



Resourcing the world

Join the Circular Economy



“

We are witnessing the dawn of a new industrial revolution which introduces the circular economy. By being more sparing and efficient, the circular economy provides an antidote to overexploitation of the environment and to the more pessimistic forecasts, by prolonging the life cycle of raw materials, water and energy. It teaches us something not theoretical but is based on facts, and it draws inspiration from nature, in which everything is a resource.

”

Antoine Frérot

Chairman and CEO, Veolia

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What Is a Circular Economy?

A circular economy is a fundamentally different way of approaching products and resources. The overarching purpose of developing a circular economy is to allow businesses at all scales and levels to reduce, reuse and recycle waste. More than just reducing trash in landfills and encouraging the recycling of paper and plastic,

this type of economy is designed to turn all the waste that companies and individuals produce into a valuable, productive resource to be used again. It does this by reintroducing “waste” into the production cycle instead of disposing of products at the end of their useful life.



Linear versus Circular Economies

The traditional production process that we inherited from the 19th century is linear and defined by “take, make, waste.” In other words, raw materials are collected, transformed into products and are used until they are finally discarded as waste. Materials travel in one direction until they are thrown out, and value comes only from producing and selling as many products as possible.

LINEAR ECONOMY



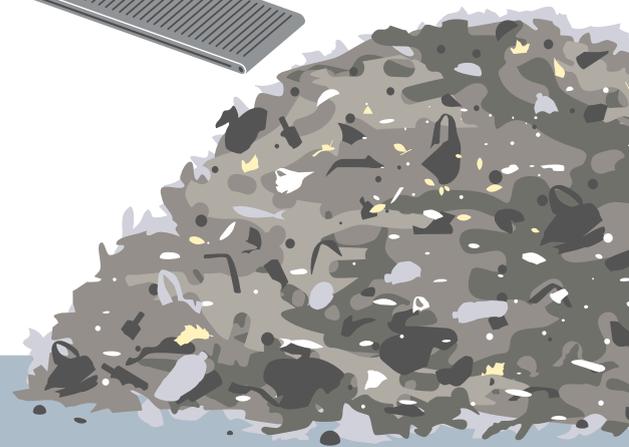
TAKE



MAKE



WASTE



The problem with this approach is that in the long run it becomes unsustainable. The linear economy puts strain on our natural resources, creates large amounts of waste that become increasingly difficult to dispose of and eliminates the possibility of using the full value of a raw material.

CIRCULAR ECONOMY

The circular economy, on the other hand, allows companies and individuals to extract additional value out of our existing materials and resources. By focusing on reusing and recycling, circular economies get closer to creating a closed loop system that minimizes the use of resource inputs and, in doing so, reduces the creation of waste, pollution and carbon emissions. This model is based on the following three principles:

Design out waste and pollution

Regenerate
natural systems

Keep products and
materials in use

By rethinking and reexamining production processes, a circular approach will help companies leverage materials further in a continuous flow, generating resource and cost savings, protecting supplies, maintaining materials at their highest value and reducing their carbon footprint.

How Circular Processes Can Benefit Your Business

Total Global Demand for Resources

According to the United Nations Environment Programme International Resource Panel, the total global demand for resources is expected to reach 130 billion tons by 2050, up from 50 billion in 2014.

.....2014.....



.....2050.....

130
billion
tons



As the demand for finite resources like natural gas, minerals, precious metals, quality soil and drinking water increases, so does the cost of obtaining them. The way companies can help mitigate the consequences of increased global resource demand, as well as reduce their current costs, is by adopting a more circular approach to their production processes.

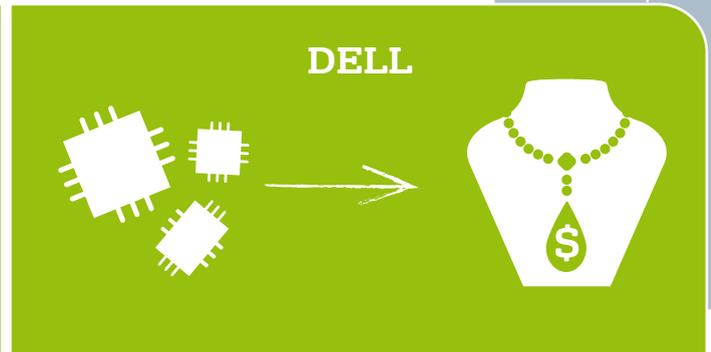
Reuse Materials to Reduce Waste

A report put out by the Ellen MacArthur Foundation estimates that the full value of circular opportunities, globally, could be as much as US \$700 billion each year in materials savings. By reducing or eliminating waste through the reuse of materials, businesses not only save on the cost of waste disposal, but also gain by selling or turning that waste into a product that can be used again.

Cost savings and operational efficiencies are direct incentives to implement circular initiatives. They create an additional return on investment or new sources of revenue from a service model that extracts the maximum value of resources. Examples of companies that have adopted more circular production models include Heineken and Dell.



Heineken went beyond just recycling glass bottles to using waste heat from a nearby factory, recycling water and selling spent grains as cattle feed. They are also working on making higher value products from the used grain by extracting the proteins, fats and other components for use in food, cosmetics and pharmaceuticals.



Dell is experimenting with creating and selling jewelry made from precious metals extracted from recycled circuit boards. Gold extracted from discarded motherboards has an environmental impact 99% lower than gold produced through strip mining methods.



Exploring Circular Possibilities

Despite the great potential for minimizing waste and creating new revenue streams, the transition from a linear to circular business model is not without some difficulties.

Factors that can hinder the transition for many companies could include:



FINANCING *the new business model*

TAXATION *systems*

INTERNAL RESISTANCE *to change*

Perceived lack of
CONSUMER DEMAND

Another potential roadblock is determining what a business can actually do with their waste. How can they recycle it or put it to another productive use?



Join the Circular Economy

But we can't let these potential problems impede our progress; there are solutions! In this guide you will find an informational overview of several circular models and what they could mean if implemented in your production process. We will take you through the defining characteristics of a circular business model, delineate different types of circular models, and explore real world applications and examples. By examining different models and opportunities for a shift towards circularity, we hope to inspire reflection for how your business can take the first steps towards more sustainable and profitable production processes.





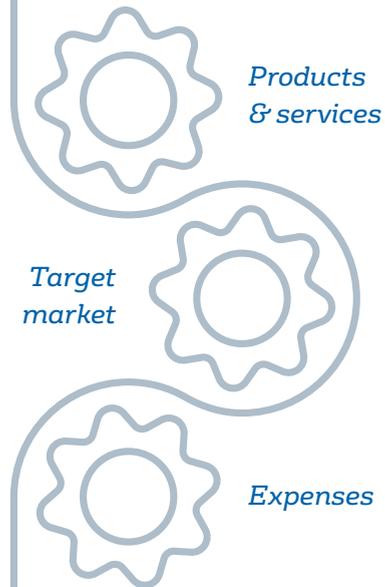
*What Is
a **Circular**
Business Model?*

Types of Business Models

Before we explore what makes a business model circular, we should identify what a business model is. In simplest terms, a business model is a company's strategy for making a profit. It involves identifying the services or products that a business will sell, plus the target markets they will sell to and all the expenses that the company will incur in the process.

A business model is also defined as a set of assumptions about what a business will and won't do and is considered a conceptual framework that supports the viability of a company or product.

Correctly identifying and understanding a company's business model is critical to its long term success. There are various types of business models, and they all outline the details of how an organization creates and delivers value and how it will produce a profit.



Basic sales structures for business models

Direct sales to end users

Franchise organizations

Distributor groups for manufacturers

Subscription purchases

Manufacturers direct to sales groups

Freemium providing a free software as a gateway to sales

The model that we want to explore is one that can be adapted to any business structure and focuses on a company's resources and how they are used and reused: the circular business model.





What Makes a Business Model Circular?

There is one primary difference between circular business models and other, more traditional models. The circular business models are engineered to reduce the use of natural resources and limit the generation of industrial and consumer waste, with the goal of creating new, profitable revenue streams in the process.

On a basic level, circular business models have existed as long as businesses have been functioning, but it's a model that is more naturally adapted to certain types of businesses. For example, leasing or renting instead of selling a product can fall under the definition of a circular model. Leasing and renting are alternatives to the classic “make, use, toss” model of the majority of businesses based on manufacturing and selling products. Companies that offer a financial or other incentive for the return of used products that are then refurbished and resold are also operating on circular business principles.

Transitioning to a Circular Economy

If they are not entirely in a closed, circular loop, companies that implement a circular business model are in the process of closing, narrowing, slowing, intensifying and dematerializing their product, supply, and waste streams.

For businesses that produce waste or sell actual products, the defining features of a circular model are resource recovery and extending product lifespan. These companies can recycle their waste into secondary raw materials and, in doing so, divert waste from its final disposal, extract more value out of it, and displace, lessen or postpone the extraction and processing of virgin raw materials.

*What features **define** a circular model?*



**EXTENDING
PRODUCT LIFESPAN**



RESOURCE RECOVERY

No matter which specific type of circular model a business incorporates, what's important is adding processes that will increase productive usage for existing products and materials.

Why Aren't More Businesses Already Circular?

In order to re-examine current resource use, companies must realize their current *modus operandi*. Traditional, noncircular business models typically have a very narrow viewpoint of their involvement with the materials used to make their products. They purchase the materials after they have been extracted from their native environment and modified to the state required for additional processing. They then create their products, sell them and discard their waste.

Historically, most businesses haven't addressed the processes required to provide the raw materials they need or the consequences of discarding the waste generated by manufacturing the product or by consumers after using the product. Their concerns have been limited to the processes involved only in the direct manufacture of their products.



Over the years, this model has made sense and has worked. The majority of businesses, large and small, have used this approach, because it is intuitive and has been an effective way to make a profit.





Broadening Our Vision

The key difference with circular business models is that companies are beginning to look at their businesses through a much wider lens. By assessing the full potential lifespan of a raw material, businesses are discovering ways to extract more value through previously unknown revenue streams, while reducing their reliance on a constant stream of virgin raw materials.



Circular business models incorporate a wider field of vision in an effort to reduce, reuse and recycle as much as possible.





Accepted Circular Business Models

*Five Methods to Operate in
More Circular Ways*



There are five methods that are widely accepted as models for businesses seeking guidance in broadening their perspectives to adapt their business models to one that maximizes their participation in the circular economy.

The five circular economy business models were developed by Accenture, a multinational professional services company that provides guidance to companies to drive innovation that causes growth in new industries and helps them transform their organizations. These five models are presented as options for businesses to use in transitioning their existing companies' structures to obtain maximum benefit through a circular economy.

These circular business models are categories that help us understand the different methods that businesses can undertake to become more sustainable and circular. They overlap in many ways, but the categories are distinct enough to be helpful. **The key to all of them is extracting more value out of existing products and reducing the use of new resources.**

The five models are summarized below, then explored in more detail in the sections that follow, including their benefits, business impact, and potential applications.



Product as a Service



Sharing Platform



Resource Recovery



Circular Supplies



Product Life Extension

Product as a Service



The Product as a Service model is one of the most basic concepts for a circular business model. Examples of this type of circular business model include car rental companies and print shops. Instead of selling the product, the company retains ownership of the product, and the customer pays the company to use the product for a defined period of time. With this model the owner manages the product while it's used and is in charge of maintenance, reuse, remanufacture and recycling of the product.

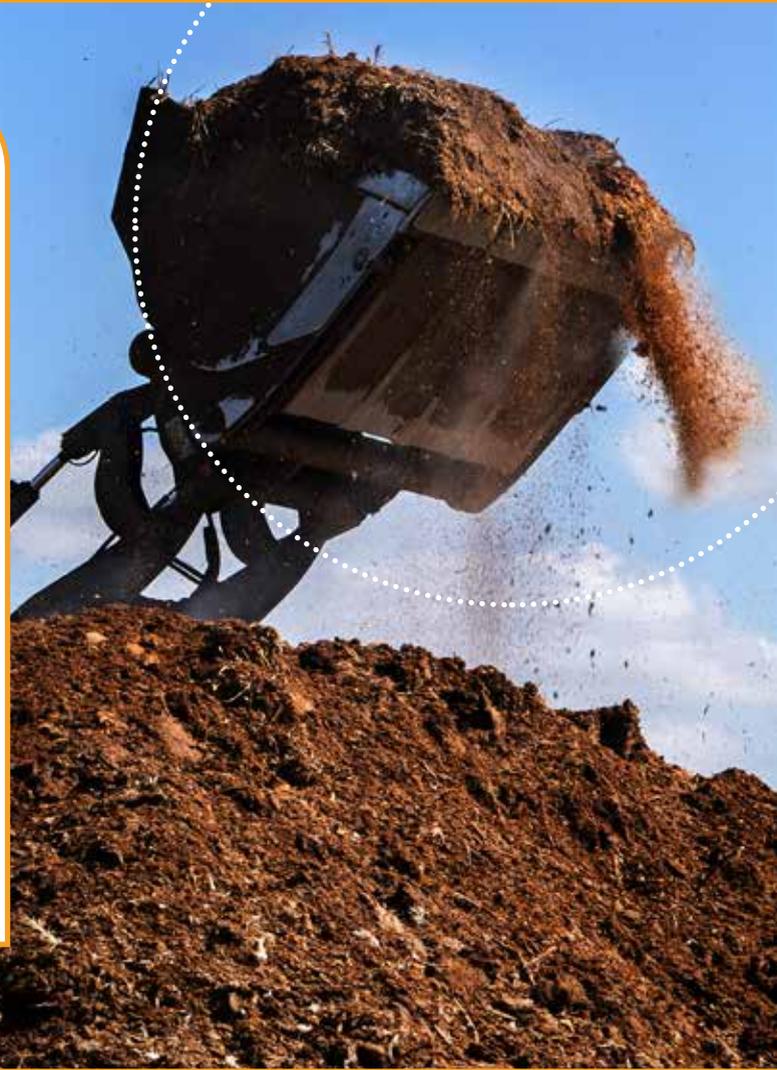
Sharing Platform

A Sharing Platform is a form of service compensation in which the owner sells access to underutilized assets to customers. Examples of this type of circular business model include ride sharing services like Uber or Lyft and short term accommodation rentals like Airbnb. The primary difference between this model and leasing models is that the typical period of usage for sharing is usually much shorter, and the number of customers using the product or asset is much greater.



Resource Recovery

The Resource Recovery business model utilizes technological innovations and advancements to recover and reuse resource outputs. A real world example is recycling plant material, food scraps or paper products through biological composting processes. The resulting material can then be used as mulch or compost, and the waste gases, such as methane, can be captured and transformed into electricity or heat. Companies that adopt this model can reduce or eliminate waste of byproducts and maximize the value they are extracting from their resources. This model accomplishes this goal by reprocessing waste materials into new resources that can be used again once or many times.

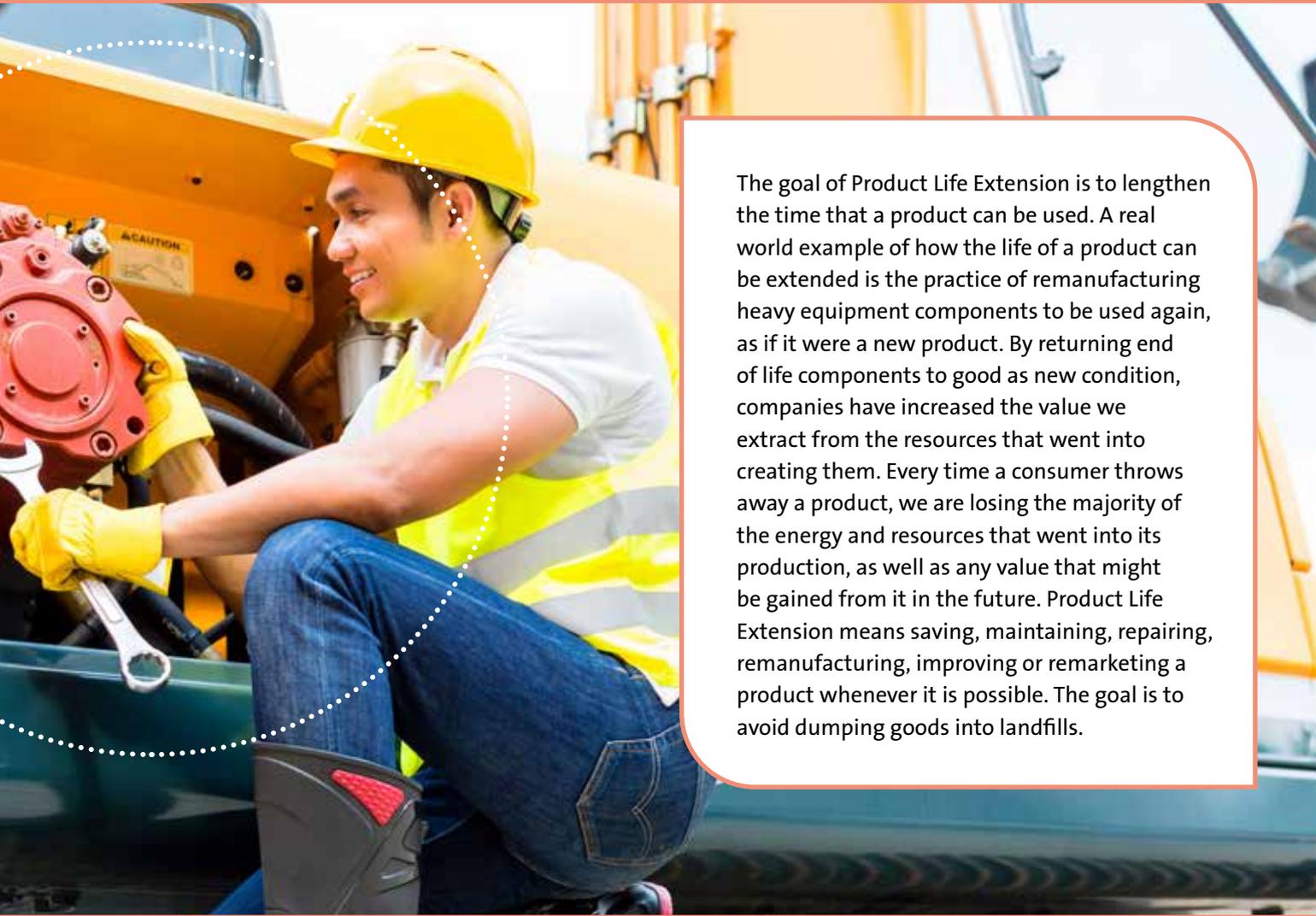


Circular Supplies

The Circular Supplies business model works by eliminating materials that are derived from virgin resources and replacing them with bio-based, renewable or recovered materials. An example of a circular supply model is converting agricultural residue like baled corn cobs, husks, leaves or stalks and converting them into bio ethanol, a renewable fuel. This model is especially relevant for companies dealing with scarce commodities, because reusing existing resources reduces their dependence on new, virgin resources.



Product Life Extension



The goal of Product Life Extension is to lengthen the time that a product can be used. A real world example of how the life of a product can be extended is the practice of remanufacturing heavy equipment components to be used again, as if it were a new product. By returning end of life components to good as new condition, companies have increased the value we extract from the resources that went into creating them. Every time a consumer throws away a product, we are losing the majority of the energy and resources that went into its production, as well as any value that might be gained from it in the future. Product Life Extension means saving, maintaining, repairing, remanufacturing, improving or remarketing a product whenever it is possible. The goal is to avoid dumping goods into landfills.



**Any efforts
toward
improvements
in the circular
economy are
welcome**

There are many ways to participate in the circular economy. These five business models are not exhaustive, and they can be implemented piecemeal, combined and used partially. Any improvements that your business can make to reduce waste or to find productive or profitable methods of utilizing its existing waste can be identified as circular in nature.

The goal is simple:

***Reduce,
Reuse and
Recycle.***

**PART
FOUR**

Circular Business Models: Implications to Consider

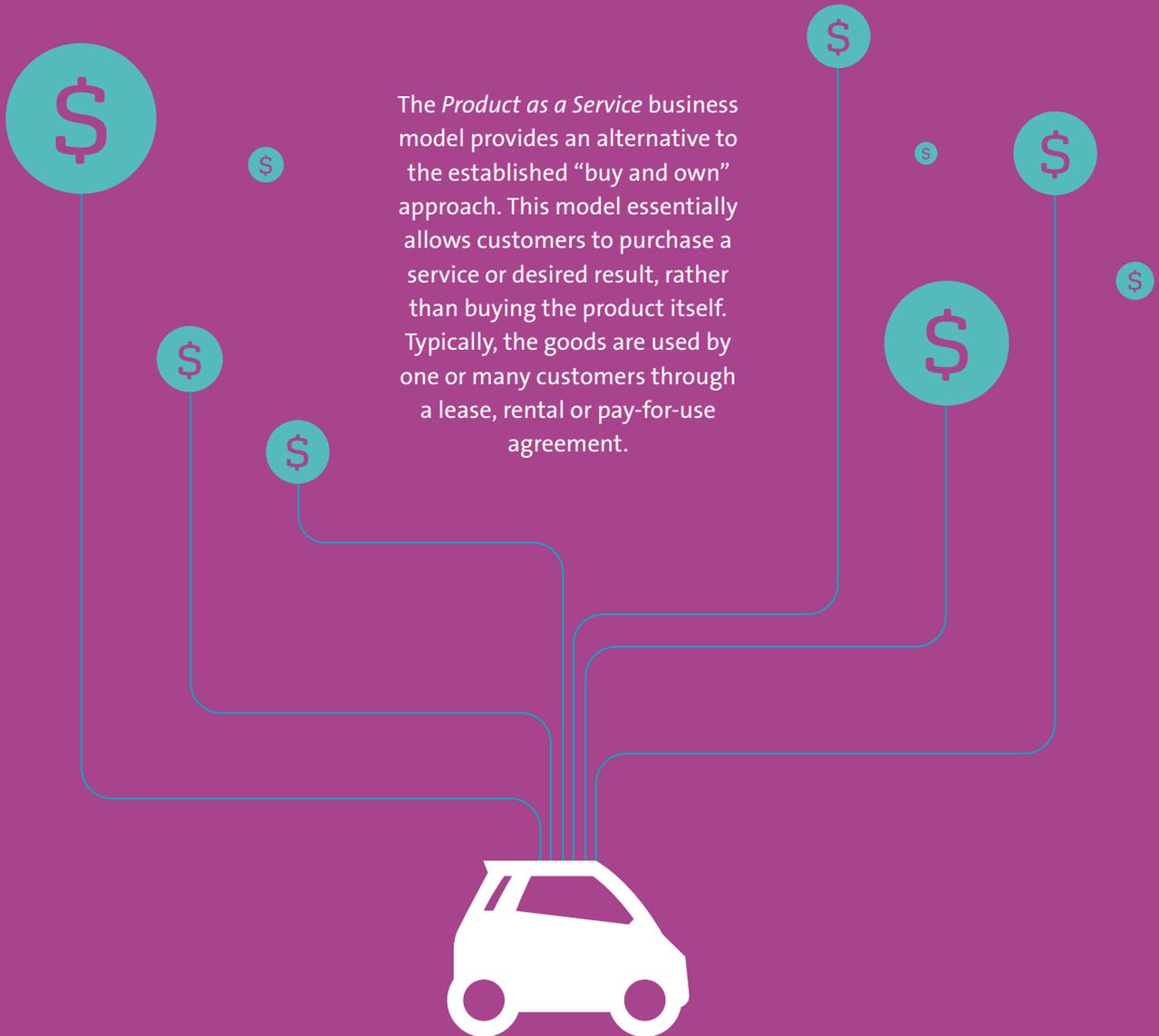


Details on each type of circular business model are provided, including how companies have implemented each one successfully. Learn how to evaluate the best strategies for converting to a comprehensive circular business model by adopting more circular processes to your current operations.



Product as a Service Business Model

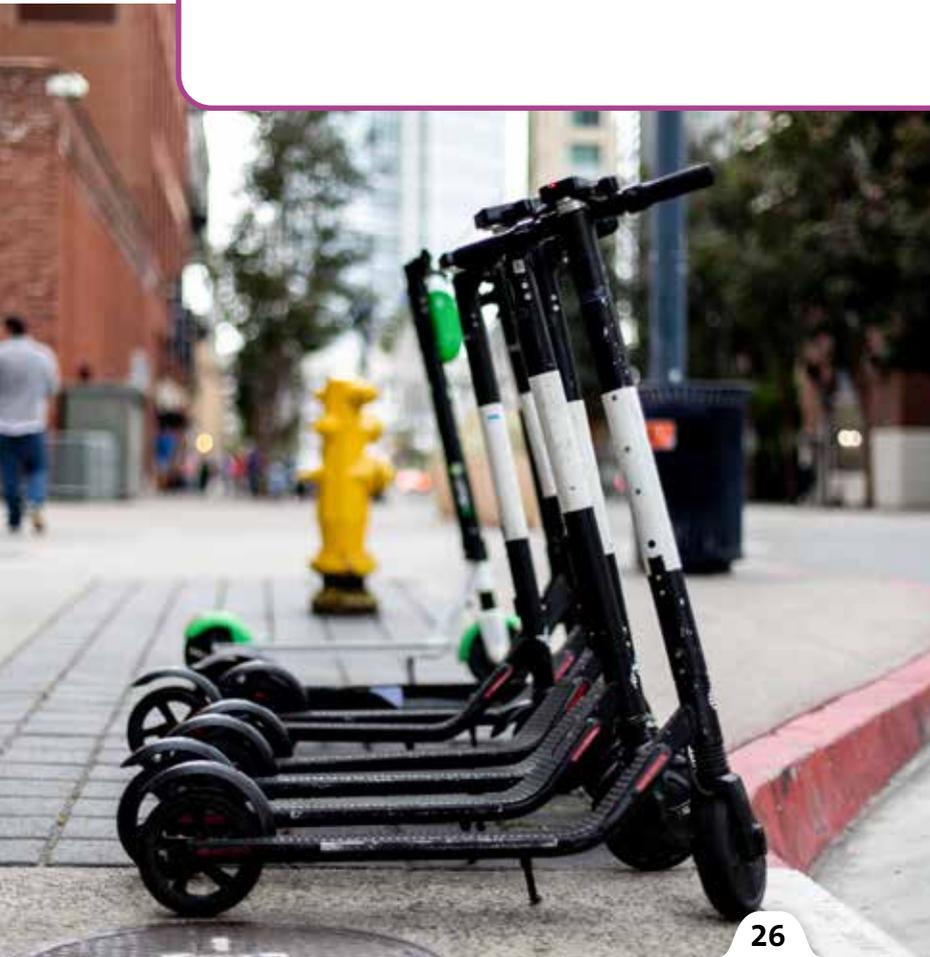
The *Product as a Service* business model provides an alternative to the established “buy and own” approach. This model essentially allows customers to purchase a service or desired result, rather than buying the product itself. Typically, the goods are used by one or many customers through a lease, rental or pay-for-use agreement.



What Drives the *Product as a Service* Model?



In addition to reducing environmental impact, the main driver behind adopting a *Product as a Service* circular business model is that it increases profitability because there is less investment in production. By reducing the number of products manufactured and increasing the quality of products to assure that they last longer and are used by more people, a company's original investment in materials goes much further.



Also, *Product as a Service* delivers a consistent, constant revenue stream as companies can keep a single product in circulation and “sell” their goods over and over again. For manufacturers, this type of business model also allows them to see how the product is being used in the field, which offers insights into product design, reliability and opportunities for improvement.

Business Implications

When considering adopting a Product as a Service business model, there are several impacts to evaluate.

Product as a Service requires **initial R&D investment as well as a continuous investment in maintenance** to ensure the quality of the product is high.

Maintenance costs can exceed the full replacement costs for some products. In these cases, a circular model would not be cost effective. Instead, it could be beneficial to seek a third party to consult on other beneficial reuse options for the “spent” products if repair is not a viable path for reusing the products.

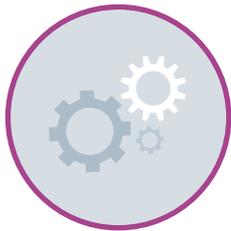
The risk is transferred from the customer to the company which maintains ownership of the product.

As the risk shifts, the company may be able to provide the service or product to a wider base of consumers, increasing revenue streams. This new accessibility can unlock market growth, but it does come with capital risks that companies should consider carefully.

For users, *Product as a Service* transforms large capital expenses into **smaller operating expenses.**

Applications

Any business model in which the customers pay to use a product instead of actually purchasing it can be described as a Product as a Service. This arrangement is becoming more and more popular as companies and consumers are uncovering the value of using large appliances in particular as a service instead of selling or buying them outright.



One example of converting appliance purchases to the Product as a Service model is laundry machines. Rather than purchase a washer and dryer, then dealing with machine breakdowns, many consumers are turning to laundry services or machine rentals. **This approach avoids a situation where the repair bill for a machine may approach the cost of buying a new one.**

An opportunity is created for companies to rent or lease expensive appliances and machines to customers who don't want to incur the cost and risk of purchasing.



Another example of a Product as a Service is renting construction or heavy equipment to customers. The company providing the equipment maintains ownership, is responsible for major repairs, and receives a steady revenue stream by renting out the machines again and again.



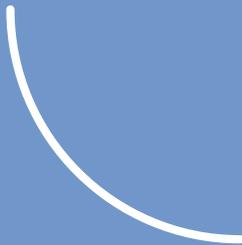
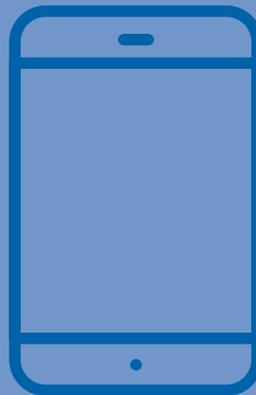
The customer benefits by saving on capital costs, not incurring any risks of ownership, not paying for major repairs, and always having access to the most up to date technology.

The environment benefits with fewer resources diverted to building new machines and extracting more value out of existing equipment.



Sharing Platform Business Model

A *Sharing Platform* business model is one in which a business promotes collaboration among users to increase the usage and value derived from its products. This model is based on sharing currently underutilized assets, whether those assets are skills, products or spaces, for monetary or non-monetary benefits. The primary feature that defines a *Sharing Platform* business is that the company does not make or own any goods. They simply create the opportunity for consumers to tap into the unused potential of products.



What Drives the *Sharing Platform* Model?

The motivation for transitioning a current business to a Sharing Platform or for creating a new business based on this model is exactly why Uber created a ride sharing app instead of starting a taxi company. With the ride sharing app, Uber did not need to invest large amounts of capital in resources like taxi cabs and is not responsible for the maintenance of any capital goods.



A *Sharing Platform* model also allows companies to provide a much greater variety of options and choices for consumers than they could offer if they actually owned the products that are shared.



Business Implications

When deciding whether to adopt this business model, it is important to consider both the potential benefits and the potential downsides.

One possible negative factor in the *Sharing Platform* business model is that companies lack control. They don't own the goods, and they are not liable for all the business costs, manufacturing of products, damages, etc. **This lack of control also means that they have less influence on the customer experience.**



A possible hurdle to success with the *Sharing Platform* model is the pride in ownership that often goes hand in hand with certain types of products. For example, people often like to own their cars and vacation homes, because they can be status symbols in a community. Owning these properties could be one way of demonstrating their success to others.

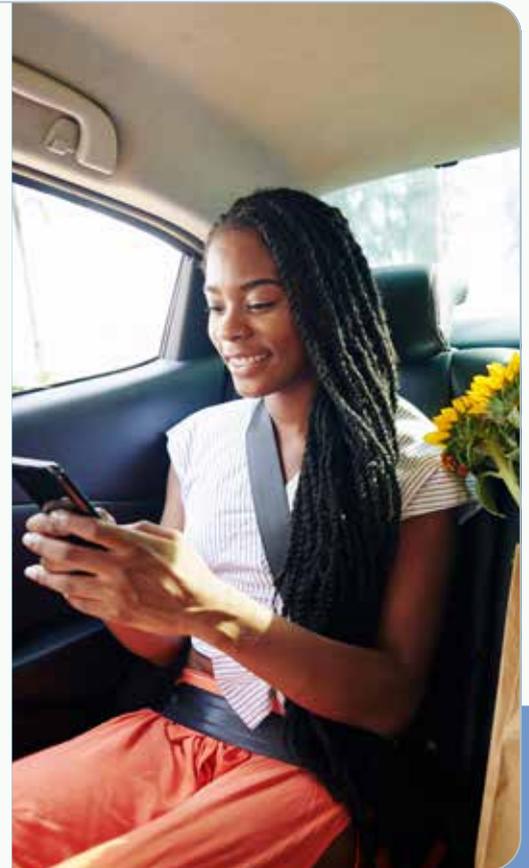
An economy based largely on sharing and using things you don't own could be less fulfilling for some people who might avoid participating in this model.





Another potential downside is a lack of regulation within the sharing economy community. Because it is so new and very different from traditional models, there is little to no regulation overseeing product or service transactions. This lack of oversight could be perceived to put end users at risk.

On the flip side, a lack of regulation can also be seen as a benefit of the sharing economy business model, because owners do not need to comply with a multitude of regulations. **Without the expenses incurred to meet excessive regulatory requirements, the company has lower overhead than might otherwise be required,** contributing toward reducing expenses and keeping the products and services affordable.

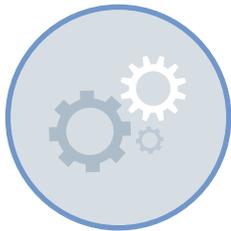


Another potential benefit of this model is that it encourages sustainable use of materials. Instead of manufacturing new products, the *Sharing Platform* model optimizes the use of products already in existence. **This structure has a very positive impact on the environment.**



Applications

Applications of the Sharing Platform business model have exploded in popularity over the last ten years as smart phones have become ubiquitous, and technology has made it possible for large numbers of users to participate in a wider variety of business ideas. Two examples of successful businesses using this model are **Airbnb** and **Roadie**.



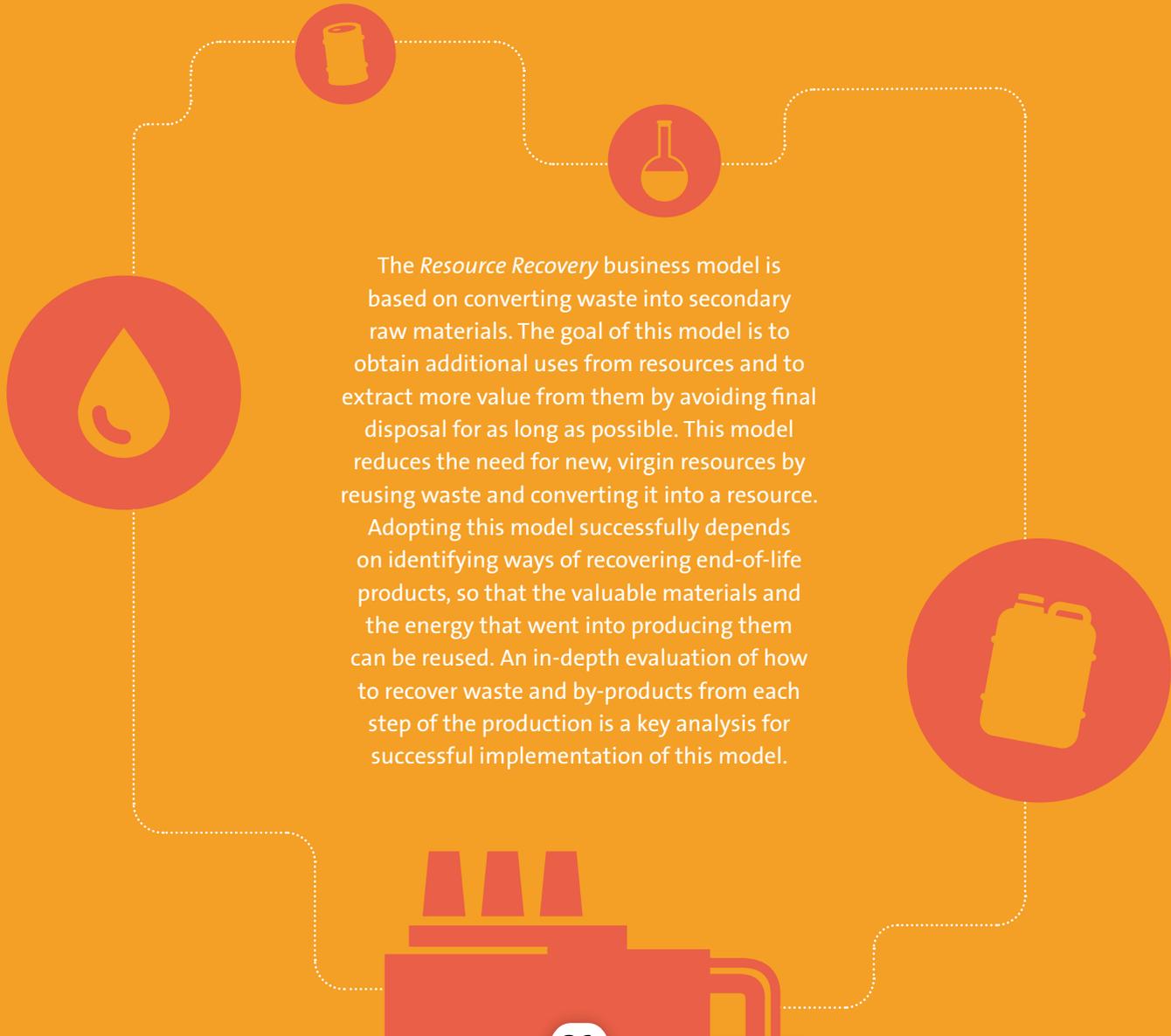
Airbnb connects homeowners with travelers who need a place to stay. The owners benefit by connecting easily with people who can view the property and commit to stay, generating income, while providing travelers a rental that's a good fit for their requirements. Airbnb does not own any houses, apartments, or rooms; they simply connect properties with renters on their platform.



Roadie is a system that allows people to earn money while taking trips they may have already planned. If you are driving somewhere, you can use the app to find people who need goods delivered to your destination. The app enables people to provide this service both locally and on long haul trips. Roadie does not employ delivery people or own vehicles; they simply connect drivers with people who need something delivered.

In both of these examples, companies are allowing people to take fuller advantage of goods. Instead of rooms or apartments sitting empty, travelers are now using them. Similarly, there are fewer trucks that are empty on one leg of their journeys.

Resource Recovery Business Model



The *Resource Recovery* business model is based on converting waste into secondary raw materials. The goal of this model is to obtain additional uses from resources and to extract more value from them by avoiding final disposal for as long as possible. This model reduces the need for new, virgin resources by reusing waste and converting it into a resource.

Adopting this model successfully depends on identifying ways of recovering end-of-life products, so that the valuable materials and the energy that went into producing them can be reused. An in-depth evaluation of how to recover waste and by-products from each step of the production is a key analysis for successful implementation of this model.

What Drives the *Resource Recovery* Model?



The primary drivers of the *Resource Recovery* business model include extracting more value from your existing resources and operating on a more sustainable, environmentally friendly basis. When companies are able to sell or otherwise use the waste they create or the by-products of their manufacturing processes, they will often add a new revenue stream where there once was a disposal expense and reduce their expenditures for raw materials.



In addition to the direct monetary advantage of new revenue streams or cost reductions, a driver of the *Resource Recovery* model is to satisfy the environmentally conscious consumer. There is a growing population of consumers that is actively seeking to do business with companies based on how environmentally friendly their products and practices are. It is important to increase recycling during any type of production as a practical initiative to reduce the use of the world's resources while decreasing costs, but it's also an important position for the company to take from a public relations perspective.

Companies that want to appeal to environmentally conscious customers are seeking ways to recover more of their waste and reuse their resources.



Business Implications

When considering whether or how to move your business to a *Resource Recovery* model, there are several implications, both positive and negative, that should be evaluated.

The secondary raw materials that are created from your waste can sometimes be inferior quality. The process of breaking an item down into its constituent elements or materials that are reused but as a lower value product is known as downcycling. Lower quality means that there are fewer applications they will be suitable for.

Unfortunately, in some cases it is more cost effective to dispose of waste materials than it is to try to regenerate them or develop a process to recycle and reuse them.



If you can find a process that is efficient, however, the impact on your business can be extremely positive. You may be able to recover the resource at a level of value that is equivalent to, or even above, the initial investment. This opportunity can be significant for companies that produce large volumes of by-products.



Reuse is Environmentally Responsible

Businesses often produce large volumes of waste that result in adverse environmental impacts, triggering negative attention from the media. This model reverses the pattern and promotes positive impressions of businesses by focusing on the benefits of reusing resources, presenting companies' reputations as socially responsible. As a result, customers see these companies as involved in their communities and invested in preserving the environment for future generations. **You want your customers to know you're making a more positive than negative impact on the community around you—not all value is monetary.**

There are professional waste consultants who can potentially find a cost efficient recycling process for your waste streams that can unlock business value you were previously missing out on.



A worker in a yellow hard hat and safety glasses is working on industrial machinery. The worker is wearing a dark blue jacket with reflective yellow stripes and is using a tool to adjust a component of the machinery. The background shows a complex network of pipes and valves.

Applications

Opportunities for and applications of *Resource Recovery* are prevalent primarily in large, industrial businesses where residuals or co-products from source operations require treatment or disposal.

Downstream oil and gas companies are an example of this model. Using secondary oil recovery processes, refineries are able to return wasted oil to the refining process, recover water effluent to reuse as quench water or to send through a wastewater treatment plant, and turn the remaining oily sludge into a dry cake that reduces the amount of material that needs to be discarded.

Refineries establish processes to recover resources from oily sludge to salvage value that would have been lost with the help of companies like Veolia. Working in refineries with capacities of up to 700,000 barrels of oil a day, Veolia processes more than 500,000 barrels of oil-bearing secondary material a year, helping reduce disposable materials and returning over 31,000 barrels annually to the refinery process.





Solvent recycling is another example of an industry that uses *Resource Recovery*. Companies that generate solvents are increasingly using processes to convert them into a usable resource. Various processes have been established to recycle solvents. Some businesses clean the solvent and return it for reuse to their own businesses.

Others convert solvents into products designed for reuse in manufacturing, or they reclaim, clean and deliver solvents to third parties who use them as a replacement for virgin solvent.

Circular Supplies Business Model

The *Circular Supplies* business model is defined as fully renewable, recyclable or biodegradable resource inputs that serve as feedstock, or raw materials, for a different production process. The overall goal of this business model is to lessen an organization's dependence on new, virgin resources. This approach is especially important for companies that depend on scarce resources or commodities.



What Drives the *Circular Supplies* Model?



Similar to the *Resource Recovery* model, one of the primary drivers for companies adopting a *Circular Supplies* model is to lessen their impact on the environment. Under this model they can operate on a more sustainable basis and align themselves better with consumers who are demanding cleaner technology and less pollution, and who are willing to pay for more expensive green, environmentally friendlier products.

Reducing their impact on the environment by using fewer resources is especially powerful for companies with a large environmental footprint or those dealing with scarce or depleted feedstock.



Business Implications

As with all the circular business models, there is a range of implications to consider when deciding whether to incorporate aspects of the *Circular Supplies* model into your production processes.

In certain situations, it can be more cost effective and easier to stick with traditional methods of supplies and resource inputs procurement, rather than risk changing to circular procurement. In these cases, companies need to focus on looking at what they intend to gain by switching models and whether their business can sustain it.



Similarly, whenever changing a business model, there will always be unforeseen consequences. This impact may be more significant when switching from a traditional, tried and tested resource procurement method to a relatively newer recycled or regenerated method.



A positive business outcome of *Circular Supplies* models is that companies can reduce their environmental impact and leverage a “going green” reputation, which is becoming more and more important among consumers.

Recycled inputs are often less expensive, which could decrease overall production costs and increase profit.



Another positive impact is that a business can reduce demand for the virgin resources they would normally use in their production processes, resulting in less damage to the earth and reducing overall strain on its resources.

Applications

There are many examples of businesses adopting a *Circular Supplies* model. Any business that uses the residual outputs from one production process (whether their own or another company's) as feedstock for another process is operating on a circular basis.



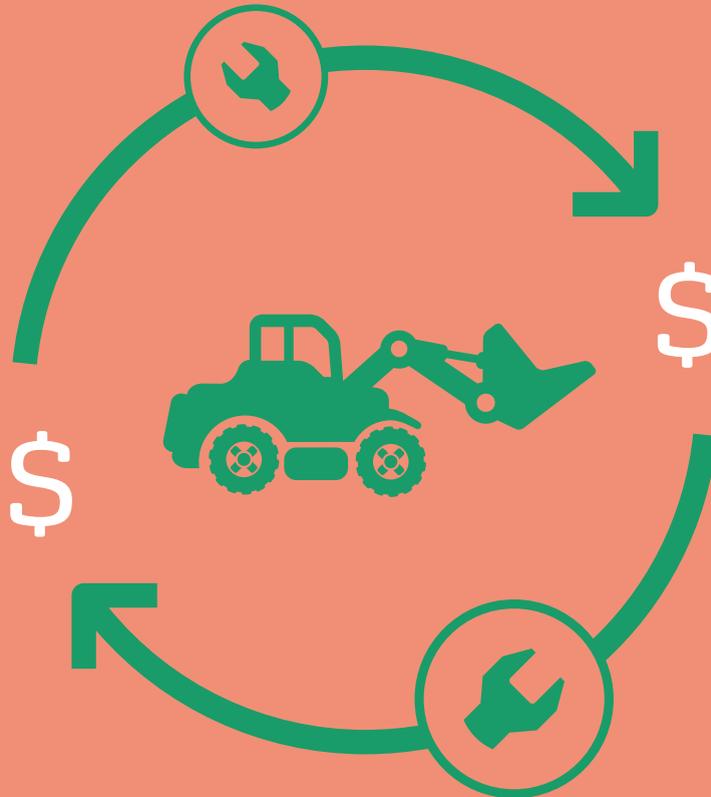
One such application is a company reusing produced water created by the extraction process for oil as “fracking fluid” necessary for the fracking extraction process of natural gas and other resources.



Another example of a *Circular Supplies* business model is reusing solvents that are required in the production of paints, adhesives, cleaners, degreasers, pharmaceuticals and personal care products. By recycling expensive solvents instead of disposing of them, companies in these industries can reduce or eliminate the amount of virgin solvent they need to purchase.

The opportunities for adopting *Circular Supplies* are many. All this model requires is using recycled or renewed resources or goods as inputs for future production processes. This approach prevents waste, extracts more value out of existing resources and reduces costs.

Product Life Extension Business Model

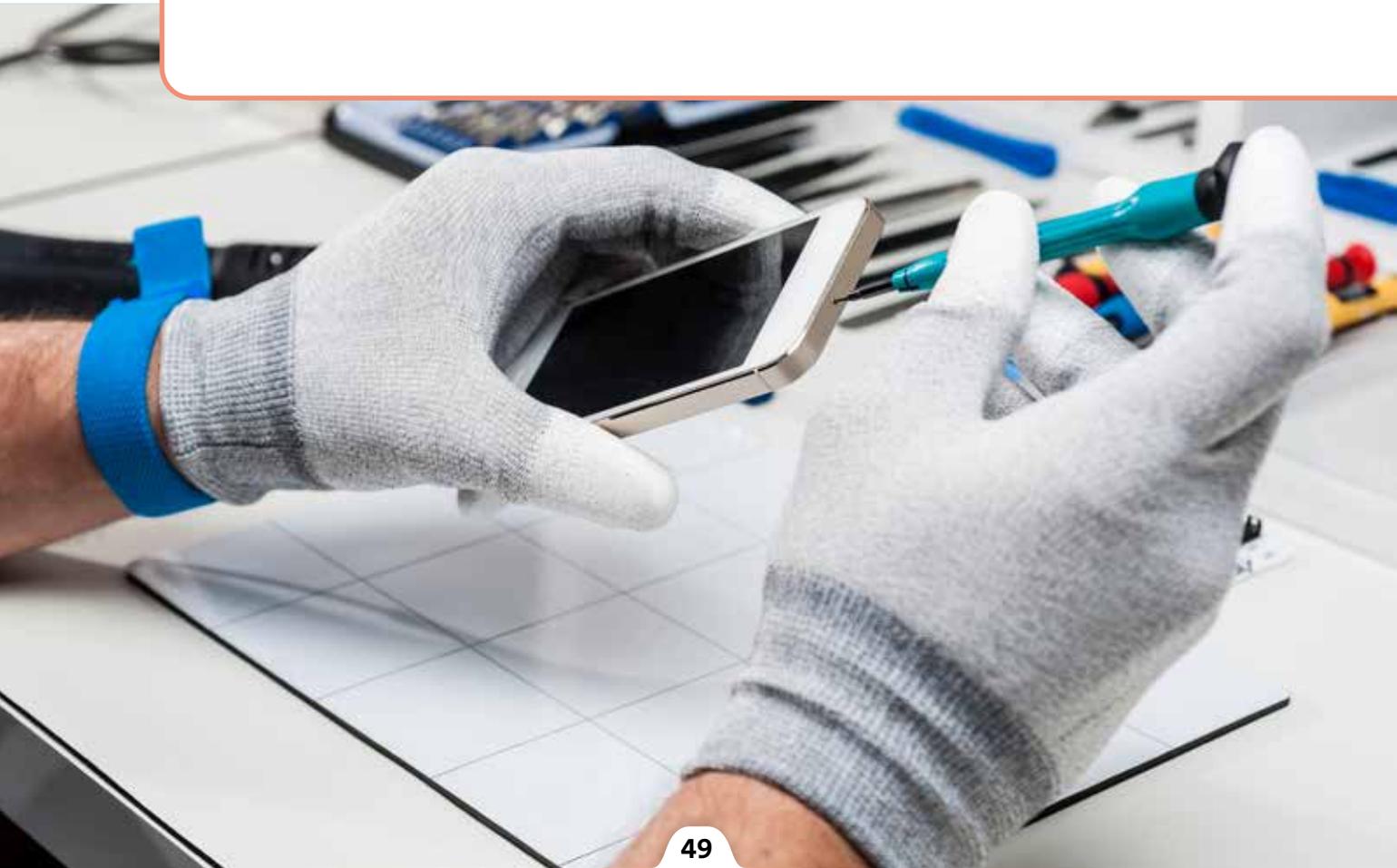


The *Product Life Extension* business model focuses on lengthening the time period that a product can be used before disposing of it. The goal is to maximize both lifespan and utilization, by increasing the value extracted from products before they are discarded. This model is the opposite of planned obsolescence, a policy of producing goods that rapidly become obsolete to assure that they must be replaced.

What Drives the *Product Life Extension* Model?



The primary driver of *Product Life Extension* business models is to limit the amount of natural resources that a company is using. Products that quickly become obsolete or are made of low quality material and quickly discarded are essentially wasting the resource inputs that went into making them. Not only do they waste resources, but goods with short lifespans add to our landfills which are already growing too quickly.



Business Implications

Although a key aspect of building a circular economy, *Product Life Extension* models are not without their drawbacks and difficulties. Below are examples of the range of business impacts you may encounter when operating under a Product Life Extension business model.

In certain industries, such as technology, companies increase sales by using subtle pressure to buy the latest and most advanced version of their products. Operating with a *Product Life Extension* model means potentially losing out on that revenue stream and working against the urge to own the newest, latest models to assure a spot in the “elite” crowd.



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Changing the mindset and practice of a business from designing products that only last a few years to designing ones that last a decade or more is not easy or necessarily beneficial to the producer.

Often it is cheaper and easier to replace an entire product instead of diagnosing the problem and replacing or repairing a single part of it.

Lowering Environmental Impact Is a Benefit

On the other hand, the benefits of the *Product Life Extension* business model closely align with improving the environment. When goods are disposed of less often, less material ends up in landfills. In addition, not producing as many new products conserves energy and reduces pollution and harmful byproducts created through the manufacturing process.



Another beneficial business impact is that by reusing materials from obsolete or damaged products, the producer can avoid purchasing raw materials, lowering input production costs.

Applications

Any time you are lengthening the useful life of a product, you are operating on a *Product Life Extension* business model. A very basic example of this model is the clothing brand Patagonia. They not only design their products to be more robust than their competition, but they back them up with online repair guides that help consumers prolong the life of their gear, and a network of repair shops to repair items too damaged for a customer to fix.



Any business that is built on refurbishing, repairing and remanufacturing goods is an example of the *Product Life Extension* business model. They include everything from electronics and major parts for heavy equipment to cars and furniture. Another application of this business model would be preventive maintenance. By identifying issues or parts that fail before they cause greater damage to the machine and conducting maintenance at critical points, you are extending that machine's productive lifespan.



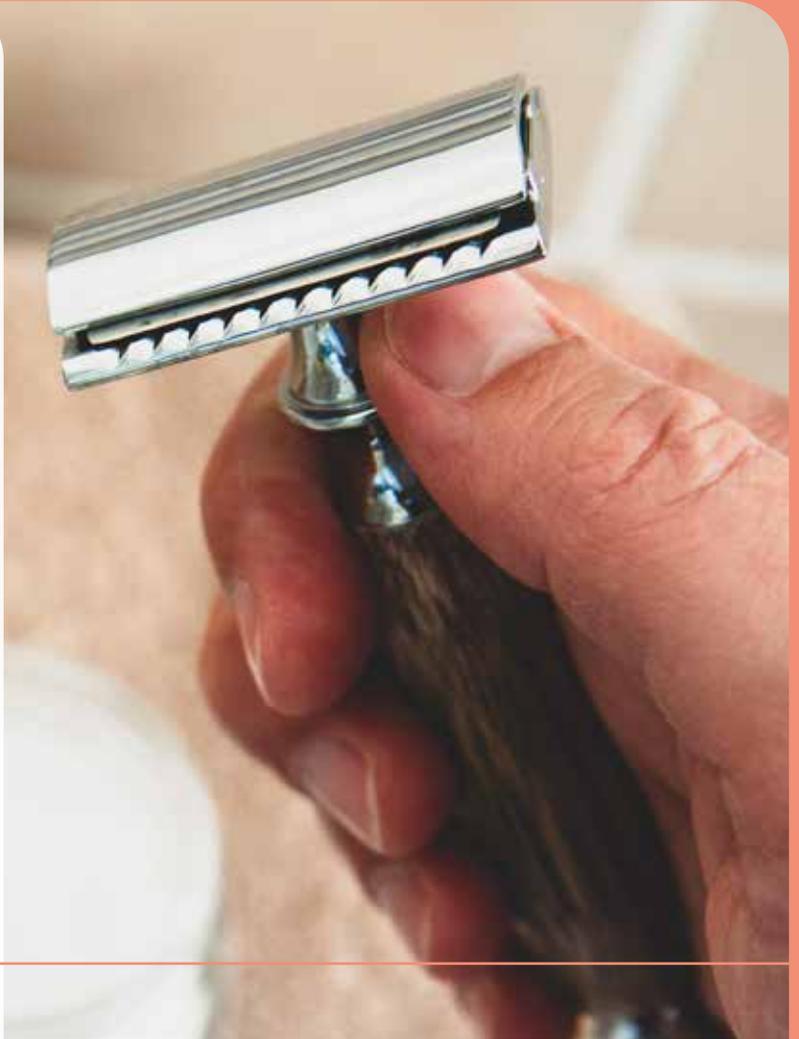
Preventive Maintenance Extends Equipment Life

Workflow optimization is one more way to apply the *Product Life Extension* business model. One example is preventive maintenance in wastewater asset management. Adding extra filters proactively to the process removes pollutants before they enter the machinery, where they damage it and reduce the lifespan of the equipment. By dissecting a process diagram for the workflow, many improvements can be made simply by focusing on ways to extend the life of the machines.



Extend Product Life

A large area of potential opportunity for adopting the *Product Life Extension* business model is taking goods that are traditionally disposed of and making them more durable and longer lasting. One example is razors. Instead of manufacturing them from plastic, intended to be discarded, some companies are now making them out of stainless steel, so they can be used again and again simply by replacing the razor blade.



In situations where it doesn't create a prohibitive cost or when the rapid advance of technology wouldn't quickly make long lasting products obsolete, it makes sense for companies to build goods out of sturdier materials, so that customers can use them longer.





PART
FIVE

Where the Circular Economy Is Going



We are at the beginning of a major shift in the way we produce goods, handle waste and think about the products and resources we use every day. There is a new sense of urgency to finding and adopting alternative operating models that take better care of our world. Circular business models are in demand from consumers who want a more sustainable economy and from all the stakeholders involved. **This demand is forcing companies to take immediate action to produce longer term benefits.**

Everybody Wins



There are many circular models that organizations can choose from, and there is no one-size fits-all solution. It is also not an all-or-nothing proposition. *Any* implementation of circular practices from one or several of the models is a positive step, even if a company's process won't easily adapt to total circularity.

Regardless of which model is used, the benefits of moving toward a circular economy are economic, environmental and sustainable. Although necessary, sustainable and helpful to humanity, changing the way we do business is not just an altruistic endeavor; it consistently produces material benefits for any company that transitions into a circular economy business model.

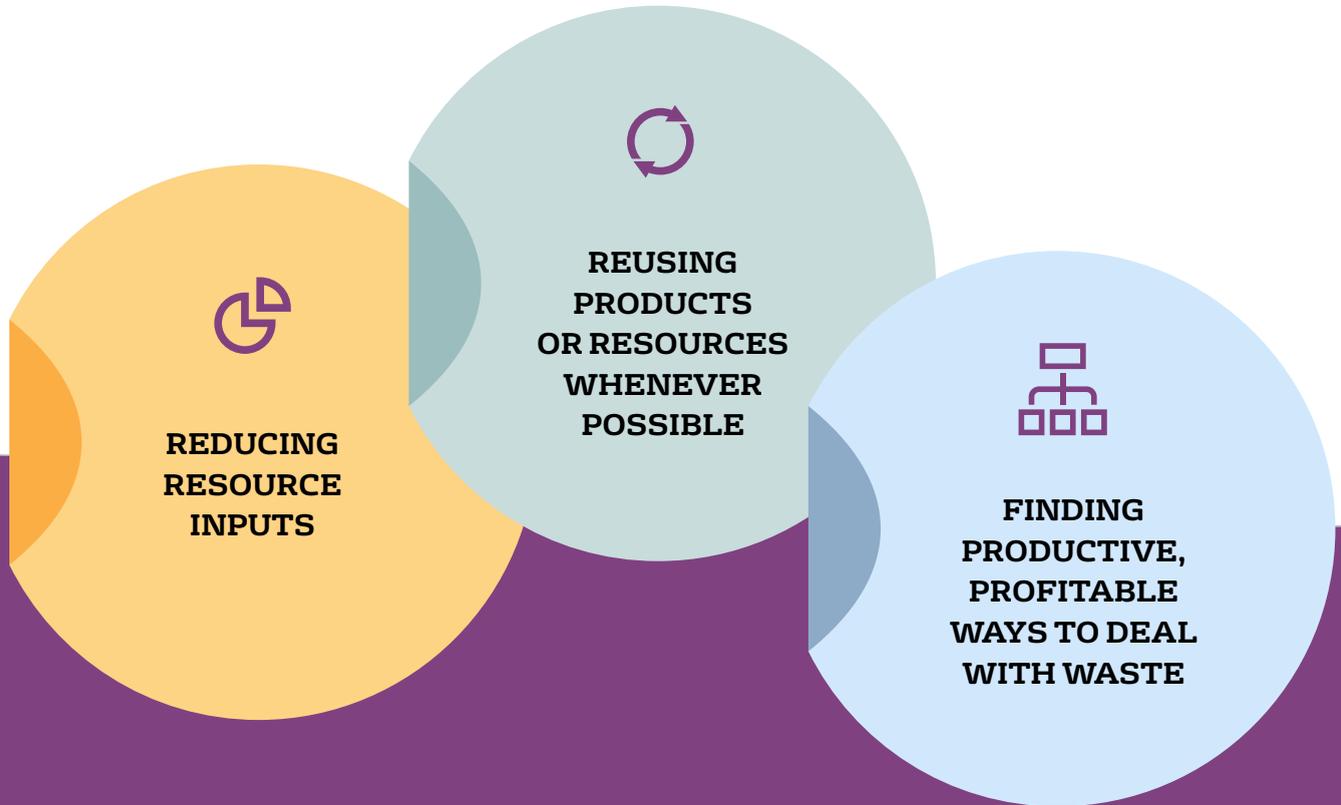


With careful evaluation and implementation, there is a massive potential for financial gains under the circular economy business models. At the same time, we'll be preserving resources, reducing harmful pollution and creating a more sustainable future for the entire planet.

Opportunities for Circular Innovation

Most Industries Can Benefit

Circular models have the potential to benefit almost any company in nearly any industry. The changes revolve around:



For certain industries, adopting more sustainable practices could be particularly lucrative. The best part of transitioning for these industries is that businesses do not need to rethink their entire model. Often, the process just involves tweaking and making adjustments to existing practices, as shown in the examples that follow within a variety of industries.



MANUFACTURERS in nearly any industry can benefit from a Total Waste Management program, which aims to eliminate, reduce or reuse waste and waste byproducts. This initiative analyzes all scrap materials produced and finds ways to repurpose them as raw materials, then reduces waste that cannot be recycled by increasing efficiencies in the production process.



PHARMACEUTICALS AND BIOTECH manufacturers are able to recycle solvents used in their production processes, often achieving a quality that is comparable to virgin solvent. If the recovered solvent is not pure enough to reuse, it can frequently be sold to companies with less stringent requirements.

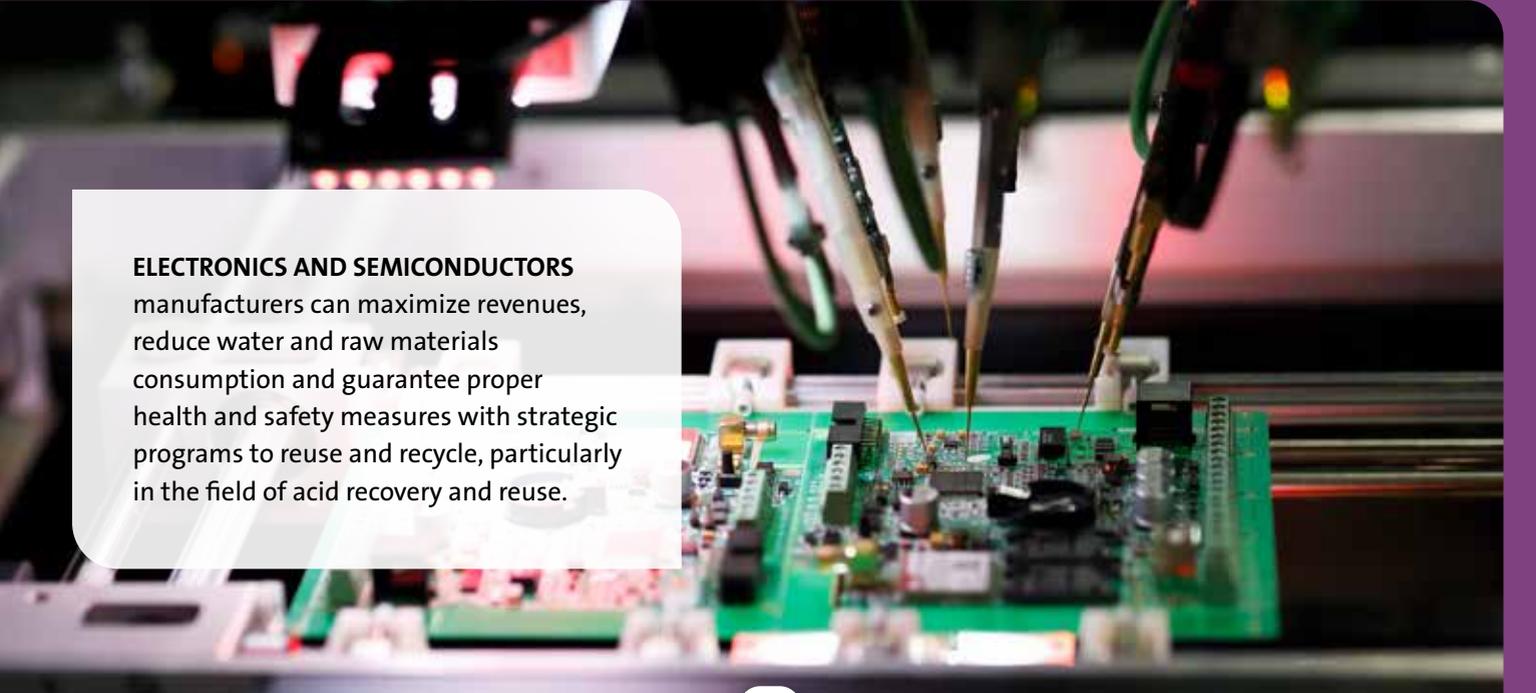
UPSTREAM OIL AND GAS companies can adopt produced water reuse and discharge solutions in order to maximize water reuse, replenish natural water aquifers, recover valuable fresh water and minimize induced seismicity to reduce operational costs.



POWER AND UTILITIES businesses can extract value by reducing a plant's carbon footprint through minimizing waste and improving the overall efficiency of water management. From wastewater treatment to battery recycling, there is a large number of circular opportunities for companies in the energy production and distribution industry.



FOOD AND BEVERAGE manufacturers can convert organic waste into biogas through anaerobic digestion rather than dispose of it, allowing manufacturers to increase resource productivity, decrease greenhouse gas emissions and reduce power and waste disposal costs.



ELECTRONICS AND SEMICONDUCTORS manufacturers can maximize revenues, reduce water and raw materials consumption and guarantee proper health and safety measures with strategic programs to reuse and recycle, particularly in the field of acid recovery and reuse.

Next Steps

Shifting to a circular business model is a practical and attainable goal. Implementation looks different for every business, but what's important is taking the first steps towards bringing circularity to your organization. You should also realize that your company does not need to handle this transition on its own. At Veolia, we have many years of experience assisting companies move to circular business models in industries that include hospitality, academia, data centers, mining, manufacturing, cities and municipalities and more.

We have experts available in every industry ready to provide options to consider in transforming your company to take advantage of a circular business model. They will show you specific steps you can take to facilitate the transition in your production and waste disposal processes and suggest many ways your company can become more circular.



We thank you for considering
circular economy solutions for
your organization and for working
toward a brighter, more profitable,
and more sustainable future.

Resourcing the world



**Contact a Veolia representative now by emailing
circulareconomy@veolia.com**