

2023 Supply Change

Climate commitments and renewable energy progress
by the world's biggest electronics suppliers

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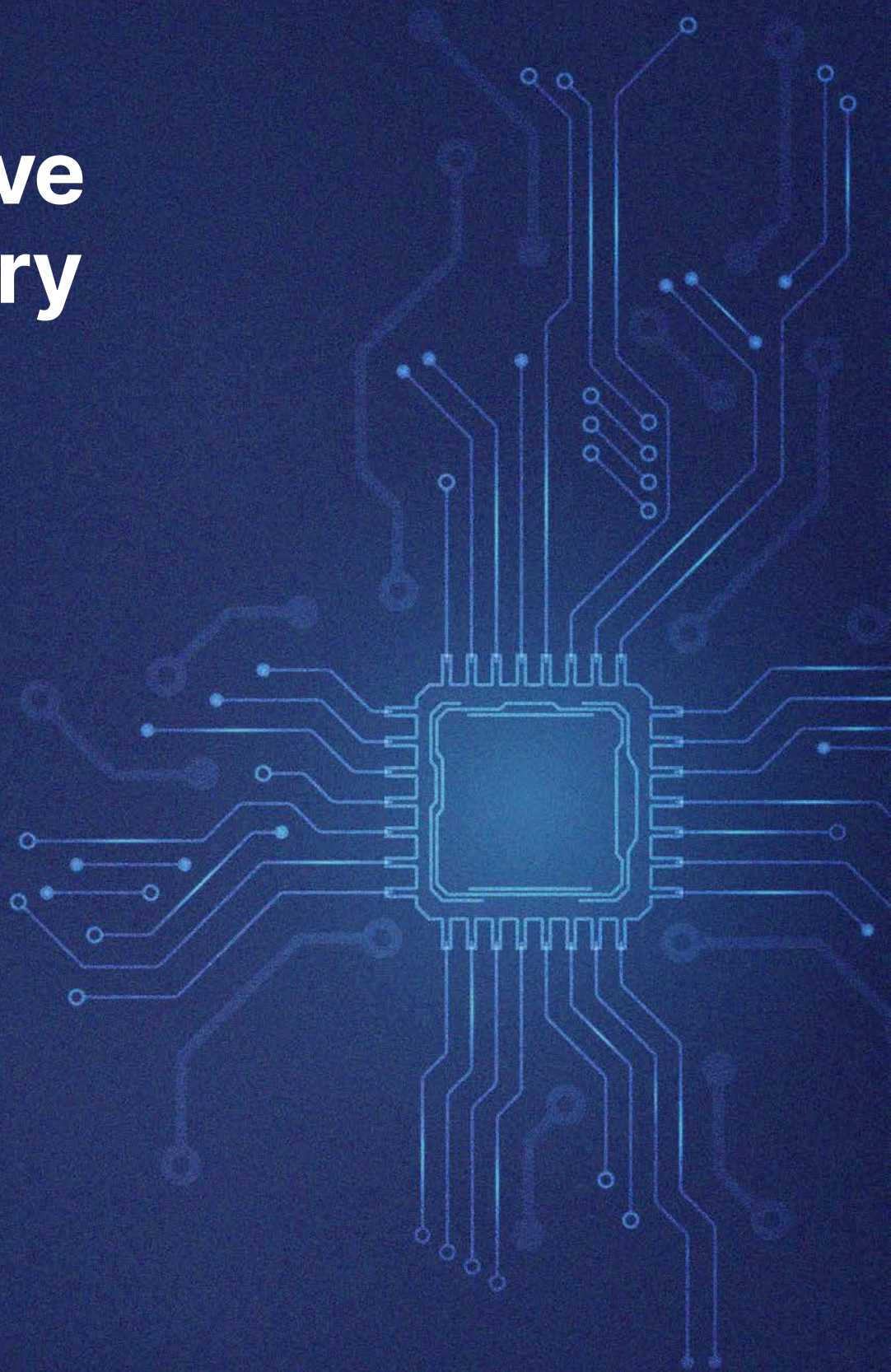
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Executive Summary



Key findings

Climate commitments

Electronics manufacturers lack ambitious emissions reduction plans. Eight out of 11 suppliers in the ranking have pledged to achieve net zero by mid-century, and none have pledged to halve their carbon emissions by 2030, a minimum level necessary to align with the Paris Agreement 1.5°C goal.

Only four major electronics suppliers have pledged to achieve net zero emissions across their supply chains by 2050: Luxshare Precision, TSMC, LG Display and Hon Hai Technology Group (Foxconn). However, the four companies lack targets to reduce emissions by more than 50% by 2030, which means that their 2030 emissions reduction targets are not in line with the 1.5°C Paris Agreement goal.

Intel is the only major electronics supplier that has pledged to transition to 100% renewable energy by 2030, but it continues to rely heavily on low-impact procurement methods, such as renewable energy certificates (RECs), to achieve this goal. In September, TSMC moved forward its 100% renewable energy target from 2050 to 2040. By contrast, Samsung Electronics still plans to transition to 100% renewable energy by 2050, a deadline that is far too distant in the future to help avert the most catastrophic impacts of climate change.

Climate action

The median reported renewable electricity procurement rate for the 11 electronics suppliers in the ranking was 20% in 2022, compared to 10% for the same 11 companies in 2021. In 2022, 9 out of 11 suppliers in the ranking increased their renewable electricity ratio. Intel's renewable electricity ratio was 93% in 2022, followed by Samsung Electronics at 31% and SK hynix at 30%. Hon Hai Technology Group (Foxconn) and Goertek reported renewable electricity ratios of less than 10% in 2022. BOE did not disclose its 2022 renewable electricity ratio.

SK hynix demonstrated the most dramatic year-on-year increase in its renewable electricity ratio in 2022, a jump of more than 25% compared to the year prior. The increase was due in large part to the purchase of RECs and participation in South Korea's Green Premium scheme. TSMC reported the lowest renewable electricity procurement ratio increase, at just over 1%.

Many suppliers, most notably Intel, Samsung Electronics and SK hynix, have relied heavily on low-impact procurement mechanisms, such as RECs, to increase their renewable electricity procurement ratio. However, in practice, RECs and green pricing rarely result in the addition of new renewable energy capacity to the grid. In 2022, only Luxshare Precision, Pegatron and Hon Hai Technology Group (Foxconn) sourced at least 70% of their renewable electricity through high-impact sourcing methods, such as onsite generation, renewable energy investment and Power Purchase Agreements (PPAs).

The emissions of five ranked suppliers – Intel, TSMC, Samsung Electronics, Hon Hai Technology Group, and Luxshare Precision – increased in 2022 compared to 2020. Goertek and BOE did not disclose sufficient data to assess their overall emissions.

Advocacy

A growing number of companies have begun to advocate for renewable energy-friendly policies. However, their level of ambition varies. Five ranked companies, Luxshare Precision, TSMC, LG Display, Samsung Display and Pegatron, have suggested policies locally to develop more renewable energy-friendly mechanisms. Other ranked companies, including Samsung Electronics, did not participate in any visible or significant policy advocacy work.

Ranking

Samsung Electronics received the lowest grade of major semiconductor manufacturers in the ranking, at a D+, due to its lack of 2030 emissions reduction target, slow timeline to transition to 100% renewable energy, and heavy reliance on low-impact renewable electricity sourcing methods.

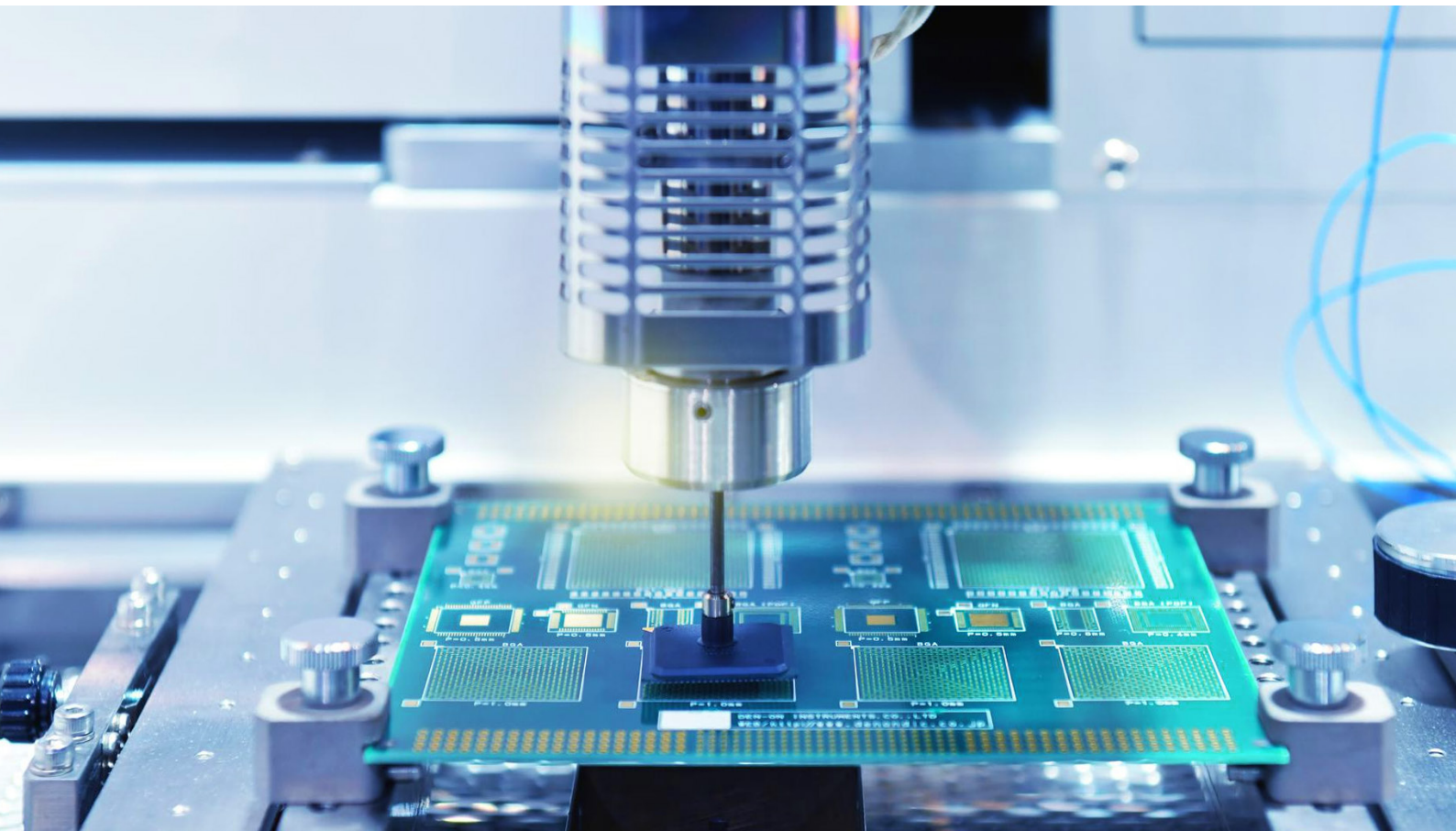
Hon Hai Technology Group (Foxconn) reported the highest emissions and electricity consumption in the final assembly category of the ranking. In 2022, the company's emissions exceeded the annual emissions of Iceland.¹¹ In 2022, Hon Hai Technology Group showed little progress on emissions reduction and renewable electricity adoption compared to its rival, Luxshare Precision. The renewable electricity usage rate of Hon Hai Technology Group (Foxconn) was just 8% in 2022.

11 Ritchie, H., Rosado, P., & Roser, M. (2023, September 28). *Greenhouse gas emissions*. Our World in Data. Retrieved October 17, 2023. from <https://ourworldindata.org/greenhouse-gas-emissions>

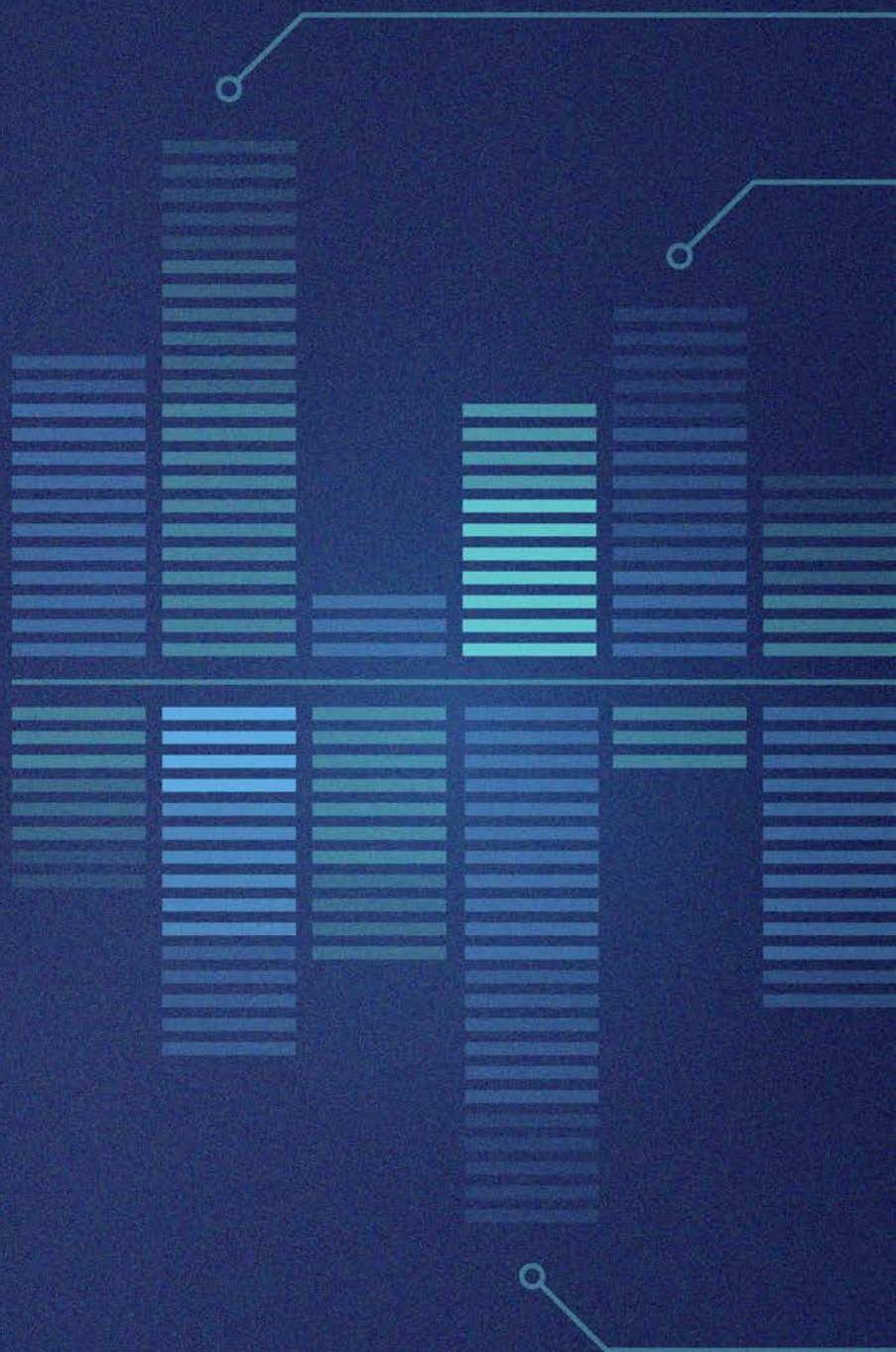
Luxshare Precision has moved up a full grade point due to the company's progress over the past year.








In April 2023, Luxshare Precision pledged to achieve 50% renewable energy by 2025. In 2022, the company sourced more than 70% of its renewable electricity from high-impact methods, such as onsite generation, direct investment in renewable energy, and PPAs. Luxshare Precision has also advised relevant administrators in China about green electricity trading mechanisms.

Goertek and BOE received the overall lowest grade, an F, due to their lack of emissions reduction and 100% renewable energy transition targets, low transparency of renewable electricity sourcing and environmental data, and lack of advocacy work.

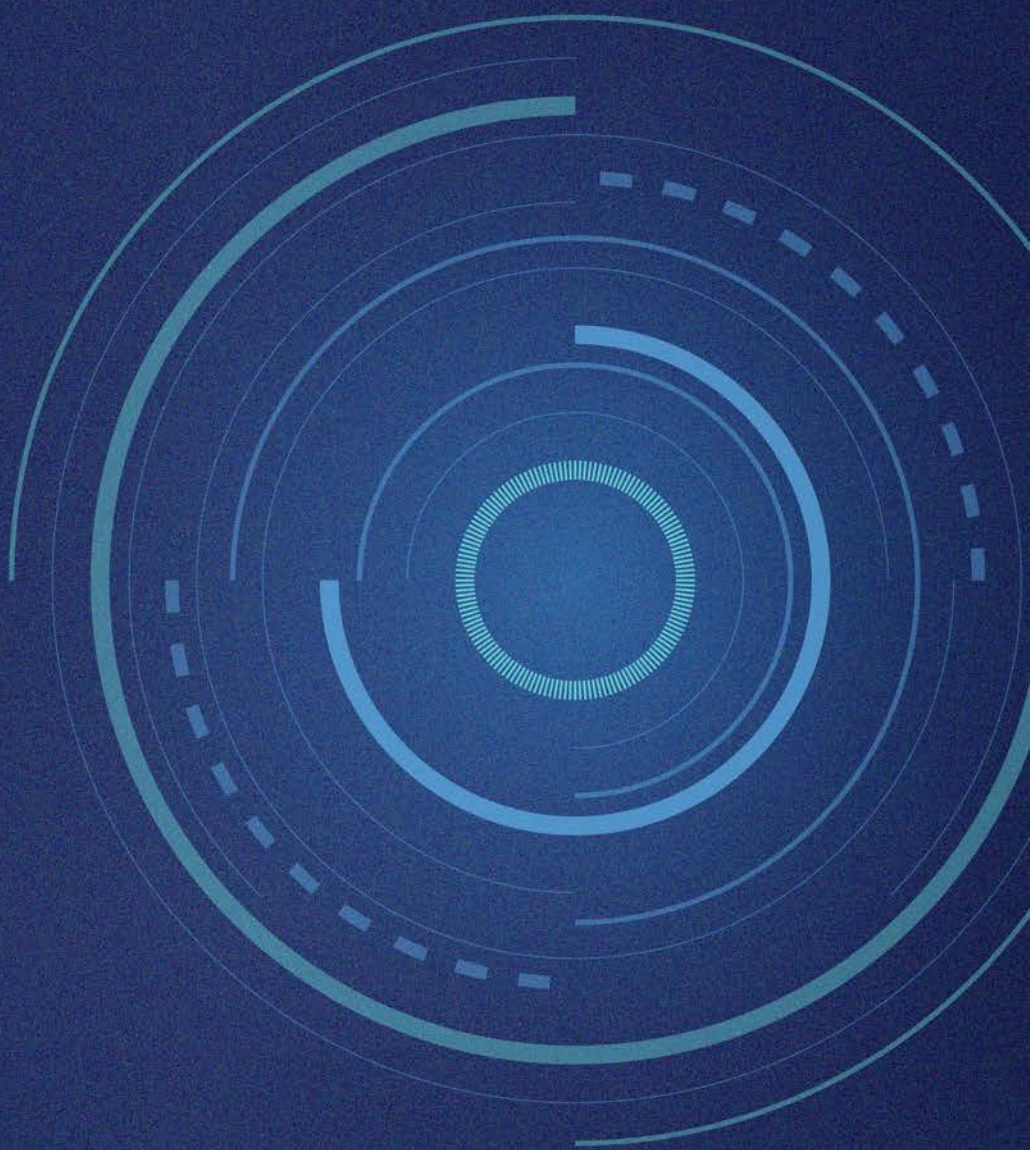


Ranking



Company	Sector	2022	2021	2021/2022 Progress
 LUXSHARE ICT	Final Assembly	C+	D+	↑
 intel.	Semiconductor	C+	C+	—
 SK hynix	Semiconductor	C	D	↑
 tsmc	Semiconductor	C	C-	↑
PEGATRON	Final Assembly	C	D-	↑
 LG Display	Display Manufacturing	C-	D	↑
 SAMSUNG SAMSUNG DISPLAY	Display Manufacturing	C-	D+	↑
SAMSUNG	Semiconductor	D+	D+	—
 FOXCONN 鴻海科技集團	Final Assembly	D+	D+	—
BOE	Display Manufacturing	F	F	—
Goertek	Final Assembly	F	F	—

Decarbonisation Progress



Since 2022, Greenpeace East Asia has been tracking the decarbonisation progress of top electronics suppliers, including their commitments, actions, environmental data transparency, and advocacy. It is encouraging to see that some companies are making progress to reduce their emissions. However, progress from leading suppliers in the ranking is still too slow to limit the global average annual temperature increase to below 1.5°C.

Progress in commitment

In 2022, two companies in the ranking moved forward their targets for renewable energy. Notably, TSMC and Luxshare have updated their renewable energy transition plan since 2022. TSMC has targeted to achieve 60% renewable energy by 2030 and 100% energy electricity by 2040, and Luxshare aims to achieve 50% renewable energy by 2025.

However, ranked companies still lack ambitious 2030 decarbonisation plans and renewable energy transition plans. To limit global warming to below 1.5°C, all companies must prioritize reducing emissions by more than 50% by 2030. On average, for ranked companies more than 60% of emissions can be reduced by transitioning to renewables. For this reason, it is imperative that electronics manufacturers target to achieve 100% energy by 2030.

Progress in action

The median reported renewable electricity usage rate for the 11 ranked companies increased to 20% in 2022, compared to 10% in 2021. Hon Hai Technology Group (Foxconn), Pegatron and Luxshare Precision relied on diversified renewable electricity sourcing methods, with the majority of their renewables from high-impact sourcing methods. However, most electronics suppliers still rely on low-impact sourcing options to procure renewable electricity.

The emissions of the five ranked suppliers – Intel, TSMC, Samsung Electronics, Hon Hai Technology Group, and Luxshare Precision – increased in 2022 compared to 2020. Luxshare Precision saw the biggest emissions increase due to an increase in production, a jump of more than 200% compared to 2020.

Progress in data transparency

In 2022, nine out of 11 suppliers updated their energy use, electricity use, scope 1 and 2 emissions, scope 3 emissions, and emissions intensity. In 2021, Hon Hai Technology Group (Foxconn) and Luxshare did not disclose scope 3 emissions, although both companies had done so in 2022. BOE and Goertek did not disclose the majority of their environmental data in 2021 or 2022.








Progress in advocacy

In 2022, five companies took public steps to advocate for renewable electricity sourcing-related policy, compared to just three the year prior. In 2022, Samsung Display, LG Display and TSMC were joined by Luxshare Precision and Pegatron as advocates for renewable energy-friendly policy. Luxshare suggested mechanisms for green electricity trading and Green Electricity Certificates, while Pegatron joined the Taiwan Climate Alliance and participated in discussions related to renewable electricity procurement policy.

Category breakdown

Climate commitments

2030 is a crucial timeline that companies need to follow in order to keep the 1.5°C goal within reach. The climate commitments section assesses whether a company has pledged to achieve emission reductions and 100% renewable energy with an ambitious timeline and scope.

Company	Commitment
	B
	C+
	C-
	D-
SAMSUNG	F
	F
	F
	F
PEGATRON	F
BOE	F
Goertek	F

Current status

Eight out of 11 ranked companies have issued net zero targets. Among all eight companies with net zero targets, only four companies, Luxshare Precision, TSMC, LG Display, and Hon Hai Technology Group (Foxconn), have included their supply chain in their net zero commitment. BOE, Goertek, and Pegatron have not committed to achieving net zero emissions. Intel is the only company to have targeted net zero emissions by 2040.

None of the 11 ranked suppliers targeted to reduce emissions by more than 50% by 2030. Six companies, TSMC, Pegatron, Hon Hai Technology Group (Foxconn), LG Display, SK hynix, and Intel, set their 2030 emissions reduction target below 50%. Other ranked companies, including Luxshare Precision, Goertek, BOE, Samsung Electronics, and Samsung Display, have not yet set 2030 emissions reduction targets.

Of the suppliers in the ranking, only Intel targeted 100% renewable energy by 2030. TSMC recently updated its 100% renewable energy timeline from 2050 to 2040. Three ranked companies, Samsung Electronics, Samsung Display, and SK hynix, have set timelines to transition to 100% renewable energy by 2050. Two companies, Luxshare Precision and Hon Hai Technology Group (Foxconn), set mid-term targets to transition to 50% renewable energy by 2025 and 2030, respectively. Three companies, Pegatron, Goertek, and BOE, have not set renewable energy targets. LG Display only set renewable energy targets for its branches in China mainland and Vietnam, and the company has not set a renewable energy target in South Korea yet.

Figure 1. Ranked companies' 2030 emissions reduction targets

Company	Over 50%	Under 50%	No targets
TSMC		✓	
Pegatron		✓	
Hon Hai Technology Group (Foxconn)		✓	
Luxshare Precision			✓
Goertek			✓
BOE			✓
Samsung Electronics			✓
Samsung Display			✓
SK hynix		✓	
LG Display		✓	
Intel		✓	

Climate action

With more and more companies setting up climate targets, it is essential to examine whether suppliers have followed through on their renewable energy commitments with renewable electricity adoption, emission reduction, and energy efficiency.

Companies are evaluated based on their renewable electricity ratio, increased renewable electricity ratio from 2021 to 2022, renewable electricity sourcing methods, energy efficiency, and whether emissions within the company’s own operations over the past three years have decreased. Companies with a high ratio of renewable electricity and high-impact renewable electricity sourcing methods, such as onsite generation, investment in renewable electricity plants and signing PPAs, are granted higher scores.

Current status

In 2022, the renewable electricity ratios of most ranked suppliers increased in comparison to 2021. SK hynix’s renewable electricity ratio increased in 2022 by 26%, which was the largest year-on-year margin of the 11 companies in the ranking, to reach a renewable electricity ratio of 30%. Five of the 11 ranked companies’ renewable electricity ratios increased by more than 10% compared to the previous year – those companies were Intel, Luxshare Precision, Samsung Electronics, Samsung Display and Pegatron. The renewable electricity ratios of LG Display, TSMC, and Hon Hai Technology Group (Foxconn) increased by less than 4% in 2022. Goertek and BOE did not provide sufficient data to calculate the progression in their renewable electricity transition in 2022.














Company	Action
PEGATRON	B-
	C
intel.	C-
	C-
	D+
	D+
	D
	D-
SAMSUNG	D-
BOE	F
Goertek	F

Figure 2. Ranked companies' renewable electricity ratio and increase in renewable electricity ratio from 2021 to 2022

Companies	RE ratio	Ratio increase ¹²
 intel.	93%	13%
SAMSUNG	31%	11%
 SK hynix	30%	26%
 LUXSHARE ICT	24%	10%
 SAMSUNG SAMSUNG DISPLAY	21%	16%
PEGATRON	19%	14%
 LG Display	13%	2%
 tsmc	10%	1%
 FOXCONN 鴻海科技集團	8%	3%
Goertek	6%	/
BOE	/	/

In terms of companies' renewable electricity sourcing, nine out of 11 ranked companies have disclosed to Greenpeace their sourcing methods in percentages. Intel, TSMC, SK hynix, Samsung Electronics, Samsung Display and LG Display sourced more than 50% of renewable energy through low-impact sourcing, including renewable electricity certificates and green premiums. Luxshare Precision, Pegatron and Hon Hai Technology Group (Foxconn) sourced their renewable electricity mainly through high-impact sourcing, such as onsite generation, renewable electricity investment, and PPAs. Onsite generation and renewable electricity certificates were the two main approaches among ranked companies for renewable electricity procurement. All 11 ranked companies have chosen such methods. Although signing

PPAs has become one of the most effective options to purchase renewable electricity in the US and Europe, ranked companies like Intel, Samsung and TSMC still opted to increase their renewable electricity ratios through RECs.

All ranked companies have taken measures to improve energy efficiency. Four ranked companies – Pegatron, Samsung Display, LG Display, and SK hynix – have reported an overall emissions decrease across their own operations since 2020. By contrast, the emissions of Intel, Samsung Electronics, Luxshare Precision, SK hynix, TSMC, and Hon Hai Technology Group (Foxconn) have increased since 2020. Goertek and BOE did not disclose any data.

12 Ratio increase = 2022 RE ratio - 2021 RE ratio

Transparency

Current status

Overall, ranked suppliers have been actively disclosing their environmental data through ESG reports and CDP disclosure. However, Goertek and BOE have disclosed very little information.

Nine out of 11 suppliers on the ranking disclosed energy use and scope 3 emissions, 10 disclosed electricity use and all 11 disclosed scope 1 and 2 emissions. Eight of the 11 ranked suppliers have disclosed their emissions intensity.

Company	Transparency
	A+
	A+
	A+
	A+
SAMSUNG	A+
	A+
	A+
PEGATRON	A+
intel.	A-
BOE	D-
Goertek	D-

Figure 3. Environmental transparency status of ranked suppliers

	Energy usage	Electricity		Emission		
	All types	All types	RE	Scope 1+2	Scope 3	GHG intensity
TSMC	✓	✓	✓	✓	✓	✓
Pegatron	✓	✓	✓	✓	✓	✓
Hon Hai Technology Group (Foxconn)	✓	✓	✓	✓	✓	✓
Luxshare Precision	✓	✓	✓	✓	✓	✓
Goertek	✗	✗	✓	✓	✗	✗
BOE	✗	✓	✗	✓	✗	✗
Samsung Electronics	✓	✓	✓	✓	✓	✓
Samsung Display	✓	✓	✓	✓	✓	✓
SK hynix	✓	✓	✓	✓	✓	✓
LG Display	✓	✓	✓	✓	✓	✓
Intel	✓	✓	✓	✓	✓	✗

Advocacy

Current status

Most of the ranked suppliers have set up climate-related task forces internally and have conducted sharing sessions on renewable electricity procurement or emissions reduction with peers.

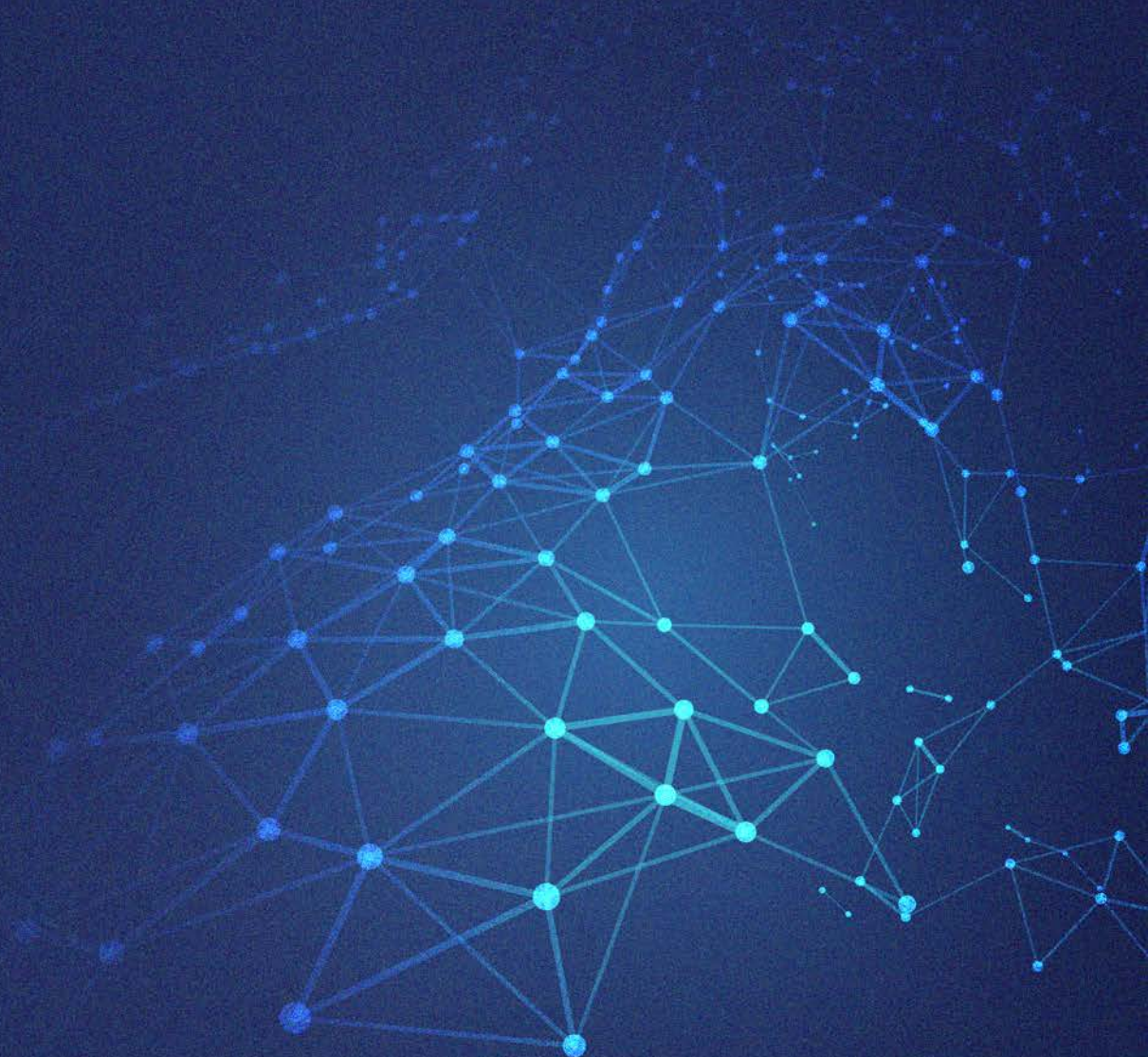
For policy advocacy, five out of 11 ranked suppliers – Luxshare, TSMC, Pegatron, LG Display, and Samsung Display – recorded engaging with relevant policy stakeholders to develop renewable electricity-friendly policies, but the ambition of the suggestions is insufficient. Top suppliers such as Samsung Electronics, Hon Hai Technology Group (Foxconn) and SK hynix have not shown enough effort in policy advocacy.

Company	Advocacy
 LG Display	A-
 LUXSHARE ICT	A-
 TSMC	B
 SAMSUNG DISPLAY	B
PEGATRON	C+
intel.	D+
SAMSUNG	D+
 SK hynix	D+
 FOXCONN 鴻海科技集團	F
BOE	F
Goertek	F

Figure 4. Advocacy status of ranked suppliers

Company	Policy	Peer	Governance
TSMC	✓	✓	✓
Pegatron	✓	✓	✓
Hon Hai Technology Group (Foxconn)	✗	✗	✓
Luxshare Precision	✓	✓	✓
Goertek	✗	✗	✓
BOE	✗	✗	✓
Samsung Electronics	✗	✓	✓
Samsung Display	✓	✓	✓
SK hynix	✗	✓	✓
LG Display	✓	✓	✓
Intel	✗	✓	✓

Greenpeace Recommendations



Companies need to transition to 100% renewable energy by 2030.

On an industry level, both the latest International Panel on Climate Change (IPCC) findings and science-based targets initiative (SBTi) suggestions underscore the need for a 50% emissions reduction by 2030.^{13,14} In July 2023, the International Energy Agency (IEA) published a report that highlighted the importance of tripling renewable power by 2030 to keep the 1.5°C goal within reach. As major consumers of electricity,¹⁵ electronics suppliers need to lead and expand procurement as well as consumption of renewable energy. Companies have to transition to 100% renewable energy by 2030 to help progress towards meeting the 1.5°C goal.

Companies should choose high-impact sourcing methods.

High-impact renewable electricity sourcing options, such as PPAs, renewable energy investment, and onsite generation should be the primary options for a company to achieve renewable electricity targets because these methods have clear additionality and trackability and are therefore impactful for climate mitigation. RECs can be an additional choice for companies to meet their targets. When companies set renewable electricity procurement targets, high-impact sourcing methods need to be clearly stated.

Companies need to actively participate in renewable energy-related policy advocacy.

Participating in renewable energy-related policy advocacy can be a step further for companies to showcase their impact in decarbonisation and transition to renewable electricity. In China mainland, companies should participate in the suggestion of green electricity trading mechanisms, such as long-term PPAs; In Taiwan, companies can advocate for policies that enable them to be more actively involved in self-generating and investing in renewable energy; in South Korea, companies should call on the government to increase renewable energy capacity.

13 Intergovernmental Panel on Climate Change (2022). The evidence is clear: The time for action is now. We can halve emissions by 2030 Retrieved October 17, 2023, from <https://www.ipcc.ch/2022/04/04/ipcc-ar6-wgiii-pressrelease/#:~:text=In%20the%20scenarios%20we%20assessed,reduced%20by%20about%20a%20third.>

14 International Energy Agency (2023). Tripling renewable power capacity by 2030 is vital to keep the 1.5°C goal within reach. Retrieved October 17, 2023, from <https://www.iea.org/commentaries/tripling-renewable-power-capacity-by-2030-is-vital-to-keep-the-150c-goal-within-reach>

15 International Energy Agency (2023). Tripling renewable power capacity by 2030 is vital to keep the 1.5°C goal within reach. Retrieved October 17, 2023, from <https://www.iea.org/commentaries/tripling-renewable-power-capacity-by-2030-is-vital-to-keep-the-150c-goal-within-reach>

Scorecard



Company: SK hynix 

Overall grade	Industry	Clients
C	Semiconductor	Apple, Microsoft, Dell, HP, Amazon, LG Electronics, Google, Lenovo, Sony, Samsung Electronics

Commitment (F)	Climate commitment	SK hynix has committed to achieving net zero emissions. However, the mid-term emissions reduction target of the company is not aligned with 1.5°C. The company has not set a target to reduce its supply chain emissions.
	100% RE commitment	SK hynix has committed to achieve 100% renewable energy by 2050.
Action (C)	Renewable electricity ratio	29.6%
	Renewable electricity increase from 2021-2022	25.6%
	Renewable electricity sourcing methods	SK hynix sourced more than 99% of its renewables through low-impact sourcing, such as RECs and green premium.
	Energy efficiency	SK hynix used various technologies to achieve energy efficiency.
	Emission reduction from 2020-2022 (own operations)	Decreased 4.9%. 2020, Scope 1+2: 7,548,328 tCO ₂ eq; 2022, Scope 1+2: 7,173,550 tCO ₂ eq
Transparency (A+)	SK hynix disclosed all of its environmental data, including energy usage, electricity and emissions.	
Advocacy (D+)	According to SK hynix's disclosure, SK hynix has become the founding member of the Semiconductor Climate Consortium (SCC). SK hynix is actively participating in five working groups finalized in early 2023 within the SCC, collaborating closely on methodologies, technological innovations, and communication efforts to reduce greenhouse gas emissions. With regards to policy advocacy, there is no evidence of SK hynix engaging with government officials on renewable energy-related policy changes.	

Data Source

- SK hynix. (2023). SK hynix Sustainability Report 2023. Retrieved October 17, 2023, from <https://www.skhynix.com/sustainability/UI-FR-SA1601/>
- SK hynix. (2023). Climate Change 2023. CDP. Retrieved October 17, 2023, from https://www.cdp.net/zh/formatted_responses/responses?campaign_id=83630982&discloser_id=1041608&locale=zh&organization_name=SK+Hynix&organization_number=8663&program=Investor&project_year=2023&redirect=https%3A%2F%2Fcdp.credit360.com%2Fsurveys%2F2023%2Fjwbhd7d6%2F309592&survey_id=82591262

Company: Samsung Electronics **SAMSUNG**

Overall grade	Industry	Clients
D+	Semiconductor	Apple, Microsoft, Dell, Lenovo, LG Electronics, Google, HP

Commitment (F)	Climate commitment	Samsung Electronics has committed to achieve carbon neutrality by 2050. However, the company has not set a mid-term emissions reduction target, and scope 3 emissions are not included in the commitment.
	100% RE commitment	Samsung Electronics has committed to convert 100% of its electricity to renewable energy by 2050.
Action (D-)	Renewable electricity ratio	31%
	Renewable electricity increase from 2021-2022	11%
	Renewable electricity sourcing methods	Samsung Electronics sourced more than 98% of its renewables through low-impact methods, such as RECs and green premium. High-impact sourcing accounted for only 2%.
	Energy efficiency	Samsung Electronics used various ways to raise energy efficiency.
	Emission reduction from 2020-2022 (own operations)	Increased 1.6% 2020, Scope 1+2: 14,806,000 tCO ₂ eq; 2022, Scope 1+2: 15,053,000 tCO ₂ eq
Transparency (A+)	Samsung Electronics disclosed all its environmental data, including energy usage, electricity and emissions.	
Advocacy (D+)	<p>According to Samsung Electronics' disclosure, Samsung Electronics joined the Semiconductor Climate Consortium (SCC) as a founding member. In January 2023 the company was selected as a member of the SCC board of directors.</p> <p>Although Samsung Electronics' disclosure stated that the company had joined the Asia Clean Energy Coalition steering committee and was working to revitalize the supply of renewable energy in Asia, it did not disclose the specific policy on which Samsung Electronics was working, and no other details have been disclosed.</p>	

Data Source

- Samsung Electronics (2023). Samsung Electronics Sustainability Report 2023. Retrieved October 17, 2023, from https://www.samsung.com/global/sustainability/media/pdf/Samsung_Electronics_Sustainability_Report_2023_ENG.pdf
- Samsung Electronics. (2023). Climate Change 2023. CDP. Retrieved October 17, 2023, from https://www.cdp.net/zh/formatted_responses/responses?campaign_id=83630982&discloser_id=1032670&locale=zh&organization_name=Samsung+Electronics&organization_number=16191&program=Investor&project_year=2023&redirect=https%3A%2F%2Fcdp.credit360.com%2Fsurveys%2F2023%2Fjwbhd7d6%2F289039&survey_id=82591262

Company: TSMC 

Overall grade	Industry	Clients
C	Semiconductor	Apple, Microsoft, Amazon, Dell, HP

Commitment (C+)	Climate commitment	TSMC has committed to achieve net zero emissions by 2050, including scope 3 emissions. The company has developed an implementation pathway to achieve its climate commitment – reducing unit greenhouse gas emissions by 30% compared to 2020 and restoring greenhouse gas emissions to the 2020 level. However, the mid-term target is not aligned with the 1.5°C target.
	100% RE commitment	TSMC had set goals to transition to 60% renewable energy by 2030 and 100% renewable energy by 2040.
Action (D-)	Renewable electricity ratio	10.4%
	Renewable electricity increase from 2021-2022	1.2%
	Renewable electricity sourcing methods	TSMC sourced its renewable energy through various ways, including 0.2% from onsite generation, 43.9% from signing PPAs, and 55.9% from RECs.
	Energy efficiency	TSMC adopted various approaches to conserve its energy.
	Emission reduction from 2020-2022 (own operations)	Increased 22.6%. 2020, Scope 1+2: 9,464,696 metric tCO ₂ eq; 2022: Scope 1+2: 11,599,089 metric tCO ₂ eq

<p>Transparency (A+)</p>	<p>TSMC disclosed complete environmental data, including energy usage, electricity and emissions.</p>
<p>Advocacy (B)</p>	<p>In TSMC’s disclosure, the company said it signed a 20,000 GWh renewable energy joint procurement contract with ARK Power in April 2023, which has enabled companies to have more access to renewable energy.</p> <p>Regarding renewable energy-related policy advocacy, TSMC made several suggestions to the government from 2021 to 2023 for the construction of offshore wind power and solar photovoltaics, such as increasing the flexibility of offshore wind farm power generation capacity and localization requirements, and strengthening the infrastructure required for renewable energy.</p>

Data Source

- TSMC. (2022). TSMC 2022 Sustainability Report. Retrieved October 17, 2023, from https://esg.tsmc.com/download/file/2022_sustainabilityReport/english/e-all.pdf
- TSMC. (2023). Climate Change 2023. CDP. Retrieved October 17, 2023, from https://www.cdp.net/zh/formatted_responses/responses?campaign_id=83630982&discloser_id=1036324&locale=zh&organization_name=Taiwan+Semiconductor+Manufacturing+Company%2C+Ltd.&organization_number=18280&program=Investor&project_year=2023&redirect=https%3A%2F%2Fcdp.credit360.com%2Fsurveys%2F2023%2Fjwbhd7d6%2F291209&survey_id=82591262

Company: LG Display  LG Display

Overall grade	Industry	Clients
C-	Display / Panel	Apple, Microsoft, Dell, HP, Lenovo, Sony, LG Electronics

Commitment (F)	Climate commitment	LG Display has committed to achieving net zero emissions by 2050 and targeted to reduce operational emissions by 53% by 2030, 67% by 2040, and 100% by 2050 compared to 2018. The company plans to reduce its scope 3 emissions 82.5% by 2050, compared to 2018.
	100% RE commitment	LG Display has a target to achieve 100% renewable energy by 2050 with factories in China mainland and Vietnam. However, the company has not set a timeline for its renewable energy transition in South Korea yet.
Action (D)	Renewable electricity ratio	13%
	Renewable electricity increase from 2021-2022	2%
	Renewable electricity sourcing methods	LG Display sourced its renewable electricity all through low-impact options, such as RECs and green premium.
	Energy efficiency	LG Display implemented various strategies to improve its energy efficiency.
	Emission reduction from 2020-2022 (own operations)	Decreased 15.58%. 2020, Scope 1+2: 6,744,893 tCO ₂ eq; 2022, Scope 1+2: 5,694,882 tCO ₂ eq

<p>Transparency (A+)</p>	<p>LG Display disclosed complete environmental data, including energy usage, electricity and emissions</p>
<p>Advocacy (A-)</p>	<p>According to LG Display’s disclosure, LG Display has policy advocacy in the aspects below:</p> <ol style="list-style-type: none"> 1. Request for policy support from MOTIE / Display Association / Korea Energy Agency / local governments / state governments to promote the use of renewable electricity. 2. Participation in the Community of Renewable Energy Initiative (CoREi) and joint opinions for renewable energy expansion policies. 3. Request for plan improvement through participation in a meeting on power purchase agreement plans organized by the Corporate Renewable Energy Foundation (CREF). <p>Further, LG Display actively engaged in collaborative exchanges within the renewable energy sector with industry peers through the Corporate Renewable Energy Initiative (CoREi) and participation in renewable energy sharing with other companies and non-government organizations.</p>

Data Source

- LG Display. (2023). LG Display 2023 ESG Report. Retrieved October 17, 2023, from https://www.lgdisplay.com/attachment/esg/csm/LGD_ESG_report_2023_eng.pdf
- LG Display. (2023). Climate Change 2023. CDP. Retrieved October 17, 2023, from https://www.cdp.net/zh/formatted_responses/responses?campaign_id=83630982&discloser_id=1034756&locale=zh&organization_name=LG+Display&organization_number=23005&program=Investor&project_year=2023&redirect=https%3A%2F%2Fcdp.credit360.com%2Fsurveys%2F2023%2Fjwbhd7d6%2F275580&survey_id=82591262

Company: Pegatron PEGATRON

Overall grade	Industry	Clients
C	Final Assembly	Apple, Microsoft, Dell, HP, Sony

Commitment (F)	Climate commitment	Pegatron targeted to cut its scope 1 and 2 emissions 25% by 2030 compared to 2019. However, Pegatron has not made a commitment to net zero emissions.
	100% RE commitment	Pegatron is targeted to transition to 40-50% of renewable energy by 2030. Yet the company has not set a 100% renewable energy target.
Action (B-)	Renewable electricity ratio	19.42%
	Renewable electricity increase from 2021-2022	13.52%
	Renewable electricity sourcing methods	According to Pegatron's disclosure, Pegatron sourced its renewable electricity approximately 5.46% from its on-site generation facility, 89.54% from PPAs, and 5% from purchasing RECs.
	Energy efficiency	Pegatron implemented various approaches to increase energy efficiency.
	Emission reduction from 2020-2022 (own operations)	Decreased 26.29% 2020, Scope 1+2: 599,078.01 tCO ₂ eq; 2022, Scope 1+2: 441,601.86 tCO ₂ eq
Transparency (A+)	Pegatron has disclosed complete environmental data on energy usage, electricity and emissions.	
Advocacy (C+)	<p>According to Pegatron's disclosure, Pegatron participated in renewable energy-related sharing with other companies and investors.</p> <p>Regarding Pegatron's policy advocacy, Pegatron joined the Taiwan Climate Alliance. Pegatron uses this as a platform to participate in discussions on renewable energy policies, including renewable energy and certificate mechanisms, carbon credit and carbon fees.</p>	

Data Source

- Pegatron (2023). 2022 Pegatron Sustainability Report. Retrieved October 17, 2023, from https://www.pegatroncorp.com/files/backend/csr_file/2022%20Sustainability%20Report.pdf
- Pegatron. (2023). Climate Change 2023. CDP. Retrieved October 17, 2023, from https://www.cdp.net/zh/formatted_responses/responses?campaign_id=83630982&discloser_id=1036090&locale=zh&organization_name=Pegatron+Corporation&organization_number=14540&program=Investor&project_year=2023&redirect=https%3A%2F%2Fcdp.credit360.com%2Fsurveys%2F2023%2Fjwbhd7d6%2F283787&survey_id=8259126

Company: Hon Hai Technology Group (Foxconn)


Overall grade	Industry	Clients
D+	Final Assembly	Apple, Microsoft, HP, Dell, Amazon, Sony, Google

Commitment (D-)	Climate commitment	Hon Hai Technology Group (Foxconn) has committed to achieve net zero by 2050, including scope 3 emissions. The company set a mid-term target to reduce emissions by 42% before 2030, and by 63% before 2035.
	100% RE commitment	Hon Hai Technology Group (Foxconn) is committed to reaching 50% renewable energy by 2030.
Action (D+)	Renewable electricity ratio	8.28%
	Renewable electricity increase from 2021-2022	3.11%
	Renewable electricity sourcing methods	Hon Hai Technology Group (Foxconn) sourced renewable electricity through onsite generation (11%), 28.40% from investing in renewable energy plants, 59.3% from PPAs, 1.32% from RECs.
	Energy efficiency	Hon Hai Technology Group (Foxconn) has implemented various approaches to improve its energy efficiency.
	Emission reduction from 2020-2022 (own operations)	Increased 5.13% 2020, Scope 1+2: 5,476,802 tCO ₂ eq 2022, Scope 1+2: 5,757,620 tCO ₂ eq
Transparency (A+)	Hon Hai Technology Group (Foxconn) disclosed complete environmental data, including energy usage, electricity and emissions.	
Advocacy (F)	There is no publicly available information or direct disclosure of Hon Hai Technology Group (Foxconn) working on renewable energy-related policy advocacy and peer information sharing.	

Data Source

- Hon Hai Technology Group (Foxconn) (2022). Hon Hai Technology Group (Foxconn) 2022 Sustainability Report. Retrieved October 17, 2023, from [https://www.honhai.com/s3/reports/CSR/CN/2022/%E9%B4%BB%E6%B5%B7-2022ESG\(CH\)-20230731-%E5%AE%8C%E6%95%B4%E7%89%88.pdf](https://www.honhai.com/s3/reports/CSR/CN/2022/%E9%B4%BB%E6%B5%B7-2022ESG(CH)-20230731-%E5%AE%8C%E6%95%B4%E7%89%88.pdf)
- Hon Hai (2023). Climate Change 2023. CDP. Retrieved October 17, 2023, from https://www.cdp.net/zh/formatted_responses/responses?campaign_id=83630982&discloser_id=1032232&locale=zh&organization_name=Hon+Hai+Precision+Industry&organization_number=21422&program=Investor&project_year=2023&redirect=https%3A%2F%2Fcdp.credit360.com%2Fsurveys%2F2023%2Fjwbhd7d6%2F267593&survey_id=82591262

Company: Luxshare Precision 

Overall grade	Industry	Clients
C+	Final Assembly	Apple, Microsoft, HP, Dell, Amazon, Google

Commitment (C-)	Climate commitment	Luxshare Precision has committed to achieving net zero by 2050, including scope 3 emissions. Luxshare has not set a mid-term target for its 2030 emissions reduction target.
	100% RE commitment	Luxshare Precision has committed to reach 50% renewable energy by 2025.
Action (C-)	Renewable electricity ratio	23.6%
	Renewable electricity increase from 2021-2022	10.34%
	Renewable electricity sourcing methods	Luxshare sourced renewable electricity through onsite generation (11%), 28.40% from investing in renewable energy plants, 59.3% from PPAs, and 13.2% from RECs.
	Energy efficiency	Luxshare Precision adopted various approaches to improve its energy efficiency.
	Emission reduction from 2020-2022 (own operations)	Increased 224.2% 2020, Scope 1+2: 547,715.32 tCO ₂ eq; 2022, Scope 1+2: 1,776,202.33 tCO ₂ eq

<p>Transparency (A+)</p>	<p>Luxshare Precision disclosed complete environmental data, including energy usage, electricity and emissions.</p>
<p>Advocacy (A-)</p>	<p>According to Luxshare Precision’s disclosure, the company has joined the sustainable supply chain and advocated for renewable energy transition and energy efficiency. Further, the company has also been working with electricity trading institutes on green electricity trading systems and green electricity certificates.</p> <p>On the peer level, Luxshare disclosed that it has been sharing experiences and joining the discussion on renewable electricity procurement with at least five companies.</p>

Data Source

- Luxshare Precision (2022). Luxshare Precision 2022 Sustainability Report. Retrieved October 17, 2023, from <https://www.google.com/url?q=https://www.luxshare-ict.com/Upload/File/201712/%25E7%25AB%258B%25E8%25AE%25AF%25E7%25B2%25BE%25E5%25AF%25862022%25E5%258F%25AF%25E6%258C%2581%25E7%25BB%25AD%25E5%258F%2591%25E5%25B1%2595%25E6%258A%25A5%25E5%2591%258A.pdf&sa=D&source=editors&ust=1689147592972805&usg=AOvVaw2wibankKg3xGA0BAtzUM60>
- Luxshare Precision (2023). Climate Change 2023. CDP. Retrieved October 17, 2023, from https://www.cdp.net/zh/formatted_responses/responses?campaign_id=83630982&discloser_id=1029601&locale=zh&organization_name=Luxshare+Precision+Industry&organization_number=51312&program=Investor&project_year=2023&redirect=https%3A%2F%2Fcdp.credit360.com%2Fsurveys%2F2023%2Fjwbhd7d6%2F276669&survey_id=82591262

Company: Intel 

Overall grade	Industry	Clients
C+	Semiconductor	Dell, HP, Lenovo, LG Electronics, Microsoft, Google, Apple, Amazon, Samsung Electronics

Commitment (B)	Climate commitment	Intel has made an ambitious commitment to achieve net zero emissions by 2040. However, Intel's 2030 emission reduction target is not yet clear, and the company has not set a target to reduce its scope 3 emissions.
	100% RE commitment	Intel set a target to achieve 100% renewable energy by 2030.
Action (C-)	Renewable electricity ratio	93%
	Renewable electricity increase from 2021-2022	13%
	Renewable electricity sourcing methods	Intel has sourced renewable electricity mainly through RECs, about 92%. Only 0.3% of its renewable electricity was generated through onsite solar systems.
	Energy efficiency	Intel has implemented various approaches to improve its energy efficiency.
	Emission reduction from 2020-2022 (own operations)	Increased 12.41% 2020, Scope 1+2: 1,360,000 metric tons CO ₂ e 2022, Scope 1+2: 1,538,500 metric tons CO ₂ e
Transparency (A-)	Intel disclosed the majority of its environmental data, including energy usage, electricity, and emissions. The company did not disclose 2022 greenhouse gas emissions intensity.	
Advocacy (D+)	According to Intel's environmental, social and corporate governance data disclosure, Intel is working with other companies, investors and utility companies to reduce its carbon footprint. There is board-level oversight of climate-related issues within Intel. There is no publicly available information or direct disclosure of Intel supporting renewable energy-related policies.	

Data Source

- Intel (2023). 2022-23 Corporate Responsibility Report. Retrieved October 17, 2023, from <https://csrreportbuilder.intel.com/pdfbuilder/pdfs/CSR-2022-23-Full-Report.pdf>
- Intel (2023). Climate Change 2023. CDP. Retrieved October 17, 2023, from https://www.cdp.net/zh/formatted_responses/responses?campaign_id=83630982&discloser_id=1032134&locale=zh&organization_name=Intel+Corporation&organization_number=9298&program=Investor&project_year=2023&redirect=https%3A%2F%2Fcdp.credit360.com%2Fsurveys%2F2023%2Fjwbhd7d6%2F270819&survey_id=82591262

Company: **Goertek**

Overall grade	Industry	Clients
F	Final Assembly	Apple, Microsoft, Google, Dell, HP, Sony, Samsung Electronics

Commitment (F)	Climate commitment	Goertek has not set targets to reduce absolute greenhouse gas emissions.
	100% RE commitment	Goertek has not set commitments to switch to 100% renewable energy use.
Action (F)	Renewable electricity ratio	5.77%
	Renewable electricity increase from 2021-2022	No mention.
	Renewable electricity sourcing methods	According to Goertek's environmental, social and corporate governance data disclosure, the company sourced renewable electricity mainly through onsite generation.
	Energy efficiency	Goertek has implemented various approaches to improve its energy efficiency.
	Emission reduction from 2020-2022 (own operations)	2022, Scope 1+2: 659,032.59 tCO ₂ e
Transparency (D-)	Goertek did not disclose all types of data on electricity. The company's scope 3 emissions and greenhouse gas intensity are lacking.	
Advocacy (F)	There is board-level oversight of climate-related issues within Goertek. However, there is no publicly available information or direct disclosure of Goertek advocating for renewable energy-related policies, or engaging with other companies on these topics.	

Data Source

- Goertek (2023). 2022 Corporate Social Responsibility Report. Retrieved October 17, 2023, from https://www.goertek.com/en/Upload/202306/20230615144619_8055.PDF

Company: **BOE** 

Overall grade	Industry	Clients
F	Display / Panel	Apple, HP, Dell, Lenovo, LG Electronics, Samsung Electronics

Commitment (F)	Climate commitment	BOE has not set targets to reduce absolute greenhouse gas emissions.
	100% RE commitment	BOE has not set commitments to switch to 100% renewable energy use.
Action (F)	Renewable electricity ratio	No mention.
	Renewable electricity increase from 2021-2022	No mention.
	Renewable electricity sourcing methods	According to BOE’s environmental, social and corporate governance data disclosure, the company sourced renewable electricity mainly through onsite generation.
	Energy efficiency	BOE has implemented various approaches to improve its energy efficiency.
	Emission reduction from 2020-2022 (own operations)	2022, scope 1+2: 6,581,400 tCO ₂ e
Transparency (D-)	BOE did not disclose renewable energy data, electricity, scope 3 emissions and greenhouse gas intensity.	
Advocacy (F)	<p>There is also board-level oversight of climate-related issues within BOE. BOE has established a carbon peak and carbon neutrality project team to manage its dual carbon project as a significant project at the group level. The company has also developed a three-step strategy and a 624 carbon peak action plan.</p> <p>However, there is no publicly available information or direct disclosure of BOE supporting renewable energy policy, peer exchange and collaboration.</p>	

Data Source

- BOE. (2022). 2021 Corporate Social Responsibility Report. Retrieved October 17, 2023, from <https://www.boe.com/about/socialResponsibility>

Company: Samsung Display



Overall grade	Industry	Clients
C-	Display / Panel	Apple, Dell

Commitment (F)	Climate commitment	Samsung Display has committed to achieve net zero emissions by 2050. However, Samsung Display has not included its scope 3 emissions in its commitment.
	100% RE commitment	Samsung Display has committed to 100% renewable energy by 2050.
Action (D+)	Renewable electricity ratio	21%
	Renewable electricity increase from 2021-2022	16%
	Renewable electricity sourcing methods	Samsung Display sourced renewable electricity mainly through low-impact sourcing methods, with nearly 73% from RECs and 22% from green premium.
	Energy efficiency	Samsung Display improved energy efficiency through various approaches.
	Emission reduction from 2020-2022 (own operations)	Decreased 24.72%. 2020, Scope 1+2: 5,440 Kilotonnes/CO ₂ e; 2022, Scope 1+2: 4,095 Kilotonnes/CO ₂ e
Transparency (A+)	Samsung Display disclosed complete environmental data, including energy usage, electricity and emissions.	
Advocacy (B)	<p>According to Samsung Display's disclosure, the company has joined various policy advocacy activities, including through the Korea Display Industry Association (KDIA), related to the renewable energy transition.</p> <p>Samsung Display also conducted climate change awareness campaigns for small and medium sized suppliers and held a seminar on carbon neutrality in the display industry during the K-Display exhibition, and held briefings for small, medium, and large companies to share the knowledge and experiences of panel companies.</p>	

Data Source

- Samsung Display (2023). Samsung Display Sustainability Report 2023. Retrieved October 17, 2023, from https://www.samsungdisplay.com/eng/file/download/SAMSUNG%20DISPLAY%20SR%202023_Eng_web_20230731.pdf
- Samsung Display (2023). Climate Change 2023. CDP. Retrieved October 17, 2023, from https://www.cdp.net/en/formatted_responses/responses?campaign_id=83630982&discloser_id=1056596&locale=en&organization_name=Samsung+Display+Co.%2CLtd&organization_number=838364&program=Investor&project_year=2023&redirect=https%3A%2F%2Fcdp.credit360.com%2Fsurveys%2F2023%2Fjwbhd7d6%2F289043&survey_id=82591262

Appendix



About data collection

Company data in this report comes from the latest online disclosure materials, such as sustainability reports, Carbon Disclosure Project (CDP) disclosure and news media. Greenpeace has consulted with companies mentioned in this report to ensure data accuracy.

The data collecting period ended on 6th October 2023 for companies. Besides climate commitments, any environmental-related data that was received from the companies mentioned in this report after this date was not taken into account.

About the evaluation criteria

The research team from Greenpeace developed scoring indexes to reflect the climate commitments and actions of key suppliers of global consumer electronics companies, from the semiconductor, display manufacturing and final assembly industries. On top of the 2021 supply change ranking methodology, the research team added “increased renewable electricity percentage” to assess the progress that ranked companies made in 2022.

Scoring rubric

Weight	Scoring dimension	Scoring principle
25%	Commitment	Climate Commitment <ul style="list-style-type: none"> - Global climate commitment with an ambitious timeline. - 2030 mid-term target. - Supply chain included.
		100% Renewable Energy Commitment <ul style="list-style-type: none"> - Global 100% renewable energy commitment with a clear pathway and ambitious timeline.

Weight	Scoring dimension	Scoring principle
45%	Action	Renewable Electricity Ratio
		Increased Renewable Electricity Percentage
		Renewable Electricity Sourcing Method <ul style="list-style-type: none"> - Disclosed sourcing methods with detailed information, including electricity, consumption and location through each sourcing option.
		Energy Efficiency <ul style="list-style-type: none"> - Has taken energy efficient actions across its own operations.
		Emission reduction from 2020 - 2022 (Own Operations)
15%	Transparency	Energy Usage <ul style="list-style-type: none"> - Total energy usage.
		Electricity <ul style="list-style-type: none"> - All types. - Renewable electricity consumption.
		Emissions <ul style="list-style-type: none"> - Scope 1+2. - Scope 3. - Greenhouse gas emission intensity.
15%	Advocacy	Policy <ul style="list-style-type: none"> - Top-level advocacy with national / regional policymakers for renewable energy-friendly and climate-focused policies.
		Peer <ul style="list-style-type: none"> - Sharing experience with other businesses in carbon reduction and renewable electricity procurement.
		Governance <ul style="list-style-type: none"> - Establishment of a working group at the senior management level to support carbon neutrality work.