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Moving toward a circular economy

In its simplest terms, a circular economy is one where all materials in an industrialized economy are in a continuous flow. It's an economy in which one person or operation's waste automatically becomes another's resource. It's a culture of recovery and reuse, recycling and re-creation. In short, it's a more efficient economy with a greater social value and minimal environmental impact.

By 2020, the global middle class is expected to mushroom from 1.8 billion to 3.2 billion people and then to 4.9 billion people by 2030. At the same time, our society is

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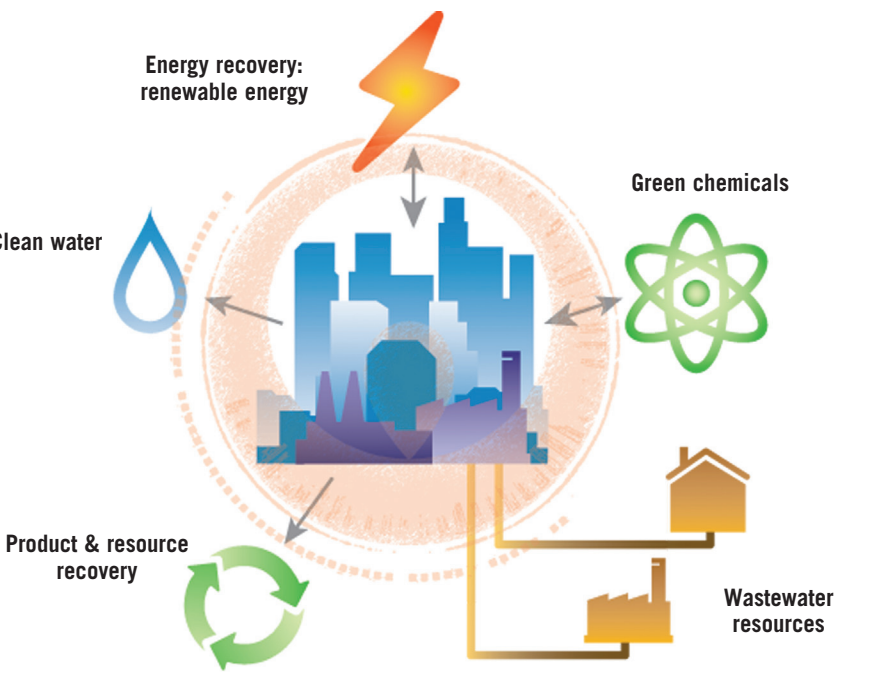
becoming more and more urban; the demand for energy and water is booming; and we're being impacted by climate change. This is all leading to unsustainable pressures on our existing resources. Our current linear "take-make-dispose" economic model will need to be more circular to relieve the increasing pressures on our resources — energy, waste and water alike.

The circular economy offers a way to transition growth into a positive trend for the environment, the economy and society. It requires new ways of thinking and questioning traditional assumptions to create value for industry, businesses, communities and people. But it will also require that industry goes beyond recycling and reusing waste, water and energy. It will take technology, innovation and a willingness to look upstream at an industrial source operation to determine how to prevent an environmental or resource recovery challenge from the start. When we do this effectively, recovering byproducts can actually create a value stream for an industrial operation where there was once a financial cost and burden on the environment. For industry, adopting a more circular attitude to resource management is also a way to hedge against risks, including raw material availability and price volatility, and contributes to defending its social license to operate.

For example, half of all gasoline made at U.S. oil refineries uses a hydrofluoric acid catalyst in their manufacturing process. Part of this acid must be neutralized with a base chemical, often potassium hydroxide (KOH). The resulting material, spent KOH, used to always be disposed as a hazardous waste. However, innovation and technology resulted in a solution to regenerate KOH for reuse. Today, for every 100 pounds of KOH used, approximately 95 pounds are recovered and returned to U.S. refineries for use in their processes. No hazardous waste is generated in the recovery process. And this process uses 34-percent less energy versus the manufacturing of new KOH product and millions of fewer gallons of fresh water to produce the recovered product. It also saves refiners considerable money when compared to the expense of buying virgin solvent. That's a circular economy.

There are several examples of this also happening in Europe, which is where the concept of the circular economy originated. For example, in Brussels, sludge from a wastewater treatment plant is producing bio-plastics that are as high quality as those from conventional plastic manufacturers. Here in the U.S., there is another wastewater reclamation facility that uses highly sophisticated technologies to produce two distinct beneficial reuse water products. The treated water becomes either a water product for irrigation or ultrapure water for industry that meets much higher standards than drinking water requirements. In water-stressed areas all over the country, couldn't this be a potential solution to back the needs of water-intensive industrial processes without sacrificing the water requirements of the residents who live there?



In a circular economy, waste is no longer waste. It becomes a byproduct for extracting value and creating new raw and reusable materials.

By implementing technologies to intercept and reuse materials that have typically been classified as waste streams, industry can drive a circular economy.

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Here's a couple more statistics to consider. According to the "Towards the Circular Economy" report produced by McKinsey & Co., "Fifty percent of the input costs for cellphones could be saved by manufacturing devices from recovered parts." The report also states, "Over $1 trillion a year could be generated by 2025 for the global economy and 100,000 new jobs created over the next five years if companies focused on encouraging the buildup of circular supply chains to increase the rate of recycling, reuse and remanufacture."

The numbers are staggering, but in order to be successful, industry has to rethink its relationship with resources and come up with new social and economic growth models that are more efficient, better balanced and more sustainable. I believe there are three main pillars to this concept:

1. Improving access to resources means supplying the greatest possible number of people with the resources needed to ensure the well-being of communities, to make regions attractive and to underpin the performance of companies. This means ensuring access to safe drinking water and energy services for cities and their inhabitants, services to industry that guarantee continuous supplies for production processes and recovery systems for materials within the circular economy approach.

2. Preserving resources is about the balanced protection of ecosystems, extracting only what is strictly necessary from the right place at the right time and using the right methods. This approach makes sure nothing is lost throughout the usage cycle while also minimizing downstream impacts so as to guarantee there are no harmful effects on human health or the natural environment.

3. Replenishing resources is about creating new secondary resources that are gradually offsetting the growing scarcity of natural primary materials. Through innovation in recycling materials and recovering waste, Veolia is providing solutions that significantly extend the lifespan and usage value of extracted resources.

Recovering byproducts can actually create a value stream for an industrial operation where there was once a financial cost and burden on the environment.

The reality is natural resources are becoming increasingly scarce or under greater pressure while our needs are growing in an evermore densely populated and urbanized world facing climate change issues. The circular economy appears to be the way forward — the most sustainable path. The growth of our societies, human and economic well-being, and environmental restoration is worth the effort.

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