INDUSTRIAL SUSTAINABILITY:

MOVING SUSTAINABILITY FORWARD IN MANUFACTURING

OMDIA

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CONTENTS

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SUMMARY

The focus on environmental, social, and governance (ESG) initiatives is at an all-time high, with concerns around environmental sustainability at the forefront. Social media and political and stakeholder (both shareholder and employee) activism have intensified this focus. In response, leading industrial companies (the top 50 excluding energy and oil and gas companies) have made commitments and pledges to develop a more sustainable business:

57% of these companies have carbon-neutral targets to completely offset their greenhouse gas (GHG) emissions.

47% have RE100 pledges to get 100% of their energy from renewable sources.

36% have science-based targets with the aim of reducing their GHG emissions to limit warming to 1.5–2°C above preindustrial temperatures.

Recommendations

COMMIT TO SUSTAINABILITY

Manufacturing companies know that sustainability matters. They need to commit to the process and set specific targets to measure success. These targets should be integrated across business functions and owned at all levels of the business. These commitments should consider the short and the long-term: identifying quick wins, and the more challenging projects, and prioritize investment with long term goals and commitments in mind.

SUPPORT WITH TECHNOLOGY

Sustainability solutions need to be built on technology. Legacy assets will not be able to provide enough data to support the efficiency improvements needed.

HAVE A DATA-LED APPROACH

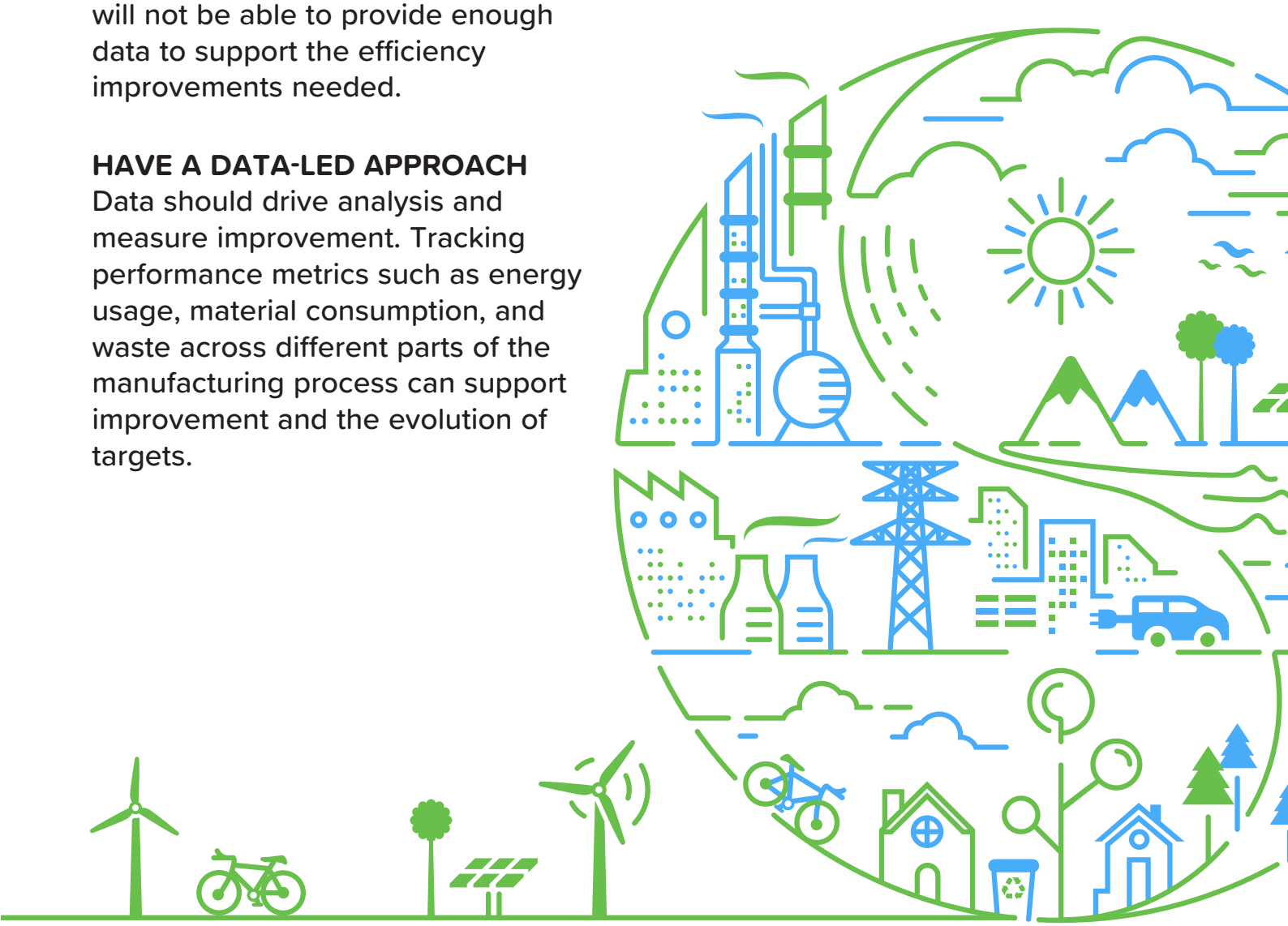
Data should drive analysis and measure improvement. Tracking performance metrics such as energy usage, material consumption, and waste across different parts of the manufacturing process can support improvement and the evolution of targets.

PARTNERSHIPS ARE IMPORTANT

Manufacturing companies need to hold their ecosystem partners to the same sustainability standards that they have set. Internally, colleague buy-in is important across the company.

SELL THE VISION

Sustainability is more than just return on investment. Positioning the return on value to the company is also an important approach. Successful sustainability projects can have a positive impact on brand management, insurance costs, and colleague morale.



INTRODUCTION

The industrial sector contributed approximately one-third of the 35 billion metric tons of carbon dioxide emitted in 2020. Industrial market engagement is going to be crucial to meet the climate change targets being set by governments around the world. However, challenges extend beyond just the industry's carbon footprint, with concerns around raw material depletion, harmful emissions, pollution, and water consumption.

35 billion metric tons of carbon dioxide emitted in 2020

These challenges will drive demand for more resource-efficient processes, the introduction and extension of solutions such as energy and water management, and supply chain solutions that support recycling and circular economy initiatives. Sustainability is a growing business concern that requires a review of existing processes, equipment, and organizational culture and technology to identify and tackle inefficiencies and waste and integrate sustainability at the core of a companies' decision-making process.

To better understand the current state of industrial sustainability, Omdia conducted a survey of industrial end users. Respondents provided feedback on a range of topics including their company's sustainability priorities, current sustainability initiatives, key challenges, and the project champions promoting sustainability within their organization.

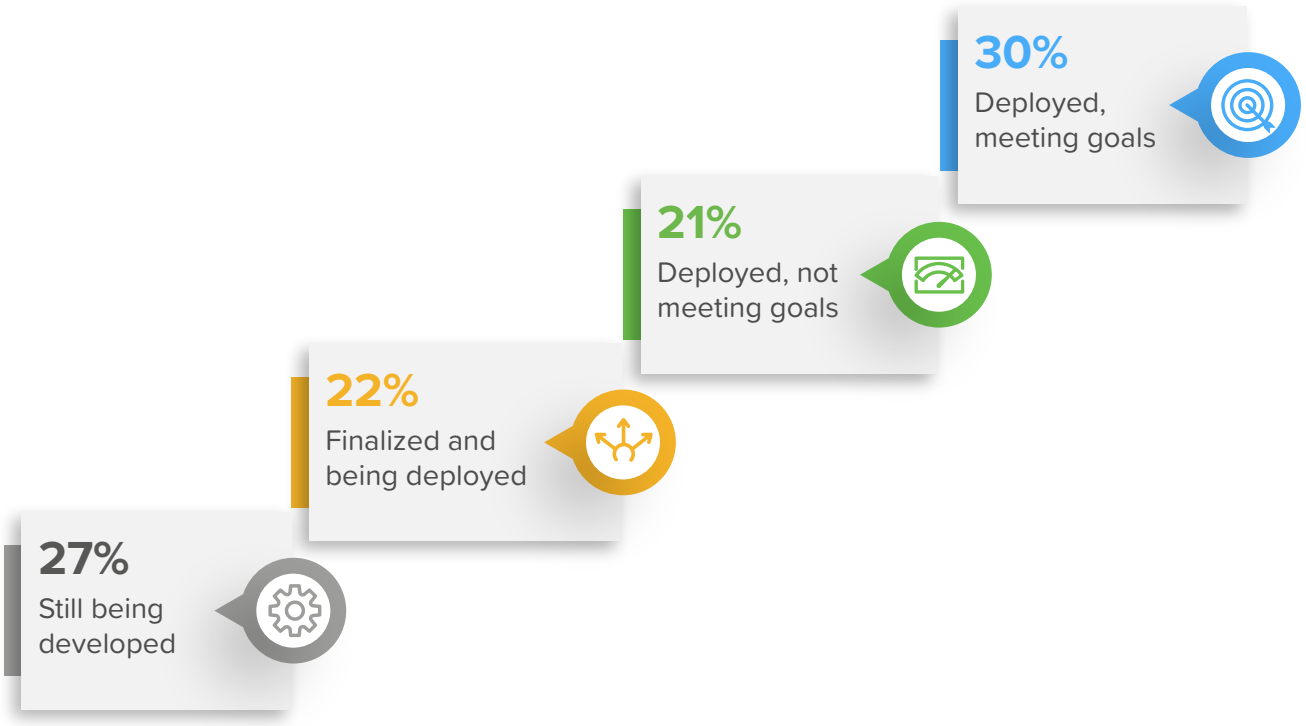
DRIVERS AND CHALLENGES

MATURITY LEVEL OF SUSTAINABILITY INITIATIVES IS LOW

The idea of sustainable development was first introduced in 1987. In the years following there have been varying levels of interest from governments and industrial corporations. The focus on sustainability really accelerated only after the formation of the Paris Climate Accords in 2015.

Although sustainability has been a topic of discussion for more than three decades, most of the manufacturing end users surveyed said their organization is still at an early stage of the deployment cycle of its sustainability program. In fact, 48% of the companies were yet to fully deploy their sustainability initiatives, with 27% still developing the program of initiatives.

FIGURE 1: MATURITY OF INDUSTRIAL COMPANIES' SUSTAINABILITY INITIATIVES



Source: Omdia

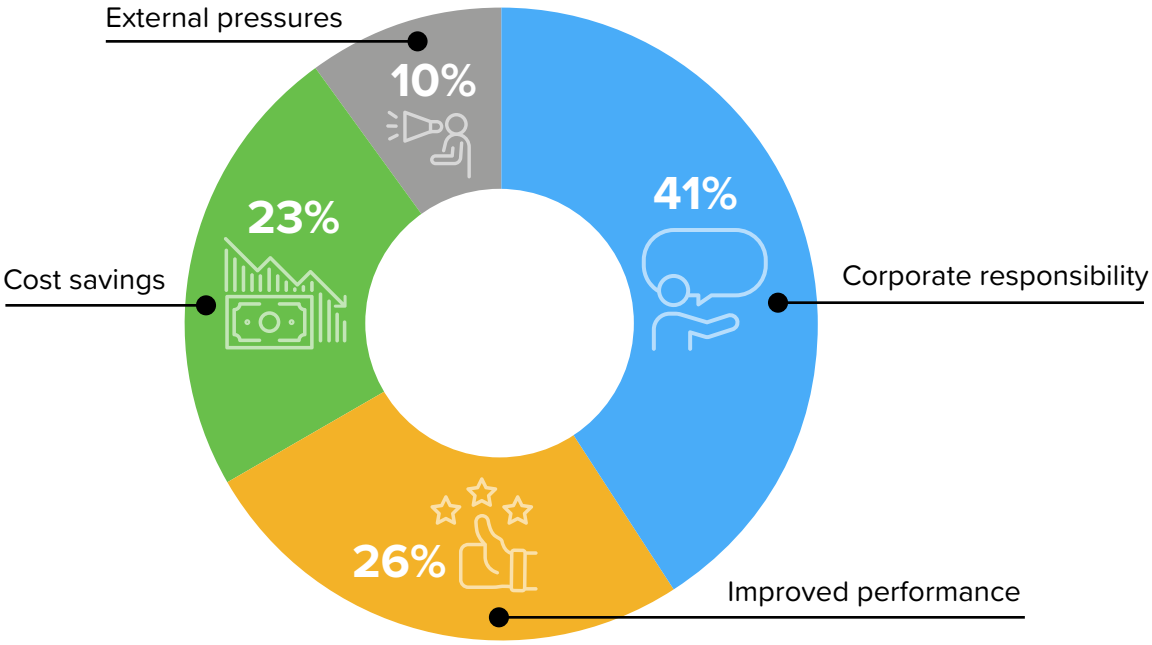
Even among the companies that had already deployed sustainability initiatives, there were many small or siloed projects rather than comprehensive corporate initiatives. The road to sustainable operations is not straightforward and investments should be made with the acceptance of necessary short-term pain and cost of initiatives for long term success. Beyond the challenge of balancing corporate responsibility and profitability, identifying and measuring value from these projects is not guaranteed. Of the companies that were already deploying sustainability projects, 42% stated that they were not meeting the company's goals.

CORPORATE RESPONSIBILITY

Corporate responsibility is an important consideration when the industrial sector's investment motivation is being assessed. Two out of five respondents stated that it was the primary investment motivator for their sustainability initiatives.

Investments in sustainability can span several applications and cross over into different business functions. Initially, individual projects may be defined by specific job roles with limited project expectations. However, as these initiatives increase in impact, corporate responsibility will become the primary driver, supporting internal decision-making sign-off and acting as an enabler of sustainability projects. Cost versus value will vary significantly by industry sector. Some industries will see direct financial benefits and clear return on investment from projects. In other industries or applications, the financial justification will be more challenging.

FIGURE 2: WHICH BEST REFLECTS WHY INVESTMENT IS BEING MADE IN SUSTAINABILITY INITIATIVES?



Note: n=262
Source: Omdia

Survey respondents were further asked to rank the top five factors influencing their organization's decision to invest in operational sustainability initiatives. The most common response, with more than half of all respondents identifying it, was reducing energy consumption. Energy costs are a critical consideration for manufacturing companies, especially in intensive industries such as chemicals, refining, pulp, and paper. Other factors included waste management, recycling, and renewables.

RECYCLING

Companies are considering how material can be recycled or remanufactured for reuse at the end of a product's lifespan. A significant area of focus is on the recycling of plastics, where only an estimated 9% of material is recycled. Some chemical companies are partnering with (or have acquired) plastic-recycling businesses. Consumer packaged goods (CPG) firms are increasingly using recycled materials and biodegradable plastics in packaging.

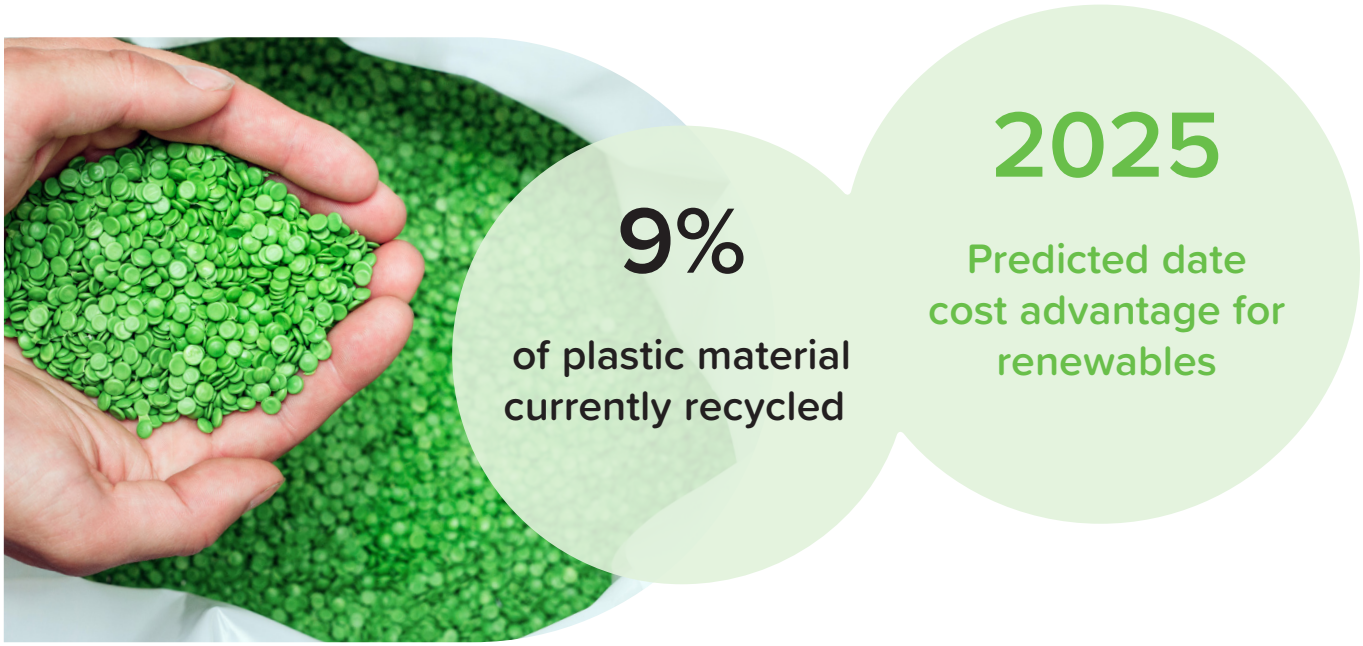
CIRCULAR ECONOMY

Companies are also reviewing how products are designed to support a circular economy where products can be remanufactured. For example, all-in-one printers are now designed so they can be remanufactured seven or eight times before the end of their life. The introduction of circular concepts requires greater transparency in the supply chain too. Fewer than a fifth of companies surveyed had implemented solutions here, though almost three-quarters recognized the value.

RENEWABLES

Another common sustainability initiative is the introduction of technologies that generate electricity from renewable sources such as solar and wind. There has been dramatic progress in installation volumes and capex and opex costs. The levelized cost of electricity from renewable sources has dropped enough to become comparable with that of electricity generated in more conventional ways. The International Energy Agency (IEA) predicts renewables to have a cost advantage by 2025. Integrating renewable energy will likely be on the sustainability roadmap of many industrial organizations.

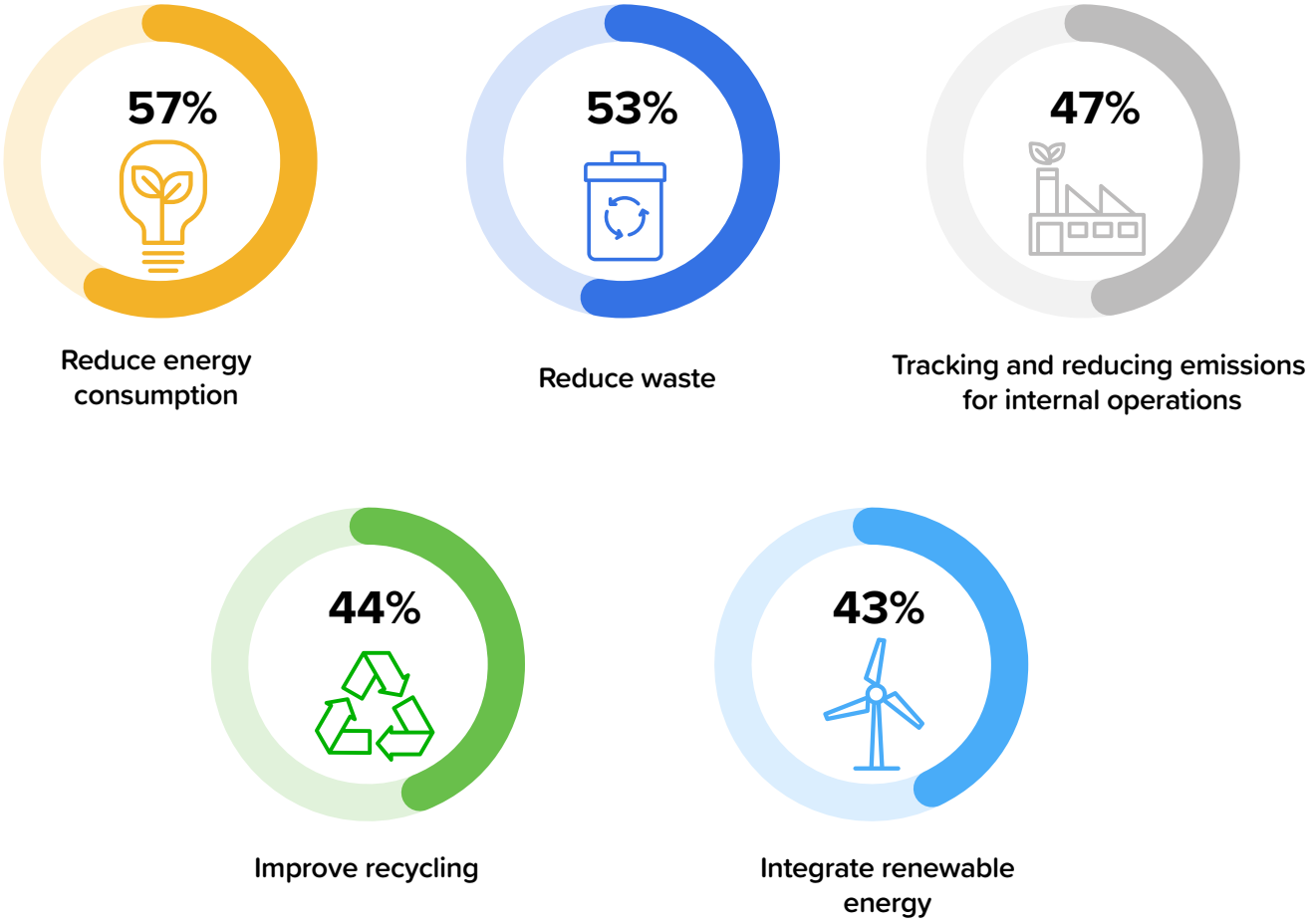
FIGURE 3: ONLY AN ESTIMATED 9% OF PLASTIC MATERIAL IS RECYCLED



Source: Omdia

Underpinning each of the sustainability initiatives identified is the ability to accurately track and report the environmental footprint of an organization. Committing to climate pledges is important, but you must be able to measure your progress. Companies must invest in improved sensing and visualization tools. Many of the leading industrial companies have already made climate change pledges that necessitate the capture of this data.

FIGURE 4: FIVE DRIVERS OF OPERATIONAL SUSTAINABILITY INVESTMENTS



Source: Omdia

There is also a need to consider the external emissions that are part of the supply chain. Referred to as scope three emissions, they often account for the larger part of a business's carbon footprint. These include transportation and distribution, the actual use of a product, and the end-of-life process. Currently, many organizations do not track these emissions, because tracking them requires transparency and a good flow of data across the supply chain. While quantifying these emissions is not required (as is currently the case for carbon-neutral pledges), there will be more demand to address this sizable concern in future.

Barriers to sustainability initiatives

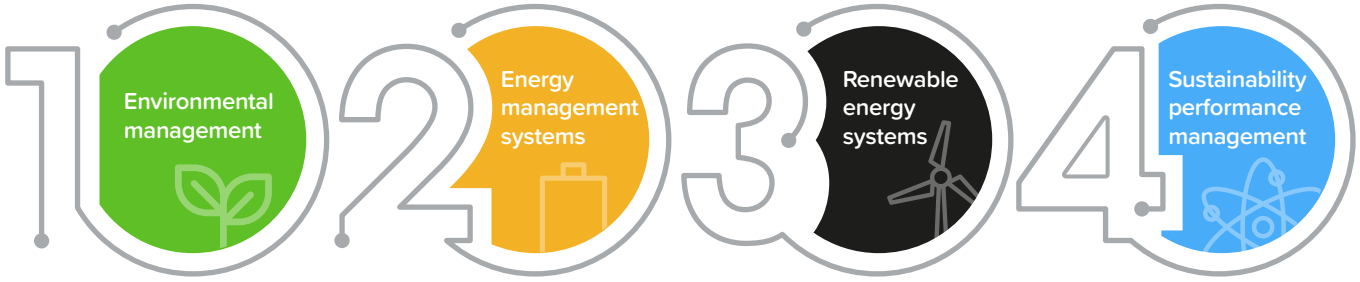
There are barriers to the deployment and success of sustainability projects. Survey respondents were asked to characterize a range of market challenges to investing in sustainability initiatives. End-users identified the following major challenges, which represent a key roadblock to deployment:

- Twenty-nine percent of respondents said legacy assets and infrastructure were a major challenge. Industrial companies often measure infrastructure replacement rates in decades, and the process is expensive and disruptive. Installed systems may not be well suited to sustainability initiatives.
- Upfront cost or budget was identified as a key roadblock by 27% of respondents. A further 47% said that this was a challenge but one that could be overcome.
- Competing priorities and a lack of access to the right data were chosen by 23% and 21% of respondents respectively. In some industries, sustainability investments can directly benefit the bottom line through reductions in energy consumption or improvements in process efficiency. This is not the case for all industry sectors, especially the less resource-intensive ones. Here, external influences, such as taxes and subsidies, may be necessary to support sustainability.
- Culture change was ranked as a major challenge by 19% of respondents. Sustainability is increasingly a C-suite initiative. Seventy-eight percent of respondents said that a C-level role is directly responsible for driving their sustainability efforts, and some companies are creating a chief sustainability officer (CSO) role to support this evolution. Beyond these executive-level positions, the success of initiatives will depend on how well the technologies and solutions can be introduced into daily operations and longer-term strategy plans.
- The lack of an identified benefit was stated as a major challenge in only 10% of responses, suggesting that most end users can articulate the benefit of sustainability projects internally. When considering the advantage of investment company's should consider return on value (ROV) rather than return on investment (ROI). With industrial sustainability projects still relatively new in many cases, the benefits that can be realised by the business will continue to evolve over time and will extend beyond direct returns to intangibles such as brand management, adherence to future legislations, insurance costs etc.

SOLUTIONS AND TECHNOLOGIES

Manufacturing companies are investing in a range of solutions that support improved sustainability either directly or indirectly. Environmental management projects were identified by more than half of respondents as projects they were working on now. Energy management and renewable energy systems are predicted to be deployed by more than 50% of respondents within three years.

FIGURE 5: WHICH SUSTAINABLE TECHNOLOGY PROJECTS WILL YOUR COMPANY WORK ON WITHIN THREE YEARS?



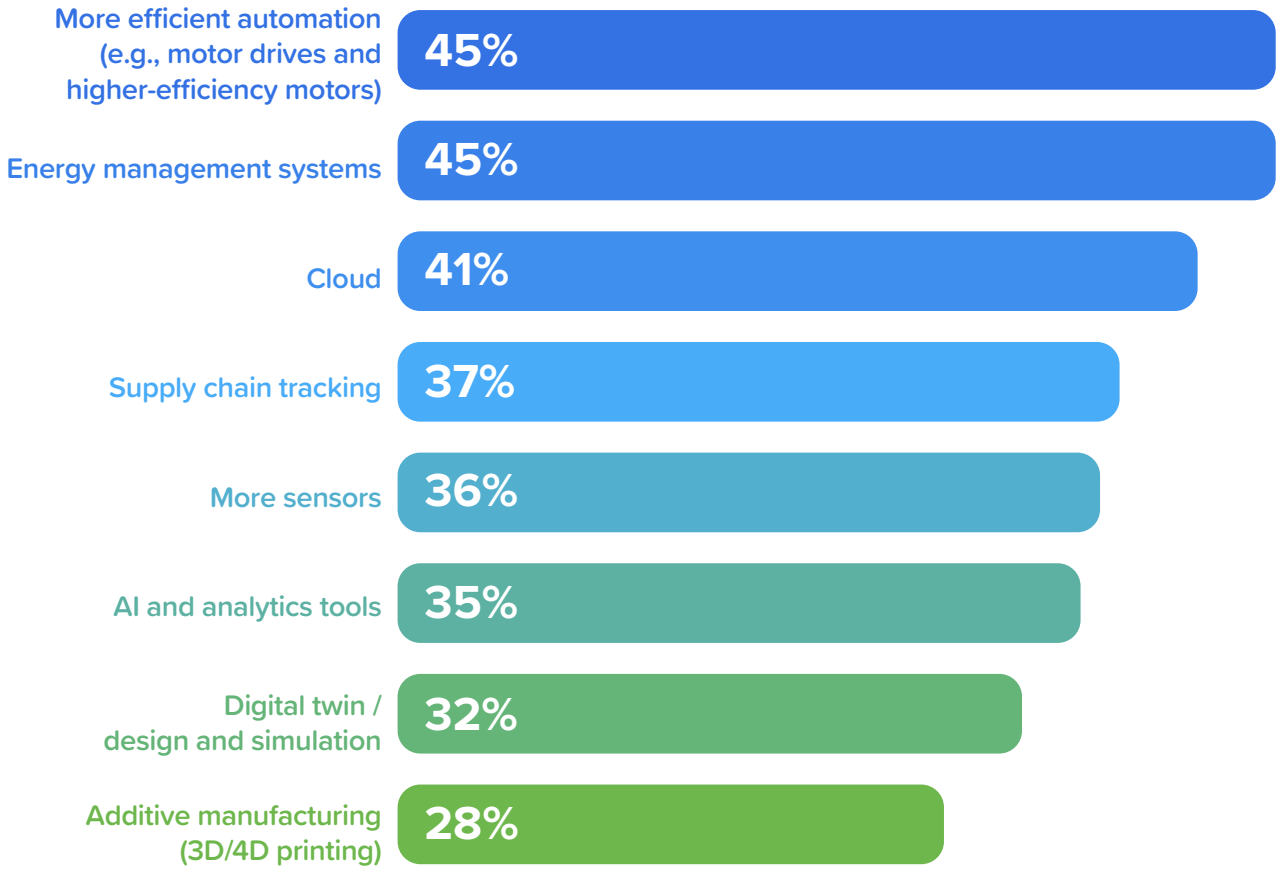
Source: Omdia

It can be difficult to manage solutions across departments because there is often no digital thread across the organization. This limits the ability to analyze relevant data. Each energy management, asset health monitoring, and supply chain management (SCM) solution system is likely to sit in a different department with limited interaction between them. An ability to view these different datasets from one perspective can help in optimizing decision-making and understanding how to prioritize investments in sustainability projects:

- **Environmental management systems (EMS) can support some of these activities.** The development of industry standards also provides companies with guidance on developing solutions around environmental management (e.g., ISO 14001). Almost half of all respondents selected EMS as likely to have the biggest impact on sustainability.
- **Improving and upgrading existing inefficient equipment is another important approach.** Forty-five percent of all respondents recognized the potential impact of more efficient automation. Legacy assets can be a challenge to more efficient automation and require a strategic approach to upgrades.
- **The cloud was also identified as a technology that will have an impact on sustainability initiatives.** The ability to bring data together from edge locations onto a central platform could have significant benefits in terms of optimization and project management.

The range of solutions and technologies that will be used in sustainability projects is broad and includes more sensing, IIoT, artificial intelligence and digital twin, and software tools such as EMS and SCM software. Analytics can range from basic identification of threshold limits through to machine learning and deep learning algorithms used on a combination of different datasets. Digital twins can be used to represent a design or setup and simulate it under varying conditions of operation to test different approaches. Many of these solutions are still emerging in the manufacturing sector. That said, some companies have already introduced them and directly (or indirectly) addressed issues to become a more sustainable business.

FIGURE 6: WHICH TECHNOLOGIES WILL HAVE THE BIGGEST IMPACT ON YOUR SUSTAINABILITY INITIATIVES?



Note: n=262
Source: Omdia

The ability to monitor and measure these technologies will be key to a company's efforts to reduce its environmental impact. Additional sensing combined with connectivity and data visualization tools will be important to improve process efficiency. It will also be important to better understand the asset base of a manufacturing company.

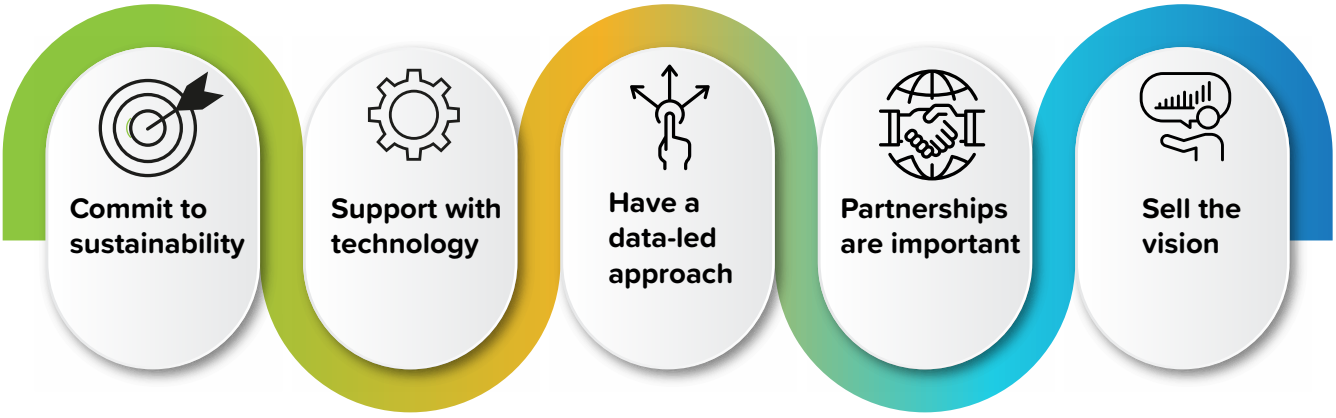
CONCLUSIONS

The industrial sector, with its material and energy consumption, production of emissions, and other waste, contributes to a significant environmental footprint. The industry has a responsibility to help meet the world's environmental and sustainability challenges. However, it is very much at the start of this sustainability journey.

Change will require a review of existing processes, equipment, organizational culture, and technology to identify and tackle inefficiencies and waste. In addition to the shift to renewable energy, technology will be a key enabler of the sustainability transition. This could range from basic approaches, such as replacing inefficient motors, through to the application of digital twin and artificial intelligence to redesign products, enabling them to work in a circular economy.

Data will be at the heart of this change, with the introduction of tools and dashboards to view the carbon footprint of individual assets, processes, and facilities. Extending visibility across a company's supply chain will also become necessary as companies are increasingly held to account for the emissions and environmental footprint of their partners and suppliers.

As outlined in the ***Summary***, there are several recommendations for the industrial sector to support efforts to become more sustainable:



APPENDIX

Methodology

SURVEY DEMOGRAPHICS

- Omdia surveyed 262 end-user respondents.
- Respondents represented companies headquartered in North America (40%); Europe, Middle East & Africa (39%), and Asia (21%).
- Respondents represented a range of company sizes from $500m to $1bn in revenue (27%) to over $5bn (34%). Thirty-nine percent of respondents were from companies with revenue of between $1bn and $5bn.
- Survey respondents worked for industrial companies active in automotive, chemicals, food and beverage, life sciences, semiconductors and electronics, and oil and gas.
- Job roles included CIO / IT director / IT manager (36% of respondents), operations (17%), CTO / technical director (15%), and engineering (11%).

The white paper presents some of the key findings from the end-user survey. Its purpose is to help industrial companies that are beginning their sustainability journey and the vendors supporting these initiatives to better understand the current state of the market and how best to navigate the opportunities and challenges that industrial sustainability will bring.

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We create business advantage for our customers by providing actionable insight to support business planning, product development, and go-to-market initiatives.

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We hope that this analysis will help you make informed and imaginative business decisions. If you have further requirements, Omdia's consulting team may be able to help your company identify future trends and opportunities.

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