Microsoft

The Next Generation of **Sustainability** Leadership

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Executive summary

At its most simple definition, leadership is the power to influence change. The diverse and multifaceted approach to drive innovation and improvements required in the dynamically changing world of sustainability will require exceptionally skilled leaders. This report guides leaders who are seeking to embed sustainability across the business and provides support in key areas of emerging need, such as simplifying the world of ESG frameworks and regulation, the role technology can play in a sustainable business strategy and the need to develop mature data infrastructure with employees that are developing and maturing new skills.

This is a new phenomenon as businesses anticipate the impact of market expectations and their obligations. Many businesses are beginning to develop the role of chief sustainability officer. What is anticipated is this will have a knock-on effect on leadership at all levels. This book is about the new sustainability leadership and how small changes and understanding of the roles and functions can accelerate the sustainability agenda of a business.

Sustainability leadership

Sustainability leadership is a multifaceted area, but its core can be explained by seven pillars that cover the scope of an operating model and incentivisation to perform:

To understand the full impact of the C-suite and how these pillars translate into an effective, sustainable leadership team, we'll be further addressing the outcomes of these roles and the impact the pillars have on their core responsibility.

Environment, Social and Governance (ESG) frameworks and regulation

There is a multitude of sustainability frameworks defined by coalitions of NGOs, governments, investors, legal professionals, technologists and so on. The number and diversity of frameworks can often leave leadership teams overwhelmed and drowning in noisy information with little clarity on what types of data can drive change.

While materiality assessments are critical for sustainability improvement, organisations will also look to adopt frameworks upon which ESG score providers inform investors. Sustainability frameworks range from broad ESG scope down to a specific focus on climate risk exposure. Some provide guidance with minute detail down to the metric units that should be captured, while others loosely align to UN Sustainable Development Goals (SDGs).

In this section, we cut through the noise and provide insights into the most popular sustainability frameworks from the angles of the depth of guidance and specificity to allow leadership teams to efficiently identify which frameworks are useful and better aligned to current and upcoming regulations in a future-proof way.

Collecting the right data

With dynamically innovative strategies and skilled teams, collecting sustainability data is the primary and most complicated hurdle underpinning a coherent sustainability strategy. Almost 40% of organisations classify data governance as their top cloud challenge.* While this is a coarse-grained analysis of prioritisation, it becomes apparent that the acquisition and quality of sustainability data and associated reporting hasn't been the highest business priority.

> **Almost 40% of organisations classify data governance as their top cloud challenge.**

Larger businesses have many issues that exacerbate the acquisition and use of sustainability data. These are common across many areas of data and can include data silos, incomplete inventories and insufficient HR capture platforms.

These common problems are further hindered by the need to consider pivots toward renewable energy and directly tracking workforce emissions without clear definitions of what this means and what data is required.

The sustainability superpower: technology

Technological innovation is critical to sustainability, from measuring and managing operational changes to innovating new solutions and driving industries and society at large closer to our shared 1.5° target. The vast technology spectrum covers cloud computing, VR, blockchain, AI and analytics, IoT and so on. Sustainability technology applications will touch on the expansive art of the possible touching every area within the enterprise and describe how innovation can be kept consistently at the core of an agile business with appropriately skilled teams.

Microsoft Cloud for Sustainability

Microsoft has paved the way for many with ambitious action plans for being carbon negative by 2030. They have empowered change at a rapid speed by investing in renewables, customising data centre hardware and optimising functionality, introducing internal carbon taxation and redefining procurement contracts in line with a prioritised sustainability agenda. They have built tools to help others do the same. Microsoft Cloud for Sustainability enables organisations to encourage better use of common data principles and a scalable growth strategy in data collection and reporting for all your carbon data.

* https://www.cio.com/article/191793/the-rise-of-the-cloud-data-platform.html

The new landscape of sustainability leadership

The Paris Agreement shook up world governments and promoted an action-oriented plan to limit global warming to less than 1.5°. The knock-on effects are still being felt with huge pressures on businesses to account for their carbon emissions and build concrete carbon reduction plans as a regular part of their business practice. While this change has been impactful, it's left a lot of businesses struggling with how to interpret their rapidly changing obligations and trying to preempt new regulations in advance of needing to show concrete emissions tracking and cuts to auditors.

Physical evidence of the impact of climate change has heightened awareness among consumers and regulators as the emergence of viruses (such as the Covid-19 pandemic), natural disasters and rising global average temperatures have become more prominent.

An EY 2020 institutional investor survey reported a large jump in non-financial evaluation from 27% in 2016 to 72% in 2020,* illustrating that a coherent, sustainable agenda can now significantly affect investor confidence and share price.

It is often reported that the challenge of creating a more sustainable world will require a global effort of multidisciplinary teams working together. The same can be said at the organisational level, but it ultimately starts with sustainability being actively considered within all leadership roles as a key priority.

The seven pillars of sustainable leadership

The recent Conference Board CEO Challenge survey** consulted senior executives from more than 80 companies about key business practices that define leadership in corporate sustainability. These collective responses resulted in seven impactful practices becoming part of our common literature and now identified as the seven pillars of leadership, a depiction of which is shown in *Figure 1*:

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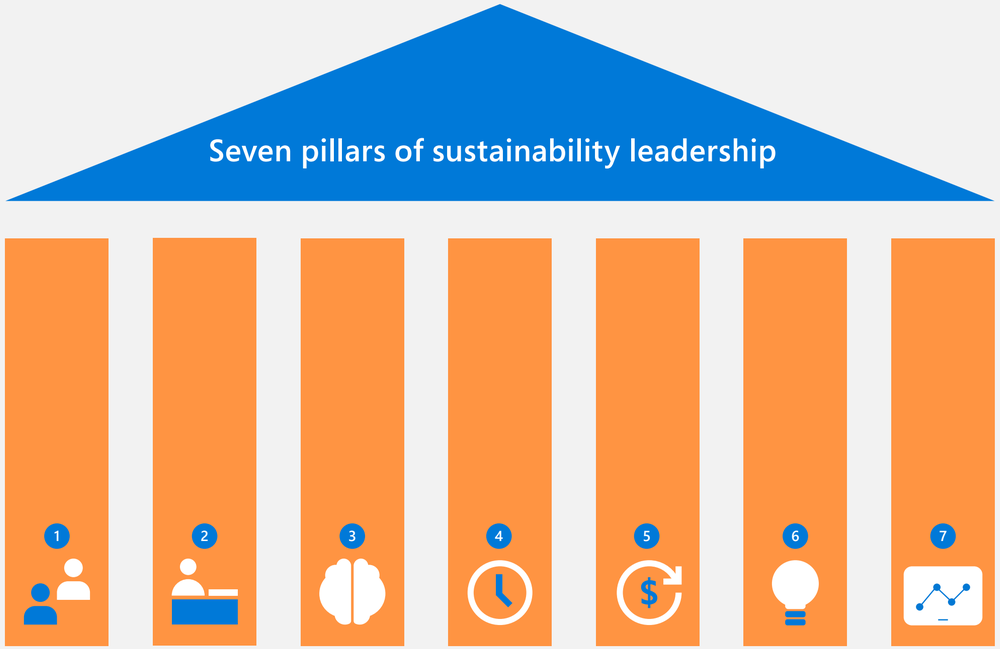


1. Active engagement
2. Lead by example
3. Strategic planning
4. Ambitious long-term goals
5. Executive compensation tied to sustainability performance
6. Innovation
7. Reporting

Figure 1: The seven pillars of sustainable leadership

> **Physical evidence of the impact of climate change has heightened awareness among consumers and regulators as the emergence of viruses (such as the Covid-19 pandemic), natural disasters and rising global average temperatures have become more prominent.**

Let's now deep dive into each of these in the following sections.

1. Active engagement

The urgency of climate change has resulted in sustainability becoming a megatrend, requiring the Board of Directors to actively engage and consider relevant risks and opportunities. This level of active engagement enables companies to take a long-term view and adequately plan for the change required.

It is not enough to just be aware of sustainability trends. Leadership efforts need to actively assess and evaluate how such trends drive changes in competitors, consumers and investor behaviours, all of which have knock-on effects on an organisation's business model.

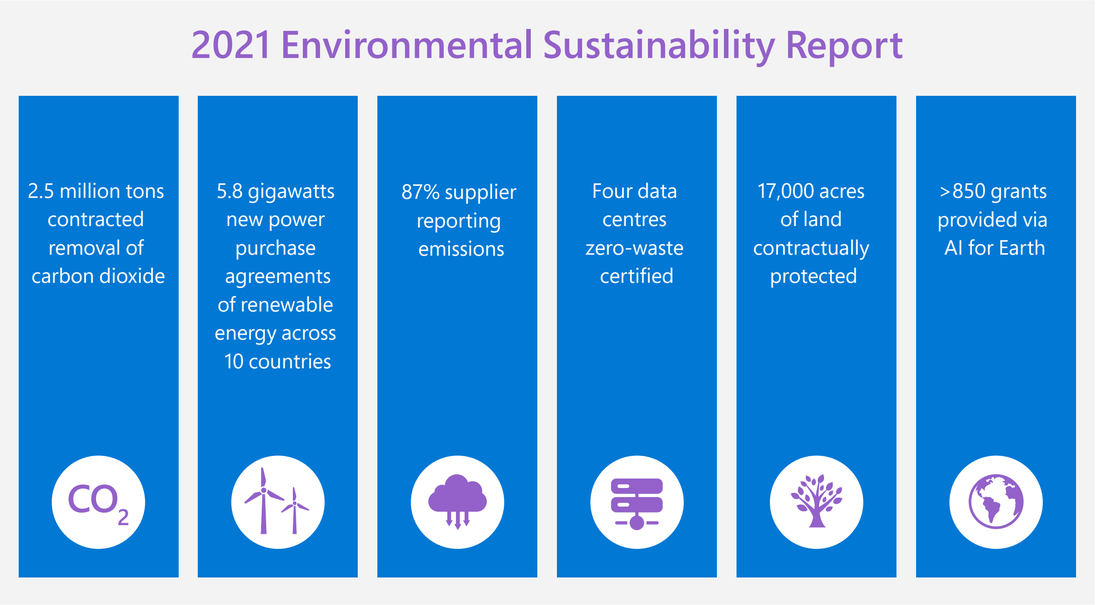
Following the *get on board or get left behind* ideology, organisations that fail to communicate a coherent sustainability strategy and action change tend to score far worse in the ESG ratings. These organisations often have an impact on investment decisions. Regulations such as those described within the EU taxonomy need detailed data about technical screening criteria for investors to prove sustainability alignment. It is imperative data on sustainability performance can be provided both with integrity and in an easily consumable form.

2. Lead by example

Despite the rise of sustainability awareness, few CEOs devote enough time to relevant issues to see real progress toward achieving sustainability-related goals. Leadership teams that take an active role in prioritising sustainability are more likely to succeed in achieving associated goals.*

* Making an impact with Microsoft's carbon fee

A good example of this is Microsoft's methodology of using capital built up from internal carbon taxation to invest in sustainability innovation. The recent 2021 Environmental Sustainability Report* highlights the contracted removal of an additional 2.5 million tons of carbon dioxide, new power purchase agreements for approximately 5.8 gigawatts of renewable energy across 10 countries, 87% supplier reporting emissions, four data centres that are zero-waste certified, contractual protection of 17,000 acres of land and more than 850 grants provided via AI for Earth. The presence of an internal carbon tax has also enabled sustainability awareness to proliferate through the organisation. Two other influential ways an organisation's sustainability profile can be strengthened are through reporting structures and the presence of internal and external advisers.



* 2021 Environmental Sustainability Report

3. Strategic planning

Top-ranking business risk factors include failure to mitigate or adapt to climate change. In line with such sustainability risks, many companies actively incorporate environmental and social issues into strategic planning processes and prioritise the most material issues to business first. Overall, a trend in thinking about sustainability in every aspect of long-term planning, from choosing more sustainable packaging to using more sustainable materials and developing better business models, is becoming more pervasive.

By considering all aspects of the value chain, including product design, suppliers, distribution and recycling, tactical adjustments can be employed to use results in a responsible timeframe. After pledging to cut its carbon emissions by 18% by 2025, Walmart discovered that suppliers accounted for 90% of their emissions. Project Gigaton allowed Walmart to scrutinise its supply chains and work with suppliers to cut a gigaton of carbon by 2030. Deep analysis of the holistic impact a business makes across its supply chain can yield key insights. There was a strong focus in November 2021 at COP26 concerning logistics and supply chains and specifically the impact of transportation on sustainability. Analysis to measure this is a constant talking point for sustainability.

4. Ambitious long-term goals

Increasingly long-term goals are more and more ambitious, focusing less on just improving business outcomes and going one step further to add value for the greater good of society. While moving toward net-zero could be argued to have a limited, *direct*, material impact on a business, it is seen as a shared societal responsibility to reduce climate-related risks for everybody. In a recent academic study conducted by Goldsmiths, University of London,** it was reported that only 41% of organisations are on track to meet net-zero government goals by 2050. This bleak outlook can be partly attributed to reduced capabilities to monitor progressive change effectively with data.

Developing ambitious long-term goals is likely to be an important, influential factor in attracting the best talent. A report by PwC found that 65% of people across China, Germany, India, the UK and the US want to work for organisations with a strong social conscience. This trend has led to more than a third (36%) of HR professionals building their hiring strategies around their organisation's social and environmental stance.

** Accelerating the journey to net zero (microsoft.com)

> **A report by PwC found that 65% of people across China, Germany, India, the UK and the US want to work for organisations with a strong social conscience.**

While a long-term agenda and a concrete declaration of net-zero targets by 2050 sends a clear message to the market, it cannot be achieved without key activities through incremental and short-term goals that hone the impact and messaging of big-bang statements. The key is to 'know thyself' by understanding where you are in your sustainability journey and then adapting concrete and empirical actions that meet these complex stretch goals.

5. Executive compensation tied to sustainability performance

The movement toward sustainable methods of operation has helped businesses overcome compliance issues and minimise risks involved in operations. Organisations have been required to break the status quo of business models to create products and services that have a reduced environmental impact. Incentivising sustainability targets makes them a priority and increases the chances of success due to focusing attention, resources and capital on achieving targets. A few companies that have opted to link executive pay to ESG performance include Apple, Starbucks, National Grid, Shell, BP, Unilever and PepsiCo. As in the case of Apple and the National Grid, specific performance toward goals focused on reducing greenhouse gases tends to be the focus aligned with executive compensation.

6. Innovation

The movement toward sustainable methods of operation shifts businesses past compliance, risk and business as usual to break the status quo of business models to create products and services with a reduced environmental impact. Sustainability innovation has the added benefits of new partnering opportunities and revenue growth. Whether it's improving product design or collaborating with new innovative suppliers, green products have been shown time and time again to attract larger growth potential backed by sustainability-aware consumers and investors.

As reported by Forbes, 87% of consumers would buy a product with social and environmental benefits if given the opportunity and 97% are more likely to trust a company that supports social or environmental issues.

In 2018, Bank of America Merrill Lynch found that firms with a better ESG record than their peers produced high three-year returns, were more likely to become high-quality stocks, were more resilient to price declines and were less likely to go bankrupt. This resilience was clearly evident during the first few months of 2021, when the Covid-19 pandemic significantly affected markets.

7. Reporting

Openly and transparently reporting financial and non-financial performance demonstrates sustainability is engrained within an organisation and provides a mechanism to take accountability for business operations and improve transparent communications toward change. It also shows shareholders and customers that accountability and transparency are core and how you are moving forward year on year toward these larger stretch goals.

Of the 1,700 senior UK business leaders surveyed in an academic study conducted by Goldsmiths, University of London, it was shown that the majority (64%) say cutting their carbon footprint is part of their organisation's environmental sustainability strategy. However, just 17% have implemented a detailed programme for mapping their emissions, while fewer than half (47%) monitor them. This inability to measure their decarbonisation efforts makes managing and improving them almost impossible.

Having considered important pillars of sustainable leadership, the following section takes a deep dive into each role within typical leadership teams to identify specific focuses and goals within an organisation's overall sustainability strategy.

The leadership roles to be engaged

One of the simplest definitions of leadership is the process to influence change (Yukl, 2001). When looking at great sustainability leaders, their traits can be complex. This can be attributed to the complex nature of sustainability itself. Complex problems are characterised by:

- Multiple complex and interconnected issues that dynamically change over time.
- The structure or dynamics are not transparent.
- The goal structure is multifaceted and not straightforward. Hypercompetitive and increasingly complex environments have given rise to a need to deal with extensive amounts of information where continuity of existing business operations may not be assumed (Foster and Kaplan, 2001), thereby increasing demands on the skills of leaders.

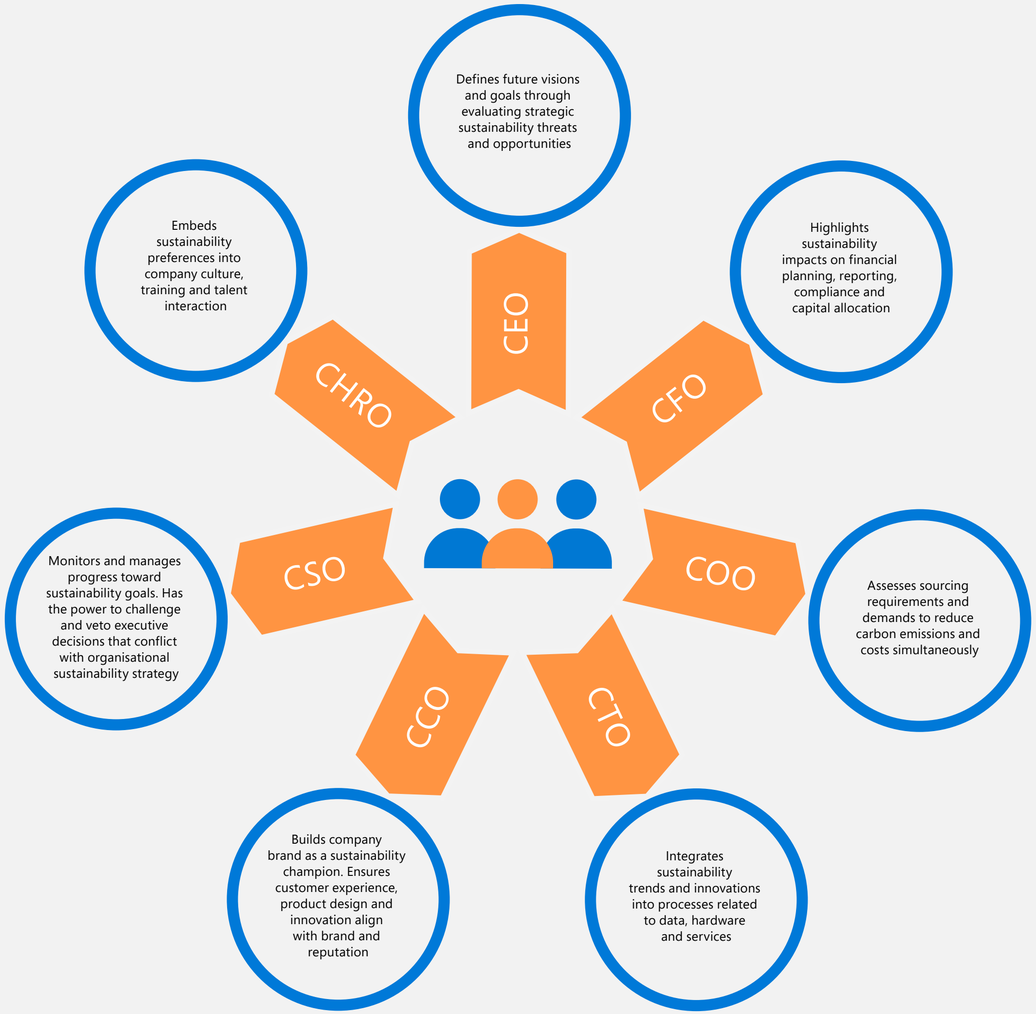


Figure 2: The sustainability roles and functions of a typical C-suite

Sustainability leaders are likely to be leaders who can read and predict through complexity, think through complex problems, engage groups in dynamic adaptive organisational change and manage emotion appropriately. Sustainability leadership is delivered better through a team spirit within the organisation rather than being an individual's sole responsibility (Metcalf and Benn, 2013).

Chief executive officer (CEO)

It is the role of a CEO to identify and communicate future sustainability visions, goals (such as the elimination of emissions by 2030) and strategies (such as the introduction of internal departmental carbon taxing policies) by effectively monitoring trends, threats and opportunities. Initial steps toward these functions and goals involve articulating well-defined and measurable (via KPIs) sustainability targets to key stakeholders. Understanding commercial data-driven insights resulting from internal and competitor changes will further establish future market trends and inform strategic resource allocation. Progressive steps include appointing a chief sustainability officer and cross-functional committees to advise on sustainability-related issues and embed transformational sustainability throughout the organisation through the constructive challenging and influence of governing structures.

Chief technology officer (CTO)

The CTO of an organisation integrates sustainability trends and innovation into processes related to data, hardware and services. The most direct touchpoint for a CTO in terms of sustainability is automating the sourcing, processing and analysing of all data related to an organisation's operations that touch on sustainability from environmental, social and governance perspectives in near real time. This will often require liaising with other departments (such as procurement, HR and finance) to avoid data siloes and bring all relevant data to one place. In a more indirect way, CTOs will also be responsible for ensuring sustainable cloud operations, hardware recycling processes and efficient technology development. While the sustainability of Microsoft Azure has been shown consistently, green software engineering principles are varied and still require further iterations of improvements. Finally, CTOs will also take responsibility for being aware of sustainability tech trends (AI, IoT, EVs, drones, VR and blockchain) and co-create new solutions.

Chief financial officer (CFO)

The CFO highlights sustainability impacts on financial planning, reporting, compliance and capital allocation. Democratic goal-based reporting goes beyond basic ESG indicators and requires exhaustive mapping and monitoring of issues with a material effect on the company and its stakeholders (investors, employees, customers and so on). With sustainability regulation gaining traction, CFOs would actively engage in updates, ensure compliance and manage physical and transition risks and costs. Looking toward the future, CFOs would typically prioritise exploring sustainability mergers and acquisitions (M&As) and green financing schemes. In addition to defining and creating AI-led early warning detection notifications of compliance risks, CFOs would strive toward providing forecasts as to how sustainability efforts affect company valuation.

Chief operating officer (COO)

The COO assesses sourcing requirements throughout the supply chain life cycle, concentrating on carbon emission reduction and costs. The CDP reports that, on average, a company's supply chain emissions are 11.4 times greater than direct emissions. Ensuring the supply chain strategy (for example, environmental product declaration in line with ISO 14025) is continuously monitored and reviewed for alignment with sustainability goals is integral to decision-making triggers, such as sourcing alternative sustainable materials/suppliers, utilising different recycling methods, or using 3D printing technologies for product design. Predictive outputs of power consumption and maintenance can also support decision making and renewable energy power purchase agreements, forging new alliances for innovation. With all such sustainable operative considerations, cost savings, brand reputation and competitive differentiation are likely to be positive, but require data to monitor and draw intelligent conclusions.

Chief customer officer (CCO)

The CCO is in charge of building a company brand, sales and marketing messages that champion sustainability through ensuring the customer experience, product design and innovation align with the brand and its reputation. To understand the effects of sustainability change, customer and stakeholder data from a variety of sources (social media, surveys, purchasing behaviour and so on) will often be evaluated. Monitoring will also reduce greenwashing risks, which could be detrimental to the company's reputation. Going a step further, CCOs can initiate complete take-back programmes in which they accept receiving all historically sold products for recycling or offering innovative intellectual property (IP) as open source for the greater good.

Chief strategy officer (CSO)

A CSO, also known as the chief disrupter, monitors and manages progress toward sustainability goals and has the power to challenge and veto executive decisions that conflict with the organisational sustainability strategy. Some argue that if ownership and accountability are distributed among the leadership team, this role becomes redundant. However, without an independent sustainability committee or a CSO, objective external evaluation and critique for improvement would go amiss. CSOs often dissect and interpret external sustainability movements, identify strategic and regulatory consequences for the company, reallocate resources where necessary and provide thought leadership needed to educate and realign teams. The CSO role is a relatively new addition to the C-suite, and not all organisations have appointed this role. A study by Deloitte identified three main reasons organisations appoint a CSO:

1. The external environment changes faster than the organisation
2. Scrutiny from external stakeholders intensifies
3. The organisation acknowledges that ESG risks are substantial

The CSO role broadly requires leadership and technical skills. Highly regarded skills among CSOs are strategy, influencing, risk management, flexibility, climate science, organisational knowledge and regulatory knowledge. Similarly, other academic groups have also concluded the importance of strategic thinking and planning in sustainability leadership (Metcalf and Benn, 2013).

General counsel

The general counsel is responsible for giving advice on all legal and company contracts and transactions. It's an important role for sustainability as more scrutiny will be given to legal obligations for all organisations that companies transact with and their adherence to emissions frameworks. Many general counsels are looking to do what's 'right' for a business rather than what's legal. As sustainability ties fiscal, social and environmental parts of the business together, the general counsel plays a key advisory role, helping the other C-Suite roles to understand how to build their operating frameworks better for sustainability legislation and compliance.

Chief marketing officer (CMO)

The CMO is a key role in spreading the message that a company is a responsible corporate citizen and is driving positive change both internally and externally by ensuring that the right message goes out about the supply chain and all internal activities to drive positive change are reported back in the right way. The CMO also needs to understand enough to avoid giving the impression of corporate greenwashing, as this can harm a company's public image.

Chief supply chain officer (CSCO)

The CSCO is a new board role used to drive positive change in the supply chain of a company by ensuring that the supply chain is responsive to the same values as the company contracting the suppliers. They ensure that processes are put in place to discover and potentially remove any supplier that isn't adhering to these corporate values. Against a backdrop of rising supply chain costs and a greater level of scrutiny and compliance, a CSCO should use supply chain contracts to build positive environmental and social change within their supplier community.

> **C-suite roles are core to the evolution and implementation of the business sustainability strategy. Hopefully, you can see that every business function has a direct and material impact on stretch goal targets.**

Summary of key evolving sustainability roles

Role	Information
CEO	• What should our sustainability targets be? • Should they be in line with or ahead of our competitors? • Do we have enough focus on sustainability internally?
CFO	• What is our financial exposure or 'revenue at risk' from climate change? • Management of physical and transition cost risks • Exploration of green financing schemes • M&A activity associated with sustainability criteria
COO	• Management of supply chain processes • Management and definition of internal processes and standards that affect direct emissions • Management of internal social and governance processes
CCO	• Championing a sales agenda based on sustainable design of products and services • Building up sustainability surveys and feedback cycles on sales with the rest of the board through a customer lens
CSO	• Check all activities adhere to a sustainability strategy • The power of veto for activities that don't marry with strategic goals • Reallocation of resources to sustainability goals where there is lag
General counsel	• Interpretation of sustainability legislation • Advisor on sustainability matters to other members of the board • Contract counsel for new contract sustainability initiatives
CMO	• Core messaging associated with sustainability both externally and internally • Filtration of all activities to ensure that no information on corporate greenwashing makes it into the public domain
CSCO	• Provide corporate sustainability standards to all of an organisation's supply chain • Supply chain cost-benefit analysis • Supply chain surveying and reputational analysis

Establishing the right foundation in sustainability leadership is vital. C-suite roles now have to address many business issues. As sustainability rises to the top, clear strategies and directions need to be owned in full by a chief sustainability officer. The broader-scope plan and its related obligations can then trickle down to C-suite-level objectives.

The following section deals with the key skills you need to promote within the talent of your organisation to achieve your sustainability goals. Any leadership is passive unless and until it upskills the workforce and helps them achieve the common goal of the organisation.

Vital skills your team needs for sustainability

It is clear that traditional leadership is not going to cut it in the fourth industrial revolution. While technology and sustainability are at the forefront of complex strategies, new-age leaders need to actively consider there are also forces shaping the future of work, such as distributed workforces, new business models, changing demographics, new societal expectations and skills of the future. A recent Green Skills Report* published by LinkedIn has described these new shifting trends as the 'Great Reshuffle', as part of which we are faced with an urgent need to transition to a green society that will require new green skills. This is evident in the fact that the share of green talent in the workforce has shown a growth rate of 38.5% between 2015 and 2021. Delving a little further into industry-specific growth, the same report acknowledges that in the last 5 years, the number of renewables and environment jobs has increased by 237% in the US, in comparison to the 19% increase for oil and gas jobs, thus projecting that by 2023, renewables and environment sector jobs will outnumber those in oil and gas. Interestingly, the majority of green skills are being requested in jobs that aren't traditionally thought of as green, such as fleet managers, data scientists and health workers.

> **The number of renewables and environment jobs has increased by 237% in the US, in comparison to the 19% increase for oil and gas jobs, thus projecting that by 2023, renewables and environment sector jobs will outnumber those in oil and gas.**

Modern-day organisations have transformed and moved away from largely static hierarchical constructs to team-based ecosystems. Leadership adaptability and embracing ambiguity are critical in such evolving situations. To embed agility and innovation, decision-making power is commonly seen distributed among teams, which also empowers workforces to contribute to influencing change. As leaders increasingly lead from the edges, they become orchestrators of a fluid workforce, bringing together the right skills, talent and experience to create value.

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* LinkedIn's Global Green Skills Report

Four critical dimensions of the employee experience are:

1. Connection with colleagues and trust in leadership.

2. Individual growth and reward opportunities.

3. Meaningful work that aligns with employees' values and contributes to a higher purpose.

4. Working in an environment that supports productivity and performance.

It is critical that organisations create, with a strong purpose, a holistic and meaningful employee experience for all talent. The transition to a green economy will need to be inclusive as well as sustainable. Current discrepancies across income, gender and education levels will require action from governments, organisations and individuals to support a green transition through new educational programmes.

HR leaders will increasingly need to develop skills related to data analytics, understanding and helping others to understand technology, systems thinking, design thinking, storytelling, understanding the emerging field of mapping jobs, skills and tasks and conducting strategic workforce planning. With the developing technologies that automate or augment typical roles in the workforce, it is imperative that organisations adopt a framework to reskill, reinvent and redeploy their workforce. A top concern for organisation leaders is the requirement for employees to learn, unlearn and relearn skills efficiently. Likewise, the workforce now rates the opportunity to learn among the top reasons for taking a job. There is a preference for independent learning across age groups, from millennials to baby boomers, and experiential learning has been shown to be most beneficial for employees. High-skilled employees with highly transferable skills are the most resilient to the advent of new technology. Skills such as communication, empathy, critical thinking, problem-solving and collaboration enable lifelong learning and intellectual curiosity. Evidently, fostering a culture that encourages lifelong learning and shared responsibility will be critical to organisational success in sustainability.

Green skills

Green skills are those that enable the environmental sustainability of economic activities. To develop new processes and technologies that consider the environmental impacts of economic activities, teams require the skills to apply working knowledge of climate science, sustainability technology and innovation, sustainability data and sustainability regulations.

Climate science research has changed quite dramatically since the 1960s, when the term climate scenarios were first introduced.* Climate scenarios do not aim to predict the future, but instead aim to better understand uncertainties in order to reach decisions that are robust under a wide range of possible futures and, as such, describe a range of plausible trajectories. A wide range of models covering emissions, climate conditions (such as temperature and precipitation), environmental scenarios (such as sea-level rise) and vulnerability scenarios (such as demographic, economic, policy, cultural and institutional characteristics) are all required to understand climate change in a holistic way. While these models were previously developed in a linear way, modern approaches have parallelised some workloads (for example, through the introduction of the Representative Concentration Pathways (RCPs)) to facilitate action toward limiting global increases in temperature. Working knowledge of the ecosystem complexities that affect climate change is necessary to drive sustainable organisational innovation so one change does not result in other environmentally damaging consequences.

As we saw in the earlier section on sustainability leadership, data is the common thread across all roles and functions. To effectively manage change toward sustainability, we need to measure progress through data acquisition. There are many frameworks and taxonomies that can guide how to start collecting the right data. Given the variety of frameworks available, it can be, quite understandably, an overwhelming journey to start collecting data. Still, it is nevertheless an important skill to instil processes to collect and analyse sustainability data. In *Section 5*, we take a closer look at the differences between the most common sustainability frameworks. It is often recognised that capitalism is very much ingrained in our world, and effective legal regulations will be required to enforce real change and enable the mobility of capital to the correct areas. Besides countries committing to carbon reduction plans via the nationally determined contributions (NDCs) as part of the Paris Agreement, regulation is also rapidly being defined. It is important for corporations as well as financial market players to understand the sustainability regulations that apply to them as the scope of coverage is quickly growing. For example, the extension of the Corporate Sustainability Reporting Directive (CSRD) saw an additional 37,400 companies come under coverage. Increasingly, relevant sustainability data will be required to show compliance and alignment, so it is important to have a working knowledge of developing sustainability regulations.

Figure 3: Green skills required for a sustainable future

* The next generation of scenarios for climate change research and assessment | Nature

Power skills

Say goodbye to 'soft skills' and welcome an era of power skills! The most in-demand skills aren't just about staying ahead of the technical curve. Skills related to leadership, teamwork, communication, productivity and wellness are critical to every employee's performance. This is why it no longer makes sense to call them 'soft skills', as if they represent a less important set of skills in the workplace. Power skills aren't just nice to have; they are essential for changing the workplace in terms of an organisation's successful performance and employee empowerment. Businesses that provide leadership training to all employees, irrespective of managerial aspirations, are 4.2× more likely to outperform those that don't in terms of revenue growth, operating margin and return on equity.

Figure 4: Power skills required for a sustainable future

Figure 5: Tactical skills required for a sustainable future

Tactical skills

A June 2021 PwC survey found that, "88% of executives say their company is experiencing higher turnover than normal." There is a growing acceptance of distributed workforces and a paradigm shift in work/life happiness; employees are making career changes they might not have imagined before the Covid-19 pandemic. By encouraging the development of tactical skills within the future workforce, some protection can be expected against high turnover as workforces are empowered to excel in their day-to-day functions. Tactical skills include business intelligence, design and UX, finance and accounting, HR and talent development, marketing, project management, sales and customer experience.

> **88% of executives say their company is experiencing higher turnover than normal.**

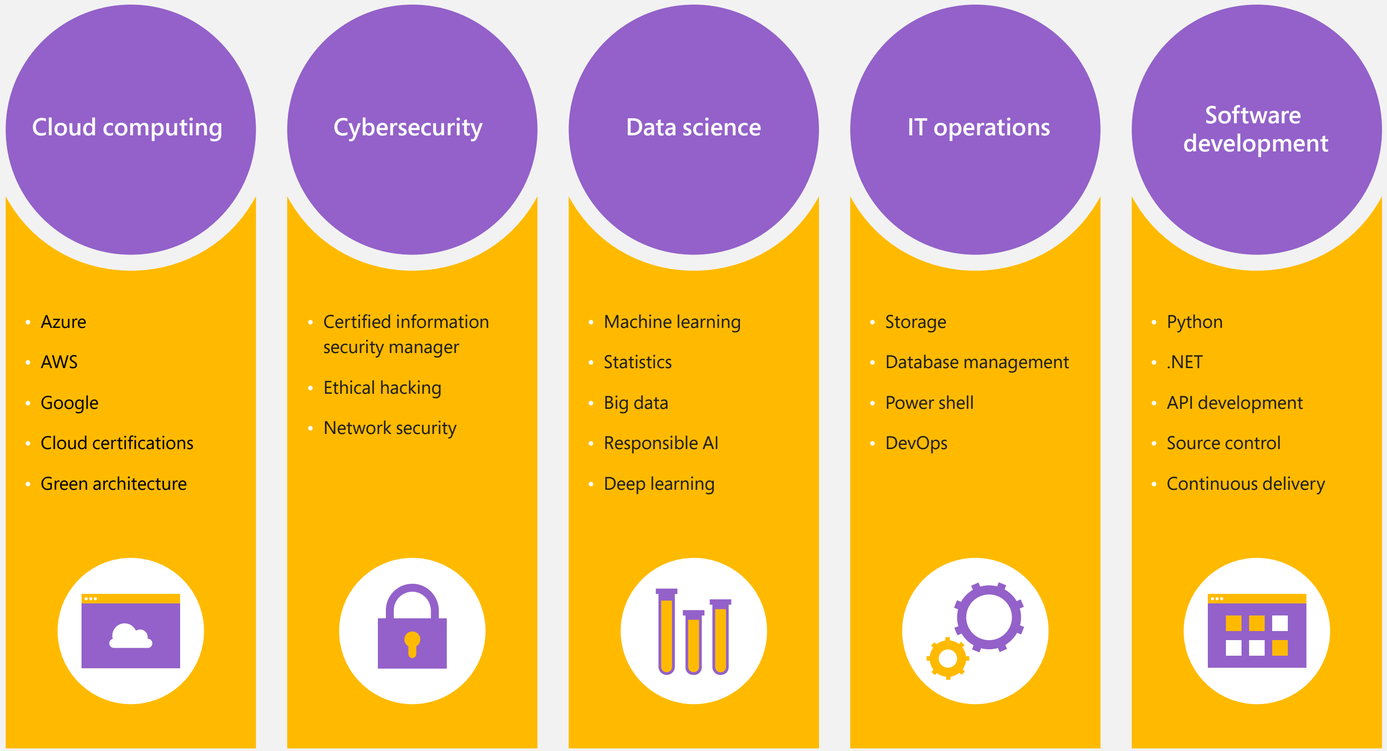


Figure 6: Technical skills required for a sustainable future

Technical skills

A technology strategy is critical to business strategy these days, and delivery teams significantly affect productivity and speed to market. Key technical skills required include cloud computing, cybersecurity, data science, IT operations and software development.

Given the challenges of our age and the way that SMART and stretch goals for sustainability need to work within an organisation on tight timelines and targets, clarity among leadership teams on what their extended obligations are will be the difference between successful executions of sustainability objectives and those that fall wide of the mark.

The next sections deal with the tools that can help monitor goals and generate the right KPIs so that the leadership can be informed and measure the gap between implementation, capability, obligations due to compliance and expected and actual progress on the sustainability plan.

Useful tools for sustainability leadership

A constant running theme is a need for data to drive intelligent decision making. In addition to the many frameworks supporting organisational data collection, many groups have been formed, providing useful guides, white papers, survey results, advice, etc. This wealth of resources can assist leaders to level up in implementing strategic and operational change, elevating an organisation's sustainability performance.

As illustrated in *Section 2*, the synergy in the leadership team required to achieve different aspects of sustainability is clear. For example, the CFO and COO are both interested in supply chain emissions, but the CFO may use this data to understand risks and identify relevant M&As. In contrast, the COO may look to utilise different technologies in product design that are more sustainable. Likewise, the CCO may look at the same data to assess greenwashing reputational risk. The multifaceted approach of looking at data from a diverse sustainability impact point of view reduces risks and increases the organisation's success and resilience. The use of common language tools and guides can facilitate this synergy.

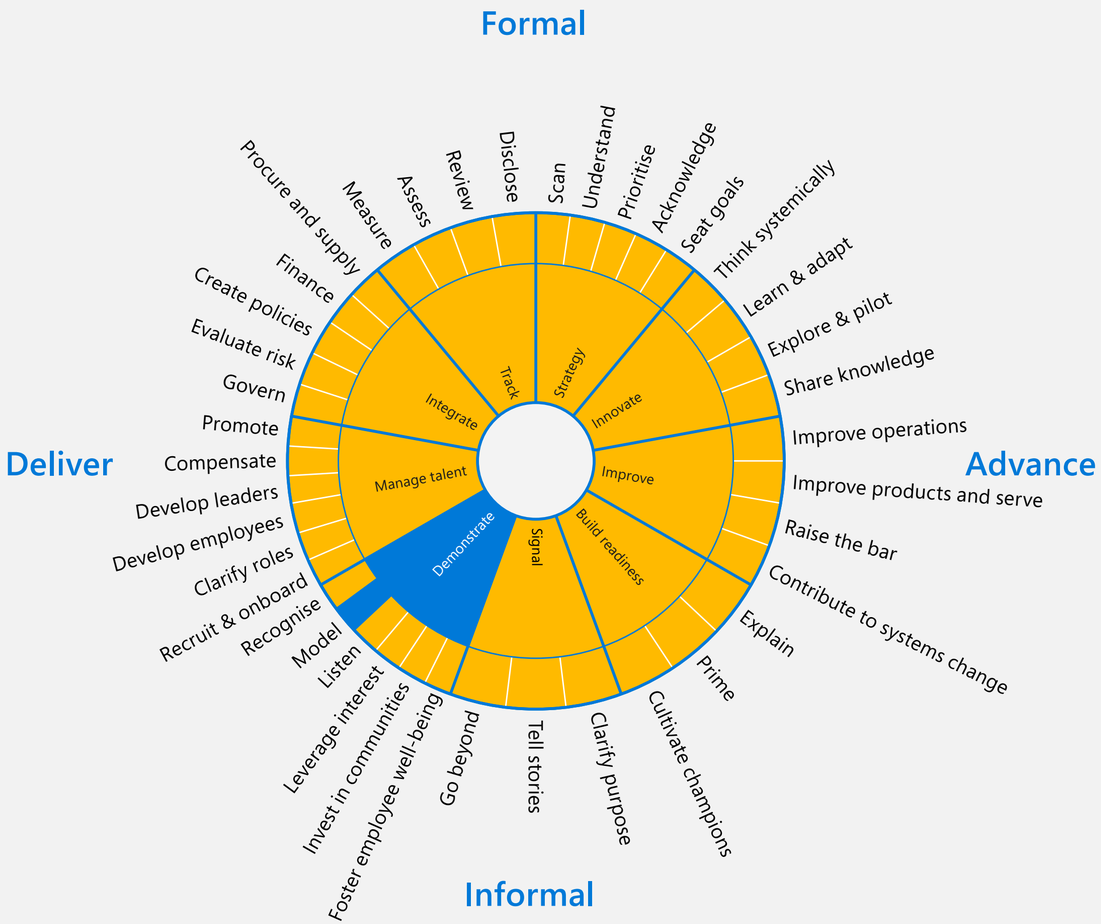


Figure 7: Source: Resources for Embedding Sustainability | Embedding Project

Embedding Project

The Embedding Project is a global public-benefit research project that helps companies embed social and environmental factors across their operations and decision making. The Embedding Project consists of useful guides, advisory content and access to a community to support cementing sustainability within an organisation.

BSR guide on selling sustainability

In collaboration with other large organisations, BSR has developed a guide on how to strategically communicate your organisation's sustainability messaging. The guide is targeted at marketers and covers:

A range of resources has been put together for HR leaders looking to instil organisational change in alignment with the sustainability strategy. The World Economic Forum white paper is one example of this, covering the six imperatives for the workforce of the future (leadership capabilities, integration of technology, employee experience, agile culture, metrics for valuing human capital and embedding diversity and inclusion) as well as various case studies with organisations such as IBM, PwC and Unilever.

UN-backed PRI compensation package

Supporting resources like the WEF HR white paper, the Principles for Responsible Investment (PRI) has published a blog post consisting of various helpful links covering the topic of executive compensation being tied to sustainability performance. While such financial moves are endorsed by regulators and have the capability to increase an organisation's value, the PRI has covered the current difficulties in implementing remuneration changes as a result of company practice and disclosure misalignment.

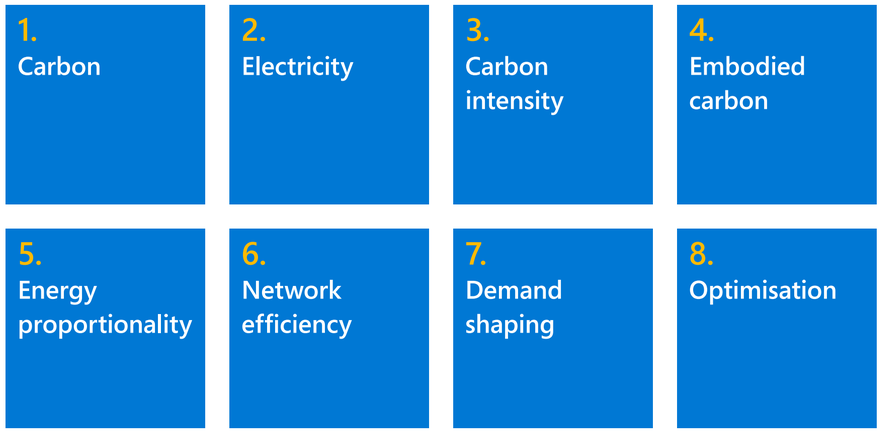
Building blocks toward net-zero

Many organisations have well-placed ambitions to reach net-zero, but struggle to make successive progress toward such goals. In a recent paper by PwC,* suggested building blocks were proposed to work toward net-zero targets: ambition, governance, strategy, enterprise, supply chains, innovation, finance, transparency and engagement. The paper goes through each building block, providing a check-list of critical actions companies should undertake to transform to net-zero, explaining why such actions are important and providing practical guidance to follow.

* Building-blocks-net-zero-companies-transformation.pdf (pwc.co.uk)

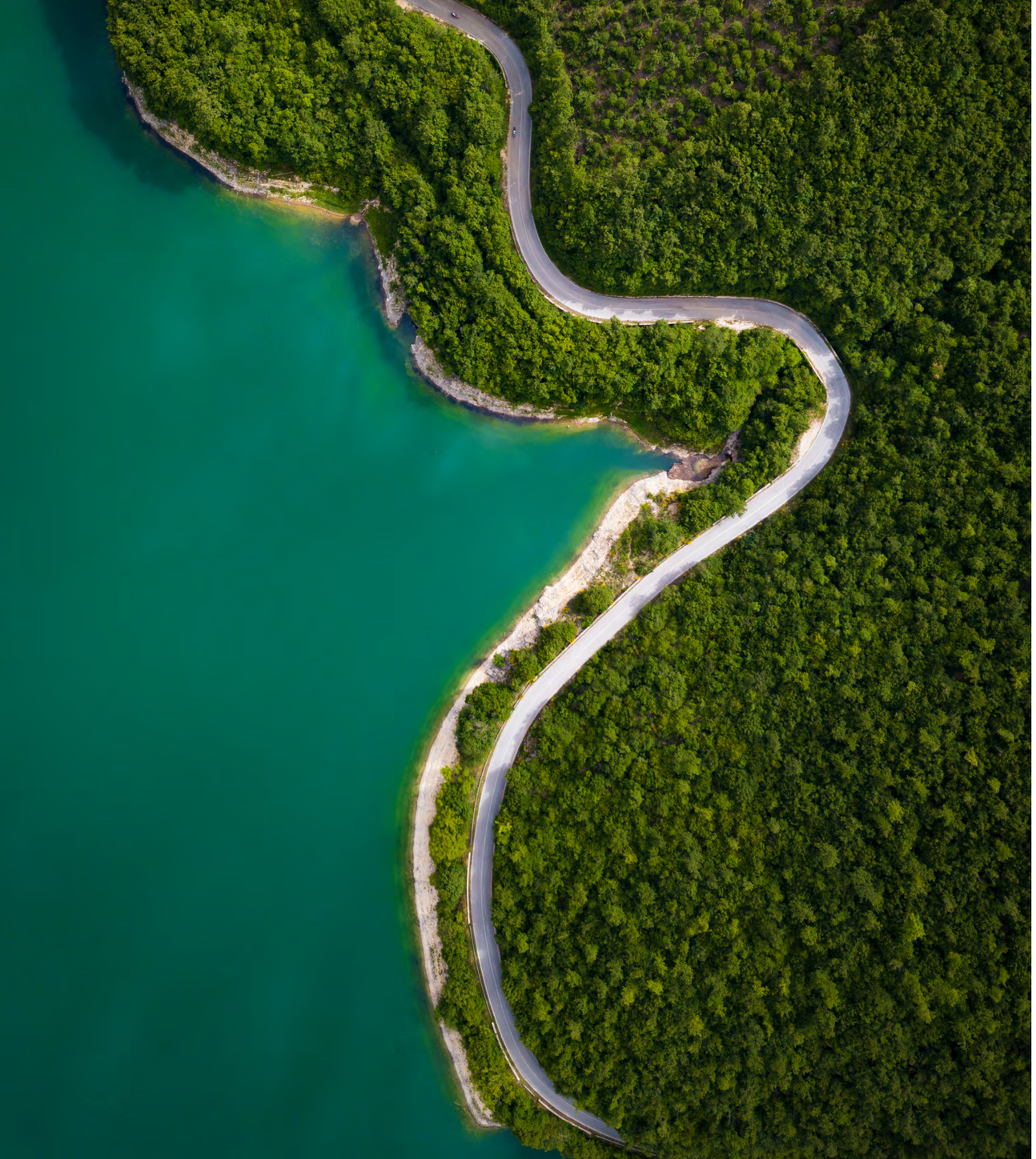
The principles of green software engineering

In addition to adopting cloud infrastructure, the actual technological development of software and services is an important consideration. There are a few, but limited, green software engineering principles that have been suggested. The Microsoft sustainable software engineering principles cover:



Some sustainability experts have highlighted the need for all architects to become 'green architects' rapidly and start actively re-evaluating the use of always-on resources, over-provisioning, autoscaling according to CPU and network traffic, geographic placement, data movement and so on. As with every element of sustainability, reliable data measurements are required to assess performance against adopted strategies for change.

Along with the skills discussed in the previous sections, the people within your workforce will need to have the knowledge of various reporting methods, regulations, frameworks and other terminologies related to sustainability. Let's deep dive into these in the following sections.



Reporting knowledge

These days, it is not enough to simply communicate that you are working toward specific sustainability goals (for example, reaching net-zero by 2030); consumers and investors demand transparency and expect to see data to support sustainability claims. As a result, many large (and increasingly small and medium) organisations are outputting non-financial sustainability reports illustrating environmental, social and governance data in alignment with various frameworks. We'll introduce ESG frameworks in this section and break down an understanding of how people, the planet and profits work together to achieve monitoring and measuring success.

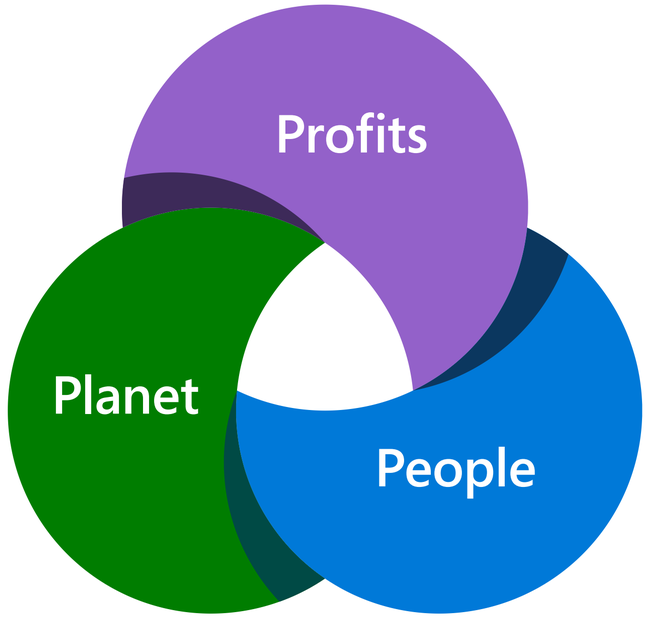


Figure 8: The focus of ESG frameworks: planet, people and profits

There are over 600+ ESG score providers that regularly mine ESG data and controversial sentiments from a wide array of online sources (such as sustainability reports, company websites, Twitter, LinkedIn and news sources). In recent years, investors have been using such scores and insights to guide investment decisions. With a wide range of frameworks and an even larger growing number of ESG providers and indexes (the Dow Jones Sustainability World/Europe Index and the FTSE4Good Index being two very common references), it is often reported that there is a lack of consistency (correlation as low as 0.4-0.6), transparency and standardisation making it difficult to know which is better without being able to evaluate the methodology upon which they were formulated, and the weight applied to different metrics (A Data Scientist's Introduction to Sustainable Finance).

Vitaly Nesis, Chief Executive of Polymetal (the biggest London-listed gold producer), has criticised methods of ESG scoring for being inconsistent, inaccurate and a box-ticking exercise based on marketing statements or self-reported statistics, hence effectively promoting greenwashing. Likewise, the chief executive of asset management at BlackRock, Larry Flink, has communicated the need for standardised climate reporting. Others have gone as far as suggesting sustainability reports are used to erect façades that enable organised hypocrisy (Cho et al., 2015).

Data quality: lots of noise, little meaning

Data and its availability to companies is a huge and widespread issue. Many businesses are still trying to formulate their data strategy. While they have long-term commitments to building strong data-driven organisations, companies are still in transition and may not have all the capabilities to locate sustainability data. The key challenge is that the larger a company is, the bigger the data platform building blocks are, meaning sustainability officers become just one customer of the organisational data platform.

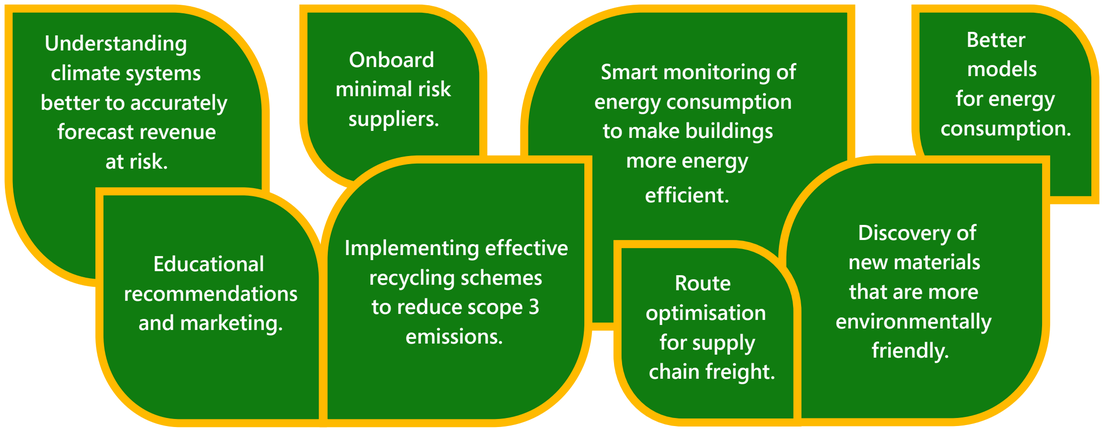
In many cases, there is key data missing. When we talk about quality, we actually mean integrity. To date, there hasn't been any proper tracking of emissions data and supply chain activities. Alignment with all of the other roles in various functions has meant that over the last two years, more accurate sustainability data has become available because functions are becoming data producers, whether, through supply chain surveys, CSR reports, emissions tracking or water usage, among others.

As such, novel techniques are needed to ensure that gaps in the data are understood and do not lead to biased views of change history in reporting (Measuring Corporate Environmental Reporting). Issues with tracking key aspects of supply chains mean that data quality is often poor, and gaps in the data are rife, which will, of course, lead to inaccurate reporting (see From Satellite to Supply Chain).

Many organisations struggle to accurately measure their sustainability impact because relevant data is not being collected or is of poor quality. There is a disparity between affluent and less-affluent companies, with the former being able to invest in various tracking devices and processes more so than the latter. This, coupled with the complexities and variations in sustainability reporting, creates prominent roadblocks for organisational leaders tracking and monitoring progress toward sustainability goals (see the Elastacloud sustainable finance white paper).

It's crucial that we get the fundamental data to a good enough standard to generate recommendation models that complement sustainability strategies. These forward-looking models can be used to enable remediation actions to be taken more efficiently to reduce environmental impacts at greater speed. Currently, organisations struggle to report their progress toward sustainability compliance measures and upcoming regulatory changes. While this is a key issue, just as pressing is the need to be able to make predictions to show that organisations are on track to meet their net 2030/2050 targets. This ability allows anomalous behaviours to be picked up through analytical methods (such as AI and machine learning) and remedied through quick realignment with the sustainability plan.

There are key entry points for future reporting and aligning AI and Machine Learning to various issues that need future resource allocation. Some of the key use cases are:



Others can be found in the article: 10 ways AI could help climate change.

One size does not fit all

To some degree, a variable number of sustainability indexes will be required; as depending on the investment sector being considered, one generic sustainability index will not be appropriate. For example, the impact of agricultural pesticide processes polluting rivers and clearing parts of forests is much easier to measure through satellite data than the impacts of the electronics or sustainable housing industries. Evidently, the same data cannot be used to measure the environmental impacts of all industries.

Regulators are gaining momentum, and some have expressed concerns about data standardisation without considering the nuances of industry-specific business operations. From an organisational standpoint, there is a fine balancing act between collecting data relevant to materiality assessments and conforming with ESG frameworks and regulations. While some pose the argument for materiality and industry-specific goals quite strongly, there is also the consideration of global impact. Oil and gas extractors and cement manufacturers will always be more carbon intense if they simply hold to the standards within their industry instead of considering the wider global impact, and also further encourage greenwashing by presenting a 'best of the worst bunch' scenario.

Financial investors regularly rely on 10-K reports, earnings calls and financial news to make decisions. ESG scores and data seem to provide more nuanced considerations due to the lack of meaningful regulatory formatting. Having said this, momentum toward standardised regulation is gathering. The following sections cover a short overview of some of the different sustainability frameworks (such as GRI, SASB, TCFD, CDP, SBTi, GRESB, WEF and UN Global Compact) that organisations may refer to when collecting and analysing their own ESG data.

As illustrated in *Figure 9*, sustainability frameworks differ in terms of scope and detail. Some frameworks cover sustainability broadly, focusing on environmental, social and governance factors, while others focus on a specific pillar (such as the environment) or industry (such as GRESB). Likewise, some frameworks provide extremely comprehensive levels of detail down to the very units of metrics that should be collected by organisations. In contrast, others provide informative flow diagrams loosely covering the UN SDGs. There is also the initiation of collaborative efforts to try and minimise confusion through the use of multiple frameworks by simplifying and aggregating frameworks. For example, SASB now contains many elements of TCFD.

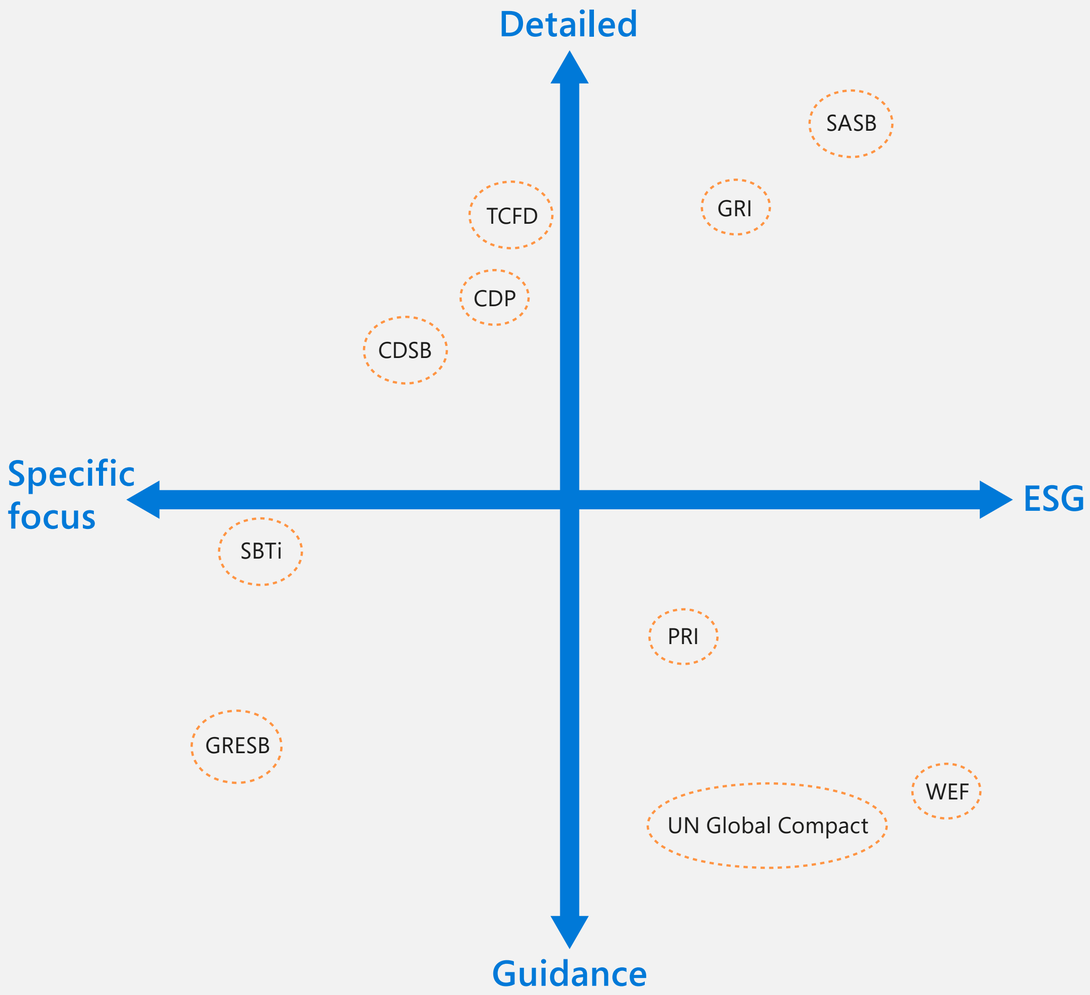


Figure 9: Quadrant overview of ESG frameworks with differing sustainability focuses and detail of the guidance

Global Reporting Initiative (GRI)

The GRI was founded in 1997 following a public outcry over the environmental damage of the Exxon Valdez oil spill. The first GRI framework was published in 2000 and has been regularly updated since through diverse collaboration and strategic partnerships. The framework is one of the most widely adopted generic frameworks and comprehensively covers environmental, social and governance metrics companies should monitor to promote transparency and accountability. The framework is also strongly aligned with the UN SDGs. Despite the rigorous and thoroughly documented framework, some argue there are still ambiguities that lead to variabilities in disclosure.

International Integrated Reporting Council (IIRC)

The IIRC was formed in 2010 and focuses on enabling companies to successfully communicate their value creation. This coalition of regulators, investors, companies and NGOs recently merged with SASB to form the Value Reporting Foundation with a focus on building a coherent and standardised reporting system.

Sustainability Accounting Standards Board (SASB)

SASB standards identify the subset of environmental, social and governance issues most relevant to financial performance in 77 identified industries. They are designed to help companies disclose financially material sustainability information to investors. Keen to distinguish itself from other frameworks, it suggests the standards are used to provide specific, detailed and replicable requirements for what should be reported. As well as actively collaborating with IIRC, SASB also collaborates with GRI to promote clarity in the sustainability landscape. A key differentiator of SASB standards is that they are industry-specific, based on evidence and market-informed. Each industry has a different set of specific metrics, making them financially material, useful for decision making and cost-effective.

CDP

The CDP, formerly known as the Carbon Disclosure Project, is a non-profit charity that runs the global disclosure system for investors, companies, cities, states and regions to manage their environmental impacts. Currently, around 13,000 companies report through the CDP across 1,100 cities, states and regions. To make disclosures using the CDP framework, companies are required to complete several surveys on climate-related activities, forestry and water security. They can receive a rating from A to D or F for failure to respond.

Climate Disclosure Standards Board (CDSB)

The CDSB consortium aims to advance and align the global mainstream corporate reporting model to equate natural capital with financial capital. With a strong focus on the environment pillar of ESG, the framework aggregates recommendations from the CDP, TCFD, SASB and WRI, among others.

Science-Based Targets initiative (SBTi)

The SBTi is focused on the environment pillar of ESG and empowers companies to set science-based emissions reduction targets. Over 1,000 companies have adopted the framework, and the extensive verification processes bode well for their credibility.

Task Force on Climate-related Financial Disclosures (TCFD)

The Financial Stability Board established the TCFD to develop recommendations for more effective climate-related disclosures that could promote more informed investment, credit and insurance underwriting decisions and, in turn, enable stakeholders to understand better the concentrations of carbon-related assets in the financial sector and the financial system's exposures to climate-related risks. These climate-related recommendations have been adopted by some other reporting organisations, including SASB and CDSB. organisations aligned with TCFD are improving their understanding of their climate-related risks and how to assess and mitigate these risks in the future.

Global ESG Benchmark for Real Assets (GRESB)

The GRESB framework adoption is popular among property companies, real estate investment trusts (REITs), funds, developers and asset managers due to the framework's focus on real assets. GRESB makes a continuous effort to update the framework to reflect the market. While this may highlight companies within an industry that excel in novel areas of sustainability development, it does not easily allow investors to compare year-on-year growth for a specific company.

UN Global Compact

The UN Global Compact is a well-respected framework, with over 15,000 companies spanning 163 countries having adopted it. The UN Global Compact calls on companies to align strategies and operations with 10 universal principles on human rights, labour, environment and anti-corruption to advance societal goals such as the UN SDGs. Participating organisations are required to produce Communication on Progress (COP) reports annually, stating their progress toward achieving the 10 principles of the compact. Unlike the GRI and SASB standards, the UN Global Compact framework does lack detail. It leaves ambiguous space for organisations to make their own interpretations of how metrics should be reported in alignment with the 10 principles.

UN Principles for Responsible Investment (PRI)

The PRI is a set of six guiding principles covering environmental, social and governance considerations. The PRI currently has around 4,000 signatories, and once organisations have submitted the agreement using the reporting framework, they gain access to a wealth of collaborative and data platforms.

World Economic Forum (WEF)

The WEF was established in 1971 by the International Business Council in collaboration with Deloitte, EY, KPMG and PwC. This super-framework simplifies and aggregates guidelines from many of the other frameworks in an attempt to standardise disclosures and align them with the SDGs. The WEF has recently published frameworks targeting organisations* and investors** separately, so organisations can build long-term resilience and investors can effectively identify global risk factors.

> **Over 15,000 companies spanning 163 countries have adopted the UN Global Compact framework to align their strategies and operations with 10 universal principles.**

* World Economic Forum Releases Framework to Help Business Identify ESG Factors for Long-Term Resilience > Press releases | World Economic Forum (weforum.org)
** World Economic Forum Releases Framework to Help Investors Address Six Global Risks > Press releases | World Economic Forum (weforum.org)

Policy knowledge

Having done a materiality assessment aligned to an ESG framework that provides appropriate coverage and implemented a technical solution to constantly stream, monitor and analyse relevant data, we now need to create a process that future-proofs organisational risk against regulations. Governmental legislation and regulations are notoriously slow and often require several iterations and amendments before they capture complexities, making them fit for purpose. Hence, building regulatory considerations into a strategy and process is challenging to do. Still, keeping your finger on the pulse is imperative to foresee changes and implement adjustments with agility. The introduction of regulation also allows investors to move beyond just scratching the surface when reallocating capital toward sustainability and move forward with more clarity.

While there is some overlap, the main regulations that are often discussed are the Sustainable Finance Disclosure Regulation (SFDR), the CSRD (replacing the Non-Financial Reporting Directive (NFRD)) and the EU taxonomy. While there are other regional (such as France's Article 173) and even industry-specific (such as for agricultural land use, food and retail) legislative requirements, it is clear that scale of impact will be a more critical factor in external evaluation from consumers and investors. Over the next few sections, we discuss current regulations, upcoming trends in relation to data acquisition and the emergence of regulated carbon markets. As demonstrated, SFDR and the EU taxonomy outline the responsibility for the finance industry, whereas CSRD imposes disclosure responsibilities for large companies. The application of the EU taxonomy also has some indirect implications for companies in terms of data captured.

The Sustainable Finance Disclosure Regulation (SFDR)

The SFDR came into effect in March 2021. Level 2 requirements are expected to be applied from January 2022. This regulation was designed to make it easier for investors to distinguish between and compare the multitude of sustainable finance strategies available on the market today. SFDR applies to all asset managers, financial advisers and insurance providers in the EU.

On February 4, 2021, the European Supervisory Authorities (ESAs) published their draft regulatory technical standards that list all the details of the implementation of the regulation as well as the list of the mandatory and optional principal adverse impacts that have to be disclosed under SFDR. In March 2021, the ESAs proposed to merge some of the EU taxonomy and SFDR disclosures for the financial products covered by both regulations.

Most funds have been considering website disclosures and the information to be included in pre-contractual disclosures under Articles 3 and 6 of SFDR. With respect to this, financial market participants (FMPs) are expected to disclose:

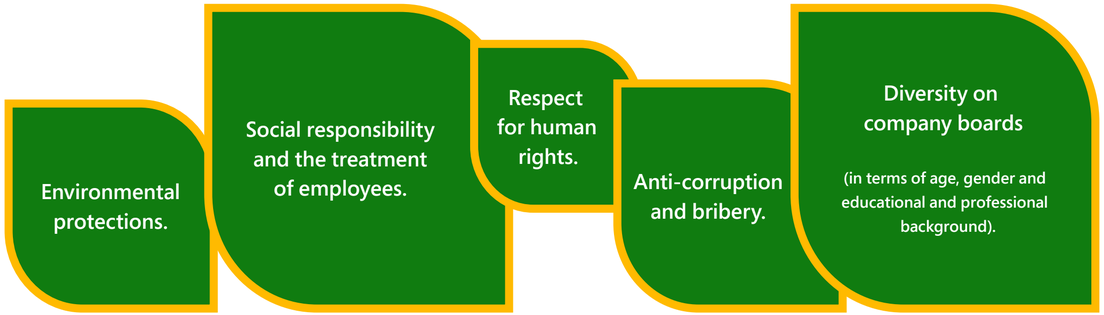
- The manner in which sustainability risks are integrated into their investment decisions.
- The results of the assessment in terms of the likely impacts of sustainability risks on the returns of the financial products they make available.
- Where the fund deems sustainability risk not to be relevant; the rationale for this must be clearly set out.
- Information on their websites about their policies on the integration of sustainability risks in their investment decision-making process.

Corporate Sustainability Reporting Directive (CSRD)

The CSRD is meant to amend the existing NFRD and has some important enhancements in terms of strengthening and standardising corporate communication on sustainability. It also expands, in terms of scope, the requirements for data assurances and mandatory disclosure. The NFRD applies to European-listed and large public-interest companies with more than 500 employees and that have either a balance sheet total of more than 20 million euros or a net turnover of more than 40 million euros. However, the CSRD has expanded this scope to include all large companies regardless of employees or whether they are listed or not, which has increased the entities covered from 11,600 to 49,000.

The goal of the CSRD is to provide investors with the information they need to consider ESG in their investment decisions and meet their requirements under the SFDR. The CSRD also enables trade unions, civil society organisations and other stakeholders to assess companies' impacts on society and the environment.

The disclosure required covers:



The CSRD also applies double materiality, meaning companies need to disclose how sustainability issues affect not only the company, but also society and the environment more widely. Interestingly, businesses will also be required to seek limited assurance through third-party audits.

EU taxonomy

Some argue the EU taxonomy to be one of the most significant developments in sustainable finance thus far, with expected wide-ranging implications for investors and corporates working in the EU and beyond. The EU taxonomy entered into force in July 2020 and is a complex classification tool that enables investors, corporates and project financiers to consistently determine whether an economic activity is environmentally sustainable or not. It provides specific science-based thresholds on the environmental performance of specific activities that need to be met for the activity to be classified as compliant with the taxonomy. The value emphasis lies within having a common language between investors, market participants, financiers and policy makers, as this will enable the mobilisation of decarbonisation of the economy through the redirection of capital flows at scale. The EU taxonomy regulation also mandates investors to disclose how and to what extent their underlying investments support economic activities that qualify as environmentally sustainable, with details down to specific KPIs showing the proportion of investments that are EU taxonomy-aligned.

The EU taxonomy consists of a set of principles and technical screening criteria. Economic activities need to contribute to one of the following six environmental objectives:

1. Climate change mitigation
2. Climate change adaptation
3. Sustainable use and protection of water and marine resources
4. Transition to a circular economy
5. Pollution prevention and control
6. Protection and restoration of biodiversity and ecosystems

Regulators have carefully thought about how to ensure focus is paid not to just one specific area, but instead considers the wide-ranging impacts on the environment and society.

This has been enforced, first, through the *do no significant harm* (DNSH) principle that needs to be applied to the remaining five environmental objectives. The subsequent Climate Delegated Act provides details on technical screening criteria (TSC) for determining the alignment of economic activities with a substantial contribution to climate change mitigation or adaptation objectives.

An example of climate change mitigation is that geothermal electricity production must not exceed the threshold of 100 g CO_2/kWh. Second, broad-ranging considerations have been enforced through the need to comply with the 'minimum social safeguards' principle.

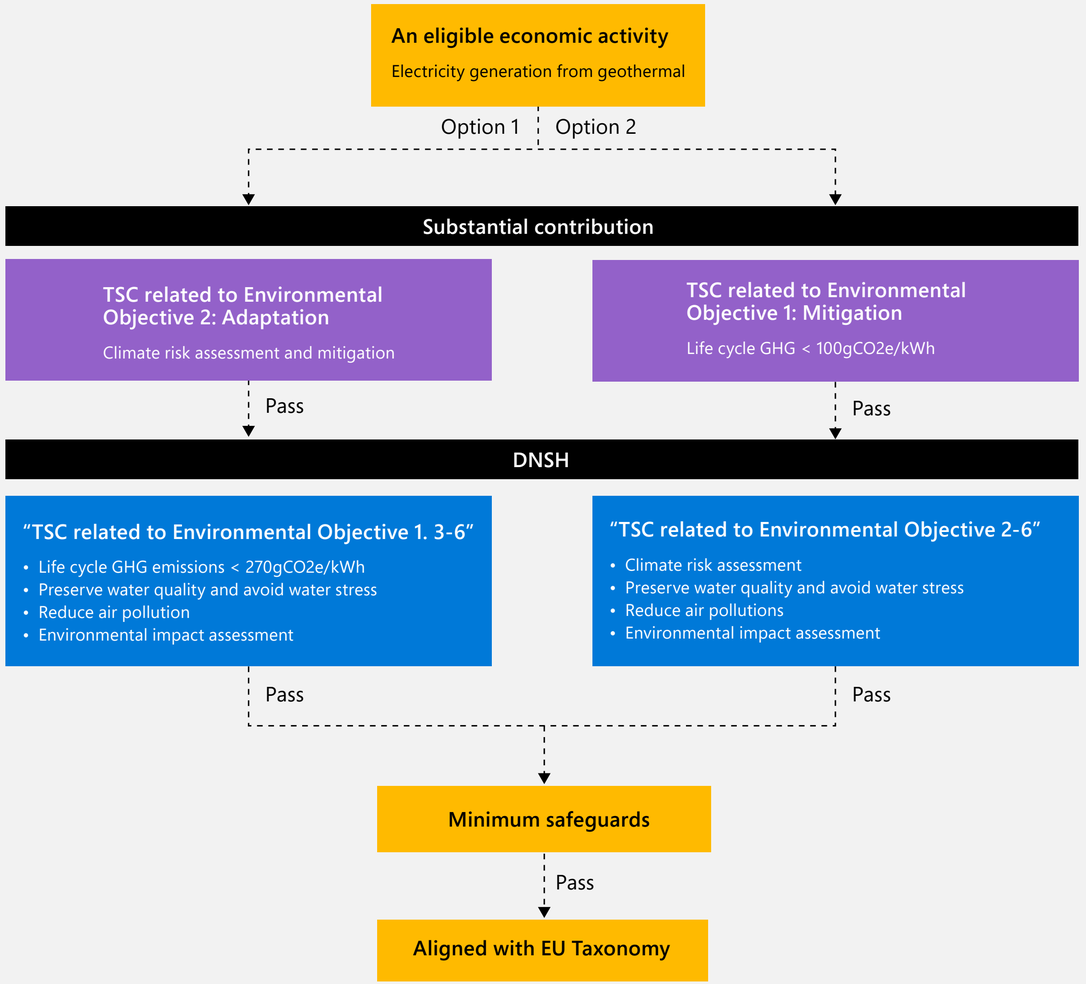


Figure 10: An example of how the EU taxonomy works

Source: 'Do No Significant Harm' and 'Minimum Safeguards' in Practice Navigating the EU Taxonomy Regulation | FTSE Russell

The application of the current TSC is complex and significant amounts of data are required to assess alignment with the EU taxonomy. An FTSE Russell study showed that the EU taxonomy proposes 105 unique DNSH requirements. Economic activity can be subject to 0-20 DNSH requirements, with an average of 9.6 requirements applied to mitigation activities and 7.2 to adaptation activities. Each activity is subject to different DNSH requirements depending on the types of activities and to which environmental objectives the activity is contributing. Additionally, the EU taxonomy requires economic activity alignment with broad-ranging OECD guidelines covering responsible conduct in the areas of consumer rights, taxation, science and technology and competition.

There is work to be done, in terms of implementation, to align DNSH indicators to ESG metrics and then the complexities of dealing with the fact that not all corporates disclose all ESG metrics, leading to insufficient data for decisive economic action to be taken. An FTSE Russell study found that of 300 environment-specific ESG indications mapped to DNSH, only 43 can be used to approximate alignment, as most TSCs are not covered by ESG data. Finally, ambiguities also arise when considering how the taxonomy aligns with portfolios.

Companies can use the EU taxonomy to improve their overall environmental performance and attract investors. By covering capital expenditure linked to the transition plans, the EU taxonomy can help attract investors searching for taxonomy-aligned investments to finance the transition to sustainability, helping both companies and investors accelerate that transition.

From an investor perspective, several approaches could be considered to overcome these data issues, such as using a phased approach, using proxy data and using controversy screening to implement DNSH and the minimum safeguards. Ultimately the EU taxonomy regulation is still a moving target, with implementation delays expected.

The application of the taxonomy is voluntary for the private financial sector. This means that no investor or investment product is compelled to abide by the taxonomy. It is only used when an investor or an investment product claims to finance one or more 'environmentally sustainable' economic activities that meet all of the taxonomy's criteria, standards and requirements. The use of the taxonomy is compulsory for the EU and member states when introducing requirements and standards regarding the environmental sustainability of financial products, such as an EU ecolabel for investment products or an EU Green Bond Standard (Art. 1, 4). It does not apply to member states that already have a system of tax waivers for sustainable financial products in place (Art. 27). The supervision and enforcement of the taxonomy regulation will be done by national supervisory authorities that oversee the different kinds of investment products covered by 10 EU investment laws. The UK has inherited the EU's taxonomy framework and reaffirmed its commitment, but does have plans to evaluate it for UK market suitability and consistency with UK governmental policy. The desire to remain aligned with international frameworks is a key goal.

The taxonomy regulation must be evaluated by 12 July 2022 and every three years thereafter. The reviews will include an assessment of the application of the screening criteria and the need to revise them, the effectiveness of the taxonomy in increasing sustainable investments and the verification mechanisms employed (Art. 26).

Compliance and voluntary carbon markets

Carbon offsets (for example, tree planting, direct air capture and soil sequestering) are widely used by individuals, corporations and governments to mitigate their greenhouse gas emissions. Many have strongly criticised organisations that try to offset their way to net-zero rather than address operational changes required to truly reduce emissions. SBTi doesn't approve the use of carbon offsets for short-term climate plans until a company has tried every other available fix (installing wind turbines, boosting efficiency, switching to cleaner fuel and so on).

> **Demand for carbon credits could increase 15-fold or more by 2030 and by a factor of up to 100 by 2050. Overall, the market for carbon credits could be worth upward of USD 50 billion in 2030.**

There are two types of carbon markets: voluntary and compliance. Compliance markets aim to establish a carbon price using laws or regulations that control the supply of permits distributed by national, regional and global regimes. These permits are then traded within a controlled emissions trading scheme (ETS), which economically incentivises emitting organisations to reduce their carbon footprint.

In contrast, voluntary markets are not legally mandated and consist of companies and individuals choosing to offset their emissions. This could be motivated by an organisation looking to offset longer-term climate risks facing their organisation or for ethical or other reasons. Due to the carbon credits in voluntary markets not being administered by a specific government, they are accessible to every sector globally in contrast to compliance markets.

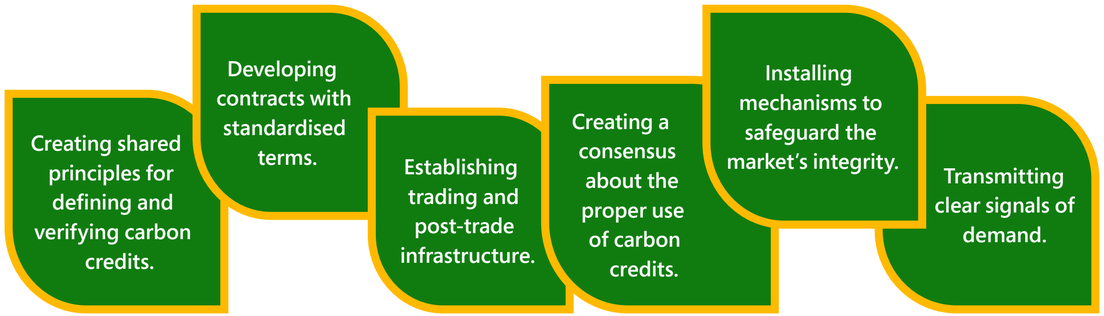
Demand in voluntary carbon markets has soared as of late, exceeding USD 1 billion in 2021. Article 6 of the UN Paris Agreement on climate change has tried to push the development of international carbon markets. Still, the slow progress leads to risks such as double-counting and weakens countries' nationally determined contributions (NDCs).

The UK-funded Taskforce on Scaling Voluntary Carbon Markets (TSVCM), led by former Bank of England governor Mark Carney, estimates that demand for carbon credits could increase 15-fold or more by 2030 and by a factor of up to 100 by 2050. Overall, the market for carbon credits could be worth upward of USD 50 billion in 2030.

However, compliance markets are regulated, and one of the problems with the voluntary carbon market is that there is no punishment for manipulation or fraud. Researchers at the non-profit group CarbonPlan recently discovered that USD 400 million worth of offsets had been sold in California without absorbing a single ton of CO_2. The Finland based non-profit Compensate found that 90% of offsets fail to deliver or come with damaging side effects for local communities.

For years, climate scientists have been trying to develop verification processes that prove a carbon offset relates to a ton of CO_2 removal. Climate scientists serving on the TSVCM have argued that the finance industry is taking an over-simplistic approach to a complex problem. Other challenges include the unprecedented rate at which the scale of carbon offset technology needs to be developed.

Building an effective carbon market requires an effective blueprint for action, which the TSVCM has identified as needing to cover:



While reporting standards are numerous and varied, and sometimes it's unclear how businesses should interpret them and what they should be doing, they are evolving rapidly along with a clearer picture of how to communicate updates to shareholders in a timelier and more concise manner. This is where technology comes to the rescue.

Technical expertise

Technological innovation is at the heart of sustainability, and the art of the possible is limitless. Advancements in VR are supporting our new hybrid working approaches and reducing the need to travel, electrifying our transport mechanisms, improving security with blockchain, utilising the optimised power of the cloud, reducing the need for inefficient, expensive, high-maintenance on-premises infrastructure, creating IoT solutions to optimise working environments and AI to predict and action change seamlessly across every vertical and pushing constant improvements. We have just touched the tip of the iceberg of what is possible.

Momentum has been illustrated by companies such as Climeworks sequestering carbon or Cervest modelling climate risk. At an organisational level, technology and AI have the power to supercharge speed toward key sustainability goals. This has recently been demonstrated by Microsoft, which has pledged to become carbon negative by 2030. How is this being done? Through refining procurement contracts, investing in renewables, customising cloud hardware, introducing an internal carbon audit to filtrate sustainability considerations and cultural change throughout the company and much more.

Artificial intelligence

Creating insight dashboards capturing performance across environmental, social and governance performance is just the initial step to fostering change toward sustainability. Without collecting, processing and analysing company ESG data, it is impossible to objectively identify and manage the improvements required. However, this is just the first step, and AI can be developed to accelerate change at a much faster pace, as shown in *Figure 11*.

Figure 11: Potential AI use cases for each role within the C-suite

IoT

Collecting ESG data is critical to solving the sustainability challenge, with IoT being the superpower for which Microsoft is the market leader. The scale of IoT enablement required for sustainability accounting is of planetary scale. The mechanism for generating quality data from multiple streams in context has a natural home in Microsoft's cloud. The investments made by Microsoft in the Azure Digital Twin product align well with the challenge outlined in this document. The range of sustainable IoT applications includes predictive maintenance, emissions tracking, smart energy management, waste management, fleet management, smart water management and smart farming.

Blockchain

Blockchain has the power to drive positive impact at an immense scale. The power of decentralised networks such as blockchain lies in their transparency. Unlike algorithms of corporate technology, blockchain contracts are public, as are the laws around who can change them and how resulting in a tamper-proof transparent system. For example, blockchain can provide effective data transference between companies and suppliers. It can drive the protection of environmental assets through systems such as seeds or Regan Networks. Blockchain is already having a strong impact in the consumer packaged goods (CPG) and aerospace industries.

On the other hand, blockchain can be extremely damaging to the environment. Currently, blockchains account for 0.5% of global electricity consumption, while bitcoin mining alone consumes as much energy as the entire US Federal Government. See War, Peace and Bitcoins for a balanced look at how to use blockchain for the greater good.

Some have argued that the use of renewable energy to power public blockchains could be a greener solution that aligns with the need to reduce fossil fuel consumption; however, given the current energy crisis, a reevaluation of the use of renewable energy for blockchain is required.

Microsoft Cloud for Sustainability

Microsoft is a renowned leader in paving the path toward sustainability. Microsoft has set and actioned ambitious goals to become carbon negative by 2030, which has been actioned through internal carbon taxing, investment in renewables and carbon sequestering processes and auditing of its entire supply chain and procurement processes to align with its sustainability agenda. More importantly, Microsoft has been empirically demonstrated to be the most sustainable cloud provider across several of its highest energy-consuming services (Microsoft Azure compute, Microsoft Azure Storage, Microsoft Exchange Online and Microsoft SharePoint Online) in comparison to on-premises solutions and other cloud providers, which can be attributed to:

1.
IT operational efficiency achieved through dynamic provisioning and multitenancy.

2.
IT equipment efficiency (custom-optimised hardware that reduces electricity consumption by up to 10%).

3.
Data centre infrastructure efficiency improving the power usage effectiveness (PUE). PUE is also reliably monitored and continuously improved through innovative design.

4.
Renewable electricity at scale supported by power purchase agreements for reliability. These key performance areas have led to the Microsoft cloud being between 72 and 98% more efficient than traditional enterprise data centres.

For further detailed information on this life cycle (manufacturing to end of life) study, see The carbon benefits of cloud computing paper.

In addition to implementing revolutionary, innovative changes toward its own sustainability targets and transparently sharing learnings and knowledge for other organisations to follow suit, Microsoft has also developed a range of platforms and service tools to facilitate other organisations to better report and develop predictive insights on their sustainability position. The AI for Earth program has supported multiple projects through grants and also provides essential satellite, weather and biodiversity datasets that can be utilised to develop predictive climate and biodiversity models to highlight assets at risk, revenue at risk, supply chain issues and so on.

Microsoft Sustainability Manager is designed to help organisations monitor and manage their sustainability performance. Sustainability Manager enables organisations to bring all sustainability-related data together in one place through the variety of prebuilt and custom data connectors. Data connections usually only need to be set up once and can be updated periodically as required. Analysts can calculate emissions that result from Scope 1, 2 and 3 activities using prebuilt, dynamic calculation models. Insightful dashboards allow business leaders to track and monitor emissions in relation to sustainability targets and goals. Data trends can validate where performance is on track and where improvements are required, promoting relevant action to be taken.

Collecting the right data

The complexities surrounding the multitude of ESG frameworks and regulations that are constantly being reviewed and adopted mean the sustainability data that organisations need to capture extends beyond materiality. To go one step further, organisations need to think about how to report on emissions in the complex hybrid-working world where employees are not necessarily utilising power inefficient smart buildings.

Microsoft Cloud for Sustainability aids the transitions required in an evolving data world. With Microsoft Cloud for Sustainability, you can currently connect data through CSV and Excel files and Open Data Protocol (OData). Future connectors are anticipated to include Power Query and third-party connectors. Bringing data from multiple systems and applications together can be extremely expensive and time-consuming. A common data model simplifies this process by allowing metadata to provide shared meaning. A common data model includes a set of standardised extensible data schemas that have been published.

When a data connection is established, the system reads the source data and provides a preview. The system provides an overview that shows how the data is mapped from its source to the common data model. You can review the mapping and make changes as required. After completing the data mapping, the system allows you selecting between automatic and manual data updates. For automatic updates, you can define the update frequency or set a schedule depending on your data requirements.

So how exactly does Microsoft Cloud for Sustainability help more so than developing a traditional data platform? Well, thinking through the ingestion process further, Microsoft Cloud for Sustainability abstracts away custom connectors that would normally be developed and handled via tools such as Azure Data Factory and maintains proximity to the data source. Additionally, there is little overhead for maintaining updates to the internal workings of other platforms, such as SAP. Overall, the process of data ingestion and data modelling becomes streamlined; hence the efficiency of gaining accurate insights is increased. Moreover, it is anticipated that the ability to explore water waste, biodiversity effects and many other ESG-relevant reports can also be effectively generated using Microsoft Cloud for Sustainability.

Building intelligence that supports action toward sustainability

It's no secret that sustainability is the future, and organisations that embed sustainability within their culture move closer toward the gold standard, leading to better profitability, better ethical standards for people and the planet and financial performance resilience. Once the right data has been collected on a holistic level, building intelligence through KPIs, trends and predictive analysis that can really support and drive action is the next step. As referenced in the *Artificial intelligence* section previously, consistent monitoring and predictive analytics support every leadership strategy decision. From building predictive climate risk models to understand revenue or assets at risk from climate disaster to developing better workforce planning by understanding outputs of models forecasting employee churn, unplanned absence, promotional activity and so on, the possibilities are far-reaching with high-impact value.

> **The Microsoft Cloud is between 72 and 98% more carbon efficient than traditional enterprise data centres."**

Conclusion

In the modern era of sustainability leadership, exceptionally skilled leaders will be required who not only have the capabilities to refine their existing roles and functions with consideration to the environmental impact, but also democratise sustainability responsibility across their organisations to action real progress through the new business models that monitor and manage change, which is communicated in effective ways through the educational implementation of green skills. From evaluating the emissions of supply chains to developing better, more sustainable products and offsetting strategies, data is the foundation for driving change across the board to facilitate analytical and AI tools to revolutionise business and enable us to reach our collective sustainability goals. Building on your sustainability journey is a constantly evolving and learning process.

Get started with Microsoft Cloud for Sustainability

References

To help you keep up to date, the following resources are helpful:

- Microsoft sustainability resources
- Sustainability Executive Playbook: 2021 and beyond. Commissioned by Microsoft and authored by EY
- The carbon benefits of cloud computing
- The Principles of Sustainable Software Engineering
- The future of the Chief Sustainability Officer. A perspective from Deloitte and the Institute of International Finance
- The Seven Pillars of Sustainability Leadership
- A Data Scientist's introduction to Sustainable Finance. Data Science with Darsh Blog
- The state of sustainable architecture practices in 2022
- Responsible Investor: I want to make an official request of regulators and the ESG community: Stop it
- Elastacloud sustainability white paper
- Taxomania! An International Overview
- The relationships between SFDR, NFRD and EU Taxonomy
- Sustainable Finance Disclosure Regulation – Article 6 Funds – What to consider when integrating sustainability risk into the investment decision making process?
- Do no significant harm and minimum safeguards in practice. Navigating the EU Taxonomy Regulation. FTSE Russell
- What You Need to Know About Article 6 of the Paris Agreement
- The Paris Agreement's New Article 6 Rules
- The Taskforce on Scaling Voluntary Carbon Markets
- Sorry, carbon offsets still aren't settled
- Carbon Offsets: New USD 100 Billion Market Faces Disputes Over Trading Rules – Bloomberg
- A blueprint for scaling voluntary carbon markets | McKinsey
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