McKinsey & Company

Operations Practice

Operations-driven sustainability

Optimizing operations can unlock simultaneous environmental and financial benefits.

by Curt Mueller, Steve Seber, Jeff Shulman, and Kimberly Stover

August 2020

The unexpectedly clean air that resulted in some places from steep COVID-19–induced drops in industrial activity appear unlikely to change a larger truth: the world is not yet on track to meet the greenhouse gas (GHG) emissions-reduction targets required by the 2015 Paris Climate Agreement. And it isn't only the atmosphere that human activity is harming. At current growth rates, global annual waste generation would increase by 70 percent by 2050, while critical resources from minerals to clean water are being depleted at unsustainable rates.

Industrial activities are responsible for the lion's share of global carbon emissions. Roughly 28 percent of global GHG emissions came from industry in 2014, so unless industry can lower its emissions, the world will continue to struggle to reach its GHG-reduction goals. Companies generate greenhouse gasses directly in their factories, and indirectly through the consumption of electricity and the fossil fuels required to transport products and materials.

Most organizations recognize the imperative to reduce the negative impact of their activities on the environment. There is also increased pressure from employees, investors, communities, and customers to improve environmental sustainability efforts.

The operations advantage
For business leaders already facing a difficult journey into the post-COVID next normal, sustainability and profitability can look like conflicting goals. Large-scale investments in renewable energy, advanced manufacturing technologies, or alternative materials may appear harder to justify in an environment when many organizations are reexamining their costs, product portfolios, and capital plans.

Sustainability doesn't have to come with a hefty price tag. When companies optimize their operations—whether to increase productivity, improve quality, or reduce cost—better environmental performance can be a byproduct.

Efficient manufacturing processes and supply chains don't just cost less to run: they also consume less energy, use fewer resources, and produce less waste.

Today, many of the world's largest businesses are learning how to maximize these synergies between operational excellence and environmental benefit, designing and executing improvement initiatives to address both cost and sustainability goals—simultaneously. A few examples illustrate the potential.

Manufacturing: Optimizing process control and product formulation
The production of basic materials, such as steel and cement, is a major contributor to global greenhouse-gas emissions. Although full decarbonization is likely to require investments in new production technologies, companies in these industries are pursuing a range of strategies to reduce the climate impact of their production processes.

Some players have found that they can make significant improvements to the environmental profile of their products with only modest capital investments. In primary steel production, for example, optimizing the control of blast furnaces with better sensors and improved analytics can reduce coal consumption by 10 to 15 percent.

Inexpensive, strong, and versatile, concrete has long been the world's favorite construction material. One of its key ingredients, cement, is also a major source of greenhouse gasses. The 4.1 billion metric tons of cement produced in 2019 generated around 2.7 billion tons of carbon, constituting seven percent of global carbon emissions. Most of those emissions are generated in the production of clinker, the main ingredient of Portland cement.

With tight control over material properties and production processes, some construction

companies and suppliers of concrete products have been able to reduce their consumption of clinker by 10 percent or more, substituting materials such as fly ash, a waste product from coal-burning power stations.

In the right conditions, asphalt—a mixture of bitumen and aggregate used in road building—can be removed from worn out roads and recycled. By carefully managing material and process properties, some asphalt companies have been able to increase the fraction of recycled materials in their products to as much as 20 percent while still meeting customers' performance requirements. Used asphalt is usually free—some municipalities will even pay for its removal—so recycling also leads to a significant reduction in material cost for asphalt producers.

Consumer goods: Optimizing packaging through the supply chain

Public awareness of packaging-waste leakage, especially from plastic waste, into the environment has increased significantly over the past 12 to 24 months. Yet recycling rates for plastic packaging are relatively low. In the United States, for example, recovery rates for packaging and food-service plastics account for only about 28 percent of the total waste.

At one major quick-service food player, the manufacture, distribution, and retail sale of sandwiches alone created more than 900 metric tons of non-food waste every year. While some of that waste was generated at the point of consumption, much of it was produced upstream, as sandwiches were placed in multiple types of packaging as they travelled through the supply chain.

To address this issue, the company redesigned its packaging, developing a single, sustainable solution that could protect the product through the end-to-end supply chain. The change cut overall packaging costs significantly and eliminated 160 tons of waste every year.

Logistics: Reducing shipping costs and greenhouse-gas emissions

The transportation sector is the world's largest single source of greenhouse-gas emissions. In the US, it accounts for around 30 percent of total carbon emissions, with freight transport making up more than 40 percent of that total. Optimizing logistics helps companies reduce costs and emissions in tandem. That means using fewer trucks, ships, and aircraft to move their products—and planning supply chains so those transport assets cover fewer miles.

One company used telematics technology to monitor the movement of its large road-vehicle fleet, then applied advanced analytics to that data to optimize routes and vehicle utilization. The project led to an annual reduction in road miles of around 20 percent, cutting carbon emissions by 1,300 metric tons. Secondary benefits included a meaningful reduction in road accidents and lower insurance premiums.

Procurement: Buying into a smaller carbon footprint

Sophisticated purchasing practices can help companies control their external costs and minimize their impact on the environment. In road building, for example, asphalt prices can vary significantly according to local market dynamics. One road builder had traditionally purchased asphalt based on price per ton alone, which often meant product was transported long distances from the producer to the point of use. When the company adopted a total-cost-of-ownership approach to sourcing, including logistics costs in its calculations, it found that local producers were usually a better value. The change cut shipping and associated carbon emissions by 40 percent.

———————

High-performing operations can deliver much more than just financial impact. Maximizing the output a business achieves for every unit of input is better for the environment as well as the

income statement. While reductions in resource consumption and waste were once just a useful side effect of operational-improvement programs, many organizations are incorporating sustainability targets into their plans from the outset. In challenging times, that approach offers a rapid route to a next normal that can be sustainable both financially and environmentally.

Curt Mueller is a senior partner in McKinsey's Chicago office, where **Steve Seber** is a consultant; **Jeff Shulman** is a senior partner in the Dallas office; **Kimberly Stove**r is an associate partner in the Detroit office.