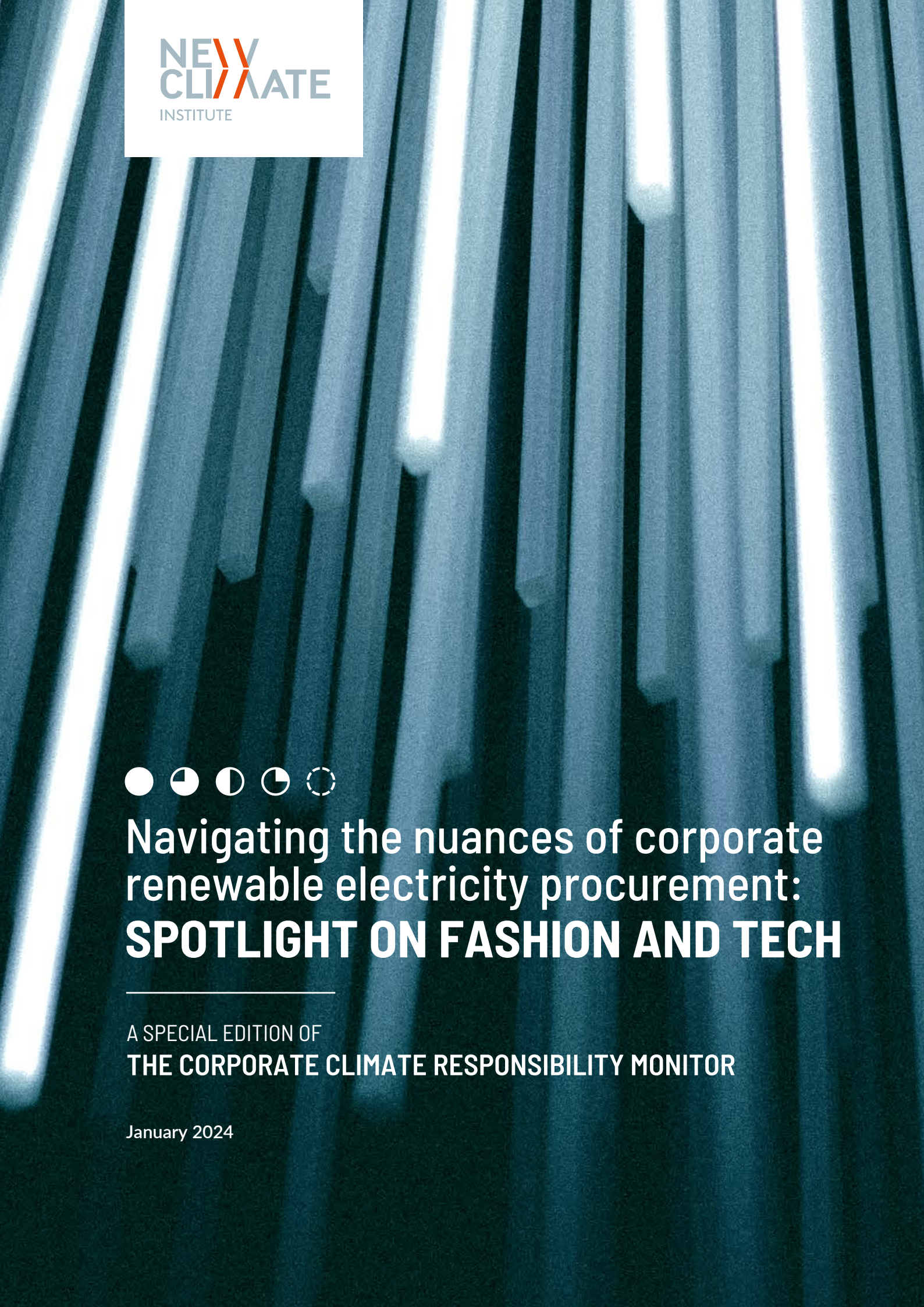

NEW CLIMATE INSTITUTE

Navigating the nuances of corporate renewable electricity procurement: SPOTLIGHT ON FASHION AND TECH

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Disclaimer

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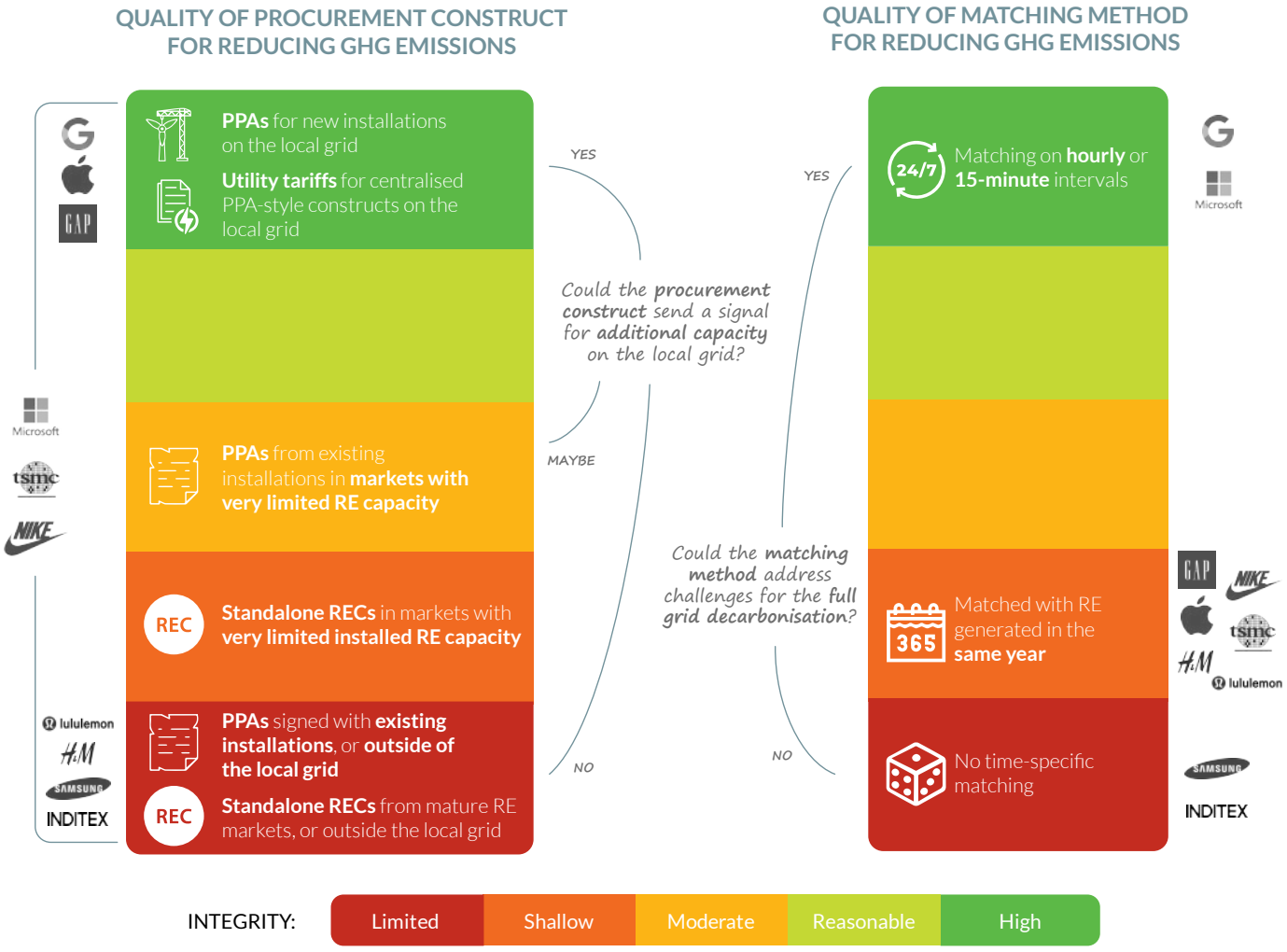
Summary

This report assesses the *transparency* and *integrity* of ten fashion and tech companies' renewable electricity targets and strategies. We aim to understand the nuances of corporate renewable electricity strategies, uncover reliable good practices and identify possible sticking points and their potential solutions. The ten companies assessed in this report – Apple, Gap, Google, H&M Group, Inditex, lululemon, Microsoft, Nike, Samsung Electronics and TSMC – are amongst the largest in their sectors and all put forward renewable electricity targets for their own operations.

The renewable electricity claims and targets of companies are nuanced to the extent that they all mean different things and their real impact is far less than what they may imply. All of the companies in this report put forward some form of claim or target for 100% renewable electricity, but the meaning of these claims and targets varies considerably according to what they cover, what instruments are used to procure the renewable electricity, and what method is used to match renewable electricity. We find that the landscape of renewable electricity procurement constructs (Figure S 1) from these companies is so diverse and nuanced, that very few of these apparently simple claims and targets are comparable to one another. Companies investing significant resources to pursue genuinely high quality and impactful strategies are held on the same platform as those that employ the easiest available cover-ups. This may leave consumers, investors and policy makers powerless to tell the difference and to incentivise more meaningful approaches.

Figure S 1: Diverse landscape of renewable electricity procurement constructs and matching methods



Source: Authors' own elaboration. The categorisation of procurement constructs is for illustrative purposes only; the integrity of any given procurement construct depends on the specific conditions of that construct and may differ from the indication given by the graphic. The placement of company logos indicates the main approaches implemented by those companies according to the interpretation of the authors. See the Methodology in the Annex for further differentiation between other procurement constructs.

The real GHG emission reduction impact of companies' renewable electricity claims is often far less than implied. Current best practices lead to modest impacts, while weaker approaches may have very little impact at all. Even current best practices for renewable electricity procurement based on high quality local power purchase agreements (PPAs) and utility programmes – which includes the strategies of Google and Apple – entail limitations regarding their real impact for reducing emissions. We interpret that Google's current 100% renewable electricity claim – which is based on matching renewable generation to consumption on a global and annual basis – only leads to avoiding a modest share of the company's electricity-related emissions, since much of the claimed renewable electricity is generated at times or in locations that do not match the consumption. Meanwhile, on the other end of the scale, weaker renewable electricity strategies may have very little impact. Several companies – including H&M Group, Inditex, lululemon and Samsung Electronics – still continue to rely heavily on standalone renewable energy certificates (RECs) towards their renewable electricity claims, despite mounting evidence and awareness that this low-cost instrument does not generally contribute to additional renewable capacity and may merely shift carbon-intensive electricity to other grid users. Consequently, GHG emissions associated with companies' electricity consumption are often significantly misrepresented, even when companies follow the mainstreamed guidance and methodologies of the GHG Protocol Scope 2 Standard, which allows companies to claim zero or near-zero electricity-related emissions through any of these diverse and limited approaches.

We see increasing awareness on the limitations of standalone RECs, and a shift to higher quality procurement instruments. Half of the companies assessed – Apple, Gap, Google, Microsoft and Nike – use PPAs or utility programmes as their primary procurement instrument today. Several other companies aim to transition to PPAs soon. While this shift to PPAs is positive, it is not a silver bullet for reducing electricity-related emissions: long-term contracts for local PPAs are *more likely* to provide effective support for increasing renewable capacity in a grid, but the causality regarding the additionality of this support is complex and uncertain. We also see signs of companies looking for more innovative solutions to overcome the burdens and complexities associated with the direct development of PPAs, which could increase access to high quality procurement constructs for other companies with more limited resources: Google and Apple have collaborated with several regional utilities to establish utility-scale programmes where companies can sign long-term contracts with the utility to manage a portfolio of PPA-style constructs; Gap and TSMC have pursued aggregated PPA constructs which facilitates companies to pool their resources and expertise to develop high quality plans.

There is growing momentum for matching renewable electricity generation with consumption on an hourly basis. Some companies – including Google and Microsoft – have recognised the limitations of annual matching and are moving to hourly (24/7) matching. The emerging scientific literature on hourly matching demonstrates clearly that its potential for responding to the challenges of the electricity system and ultimately decreasing emissions is *far* superior to the outcomes of *annual* matching. Where annual renewable electricity matching hides a significant embedded reliance on fossil fuel generation, companies that commit to match their electricity consumption on an hourly basis provide a critical demand pull for additional and novel renewable energy generation and storage technologies that will be necessary to completely decarbonise power systems in the most challenging times and locations.

However, 24/7 targets based on *carbon free* energy (CFE) entail significant limitations for *renewable* electricity. Google's and Microsoft's commitment to 24/7 *carbon free* energy leaves to door open for use of (existing) nuclear power and fossil fuels with carbon capture and storage (CCS). It is uncertain to what extent these targets will drive the development of *renewable* capacity. The current CFE focus behind the momentum for 24/7 matching could represent a barrier for companies with a strong renewable-oriented brand image to move to this otherwise more effective accounting approach. We recommend the *United Nations (UN) 24/7 Carbon-Free Energy Global Compact* to establish a set on principles for 24/7 ***renewable*** electricity for companies that wish to focus on less contentious technologies.

Strategies for renewable electricity in the supply chain remain an underdeveloped blind spot, despite being often the largest source of emissions, but replicable good practices exist. None of the ten companies assessed disclose data on electricity consumption in the supply chain. Only Apple and H&M Group set targets for 100% renewable energy in the supply chain, although these targets also contain significant caveats: H&M's target is undermined by the lack of a commitment to electrify manufacturing processes, while Apple's target applies only to Apple output and may therefore require little action from suppliers who could allocate existing renewable electricity shares to Apple output while effectively making other output more carbon intensive. Across the 10 companies, we identify a range of replicable good practice measures for supporting renewable electricity in the supply chain, although none of the companies currently implement a comprehensive package of good practice measures. Companies could learn from the various practices of their peers to implement more multi-faceted strategies in the future. Apple's "Supplier Clean Energy Programme" and TSMC's collective procurement programme are particularly promising measures to proactively support suppliers in challenging market conditions.

Highly influential initiatives currently provide limited incentives for companies to strive for higher quality renewable electricity strategies. Major initiatives whose guidelines and criteria are influential for the development of companies' electricity strategies – including RE100, GHG Protocol and Science Based Targets initiative – do not sufficiently distinguish between the key nuances of renewable electricity procurement that differentiate real corporate leadership from potential greenwashing. We did not identify a correlation between the quality of companies' renewable electricity strategies and their membership of RE100, or the emissions they report under GHG Protocol guidelines. Moreover, we find that the undifferentiated standards of these initiatives may even represent a *barrier* for companies to adopt emerging best practice; companies that strive for higher quality accounting and procurement approaches may find themselves at a comparative disadvantage, next to companies that report very high shares of renewable electricity under the minimum criteria of the mainstreamed standards, using annual matching and standalone RECs. Given the degree of influence that these initiatives command, the revision of their guidelines and criteria to facilitate such a differentiation may represent one of the most promising and necessary levers for raising the ambition of companies' renewable electricity strategies.

We set out recommendations for the revision of guidelines and criteria of major initiatives to distinguish between highly significant nuances in corporate renewable electricity strategies:

→ We recommend that the major initiatives adopt a **common standard for renewable electricity claims** and revise the **market-based emission accounting method** to differentiate between highly significant nuances in renewable electricity strategies. This means:

- Only counting meaningful renewable electricity procurement constructs; standalone RECs should be understood only as a supplementary accounting tool, unless evidence can be provided that this instrument can serve as an effective procurement construct.
- Only counting renewable electricity that is generated on the same grid as the electricity consumption to which it is matched.

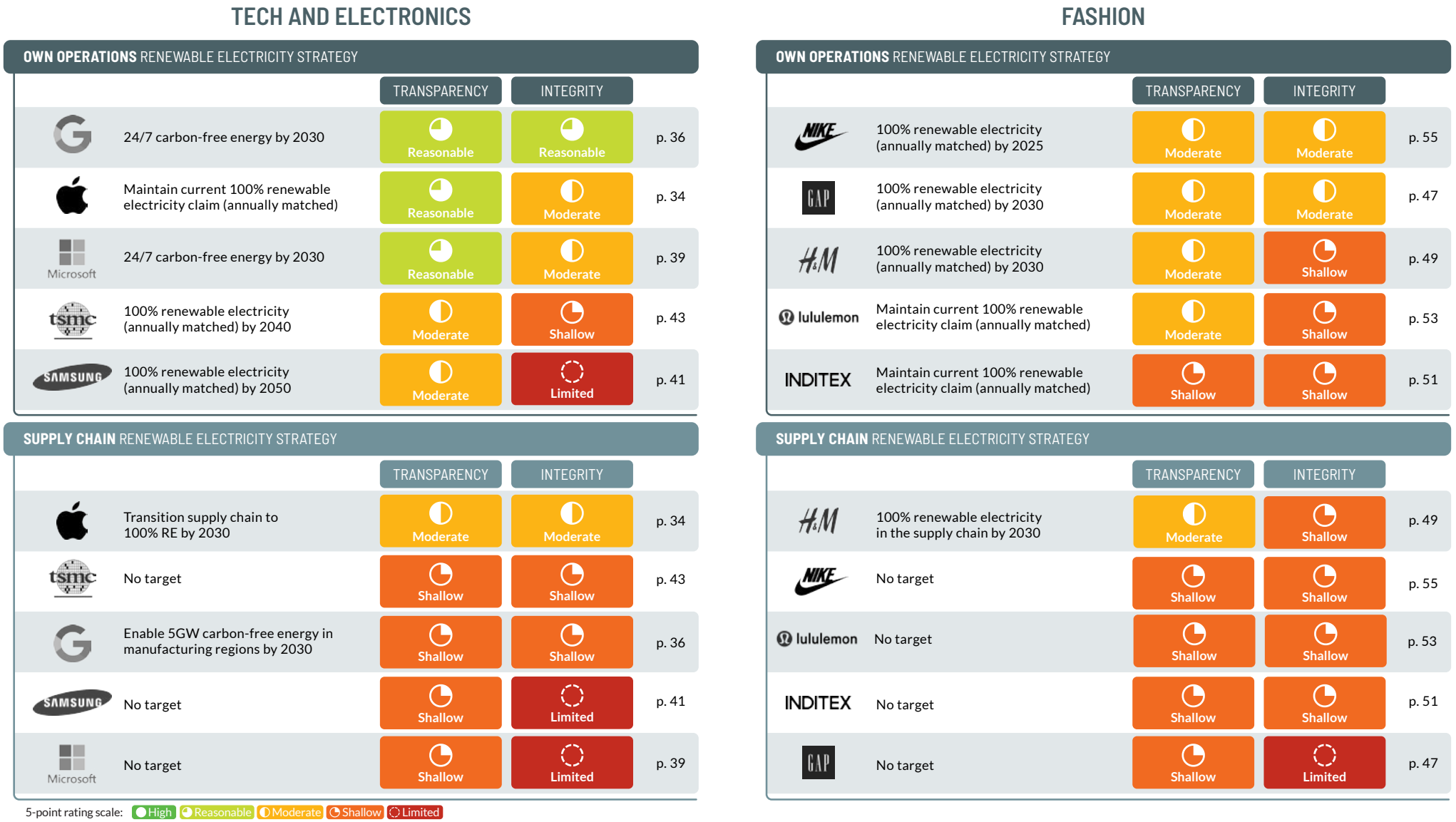
→ We recommend that the criteria, guidelines and data collection protocols of major initiatives are adjusted or complemented to *distinguish* between annual and **hourly accounting** methods, moving towards hourly matching as the standard approach as soon as practically possible.

→ We recommend that it be required for companies to report both market- and location-based estimates for scope 2 emissions and to **use the larger of the two values towards the company's aggregated emissions footprint**. This would create a clear incentive both to maximise energy efficiency improvements and to procure renewable electricity. Especially in the current context that market-based emission accounting methods lead to such considerable exaggerations and inaccuracies, we find that the emphasis currently placed on market-based values is misleading and inappropriate.

→ We recommend extending the membership criteria of RE100 to ***require*** **supply chain targets** and strategies and extending the CDP questionnaire to collect supply chain electricity data.

Figure S 2 gives an overview of the results from the company specific assessments in section B, which underpin the conclusions presented here.

Figure S 2: Overview of the transparency and integrity of renewable electricity strategies from the ten companies assessed.



The ratings shown in this figure are based on the assessment of various elements of corporate renewable electricity strategies. Assessments were made based on public information identified by the authors. A poor rating may not necessarily be an indication that a company's renewable electricity strategy is weak but could also indicate that the information was insufficient to confirm good practice. Ambitious companies can improve their ratings by ensuring that all aspects of their renewable electricity strategies are transparently and accurately disclosed, and in the public domain.

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About this study

This report assesses the *transparency* and *integrity* of ten major fashion and tech companies' renewable electricity targets and strategies. The ten companies are amongst the largest in their sectors and all put forward renewable electricity targets for their own operations.

We critically assess companies' renewable electricity targets and procurement strategies for their own operations and in the supply chain. We evaluate pledges and procurement approaches against good practice criteria to identify areas for improvement, as well as good practice that can be replicated and scaled up. The methodology for our assessments can be found in the *Annex*. We assess transparency and integrity in the following areas:

- Disclosure of electricity related data.
- Claims on renewable electricity consumption in own operations today and targets for the future.
- Procurement methods today and in the future; including how companies plan to match their electricity consumption with the generation of renewable electricity.
- Renewable electricity targets for the supply chain and support measures.
- Advocacy for supportive policy frameworks (only transparency).

We assess transparency on corporates' advocacy efforts for supportive policy frameworks, considering whether they make statements about the required policy framework they would need to make the shift to 100% renewable electricity and provide information on their advocacy efforts. An assessment of the *integrity* of advocacy efforts falls outside this report's scope. Such an assessment would require access to non-public information, including meetings behind closed doors.

This report *does not assess* companies' broader climate target and measures. A positive evaluation of renewable electricity targets and procurement constructs does not necessarily imply that the company's overall climate strategy has high integrity. This report is a spin-off of *the Corporate Climate Responsibility Monitor*, our annual publication that evaluates major corporates climate strategies. The 2022 and 2023 editions included assessments of Apple, Google, H&M Group, Inditex, Microsoft and Samsung Electronics (Day *et al.*, 2022, 2023a).

SECTION A

Aggregate insights

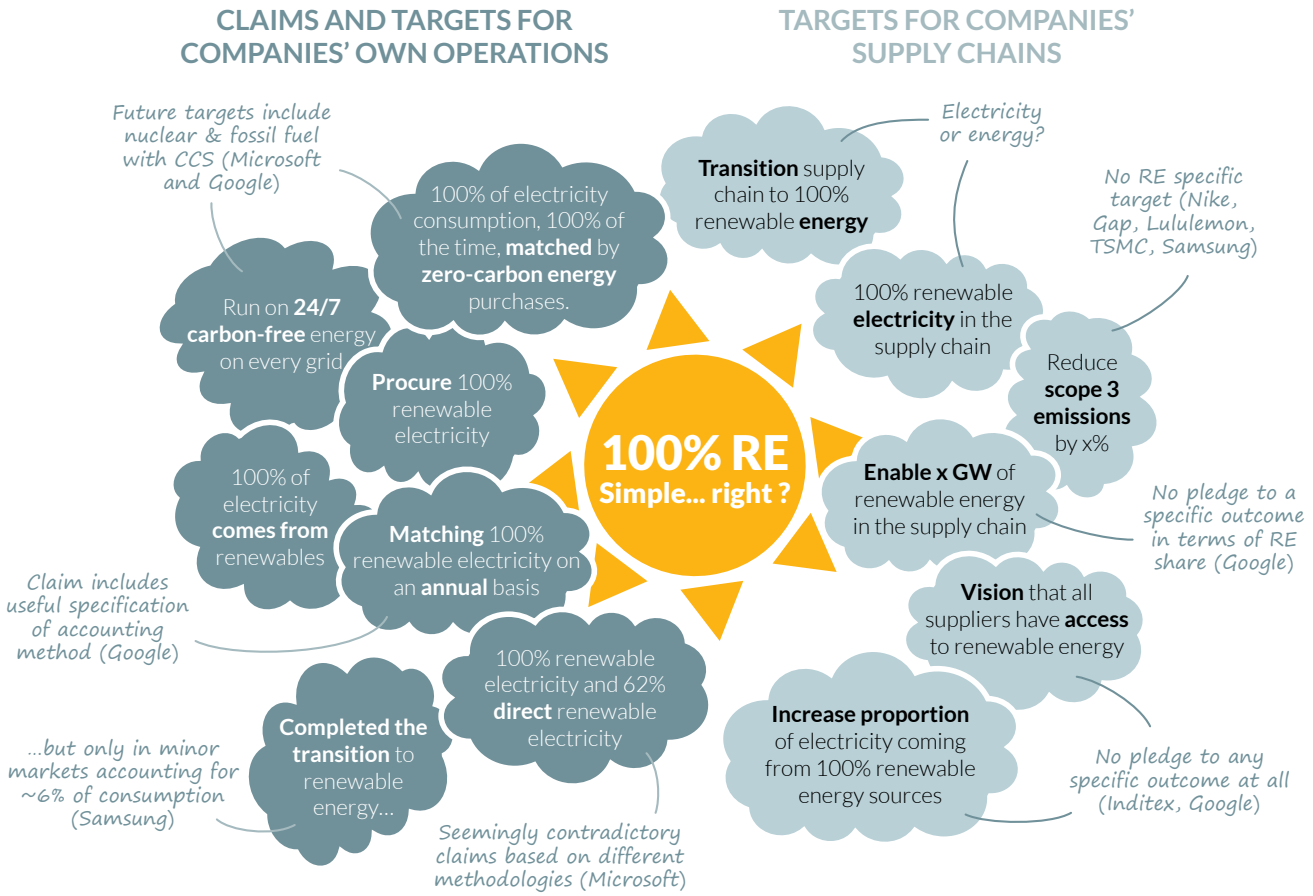
1 Landscape of renewable electricity claims and strategies

Corporate renewable electricity claims are increasingly common. By 2023, over 400 major companies had committed to "go 100% renewable" through membership of the initiative RE100 (RE100, 2023b). Thousands more medium and small companies report similar claims or ambitions. The increasing momentum for corporates to engage with the issue of renewable electricity is a positive sign. Demand from major corporates can drive renewable electricity markets, and corporates can also play an influential role to support more ambitious policy.

Yet, there is a major sticking point. The renewable electricity claims and targets of companies all mean different things and their real impact is far less than what they may imply. Even current best practices entail major limitations in their real impact for reducing emissions, while the weakest practices have no significant impact on reducing emissions whatsoever *(see section 7.2)*. The consequence is that GHG emissions associated with companies' electricity consumption are often significantly misrepresented, even when companies follow the mainstreamed guidance and methodologies of the GHG Protocol.

This report includes an analysis of the renewable electricity strategies of 10 major global companies from the tech and fashion industries *(see section B)*. We find that the landscape of renewable electricity claims (Figure 1) and procurement constructs (Figure 2) from these companies is so diverse and nuanced, that very few of these apparently simple claims and targets are in any way comparable to one another. Companies investing significant resources to pursue genuinely high quality and impactful strategies are held on the same platform as those that employ the easiest available cover-ups. Consumers, investors and policy makers are powerless to tell the difference and to incentivise more meaningful approaches.

Figure 1: Diversity of nuances in 100% renewable claims and targets



Source: Authors' own elaboration. The graphic compiles a demonstrative selection of targets and claims from the companies assessed in this report. Full details can be found in the company assessments in Section B.

This report looks at the transparency and integrity of the renewable energy strategies from 10 major companies, to draw insights into some of the key nuances of these strategies. We identify and focus in particular on three overarching issues:

Procurement constructs for renewable electricity

Figure 2 presents a simplified summary of the range of renewable electricity procurement constructs that companies pursue. The extent to which these constructs are likely to lead to additional renewable electricity and to reduce the emissions of the companies varies from one extreme to another.

Standalone renewable energy certificates (RECs) and virtual power purchase agreements (PPAs) which are signed for installations **outside of the local grid** are less likely to send a signal for additional renewable electricity capacity on the grid. Section 2 of this report discusses the limitations of RECs and trends related to their widespread continued use.

PPAs for new installations on the local grid and **utility programmes** that result in PPA-style constructs are more likely to lead to additional renewable electricity capacity on the grid, although the impact depends on the terms of the contract as well as the matching method; even higher quality constructs are not necessarily guaranteed to deliver renewable electricity and emission reductions. Section 3 looks at trends for how and which companies are striving for higher quality procurement constructs.

Methods for matching for renewable electricity

The time frame against which companies match their electricity consumption to renewable electricity generation also varies and has a significant impact on the extent to which renewable electricity procurement results in emission reductions.

While some companies procure **RECs of any vintage**, others match their electricity consumption **annually** with renewable electricity generated in the same year, and some companies are moving towards **24/7 approaches** to matching on hourly or 15-minute intervals.

Section 4 explains how the accounting method can make a significant difference to the quality and impact of the overall strategy, and looks at the emerging trends for companies setting 24/7 targets.

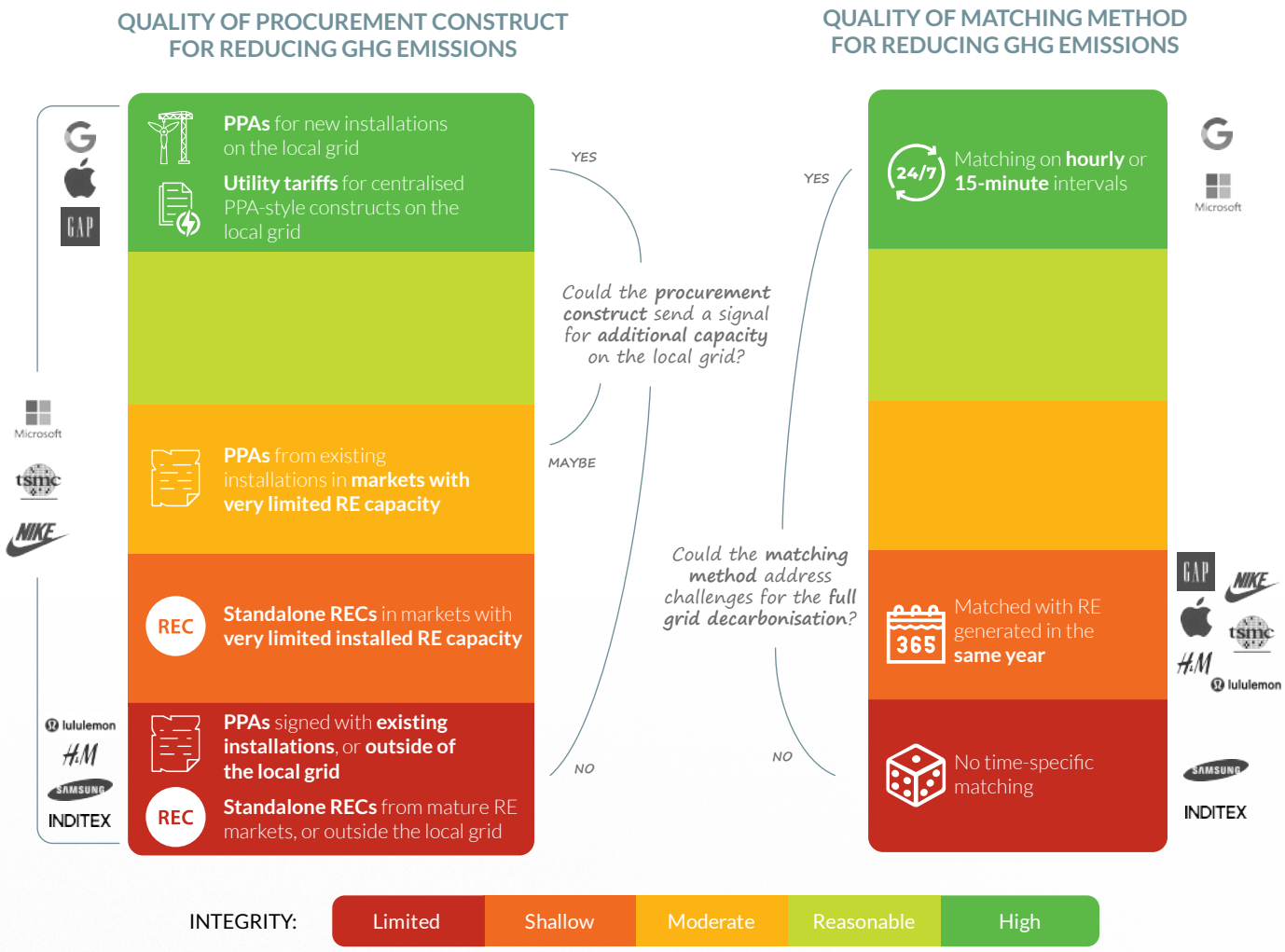
Strategies for renewable electricity in the supply chain

For many companies, electricity consumption in the supply chain is a more significant emission source than the company's consumption of electricity for its own operations. Despite the value chain's importance, Figure 2 indicates that the landscape of pledges for supply chain renewable electricity is even more varied and ambiguous than the diverse set of claims and targets for own operations.

Section 5 looks at trends for how companies are supporting renewable electricity in the supply chain, identifying promising practices that could be scaled up and replicated by others.

Based on the various nuances and issues identified in the company case studies and discussed in the following sections, Section 6 looks at the role for major initiatives like GHG Protocol, RE100, SBTi and CDP to improve corporate renewable electricity accounting and claims.

Figure 2: Diverse landscape of renewable electricity procurement constructs and matching methods



Source: Authors' own elaboration. The categorisation of procurement constructs is for illustrative purposes only; the integrity of any given procurement construct depends on the specific conditions of that construct and may differ from the indication given by the graphic. The placement of company logos indicates the main approaches implemented by those companies according to the interpretation of the authors. See the Methodology in the Annex for further differentiation between other procurement constructs.

2 Limitations of Renewable Energy Certificates (RECs)

Snapshot of findings from 10 major companies from the tech and fashion sectors

Despite consensus on their limitations, standalone RECs that are not bundled with the actual procurement of renewable electricity still play a large role in companies' renewable electricity procurement strategies. Eight of the 10 companies we assessed use RECs to claim using renewable electricity, even though RECs do generally not contribute to additional renewable capacity and merely shift carbon-intensive electricity to other grid users.

We see indications for a shift away from RECs that are not bundled with the actual procurement of renewable electricity to PPAs. Several companies commit to moving from RECs to PPAs in the coming years. High quality PPAs are more likely to contribute to additional renewable capacity *(see section 3)*.

Renewable energy certificates (RECs) are an accounting tool and not a renewable electricity procurement option in their own right. RECs are known under various names, such as Guarantees of Origin (GOs) and Energy Attribute Certificates (EACs). One REC represents 1 MWh of renewable electricity. While a REC is intended to give the holder the right to *claim* 1 MWh of renewable electricity, the holder of the certificate does not necessarily use or procure that MWh. RECs as an accounting tool are a necessary complement to short- and long-term procurement contracts for renewable electricity, such as PPAs *(see section 3)*. However, it is common for companies to treat RECs as a procurement method for renewable electricity. Major initiatives, such as the Greenhouse Gas Protocol, RE100 and SBTi, allow companies to purchase standalone RECs that are not bundled with the actual procurement of renewable electricity and claim on that basis a reduction of their scope 2 emissions *(see section 6)*. In theory, purchasing standalone RECs would send a signal to electricity producers that there is demand for renewable electricity, which would lead to additional capacity being installed. In reality, however, purchasing RECs has historically contributed very little to the development of additional renewable energy installations in Europe and the United States of America (USA) (Hulshof *et al.*, 2019; Miller, 2020). Oversupply of certificates and associated low prices, along with implicit double counting, are key reasons for this problem. For example, in Europe there is an oversupply of standalone RECs at low prices that mostly stems from decades-old hydropower installations in Scandinavia (Hulshof *et al.*, 2019; NewClimate Institute and Data-Driven EnviroLab, 2020). Even if REC prices would be high, the majority of future renewable electricity generation would very likely continue to take place in the absence of a market for standalone RECs (Martinsen and Mouilleron, 2020).

The purchase of standalone RECs simply displaces more carbon-intensive electricity to other consumers on the grid. When a customer purchases standalone RECs, the actual energy mix that a certificate owner receives does not change, nor does the energy mix in the grid. If fossil-fired power plants and renewable energy technologies feed electricity into a grid, the actors who draw from that grid would all receive a combination of renewable- and fossil-fired electricity. Consequently, if the owner of a renewable energy generation facility were to sell standalone RECs to one actor, that actor may claim a lower grid emission factor to determine its scope 2 GHG emissions but would still continue to receive the same combination of renewable- and fossil-fired electricity. Other customers on the same grid need to apply a higher grid emissions factor, so their reported electricity-related emissions will increase (NewClimate Institute and Data-Driven EnviroLab, 2020).

The very unlikely impact of standalone RECs undermines the credibility of corporate claims related to renewable energy consumption and GHG footprint. There are large differences in the importance of standalone RECs in corporate procurement strategies. While Apple uses RECs that are not bundled with the actual procurement of renewable electricity to cover only 4% of its electricity consumption, H&M Group, Inditex and lululemon purchase standalone RECs to cover over 70% of their electricity consumption. These fashion companies claim that, as a result, the majority of their scope 2 emissions are offset. Given the limitations of standalone RECs, this is a large exaggeration of the true climate impact these companies made.

Of the eight companies using standalone RECs, not a single one purchases its electricity and associated RECs from the same producer. While two companies provide no information on the origin of their RECs, six state that they purchase unbundled RECs that are not necessarily produced in the same region as where the companies are active. For instance, lululemon procured RECs from Germany to covers its electricity consumption in all countries across the European Union (EU) where the company is active (lululemon, 2023), while H&M Group bought RECs from Norway to cover electricity consumption in its stores in Bulgaria, Cyprus, Greece and Spain, amongst others (H&M Group, 2023b). Although the European grid is interconnected, the flow of RECs exceeds the physical flow of electricity (Hamburger, 2023). Purchasing Norwegian RECs does not send a demand signal to the Bulgarian electricity market and carries the risk of implicit double counting, where both the buyer of the RECs and Norwegian grid consumers believe they are using renewable electricity.

We see indications that companies recognise the limitations of standalone RECs and have plans to pursue more meaningful procurement constructs. H&M Group, Inditex and lululemon currently purchase standalone RECs to cover over 70% of their electricity demand, but these companies plan to transition to PPAs in the coming years. H&M Group has recently signed PPAs in Spain, Sweden and the United Kingdom, which account for about a third of the company's current electricity demand (H&M Group, 2023a). The shift to PPAs may not only be driven by companies' desire to source higher quality renewable electricity, but also because PPAs can be economically attractive. H&M Group states that they sign PPAs to reduce their GHG emissions *and* secure future energy prices (H&M Group, 2023a). We also see signs that PPAs are leapfrogging RECs in emerging renewable electricity markets. While Samsung and TSMC could have purchased standalone RECs for their operations in South Korea and Taiwan, respectively, neither company has pursued this option; now that PPAs are possible in these two countries, Samsung and TSMC show signs of starting to procure renewable electricity through this approach.

3 Striving for higher quality procurement constructs

Snapshot of findings from 10 major companies from the tech and fashion sectors

On-site renewable electricity installations generate an extremely low share of the 10 companies' electricity consumption. Six of the 10 companies assessed have on-site renewable generation capacity, but this generates typically less than 1% of their electricity demand for own operations.

Half of the companies assessed use PPAs or utility programmes to cover more than 50% of their current electricity demand, with several other companies aiming to transition to PPAs in the near future. While this shift to PPAs is positive, it is important to note that PPAs do not necessarily contribute to additional renewable electricity installations or lead to significant emission reductions, depending on the conditions of the contract and the matching method.

There is potential for increased on-site renewable generation capacity. While six of the 10 companies assessed have on-site renewable electricity installations, these typically generate less than 1% of the companies' total electricity consumption in own operations. Apple and Nike stand out, but still produce only 8% and 4% of their electricity demand, respectively. Given that most of the companies assessed in this report have stores, offices, parking lots, distribution centres or data centres, there is likely potential for additional on-site solar PV capacity. Regulatory barriers may hinder the development of on-site solar in many countries, for instance when a company rents a store or office space and is not allowed to install rooftop solar PV. In such cases, companies should engage with policymakers to address these barriers.

Six of the 10 companies assessed sourced renewable electricity through PPAs in 2022, with growing demand for this procurement construct. Apple, Gap, Google, Microsoft and Nike source over 50% of their electricity demand through PPAs, while lululemon currently procures 29% of its annual electricity consumption with PPAs. H&M Group and TSMC currently get no or a very small share of their renewable electricity from PPAs, but both companies recently signed PPAs that may deliver a significant proportion of their renewable targets for 2030. Inditex and Samsung also aim to use PPAs in the future, but we could not identify further details on their plans. A study looking at the impact of corporate climate action initiatives also found that PPAs have become more prevalent amongst SBTi and RE100 members in recent years (Ruiz Manuel and Blok, 2023).

PPAs *can* but do not necessarily contribute to the installation of new renewable capacity. There is not a single definition for what a PPA is, but in most cases it refers to a long-term contract between an electricity provider and an electricity consumer, usually spanning 10-20 years, although PPAs for much shorter timeframes exist too. The consumer agrees to purchase a certain amount of electricity from a specific generation installation under a predetermined pricing arrangement. PPAs are generally signed with new renewable electricity installations and can form part of the project investment decision, especially if the electricity provider and consumer agree on a fixed price, rather than the spot market price (NewClimate Institute and Data-Driven EnviroLab, 2020). However, there is a lack of research on the extent to which PPAs drive the development of additional renewable capacity and their impact may differ between countries, depending on local market conditions and subsidies for renewables. While significantly better than the standalone purchase of RECs, the procurement of renewable electricity through PPAs should not be understood as the perfect solution for eliminating electricity-related emissions. Section 6.2 explores how even the current best practices for the procurement of renewable electricity through local PPAs may only lead to moderate reductions in GHG emissions.

Companies should sign procure renewable electricity from installations on the same grid as from which they source their electricity to reduce their GHG footprint. Ultimately, all electricity grids need to decarbonise. Companies should procure renewable electricity from the same geographical region as where they operate to ensure that they contribute to decarbonising local grids, rather than signing contracts in countries where it is cheapest or easiest to do so. For companies that have a relatively smaller electricity demand across various countries, it may be reasonable to sign PPAs that cover their electricity consumption in the country where the renewable installation is located and in neighbouring countries. For instance, H&M Group has signed three PPAs in Spain, Sweden and the United Kingdom to cover its European

facilities (H&M Group, 2023d, p. 31), and lululemon signed a PPA in Texas to power its operations across the USA and Canada (lululemon, 2023a). This reduces the extent to which those PPAs effectively reduce the emissions of the companies' operations in various locations, but may be a pragmatic compromise for small and fragmented demand loads. As these companies explore additional PPAs, they could consider signing them in other operational regions, including those where the renewable electricity market is less mature.

Demand for PPAs is growing quickly but may be outpacing supply. In Europe, the number of corporate PPAs increased from 47 in 2019 (2.5 GW) to 129 (7 GW) in 2022 (Pexapark, 2023). However, demand may be increasing at a faster pace than supply. Gap, for instance, point at the limited supply as a potential barrier for signing additional PPAs in the near future (Gap, 2022, p. 45). While PPAs are more mature in West Europe and North America, companies continue to have limited access to PPAs in many Asian markets (RE100, 2023a). Of the RE100 members with operations in China, 70% report a lack of procurement options as a barrier, while close to 60% of RE100 members in South Korea and India mention this as a barrier. We see some initial signs that the accessibility of PPAs is improving in emerging renewable electricity markets. Samsung plans to sign PPAs in South Korea and TSMC has recently signed an aggregated PPA in Taiwan.

Aggregated PPAs may be an interesting option for medium-sized companies. These are PPA constructs where a group of buyers collectively sign an agreement with a renewable electricity project developer. Gap signed its first PPA as part of a consortium with four other companies (Samway, 2019) and TSMC recently signed an aggregated PPA to cover some of its own and suppliers' electricity demand in Taiwan *(see Box 2, section 5)*. Given that signing PPAs is usually a time-consuming and complex procedure that requires specific knowledge, it is not necessarily an attractive construct to medium-sized companies with limited financial resources. Moreover, medium-sized companies may not have a high enough electricity demand to sign PPAs on their own, because project developers sometimes require a large minimum procurement volume.

Likewise, in the USA, utility green tariffs can also be a high-quality procurement option for medium-sized companies. There is a not a single definition of utility green tariffs. In several states in the USA, commercial consumers and energy utilities can agree contracts for bundled renewable electricity from specific installations against a utility tariff rate. These long-term contracts have the advantage that the utility manages the development of new contracts with renewable electricity operators under conditions similar to PPAs, but without off takers needing to build inhouse expertise on electricity markets to arrange those PPAs directly. This may be a more scalable approach than corporate PPAs, since it is more accessible to smaller organisations, but – as for PPAs – the quality of this approach depends on the details with regards to how it is implemented, such as whether it focuses on new installations only, and whether it is based on long-term contracts. In contrast, a "utility green tariff" can *also* mean that consumers buy fossil-generated electricity bundled with third-party generated RECs from their energy utility. We consider this simply a form of procuring standalone RECs and an unsuitable procurement option to reduce electricity-related emissions.

4 Going further with 24/7 matching

Snapshot of findings from 10 major companies from the tech and fashion sectors

There is growing momentum for 24/7 matching of electricity consumption. Google was the first company to commit to match its electricity consumption with carbon free energy generation on an hourly basis and Microsoft has followed suit.

Corporate carbon free energy (CFE) targets might be undermined by reliance on (existing) nuclear capacity and fossil fuels with CCS. Some companies with CFE targets bank existing nuclear power and fossil fuels with CCS to achieve their targets.

Matching electricity consumption with the generation of renewable electricity on an annual basis overestimates the actual emission reductions from renewable electricity procurement and hides embedded fossil reliance. Most companies with 100% renewable electricity targets procure as much renewable electricity as they consume within a given year. While this approach has helped the energy transition in its initial phases, it does not lead to full grid decarbonisation because the wind or solar generation that a company purchases will in most cases not align with the timing of the company's electricity consumption (Miller, 2020; Xu *et al.*, 2023). For instance, a company with a PPA for a solar park does not receive sufficient electricity from this installation on cloudy days or during the night. Several studies found that annual matching results in limited or even zero emission reductions, amongst others, because the renewable electricity that companies procure is *not additional* and would have been generated also in the absence of the companies' 100% renewable electricity targets and accompanying procurement strategies (de Chalendar and Benson, 2019; Langer *et al.*, 2023; Xu *et al.*, 2023). Modelling research shows that 100% renewable electricity on an *annual* basis hardly leads to the displacement of fossil fuels (Xu *et al.*, 2023)

There is growing momentum for matching electricity consumption with renewable electricity generation on an hourly basis. Some companies have recognised the limitations of annual matching and are moving to hourly matching (e.g., Google and Microsoft). Companies that commit to match their electricity consumption with the generation of renewable electricity on an hourly basis provide a critical demand pull for additional and novel renewable energy generation and storage technologies that will be necessary to completely decarbonise power systems (Xu *et al.*, 2023). The hourly matching approach also requires companies to consider when to use electricity (i.e., when generation peaks) and may lead to efficiency improvements.

Google and Microsoft demonstrate leadership in pushing the 24/7 matching method forward. Google was the first global company to advocate for and commit to 24/7 CFE by 2030. The tech company co-launched the *United Nations (UN) 24/7 CFE Compact* in 2021, to which Microsoft has also signed up. Both companies have invested resources in developing the knowledge and technologies for implementing the 24/7 matching method, which is an enabler for other companies to follow suit.

However, the 24/7 targets of Google and Microsoft entail significant limitations for renewable electricity, as they are based on CFE. While both companies demonstrate leadership with their 24/7 commitments, their commitment to *carbon free* - instead of *renewable* – energy is a caveat. Given that the companies' targets allow for (existing) nuclear power and fossil fuels with carbon capture and storage (CCS), it is uncertain to what extent they will drive the development of *renewable* capacity. Microsoft has signed an agreement with a nuclear power plant to purchase RECs, while Google claims the share of renewable on the grid towards its 24/7 commitment. Neither company specifies what role nuclear or CCS will play in their overall electricity consumption mix by 2030, so it would be possible that these 24/7 targets do not significantly advance on the companies' existing renewable procurement.

We recommend the *UN 24/7 Carbon-Free Energy Global Compact* to establish a set on principles for 24/7 *renewable* electricity for companies that wish to focus on less contentious technologies. Nuclear power and CCS pose various environmental and social limitations, and their costs are substantially higher than some renewable generation technologies (Taebi, 2011; IISD, 2022; Mooldijk *et al.*, 2022; Lazard, 2023). Banking on existing nuclear capacity carries the risk of delaying investments in renewable capacity that needs to be developed in the near future to achieve sectoral decarbonisation benchmarks for the power sector. 24/7 renewable electricity consumption would require more

complex solutions than CFE but delivers the best outcome in terms of near- and medium-term emission reductions. In addition, companies that have built a strong brand image around their renewable electricity strategies – like Apple – might be reluctant to commit to 24/7 CFE if the association with contentious technologies risks undermining their brand image.

"Emissions matching" is a form of offsetting that is unlikely to contribute to decarbonising companies' own GHG footprint or power grids. Some companies – including Amazon and Meta, which we do not assess in this report – argue for an "emissions first" approach as an alternative to annual matching of electricity consumption. Under this approach, companies match the *emissions* from their electricity consumption – and not the kWh consumed - with avoided emissions from purchasing renewable electricity elsewhere (Emissions First Partnership, 2023). These companies argue that it makes most economic sense to invest in renewable electricity in regions with relatively carbon-intensive grids, as the marginal emission rates are higher there than in regions with clean grids. The rationale behind this matching method is the same as for offsetting with carbon credits: companies claim cheap and accessible emission reductions to neutralise their own GHG footprint, without addressing the more expensive challenges for decarbonising the grids that they actually place demand on. However, research found that emissions matching leads to no or very little displacement of fossil fuel generation (Langer *et al.*, 2023; Xu *et al.*, 2023).

Table 1: Comparing the integrity of companies claims today and targets for the future (renewable electricity in own operations only)

TECH AND ELECTRONICS

	INTEGRITY OF CLAIMS TODAY		INTEGRITY OF FUTURE TARGETS
Google	Moderate	–	Reasonable
Apple	Moderate	–	Moderate
Microsoft	Moderate	–	Moderate
TSMC	Shallow	–	Shallow
Samsung	Limited	–	Limited

Google, Apple and Microsoft's current **100% renewable electricity claims** are based mostly on **local PPAs**, and **annual matching**. Apple currently has no plans to move beyond this approach. Google and Microsoft are moving towards **hourly matching** but the significance of their hourly matched targets for renewables is uncertain due to the companies targeting 100% **carbon-free energy**, which includes nuclear and fossil fuel with CCS. Microsoft may also count PPAs with existing installations towards its target, while Google will focus on new installations through PPAs or its CFE manager model.

TSMC and Samsung both claimed only very shallow rates of renewable electricity in 2022, **based mostly on RECs**; TSMC match RECs annualy, while Samsung do not report the vintage of purchased RECs. Samsung's insufficient target for **100% RE by 2050** includes **no clear strategy** regarding procurement constructs or matching method. TSMC's target **for 100% RE by 2040** is likely to be at least partially based on **recently signed PPAs**.

FASHION

	INTEGRITY OF CLAIMS TODAY		INTEGRITY OF FUTURE TARGETS
Nike	Moderate	–	Moderate
Gap	Shallow	▲	Moderate
lululemon	Shallow	–	Shallow
H&M	Limited	▲	Moderate
Inditex	Limited	▲	Shallow

Nike and Gap mostly use **local PPAs** and **annual matching** for their current claims. Nike claimed a 93% renewable share in 2022; Gap's reported renewable share is inconsistent between documents (36% & 57%). Nike and Gap aim for a 100% renewable share by 2025 and 2030 repsectively, but **neither company commits to continue using high quality procurement constructs**, nor to move towards hourly matching.

H&M Group and Inditex's renewable energy claims in 2022 are based almost exclusively on **standalone RECs**. Lululemon's claim is also based mostly on such RECs, although PPAs account for nearly one third of consumption. H&M Goup plans to move towards the use of PPAs and has recently **signed several agreements** that will start delivering in the next years. Lululemon and Inditex indicate a **non-commital intention** to increase the role of PPAs in their procurement, but without ruling out the **continued use of standalone RECs**.

5-point rating scale: High | Reasonable | Moderate | Shallow | Limited

Assessments were made based on public information identified by the authors. A poor rating may not necessarily be an indication that a company's renewable electricity strategy is weak but could also indicate that the information was insufficient to confirm good practice. Ambitious companies can improve their ratings by ensuring that all aspects of their renewable electricity strategies are transparently and accurately disclosed, and in the public domain.

5 Supporting renewable electricity in the supply chain

Snapshot of findings from 10 major companies from the tech and fashion sectors

We identify a range of replicable good practice measures for supporting renewable electricity in the supply chain, although none of the companies currently implement a comprehensive package of targets and measures.

Data and targets for renewable electricity in the supply chain are lacking. None of the 10 companies disclose data on electricity consumption in the supply chain, while only two of the companies set outcome-specific targets.

Electricity consumption in the supply chain represents a major source of most companies' GHG emission footprints.

- **In the tech sector**, electricity consumption for manufacturing products and components is a highly relevant emissions source. For three of most of the tech and electronics companies assessed in this report, supply chain emissions are significantly higher than those companies' own operational emissions. We understand electricity consumption to be the major source of these supply chain emissions. Due to the highly technical nature of products manufactured, supply chains are often concentrated with a relatively small number of key suppliers that account for a high volume of the supply chain activity. For the companies in this report that disclose information, the majority of suppliers are located in Asia, particularly South Korea, China and Taiwan.
- **In the fashion sector**, the volume of electricity consumption for manufacturing garments in the supply chain is vastly more significant than major brands' own operational electricity consumption. Supply chain emissions (scope 3 category 1 *Procured materials and products*) account for about 78% of fashion brands' total GHG footprint (Ley *et al.*, 2021). The supply chains of Gap, H&M Group, Inditex, lululemon and Nike comprise of thousands of manufacturing facilities, distributed globally but concentrated in Asia, particularly China, Bangladesh, Vietnam and Pakistan.

The location of these companies' manufacturing supply chains presents a considerable challenge for the transition to renewable electricity. RE100 members report on average relatively low shares of procured renewable energy for their operations in China (32%), South Korea (2%), Bangladesh (23%), Pakistan (17%), Taiwan (3%) and Vietnam (7%) compared to members with operations in Europe (85%) and North America (66%) (RE100, 2023a). Most of these Asian countries have been identified by RE100 as very challenging markets for the procurement of renewable electricity (RE100, 2020). The development of PPAs remains costlier and more bureaucratic, or is not even possible in some locations (RE100, 2023a).

Reflecting these challenges, the 10 companies' strategies for renewable electricity in the supply chain tend to be less comprehensive than the strategies for their own operations. Table 2 shows that only one of the companies we assessed – Apple – achieved a *moderate* rating for the integrity of their supply chain strategy, while no companies achieved a *high* or *very high* rating. Companies appear reluctant to set targets that are explicit to renewable electricity outcomes: only Apple and H&M Group set targets for 100% renewable energy in the supply chain, although these targets contain significant caveats: H&M's target is significantly undermined by the lack of a commitment to electrify manufacturing processes *(see p49)*, while Apple's target applies only to Apple output and may therefore require little action from suppliers who could allocate existing renewable electricity shares to Apple output while effectively making other output more carbon intensive *(see Box 1 and p34)*. Google's "enabling" target is formulated in relatively ambiguous terms that do not imply end responsibility for outcomes. We did not identify any leading examples for disclosure of supply chain electricity consumption data; none of the 10 companies are yet reporting on this indicator, although several of them report that they are collecting the information from suppliers. Such disclosure would be necessary to contextualise and understand the significance of targets.

Table 2: Overview of supply chain renewable electricity strategies for 10 major tech and fashion companies

INTEGRITY RATING		DATA DISCLOSURE	EXPLICIT TARGETS FOR RE	SUPPORT MEASURES FOR RE
High	*No companies achieved a **high** integrity rating for supply chain renewable electricity strategy*			
Reasonable	*No companies achieved a **reasonable** integrity rating for supply chain renewable electricity strategy*			
Moderate	**Apple**	Moderate	Transition to entire supply chain to 100% renewable electricity by 2030.	"Supplier Clean Energy Programme" *(see Box 1)*
Shallow	**Gap**	Shallow	*– No explicit target identified –*	PPA for suppliers and capacity-building programmes.
	Google	Shallow	Enable 5GW of carbon-free energy in key manufacturing regions by 2030	Capacity building
	H&M Group	Shallow	100% renewable electricity in the supply chain by 2030.	Capacity building and financial support
	Inditex	Shallow	*– No explicit target identified –*	Capacity building
	lululemon	Moderate	*– No explicit target identified –*	Capacity building and target setting requirement
	Nike	Shallow	*– No explicit target identified –*	Capacity building and financial support
	TSMC	Shallow	*– No explicit target identified –*	Disclosure requirements and collective RE procurement programme *(see Box 2)*
Limited	**Microsoft**	Shallow	*– No explicit target identified –*	Capacity building and requirements for target setting
	Samsung Electronics	Shallow	*– No explicit target identified –*	Capacity building

5-point rating scale: High | Reasonable | Moderate | Shallow | Limited See individual company analyses.

Assessments were made based on public information identified by the authors. A poor rating may not necessarily be an indication that a company's renewable electricity strategy is weak but could also indicate that the information was insufficient to confirm good practice. Ambitious companies can improve their ratings by ensuring that all aspects of their renewable electricity strategies are transparently and accurately disclosed, and in the public domain.

Companies implement a range of replicable good practice measures for supporting renewable electricity in the supply chain. Despite the lack of supply chain targets and data disclosure, it is encouraging that most companies that we assessed report measures to support suppliers with the procurement of renewable electricity. Table 3 presents an overview of the types of measures that we identified, including capacity building measures, incentive instruments, requirements for suppliers and enabling measures. Although very few of the companies implement a comprehensive package of measures, the wide variety of measures have significant potential for replication and scaling up. Companies could learn from the various practices of their peers to implement more multi-faceted strategies in the future. Some examples particularly stand out as worthy of closer consideration and potential replication: Apple's "Supplier Clean Energy Programme" *(see Box 1)* and TSMC's collective procurement programme *(see Box 2)* are particularly promising measures to proactively support suppliers in challenging market conditions. Initiatives such as Inditex's online portal for suppliers to explore best available technologies may be a good starting point for sharing basic information across a highly fragmented supply chain, and could be built upon in coalition with other major fashion companies with similar supply chains.

Table 3: Measures to support renewable electricity procurement in the supply chain.

POTENTIAL MEASURES	SELECTED NOTABLE EXAMPLES
Capacity building measures: Support to connect suppliers with experts; direct provision of information or training.	**Inditex**'s online portal for suppliers to explore best available technologies; **Apple**'s Supplier Clean Energy Portal includes country-specific guidance for renewable electricity procurement constructs; **Nike**'s solar PV consulting programme
Incentive instruments: Selection criteria and/or preferential conditions for suppliers based on RE performance.	**Google** is starting to integrate climate criteria into supplier sourcing and evaluation processes.
Mandatory requirements: Requirements to disclose emissions and energy data; requirements to set targets and/or meet specific thresholds for renewable electricity.	Most of **Apple**'s major suppliers have committed to 100% renewable electricity, but for their Apple production only *(see Box 1)*; **Microsoft** and **lululemon** require their suppliers to set climate targets and report to CDP.
Enabling measures: Financial support for RE strategy	**H&M Group**'s contribution to the Fashion Climate Fund (together with **lululemon** and others) provides financial support to suppliers.
Facilitating measures: Direct investment in RE installations; collaborative funds for RE installations; collective / aggregated PPAs.	**Apple**'s supplier co-investment model (inc. China Clean Energy Fund, see Box 1); **TSMC**'s collective procurement programme *(see Box 2)*.

BOX 1

Apple's Supplier Clean Energy Program

Adapted from the 2023 Corporate Climate Responsibility Monitor (Day et al., 2023b, p. 46 Box 2)

Apple's *Supplier Clean Energy Program* consists of a complementary package of measures to support and encourage suppliers to procure renewable electricity, although the target "to transition the entire manufacturing supply chain to 100% renewable electricity by 2030" has significant limiting caveats.

Apple launched the Supplier Clean Energy Program in 2015 to transition its manufacturing supply chain to 100% renewable electricity by 2030 (Apple Inc., 2022c, p. 1). If achieved through the implementation of highly quality measures and accounting methods, this could significantly decrease the company's GHG emissions footprint, as most of Apple's emissions (70%) originate from use of energy to manufacture products in third-party supply factories (Apple Inc., 2022b, p. 84).

The Supplier Clean Energy Program encourages suppliers to commit to 100% renewable electricity for Apple production. However, herein lies a significant limitation which could limit the impact that this programme may have on additional renewable capacity and real emission reductions. The supply chain renewable electricity target covers *only* the electricity from *Apple's share* of suppliers' production. This may significantly limit the impact of Apple's renewable electricity target for suppliers, since suppliers may reallocate the renewable portion of their electricity between contractors; Apple could claim the renewable share, while the emissions-intensive electricity is shifted to other contractors. In some cases, for suppliers where Apple accounts for a minority of their output, the achievement of these targets may require only very shallow rates of renewable electricity consumption and may not require significant additional action. The supply chain target would be considerably stronger if Apple would aim for its suppliers to be operating on 100% renewable energy, rather than just allocating the renewable part of its electricity mix to Apple output.

Apple reports that the current number of suppliers covered by the programme stands at over 300 and represents more than 90% of its direct manufacturing expenditure (Apple Inc., 2023a). These suppliers report to Apple, and the company tracks their progress in renewable electricity procurement (Apple Inc., 2022c, p. 3).

Apple supports suppliers both technically and financially. Apple reports that its Supplier Clean Energy Portal offers internal training and resources that are tailored to each supplier's country, and connects them to experts and renewable energy industry associations. Where renewable energy procurement options are limited, Apple reports to have implemented co-investment models for suppliers, in which Apple and suppliers invest in a common fund that is used to create new renewable electricity capacity for suppliers (Apple Inc., 2022c, p. 3). The China Clean Energy Fund, based on this model, was launched in 2018 with three wind power PPAs contracted by Apple together with ten China-based suppliers (Apple Inc., 2019). Apple reports that this programme has helped its suppliers in China to invest in over 1 GW of renewable energy (Apple Inc., 2022c, p. 3) and Apple reports to have injected more finance into the programme in 2022 (Apple Inc., 2022a). Apple has also directly invested in 500 MW of renewable energy in Japan and China with the intention to improve renewable electricity access for indirect suppliers with whom Apple has no direct contracts. The company reports that its support efforts have achieved a substantial increase in renewable energy capacity in the supply chain, increasing from about 2 GW operational or committed capacity in 2016 to over 13 GW operational and 20 GW committed capacity in 2023 (Apple Inc., 2023a).

Apple and its suppliers report that they strive for high-integrity renewable electricity procurement, where investments likely result in truly additional renewable electricity capacity Apple reports that it applies the same integrity criteria to suppliers' renewable energy that it applies to itself. For suppliers' renewable electricity, Apple reports that it prioritises PPAs, which represent 79% of renewable electricity procurement mechanisms, followed by standalone RECs (8%), direct investments (10%), and on-site production (3%) (Apple Inc., 2022c, p. 4). It is not clear how this correlates with the fact that *some* of Apple's major suppliers are heavily reliant on standalone RECs for their reported renewable electricity shares *(see Samsung Electronics, p41)*. Such high shares of PPAs would be a significant achievement given that Apple's supply chain is mostly concentrated in Asia, including countries where the market conditions for higher quality procurement constructs are challenging. To this end, Apple claims to advocate in suppliers' countries for regulations that create more opportunities for high-quality renewable electricity procurement.

Despite this positive collection of measures that Apple sets out, the company continues to report only in absolute figures on the amount of renewable electricity in the supply chain; without putting this into any meaningful context through the disclosure of total electricity consumption and renewable shares. In reality, progress to-date remains very limited for some of Apple's major suppliers such as Hon Hai and Pegatron, which report renewable electricity shares of just 8% in 2022 and 6% in 2021, respectively (Pegatron, 2022; Hon Hai, 2023). Accordingly, it is not yet clear to what extent the Supplier Clean Energy Programme has the depth and conviction to significantly decarbonise the supply chain by 2030. This programme of support measures could be significantly strengthened if Apple were to exert its influence to place stronger demands on its major suppliers.

BOX 2 TSMC's collective procurement programme through aggregated PPAs in Taiwan

In 2023 TSMC established a model for collaborative renewable electricity procurement with suppliers, by signing an aggregated PPA in Taiwan with ARK Power, under which both TSMC and its suppliers in Taiwan will be able to procure renewable electricity (HPC Wire, 2023; TSMC, 2023c). This model may lower the barrier for suppliers to procure renewable electricity through PPAs, which are reportedly complicated and costly to establish in the Taiwanese context.

In 2020, RE100 listed Taiwan as one of the top 10 most challenging markets to source renewable electricity (RE100, 2020). Since then, Taiwan has seen promising developments for renewable electricity; the country committing to net-zero GHG emissions by 2050, and demand for renewable electricity from companies based in Taiwan has increased significantly.

Surveys of companies in Taiwan undertaken by RE100 and the Chung-Hua Institution for Economic Research (CIER) indicate that companies still lack access to PPAs due to their high costs, and developers' requirements for large minimum purchase volumes and long contract durations. Accordingly, there is eagerness amongst companies in Taiwan to explore the concept of aggregated PPAs, which remains a novel concept in the country (Chung-Hua Institution for Economic Research, 2022). Aggregated PPAs are constructs under which multiple companies come together to pool their

resources and risk profiles, in order to access PPAs that may otherwise not be accessible to them. This form of collective procurement is already in use in other regions, with prominent examples including Walmart's Project Gigaton and Apple's China Clean Energy Fund (Day *et al.*, 2023b).

CIER's research finds that while aggregated PPAs in Taiwan may have many benefits to unlock higher quality procurement constructs, there remain considerable barriers. Given the low risk and high price deals that renewable electricity developers have with the main state utility Taipower, lenders and developers are put off by the perceived risks and management costs associated with contracting multiple stakeholders (Chung-Hua Institution for Economic Research, 2022).

TSMC's collaborative PPA is the first example of such a construct in Taiwan. The PPA was signed under a joint procurement model for 1,000 GWh yearly, for 20 years. TSMC is the managing anchor of the collaborative PPA, taking over the costs and risks associated with multiple stakeholders, which has otherwise represented a key barrier for project developers and lenders. TSMC will procure 500 GWh yearly, while suppliers in Taiwan will be invited to procure the remaining 500 GWh. It remains unclear to what extent TSMC may plan to replicate and scale up this promising programme.

It is not clear to what extent major companies are exerting their influence to advocate for improved conditions for renewable electricity procurement in their supply chain regions. Advocacy is a key lever for progress, given the challenging market conditions for renewable electricity in companies' supply chains. Major corporates have shown that their renewable electricity plans are highly relevant and influential for policy development in their home markets; these companies could be equally as relevant and influential for policy developments in supply chain regions. Across the 10 companies assessed in this analysis, we identify very little evidence of companies applying this lever. Apple and H&M Group stand out: Apple publishes a description required policy frameworks in supply chain regions, and reports many direct interactions with governments in these regions; H&M Group is even more explicit about its advocacy support for facilitating PPAs and improved electricity grid connectivity in its supply chain regions. Several companies refer to advocacy efforts in vague terms, but the markets of the companies' own operations remain the clear focus of advocacy efforts for most companies. This void and lack of best-practice examples should represent a new potential frontier for demonstrating leadership, given the relevance of electricity in the supply chain and the important role of policy development for overcoming significant barriers.

6 Improving renewable electricity accounting and claims: GHG Protocol, RE100, SBTi and CDP

Snapshot of findings from 10 major companies from the tech and fashion sectors

Highly influential initiatives currently provide limited incentives for companies to strive for higher quality renewable electricity strategies: the revision of their guidelines and criteria may represent one of the most promising levers for raising the ambition of companies' renewable electricity strategies.

Major initiatives do not distinguish between key nuances. We did not identify a correlation between the quality of companies' renewable electricity strategies and their membership of RE100, or the emissions they report under GHG Protocol guidelines.

Market-based accounting can lead to major misrepresentations of the real GHG emission footprint associated with companies' electricity consumption, depending on the quality of the procurement constructs and the matching methods that a company takes.

We set out recommendations for the revision of guidelines and criteria to distinguish between highly significant nuances in RE strategies and to define and adopt consistent terminologies for claims.

6.1 Overview of initiatives and their current criteria

Companies' climate strategies – and the integrity of their leadership credentials – are dependent on high quality guidelines, standards and criteria from the major international cooperative initiatives and certification schemes. Four of the most influential initiatives for corporate renewable electricity procurement are the **GHG Protocol**, **RE100**, **SBTi** and **CDP's disclosure platform**.

- **The GHG Protocol**'s Corporate Accounting and Reporting Standard (GHG Protocol, 2004) is a highly influential standard and a fundamental building block of most other major international initiatives for benchmarking, target setting and measuring progress. The GHG Protocol's Scope 2 Guidance (GHG Protocol, 2015) sets out accounting rules for GHG emissions associated with electricity procurement. Its provisions are therefore highly influential for determining how companies wishing to claim a reduction in their GHG emissions procure renewable electricity. The GHG Protocol began a major revision period in 2023, anticipating an updated set of standards to be published in 2025 (GHG Protocol, 2023).
- **RE100** is an international cooperative initiative from Climate Group and CDP whose corporate members commit to 100% renewable electricity. While RE100 started in 2014 as an initiative to *mobilise* companies, membership is now subject to technical requirements related to companies' commitments for renewable electricity, and companies often present their membership of RE100 to imply external *certification* of their ambition level. RE100 therefore effectively serves as an initiative for standard setting and validation, even if it is not necessarily designed for these functions. Accordingly, the RE100 technical criteria (RE100, 2022) for membership are also highly influential for determining companies' renewable electricity procurement strategies.
- **The Science Based Targets initiative (SBTi)** provides guidance and standards for companies in various sectors to set 1.5 °C aligned climate targets. The initiative also validates companies' plans against these standards and serves as a platform for those validated plans. The SBTi Net Zero Standard (SBTi, 2023) defines benchmarks for the amount of renewable electricity that companies should procure by 2025 and 2030, but provides no specific requirements regarding procurement constructs and accounting methods, beyond those of the GHG Protocol and RE100.
- **CDP** – formerly the Carbon Disclosure Project – maintains a disclosure platform where companies can disclose information on their climate footprints and strategies, through the means of a standardised set of questionnaires. Companies are able to disclose a considerable level of detail on their operational energy consumption, and their strategies for the procurement of renewable electricity. CDP questionnaire responses form the means through which compliance with some of RE100 membership criteria is validated. CDP's taxonomy of renewable electricity procurement approaches, and the degree of specificity and granularity that its questionnaires request, are also therefore highly influential to companies' strategies.

In their current form, these highly influential initiatives currently provide limited incentives for companies to strive for higher quality renewable electricity strategies. Table 4 Table 4 provides an overview of how these initiatives largely fail to distinguish between the relevant nuances of renewable electricity accounting.. While the tools developed by the GHG Protocol, RE100, SBTi and the CDP may have been well placed to promote awareness of corporate renewable electricity procurement at the point of their design, the level of detail and differentiation no longer reflects the landscape of corporate renewable electricity strategies that we see from major companies today. Table 5 indicates that – for the companies selected in this analysis – these initiatives do not offer any clear and consistent differentiation between companies that demonstrate real leadership for high quality renewable electricity strategies, and companies that pursue much lower quality approaches. Moreover, our assessments of Google (p36) and Microsoft (p39) explain how the undifferentiated standards of these initiatives may even represent a *barrier* for companies to adopt emerging best practice. Companies that strive for higher quality accounting and procurement approaches but are currently procuring comparably low shares of impactful renewable electricity may find themselves at a comparative disadvantage, next to companies that report very high shares of renewable electricity under the minimum criteria of the mainstreamed standards, using annual matching and standalone RECs. Given the degree of influence that these initiatives command, the revision of their guidelines and criteria to facilitate such a differentiation may represent one of the most promising and necessary levers for raising the ambition of companies' renewable electricity strategies.

Table 4: Renewable electricity accounting distinctions of GHG Protocol, CDP and RE100

	GHG PROTOCOL	RE100	SBTi	CDP PLATFORM
RE accounting and matching distinctions				
• Procurement constructs	Neither the GHG Protocol Scope 2 Standard, the RE100 technical criteria nor the SBTi Net Zero Standard distinguish between procurement constructs such as standalone RECs, PPAs and utility-scale tariffs.			The CDP questionnaire facilitates the provision of more granular data for procurement constructs at the country level, which could in theory facilitate differentiation. This information is not used by CDP towards adjustments of company-reported RE shares.
• Locality	The market-based accounting methods of the GHG Protocol Scope 2 Standard restricts the use of certificates to the geographical boundaries determined by the certificate issuer. This may in some cases require local matching, but not always. The RE100 technical criteria and the SBTi Net Zero Standard defer to GHG Protocol.			
• Timing	None of the initiatives distinguish between annual and hourly approaches for matching renewable electricity.			
Scope 2 GHG emission accounting	The market-based accounting approach of the Scope 2 Standard allows companies to claim to have reduced their emissions from electricity procurement (down to zero emissions), as opposed to the location-based method which is based on local grid emission factors. The standard requires companies to report on both market- and location-based emissions but allow companies to select their preferred method for reporting total GHG inventories.	RE100 provides no guidance or criteria for emissions accounting.	SBTi defers to the criteria and accounting guidance of the GHG Protocol for renewable electricity and scope 2 emissions.	The CDP questionnaire aligns with the GHG Protocol and allows companies to input data for both market- and location-based emissions. Companies reporting both values achieve higher transparency ratings, but there is no evaluation of which values are given more prominence.
Supply chain	Renewable electricity in the supply chain is bundled along with all other emission sources in Scope 3 category 1 "Purchases goods and services". These emissions are included in complete inventories, but the categorisation does not facilitate a clear understanding of the electricity-related emissions.	RE100 provides no guidance or criteria for supply chain electricity.	SBTi provides no guidance or criteria for supply chain electricity.	The CDP questionnaire includes no structured questions that focus specifically on electricity in the supply chain. Companies can optionally report on selected initiatives under more general target and measure inputs, but such inputs are not directly comparable.

Table 5: Comparison of companies' renewable electricity claims and our integrity assessments

	RE100 MEMBERSHIP*	SCOPE 2 EMISSIONS REPORTED ($MtCO_2E$ 2022)		100% RE CLAIM TODAY	INTEGRITY OF CLAIMS, TARGETS AND MEASURES (from our company-specific analyses section B)		
		LOCATION-BASED	MARKET-BASED		RE PROCUREMENT TODAY	FUTURE RE PROCUREMENT	RE IN THE SUPPLY CHAIN
TECH AND ELECTRONICS							
Apple	Gold	1.1	0.003	✓	Moderate	Moderate	Moderate
Google	Gold	8.5	2.5	✓	Moderate	Reasonable	Shallow
Microsoft	Gold	6.4	0.3	✓	Moderate	Moderate	Limited
Samsung Electronics	Gold	19.9	9.1	In some regions	Limited	Limited	Limited
TSMC	✓	10.9	9.5	–	Shallow	Shallow	Shallow
FASHION							
Gap	–	1.1	0.003	–	Shallow	Moderate	Limited
H&M Group	✓	8.5	2.5	(>90%)	Limited	Moderate	Shallow
Inditex	–	6.4	0.3	✓	Limited	Shallow	Shallow
lululemon	✓	19.9	9.1	✓	Shallow	Shallow	Moderate
Nike	Gold	10.9	9.5	(>90%)	Moderate	Moderate	Shallow

5-point rating scale: High | Reasonable | Moderate | Shallow | Limited

* Gold memberships for RE100 are available to companies for a premium fee. Companies paying for gold status receive preferential placement and profiling on the RE100 website and at events (Climate Group, 2021). We could not identify any specific technical criteria that companies must fulfil to qualify for this label (aside from criteria for energy producers and financial institutions).

6.2 Inaccuracies of scope 2 emissions accounting

All the companies assessed in this report measure and disclose their GHG emission footprints based on the accounting guidelines of the GHG Protocol. According to the GHG Protocol, companies should report on scope 2 emissions using both the location-based and market-based accounting methods (WRI and WBCSD, 2015, p. 59):

- The location-based method reflects the average emissions intensity of electricity grids from which consumption occurs.
- The market-based method reflects emissions from electricity that companies have purposefully chosen to buy. It derives emission factors from contractual renewable electricity procurement instruments.

Market-based accounting can lead to major misrepresentations of the real GHG emission footprint associated with companies' electricity consumption, depending on the quality of the procurement constructs and the matching methods that a company takes. Table 5 indicated how all of the companies assessed in this report use market-based accounting to claim major reductions in their GHG emission footprint, compared to location-based emissions; with most claiming >90% emission reductions. However, the extreme examples discussed below indicate that under companies' current renewable electricity procurement strategies, location-based emissions may really be reduced by as little as nothing, and by as much as just around one third.

The best-case example of corporate renewable electricity in this report translates to only relatively modest emission reductions compared to location-based emissions. Google reports that its 100% renewable electricity claim equates to just 64% carbon-free energy on an hourly basis in 2022, and we understand that most of this carbon-free energy share comes from existing renewable and nuclear electricity from the grid. This existing renewable and nuclear electricity in the grid is already accounted for in the grid emission factors that underpin location-based emissions. Although Google's renewable electricity procurement strategy is considerably better than most of the other companies we have assessed, its current renewable electricity procurement constructs can actually only lead to a modest reduction of GHG emissions in many of its locations, compared to the location-based estimate *(see Google assessment, p36)*. In recognition of this issue, Google uses its own methodology for calculating the avoided emissions associated with corporate renewable electricity procurement for internal decision making, which considers only the company's contracted electricity procurement on an hourly matching basis (which Google refers to as its "contracted CFE" (Google, 2021a). We consider that this would be a far more accurate way to calculate scope 2 emissions than the approach currently mainstreamed by the GHG Protocol. Google does not currently report its contracted CFE scores, but from the information provided we understand that this accounts for a modest proportion of the overall CFE score that the company reported in 2022 (Google, 2021a). Based on these considerations and the information available to us, we crudely estimate that Google's current renewable electricity procurement is unlikely to lead to the avoidance of more than one half of its location-based emissions.[1]

There is little evidence that the weakest examples of corporate renewable electricity strategies in this report can lead to any significant emission reductions. The current renewable electricity claims of H&M Group (92% RE) and Inditex (100% RE) are based nearly entirely on the purchase of standalone RECs that are not bundled with the actual procurement of renewable electricity and often come from other regions as where the companies' operations take place. Inditex does not disclose data on the vintage of the certificates, which may even originate from historical years. Through the market-based method, Inditex report *zero* scope 2 GHG emissions, while H&M Group report a 92% reduction of GHG emissions compared to the location-based value. In reality, it is very likely that the two fashion companies do not contribute to any significant reductions of their electricity related emissions. Aside from the fact that annually matched renewable electricity is likely to have only a very marginal impact on reducing emissions, compared to an hourly matching approach, there is also a significant volume of evidence that the purchase of standalone RECs does not lead to additional renewable electricity capacity or emission reductions in most conditions, especially in the key markets where these companies' operations are mostly located *(see section 2)*.

The exaggeration and inaccuracies of market-based emission accounting can be harmful for climate action. As the impact of renewable electricity projects varies and is often unclear, market-based reporting for renewable energy constructs may give the false impression that a company has no or few scope 2 emissions and could divert prioritisation away from energy efficiency improvements. The lack of differentiation between higher and lower quality approaches also creates no incentives for companies to pursue higher quality renewable electricity procurement.

1 *This is a crude but conservative estimate based on the understanding that electricity from the grid ("grid CFE") currently accounts for the majority of Google's overall CFE score for most data centres. However, the information provided by Google does not allow for a definitive determination of its "contracted CFE", so the company's contracted CFE could be considerably higher or lower than one half, which is estimated by the authors of this report for indicative and illustrative purposes only.*

On the other hand, some companies' market-based emission estimates may be higher than their location-based estimates, due to contractual arrangements for the direct procurement of fossil-fuel-generated electricity. In this case, companies could report location-based emissions based on the local grid emissions factor, while profiting from cheaper electricity procurement constructs from a more emissions-intensive source. To create a clear incentive both to maximise energy efficiency improvements and to procure renewable electricity, it would be most constructive for companies to report both market- and location-based estimates for scope 2 emissions and to use the larger of the two values towards the company's aggregated emissions footprint. This is aligned with the ISO's Net Zero Guidelines, which require companies to calculate scope 2 emissions using both accounting methods but use the highest of the two estimates to drive energy efficiency improvements (ISO, 2022).

6.3 Recommendations for more nuanced guidelines and criteria

We offer the following recommendations for the revision of key initiatives guidelines and criteria, based on the findings of our analysis:

6.3.1 Consistency in definition and scope of 100% renewable electricity claims

Section 1 demonstrated that there is a lack of consistency in the meaning of 100% renewable electricity claims. Due to a variety of nuances, companies' 100% renewable electricity claims are rarely comparable to one another, and may mean completely different things.

Moreover, renewable *electricity* claims based on existing electricity consumption alone can be a significant and misleading distinction from renewable *energy* claims. For some of the fashion sector companies assessed in this analysis, 100% renewable electricity targets for the supply chain only refer to shifting existing electricity consumption to renewable sources. These targets do not address the issue that one of the most important measures for reducing emissions in the supply chain would be the electrification of manufacturing processes that continue to rely on fossil powered heat and steam. In the worst-case scenario, companies may delay the *electrification* of fossil-powered processes and shift from coal to other unsustainable energy carriers such as biomass, to avoid adding additional complexities to the goal of claiming 100% renewable electricity.

- → We recommend that the major initiatives adopt a common standard for renewable electricity claims, including a clear definition of terms that accounts for and differentiates between all of the highly significant nuances addressed in the following recommendations (related to quality of procurement constructs, matching methods and definition of renewable technologies).
- → We recommend that renewable electricity shares should be reported only together with the proportion of overall *energy* consumption that is electrified, for context.

6.3.2 Accurate and transparent market-based GHG emission accounting

Table 5 shows that all 10 companies assessed in this report claim significant reductions in their scope 2 GHG emission footprints through the market-based accounting method; the majority report near-zero emissions from this emission source. All 10 companies report their market-based scope 2 emissions more prominently than their location-based emissions and use the marked-based data point towards their overall aggregated emission reporting in their annual sustainability reports. In reality, section 6.2 discusses **that the strategies pursued by these 10 companies range from those that are likely to have a *moderately* positive impact for reducing emissions, to those that are unlikely to have any impact at all**.

In the current situation, the market-based accounting method may conceal the real climate impact associated with electricity consumption, and can distract attention away from the need to address these emissions through energy efficiency measures, as well as higher quality renewable electricity procurement constructs.

- → We recommend that the market-based emission accounting method should be revised to account for and differentiate between all of the highly significant nuances addressed in the following recommendations (related to quality of procurement constructs, matching methods and definition of renewable technologies).
- → We recommend that it be required for companies to report both market- and location-based estimates for scope 2 emissions and to use the larger of the two values towards the company's aggregated emissions footprint. This would create a clear incentive both to maximise energy efficiency improvements and to procure renewable electricity. This would also be aligned with the ISO's Net Zero Guidelines which require the highest of the two estimates for emission reduction targets and tracking progress (ISO, 2022, p. 18). Especially in the current context that market-based emission accounting methods lead to such considerable exaggerations and inaccuracies, we find that the emphasis currently placed on market-based values is misleading and inappropriate.

While there are good arguments for market-based accounting and the extension of this accounting method to scope 3 category 1 emissions from the supply chain, we strongly caution against the introduction of market-based accounting for supply chain emissions until market-based accounting methodologies have undergone major revisions with respect to these recommendations.

6.3.3 Distinction between standalone RECs and higher quality constructs

After two decades of experience with REC schemes in several regions, there is now a clear consensus in the scientific literature that the purchase of standalone RECs is very unlikely to have a meaningful impact on reducing GHG emissions. Standalone RECs are unlikely to directly or indirectly lead to any additional renewable electricity capacity installations *(see section 2 Limitations of Renewable Energy Certificates)*.

→ Accordingly, we recommend that procured renewable electricity should only be counted towards a company's own renewable electricity shares when procurement constructs are used that are likely to result in an additional impact for renewable electricity capacity. Experiences with the use of RECs has shown that these certificates are not an effective means of procuring electricity, although they are an essential accounting tool alongside procured renewable electricity. We recommend that the purchase of standalone RECs outside of other consequential procurement constructs should not qualify towards a company's renewable electricity shares and should not be counted towards GHG emission reduction claims, unless evidence can be provided that the procurement of standalone RECs in the specific region will lead to additional renewable electricity installations and emission reductions. Otherwise, there is no scientific basis for those claims.

We recognise – and observe from the findings of our analysis – that there are regional differences with regards to the availability of higher quality procurement constructs, such as PPAs. At the same time, we also see significant progress in removing these barriers since over the past 2 years; higher quality procurement constructs are now available in the main operational markets of all the companies assessed in this report, since recent regulatory reforms in South Korea and Taiwan considerably improved the conditions for major companies to access PPAs (Chung-Hua Institution for Economic Research, 2022; Mayer Brown, 2022a; PwC, 2022; Shin & Kim, 2022). Through 2022 and 2023, a pilot programme for direct PPAs was being introduced in Vietnam (Mayer Brown, 2022b; Vietnam Business Law, 2023), while a pilot programme in China continued to be upscaled across more areas of the country (Hao *et al.*, 2023). In 2022, companies signed PPAs for large-scale renewable power installations in Indonesia (Enerdatics, 2022) and Bangladesh (Envision Energy, 2022). The collaborative PPA announced by TSMC in Taiwan in 2023 shows that there are ways to make higher quality renewable procurement accessible when legislation and bureaucracy represent barriers *(see TSMC p43)*.

Although access to higher quality procurement constructs remains limited in some countries, we recommend that this reality does not lead to case-specific leniency with regards to standalone RECs in accounting for emissions and renewable shares. The lack of clear evidence for standalone RECs to have a meaningful impact in most regions means there is no scientific basis for those claims, and the ability to make such claims can reduce the incentive for companies to advocate for achievable regulatory change. Standalone RECs should only be considered a meaningful interim step when there is clear evidence that the purchase of such certificates is likely to lead to additional renewable electricity installations and emission reductions. Based on the evidence available in the current scientific literature, we do not consider it likely that such a case can be made in most countries *(see section 2)*.

A key question here is, **what can be done to create *incentives* for companies to take proactive and positive measures for renewable electricity procurement in challenging regulatory environments?** Given the ineffectiveness of standalone RECs in driving additional capacity, we consider it more important to provide companies with incentives to advocate for further regulatory improvements. Such incentives could be provided – for example – through membership of visible and respected initiatives for transparent and ambitious advocacy. Such labelling- or membership-based incentives may indicate strong leadership on renewable energy policy, when adjustments to the bottom line of GHG emissions may be inaccurate and even counterproductive.

6.3.4 Distinction between global matching and local procurement

Companies should procure renewable electricity generated in the same geographical region as where they operate to ensure that they contribute to decarbonising local grids, rather than establishing renewable electricity procurement constructs in countries where it is cheapest or easiest to do so *(see section 3)*.

→ Accordingly, we recommend that procurement of renewable electricity should only be counted towards a company's renewable electricity shares when the electricity is generated on the same grid as the electricity consumption to which it is matched. Renewable electricity purchased from other regions should not qualify towards a company's renewable electricity shares and should not be counted towards GHG emission reduction claims.

6.3.5 Distinction between annual matching and hourly matching

Hourly matching (also referred to as 24/7 matching or temporal matching) can help drive grid decarbonisation. Some companies have recognised the limitations of annual matching and are moving to hourly matching (e.g., Google and Microsoft). Companies that commit to match their electricity consumption with the generation of renewable electricity on an hourly basis provide a critical demand pull for additional and novel renewable energy generation and storage technologies that will be necessary to completely decarbonise power systems (Xu *et al.*, 2023). The hourly matching approach also requires companies to consider when to use electricity (i.e., when generation peaks) and may lead to efficiency improvements *(see section 4)*.

- → We recommend that companies are required to report on the vintage of their procured renewable electricity.
- → We recommend that the criteria, guidelines and data collection protocols of major initiatives are adjusted or complemented to *distinguish* between annual and hourly accounting methods, moving towards hourly matching as the standard approach as soon as practically possible.
- → We recommend that initiatives implement criteria, labels or other incentives to *strongly encourage* and eventually *require* companies to transition to an hourly reporting basis.

6.3.6 Clarity in classification of "renewable" generation technologies

A further inconsistency in how renewable electricity is treated lies in the technologies that initiatives, standards and guidelines classify as renewable electricity. Large-scale hydropower and biomass are treated inconsistently between different guidelines.

Similarly, some initiatives, and companies start to move from the terminology renewable energy to CFE, a terminology that can include nuclear power as well as fossil-fuel generation combined with CCS, in addition to renewable technologies. The sustainability of non-renewable CFE technologies is highly contentious, due to the environmental costs and uncertainties associated with nuclear waste and large-scale CCS.

- → Accordingly, we recommend that high-ambition coalitions and initiatives that seek to mobilise corporates for climate change ambition raising should focus on sustainable renewable energy technologies, which excludes biomass, nuclear and fossil fuel generation with CCS. A focus on renewables, storage technologies and smart grid infrastructure would most directly address the major challenges for power sector decarbonisation.

6.3.7 Focus on renewable electricity in the supply chain

Electricity consumption in the supply chain is one of the largest emission sources for many companies and often considerably more relevant than the electricity that a company procures for its own operations. Despite its relevance, we find that companies' strategies for renewable electricity in the supply chain are far less developed than their strategies for their own operations. This could be linked to a lack of guidance or incentives for the development of supply chain strategies from the key initiatives.

- → We recommend extending the membership criteria of RE100 to *require* supply chain targets and strategies.
- → We recommend an extension of the CDP questionnaire to collect information on supply chain electricity.
- → The scope 3 standard of the GHG Protocol *could* also better incentivise renewable electricity in the supply chain through the introduction of market-based accounting approaches for upstream scope 3 emissions, although great caution should be taken to ensure that this does not reduce transparency and provide a platform for greenwashing, as market-based accounting approaches have done in some cases for scope 2 emission accounting *(see section 6.2: Inaccuracies of scope 2 emissions accounting)*.

SECTION B

Company case studies

This report assesses companies that have committed to high-profile renewable electricity targets. The key objective of the report is to identify replicable good practice while assessing the integrity of the most influential global corporate actors that are putting themselves forwards as climate leaders and role models for other companies. Scrutiny of their plans is also necessary to identify whether these influential leaders really are setting the right examples, and whether the guidance and frameworks upon which they are making their plans are sufficient.

Our company-specific assessments include a rating of the **transparency** and **integrity** of their approaches across key elements of renewable electricity strategies: **disclosure of electricity-related data, renewable electricity claims and targets**, and **disclosure of advocacy** for supportive policy frameworks.

Transparency ratings are primarily based upon the extent to which a company publicly discloses the information necessary for an observer to fully understand the integrity of that company's approaches towards the various elements of renewable electricity procurement and consumption. **Integrity**, in this context, is a measure of the quality and credibility of those approaches. A full overview of the rating methodology for transparency and integrity of every indicator is presented in the *Annex*.

The approach of this analysis promotes transparency with the philosophy that consumers, regulators, shareholders, and other observers should be able to follow and assess the integrity of companies' claims. Accordingly, the company assessments in this section are based only on publicly available information that we could be identify. Each rating represents our understanding of the publicly available information. In some cases, company information was scattered across different sources (e.g. annual reports, press releases and statements, webpages, and other marketing materials).Although we asked the 10 companies to share relevant information with us and to review our assessments, It is possible that we may have misinterpreted or overlooked information. Companies should consider how to present information as transparently as possible, to ensure that observers are able to readily identify all the relevant information necessary to understand their climate strategies.

7 Tech and electronics

In this section, we present our assessment of the renewable electricity strategies of **Apple**, **Google**, **Microsoft**, **Samsung Electronics** and **TSMC**. Table 6 provides a summary of these companies' transparency and integrity rating. The methodology for our assessments can be found in the *Annex*.

Table 6: Overview of the transparency and integrity of renewable electricity strategies in the tech and electronics sector

OWN OPERATIONS RENEWABLE ELECTRICITY STRATEGY		TRANSPARENCY	INTEGRITY	
Google	24/7 carbon-free energy by 2030	Reasonable	Reasonable	p. 36
Apple	Maintain current 100% renewable electricity claim (annually matched)	Reasonable	Moderate	p. 34
Microsoft	24/7 carbon-free energy by 2030	Reasonable	Moderate	p. 39
TSMC	100% renewable electricity (annually matched) by 2040	Moderate	Shallow	p. 43
Samsung	100% renewable electricity (annually matched) by 2050	Moderate	Limited	p. 41

SUPPLY CHAIN RENEWABLE ELECTRICITY STRATEGY		TRANSPARENCY	INTEGRITY	
Apple	Transition supply chain to 100% RE by 2030	Moderate	Moderate	p. 34
TSMC	No target	Shallow	Shallow	p. 43
Google	Enable 5GW carbon-free energy in manufacturing regions by 2030	Shallow	Shallow	p. 36
Samsung	No target	Shallow	Shallow	p. 41
Microsoft	No target	Shallow	Limited	p. 39

5-point rating scale: High | Reasonable | Moderate | Shallow | Limited

Assessments were made based on public information identified by the authors. A poor rating may not necessarily be an indication that a company's renewable electricity strategy is weak but could also indicate that the information was insufficient to confirm good practice. Ambitious companies can improve their ratings by ensuring that all aspects of their renewable electricity strategies are transparently and accurately disclosed, and in the public domain.

Relevance of operational and supply chain energy and emissions

Operational, upstream and downstream emissions are all of particularly high relevance for emissions in the tech and electronics industries. Our analysis considers strategies for operational electricity use and electricity in the supply chain only, although some companies are developing innovative measures to address downstream electricity consumption at the product use phase.
Most major tech and electronics companies do not have a very significant volume of emissions from direct fuel consumption in their own operations; most energy consumption is in the form of electricity. The major sources of electricity consumption from the companies assessed include data centres and transmission networks, and manufacturing facilities for electronic devices and components.

Other relevant issues for climate change strategy

The assessment of major tech and electronics companies in this report considers only their renewable electricity procurement strategies. This does not necessarily correlate with the quality of companies' overall climate strategies; the Corporate Climate Responsibility Monitor considers companies climate strategies in more comprehensive terms, including other issues in addition to renewable electricity strategies, such as GHG emission reduction targets, energy efficiency measures, and the credibility of offsetting. In particular, the 2023 CCRM (Day *et al.*, 2023a) identified that contentious offsetting claims represented a key weakness in the overall strategy of companies from the sector, including Apple, Google and Microsoft. These broader issues are not reflected in the companies' assessments in this report, but are of critical importance for considering the overarching integrity of companies' climate strategies.

APPLE

	TRANSPARENCY	INTEGRITY
RENEWABLE ELECTRICITY STRATEGY FOR OWN OPERATIONS *Scope 1 & 2 emissions - Global*	Reasonable	Moderate
Disclosure of electricity-related data		
Electricity consumption disclosure	Electricity consumption reported and broken down to specific corporate locations and data centres. Renewable electricity share is reported only with annual matching.	
Scope 2 emissions disclosure	Disclosure of market-based and location-based emissions, but market-based method used for aggregated emissions.	
Claims and measures for renewable electricity today		
Claim	*100% renewable electricity for corporate operations since 2018.*	
Coverage	Claim covers all scope 2 emissions from electricity.	
Procurement means	Most renewable electricity is procured through long-term contracts with new, local RE installations, either through PPAs or utility programmes.	
Matching method	Apple matches its electricity consumption on an annual basis.	
Targets and measures for renewable energy in the future		
Targets	*Maintaining 100 percent renewable electricity for Apple facilities (no additional target beyond current claim).*	
Coverage and target year	Continuation of existing claim, which covers all scope 2 emissions from electricity.	
Procurement means	Continuation of existing approach (see above) with strong procurement measures.	
Matching method	Continuation of existing approach to match consumption on an annual basis. This has significant limitations, as competitors are moving towards 24/7 matching.	
Disclosure of advocacy for supportive policy frameworks		*not assessed*
Required policy framework	General description of required policy framework in some regions of operation, through Apple's website, social media, and sustainability reports.	*not assessed*
Advocacy efforts	Apple publish a detailed overview of advocacy efforts with a high-level indication of its positions. The complete publication of submissions could not be identified.	*not assessed*
RENEWABLE ELECTRICITY STRATEGY IN THE SUPPLY CHAIN *Upstream scope 3 emissions - Global (mostly Asia)*	Moderate	Moderate
Disclosure of electricity-related data		
Electricity consumption disclosure	Apple discloses information on its suppliers and renewable electricity consumption in the supply chain, but this is not contextualised with total electricity consumption figures.	
Targets and measures for renewable energy in the supply chain		
Targets	*To transition the entire supply chain to 100% renewable electricity by 2030.*	
Coverage and target year	Target only covers Apple's share of the suppliers' output. This has a high risk of contributing little or no additional RE capacity to the grids. The company uses the terms "clean" and "renewable" interchangeably, despite defining them differently.	
Procurement means	The "Supplier Clean Energy programme" is a multifaceted approach to supplier engagement, but Apple could place stronger demands on its major suppliers, some of which have made limited progress.	
Disclosure of advocacy for supportive policy frameworks in the supply chain		*not assessed*
Required policy framework	Apple's general description of required policy framework is equally relevant for its supply chain regions.	*not assessed*
Advocacy efforts	The published overview of advocacy efforts includes many interactions with governments and policy processes in supply chain regions. The complete publication of Apple's positions could not be identified.	*not assessed*

5-point rating scale: High | Reasonable | Moderate | Shallow | Limited

Transparency refers to the disclosure of information. **Integrity** refers to the quality and credibility of the approach.

Sources: *Authors' interpretation of identified public documentation from Apple Inc. (2019, 2021, 2022a, 2022b, 2023a, 2023b).*

Apple

Apple's claim to use 100% renewable electricity for its operations is transparently substantiated with relatively high-quality procurement constructs, but could be significantly improved through a commitment to 24/7 matching. The company's Supplier Clean Energy Programme include a compilation of complementary support measures for renewable electricity in the supply chain, although the extent of its impact and sufficiency remains unclear. The target to transition the supply chain to 100% renewable electricity by 2030 may be significantly undermined by its limited scope coverage, since it covers only the electricity from Apple's share of each suppliers' production.

Apple's claim to use 100% renewable electricity for its operations since 2018 is transparently substantiated with relatively high-quality procurement constructs. Apple transparently discloses a substantial amount of data on its own energy consumption and related scope 1 and 2 emissions. Renewable energy procurement constructs are explained for each major corporate location and data centre individually (Apple Inc., 2023b, p. 86). Overall, the company reports that 90% of its renewable electricity consumption is sourced from "Apple-created" projects. This includes Apple's own on-site generation, PPAs and utility green tariff programmes initiated in together with Apple, which involve long-term contracts for the delivery of renewable energy from a newly installed project managed by the utility on Apple's behalf (Apple Inc., 2023b, p. 20). Apple's own renewable energy-sourcing standards stipulate that these are only new and local projects. In locations where new renewable projects depend upon preferential rates or long-term contracts, the company's focus on these procurement constructs likely has a positive impact on decarbonising the local grid and – to some extent – Apple's own electricity consumption. Where such constructs are not available, Apple reports that it uses standalone RECs to match only a very small portion (3.5%) of its annual electricity consumption (Apple Inc., 2023b, p. 21).

Apple could further improve its renewable electricity procurement through a new target for 24/7-matched renewable electricity. Annual matching of renewable electricity entails significant limitations, since it does not require companies to address the core challenges of electricity sector decarbonisation, such as intermittency and seasonal capacity limitations. Apple acknowledges that it relies on fossil-fuelled electricity from the grid due to intermittency, and it explores renewable electricity storage to address this issue. Specifically, the company mentions the California Flats storage system, which can store up to 240 MWh of electricity in the grid that powers most of Apple's operations in California, USA (Apple Inc., 2023b, p. 21). Apple does not mention if it will invest in renewable electricity storage beyond its facilities in California. Moreover, the company does not commit to matching renewable electricity generation and consumption on an hourly, instead of annual, basis, although a 24/7 commitment could significantly improve the quality of its claims and procurement strategy. Some of Apple's major competitors are moving towards 24/7 commitments.

Apple provides a complementary package of measures to support suppliers towards the target to transition the supply chain to 100% renewable electricity by 2030. Apple's Supplier Clean Energy Programme combines several promising measures for supplier engagement such as mandatory reporting requirements, capacity building, direct investment and the establishment of funds to co-invest with suppliers and pool their resources for renewable electricity investments (Apple Inc., 2023b, p. 95) *(see Box 1 section A for further details)*. Apple discloses a complete list of its suppliers (Apple Inc., 2021) and the list of over 300 suppliers – which represent more than 90% of the company's manufacturing expenditure – that have made the renewable electricity commitment under its programme (Apple Inc., 2023b, p. 97). However, the company does not disclose data on electricity consumption and renewable shares through the supply chain, which would be necessary to evaluate progress towards the target, which appears to be very limited for some of Apple's major suppliers *(see Box 1, section A)*. Accordingly, it is not yet clear to what extent the Supplier Clean Energy Programme has the depth and conviction to significantly decarbonise the supply chain by 2030. This programme of support measures could be significantly strengthened if Apple were to exert its influence to place stronger *demands* on its major suppliers.

Targeting only Apple's share of suppliers' production limits the impact that the supply chain target may have on additional renewable capacity. The company's 2030 target to transition the supply chain to 100% renewable electricity only covers electricity from Apple's share of suppliers' production. This may significantly limit the impact of Apple's renewable electricity target for suppliers, since suppliers may reallocate the renewable portion of their electricity between contractors, and Apple could claim the renewable share while effectively shifting more emissions intensive electricity to other contractors. In some cases, for suppliers where Apple accounts for a minority of their output, the achievement of these targets may require the supplier to achieve only very shallow rates of renewable electricity consumption and may not require significant additional action. The supply chain target would be considerably stronger if Apple would aim for its suppliers to be operating on 100% renewable electricity, rather than just allocating the renewable part of its electricity mix to Apple output.

GOOGLE

	TRANSPARENCY	INTEGRITY
RENEWABLE ELECTRICITY STRATEGY FOR OWN OPERATIONS *Scope 1 & 2 emissions - Global (mostly U.S.)*	Reasonable	Reasonable
Disclosure of electricity-related data		
Electricity consumption disclosure	Detailed data on consumption and renewable electricity supply, including 24/7 matching data. Data is broken down to regions but not countries.	
Scope 2 emissions disclosure	Disclosure of market-based and location-based emissions, but market-based method used for aggregated emissions.	
Claims and measures for renewable electricity today		
Claim	*100% renewable electricity matching on an annual basis every year since 2017; 64% carbon-free energy in 2022.*	
Coverage	Covers all electricity across the company's operations but the difference between the two claims may not be easily understandable.	
Procurement means	Google reports to procure most of its electricity from PPAs on the local grid, but we could not identify specific details on individual procurement constructs.	
Matching method	Google's current claim matches consumption on an annual basis. This entails limitations which Google transparently discusses.	
Targets and measures for renewable energy in the future		
Targets	*Run on 24/7 carbon-free energy on every grid where we operate by 2030.*	
Coverage and target year	Covers all electricity across the company's operations. Inclusion of nuclear and fossil fuel with CCS in the target means that it is likely to be significantly less than 100% renewable energy.	
Procurement means	PPAs (either direct or through a "CFE manager" construct) on the local grid.	
Matching method	Google will match its consumption on a 24/7 (hourly) basis.	
Disclosure of advocacy for supportive policy frameworks		*not assessed*
Required policy framework	Detailed presentation of required regulatory policy in 2023 Sustainability Report and separate "Policy Roadmap" white paper.	*not assessed*
Advocacy efforts	Detailed presentation of advocacy efforts and public disclosure of comments submitted to consultation processes.	*not assessed*
RENEWABLE ELECTRICITY STRATEGY IN THE SUPPLY CHAIN *Upstream scope 3 emissions - Locations not disclosed*	Shallow	Shallow
Disclosure of electricity-related data		
Supply chain energy profile	Google discloses that key suppliers report on average 21% renewable electricity use, but no information could be found related to electricity consumption. Key suppliers and their locations are not disclosed.	
Targets and measures for renewable energy in the supply chain		
Targets	• *Long-term vision that all suppliers have access to reliable, cost-effective carbon-free energy.* • *Enable 5 GW of new carbon-free energy in key manufacturing regions by 2030.*	
Coverage and target year	Google set out a series of targets for the short and long-term, but these targets are either presented vaguely or refer to enabling measures rather than specific targets for RE outcomes.	
Procurement means	Google encourages suppliers to develop and report on their RE strategies. The company reports capacity building measures, but in rather vague terms.	
Disclosure of advocacy for supportive policy frameworks in the supply chain		*not assessed*
Required policy framework	Due to limited disclosure on the location of key suppliers, we cannot determine the relevance of Google's policy requests for RE in the supply chain.	*not assessed*
Advocacy efforts	Due to limited disclosure on the location of key suppliers, we cannot determine the relevance of Google's reported advocacy efforts for RE in the supply chain.	*not assessed*

5-point rating scale: High | Reasonable | Moderate | Shallow | Limited

Transparency refers to the disclosure of information. **Integrity** refers to the quality and credibility of the approach.

Sources: *Authors' interpretation of identified public documentation from Google (2016, 2020, 2021a, 2021b, 2022a, 2022b, 2023).*

Google

The high transparency of Google's renewable electricity strategy over the past decade has helped to drive collaborative exchange for the development of more meaningful and accessible renewable electricity procurement constructs. Google continues this leadership role through its commitment to 24/7 matching, although the extent to which the company's carbon-free energy target leads to improved outcomes for renewable electricity depends on the eventual role of nuclear and CCS. Google's plans for renewable electricity in the supply chain are far less developed and could be prioritised as a new frontier for Google to demonstrate climate leadership in the future.

Through its transparency, Google has been at the forefront of developing best practice for corporate renewable energy procurement for a decade. Since 2012, when the company first set a target for 100% renewable electricity, Google has been very transparent about its approaches and progress towards achieving its evolving targets. Over the past decade, Google has published a number of technical white papers to set out and discuss the limitations its own renewable electricity procurement approaches, its proposals for new ways forward, and the regulatory framework that would be conducive for advancing the agenda. This transparency has enabled Google – as well as other companies and stakeholders of the electricity supply system – to strive for higher quality corporate renewable electricity procurement constructs.

Google's claim to operate on 100% renewable electricity is based on high quality procurement constructs, but the company recognises the significant limitations of annual matching. Google claims to have operated on 100% renewable electricity on an annual matching basis every year since 2017 (Google, 2023, p. 42). Towards this claim, Google procures the majority of its renewable electricity through PPAs, mostly on the same grid as where the consumption takes place. Google's renewable electricity matching towards this claim is on an *annual* and *global* basis; in the few cases where it is not possible in specific geographies to establish PPAs on the local grid, Google accounts for the electricity through Virtual Power Purchase Agreements (VPPAs) in other countries (Google, 2023, pp. 43, 91, 93). The impact of global matching is contentious and the approach is not recognised by the GHG Protocol or RE100. However, we understand that Google's use of global matching is only for a minor share of its 100% renewable claim and only for countries where Google has not yet established higher quality procurement constructs . Still, it would be more transparent to report its metrics without global matching. Annual matching of renewable electricity is the standard approach under the GHG Protocol guidelines and other mainstreamed corporate renewable electricity standards, but the approach entails significant limitations, since it does not require companies to address the core challenges of electricity sector decarbonisation, such as intermittency and seasonal capacity limitations. Google clearly acknowledges the limitations of annual and global matching in its annual sustainability reports (Google, 2022b, 2023) as well as through its other technical white papers on renewable electricity (Google, 2016, 2020, 2021b, 2021a).

The extent to which Google's *24/7 carbon-free energy* target pushes the renewable energy agenda further depends on the eventual role of nuclear energy and CCS. Google's recognition of the significant limitations of annual matching, and its move towards 24/7 matching is highly commendable. 24/7 matching requires companies' strategies to go much further in addressing the core issues of grid decarbonisation, in particular the intermittency and seasonality of renewables. Illustrating the scale of this challenge, we understand from the data reported by Google that the contracted renewable energy that it procured towards its annual 100% renewable energy claim in 2022, contributed to only a modest proportion of the company's electricity consumption for many of its data centres when matched on an hourly basis within the same grid (Google, 2023, p. 43). For some of Google's larger data centres in the USA, Germany and Finland, the company's contracted renewable electricity appears to account for a majority of its electricity consumption on an hourly basis. However, for 27 out of 40 data centres listed, Google's contracted procurement appears to make zero contribution. These stark differences underline the major limitations of annual matching and the importance of the shift to local and hourly matching that Google has committed to. But there is also a significant caveat and uncertainty with Google's forward looking target: that it is no longer expressed as a renewable energy target but rather as "carbon-free energy", which may include nuclear generation and fossil fuel generation combined with CCS, including existing installations for these technologies on the grid (Google, 2021a). Overall, we understand from the data provided that Google's reported score of 64% time-matched "carbon-free energy" for 2022 is made up mostly from existing renewable energy and nuclear energy coming from the grid, for most of its data centres (Google, 2023, pp. 43, 93). Accordingly, it is unclear to what extent the new "carbon free energy" target will lead to improvements with regards to the deployment and use of renewable electricity, compared to the company's current approach. A 24/7 *renewable* electricity target would be far more ambitious and more constructive for the decarbonisation of the sector, given the significant uncertainties on the suitable role of nuclear and CCS for the future of the electricity generation sector. This is a critical moment for Google to re-affirm its leadership credentials, given the rate at which other companies and standards are likely to move towards the 24/7 matching approach in the near future.

Google's two different claims for renewable electricity consumption in 2022 may be confusing to many audiences, but the potential for transparency is limited by the fact that mainstreamed guidance for accounting metrics is not well suited to emerging best practice. Having two different definitions of renewable electricity and dual claims for 2022 – 100% renewable electricity on an annual matching basis and 64% carbon-free energy – may be considered an untransparent approach, since it is likely to confuse and potentially mislead some audiences. On the other hand, it would be difficult within the constraints of the presently mainstreamed guidance for renewable electricity accounting metrics (from GHG Protocol and RE100) for Google to present the positive nuances of its strategy in a more transparent way. GHG Protocol and RE100 do not distinguish between hourly and annual matching, or between standalone RECs and high quality PPAs. A metric for hourly-matched electricity is completely incomparable to a metric for annually matched electricity, just as a metric for electricity matched through high quality PPAs is incomparable to a metric for electricity matched through standalone RECs only. If Google were to report on their hourly matching metrics only, this would put them at a comparative disadvantage to companies that continue to report higher renewable electricity shares with the lower quality accounting approaches that are allowed under GHG Protocol and RE100, such as annual matching with standalone RECs. In this regard, the mainstreamed guidance of those initiatives is not well suited to emerging best practice and may even represent a significant disincentive for companies to advance to better accounting and procurement methods. As such, Google's dual claims may be untransparent for some audiences, but it is commendable that the company strives for higher quality approaches despite the barriers that it faces in doing so.

Google's plans for renewable electricity in the supply chain are far less developed and could represent a new frontier for Google to demonstrate climate leadership in the future. We could not identify any public information on who Google's major suppliers are, their location or their energy consumption profiles. Google reports that - of the companies that participated in Google's survey of its direct suppliers – the average company uses 21% renewable electricity (Google, 2022a, p. 37). The significance of this information is unclear without any contextual information on the suppliers' location, or their approaches to procuring and accounting for renewable electricity. Google reports a number of initiatives to support suppliers with renewable electricity procurement, and some goals for the current reporting year (Google, 2022a, p. 46), but the presentation of these initiatives and goals is in rather ambiguous terms and their overall significance is unclear. Most of the initiatives amount to enabling measures, while we could not identify any concrete *requirements* for suppliers or outcome-specific targets for the realisation of renewable electricity use. Given the relevance of renewable electricity in the supply chain within this sector, and given Google's acquired experience and expertise in renewable electricity procurement in regions worldwide, this remains a significant gap in Google's strategy, and could be embraced as a new frontier for Google to continue demonstrating climate leadership in the future.

MICROSOFT

	TRANSPARENCY	INTEGRITY
RENEWABLE ELECTRICITY STRATEGY FOR OWN OPERATIONS *Scope 1 & 2 emissions - North America (also Asia, Europe, Middle East, Africa and Latin America)*	Reasonable	Moderate
Disclosure of electricity-related data		
Electricity consumption disclosure	Detailed data on consumption and renewable electricity supply, but no 24/7 matching data. Data broken down to specific grids.	
Scope 2 emissions disclosure	Disclosure of market-based and location-based emissions, but market-based method used for aggregated emissions.	
Claims and measures for renewable electricity today		
Claim	*100% renewable electricity and 62% "direct renewable electricity".*	
Coverage	Covers all electricity across the company's operations but the difference between the two claims is not immediately clear.	
Procurement means	PPAs and standalone RECs each accounted for approximately half of renewable electricity consumption in 2022	
Matching method	Microsoft's current claim matches consumption on an annual basis. This entails limitations which Microsoft transparently discusses.	
Targets and measures for renewable energy in the future		
Targets	*100% renewable electricity on annual basis by 2025 and 24/7 carbon-free energy by 2030.*	
Coverage and target year	2030 target year may be 1.5 °C compatible, but inclusion of nuclear in the target means that it is likely to be significantly less than 100% renewable energy.	
Procurement means	Mix of new PPAs, PPAs with existing installations, long-term utility contracts and clean energy on the grid.	
Matching method	Microsoft will match its consumption on a 24/7 (hourly) basis.	
Disclosure of advocacy for supportive policy frameworks		*not assessed*
Required policy framework	Presentation of required regulatory policy in 2022 Sustainability Report and separate "Electricity Policy" brief.	*not assessed*
Advocacy efforts	Reference to advocacy efforts and support for legislatory changes in the US and Europe in the 2022 Sustainability Report	*not assessed*
RENEWABLE ELECTRICITY STRATEGY IN THE SUPPLY CHAIN *Upstream scope 3 emissions - East Asia*	Shallow	Limited
Disclosure of electricity-related data		
Supply chain energy profile	Disclosure of scope 3 emissions and key suppliers and their locations but no details on suppliers' electricity consumption.	
Targets and measures for renewable energy in the supply chain		
Targets	*Commitment to reduce scope 3 emissions by 55% by 2030, but no separate target for renewable electricity.*	
Coverage and target year	No separate target for renewables in the supply chain.	
Procurement means	Capacity building measures and requirement to set emission reduction targets, but unclear how exactly Microsoft supports renewables in the supply chain.	
Disclosure of advocacy for supportive policy frameworks in the supply chain		*not assessed*
Required policy framework	We identified limited detail on required policies in key manufacturing countries	*not assessed*
Advocacy efforts	We identified limited detail on advocacy efforts in key manufacturing countries	*not assessed*

5-point rating scale: High | Reasonable | Moderate | Shallow | Limited

Transparency refers to the disclosure of information. **Integrity** refers to the quality and credibility of the approach.

Sources: *Authors' interpretation of identified public documentation from Microsoft (2022a, 2022b, 2022c, 2023a, 2023b, 2023c), Constellation (2023) and Helion (2023).*

Microsoft

Although Microsoft currently purchases standalone RECs to cover half of its annual electricity consumption, the company is expanding its investments in PPAs and commits to match all its electricity consumption with zero carbon energy on an hourly basis by 2030. However, it is unclear to what extent Microsoft's 24/7 commitment will drive investments in new renewables, as the company plans to rely to an undefined extent on nuclear power and contracts with existing installations.

Microsoft commits to 100% renewable energy by 2025 and is expanding its PPA portfolio to achieve this target (Microsoft, 2023b, p. 12). We understand this target to depend on the use of PPAs, other long-term energy contracts and renewable energy on the grid, but to exclude use of standalone RECs independently of these constructs (Microsoft, 2023a, p. 13). This target is an improvement on today's claims that the company procures "100% renewable electricity", which is based on about 50% standalone RECs and 50% PPAs located mostly on the same grid as consumption (Microsoft, 2022a, pp. 30–42). Microsoft's also claims that its "direct renewable electricity" consumption was at 62% in 2022 (Microsoft, 2023a, p. 6). This number is based on PPAs, other long-term energy contracts, and the grid mix, but excluding standalone RECs. The use of different claims can be confusing to consumers and observers, who do not immediately understand the difference between them. However, it is difficult within the constraints of the presently mainstreamed guidance for renewable electricity accounting metrics (from GHG Protocol and RE100) for Microsoft to present the positive nuances of its strategy in a more transparent way; GHG Protocol and RE100 do not distinguish between standalone RECs and high quality PPAs for renewable electricity shares, although renewable energy shares delivered through these procurement models are not comparable to one another *(see also Google's dual targets on p36)*.

Microsoft's 2030 commitment to zero carbon electricity around the clock depends in part on nuclear power and may therefore not necessarily require Microsoft to go beyond its target of 100% renewable electricity by 2025. By 2030, the tech giant plans to match all of its electricity consumption by CFE purchases 100% of the time (Microsoft, 2023b, p. 12).This target does not necessarily require Microsoft to invest in more renewable energy than for its 2025 target, as CFE includes nuclear and fossil fuels with CCS. Indeed, Microsoft has recently signed agreements with existing nuclear plant operators in the USA and Canada to purchase RECs on an hourly basis (Microsoft, 2022c; Constellation, 2023) and signed a PPA for a fusion power plant that is scheduled to start operating in 2028 (Helion, 2023). Buying RECs from existing nuclear power plants does not drive the development of *additional* zero-carbon energy capacity but rather displaces the more carbon-intensive electricity on the grid to other consumers. It is unclear what share of its electricity consumption Microsoft plans to match with nuclear energy and what share with renewables. A clarification on this is necessary to understand whether Microsoft's CFE commitment would require the company to go beyond its target of 100% renewable electricity by 2025 and continue to invest in new renewable capacity.

Microsoft has not set a renewable electricity target for its supply chain. Microsoft committed to reduce its scope 3 emissions by 55% by 2030 and asks its suppliers to set emission reduction targets (Microsoft, 2023c, p. 37). Microsoft states that reducing its scope 3 emissions requires "unprecedented scaling of corporate clean energy purchases across [the] value chain" (Microsoft, 2023b, p. 14) and says that suppliers should "commit to implementing carbon reduction initiatives, such as switching to renewable energy" (Microsoft, 2023c, p. 37). Despite this, Microsoft has not yet set a renewable electricity target for its value chain, which would send a strong signal to its suppliers and policy makers.

Microsoft provides details on its advocacy efforts for better renewable electricity regulation. The tech company published a policy brief, outlining focus points for advocacy efforts, including accelerating the transition to clean electricity generation, and improving grid infrastructure (Microsoft, 2022b, p. 3). The company claims to be supporting such efforts at both the national and state level (Microsoft, 2023b, p. 72). Microsoft also supported the adoption of disclosure regulation in the USA and the EU (Microsoft, 2023b, p. 72). We could not identify advocacy efforts for policy in Asia, where many of Microsoft's suppliers are located. Given that corporates face difficulties in procuring renewable electricity on many Asian markets (RE100, 2020),it is critical that influential corporates engage with policymakers.

SAMSUNG ELECTRONICS

		TRANSPARENCY	INTEGRITY
RENEWABLE ELECTRICITY STRATEGY FOR OWN OPERATIONS *Scope 1 & 2 emissions - Global (mostly South Korea)*		Moderate	Limited
Disclosure of electricity-related data			
Electricity consumption disclosure	Aggregated electricity consumption is publicly reported but breakdowns to regions are only available from CDP responses.		
Scope 2 emissions disclosure	Disclosure of market-based and location-based emissions, but market-based method used for aggregated emissions.		
Claims and measures for renewable electricity today			
Claim	*"Completed the transition to 100% renewable electricity use" in several countries.*		
Coverage	The headline claim relates to countries that only account for a very minor share of Samsung's electricity consumption. Progress in South Korea remains very limited.		
Procurement means	Standalone RECs are the main procurement instrument and used in all regions; PPAs and self-generation only account for a minor share.		
Matching method	Samsung does not disclose the vintage of the certificates that it procures.		?
Targets and measures for renewable energy in the future			
Targets	*Achieve the transition to renewable energy for electricity use by 2050.*		
Coverage and target year	Target year is not aligned with 1.5 °C compatible pathways for electricity sector decarbonisation.		
Procurement means	Samsung alludes to plans for on-site RE generation in Korea and PPAs in countries where the construct is available, but no specific details or commitments identified.		?
Matching method	Samsung does not specify the accounting method or time period over which it will match its electricity consumption.		?
Disclosure of advocacy for supportive policy frameworks			*not assessed*
Required policy framework	Samsung implies that it faces supply-side challenges in some regions, including Korea, but provides no details on these challenges or requirements.		*not assessed*
Advocacy efforts	Samsung reports its membership of relevant coalitions and initiatives but without any details on specific demands or actions.		*not assessed*
RENEWABLE ELECTRICITY STRATEGY IN THE SUPPLY CHAIN *Upstream scope 3 emissions - Mostly Asia*		Shallow	Limited
Disclosure of electricity-related data			
Supply chain energy profile	Upstream scope 3 emissions are disclosed, and major suppliers are listed, but no data identified for electricity consumption in the supply chain.		
Targets and measures for renewable energy in the supply chain			
Targets	*No target identified to increase renewable electricity and/or address related GHG emissions from electricity in the supply chain.*		
Coverage and target year	N/A		
Procurement means	Samsung alludes to capacity building measures for tracking GHG emissions, setting targets and defining reduction strategies. Detail is insufficient to assess significance.		?
Disclosure of advocacy for supportive policy frameworks in the supply chain			*not assessed*
Required policy framework	No information disclosed.		*not assessed*
Advocacy efforts	Samsung reports its membership of relevant coalitions and initiatives but without any details on specific demands or actions.		*not assessed*

5-point rating scale: High | Reasonable | Moderate | Shallow | Limited

Transparency refers to the disclosure of information. **Integrity** refers to the quality and credibility of the approach.

Sources: *Authors' interpretation of identified public documentation from Samsung Electronics (2023).*

Samsung Electronics

Samsung Electronics Co., Ltd. (Samsung) has improved its engagement with the topic of renewable energy in recent years. However, contrary to the impression given by the claim that it has "completed the energy transition" in several regions – its strategy remains at a relatively early stage of maturity. Samsung's 2050 target year for achieving 100% renewable electricity is not sufficiently ambitious to align with 1.5 °C compatible trajectories for the power sector, and the company relies on renewable electricity procurement constructs with likely limited impact. The company could be more transparent about the limitations it faces in procuring renewable electricity in key regions, and its advocacy plans to address that.

Samsung's claims to have completed the transition to renewable electricity in several countries may give a misleading impression on the slow pace of overall progress towards relatively unambitious targets. Samsung's 2023 Sustainability Report and the accompanying press release make several references to the company having completed the transition to 100% renewable energy use in specific divisions and countries including the USA, Vietnam, India, Brazil, Hungary, Slovakia and Poland (Samsung Electronics, 2023, p. 22). Although these claims imply in rather absolute terms that this emission source has been comprehensively addressed, we consider that Samsung's renewable electricity procurement strategy is still in a stage of relative infancy compared to some of its industry competitors, and that much can be done to improve the significance of the company's renewable energy procurement and effectively reduce its electricity-related emissions. Overall, the company reports that just 31% of its electricity was derived from renewable sources in 2022 (Samsung Electronics, 2023, p. 108). This is a significant increase from approximately 20% in 2021, but Samsung is a relative latecomer to the issue of renewable energy procurement, and overall progress is hampered by limited progress in South Korea, where we understand that the regulatory environment for corporate RE procurement presents significant challenges. The company has not advanced on its relatively unambitious target year of 2050 for 100% renewable energy (Samsung Electronics, 2023, p. 15). This target year falls considerably short of the necessary level of ambition to align with 1.5 °C compatible trajectories for the power sector. The International Energy Agency indicates that this would require net zero emissions from the power sector by 2035 for advanced economies, by 2040 for China, and by 2045 for the rest of the world (IEA, 2023).

Samsung's renewable electricity claims and targets are also undermined by low-quality procurement constructs. The majority of its renewable energy procurement comes from the purchase of low-impact renewable energy certificates, even in geographies where much higher quality procurement constructs are possible. With its heavy use of standalone RECs and its annual-matching accounting method, Samsung's approach is far less likely to lead to meaningful emission reductions than companies that have moved onto higher quality PPAs and those that are moving towards a 24/7 accounting method. Samsung says that it intends to expand its use of PPAs (Samsung Electronics, 2023, p. 17), but it does not imply that there are any limitations with current procurement constructs, nor that the company will exclusively pursue higher quality constructs moving forwards.

The company could be more transparent and proactive about the regulatory challenges it faces in specific regions. Samsung faces considerable challenges to implement effective measures to decarbonise its electricity due to the lack of conducive regulatory frameworks for high quality renewable energy procurement in some of the countries that it operates, such as in South Korea. But a transparent recognition of the limitations that the company faces to implement more meaningful measures, and its advocacy measures to overcome this, would be more constructive than absolute assertions that the transition to renewable energy is complete. Samsung does not disclose any details or demands regarding the regulatory framework that it would need to improve its renewable electricity procurement. Samsung reports its membership of industry initiatives such as the Asia Clean Energy Coalition and the Semiconductor Climate Consortium (Samsung Electronics, 2023, p. 15), but with limited information on the requirements or demands of these coalitions towards regulators. At this stage, active engagement and advocacy should be of key importance for companies like Samsung, given the policy and market limitations that the company faces to improve on the significant misalignment between its targets and Paris compatible pathways for the sector.
Samsung reports some measures to support suppliers' renewable electricity procurement, but it offers insufficient information to assess these plans. Samsung Electronics reports capacity building support measures for suppliers' renewable electricity transition, and that it launched a GHG emission reduction system for its supply chain in 2022 (Samsung Electronics, 2023, pp. 16, 24). But the level of detail on these measures is insufficient to understand the meaning or significance of those measures. We could not identify any published data on electricity consumption in the supply chain, nor concrete plans or targets for renewable electricity in the supply chain.

TSMC

	TRANSPARENCY	INTEGRITY
RENEWABLE ELECTRICITY STRATEGY FOR OWN OPERATIONS *Scope 1 & 2 emissions - Taiwan, North America, Europe, Japan, China, South Korea*	Moderate	Shallow
Disclosure of electricity-related data		
Electricity consumption disclosure	Aggregated electricity consumption is publicly reported but breakdowns to regions are only available from CDP responses.	
Scope 2 emissions disclosure	Disclosure of market-based and location-based emissions, but market-based method used for aggregated emissions.	
Claims and measures for renewable electricity today		
Claim	*>10% renewable energy share in total power consumption and zero carbon emissions from power consumption in overseas.*	
Coverage	TSMC claims only a 10.4% renewable electricity share. The zero carbon emission claim for overseas subsidiaries has limited significance since Taiwan represents 94% of total energy consumption.	
Procurement means	Current claim is mostly based on RE in overseas subsidiaries, where TSMC relies on standalone RECs. A small portion of electricity for Taiwan derives from PPAs, but details are unclear.	
Matching method	TSMC matches its electricity consumption on an annual basis.	
Targets and measures for renewable energy in the future		
Targets	*60% renewable energy company-wide by 2030 and 100% renewable energy by 2040.*	
Coverage and target year	Trajectory and target year may be aligned with 1.5°C-compatible pathways for electricity sector decarbonisation.	
Procurement means	Plans are not disclosed, but 2.9 GW of PPAs signed by 2022 may deliver at least a minor proportion of the company's 2030 renewable target.	?
Matching method	TSMC continues to match its electricity consumption on an annual basis.	
Disclosure of advocacy for supportive policy frameworks		*not assessed*
Required policy framework	No information identified.	*not assessed*
Advocacy efforts	TSMC reports having made recommendations to the government to speed up renewable energy development in Taiwan, but no public details on the contents of these recommendations could be found.	*not assessed*
RENEWABLE ELECTRICITY STRATEGY IN THE SUPPLY CHAIN *Upstream scope 3 emissions - Taiwan, USA, Europe, South Korea, Japan, China*	Shallow	Shallow
Disclosure of electricity-related data		
Supply chain energy profile	Upstream scope 3 emissions are dislosed, and major suppliers are listed, but no data identified for electricity consumption in the supply chain.	
Targets and measures for renewable energy in the supply chain		
Targets	• *No explicit supply chain renewable electricity target* • *Net zero emissions by 2050 target implicitly covers supply chain electricity*	
Coverage and target year	No details on what the 2050 net zero target means for supply chain electricity; roadmap does not envisage reducing 2020 emission levels until after 2030.	
Procurement means	GHG emission disclosure requirements for suppliers since 2021. Collective RE procurement programme for suppliers started in 2023.	
Disclosure of advocacy for supportive policy frameworks in the supply chain		*not assessed*
Required policy framework	No information identified.	*not assessed*
Advocacy efforts	TSMC reports having made recommendations to the government to speed up renewable energy development in Taiwan, but no public details on the contents of these recommendations could be found.	*not assessed*

5-point rating scale: High | Reasonable | Moderate | Shallow | Limited

Transparency refers to the disclosure of information. **Integrity** refers to the quality and credibility of the approach.

Sources: *Authors' interpretation of identified public documentation from TSMC (2020, 2021, 2023a, 2023b, 2023c, 2023d).*

TSMC

Taiwan Semiconductor Manufacturing Company Ltd. (TSMC) is positioning itself as an emerging leader for renewable electricity in the Taiwanese context, having significantly stepped up its efforts in recent years. While the company achieved very little with regards to renewable electricity procurement up to 2020, TSMC is now demonstrating promising first steps with regards to both the procurement of its own electricity and the implementation of support measures for suppliers. Explicit supply chain targets could significantly strengthen the supply chain strategy.

TSMC's progress on renewable electricity to date has been slow and based mostly on lower quality procurement constructs. TSMC reports that 10.4% of its electricity consumption in 2022 derived from renewable sources (TSMC, 2023a, p. 228). In Taiwan – which accounted for 94% of the company's electricity use in 2022 – we deduct that only 5% of TSMC's consumption in Taiwan was matched to renewable electricity generation in 2022, up from 0% in 2019 (TSMC, 2023a, p. 100). TSMC's overall claim of 10.4% renewable electricity consumption stems mostly from its parallel claim that its international subsidiaries – which account for 6% of TSMC's overall electricity consumption – operate on 100% renewable electricity. This claim is based on the purchase of standalone RECs (TSMC, 2023a, p. 100), in markets where the purchase of such certificates alone has very little impact, and where higher-quality constructs are available. Overall, this amounts to quite a lack of meaningful progress with regards to renewable electricity procurement to date.

Since 2020, TSMC appears to have considerably stepped up its renewable energy agenda. TSMC became the first semiconductor company in the world to commit to 100% renewable electricity when it joined the RE100 initiative in 2020 (TSMC, 2020). In the same year, it signed the world's largest PPA for the development of offshore wind in Taiwan (Ørsted, 2020). With these developments, TSMC quickly became recognised as an emerging force of potential leadership for corporate renewable electricity in Taiwan, a country characterised as having a particularly challenging regulatory framework for corporate renewable electricity procurement (Chung-Hua Institution for Economic Research, 2022). By 2022, the company had signed PPAs for a total of 2.9 GW of renewable electricity generation capacity (TSMC, 2023a, p. 100). Although specific details on these PPAs are lacking, it is reasonable to assume that they may deliver around 6,000-8,000 GWh of electricity each year once they come online. This may be equivalent to around one third of TSMCs electricity consumption in Taiwan in 2022. However, the significance of this must be considered in the context that the company's electricity consumption continues to increase at a high rate - on average 13% per year between 2020 and 2022 (TSMC, 2023a, p. 228). While still relatively modest, these PPAs represent a significant step forwards compared to the company's relative lack of progress two years earlier. It is also commendable that TSMC has started to pursue higher quality procurement constructs in the form of PPAs, despite the challenges associated with renewable electricity procurement in Taiwan, where PPAs are considerably more costly and bureaucratic to establish in comparison to some other markets (Chung-Hua Institution for Economic Research, 2022).

TSMC's has substantiated its new renewable electricity agenda through improved targets. In September 2023, TSMC announced new and improved targets for renewable electricity procurement. The new targets to reach 60% renewable electricity consumption by 2030 and 100% by 2040 (TSMC, 2023b) may be aligned with 1.5 °C compatible trajectories for the power sector, according to the International Energy Agency's power sector decarbonisation benchmarks for non-OECD countries (IEA, 2023); the International Energy Agency indicates that this would require net zero emissions from the power sector by 2035 for advanced economies, by 2040 for China, and by 2045 for the rest of the world (IEA, 2023). These new targets are significantly more ambitious than the company's previous targets to achieve a 40% renewable share by 2030 and 100% by 2050. But the lack of clarity on how TSMC plans to achieve these targets remains a caveat. If TSMC would confirm that it plans to meet its targets through high quality procurement constructs – scaling up the company's recent efforts to establish PPAs – this would confirm a step change in ambition for TSMCs renewable electricity procurement strategy.

Promising measures for renewable electricity in the supply chain are undermined by a lack of supply chain targets. Since 2021, TSMC has implemented a number of measures to support renewable electricity in the supply chain. The company implemented capacity building measures and reporting requirements, including requiring its suppliers to track and disclose their energy consumption (TSMC, 2021, p. 4), as well as to disclose energy plans for major new manufacturing facilities. In 2023, TSMC established a model for collaborative renewable electricity procurement with suppliers, by signing an aggregated PPA in Taiwan with ARK Power (HPC Wire, 2023; TSMC, 2023c). This model may lower the barrier for suppliers to procure renewable electricity through PPAs, which are reportedly complicated and costly to establish in the Taiwanese context *(see Box 2 Section A6 for further details)*. While these promising measures may represent an example of good practice supply chain engagement in a complex regulatory environment, TSMC's supply chain strategy can be significantly strengthened by providing clarity on how this may be scaled up. TSMC states that it will continue to pursue the joint procurement model in the future, although details are limited. TSMC has not set a clear target to transition its supply chain to renewable electricity, although it sets the aspiration to have a "zero-carbon semiconductor supply chain" by an unspecified date (HPC Wire, 2023), and electricity in the supply chain is implicitly covered by the company's 2050 net zero emission target.

8 Fashion

In this section, we present our assessment of the renewable electricity strategies of **Gap**, **H&M Group**, **Inditex**, **lululemon** and **Nike**. Table 7 provides a summary of these companies' transparency and integrity rating. The methodology for our assessments can be found in the *Annex*.

Table 7: Overview of the transparency and integrity of renewable electricity strategies in the fashion sector

OWN OPERATIONS RENEWABLE ELECTRICITY STRATEGY		TRANSPARENCY	INTEGRITY	
NIKE	100% renewable electricity (annually matched) by 2025	◐	◐	p. 55
GAP	100% renewable electricity (annually matched) by 2030	◐	◐	p. 47
H&M	100% renewable electricity (annually matched) by 2030	◐	◔	p. 49
lululemon	Maintain current 100% renewable electricity claim (annually matched)	◐	◔	p. 53
INDITEX	Maintain current 100% renewable electricity claim (annually matched)	◔	◔	p. 51
SUPPLY CHAIN RENEWABLE ELECTRICITY STRATEGY		TRANSPARENCY	INTEGRITY	
H&M	100% renewable electricity in the supply chain by 2030	◐	◔	p. 49
NIKE	No target	◔	◔	p. 55
lululemon	No target	◔	◔	p. 53
INDITEX	No target	◔	◔	p. 51
GAP	No target	◔	◌	p. 47

5-point rating scale: High | Reasonable | Moderate | Shallow | Limited

Assessments were made based on public information identified by the authors. A poor rating may not necessarily be an indication that a company's renewable electricity strategy is weak but could also indicate that the information was insufficient to confirm good practice. Ambitious companies can improve their ratings by ensuring that all aspects of their renewable electricity strategies are transparently and accurately disclosed, and in the public domain

Relevance of operational and supply chain energy and emissions

Our analysis considers strategies for both operational electricity use and electricity in the supply chain. **Supply chain emissions** associated with the production of materials and products (scope 3 category 1) account for about 80% of fashion brands' total GHG footprint (Ley *et al.*, 2021). **Operational emissions** associated with procured energy (scope 2 emissions) account for account for just 3% of the GHG footprint of fashion companies on average (Ley *et al.*, 2021). But while the supply chain is by far the most significant contributor to GHG emissions for the fashion sector, major fashion companies' own operational renewable electricity strategies are also relevant for the signal that they send to their suppliers, and to other companies.

Downstream emissions, mostly from the use of products (scope 3 category 11) also account for a highly significant proportion of *some* companies' reported emission footprints. Methodologies for calculating downstream emissions for the fashion sector are broadly inconsistent, depending on whether companies account for indirect product use-phase emissions, such as emissions associated with the use of washing machines for washing clothes sold. We do not consider downstream energy and emissions in this analysis.

Major energy demand sources

The rate of electrification is still low for some of the major energy demand sources in the fashion sector. Direct fuel consumption is used for various processes in garment production, including **textile production**, **spinning and weaving**, **dyeing and printing** and **garment assembly**, although these processes can be electrified in modern manufacturing facilities.

Accordingly, we consider the coverage of companies' renewable electricity commitments to be of shallow integrity at best, if they are not accompanied by plans for the electrification of garment production processes, where feasible *(see Methodology in the Annex)*.

In particular, the use of **bioenergy** as an alternative fuel to claim renewable energy in the supply chain is an especially contentious issue. Although biomass and natural gas are currently viable alternatives to replace coal in thermal processes, neither is considered a suitable long-term solution for decarbonisation. Biomass comes with significant sustainability concerns such as deforestation, food insecurity, and the release of sequestered carbon into the atmosphere. Sustainable biomass has limited potential and should be reserved for sectors without viable alternatives to fossil fuel combustion. The fashion sector, on the other hand, has alternative options available and should transition to zero-carbon alternatives, such as green hydrogen and concentrated solar power (Ley *et al.*, 2021).

Other relevant issues for climate change strategy

The assessment of major fashion companies in this report considers only their renewable electricity procurement strategies. This does not necessarily correlate with the quality of companies' overall climate strategies; the Corporate Climate Responsibility Monitor (Day *et al.*, 2023a) considers companies climate strategies in more comprehensive terms, including other issues, such as GHG emission reduction targets, energy efficiency measures, and the credibility of offsetting. In particular, the 2023 CCRM identified that the fast fashion business model and a reluctance to present measures to improve the quality and longevity of products represented a key weakness in the overall strategy of companies from the sector, including H&M Group and Inditex. These broader issues are not reflected in the companies' assessments in this report, but are of critical importance for considering the overarching integrity of companies' climate strategies.

GAP

		TRANSPARENCY	INTEGRITY
RENEWABLE ELECTRICITY STRATEGY FOR OWN OPERATIONS *Scope 1 & 2 emissions - USA, Europe, East Asia*		Moderate	Moderate
Disclosure of electricity-related data			
Electricity consumption disclosure	Aggregated electricity consumption is publicly reported but breakdowns to regions are only available from CDP responses.		
Scope 2 emissions disclosure	Disclosure of market-based and location-based emissions, but market-based method used for aggregated emissions		
Claims and measures for renewable electricity today			
Claim	*36% (or 57%) of electricity for company-operated facilities was renewable in 2022.*		
Coverage	Reported RE shares are inconsistent between sources. A 36% share would not necessarily be ambitious in GAP's main operational locations.		?
Procurement means	Three PPAs for new installations in the USA account for all renewable electricity consumption.		
Matching method	GAP matches its electricity consumption on an annual basis.		
Targets and measures for renewable energy in the future			
Targets	*100% renewable electricity for company-operated facilities by 2030.*		
Coverage and target year	Target covers all electricity consumption and target year is in line with benchmarks for decarbonising the power sector.		
Procurement means	Existing PPAs will be relevant towards delivery of the future target, but GAP is non-comittal regarding future procurement constructs.		
Matching method	GAP matches its electricity consumption on an annual basis.		
Disclosure of advocacy for supportive policy frameworks			*not assessed*
Required policy framework	No clear statement of required policies identified.		*not assessed*
Advocacy efforts	Reference to advocacy efforts and support for legislatory changes in the USA but no further details identified.		*not assessed*
RENEWABLE ELECTRICITY STRATEGY IN THE SUPPLY CHAIN *Upstream scope 3 emissions - Mostly Asia*		Shallow	Limited
Disclosure of electricity-related data			
Supply chain energy profile	Presentation of key suppliers but no details on their energy consumption identified.		
Targets and measures for renewable energy in the supply chain			
Targets	*No target for renewable electricity in the supply chain identified. Other relevant targets:* • *Reduce emissions from purchased goods and services by 30% from a 2017 baseline* • *Achieve net-zero across the value chain by 2050*		
Coverage and target year	*No details on what the 2050 net zero target means for supply chain electricity.*		
Support measures	Reference to PPAs for suppliers and capacity-building programmes but no further details identified.		
Disclosure of advocacy for supportive policy frameworks in the supply chain			*not assessed*
Required policy framework	Reference to barriers to procuring renewable electricitiy in supplier countries.		*not assessed*
Advocacy efforts	Reference to a call made to the Vietnam government to simplify and expand access to renewable electricity.		*not assessed*

5-point rating scale: High | Reasonable | Moderate | Shallow | Limited

Transparency refers to the disclosure of information. **Integrity** refers to the quality and credibility of the approach.

Sources: *Authors' interpretation of identified public documentation from Gap (2022, 2023a, 2023b, 2023c) and Clean Energy Investment Accelerator (2021a)*

Gap

Gap procures renewable electricity through high quality constructs, but the coverage of its procurement is unclear and we cannot identify clear details on plans to achieve 100% renewable electricity in own operations by 2030. Despite the significance of electricity use in the supply chain, Gap has not set a renewable electricity or emission reduction target for scope 3.

Gap's renewable electricity consumption is based on high quality PPAs, but it is not clear what proportion of electricity consumption these cover. Over 80% of Gap's electricity consumption for own operations took place in the USA, with Canada, Japan and China jointly accounting for about 15% (Gap, 2023a, pp. 48–51). We identified inconsistencies in the renewable electricity shares reported by Gap in 2022, which we have not been able to understand; in its ESG Data Sheet and CDP disclosure we identified 36%, 55% and 57% renewable electricity shares for 2022 (Gap, 2023a, 2023b). The company signed VPPAs for new solar and wind installations in North Dakota and North Carolina and installed solar array on its distribution centre in California (Gap, 2023a, p. 12). It is commendable that Gap focuses its procurement efforts on high quality and new renewable electricity installation, instead of procuring standalone RECs and claiming to consume 100% renewable electricity already today, but a 36% share would indicate rather shallow progress in the context of Gap's operational locations; over half of the electricity generated in California was renewable in 2022 (California Energy Commission, 2023)

It remains unclear what Gap's renewable electricity strategy moving forwards is. Gap committed to consume 100% renewable electricity in its operations by 2030 (Gap, 2022, p. 10) but we could not identify a clear plan on how to reach this target. In its 2022 Sustainability Report, Gap provides that it "continues to explore additional renewable electricity projects and VPPAs" but also that "changes in international markets […] increased the price and decreased the availability of these opportunities" (Gap, 2022, p. 45). This suggests that Gap faces difficulties in securing additional renewable electricity and may not have a clear strategy to 2030. In its 2023 CDP disclosure, the company also mentions RECs as a procurement option (Gap, 2023a, p. 13). This would be a step back from the company's current approach, as standalone RECs are extremely unlikely to support additional renewable energy capacity and decarbonisation of the grid in many regions (Mulder and Zomer, 2016; Brander *et al.*, 2018; Bjørn *et al.*, 2022).

Gap has not set renewable electricity targets for its suppliers, but it presents some plans to increase renewable energy in the supply chain, albeit with limited detail. While purchased goods and services account for over 70% of Gap's full value chain emissions (Gap, 2023b), we could not identify any quantitative estimates on suppliers' electricity consumption. Gap has also not set a renewable electricity target for its supply chain, although its net zero target for 2050 will require that its suppliers shift away from fossil fuels. Gap presents some measures to increase renewable electricity consumption in the supply chain, including engagement with suppliers and investments in PPAs (Gap, 2022, pp. 44–45), but we were unable to identify the scale and significance of these measures.

Gap mentions some barriers to sourcing renewable electricity in manufacturing countries but it is unclear whether and to what extent the fashion company advocates with policymakers for changes to regulatory frameworks. The majority of Gap's Tier 1 suppliers (about 80% by count) are based in China, India, Sri Lanka, Vietnam, Indonesia, Cambodia, and Bangladesh (Gap, 2023c). In many of these countries, regulatory barriers hinder corporates to source renewable electricity (RE100, 2020). Indeed, Gap states that it faces challenges in procuring renewable electricity for suppliers in Vietnam, because of prohibitive costs of PPAs; and in India, because every state has different legal models around renewable electricity procurement (Gap, 2022, p. 45). Gap has publicly called on the Vietnam government to prioritise clean energy investments and deployment (Clean Energy Investment Accelerator, 2021a) but we could not identify whether Gap systematically engages with policy makers in manufacturing countries.

H&M GROUP

	TRANSPARENCY	INTEGRITY
RENEWABLE ELECTRICITY STRATEGY FOR OWN OPERATIONS *Scope 1 & 2 emissions - Nordics, western Europe, eastern Europe, southern Europe, North & South America, Asia, Oceania & Africa*	Moderate	Shallow
Disclosure of electricity-related data		
Electricity consumption disclosure	Detailed data on consumption and renewable electricity supply, but no 24/7 matching data. Data broken down to specific grids.	
Scope 2 emissions disclosure	Disclosure of market-based and location-based emissions, but market-based method used for aggregated emissions.	
Claims and measures for renewable electricity today		
Claim	*92% renewable electricity in own operations in 2022.*	
Coverage	92% would constitute a high share of renewable energy for 2022 in H&M's operational regions.	
Procurement means	Unbundled RECs account for close to 100% of renewable electricity consumption.	
Matching method	H&M Group matches its electricity consumption on an annual basis.	
Targets and measures for renewable energy in the future		
Targets	*100% renewable electricity by 2030.*	
Coverage and target year	2030 could consitute a sufficient target year for 100% RE in H&M's operational regions.	
Procurement means	Several PPAs that account for about a third of H&M Group's current electricity consumption were signed in the past year. Indication that this is the company's approach moving forwards.	
Matching method	H&M Group matches its electricity consumption on an annual basis.	
Disclosure of advocacy for supportive policy frameworks		*not assessed*
Required policy framework	No clear statement of required policies identified.	*not assessed*
Advocacy efforts	Reference to advocacy efforts and support for legislatory changes in Europe in the 2022 Sustainability Disclosure. Public support for increased investments in renewables in the EU.	*not assessed*
RENEWABLE ELECTRICITY STRATEGY IN THE SUPPLY CHAIN *Upstream scope 3 emissions - China and Bangladesh are the largest production market for clothing and Europe for beauty products*	Moderate	Shallow
Disclosure of electricity-related data		
Supply chain energy profile	Presentation of key suppliers but no details on their energy consumption identified.	
Targets and measures for renewable energy in the supply chain		
Targets	*100% renewable electricity in the supply chain by 2030.*	
Coverage and target year	The target is significantly undermined by a lack of commitment to electrify processes where feasible, since direct energy carriers continue to account for a major share of energy consumption in the sector.	
Procurement means	Training and financial support, including through the Fashion Climate Fund and an Energy Expert Team.	
Disclosure of advocacy for supportive policy frameworks in the supply chain		*not assessed*
Required policy framework	H&M sets out a need for legislation supportive of PPAs and improved electricity grid connectivity.	*not assessed*
Advocacy efforts	Advocacy for legislation supportive of PPAs and improved electricity grid connectivity in markets of production.	*not assessed*

5-point rating scale: High | Reasonable | Moderate | Shallow | Limited

Transparency refers to the disclosure of information. **Integrity** refers to the quality and credibility of the approach.

Sources: *Authors' interpretation of identified public documentation from H&M Group (2022a, 2022b, 2023a, 2023b, 2023c, 2023d), Clean Energy Investment Accelerator (2021a, 2021b) and EuroCham Cambodia (2022).*

H&M Group

H&M Group committed to using 100% renewable electricity in its own operations *and* in the supply chain by 2030. Although the company currently procures standalone RECs to annually match its own electricity consumption, it has recently signed a number of PPAs that jointly cover about a quarter of H&M Group's electricity consumption. H&M Group reports various measures to support suppliers in switching to renewables, but the significance of the company's supply chain renewable electricity target may be undermined by the lack of commitment to electrify manufacturing processes.

While H&M Group's claim of using over 90% of renewable electricity in its own operations is currently based on standalone RECs, the company is shifting its focus to PPAs. H&M Group claims that over 90% of its electricity consumption was from renewable sources in the past years (H&M Group, 2023a, p. 92). This claim is solely based on standalone RECs, which the company centrally procures. Standalone RECs that are not bundled with the actual procurement of renewable electricity are extremely unlikely to support additional renewable energy capacity and decarbonisation of the grid in many regions, including in Europe, where most of H&M Group's operations are (Mulder and Zomer, 2016; Brander *et al.*, 2018; Bjørn *et al.*, 2022). We see indications that H&M Group is shifting its focus from standalone RECs to PPAs, as the company has recently signed PPAs for new renewable capacity within the regions of key operations, specifically within United Kingdom, Spain and Sweden (H&M Group, 2023d, p. 31). H&M Group expects that these PPAs will generate approximately 300 GWh each year, which would be almost a quarter of the company's annual consumption in 2022 (H&M Group, 2023d, p. 30). H&M Group could further improve its future renewable sourcing strategy by making clearer commitments to using only high-quality constructs and moving to a 24/7 matching approach.

H&M Group committed to the target of 100% renewable electricity in the supply chain by 2030, but the significance of the target may be undermined by the lack of commitment to electrify key manufacturing processes. The company states that by 2030, the electricity sourced in the supply chain will be 100% renewable (H&M Group, 2023d, p. 26). Given that most of the company's suppliers are based in Southeast Asia, where policies are often not conducive to renewable energy procurement, this target could be considered a positive statement of intent. However, much of the energy consumption in the clothing manufacturing process typical derives from other energy carriers, and we identify no commitment to electrify these processes. Rather H&M Group appears to focus on supporting the adoption of bioenergy in the supply chain, which we do not consider a sustainable alternative to processes that could be electrified. The company works on addressing barriers to transitioning to biomass boilers in Indonesia and plans for Cambodia to be H&M Group's first production country to use 100% biomass boilers (H&M Group, 2022b, p. 24).

As such, the supply chain renewable electricity target may be misleading due to its limited significance. We could also not identify clear details on how H&M Group plans to achieve this target. The company lists a number of initiatives, including an *Energy Expert Team* that provides suppliers with data, information and training on renewable energy and energy efficiency, and the initiation of a *Sustainable Supplier Facility* that allows brands and suppliers to co-invest in in decarbonisation technologies (H&M Group, 2023c). These plans may represent good practice examples for supplier engagement, but further details would be necessary to support replication and to understand their real impact.

H&M Group engages with policy makers and advocates for better regulatory conditions in manufacturing countries. The company states that it advocates for legislation supportive of PPAs and improved electricity grid connectivity in production markets (H&M Group, 2023d, p. 16) and that it engages with policy makers to "create the right conditions" for decarbonising garment production (H&M Group, 2023a, p. 105). In its CDP disclosure, H&M Group lists what regulatory processes it has been involved in, mostly in manufacturing countries and the European Union (H&M Group, 2023b, pp. 116–124). The company has publicly advocated for prioritising clean energy deployment and investment in renewables in manufacturing countries, such as Vietnam, Cambodia and Indonesia (Clean Energy Investment Accelerator, 2021a, 2021b; EuroCham Cambodia, 2022).

INDITEX (INCL. ZARA)

		TRANSPARENCY	INTEGRITY
RENEWABLE ELECTRICITY STRATEGY FOR OWN OPERATIONS *Scope 1 & 2 emissions - Global; mostly Europe*		Shallow	Shallow
Disclosure of electricity-related data			
Electricity consumption disclosure	Consumption data published and broken down to activity level. Country-level consumption only available from CDP response.		
Scope 2 emissions disclosure	Disclosure of market-based and location-based emissions, but market-based method used for aggregated emissions.		
Claims and measures for renewable electricity today			
Claim	*100% of electricity used in own facilities comes from renewable sources.*		
Coverage	Complete coverage of electricity in own operations, including all stores, offices and logistics centres worldwide.		
Procurement means	99% unbundled RECs, not necessarily deriving from the same region as the consumption.		
Matching method	Inditex does not disclose the vintage of the RECs that it procures.		?
Targets and measures for renewable energy in the future			
Targets	*Continuation of current 100% renewable electricity claim (no additional target identified)*		
Coverage and target year	Complete coverage of electricity in own operations, including all stores, offices and logistics centres worldwide.		
Procurement means	Inditex plans to establish PPAs and signed a first VPPA in 2023, but there is no clear target or indication for the future role of PPAs and RECs in the overall procurement mix.		
Matching method	Inditex does not specify the accounting method or time period over which it will match its electricity consumption.		?
Disclosure of advocacy for supportive policy frameworks			*not assessed*
Required policy framework	No information identified related specifically to renewable electricity.		*not assessed*
Advocacy efforts	No information identified related specifically to renewable electricity.		*not assessed*
RENEWABLE ELECTRICITY STRATEGY IN THE SUPPLY CHAIN *Upstream scope 3 emissions - Mostly Asia and Europe.*		Shallow	Shallow
Disclosure of electricity-related data			
Supply chain energy profile	Disclosure of scope 3 emissions but no details on suppliers' electricity consumption.		
Targets and measures for renewable energy in the supply chain			
Targets	• *Increase the purchase or generation of electricity coming from 100% renewable sources.* • *Eliminate use of coal in the supply chain by 2030.* • *Net zero emissions in 2040 (implicitly covering supply chain electricity)*		
Coverage and target year	Net-zero 2040 target implicitly covers supply chain electricity, but the electricity-specific target is ambiguous in providing no target year nor a specific target value.		
Procurement means	Capacity building in the form of country-specific briefings on RE constructs. Incentives or requirements for suppliers to set targets are unclear.		
Disclosure of advocacy for supportive policy frameworks in the supply chain			*not assessed*
Required policy framework	No information identified related specifically to renewable electricity.		*not assessed*
Advocacy efforts	No information identified related specifically to renewable electricity.		*not assessed*

5-point rating scale: High | Reasonable | Moderate | Shallow | Limited

Transparency refers to the disclosure of information. **Integrity** refers to the quality and credibility of the approach.

Sources: *Authors' interpretation of identified public documentation from Inditex (2022, 2023) and EDP Renewable (2023)*

Inditex

Inditex's renewable electricity strategy for its operations is based on lower quality renewable electricity procurement constructs and accounting methods, which undermine the company's 100% renewable electricity claim. Information and targets related to renewable electricity in the supply chain are very limited, although this should be a key emissions source to be addressed under Inditex's 2040 net-zero emissions pledge which covers the full value chain.

Inditex's current approach to procuring renewable has significant limitations that undermine its 100% renewable claim. With the information available, we understand that over 99% of Inditex's operational electricity consumption in 2022 was matched by unbundled renewable energy certificates of unspecified vintages (Inditex, 2023, p. 204). Self-generation projects in specific locations accounted for a very minor share of supply. Although Inditex specifies that its renewable energy certificates are mostly derived from the same grid on which demand is placed, we understand from the available scientific literature that the purchase of unbundles certificates in the absence of any other procurement construct offers no real prospects for supporting additional renewable energy capacity and decarbonisation of the grid in many regions, including Europe, which is the major region of Inditex's operations (Mulder and Zomer, 2016; Brander *et al.*, 2018; Bjørn *et al.*, 2022). Accordingly, the claim to operate on 100% renewable electricity and to have near-zero scope 2 emissions does not provide an accurate impression of the climate footprint associated with Inditex's operations. The location-based scope 2 emissions estimate of 450 $ktCO_2$ – which is derived from consumption and grid emission factors – is a far more representative indication of the climate impact from Inditex's own operations, especially given the limitations of the standalone RECs which Inditex's claims are based upon.

Signs of potential improvement in Inditex's electricity procurement strategy could be substantiated with clearer commitments. Inditex reports in its 2022 Sustainability Report that it is in the process of establishing PPAs in key operational centres (Inditex, 2023); in 2023, the company signed its first PPA with an installation in the area of its headquarters in Spain (EDP Renewables, 2023). The company also reports that it is making direct investments in its own renewable electricity generation, although the reported plans will cover only a very small share of the company's overall electricity consumption (Inditex, 2023). Due to the lack of more detailed information on the future role of such constructs, it is unclear to what extent these signs of improvement represent a significant development or change of direction for the company's overall renewable electricity procurement strategy. Inditex could significantly strengthen its strategy by providing clear commitments to move towards higher quality procurement constructs, and a 24/7 matching approach.

Inditex discloses relatively detailed information regarding electricity consumption and renewable energy procurement options for its own operations. The company discloses its total electricity consumption, broken down to business activities and explains the role of different procurement constructs, including own generation, RECs and PPAs (Inditex, 2023). The company's 2022 CDP response provides further details on specific procurement constructs in individual countries, which aligns with the information reported in public documents (Inditex, 2022).

Information on electricity use and renewable electricity targets in the supply chain is very limited, despite the high relevance of this emission source in Inditex's overall value chain. A substantial share of emissions from manufacturing textiles derive from carbon-intensive electricity use, so switching to renewable electricity in the supply chain is a critical measure in decarbonising the fashion industry (Berg *et al.*, 2020; Ley *et al.*, 2021; Sadowski *et al.*, 2021). While Inditex's GHG emission disclosure in 2022 indicated that over 75% of its full value chain emissions derive from the company's supply chain (Inditex, 2023), we could not identify any quantitative estimates on electricity consumption within the supply chain, nor on renewable electricity generation or procurement instruments. The target for facilities in the supply chain to "increase the purchase and/or generation of electricity coming from 100% renewable sources" (Inditex, 2023) is potentially misleading. This could be misunderstood as a target for 100% renewable electricity, although it is only an ambiguous target to increase the procurement of renewable energy to an undefined level and without a target year. Inditex's net-zero emission target for 2040 – which in July 2023 was substantiated by a commitment to reduce GHG emissions by at least 90% across the value chain – implies plans for the deep decarbonisation of electricity in the supply chain, among other emission sources. However, specific targets and measures for renewable electricity would be helpful to send a signal to the actors across that supply chain, as well as the stakeholders and regulators of the electricity supply system, especially considering the challenges for renewable electricity procurement in some of Inditex's key manufacturing locations.

Inditex's efforts to promote bioenergy in the supply chain are not a sustainable alternative to electrification and the use of renewable electricity. Inditex indicates that it encourages suppliers to use bioenergy as a replacement to fossil fuels in some processes. The company also says that it encourages electrification of processes, where possible (Inditex, 2023). Inditex could be clearer about for which processes and in what situations it pursues bioenergy as a solution. There are very limited circumstances under which we consider bioenergy to be sustainable and reasonable option for replacing fossil fuels. Due to land scarcity, environmental degradation and the GHG emissions associated with the production and transport of most forms of bioenergy, the sustainable potential for bioenergy is very limited, and this should not be considered a sustainable alternative for processes that could be reasonably electrified. If Inditex encourages suppliers to use bioenergy for processes that could be electrified, this can significantly undermine the significance of any renewable electricity targets set for the supply chain.

Stronger measures and advocacy efforts for supply chain electricity decarbonisation may be necessary for meaningful progress towards the 2040 net-zero target. Inditex reports capacity building measures for supply chain actors – including assisting suppliers to understand local procurement options for renewable electricity and to set renewable energy targets (Inditex, 2023). To this end, Inditex has published *an online portal for suppliers to explore best available technologies* for various aspects of the manufacturing process. This portal includes detailed country-specific briefings on the renewable energy procurement constructs available within nine key countries. These briefings may support suppliers to take first steps with renewable energy, although it will not necessarily lead them to the highest quality renewable energy strategies since the various limitations of each construct are not well explained. Aside from these *capacity building* measures, Inditex does not report any *requirements*, *preferential treatment* or other *incentive instruments* for suppliers related to renewable electricity. We also could not identify any evidence of advocacy efforts to support regulatory developments for corporate renewable electricity procurement in any of Inditex's key manufacturing regions. These shortcomings, in combination with the lack of specific targets, makes it unclear how Inditex will achieve the deep decarbonisation of supply chain electricity, and whether the 2040 net-zero target will be implemented in a meaningful way with high-quality renewable electricity procurement constructs. Such constructs are not currently available in many of Inditex's key manufacturing regions and would likely require proactive action to be realised in the medium-term. A simple reliance on standalone RECs to effectively offset electricity-related emissions from the supply chain, or the use of biomass for processes that could rather be electrified, would significantly undermine the integrity of the company's net zero target.

LULULEMON

	TRANSPARENCY	INTEGRITY
RENEWABLE ELECTRICITY STRATEGY FOR OWN OPERATIONS *Scope 1 & 2 emissions - North America, Europe, China, Asia Pacific*	Moderate	Shallow
Disclosure of electricity-related data		
Electricity consumption disclosure	Detailed disclosure of electricity demand, including regional breakdown. Renewable electricity share is reported only with annual matching.	
Scope 2 emissions disclosure	Disclosure of market-based and location-based emissions, but market-based method used for aggregated emissions.	
Claims and measures for renewable electricity today		
Claim	*lululemon procures 100% renewable electricity to power all owned and operated facilities.*	
Coverage	The claim covers all electricity demand of own operations.	
Procurement means	The claim is based on the purchase of unbundled RECs (69%), VPPAs (29%) and retail supply contracts (2%).	
Matching method	lululemon matches its electricity consumption on an annual basis.	
Targets and measures for renewable energy in the future		
Targets	*100% renewable electricity (no additional target beyond the current claim).*	
Coverage and target year	The claim covers all electricity demand of own operations.	
Procurement means	lululemon intends to increase the share from VPPAs but the quality of those potential PPAs is unclear and lululemon does not rule out continued use of unbundled RECs.	
Matching method	lululemon matches its electricity consumption on an annual basis.	
Disclosure of advocacy for supportive policy frameworks		*not assessed*
Required policy framework	Claim to support public policies without further details	*not assessed*
Advocacy efforts	No information identified.	*not assessed*
RENEWABLE ELECTRICITY STRATEGY IN THE SUPPLY CHAIN *Upstream scope 3 emissions - Vietnam, Indonesia, Cambodia, China, Sri Lanka, Bangladesh, Taiwan, Peru, Philippines, Thailand, Haiti*	Shallow	Shallow
Disclosure of electricity-related data		
Supply chain energy profile	lululemon discloses information on its suppliers and renewable electricity consumption in the supply chain, but this is not contextualised with total electricity consumption figures.	
Targets and measures for renewable energy in the supply chain		
Targets	*No RE target, only an intensity target for s3 (60% by 2030, per unit of value added, compared to 2018 levels).*	
Coverage and target year	*N/A*	
Support measures	Coal boiler phase out requirements and renewable energy strategies for suppliers; research into novel technologies in the supply chain; additional details not identified.	
Disclosure of advocacy for supportive policy frameworks in the supply chain		*not assessed*
Required policy framework	lululemon describes the absence of adequate RE procurement constructs in South Korea. No further details provided.	*not assessed*
Advocacy efforts	We did not identify information on advocacy efforts.	*not assessed*

5-point rating scale: High | Reasonable | Moderate | Shallow | Limited
Transparency refers to the disclosure of information. **Integrity** refers to the quality and credibility of the approach.
Sources: *Authors' interpretation of identified public documentation from lululemon (2023a, 2023b).*

lululemon

lululemon claims to have already achieved its 100% renewable electricity target for its owned and operated facilities, although this claim is mostly based on the purchase of standalone RECs that are unlikely to have a significant impact on grid decarbonisation. While the company has recently signed two PPAs, there is no commitment to rule out the use of standalone RECs in the future. lululemon has no renewable electricity target for its supply chain. Although lululemon presents some promising measures to increase renewables in the supply chain, more information is needed to understand the potential impact of those.

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lululemon's claim that it procures 100% renewable electricity to power its operations is mainly based on standalone RECs. lululemon had a target to achieve 100% renewable electricity to power its owned and operated facilities by 2021. In 2022, lululemon procured standalone RECs that were not bundled with the actual procurement of renewable electricity to cover roughly two thirds of its electricity consumption, while electricity from VPPAs accounted for about one third (lululemon, 2023, pp. 55–73). Available scientific literature suggests that standalone RECs as a procurement construct barely lead to supporting conditions for the development of additional renewable energy capacity and decarbonisation of the grid in many regions, including North America and Europe, which are two of the major regions of lululemon's operations (Mulder and Zomer, 2016; Brander *et al.*, 2018; Bjørn *et al.*, 2022).

lululemon recently signed PPAs to improve its renewable electricity procurement strategy, but how the company plans to move forward remains unclear. In its 2021 Impact Report, lululemon stated its intention to transition from standalone RECs to PPAs (lululemon, 2022, p. 42). In 2021, as a start of this transition, the company signed a VPPA for a wind farm in Texas that came online in May 2022 (lululemon, 2023a, p. 53). Given that PPAs are generally more likely to contribute to additional renewable capacity, the shift to VPPAs likely represents an improvement of lululemon's renewable electricity strategy. However, without further details, it remains uncertain whether the VPPAs that lululemon signs really lead to additional capacity and contribute to grid decarbonisation on the grids where lululemon consumes electricity. We could not identify information on any other (future) PPAs that lululemon pursues. Notably, we did not identify any information on the company's renewable electricity procurement strategy for its operation in Asia either, which is lululemon's second most important operational region (lululemon, 2023, p. 1).

lululemon presents promising measures to increase renewable electricity in its supply chain, but does not yet have either a renewable electricity target or an absolute emissions reduction target for its supply chain. Roughly 98% of lululemon's reported emissions footprint derive from its supply chain (lululemon, 2023a, pp. 47, 77–79), of which a substantial share is related to carbon-intensive electricity consumption. Hence, it is crucial that the company rapidly increases the share of renewable electricity in the supply chain (Berg et al., 2020; Ley et al., 2021; Sadowski et al., 2021). However, lululemon has not publicly committed to either a renewable electricity target for the supply chain or an absolute emission reduction target for scope 3. lululemon presents a number of measures to increase renewable electricity and phase out carbon-intensive processes in the supply chain. These include phasing out coal boilers, developing renewable electricity roadmaps, exploring opportunities for on-site solar, and researching the potential for novel technologies that could replace carbon-intensive heat processes (lululemon, 2023a, p. 51). Although these measures suggest that lululemon works to decarbonise its supply chain, more information would be needed to understand their scale and potential.

lululemon shows good practice with its reporting on energy demand in own operations, but supply chain data is lacking. lululemon provides a high level of detail in its disclosure on energy use and emissions for its own operations, showing a breakdown in emissions and energy demand by fuel type and geography (lululemon, 2023a, p. 75). This allows for a thorough understanding of its emission sources and the relevance of electricity demand in scope 1 and 2. lululemon's disclosure could be significantly strengthened through the publication of energy consumption estimates for the supply chain, where the majority of energy demand occurs. lululemon could also improve the transparency of its renewable electricity targets and claims by reporting on the matching method used to calculate shares of renewable electricity in own operations and the supply chain.

This assessment of lululemon's renewable electricity strategy was updated on 17.01.2024. In the previously published version, lululemon had been rated with reasonable transparency and integrity for disclosure of electricity-related data in the supply chain. This was corrected to a moderate rating, because lululemon does not publish data on supply chain electricity and energy consumption.

NIKE

	TRANSPARENCY	INTEGRITY
RENEWABLE ELECTRICITY STRATEGY FOR OWN OPERATIONS *Scope 1 & 2 emissions - Global*	Moderate	Moderate
Disclosure of electricity-related data		
Electricity consumption disclosure	Detailed disclosure of electricity demand, including regional breakdown. Renewable electricity share is reported only with annual matching.	
Scope 2 emissions disclosure	Disclosure of market-based and location-based emissions, but market-based method used for aggregated emissions	
Claims and measures for renewable electricity today		
Claim	*93.22% of electricity demand is from renewable electricity.*	
Coverage	93% would constitute a high share of renewable energy for 2022 in Nike's operational regions.	
Procurement means	Transparent information about procurement means. Roughly 75% of RE demand met by PPAs, but many of those PPAs do not serve the local grid. 25% derives from RECs.	
Matching method	Nike matches its electricity consumption on an annual basis.	
Targets and measures for renewable energy in the future		
Targets	*100% renewable electricity by 2025.*	
Coverage and target year	Transparent information on target and coverage. Target covers all operational electricity.	
Procurement means	We assume existing PPAs will continue to play a significant role towards the 2025 target, but further information not identified.	
Matching method	Nike matches its electricity consumption on an annual basis.	
Disclosure of advocacy for supportive policy frameworks		*not assessed*
Required policy framework	Brief description of required policy changes in Annual Report.	*not assessed*
Advocacy efforts	Annual Report includes description of advocacy efforts on reducing barriers for RE adoption. Limited information on what these efforts are.	*not assessed*
RENEWABLE ELECTRICITY STRATEGY IN THE SUPPLY CHAIN *Upstream scope 3 emissions - South East Asia*	Shallow	Shallow
Disclosure of electricity-related data		
Supply chain energy profile	No disclosure on electricity consumption in supply chain, but scope 3 is reported with some detail.	
Targets and measures for renewable energy in the supply chain		
Targets	*Nike does not have a RE target for its supply chain. It has a scope 3 emission reduction target: 30% by 2030, compared to 2015 levels.*	
Coverage and target year	*N/A*	
Support measures	Nike provides a consulting programme for on-site solar PV to its suppliers, and requires suppliers to set GHG emission reduction targets. The company also reports financial support for RE adoption, although details are unclear.	
Disclosure of advocacy for supportive policy frameworks in the supply chain		*not assessed*
Required policy framework	Brief description of required policy changes in Annual Report.	*not assessed*
Advocacy efforts	Annual Report describes advocacy efforts on reducing barriers for RE adoption, efforts for better RE procurement options when only few good options are available. Nike also collaborates with USAID and other US initiatives to support RE adoption in manufacturing countries.	*not assessed*

5-point rating scale: High | Reasonable | Moderate | Shallow | Limited

Transparency refers to the disclosure of information. **Integrity** refers to the quality and credibility of the approach.

Sources: *Authors' interpretation of identified public documentation from Nike (2023) and Clean Energy Investment Accelerator (2021b).*

Nike

Nike has a headline electricity pledge to reach 100% renewable electricity by 2025, which covers own operations but it remains unclear whether Nike's electricity procurement methods are adequate to substantiate its claim. Although Nike advocates for more renewable capacity in its suppliers' countries, the company has not set renewable electricity targets for its supply chain.

Nike claims that its operational electricity consumption derives 93% from renewable sources today, and aims for 100% by 2025 (Nike, 2023, p. 90), but the quality of procurement constructs remains unclear. Roughly a quarter of its renewable electricity demand is met by standalone RECs and three quarters by PPAs (Nike, 2023, pp. 192–193). Roughly 5% of the company's electricity consumption is generated with own renewable capacity. Nike provides limited details on its PPA constructs, but for some of these construct it appears the generation is not in the same country as the consumption. Therefore, clarity regarding to what extent the PPAs lead to additional renewable electricity capacity on the grid, and to what extent Nike's claim of 93% renewable electricity is met by adequate constructs, is still lacking.

Nike's reporting allows for a thorough understanding of its electricity demand in scope 1 and 2. Nike's reporting on energy and electricity demand of own operations is detailed, comes with various breakdowns, and includes both market-based and location-based scope 2 estimates (Nike, 2023, pp. 188–190). The company sets good practice for scope 1 and 2 reporting, which allows for a deep understanding of emission sources and energy demand. In contrast, Nike does not provide much information on energy demand in its supply chain. A more detailed breakdown of scope 3 emission sources would generate a better understanding of its most significant emissions.

Nike does not have a renewable electricity target for its supply chain, despite its target to reduce scope 3 emissions by 30% by 2030. The existing renewable electricity target only covers scope 1 and 2; we did not identify a target for scope 3 electricity demand specifically. Nike's scope 3 emissions make up 99% of its emissions footprint and carbon-intensive electricity makes up a substantial share of emissions in textile manufacturing (Berg *et al.*, 2020; Ley *et al.*, 2021; Sadowski *et al.*, 2021). Nike could enhance its scope 3 climate strategy by introducing a renewable electricity target for its supply chain. This would underpin the existing scope 3 target, as well as send a clear signal to suppliers and regulators in manufacturing countries.

Nike supports the development of renewable electricity capacity at owned facilities as well as suppliers' facilities, but the scale and expected impact remain unclear. Nike states that at its Chinese facilities, a substantial share of electricity demand is met through on-site renewable capacity: a combination of already existing solar PV and recently added wind turbines, which will cover 20% of Nike's electricity demand in China (Nike, 2023, pp. 92, 192). The company further describes a solar PV consulting programme for suppliers in China, Vietnam and Indonesia. Under this programme, Nike supports the installation of solar PV through providing suppliers with technical advice and assistance during the renewable electricity investment phase, helping to reduce the risks and defining the business case of the to-be-installed solar PV (Nike, 2023, p. 98).

Nike provides some information on its advocacy efforts for higher uptake of renewable energy in its suppliers' regions. Nike describes that it is working with energy regulators to advocate for more adequate policies that support additional onsite solar PV installations in countries where its consulting efforts are not fruitful yet (Nike, 2023, pp. 98–99). In addition, the company advocates for better renewable electricity procurement options when only few good options are available. They claim to use standalone RECs only as "bridge solutions", while working with relevant policymakers to reduce the barriers to renewable electricity adoption and better constructs, such as PPAs (Nike, 2023, pp. 98–99). For example, Nike publicly encouraged the Indonesian government to enact regulations that would, for instance, encourage corporate PPAs and private sector investments in renewable energy (Clean Energy Investment Accelerator, 2021b)

Glossary and abbreviations

CCS	Carbon capture and storage
CCU	Carbon capture and utilisation
CDP	Formerly the Carbon Disclosure Project: Many companies report emissions as well as other details of their climate strategies to CDP. CDP provide companies with a certified rating of their level of climate transparency, which is often used in company's marketing materials.
CEIA	Clean Energy Investment Accelerator initiative
CFE	Carbon-free energy
CO_2	Carbon dioxide
EU	European Union
GHG Protocol	The GHG Protocol is an initiative driven by the World Resources Institute and World Business Council for Sustainable Development, that provides international guidance and standards for GHG emissions accounting.
GHG	Greenhouse gas
Guarantees of origin (GOs)	Other terminology for Renewable Energy Certificates (REC), see "Renewable Energy Certificates (REC)"
Integrity (rating)	The Corporate Climate Responsibility Monitor assesses the transparency and integrity of companies' climate pledges. Integrity, in this context, is a measure of the quality, credibility and comprehensiveness of a company's approaches towards the various elements of corporate climate responsibility.
Location-based method (for scope 2 emissions accounting)	The location-based method for scope 2 emissions accounting reflects the average emission intensity of the electricity grid from which the consumer's energy is delivered.
Market-based method (for scope 2 emissions accounting)	The market-based method for scope 2 emissions accounting reflects the emissions from electricity generation specifically procured by the consumer (which may not reflect the electricity they actually consume from a grid that features multiple buyers and sellers). It derives emission factors from contractual renewable electricity procurement instruments.
Power purchase agreement (PPA)	A PPA is a long-term contract between an electricity provider and an electricity consumer, usually spanning 10-20 years. The consumer agrees to purchase a certain amount of electricity from a specific asset under a pre-determined pricing arrangement. PPAs are generally signed with new renewable energy installations and form part of the project investment decision (NewClimate Institute and Data-Driven EnviroLab, 2020). PPAs can also be signed for existing installations, in which case it is less likely the PPA results in additional renewable electricity capacity. However, it may be that existing installations would cease operations if the operator cannot sign a new PPA.
PV	Photovoltaics

Renewable energy certificate (REC)	Renewable Energy Certificates (RECs) are also known under various names, such as Guarantees of Origin (GOs) or Energy Attribute Certificates (EACs). RECs can be acquired simply as an accounting tool alongside other renewable electricity procurement constructs, or may be procured as "standalone RECs". • **Standalone RECs:** The procurement of RECs without any accompanying renewable electricity procurement construct, such as a PPA. RECs are often differentiated in other studies, depending on whether they are bundled or unbundled with the electricity that a company consumes: • **Unbundled RECs:** the consumer purchases RECs from a third party, separately from their procurement of electricity from another supplier. • **Bundled RECs – third-party generated:** the consumer purchases electricity and RECs from the same supplier, but this supplier has procured the RECs from a third party. In this situation, the supplier may sell electricity generated using fossil fuels but market it as 'low-carbon' electricity by bundling an equivalent volume of RECs into the sale. • **Bundled RECs – supplier generated:** the consumer purchases renewable electricity and associated RECs from the same supplier.
Science Based Targets initiative (SBTi)	SBTi reviews and certifies the climate targets of companies who join the initiative as members. Companies' climate targets are certified as 1.5°C or 2°C compatible if they align with SBTi's own methodology and benchmarks.
Scope (of GHG emissions)	The GHG Protocol Corporate Standard classifies a company's GHG emissions into three 'scopes' (WBCSD and WRI, 2004):
Scope 1 emissions	Scope 1 emissions are direct emissions from owned or controlled sources.
Scope 2 emissions	Scope 2 emissions are indirect emissions from the generation of purchased energy (see also *location-based method* and *market-based method*).
Scope 3 emissions	Scope 3 emissions are all indirect emissions (not included in scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions (GHG Protocol, 2013).
Upstream scope 3 emission sources	Upstream emissions are indirect GHG emissions related to purchased or acquired goods and services (GHG Protocol, 2013).
Downstream scope 3 emission sources	Downstream emissions are indirect GHG emissions related to sold goods and services (GHG Protocol, 2013).
Normal scope 3 emission sources	The GHG Protocol's Scope 3 Standard identifies 15 distinct reporting categories for scope 3 emission sources, and requires companies to quantify and report scope 3 emissions from each category (GHG Protocol, 2013).
Optional scope 3 emission sources (indirect use-phase emissions)	*Indirect use-phase emissions* are described by the GHG Protocol Scope 3 Standard (GHG Protocol, 2013) as an optional reporting component. In contrast to direct use-phase emissions from products, such as the energy consumption of vehicles and appliances, indirect use-phase emissions refer to the emissions that occur indirectly from the use of a product. For example, apparel requires washing and drying; soaps and detergents are often used with heated water.

Transparency (rating)	The Corporate Climate Responsibility Monitor assesses the transparency and integrity of companies' climate pledges. Transparency ratings refer to the extent to which a company publicly discloses the information necessary to fully understand the integrity of that company's approaches towards the various elements of corporate climate responsibility.
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
USA	United States of America
Value chain emissions	A company's full value chain emissions refers to the entirety of scope 1, scope 2, and scope 3 emissions.
VPPA	Virtual Power Purchase Agreement

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ANNEX

Assessment methodology

The following sections set out the guiding principles and assessment criteria against which we assess companies' renewable electricity strategies in section B.

1 Disclosure of electricity-related data

1.1 Own operations

1.1.1 Guiding principles

Companies should annually disclose information on their electricity consumption and related GHG emissions, as a pre-requisite for appraising targets and measures for the procurement of renewable electricity. Meaningful planning for decarbonisation of electricity depends on a thorough and granular understanding of a company's electricity consumption footprint. Complete and transparent disclosure should cover all electricity consumption and electricity-related emissions from the company's own operations and supply chain, including the proportion of electricity that is self-generated and the proportion that is procured.

It is best practice for companies to disclose contextual and granular information to facilitate an increased understanding targets and measures for the procurement of renewable electricity. The electricity consumption profiles of companies may vary considerably between sectors and regions; more contextual and granular information is usually necessary to understand the climate impact of companies' electricity consumption and the significance of the targets that they communicate. This includes the disclosure of historical data, and a breakdown of electricity consumption and associated emissions to countries and specific activities. Transparency of thorough and granular information is a tool for increasing ambition in its own right; it contributes to a constructive, collaborative dialogue that is required to overcome challenges and share lessons learnt for accelerated decarbonisation.

Companies should report electricity-related emissions using both the location-based and market-based method, taking the highest of the two values for their calculation of their total emissions footprint. According to the GHG Protocol companies should report on scope 2 emissions using both the location-based and market-based accounting methods (WRI and WBCSD, 2015, p. 59):

- The location-based method reflects the average emissions intensity of electricity grids from which consumption occurs.
- The market-based method reflects emissions from electricity that companies have purposefully chosen to buy. It derives emission factors from contractual renewable electricity procurement instruments.

Both accounting approaches have the potential to mispresent the emission footprint of electricity consumption in different circumstances. Companies have a variety of options for sourcing renewable electricity *(see section 2.1.2)*. While for some options an emissions reduction claim may be legitimate, for others the impact is unclear. As the impact of renewable electricity projects varies and is often unclear, market-based reporting for renewable energy constructs may give the false impression that a company has no or few scope 2 emissions and could divert prioritisation away from energy efficiency improvements.

On the other hand, some companies' market-based emission estimates may be higher than their location-based estimates, due to contractual arrangements for the direct procurement of fossil-fuel-generated electricity. In this case, companies could report location-based emissions based on the local grid emissions factor, while profiting from cheaper electricity procurement constructs from a more emissions-intensive source.

To create a clear incentive both to maximise energy efficiency improvements and to procure renewable electricity, it would be most constructive for companies to report both market- and location-based estimates for scope 2 emissions and to use the larger of the two values towards the company's aggregated emissions footprint. This is aligned with the ISO's Net Zero Guidelines, which require companies to calculate scope 2 emissions using both accounting methods but use the highest of the two estimates to drive energy efficiency improvements; the same estimate should be used for emission reduction targets and tracking progress (ISO, 2022, p. 18).

Companies' disclosure should include subsidiary companies. Companies may depend on emission-intensive assets and infrastructure that are held by other subsidiary companies. Transparent and complete reporting also includes these entities, which should be integrated into the company's scope 1, 2 and 3 emissions. The exclusion of these entities from energy and emissions data can lead to inaccurate interpretations regarding specific brands' or products' GHG emissions footprint. If companies report transparently on the energy consumption and emissions of all subsidiaries, this can incentivise those companies to make a real shift away from emission-intensive activities and assets, rather than continuing those emission-intensive activities through subsidiaries.

1.1.2 Assessment criteria

DISCLOSURE OF ELECTRICITY DATA FOR OWN OPERATIONS

	TRANSPARENCY	INTEGRITY
●	The disclosure of electricity consumption is complete and presented in a way that facilitates a thorough understanding of the committed targets and measures. It includes: • Annual electricity consumption. • A breakdown of electricity consumption to self-generation and procured energy, and to specific locations or activities. • Share of consumption matched to renewable generation on an annual basis. • Share of consumption matched to renewable generation on a 24/7 basis. Historical data (at least 3 years) for all data points.	Transparency and integrity are assessed collectively for this element.
◕	Annual electricity consumption is disclosed with significant detail, but one of the aforementioned criteria is not fulfilled.	
◑	Annual electricity consumption is disclosed and presumed complete, but the level of detail does not facilitate a thorough understanding of the committed targets and measures.	
◔	Electricity consumption is only disclosed to a very limited extent and possibly incomplete.	
○	Electricity consumption is not disclosed to any extent.	

DISCLOSURE OF SCOPE 2 EMISSIONS DATA (ELECTRICITY RELATED)

	TRANSPARENCY	INTEGRITY
●	The disclosure of scope 2 emissions data is complete and presented in the most transparent way: • Scope 2 emissions are reported for **both** market- and location-based accounting method. • The largest value of the two accounting methods is consistently used towards aggregated emission data across all emission sources. • Historical data (at least 3 years) is provided for all data points.	Transparency and integrity are assessed collectively for this element.
◕	• Scope 2 emissions are reported for **both** market- and location-based accounting method. • The largest value of the two accounting methods is in some key instances but not always used towards aggregated emission data across all emission sources. • Historical data (at least 3 years) is provided for all data points.	
◑	• Scope 2 emissions are reported for **both** market- and location-based accounting method, but the smaller value is used towards aggregated emission data across all emission sources.	
◔	• Scope 2 emissions are only reported for one of the aforementioned accounting methods.	
○	• Scope 2 emissions are not reported or perceived to be likely incomplete.	

5-point rating scale: ● High ◕ Reasonable ◑ Moderate ◔ Shallow ○ Limited

1.2 Supply chain

1.2.1 Guiding principles

Companies should disclose information on electricity and energy consumption in the supply chain, to contextualise their supply chain targets and facilitate progress tracking. Electricity consumption in the supply chain represents a major source of most companies' GHG emission footprints. The collection of data on energy consumption in the supply chain may be a challenging task, but it is necessary to understand and track progress towards supply chain targets.

1.2.2 Assessment criteria

DISCLOSURE OF SUPPLY CHAIN ELECTRICITY CONSUMPTION PROFILE		
	TRANSPARENCY	INTEGRITY
●	The disclosure of electricity consumption and emissions in the supply chain is presumed complete and presented in a way that facilitates a thorough understanding of the committed targets and measures. It includes: • Annual electricity consumption across the supply chain. • A breakdown of electricity consumption to specific suppliers, locations or activities. • Share of consumption matched to renewable generation on an annual basis. • Share of consumption matched to renewable generation on a 24/7 basis. • Full upstream scope 3 emissions. • Disclosure of who major suppliers are, and their location. • Historical data (at least 3 years) for all data points.	Transparency and integrity are assessed collectively for this element.
◕	The supply chain electricity profile is disclosed with significant detail, but one of the aforementioned criteria is not fulfilled.	
◑	The disclosure of electricity consumption and emissions in the supply chain is presumed complete but not presented with sufficient detail to facilitates a thorough understanding of the committed targets and measures.	
◔	Only very limited details are disclosed related to suppliers and their electricity consumption profile.	
◌	No details are disclosed related to suppliers and their electricity consumption.	

5-point rating scale: ● High ◕ Reasonable ◑ Moderate ◔ Shallow ◌ Limited

2 Claims, targets and measures for renewable electricity

2.1 Own operations

2.1.1 Coverage of claims and targets

2.1.1.1 Guiding principles

Renewable electricity targets send a clear signal for the need to switch from carbon-intensive electricity. Reducing global emissions to net zero by 2050 requires a transformation of the power sector and a rapid shift to renewable energy. Given their scale and influence, large companies can help drive the energy transition and unlock additional renewable electricity generation capacity. Renewable electricity targets provide companies with a strong incentive to start planning for and investing in new renewable electricity capacity today.

Claims about renewable electricity consumption today should be clear and easy to understand for investors and consumers. Companies can report on their renewable electricity consumption in various ways. Some companies report on total consumed renewable electricity, which includes the share of renewable electricity on the grid, on-site installations and renewable electricity sourced through a number of procurement constructs. Other companies report on *direct procured electricity*, which reflects how much of their electricity consumption comes from Power Purchase Agreements. Corporates may also claim to have invested in a certain number of MW installed capacity. To avoid confusion, companies should be clear about the coverage of their claims and provide sufficient context for consumers and investors to understand the meaning of these claims.

Targets for 100% renewable electricity should be aligned with benchmarks for decarbonising the power sector. According to the IEA (2021), advanced economies should achieve overall net-zero emissions from electricity by 2035, with the rest of the world following in 2040. This means that companies with the majority of their operations in OECD countries should commit to 100% renewable electricity by 2035 at the latest, while companies in other parts of the world should reach this milestone no later than 2040.

The significance of renewable electricity targets may be undermined if not accompanied by commitments to electrify all energy-intensive processes that can be electrified. Some sectors continue to emit a large volume of CO_2 emissions from direct fuel combustion, although in many cases the energy consuming processes could be powered by renewable energy directly, or electrified. The electrification of such processes is a key climate change mitigation measure in many sectors. Renewable electricity targets could be very misleading, in the case that a company consumes a high proportion of direct energy, especially in the case that those processes could be feasibly electrified: much of the energy-related emissions that could be covered by such a target, would not be. To avoid this pitfall, companies should ensure that renewable electricity targets are accompanied by commitments to electrify all energy-intensive processes that can be electrified.

2.1.1.2 Assessment criteria

COVERAGE OF RENEWABLE ELECTRICITY CLAIMS TODAY

	TRANSPARENCY	INTEGRITY
	• The company clearly communicates the scope of the claim • When other major energy carriers exist, the company clearly communicates the limited relevance of electricity compared to other energy carriers in own operations *(The relevance of other energy carriers is determined at the sector level, through the judgement of the authors.)*	The company claims to use over 90% renewable electricity in own operations.
	N / A	The company claims to use 71-90% of renewable electricity in own operations
	N / A	The share of renewable electricity that the company claims is significantly greater than the existing grid renewable share in the company's major operational regions.
	N / A	The share of renewable electricity that the company claims is only marginally greater than the existing grid renewable share in the company's major operational regions.
	The company's communication is not clear about the scope coverage or does not prominently specify the relevance of electricity compared to other energy carriers in own operations.	The share of renewable electricity that the company claims to use is no greater than the existing grid renewable share in the company's major operational regions.

COVERAGE AND TARGET YEAR OF RENEWABLE ELECTRICITY TARGETS FOR OWN OPERATIONS

	TRANSPARENCY	INTEGRITY
	• The company clearly communicates the scope of the target and the target year • When other major energy carriers exist, the company clearly communicates the limited relevance of electricity compared to other energy carriers in own operations *(The relevance of other energy carriers is determined at the sector level, through the judgement of the authors.)*	• The target covers all electricity consumption in own operations. • The target year is in line with benchmarks for decarbonising the power sector. For OECD countries, this means 100% renewable electricity by 2030. • Where relevant, the renewable electricity target is accompanied by a commitment to electrify all energy processes that can be electrified
	N / A	N / A
	The company clearly communicates the scope of the target and the target year ***<BUT>*** When other major energy carriers exist, the company does not clearly communicate the limited relevance of electricity compared to other energy carriers in own operations	The target covers all electricity consumption in own operations. ***<BUT>*** The target year misses benchmarks for decarbonising the power sector by less than three years. ***<OR>*** The company does not commit to electrifying all energy processes that can be electrified, which potentially undermines the renewable electricity commitment.
	N / A	The target covers all electricity consumption in own operations. ***<BUT>*** The target year misses benchmarks for decarbonising the power sector by more than three but less than ten years.
	The company's communication is not clear about the scope coverage or does not prominently specify the relevance of electricity compared to other energy carriers in own operations. ***<OR>*** The company does not clearly specify the target year.	The target does not cover all electricity consumption in own operations. ***<OR>*** The target year misses benchmarks for decarbonising the power sector by at least a decade. ***<OR>*** The company does not commit to electrifying all energy processes that can be electrified, which undermines the renewable electricity commitment.

5-point rating scale: High | Reasonable | Moderate | Shallow | Limited

2.1.2 Procurement means for renewable electricity

2.1.2.1 Guiding principles

Companies can help drive grid decarbonisation if they pursue high-impact procurement options for renewable electricity. Decarbonising the power sector is the backbone to decarbonising most economic sectors and requires rapid development of additional renewable electricity generation and storage capacity. No company can bring its emissions to zero without investing in renewable electricity. Companies take varying approaches to sourcing renewable electricity *(see Table 8 below)*, including on-site capacity, Power Purchase Agreements (PPAs) and standalone Renewable Energy Certificates (RECs). While the causal relation between procurement approaches and additional capacity on the grid is hard to prove, on-site installations and Power Purchase Agreements are generally more likely to contribute to grid decarbonisation than standalone RECs *(see each construct below for further details)*.

Procuring renewable electricity is easier in some geographies than in others, but accessibility to PPAs is improving in recent years. There are regional differences with regards to the availability of higher quality procurement constructs, such as PPAs. In many areas of North America and Europe, it is usually relatively straightforward to sign a PPA or connect a private installation to the local grid. In contrast, it has been very complicated for corporates to sign PPAs or set up their own installations in many East and Southeast Asian countries, when the electricity markets are monopolised. At the same time, we also see significant progress in removing these barriers since over the past 2 years; higher quality procurement constructs are now available in the main operational markets of all the companies assessed in this report, since recent regulatory reforms in South Korea and Taiwan considerably improved the conditions for major companies to access PPAs (Chung-Hua Institution for Economic Research, 2022; Mayer Brown, 2022a; PwC, 2022; Shin & Kim, 2022). Through 2022 and 2023, a pilot programme for direct PPAs was being introduced in Vietnam (Mayer Brown, 2022b; Vietnam Business Law, 2023), while a pilot programme in China continued to be upscaled across more areas of the country (Hao *et al.*, 2023). In 2022, companies signed PPAs for large-scale renewable power installations in Indonesia (Enerdatics, 2022) and Bangladesh (Envision Energy, 2022). The collaborative PPA announced by TSMC in Taiwan in 2023 shows that there are ways to make higher quality renewable procurement accessible when legislation and bureaucracy represent barriers *(see TSMC p43)*.

On-site generation

On-site renewable electricity generation with on-site storage offers the best guarantee that companies use renewable electricity without placing a significant burden on grid infrastructure. This approach reduces scope 1 emissions in the case that those renewable energy technologies replace existing on-site fossil-fuelled generators. Scope 2 emissions are reduced in the case that new renewable energy installations shift energy demand away from external energy procurement, bringing renewable energy generation under the direct control of actors (NewClimate Institute and Data-Driven EnviroLab, 2020). Companies that have on-site installations but no storage systems are very likely to continue to rely on the local grid. For instance, to inject surplus electricity or to consume electricity when their demand is higher than their electricity production. Therefore, the option of on-site generation with on-site storage is preferable and more likely to guarantee that companies use renewable electricity for their activities.

Power Purchase Agreements

Higher quality PPAs may lead to additional renewable electricity capacity and fewer GHG emissions. A PPA is a long-term contract between an electricity provider and an electricity consumer, usually spanning 10-20 years. The consumer agrees to purchase a certain amount of electricity from a specific asset under a pre-determined pricing arrangement. PPAs are generally signed with new renewable energy installations and can form part of the project investment decision (NewClimate Institute and Data-Driven EnviroLab, 2020). PPAs can also be signed for existing installations, in which case it is less likely the PPA results in additional renewable electricity capacity. However, it may be that existing installations would cease operations if the operator cannot sign a new PPA. While PPAs have contributed to the development of additional renewable electricity capacity in the past, the falling costs of renewable electricity generation as well as the current high electricity prices, could mean that PPAs are becoming less relevant in the decision to invest or not invest in renewable electricity project.

Utility green tariffs

High quality utility green tariffs can bring the advantages of PPAs into a more scalable model, but the same terminology can also be used to refer to the simply procurement of standalone RECs from a utility.

There is a not a single definition of utility green tariffs. In several states in the USA, commercial consumers and energy utilities can agree contracts for bundled renewable electricity from specific installations against a utility tariff rate. These long-term contracts have the advantage that the utility manages the development of new contracts with renewable electricity operators under conditions similar to PPAs, but without off takers needing to build inhouse expertise on electricity markets to arrange those PPAs directly. This may be a more scalable approach than corporate PPAs, since it is more accessible to smaller organisations, but – as for PPAs – the quality of this approach depends on the details with regards to how it is implemented, such as whether it focuses on new installations only, and whether it is based on long-term contracts.

In contrast to potentially high quality utility green tariffs, the same terminology can *also* mean that consumers buy fossil-generated electricity bundled with third-party generated RECs from their energy utility. In such cases, we consider this simply a form of procuring standalone RECs ,and an unsuitable procurement option to reduce electricity-related emissions.

Investments in RE

Investments in renewable electricity capacity are likely to lead to additional renewable energy capacity but are not necessarily a suitable approach to reduce electricity-related emissions. Investments in renewable electricity projects are a business case in their own right. Companies can only claim a neutralisation of own electricity-related emissions if they set up an agreement to procure the electricity and RECs from the new installation. Only in this situation, other parties cannot enter into agreement to claim renewable energy from those installations (NewClimate Institute and Data-Driven EnviroLab, 2020). Without the guarantee that other actors cannot claim the renewable electricity, there is a high risk of double counting renewable electricity.

Premium

Energy suppliers can charge a premium on top of the electricity price (USD/KWh) that is dedicated to the construction of additional renewable electricity capacity. Such a premium can be bundled with any form of energy procurement model, such as RECs or a PPA, regardless of the volume of energy procured. More ambitious electricity providers offer their clients an independently verified guarantee that their electricity generation stems from renewable energy installations not older than five or ten years (NewClimate Institute and Data-Driven EnviroLab, 2020). A capacity expansion premium alone cannot underpin the claim of the neutralisation of current electricity emissions, but rather it can be add-on to improve the quality of any other energy procurement model and contribute to more renewable electricity capacity in the near future.

Standalone RECs

Standalone Renewable Energy Certificates (RECs) – also known under various names, such as Guarantees of Origin (GOs) or Energy Attribute Certificates (EACs) – often do not contribute to additional renewable electricity capacity. They are not a suitable approach for corporates to address electricity-related emissions. RECs can serve as an important accounting tool when acquired alongside other renewable electricity procurement constructs, such as PPAs, or may be procured as standalone RECs. We define ***standalone RECs*** as the procurement of RECs *without* any accompanying renewable electricity procurement construct, such as a PPA. The impact of standalone RECs is highly questionable. While the purchase of standalone RECs could in theory send a signal to investors that there is demand for renewable energy, studies indicate that standalone RECs have historically contributed very little to the development of additional renewable energy installations in Europe and the USA (Hulshof *et al.*, 2019). Oversupply of certificates and associated low prices, along with implicit double counting, are key reasons for this problem. For example, in Europe there is an oversupply of RECs at low prices that mostly stems from decades-old hydropower installations in Scandinavia (Hulshof *et al.*, 2019; NewClimate Institute and Data-Driven EnviroLab, 2020).

The very unlikely impact of standalone RECs can have substantial consequences for the credibility of corporate claims related to renewable energy consumption and GHG footprint. Bjørn *et al.* (2022) found that the use of RECs by companies with SBTi-approved reduction targets leads to an inflated estimate of those companies' abatement efforts. The researchers concluded that 42% of committed scope 2 emission reductions may not result in real-world mitigation (Bjørn *et al.*, 2022).

Recent studies suggest that consumers' demand for RECs and their willingness to pay may increase, which could lead to the development of additional renewable electricity installations in the future. For instance, one study modelling the impacts of future corporate procurements in northern Europe found that a high and stable price for RECs can have a positive effect on future

renewable electricity generation (Martinsen and Mouilleron, 2020). However, according to this study, the majority of future renewable electricity generation would continue to take place in the absence of a market for RECs, meaning that the procurement of one 1MWh certificate leads to *additional* generation of less than 1MWh (Martinsen and Mouilleron, 2020).The sale of RECs displaces more carbon-intensive energy to other consumers. When a customer purchases RECs, the actual energy mix that a certificate owner receives does not change, nor does the energy mix in the grid. If fossil-fired power plants and renewable energy technologies feed electricity into a grid, the actors who draw from that grid would all receive a combination of renewable- and fossil-fired electricity. Consequently, if the owner of a renewable energy generation facility were to sell RECs to one actor, that actor may claim a lower grid emission factor to determine its scope 2 GHG emissions but would still continue to receive the same combination of renewable- and fossil-fired electricity. Other customers on the same grid need to apply a higher grid emissions factor, so their reported electricity-related emissions will increase (NewClimate Institute and Data-Driven EnviroLab, 2020).

RECs are often differentiated according to whether or not they are bundled or unbundled with the electricity that a company consumes:

- **Unbundled RECs:** the consumer purchase RECs on the spot market from a third party, separately from the purchase of electricity from another supplier.
- **Bundled RECs – third-party generated:** the consumer purchases electricity and RECs from one and the same supplier, but this supplier has procured the RECs from a third party. In this situation, the supplier may sell fossil fuel power electricity and green it with the sale of RECs.
- **Bundled RECs – supplier generated:** the consumer purchases renewable electricity and associated RECs from one and the same supplier.

We do not identify any clear differentiation between “bundled” and “unbundled” RECs amidst the aforementioned scientific literature indicating that the procurement of standalone RECs may have very little impact on increasing renewable electricity capacity. Accordingly, for our methodology and analysis, we do not identify RECs according to this terminology, but rather we differentiate between the procurement of “**standalone RECs**”, and the use RECs that are used as an accounting tool alongside other constructs for procuring renewable electricity.

Table 8: Likelihood of contributing to additional renewable capacity

RENEWABLE ENERGY PROCUREMENT CONSTRUCT	LIKELIHOOD OF ADDITIONAL CAPACITY	
Own RE installation with storage capacity		Constructs ensure the installation of capacity that would not have come online otherwise. New storage solutions in combination with these new installations can help reducing the impact on the local grid and support 24/7 matching of demand and supply. However, in most cases, companies still rely on the local grid when their generation and storage does not cover their demand. They should use the location-based emissions factor for the emissions reporting for the energy that is consumed directly from the grid. The emissions factor for the energy that they generate themselves may be zero.
Own RE installation without storage capacity		
Power Purchase Agreement (PPA)		PPAs can contribute to additional capacity if the PPA is signed with a new RE installation and provides the energy provider with the necessary financial security to go ahead with the construction of the installation. To contribute to reducing a company's energy-related emissions, it is necessary that the PPA is signed for an installation connected to the same electricity grid as the company's facilities. To avoid double claiming of renewable electricity, companies should acquire RECs from the RE installation for which they signed a PPA. PPAs are unlikely to contribute to the installation of additional capacity if the PPA is signed for an existing installation (unless the energy provider would need to shut down the installation in the absence of a new PPA). PPAs that are signed for an installation in a different geographical area may lead to additional capacity but do nothing to reduce emissions on the company's local energy grid. PPAs do not lead to a direct and immediate reduction of emissions from the consumed electricity at all times of the day. Electricity is still procured from the grid, supplied by a mix of generation technologies. The emission impact is not comparable to a reduction in electricity demand through energy efficiency measures. A location-based emissions factor should be used to accurately indicate the emissions impact associated with electricity consumption.
Utility green tariffs		There is a not a single definition of utility green tariffs. In several states in the USA, commercial consumers and energy utilities can agree contracts for bundled renewable electricity from specific installations against a utility tariff rate. These long-term contracts have the advantage that the utility manages the development of new contracts with renewable electricity operators under conditions similar to PPAs, but without off takers needing to build inhouse expertise on electricity markets to arrange those PPAs directly. This may be a more scalable approach than corporate PPAs, since it is more accessible to smaller organisations, but – as for PPAs – the quality of this approach depends on the details with regards to how it is implemented, such as whether it focuses on new installations only, and whether it is based on long-term contracts. In contrast, a "utility green tariff" can also mean that consumers buy fossil-generated electricity bundled with third-party generated RECs from their energy utility. We consider this simply a form of procuring RECs and an unsuitable procurement option to reduce electricity-related emissions.
Capacity premium		The likelihood of a capacity premium leading to additional capacity can be considered high, moderate or low depending on the integrity of the entity that collects the capacity premium and on the construct (see this table's overview) for which the collected funds are invested in.
Standalone RECs		While some claim that RECs may signal to the market that there is demand for renewable electricity, studies have found no evidence that the procurement of RECs leads to the development of additional renewable electricity capacity (Bjørn et al., 2022). Standalone RECs have a low likelihood of contributing to additional RE capacity. The theoretical case for the procurement of standalone RECs to send a signal for additional capacity may be stronger in markets with very limited existing renewable electricity capacity, but we also cannot identify any clear evidence of this. Even if the circumstances exist for standalone RECs to send a signal for additional capacity, this would not lead to a direct and immediate reduction of emissions from the consumed electricity at all times of the day. Electricity is still procured from the grid, supplied by a mix of generation technologies. The emission impact is not comparable to a reduction in electricity demand through energy efficiency measures. A location-based emissions factor should be used to accurately indicate the emissions impact associated with electricity consumption.
Investments in renewable energy installations		Investments in renewable energy capacity are a business case. They can be combined with a PPA or RECs.

3-point rating scale: High Moderate Low

2.1.2.2 Assessment criteria

PROCUREMENT METHODS FOR OWN OPERATIONS TODAY AND IN THE FUTURE		
	TRANSPARENCY	INTEGRITY
●	The company provides thorough details on the pursued renewable energy constructs. This includes details on the following: • Type of renewable electricity/supply construct • Location of renewable electricity generation capacity for each construct • Volume of electricity procured through each construct. • Agreements regarding the bundling (or cancellation) of any associated certificates.	96-100% of **procured** renewable electricity comes from high quality constructs, including: • On-site renewable electricity capacity with or without storage • High-quality PPAs with generation capacities within the same location as the electricity demand, including the bundling/transfer or cancellation of any associated certificates. • Long-term contracts with high quality utility-scale programmes, including the bundling/transfer or cancellation of any associated certificates.
◕	The company provides thorough details on the pursued renewable electricity constructs but one of the criteria above is not met.	66-95% of **procured** renewable electricity comes from high quality constructs.
◑	The company provides details on the pursued renewable electricity constructs, but only two of the criteria above are met.	36-65% high quality of **procured** renewable electricity comes from high quality constructs
◔	The company provides information, but the level of detail does not facilitate an understanding of the pursued procurement construct.	6-35% high quality of **procured** renewable electricity comes from high quality constructs
◌	No information identified.	0-5% of **procured** renewable electricity comes from high quality constructs

5-point rating scale: ● High ◕ Reasonable ◑ Moderate ◔ Shallow ◌ Limited

2.1.3 Matching renewable electricity

2.1.3.1 Guiding principles

Matching electricity consumption with renewable electricity generation on an annual basis has significant limitations. Most companies with 100% renewable electricity targets procure as much renewable electricity as they consume within a given year. While this approach has helped the energy transition in its initial phases, it does not lead to full grid decarbonisation because the wind or solar generation that a company purchases will in most cases not align with the timing of the company's electricity consumption (Miller, 2020; Xu *et al.*, 2023). For instance, a company with a PPA for a solar park does not receive sufficient electricity from this installation on cloudy days or during the night. Several studies found that annual matching results in limited or even zero emission reductions, amongst others, because the renewable electricity that companies procure is *not additional* and would have been generated anyway (de Chalendar and Benson, 2019; Xu *et al.*, 2023). Further, in some regions, renewable electricity procured to meet annual matching requirements displaces other renewable electricity projects (Xu *et al.*, 2023).

Hourly matching (also referred to as 24/7 matching or temporal matching) can help drive grid decarbonisation. Some companies have recognised the limitations of annual matching and are moving to hourly matching (e.g. Google and Microsoft). Companies that commit to match their electricity consumption with the generation of renewable electricity on an hourly basis provide a critical demand pull for additional and novel renewable energy generation and storage technologies that will be necessary to completely decarbonise power systems (Xu *et al.*, 2023). The hourly matching approach also requires companies to consider when to use electricity (i.e. when generation peaks) and may lead to efficiency improvements.

Carbon accounting should accurately reflect how much renewable electricity a company uses. Ultimately, carbon accounting should provide companies and externals with a thorough and granular understanding of the company's climate impact and electricity consumption footprint. Annual accounting allows companies to claim renewable electricity that they do not use, which gives a wrong impression of the company's climate impact and distracts from the fact that the majority of companies still rely on carbon-intensive electricity grids. Accounting based on hourly matching more accurately reflects companies' electricity footprint.

2.1.3.2 Assessment criteria

ACCOUNTING METHODS TODAY AND IN THE FUTURE		
	TRANSPARENCY	INTEGRITY
	The company explicitly states what accounting method it uses to match its electricity consumption with the generation of renewable electricity. ***<AND>*** The company describes any limitations associated with this accounting method.	The company matches its electricity consumption with the generation of renewable electricity 24/7 (on an hourly basis).
	N / A	N / A
	It can be reasonably determined – whether explicitly stated or not – which accounting method the company uses to match its electricity consumption with the generation of renewable electricity ***<BUT>*** The company does not describe any limitations associated with this accounting method.	N / A
	N / A	The company matches its electricity consumption with renewable electricity generation on an annual basis, using certificates generated in the same year as the company's electricity consumption.
	It is not clear what the accounting method is. The company provides no information on REC vintage.	The company uses RECs that predate the year of the company's electricity consumption.

5-point rating scale: High | Reasonable | Moderate | Shallow | Limited

2.2 Supply chain

2.2.1 Guiding principles for renewable electricity targets for the supply chain

Companies should commit to renewable electricity targets for the supply chain. Scope 3 emissions typically account for over 80% of corporates GHG footprint, with a large share of these emissions attributable to carbon-intensive energy processes. While there is more and more recognition of the need for companies to commit to emission reduction targets for their supply chain, only few companies set renewable electricity targets for their suppliers. However, like renewable electricity targets for own operations, setting such targets for the supply chain sends a clear and immediate signal to companies that they need to plan for and invest in renewable electricity today.

Companies should be clear about the scope and coverage of their renewable electricity targets for suppliers. For instance, they should clearly state which suppliers are covered by this commitment and what the relative importance of these suppliers is. Renewable electricity targets for the supply chain should cover suppliers' entire electricity demand. Otherwise, it would be easy for suppliers to allocate the renewable electricity from the grid to one brand, who can then claim 100% renewable electricity in the supply chain. However, this simply displaces the carbon-intensive electricity on the grid to other brands that source from the same supplier.

Where relevant, corporates should commit to electrifying all energy processes that can be electrified and to phasing out on-site fossil fuel power-generators. For example, tier 1 and tier 2 suppliers in the fashion sector often use on-site coal-fired boilers for their manufacturing process. If fashion brands set renewable electricity targets for their suppliers, but leave other carbon-intensive energy processes unaddressed, their electricity targets are potentially misleading.

2.2.2 Assessment criteria for renewable electricity targets for the supply chain

RENEWABLE ELECTRICITY TARGETS FOR THE SUPPLY CHAIN		
	TRANSPARENCY	INTEGRITY
	The company provides details on all of the following: • How many of its suppliers are covered by the claim. • Who its suppliers are • What share of upstream scope 3 emissions/inputs these suppliers represent • What share of the supplier's electricity demand is covered ***<AND>*** • When other major energy carriers exist, the company clearly communicates the limited relevance of electricity compared to other energy carriers in the supply chain *(The relevance of other energy carriers is determined at the sector level, through the judgement of the authors)*	The target covers the entire supply chain (i.e. tier 1, tier 2, tier 3 and tier 4 suppliers) ***<AND>*** Where relevant, the company commits to electrify all carbon-intensive processes that can be electrified in the supply chain.
	N / A	The target covers most but not all of the company's suppliers ***<AND>*** Where relevant, the company commits to electrify all carbon-intensive processes that can be electrified in the supply chain.
	The company provides details on all of the following: • How many of its suppliers are covered by the claim. • Who its suppliers are • What share of upstream scope 3 emissions/inputs these suppliers represent • What share of the supplier's electricity demand is covered ***<BUT>*** • When other major energy carriers exist, the company does not clearly communicate the limited relevance of electricity compared to other energy carriers in the supply chain	***<OR>*** Good coverage of the company's most relevant suppliers but most suppliers are not covered (expert judgment) ***<OR>*** The company does not commit to electrifying all carbon-intensive processes that can be electrified, when direct energy consumption currently accounts for a reasonably significant share (~20-50%) of energy consumption in the manufacturing process.
	The company provides some details on the coverage of its target, but these are insufficient to understand the significance of this target.	The target leaves out a substantial share of suppliers. ***<OR>*** The renewable electricity target covers only the contractor's output and not suppliers' entire electricity consumption. ***<OR>*** The company does not commit to electrifying all carbon-intensive processes that can be electrified, when direct energy consumption accounts for the majority of energy consumption (>50%) in the manufacturing process.
	The company provides very little or no details on the coverage of its target for renewable electricity in the supply chain.	The company has no renewable electricity target for the supply chain.

5-point rating scale: High | Reasonable | Moderate | Shallow | Limited

2.2.3 Guiding principles for support measures

Ambitious companies should commit to support their suppliers in sourcing renewable electricity. Scope 3 emissions typically account for over 80% - and sometimes close to a 100% - of company's GHG footprint. Switching to renewable electricity in the supply chain is critical to reducing those emissions. However, many suppliers likely lack the necessary expertise and/or financial resources to procure high-quality renewable electricity; or their electricity demand is not large enough to make PPAs economically viable. Large corporates can support their suppliers in various way, for instance by providing guidance and training or setting up collective PPAs.

Companies can encourage their suppliers to switch to renewables by requiring them to set renewable electricity targets and providing appropriate incentives for this transition – either in the form of knowledge transfer, financial support, or collective renewable procurement frameworks. Table 9 gives a non-exhaustive overview of support measures that companies can take.

Table 9: Non-exhaustive overview of support measures for renewable electricity in the supply chain

TYPE OF SUPPORT	MEASURES
Capacity building	Provision of information or training
	Country-specific briefings on available renewable electricity procurement constructs
	Portal on best available technologies for various stages of the manufacturing process
Enabling measures	Financial support for RE strategy
Facilitating measures	Facilitation of collective PPAs
	Collaborative funds for RE installations
	Direct investments in renewable electricity projects
Incentive instruments	Selection of suppliers depends on RE performance
	Preferential conditions for suppliers depending on RE performance
Requirements	Requirement for suppliers to disclose scope 1 and scope 2 emissions
	Requirement for suppliers to set emission reduction or renewable electricity targets
	Requirement for suppliers to phase out coal-fired boilers

2.2.4 Assessment criteria for support measures

SUPPORTING SUPPLIERS IN PROCURING RENEWABLE ELECTRICITY		
	TRANSPARENCY	INTEGRITY
	The company provides details on the type of support offered (e.g. training, financial support) and any requirements it sets for its suppliers. ***<AND>*** The company provides details on the scale of support offered, for instance, how much financial support is offered, to how many suppliers, what share of production are these suppliers responsible for, etc.	The company's support measures include the **majority of potential support measures** listed in Table 2 (capacity building, enabling measures, facilitating measures, incentive instruments and requirements). ***<AND>*** **Measures have depth and high supplier coverage:** measures cover nearly all suppliers, and recent progress in key suppliers' renewable energy shares indicate depth and conviction in the implementation of those support measures.
	N / A	The company's support measures include **the majority of potential support measures** listed in Table 2. **Supplier coverage or depth of measures is poor or unclear.** ***<OR>*** The company's support measures include **various but not most of the potential support measures** listed in Table 2. **Measures have depth and high supplier coverage.**
	The company provides a moderate level of detail on support for renewable electricity in the supply chain.	The company's support measures include **various but not most of the potential support measures** listed in Table 2. **Supplier coverage or depth of measures is poor or unclear.**
	N / A	The company takes some **capacity building measures**, such as provision of information or training, but the support does not go beyond this.
	The company provides very limited to no details on support for renewable electricity in the supply chain.	No support measures identified.

5-point rating scale: High | Reasonable | Moderate | Shallow | Limited

3 Advocacy for supportive policy frameworks

3.1 Own operations

3.1.1 Guiding principles

Major corporates have a key role and responsibility to lobby and advocate for policies and regulations that support the accessibility of higher quality renewable energy procurement constructs. In many regions, local policy and regulations represent a significant barrier for companies to reach for higher quality renewable energy procurement constructs. High quality power purchase agreements are usually only feasible where the electricity system is a liberalised market and where it is possible for private entities to sell their electricity and for consumers to select their providers. The quality of renewable energy certificate schemes also depends on regulatory design. Achievement of 24/7 renewable energy will depend on close cooperation with regulators and grid operators to advance the capabilities of transmission infrastructure, and accounting systems, amongst others. Major companies depend on these supporting policies and regulations to improve the quality of their renewable energy procurement, and they are often in a strong position to lobby for these developments, given their political influence and the significance of their electricity consumption in the areas that they operate.

Companies should publish details of the supportive policies that they require, and their lobbying efforts towards those policies. The UN High Level Expert Working Group for Net Zero Emission *Commitments* published the following recommendation for non-state actors to align lobbying and advocacy with their commitments:

> *"As part of their transition plan and annual disclosures, non-state actors should outline the specific policies and regulations, including carbon pricing, that they would need to cut emissions in line with a 1.5°C scenario. This disclosure should specify the emissions reductions possible if the listed policies and regulation by authorities and jurisdictions were in place."*

This recommendation is valid for all aspects of net zero emission targets, including efforts to decarbonise procured renewable electricity.

3.1.2 Assessment criteria

DISCLOSURE OF REQUIRED POLICY FRAMEWORK

TRANSPARENCY		INTEGRITY
●	Very detailed presentation of policy needs in public reports.	Integrity is not assessed for this element.
◕	Relatively detailed presentation of policy needs in public reports.	
◑	Brief and undetailed mention of policy needs in public reports.	
◔	Indication in public reports that that policy conditions represent a challenge, but without explicitly mention of policy needs.	
◌	No mention in public reports on the relevance of policy framework for the quality of the company's renewable electricity procurement strategy.	

DISCLOSURE OF ADVOCACY EFFORTS

TRANSPARENCY		INTEGRITY
●	The level of information provided facilitates a good understanding of the positions for which the company advocates, across *most* of the relevant geographies and spheres of policy. This may include: • Comprehensive compilation of all advocacy efforts across all relevant geographies • Publication of submissions to consultation processes	Integrity is not assessed for this element.
◕	The level of information provided facilitates a good understanding of the positions for which the company advocates, for *some* of the most relevant geographies and spheres of policy. This may include: • Publication of submissions to consultation processes • Publication of content from direct government engagement such as open letters	
◑	The level of information provided gives an *indication* of the positions for which the company advocates. This may include: • Redacted reporting on submissions to consultation processes, without publication of full submissions. • Redacted reporting of contents of direct government engagement, without publication of full contents. • Reference to membership of initiatives / coalitions along with clear details on the agenda of those groups and the content of their requests.	
◔	The company provides information, but the level of information identified does not facilitate an understanding of the positions for which the company advocates. This may include: • Reference to membership of initiatives / coalitions but without clear details on the agenda of those groups and the content of their requests. • Reference to participation in consultation processes or other relevant forum, but without clearer details on the agenda and contents of discussions.	
◌	Nothing identified at all	

5-point rating scale: ● High ◕ Reasonable ◑ Moderate ◔ Shallow ◌ Limited

3.2 Supply chain

The guiding principles and assessment criteria for advocacy for supportive policy frameworks in the supply chain are the same as for own operations above.

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