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Core Challenges: Tracking Renewable Energy Progress Across Apple's Final Assembly Supply Chain

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Introduction

Supply chain emissions accounted for more than half of Apple's total emissions in 2024. Apple has set a target of achieving 100% renewable energy across its supply chain by 2030 and has taken steps towards achieving this goal.[1] However, driven by growing global demand, the energy consumption and carbon emissions from the electronics manufacturing industry have been increasing rapidly.[2] Given Apple's climate ambition and the rising environmental footprint of the industry, there is a need to track the climate progress of companies in Apple's supply chain.

This briefing highlights the discrepancies in renewable energy progress within Apple's supply chain by assessing the 2024 renewable energy transition performance of the five largest Apple final assembly suppliers[3] – Foxconn, Luxshare Precision, Pegatron, Compal, and Wistron – across five key categories: climate commitments, renewable energy targets, renewable energy ratios, sourcing methods, and advocacy.

It reveals that each of these final assembly companies must increase their procurement of renewable energy through high-impact mechanisms, and that some suppliers, most notably Pegatron, are lagging significantly behind their peers on climate action. With only five years left before 2030, companies like Pegatron need to set ambitious renewable energy targets with clear pathways to achieve them.

Uneven Progress

Researchers collected data from the five[4] final assembly suppliers to assess their renewable energy progress in 2024.

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[1] Apple, "Apple calls on global supply chain to decarbonize by 2030," October 25, 2022, accessed June 5, 2025, https://www.apple.com/hk/en/newsroom/2022/10/apple-calls-on-global-supply-chain-to-decarbonize-by-2030/.

[2] Rocky Mountain Institute, "Towards Net-Zero Electronics: Unlocking the power of energy efficiency in manufacturing facilities," April 18, 2025, accessed June 6, 2025, https://rmi.org/insight/towards-net-zero-electronics/.

[3] Final assembly companies play a crucial role in Apple's supply chain as they are responsible for assembling finished electronic products such as smartphones, laptops, and tablets.

[4] Four out of five companies provided data to the researchers directly. Wistron did not respond to Greenpeace East Asia's request for data, so researchers used data from the company's most recent sustainability report (2023).

Pegatron, which ranked lowest among all companies examined in the study, lacks a 100% renewable energy target. It has made only limited progress toward increasing its renewable energy ratio, and relies heavily on less impactful procurement strategies, such as purchasing Renewable Energy Certificates (RECs).

Although Foxconn and Luxshare Precision led in the ranking, their performance still falls short in several critical areas**.** Luxshare Precision was the only ranked company that both reported a renewable energy ratio of at least 70% in 2024 and met its renewable energy needs primarily through high-impact sourcing methods. However, Luxshare Precision has yet to implement a 100% renewable energy target. Foxconn reported the highest renewable energy ratio of all five companies in 2024, but it sourced more than 75% of its renewable energy from RECs. Foxconn's 100% renewable energy target is also 10 years behind a timeline that would align with the Paris Agreement 1.5°C goal.[5]

An Achievable Goal

Greenpeace is urging Apple's largest final assembly suppliers to aim for 100% renewable energy by 2030. To achieve this goal, each supplier must enhance their procurement of renewable energy through high-impact methods. Companies can engage in Power Purchase Agreements (PPAs), make direct investments in renewable energy, and install on-site renewable electricity self-generation facilities. Additionally, companies need to take advantage of opportunities to increase renewable energy consumption throughout Asia, where most of Apple's manufacturing and assembling activities take place, including Direct Power Purchase Agreements in Vietnam and green power transactions in China.[6][7]

While Apple has faced significant public scrutiny regarding its carbon footprint, its suppliers have not. By drawing attention to the inconsistent climate progress across Apple's supply chain, we hope to encourage manufacturers to take advantage of East Asia's fast-growing renewable energy potential and ensure that Apple can achieve its 2030 renewable energy goal.

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[5] Recent reports from the International Panel on Climate Change (IPCC) and recommendations by the Science-Based Targets initiative (SBTi) stress the necessity of cutting emissions by half by 2030. In July 2023, the International Energy Agency (IEA) released findings emphasizing that tripling renewable energy capacity by 2030 is critical to achieving the global 1.5°C target. Final assembly companies must transition to 100% renewable energy by 2030 to ensure progress towards meeting the 1.5°C goal.
[6] Vietnam Briefing, "Vietnam Notifies Decree 80/2024/ND-CP on Direct Power Purchase Agreements: Key Details," July 4, 2024, accessed June 5, 2025, https://www.vietnam-briefing.com/news/vietnam-notifies-decree-80-2024-nd-cp-on-direct-power-purchase-agreements-key-details.html/.
[7] Reuters, "China issues guidelines on green power trading," August 23, 2024, accessed June 9, 2025, https://www.reuters.com/business/energy/china-issues-guidelines-green-power-trading-2024-08-23/.

Key findings

- **Pegatron received the lowest ranking due to its low renewable energy ratio, reliance on low-impact renewable energy sourcing methods, and absence of a target to achieve 100% renewable energy.**

  The company sourced the majority of its renewable energy from Renewable Energy Certificates (RECs), which is one of the least impactful sourcing methods because RECs seldom lead to the addition of new renewable energy capacity to the grid.

- **Foxconn and Luxshare Precision received higher rankings than other suppliers, but both companies still have areas for improvement.**

  Foxconn reported the highest renewable energy ratio among the five companies. It has also set a target to achieve 100% renewable energy by 2040. Nevertheless, with 77% of its renewable energy consumption in 2024 procured from RECs, Foxconn showed the heaviest dependence on low-impact sourcing methods among all suppliers in the ranking.

  Luxshare Precision was the only ranked company that both reported a renewable energy ratio of 70% or above in 2024 and met its renewable energy needs primarily through high-impact sourcing methods. However, unlike many of its peers, Luxshare Precision has not yet issued a 100% renewable energy target, despite achieving its 50% renewable energy goal two years ahead of schedule.

- **Wistron is the only company in the ranking that has targeted 100% renewable energy by 2030, but the company lost points due to its heavy reliance on low-impact sourcing methods such as RECs.**

  Luxshare Precision targeted 50% renewable energy by 2025, and Pegatron pledged the same by 2030, but neither firm has committed to achieving 100% renewable energy at any point in the future. Foxconn targeted 100% renewable energy by 2040 and Compal by 2050, putting them 10 and 20 years, respectively, behind a timeline that would align with the Paris Agreement 1.5°C goal.

- **The renewable energy ratios of Luxshare Precision and Foxconn surpassed 70% in 2024. By contrast, the renewable energy ratios of Pegatron and Compal remained at 56% and 46%, respectively, in 2024.**

  Foxconn's renewable energy ratio reached 78% in 2024, a 17% increase from the year prior. Between 2023 and 2024, Luxshare Precision's renewable energy ratio increased by 7%, to 70%. Pegatron's renewable energy ratio increased by 9% over the same period, to 56% in 2024. Compal's renewable energy ratio remained roughly unchanged year on year in 2024.

- **Apple's final assembly suppliers relied heavily on RECs to meet renewable energy targets in 2024.**

  Given that unbundled RECs can be traded in the market independently of the electricity they represent, their acquisition often fails to ensure the additionality of renewable energy projects.[8] This limitation can undermine the intended impact of companies' renewable energy commitments if RECs are the primary instrument used.

  Among the five suppliers, Foxconn reported the highest reliance on low-impact sourcing methods, with 77% of its 2024 renewable electricity consumption sourced from RECs. Wistron, Pegatron, and Compal also sourced over 50% of their renewable electricity from RECs.

  Only Luxshare Precision sourced more than half of its renewable energy from high-impact methods, including participating in China's green power trading system, investing in renewable energy power plants, and installing on-site renewable energy generation facilities like solar panels.

- **Four of the five suppliers have publicly advocated for an expansion of renewable energy sources. However, at least one final assembly leader has also urged a return to nuclear power.**

  Pegatron's CEO has actively advocated for reviving nuclear power despite widespread concerns about the safety of nuclear power generation and the disposal of nuclear waste.[9] In addition, prolonging the life of nuclear plants requires significant expenses, including inspections, equipment replacements

[8] S&P Global, "Problematic corporate purchases of clean energy credits threaten net zero goals," May 5, 2021, accessed June 5, 2025, https://www.spglobal.com/esg/insights/problematic-corporate-purchases-of-clean-energy-credits-threaten-net-zero-goals.
[9] Taiwan News, "Pegatron chair highlights importance of nuclear energy for Taiwan," May 10, 2025, accessed June 5, 2025, https://taiwannews.com.tw/news/6055403.

and upgrades, and new waste storage facilities.[10]

According to a report published by the International Energy Agency (IEA), extending nuclear operations will cost between USD $500 and $1100 per kilowatt in 2030 – a figure that is steadily increasing. By contrast, the cost of renewable energy continues to decline as a result of technological advancements.[11]

[10] Greenpeace, "6 reasons why nuclear energy is not the way to a green and peaceful world," March 18, 2022, accessed June 5, 2025, https://www.greenpeace.org/international/story/52758/reasons-why-nuclear-energy-not-way-green-and-peaceful-world/.
[11] IEA, "Nuclear Power and Secure Energy Transitions," June 2022, accessed June 5, 2025, https://www.iea.org/reports/nuclear-power-and-secure-energy-transitions.

Table: Climate progress of Apple's major final assembly suppliers in 2024[12]

Supplier	Overall performance	Climate commitments		RE target	RE ratio	Absolute RE ratio increase from 2023 to 2024	RE sourcing methods		RE advocacy
		Short-term	Long-term				Renewable Energy Certificates (RECs)	High-impact sourcing methods**	
Foxconn	Average	By 2030, reduce absolute Scope 1, 2 and 3 greenhouse gas emissions by 42% from 2020 levels.	Net zero by 2050	100% by 2040	78%	17%	77%	23%	- RE100 membership - Green energy investment: partnered with Albumen Capital Partners to establish a green energy asset investment company and a green energy development fund
Luxshare Precision	Average	By 2032, reduce absolute Scope 1 and 2 emissions by 50.4% and Scope 3 emissions per unit of value added by 58.1% from 2022 levels.	Net zero by 2050	50% by 2025	70%	7%	28%	72%	- Luxshare Precision Carbon Management Commitment & Statement: committed to advancing clean technology & product development, expanding clean energy application scenarios, and supporting the energy transition away from fossil fuels
Wistron*	Below average	By 2030, reduce absolute greenhouse gas emissions in Scope 1 and 2 by 90% and Scope 3 emissions (from purchased goods and services, and the use of sold products) by 25% from 2022 levels.	Net zero by 2050	100% by 2030	66%	-	75%	25%	Not disclosed
Compal	Lagging	By 2030, reduce absolute Scope 1 and 2 emissions by 50.68% and Scope 3 emissions by 25% from 2021 levels.	Net zero by 2050	100% by 2050	46%	-1%	54%	46%	- RE100 membership
Pegatron	Significantly lagging	By 2030, reduce absolute greenhouse gas emissions in Scope 1 and 2 by 42% and Scope 3 emissions by 25% from 2021 levels.	Net zero by 2050	50% by 2030	56%	9%	67%	33%	- Taiwan Climate Alliance membership: participated in government discussions on renewable energy policies and has shared experience-based recommendations

*Since Wistron did not provide its 2024 data, we referred to its publicly disclosed data for 2023.

** High-impact renewable energy sourcing methods include power purchase agreements, on-site renewable electricity generation, direct investments in renewable energy, and green power trading (China).

[12] Details on the data sets used in the Table are available in the "Scope and Methodology" section.

Greenpeace recommendations

- **Apple's final assembly suppliers need to target 100% renewable energy by 2030.**

  Final assembly suppliers cannot postpone the transition to renewable electricity while their main client Apple has made a clear decarbonization commitment across its supply chain. Additionally, in recent years, access to renewable energy sources has greatly expanded within companies' key operational geographies, especially in East Asia and Southeast Asia.[13] Companies need to establish targets to reach 100% renewable energy by 2030 with clear pathways to achieve this goal and seize the opportunities in fast-developing renewable energy markets in Asia.

- **Suppliers need to increase their renewable energy consumption through high-impact sourcing methods.**

  High-impact renewable electricity sourcing options – such as PPAs, renewable energy investment, and onsite self-generation – are preferred due to their demonstrable additionality and robust traceability, which are essential for delivering substantial climate mitigation outcomes. RECs can be an additional choice for companies to meet their targets only when other options are not available. When establishing climate targets, the explicit adoption of high-impact sourcing methods must be clearly specified and prioritized in a company's procurement strategy.

[13] BloombergNEF, "New Energy Outlook," accessed June 5, 2025, https://about.bnef.com/insights/clean-energy/new-energy-outlook/.

Scope and methodology

This study assesses the 2024 renewable energy transition performance of five major Apple final assembly suppliers – Foxconn, Luxshare Precision, Pegatron, Compal, and Wistron – across five key categories: climate commitments, renewable energy targets, renewable energy ratios, sourcing methods, and advocacy. As reported by Bloomberg, the five firms collectively accounted for more than 50% of Apple's overall supply chain expenditures as of May 2025.[14]

This study uses two primary data sets. The 2024 data were provided directly by the companies through questionnaires; the relevant 2023 data were extracted from each company's 2023 sustainability report.

The questionnaires were distributed to the five selected companies in March 2025. By mid-May 2025, we received responses from Foxconn, Luxshare Precision, Pegatron, and Compal. For detailed figures, please refer to each company's official sustainability report.

[14] According to Bloomberg, by the end of May 2025, the five companies together accounted for more than half of Apple's total cost of goods sold (COGS), namely the total cost of producing Apple products.

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