Supply Change: Tracking AI Giants' Decarbonization Progress

GREENPEACE

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Executive summary

Artificial intelligence (AI) is moving at a breakneck pace, driven by increasing investments from global tech giants such as Nvidia, Meta, and Google. Despite the exponential growth and opportunities in the sector, rising greenhouse gas emissions due to AI's mounting energy demand is becoming a growing concern.

Tech companies are addressing rising greenhouse gas emissions associated with rapidly increasing energy consumption of data centers. In addition, the AI supply chain—especially manufacturing AI-related hardware (advanced chips, for example), cloud servers, and AI-related consumer products is emerging as a significant source of AI's soaring carbon pollution. In 2024, supply chain emissions were a dominant source of total emissions among the AI giants. Leading chip designers Nvidia and AMD had as much as 84% and 98%, respectively, of total emissions from their supply chains.[1]

Manufacturing AI hardware is energy intensive. By 2030, electricity demand from global AI chipmaking could skyrocket 170 times to about 37,238 gigawatt-hours (GWh) in comparison to 2023 levels, which is more than the electricity consumption of the Republic of Ireland in 2023.[2] Furthermore, AI hardware production is largely concentrated in East Asia, where fossil fuels dominate the region's energy mix. With the slowing transition to renewable energy from key component suppliers in East Asia, some of the world's richest companies, including Nvidia, AMD, and Microsoft, have brought rising emissions to the region.

In this report, Greenpeace East Asia assessed the decarbonization progress of ten global AI giants: Microsoft, Apple, Amazon, Google, Meta, Nvidia, Broadcom, Advanced Micro Devices (AMD), Qualcomm, and Intel. These companies were chosen because of the significant part they play in AI infrastructure and product development. The rankings are based on publicly available information and evaluate the decarbonization progress in each firm's operation and supply chain using a four-pillar framework focused on Commitment, Transparency, Action, and Engagement and advocacy.

The report found that the majority of the AI giants have made slow decarbonization progress, especially in the supply chain. There is a gap between companies' operational and supply chain decarbonization performances due to a lack of ambitious targets to transition the supply chains to 100% renewable energy, limited supply chain climate data transparency, and inadequate efforts to decarbonize the supply chains. Nvidia, as a leading AI chip designing company, significantly lagged behind other AI giants with regards to emissions reduction and renewable energy transitions in the supply chain.

To effectively reduce supply chain emissions, AI giants should set the target to transition to 100% renewable energy for their supply chains by 2030. To bridge the gap between operational and supply chain decarbonization progress, companies need to actively expand investments to increase renewable energy accessibility for their suppliers, especially for those based in East Asia, where AI hardware manufacturers are currently highly concentrated and where the procurement of renewable electricity can be challenging. The AI giants need to make joint efforts to invest in additional renewable energy capacity to local power grids, and engage with policymakers to promote supportive policymaking to scale up renewable energy development.

1 See Figure 1 in the report for detailed information.

2 Greenpeace East Asia, "Chipping Point: Tracking Electricity Consumption and Emissions from AI Chip Manufacturing," April 10, 2025, accessed September 19, 2025, https://www.greenpeace.org/static/planet4-eastasia-stateless/2025/04/5011514f-greenpeace_chipping_point.pdf.

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Key findings

Overall

Nvidia and Broadcom ranked at the bottom of the overall list due to their lack of clear climate and renewable energy commitments especially for supply chains, low supply chain transparency on climate and energy data, insufficient action to reduce supply chain emissions, limited public policy advocacy, and inadequate supply chain engagement on renewable energy transitions. Six of the ten companies on the list received an F for their overall performance, due to a lack of ambitious decarbonization strategies and efforts in their supply chain, as well as limited transparency on supply chain energy consumption and procurement of renewable energy.

Apple ranked at the top with a B+ grade overall due to its ambitious renewable energy targets for both the company's own operational activities and for its supply chain, impactful decarbonization actions in operations and the supply chain, and meaningful policy advocacy. However, Apple still needs to improve its supply chain transparency. Apple failed to disclose the total electricity consumption and the ratio of renewable energy in its supply chain, which creates obstacles to track the actual progress towards its goal of transitioning the entire supply chain to 100% renewable electricity.

In 2024, the ranked companies did not take sufficient meaningful action to reduce supply chain emissions, with certain companies' supply chain accounting for as much as 98% of the total emissions. The neglect of supply chain decarbonization from the ranked companies has created a disconnect between corporate actions and actual sources of the majority of emissions.

Commitment and target

Most ranked AI companies fall short of making ambitious commitments to reduce emissions across their operations and supply chains by 2030, a timeline crucial to limit global warming to 1.5°C above pre-industrial levels. Seven of ten companies have set targets for carbon neutrality or net-zero emissions in their own operations and have extended their commitments to their supply chains. Among them, only Apple, Google, Microsoft, and Meta plan to meet their climate goals across their entire supply chains by 2030. Three companies—Nvidia, Broadcom, and AMD—have not set net-zero climate targets to reduce emissions either in their operations or supply chains.

Only Apple has committed to transitioning to 100% renewable energy for both its operations and supply chains by 2030. While Google and Microsoft also demand that their suppliers move away from fossil fuels to carbon-free energy, such targets might open the door for false solutions such as nuclear energy. Intel and AMD require their supply chains to use renewable energy to reduce emissions; however, their targets lack clarity regarding full supplier compliance and the commitment to 100% renewable energy. Amazon, Nvidia, and Meta have set targets for 100% renewable or carbon-free energy, but only for their own operations. In contrast, Broadcom and Qualcomm have not made any commitments to achieve 100% renewable energy for their operations or supply chains.

Transparency

Overall, the ranked companies lagged behind in disclosing climate and energy data about their supply chains compared to their own operations. Except for Apple, all ranked companies, including Microsoft, Google, and Nvidia, received an F for their supply chain transparency due to a lack of comprehensive disclosure on their supply chain electricity consumption and suppliers' renewable energy usage. Most of the ranked companies have published data and breakdowns of their Scope 3 emissions, but they were not fully transparent about details of electricity consumption across their supply chains. In terms of the electricity consumption of the supply chain, none of the companies in the ranking disclosed the total annual amount.

Action

Over half of the ranked companies failed to steadily reduce their Scope 3 emissions from 2022 to 2024. Among them, Nvidia's Scope 3 emissions nearly doubled from FY23 to FY25, increasing from 3,514,763 MT CO_2e to 6,912,577 MT CO_2e.

More than half of the ranked companies received an F grade for supply chain decarbonization due to failure to take meaningful steps, such as high-impact renewable energy procurement and investments in renewable electricity projects, to address rapidly increasing emissions by their supply chains. Intel, Amazon, and Nvidia scored the lowest. Apple scored the highest in operational and supply chain decarbonization actions due to significant renewable electricity procurement, effective strategies for mitigating supply chain emissions, and direct investments in renewable energy projects for its suppliers. In contrast, Nvidia, Broadcom, and Qualcomm have taken minimal steps to abate emissions from their suppliers, enhance supply chain energy efficiency, or launch investments to support their suppliers in procuring high-impact renewable electricity.

Apart from Apple, none of the companies in the ranking has shown how their suppliers sourced renewable energy, which makes it harder to track the impact of their supply chain renewable energy purchasing.

Engagement and advocacy

Most companies in the ranking demonstrated some level of direct engagement in climate policy and with suppliers on supply chain decarbonization, although Nvidia showed minimal activity in both areas. Meanwhile, seven ranked companies, including Google, Microsoft and Nvidia, have also been advocating for nuclear expansion. Except for Nvidia and Broadcom, the other ranked companies have directly engaged in climate policy related to renewable energy and greenhouse gas emissions regulation.

All ranked companies, except Nvidia, have shown evidence of direct engagement with suppliers on accelerating decarbonization and renewable energy procurement in addition to the adoption of climate targets. Whereas, overall, the level of supply chain engagement remains broader and less strategic than policy engagement. Furthermore, Nvidia, Microsoft, Google, Amazon, Intel, AMD, and Meta have been publicly advocating for nuclear energy expansion, a controversial form of energy that poses significant security risks, produces radioactive waste, and could dilute efforts on renewable energy development.

Overall Ranking

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Overall Ranking	
Apple	B+
Microsoft	C-
Google	C-
Meta	D-
amazon	F
AMD	F
Qualcomm	F
intel.	F
NVIDIA	F
BROADCOM	F

Note: This report assesses and ranks the performance of ten companies in the AI sector. The details of company selection process, data sources and evaluation criteria are provided in the **Appendix: Scope and methodology.**

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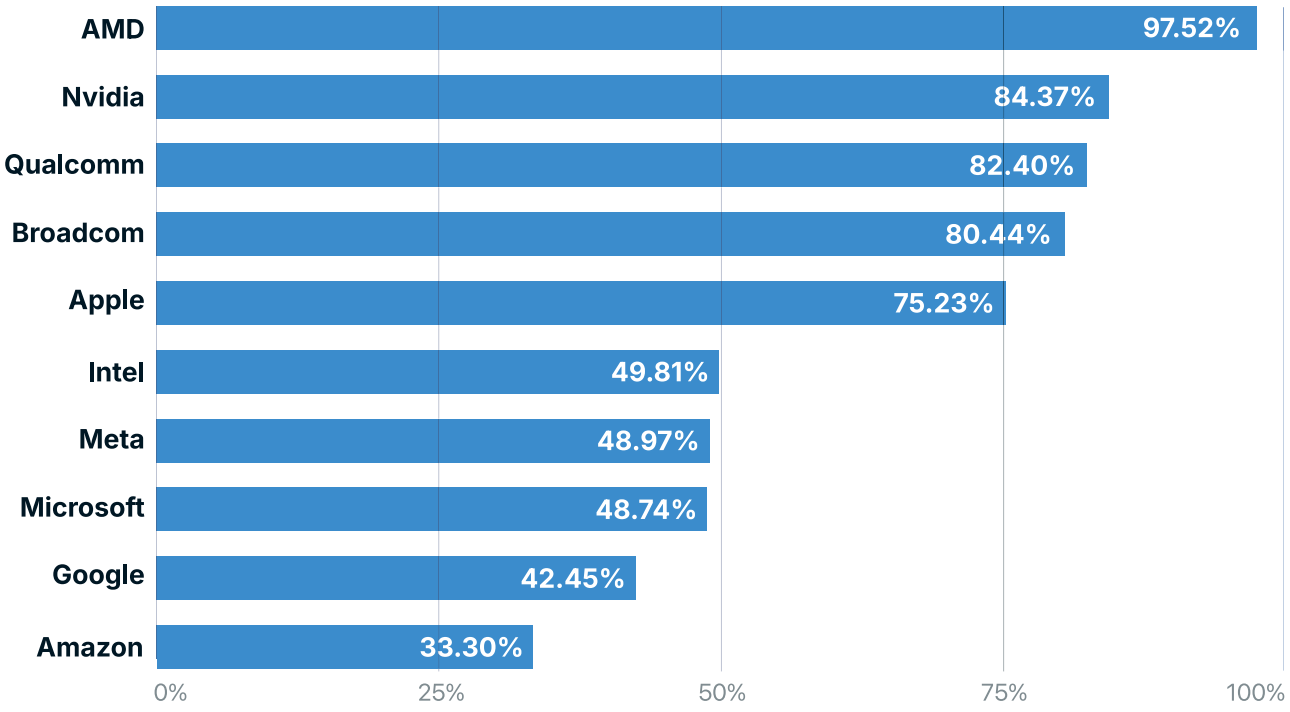
Introduction

Artificial intelligence (AI) has been advancing rapidly in recent years, fueled by escalating investments from leading tech companies and the rapid expansion of AI infrastructure. The global AI market is expected to grow by 25 times from $189 billion in 2023 to $4.8 trillion by 2033.[3]

However, the booming AI market is accompanied by growing environmental challenges. The AI industry's vast energy demands are raising concerns about its long-term sustainability. Global energy consumption by data centers is expected to more than double compared to 2024 and reach around 945 terawatt-hours (TWh) by 2030.[4] Furthermore, beyond companies' own operations, the supply chain of AI hardware, including semiconductors and cloud server equipment, is another significant contributor to AI-related emissions. In 2024, the supply chain emissions of AI giants were a significant share, with one company's supply chain emissions totaling almost 98% of its total emissions (see Figure 1).[5] In particular, leading AI chip designers, including AMD, Nvidia, Qualcomm, and Broadcom, had over 80% of their total emissions from their supply chains.

Figure 1. In AI giants' total emissions in the 2024 fiscal year, the proportion of supply chain emissions[6,7]



3 UNCTAD, "AI market projected to hit $4.8 trillion by 2033, emerging as dominant frontier technology," April 7, 2025, accessed September 19, 2025, https://unctad.org/news/ai-market-projected-hit-48-trillion-2033-emerging-dominant-frontier-technology.

4 IEA, "AI is set to drive surging electricity demand from data centres while offering the potential to transform how the energy sector works," April 10, 2025, accessed September 19, 2025, https://www.iea.org/news/ai-is-set-to-drive-surging-electricity-demand-from-data-centres-while-offering-the-potential-to-transform-how-the-energy-sector-works.

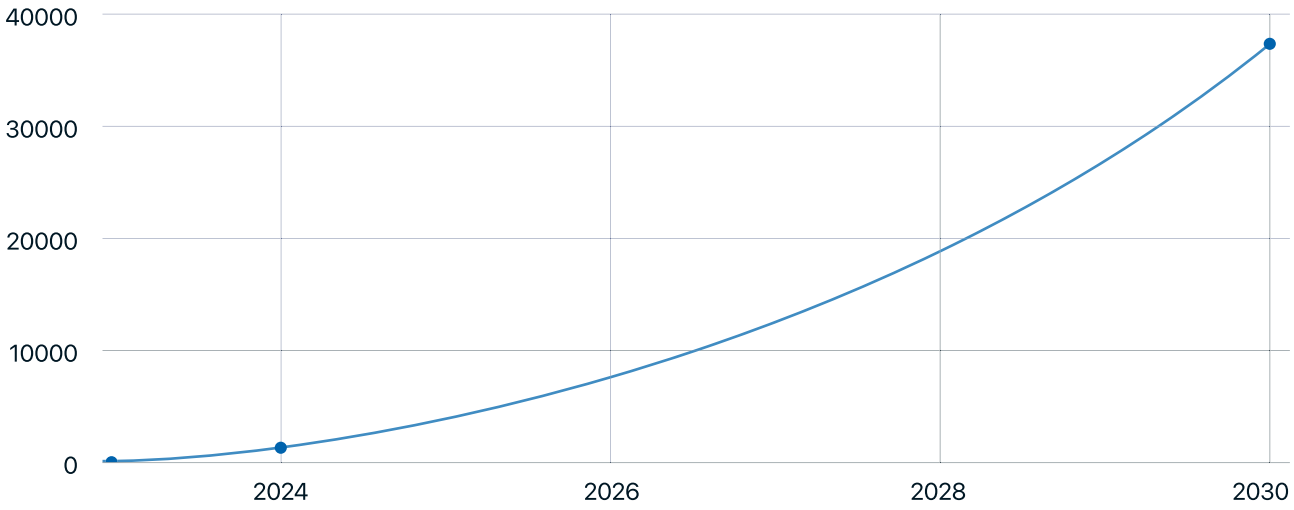
5 Calculations of total emissions exclude the use phase of products (Scope 3 category 11), and the supply chain emissions are calculated using Scope 3 categories 1 and 2. See more details in Footnote 7.

6 Source: the latest sustainability reports of the presented companies. Nvidia data corresponds to the company's fiscal year 2025, covering the period from January 29, 2024, to January 26, 2025.

7 Supply chain emissions are calculated using Scope 3 categories 1 (purchased goods and services) and 2 (capital goods) to account for variations in company-specific reporting methodologies and disclosure practices. The emissions from the manufacture of AI hardware such as consumer electronics and AI chips that the companies sell are often included in Scope 3 category 1. For AI hardware used internally such as cloud server equipment and AI chips at data centers, companies including Microsoft, Google, and Meta include relevant emissions from upstream purchasing in Scope 3 category 2 according to their latest sustainability reports. Total emissions are calculated by adding up the Scope 1, Scope 2 (location-based), and Scope 3 emissions of the company, excluding the use phase of sold products such as Scope 3 category 11 (use of sold products) where data are available.

The manufacture of AI chips, an essential component of AI hardware, is an inherently energy-intensive process. By 2030, electricity demand from global AI chipmaking is projected to increase 170 times from 2023 levels to reach 37,238 gigawatt-hours (GWh)—exceeding the current total electricity consumption of the Republic of Ireland (Figure 2).[8] In contrast to data center electricity demands, which companies like Apple, Google, and Microsoft have shown the ability to match with renewable energy, AI hardware manufacturing is currently concentrated in East Asia, where it relies heavily on fossil fuels for energy generation, thereby exacerbating supply chain emissions.[9,10]

Figure 2. Projected electricity consumption for global AI-related chip manufacturing in 2030[11]



In light of the significant carbon footprint of the supply chain, it seems difficult for AI giants to justify that they are on track to decarbonize their businesses until they make meaningful progress to reduce supply chain emissions. The majority of AI hardware suppliers are currently concentrated in East Asia and heavily rely on electricity generated by fossil fuels. Therefore, the transition to renewable energy is one of the most efficient and feasible pathways for companies to decarbonize.

This report has found that despite setting ambitious climate and renewable energy targets and decarbonizing their own operations, many leading AI companies maintain loose renewable energy requirements for their suppliers, leaving supply chain emissions largely unaddressed.

8 Greenpeace East Asia, "Chipping Point: Tracking Electricity Consumption and Emissions from AI Chip Manufacturing," April 10, 2025, accessed September 19, 2025, https://www.greenpeace.org/static/planet4-eastasia-stateless/2025/04/5011514f-greenpeace_chipping_point.pdf.

9 Greenpeace East Asia, "Chipping Point: Tracking Electricity Consumption and Emissions from AI Chip Manufacturing," April 10, 2025, accessed September 19, 2025, https://www.greenpeace.org/static/planet4-eastasia-stateless/2025/04/5011514f-greenpeace_chipping_point.pdf.

10 For details on the high concentration of AI hardware suppliers in East Asia, please refer to the Box: AI giants' interlinks with East Asian suppliers in this report.

11 Figure shows the electricity consumption projection for 2030 under the ambitious scenario. See "Chipping Point: Tracking Electricity Consumption and Emissions from AI Chip Manufacturing," for further details: https://www.greenpeace.org/static/planet4-eastasia-stateless/2025/04/5011514f-greenpeace_chipping_point.pdf.

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Category breakdown:

Assessing AI giants' decarbonization performances

Overall, there is a gap between the AI giants' operational and supply chain decarbonization progress. Each of the ranked companies achieved a lower grade for supply chain performance compared to their own operations. Seven out of ten companies scored an F on the supply chain ranking, suggesting limited progress in reducing emissions and scaling up renewable energy procurement in their supply chains.

Table 1. Company overall grades for operations and supply chains

Operational	Company	Supply chain
A-	Apple	B
B	Google	D-
C	Microsoft	C-
C-	Meta	F
D	amazon	F
F	Qualcomm	F
F	intel.	F
F	NVIDIA	F
F	AMD	F
F	BROADCOM	F

Commitment and target

To limit global warming to 1.5°C above pre-industrial levels, global greenhouse gas (GHG) emissions need to be reduced by 43% by 2030 relative to 2019.[12] However, the surging energy demand of AI is challenging the global climate agenda. Although many companies in the AI industry have made near-term emissions reduction targets, long-term commitments to full-scale emission reduction by 2030 are essential to limit the environmental impact of AI. Given the large proportion of supply chain emissions, companies may exacerbate climate risks by not including supply chains in their climate targets. Furthermore, to devise a practical roadmap for achieving their emissions reduction commitments, companies need a clear renewable energy target. Therefore, companies should aim to achieve both full-scale emissions reduction and 100% renewable energy by 2030, as well as include the upstream supply chain in their commitments.

While most of the ranked AI companies have set climate or renewable energy targets, only three—Apple, Google, and Microsoft— have made ambitious commitments to reduce emissions and transition energy across their operations and supply chains by 2030 (Table 2). This highlights an urgent need for other companies to expand commitments to reduce emissions in their supply chains and accelerate their timelines.

12 United Nations, "1.5°C: what it means and why it matters," accessed September 19, 2025, https://www.un.org/en/climatechange/science/climate-issues/degrees-matter.

Table 2. Company commitment and target grades for operations and supply chains

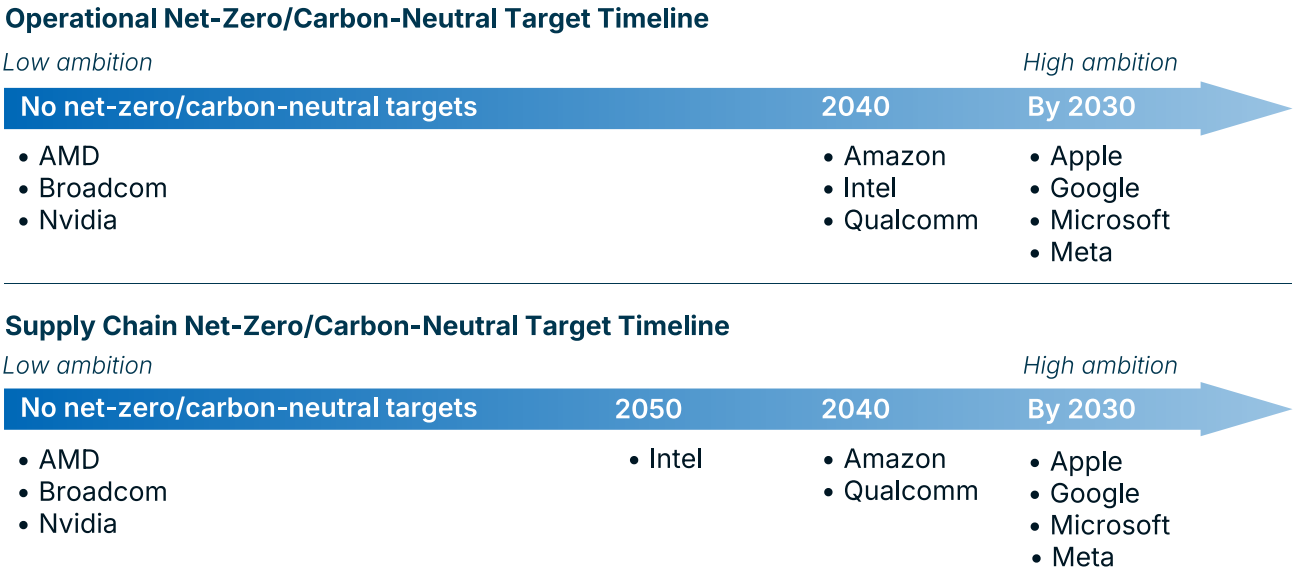
Operational	Company	Supply chain
A		A+
A-	Google	A
A-	Microsoft	A
A-	Meta	F
C	intel.	D+
C	amazon	F
F	NVIDIA	F
F	Qualcomm	F
F	AMD	F
F	BROADCOM	F

Climate commitment

Seven of the ten companies in this report (Amazon, Apple, Google, Intel, Meta, Microsoft, and Qualcomm) have set a target to achieve carbon neutrality or net zero for their own operations and extended the net-zero commitment to their supply chains. Three companies—Nvidia, Broadcom, and AMD—have yet to set net-zero climate targets to reduce emissions for either their own operations or supply chains.

While several ranked companies have established their climate commitments, the timelines to achieve the goals shows a mixed picture (Figure 3). Among the seven companies that have set full-scale climate targets for both operations and supply chains, only Apple, Google, Microsoft, and Meta aim to achieve their climate targets across the entire supply chain no later than 2030. Amazon and Qualcomm have a 2040 net-zero emissions goal for their Scope 1, 2 and 3 greenhouse gas emissions. For Intel, while it aims to achieve net-zero Scope 1 and 2 greenhouse gas emissions by 2040, its net-zero commitment on the upstream supply chain is much less ambitious, and is only set to be achieved by 2050. However, Nvidia, Broadcom, and AMD still lack a net-zero target for supply chain decarbonization.

Figure 3. The timeline of ranked companies' net-zero or carbon-neutral targets



Renewable energy target

Overall, the AI companies demonstrate a stronger commitment to transitioning to renewable energy within their operations compared to across their supply chains (Table 3). Eight of ten companies have set renewable energy targets for their own facilities, while five companies have released requirements that their suppliers transition to renewable energy. In particular, five companies, namely Apple, Google, Microsoft, AMD, and Intel, have set renewable energy targets on both their own operations and suppliers. Three ranked companies, Amazon, Nvidia, and Meta, have their current renewable energy targets limited to operational activities, leaving their suppliers outside the renewable energy strategies. Broadcom and Qualcomm lag behind other companies due to a lack of targets for either operations or upstream supply chains.

In terms of the timeline and scope, in general, companies have much lower requirements for their suppliers compared to their own operations. Seven companies with operational targets—Nvidia, Apple, Google, Microsoft, Amazon, Meta, and Intel—have committed to transitioning to 100% renewable energy or carbon-free energy by 2030 at the latest. AMD set the 100% operational renewable electricity timeline by 2035. Among the five companies with supply chain renewable energy targets, only Apple has a clear demand for its suppliers to transition to 100% renewable energy by 2030. Although Microsoft and Google also set similar requirements for their suppliers, they use the term "carbon-free energy" instead of "renewable energy" for their supplier targets. Intel and AMD have asked their suppliers to adopt renewable energy, yet the granularity of their requirements is not clear. Intel did not specify which suppliers are required to fulfill the renewable energy target, and AMD sets no requirement for the minimum amount of renewable energy to be sourced by suppliers.

Table 3. Renewable energy targets of AI giants

Operational	Company	Supply chain
To maintain 100% renewable electricity	Apple	To transition to 100% renewable electricity by 2030
To match 100% of the electricity consumption with zero carbon electricity purchases 100% of the time by 2030	Microsoft	To transition to 100% carbon-free electricity by 2030
To achieve 24/7 carbon-free energy by 2030	Google	Suppliers in the manufacturing of Google technical infrastructure and consumer hardware products to commit to achieving a 100% clean electricity match by 2029
To achieve 100% renewable electricity by 2030	Intel	Key suppliers to commit to 100% renewable electricity by 2030
To achieve 100% renewable electricity in 3~10 years	AMD	80% manufacturing suppliers to source renewable energy by 2025, no minimum amount required
To achieve 100% renewable electricity by 2025	Amazon	N/A
To achieve 100% renewable energy by FY25	Nvidia	N/A
To maintain 100% clean and renewable energy	Meta	N/A
N/A	Qualcomm	N/A
N/A	Broadcom	N/A

Different implications of AI giants' renewable energy targets

1. The importance of matching renewable energy use every hour

None of the ranked companies have committed to matching renewable energy use on an hourly basis. To avoid greenwashing in renewable energy sourcing, companies need to consider matching their electricity consumption with renewable energy generated on the local grid on an hourly basis. Matching electricity consumption with renewable electricity on an hourly basis provides crucial steps to expand the renewable energy generation with required energy storage, eventually decarbonize the local grids. Read more on 24/7 hourly matching renewable energy sourcing.

2. Renewable energy vis-à-vis carbon-free energy

Renewable energy, such as solar, wind, and geothermal energy, is derived from natural sources.[13] Besides renewable energy, carbon-free energy (CFE) also includes other types of electricity generation that do not directly emit carbon dioxide, such as nuclear and carbon capture and storage (CCS).[14] By setting a target on CFE rather than renewable energy, a company may promote false solutions like nuclear energy and gas with carbon capture technology.[15] Nuclear power should not be taken as a solution to the soaring energy demand of AI, as it presents higher environmental and security concerns, higher development costs, and longer development timelines compared to renewable alternatives.[16]

3. False solutions under carbon-free energy targets: case studies of Google, Microsoft, and Meta

Gas is one of the major power sources for global data centers, with the adoption of nuclear power on the increase.[17] As the expanding AI sector continues to drive increased electricity demand from data centers, technology companies are under pressure to secure additional energy supplies.

Google and Microsoft have achieved 100% renewable energy for their electricity consumption and have committed to 24/7 CFE for all operational electricity consumption by 2030. Meta has reached 100% renewable energy to power operational electricity consumption and also aims to continue to match all of its operational electricity use with clean energy. However, Google, Microsoft, and Meta have increasingly sought nuclear energy to power their data centers. In October 2024, Google signed a deal to start to use small modular reactors (SMRs) for AI data centers by the end of this decade.[18] In May 2025, Google agreed with a nuclear developer to fund early-stage development of three nuclear reactors.[19] Microsoft signed a 20-year deal starting from 2028 to purchase power for AI expansion from the Three Mile Island energy plant.[20] Similarly, in June 2025, Meta struck an agreement with a nuclear reactor for 20 years to power AI and data centers, beginning in 2027.[21]

13 United Nations, "What is renewable energy?" accessed September 19, 2025, https://www.un.org/en/climatechange/what-is-renewable-energy.

14 United Nations, "24/7 CFE at a Glance," accessed September 19, 2025, https://www.un.org/sites/un2.un.org/files/2021/10/24-7cfe_compact_-_v2_updated.pdf.

15 Carbon Herald, "Microsoft Weighs Natural Gas With Carbon Capture To Power AI Data Centers," accessed September 30, 2025, https://carbonherald.com/microsoft-weighs-natural-gas-with-carbon-capture-to-power-ai-data-centers.

16 Greenpeace, "6 reasons why nuclear energy is not the way to a green and peaceful world," March 18, 2022, accessed September 19, 2025, https://www.greenpeace.org/international/story/52758/reasons-why-nuclear-energy-not-way-green-and-peaceful-world/.

17 European Parliament, "AI and the energy sector," July 4, 2025, accessed September 28, 2025, https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2025)775859.

18 Google, "New nuclear clean energy agreement with Kairos Power," October 14, 2024, accessed September 27, 2025, https://blog.google/outreach-initiatives/sustainability/google-kairos-power-nuclear-energy-agreement/.

19 Google, "Google and Elementl Power are collaborating to advance nuclear energy site development," May 7, 2025, accessed September 27, 2025, https://blog.google/feed/google-and-elementl-nuclear-energy-site-development/.

20 Constellation, "Constellation to Launch Crane Clean Energy Center, Restoring Jobs and Carbon-Free Power to The Grid," September 20, 2024, accessed September 27, 2025, https://www.constellationenergy.com/newsroom/2024/Constellation-to-Launch-Crane-Clean-Energy-Center-Restoring-Jobs-and-Carbon-Free-Power-to-The-Grid.html.

21 Meta, "Meta and Constellation Partner on Clean Energy Project," June 3, 2025, accessed September 19, 2025, https://about.fb.com/news/2025/06/meta-constellation-partner-clean-energy-project/.

Transparency

To achieve the corporate climate targets, AI giants are taking various measures to abate or indirectly offset emissions, such as purchasing renewable energy certificates (RECs), signing renewable electricity power purchase agreements, and buying carbon removal credits. The impacts of these methods vary, and some remain debatable.[22] Climate disclosure is crucial to facilitate independent analysis of the extent to which companies are making progress towards emissions reduction goals and renewable energy targets, and to help with identifying potential greenwashing. Companies need to be transparent about emissions, carbon credits, electricity consumption, and renewable energy procurement within their own operations and supply chains, as well as the list of suppliers and year-over-year supplier decarbonization progress. The data should be publicly available through channels such as company annual sustainability reports and corporate official websites.

Overall, the ranked companies disclosed more comprehensive climate and energy data about their own operations than supply chains (Table 4). Apple ranked at the top with regards to transparency in its own operations and of its supply chain. Nine out of ten companies scored an F grade on supply chain transparency, mainly due to missing public disclosure on supply chain electricity and details about renewable energy consumption.

Table 4. Company transparency grades for operations and supply chains

Operational	Company	Supply chain
B+	Apple	B-
C+	Google	F
C+	Microsoft	F
D+	Meta	F
D-	Qualcomm	F
D-	NVIDIA	F
D-	AMD	F
F	intel.	F
F	amazon	F
F	BROADCOM	F

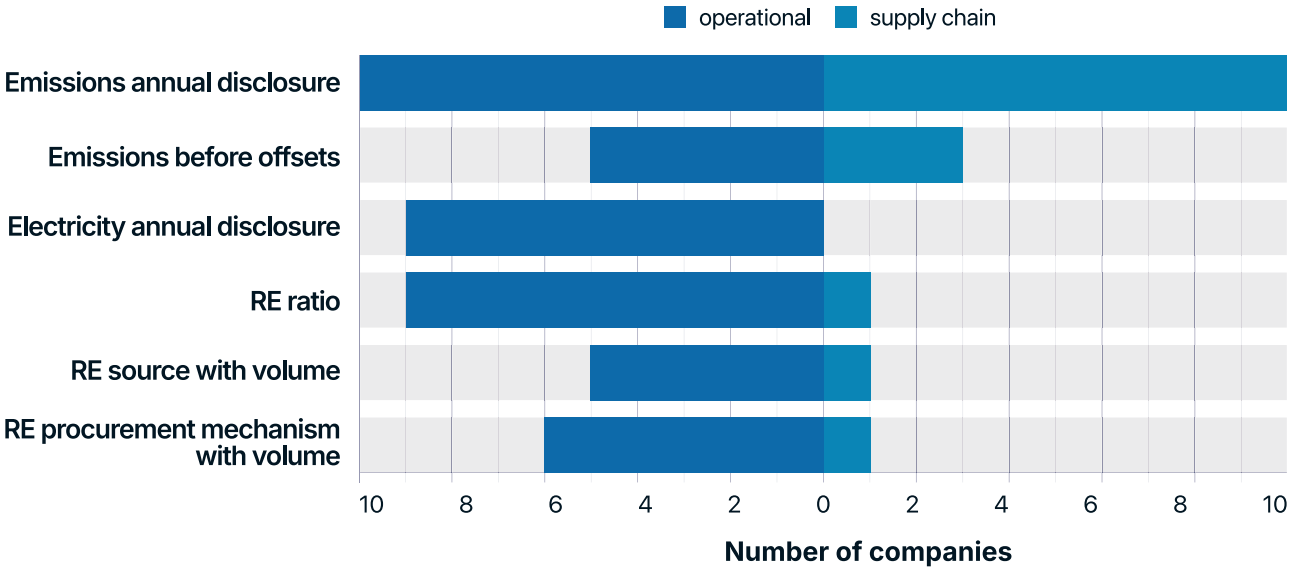
22 Probst, B.S., Toetzke, M., Kontoleon, A. et al. Systematic assessment of the achieved emission reductions of carbon crediting projects. Nat. Commun. 15, 9562 (2024). https://doi.org/10.1038/s41467-024-53645-z.

Current status

At the operational level, all companies in the ranking released data on the latest and historical Scope 1 and 2 emissions, and the majority of them disclosed market-based and location-based Scope 2 emissions, carbon credits usage, electricity use, and renewable energy consumption in 2024 (Figure 4). Only Apple disclosed fully transparent details of renewable energy by location of generation, procurement mechanisms, and technologies in its environmental report. A few companies, including Qualcomm, Amazon, and Intel, disclosed only select aspects of renewable energy procurement.[23]

At the supply chain level, most of the ranked companies have published the latest and historical data as well as category breakdowns of Scope 3 emissions (Figure 4). However, companies were less transparent about supply chain electricity consumption details. None of the companies in the ranking disclosed the total annual amount of electricity consumption in their supply chains. Apple was the only company that published the supply chain renewable energy capacity and usage, along with supplier renewable energy sources and procurement mechanisms. Yet, Apple failed to disclose the total electricity consumption of its supply chain, which creates obstacles to tracking the actual progress towards its goal of transitioning the entire supply chain to 100% renewable electricity.

Figure 4. The number of companies disclosing operational and supply chain emissions and electricity consumption[24]



Overall, AI giants showed limited transparency on supplier information and year-over-year supply chain decarbonization progress tracking. Only two ranked companies, namely Apple and Amazon, disclosed and updated their lists of suppliers annually. Fewer than half of the companies, including Apple, Amazon, AMD, and Microsoft, publicly tracked year-over-year supplier decarbonization progress.

23 Companies including AMD, Google, Microsoft, and Qualcomm disclosed details of operational renewable electricity procurement via the 2024 CDP questionnaires and published responses on their websites.

24 Where available, the source of renewable energy and procurement data from CDP responses from the 2024 cycle are incorporated due to unavailability of 2025 data as of September 2025, as we assume continued annual disclosure on corporate decarbonization and energy transition progress.

Action

This section examines decarbonization actions and progress made by tech companies towards meeting their climate targets and asks whether ambitions are matching up with effective emissions reduction pathways.

The transition to renewable energy across operations and supply chains is the most practical approach for corporations to effectively reduce their emissions. However, sourcing renewable energy is not always straightforward because some methods of sourcing have a greater impact in reducing emissions than others. For example, unbundled renewable energy certificates (RECs) can be traded on the market independently of the electricity they represent, which means that their acquisition often fails to ensure the renewable energy projects can contribute to additional capacity on local power grids.[25] Additionality refers to the principle that procurement should directly lead to the creation of new renewable energy capacity beyond what would have otherwise occurred.[26] To achieve the intended impact of companies' renewable energy commitments, companies need to adopt power purchase agreements (PPAs), self-generation, and direct investments as primary instruments for renewable energy sourcing (Table 5).

Table 5. Renewable energy sourcing and impact comparison

Renewable energy sourcing methods	Impact
Onsite generation	★★★★★
Renewable energy project investment	★★★★★
Power purchase agreement	★★★★★
Renewable energy certificate[27]	★

Overall, more progress has been made on operational decarbonization compared to supply chains by the ten companies in this report. However, there is substantial room for improvement by all companies to improve both operational and supply chain decarbonization (Table 6). The companies' operational scores range from B to F, with an average score of D-, while more than half of the ranked companies scored a failing grade (F) for their supply chain actions. The majority of the companies had increasing Scope 3 emissions but lacked concrete efforts to tackle this challenge. Apple ranked high on operational and supply chain decarbonization performances due to a high ratio of impactful renewable electricity procurement for its own operations, solid action to abate supply chain emissions, and direct investments in renewable energy projects for its suppliers. Nevertheless, companies including Nvidia showed a large gap by reducing emissions and scaling up renewable energy procurement within their operations, but making negligible efforts to decarbonize the supply chain.

25 S&P Global, "Problematic corporate purchases of clean energy credits threaten net zero goals," May 5, 2021, accessed September 19, 2025, https://www.spglobal.com/esg/insights/problematic-corporate-purchases-of-clean-energy-credits-threaten-net-zero-goals.

26 RE100, "RE100 Technical FAQs," February 16, 2024, accessed September 26, 2025, https://www.there100.org/sites/re100/files/2025-01/RE100%20FAQs%20-%20Feb%202024%20-%20V2.pdf.

27 The impact of renewable energy certificates varies depending on different electricity market. In general, RECs are considered less impactful compared to other sourcing options.

Table 6. Company action grades for operations and supply chains

Operational	Company	Supply chain
A-		B-
B-	Google	F
D+	amazon	F
D+	Meta	D+
D+	NVIDIA	F
D+	Qualcomm	F
D-	Microsoft	D+
F	AMD	C
F	intel	F
F	BROADCOM	F

Emissions

Overall, AI giants showed better performance in reducing emissions from their own operations than supply chains. In terms of operations, all of the ranked companies have reduced or maintained their Scope 1 and market-based Scope 2 emissions or carbon intensity per unit of revenue from 2022 to 2024. However, this trend did not extend to the supply chain, with over half of the ranked companies, namely Amazon, Broadcom, Google, Intel, Meta, Microsoft, and Nvidia, showing an increase or fluctuation rather than a steady reduction during the same period.

Eight out of ten companies have incorporated the requirement for climate target-setting in their supplier code of conduct. However, only five companies, including Apple, Microsoft, Amazon, AMD, and Meta, demonstrated concrete actions and quantifiable progress to abate suppliers' emissions directly. One good practice is Apple allocating green bond proceeds to support suppliers with fluorinated greenhouse gases (F-GHG) prevention and reduction.

Decoding the market-based Scope 2 emissions: What contributed to the decreasing trend?

While many AI giants have largely cut down their market-based Scope 2 emissions in recent years, some location-based Scope 2 emissions[28] have increased. This divergence suggests that despite support from AI firms towards renewable energy projects, the actual carbon footprint of these companies' electricity consumption remains high. The core reason is that many companies use unbundled RECs, which do not necessarily lead to emissions reductions in the locations where their data centers and operations are based, raising questions about the true environmental impact of relying heavily on this approach.

28 Location-based Scope 2 emissions measure a company's indirect emissions from purchased electricity based on the average emission intensity of the local grid where the electricity is consumed, rather than the specific energy choices or contracts of the company.

Electricity use

Overall, there is a huge gap in the progress made in renewable energy transition between companies' own operations and their upstream supply chains.

For operational activities, six out of ten ranked companies—Amazon, Apple, Google, Meta, Microsoft, and Nvidia—have achieved 100% renewable electricity, followed by Intel's 98%, Qualcomm's 68%, and AMD's 50%. Broadcom lagged behind the other companies with less than half of its electricity consumption (36%) sourced from renewables. With the exception of Intel (which experienced a fluctuation in its renewable energy) and Broadcom (renewable energy ratio in 2022 not disclosed), all the ranked companies have increased their renewable energy ratio or maintained 100% electricity consumption from renewable sources from 2022 to 2024.

Although most companies in the ranking claimed a high percentage of renewable energy in their own operations, only two ranked companies, namely Apple and Qualcomm, provided a detailed breakdown of their renewable energy sourcing and corresponding volumes in their latest sustainability reports. Both companies prioritized high-impact sourcing mechanisms, including PPAs, self-generations, and direct investments, which contribute to the additionality of local renewable energy capacity. Additionally, AMD, Google, and Microsoft disclosed the relevant information in their 2024 CDP questionnaire responses, which are publicly available through their corporate websites.[29] Among these three companies, only Google sourced more than half of its renewable electricity from high-impact methods. Due to a lack of public information, it is unclear what mechanisms were adopted by the rest of the ranked companies for renewable energy sourcing in 2023 or 2024. On the other hand, Apple is the only company in the ranking that released the ratio and corresponding volume of high-quality renewable energy from its suppliers. In 2024, Apple's suppliers sourced 41% of its renewable electricity from on-site renewable energy generation, PPAs, and direct investment.[30]

While more than half of the ranked companies have taken measures to boost their suppliers' energy efficiency, fewer companies, including Apple, Google, Microsoft, Amazon, and AMD, demonstrated concrete efforts to increase suppliers' renewable energy consumption and investments. Good practices include Apple's Clean Energy Fund, which has been investing in and developing renewable energy projects in China Mainland since 2018, and Google's investment in the development of new solar energy in Taiwan in 2024. On the contrary, Nvidia, Broadcom, and Qualcomm showed negligible actions to boost supply chain energy efficiency or enable suppliers to procure high-impact renewable electricity. Notably, although the supply chain carbon footprint of Nvidia has more than doubled over the past three years,[31] no publicly available information indicates that the company has initiated any form of investments to increase renewable energy sourcing for its supply chain.

29 The 2024 CDP questionnaire response reflects the company's activities and performance in 2023. Intel's 2024 CDP questionnaire response is not publicly available.

30 According to Apple's 2025 Environmental Progress Report, in 2024, suppliers relied mostly on RECs (59%) for renewable energy sourcing, which was largely contributed by the Chinese Green Electricity Certificate (GEC) expansion and official recognition as the sole instrument for tracking renewable energy consumption in China Mainland. The GECs can be traded either in the unbundled form or with physical renewable electricity delivery. Where possible, Apple needs to disclose details of GEC purchasing and clarify whether the procurement has contributed additional renewable energy to local power grids. https://www.apple.com/environment/pdf/Apple_Environmental_Progress_Report_2025.pdf.

31 According to Nvidia's sustainability report, the Scope 3 category 1 emissions of the company increased from 2,974,189 metric tons of CO_2e in FY23 to 6,036,105 metric tons of CO_2e in FY25. https://images.nvidia.com/aem-dam/Solutions/documents/NVIDIA-Sustainability-Report-Fiscal-Year-2025.pdf.

AI giants' interlinks with East Asian suppliers

East Asia plays an essential part in the global AI industry by manufacturing AI-related hardware, including advanced chips, data center servers, and consumer electronics. The region holds 75% of global chip fabrication. Taiwanese companies manufacture 90% of the world's most advanced semiconductors. The Korean industry accounts for more than 60% of the global memory chip market.[32] In terms of data center IT equipment, Taiwan dominates the global AI server manufacturing industry with a share of 90%.[33] Additionally, East Asia takes up a significant share of 57% in the world's electronics manufacturing industry.[34]

Although the ranked AI giants are all based in the United States, many of their key suppliers are concentrated in East Asia. According to the latest annual reports, sustainability reports, and public lists of suppliers, companies such as Microsoft[35], Apple[36], Nvidia[37], and AMD[38] demonstrated strong ties with suppliers based in Taiwan, South Korea, and Japan. Key suppliers include Taiwan Semiconductor Manufacturing Company (TSMC), United Microelectronics Corporation (UMC), Hon Hai Precision, Pegatron, Samsung Electronics, SK Hynix, and Micron Technology.

High-impact supply chain renewable energy investments in East Asia

East Asia markets, including Taiwan and South Korea, are among the most challenging markets in the world for companies to achieve 100% renewable energy.[39] To enable suppliers in East Asia to access and afford renewable energy through high-impact mechanisms, it is essential for AI giants to collaborate with their suppliers to increase investments and scale up additional renewable electricity projects in the region.

To decarbonize its supply chain, Apple has been contributing to additional renewable electricity projects in East Asia through direct investments. By the end of 2024, direct investments had

32 Technology in Global Affairs, "Semiconductor Manufacturing Facilities Map," May 27, 2024, accessed September 27, 2025, https://technologyglobal.substack.com/p/semiconductor-manufacturing-facilities.

33 Reuters, "Foxconn's Apple era fades as AI servers drive growth in Taiwan tech sector," August 19, 2025, accessed September 19, 2025, https://www.reuters.com/world/china/foxconns-apple-era-fades-ai-servers-drive-growth-taiwan-tech-sector-2025-08-18/.

34 TITOMA, "Top 10 Electronics Manufacturers by Country," December 19, 2024, accessed September 19, 2025, https://titoma.com/blog/largest-electronics-manufacturers/.

35 Microsoft highlighted in its 2025 Environmental Sustainability Report that the majority of its semiconductors are sourced from South Korea, Japan, and Taiwan, where Microsoft has a significant supply chain footprint. https://cdn-dynmedia-1.microsoft.com/is/content/microsoftcorp/microsoft/msc/documents/presentations/CSR/2025-Microsoft-Environmental-Sustainability-Report.pdf.

36 Apple Supplier List (April 2024), available at: https://s203.q4cdn.com/367071867/files/doc_downloads/2024/04/Apple-Supplier-List.pdf.

37 Nvidia's 2025 Annual Report stated that "our supply chain is mainly concentrated in the Asia Pacific region. We utilize foundries, such as Taiwan Semiconductor Manufacturing Company (TSMC) and Samsung Electronics, to produce our semiconductor wafers. We purchase memory from SK Hynix Inc., Micron Technology, and Samsung. We engage with independent subcontractors and contract manufacturers such as Hon Hai Precision Industry, Wistron Corporation, and Fabrinet to perform assembly, testing and packaging of our final products." https://s201.q4cdn.com/141608511/files/doc_financials/2025/annual/NVIDIA-2025-Annual-Report.pdf.

38 According to AMD's 2025 Corporate Responsibility Report, AMD's primary manufacturing suppliers are concentrated in East Asia, including TSMC, United Microelectronics Corporation, Samsung Electronics, etc.

39 Climate Group, "Revealed: the most challenging places in the world for business to source renewable electricity," December 15, 2020, accessed September 19, 2025, https://www.there100.org/re100-most-challenging-geographies.

supported the development of nearly 500 megawatts of solar and wind capacity in China Mainland and Japan. Furthermore, the China Clean Energy Fund, established in 2018, has facilitated the development of more than 1 gigawatt of new wind and solar projects across 14 provinces in China Mainland, with participation from Apple and its suppliers.[40] These initiatives have helped cover approximately two-thirds of the electricity consumed by Apple's manufacturing operations in China Mainland with renewable sources.[41] A second phase of the China Clean Energy Fund has been launched with a commitment of $99.22 million aimed to further promote the adoption of renewables within its supply chain.[42]

Additionally, accelerating renewable energy development in regions such as East Asia, which has been a key spot for AI development, should not be one company's responsibility. AI companies should have no excuses for pushing the responsibility away by simply waiting for existing renewable energy projects to be put in place. AI players and manufacturers in the region must change their mindset from consumer to prosumer in renewable energy development and fostering renewable energy transition. AI giants should form joint efforts with their suppliers to invest in new renewable energy capacity where possible.

Engagement and advocacy

A company's climate impact extends far beyond its direct operations. As tech giants expand energy-intensive AI infrastructures and increase partnerships with governments on AI industry development, they are playing an increasingly impactful role in advocating for renewable energy policymaking. Favorable renewable energy policies and affordable renewable energy resources with high accessibility are essential for AI companies to decarbonize their own operations and supply chains. Companies need to proactively engage with policymakers, utilizing a comprehensive range of tactics to scale up supportive policies for renewable energy development and consumption, as well as empower suppliers with capacity-building programs on renewable energy sourcing.

The majority of the companies in the ranking have engaged with policymakers directly or through climate initiatives and industry associations to push for favorable policies for decarbonization and renewable energy development, and have initiated capacity-building programs to increase suppliers' renewable energy consumption. However, Nvidia remains a laggard on both aspects due to its lack of renewable energy policy advocacy, promotion of false solutions, and limited engagement with suppliers on decarbonization (Table 7).

40 Apple, "Apple ramps up investment in clean energy and water around the world," April 17, 2024, accessed September 19, 2025, https://www.apple.com/hk/en/newsroom/2024/04/apple-ramps-up-investment-in-clean-energy-and-water-around-the-world/.

41 Apple, "Apple launches a new CNY 720 million investment fund to accelerate the development of clean energy in China," March 24, 2025, accessed September 19, 2025, https://www.apple.com.cn/newsroom/2025/03/apple-launches-new-720-million-investment-fund-to-accelerate-clean-energy-in-china/.

42 Reuters, "Apple announces $99 million new clean energy fund in China," March 24, 2025, accessed September 19, 2025, https://www.reuters.com/technology/apple-announces-99-million-new-clean-energy-fund-china-2025-03-24/.

Table 7. Company grades for policy advocacy and supplier engagement

Policy advocacy	Company	Supplier engagement
A-		C
B	Google	D+
D+	amazon	F
D+	Microsoft	D
F	Qualcomm	F
F	Meta	D
F	intel.	D
F	AMD	F
F	BROADCOM	F
F	NVIDIA	F

Public policy advocacy

From 2022 to 2024, the ranked companies have been engaged with policymakers at different levels to advocate for public policies that favor decarbonization and renewable energy development. While a few selected companies actively engaged with ambitious policy positions, the majority showed inadequate engagement in terms of scope and intensity.

Among ranked companies, Apple and Google have disclosed details of their policy engagement activities in sustainability reports and initiating direct conversations with policymakers to scale up renewable electricity procurement and industrial decarbonization practices. A few companies have also extended their focus beyond the United States to key AI manufacturer regions in East Asia. For example, in 2022, Apple called for an ambitious national target for renewable energy in the 2030 energy plan of South Korea.[43] In 2024, Qualcomm shared industry perspectives with government officials on expanding access of the semiconductor ecosystem in South Korea to renewable energy to help the sector meet its net-zero targets.[44] In contrast, Nvidia and Broadcom have not provided any details of their engagement activities on specific climate-related policies in their sustainability reports.

In addition to direct dialogue and engagement, the majority of the ranked companies supported policy advocacy through industry coalitions and voluntary initiatives such as the Japan Climate Leaders Partnership, Asia Clean Energy Coalition, and 3xRenewables by 2030 Campaign by the Global Renewable Alliance. Nevertheless, the contributions of the companies varied, because memberships may not lead to an endorsement of each policy position held by the organization. Furthermore, even

43 Apple, "Apple and global suppliers expand renewable energy to 13.7 gigawatts," April 5, 2023, accessed September 19, 2025, https://www.apple.com/newsroom/2023/04/apple-and-global-suppliers-expand-renewable-energy-to-13-point-7-gigawatts/.

44 SEMI, "SEMI and energy collaborative sponsors meet with South Korea MOTIE officials to present recommendations on expanding renewable energy," June 4, 2025, accessed September 19, 2025, https://www.semi.org/en/news-media-press-releases/semi-press-releases/semi-and-energy-0collaborative-sponsors-meet-with-south-korea-motie-officials-to-present-recommendations-on-expanding-renewable-energy.

among the initiatives that companies supported, the strategic alignment and effectiveness of the advocacy efforts differ, with some lagging behind their peers.

Despite policy advocacy for renewable energy, Google, Microsoft, Amazon, and Meta have been publicly endorsing false solutions such as nuclear energy for the electricity demand of AI development by releasing policy papers or joining pro-nuclear organizations. Nvidia and Broadcom demonstrated limited engagement efforts in either direct or indirect renewable energy policy advocacy. Furthermore, Nvidia's CEO, Jensen Huang, promoted nuclear power as a key solution to powering AI and advocated for expanding investments in nuclear energy. Support for nuclear expansion risks diverting resources away from the urgent priority of scaling up renewable energy.

Public policy advocacy on false energy solutions by AI giants

To meet AI's surging electricity demand, some dominant players have been advocating for the expansion of what Greenpeace considers to be false energy solutions: nuclear power plants and small modular reactors (SMRs). The implementation of nuclear energy could dilute efforts to develop renewable energy and could jeopardize the efforts made by AI firms towards their climate goals.

In December 2023, Microsoft released a policy brief to advocate for nuclear energy.[45] In 2025, Google, Meta, and Amazon supported a pledge to at least triple worldwide nuclear power by 2050.[46] Nvidia's CEO, Jensen Huang, has repeatedly promoted nuclear power for AI development. Huang said that nuclear power will be a vital and integral part of energy supplies to AI data centers.[47] During his visit to Taiwan, where Nvidia's key AI hardware suppliers like TSMC, Foxconn, and Pegatron are headquartered, he said that "Taiwan should definitely invest in nuclear energy" for the AI industry in a recent public speech.[48, 49]

45 Microsoft, "Accelerating a Carbon-Free Future: Microsoft policy brief on advanced nuclear and fusion energy, " December 2023, accessed September 19, 2025, https://cdn.prod.website-files.com/6115b8dddcfc8904acfa3478/656f712cf82ecbc5ac1feab6_Accelerating%20a%20Carbon-Free%20Future%20-%20Microsoft%20Policy%20Brief%20on%20advanced%20nuclear%20and%20fusion%20energy.pdf.

46 CNBC, "Amazon, Google and Meta support tripling nuclear power by 2050," March 12, 2025, accessed September 19, 2025, https://www.cnbc.com/2025/03/12/amazon-google-and-meta-support-tripling-nuclear-power-by-2050.html.

47 Bloomberg, "Nvidia's Huang Says Nuclear Power an Option to Feed Data Centers," September 28, 2024, accessed September 27, 2025, https://www.bloomberg.com/news/articles/2024-09-27/nvidia-s-huang-says-nuclear-power-an-option-to-feed-data-centers.

48 Taipei Times, "Nvidia and Taiwan's nuclear policy," June 19, 2025, accessed September 19, 2025, https://www.taipeitimes.com/News/editorials/archives/2025/06/19/2003838849.

49 The Liberty Times, "Pegatron is becoming one of the key AI suppliers," October 22, 2024, accessed September 19, 2025, https://ec.ltn.com.tw/amp/article/paper/1673110.

Supply chain initiatives

All of the ranked companies except Nvidia have launched initiatives to directly engage with suppliers to accelerate decarbonization and renewable energy procurement in addition to the adoption of climate targets. On the one hand, companies like Google, Intel, Meta and Microsoft have taken steps forward by launching programs to help their suppliers to set both decarbonization and renewable targets. Apple has taken a further step by releasing a framework proposal for science-aligned corporate climate action to encourage companies to include supply chain emissions in corporate climate strategy. Furthermore, a few companies have incorporated their expectations for supply chain decarbonization and renewable energy adaptation into their supplier codes of conduct, which provide the fundamental framework for a company's procurement decisions. On the other hand, companies receiving fail grades demonstrated limited engagement.

Alongside direct supply chain engagement, AI giants in the ranking also participated in various industry associations and climate initiatives to advocate for compliance standards for suppliers and share knowledge of renewable energy transitions. Some initiatives focus specifically on improving renewable energy accessibility and adoption in the semiconductor value chain, a sector heavily concentrated in the East Asia region, while some adopt a broader approach, targeting more general responsible supply chain management. While the depth and scope of these initiatives vary, their impact on driving meaningful supply chain decarbonization remains a key consideration in the evaluation.

06

Greenpeace recommendations

- **Artificial intelligence companies should target the transition towards 100% renewable energy by 2030 for their supply chains.**
  Commitment to renewable energy is crucial due to the immense electricity demands of data centers and artificial intelligence (AI) hardware manufacturing. Emissions from the supply chain contributed to a significant proportion (over 80% for certain companies) of the ranked AI giants' total emissions, with heavy reliance on fossil fuels during AI hardware manufacturing. To rein in emissions from the expansion of AI infrastructure and applications, it is essential for AI companies to set a goal to achieve 100% renewable energy across their supply chains by 2030. AI giants should also incorporate renewable energy targets into their supplier codes of conduct.

- **Companies need to increase transparency, especially on supply chain decarbonization, to enhance accountability and avoid greenwashing.**
  Companies should track the progress of their decarbonization activities each year on operational and supply chain levels with full transparency. The process of transparency will involve moving beyond reporting operational emissions (Scope 1 and 2) and electricity use to meticulously measuring and disclosing their much larger Scope 3 emissions by categories and supply chain electricity consumption. Furthermore, details on renewable energy procurement, including matching methods, sourcing methods, location of generation, and technologies, should be made publicly available for stakeholders to track and evaluate the real progress and impact of companies' renewable energy consumption.

- **Companies should prioritize high-impact procurement mechanisms to source renewable electricity for their own operations and supply chains.**
  Renewable energy certificates (RECs) can be an additional choice for companies to meet their targets but only when other options are not available. For example, instead of simply buying unbundled RECs that offset power usage with existing renewable sources, companies should prioritize high-impact sourcing methods such as the installation of self-generation facilities, direct investments in the construction of new wind or solar farms, and power purchase agreements (PPAs), thereby adding additional renewable energy to the local power grid. AI giants need to proactively and directly engage with suppliers on capacity building to reduce reliance on RECs and expand high-impact renewable electricity procurement. Engagement with suppliers might include, but is not limited to, financial support, knowledge sharing, and technical assistance, which connect suppliers with high-impact sourcing expertise and opportunities.

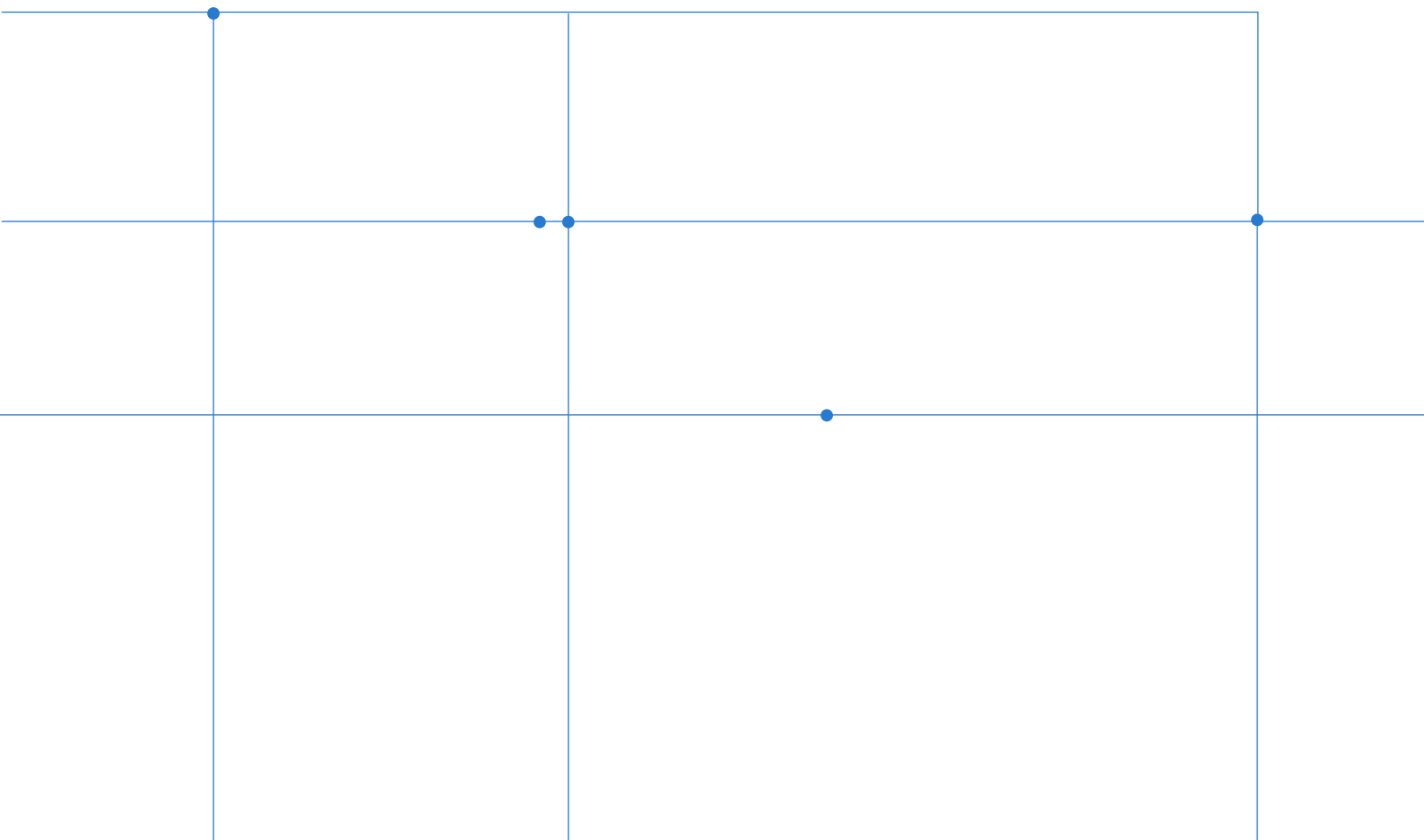
- **AI giants need to change their mindset from renewable energy consumer to prosumer by exploring joint renewable energy investment opportunities with suppliers.**
  Regions like East Asia bear significant carbon footprints of AI giants due to the heavy reliance on fossil fuels powered by local power grids and limited renewable energy resources.[50] It is crucial for AI players to understand the urgency of supply chain decarbonization by simply not waiting for the existing renewable energy infrastructure. AI companies must change their mindsets from renewable energy consumer to renewable energy prosumer. AI giants should explore joint renewable energy investment opportunities with their suppliers to expand the renewable energy sources in the region. As an example, in 2023, Decathlon, the world's largest sporting goods retailer, brought together 14 supply chain partners in China Mainland on an aggregated PPA to procure bundled renewable energy from an offshore solar farm.[51]

50 Greenpeace East Asia, "Chipping Point: Tracking Electricity Consumption and Emissions from AI Chip Manufacturing," April 10, 2025, accessed September 19, 2025, https://www.greenpeace.org/static/planet4-eastasia-stateless/2025/04/5011514f-greenpeace_chipping_point.pdf.

51 Decathlon, "Decathlon announces major renewable energy initiative in China," November 7, 2023, accessed September 19, 2025, https://www.decathlon-united.media/pressfiles/decathlon-major-renewable-energy-initiative-in-china.

- **AI companies need to actively engage with policymakers to promote policymaking to scale up renewable energy capacity.**
  As major energy consumers, the driving force of technology advancement, and significant contributors to economic development, AI giants have a powerful voice to influence policymaking. Companies should move from vague support statements to advocating for specific and ambitious policies, initiate direct conversations with policymakers on streamlining renewable energy permits and regulatory improvements, rather than extending the lifetime of fossil fuel infrastructure or expanding nuclear power capacity.

- **AI companies should engage with their suppliers in setting up achieving 100% renewable energy by 2030.**
  As clients, AI companies hold great bargaining power in talking with suppliers. AI companies should utilize this bargaining power in urging suppliers to set ambitious renewable energy targets and speed up their renewable energy transition.



07

Scorecard

Apple	**Overall grade**	**B+**
	Apple has made important progress in reducing its supply chain emissions. The company has steadily expanded its renewable energy-led decarbonization strategy from its own operations to the supply chain through its Supplier Clean Energy Program (CEP), which now claims to have resulted in the deployment of nearly 18 Gigawatts of renewable electricity. It is important for Apple to continuously invest in renewable energy globally, especially in the regions like Taiwan and South Korea where renewable energy resources are challenging to access for its suppliers. Apple should further increase its supply chain renewable energy transition transparency by disclosing its supply chain renewable energy ratio annually in order to track progress. Additionally, Apple is encouraged to aim for hourly renewable energy matching for its own operations. The company should also increase collaboration with its suppliers to secure the policy changes and investments needed to secure a meaningful transition of its supply chain to renewable energy.	

Operational (A-)		
Commitment and targets (A)	Apple scored an A because it has committed to carbon neutrality by 2030 and matches the electricity use with renewable energy annually for its own operations. Looking forward, Apple is encouraged to target hourly renewable energy matching.	
	Greenhouse gas target	Apple has committed to achieving carbon neutrality for its entire carbon footprint by 2030 by reducing collective Scope 1, 2, and 3 emissions — upstream and downstream — by 75% before balancing the remaining emissions with high-quality carbon removals. The company also committed to working towards reaching a 90% reduction in emissions from its 2015 baseline by 2050.
	Renewable energy target	Apple has committed to power for its own operations with 100% renewable electricity, matched annually with local and additional supplies of renewable electricity. Since 2018, Apple has achieved 100% renewable electricity generated or sourced for its corporate operations annually.
Transparency (B+)		Apple scored B+ because it demonstrated high transparency on its emissions, electricity consumption, and renewable energy procurement details. Marks were lost because the company did not disclose its current and historical carbon intensity.
Action (A-)	Apple scored an A- because it has maintained 100% renewable electricity over the past three years and sourced the majority of its renewable energy from high-impact procurement methods, including power purchase agreements, direct investments, and on-site generation. However, there is a fluctuation in Apple's Scope 1 and 2 emissions. And Apple is encouraged to achieve hourly matching of renewable electricity in the upcoming years.	
	Scope 1 and 2 emissions from 2022 to 2024 (metric tons CO_2e)	FY22: 58,200 FY23: 58,600 FY24: 58,500
	Renewable electricity ratio from 2022 to 2024	Maintained 100% from 2022 to 2024
	Percentage of renewable electricity from high-impact sourcing methods	In 2024, Apple sourced 96% of its renewable electricity from high-impact procurement mechanisms. Regarding Apple's total renewable energy procurement, 89% was from Apple-created projects, including long-term renewable energy contracts, equity investment, and direct ownership; 4% was from directly purchasing renewable electricity through available utility green energy programs; 3% was from co-location and distribution facility vendors; and 4% was from renewable energy certificates.
Engagement and advocacy (A-)	**Decarbonization and renewable energy policy advocacy**	Apple achieved an A- for policy engagement, reflecting its positive support for decarbonization and renewable energy policies globally. The company demonstrates transparency by publishing annual climate policy engagement milestones and a list of initiatives in its Environmental Progress Report. Apple actively engages directly by submitting comments and providing feedback on supported policies, with great efforts in Asian countries. However, its direct engagement has been less active in the most recent year compared to previous years. Apple also actively engages in climate policy through several industry associations, including the Clean Energy Buyers Association, Asia Clean Energy Coalition, Global Renewables Alliance, and Japan Climate Leaders Partnership.

Supply chain (B)		
Commitment and targets (A+)	Apple scored an A+ in this aspect as the only company on the ranking that has required its entire supply chain to achieve carbon neutrality and 100% renewable electricity by 2030.	
	Greenhouse gas target	Apple has committed to achieving carbon neutrality for its entire carbon footprint by 2030 by reducing collective Scope 1, 2, and 3 emissions — upstream and downstream — by 75% before balancing the remaining emissions with high-quality carbon removals. The company also committed to working toward reaching a 90 percent reduction in emissions from its 2015 baseline by 2050.
	Renewable energy target	Apple has committed to transitioning its entire supply chain to 100% renewable electricity by 2030.
Transparency (B-)		Apple scored a B- in this aspect, as it disclosed its list of suppliers and released most of the data on suppliers' emissions and renewable energy procurement, but lacks transparency on the carbon intensity and electricity consumption of its supply chain. Failing to disclose the total supply chain electricity consumption creates obstacles to tracking the actual progress towards its goal of transitioning the entire supply chain to 100% renewable electricity.
Action (B-)	Apple scored a B- for its supply chain decarbonization actions. While the company has been reducing its supply chain emissions over the past three years through green bonds, renewable energy investments, and the Supplier Energy Efficiency Program, its supply chain renewable energy transition progress remains unclear due to a lack of public disclosure on current and historical supply chain renewable energy ratios. Furthermore, the majority of supply chain renewable energy was sourced via renewable energy certificates, including the Chinese Green Electricity Certificate (GEC). Apple needs to scale up high-impact sourcing of renewable energy methods in its supply chain.	
	Scope 3 emissions from 2022 to 2024 (metric tons CO_2e)	FY22: 20,545,800 (category 1: 13,400,000) FY23: 15,982,800 (category 1: 9,400,000) FY24: 15,110,000 (category 1: 8,200,000)
	Renewable electricity ratio from 2022 to 2024	No data
	Percentage of renewable electricity from high-impact sourcing methods	In 2024, Apple's suppliers sourced 41% of the renewable electricity from high-impact methods, including 36% from renewable power purchase agreements, 4% from direct investment, and 1% from onsite renewable electricity. The remaining 59% of the renewable energy was sourced from renewable energy certificates.
	Supplier management	Apple Supplier Code of Conduct requires its entire direct manufacturing supply chain to use 100% renewable electricity for all Apple production before 2030. The supplier should regularly quantify, set targets, monitor progress, and reduce its emissions of greenhouse gases through conservation, use of clean energy, or other measures.
	Upstream supply chain direct emission abatement	Apple allocates green bond proceeds to support close collaboration with its supply chain partners as they work to prevent fluorinated greenhouse gases from being released into the atmosphere. Apple has issued $4.7 billion in green bonds to model how businesses can drive investments to reduce global emissions.
	Supply chain energy efficiency	Apple launched the Supplier Energy Efficiency Program, through which it provides technical and planning support to suppliers as they build more energy-efficient systems. Apple also launched the Asia Green Fund to help provide technical expertise and finance capital-intensive energy efficiency projects.
	Supply chain renewable energy consumption and generation investment	Apple has directly invested in nearly 500 megawatts of solar and wind projects in China and Japan to address our upstream electricity emissions. Through the China Clean Energy Fund, Apple and its suppliers have invested in more than 1 gigawatt of renewable electricity projects.
Engagement and advocacy (C)	**Supplier engagement on decarbonization and renewable energy**	Apple received a C in supplier climate engagement. Apple has published a framework proposal for science-aligned corporate climate action, which provides a blueprint for the company and its suppliers to achieve ambitious climate goals. Apple's Supplier Clean Energy Program and Supplier Energy Efficiency Program help suppliers decarbonize and move towards Apple's commitment to power its entire manufacturing supply chain to 100% renewable electricity. Apple is currently outperforming its peers in this ranking. To maintain its leadership, Apple needs to proactively and publicly urge its suppliers to commit to 100% renewable energy by 2030 and actively assist them in achieving this target, and also intensify its focus on helping suppliers access and acquire high-quality renewables such as power purchase agreements (PPAs).

Microsoft	**Overall grade**	**C-**
	In recent years, Microsoft has been increasing investments in AI model development and expanding cloud computing infrastructure. While the company has made an ambitious carbon-negative commitment for its operations and supply chain, by focusing on transitioning to carbon-free electricity instead of renewable energy, it is planning to power its growing AI business with false energy solutions like nuclear power. Microsoft should increase investments in new renewable energy capacities in its supply chain to control its growing supply chain emissions. It should also enhance engagement with policymakers and suppliers to expand renewable energy procurement rather than advocating for nuclear energy.	

Operational (C)		
Commitment and targets (A-)	Microsoft scored an A- for its commitment to achieving carbon negative by 2030 and 100% direct renewable electricity for its own operations by 2025. However, Microsoft's target focuses on zero-carbon electricity rather than renewable energy, which might open the door for false solutions such as nuclear energy.	
	Greenhouse gas target	Microsoft is committed to becoming carbon negative by 2030 and reducing Scopes 1, 2, and 3 emissions by 55% from a 2020 baseline. Microsoft also committed to removing (by 2050) from the atmosphere an equivalent amount of all the CO_2 the company has emitted either directly or by its electricity consumption since it was founded in 1975.[52]
	Renewable energy target	Microsoft set a target to procure enough direct renewable electricity to cover 100% of its electricity usage by 2025, meaning that it will have PPAs or other long-term contracts for green power products for 100% of carbon-emitting electricity consumed by all our datacenters, buildings, and campuses. By 2030, 100% of the company's electricity consumption will be matched by zero-carbon electricity purchases 100% of the time.
Transparency (C+)		Microsoft scored a C+ due to a lack of transparency on up-to-date and comprehensive renewable energy procurement and generation details. Microsoft disclosed comprehensive data on Scope 1 and 2 emissions, carbon intensity, and electricity consumption. The company published renewable energy procurement and generation details in 2023 through Carbon Disclosure Project (CDP) responses. However, the comprehensive renewable energy procurement and generation details in 2024 have not been disclosed, creating obstacles to evaluating the impact of the company's renewable energy transition.
Action (D-)	Microsoft scored a D- mainly due to a lack of steady decreasing trend in its Scope 1 and 2 emissions over the past three years as well as its heavy reliance on renewable energy certificates. Microsoft should prioritize high-impact renewable energy sourcing methods such as power purchase agreements, direct renewable energy investments, and self-generation.	
	Scope 1 and 2 emissions from 2022 to 2024 (metric tons CO_2e)	FY22: 427,442 FY23: 538,094 FY24: 402,600
	Renewable electricity ratio from 2022 to 2024	Maintained 100% from 2022 to 2024
	Percentage of renewable electricity from high-impact sourcing methods	According to CDP data, Microsoft sourced 47.6% of its renewable electricity from high-impact methods in 2023.
Engagement and advocacy (D+)	**Decarbonization and renewable energy policy advocacy**	Microsoft received a D+ in policy engagement. Microsoft has released policy briefs on decarbonization and clean energy and demonstrated positive support for a range of climate policies, while its direct engagements are primarily focused on the United States and Europe. More concerning is that, besides support for renewables, Microsoft also actively supports nuclear energy, including releasing a nuclear policy brief and backing federal and state legislation to support fusion energy development and enhance regulatory processes for advanced nuclear reactors. While Microsoft participates in groups with positive climate advocacy, such as the Clean Energy Buyers Alliance, the Global Renewable Alliance's 3xRenewables campaign, and the Japan Climate Leaders Partnership, this positive engagement is contradicted by its membership in the Fusion Industry Association and the U.S. Nuclear Industry Council, which advocate for nuclear expansion.

52 Microsoft will achieve carbon removal through a portfolio of negative emission technologies potentially including afforestation and reforestation, soil carbon sequestration, bioenergy with carbon capture and storage, and direct air capture. https://blogs.microsoft.com/blog/2020/01/16/microsoft-will-be-carbon-negative-by-2030/.

Supply chain (C-)		
Commitment and targets (A)	Microsoft scored an A in for its commitment to achieving carbon negative by 2030. However, it requires its suppliers to transition to 100% carbon-free electricity rather than renewable electricity, which might open the door for false solutions such as nuclear energy.	
	Greenhouse gas target	Microsoft is committed to becoming carbon negative by 2030 and reducing Scopes 1, 2, and 3 emissions by 55% from a 2020 baseline. Microsoft also committed to removing from the atmosphere an equivalent amount of all the CO2 the company has emitted either directly or by its electricity consumption since it was founded in 1975 by 2050.
	Renewable energy target	To decarbonize its supply chain, Microsoft requires its suppliers to transition to 100% carbon-free electricity (CFE) by 2030 for goods and services delivered to Microsoft.
Transparency (F)		Microsoft scored an F in this aspect due to a lack of transparency on the list of suppliers, as well as no public information on supply chain electricity consumption and renewable energy procurement details. Microsoft disclosed comprehensive data on Scope 3 emissions with category breakdowns and carbon intensity. However, due to a lack of public information, the full list of suppliers, the supply chain electricity and renewable energy consumption amount, and how its suppliers sourced renewable energy remain unclear. The progress towards the company's supply chain renewable energy target cannot be effectively tracked without the relevant information.
Action (D+)	Microsoft scored a D+ because it failed to reduce Scope 3 and supply chain emissions continuously over the past three years and its supply chain renewable energy transition progress was not made public. Additionally, while Microsoft has been actively engaging with suppliers on clean energy target-setting, emission abatement, and energy efficiency improvement, the company has not launched any direct investment in renewable energy capacities in its supply chain.	
	Scope 3 emissions from 2022 to 2024 (metric tons CO_2e)	FY22: 15,916,000 (category 1 & category 2: 9,611,000) FY23: 16,397,000 (category 1 & category 2: 11,209,000) FY24: 15,140,000 (category 1 & category 2: 11,123,000)
	Renewable electricity ratio from 2022 to 2024	No data
	Percentage of renewable electricity from high-impact sourcing methods	No data
	Supplier management	The Microsoft Supplier Code of Conduct requires suppliers to provide and achieve plans to reduce Microsoft delivered goods and services absolute greenhouse gas emissions by a minimum of 55% by 2030 or an alternative reduction target pursuant to the baseline established in their supplier contract or in other written communication with Microsoft. Suppliers are also required to transition to 100% carbon-free electricity for their Microsoft delivered goods and services by 2030, as part of the plan.
	Upstream supply chain direct emission abatement	Microsoft invests in decarbonizing need-to-abate sectors, including steel, concrete, and other building materials used in its data centers. The company also makes sustainable aviation fuel (SAF) more accessible to suppliers to help abate aviation-related emissions.
	Supply chain energy efficiency	Microsoft sets benchmarks for operational efficiency and environmental impacts for its logistics supply chain to reduce emissions. It also integrates low-carbon materials and equipment requirements into supplier contracts.
	Supply chain renewable energy consumption and generation investment	While Microsoft has invested in renewable energy development for its own operations, the company lacks investments in renewable energy projects for its suppliers.
Engagement and advocacy (D)	**Supplier engagement on decarbonization and renewable energy**	Microsoft received a D on supplier climate engagement. It has incorporated a requirement for suppliers to transition to 100% carbon-free energy by 2030 into their supplier code of conduct and offers knowledge sharing on accessing and procuring carbon-free energy. Their supplier energy transition requirements should leverage renewable energy procurement and actively engage suppliers in setting and achieving greenhouse gas emissions reduction targets.

Google	**Overall grade**	**C-**
	Google has made an ambitious commitment to achieving net-zero emissions for its operations and supply chain by 2030 and 24/7 carbon-free electricity matching. However, under the carbon-free electricity goal, it has planned to power data centers with false energy solutions like nuclear power. Google has also seen a continuous increase in its supply chain emissions over the past three years due to its expanding AI infrastructure. Although Google invested in a 1 GW solar energy project in Taiwan in 2024, it should further increase direct investments in supply chain renewable energy capacities to meet the surging power demand driven by AI growth. The company should also enhance engagement with policymakers and suppliers to expand renewable energy procurement rather than advocating for nuclear energy.	

Operational (B)		
Commitment and targets (A-)	Google scored an A- in this aspect, because it committed to net-zero emissions and has a 24/7 clean matching goal by 2030. However, Google's target focuses on carbon-free energy rather than renewable energy, which might open the door to false solutions such as nuclear energy.	
	Greenhouse gas target	Google has committed to reaching net-zero emissions across all of its operations and value chain by 2030. The company plans to reduce its absolute, combined Scope 1,2 (market-based), and 3 emissions by 50% from a 2019 base year and invest in a range of carbon removal solutions to neutralize the remaining emissions.
	Renewable energy target	Google has matched 100% of its global electricity use with renewable energy purchases since 2017 and aims to run on 24/7 carbon-free energy on every grid where it operates by 2030.
Transparency (C+)		Google scored a C+ due to a lack of transparency on up-to-date and comprehensive renewable energy procurement and generation details. Google disclosed comprehensive data on Scope 1 and 2 emissions, carbon intensity, and electricity consumption. The company published renewable energy procurement and generation details in 2023 through Carbon Disclosure Project (CDP) responses. Google also released some project-specific renewable energy procurement information through blogs on its website. However, the comprehensive renewable energy procurement and generation details in 2024 have not been disclosed, creating obstacles to evaluating the impact of the company's renewable energy transition.
Action (B-)	Google scored a B- because it sourced renewable energy mainly through high-impact mechanisms but has seen an increase in its Scope 1 and 2 emissions over the past three years.	
	Scope 1 and 2 emissions from 2022 to 2024 (metric tons CO_2e)	FY22: 2,583,300 FY23: 3,502,800 FY24: 3,132,200
	Renewable electricity ratio from 2022 to 2024	Maintained 100% from 2022 to 2024.
	Percentage of renewable electricity from high-impact sourcing methods	According to CDP data, Google sourced 82% of its renewable electricity from high-impact methods in 2023.
Engagement and advocacy (B)	**Decarbonization and renewable energy policy advocacy**	Google received a B grade for its climate policy engagement, reflecting active engagements in both decarbonization and clean energy across the United States, Europe, and Asia. Google discloses a list of its sustainability policy engagements and participates in trade associations and third-party groups. However, this positive engagement was tempered by Google's membership in organizations such as the World Nuclear Association and the Nuclear Innovation Alliance negatively engaged on renewable energy expansions, raising concerns. These associations' focus on nuclear energy could divert resources and policy attention away from the urgent need to scale up renewable energy.

Supply chain (D-)		
Commitment and targets (A)	Google scored an A for its commitment to net-zero emissions across the value chain by 2030 and an ambitious timeline for supply chain clean energy transition by 2029. However, it requires its manufacturing suppliers to transition to 100% carbon-free electricity rather than renewable electricity, which might open the door to false solutions such as nuclear energy.	
	Greenhouse gas target	Google has committed to reaching net-zero emissions across all of its operations and value chain by 2030. The company plans to reduce its absolute, combined Scope 1,2 (market-based), and 3 emissions by 50% from a 2019 base year and invest in a range of carbon removal solutions to neutralize the remaining emissions.
	Renewable energy target	Google asks suppliers that manufacture technical infrastructure and consumer hardware products to commit to achieving a 100% clean electricity match by the end of 2029 for the electricity they use to manufacture Google products. The company also set a target in 2020 to enable 5 gigawatts (GW) of new carbon-free energy through investments in its key manufacturing regions by 2030.
Transparency (F)		Google scored an F in transparency due to a lack of transparency on the full list of suppliers, as well as no public information on the supply chain electricity consumption amount and renewable energy procurement details. Google disclosed Scope 3 emissions with category breakdowns, but lacks disclosure on the list of suppliers, Scope 3 carbon intensity, and details on supply chain electricity consumption and renewable energy procurement. The progress towards the company's supply chain renewable energy target cannot be effectively tracked without the relevant information.
Action (F)	Google scored an F mainly due to its continuously increasing Scope 3 and supply chain emissions over the past three years, driven by the rapid growth of AI, as well as unclear supply chain renewable energy transition progress due to a lack of public disclosure. While Google launched an investment in supply chain renewable energy capacity in 2024, it should scale up investments in the future to control the rising emissions from its supply chain.	
	Scope 3 emissions from 2022 to 2024 (metric tons CO_2e) *(Google only disclosed an aggregated figure of categories 2 and 11)*	FY22: 9,317,000 (category 1, 2, and 11: 7,390,000) FY23: 10,794,000 (category 1, 2, and 11: 8,534,000) FY24: 12,053,000 (category 1, 2, and 11: 9,938,000)
	Renewable electricity ratio from 2022 to 2024	No data
	Percentage of renewable electricity from high-impact sourcing methods	No data
	Supplier management	Google's Supplier Code of Conduct requires suppliers to establish a greenhouse gas reduction goal and publicly report on progress. Where possible, suppliers commit to achieving 100% clean energy across operations by 2030 for Google products and services.
	Upstream supply chain direct emission abatement	No data
	Supply chain energy efficiency	Google developed the Energy Assessment tool for supplier facility managers to identify energy efficiency opportunities across their operations and get guidance on energy consumption improvements and cost reductions.
	Supply chain renewable energy consumption and generation investment	In 2024, Google announced an investment to support the development of a 1 GW pipeline of new solar energy in Taiwan and plans to offer a portion of this clean energy to its semiconductor suppliers and manufacturers in this region.
Engagement and advocacy (D+)	**Supplier engagement on decarbonization and renewable energy**	Google received a D+ on supplier climate engagement. Google actively engages suppliers through the Clean Energy Addendum, asking manufacturing suppliers to commit to an ambitious 100% clean electricity match by 2029. Google also participates in industry initiatives such as Catalyze, Semiconductor Equipment and Materials International (SEMI) Energy Collaborative, and Clean Energy Buyers Association's Clean Energy Procurement Academy. However, their direct efforts in helping suppliers achieve their decarbonization goals remain relatively limited.

Meta	Overall grade	D-
	Meta has been aggressively expanding its data center infrastructure with a focus on AI-optimized facilities. The company matched 100% of its operational electricity consumption with renewable energy on an annual basis, but it has seen increasing Scope 3 and supply chain emissions from 2023 to 2024. Meta is committed to achieving net-zero emissions for its operations and supply chain in 2030, but failed to set a goal on hourly renewable energy matching for its operations or any renewable energy targets for its supply chain. Meta has been engaging with suppliers on emissions reduction target setting, emission abatement, and energy efficiency improvement. However, the company has not initiated any direct investment in supply chain renewable energy capacities, but advocates publicly for false energy solutions like nuclear power to meet the growing energy demand of AI. Meta should aim for hourly renewable energy matching for its data centers, as well as accelerate the supply chain renewable energy transition by setting an ambitious target and increasing investments.	

Operational (C-)		
Commitment and targets (A-)	Meta scored an A- as the company has committed to net-zero emissions and 100% renewable electricity by 2030. However, Meta's target focuses on carbon-free energy rather than renewable energy, which might open the door to false solutions such as nuclear energy. The company is also encouraged to target hourly renewable energy matching.	
	Greenhouse gas target	Meta is committed to achieving net-zero emissions across its value chain in 2030. The company aims to reduce Scope 1 and 2 emissions by 42% in 2031 compared to a 2021 baseline.
	Renewable energy target	Meta aims to continue to match 100% of its electricity use with clean and renewable energy to support its operations.
Transparency (D+)		Meta scored a D+ in this aspect, as the company disclosed comprehensive data on Scope 1 and 2 emissions and electricity consumption with clear breakdowns by data centers. It also published the renewable energy matching method and data on carbon offsets. However, the company failed to disclose data on renewable energy sourcing by procurement methods, technologies, and generation locations, creating obstacles to evaluating the impact of the company's renewable energy transition.
Action (D+)	Meta scored a D+ because it has reduced its Scope 1 and 2 emissions continuously and maintained 100% renewable electricity over the past three years. However, due to a lack of public disclosure, the renewable electricity sourced from high-impact mechanisms remained incalculable, creating obstacles to evaluating the impact of the company's renewable energy transition. Additionally, Meta is encouraged to achieve hourly matching of renewable electricity in the upcoming years.	
	Scope 1 and 2 emissions from 2022 to 2024 (metric tons CO_2e)	2022: 67,207 2023: 50,610 2024: 48,826
	Renewable electricity ratio from 2022 to 2024	Maintained 100% from 2022 to 2024
	Percentage of renewable electricity from high-impact sourcing methods	Meta partnered with energy providers on long-term power purchase agreements (PPAs) to match its electricity use with clean and renewable energy. As of the end of 2024, 89 of the 128 projects in its portfolio were online and producing power. However, Meta didn't disclose relevant data in 2023 and 2024 as did Apple, Google, and Microsoft, leaving the percentage of its renewable electricity procured from high-impact mechanisms incalculable. Meta has been expanding data center infrastructure significantly in recent years, therefore it is crucial for the company to match the new electricity demand with renewable energy procured through high-impact mechanisms, such as PPAs, direct investments in renewable energy, and self-generation, and avoid false energy solutions like nuclear energy and gas.
Engagement and advocacy (F)	**Decarbonization and renewable energy policy advocacy**	Meta received an F for policy advocacy due to insufficient and conflicting engagement on climate and renewable energy policy. While Meta directly engaged in regulation regarding greenhouse gas emissions and renewable energy in the United States in 2022 and 2023, since then there is limited publicly available evidence of such engagement activities. Meta discloses a list of industry association memberships, including support for energy transition through groups like Clean Energy Buyers Alliance (CEBA) and Asia Clean Energy Coalition. However, Meta also holds memberships in associations with opposite positions, such as Emissions First, which proposed weakening the scope 2 standard of the Greenhouse Gas Protocol, and World Nuclear Association, which actively supports tripling nuclear capacity by 2050.

Supply chain (F)		
Commitment and targets (F)	Meta scored an F because it has not set any renewable energy targets for its supply chain, which creates ambiguity and uncertainty regarding the pathway towards its value chain net-zero emissions commitment.	
	Greenhouse gas target	Meta is committed to achieving net-zero emissions across its value chain in 2030. It aims not to exceed its 2021 baseline Scope 3 emissions by the end of 2031.
	Renewable energy target	Meta has not set any renewable energy targets for its supply chain.
Transparency (F)		Meta scored an F due to a lack of transparency on the full list of suppliers, as well as no public information on the supply chain electricity consumption amount and renewable energy procurement details. Meta released data on Scope 3 emissions with category breakdowns and carbon offsets. However, the company lacks transparency on carbon intensity, its list of suppliers, and supply chain electricity consumption and renewable energy procurement details. The progress and impact of the company's supply chain net-zero emissions commitment cannot be effectively evaluated without the relevant information.
Action (D+)	Meta scored a D+ because the company failed to continuously reduce its Scope 3 and supply chain emissions over the past three years. Driven by the growth of AI, the emissions have increased from 2023 to 2024. The company's supply chain renewable energy transition progress remained unclear due to a lack of public disclosure. Additionally, while Meta has been engaging with suppliers on climate target setting, emission abatement, and energy efficiency improvement, it has not initiated any direct investment to expand renewable energy capacity in its supply chain.	
	Scope 3 emissions from 2022 to 2024 (metric tons CO_2e)	2022: 8,466,264 (category 1 & category 2: 7,892,049) 2023: 7,445,621 (category 1 & category 2: 6,880,740) 2024: 8,151,769 (category 1 & category 2: 7,438,027)
	Renewable electricity ratio from 2022 to 2024	No data
	Percentage of renewable electricity from high-impact sourcing methods	No data
	Supplier management	Meta assesses suppliers' conformance to the Responsible Business Alliance (RBA) Code of Conduct and other Responsible Supply Chain (RSC) policies and standards. Suppliers should establish and report against an absolute corporate-wide greenhouse gas reduction goal. Energy consumption and all Scopes 1, 2, and significant categories of Scope 3 greenhouse gas emissions should be tracked, documented, and publicly reported.
	Upstream supply chain direct emission abatement	Since 2023, Meta has launched the annual request for proposal for value chain interventions for emissions reductions, which include emission-intensive sectors like semiconductor manufacturing.
	Supply chain energy efficiency	Meta takes supplier-provided data and works with suppliers to focus on emissions reduction in key areas such as energy efficiency, circularity, and clean and renewable energy.
	Supply chain renewable energy consumption and generation investment	No data
Engagement and advocacy (D)	**Supplier engagement on decarbonization and renewable energy**	Meta received a D on supplier climate engagement. Meta has a Net-zero Supplier Engagement Program that encourages suppliers to set science-aligned emissions reduction targets, with a goal of engaging two-thirds of their suppliers by 2026. However, the reach and intensity of direct engagements remain limited with unclear details on specific actions. Meta's engagement on science-aligned emissions aims to engage two-thirds of its suppliers by 2026. Meta is a member of Semiconductor Equipment and Materials International (SEMI) Energy Collaborative, advocating for the adoption of low-carbon energy in the semiconductor industry, and a steering committee member of CEBA's Clean Energy Procurement Academy, which provides training in clean energy procurement in the Asia Pacific region.

Amazon	Overall grade	F
	Amazon's subsidiary, Amazon Web Services (AWS), is one of the world's largest cloud computing service providers and developers of AI infrastructure. In 2024, Amazon's emissions increased 6% compared to the previous year, and construction of new data centers under AWS was a key contributor.[53] However, unlike other leading cloud computing giants, including Google and Microsoft, Amazon has failed to make an ambitious net-zero emissions commitment by 2030, with clear goals for absolute emission reduction. Additionally, Amazon has not pledged to match its operational power consumption with renewable electricity on an hourly basis, and has no renewable energy target for its supply chain. While the company has been engaging with suppliers through programs including the Amazon Sustainability Exchange, it has not initiated any direct investments to expand renewable energy capacities in its supply chain. Amazon should prioritize high-impact renewable energy sourcing to decarbonize its AI infrastructure and supply chain and avoid advocating for false energy solutions like nuclear power.	

Operational (D)		
Commitment and targets (C)	Amazon scored a C due to a lack of ambition in its greenhouse gas target, as the company failed to commit to achieving net-zero emissions by 2030. The company is also encouraged to target hourly renewable energy matching.	
	Greenhouse gas target	Amazon is committed to reaching net-zero emissions across its global operations by 2040. However, the company did not specify how much greenhouse gas emissions will be reduced by to achieve this commitment, which could legitimize loopholes like dependence on the controversial offsetting model.
	Renewable energy target	Amazon aims to match 100% of the electricity consumed by its global operations with renewable energy annually by 2025.
Transparency (F)		Amazon scored an F in transparency because it failed to disclose most of its climate and energy data. The company's decarbonization progress and impact cannot be effectively assessed without transparent disclosure of location-based Scope 2 emissions and electricity consumption details. Amazon disclosed its Scope 1 and 2 emissions, carbon intensity, and renewable energy generation details. However, the company has limited transparency on location-based Scope 2 emissions, carbon offsets, and electricity consumption, and renewable energy procurement details.
Action (D+)	Amazon scored a D+ due to its continuously increasing Scope 1 and 2 emissions and unclear renewable energy sourcing method details. Additionally, Amazon is encouraged to achieve hourly matching of renewable electricity in the upcoming years, especially for the fast-expanding AI infrastructure under AWS.	
	Scope 1 and 2 emissions from 2022 to 2024 (metric tons CO_2e)	2022: 16.08 million 2023: 16.98 million 2024: 17.93 million
	Renewable electricity ratio from 2022 to 2024	2022: 90% 2023: 100% 2024: 100%
	Percentage of renewable electricity from high-impact sourcing methods	Amazon didn't disclose relevant data in 2023 and 2024 as did Apple, Google, and Microsoft. Amazon has been expanding data center infrastructure significantly in recent years, therefore it is crucial for the company to match the new electricity demand with renewable energy procured through high-impact mechanisms, such as power purchase agreements, direct investments in renewable energy, and self-generation, and avoid false energy solutions like nuclear energy and gas.
Engagement and advocacy (D+)	**Decarbonization and renewable energy policy advocacy**	Amazon received a D+ in policy engagement. Amazon advocates for net-zero emissions and carbon-free energy policies and collaborates with industry associations on climate policy advocacies, with a focus on transportation decarbonization, while its overall position on climate action is mixed. The company did not disclose a list of its policy engagement activities or participating trade associations. Amazon's most active engagement focuses on decarbonization of transportation, such as supporting emissions reduction targets for newly registered heavy-duty vehicles in Europe and supporting low-carbon fuels in the United States. While supporting climate policies, Amazon also holds memberships in Emissions First, which proposed weakening the scope 2 standard of the Greenhouse Gas Protocol, and the World Nuclear Association, which actively supports tripling nuclear capacity by 2050, which could divert resources from renewable energy deployment.

53 Earth.org, "Amazon Emissions Rose in 2024 Amid Expansion of Energy-Hungry Data Centers," July 17, 2025, accessed October 13, 2025, https://earth.org/amazon-emissions-rose-in-2024-amid-expansion-of-energy-hungry-data-centers/.

Supply chain (F)		
Commitment and targets (F)	Amazon scored an F as it failed to commit to net-zero emissions by 2030 and has not set any renewable energy targets for its supply chain.	
	Greenhouse gas target	By joining the Climate Pledge, Amazon committed to reaching net-zero carbon Scope 3 emissions by 2040. However, the company did not specify by how much greenhouse gas would be reduced, which could legitimize loopholes like dependence on the controversial offsetting model.
	Renewable energy target	Amazon has not set a renewable energy target for its supply chain.
Transparency (F)		Amazon scored an F due to limited transparency on carbon offsets and no public information on the supply chain electricity consumption amount and renewable energy procurement details. Amazon disclosed its supplier list and Scope 3 emissions with category breakdowns, but failed to disclose carbon intensity, carbon offsets, and electricity consumption details on its supply chain, which creates obstacles to tracking the company's progress towards its net-zero commitment.
Action (F)	Amazon scored an F as the company failed to reduce its Scope 3 and supply chain emissions continuously over the past three years, as well as unclear supply chain renewable energy transition progress due to a lack of public disclosure. While Amazon has been engaging with suppliers on emission abatement, energy efficiency improvement, and renewable energy procurement, the company has not required its suppliers to set ambitious renewable energy targets or directly invested in supply chain renewable energy capacities.	
	Scope 3 emissions from 2022 to 2024 (metric tons CO_2e)	2022: 49.02 million (Category 1 & category 2: 26.27 million) 2023: 47.40 million (Category 1 & category 2: 24.91 million) 2024: 50.32 million (Category 1 & category 2: 27.23 million)
	Renewable electricity ratio from 2022 to 2024	No data
	Percentage of renewable electricity from high-impact sourcing methods	No data
	Supplier management	Amazon has not required its suppliers to set climate commitments or renewable energy targets in the Amazon Supply Chain Standards. Suppliers are encouraged to establish a greenhouse gas reduction goal and publicly report against their progress.
	Upstream supply chain direct emission abatement	Amazon promotes the development of decarbonization technologies, making progress on commodities where decarbonization solutions are not yet available within its direct supply chain. The company also promotes decarbonization initiatives for suppliers through its Sustainability Exchange program.
	Supply chain energy efficiency	Amazon encourages suppliers to continuously improve energy efficiency and reduce energy consumption through its Supply Chain Standards and the Sustainability Exchange program.
	Supply chain renewable energy consumption and generation investment	Amazon developed pilot projects to make it easier for suppliers to purchase renewable energy certificates and make progress toward their decarbonization goals. Some of its key suppliers have matched 100% of the electricity to power the majority of products provided to Amazon in 2024.
Engagement and advocacy (F)	**Supplier engagement on decarbonization and renewable energy**	Amazon received an F for its climate engagement with suppliers due to its positive but limited scope of actions. Amazon's engagement with suppliers is positive toward carbon-free energy and decarbonization, while its Sustainability Exchange program and carbon abatement workshops target the Amazon Private Brands supply chain, which does not extend to the majority of Amazon's suppliers.

AMD	Overall grade	F
	As a leading AI chip-designing company, AMD has committed to near-term emission reduction and adopting renewable energy for its operations and supply chain. However, the company failed to set any net-zero targets, and its renewable energy transition plan across its operations and supply chain lacks significant clarity. Additionally, AMD has yet to prioritise high-impact sourcing methods for its renewable electricity procurement strategy. While the company has been actively engaging with key manufacturing suppliers like TSMC on decarbonization and renewable energy consumption, it should specify the requirement on renewable energy consumption for its suppliers and increase direct investments in new supply chain renewable energy capacities. Furthermore, as an impactful player in the AI industry, AMD should also enhance public policy advocacy for renewable energy development.	

Operational (F)		
Commitment and targets (F)	AMD scored an F due to a lack of commitment to net-zero Scope 1 and 2 emissions and inadequate ambition in the renewable energy transition by 2030. AMD is also encouraged to set a target to reach renewable energy matching on an hourly basis.	
	Greenhouse gas target	AMD has not committed to achieving net zero for its Scope 1 and 2 emissions by any time. The company has set the goal to achieve a 50% absolute reduction in Scope 1 and 2 emissions by 2030 (base year 2020).
	Renewable energy target	AMD aims to increase the amount of global electricity from renewable energy sources up to 100% in 3-10 years.
Transparency (D-)		AMD scored a D- due to a lack of transparency on operational carbon intensity, renewable energy matching method, and up-to-date renewable energy procurement and generation details. AMD disclosed Scope 1 and 2 emissions and electricity consumption, but failed to disclose its carbon intensity and renewable energy matching method. The company published renewable energy procurement and generation details in 2023 via Carbon Disclosure Project (CDP) responses. However, the comprehensive renewable energy procurement and generation details in 2024 have not been disclosed, creating obstacles to evaluating the impact of the company's renewable energy transition.
Action (F)	AMD scored an F in this aspect due to a low renewable energy ratio compared to the majority of the companies on the ranking that have achieved 100% in 2024. Additionally, AMD relied heavily on unbundled renewable energy certificates (RECs) to source renewable electricity, which has a limited contribution to new renewable energy capacity to local power grids.	
	Scope 1 and 2 emissions from 2022 to 2024 (metric tons CO_2e)	2022: 47,890 2023: 46,606 2024: 44,190
	Renewable electricity ratio from 2022 to 2024	2022: 37% 2023: 46% 2024: 50%
	Percentage of renewable electricity from high-impact sourcing methods	According to CDP data, AMD sourced over 70% of its renewable energy from unbundled renewable energy certificates (RECs) in 2023, which had a limited contribution to new renewable energy capacities on local grids.
Engagement and advocacy (F)	**Decarbonization and renewable energy policy advocacy**	AMD received an F for climate policy engagement due to a lack of demonstrable action and transparency. AMD is a member of the Semiconductor Equipment and Materials International (SEMI) Energy Collaborative and In 2024, AMD participated in a meeing in Taiwan with other SEMI Energy Collaborative members and policymakers to discuss identifying and overcoming barriers hindering the adoption of sustainable energy sources. While AMD reports responsible supplier management as one of its stated public policy priorities, no further details were disclosed regarding specific climate-related policy advocacy.

Supply chain (F)		
Commitment and targets (F)	AMD scored an F because it has not committed to achieving net-zero Scope 3 emissions and has not pledged to transition its entire supply chain to 100% renewable energy with an ambitious timeline (by 2030). The current renewable energy target lacks a clear requirement on the amount of renewable energy to be sourced by suppliers, and the timeline for the long-term supply chain renewable energy goal is vague, which brings uncertainties to the company's decarbonization pathway.	
	Greenhouse gas target	AMD has not committed to achieving net-zero Scope 3 emissions by any time. The company has set the goal to reduce carbon intensity (CO_2e/$) for manufacturing suppliers by 25% below a 2024 baseline by 2030.
	Renewable energy target	AMD asked for 80% of its manufacturing suppliers to source renewable energy by 2025. AMD does not require a minimum amount of renewable energy to be sourced by manufacturing suppliers to be included in the goal. In the long term (10+ years), AMD encourages manufacturing suppliers to source 100% renewable electricity to manufacture AMD wafers.
Transparency (F)		AMD scored an F due to a lack of transparency on the Scope 3 emission details and the full list of suppliers, as well as no public information on the supply chain electricity consumption amount and renewable energy procurement details. AMD released data on Scope 3 emissions. However, the company lacks transparency on category breakdown of Scope 3 emissions, carbon intensity, carbon offsets, its list of suppliers, and supply chain electricity consumption and renewable energy procurement details. The progress towards the company's supply chain renewable energy target cannot be effectively tracked without the relevant information.
Action (C)	AMD scored a C in this aspect, as the company has been steadily reducing its Scope 3 emissions over the past three years and actively engaging with its suppliers to abate emissions, improve energy efficiency, and increase renewable energy procurement. However, the company's supply chain renewable energy transition progress remained unclear due to a lack of public disclosure. AMD should also directly invest in new renewable energy capacity for its suppliers, as its key manufacturing suppliers, like TSMC, are facing challenges of renewable electricity procurement due to limited local resources.	
	Scope 3 emissions from 2022 to 2024 (metric tons CO_2e)	2022: 26,401,535 (Upstream: 4,131,175) 2023: 23,126,774 (Upstream: 4,031,298) 2024: 18,281,832 (Upstream: 4,088,926)
	Renewable electricity ratio from 2022 to 2024	No data
	Percentage of renewable electricity from high-impact sourcing methods	No data
	Supplier management	AMD requires suppliers to comply with the Responsible Business Alliance (RBA) Code of Conduct, as AMD's supply chain code of conduct. Suppliers should establish and report against an absolute corporate-wide greenhouse gas reduction goal. Energy consumption and all Scopes 1, 2, and significant categories of Scope 3 greenhouse gas emissions should be tracked, documented, and publicly reported.
	Upstream supply chain direct emission abatement	AMD works with suppliers to evaluate advanced abatement technologies, including onsite presentations and demonstrations in 2024-2025 about innovative new abatement solutions available. Direct emissions from AMD's foundry suppliers have decreased by approximately 24% from 2020-2024.
	Supply chain energy efficiency	AMD engaged with key suppliers like TSMC to implement energy-saving measures. In 2024, TSMC contributed to saving approximately 72,000 MWh of energy attributed to AMD wafer production.
	Supply chain renewable energy consumption and generation investment	AMD prioritizes strategies to increase renewable electricity use in foundry operations, which have led to accelerating the expected renewable electricity adoption in the wafer manufacturing of AMD products to more than 60% by 2030.
Engagement and advocacy (F)	**Supplier engagement on decarbonization and renewable energy**	AMD received an F for climate policy engagement due to a lack of demonstrable action and transparency. AMD is a member of the SEMI Energy Collaborative and in 2024, AMD participated in a meeting in Taiwan with other SEMI Energy Collaborative members and policymakers to discuss identifying and overcoming barriers hindering the adoption of sustainable energy sources. Although AMD reports responsible supplier management as one of its stated public policy priorities, no further details were disclosed regarding specific climate-related policy advocacy.

Qualcomm Qualcomm	**Overall grade**	**F**
	With a business model focused on chip designing, Qualcomm has 82.4% of its total greenhouse gas emissions (without the use phase) coming from its supply chain. However, despite a net-zero emissions commitment by 2040, the company has not set any renewable energy targets for its supply chain, leaving its supply chain decarbonization pathway unclear. So far, Qualcomm has been increasing its operational renewable energy procurement mainly with high-impact sourcing methods, including power purchase agreements (PPAs) and self-generation. However, its supply chain decarbonization progress and impact remained unclear due to a lack of public disclosure, and the company has taken negligible actions to engage with suppliers on emission abatement and renewable electricity consumption. Qualcomm should enhance its supply chain climate and energy data transparency, initiate direct investments to expand renewable energy capacities for its supply chain, and enhance engagement with policymakers and its suppliers on decarbonization actions and renewable energy transitions.	

Operational (F)		
Commitment and targets (F)	Qualcomm scored an F in this aspect due to a lack of ambition in its greenhouse gas target to achieve net-zero emissions by 2030 and no renewable energy target for its operations yet.	
	Greenhouse gas target	Qualcomm is committed to achieving net-zero Scope 1 and 2 emissions by 2040. The company aims to reduce absolute Scope 1 and Scope 2 greenhouse gas emissions 50% by 2030, from a 2020 base year.
	Renewable energy target	Qualcomm has not set renewable energy targets for its operations.
Transparency (D-)		Qualcomm scored a D- in this aspect. The company disclosed comprehensive data on Scope 1 and 2 emissions, carbon offsets, and renewable energy procurement mechanisms. It also published renewable energy procurement and generation details in 2023 via Carbon Disclosure Project (CDP) responses. However, it failed to disclose key information, including carbon intensity, renewable electricity matching method, renewable energy procurement technologies, and the location of renewable electricity generation in 2024.
Action (D+)	Qualcomm scored an D+ because it reduced Scope 1 and 2 emissions over the past three years and procured more than half of its renewable electricity from high-impact mechanisms in 2024. However, compared to the majority of the companies on the ranking that have achieved 100% renewable electricity in 2024, Qualcomm needs to work on increasing its renewable energy ratio. The company should also further increase the ratio of renewable electricity sourced from high-impact methods and reduce the proportion of unbundled renewable energy certificates.	
	Scope 1 and 2 emissions from 2022 to 2024 (metric tons CO_2e)	2022: 265,267 2023: 237,880 2024: 195,622
	Renewable electricity ratio from 2022 to 2024	2022: 46.93% 2023: 55.25% 2024: 67.69%
	Percentage of renewable electricity from high-impact sourcing methods	In 2024, renewable electricity sourced from on-site generation and power purchase agreements accounted for 59.6% of Qualcomm's total renewable electricity consumption.
Engagement and advocacy (F)	**Decarbonization and renewable energy policy advocacy**	Qualcomm received an F due to a lack of demonstrable climate-related policy advocacy. Qualcomm is a member of the Clean Energy Buyers Alliance (CEBA) and Semiconductor Equipment and Materials International (SEMI) Energy Collaborative, which express support for energy transition. Qualcomm provided industry perspectives during a meeting with officials from South Korea's Ministry of Trade hosted by SEMI Energy Collaborative regarding chip supply chain renewable energy transition. No other evidence of engagement activities, such as direct policy lobbying or public statements, was found.

Supply chain (F)		
Commitment and targets (F)	Qualcomm scored an F due to a lack of ambition to achieve net-zero emissions by 2030. The company has not set renewable energy targets for its entire supply chain.	
	Greenhouse gas target	Qualcomm is committed to achieving net-zero emissions across the value chain by 2040. The company aims to reduce absolute Scope 3 greenhouse gas emissions by 25% by 2030, from a 2020 base year.
	Renewable energy target	Qualcomm has not set renewable energy targets for its operations.
Transparency (F)		Qualcomm scored an F due to a lack of transparency on the full list of suppliers, as well as not disclosing public information on the supply chain electricity consumption amount and renewable energy procurement details. Qualcomm released data on Scope 3 emissions with category breakdowns. However, the company lacks transparency on carbon intensity, carbon offsets, its list of suppliers, and supply chain electricity consumption and renewable energy procurement details. The progress and impact of the company's supply chain net-zero emissions commitment cannot be effectively evaluated without the relevant information.
Action (F)	Qualcomm scored an F in this aspect. While the company was able to reduce its Scope 3 and supply chain emissions over the past three years, it has taken negligible actions to support suppliers on direct emissions abatement, energy efficiency improvements, and renewable electricity procurement. The company's supply chain renewable energy transition progress remained unclear due to a lack of public disclosure. Additionally, Qualcomm has not initiated any direct investment to expand renewable energy capacity on its supply chain.	
	Scope 3 emissions from 2022 to 2024 (metric tons CO_2e)	2022: 6,394,094 (category 1: 4,699,435) 2023: 5,070,086 (category 1: 3,796,564) 2024: 3,935,138 (category 1: 2,779,307)
	Renewable electricity ratio from 2022 to 2024	No data
	Percentage of renewable electricity from high-impact sourcing methods	No data
	Supplier management	Qualcomm requires suppliers to comply with the Responsible Business Alliance (RBA) Code of Conduct, as Qualcomm's supply chain code of conduct. Suppliers should establish and report against an absolute corporate-wide greenhouse gas reduction goal. Energy consumption and all Scopes 1, 2, and significant categories of Scope 3 greenhouse gas emissions should be tracked, documented, and publicly reported.
	Upstream supply chain direct emission abatement	No data
	Supply chain energy efficiency	No data
	Supply chain renewable energy consumption and generation investment	No data
Engagement and advocacy (F)	**Supplier engagement on decarbonization and renewable energy**	Qualcomm falls short in supplier climate engagement, resulting in an F grade due to a lack of demonstrable engagement activity. Qualcomm hosted a supplier summit in 2024, emphasizing the importance of a responsible supply chain; however, the absence of publicly available information regarding the summit's agenda and specific outcomes prevents a thorough evaluation of its impact.

Intel	Overall grade	F
	Intel has committed to achieving net-zero emissions for its operations by 2040 and supply chain by 2050, but the timelines suggest limited ambition. While Intel has been achieving a high renewable electricity ratio for its operations, its contribution to new renewable energy capacities on local grids remained limited due to its heavy reliance on unbundled renewable energy certificates. With a business model combining semiconductor designing and manufacturing, Intel has witnessed continuously increasing Scope 3 and supply chain emissions over the past three years. However, the company failed to require its entire supply chain to transition to 100% renewable energy and has not initiated any direct investments to increase supply chain renewable energy capacities. Intel should scale up high-impact renewable energy procurement for its operations and supply chain, hold a consistent position on policy advocacy for effective decarbonization pathways and renewable energy development, and enhance engagement with suppliers on climate actions.	

Operational (F)		
Commitment and targets (C)	Intel scored a C because the company failed to set an ambitious Scope 1 and 2 net-zero emissions target by 2030. Additionally, Intel is encouraged to achieve hourly renewable energy matching by 2030.	
	Greenhouse gas target	Intel pledged to reach net-zero Scope 1 and 2 greenhouse gas emissions by 2040. The company's climate transition plan calls for an additional 10% reduction in its absolute Scope 1 and 2 greenhouse emissions from 2019 to 2030, as the company has peaked its absolute Scope 1 and 2 greenhouse gas emissions in 2007 and reduced the emissions by 70% since then.
	Renewable energy target	Intel aims to achieve 100% renewable electricity across its global operations by 2030.
Transparency (F)		Intel scored an F due to a lack of transparency on up-to-date and comprehensive details of carbon offsets and renewable energy procurement and generation details. Intel disclosed comprehensive data on Scope 1 and 2 emissions and electricity consumption. The company provided renewable energy procurement details in 2023 through Carbon Disclosure Project (CDP) responses, which was not publicly available by the time this report was released. Intel lacks transparency on carbon intensity, carbon offsets, and renewable energy procurement and generation details in 2024, which creates obstacles to evaluating the impact of the company's renewable energy transition.
Action (F)	Intel scored an F mainly due to its heavy reliance on unbundled renewable energy certificates to procure renewable electricity, which has limited contribution to new renewable energy capacity to local power grids. As a result, the impact of the company's high renewable energy ratio and operational emissions reduction remains contentious. Additionally, the company failed to achieve a steady decrease in Scope 1 and 2 emissions over the past three years and has not achieved 100% renewable energy for its operations.	
	Scope 1 and 2 emissions from 2022 to 2024 (metric tons CO_2e)	2022: 1,538,500 2023: 893,000 2024: 1,202,000
	Renewable electricity ratio from 2022 to 2024	2022: 93% 2023: 99% 2024: 98%
	Percentage of renewable electricity from high-impact sourcing methods	According to CDP data, Intel sourced 0.3% of its renewable electricity from high-impact methods in 2023.
Engagement and advocacy (F)	**Decarbonization and renewable energy policy advocacy**	Intel received an F for climate policy engagement due to the limited intensity and scope of its activities and its membership in associations that advocate for conflicting positions. While Intel demonstrates positive positions on climate action, the company did not disclose a list of its policy engagement activities or participating trade associations. Its direct policy engagements primarily focus on the United States, including signing a joint letter organized by the Center for Climate and Energy Solutions to support climate provisions in the Build Back Better framework and publicly supporting the Inflation Reduction Act. However, no further active engagement was identified towards specific policies. Intel is a member of the Clean Energy Buyers Alliance, whereas Intel also holds memberships to Emissions First, which proposed weakening the scope 2 standard of the Greenhouse Gas Protocol.

Supply chain (F)		
Commitment and targets (D+)	Intel scored a D+ due to a lack of an ambitious Scope 3 net-zero emissions target by 2030. The company also hasn't required its entire supply chain to transition to 100% renewable energy by 2030.	
	Greenhouse gas target	Intel is committed to partnering with suppliers to drive supply chain greenhouse gas emissions to at least 30% lower from 2021 to 2030 than they would be in the absence of investment and action, and reaching net-zero upstream Scope 3 greenhouse gas emissions by 2050.
	Renewable energy target	Intel asks its key suppliers to commit to 100% renewable electricity for facilities that provide products and/or services to Intel, with a target year of 2030 or earlier.
Transparency (F)		Intel scored an F due to limited transparency on carbon offsets, the full supplier list, and no public information on the supply chain electricity consumption amount and renewable energy procurement details. Intel disclosed Scope 3 emissions and breakdown by categories. However, the company lacks transparency on carbon intensity, carbon offsets, its list of suppliers, and supply chain electricity consumption and renewable energy procurement details. Without the information, the company's progress towards its supply chain net-zero emissions commitment and renewable energy target cannot be effectively tracked.
Action (F)	Intel scored an F mainly due to continuously increasing Scope 3 and supply chain emissions over the past three years, unclear progress on supply chain renewable energy transition, and inadequate efforts to abate supply chain emissions and invest in renewable energy capacity. The company's supply chain emissions increased over 60% from 2022 to 2024. However, Intel has not required all suppliers to set ambitious renewable energy targets or launched any direct investment to scale up supply chain renewable energy procurement.	
	Scope 3 emissions from 2022 to 2024 (metric tons CO_2e)	2022: 22,791,000 (category 1: 4,792,000) 2023: 23,095,000 (category 1: 5,800,000) 2024: 25,059,000 (category 1: 7,730,000)
	Renewable electricity ratio from 2022 to 2024	No data
	Percentage of renewable electricity from high-impact sourcing methods	No data
	Supplier management	Through the Supplier Program to Accelerate Responsibility and Commitment, Intel has been encouraging suppliers to set 100% renewable electricity and net-zero greenhouse gas targets. However, the company has not required its suppliers to set climate commitments in the Supplier Code of Conduct.
	Upstream supply chain direct emission abatement	No data
	Supply chain energy efficiency	Intel is actively engaged with its suppliers to identify areas of improvement, including increasing supplier focus on energy conservation and renewable energy sourcing, increasing chemical and resource efficiencies, and leading cross-industry consortia to support the transition to a net-zero greenhouse gas semiconductor manufacturing value chain.
	Supply chain renewable energy consumption and generation investment	No data
Engagement and advocacy (D)	**Supplier engagement on decarbonization and renewable energy**	Intel rated D in supplier climate engagement, reflecting positive actions but a limited scope in its climate and renewable energy engagement with suppliers. While Intel's Supplier Program directly engaged with suppliers on calls to action to set 100% renewable electricity and net-zero greenhouse targets, there is a lack of adequate support for suppliers to achieve their goals. Intel has also been supporting climate actions in the semiconductor supply chain through its memberships in the Semiconductor Equipment and Materials International (SEMI) Semiconductor Climate Consortium (SCC) and Catalyze.

Nvidia	Overall grade	F
	With a business model focused on chip designing, Nvidia took up over 90% of the global generative AI market in 2024 with a growing market capitalization.[54] However, Nvidia's decarbonization progress has not kept up with its business expansion. Unlike Apple, Google, and Microsoft, the company has not made any net-zero emissions commitments or renewable energy goals for its operations and supply chain, despite surging supply chain emissions over the past three years that have been driven by AI development. While Nvidia increased its operational renewable electricity ratio from 44% in 2022 to 100% in 2024, historical data suggest the company's heavy dependence on unbundled renewable energy certificates, which could have limited contribution to new renewable energy capacities on local grids. Additionally, the company has taken negligible efforts to abate supply chain emissions, increase supply chain energy efficiency, and increase renewable energy consumption by its suppliers. In recent years, Nvidia's chief executive officer, Jensen Huang, has been advocating for false energy solutions like nuclear power to meet the surging energy demand of AI. Nvidia should enhance its climate and energy data transparency, set an ambitious supply chain renewable energy target, initiate direct investments to expand renewable energy capacities for its supply chain, and enhance engagement with policymakers and its suppliers on decarbonization actions and renewable energy transitions.	

Operational (F)		
Commitment and targets (F)	Nvidia scored an F due to a lack of commitment to net-zero Scope 1 and 2 emissions by 2030. Although the company has committed to 100% renewable energy and achieved the target in 2024, Nvidia is encouraged to set a target to reach renewable energy matching on an hourly basis.	
	Greenhouse gas target	Unlike Apple, Google, and Microsoft, Nvidia has not committed to achieving net zero or carbon neutral for its Scope 1 and 2 emissions by any time. Its near-term target is to reduce absolute Scope 1 and 2 emissions 50% by FY30.
	Renewable energy target	Nvidia has set a goal to purchase or generate enough renewable electricity to match 100% of its global electricity usage for offices and data centers under its operational control by FY25.
Transparency (D-)		Nvidia scored a D- due to a lack of transparency on carbon offsets and up-to-date renewable energy procurement and generation details. Nvidia disclosed comprehensive data on Scope 1 and 2 emissions, carbon intensity, and electricity consumption. However, the comprehensive renewable energy procurement and generation details in 2024 have not been disclosed, creating obstacles to evaluating the impact of the company's renewable energy transition.
Action (D+)	Nvidia scored a D+ due to decreasing Scope 1 and 2 emissions over the past three years and 100% renewable energy ratio achieved in 2024. However, historical data suggested the company relied heavily on unbundled renewable energy certificates (RECs) to procure renewable electricity. Due to a lack of public disclosure in recent years, the renewable electricity sourced from high-impact mechanisms by Nvidia in 2023 and 2024 remained unclear, creating obstacles to evaluating the impact of the company's renewable energy transition. Additionally, Nvidia is encouraged to achieve hourly matching of renewable electricity in the upcoming years.	
	Scope 1 and 2 emissions from 2022 to 2024 (metric tons CO_2e)	FY23: 70,343 FY24: 52,451 FY25: 12,952
	Renewable electricity ratio from 2022 to 2024	FY23: 44% FY24: 76% FY25: 100%
	Percentage of renewable electricity from high-impact sourcing methods	Nvidia didn't disclose relevant data in FY24 and FY25 as did Apple, Google, and Microsoft. According to its Carbon Disclosure Project (CDP) responses, the company relied completely on unbundled procurement of RECs in FY23. As the growth of AI drives up global demand for advanced chips, Nvidia should prioritize high-impact renewable electricity sourcing mechanisms such as power purchase agreements, direct investments in renewable energy, and self-generation, and avoid false energy solutions like nuclear energy and gas. Heavy reliance on RECs to reduce emissions has limited contribution to renewable energy capacity on local power grids and leads to risks of greenwashing.
Engagement and advocacy (F)	**Decarbonization and renewable energy policy advocacy**	Nvidia received an F for policy advocacy due to limited engagement on climate or renewable energy policy. The company did not disclose its direct or indirect policy activities. Furthermore, Nvidia chief executive officer Jensen Huang's public advocacy for nuclear energy in Taiwan negatively impacts the company's score.

54 IoT Analytics, "The leading generative AI companies," March 4, 2025, accessed October 13, 2025, https://iot-analytics.com/leading-generative-ai-companies/.

Supply chain (F)		
Commitment and targets (F)	Nvidia scored an F because the company has not set any net-zero emissions or renewable energy targets for its supply chain. With supply chain emissions taking up a dominant share (84.4%) in the company's total greenhouse gas emissions (without the use phase), it is essential for Nvidia to set ambitious climate and energy targets.	
	Greenhouse gas target	Unlike Apple, Google, and Microsoft, Nvidia has not committed to achieving net zero emissions for its value chain by any time. Although the company has set a near-term target to reduce Scope 3 emissions intensity from the use of sold Graphics processing unit (GPU) products by 75% per floating point operations per second (PFLOP) by FY30, the current goal failed to cover the upstream supply chain, which is a dominant contributor to the company's total greenhouse gas emissions.
	Renewable energy target	Despite a dominant proportion of emissions from its supply chain, Nvidia has not set any relevant renewable energy targets.
Transparency (F)		Nvidia scored an F in this aspect due to a lack of transparency on the full list of suppliers, carbon intensity, and carbon offsets, as well as no public information on the supply chain electricity consumption amount and renewable energy procurement details. Nvidia disclosed Scope 3 emissions with category breakdowns, but lacks disclosure on the list of suppliers, Scope 3 carbon intensity, carbon offsets, and details on supply chain electricity consumption and renewable energy procurement. While most of Nvidia's greenhouse gas emissions are outside of its direct operations, the company's supply chain decarbonization progress cannot be effectively tracked without the relevant information.
Action (F)	Nvidia scored an F in this aspect due to its surging Scope 3 and supply chain emissions and limited supply chain decarbonization efforts. Driven by the growth of AI, the company's supply chain emissions have more than doubled over the past three years. However, the company's supply chain renewable energy transition progress remained unclear due to a lack of public disclosure. So far, Nvidia has not taken adequate efforts to abate supply chain emissions, increase supply chain energy efficiency, or expand renewable energy procurement by its suppliers. Additionally, the company has not initiated any direct investment to expand renewable energy capacity in its supply chain.	
	Scope 3 emissions from 2022 to 2024 (metric tons CO_2e)	FY23: 3,514,763 (category 1: 2,975,189) FY24: 3,638,432 (category 1: 3,216,144) FY25: 6,912,577 (category 1: 6,036,105)
	Renewable electricity ratio from 2022 to 2024	No data
	Percentage of renewable electricity from high-impact sourcing methods	No data
	Supplier management	Nvidia requires suppliers to comply with the Responsible Business Alliance (RBA) Code of Conduct, as Nvidia's supply chain code of conduct. Suppliers should establish and report against an absolute corporate-wide greenhouse gas reduction goal. Energy consumption and all Scopes 1, 2, and significant categories of Scope 3 greenhouse gas emissions should be tracked, documented, and publicly reported.
	Upstream supply chain direct emission abatement	No data
	Supply chain energy efficiency	No data
	Supply chain renewable energy consumption and generation investment	No data
Engagement and advocacy (F)	**Supplier engagement on decarbonization and renewable energy**	Nvidia failed to effectively engage with its suppliers due to limited climate engagement efforts and a lack of transparency. While Nvidia expects key suppliers to report to the RBA Environmental Survey or CDP and adopt science-based targets, it does not disclose the progress of suppliers participating. Nvidia's membership in the Semiconductor Equipment and Materials International (SEMI) Energy Collaborative provides indirect support for renewable energy, but its specific contributions and impact are unclear.

Broadcom	Overall grade	F
	With a business model focused on chip designing, Broadcom has seen a rapid increase in its Scope 3 and supply chain emissions over the past two years, driven by the growth of AI. However, the company has not committed to net-zero emissions or set any renewable energy target for its operations or supply chain. Due to a lack of public disclosure, the company's renewable energy transition progress remained unclear, and it has made negligible efforts to increase high-impact renewable energy sourcing for its operations and supply chain. Broadcom should enhance its climate and energy data transparency, initiate direct investments to expand renewable energy capacities for its supply chain, and enhance engagement with policymakers and its suppliers on decarbonization actions and renewable energy transitions.	

Operational (F)		
Commitment and targets (F)	Broadcom scored an F because the company has not committed to a net-zero goal or set any renewable energy targets for its operations.	
	Greenhouse gas target	Broadcom has not committed to achieving net zero Scope 1 and 2 emissions by any time. The company is committed to reducing its Scope 1 and Scope 2 emissions by 38% by 2030 from the 2021 baseline and currently focuses on setting new near-term science-based greenhouse gas emissions targets before planning any long-term targets.
	Renewable energy target	Broadcom has not set renewable energy targets for its operations.
Transparency (F)		Broadcom scored an F due to a lack of transparency on carbon offsets and the renewable energy matching method, and up-to-date renewable energy procurement and generation details. Broadcom disclosed comprehensive data on Scope 1 and 2 emissions. However, there is no public information on its carbon offsets, renewable energy matching method, and renewable energy consumption details. A lack of transparency creates obstacles to evaluating the impact of the company's emission reduction and renewable energy transition.
Action (F)	Broadcom scored an F because it has failed to reduce its Scope 1 and 2 emissions continuously over the past three years and had a low renewable energy ratio compared to the majority of the companies on the ranking that have achieved 100% in 2024. Additionally, a lack of public disclosure on renewable energy procurement mechanisms creates obstacles to evaluating the impact behind the renewable electricity ratios.	
	Scope 1 and 2 emissions from 2022 to 2024 (metric tons CO_2e)	2022: 249,715 2023: 198,769 2024: 220,401
	Renewable electricity ratio from 2022 to 2024	2022: no data 2023: 22% 2024: 36%
	Percentage of renewable electricity from high-impact sourcing methods	Broadcom didn't disclose relevant data in 2023 and 2024 as did Apple, Google, and Microsoft.
Engagement and advocacy (F)	**Decarbonization and renewable energy policy advocacy**	Broadcom received an F due to a lack of demonstrable direct engagement on climate policy or membership in industry associations advocating for such policies.

Supply chain (F)		
Commitment and targets (F)	Broadcom scored F because the company has not set any emission reduction or renewable energy targets for its supply chain. With supply chain emissions taking up a dominant share in the company's total greenhouse gas emissions, it is essential for Broadcom to set ambitious climate and energy targets.	
	Greenhouse gas target	Broadcom has not committed to reaching net zero for its supply chain emissions.
	Renewable energy target	Broadcom has not set a renewable energy target for its supply chain.
Transparency (F)		Broadcom scored an F due to a lack of transparency on the full list of suppliers and no public information on the supply chain electricity consumption amount and renewable energy procurement details. Broadcom released data on Scope 3 emissions with category breakdowns. However, the company lacks transparency on carbon intensity, carbon offsets, its list of suppliers, and supply chain electricity consumption and renewable energy procurement details. While most of Broadcom's greenhouse gas emissions are outside of its direct operations, the company's supply chain decarbonization progress cannot be effectively tracked without the relevant information.
Action (F)	Broadcom scored an F due to its rapidly increasing Scope 3 and supply chain emissions, unclear progress on supply chain renewable energy transition, and inadequate efforts to abate supply chain emissions and invest in renewable energy capacity.	
	Scope 3 emissions from 2022 to 2024 (metric tons CO_2e)	2022: 27,177 (certain categories not calculated) 2023: 1,847,962 (category 1: 1,678,073) 2024: 2,410,880 (category 1: 2,181,575)
	Renewable electricity ratio from 2022 to 2024	No data
	Percentage of renewable electricity from high-impact sourcing methods	No data
	Supplier management	Broadcom requires its suppliers to comply with the Supplier Environmental and Social Responsibility Code of Conduct by establishing their greenhouse emissions reduction goals and by seeking to minimize their energy consumption and environmental impact.
	Upstream supply chain direct emission abatement	No data
	Supply chain energy efficiency	No data
	Supply chain renewable energy consumption and generation investment	No data
Engagement and advocacy (F)	**Supplier engagement on decarbonization and renewable energy**	Broadcom received an F for supplier climate engagement due to a lack of demonstrable impact and transparency. Broadcom reported engagement with more than 79% of their 2024 supplier spend regarding climate change, renewable energy procurement, and greenhouse gas emissions reduction targets, while no details or evidence of tangible impact were provided.

Appendix:
Scope and methodology

Company selection

The ten companies in the ranking were selected based on their market capitalization as of July 2025. To determine the impactful players in terms of AI infrastructure, model, and product development, we screened five companies with the largest market capitalization in the global technology and cloud computing industries, which include Microsoft, Apple, Amazon, Google, and Meta, as well as five leading companies in the semiconductor designing market, namely Nvidia, Broadcom, Advanced Micro Devices (AMD), Qualcomm, and Intel.

Data sources

The ranking presented in this report relies on data derived from three key sources: (1) sustainability reports published by the ranked companies for fiscal year 2024,[55] (2) supporting documentation, including blog posts and other relevant materials, available on company websites, and (3) company responses to the Carbon Disclosure Project (CDP) Corporate Questionnaire submitted during the 2024 disclosure cycle. The CDP responses served as a supplementary data source specifically for the Transparency and Action pillar.[56] In addition, the ranked companies were contacted for data verification purposes and their feedback was incorporated into the final ranking where applicable. We thank the following companies for their participation in the data verification process: AMD, Google, Meta, and Microsoft.[57]

Evaluation criteria

To assess the company's operational and supply chain management regarding climate action and renewable energy transition, the evaluation employs a four-pillar framework comprising Commitment, Transparency, Action and Advocacy. The overall score for each company is weighted, with 40% attributed to operational performance and 60% to supply chain management acknowledging that a greater portion of emissions lies within the supply chain. Performance in fiscal year 2024 was assessed using the criteria in Appendix Tables 1 and 2.

55 Nvidia data corresponds to the company's fiscal year 2025, covering the period from January 29, 2024, to January 26, 2025.

56 The CDP documents from the 2025 disclosure cycle were not available at the time of writing. While the CDP data are drawn from the previous year's disclosure cycle, we assume that companies will not only continue to disclose such information in their CDP responses for the current year, but also remain on track with their stated decarbonization and renewable energy strategies.

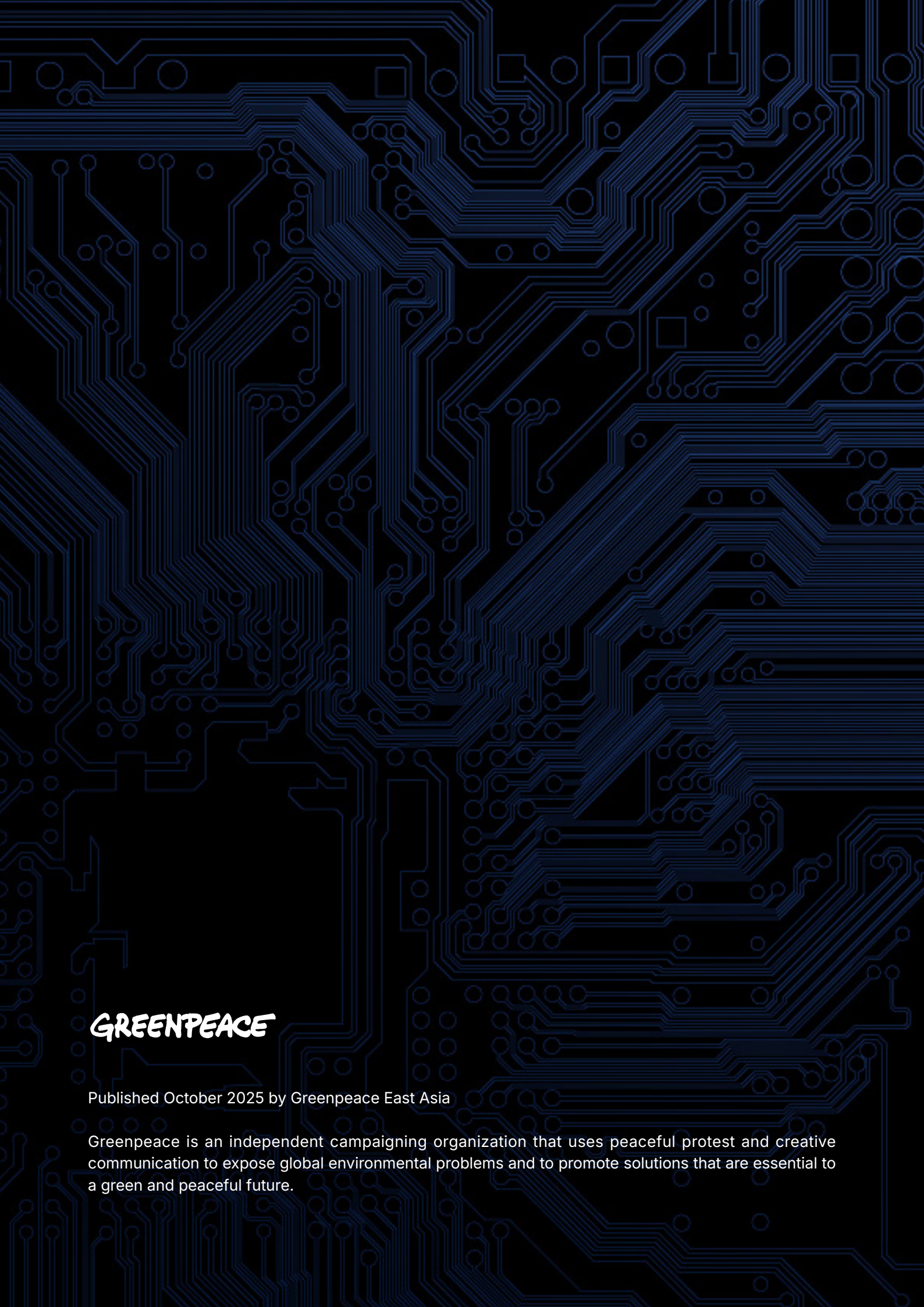
57 Companies mentioned are listed in alphabetical order and do not reflect a difference in contribution.

Appendix Table 1. Operational management scoring rubric

Weight	Scoring Pillar	Scoring Principle
30%	Commitment	Climate commitment - A commitment to achieving global carbon neutral or net-zero emissions with an ambitious timeline
		Renewable energy commitment - A bold renewable energy commitment with an ambitious timeline - Targeted renewable energy matching method
20%	Transparency	Emissions - Annual Scope 1 emissions disclosure - Annual market- & location-based Scope 2 emissions disclosure - Greenhouse gas emission intensity - Emissions breakdown by source - Application of offsets/removals
		Electricity - Annual Disclosure on electricity and renewable energy consumptions - Renewable energy breakdown by sources, location of generation and procurement mechanisms - Renewable energy matching approach
35%	Action	Decarbonization - Emissions and carbon intensity reduction
		Renewable energy - Ratio of electricity consumption matched by renewable energy - Renewable energy by procurement mechanisms
15%	Advocacy	- Direct policy advocacy for decarbonization and renewable energy - Indirect policy advocacy for decarbonization and renewable energy through third-party groups - Advocacy for fossil fuels and nuclear power

Appendix Table 2. Supply chain management scoring rubric

Weight	Scoring Pillar	Scoring Principle
30%	Commitment	Climate commitment – A commitment to achieving global carbon neutral or net-zero emissions with an ambitious timeline for supply chain.
		Renewable energy commitment – A bold renewable energy commitment with an ambitious timeline for supply chain
20%	Transparency	Supplier management – Supplier list – Tracking supplier decarbonization progress
		Emissions – Annual Scope 3 emissions disclosure with category breakdown – Greenhouse gas emission intensity including Scope 3 – Application of offsets/removals
		Electricity – Annual Disclosure on electricity and renewable energy consumptions in supply chain – Renewable energy breakdown by sources and procurement mechanisms
35%	Action	Supplier management – Incorporate emissions reduction & renewable energy targets into the supplier code of conduct
		Decarbonization – Emissions and carbon intensity reduction in supply chain – Actions towards supply chain direct emissions abatement
		Renewable energy – Ratio of electricity consumption matched by renewable energy in supply chain – Renewable energy by procurement mechanisms – Actions promoting energy efficiency in supply chain – Actions promoting renewable energy consumption and accessibility in supply chain
15%	Advocacy	– Direct engagement with supply chain and suppliers for decarbonization and renewable energy transition – Indirect engagement with supply chain and suppliers for decarbonization and renewable energy transition through third-party groups



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