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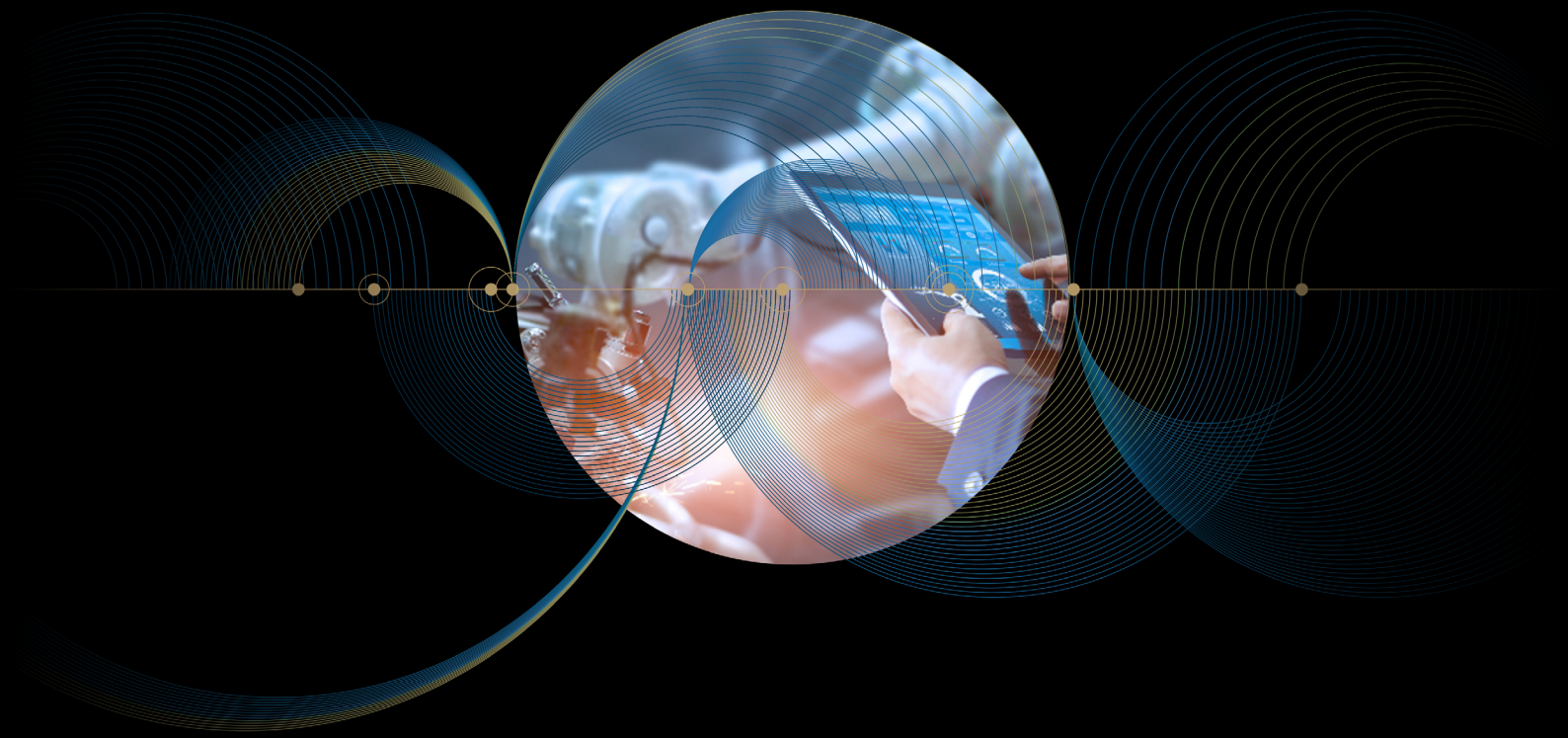


Forging the factory of the future

In considering ways to reap the rewards of sustainability within the manufacturing sector, another critical focal area is on the factory floor. This often begins with automation and integration.

In recent years, manufacturers have implemented lean processes as well as digital capabilities to boost productivity, create safer workplaces, and reduce costs. By providing manufacturers integrated and complimentary capabilities, they can gain greater visibility into their production processes, equipment wear-and-tear, and energy usage. These capabilities can empower organizations to optimize production, improve predictive maintenance, and minimize material waste.

Alternative energy options

Currently, manufacturing processes use roughly one-quarter of the energy in the United States and one-third of the world's energy.[23] Even in lower-intensity sectors, energy often represents a significant cost—which only stands to rise as global energy prices increase. By reducing waste and water usage, adjusting energy loads, lowering heating requirements, and even embracing carbon-neutral manufacturing, the factories of the future have the potential to drive measurable sustainability outcomes as well as reduced costs. This is particularly salient given that these energy efficiency improvements are increasingly mandated by licensing authorities at the outset or review of operations.

One approach for making this happen may be by increasing reliance on the increasingly competitive renewable energy sources. Through power purchasing agreements (PPAs), manufacturers can lock in fixed prices for the supply of renewable energy, sometimes for as long as 15 or 20 years.[24]

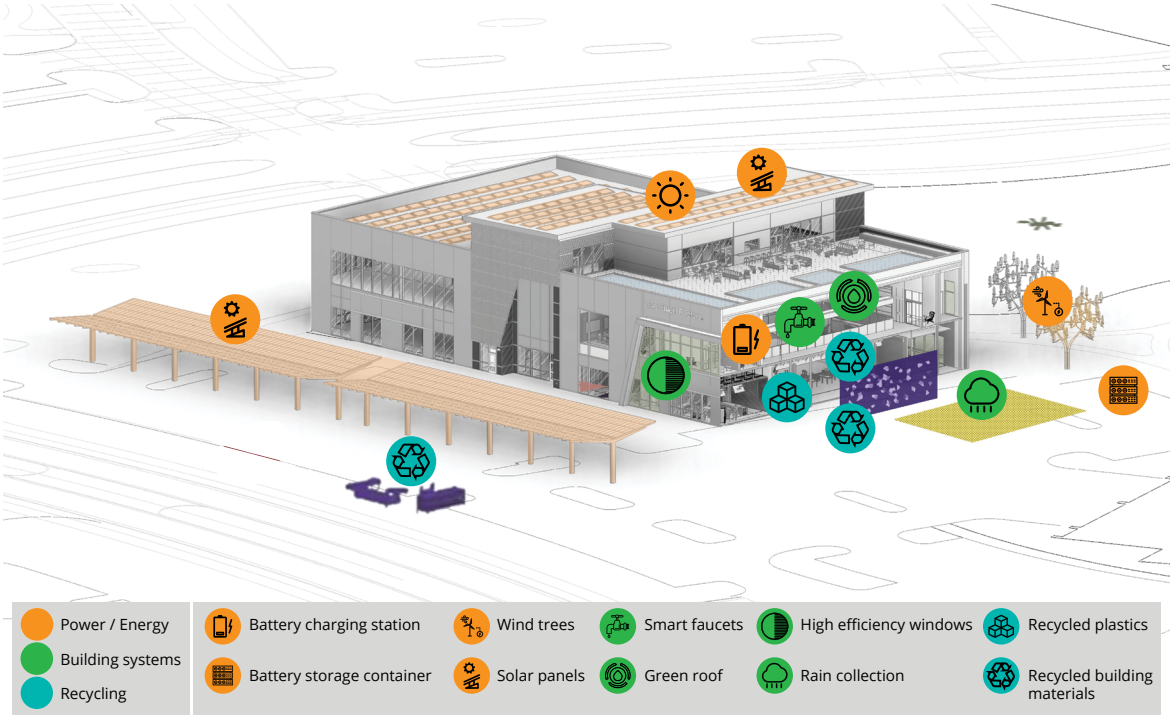
Several manufacturers with large campuses have even begun investing in on-site generation, using solar panels, wind turbines, and geothermal pumps to power their own facilities. Given the upfront costs associated with renewable energy generation, however, governmental incentives will likely be required before this approach gains widespread traction.

The Smart Factory @ Wichita

One of the best ways to understand the benefits conferred by the factory of the future is through personal experience. As an example, Deloitte is currently building a net-zero building called The Smart Factory @ Wichita, which was created to bring to life leading practices and real-world proof points to show manufacturers the art of the possible. The building is 60,000 square feet—with the manufacturing site comprising roughly one-third of that space. This allows the smart factory to generate sufficient energy on-site to power operations. It does so using a range of best-of-breed technology from around the world—including solar panels on the roof and carports, next-generation wind trees, and lithium-ion (Li-ion) battery stacks to achieve utility-grade storage. Microgrid control units monitor energy flows to ensure consistent loads, relying on advanced analytics to improve demand management. Excess power is also stored for later use. While the site features a generator to meet peak loads, the ability to store dense, renewable energy in-situ allows for the creation of a sustainable smart grid and supports the net-zero vision for the factory of the future (see figure 3).

The Smart Factory @ Wichita also brings together a wide range of leading vendors, who are collaborating to deliver technological interoperability. The aim is to build a sustainability ecosystem that allows the smart factory to integrate multiple technology platforms—whether manufacturers choose to build a greenfield factory or, the more-likely scenario, retrofit a brownfield site. Manufacturers who visit the site will have the opportunity to explore various use cases to see some of the benefits of a smart factory in action. Also, to further enhance sustainability, The Smart Factory @ Wichita is working towards becoming a zero-waste facility.

Figure 3: The Smart Factory @ Wichita sustainability overview | Key net-zero components



Source: The Smart Factory @ Wichita

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