

Scope 2 Emissions: Procurement as a Lever for Climate-Neutral Energy Use

Scope 2 emissions are the indirect greenhouse gas emissions arising from the generation of purchased energy such as electricity, heat, steam or cooling. For industrial companies they are among the most transparent and most quickly influenceable emission categories, because energy procurement and energy efficiency can be controlled directly within procurement. Correct measurement and reporting in accordance with the GHG Protocol Scope 2 Guidance rules is both a reporting obligation and a strategic lever for CO2 targets. This article explains definitions, accounting methods, KPIs, risks and current developments from a technical procurement perspective.

Key facts

- Scope 2 covers indirect emissions from purchased energy: electricity, district heating, steam and cooling.
- Accounting follows the dual reporting rule: the location-based and market-based methods are reported in parallel.
- Power Purchase Agreements and energy attribute certificates are the most important instruments for emission reduction in procurement.
- Energy procurement and sustainability reporting require close collaboration between procurement, energy management and controlling.
- In practice, data collection and certificate verification typically cause the greatest workload in reporting.

Definition: Scope 2 Emissions

Scope 2 emissions denote, according to the GHG Protocol, the indirect greenhouse gas emissions from the generation of purchased energy that the company itself consumes. They arise physically at another emitter but are attributed to the energy consumer.

Distinction from Scope 1 and Scope 3

Scope 1 covers direct emissions from own installations and vehicles, Scope 3 all other indirect emissions along the value chain. Scope 2 forms the interface: the emissions source is the power plant, while the cause is the company's energy consumption. This distinction is relevant in practice because double counting between supplier (power plant) and purchaser (factory) must be avoided. For buyers this means: where green electricity is purchased, the company's own Scope 2 output falls, while Scope 1 arises at the energy generator.

- Scope 1: direct emissions from own sources
- Scope 2: indirect emissions from purchased energy
- Scope 3: all other upstream and downstream emissions

Scope of Energy Types Captured

What is captured is electricity, district heating, district cooling and steam from external suppliers. Energy generated in-house, for example from an energy centre based on a combined heat and power unit, falls under Scope 1 or is treated as self-consumption without external purchase. In practice, electricity emissions dominate the Scope 2 footprint; heat and steam purchasing play a major role especially in energy-intensive sectors such as metalworking, chemicals or food manufacturing. Energy consumption in leased premises and data centres may also fall under Scope 2, provided the energy purchase is contractually the company's responsibility.

Methods and Approach: Accounting under the Location-Based and Market-Based Methods

The GHG Protocol prescribes dual reporting for Scope 2: companies report their emissions both location-based and market-based. Both methods produce different results and have different steering effects.

Location-Based Method

The location-based method reflects the physical supply grid and uses average emission factors of the national or regional electricity mix. The company's own energy procurement has no influence on this; improvements only result from absolute consumption reduction. It is suitable for mapping the real physical intensity of energy consumption and for comparing sites with one another. For buyers it is the reference point against which the effect of efficiency measures such as LED retrofits, frequency converters or waste heat recovery can be measured.

Market-Based Method

The market-based method takes account of contractual arrangements on energy origin: Power Purchase Agreements, energy attribute certificates, green tariffs and supplier factors. It reflects what procurement actually sources and is therefore the central steering instrument of procurement. The prerequisite is high-quality evidence meeting the GHG Protocol's quality criteria, in particular temporal and geographical proximity and exclusivity of the certificate. Without reliable contractual data, the fallback is the grid residual mix, which typically yields a worse result.

- Power Purchase Agreements (PPAs) with long-term commitment
- Energy attribute certificates or Guarantees of Origin
- Supplier-specific emission factors with evidence
- Untracked residual mix factors for electricity not covered by contracts

Approach in the Procurement Process

The process starts with an energy consumption analysis per site and cost centre, followed by the procurement of suitable contract structures. In bid negotiations with energy suppliers or PPA providers, energy attribute certificates, price structure and delivery duration are among the standard award criteria. Consumption and certificate data are then captured systematically, ideally integrated into existing Purchase-to-Pay and energy management processes. Regular reconciliation with sustainability and accounting teams ensures that certificates purchased are posted correctly and documented in accordance with reporting obligations.

Key KPIs for Steering Scope 2 Emissions

Scope 2 is steered via a small number of clearly measurable metrics. They connect the energy sector and procurement controlling and can be integrated into existing KPI systems.

Emissions Intensity and Consumption Metrics

The central metric is absolute Scope 2 emissions in tonnes of CO₂ equivalent per year, differentiated by location-based and market-based method. In addition, emissions intensity per unit of production is used, typically in kg CO₂e per unit of energy or product. Because it is set in relation to output, it counteracts consumption-increasing effects such as capacity expansion. In practice, companies also frequently report the share of renewable energy in total consumption as a target metric with annual reduction pathways.

Procurement and Quality Metrics

On the procurement side, the share of contractually covered green electricity, the certificate coverage rate and the difference between the location-based and market-based methods count as indicators of procurement quality. Also relevant are energy cost volatility and the deviation from the budgeted figure, comparable to a Purchase Price Variance (PPV) in energy procurement. These metrics are suitable for reporting to management and customers and can be combined with existing sustainability assessments such as an EcoVadis rating.

- Absolute Scope 2 emissions (t CO₂e, both methods)
- Emissions intensity per unit of product
- Share of contractually covered renewable energy
- Certificate coverage rate and residual mix share

Risks and Controls in Scope 2 Reporting

The greatest weakness of Scope 2 accounting lies in data and certificate quality. Errors jeopardise not only credibility but increasingly also regulatory compliance.

Data Quality and Certificate Risks

Common sources of error are incomplete consumption data, incorrect emission factors or certificates that were sold multiple times or not delivered in time. Double-used energy attribute certificates completely undermine the meaningfulness of the market-based method. Controls include reconciling certificate quantities against kilowatt hours consumed, verifying registry systems and contracts with clear liability for certificate delivery, analogous to an effective limitation of liability. Supplier evaluations should include certificate reliability as a criterion.

Regulatory and Communication Risks

In view of tightened reporting obligations, such as through EU reporting frameworks and due diligence requirements along the supply chain, inaccurate statements are becoming a liability and reputational risk. Greenwashing accusations loom if green tariffs are advertised without reliable evidence. Control instruments include the four-eyes principle for data release, internal audit of the energy balance and documented processes that fit into an overarching compliance and Business Continuity Plan (BCP) framework. Legal assessments of the specific reporting obligation should be professionally reviewed case by case.

Price and Supply Risks in Energy Procurement

Long-term PPAs reduce emissions but bind volumes and prices for years. Given price volatility in commodity and energy markets, a poorly dimensioned hedge can prove costly. Staggered contract horizons, partial volume flexibility and market monitoring before contract conclusion make sense. In bid negotiations, the provider's default risk should also be assessed, especially for long-running PPA structures, and secured through guarantees or replacement supply arrangements.

Current Developments around Scope 2 Emissions

Scope 2 sits at the intersection of energy prices, regulation and supply chain requirements. Several trends are changing the demands on procurement.

Tighter Evidence Criteria and 24/7 Accounting

Experts are discussing whether temporal matching (hourly matching of consumption and generation) should be given greater weight in future. Initial companies are already accounting for 24/7 carbon-free energy. For buyers this means structurally more complex procurement in the long term, because certificates must then be sourced not only annually and regionally but matched in time to the company's own consumption curve. Those who review contract structures for flexibility now are better positioned for this.

Supply Chain as a Lever: Scope 2 at Suppliers

For customers of a manufacturer, that manufacturer's energy consumption often falls under their Scope 3, which increases the pressure on suppliers to reduce their own Scope 2 emissions. Buyers should therefore anchor energy metrics in supplier evaluations and quality agreements and disclose them in new tenders. Platforms for supplier networks and sustainability ratings such as an EcoVadis rating provide standardised source data and facilitate comparison.

Digitalisation and Process Integration

Increasingly, energy and certificate data are being integrated into procurement and ERP systems in order to automate evaluations and handle exceptions systematically, for example missing certificate deliveries as a clearly defined exception management case. Automated reconciliations between consumption metering, invoice and certificate significantly reduce manual effort. Practice shows: those who treat Scope 2 as a procurement rather than a reporting issue achieve measurable results faster and simultaneously relieve the sustainability team.

Typical metrics

Absolute Scope 2 emissions: location-based and market-based in t CO₂e/year

Baseline metric of sustainability reporting, to be compared annually

Emissions intensity: typically kg CO₂e per unit of product

Neutralises consumption effects caused by production growth

Share of renewable energy: commonly a target corridor of 80–100% by 2030

Proportion of contractually bound or certified renewable electricity

Certificate coverage rate: > 100% of electricity consumed

Coverage of all kilowatt hours with valid energy attribute certificates

Practical Example

A mid-sized mechanical engineering company with three sites and around 15 GWh of annual electricity consumption faced the task of reporting its Scope 2 emissions reliably in its sustainability reporting. The site mix under the location-based method showed high output due to a fossil-dominated grid mix. Working with energy management, procurement developed a three-stage strategy and significantly reduced market-based emissions within two years, without increasing energy costs.

- Conclusion of a ten-year PPA covering a share of a wind farm for the largest site
- Complementary procurement of regional energy attribute certificates for the remaining sites
- Energy efficiency programme with frequency converters and waste heat recovery to reduce consumption
- Integration of certificate reconciliation into Purchase-to-Pay processes with defined exception management

Conclusion

For industrial companies, Scope 2 emissions are the most accessible entry point to decarbonisation because electricity and heat procurement lies directly within procurement. The dual reporting obligation under the location-based and market-based methods requires sound data and high-quality certificates, otherwise reputational and compliance risks loom. Those who systematically combine PPAs, energy attribute certificates and efficiency measures reduce emissions while simultaneously stabilising energy costs. The effort involved in data quality and contract management is manageable if Scope 2 is understood from the outset as a procurement task and not merely a reporting one. Buyers who act early here give their company measurable progress and a competitive advantage when meeting customer requirements.

Frequently asked questions

What are Scope 2 emissions in simple terms?

Scope 2 emissions are the greenhouse gases generated in producing the energy a company purchases, mainly electricity, heat, steam and cooling. They are attributed to the energy consumer even though they are generated elsewhere. Example: the CO₂ output of a coal-fired power plant whose electricity a factory consumes counts towards the factory's Scope 2.

What is the difference between Scope 1, 2 and 3?

Scope 1 covers direct emissions from own sources such as own facilities and vehicle fleet. Scope 2 captures indirect emissions from purchased energy. Scope 3 maps all other indirect emissions along the value chain, for example at suppliers, in transport or during product use. The three categories follow the GHG Protocol.

What is the difference between the location-based and market-based methods?

The location-based method uses the average emission factor of the regional electricity grid and reflects physical reality. The market-based method takes account of contractual arrangements such as PPAs and energy attribute certificates and thus shows the impact of energy procurement. The GHG Protocol requires both methods to be reported in parallel (dual reporting).

How can procurement reduce Scope 2 emissions?

The key levers are concluding Power Purchase Agreements, purchasing energy attribute certificates and switching to suppliers with demonstrably low emission factors. In addition, efficiency measures such as waste heat recovery, modern drives and load management reduce consumption and therefore emissions. Long-term contracts also stabilise energy costs.

What are energy attribute certificates and what are they needed for?

Energy attribute certificates (in Europe, Guarantees of Origin) prove that a specific quantity of electricity was generated from renewable sources. They make it possible to account for purchased electricity in the market-based method using the emission factor of the generation type. Quality, temporal and geographical proximity and the single use of the certificate are all important.

Which energy types fall under Scope 2?

All purchased forms of energy count: electricity, district heating, district cooling and industrial steam from external suppliers. The deciding factor is that generation takes place outside the company's own system boundary and the energy is purchased. Energy generated in-house with own installations, by contrast, falls under Scope 1.