



OnTheMark™

The sustainability issue | Volume 2



On the sustainability frontier

Welcome to the second edition of On the Mark, a UL publication dedicated to exploring the intersection of safety, science and sustainability.

It seems that we are confronted every day with another study or report highlighting the impact of human activity on our environment. Here are just a few recent headlines showcasing the extent of the problem:

- “1 million species under threat of extinction because of humans, biodiversity report finds” – *NBC News*
- “Scientists can now blame individual natural disasters on climate change” – *Scientific American*
- “Ocean-clogging microplastics also pollute the air, study finds” – *New York Times*

These and other reports on the state of our environment make it clear that centuries of overconsumption and unchecked industrial activities have resulted in environmental deterioration.

Fortunately, many companies are acknowledging their own contributions to environmental pollution and taking important steps to reduce waste, use our natural resources more efficiently and build products based on sustainable practices. Such efforts are gaining momentum as more and more organizations learn that sustainability and stakeholder values are closely aligned.

In this issue, we report on some of the many programs and practices being adopted by businesses to support their company’s sustainability efforts — from engaging employees and increasing recycling efforts to integrating the principles of circularity in supply chain activities.

I hope you find these stories as inspiring as I do and that they give you a fresh perspective on steps that you can take as well.



Keith E. Williams

President, chief executive officer and trustee

In 2005, Keith Williams was named the president and chief executive officer of UL. As CEO, Keith has led a profound transformation at UL, more than doubling its enterprise value while staying true to its 125-year-old safety mission. Guided by the clear strategic imperative to lead in science, build client loyalty and be highly relevant, Keith has led a substantial diversification of UL’s business, laying the foundation for the company’s growth in the 21st century.



Interested in learning more about the issues businesses face today? If so, you can easily subscribe to our magazine at <https://s.ul.com/2I4tP1V> or scan the QR code to the left!



We employ exacting scientific processes and the highest ethical principles to help create a better world. As safety challenges and concerns expand to include sustainability, well-being, connected technologies and security, we provide broad leadership, deep expertise and vital services to guide these transformations.

Fueled by our mission of working for a safer world, we are trusted partners in solving our customers’ and stakeholders’ most critical challenges. We believe that when choices are empowered by insight and opportunity, the potential to

realize responsible innovation and better living is endless. To fulfill our mission, UL delivers business solutions while our nonprofit conducts independent research and shares scientific knowledge broadly.

About the publication:

On the Mark publishes content from various authors and sources both inside and outside of UL. The views and opinions expressed in the publication’s articles are those of the authors and do not necessarily represent the official position of UL.

The sustainability issue



4. The case for sustainability

Is 'doing good' good for your bottom line? How going green benefits business.



8. The new sustainability landscape

A firsthand view of the dynamics driving today's global economy.



12. Engaging sustainability

How do you build a culture of sustainability into your workplace?



17. Global chains

Learn how companies are building long-term resiliency against climate change.



21. All-in

Take a look at how a nonprofit think tank promotes a culture of business and citizen social responsibility.



25. Throwaway

The apparel industry is one of the biggest environmental polluters. Find out about the solutions some companies have come up with.



28. Next generation

Research is finding that 21st century employees are focusing more on mission and purpose.



32. Economics

For companies that depend on sales volume to satisfy stakeholders, where does sustainability fit?



36. Recharged

Where do batteries go when they die? Or do they die at all? New efforts are being made to use old batteries in new ways.



40. Conscious consumerism

Many consumers are now putting their money behind their values.



43. Material knowledge

New technologies are enabling production processes that eliminate excess waste; understanding materials is key.

An aerial photograph of a city skyline, likely Chicago, featuring a large body of water, a sandy beach, a multi-lane highway, and a park area with a winding path. The sky is blue with light clouds. Overlaid on the image are several concentric, dashed white circles and dots, suggesting a network or data flow. A large green rectangular overlay is positioned in the lower-left quadrant, containing white text.

Making the business case for sustainability

Companies are discovering that efforts to save the planet can also have financial benefits

By Lou Carlozo

Make no mistake: In 2019, discussions on the subject of sustainability are generating enough excitement to power a big city. The current level of engagement on the issue stems in part from our growing understanding of how sustainable practices impact the quality of everyone's lives, as well as the fact that it simply feels right to contribute in whatever way we can to our stewardship of the environment, our resources and our world.

But sustainability also speaks the language of business — and in concrete, bottom-line terms.

Look around and you'll find that the business case for sustainability spans a wide spectrum of industry sectors — from real estate, where smart buildings turn utility savings into huge cost savings, to consumer goods (from a marketing perspective, sustainable items are “hot”), all the way to the investment arena, where, according to Bloomberg, the total value of so-called green bond issuances passed the \$600 billion mark in 2018.

This is just the kind of promise and progress that excites Catherine Sheehy, who leads the advisory practice in UL's Environment and Sustainability division. Think of it this way: Instead of the legacy notion that a business' financial performance

takes priority over the good of the planet, sustainable practices and profitability are increasingly being viewed as synergistic drivers of enterprise success in the 21st century.

“Like any business strategy, I put this in business terms,” said Sheehy, who is based in Silver Spring, Maryland. “We do this work because it represents numerous opportunities — revenue, cost savings, risk mitigation and reputational — for an organization. These five drivers are important considerations in any business, regardless of the nature of the activity they're considering.”

The good news is that corporate sustainability initiatives “really align pretty well across those drivers, depending on the levers that you're trying to pull and what your priorities

are,” Sheehy said. “Knowing where you want to prioritize your interest or your focus can help you better understand where you might want to go next.”



Cautious approach

Sheehy and her team at UL are hardly alone in their view of sustainability or in their proactive approach to it. Yet, before anything of substance happens, the case must be made to business leaders in organizations of all sizes that sustainability is worth the time and effort. Even the most successful companies are cautious when embarking on a new initiative that requires the use of other precious resources — time and money.

Such a tentative mindset is absolutely understandable, but the reality is more complex when you examine the whole picture. Sheehy cites a study conducted by the McKinsey Global Institute, which



“We do this work because it represents numerous opportunities — revenue, cost savings, risk mitigation and reputational — for an organization.”

found that businesses with a long-term focus have 40% higher revenues and 36% greater earnings than those that think and act from a short-term perspective. When it comes to top-priority, long-term trends, according to Sheehy, “I’d say sustainability is not an add-on or a ‘nice-to-have,’ but an integral part of that long-term focus.”

One path for moving beyond the status quo is to “make smaller sustainability changes first and measure those returns before taking bigger steps to ensure profitability,” said sustainability expert Kevin Haseney, district commander at JDog Junk Removal & Hauling Tampa, a Military Veteran Partners company. “Switching out the lighting in an office building is low cost and will result in increased returns in the long term. Plus, it can encourage bigger changes down the road.”

The same goes for something as simple as going paperless. When Colorado Springs, Colorado, moved the city’s asset management over to a software-based system that eliminated paper-based records and leveraged mobile technology, it realized a \$2.5 million return on investment, according to Cartegraph.

Small sustainability experiments can ultimately lead to sustainability achievements with significant impact. For example, athletic apparel company Nike is working with Avangrid Renewables to build on its use of sustainable energy. Having already contracted to purchase all of the electrical power produced by Avangrid’s three wind farms in Oregon, Nike announced in 2018 its plans to buy an additional 86 megawatts of power from Avangrid’s 286-megawatt Karankawa Wind Farm just northwest of Corpus Christi, Texas. These renewable energy initiatives have proven so successful that Nike is aiming to source half of the electricity it consumes worldwide from renewables by fiscal 2025.

“No matter how forward-thinking a company’s leadership is, the overall economics must intelligently drive the business process to stay profitable,” said Jim Mathers, CEO of Energy Professionals, an energy strategy company based in Clearwater, Florida. “By installing efficiency measures — whether it’s energy intelligence software, LED upgrades, renewable energy generation or other developments from

the expanding green-power marketplace — you’re reaping the rewards of decreased operational costs, which directly impacts profitability in a positive way.”



Consumers (and investors) are noticing

The type of sustainability efforts being implemented by Nike and others is likely to gain further momentum as news of these changes begins to influence consumer spending. A recent study conducted by the Center for Sustainable Business at New York University’s Stern School of Business tracked point-of-sale data on purchases. Authored in conjunction with market research company IRI, the study found that sustainability-marketed products delivered 50.1% of market growth from 2013 to 2018 while representing 16.6% of the consumer packaged-goods market in dollar sales for 2018.

“These results were directly related to marketing efforts that highlighted the sustainability of those products,” Sheehy notes. “This is not just about what consumers say they’ll do. We say all sorts of things about what we will do. This is about what consumers actually do. And the proof is in the numbers.”

Investors are also taking notice of these trends. In its most recent “Global Sustainable Investment Review,” the Forum for Sustainable and Responsible Investment reports that \$12 trillion is now directly associated with sustainable investment assets in the U.S.

Sheehy recalls her reaction to hearing that statistic: “\$12 trillion is a number I couldn’t even conceive. That’s one in every four dollars invested. I looked at the 2018 GDPs of various countries, and that’s more than Germany, the United Kingdom and France combined. I mean, that’s how huge that is.”





Apple gets on board

Speaking of big money, sustainability has become a major priority for Apple — which, with a market value of about \$1 trillion, is the most valuable company on Earth. Apple has announced that its suppliers have achieved UL Zero Waste to Landfill validation for all final assembly, test and packaging facilities for its iPhone, iPad, Mac, Apple Watch, AirPods and HomePod.

“Our suppliers conserved 7.6 billion gallons of freshwater, and 100% of our final assembly sites adopted safer, greener cleaners in their manufacturing processes,” according to the company’s 2019 Supplier Responsibility Progress Report.

For UL’s Sheehy, “Apple really applied the UL 2799 Zero Waste to Landfill program across their supply chain — and they’re using that standard and that program to engage their suppliers in understanding and taking action on waste.”

Although obtaining Zero Waste certification can be difficult, the results are well worth it. Certification becomes a point of pride that certified organizations can leverage as they plot their sustainability journey.

“There’s a level of rigor associated with third-party, science-based auditing that some companies will not choose to undergo — because it’s scary and they don’t necessarily want to find out certain things,” Sheehy said. “I think that approach, that rigor, that willingness to basically expose their operations to auditors who are going to scrutinize them and give them feedback — that, I think, is incredible.” ☉

Change is coming

UL's Morten C. Lassen shares his thoughts on sustainability

By Marco Buscaglia

Sustainability may be a buzzword to some, but not for Morten C. Lassen, UL's vice president, North-West European Region.

For Lassen, the term sustainability is indicative of a movement that is changing how companies and consumers approach goods and services. Although Lassen does not consider himself a sustainability expert, he has a comprehensive understanding of its business implications through his 20-plus-year career leading globally diversified organizations in a wide range of industries throughout Europe as well as in Japan, Singapore and the U.S. That experience has given him a firsthand view of the dynamics driving today's global economy, as well as a strong sense of the importance of cultural values in informing individual decisions about sustainability.

Lassen spoke with us from his office in Copenhagen, Denmark, and shared his thoughts on why it's time for sustainability to become an essential component in the strategic priorities of companies around the world.

Let's start with the obvious.

What does sustainability mean to you?

It's about the services you provide, the customers you serve, the employees who get the job done and society as a whole. The concept is perfectly captured by the phrase "people, planet and profit," the so-called triple bottom line that addresses environmental, social and economic performance. I like that definition. Sustainability, as delivered by a business, is ultimately the value to customers, employees and society over time.

How does that relate to the circular economy?

Well, the roots of the circular economy, or circularity as it's often called, originated with an initial focus on waste — that is, designing out waste to



minimize pollution and its impact on our environment. Over time, especially in the 1980s and 1990s, companies started examining other complementary dimensions, such as keeping products and materials in use and working to regenerate natural systems and resources. As a result, circularity is now a global trend.

Circularity is about effectively leveraging the finite resources on Earth. Today, we use about “1.7 Earths” worth of finite resources every year. Some would argue that the solution is to grow the economy less rapidly or consume less of those resources. However, I agree with those who believe that the solution is about decoupling growth from our use of finite resources. When finite resources are reused in a circular economy, the economy can continue to grow without depleting them.

Were there consumer factors that pushed this approach?

Yes, definitely! Consumers started paying more attention to the societal impacts of the practices used by the companies whose products and services they purchased, including human rights issues, the use of child labor and so on. Recently, that focus has expanded, due in part to the United Nations Sustainable Development

Goals (U.N. SDGs), which have increased societal awareness and understanding of sustainability.

We now see sustainability issues impacting government policies, such as the push in some countries for lower taxes on sustainable products. We also see consumers preferring to purchase products from companies that support sustainable values through their practices. Throughout the world, a growing, well-educated middle class is demanding sustainable products as one way to make a positive contribution to society.

And, consumers are also employees. Many choose to work for companies whose practices are having a positive and authentic world impact.

But is “doing good” enough of an incentive for a business to change its approach?

For many companies, probably not. One could argue that relying exclusively on “doing good” is not scalable or sustainable, and large-scale philanthropy is an option only for a select few. On the other hand, a profitable, sustainable business is scalable and can have a much larger global impact.

Some companies may simply choose to embrace sustainable practices because they make good business sense. “Doing

good” and “doing good business” are not mutually exclusive. But, in the end, it’s a win-win for everyone when companies introduce products — or new ways of making or delivering products — that benefit the company, consumers and the planet.

What about this idea of buying into a service, not necessarily a product?

It’s a whole new way of thinking about how we consume products. For example, instead of purchasing a new car, you buy a transportation service. Most cars are parked 90% of the time. So, if companies continued to own the cars, they could allocate this asset to multiple users. They just need to ensure that a car is available when and where you need it.

In such a system, the company is incentivized to produce and deploy vehicles that are energy-efficient, long-lasting and recyclable to get the greatest return on their investment. Even though there is still the same amount of driving to be done, the demand can be served with fewer cars, resulting in a positive impact on the environment — not to mention a potential reduction in traffic congestion.

That’s a complete upheaval of the traditional model. Are companies up for that?

The model is already being deployed



in many manufacturing operations. Companies provide the factory machinery or equipment and handle all of the maintenance and servicing aspects. Their customers are not buying a piece of equipment but rather the function that the equipment provides. And they don't have to worry about how to maintain it, where the parts come from, or when and how to replace it. The "product as a service" concept has become a very strong model in B2B commerce and is now migrating over to address consumer needs as well.

Let's talk about lighting. You can now buy bulbs that last more than a decade. How does a company make money if it's selling something to consumers that will last five times longer than the previous model?

Consumers do not have a need to own a light bulb. They have a need for lighting. And that lighting need is clearly increasing as we learn more about how to improve our indoor environment with special lighting for work, play and sleep. However, the focus should be on how that need for lighting is served. Companies are already purchasing lighting-as-a-service contracts. In such a scenario, the lighting company now has a direct interest in making their products intelligent, for example capturing data about usage/maintenance, ultra-long-lasting and recyclable, and in making sure that your lighting needs are satisfied. The need increases, but the delivery model is completely different.

So, will companies have to educate their customers on this new approach?

Yes, but it's a different kind of conversation compared to a typical new product introduction. Many people have a genuine interest in buying sustainable products and services, and companies have an opportunity to support those goals through efforts that both improve the ways people use their products and reduce their environmental footprint. So, in that kind of conversation, we must be authentic and transparent.

Consumers are very skeptical about "green-washing," where companies communicate sustainability claims that are not authentic. For example, a company with a legacy product adds a more sustainable version of that product to its portfolio. The company might claim improvements in the overall performance of the product, but the

legacy product remains on the market unchanged. This not only affects consumers but also impacts the many companies that offer technologies and products that offer substantial benefits over others. Fortunately, regulations, testing and reporting about product sustainability characteristics are rapidly evolving to help address this problem.

Where did this current push for sustainability come from?

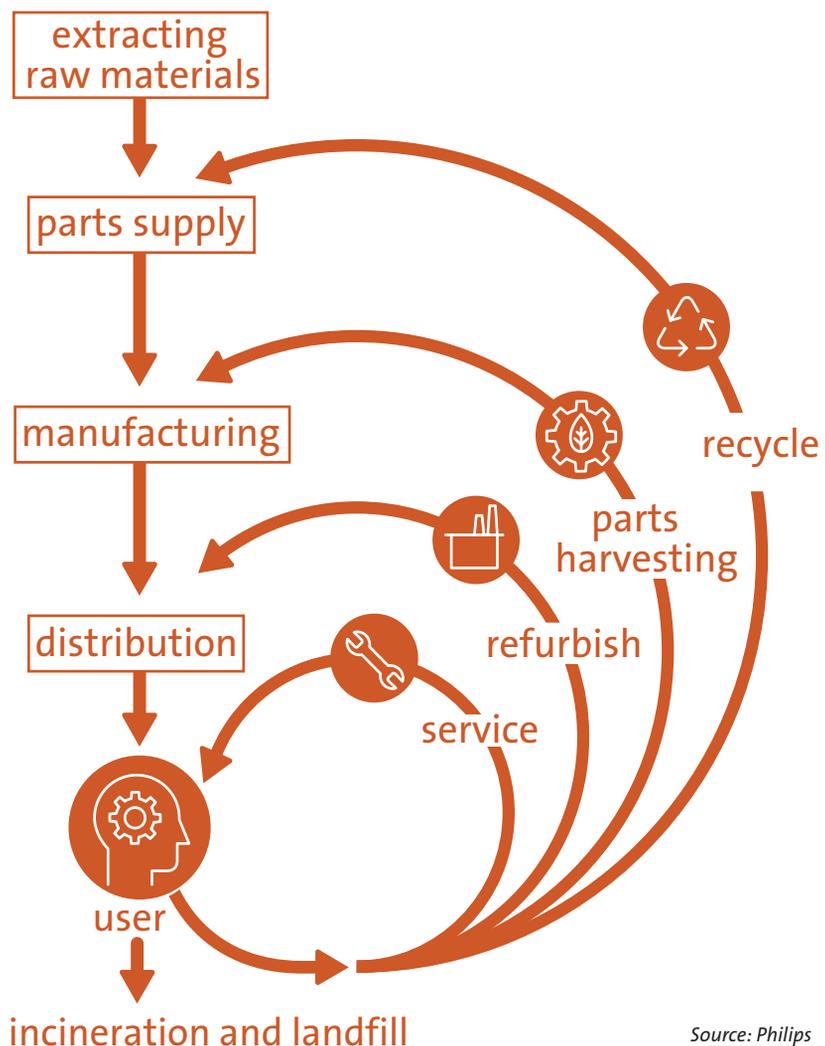
I think it comes from a number of places. Regulators around the world are developing policies that foster sustainable practices, and consumers are playing their part as well by pushing for products that support sustainability goals. The motivation is also coming from the financial markets, where investors are increasingly putting their money behind companies that embrace the "people,

planet, profits" mantra. And, as those companies begin to outperform those that fail to change, their market values will increase, and business leaders will see that sustainable practices can translate into increased shareholder value.

Just to play devil's advocate, what are some things that would scare a company off from addressing sustainability?

There are several challenges, and let me mention two. First, modern sustainability reporting includes not only the environmental impact made by a company but also the environmental impact of raw materials, components and even energy sources (coal/wind/solar) used in the company's processes. For example, several large global retailers have mentioned that more than 70% of their environmental impact comes from the products they sell. This means they need to get their suppliers (and their

The circular economy as envisioned by Philips



Source: Philips

suppliers' suppliers) to conduct business in a new way. That is difficult.

Another challenge is that, in order to be effective, the task of implementing company sustainability efforts can't be delegated to a committee or addressed as a function of some administrative department. Instead, sustainability has to be integrated into the very core of the business, on a level equal to quality, profitability and design. The best companies in the world have embraced sustainability in all areas of their organization and have adopted a sustainability mindset for every aspect of their business. Value-chain considerations and core business challenges are two good examples of why this is difficult and also why some companies will be able to build a competitive advantage with a sustainability business model.

How will a circular economy impact transportation? Or maybe the better question is: How will transportation affect the circular economy?

The transportation industry is supporting a lot of innovation, such as new fuel, new types of ships, etc., to help drive down the negative environmental impact of industrial transportation. New technologies, such as additive manufacturing, also called 3D printing, will transform where and how we manufacture products and will also have a positive environmental impact. From a circularity perspective, there will be a growing need for the disassembly and reuse of components at different points in the manufacturing process that will increase the demand for transportation. It is going to be an interesting balance between cost and benefit to help keep finite resources in the loop. Here, the transportation industry will be an important stakeholder.

How would a model based on reusing a product — or parts of a product — work?

If I'm a manufacturer, I can examine the sources for the raw materials and components that I use. Maybe I can get that material as a "second-life" component and use it in my "first-life" product. For example, a component in an old hospital scanner may have plenty of second-life usage left for my product. Harvesting and certifying second-life components can help lower costs and significantly improve the environmental footprint of products.



“As more experimentation takes place with resins and other raw materials used in 3D printing, recycled materials may become an important raw material source.”

Similarly, I can consider which components from my finished products could be used again in other products. Maybe another manufacturer would be willing to collect these old products in the market, at no cost to me, in order to gain access to the embedded components. If so, I might even consider using a higher-quality component in my product to secure its second-life use.

So, as you can see, it is about thinking about multiple value chains of different products across different industries to support multiple lives. This thought process opens up the possibilities for true circularity of finite/expensive resources. That decoupling of growth from finite resource constraints represents true circularity.

Technology could play a role as well.

That's right. Think of the new manufacturing methods that will only be improved over time. As we mentioned earlier, additive manufacturing will allow you to make the components you need right where you need them. As more experimentation takes place with resins and other raw materials used in 3D printing, recycled materials may become an important raw material source. And connected industrial products will be able to assess and communicate the "rest-of-life" usage available for various components at the point of decommission. Such data may well become the future currency in a circular economy.

How do you think this circular-economy approach impacts employment?

That's a good question. I can see both

negative and positive impacts to some individual businesses and within certain industries. As with most transformations, some jobs will no longer be needed while other new employment opportunities will emerge. Many jobs available today within social media or artificial intelligence did not exist 15 years ago. In a similar way, an intelligent, connected circular economy will help create a variety of new jobs and career opportunities. The challenge will be to support educational efforts that can provide workers with the skills they need for these new jobs.

In the end, business sustainability efforts will create value for shareholders and a new set of opportunities for employees. And they'll have a significant positive impact on the global environment.

You work in an optimistic field.

Let's just say I'm an excited but cautious optimist. UL's mission is to promote safe, secure and sustainable products to both living and working environments. For a 125-year-old company, this mission is becoming more relevant every day. The sustainability focus is gaining momentum as a true business opportunity and a way for companies to positively differentiate their products to consumers and their companies to prospective employees. In the future, we'll look back on this era and the convergence of consumer demand, governmental focus, new technologies and new business models as a time when progress on sustainability dramatically shifted into high gear. And it will be exciting to watch! ●



That's the spirit

Companies embrace new corporate culture in an attempt to promote sustainability

By Marco Buscaglia

Excited about your company's new recycling initiative? That's fine. Just don't expect to hear rousing chants of "Renew, reuse, recycle!" during departmental meetings. After all, sustainability efforts, including recycling, rarely generate outbursts of enthusiastic applause. But that doesn't mean today's employers aren't paying attention.

As companies large and small work to promote such efforts, managers often learn that even if employees find these programs enticing, they sometimes need a spark to get them going. That spark, said Ellen Shieh, UL's environmental sustainability manager, often comes from the employees themselves.

"Companies have been working on their sustainable approach for years, but in most cases, things were happening in individual locations and there wasn't a companywide

approach," Shieh said. "What was being done was the result of employees who cared — grassroots efforts from people who were passionate and willing to do things differently."

While Shieh said bottom-up efforts still take place, she noted that more and more companies have discovered that they can enjoy the benefits of sustainable practices by creating an atmosphere where upper management sets the pace.

"You're beginning to see one or two leaders within each organization who are very committed to making a difference," Shieh said. "They're trying to change things from the top down."

Companies have been working toward being socially responsible for years, but being a truly sustainable business requires that top-down approach as well as a long-term commitment to changing the company's culture.

"Sustainability is a wonderful umbrella," said Barb Guthrie, UL's vice president for corporate sustainability. "It can include practices that impact all areas of business."

Shieh agreed, noting that true sustainability goes beyond recycling and training.

"We can show that we are a responsible company through our operations, how we deal with our employees and how we deal with our suppliers," Shieh said.

As corporate leaders around the world began to realize that business-side benefits can go hand in hand with personal interests, many companies have decided to increase their sustainability efforts and to focus on the broader benefits that can be realized both now and in the future.

One aspect of UL's long-term approach is to encourage employees to be more mindful of their actions.

"Thinking beyond your day to day, thinking

beyond what happens when you throw something away, thinking about the longer-term impact of your actions — those things matter,” Shieh said.

Broadening the perspective

UL has been working to expand the definition of sustainability itself.

“It has become holistically inclusive,” Guthrie said. “With sustainability, we’ve defined the purpose of what we’re working on, which is to positively impact our planet, its people and prosperity as we work for safer, more secure and sustainable growth. To do this, we optimize our human capital, our financial capital and our brand capital. And we’re taking measures to manage our consumption and to reduce and eliminate waste.”

As UL expands its definition of sustainability, it’s important to consider what that term means.

“It’s a broad term, that’s for sure,” Shieh said. “I think the definition varies because it can affect people differently. In a large company, it can touch everyone — department by department — in different ways.”

Shieh said that while companies such as UL use the term to illustrate a singular mindset, the methods in which companies engage their employees usually cover three areas:

1. Operational efficiency: Companies are not only looking to change the way they source and manufacture products to reduce their own carbon footprint, but they’re also engaged in seeking major accommodations from their suppliers. Microsoft and Walmart, for example, are two companies that are working to reduce carbon emissions and are leading the way with initiatives that require their suppliers to do things differently.

“It’s no longer enough to say, ‘We’re doing this to reduce our carbon output,’” Shieh said. “If a company wants to be truly open to creating a sustainable environment, they have to pay attention to all aspects of their manufacturing process and then work with their suppliers to ensure that their methods aren’t harming the environment.”

2. Product design: No longer designing products with only form and function in mind, more manufacturers are looking



Top 25 most sustainable companies in 2019

The Global 100 ranks large corporations (with a list of about 7,500 companies, which generate more than \$1 billion in annual revenue) across the globe on their performance reducing carbon and waste, their gender diversity among leadership and revenue from clean products and sustainability. The ranking is compiled by a Canada-based sustainability-focused financial information company, Corporate Knights.

2019 Global 25 most sustainable corporations index:

Rank	Company	Country	GICS Industry	Overall Score
1	Chr. Hansen Holding A/S	Denmark	Food or other Chemical Agents	82.99%
2	Kering SA	France	Apparel and Accessories	81.55%
3	Neste Corporation	Finland	Petroleum Refineries	80.92%
4	Ørsted	Denmark	Wholesale Power	80.13%
5	GlaxoSmithKline plc	United Kingdom	Biopharmaceuticals	79.41%
6	Prologis, Inc.	United States	Real Estate Investment Trusts	79.12%
7	Umicore	Belgium	Primary Metals Products	79.05%
8	Banco do Brasil S.A.	Brazil	Banks	78.15%
9	Shinhan Financial Group Co.	South Korea	Banks	77.75%
10	Taiwan Semiconductor	Taiwan	Semiconductor Equipment	77.71%
11	Pearson PLC	United Kingdom	Personal Professional Services	76.91%
12	Outotec Oyj	Finland	Machinery Manufacturing	76.53%
13	McCormick & Company	United States	Food and Beverage Production	76.20%
14	Cisco Systems, Inc.	United States	Communications Equipment	76.12%
15	Natura Cosméticos S.A.	Brazil	Personal Care and Cleaning	75.55%
16	ERG S.p.A.	Italy	Wholesale Power	75.39%
17	Analog Devices, Inc.	United States	Semiconductor Manufacturing	75.31%
18	Novartis AG	Switzerland	Biopharmaceuticals	75.19%
19	CEMIG	Brazil	Electric Utilities	75.18%
20	Sanofi	France	Biopharmaceuticals	75.16%
21	Ericsson	Sweden	Communications Equipment	74.92%
22	Bombardier Inc.	Canada	Aerospace and Defense	74.79%
23	UPM-Kymmene Oyj	Finland	Forestry and Paper Products	74.42%
24	BNP Paribas SA	France	Banks	74.14%
25	City Developments Limited	Singapore	Real Estate Invest.+ Services	72.73%

Source: Corporate Knights — corporateknights.com

to the supply chain to simplify their production process, tap into local suppliers, and create new opportunities to use and reuse existing materials.

“Ocean plastic is a huge issue for a lot of manufacturers,” Shieh said. “If a provider can find ways to not only reuse a material like plastic but also make sure that the plastic won’t end up in a landfill or in the ocean, that’s a major shift in thinking.”

3. Community engagement: Efforts by companies to get directly involved in the lives of their employees and their communities are becoming more commonplace, especially in underdeveloped economies. To illustrate, Shieh cited the P.A.C.E. (Personal Advancement and Career Enhancement) program by apparel manufacturer Gap Inc., in which the company takes an active role in enhancing the personal and professional lives of female factory workers in Southeast Asia by providing financial advice, leadership skills and more.

“It’s an effort to help lead women out of poverty,” Shieh said. “Companies offer classes and mentoring to their employees, knowing that a stronger, smarter workforce will benefit them in the present and in the future.”

Outside efforts

Still, a focus on the future impact of immediate decisions hasn’t always guided companies to do the right thing. In fact, it can be easy to overlook that extended impact, especially if it helps the bottom line.

“There was a time when manufacturers paid little attention to the production of their materials or the assembly of their products, especially when those actions occurred in countries with little to no political power,” said Jeffrey Zax, a professor of economics at the University of Colorado.

“Today, the internet has changed that. A photo of a child working at a textile plant in Bangladesh under terrible conditions can be a real blow to a well-established brand.”

But efforts like Gap’s P.A.C.E. program go a long way, not only to help correct manufacturing issues but, more importantly, to help the people who do the manufacturing.

“There’s a real value when a company decides to take a direct approach in improving the lives of their employees,” Zax said. “It can be transformational for an individual, a family, a town. It can have benefits that extend for generations.”

More companies are expanding their efforts to improve the lives of workers in their supply chain. Microsoft created a supplier code of conduct that requires suppliers to “uphold the human rights, labor, health and safety, environmental and business ethics practices” outlined by the company, according to Joan Krajewski, Microsoft’s general manager of safety, compliance and sustainability.

“We realize our role in improving the lives of our suppliers,” Krajewski said. “We don’t take it lightly or treat it as an afterthought. It’s a fundamental part of our planning and processes.”

High risk, high reward

New initiatives aren’t without risk, especially with a safety science company such as UL, since so much of its business relies on evaluating the safety and effectiveness of various parts and products.

“Looking at ways in which we can manage and mitigate our risk is really important, and we’re looking at it through a lens specific to sustainability,” Shieh said. “We’re making sure that we are compliant with regulations in different areas of the world in which we operate; making sure that we can secure and have access to certain supplies so that we can continue to conduct our testing services and certifications.”

UL hopes that its approach will have a long-term impact on both the company’s bottom line and its employees’ professional and personal lives “in and out of the building and in and out of their community,” Guthrie said.

Does this mean that UL is tweaking its work/life approach? Not really, Guthrie said. “It’s less about balancing your work life and your family life than it is about bringing them all together.” ●



BASF connects the dots for sustainability

Think achieving zero waste is an impossible dream? One company proves it's possible when teams align and leaders commit to staying on the sustainability course.

By Lynn O'Meara

BASF's journey to zero waste started with a 2016 challenge to "walk the talk," according to Helen Williams, senior environmental health and safety specialist for the global chemical company's production plant in Huntsville, Alabama. The facility's former operations manager wanted BASF customers to see that the company believed wholeheartedly in sustainability and environmental reduction.

For the plant's leadership, it was about going above the status quo, to not only commit but achieve through facility leadership and employee collaboration. And Williams, who monitored the facility's external emissions and environmental programs, was the perfect person to guide the effort.

A six-and-a-half-year employee with more than 20 years of experience, Williams had always been focused on waste reduction, but, she said, "My manager wanted me to look beyond what we were already doing."

Williams' early focus included analyzing the facility's material and energy flow to minimize industrial waste and emissions through source reduction strategies. Waste from one application would be moved for reuse in another area. As raw material and virgin product consumption decreased, hazardous waste shipments decreased as well.

"My first goal was always to eliminate waste generation, then directly reuse the waste in another process, with recycling as the final option," Williams said. "The challenge to further improve our reduction strategies meant we started to look for other areas of opportunity in the facility."



All aboard for waste reduction

To meet the challenge, BASF formed the Zero Waste to Landfill team, which consisted of one member from each of the facility's departments. Members took the team's initiatives back to their groups to help connect the dots between waste generation and waste disposal.

"We knew it was going to have to be a culture change to get people to start thinking in terms of segregating waste," Williams said. "Because we integrated the team from the beginning, different areas started to see how their jobs linked together and moved beyond individual actions to assuming responsibility for the entire facility."

Making it 'easy'

To keep people from taking the "shortcut," i.e., throwing waste away, BASF set up more than 50 recycling stations all over the plant. They strategically placed each station based on where waste was generated. The team also mapped out the plant's waste intake to develop decision processes for each type of material.

For example, parts come into the facility packaged in cardboard with plastic divider trays. The uncoated parts are unpackaged, loaded on the coating line and then repackaged in the same packaging when they are coated to be shipped off site. This practice reduces more than 7,401 potential tons of waste. The facility also reuses drums, pallets and other containers. Williams estimated that they currently reuse about 80% of their packaging.

This sort of initiative has delivered a value that goes beyond being kind to the environment, especially in terms of costs saved for the company.

"If you don't have to buy it from somewhere else and if you don't have to dispose of it, that's big," Williams said. "They were going to have to segregate the waste on the line anyway, so this process didn't stop or disrupt production."

Partnerships key to success

Having an integrated team involved in the Zero Waste to Landfill challenge helped Williams and the facility succeed. Not only did they identify strategic places for reuse, but they also helped communicate the project's importance as well as monitor the initiative for each department.

External partnerships also proved useful, especially as the facility looked for more and more ways to reduce, reuse and recycle.

"It's the little volumes of waste that proved most difficult," Williams said. "Our waste company helped us find alternatives along with referring us to different certification companies, as getting certified was also a priority for us."

But the companies Williams was referred to weren't really committed to certification, because, she was told, "nobody else had really ever asked for it." Fortunately, BASF eventually found UL and its Zero Waste to Landfill Validation program, one of the first programs of its kind that focused on monitoring and measuring material flows that are not part of an organization's final product.

"We agreed with their philosophy, what they're doing and how they measure results," Williams said. "Plus, UL is a globally recognized company."

UL presented the BASF facility with the Zero Waste to Landfill Validation in August 2017. One year later, the facility earned the first Platinum Level Zero Waste to Landfill Validation from UL, achieving 100% landfill diversion with 5% incineration with energy recovery.

According to the news release, less than 0.2% of waste goes to the landfill from the BASF production facility, and in 2018, gen-

eral trash disposal was reduced by almost 40 tons, recycling was increased by 71 tons, and waste that could be directly reused was increased by 81 tons.

All of these achievements can be attributed to the robust waste management program at BASF in Huntsville.

A lot of pride going around in Huntsville

BASF has also received awards from Honda, Subaru, the American Chemistry Council and the City of Huntsville Air Pollution Board, noted Williams, who said that awards from their customers and community are especially satisfying.

"When our customers come in and they see what we're doing, especially in the auto industry, our efforts become even more of a core value for us," she said.

Other facilities want to emulate BASF's achievements as well. Sites near Mobile, Alabama, and Chattanooga, Tennessee, have asked Williams for her contacts and information on how their Huntsville facility does it, especially as it relates to difficult wastes.

But, in the end, it's the little things that bring a smile to Williams' face, like co-workers folding the candy boxes that you get at the movie theater.

"And they're folding them flat and recycling them instead of putting them in the trash," she said. "Seeing people do things that just aren't ordinary gets me excited." ●



Global warning

Improvements in supply-chain processes can help ease the pain of manufacturing shutdowns, delays





By Robert Snarski

Any large manufacturer can tell you that a natural disaster can shut down plants, displace workers and create seemingly insurmountable barriers in the supply chain. Here are some recent examples to illustrate the point:

- Hurricane Maria, Puerto Rico, September 2017: After the hurricane hit the island of Puerto Rico, pharmaceutical and medical device companies had to scramble to ensure that their supplies didn't drop below critical levels. Power outages afflicted the facilities that make sterile saline bags and delayed transportation for repairs and supplies. Several hospitals across the U.S. were forced to ration saline in an effort to use fewer bags.
- Earthquake and tsunami, Tohoku, Japan, March 2011: Economists estimated costs of up to \$210 billion for Japanese

businesses and their supply-chain partners. Japanese manufacturers mostly subscribe to the Just-In-Time (JIT) approach to inventory management, which eschews traditional inventory models for one that relies on replacing parts as needed. General Motors, Toyota and Nissan were among the companies that had to temporarily shut down auto manufacturing and assembly operations while waiting for necessary parts.

- Hurricane Florence, North Carolina and South Carolina, September 2018: Recovery efforts at the region's two main shipping ports delayed the delivery of goods to businesses in the Carolinas and beyond. In addition to the major damage it did to warehouses, railroads and shipping yards, Florence also shut down Interstate 95, a major thoroughfare for the trucking industry, for several days.

In preparation

In order to reduce the lengthy delays and high costs associated with natural disasters along the supply chain, it may be helpful to heed the words of W. Edwards Deming, the father of the aforementioned JIT inventory system. He believed that executive-level employees had to take a strong, proactive hand in managing the processes that run their companies.

"Eighty-five percent of the reasons for failure are deficiencies in the systems and process rather than the employee," Deming said three decades ago when pushing his new model. "The role of management is to change the process rather than badgering individuals to do better."

When processes are changed in order to achieve more favorable results throughout the supply chain, it can help employees pinpoint specific issues and address them in a quick, comprehensive manner.

“When the procedure is set, including several scenarios that outline what to do to deal with certain situations, companies can isolate issues and then pull members from other teams to solve problems,” said Saibal Ray, a professor at the Bensadoun School of Retail Management at McGill University in Montreal. “It’s responsible planning. When a crisis hits, there will always be a few moments of panic and desperation. But, if you have a plan in place, you’ll find that it can be quickly overcome.”

It may be unfair to claim that a strong global supply-chain system will always eliminate delays in the manufacturing process. While most companies can control their own processes and hire the right partners, controlling the processes of Mother Nature is another story.

“The weather is the wild card,” said Lauren Gaches, spokesperson for the National Oceanic and Atmospheric Administration. “Natural disasters aren’t going away. We’ve seen enough data to know that this is the future that we have to plan for. These are no longer ‘what-if’ scenarios. Now it’s a ‘when.’”

For some economists, it’s the “when” that will redefine how companies do business in both small and large ways.

“There have been discussions about carbon taxes and regulations for years, proposals that could impact today’s largest corporations,” said Geoffrey Heal, an environmental economics professor at Columbia University in New York. “But, in reality, the biggest impact will be created by how companies react or don’t react to global disasters.”

Better-case scenarios

Still, if the right processes are in place, the impact of global disasters on manufacturing can be reduced.

“A truly sustainable supply chain would be one in which risks among its constituent suppliers are mitigated,” said Alistair Blackmore, product strategy manager with UL’s Environment and Sustainability division in Cambridge, England. “For example, a manufacturer who sources materials from a third party might work to ensure that the supplier’s employees and manufacturing facilities are not located in flood-risk areas.”

While Blackmore points out that taking



Cyberattacks: Another form of disaster for supply chains

According to the National Institute of Standards and Technology, cybersecurity in the supply chain cannot be viewed as an IT problem only. Cyber supply chain risks touch sourcing, vendor management, supply chain continuity and quality, transportation security and many other functions across the enterprise and require a coordinated effort to address.

Some of the concerns include risks from:

- Third-party service providers or vendors – from janitorial services to software engineering – with physical or virtual access to information systems, software code or IP.
- Poor information security practices by lower-tier suppliers.
- Compromised software or hardware purchased from suppliers.
- Software security vulnerabilities in supply-chain management or supplier systems.
- Counterfeit hardware or hardware with embedded malware.
- Third-party data storage or data aggregators.

Cyber supply chain security principles:

1. Develop the company’s defenses based on the principle that your systems will be breached. When one starts from the premise that a breach is inevitable, it changes the decision matrix on the next steps. The question becomes not just how to prevent a breach, but how to mitigate the attacker’s ability to exploit the information they have accessed and how to recover from the breach.

2. Cybersecurity is never just a technology problem; it’s a people, processes and knowledge problem. Breaches tend to be less about a technology failure and more about human error. IT security systems won’t secure critical information and intellectual property unless employees throughout the supply chain use secure cybersecurity practices.

3. Security is security. There should be no gap between physical and cybersecurity. Sometimes the bad guys exploit lapses in physical security in order to launch a cyber attack. By the same token, an attacker looking for ways into a physical location might exploit cyber vulnerabilities to get access.

Source: National Institute of Standards and Technology — csrc.nist.gov

such an approach would mitigate losses, he acknowledges that the proactive approach could come with a higher price tag.

“This might come with a premium for the materials being supplied, since the cost of land in higher areas is likely to be greater than that in low-lying areas,” Blackmore said. “But it would better protect the well-being of workers in the supply chain and help to ensure resilience within their production cycle.”

While the concept behind global supply chains isn’t new, Blackmore pointed out that many classic examples often relied on less than scrupulous practices.

“The trading empires of the 15th century onwards, driven by the Portuguese, Dutch and British explorers, were the antecedents of the modern supply chain,” Blackmore said. “But the moral record of these examples was often corrupted with slavery and other forms of exploitation of workers and resources.”

“The phrase ‘supply chain sustainability’ started to be discussed more frequently in the 2000s, in part as a reaction to these practices,” Blackmore said. “And, indeed, research has shown that rather than limiting sustainability efforts to their own activities, organizations can have a much larger impact through more effective over-

sight and management of supply-chain activities.”

Looking ahead

As business leaders continue to rework their supply-chain procedures, Blackmore sees a future that continues to place proximity at a premium.

“In an ideal world, production occurs in the most optimal location in terms of environmental, social and economic impacts,” he said. “There are geographic, political, economic, cultural and ideological barriers to achieving this, but powerful influencers and brands demanding transparency will help to drive change in the right direction.” ●



“There are geographic, political, economic, cultural and ideological barriers to achieving [optimal production], but powerful influencers and brands demanding transparency will help to drive change in the right direction.”



Future vision

PROhumana looks at sustainability through an ambitious but realistic lens



By Marla Caceres

Since its founding more than 20 years ago, the Chilean-based nonprofit foundation PROhumana has focused on global sustainability issues at the corporate, government and individual citizen level. Through its open dialogue-based approach to research and activism, PROhumana promotes corporate social responsibility and responsible citizenship beyond the borders of its home nation.

Soledad Teixidó, the founder and leader of PROhumana, spoke with us from her offices in Santiago, Chile, about the origins of PROhumana, the impact of its initiatives during the organization's history, and what's ahead for corporate sustainability programs in the future.

What was the objective when PROhumana began, and how has that changed over the years?

We founded PROhumana in 1997 as the "Research Program for Human Promotion." At that time in Chile, there was generally little understanding of a comprehensive approach to sustainability, what it would

involve and the benefits that it could bring to organizations and people. Our focus was to create spaces for training and awareness, and to establish networks to foster co-creation and collaboration. We also wanted to conduct and share the results of research that would help organizations better understand what sustainability actually involved.

The PROhumana Roundtables program is one of the key initiatives that emerged from that early exploration, and today it has brought together more than 300 leaders from various organizations. By creating space for dialogue and trust, the Roundtables program has helped participants explore a broad range of issues — from global warming, comprehensive sustainability and the circular economy to diversity, gender equality, immigration, human rights and labor restructuring. It has even raised awareness about the attitudes and beliefs held by members of the millennial generation about these issues.

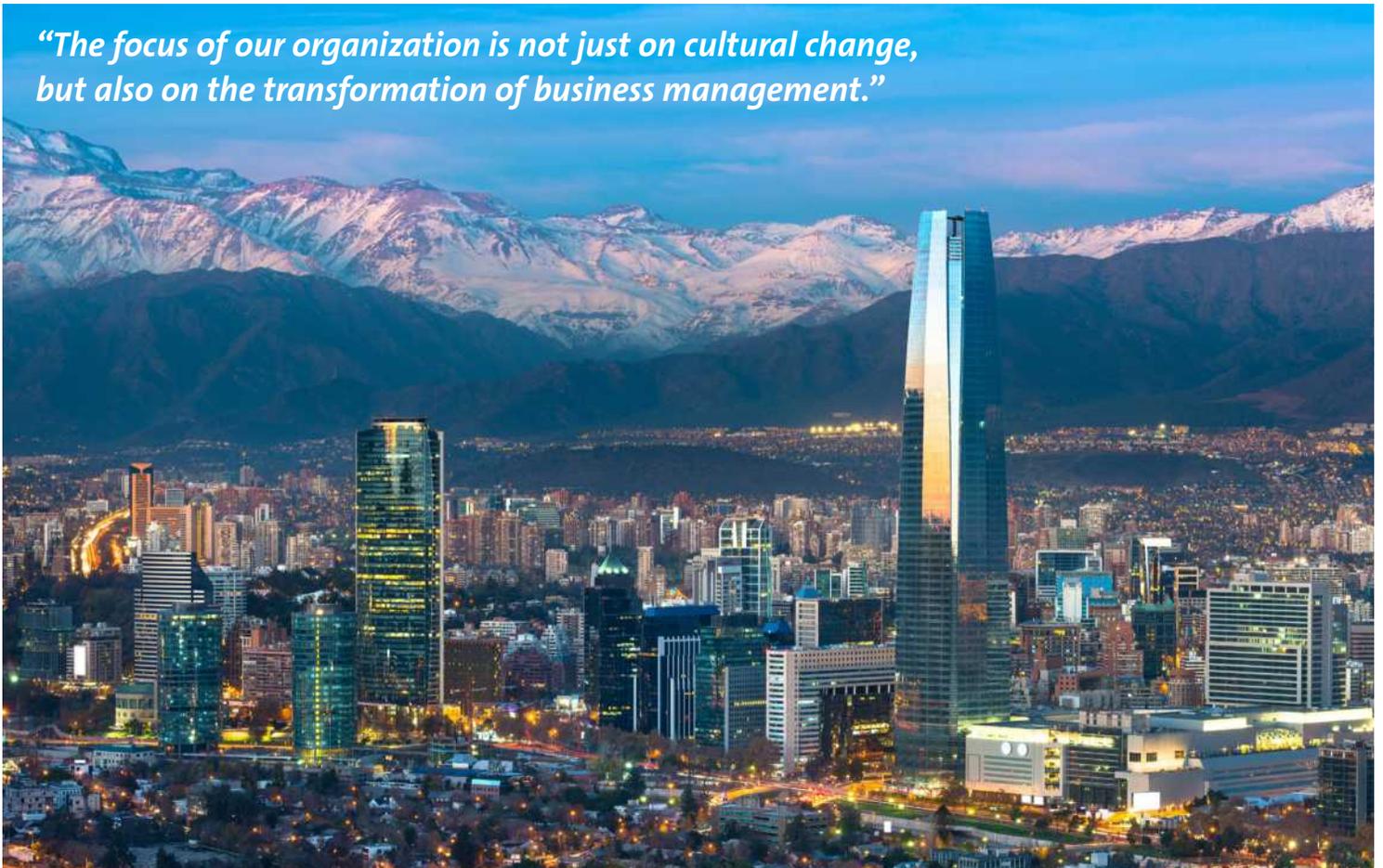
The focus of our organization is not just on cultural change, but also on the

transformation of business management. So, in 2005, we created the PROhumana Sustainable Business Strategy Model, which was designed to help organizations develop sustainability strategies that are comprehensive, innovative and consistent. Today, that model has helped to promote sustainability as a central tenet in more than 440 applications in various organizations and has greatly influenced how organizations address sustainability issues with their suppliers, their customers and with the greater community.

In the 21 years since PROhumana was established, what changes have you seen in attitudes toward sustainability at the corporate level? What changes have you seen from the consumer's point of view?

Although Chile has advanced as a country in recent years, many sustainability challenges remain in aligning our efforts to those of other countries. Here at PROhumana, we are committed to the goal of making an important contribution to that effort, and toward the creation of a society that supports consistent human development. We are convinced that the

"The focus of our organization is not just on cultural change, but also on the transformation of business management."



companies — and people — that can systemically manage their sustainability efforts will last well into the next decade and beyond. For those organizations, sustainability is an integral part of their strategic plan and one that aligns with the dynamic challenges ahead.

We see here in Chile and elsewhere around the world that more and more people are embracing the new model of work and consumption. Spearheaded by corporations, this model also relies on the active participation of society in order to succeed. Individual companies must reflect this dynamic in their activities in order to remain a viable partner for consumers.

What role does diversity play in corporate sustainability?

There is little doubt that the world is likely to change more in the next 20 years than it has in the last 300 years. This transformation will challenge all of us in terms of how we adapt as individuals and as organizations. We believe that diversity will play an essential role in navigating these radical changes.

The professional and personal skills needed to live in this “new world” include creativity, openness and inclusivity, and the ability to have a purpose and to connect with others who share that purpose. Successfully managing people with such skills requires adaptive leadership — that is, the ability to bring together groups of people who are diverse in their composition and skill set to achieve a greater good. That’s why valuing and respecting diversity will be so essential to building successful and sustainable organizations over the long term.

For example, our initiative, the PROhumana Alliance for Gender, promotes organizational diversity through a focus on gender equity. Created in 2017, the Alliance already includes more than 70 companies and organizations — clear evidence that there is an awareness of the importance of making the workplace a more diverse and inclusive environment.

Our efforts also include a Gender Equity Index, a proprietary methodology that seeks to promote gender equity in corporate management. In the three years since it was created, companies that have used our index as a key metric have improved their strategies, reduced their pay gaps and



The most sustainable companies operating in Latin America and the Caribbean

With the intention of recognizing sustainability champions and further encouraging the growth of corporate sustainability in Latin America and the Caribbean (LAC), the Inter-American Development Bank developed IndexAmericas, a corporate sustainability index that analyzes the performance of companies operating in LAC. IndexAmericas assesses companies along four critical indicators: environment, society, corporate governance and their contributions to socio-economic development in the region. For more information, visit indexamericas.iadb.org

2018 sustainable companies operating in Latin America and the Caribbean index

Company	Sector	Country
Aes Tietê Energia	Utilities	Brazil
Antofagasta PLC	Basic Materials	Chile
Banco Davivienda S.A.	Financials	Colombia
Banco do Brazil	Financials	Brazil
Banco Itaú	Financials	Brazil
Bancolombia S.A.	Financials	Colombia
Bradesco	Financials	Brazil
Celsia	Utilities	Colombia
Cemex	Basic Materials	Mexico
CEMIG	Utilities	Brazil
Cielo	Industrials	Brazil
Colbún	Utilities	Chile
Copel	Utilities	Brazil
CPFL Energia S.A.	Utilities	Brazil
Eletropaulo	Utilities	Brazil
Embraer	Industrials	Brazil
Enel Generación Chile	Utilities	Chile
Energias do Brazil	Utilities	Brazil
Engie Brazil	Utilities	Brazil
FEMSA	Consumer Non-Cyclicals	Mexico
Grupo Argos	Basic Materials	Colombia
Grupo Financiero Banorte	Financials	Mexico
Grupo México	Basic Materials	Mexico
Grupo Nutresa	Consumer Non-Cyclicals	Colombia
Industrias Peñoles	Basic Materials	Mexico
Klabin	Basic Materials	Brazil
Lojas Renner	Consumer Cyclical	Brazil
Mexichem	Consumer Cyclical	Mexico
Natura	Consumer Non-Cyclicals	Brazil
TIM	Telecommunication Services	Brazil

Source: Index Americas — indexamericas.iadb.org

promoted a more equitable and diverse workplace within their organizations.

PROhumana's "Tours of the Future" exposes business leaders to sustainable practices around the world. For participating leaders, what has been the effect of these tours?

From the beginning, we have understood that the exchange of knowledge between people in different countries is of great value for the growth and development of nations. So, since 2008, our Tours of the Future program has made nine separate trips and has visited eight different countries, including Brazil, Canada, the United Kingdom, Spain, the Netherlands, Denmark, Norway (two times!) and Finland.

We have had the opportunity to visit a number of industry leaders in sustainabil-

ity efforts, including Pension Danmark, Stora Enso, Philips and HSBC. And our 2018 meeting with Gro Harlem Brundtland, an international leader in sustainability, was undoubtedly one of the most interesting and inspiring experiences and contributed greatly to expanding our understanding of what sustainability has to offer.

The aim of these tours is to promote the development of innovative policies of integral sustainability and business sustainability by fostering direct contact between representatives of government, organizations and civil society. But perhaps the greatest benefit has been creating connections and relationships between the more than 100 Chilean participants that travel with us on our tours. That engagement helps them to strengthen their own

efforts toward integral sustainability and business sustainability here in Chile.

What is the future of corporate sustainability?

The future is now, and so we must take on the challenge that is in front of us, both as businesses and as people. The United Nations Sustainable Development Goals clearly identify the urgent issues that need attention now from businesses and countries in order to support sustainable practices today and the future of humanity. Global meetings and government accords can help provide a relevant path. But it is we, the people who work in companies, the leaders of government institutions, the citizens of the world, who must accept the challenge to transform ourselves and our societies with sustainable development. ©



“The United Nations Sustainable Development Goals clearly identify the urgent issues that need attention now from businesses and countries in order to support sustainable practices today and the future of humanity.”

Clothes call

Apparel and footwear industries look to improve sustainability efforts



#StainlessWasteless

UPON
By your purchase
BUYER'S AND SELLER'S
RESPONSIBILITY
Abolished

10.5 MILLION
Items of clothes are
DISCARDED
every year.

THREE QUARTERS
of clothes are
NOT DONATING
before being dry
CLEANED & TORN.

#StainlessWasteless
Be part of the solution!

1. Turn on the
Dry Sense technology with
Anti-Wrinkle technology
to help reduce the amount
of clothes that are
discarded.
2. Give A Shirt™ your
undies the clothes
that you no longer wear.

LEPPERS

#StainlessWasteless
Be part of the solution!

By Marla Caceres

In 2018, online secondhand clothing retailer ThredUp openly criticized a well-known luxury brand for incinerating unsold products worth more than \$37 million.

ThredUp pointed out that the company was not alone in this regard. Incinerating unsold merchandise is a common practice among luxury brands, who claim that doing so helps to maintain the exclusivity of their lines while also reducing the incidence of almost identical-looking fake products.

Few consumers are likely to pay thousands of dollars for a designer garment if they think that they'll find the same or similar garment at a discount retailer a few months later. Luxury brands, by their very nature, command premium prices because of the law of supply and demand — scarcity makes products inherently more valuable.

Heavy on resources and pollution

Overstock incineration isn't the fashion industry's only environmental problem. According to reports by management consulting firm McKinsey & Company and sustainability metrics company Quantis, the apparel and footwear industries are responsible for more than 8% of global greenhouse-gas emissions. Fabric dyeing and finishing releases toxic chemicals into water supplies, and it also devours resources. According to Quantis, the apparel industry's annual per-capita water consumption totals 23,900 liters, the equivalent of taking 150 baths.

Waste is a problem too, a casualty of an industry increasingly devoted to disposable, fast fashion. The EPA estimates that in the U.S. alone, textiles make up more than 9% of municipal solid waste, meaning that the average American tosses about 81 pounds of clothing in the trash every year.

Consumers are getting savvier

But consumers are starting to pay attention, and sustainability is moving from a niche concern to a mainstream "reason to buy" (RTB), especially among younger people. According to Nielsen research, millennials are twice as likely as baby boomers to say they are changing their habits to reduce their impact on the environment (75% versus 34%).

The fashion industry is responding with efforts ranging from in-store clothing



A 26-foot-tall installation comprised of thousands of articles of used clothing is seen in the Oculus of Westfield World Trade Center in 2018. The event, co-sponsored by Unilever Deodorants and by Savers, a thrift store, is meant to draw attention to the amount of clothing, totaling 10.5 million tons, discarded every year. Titled "Stain-Less, Waste-Less," it promotes Unilever deodorants that do not leave stain marks on your clothing, thus extending the life of your clothes. Consumers are also given the option of donating used clothing, which will be recycled to a nonprofit. — Story cover photo / photo above by Richard B. Levine

recycling drop-offs to total supply-chain transparency.

"Apparel companies have started to embrace the importance of sustainability, realizing that sustainability is not a trend," said Teresa Marshall, a representative for Sitka, a Canadian outdoor-lifestyle clothing brand that seeks a balance between conservation and consumerism.

"With the population's growth, the strain on resources will eventually force companies to adapt," said Marshall. "It's best to get ahead of the inevitable and make the shift now. Social realities are rapidly chang-

ing. Consumer preferences have shifted, and continue to shift, toward sustainability. We're seeing savvy customers asking more questions, calling brands out for unsustainable practices, taking the time to educate themselves."

Chemistry 101

One starting point on the route to sustainability in the apparel and footwear industries is a focus on the chemicals that are used at the beginning of the clothing production process.

According to Dr. Anne Bonhoff, a principal chemist with UL, the scrutiny began with

an awareness campaign by Greenpeace in 2011.

“That was the starting point for this discussion, when they could prove the direct links between the global clothing brands and suppliers, and pollution of the waterways globally,” Bonhoff said.

This led to the founding of the Zero Discharge of Hazardous Chemicals Foundation (ZDHC). Its mission is in its name: zero discharge of hazardous chemicals in the textile, leather and footwear value chain. Today, 28 signatory brands, 81 value chain affiliates and 17 associates are working with the ZDHC to implement safer chemical management practices. This includes global brands such as H&M, Gap Inc. and Nike.

The ZDHC also created a searchable database, the Gateway, that allows textile and leather manufacturers to find safe substitutes for hazardous chemicals.

Waste not, want not

Fashion brands are also shifting attention to keeping clothing out of landfills and closing the loop on a garment’s life cycle. Japanese brand Uniqlo includes recycling bins in its stores around the world, giving customers a place to deposit Uniqlo-branded items that are no longer wanted. According to the company, it collected 77.6 million items from 18 countries and regions in 2018. Items that are in good shape are donated to refugees, disaster victims and others in need through partnerships with the United Nations High Commissioner for Refugees as well as other non-government organizations (NGOs). (In 2018, 30.3 million donated items were redistributed in 65 countries and regions around the world.) Items that are deemed unwearable are recycled into refuse paper and plastic fuel pellets.

International retailer H&M also collects unwanted items from customers — from any brand, in any condition. Items that can be worn again are sold as secondhand clothing, while less-wearable items are turned into products such as cleaning cloths. The rest is recycled into items such as textile fibers for insulation. According to the company, H&M stores collected 20,649 tons of textiles in 2018, a 16% increase over 2017 and the equivalent of 103 million T-shirts.

The recycling of unwanted clothing does

help create a circular system. But what happens at the start of a garment’s life cycle can affect its second life as a recycled item. If hazardous chemicals are used in the production of an item, it cannot be recycled safely, noted UL’s Bonhoff.

“The first point to reduce waste is to enable recycling in a sustainable way, which means that we need safe and long-lasting products,” Bonhoff said. “But they need to be free of hazardous substances, because otherwise the materials cannot be recycled.”

New look at fabric

For many fashion brands, sustainability starts with the raw materials — the fabrics used to construct the clothing.

Women’s fashion brand Eileen Fisher makes sustainability and social responsibility part of its core missions. Its Vision 2020 initiative includes recycling programs,

accountability and transparency in its supply chain, and the use of sustainable fibers. According to the company, all of its cotton and linen materials will be organic by 2020, rayon will be replaced by the more sustainable Tencel, and polyester will only be used if it is recycled.

Sitka likewise produces many items with organic cotton, and the Canadian company is committed to what it calls “ethical and quality-based production.”

“Sometimes looking to the past can help us move forward,” said Sitka’s Marshall. “The majority of clothing made these days comes from a fossil fuel (petroleum) base. This has only been around for 70 years. Prior to the advent of polyester, nylon or acrylic, humans still wore clothing. Getting back to using natural fibers that have a lower carbon footprint and can biodegrade is actually an innovative solution these days.”

Support sustainable and ethical fashion

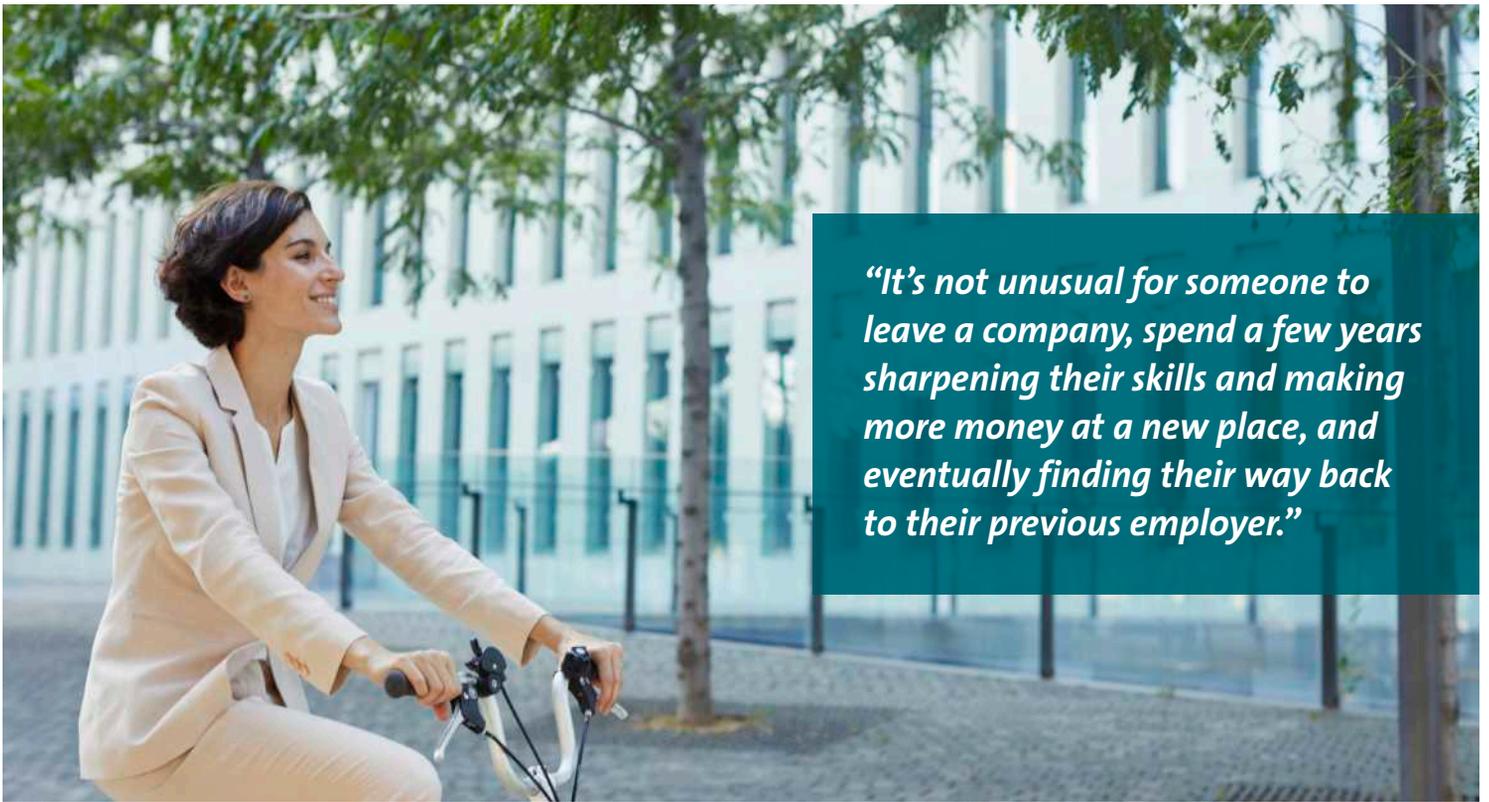
- **Buy less (choose quality over quantity)**
- **Choose vintage / secondhand**
- **Look for recycled content / reused materials**
- **Try renting (it’s not just for tuxedos anymore)**
- **Choose the materials and business models you value (e.g., organic, fair trade, zero waste, zero discharge)**



Made to stick!

Efforts to retain the next generation of employees are strengthened by increased training, opportunities for growth and meaningful work





“It’s not unusual for someone to leave a company, spend a few years sharpening their skills and making more money at a new place, and eventually finding their way back to their previous employer.”

By Marco Buscaglia

If there’s a widespread stereotype about the current generation of job-seeking young professionals, it’s that they all want to work in converted high-ceiling warehouses. Think open work spaces, lounge areas for socializing and, of course, an always bustling ping-pong table.

Except that they don’t.

“Attracting and keeping employees has little to do with whether there is an open floor plan,” said Amy Radin, author of “The Change Maker’s Playbook: How to Seek, Seed and Scale Innovation in any Company.” “It’s more about talent and culture. It’s about where resources are being invested. It’s about how fast things happen.”

Radin said that companies have greater success retaining new and recently hired employees when they’re made to feel like they’re part of the company’s present and future.

“Anyone who wants to work for a growth business should be asking what the company is doing to stay on top of customer trends, attract diverse talent and keep pace with fast-changing technologies and competitive maps,” said Radin, who consults with senior corporate leaders on using innovative approaches to their businesses.

“Prospective employees should look for indications of collaboration, experimentation and openness.”

Shopping around

In a recent study on the job-seeking habits of millennials and other new entrants to the job market, researchers Brandon Rigoni and Amy Adkins found that those in the initial stages of their professional careers seek far more than a competitive salary from potential employers.

“Ultimately, millennials are consumers of the workplace. They shop around for the jobs that best align with their needs and life goals,” Rigoni and Adkins wrote. “More than ever, employers need to know and act on the factors that make their company appealing to these candidates. They have to make it easy for prospects to choose them over their competition.”

Paul McDonald, senior vice president with staffing firm Robert Half, agreed, adding that new employees are looking for more than short-term benefits.

“Job applicants are asking, ‘What’s this company going to do for me and my career path,’” McDonald said. “They ask, ‘Are they going to invest in me? Are they going to train me to do more than what they hired me to do? Are they going to give me the opportunity to do different things?’ They want to be assured that the position they’re accepting will be setting them up for success in one year, five years, 10 years and beyond.”

That’s not to say companies expect to

train all their employees to the point where they’ll never leave. “Even the best retention-based plans won’t keep every employee. That’s unreasonable,” McDonald said. “There are plenty of logistical reasons an employee may leave a company, many of which may have nothing to do with the work or the company itself.”

And, unlike members of previous generations, who faced a “leave and don’t come back” attitude from their employers, today’s workers often return to a company they’ve worked for in the past.

“We live in a different job market than before,” McDonald said. “It’s not unusual for someone to leave a company, spend a few years sharpening their skills and making more money at a new place, and eventually finding their way back to their previous employer.”

New approach

Helen Haacker is communications manager for UL University, the internal learning and development group for UL. She’s also working with MillennUL, the business resource group created to assist UL’s early-stage professionals and those who work with them.

“We want to help our employees understand how the organization can best use their talents to have the greatest impact on the company and the community,” Haacker said.



“People in the modern workplace want the ability to develop. We’re entering the era of the T-shaped employee — someone who wants to branch out in different directions.”

UL’s ultimate goal? “To always uphold the ideals of diversity and inclusion, which make for a more diverse workplace that allows people to pursue their passions and make connections with our business resource groups,” Haacker said.

UL was inspired to invest in efforts to cultivate the talent of new and early-stage employees after realizing how other companies began adapting to a changing workforce.

“We saw in other companies that millennials really started driving intrapreneurship and internal learning about the different parts of businesses,” said Khoi Do, director of UL’s Product iQ™ platform, a resource for product data and information for UL partners, customers and consumers.

“Millennials are very entrepreneurial and really began driving innovation. We were inspired by that.”

Haacker said that when UL started examining the habits of its own workforce, the company observed that the overall approach to work evidenced by many of the company’s newer employees was on par with that of some of its more experienced professionals. “Just like veteran workers, millennials really value challenging work and opportunities to reach goals,” she said.

Once UL realized this untapped potential within the company, it launched programs to provide its early-stage employees with the skills necessary to support their professional development.

“People in the modern workplace want the ability to develop,” Haacker said. “We’re entering the era of the T-shaped employee — someone who wants to branch out in different directions.”

And those new skills, as McDonald previously noted, don’t just benefit the employer. “It’s important to make our employees more diverse in their current roles, but also to help make them more marketable in the future, both within and outside of UL,” Haacker said.

Having their say

Do noted that UL’s employee-betterment programs, which include webinars, classes and other forms of training as well as mentoring opportunities, are formed and revised in response to comments and suggestions from the participants themselves.

“One of the things we learned early on is when you talk about millennials as only a phenomenon, you’re on the outside,” Do said. “We want to be part of the conversation. We want them to address us and call us — we’d much rather be part of a conversation where we can listen to and help provide feedback. Then, we can begin shaping an appropriate response or strategic direction.”

Haacker said that part of UL’s overall employee philosophy is based on a combination of group effort and individual motivation.

“We’re very passionate about the fact that we’re all the owners of our career development,” she said. “Following one’s career aspirations is something that is beneficial not just to the individual but also to UL as a whole.”

Indeed, giving new and early-stage employees the opportunities and resources to shine isn’t motivated purely by altruistic intentions. In fact, just as millennials are increasingly taking on leadership positions in global companies around the world,

UL is hopeful that its own group of generational leaders will be well prepared to engage with their millennial counterparts outside of the company.

“As our customers hire and promote millennials, they’re looking for more innovative things. So being able to take that same approach and align with what our customers are seeking is important,” Haacker said. “We’re not the only company that’s changing. The idea of diversity and inclusion, of making sure to include ideas from those who may have something innovative to offer, that’s only going to help UL.”

Do said that many of today’s corporate leaders are actively seeking partners with similar business philosophies.

“Companies want to do business with companies who have the same sort of dynamic or culture,” Do said. “Over time — and especially with transparency and things like the Carbon Disclosure Project and Global Reporting Initiative — you’re going to see people being more explicit about this. And for companies, the more that they foster that level of transparency within, the more they’re going to demand it of others outside of their organization.”

Lots to learn

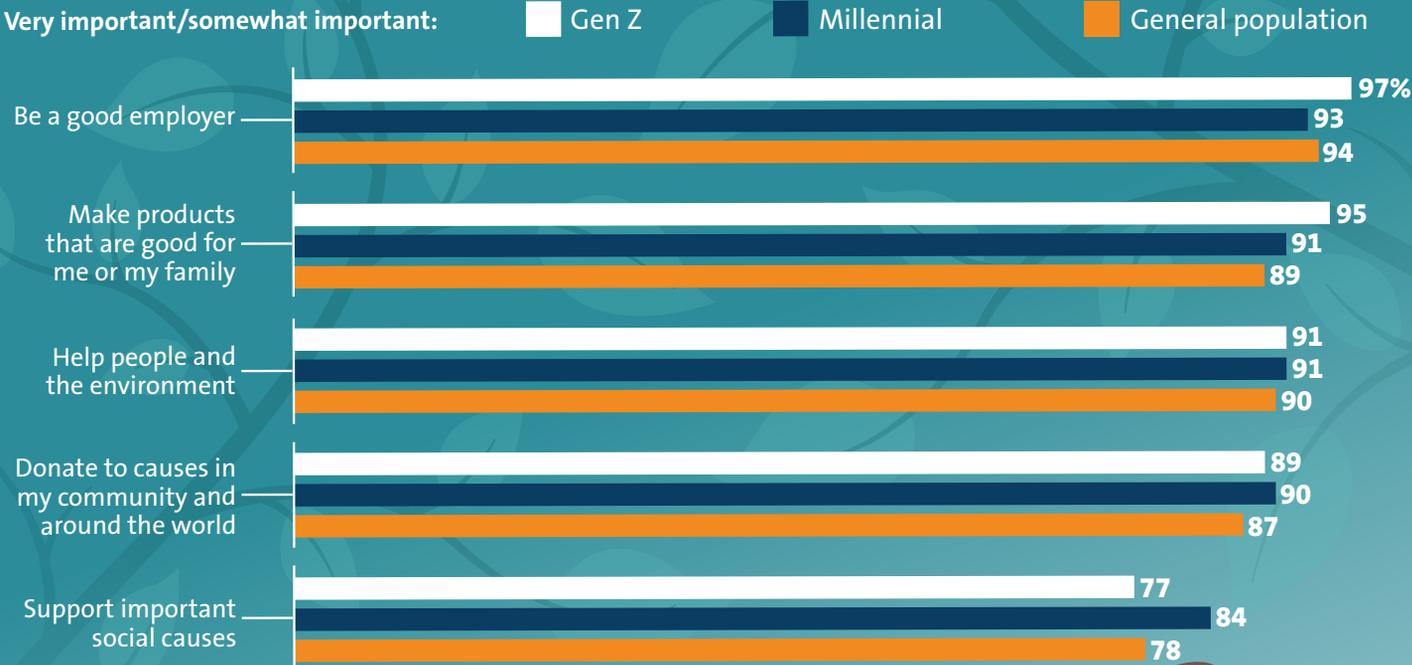
Both Haacker and Do said the energy and innovative spirit displayed by many of UL’s rising generation of associates can have a positive impact on the company’s veteran employees — an often-underappreciated benefit of a diverse workforce, according to T’Shaka Lee, a partner in Deloitte’s Los Angeles office.

“We focus a lot on the accumulation of knowledge, but we’re in this environment now where long-held views about the way we do things change very quickly,” Lee said. “It’s actually equally important that employees become skilled at unlearning as much as they’re skilled at learning. You have to be willing to let go of things in order to have a meaningful impact moving forward. But it can be very hard to see and accept a new way of doing things.”

But for companies committed to a future of growth, diversity and innovation, the new way can often help create a path to move forward. In fact, UL and a growing number of other companies are counting on it. ●

Gen Z and millennial views on company responsibility

A recent Cone Gen Z CSR Study shows Gen Zers and millennials have a mature perspective on what it means to be a responsible company. These generations believe that a company should have the responsibility of being a good employer, making good products and helping the environment.

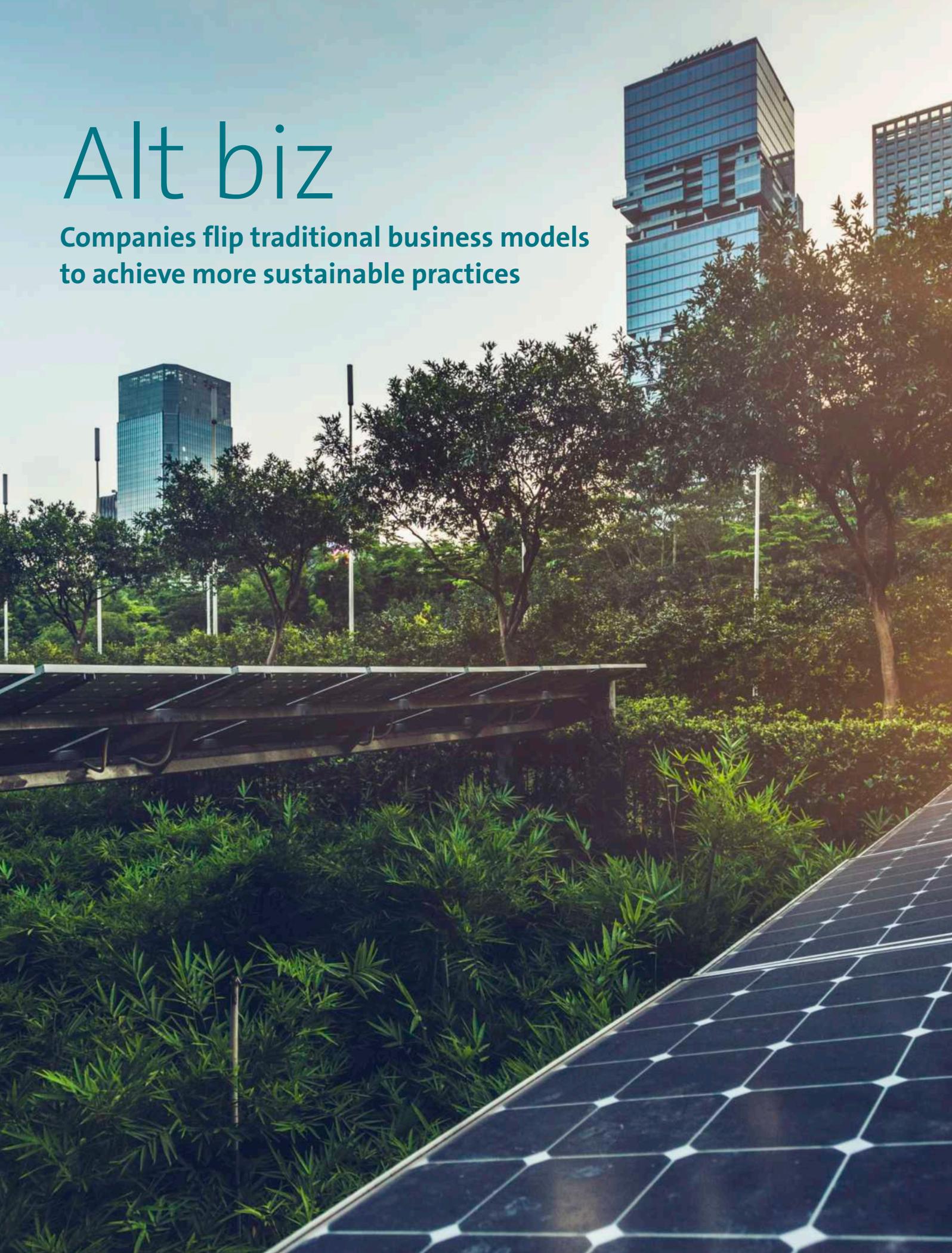


2017 Cone Gen Z CSR Study



Alt biz

Companies flip traditional business models to achieve more sustainable practices



By **Dave Wilson**

According to some experts, the world's population is currently consuming about 1.7 times the planet's regenerative capacity — a destructive pace that is quickly torching the planet's finite resources.

"We're using more than the Earth can sustain," said Catherine Sheehy, who leads the advisory practice in UL's Environment and Sustainability division.

Adrian Wain, a United Kingdom-based UL consultant focused on the development of low carbon and circular economies, agreed.

"If you look at the current economy and the rate at which we are extracting virgin resources, it's really unsustainable," Wain said, referencing a United Nations environmental report showing that virgin resource extraction is responsible for half of global emissions and 80% of global biodiversity loss.

This extreme rate of consumption means that companies are now evaluating standard practices with an eye toward change. But, while it may be important to build a more environmentally sustainable business, no factor is likely to result in a more rapid change than the goal of achieving business success over the long term. Indeed, companies have discovered that sustainable practices can be inherently profitable and help drive future operational and financial performance, inverting many traditional business models.

The strategy, according to Christophe Schilling, founder and CEO of Genomatica, which uses bio-based processes to replace petroleum-based materials, makes perfect sense.

"Smart companies are learning how they can deliver more sustainability while focusing on what they do best," Schilling said.

Nabil Nasr, director of the Rochester Institute of Technology's Center for Integrated Manufacturing Studies, said sustainability is practically a requirement for today's top companies.

"There are more consumer demands for better environmental performance of products as well as growing requirements from governments for managing the environmental impact of businesses," Nasr said. "Sustain-

ability, when done proactively at the system level, can result in improved competitiveness and financial performance."

Consumers, stakeholders, front and center

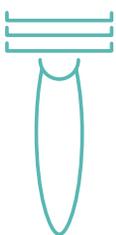
Beyond meeting nascent environmental regulations and minimizing the use of finite resources, large and small companies around the globe are focusing on the demands of consumers who want to purchase greener and safer products. Meanwhile, according to UL's Sheehy, initiatives developed to support the European Union's Circular Economy Strategy help companies employing environmentally sound business practices interact with other companies that have similar ideologies.

"Specifically, the European Union's Circular Economy Stakeholder platform provides a virtual open space for stakeholders to share best practices and to identify challenges and opportunities for the transition to a circular economy," Sheehy said. "The beauty of the circular economy concept is that it actually reflects time-honored business practices."



"Smart companies are learning how they can deliver more sustainability while focusing on what they do best."

Old products, new approach



Razor blades While some companies are bypassing traditional retail channels and using subscription services to distribute razor blades directly to their customers, a handful of companies are taking it one step further by adopting a circular subscription model. New razors and razor blades are sent to the consumer, who then places their old blades in a dedicated envelope and mails them back to a designated third party for recycling.



Fashion libraries Instead of purchasing new apparel and footwear, more and more people are renting them from clothing shops and online retailers that feature barely worn or vintage fashion items. Think of it as the tuxedo-rental model applied to everyday fashion. This trend demonstrates that a circular economic plan isn't relegated exclusively to high-tech operations.

Schilling of Genomatica said companies can play a role across their industries by shifting priorities and practices.

“A company can tell its suppliers to increase how much they use ingredients made from natural, renewable sources instead of crude oil,” Schilling said. “An example of this is in single-use plastic shopping bags. Now, companies can make bags of the same quality that are both compostable and made from renewable ingredients rather than crude oil. It’s a double win.”

Other sustainable business models

In addition to taking a circular economy approach, there are other sustainability business models that can help shape a greener future, Sheehy noted. These models include:

- **Regenerative design biomimicry:** In this process, companies restore their own sources of energy and materials by relying on what Sheehy characterized as “an imitation of nature’s designed processes to solve human problems.”
- **Closed-loop recycling:** Waste is collected and reused to make new products. This method can include everything from simple aluminum can recycling to weaving polyester clothing from plastic bottles. Sheehy described it as “integrating recycled content in product life extension, making the products last longer.”
- **Sharing platforms:** Taking a shared approach to the use of resources through services like Airbnb, VRBO or ridesharing.

Meeting consumer expectations

UL’s Wain stresses the importance of sustainability as it relates to tomorrow.

“Future generations are really expecting us to kind of rewire the economy and make it more sustainable,” he said.

Wain cited a more specific example of how that might be achieved.

“What if, instead of buying a washing machine and then having to regularly buy detergent, deal with maintenance issues and then replacing the machine after 10 years, you could have one delivered and installed by a company that handles every aspect of the use cycle — from providing laundry supplies on a set schedule to performing maintenance as required and



Catherine Sheehy, advisory practice lead, UL

then replacing the machine at the end of its useful life?” he asked.

“A company that can provide that level of service is meeting a genuine consumer need, contributing to the customer’s overall level of satisfaction, and simultaneously building a long-term relationship at the same time. This example perfectly illustrates how to reframe the existing business model for everyone’s benefit.”

Sheehy agreed and noted that sustainable

business approaches of this kind are also meeting the consumer demands of a certain generation.

“Extending the life cycle of product or service [means] companies are looking to basically build relationships with their customers over a much longer period of time,” she said. “When you look at statistics on millennials, they’re not interested in buying stuff. They want to buy services and experiences. Companies are re-examining their models to find new ways to meet those expectations.” ●

Sustainability efforts expected to generate new jobs

The push toward sustainability has raised concerns in some circles about the potential impact on employment opportunities. But these are likely overstated, according to UL's Adrian Wain.

"The United Nations Development Program estimates there's \$12 trillion worth of new business growth to come from the sustainable development goals and 380 million new jobs," Wain said.

According to a report by the U.K.-based Green Alliance Trust and WRAP, additional jobs that will be created in the circular economy fall into one of the following three categories:

- **High-skill research and development jobs:** People who design products and services that fit within new-sector business models.
- **Medium-skill jobs:** Workers who contribute to refurbishment processes and help with the delivery of services.
- **Low-skill jobs:** Employees who have day-to-day responsibilities in

waste removal, product recovery and logistics.

"The move to a circular economy is likely to have a positive impact on the workforce," Wain said. "Research has shown moving to sustainable business models can deliver jobs."

Catherine Sheehy, head of the advisory practice lead in UL's Environment and Sustainability division, also sees job creation associated with a circular economy.

"Whatever you feel about the Green New Deal, the concepts behind it include job creation," Sheehy said. "And creating those jobs will require investments in both training and technologies."

Sheehy also views the employment impact of a circular economy from a global perspective.

"China is investing \$260 billion in renewable power, according to their current five-year plan, and that's creating 13 million new jobs," she said. "So, there is a direct relationship between these issues and new job creation."

Who's doing what?



Eataly: The Italian food retailer has used more than 7 million dishes made with biodegradable plastic.



GE Healthcare: The company refurbishes diagnostic imaging equipment and sells it at a lower price to serve smaller clinics in developing markets.



Vestas wind turbines: Steel, precious metals and other commodities make up this company's wind turbines, which are designed with recycling in mind. "They designed those to be remanufactured so that at the end of their life, typically 20 to 25 years, they can actually recover materials and components for re-use," UL's Adrian Wain said.



Unilever: A manufacturer of everything from soap to ice cream, Unilever recently made a commitment to achieve the U.N.'s Sustainable Development Goals.



Recharge it

Using old batteries in new ways can be good for business

By Dave Wilson

Lithium-ion batteries are everywhere, powering devices large and small, from mammoth military vehicles to pocket-sized fitness trackers. Every day, new products are being created and existing products modified to take advantage of this increasingly reliable power source. But what happens when batteries can no longer hold a charge or the devices they power are discarded?

“Forecasts are calling for over 11 million tons of spent lithium-ion batteries to be discarded globally between now and 2030, with an approximate residual value of \$65 billion,” said Chris Berry, a New York City-based independent analyst and consultant in the energy metals sector.

Disposal of a lithium-ion battery after a typical 10-year life is still a vague and confusing process. For example, according to the Financial Times, less than 5% of the

lithium-ion batteries used in automobiles and other vehicles are currently being recycled, compared with approximately 90% of vehicular lead-acid batteries.

Maurice Johnson, a UL business development engineer specializing in batteries, fuel cells and land vehicle converters and inverters, notes that the proper disposal of lithium-ion batteries used in electrical vehicles is becoming more important as more and more electric vehicles powered by larger lithium-ion batteries take to the road.

“Globally, regulations are pushing automotive manufacturers to increase the average fuel efficiency of their fleets,” Johnson said. “As a result, you’re going to see more electric vehicles on the road in the next five years.”

This dynamic, he said, will make it imperative to have an established recycling infrastructure in place.

Laurie Florence, who for 16 years has been

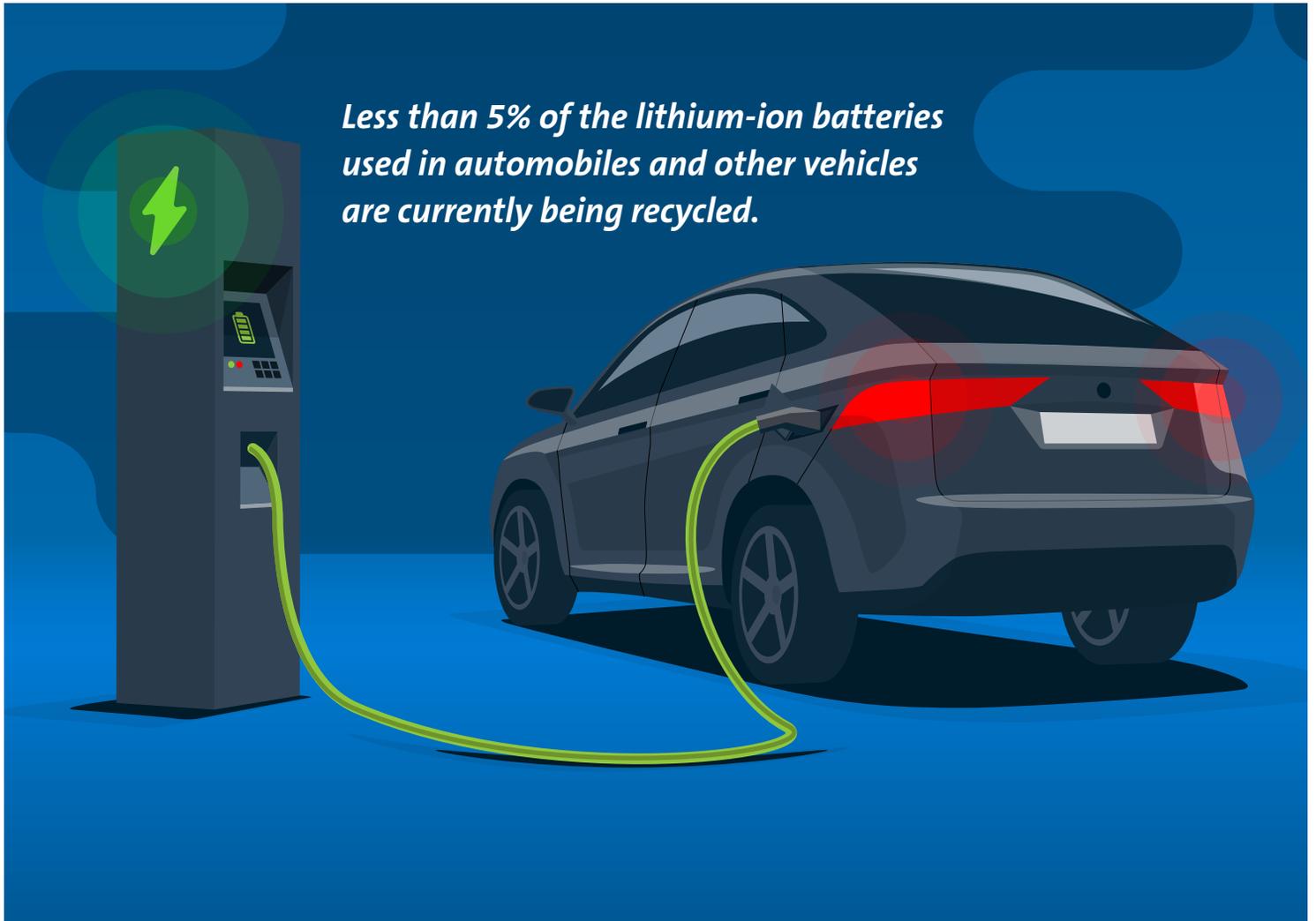
UL’s principal engineer responsible for developing UL and international battery standards as well as UL battery certification programs, said that the sheer size of the lithium-ion batteries that power vehicles, along with their plummeting costs, will make recycling efforts more difficult.

“There is a growing concern about the consequences of disposing this growing number of used lithium-ion batteries in landfills,” Florence said.

And future demand for lithium-ion batteries extends beyond those used in automobiles and other vehicles. The global demand for lithium is expected to climb to approximately 1 million tons by 2025, Berry said, up from just 270,000 tons in 2018, with 80% of that earmarked for use in rechargeable batteries.

“So, the issue of recycling is going to become an increasingly important issue for everyone,” Berry said.

Less than 5% of the lithium-ion batteries used in automobiles and other vehicles are currently being recycled.



Because batteries still retain a large amount of usable energy capacity — 80%, according to a recent UL report — some companies repurpose instead of recycle for uses in stationary power sources, which also eliminates some landfill waste.



Tough process

While recycling batteries is better than dumping them in landfills, recycling presents its own unique problems.

“Batteries are complex chemical devices, and there is a risk of explosion if they are not handled properly during the recycling process,” Berry said. “For this reason, it’s important to have a recycling process in place that is safe to scale. And since we’ve never seen this much demand in the lithium-ion battery sector, it is crucial that new business models get this right the first time.”

Just as important, Berry said, is that they “do so profitably.”

Johnson agreed that recycling lithium-ion batteries can be a challenge.

“In trying to reclaim some of the materials,

individual cells within the battery must be broken into,” he said. “Removing ingredients from a lithium-ion battery is a much more complex process than that required for a lead-acid battery.”

Battery business

Recycled lithium-ion batteries do retain a decent percentage of their power capacity, but Berry noted that retention rates aren’t the only factor driving a potentially budding battery recycling industry.

“The key question has always been one of economics, which is driven by the chemical process employed for recycling and resource recovery,” he said. “Today, there are ample collection efforts with entities such as Call2Recycle in the U.S., but it is really companies such as Umicore in Belgium or Guangdong Brunp or GEM in China that

are known for recycling at scale.”

Battery recycling efforts in the U.S. exist, but efforts by American companies lag those of their overseas counterparts. One reason may be attributed to an environmental mindset that differs from that held by businesses in other countries.

“Especially in countries that have more stringent recycling environmental controls, such as in Europe, or where there is actually greater large-battery use, as in Asia, companies are likely to conduct more research on how to safely recycle lithium-ion batteries,” Berry said. “It’s not like we don’t know about such practices in the U.S., but the scale of activity here is just not that great.”

Berry acknowledged the ever-present safety concerns as well.

Battery recycling as a business

The annual world market for lead-acid-based batteries (the most common in use) was \$33 billion in 2015, according to Battery University, followed by lithium-ion, valued at \$16.6 billion. The table below lists the material cost per ton to build these batteries.

Battery chemistry	Metal value (per ton)*	Recycling
Lithium cobalt oxide	\$25,000	Subsidy needed
Cobalt	\$50,000	Relevant, subsidy
Lithium iron phosphate	\$400	Subsidy needed
Lead acid	\$1,500	Profitable
Nickel	\$10,000 - \$17,000	Subsidy needed
Cadmium	\$2,200	Subsidy needed

*2017 prices; purity and supply govern value

Source: batteryuniversity.com



“Even though [the batteries] have energy loss, there’s still enough energy that they represent a hazard,” he said.

Second life

Because batteries still retain a large amount of usable energy capacity — as much as 80%, according to a recent UL report — some companies repurpose batteries instead of recycling them for uses in stationary power sources. This process, which involves the sorting and grading of battery packs, modules and cells, also has the benefit of eliminating some landfill waste generated from the disposal of batteries.

As a result, Florence said that original equipment manufacturers are now considering ways in which they can repurpose used batteries in other applications.

“Maybe the batteries don’t have sufficient energy for a vehicle application, but the energy that remains may still be sufficient for another purpose,” said Florence, who added that reusable batteries may be usable in their former use state or combined with battery components from other devices.

Indeed, this potential has resulted in a burgeoning battery repurposing business.

“There are numerous startups in the lithium-ion battery recycling space that are not only focused on recycling but also repurposing and remanufacturing to add diversity among their various business lines,” Berry said.

He offered the global automotive business as an example of an industry with a keen eye on the battery recycling opportunity.

“As vehicle electrification becomes more widespread, there is potential reputational risk when car batteries are not accounted for at end of life,” Berry said. “Essentially, almost every original equipment manufacturer you can name is closely studying the battery life cycle and putting plans in place for a closed-loop ecosystem, where the battery is recycled and any battery-grade, high-purity raw materials such as lithium and cobalt are injected upstream back into the battery supply chain.”

But while exciting progress is being made on this front, Berry is quick to point out that battery repurposing is still in its infancy.

“I’d argue that it is still early regarding second-life applications, and I’m not sure second-life is the panacea many people think it is,” he said. “With lithium-ion battery prices continuing to fall 10% to 14% each year, eventually it may be cheaper to just recycle the batteries, even with 50% or 60% of their capacity, and build brand-new ones for energy storage.”

Moving forward

The importance of finding a final resting place for lithium-ion batteries will prompt new businesses to focus on storage and disposal.

“It’s poised to be a large, emerging industry,” Berry said. “This will, of course, be led by China, and we’re already seeing start-ups and existing companies incorporate lithium recycling into their long-term business plans. Dumping used lithium-ion batteries in landfills, with their risk of explosion, is not a viable long-term strategy, and so governments and the private sector are joining forces to get ahead of the curve here.”

Despite the numerous possibilities for reusing lithium-ion power sources, there is a logical end to the life of a battery once all its resources have been spent.

“We always think of repurposing, then recycling for a second life, and maybe even a third life,” Johnson said. “However, you eventually get to the point where the battery can’t be reused for anything, and it’s time to extract the precious metals and materials from those batteries for use in future products.” ●

Buying power

Company policies now a draw for conscious consumers



By Marla Caceres

A recent discussion in a mothers-only Facebook group turned to the topic of the companies that the women support as consumers and the ones that they avoid.

One woman from Annapolis, Maryland, said that she supported a retailer for the things that it doesn't do.

"I swear, half of our disposable income goes to random and constant shopping at CVS," she said. "I like that they pulled tobacco products from their shelves."

The women discussed other choices — buying locally when possible, supporting companies that pay higher wages to retail workers and promote from within, and patronizing local franchisees even if their corporate parent companies have questionable practices — when another woman, this one from St. Petersburg, Florida, summed up her point of view.

"I think conscious consumerism is one of the few ways we can truly make a difference," she said.

The power of consumer choice

People who practice conscious consumerism use their buying power to influence a company's policies and practices. They signal their approval by spending their dollars with companies whose values they support — and their disapproval of others by withholding them.

Conscious consumerism has taken off in the age of social media, when news about a company's practices can go viral in minutes. Indeed, according to a survey by media company Cone Communications, 70% of Americans believe that companies have an obligation to take positions on important matters, including social issues that may be beyond the scope of their day-to-day business dealings. For example, 73% of Americans surveyed said that they would stop buying products sold by a company that took a stand opposing issues such as racial equality, climate change or women's rights.

And conscious consumerism may be generational. The same study found that millennial consumers are more likely than other shoppers to do research to find out where a company stands on social issues that are important to them.



Companies are listening, and responding

But, even before the age of tweets, retweets and shares, making responsible choices has always been part of the business plan for many companies.

Think of examples like Patagonia's decades-long commitment to corporate responsibility and protecting the environment, or Google's efforts to match 100% of its total energy use with clean energy sources. These brands and others like them, both large and small, are continuously working to do the right thing.

But now, more than ever, consumers are taking notice.

"In the last few years, we have seen an increased interest in customers about our ethical and environmentally friendly production," said Nicole Rohde of the British luxury fashion brand Maxwell-Scott. Rohde said the pages on the company's website describing these efforts "are now actually our most clicked pages on our website, so the interest is definitely there."

For many consumers, slipping on a luxury garment feels even better when they know it was produced by a company that embraces ethical and sustainable business practices.

"I think that conscious consumerism is here to stay — especially in the luxury sector," Rohde said. "Buying a product isn't only about fulfilling a need, but it is also about feeling good when you are using it. In today's day and age, supporting conscious consumerism is a huge, unique selling proposition for companies."

For Dave Munson, president of the Fort Worth, Texas-based Saddleback Leather Company, the business reasons for corporate responsibility are endless.

"The companies that are 'others-focused' attract 'A-player' employees, because they want to be a part of something meaningful — especially the millennials," Munson said. "Good companies don't have to worry about headhunters luring away their best and brightest with the offer of more money."

Factory workers in his Mexico-based production facility enjoy benefits such as free daycare for their children and free access to an English-language private elementary school for older children. Saddleback produces high-quality, higher-priced leather goods, but Munson's customers don't mind paying a premium.

"The one we hear all of the time is this: 'If I had a business, I would run it exactly like you're running Saddleback Leather,'" Munson said. "We also hear that the two main reasons customers continue buying from us and telling everybody about us is because of the quality and because of the purpose."

"It's not just a good marketing ploy to do good," Munson noted. "Doing good is just plain good for business, and more than that, it's the right thing to do. This millennial generation values this like no other."

Finding the ROI in doing good

But, unlike Rohde or Munson, some business leaders need more tangible reasons to make more ethical, socially responsible, environmentally conscious choices in running their companies.

The sustainability minded consumer



And when it comes to consumption and sustainability — areas where consumers with environmental concerns often place their focus — the balance between profits and responsibility is especially tricky.

“Businesses are inherently structured to return value to their shareholders,” said Alistair Blackmore, product strategy manager for UL. “How do you maximize value to shareholders while pursuing a model in which you’re working to convince your customers to buy less?”

One way companies can effect positive change in the area of sustainability is by pursuing a circular business model. Unlike a linear business model — with resources extracted on one end and disposed of on the other — a circular model attempts to close the loop by emphasizing the reuse, repurposing and sharing of items.

A service-based model shifts some of the focus away from the production and consumption of objects and places it instead on the servicing of those items. UL’s Blackmore

said a prime example of this is an offering from technology company Signify, formerly known as Philips Lighting. It offers customers a service-based approach to installing and maintaining their commercial lighting.

In the traditional model, a customer would purchase lighting equipment then employ personnel to maintain it. When the equipment aged to a point beyond repair, it would be removed and new lighting purchased.

The service-based model takes a different approach. A Signify client pays by the lumen, essentially leasing the equipment from Signify, which takes care of maintaining and replacing it.

The primary environmental benefit of a service-based model is that it reduces waste. Signify can repair and repurpose the lighting leased by its customers — which also provides Signify with valuable research data about how its products actually perform.

This model is already in place in several terminals in Heathrow Airport in England.

“It’s simpler and makes their business model much more streamlined,” Blackmore said. “[Heathrow Airport Terminal 5] doesn’t have to pay an engineer — it’s part and parcel of the contract they have with Signify. And Signify is getting more direct and accurate feedback on the quality of their product.”

According to 2014 data from the World Economic Forum, companies that adopt circular business models appropriate to their businesses could enjoy cost savings of \$520 billion to \$630 billion each year in complex durables in Europe alone.

When companies adopt innovative solutions that also have social impact, change can happen — the sort of change that consumers will notice and support.

“Rather than remaining with outdated business models in which things are consumed and then disposed of, moving to a circular economy can have a significant, positive impact on both sustainability and profitability,” Blackmore said. ●

Material concerns

How the circular economy is contributing
to more sustainable manufacturing



By Sarah Newkirk

Now more than ever, companies are making a push to incorporate green initiatives and materials into their manufacturing processes, often establishing sustainability divisions to help achieve their goals. They're discovering that going green doesn't just mean doing what's better for the Earth, it also translates into a healthier bottom line by reducing costs and increasing access to resources.

"The circular economy is about replacing the traditional linear model of sourcing virgin materials for manufacturing with one that conserves energy and resources, and reduces waste in an economically feasible way," said Mark Kardos, senior sustainability consultant at UL's Environment and Sustainability division.

"We're seeing a lot of industries making efforts to adopt a circular approach as they rebuild their production infrastructure," he said. "These efforts are still very much in the early stages, but organizations are successfully addressing new challenges in figuring out the best ways to achieve sustainability under this model."

A higher standard

The electronics industry has been an early leader in advancing more environmentally sustainable manufacturing policies and practices.

"The electronics space is one of the areas where we've seen a really big push toward zero waste — not just at the final-tier assembly but actually throughout the entire supply chain," Kardos said. "For example, we've been working closely with Apple, which has adopted ambitious policies around zero waste and has also introduced recycled materials into some of their products."

Kardos said it's worth noting that leading companies in multiple industries are also engaged in waste diversion — Walmart, Firestone Building Products, BASF and ExxonMobil, to name a few.

"ExxonMobil has taken their entire lubricants division toward zero waste," he said. "Many companies start small by rolling out their zero-waste commitments at a few sites. ExxonMobil, on the other hand, made a more ambitious commitment to tackle waste by seeking certification under UL

2799 Zero Waste to Landfill Certification Program at all 22 of the company-owned sites in this division.

"This was a major effort on their part to look at where the environmental impacts are in their supply chain and to work in meaningful ways to begin mitigating those impacts."

Upping the ante

But creating something more sustainable rarely comes down to simply changing one material for another. Instead, companies must address a number of safety, reliability and performance considerations when using recyclable materials in manufacturing, whether on a small or large scale.

"When a product designer is looking to

switch materials in their products, they have to consider a number of factors related to material functionality, processability and performance," said Thomas Fabian, UL's research and development manager for polymer material science. "For example, will the product made with an alternative material still function as it did with the former material? Can the product be produced using the same manufacturing processes as before, or will it require changes in equipment? And how might the alternative material affect critical performance requirements like safety? And, of course, what about the cost?"

Fabian and his team at UL investigate the performance properties of materials under a variety of conditions, such as whether



"If an alternative material is more difficult to process, then a company may have to change its process or its equipment in order to use it."



they are more combustible or how they might contribute to the spread of a fire. They are also evaluating how material properties may be affected by additive manufacturing (AM) techniques such as 3D printing, and what changes in AM technologies might be required to process those materials.

“If an alternative material is more difficult to process, then a company may have to change its process or its equipment in order to use it,” Fabian said.

There are also safety considerations with respect to recycled materials. Recycling materials for reuse may require the introduction of additional elements into the material composition. Some materials, such as plastics, may not possess the same

consistency or structural integrity once they’ve been recycled one or more times. And recycling electronics may contribute to an increase in the content of heavy metals and other hazardous materials.

“But there are projects underway today that are designed to address the quality and performance concerns related to recycled plastics,” UL’s Kardos noted. “In fact, UL is engaged in PolyCE, a multiyear consortium demonstration project under the European Union Horizon 2020 program designed to transform the life cycle of e-plastic material into a more sustainable one. The work of PolyCE may well lead to changes in the way we recycle plastics and help to mitigate some of these issues.”

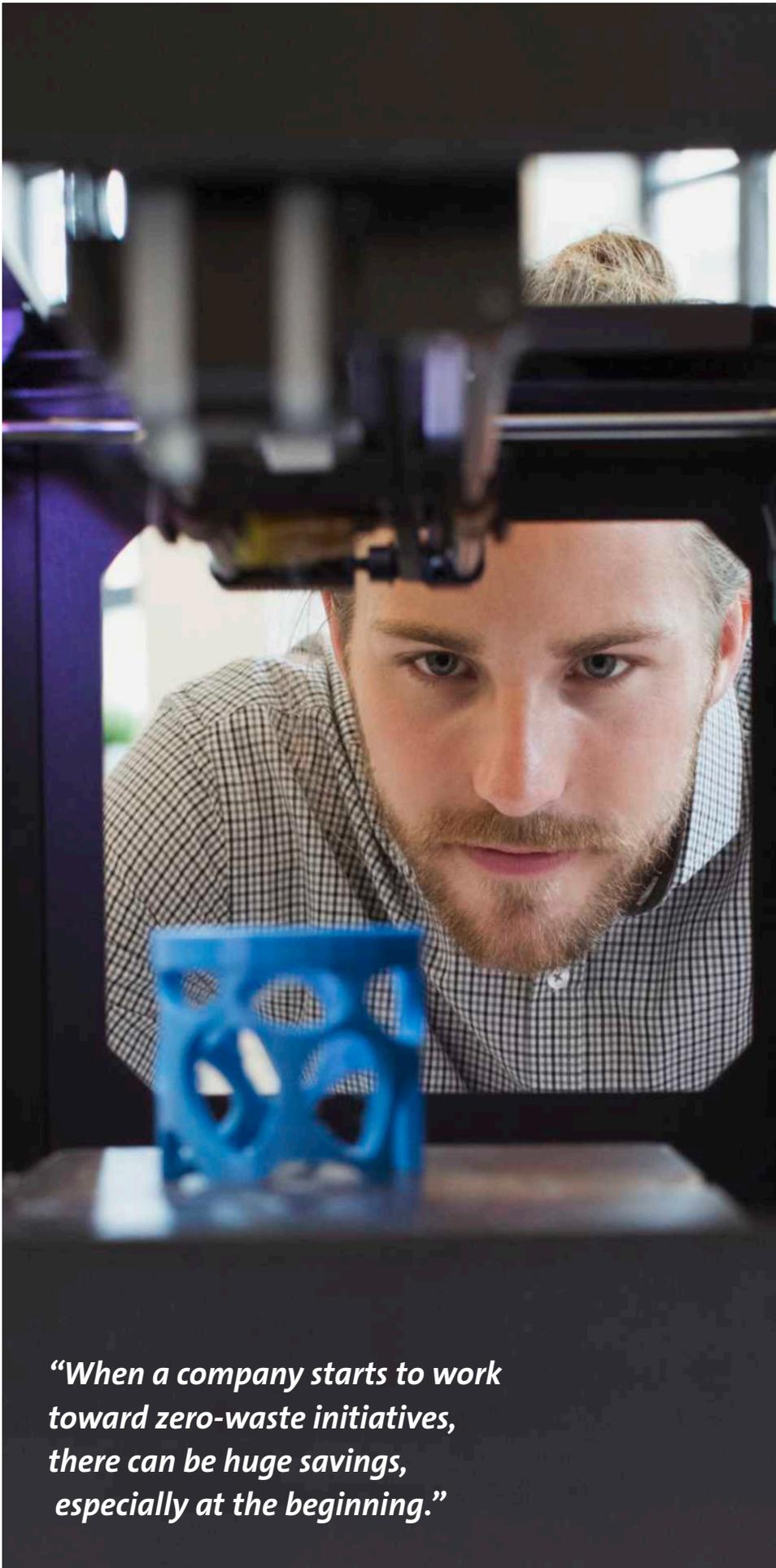
Making financial sense

Experts agree that if a company can draw upon its own supply chain in its sustainability endeavors, it can be hugely beneficial to the bottom line.

“There is simply no question that this form of direct recycling into products makes doing the environmentally responsible thing highly economic,” said Joshua Pearce, a professor in Michigan Technological University’s department of electrical and computer engineering.

In some of its recent findings, Pearce’s research group for technology and sustainability determined that waste plastic could be converted into 3D printing filament with a recyclebot.





“When a company starts to work toward zero-waste initiatives, there can be huge savings, especially at the beginning.”

“We have been working with a 3D printer manufacturer to directly 3D print from waste,” Pearce said. “This is much more sustainable, particularly if the plastic waste is biopolymers.”

Pearce pointed to recent research showing that the use of the industrial 3D printer called the Gigabot X could reach returns on investments of greater than 1,000% when used to manufacture large products from waste material.

The ‘new normal’

Closed-loop recycling and the circular economy are still new concepts to many, but waste diversion and zero-waste commitments are tangible and therefore easier for many organizations to grasp right away. In the U.S., it costs an average of \$55 per ton to transport waste to a landfill, so cutting down on waste can result in significant reductions in business expenses and help boost bottom-line profitability.

“When a company starts to work toward zero-waste initiatives, there can be huge savings, especially at the beginning,” UL’s Kardos said. “There are often high-value materials such as recyclable plastics and metals that are the ‘low-hanging fruit’ so to speak, and which can be diverted with relative ease. It’s flipping from something that was formerly a cost and creating an income stream instead.”

From Kardos’ perspective, these types of initiatives are rapidly becoming the norm in business practices.

“Sustainability concepts are no longer considered a separate or external factor when you’re making your final decisions,” he said. “They’ve become integrated into the design and sourcing of materials and components, and the production processes, because they are functionally crucial to the business model and company performance.”

In other words, obtaining materials via closed-loop cycles instead of relying on virgin materials can make supply chains more resilient and help manufacturers avoid supply chain surprises, regardless of their cause.

“This approach actually becomes a driver to increase both profitability and supply chain resilience,” Kardos said. ●



Move toward a safer, more prosperous world

The mandate for business is changing. From aligning to Sustainable Development Goals to producing meaningful results, companies are moving beyond the “triple bottom line” to business models that improve transparency, reduce waste and mitigate risk.

No matter where you are on your sustainability journey, UL’s expertise and digital platforms can help you achieve your company’s goals and improve business results.

Among UL’s offerings:

- Tracking software for ESG factor reporting (e.g carbon, waste)
- Globally-recognized product sustainability certifications
- Supply chain and chemical policy management software
- Responsible sourcing assessment and auditing
- Circular Economy goal setting and benchmarking
- ZDHC analysis and training
- Regulatory advisory services

Visit <https://s.ul.com/2JslsLr> to learn more.

Empowering Trust™

UL and the UL logo are trademarks of UL LLC © 2019.

