

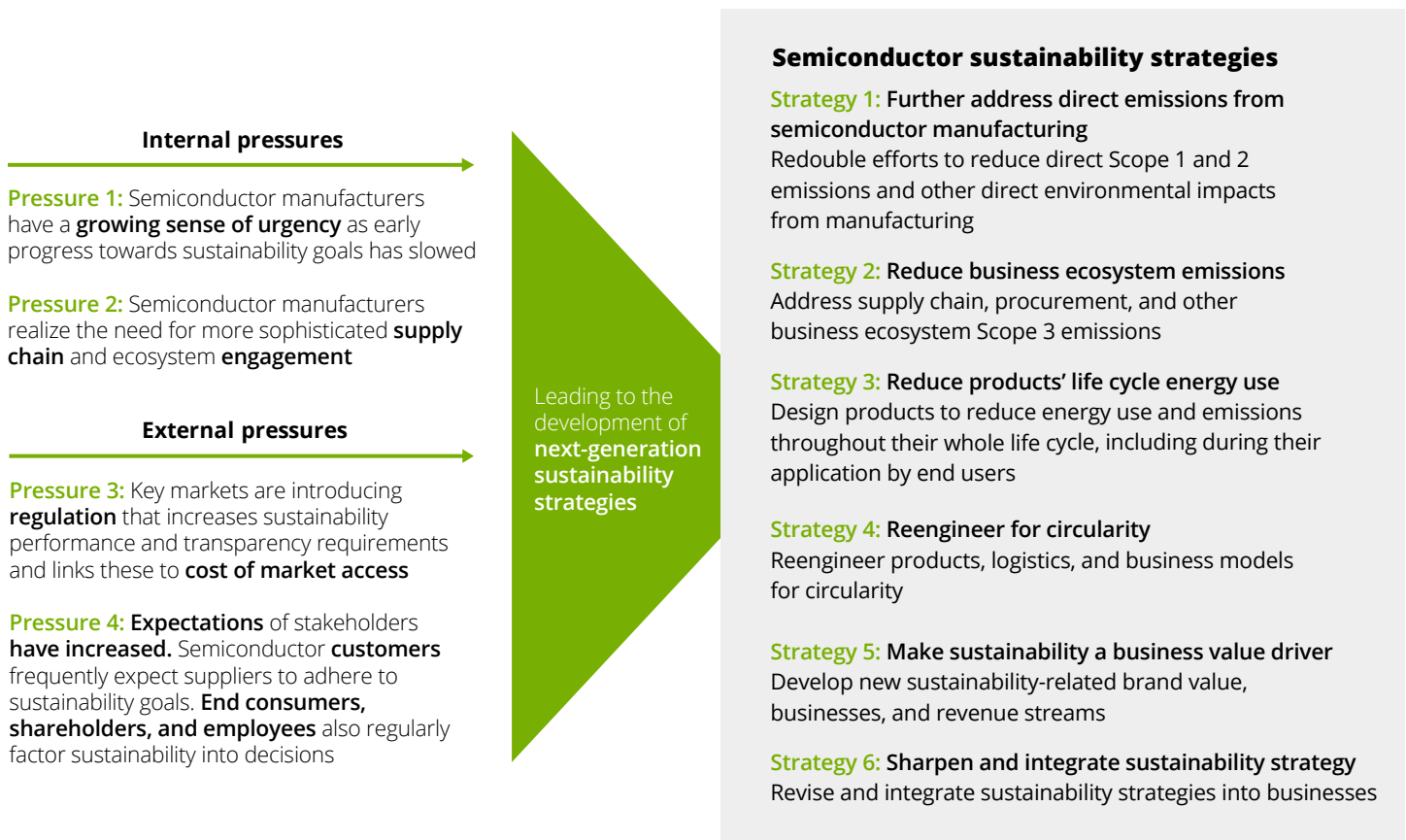
Semiconductor sustainability trends

Strategy 6: Semiconductor leaders are sharpening sustainability strategies and integrating them into the business

Series overview

As illustrated in the graphic below, through our experience in the industry, Deloitte sees four broad sources of pressure toward increased sustainability in the semiconductor sector. Companies' responses are coalescing into six next-generation semiconductor sustainability strategies:

Sustainability pressures and strategies in today's semiconductor sector



Earlier articles in Deloitte's *Semiconductor Sustainability* series have discussed the overall sustainability landscape and delved into each sustainability strategy. As the closing chapter in the series, this article discusses the specific drivers and the distinct solutions that companies are implementing to pursue Strategy 6: Revising sustainability strategies and integrating them into the business.

Context

Previous articles in this series have discussed the range of pressures for semiconductor companies to address sustainability. We have also discussed the specific drivers that have been leading to the adoption of a set of sustainability strategies that range from new investments in manufacturing and deeper engagement of supply chain partners; to the redesign of products to help reduce their energy use and enable circularity; through development of new sustainability-related revenue streams and service offerings.

The breadth of these pressures, drivers, and strategies shows that sustainability considerations have become important to almost every element in the business of manufacturing and supplying semiconductor products. It is no surprise that semiconductor company leadership today sees sustainability as a central factor in the success of their business and that companies have been revising both the content and structure of their sustainability goals and strategies to reflect this. In general, as companies' experience with sustainability has matured, the representative approach has evolved from being a somewhat separate compliance- and brand-related effort managed by a distinct environmental, social, and governance (ESG) team, toward a priority that is co-owned by executive leadership and increasingly integrated throughout the business.

Drivers

Drivers and solutions for sharpening and integrating sustainability strategy into the semiconductor business

Internal drivers

Driver 1: A desire to act on lessons from early decarbonization goal-setting and progress. Companies have learned that their emissions-reduction goals need greater scientific rigor and clearer implementation plans

Driver 2: A recognition that addressing sustainability is fundamental to long term business health. Semiconductor executives recognize sustainability as a top issue in the long-term growth and health of their businesses

External drivers

Driver 3: A requirement to prepare for heightened emissions regulation and reporting standards. A growing number of sustainability-related laws and regulations require greater readiness and capabilities for compliance

Driver 4: A response to increasingly sophisticated stakeholder expectations, requiring companies' sustainability strategies to be rigorous, up-to-date and authentic

Leading to the revision of sustainability strategies to achieve more rigor, value creation and integration with the business

Solution 1: More rigorous goal setting and reporting.

Companies are revising their decarbonization and other sustainability goals to have greater scientific rigor, clearer roadmaps, and to articulate the costs and benefits to the business

Solution 2: A recognition that addressing sustainability is fundamental to long term business health.

Semiconductor executives recognize sustainability as a top issue in the long-term growth and health of their businesses

Solution 3: Greater integration of sustainability throughout leadership and the organization, to reflect its growing impact on the business and to capture more value from sustainability

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Solution 4: Technology-enabled sustainability monitoring, evaluation, and disclosure.

Companies are enabling their increasingly sophisticated sustainability strategies with dedicated data systems capabilities

How are the drivers for revising and strengthening sustainability strategies manifesting for semiconductor companies?

Driver 1. A desire to act on lessons from early decarbonization goal-setting and progress

Following the Paris Agreement's goal to limit global temperature rise by 1.5°C or less, many semiconductor companies announced goals to reduce their greenhouse gas (GHG) emissions. AMD,¹ Wolfspeed,² and Analog Devices,³ for example, have each announced a goal of reducing Scope 1 and 2 emissions by 50% by 2030. A visit to semiconductor manufacturers' websites will likely reveal that the majority have set, or are planning to set, decarbonization goals.

With the benefit of several years' experience, two broad lessons have emerged. First, early decarbonization goals often lacked a clear scientific basis and feasibility analysis and fell short of guiding ambitious, long-term action. Of the 1,000 companies that disclosed data via the 2017 CDP Climate questionnaire, 89% had already set targets for emissions reduction while only 20% set emissions reduction targets that extend to 2030 or beyond.⁴ Second, progress toward reducing emissions has frequently lagged the timeline needed to achieve those goals. An analysis led in part by the Semiconductor Climate Consortium shows that the industry as a whole is not on track to reach the required net-zero emissions mark by 2050 and will exceed its allocated emission budget by 3.5 times.⁵

Driver 2. A recognition that addressing sustainability is fundamental to long-term business health

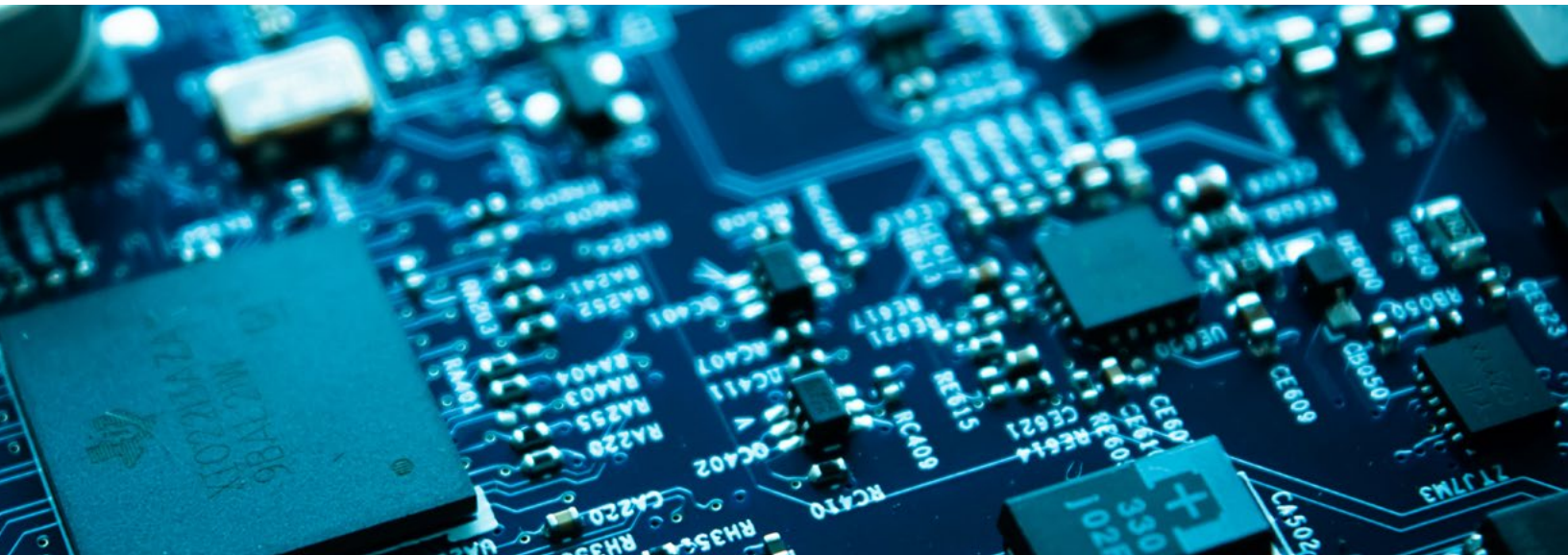
The business sustainability strategies described in earlier articles in this *Semiconductor Sustainability* series point to how the topic is becoming fundamental to semiconductor operations and market strategies. Looking to the longer term, Deloitte's global *Turning point report*⁶ finds that unchecked climate change could cost the global economy US\$178 trillion over the next 50 years, unless global leaders unite in taking action to address its causes. Meanwhile, the same analysis indicated that by investing in a systemic net-zero transition, the global economy could gain US\$43 trillion over the same period.

Deloitte's 2023 *CxO sustainability report*⁷ found that 42% of CxOs rated climate change as a "top-three issue" with only economic outlook ranking higher; 61% said climate change will have a high or very high impact on their organization's strategy and operations over the next three years; and 75% said their organizations have increased their sustainability investments over the past year (with nearly 20% reporting that they had increased investments significantly). With this growing centrality of sustainability to current and future business health, the topic is firmly on the executive and board agendas at semiconductor companies.

Driver 3. A requirement to prepare for heightened emissions regulation and reporting standards

Semiconductor companies are subject to a growing number of sustainability-related laws and regulations. These span multiple geographies and are growing in both volume and sophistication and depth of implications for the business. The European Union's Corporate Sustainability Reporting Directive (CSRD)⁸ broadly requires companies to publicly disclose and verify their greenhouse gas emissions, while its future Carbon Border Adjustment Mechanism (CBAM) is likely to tie emissions embedded in semiconductor products to the cost of market access. In the United States, California has passed legislation requiring disclosure of emissions data⁹ and climate-related financial risk disclosure,¹⁰ and the SEC is expected to issue US climate disclosure guidelines.¹¹ Additionally, in the United States, the Inflation Reduction Act¹² includes incentives for energy efficiency that are likely to affect the market for semiconductor products, while the CHIPS Act¹³ includes incentives for semiconductor companies to review their investment strategies. In Asia, there is growing pressure to expand the availability of renewable energy to help semiconductor companies reduce the carbon footprint of fabrication and packaging.¹⁴

The increasingly complex regulatory landscape, combined with a trend toward compliance with (and reporting on) regulations requiring greater reach into both company operations and supplier networks is leading companies to revisit their sustainability regulatory preparedness and approaches to compliance. Sixty-five percent of respondents to Deloitte's 2023 *CxO sustainability survey*¹⁵ said the changing regulatory environment has led their organization to increase climate action over the past year.



Emissions reporting standards are being adopted across all major economies¹⁶

US

- SEC proposed a **climate change disclosure rule (delayed)**
- SEC released two proposals which aim to enhance disclosures on **mutual funds, exchange-traded funds and similar vehicles that account for ESG**
- California adopted SB 253 & SB 261 on climate disclosures

UK

- **Mandatory TCFD reporting** for listed companies since January 2021
- UK announced intentions to **mandate ISSB**
- FCA sets ambition to lead regulatory agenda on granularity of transition plans with the **UK Transition Plan Taskforce (TPT)** framework
- **Department for Business, Energy & Industrial Strategy (BEIS)** requirements to underpin economy wide **mandatory TCFD aligned climate disclosure requirements** that start in April 2022

EU

- **The European Parliament** adopted the **Corporate Sustainability Reporting Directive (CSRD)**
- **The EU Commission** released final **European Sustainability Reporting Standards (ESRS)** on climate and sustainability disclosures based on **European Financial Reporting Advisory Group (EFRAG)** proposition
- The **EU Taxonomy enforced in July 2020**, is a classification system establishing a list of environmentally sustainable economic activities helping the EU **scale up the green deal**

South America

- **Brazil** has adopted ISSB (IFRS S1&S2)

International

- **IFRS Foundation & VRF** complete consolidation to support the work of the ISSB
- **ISSB** published its final sustainability reporting (S1) and climate (S2) standards in June 2023
- IAASB is preparing **"ISSA5000"**, the global sustainability assurance standard



APAC

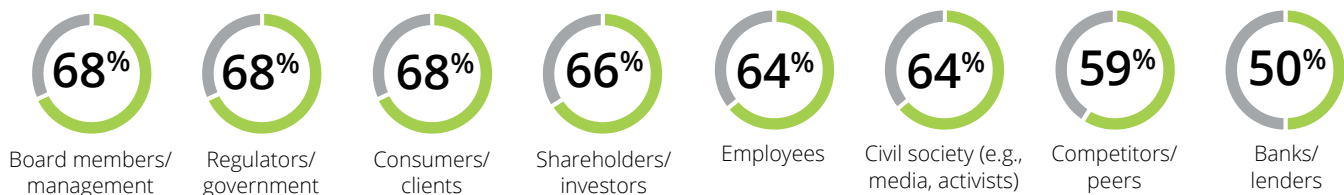
- **Japan, Hong Kong, and Singapore** announced **mandatory climate disclosures** aligned with TCFD
- **ASEAN** Taxonomy Board (ATB) released the **ASEAN Taxonomy for Sustainable Finance (ASEAN Taxonomy)**
- **China** announced **plans to adopt ISSB**

Driver 4. A response to increasingly sophisticated stakeholder expectations

In earlier articles in Deloitte's *Semiconductor Sustainability* series, we've discussed the increased sustainability sophistication and expectations of end consumers, customers, regulators, and capital providers. This is exerting pressure for companies' sustainability strategies to be rigorous, up to date, and

authentic. In Deloitte's *2023 CxO sustainability survey*,¹⁷ more than half of respondents said that employee activism on climate matters has led their organizations to increase sustainability actions over the past year, with 24% reporting that it led to a "significant" increase. Respondents' relative weighting of alternative sources of stakeholder pressure for sustainability action is summarized in the following graphic.

Responses of "Large" or "Moderate" to the question: "To what extent does your company feel pressure to act on climate change from your stakeholders?"¹⁸



Solutions

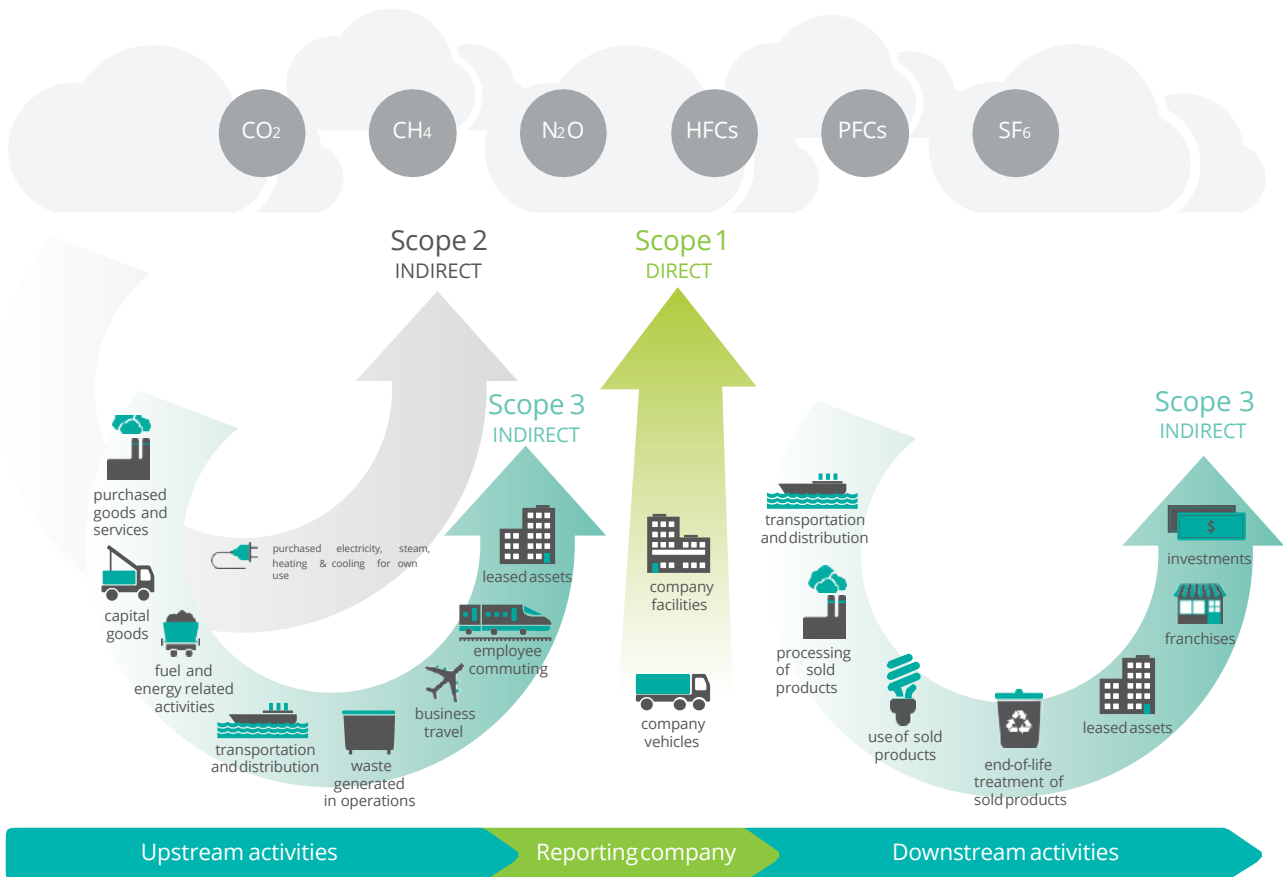
In response to these drivers, semiconductor companies are sharpening and revising their sustainability-related strategy and organization. What specific solutions are they pursuing?

Solution 1. More rigorous goal-setting and reporting

Having gained several years’ experience in both stakeholders’ perspectives and the practicalities of setting and working toward emissions reduction goals, some companies are revisiting and revising their decarbonization goals. Two themes appear predominant in this trend: Aligning goals with a highly credible international standards and setting goals in parallel with developing business plans and road maps for achieving them.

While multiple standards exist, the Science Based Targets initiative (SBTi)¹⁹ has emerged as a highly credible standard for net-zero targets. SBTi developed the definitions for Scopes 1, 2, and 3 emissions, as well as for specific emissions categories within each Scope. It requires companies to address the more challenging Scope 3 emissions, in addition to Scopes 1 and 2, and also is consistently developing and publishing guidelines to setting emissions reduction targets for individual economic sectors. At the start of 2019, just one semiconductor company had a SBTi-approved target. As of October 2023, 22 semiconductor companies now have science-based targets.²⁰ Onsemi, NXP, and Analog Devices each have committed to SBTi goals, for example; and others, such as Allegro Microsystems, are in the process of evaluating science-based targets.

SBTi requires companies’ emissions reduction goals to address Scopes 1, 2, and 3²¹



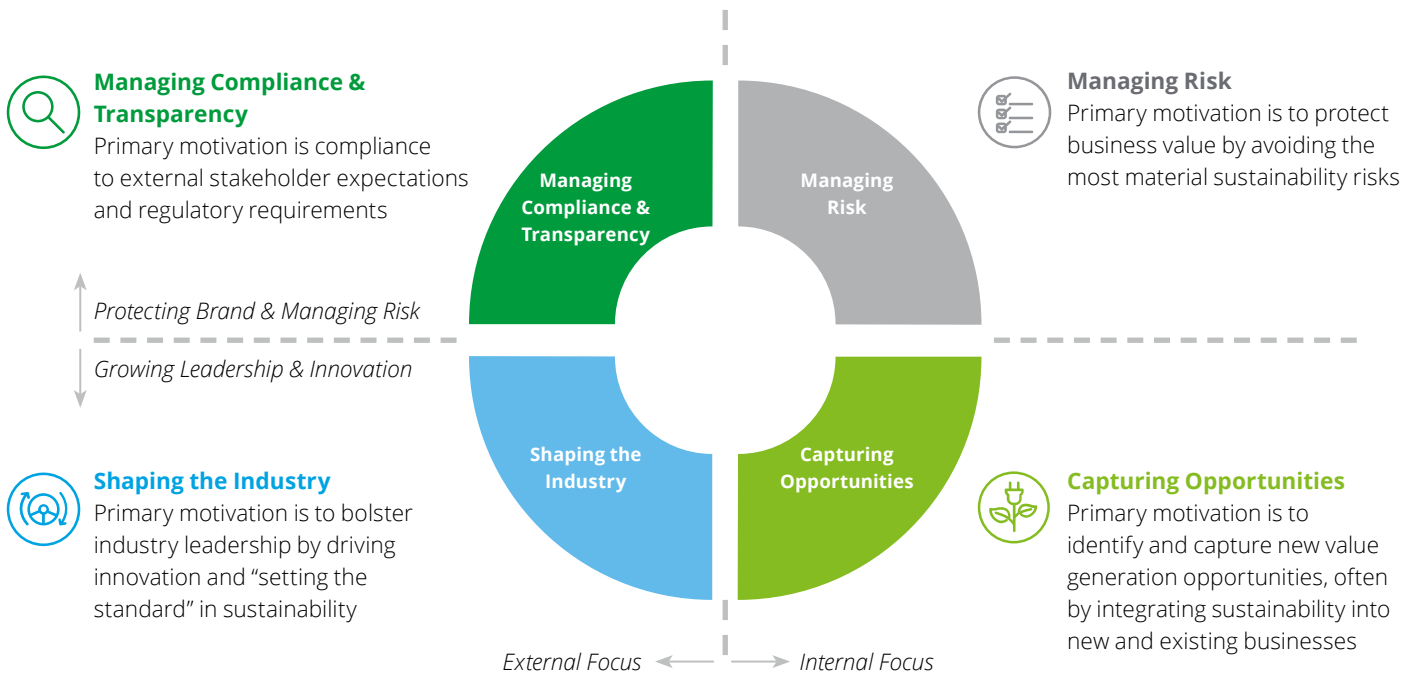
Source: [Science Based Target Initiative](https://sciencebasedtargets.com/)

The process for establishing clear science-based targets has advanced significantly in recent years. Broadly, the initial step involves measuring or estimating a company’s baseline emissions, identifying their sources, and prioritizing their relative materiality. There are several accepted methods for establishing the emissions baseline, ranging from estimations based on a database of emissions intensity factors through to direct measurement. Following this, databases of abatement technologies and processes can be consulted and assessed in light of a business’s operations and supply chain, as well as its ambitions, to arrive at credible emissions reduction approaches, timelines, investment plans, goals, and reporting. The result can be a much more rigorous, credible, informed, and achievable set of emissions reduction goals than was possible just a few years ago. In addition to emissions reduction, many companies have also expanded the breadth of their sustainability goal-setting to include other environmental and social goals beyond climate. It is increasingly recognized that rigorous sustainability targets can strengthen a business and “enhance revenue and lower operational costs by developing new business models and low-carbon processes, technologies, services, products and other sources of value.”²²

Solution 2. Extending and sharpening sustainability strategy

Deloitte’s experience working with organizations in the semiconductor sector has shown that there are broadly four complementary approaches to generating business value from investment and initiatives in sustainability. These are shown in the graphic below. Typically, a representative semiconductor company may have first begun engaging in sustainability from the perspective of seeking to meet regulator and other stakeholder expectations as sustainability became more prominent on those stakeholder’s motivations. Another motivation may have been the need to manage risk, both the brand value and regulatory compliance risks related to compliance and transparency, and tangible business risks associated with sustainability such as raw materials access or the possibility of carbon taxes being imposed by some jurisdictions. These two broad approaches to the business value associated with sustainability tended to focus on avoiding value destruction of business costs and tended to lead to sustainability strategies that were viewed as somewhat separate from the core business and were often managed as initiatives run by distinct ESG or sustainability teams. We can think of these as “first generation” sustainability strategies, represented in the top half of the graphic.

The four sources of business value from sustainability



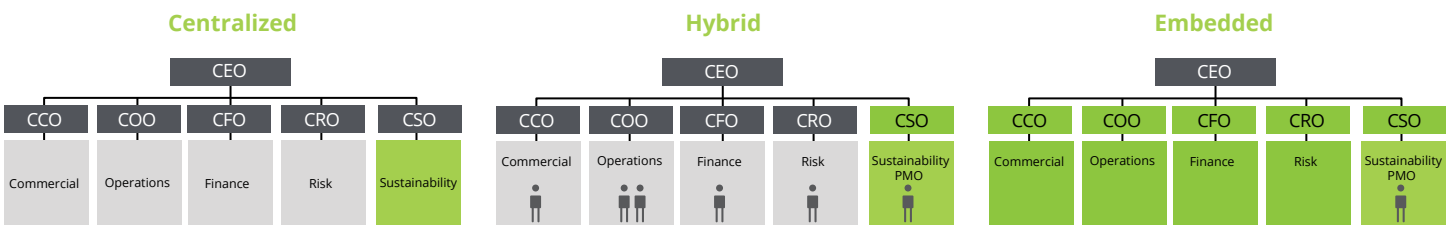
The articles in this Semiconductor Sustainability series have focused on a recently emerging set of “next-generation sustainability strategies” that tend to focus on the proactive generation of direct and indirect value for the business. These approaches to generating value from sustainability investments are represented in the bottom half of the graphic: Investment in the latest low-emissions semiconductor manufacturing processes and engaging with supply chain partners to track and reduce emissions can drive process innovation. Efforts to reduce products’ life cycle energy use, introduce circularity, and develop new sustainability-related businesses and products were discussed quite extensively in earlier articles and can capture opportunities to directly drive business growth. Taken together, these efforts can shape the future evolution of the semiconductor industry. In our work with semiconductor companies, Deloitte is being asked with increasing frequency to help companies chart their course for future market-based value generation related to sustainability.

Solution 3. Greater integration of sustainability throughout leadership and the organization

As semiconductor companies’ sustainability strategies have become more ambitious, sophisticated, and business-centric, companies have found increasing benefit from integrating their sustainability teams and functions with both overall corporate

leadership and the business. Early sustainability strategies that emphasized regulatory compliance, reporting, and stakeholder management could be adequately managed as largely distinct initiatives, managed by teams that may have reported to the general counsel, corporate public relations, or investor relations. As more evolved sustainability strategies have emerged, there has been a need to engage business units and functions more directly and more deeply. For example, procurement needs to lead engagement of supply chain partners in addressing Scope 3 emissions reduction: business unit product management, sales, and corporate strategy are essential to developing new sustainability-related revenue streams; product design, engineering, and operations are essential to the introduction of circularity, while manufacturing is a key internal collaborator for reducing in-house emissions. As a result, semiconductor companies are increasingly involving the full executive group in leading sustainability—and have been moving from centralized sustainability teams toward integrating them with other functions and business units. Strategies tend to succeed when others within the business—not the ESG team alone—drive progress, and many semiconductor companies are revising their business models, organizational structures, governance processes, and networks of involved stakeholders to embed sustainability into their company’s DNA²³. This is illustrated in the next graphic.

Centralized, hybrid, and embedded approaches to organizing the corporate sustainability function



Sustainability capability is centralized in an independent function, responsible for creation of the sustainability strategy and driving initiatives to improve sustainability performance

Sustainability capability structured as a small centralized team responsible for developing the sustainability strategy and utilizing the business to execute

Sustainability is in the DNA of the whole organization and every employee including leadership constitutes the sustainability capability

This office, under a Chief Sustainability Officer, supports and partners with other functions to deliver sustainability initiatives

A good example of this evolution in maturity is provided by Allegro Microsystems.²⁴ Like many other semiconductor companies, Allegro began its sustainability journey with a set of solid but largely disconnected initiatives and a small central sustainability team reporting to the general counsel's office. This initial team tracked and supported initiatives and supported basic sustainability reporting and questions. Recently, Allegro convened its executive leadership over a period of several months to develop a holistic organization-wide sustainability strategy. Allegro's revised sustainability strategy spans all elements of the business, and each pillar of the strategy is now led by an executive responsible for its progress and for embedding it in the business.

Putting this level of sustainability integration into action involves a range of actions, from elevating sustainability to be a part of overall corporate strategy, to restructuring capital allocation, to adopting performance-based incentives to drive accountability.²⁵ As described repeatedly in earlier articles in this series, more fundamentally, many semiconductor companies are rethinking the core of how they do business and placing sustainability at the center through new products, business models, and partnerships that position them to win in a low-carbon, more equitable future.

Solution 4. Technology-enabled sustainability monitoring, evaluation, and disclosure

As sustainability becomes ever-more integrated across the business, corporations in the semiconductor and other sectors are building sustainability data and analysis capabilities into their technology, systems, and processes. The aim is to enable their organization to collect and track information, derive insights, identify strategic opportunities, and meet or exceed requirements for both financial and nonfinancial climate-related data to support sustainability-related management decisions and disclosures.²⁶ Enterprise resource planning and manufacturing systems often lack integration, and there are opportunities for increased business efficiency as well as sustainability management and reporting from the integration of both systems and data. Similarly, as Generative AI approaches are introduced to help optimize and manage manufacturing and process efficiency, they also can help model and optimize sustainability performance.

A growing range of sustainability-related data platforms are available, with both mainstream enterprise resource platforms adding sustainability capabilities, and a range of new platform providers focused on sustainability data and reporting.²⁷ To secure the maximum benefit from investing in these capabilities, a semiconductor company should thoughtfully assess its existing IT and data architecture; its sustainability data, reporting, and analysis needs; and the holistic capabilities of each potential sustainability data platform to meet these.



In conclusion

Throughout this *Semiconductor Sustainability* series, we have highlighted the growing breadth of sustainability strategies being pursued by semiconductor companies; how profoundly sustainability considerations are now embedded in the leading semiconductor businesses; and the ways in which sustainability enhances value generation. As sustainability continues to be embedded in the corporate goals, strategy, organization, and systems of leading semiconductor companies, we can anticipate it becoming ever-more central to the future of the semiconductor sector. Indeed, this is essential if the potentially harmful sustainability impacts of continued growth of the sector are to be offset by its positive impacts on our economies and society.

Authors and contacts



Steve Watkins

Deloitte Consulting LLP
stewatkins@deloitte.com

Steve is a leader in Deloitte's Sustainability Strategy practice, where he focuses on helping corporate leaders to create value by integrating sustainability into their business strategies and operations. He serves clients in the semiconductor, high-tech, financial services and related industries, drawing on past roles ranging from financial journalism to banking to building his own business and growing several sustainability NGOs. Steve has a BA (honors) and an MA in economics from the University of Cambridge and an MBA from the Kellogg Graduate School of Management. He has completed a Sawhill Fellowship at the University of North Carolina, taught the Masters in Communications course at the University of Texas El Paso, and regularly publishes and speaks on topics at the intersection of business and social good.



Duncan Stewart

Deloitte Canada
dunstewart@deloitte.ca

Duncan is the director of Technology Sector Research for Deloitte Canada, the lead researcher on semiconductor topics for Deloitte's US Technology, Media & Telecommunications (TMT) Center. Duncan has 33 years of experience in the TMT industry. As a portfolio manager, he made investments in the tech and telecom sector and won the Canadian Technology Fund Manager of the Year award in its inaugural year. In his time as an investor he deployed a cumulative \$2 billion of capital into global TMT markets, in public and private companies. He is a CFA® charterholder and holds a BA in Political Science from the University of British Columbia.



Nakul Lele

Deloitte Consulting LLP
nlele@deloitte.com

Nakul is a leader in Deloitte's Strategy practice, focusing on supporting clients in the technology industry. He brings more than 20 years of global experience advising semiconductor, hardware, software, and fintech clients on their corporate and go-to-market strategies. Nakul enjoys helping clients identify growth opportunities, define new business models, and transform underlying processes and systems to achieve their ambition. Nakul holds an MBA with a focus on entrepreneurship from the UC Berkeley Haas School of Business and a BS in computer science and mathematics from Allegheny College.

Fabian Pineda, Mackenzie Schnell, Pete Edmunds, Kayla Cherry, and Monroe Erle also contributed to the content of this article.

Endnotes

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About Deloitte's *Semiconductor Sustainability* series of articles

Clients and other industry actors are interested in learning about the broad trends and patterns that we see in our work in the semiconductor sector, and interest is especially high in the critical task of driving sustainability through their operations and ecosystems.

Deloitte's series of short Semiconductor Sustainability articles responds to this interest by summarizing emerging sustainability strategies that Deloitte is seeing through our work with clients. Each article is intended to be a short, accessible summary that can be read in less than 20 minutes. We hope that the series proves useful to anyone interested in how the semiconductor sector is working to address its sustainability challenges.

Below is a list of all the articles in this series, in order of publication:

Series overview: Current sustainability pressures and next-generation sustainability strategies in the semiconductor sector

Strategy 1. Further address direct emissions from semiconductor manufacturing

Semiconductor companies are redoubling efforts to reduce direct "Scope 1 and 2", greenhouse gas emissions, other environmental impacts from manufacturing.

Strategy 2. Reduce business ecosystem emissions

Semiconductor companies are addressing supply chain, procurement, and other business ecosystem Scope 3 emissions.

Strategy 3. Reduce products' life cycle energy use

Semiconductor companies are designing products to reduce energy use and emissions throughout their full life cycles.

Strategy 4. Reengineer for circularity

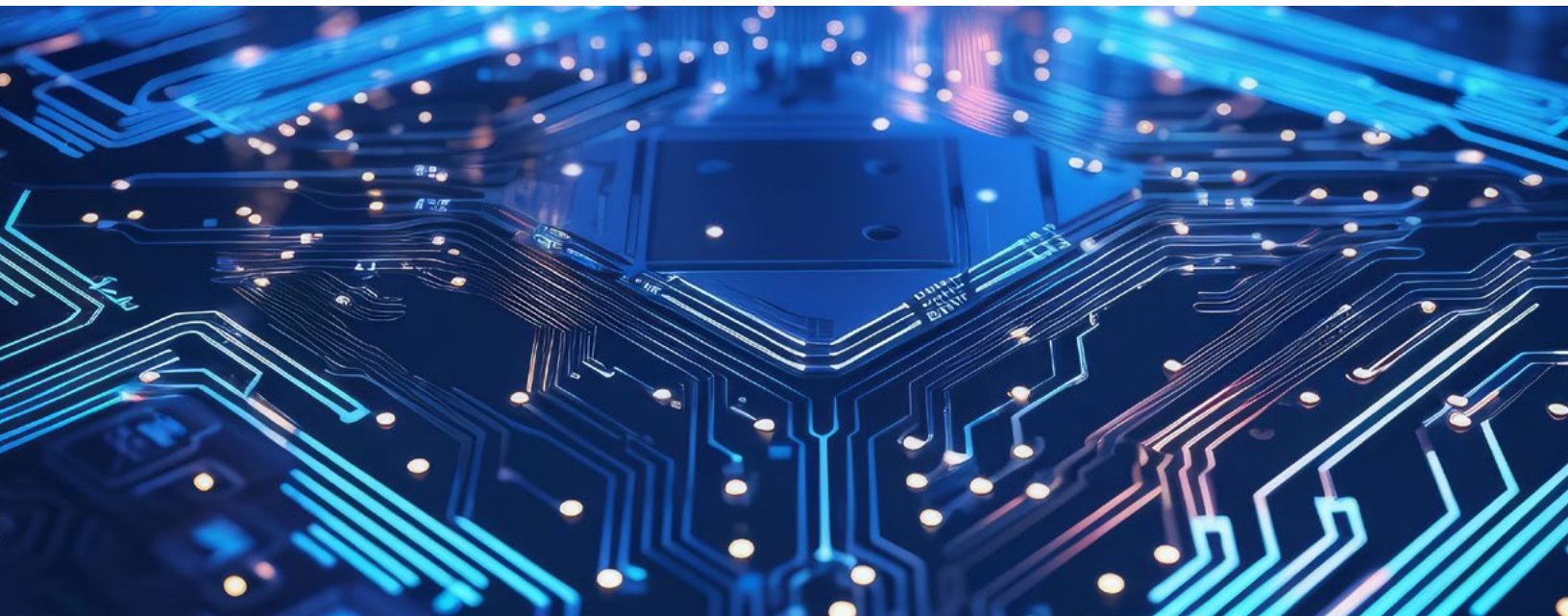
Semiconductor companies are reengineering products, logistics, and business models for circularity.

Strategy 5. Make sustainability a business value driver

Companies in the semiconductor sector are developing new, sustainability-related brand differentiation, businesses, and revenue streams.

[This article] Strategy 6. Sharpen and integrate sustainability strategy

Semiconductor leaders are strengthening sustainability strategies and integrating them into the businesses.





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