



Living by Principles

Business resiliency through increased circularity

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Introduction

Ensuring resources are deployed efficiently and maintaining systems and components at their highest levels of utility are well worth the time and effort to achieve sustainable growth.

The future viability and success of any enterprise depends on identifying and navigating risks. Accordingly, a company's long-term strategies and its short-term operational decisions must continue to reduce operating costs, improve efficiency, foster innovation, and nurture and preserve the company's reputation.

It's estimated that over \$1 trillion could be saved globally, each year, by 2025 with the adoption of circular economic practices.

One of those risks is resource scarcity. The World Business Council for Sustainable Development predicts that the total demand for resources will reach 130 billion tons by 2050, up significantly from the 50 billion ton level in 2014, an overuse of the Earth's total capacity by more than 400%.¹

In that context, it's easy to make the case for a circular economy. In a circular economic model, systems, procedures, facilities, and practices are created and managed in such a way that they can continue indefinitely, without exhausting the natural resources upon which they depend. Striving to ensure that resources are used as efficiently as possible, and ensuring that anything of value is put back into the larger cycle rather than being prematurely discarded, is logical on almost any level and in almost any time frame.

A recent report from the U.S. Green Building Council found that the current mode of global operation is in stark contrast with the reality of Earth's limited resources, as we consume resources 50% faster than they can be regenerated. They estimate that over \$1 trillion could be saved globally, each year, by 2025 with the adoption of circular economic practices.²

Moving to a circular economic model requires a tremendous shift in thinking, away from a sole focus on the financial implications of business to one that considers long-term sustainability. In this paper, we'll explore the circular economic model in more depth, and its ramifications on business design for the future.

A new way of thinking, a new business model

In 2005, Ellen MacArthur set a new world record for the fastest solo nonstop sailing trip around the world. A singular-minded, passionate individual, her experience as a solo sailor inspired her understanding of what it means to live with finite resources. Out of that experience came her desire to shift the global economy away from a flawed operating system of consumption to one of regeneration of natural capital. Unlike a traditional linear economy, which relies on raw materials that are used and then discarded, MacArthur espouses a circular economy that mimics the complex systems of the environment that decouples growth from resource constraints, that is “restorative and regenerative by design.”³

MacArthur started the Foundation that bears her name in 2010. Today, hundreds of companies, innovators, universities, cities, and affiliates — including Schneider Electric — have joined the Foundation’s Circular Economy 100, which brings together stakeholders from across disciplines to develop collaborative solutions to pressing economic and resource constraints. The work of the Foundation draws on concepts such as the performance and sharing economies, biomimicry, and cradle-to-cradle design.

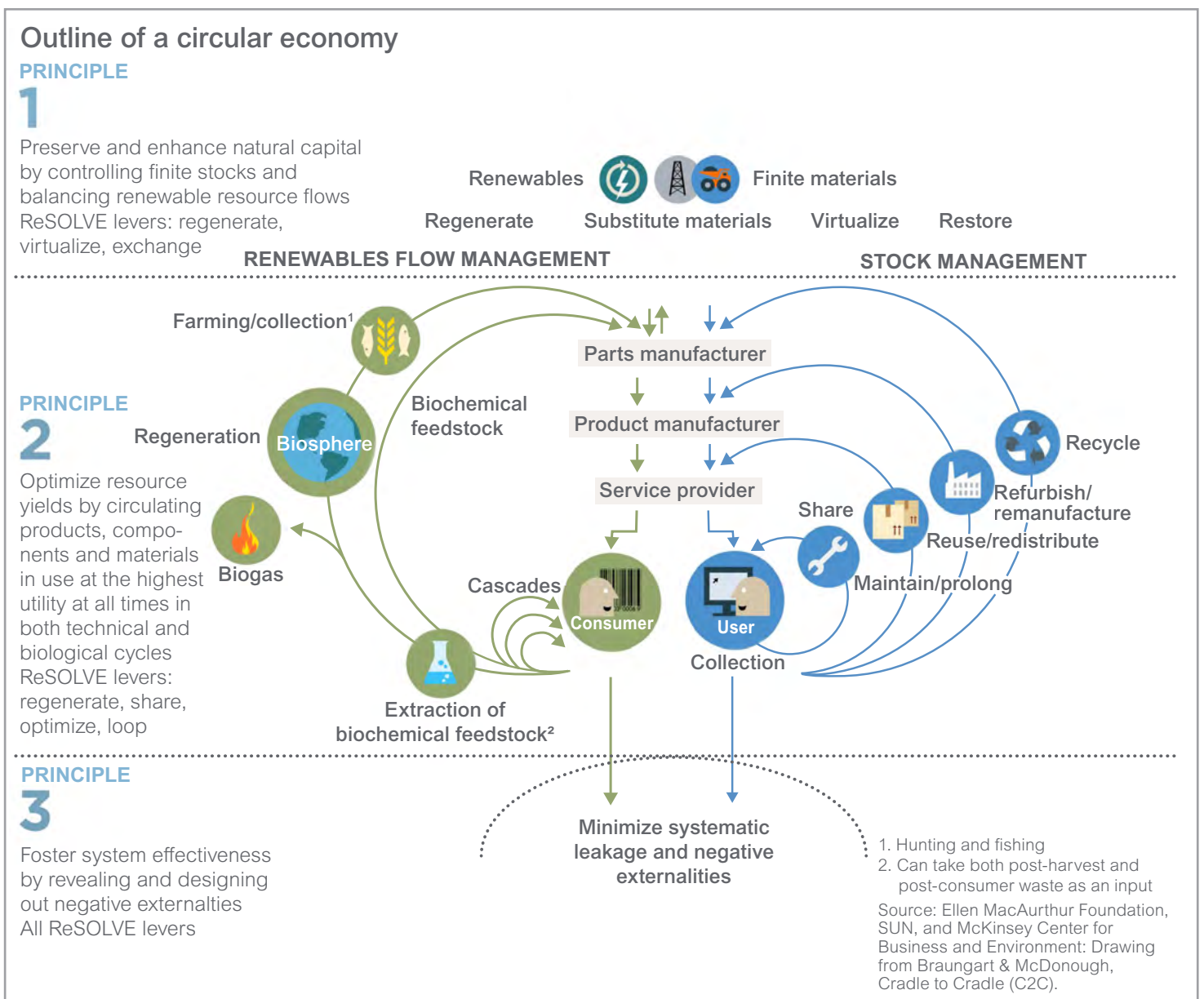
Achieving positive ROI remains important in a circular economic model, but it is joined by the imperative to use natural resources responsibly.



Achieving positive ROI remains important in a circular economic model, but it is joined by the imperative to use natural resources responsibly. This approach, as shown in Figure 1, makes an important distinction between renewable resources, such as wood, and those with a finite supply, such as minerals. It also distinguishes between biological and technical (nonbiological) materials, for which it advocates a 5 R approach — repair, reuse, refurbish, remanufacture, and recycle — that goes

beyond the traditional 3 R's (reduce, recycle and reuse) of linear economic thinking. Through this different way of looking at finite resources, the circular economy model seeks to always keep products, components, and materials at their highest utility and value and takes full advantage of every opportunity to eliminate waste.⁴

Figure 1 – Outline of a Circular Economy.
(Source: “Circular Economy System Diagram” from Ellen MacArthur Foundation.)



How the circular economy affects return on investment

Anyone concerned with getting their money's worth out of even a small investment knows that waste is to be avoided. But what happens when the definition of waste changes?

The European auto manufacturer Renault has been using remanufactured parts — reclaiming the value in what others might see as waste — since the middle of the 20th century. Today the Choisy-le-Roi facility's output has diversified to include injection pumps, gearboxes, injectors, and turbocompressors — remanufactured parts that are 30%-50% less expensive than newly manufactured parts. At the same time, the facility sends no material to landfills and uses far less resources in remanufacturing, compared to new production:

- 80% less energy
- 88% less water
- 92% less chemical products⁵

That's the kind of change that happens when companies and people start thinking in terms of a circular economy. Suddenly, an outdated electrical switchgear component is transformed from waste into raw material — a candidate for refurbishment, remanufacturing, or recycling. It is no longer just trash, but rather a source of raw material.

Determining how to move a business toward a circular economic model reaffirms existing efforts made to intentionally build operations that are friendly to the environment. In other cases, such introspection provides focus, direction, and encouragement for reinventing portions of the enterprise.⁶

Due to their scale, corporations are in a strong position to positively influence others to embrace more comprehensive product life-cycle sustainability best practices. By sharing methodologies for designing longer life products, capable of being refurbished or remanufactured



as needed, and by preserving the value inherent in waste materials, sustainability and return on investment (ROI) are enhanced. A focus on a circular economy model enables forward-thinking companies to present themselves as valued partners to like-minded organizations in building a sustainable future.

For example, Schneider Electric has taken numerous steps toward circularity that include:

- Implementing a system for recycling sulfur hexafluoride (SF₆) from equipment that has reached the end of its useful life, both protecting the atmosphere and ensuring an ongoing supply of this useful dielectric material.⁷
- Converting older manufacturing facilities into a central hub for repairing and refurbishing uninterruptible power supplies, which are prime candidates for periodic refurbishment.⁸
- Offering industrial repair services for many different brands of electrical distribution equipment dating back 40 years or more, extending this equipment’s useful life and reducing the risks associated with equipment failure.⁹

Similar efforts have paid off in other industries. Nike, for example, spent more than a decade investigating the environmental impact of its business across its value chain.

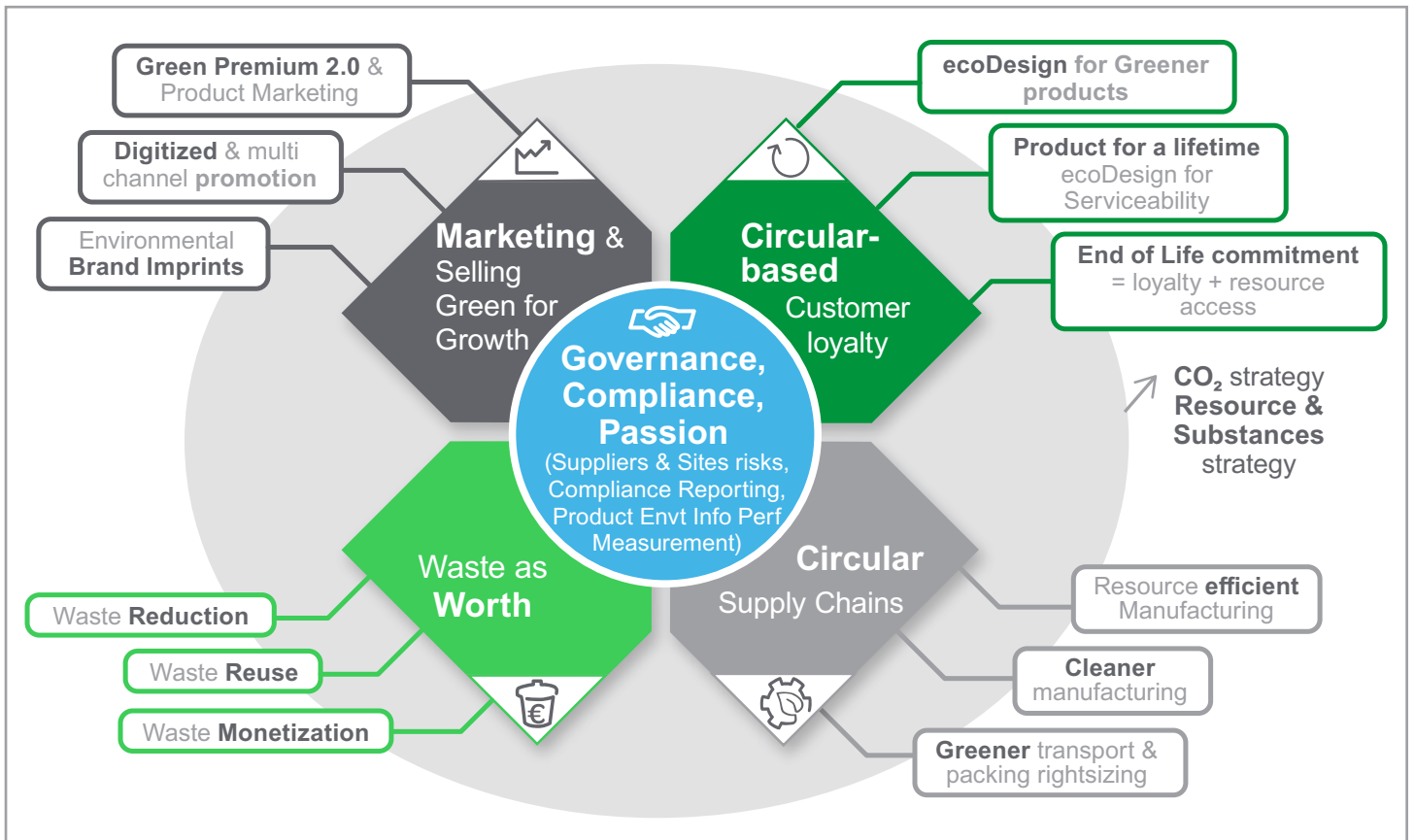


Figure 2 - Schneider Electric has made a corporate commitment to supporting the various aspects of a circular economy. (Source: Schneider Electric “Circular Innovations Presentation,” May 2017)

An early member of the Sustainable Apparel Coalition, the company has aggressively cut waste and its use of water, energy, and new materials by working toward a closed-loop ecosystem.

One initiative at Nike has been the transition to renewable energy sources, with the goal to achieve 100% in owned or operated facilities by fiscal year 2025. In addition, Nike Grind — the company's palette of premium recycled materials — is today used in 71% of Nike footwear and apparel products, ranging from yarns and trims to soccer kits and basketball shoes.¹⁰

A key benefit to Nike is also the reduction in the company's operational risk — the increase in the resilience of the enterprise — that comes from switching to renewable energy sources and recycled materials. These changes provide a hedge against rising prices and make the company less dependent on new raw materials, thereby reducing uncertainties about future availability and affordability.

Circular thinking also now frequently plays an important role in influencing the strategy of facility location. For instance, as the demand for data centers continues to grow, companies look for ways to reuse

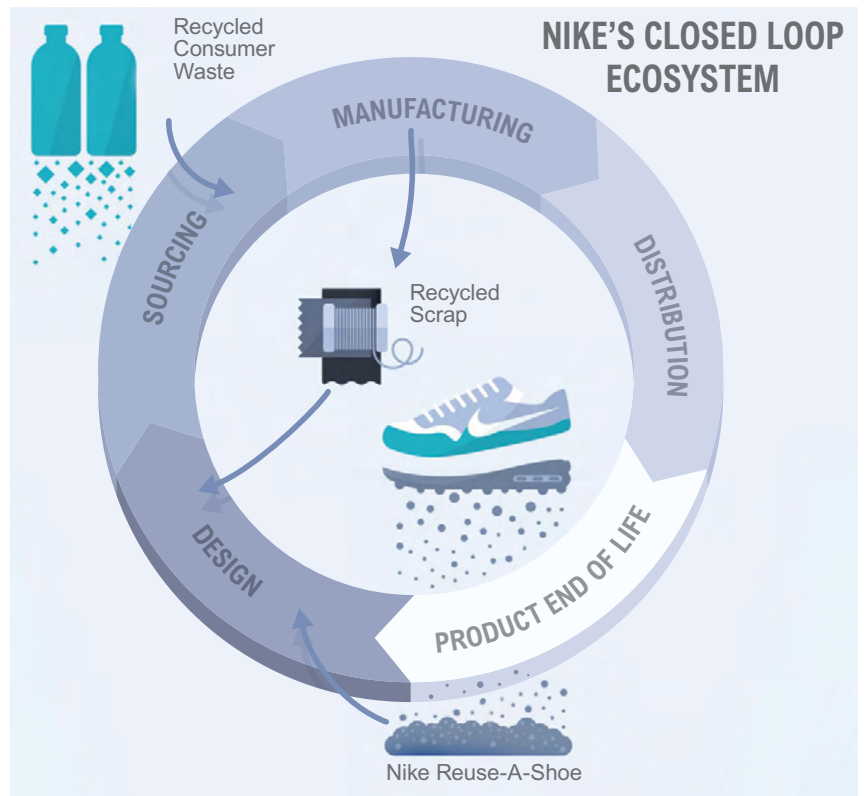


Figure 3 – Source: Nike

existing infrastructure and capture and use waste heat. Some examples:

- A region of Scandinavia, once home to large mining operations, was recently chosen to be the home of a large, new data center. Although mining activities

Upgrading early saves resources (including money)

Many sustainability-conscious companies are initiating equipment replacements and upgrades much earlier, rather than waiting until systems or components reach their end of life. Why? To take advantage of decreased energy use and better ensure business continuity. For example, replacing older industrial motors can trim operating expense — which is to say, energy use — considerably. Newer equipment also comes with higher levels of support, and older equipment can responsibly refurbished or recycled following the tenets of a circular economy. Taken together, these aspects of proactive ongoing optimization grow increasingly attractive as an investment and a reliable way to reduce the likelihood of business interruption.

One example is Kingsly Compression. This leading supplier of small to medium horsepower natural gas compressors replaced motors/drives and controls ahead of schedule to obtain improved remote control, coincidentally achieving a 25% energy savings.¹¹

ceased years ago, the electrical generation and distribution infrastructure remained operational and in place, setting up a win-win scenario for the underutilized resource to supply the data center’s power needs.

- Some recent data center installations in Europe have been located to facilitate use of the heat collected from banks of servers. In one case, the data center was installed adjacent to a district heating facility that now uses the server-generated heat to supplement its own heat sources and supply process and residential heating throughout the area. In another case, a data center was purposefully located near a municipal swimming pool, where the heat from server operation supplies some of the energy needed to heat the water in the pool.

Technological advances in server temperature control have also improved the resiliency of data center facilities by reducing heat-related failure. This is achieved through a combination of improved universal power system efficiency, higher voltage power equipment, whole-facility cooling processes, and indirect air economizers that cut energy use by 92% on average.¹² Cumulative energy savings from all four improvements were utilized in a Dublin data center, increasing its Power Usage Effectiveness (PUE) by 82% and resulting in savings of \$345,766 per year.

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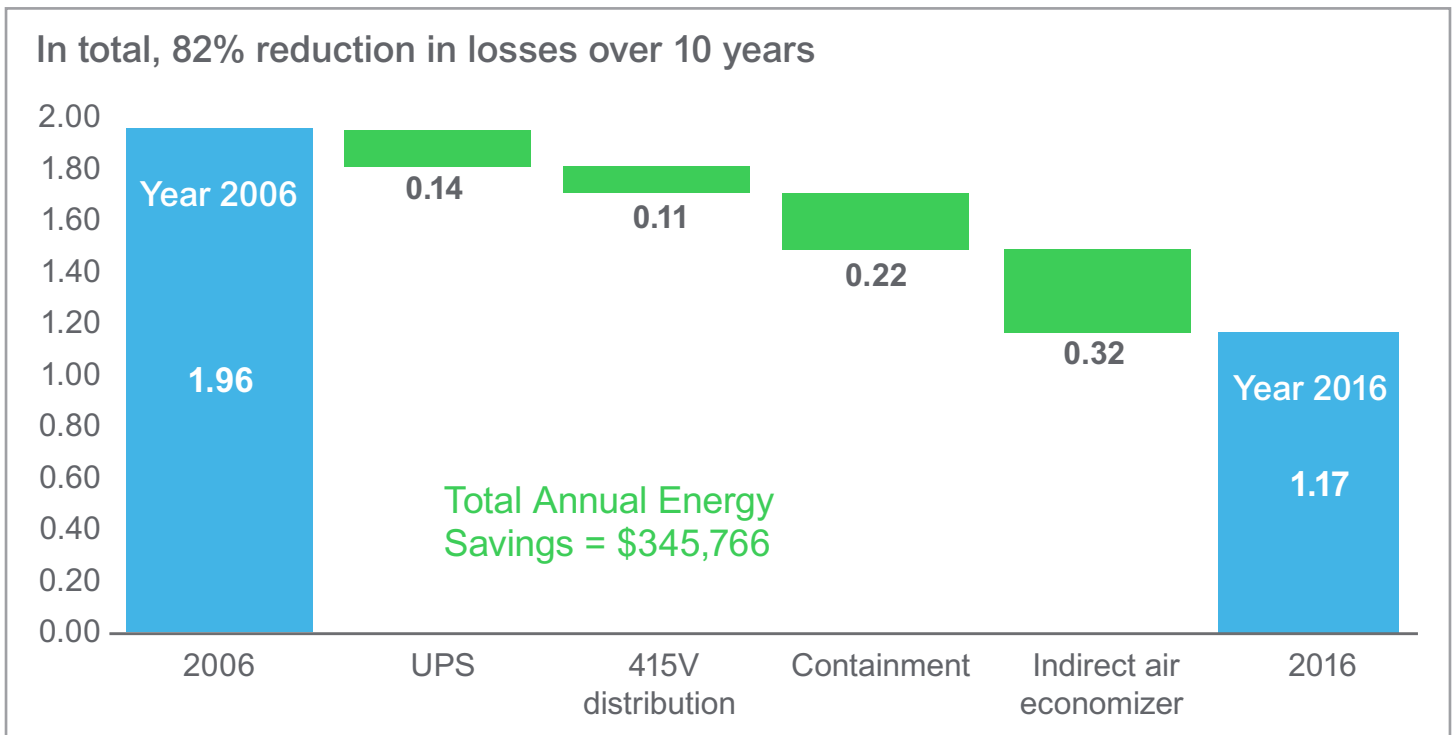


Figure 4 - The cumulative effect of improvements to Power Usage Effectiveness in data centers has gone from an average of 1.96 in 2006 to 1.17 2016, thanks to UPS improvements (-0.14 PUE), energy distribution improvements (-0.11 PUE), containment (-0.22 PUE), and indirect air economization (-0.32 PUE) (the last two are both related to cooling). (Source: Schneider Electric, Data Center Sustainability Then and Now Presentation," June 2016)

A new basis for decision-making and risk avoidance

When an enterprise adopts a circular economy point of view, it provides a new basis for decision-making and results in actions and policies that are both good for the planet and good for the company's bottom line. This point of view is informed by several cornerstone circular economic concepts:

- Given the reality of Earth's finite resources, there are no viable long-term alternatives to the practice of sustainability.
- Reclassifying waste as another source of raw materials can extend the useful life of many resources.
- Switching to corporate renewable energy sources and recycled materials increases resilience by providing a hedge against rising fuel prices, reducing dependence on new raw materials, and eliminating uncertainties about future availability.
- Expanding the environmental focus from 3 R's (reduce, recycle, reuse) to 5 R's (repair, reuse, refurbish, remanufacture, and recycle) facilitates a mindset that comes as close as possible to eliminating waste in technical materials.

Circular economic models, processes, and practices can be used to help future-proof a corporation and its supply chain by developing greater resiliency. The World Business Council for Sustainable

Development has identified eight positive outcomes from circular thinking, including adaptive business models and innovation, both of which contribute to a business' overall responsiveness in the face of challenge and change.

Expanding the environmental focus from 3 R's to 5 facilitates a mindset that comes as close as possible to eliminating waste in technical materials.

The ability to withstand fluctuations is critical to sustaining a company over the long term, but also in developing a reliable and consistent brand that consumers can trust. By optimizing resource consumption, businesses can build long-term confidence and commitment with their customers. This will become increasingly important

Eight business cases managers can use to justify circular economy practices across the board

- **Gener8**: create additional revenue from existing products and processes
- **Innov8**: spur innovation of new products and services
- **Moder8**: reduce operating costs
- **Captiv8**: engage customers and employees
- **Differenti8**: distinguish from competition
- **Integr8**: align with corporate strategy or mission
- **Acclim8**: adapt business models and value chain relationships
- **Insul8**: mitigate linear risk exposure

Source: World Business Council for Sustainable Development



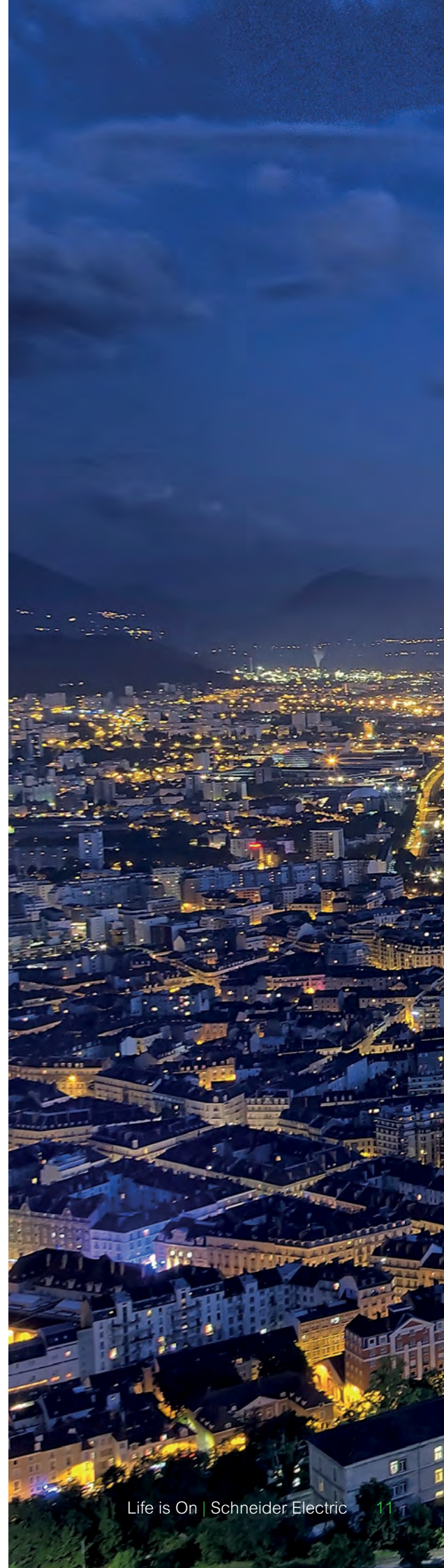
as companies shift from linear economic models to ones that are based in services and circularity. By demonstrating to consumers that companies care about the long-term sustainability not only of their business, but the planet, trust is engendered, and a new level of relationship established with the customer.

One company that is using its circular business model to drive this kind of customer engagement is Patagonia. Patagonia's commitment to sustainability and global action is front and center to its brand. The company's Worn Wear® program provides a virtual marketplace where consumers can source used Patagonia gear and get instructions on how to repair gear, as well as instructions on where worn materials can be traded in and recycled. The company has successfully used its brand, its commitment to sustainability and circularity, and its Worn Wear program to engage consumers, developing a roadshow program that travels from city-to-city.¹³

Bottom Line

Modern business requires the understanding that resources are finite, and that to avoid disruption and other risks, companies must adopt new, circular ways of thinking about how to produce goods and services that are truly sustainable.

The good news is that companies are increasingly thinking this way, and exploring the means to redeploy their business more responsibly, driving not only resiliency, but ROI.



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Learn more.

At Schneider Electric, sustainability works.

Schneider Electric launched its sustainability approach in 2002. Since then, the company has grown to be a global leader, widely recognized as one of the most respected, ethical, and sustainable companies in the world.

On top of its own progressive approach to corporate sustainability, Schneider Electric's products, programs, and services lead the industry on environmental and social responsibility by addressing specific, pressing challenges in a customer-centric way.

- **ecoLabel Green Premium**, the self-declaring label program for Schneider Electric products that since 2008 has promoted compliance and transparency concerning use of hazardous substances, environmental impact, and end-of-life management.
- **Green Premium 2.0**, a new Schneider Electric environmental brand promise, redesigned to include value proposals tailored to different segments that will cover products, services, systems, solutions, and architectures.
- **ecoDesign Way**, our corporate commitment to designing all new products and solutions to reduce their environmental impacts throughout their life cycles.
- **ecoFit**, our field services and retrofit program designed to help customers extend the life of their medium- and low-voltage electrical distribution equipment through selective component upgrades and replacements.
- **Tailored Sustainable Connected Supply Chain 4.0 (TSC 4.0)**, a reimagined customer-centric strategy designed to be collaborative, lean, agile, project-driven, and fully flexible so we can improve our speed and responsiveness.
- **EcoStruxure™**, our next generation of active energy management and automation architecture, is driving innovation at every level to take full advantage of our connected products.
- **Energy & Sustainability Services (ESS)**, which is a trusted advisor to corporations worldwide on energy procurement, energy efficiency, renewable and clean technologies, and sustainability. Our ESS offer includes EcoStruxure™ Resource Advisor, our award-winning data management platform, and NEO Network™, our innovative global renewable energy transaction enabler.

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