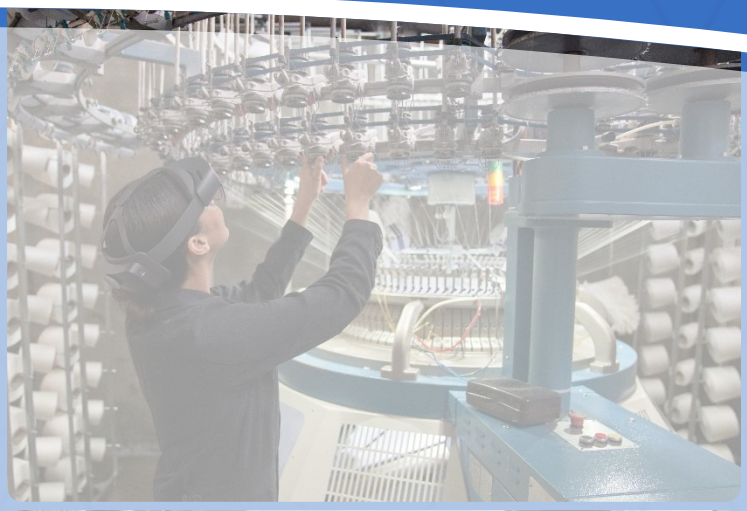
Microsoft

# Profitable Sustainability in Manufacturing



# Executive summary

Manufacturing executives today are confronted with seemingly competing expectations to meet financial, sustainability, and regulatory targets. These goals do not have to compete. Pursuing sustainability goals can cut costs, drive innovation and top-line growth, while meeting increasingly stringent regulatory requirements. Technology supports these joint objectives by capturing and unifying data, deploying workloads to the cloud where most efficient, providing accurate reporting, and revealing actionable business insights. This paper outlines waypoints on this journey and next steps to pursue for manufacturing organizations of any size and specialty.

# Pressures: Cost, Sustainability, and Regulation

Investors are asking organizations to achieve more ambitious sustainability targets. This is evident not only from specialty Environmental, Social, and Governance (ESG) funds, but also by the pressure institutional investors such as Blackrock are applying toward greater sustainability focus and reporting.[1] Allianz Global Investors puts a fine point on the matter: "Disclosure is often where companies fall down; they might be doing good things, but as an investor, if they're not reporting on it, it's hard to take a view."[2] And when we broaden the aperture to include ESG altogether, more than 90% of S&P 500 have published some kind of ESG report.[3]

**73%**

Of investors who say a company's stance on sustainability influences their investment decisions.[4]

At the same time, organizations are under more pressure than ever to achieve financial targets in the context of significant economic headwinds. These include demand fluctuations, rising capital cost, inflation, and a Producer Price Index up more than 8% in the last year. Manufacturing executives are responsible for controlling these costs – and 71% of CFOs said in a recent survey they are expected to help drive top-line growth as well.[5]

**220-240%**

Internal Rate of Return when manufacturing enterprises adopt sustainability programs (Microsoft Research)

In addition, Manufacturing executives must meet new and evolving regulations. The US Securities and Exchange Commission for example will starting auditing climate metrics and disclosures from companies' financial statements starting in 2024.[6] Led by California, individual states have begun adopting their own emissions standards that are more stringent than federal regulations – and more likely to change rapidly in response to local pressures.[7] To comply with such regulations, organizations must have access to sustainability data, standardized to enable appropriate reporting.

Increasingly, governments are offering new incentives to adopt sustainability practices. The Inflation Reduction Act of 2022 for example authorizes $391 billion in spending on energy and climate change initiatives.

Resources:

[1] https://blogs.worldbank.org/psd/global-investors-shift-focus-sustainability-amid-push-green-recovery

[2] Why investors are putting sustainability at the top of the agenda | EY - Global

[3] ESG: Investors Increasingly Seek Accountability and Outcomes (harvard.edu)

[4] ESG: Investors Increasingly Seek Accountability and Outcomes (harvard.edu)

[5] https://the-cfo.io/2017/05/19/increasing-pressure-on-cfos-putting-businesses-at-risk

[6] SEC's Climate Disclosure Rules: GHG Emissions Disclosure Requirements (harvard.edu)

[7] 17 States Consider Adopting California Emissions Standards (nationworldnews.com)

# Net Income, meet Sustainability

Despite business leaders' occasional reluctance to prioritize sustainability initiatives, the economic case for sustainability is compelling. Sustainable transformation lowers operating costs, unlocks innovation, and positions organizations for the future.[8] In other words, the pursuit of profit and the pursuit of sustainability goals go hand-in-hand.

**20%+**

Margin improvement from "sustainable DNA"[9]

The biggest driver of sustainability efforts in business are the tangible financial opportunities they enable. Accenture estimates that activating an organization's 'sustainable DNA' by adopting sustainable practices, systems, and processes can increase profits by more than 20%.[9]

The economic opportunities offered by sustainability in manufacturing include cost savings through resource efficiency and new revenue streams created, for example, through connected products. Monitoring is vital both to quantify these gains and to meet regulatory requirements.

**Efficiency.** More than a third of the US' energy is consumed by manufacturing.[10] Energy is a top-3 operating expense for most manufacturers, looking across the consumption of electricity in buildings, direct use of energy in operations, and vehicle fuel. About 40% of carbon emissions can be linked to buildings, meaning that facilities are often the right place to start identifying potential savings.[11] The Environmental Protection Agency estimates that manufacturing facilities with ENERGY STAR certifications have saved more than $7 billion on energy bills compared to average facilities since 2006.[12] Microsoft has reduced energy consumption in its buildings by 20% through smart technologies which are also commercially available.[13]

Computer modeling and advanced simulation reduce costs and mitigate risk in a variety of areas. Vestas Wind Systems, for example, employed machine learning and Microsoft Azure high-performance computing to mitigate the negative impact of its turbines' wakes, while generating more wind energy in the process.[14] IoT technology helps measure and monitor energy usage, while modeling and simulation optimize the use of these resources. Together, these technologies help manufacturers compensate for fluctuating fuel and electricity prices, mitigate energy waste by turning off idle assets, and make capex decisions about whether to build or buy energy assets. Process simulation helps reduce waste while driving the efficient use of scarce materials. Finally, adopting an agile approach to the product supply chain enables organizations to source key materials from the most efficient suppliers.

On the plant floor, organizations harness operational data and employ digital twins to cut costs, improve productivity, and increase operational visibility. Mercedes Benz is collaborating with Microsoft to transform its manufacturing processes. Operators can now create a virtual replica of the entire manufacturing process from start to finish. This allows them to visualize potential bottlenecks while increasing operational efficiency and reducing wasteful energy consumption. Through this innovation, Mercedes Benz anticipates improving vehicle

[8] Sustainable transformation | Deloitte Insights
[9] Sustainability and profitability can co-exist. Here's how | World Economic Forum (weforum.org)
[9] Sustainability and profitability can co-exist. Here's how | World Economic Forum (weforum.org)
[10] Use of energy in industry - U.S. Energy Information Administration (EIA)
[11] Built Environment - World Business Council for Sustainable Development (WBCSD)
[12] https://www.epa.gov/newsreleases/epa-announces-most-energy-efficient-manufacturing-plants-2021
[13] https://corporateecoforum.com/buildings-talk-story-microsofts-energy-smart-buildings-initiative/
[14] https://customers.microsoft.com/en-us/story/1430379358742351454-vestas-energy-azure-hpc

production efficiency by 20% by 2025, and one facility reports a being able to reduce its daily shop floor meeting by 30%.[15]

**New Revenue Streams.** We've seen how manufacturing firms achieve efficiency gains through sustainability initiatives. Sustainability also plays a key role in driving innovation and top-line growth. The pace of innovation in manufacturing has increased rapidly, as indicated by the 150% rise in patent filings the last two decades.[16] Underlying this growth are transformations both in manufacturing processes and in materials.

Water and hygiene pioneer Ecolab partnered with Microsoft to create a seamless solution for collecting, analyzing, and sharing information across multiple of its locations worldwide. These innovations drove efficiency gains through machine learning insights and analytics and new value to its customers through consumption monitoring tools. These advances helped Ecolab's bottom line and progress toward it's net-zero water usage goal.[17]

Global ingredient solutions provider Ingredion looked to Microsoft for its own ambitious All Life 2030 sustainability plan. As is often the case, the first step in this partnership required standardizing disparate data across 70 global facilities and offices, then creating signals for more effective decision-making. The Microsoft Cloud for Sustainability gives Ingredion the tools it needs for this transformation, and in so doing creates value by offering customers the sustainability data they're asking for.[18]

**Monitoring.** Adjusting production processes and tweaking supply chains require enterprises to understand their operations and the potential impact of change. Many organizations do not have access to the data required to measure the impact of these changes to their operations, cost structure, or sustainability outcomes. Unlocking operational data unlocks cost savings, drives innovation, and ensures regulatory compliance. In fact, Forrester has found that 73% of manufacturing firms now see data and analytics as key strategic enablers for their business.[19] The question for most manufacturers is then where to begin.

# Start with Data

The first step in any enterprise's sustainability journey is to gather the data needed to guide business and operations decisions. This often starts on the factory floor with connected OEM equipment and sensors. Improving the quality of these data and capacity to store and process them at scale then helps organizations identify opportunities to adopt sustainable approaches while enabling process efficiency and product innovation.

Transitioning these workloads to the cloud reduces costs, increases visibility, and improves sustainability outcomes. Nowhere is this dual-efficiency more apparent than in Microsoft's own datacenters, where an investment in sustainable energy sources makes them more carbon efficient than traditional datacenters, lowering both the costs and impact on the earth.[20] One example of where to begin is with the Microsoft Cloud for Sustainability, which improves data intelligence to drive better reporting and business insights. The Microsoft Sustainability Manager unifies data intelligence and allows organizations to record, report, and reduce emissions across the enterprise more easily and effectively. Manufacturing organizations use tools like these to reduce emissions and waste, and to centralize reporting to meet regulatory requirements. This empowers the C-suite to embed sustainability into the operations and culture alike.

[15] https://news.microsoft.com/2022/10/12/mercedes-benz-and-microsoft-collaborate-to-boost-efficiency-resilience-and-sustainability-in-car-production/
[16] U.S. Patent Activity, CY 1790 to Present (uspto.gov)
[17] https://news.microsoft.com/transform/sustainable-water-supply-smart-manufacturing-fuel-ongoing-partnership-ecolab-microsoft/
[18] Microsoft Customer Story-Ingredion aims to make the world a better place for all using powerful sustainability data
[19] How to master manufacturing's data and analytics revolution | World Economic Forum (weforum.org)
[20] The Art of Microsoft Worldwide Datacenter Technology – Microsoft News Center Hong Kong

# What to do next

Wherever your organization is in its sustainability transformation, Microsoft and our partners can help. Contact your Microsoft representative to take the next step.

Take a deeper dive into these resources to learn more:

- Sign up to stay informed, at aka.ms/sus-stay-informed
- Learn more at microsoft.com/sustainability
- Try out Microsoft Sustainability Manager with a free trial at aka.ms/MSMTrial
- Learn more about our Manufacturing cloud solutions
- Azure Sustainability Customer Stories
- Microsoft Cloud for Sustainability
- Microsoft Sustainability Calculator