comprehensive set of indicators and not at individual indicators like GHG emissions or use of non-renewable materials in isolation. Also, in the case of new business models, the standard LCA calculation may be not sufficient and should be adapted to reflect the actual impact (such as a reuse model).

LCA is often performed in later project stages to confirm targeted environmental benefits, for example once the design of a new product is frozen and all input data is known. In cases where environmental performance is behind expectations, it is often too late or too costly to implement design changes. It is therefore recommended to use LCA from the early project stages on in order to be able to make the right choices (such as about ingredients, sourcing or manufacturing strategy) while design freedom is still high.

17. Software that can be used for LCA: **SimaPro, Pre-Sustainability, Quantis Suite**. Software providers: **Quantis, GaBi, Thinkstep**



Examples

Environmental assessments

Bio-based Polyethylene

Polyethylene (PE) is a plastic material that traditionally is derived from fossil fuel resources. In the recent past, companies have installed industrial capacity to produce it from renewable resources, notably through bioethanol from sugarcane, sugar beets or corn. The properties of the bio-based materials are equivalent to those of petroleum-based materials because they are chemically identical. LCA has demonstrated a significant reduction in greenhouse gas emissions when switching from fossil-based to bio-based PE.¹⁸ However, at the same time, land use and other indicators driven by agricultural activities, like water use and ecosystem quality, show significantly higher impacts.

Social assessments

Fruit and vegetable Packaging

Transport packaging for fresh fruit and vegetables in Europe is mainly made up of reusable plastic crates and single-use wooden or cardboard boxes. LCA shows that plastic and wooden boxes have the best environmental performance. At the same time, the reusable system is the most cost effective over its entire life cycle. Social assessments indicate that all three packaging types require a comparatively high amount of low-qualified labor but that the production of one plastic crate requires the most human labor. Nevertheless, the lethal accident rate for the wooden and cardboard boxes is higher because of wood logging.¹⁹

"Firmenich is committed to operating the most traceable, sustainable and ethical value chain in the industry. In collaboration with governments, peers, NGOs and communities, we have embraced the circular economy principles and are working with all of our stakeholders, from sourcing to disposal, to minimize our environmental impact, while maximizing our efficiency."

Gilbert Ghostine,

CEO of Firmenich, Co-Chair of the WBCSD Sustainable Lifestyle Cluster and WBCSD Council Member

Social assessments

A circular economy is often linked to the creation of jobs, which is a typical social impact. Social life cycle assessment methodologies (social LCAs) are less well developed but could be useful because of their similar structure to regular LCAs. Social LCAs could help to quantify this and highlight other potential social impacts (see table on next page). Some standards and software solutions are emerging (see for example the **Social Hotspots Database**). Additionally, some quantitative and qualitative methods and an emerging standard, the **UNEP SETAC Guidelines for Social Life Cycle Assessment of Products**, are also under development. Additionally the Roundtable for Product Social Metrics has issued a **Handbook for Social Impact Assessment** under the lead of some key players in the industry.

Qualitative methods are typically based on checklist-type questionnaires. They are relatively quick and easy to perform but also somewhat subjective. In any case, they can help to raise awareness and identify potential issues or opportunities that otherwise would have been overlooked and not addressed. Quantitative methods require a much more exhaustive collection of data and underlying databases are not yet available or are incomplete. The results, however, allow for a quantitative comparison of different scenarios. The difficulty of interpreting the results, however, remains. Good guidance on how to establish a social LCA can be found on the **WBCSD's website**.

Social LCA looks at impacts on different stakeholder groups and related social themes (social impact subcategories, see table below). In the context of a circular economy, job creation is the most discussed subject, whereas other indicators, like quality of the jobs created and worker safety and health, are often ignored. Beyond job creation, there are many more social topics as can be seen from the table below. Potential issues and opportunities can be easily overlooked, particularly for products that use materials coming from international and sometimes unknown sources.

18. Tsiropoulos et al. 2015.

19. Albrecht et al. 2013.



Table: Stakeholder groups and related social impact subcategories (source: UNEP/SETAC)

Stakeholder groups	Social impact subcategories (not exhaustive)
Worker	Child labor, fair salary, working hours, forced labor
Consumer	Health & safety, consumer privacy, transparency
Local community	Access to material resources, delocalization and migration, safe & healthy living conditions, respect of indigenous rights
Society	Public commitments to sustainability issues, contribution to economic development, technology development, corruption
Value chain actors	Fair competition, promoting social responsibility, supplier relationships

Like in environmental LCA, social indicators and stakeholder groups must be looked at holistically in order to avoid cases where focusing on improving one particular issue creates unwanted negative consequences on others.

Economic assessments

Overall circular economy initiatives and business models can lower input costs and in some cases create entirely new profit streams, build greater resilience in supply chains, and reduce exposure to material shortages and related price volatility impacts. New business models such as rentals or leasing contracts establish a longer term relationship with customers. There are also a number of non-tangible benefits, such as improved reputation and reduced risks. Last but not least, circular economy initiatives often come with financial subsidies and incentives that may help boost its business case.

Most methods of evaluating circular economy initiatives are standard techniques in business, relying on what companies already know and do .

The **Natural Capital Protocol**²⁰ was designed to help generate trusted, credible and actionable information for business managers in order to inform

their decisions. The Protocol responds by offering a standardized framework to identify, measure and value impacts and dependencies on natural capital. Life cycle costing (LCC) principles assess not only purchase price and all associated costs but also operating costs, end-of-life costs and, potentially, costs of externalities. Combined with a classical discounted cash flow model (DCF) providing today's value of future costs and revenues associated with a circular economy initiative, it can be complemented with a Monte Carlo simulation providing a statistical distribution of possible project returns depending on key variables and probabilities.

However, the model is limited by the expected return on investments. Circular economy investments are in most cases long-term investments in which a significant share of the value will be derived from intangible benefits and risk minimization, which are always extremely difficult to model in a classical DCF methodology.

In a DCF model, costs can be defined as investment, yearly operating expenses or one-off costs required to implement and operate the new circular economy business model, such as cost of setting up a collection network, or raw material recovery as part of a manufacturing process, etc.

The following revenue streams and/or cost reductions will have a favorable impact on the economic business case:

- Higher sales from increased volumes triggered by cost savings expanding the customer base or frequency of purchases;
- Higher sales from increased selling price associated with a higher value proposition;
- Raw material cost savings achieved when raw material inputs are reduced through recycling/ downcycling/upcycling, dematerialization or modular strategies;
- Disposal costs may be reduced with lower disposal volumes; this may include reduced logistics costs as well;
- Financial incentives/subsidies may be available to fund circular economy initiatives.

20. Natural Capital Coalition 2016.



Example

Economic assessments (numbers for illustration only):

Closed loop recycling - The North Face



Closed loop recycling financial business case	Y1	Y2	Y3	Y4	Y5	TV
- [Capital investment or Operating expenditure]	-100	-20	-20	-20	-20	
+ Raw material cost reduction	10	11	12	11	10	
+ Increased revenues from higher volume or	15	15	15	15	15	
+ Increased revenue through higher pricing	5	5	5	5	5	
+ Financial incentives	10	10	10	0	0	
+ Reduced disposal cost	5	5	5	5	5	
Net financial impact	-55	26	27	16	15	250

NPV 5 yrs (kEUR)	17,8
NPV incl. TV (kEUR)	194,0
IRR (%)	62%
Payback (yrs.)	3,5

For the North Face, the "Clothes the Loop" recycling initiative is providing a positive return of €194,000 net present value, a return on investment far beyond the rate expected from financial stakeholders, and a payback of 3.5 years. The investment is worth pursuing from a purely economic perspective.

Other indirect and intangible benefits could include:

- A more resilient supply chain against shocks, minimizing risks of large and unexpected price fluctuations and shortages;
- Improved reputation and brand equity;
- Marketing opportunities through increased touch points with customers/consumers;
- Long-term contracts and customer loyalty.

Such intangible benefits will, in most cases, not be part of the economic/financial business case. However, they have to be identified and brought to the attention of decision-makers as they may materially reduce the risk profile of the investment or/and increase the intangible value of the investment. Typically, such items would provide a significant upside potential to the economic business case of circular economy initiatives if they were quantifiable.

In financial terms, for the initiative to be promoted it has to show a positive net present value (NPV), an internal rate of return above the discount rate, and a payback period that is not too long. This is, however, subject to the risk appetite of the investor.

On the left side of the page is an illustration of a short financial case for a closed loop combined with downcycling initiative at the North Face Company. Its "Clothes the Loop" recycling program is designed to extend the life cycle of clothing and footwear by collecting discarded items and either reusing or refashioning them into basic materials for use in manufacturing. North Face has also partnered with I:CO USA, a company that sorts the collections at its recycling centers. It organizes collected items into more than 400 categories to determine which can be resold or recycled into raw materials such as insulation, carpet padding and stuffing for toys. I:CO's goal is to create an endless loop of material reprocessing by giving used clothing and shoes a new life²¹.

21. Forum for the Future and Unilever n.d.

Step 4: Implement

Implementing a business opportunity in the context of a circular economy may range from something very simple like a material efficiency assessment. But it could also be something quite complex like establishing a new business model, including partnering with other companies to leverage circular material flows in industrial symbiosis.

Implementation should include:

- The **use of established processes and structures of your company to get implementation done**, such as a new product development (NPD) process. At the same time, there might be a need to adapt those processes and structures in case the new business opportunities are really a breakthrough and something your company has never done before.
- **Systematic checks of your business model, not only in terms of financials but also in terms of social and environmental performance.** This is necessary because the first evaluation of your idea will be based on a lot of assumptions (such as origin and quantity of input materials in order to produce a product). As you go further with the project, you will need to confirm or correct those assumptions and repeat your assessment to make sure you still hit the triple bottom line or, if not, take corrective action (see example on PLA).
- **Immediate engagement of employees and their buy-in** so they can draw useful lessons and share concrete feedback from their circular economy experiences. You might start with employee engagement by giving incentives or organizing an internal circular economy competition to encourage circular economy ideas or projects coming directly from employees. Without the involvement and active participation of employees, circular economy implementation cannot be fully optimized.
- **Putting the right external and internal communication strategy in place** (see step 5).

22. Vink and Davies 2015.

23. Perella 2015.

Examples:

Implement

PLA (polylactic acid) is a polymer based on renewable resources. It outperforms some petroleum-based polymers like polyester in terms of greenhouse gas emissions and use of non-renewable resources when compared on a 1:1 weight basis.²² One idea was to use it as packaging material, such as for plastic beverage bottles. Initial trials, however, revealed insufficient mechanical, thermal and water retention properties for beverage bottle applications. In order to achieve acceptable performance of the bottle in terms of protecting the beverage and retaining it sufficiently during the desired shelf life, its weight would have to be increased significantly compared to PET (polyethylene terephthalat). This in turn would increase costs significantly and compromise the environmental benefits. Other applications for this material were found, for instance as wrappers for confectioneries where increased water permeation is not an issue and other properties like twist retention provide additional advantage.

Walk the talk and talk the walk

Philips provides a dedicated page about its circular economy implementation on its corporate website. It includes practical examples and references to its global partners (such as the Ellen MacArthur Foundation).

www.philips.com/a-w/about/sustainability/sustainable-planet/circular-economy.html

“AkzoNobel has embraced the concept of [a] circular economy in its Planet Possible agenda. Radical resource efficiency is the necessary route to a sustainable society. That’s why we have adopted an innovative financial metric in AkzoNobel: the Resource Efficiency Index (REI)—measuring our progress on decoupling our value creation from resource use.”

Ton Buechner,
CEO of AkzoNobel and WBCSD Council Member



Step 5: Walk the talk and talk the walk

A circular economy cannot be built alone and needs engagement from leadership and collaboration with all stakeholders and partners across sectors, governments and NGOs. Strong communication to engage employees, consumers and partners is essential for a circular economy to succeed.

Walk the talk

An old saying declares that “actions speak louder than words”. Strong leadership is required to ensure that behavior and day-to-day actions match the aspirations of circular economy goals. Therefore circular economy initiatives should be integrated into business strategy, communicated and executed with support from the top with priority and resources.

Creative communications approaches

Demonstrating real life examples has been considered the most effective circular economy communications approach according to a survey conducted in 2015 by the GoCircular platform (www.gocircular.com).²³ Communication strategies such as storytelling, educational messages and statistics could be also used, depending on the audience.

Current media and digital channels provide a unique opportunity for creative approaches to communicating the circular economy in an engaging and positive way (for example, gamification).

Employees to “talk the walk”

Circular economy communications should be led from the top, with an inclusive approach taken across the company. This is to ensure that companies proactively engage with a diverse mix

of job functionalities and departments in giving inputs to circular economy communications—which leads to stronger internal buy-in. As a result, more employees become circular economy ambassadors and “talk the walk”. At the same time, doing this also links the circular economy with and integrates it into wider corporate interests, such as corporate communications and brand reputation.

Promoting collaboration and transparency with external stakeholders

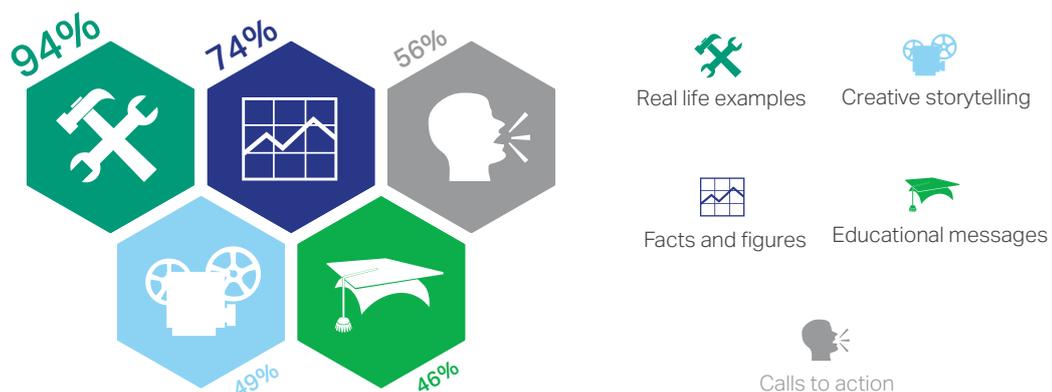
With the integration of a circular economy in supply chains, most companies now operate in much more complex supply chains in terms of the number of suppliers and business partners involved, with higher quality and a greater degree of interdependency between them. Implementing a circular economy means getting suppliers and business partners to commit to the same principles and to rise to the same challenges and opportunities.

Adapting simpler circular economy messaging to consumers

Circular economy messaging to consumers needs to be simple and personal. For example, companies can talk about their products having a lifetime of adventure or carrying memories that can be handed down to the next generation.

In addition, consumers are more connected than ever before and can easily find out more about companies and their products via websites or through social media. Thus it is important that communication on a company’s circular economy implementation be publicly available and easy to understand. The companies that already know about shifting consumer expectation and are already working to adapt to this new type of consumers will be the successful ones.

Figure 3: Elements of a circular economy communication strategy
Source: Perella 2015.





3. Unlocking the value

“[The] future world is totally based on the principles of [a] circular economy. Our role as engineers and designers is to design the waste away, and nothing less than 100% recyclability can be the target. We are not afraid of the technical and regulatory challenges to come on our way to the recyclable mill; we are proud to solve them in cooperation with regulators, research institutions and partner companies.”

Jaana Tynismaa,

President, Environment Regional Operations Northern Europe at Pöyry Finland Oy

Business growth at the expense of people or the environment is both unacceptable and unsustainable. Sustainable growth is the only acceptable model for businesses. The mindset of the current linear “take-make-dispose” economy will need to shift towards a circular economy model to decouple value creation from resource use.

However, the full implementation of the circular economy will require a major systemic change. The journey will require vision and commitment from leadership and real dedication to execution. This guide provides practical steps to get started and shows that there are already opportunities that companies can seize that are inspired by a circular economy. The circular economy cannot be built alone and it needs engagement and collaboration with all stakeholders and partners across sectors, governments and NGOs.

Leaders who grasp this will stay ahead of the competition and create sustained value with stronger business results and stronger connections with consumers and communities while being resilient in a resource-scarce world.

Our 5 recommended steps to get your company started on the road to a circular economy:

1. Conduct an assessment to identify what the company is already doing. Companies are often already pursuing circular economy activities without knowing it. The assessment contains 15 questions to help to define the current state of capabilities. Concrete examples from other companies are included to inspire thinking. Using a tool such as the Circular Economy Opportunity Matrix (to measure impact versus effort) will help to identify quick wins or existing initiatives that can be scaled up.
2. Integrate circular design principles supported by social and environmental life cycle assessments (LCA) into innovation processes to ensure the results deliver maximum impact on the triple bottom line. The guide describes the methodologies and how and when to use them.
3. Build business cases that justify specific circular economy initiatives by combining tangible **and** intangible benefits considering a longer term horizon than traditional investments.
4. Ensure stakeholders support circular economy initiatives by communicating success stories via various creative forms of communication.
5. Walk the talk and talk the walk. Lead by example and show that it can be done.

Glossary

dematerialization

The act of reducing or even eliminating the need for materials in a product while maintaining its utility.

Source: Ellen MacArthur Foundation 2016b.

eco-design

Products designed for a longer life, enabling upgrading, reuse, refurbishment and remanufacture; product design based on the sustainable and minimal use of resources and enabling high-quality recycling of materials at the end of a product's life; substitution of hazardous substances in products and processes, enabling cleaner material cycles.

Source: European Environment Agency 2016.

industrial symbiosis

Collaboration between companies whereby the wastes or byproducts of one become a resource for another.

Source: European Environment Agency 2016.

remanufacture

"A process of disassembly and recovery of an asset at a product and component level. Functioning, reusable parts are taken out of a used product and rebuilt into another. By definition, the performance of the remanufactured component is equal to or better than as new."

Source: Ellen MacArthur Foundation 2016a, page 15, quote from Nabil Nasr, Rochester Institute of Technology, presentation at Re:Thinking progress conference, Circular Economy and Remanufacturing, 14 April 2015.

reverse logistics

The process of moving goods from their typical final destination to concentrate them at a central location, either for the purpose of capturing value (through reuse, remanufacturing, refurbishment, parts harvesting or recycling) or for proper disposal.

Source: Ellen MacArthur Foundation 2016a.

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Acknowledgments

“The future lies with leaders who care for the Earth’s resources—which is imperative for society and business to thrive. It is vital to look at systems such as circular economies and start on a new path now.”

Amelie, Arthur, Christian, Jemmy, Kirsi, Serpil, Stephane,
authors of this guide and 2016 WBCSD Leadership Program participants.

We would like to express our sincerest gratitude and appreciation to the WBCSD and all the experts who provided support in developing this report.

Special thanks to Suzanne Feinmann, Andrea Brown and Brendan Edgerton from the WBCSD for their guidance, mentoring and feedback at different stages of this project. We would also like to thank the various experts who have provided input to this report:

- Reid Lifset, Yale University
- Joan Prummel, Ministry of Infrastructure and the Environment, Netherlands
- Nik Engineer, Ellen MacArthur Foundation
- Jocelyn Blériot, Ellen MacArthur Foundation
- Gavin Warner and Truus Huisman, Unilever

Finally, thank you also to our companies who supported us throughout this project and the whole of the WBCSD Leadership Program 2016.

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About the World Business Council for Sustainable Development (WBCSD)

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Our member companies come from all business sectors and all major economies, representing a combined revenue of more than \$8.5 trillion and 19 million employees. Our global network of almost 70 national business councils gives our members unparalleled reach across the globe. WBCSD is uniquely positioned to work with member companies along and across value chains to deliver impactful business solutions to the most challenging sustainability issues.

Together, we are the leading voice of business for sustainability: united by our vision of a world where more than 9 billion people are all living well and within the boundaries of our planet, by 2050.

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