ZF Supplier Guideline & FAQ on Green Energy

Version 2.1



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Change Log

Date	Type of Change	Description
2022-04-26	Creation	"ZF Supplier Guideline & FAQ on Green Electricity" V 1.1 published
2025-04-01	New Version 2.0	"ZF Supplier Guideline & FAQ on Green Energy" created • Rename of document title • Chapter 1 "Introduction" revised • Chapter 2.5 "Green Electricity Verification @Supplier" revised • New Chapters 3 "Energy Efficiency" included • Additional appendices in the Annex • Adapted Glossary
2026-07-01	New Version 2.1	• Chapter 2.5.1: Enhanced and further detailed the allocation of self-generated green electricity.(GE) • Chapter 2.5.3: Verification and auditing process further detailed; deadlines adapted; applicability of the ZF Supply Chain Audit Approach (ISRS 4400) extended to the ZF GE Minimum Requirement, subject to complexity assessment. • Appendix 9: Added Allocation Declaration templates.

Glossary

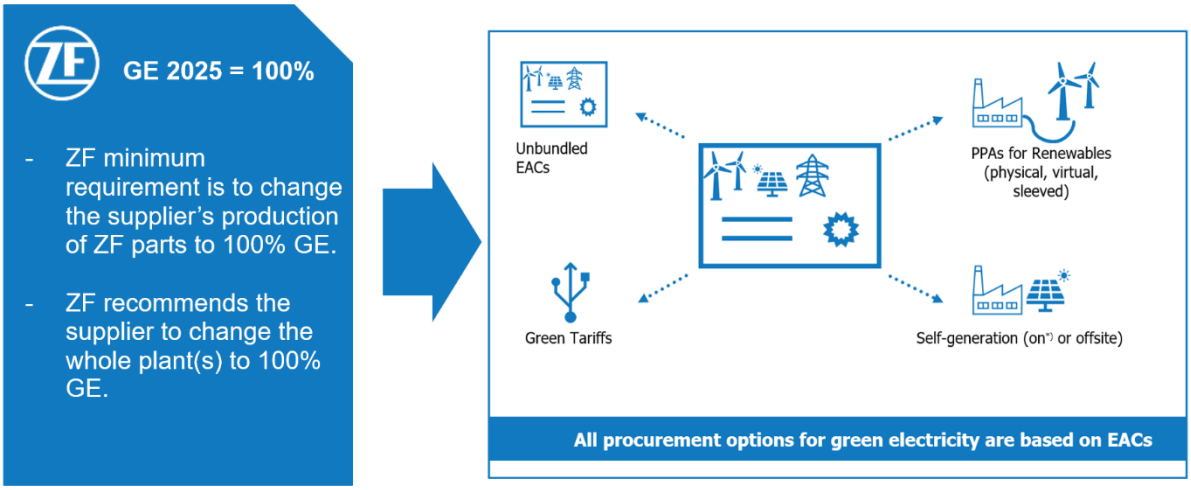
Term	Definition / Explanation
CHP	Combined Heat and Electricity. The two most common CHP system are: (a) Combustion turbine with heat recovery unit (b) Steam boiler with steam turbine
CDP	Carbon Disclosure Project CDP is a non-profit organization that helps companies to disclose their environmental impact.
EAC (unbundled)	Energy Attribute Certificate. Explanation in Chapter " *Introduction to Renewable* Electricity Certificates"
EECS	European Energy Certificate System EECS was developed to serve as the standardization of the European EAC market, i.e. for the European GoOs
GE	ZF Green Electricity = Renewable Electricity
GEC	Green Electricity Certificate (GEC) Type of EAC for renewable electricity generation in China.
GoO	Guarantees of Origin Type of EAC. Mainly used in Europe.
HVAC	Heating, Ventilation and Air Conditioning. Technologies used to control the temperature humidity and air quality in an enclosed space.
On grid / Off grid	The source of energy is connected (on grid) / not connected (off grid) to the electricity grid.
PPA (physical (sleeved), virtual, (synthetic))	Power Purchasing Agreement A PPA refers to a long-term electricity supply agreement between two parties, usually between an electricity producer and a customer. The different types of PPAs are explained in Chapter 2.4 *Green Electricity Procurement Options*
REC / I-REC	Renewable Energy Certificate / International Renewable Energy Certificate Types of EAC. REC is mainly used in the US and Canada. I-REC is used in over 45 countries spread over Asia, Oceania, Africa, South America and Middle America.
RE100	RE100 is a global initiative bringing together the world's most influential businesses committed to 100% RE
Sales	Can be interpreted for the purpose of this document either as revenue (measured under the supplier's local GAAP and functional currency) or as the weight (mass) of the goods supplied.

1. Introduction

With "Next Generation Mobility," ZF is pursuing an agile and integrated approach to shaping the fundamentally changing mobility needs of tomorrow. Sustainability is an integral part of ZF's strategy. Therefore, ZF has drawn up a climate strategy and aims to be climate neutral by 2040 for all three scopes of the Greenhouse Gas Protocol.
To meet the ambitious target of climate neutrality by 2040 along the entire value chain, the contribution of ZF´s supply chain partners is key. Transitioning suppliers to clean, renewable electricity and efficient energy consumption are important levers to reduce product-related carbon emissions.

ZF Expectations

- We expect all production material suppliers to either transition the manufacturing locations where ZF parts are produced to 100% Green Electricity (hereinafter referred to as "ZF GE Recommendation") or ensure that ZF parts production is powered by 100% Green Electricity (hereafter referred to as "ZF GE minimum requirement").
- Non-compliance will lead to disadvantages in new sourcing opportunities.
- Suppliers are expected to implement energy efficiency measures and reduce energy consumption in line with ISO 50001 standard or/and EMAS.



This document aims to support ZF suppliers in meeting the Green Electricity requirements set by ZF. It provides a brief explanation of the general market mechanism of Green Electricity and ensures the credibility of activities by outlining the minimum requirements for technology and contractual framework.
The Green Energy guidance also outlines the importance of Energy Efficiency and specifies the requirements and standards to be applied.

The Guide addresses the following commonly asked questions and provide links / resources to further information:

- What is renewable energy and green electricity?
- What are the eligible technologies?
- What procurement options exist?

- What kind of verification is needed?
- How do I communicate my green electricity purchase to ZF?
- What is Energy Efficiency and how to increase it?

2. Green Electricity (GE)

This chapter of the Green Energy Supplier Guide deals with the topic of Green Electricity as a subset of Green Energy. It provides an overview of ZF's GE definition, ZF's GE requirement for production material suppliers, procurement options and the process how the supplier shall verify the compliance with ZF's GE requirement.

2.1 ZF Definition of Green Electricity

The term green electricity can be used in several different ways. In this guide, green electricity refers specifically to electricity supplied from a subset of renewable resources that provide the highest environmental benefit. It is also defined as renewable electricity that replenish itself over short periods of time without being depleted.

Following types are eligible to be considered as renewable electricity.

Eligible Technologies:

- Wind, solar power (solar photovoltaic panels, solar thermal energy), hydro, geothermal
- Solid, liquid and gaseous forms of biomass from fuels (see Appendix 1 Renewable Energy Technologies fuel requirements)
- Ocean-based energy resources captured through tidal and wave technologies.

Excluded Technologies

Electricity from nuclear power, natural gas (e.g. CHP) and from waste combustion are not regarded as renewable electricity.

2.2 Green Electricity Categories

Companies can achieve 100% green electricity by choosing options from the following main categories or a mix of them:

1. Self-generation
   Production of renewable electricity from their own facilities. These can be onsite or offsite, grid-connected or entirely off the grid.
2. Purchased green electricity
   This may include direct purchases from specific generators (e.g. PPAs) or retail purchases from suppliers and utilities (e.g. green tariffs), and the purchase of stand-alone ("unbundled") EACs.

Thereof, ZF accepts the following seven categories as green:

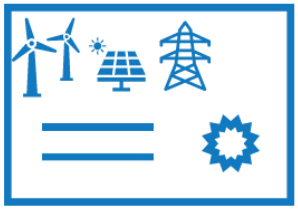
ZF Green Electricity Categories	
Self-Generation – Prove by meter	
1	Production and use of green electricity from supplier's own facilities that meet the eligible renewables definition are eligible sources. ▪ On-site/Off-site: Self-generation facility can be located on-site where the power is consumed (behind the meter or generation located on supplier´s premises and used on site), or it can be located off-site ▪ On-grid / Off-grid: Self-generation facility can be connected to the public grid, i.e. is supplying the generated and not self-consumed power into the grid or it can be off-grid, i.e. is not supplying power into the public grid.
Purchase Options – Prove via EACs / Power Contract	
A) Bundled Options	
2	PPA / sleeved PPA
3	Virtual PPA
4	Green Electricity Tariff / Green Electricity Product (Electricity supplied by an electricity provider where the provider takes over the responsibility to provide the electricity either directly from renewable sources, for example through PPAs, or procures and redeems unbundled EACs for the supplied electricity)
B) Unbundled Options	
5	Unbundled regional/international EACs, e.g. GoOs, RECs, I-RECs
6	Unbundled national EACs, e.g. GECs, Indian RECs
7	Exceptions for unregulated markets: If I-RECs or other EACs are not applicable as proof of a renewable electricity delivery in the country the carbon emission occurs, an alternative type of proof must be chosen which is locally an accepted method during the time of production for example a local governmental system.

The different procurement options are explained in the Chapter 2.3 Green Electricity Procurement Options in more detail.

2.3 Introduction to Renewable Electricity Certificates

When a company wants to procure green electricity, it is important that the procurement not only includes the physical power but also the corresponding Energy Attribute Certificates (EACs). The reason is simple: All generated energy, whether renewable or fossil fuel based, is being fed into the same common grid. As it is not possible to physically trace renewable electricity from producer to consumer, EACs play an essential role as they solve the problem of identification, allocation and ownership of renewable electricity across a shared electric grid.

An EAC is the "ID-badge" for Electricity



- Electricity cannot physically be tracked between producer and consumer.
- Therefore, EAC book & claim accounting systems were established worldwide.
- EAC is a generic term for the different types of certificates of the different tracking systems which exist worldwide (REC, I-REC, GoO, etc.)
- EACs track the production and use of 1 MWh of electricity, along with its attributes:
  - Date of production
  - Location of generation device
  - Generation technology (wind, solar, hydro, etc.)
  - Age of production device

No claiming of green electricity without an EAC!

EACs have been established in a book and claim system to track the attributes of a given megawatt-hour (MWh) of electricity from a producer to a consumer. EACs can be seen as an "ID badge" for electricity. In the case of renewable EACs, they provide proof of the unique attributes of each MWh of produced renewable electricity, such as:

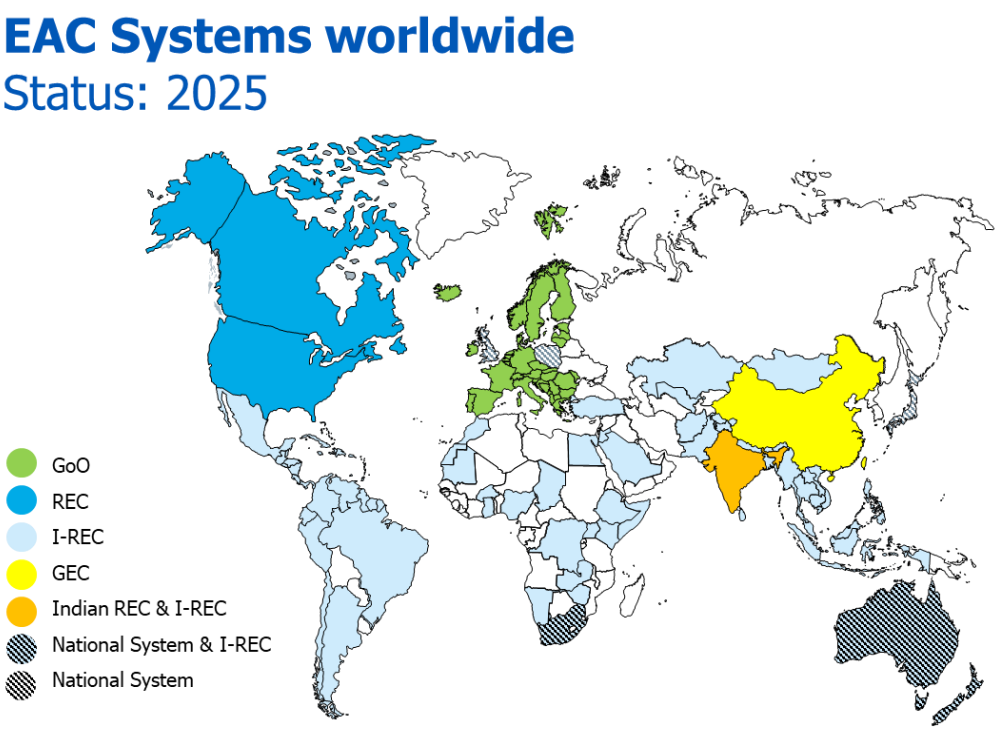
- time and date of production
- location of the generation device
- generation technology (e.g., wind, solar, hydro, biomass, geothermal)
- age of the production device

In addition to being essential to substantiate environmental claims, EACs help avoid double counting and claiming of the same generation attributes by more than one party. EACs must include all relevant information on the generation of their underlying green electricity including location, fuel type and month or quarter of generation. They must be tied to 1 MWh of actual green electricity generation no matter how large or small the facility is or where the facility is located relative to the consumer.

A key principle of book and claim systems is that the attributes of a given product are separated from the underlying product itself. This means that an EAC can be sold either together with the underlying power (= bundled), or separately from it (= unbundled).

Multiple EAC products had been developed being traded on different market worldwide. The most common EAC products are:

- RECs – North America
- Guarantees of Origin (GoOs) – Europe
- Green Electricity Certificates (GEC) - China
- Indian RECs - India
- International RECs (I-RECs) – many regions
- Tradable Instruments for Global Renewables (TIGRs) – some regions
- J-Credits – Japan



It is important to understand that EACs can only be produced and consumed within the same EAC market. It is not possible, for example to claim a REC produced in the US for a plant in Europe.
To safeguard credibility and prevent double counting in line with the GHG Protocol Scope 2 Quality Criteria, EACs should be sourced from the same market in which the electricity is consumed and should correspond as closely as possible to the consumption period.

Wherever possible, ZF recommends suppliers to use RECs, GoOs and I-RECs, because those are the most established products.

Avoiding Double Counting – The Role of EACs

Double Counting must be avoided to prevent misrepresentation of renewable energy use, reputational damage, and legal consequences. Eligible EACs or renewable electricity can be used once and only once. Renewable energy or EACs (or the renewable or environmental attributes incorporated in that EAC) that can be legitimately claimed by another party may not be used.

To ensure exclusive ownership and prevent double counting, all EACs must be formally retired by or on behalf of the claiming party. Retirement is the only mechanism that ensures an EAC is removed from the market and cannot be resold or reused by another entity.

Examples of prohibited double uses include, but are not limited to:

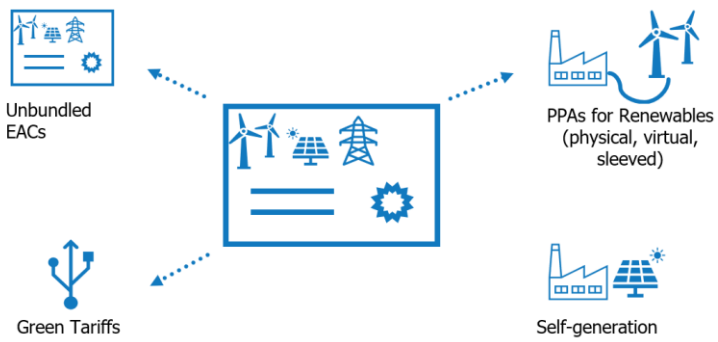
1. When the same EAC is sold by one party to more than one party, or any case where another party has a conflicting contract for the EACs or the renewable electricity.
2. When the same EAC is claimed by more than one party, including any expressed or implied environmental claims made pursuant to electricity coming from a renewable energy resource, environmental labelling or disclosure requirements. This includes representing the energy from which EACs are derived as renewable in calculating another entity's product or portfolio mix for the purposes of marketing or disclosure.
3. When the same EAC is used by an electricity provider or utility to meet an environmental mandate, such as an RPS, and is also used to satisfy customer sales or
4. Use of one or more attributes of the renewable energy or EAC by another party. This includes when an EAC is simultaneously sold to represent "renewable electricity" to one party, and one or more attributes associated with the same MWh of generation (such as CO2 reduction) are also sold, to another party.

2.4 Green Electricity Procurement Options

Green electricity can be procured in several different ways. However, all forms of green electricity supply and consumption need to include EACs. Green electricity purchases can either include both: the physical electricity and the EAC. In this case it is a "bundled" GE procurement option. Or physical electricity and EAC can be bought separately from each other, i.e. "unbundled".
If a company chooses to purchase green electricity they may procure it from a local distribution utility, from competitive power suppliers, or directly from a renewable energy generator. Those are usually "bundled" GE purchases. Even in countries where there are no green electricity suppliers and the utilities do not offer a green electricity option, any organization can buy EACs as a stand-alone product, "unbundled" from the organization's electricity purchases.

Another option is the self-generation of electricity either by owning or leasing green power generation facilities (e.g., solar, wind, biomass). Self-generation can be done on-site opportunities (e.g. with a photovoltaic on the plant's roof) or off-site. Self-generation usually do not include the generation EACs; so the proof of green electricity needs to be done by the meter.

EACs are the key instrument for tracking green electricity



All procurement options for green electricity are based on EACs

1. Self-generation (on-site / off-site)

If a GE system is physically located at the location and is directly connected to company's electrical circuits, it is considered on-site. If the system needs to be connected to utility-owned transmission or distribution infrastructure before providing GE to the consuming location, it is considered off-site.
A company may own the equipment and be responsible for maintenance and operation, but it can also be contracted to an external service provider. Since self-generation usually requires an up-front capital investment and the power generation facilities need space accordingly, this option is not applicable for all organizations.
The self-consumption of self-generated GE is a valid source of GE. However, usually there are no EACs generated for the self-consumed GE.

2. Purchasing Power Agreements (PPAs)

A Power Purchase Agreement (PPA) is a long-term agreement between a power producer and a customer (a consumer or trader of electricity). The PPA defines the terms of the agreement, such as the amount of electricity to be supplied and the price to be negotiated. For the buying companies PPAs offer a long-term supply of green electricity with stability in prices, often at or below current market prices. PPAs are mainly used by large-scale electricity consumers. There are different types of PPAs available:

a. Physical PPA
   Characteristic: The power producer (directly) ensures the customer's supply.
   I. Onsite-PPA
      The generation plant is located behind the meter of the consumer, i.e. on-site at a consuming company. For example, a company opts to outsource the installation and operation of a photovoltaic on the plant's roof to an electricity producer. For this purpose, the company enters an on-site PPA with the producer, who now installs the photovoltaic system on the roof and sells the electricity generated directly to the company.
   II. Offsite-PPA
      In contrast to on-site PPAs, the producer delivers the electricity to the consumer through the public grid. The power generation system does not need to be located close to the consumer. This provides additional flexibility, as the plant operator can now choose locations with optimal conditions or a plant that already exists.

b. Sleeved-PPA
   Characteristic: Between the power producer and the consuming customer, an energy service provider acts as intermediary and ensures the customer's supply.
   The service provider might offer different services, e.g. balancing group management, preparing feed-in forecasts, marketing green certificates, or assuming various risks.

c. Virtual PPA (a.k.a. synthetic PPA)
   Characteristic: Producer and customer agree to a Contract for Difference (CfD)
   GE project developers sometimes enter into virtual PPAs with energy consumers to get financing. By entering into a virtual PPA the customer guarantees the owner of the GE project a

certain fixed price for the electricity they sell to the electric grid. When the GE project is complete, the developer of the renewable project sells the electricity to the grid. Now two situations can occur:

I. If the electricity sells to the grid for less than the guaranteed fixed price, the customer will pay the difference.

II. If the electricity sells to the grid for more than the fixed price, the customer will make money.

Benefits: The developer has the price security it needs to get financing for the project, and the customer has both price stability and the opportunity to make money.

3. Green Tariffs
   A green tariff is a contract between the electricity supplier (a utility, or other power developer or market entity) and the consuming customer through a special utility tariff rate. The supplier matches the electricity consumed by the customer and delivered through the grid with renewable electricity produced or purchased from a variety of sources and/or projects.
   The electricity supplier shall purchase and retire or retain certificates on behalf of the consuming company making the claims.

4. Unbundled EACs
   As described in the Chapter 2.3 EACs can either be sold "bundled" with the underlying physical electricity (e.g. PPA/Green Tariff), or "unbundled" from it. Thus, the consuming company may choose to buy both power and attributes from the same power producer or buy both from separate suppliers.
   With either procurement choice, the fundamental principles remain the same. If customers are buying EACs for renewable electricity – no matter bundled or unbundled – they are providing an income stream to renewable electricity producers, thus accelerating the energy transition. Companies may purchase unbundled certificates like RECs, GoOs and I-RECs separately from electricity to match with their electricity consumption from non-renewable sources.

2.5 Green Electricity Verification @Supplier

The GE Commitment which has been given to ZF needs to be verified by the supplier This verification will be conducted by an independent, registered auditor. This chapter describes the GE verification process.

2.5.1 Green Electricity Approaches at ZF

To meet ZF's sustainability expectations, suppliers may choose between two accepted approaches for sourcing and allocating green electricity:

- ZF GE Recommendation
  This approach requires that 100% of the electricity consumption — whether group-wide, company-wide, or at the manufacturing plant(s) listed in the contractual agreement with ZF — must be covered by eligible green electricity. Consequently, no separate allocation of electricity to ZF-related production is required, as the entire organization or specified site operates on renewable electricity.

- ZF GE Minimum Requirement
  Under this approach, the supplier must ensure that electricity used for ZF parts production is covered by 100% green electricity. This requires a transparent and auditable allocation, supported by documentation that verifies the electricity volumes assigned to ZF-related production.

The table below summarizes the key differences between both implementation models. While both approaches meet ZF's expectations, they vary in terms of operational complexity, documentation effort, and procurement flexibility. Although both approaches are accepted, the **GE Recommendation** offers advantages in terms of simplicity, lower verification effort, and reduced risk of double counting.

Aspect	ZF GE Recommendation	ZF GE Minimum Requirement
Scope of Green Electricity	100% of electricity consumption at the manufacturing site, company-wide, or group-wide	100% of the electricity attributable to supplier's production of ZF parts
Electricity Consumption Allocation	Not required – the entire group, company, or manufacturing plant(s) listed in the contractual agreement operates on green electricity	Required – allocation to ZF-related production via metering or estimation
EAC Redemption Purpose	No specific redemption purpose required	Redemption purpose must state: "Used for the production of ZF parts"
Procurement Flexibility	All procurement models applicable (e.g., PPA, green tariffs, unbundled EACs, self-generation)	May be limited to options that allow clear attribution (e.g., registries with free-text fields)
Registry Compatibility	All recognized EAC registries may be used	Only registries supporting redemption purpose text are acceptable
Verification Complexity	Low – no allocation or additional documentation required	Higher – allocation and EAC attribution must be auditable

For self-generated and self-consumed electricity for which no EACs are issued, the supplier submits an Allocation Declaration (see Appendix 9 Allocation Declaration templates) together with the underlying evidence. The supplier declares that the relevant electricity is used exclusively for the production of ZF parts. It must be signed by the supplier's legal representatives.

Where the entity holding the commitment, electricity contract, or EACs differs from the entity producing the ZF parts, or only partly corresponds to it, the verification must include the producing entity.

Where multiple entities within the supplier group are involved in the production of the ZF parts, all such entities must be included in the verification, unless they have submitted separate commitments.

2.5.2 Measuring Electricity Consumption for ZF Parts

This section applies exclusively to suppliers applying the **ZF GE Minimum Requirement**, as they must determine the electricity volume attributable to ZF parts production.

ZF recommends the following approaches for measuring the electricity consumption:

1. Direct Metering

Where technically and economically feasible, dedicated electricity meters should be installed to directly measure the electricity used for ZF-related production processes. This approach offers a high degree of traceability and facilitates verification.

2. Mass Balance Allocation

If direct metering is not feasible, suppliers may use a mass balance method based on the share of ZF-related output. The calculation shall follow a two-step approach:

- Step 1:
  Determine the ratio of sales (revenue/weight) to ZF in relation to the total sales of the manufacturing site:
  ZF Ratio = ZF Sales of manufacturing site ÷ Total Sales of manufacturing site
- Step 2:
  Apply this ratio to the total electricity consumption of the site to estimate the electricity used for ZF parts production:
  ZF Electricity Consumption = ZF Ratio × Total Electricity Consumption

This method requires consistent and transparent underlying data. The allocation must be documented in a reproducible and auditable format.

2.5.3 Verification & Auditing

2.5.3.1 Purpose and Calculation of the Green Electricity Share

To ensure the credibility of reported green electricity use, ZF requires verification of the declared green electricity share related to supplier's production of ZF parts.

This requirement applies regardless of whether suppliers follow the:

- ZF GE Recommendation (100% green electricity for the entire production site), or
- ZF GE Minimum Requirement (100% green electricity for the share allocated to ZF parts).

In both cases, suppliers must provide verifiable documentation that supports the declared green electricity share.

The green electricity share represents the proportion of electricity used for ZF parts production that is covered by eligible renewable electricity depending on the approach used. It is calculated as follows:

Green Electricity Share (in %) = (Amount of Green Electricity Used) ÷ (Total Electricity Used) x 100

Both values used in this calculation must be based on consistent and auditable data. Acceptable sources of evidence include:

- Meter readings (start and end of year)
- Utility bills
- Power supply contracts
- Green electricity delivery statements
- Energy Attribute Certificates (EACs)
- Sales data used for mass balance allocation

In addition to the green electricity share, the supplier reports the portion of that share which is covered by unbundled EACs.

If the ZF GE Minimum Requirement is applied, the electricity volume used for ZF parts must be determined either through direct metering or a mass balance approach, as outlined above. The associated purchased green electricity must be substantiated by properly retired EACs, which must include a clear redemption purpose.

Redemption purpose by approach: under the ZF GE Minimum Requirement a redemption (cancellation) note that unambiguously allocates the cancelled EACs to ZF is always required, as a specific share is allocated to ZF. A suitable example is:

> "Cancelled exclusively for ZF Friedrichshafen AG: EACs for the electricity used in the manufacturing process in reporting year [YYYY]; not used or claimed for any other party or purpose."

The exact wording is not decisive, provided the cancellation note clearly identifies the allocation of the cancelled EACs to ZF Friedrichshafen AG and excludes double counting.

Under the ZF GE Recommendation it is only required for the manufacturing-plant(s) approach and allocation can be done regarding the manufacturing plant instead of ZF; for the group-wide or company-wide scope it is not needed, because the entire entity operates on green electricity." This ensures traceability and prevents double counting.

2.5.3.2 Verification Timeline and Process

Starting with the reporting year 2025, ZF will implement a rotating, sample-based verification process to review the reported green electricity share of its suppliers. This process is designed to ensure the accuracy, credibility, and traceability of reported data.

1. Selection of Suppliers

In the second half of the reporting year, ZF will inform the suppliers selected for verification. The selection is based on predefined sampling criteria and may include suppliers from different regions and across all procurement volumes.

2. Submission Deadline

Selected suppliers must upload their audit report which needs to state the green electricity share and the signed ZF form “Declaration on the fulfilment of ZF GE requirement” to the “Green Electricity Roadmap” section in the ZF SupplyOn Business Directory by 31 May of the following year (e.g., by 31 May 2027 for the 2026 reporting year).

3. Verification Scope

The verification will assess the accuracy and completeness of the green electricity share calculation, including the reported portion covered by unbundled EACs, as well as the traceability, consistency, and credibility of all supporting documentation.

2.5.3.3 Accepted Verification Approaches

The verification must be performed by an independent public auditor (Wirtschaftsprüfer) or a registered audit firm, applying ISRS 4400 or ISAE 3000 (Revised) / ISSA 5000. Certifications or audits issued by ISO or management-system certification bodies (for example ISO 50001 or ISO 14001 auditors) are not accepted for the verification of the green electricity share.

ZF recognizes two audit approaches as valid evidence for the reported green electricity share. Suppliers may choose the option that best fits their internal processes and reporting obligations.

1. ZF Supply Chain Audit Approach

This approach involves a standardized verification performed by an independent, registered auditor, based on the international standard ISRS 4400. It is specifically designed to meet ZF’s internal validation needs and focuses exclusively on the green electricity share declared to ZF.

Key characteristics:

- Conducted by an audit firm that is familiar with ZF's specific verification requirements
- Based primarily on document review
- Clearly defined audit scope and process steps
- Lower administrative and financial burden than external assurance
- Not suitable for regulatory or third-party reporting

2. General Limited Assurance Approach

This option involves an independent verification conducted by an external assurance provider, following recognized international standards such as ISAE 3000 (Revised) or ISSA 5000. Limited assurance is the minimum requirement and is sufficient for ZF purposes. A reasonable assurance engagement is also accepted and provides a higher level of assurance, but it is not required.

Key characteristics:

- Suitable for suppliers already subject to sustainability assurance obligations
- May be integrated with broader ESG or CSRD-related reporting
- Accepted for both regulatory and customer-facing disclosures (subject to agreement)
- Typically, more cost-intensive
- Offers higher credibility toward other external stakeholders

The audit approach to be taken strongly depends on the GE approach the supplier has chosen.

- If the supplier follows the ZF GE Recommendation, both audit approaches are applicable.
- If the supplier has chosen to follow the ZF GE Minimum Requirement, the limited assurance approach is applicable. The ZF Supply Chain Audit Approach (ISRS 4400) may also be used, but only depending on the complexity of the situation and therefore subject to a prior assessment. Where this prior assessment shows that the allocation is too complex, the ISRS 4400 approach is not sufficient and a limited assurance engagement (ISAE 3000 (Revised) / ISSA 5000) is required instead.

Audit Approach / GE Approaches	ZF GE Recommendation	ZF GE Minimum Requirement
ZF Supply Chain Audit Approach	x	(x)[1]
General Limited Assurance Approach	x	x

[1] Depending on a prior assessment.

2.5.3.4 Procurement Options: Verification and Best Practice Evidence

The type of documentation required for verification depends on the electricity procurement model employed. The following overview outlines the verification requirements and recommends best practice evidence for each procurement option.

Procurement Model	Verification Method	Best Practice Evidence
Self-Generation of Green Electricity	Metered production and consumption over the course of a year	- Meter readings (end of previous and current year) - Contract related to installation (e.g. purchase or lease) - Technical specifications on expected capacity - Optional: Commissioning or decommissioning certificates-Allocation Declaration (Appendix 9)
Bundled 100% Green Electricity Contract	Prove via Contract: Binding power contract confirming renewable energy supply, EAC retirement, penalties, and reporting terms Alternatively: Prove via EAC: retired on behalf of the supplier	- Utility bills showing annual electricity usage - Green electricity delivery report - Contract confirming renewable energy supply, EAC retirement, penalties, and terms - Utility bills showing annual electricity usage - Green electricity contract - EAC certificate - Retirement confirmation statement
Non-Renewable Electricity Contract + Unbundled EACs	Review of power contract plus proof of retired EACs	- Utility bills showing annual electricity usage - Fuel mix declaration from electricity provider - Power contract - EAC certificate - Retirement confirmation statement
Additional Unbundled EACs	EACs must originate from a recognized market and be properly allocated	- EAC certificate - Retirement confirmation statement

2.5.4 Consequences of Non-Compliance

Suppliers who fail to provide valid verification for their reported green electricity share within the specified timeline are considered non-compliant with ZF's sustainability requirements.

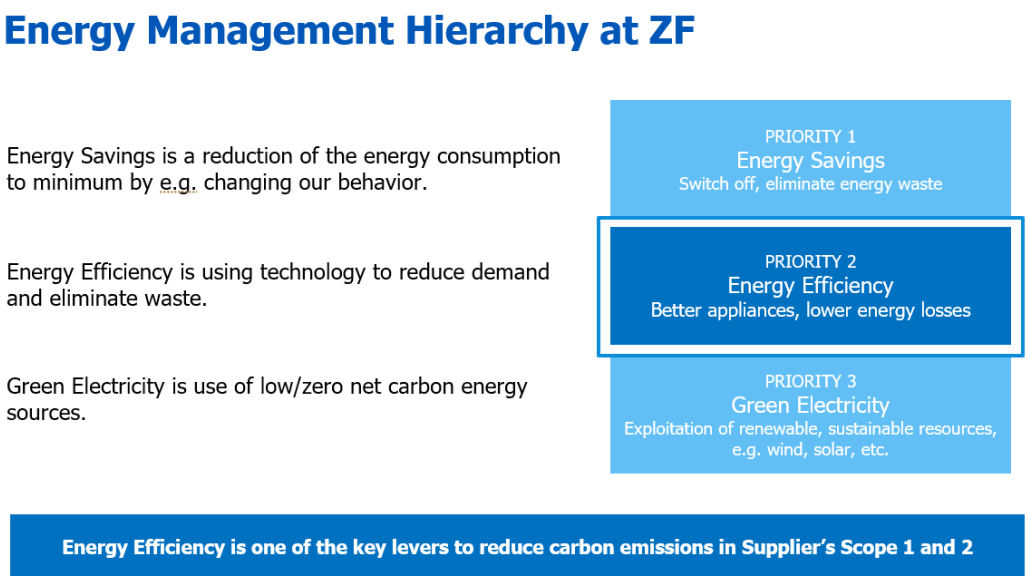
In such cases, ZF reserves the right to apply contractual measures in line with the applicable supplier agreements. ZF strongly encourages timely and transparent communication in the event of documentation issues or delays.

3. Energy Efficiency

3.1 Energy Management Hierarchy

The below ZF Energy Management Hierarchy represents the steps towards sustainable energy management:

- Priority 1 is Energy Savings, which is a reduction of the energy consumption to minimum.
- Priority 2 is Energy Efficiency, which is mainly based on technology to reduce demand and eliminate waste (e.g. energy efficient equipment, electrification or energy capturing investments).
- Priority 3 is Green Electricity described in the chapter above. It focuses on the exploitation of renewable energy sources substituting conventional power. It is low and carbon neutral and thus one of the most important decarbonization requirements towards our Suppliers.



3.2 Energy Efficiency and Regulatory Compliance

Energy efficiency is a critical focus for regulators, who establish guidelines and mechanisms to facilitate the reduction of energy consumption among entities. Specific EU and international mandates target the industrial sector and manufacturers, who are significant contributors to greenhouse gas emissions.

EU Regulations

The Energy Efficiency Directive (EU/2023/1791) mandates a legally binding target for EU member states to reduce final energy consumption by 11.7% by 2030, relative to 2020 projections. Article 8 of this directive stipulates additional measures for:

- Small and Medium Enterprises (SMEs): Obligated to conduct energy audits where substantial energy-saving potential exists.
- Large Enterprises: Defined as non-SMEs with a minimum of 250 employees or an annual turnover of at least 50 million EUR, these entities must implement energy audits in accordance with standards such as ISO 50001, EN 16247, or EMAS.

Global Applicability

The following instruments underpin energy efficiency targets and possess global applicability. ZF advocates for its EU and international suppliers to adopt these mechanisms to streamline the verification process. Non-EU suppliers are also encouraged to acquaint themselves with country-specific energy standards and policy requirements. For detailed information on non-EU regulations, including those in the USA, China, and Mexico, please refer to Appendix 6.

Table 1 EU/International Standards enabling energy management verification process

Details	ISO 50001 EnMS	EN 16247 Energy Audit	EMAS
Basic principles	Energy Management System (international standard) Aims to systematically optimize energy performance, reduce energy consumption and minimize environmental impact while improving energy efficiency	Energy Audit (EU standard) Aims to improve energy efficiency. Consistent examination of the energy consumption on plant/organization level to identify energy efficiency savings	Eco-Management and Audit Scheme (EU standard) Supports utilization of energy saving potentials on top of comprehensive improvement of environmental management
Benefits	Compatible with other management system standards such as ISO 9001 or ISO 14001. Fulfills EU Energy Efficiency Directive legal requirements acc. energy management.	Prepares for EnMS ISO 50001 implementation. Basis for the energy audit required by EU Energy Efficiency Directive. Principles and methodologies can be applied to organizations worldwide.	Open to public, enhance credibility with stakeholders. Holistic approach. Globally applicable.
Recommendations	Recommended certification for companies with high energy consumption e.g. non-SMEs. Not mandatory.	1) EN 16247-1 (general requirements applicable to all sectors) or 2) EN 16247-3: (more detailed for industrial processes) Mandatory every 4 years for EU non-SMEs. *Exemption: companies certified under ISO 50001 or EMAS.*	Suitable for enterprises of all sizes and from all sectors, both public and private. Not mandatory.

3.3 ZF Energy Efficiency Requirements towards Suppliers

ZF expect the Business Partners to drive internal energy efficiency initiative and set energy reduction targets to minimize their operational carbon footprint. Our requirements towards energy efficiency are part of the sourcing process and are included in the ZF Corporate Sustainability Bid Conditions.

1. Energy Management System: All suppliers are encouraged to establish and maintain an energy management system in accordance with ISO 50001 and/ or EMAS or equivalent.
2. Energy Efficiency Targets: Suppliers must develop a systematic approach to energy efficiency and set energy reduction targets, monitor energy consumption, and reduce its demand in line with ISO 50001 and/ or EMAS or equivalent.
3. GE Verification: To demonstrate their commitment, Suppliers are encouraged to submit energy audits and certificates through SupplyOn. This will positively influence the evaluation of their performance.

More details on energy efficiency measures and energy performance indicators, how to calculate Energy Efficiency, etc. can be found in Appendix 4 and 5. For international regulatory framework and local energy efficiency programs/incentives, please refer to Appendix 6 and 7.

Moreover, please see the training session: 'Energy Efficiency in the Supply Chain' available at ZF Supplier Academy (registration on ZF Supplier Academy required upfront).

For any other additional support regarding energy efficiency and green electricity, please contact us via sustainability.supplychain@zf.com

4. Frequently Asked Questions (FAQs)

Topic	Question	Answer
Definition of ZF Green Electricity	My grid mix shows a huge share of nuclear power. Is this considered green? If not, what can I do?	No. Nuclear is not considered green. To claim green electricity, apply one of the procurement options for green electricity, for example change to a green tariff or buy EACs.
Grid mix / EACs	My energy supplier's normal grid mix shows 50% RE. Thus, can I claim 50% green electricity?	No claiming of green electricity without an EAC. You need to get EACs from your energy supplier.
Grid mix / EACs	How can I claim the share of RE in my normal grid mix at my energy supplier?	You can't. You need to choose one of the procurement options for green electricity, e.g. green tariffs.
Grid mix / EACs	I bought a green tariff at my power supplier. Is this automatically considered green electricity?	No claiming of green electricity without an EAC. Provide evidence that according EACs had been decommissioned.
Offsetting programs	Can I buy carbon offsets and claim them as green electricity?	No. This is not an option that ZF accepts as green electricity.
Share of Green Electricity	Our plant produces 25% for ZF and 75% for other customers not requiring green electricity. Do I need to switch my plant to 100% green electricity anyway?	No. But it would be easier for the supplier to proof it, if the plant is 100% on green electricity. In the case you are only buying a share of green electricity especially for ZF, you must proof that the share is really used for ZF products only and not for other customers or double counted. Best would be that an external auditor approves that green electricity is used for ZF only.
Purchasing Options	I am a small/medium sized enterprise (SME). Can you give me a recommendation which purchasing options I should prefer?	As an SME with a consumption <30 GWh per year, you will have troubles to purchase PPAs because most of the providers will require a minimum of energy consumption. You might also struggle with investments into on-site generation. Thus, the two options are potentially best for SMEs: 1. Green tariffs 2. Unbundled EACs
Purchasing Options	I often hear that GE is not available worldwide, for example in China. Is that correct?	No. GE is available in all developed countries (e.g. see https://www.iea.org/reports/renewables-2024)
On-site generation	Is a CHP considered green?	It depends on how the CHP is fueled. If it runs with natural gas it's not green. If bio-based fuels are used, e.g. woody waste it's considered green. If renewable fuels of non-biological origin (RFNBO), e.g. renewable hydrogen are used, it is considered green, too.
On-site generation	I have installed an off-grid solar panel on my roof. It covers 10% of my overall power consumption. Can I automatically claim it as renewable energy (RE)? Can I assign those 10% all to ZF products although they only make 25% of my overall production volume?	No. Even for an on-site off-grid electricity production, the verification of the attributes of the RE is required to make a claim. You need to proof the yearly production of your solar panel. Then you need to proof what the energy consumption for the ZF products in your plant is. The share of energy consumption covered by the solar panel energy production you can claim green. This "mass-balance" approach as well as the usage of the produced electricity for ZF only, needs to be approved by an external auditor.
EAC markets	Can I transfer an EAC from one market to the other, for example buy a REC in the US and account it for my plant in China?	No. Green electricity/EACs needs to be sourced from the same EAC market as the consuming company.

EAC markets	Can I apply an EAC for one country to another country of the same EAC market, for example buy a GoO in Spain and account it for my plant in Germany?	Yes. Germany and Spain belong to the same EAC market (EECS – Guarantees of Origin), so a GoO is valid for all countries belonging to that market.
EAC markets	In which county do I have to claim the green electricity?	There are regulatory restrictions. The cancellation of EACs (= green electricity claim) needs to be carried out in the country of electricity consumption.
Verification @supplier	Can I proof the fulfillment of my GE commitment towards ZF other than with the ZF GE Declaration form?	No. And that is also in the interest of the suppliers. The verification will need the supplier to give transparency to electricity consumption and purchases, power contracts etc. This information should be given to a third party auditor.
Evidence / Allocation Declaration	We were not aware of the redemption note requirement, can we allocate the EACs to ZF in some other way?	In exceptional cases the allocation to ZF may be demonstrated by an Allocation Declaration (see Appendix 9), submitted together with the underlying evidence. This applies to EACs already retired in the corresponding amount before the ZF redemption note could be applied, where the retirement can no longer be amended. The Allocation Declaration is admissible only where: (1) the standard mechanism (the redemption note) was objectively not available or could no longer be applied; (2) the omission was not intentional and did not serve to circumvent the requirement, it is sufficient if the redemption note was simply not applied because the supplier was unaware of the requirement; and (3) the relevant quantity is unambiguously identifiable (EAC serial numbers, or generation facility and meter readings) and allocated exclusively to ZF, with no indication that the same electricity or EACs are or will be claimed elsewhere. These are requirements addressed to the supplier and are examined as part of the verification. Once the supplier is aware of the ZF requirement, the redemption note must be applied to any certificates retired thereafter.

5. Appendices

Appendix 1 Renewable Energy Technologies fuel requirements

Criteria to consider if renewable energy is produced with solid, liquid and gaseous forms of biomass from fuels:

Renewable Energy Technologies fuel requirements

The following types of renewable energy are eligible to be considered as renewable electricity

2. **Solid, liquid and gaseous forms of biomass from the following fuels**
   a. Woody waste, including but not limited to residues such as tops and limbs and urban wood waste, is eligible if the following requirements are met:
      i. The fuel does not contain paints, plastics, Formica, halogens, chlorine, or halide compounds like chromated copper arsenate–treated materials, arsenic, or contaminating treatments. Qualified wood fuels may contain de minimis quantities of wood containing the above excluded contaminates. Railroad ties and utility poles are excluded from eligibility.
      ii. Forestry-derived fuels originate from forests that were managed in accordance with national or regional best management practices and regulations;
      iii. Forestry-derived fuels were removed in accordance with State or Provincial best management practices and regulations; and
      iv. The fuel is **not derived** from whole trees unless at least one of the following is met:
         - The whole trees are urban wood waste such as used Christmas trees;
         - The whole trees are part of a thinning required for maintenance of existing roads. Such roads are not on protected lands or wilderness.
      i. Land Fill gas and wastewater methane
      ii. Animal and other organic waste.
      iii. Energy crops, **excluding food crops** or **animal feed**, that have a rotation less than 10 years (e.g. poplar, willow, or eucalyptus), and meet at least one of the below criteria to avoid land conversion from forest land or displace food production:
         - Grown on agricultural land not in use for food production in the last two years; or
         - Grown on agricultural land in a way that does not displace food production.

Appendix 2 ZF form "Declaration on the fulfilment of ZF GE requirement"

Download latest version from download section of the ZF Supplier Board.

Declaration by the supplier on the fulfillment of ZF requirement "Green Electricity (GE) = 100%"

	From	To
Supplier Name:	_____	**ZF Friedrichshafen AG**
Address:	_____	Löwentaler Str. 20
	_____	88046 Friedrichshafen
	_____	**-hereinafter referred to as "ZF" or "ZF Group"-**
DUNS Number:	_____	
Manufacturing Locations:	See listed locations in Appendix A **-hereinafter referred to as "locations"-**	

Reporting period	**01 Jan – 31 Dec** _____
Scope *(tick one only)*	ZF GE Recommendation, scope: ☐ Group-wide ☐ Company-wide ☐ Manufacturing plant(s) (Please fill out Appendix A) ZF GE Minimum Requirement → method: ☐ Direct Metering (Please fill out Appendix A) ☐ Mass-Balance Allocation (Please fill out Appendix A)
Chosen verification approach *(tick one only)*	☐ **ZF Supply Chain GE Verification** ☐ **Limited Assurance Audit** (ISAE 3000 (Revised)/ ISSA 5000) ☐ **Reasonable Assurance Audit** (ISAE 3000 (Revised)/ISSA 5000)
Attachments required	**Appendix A** – Sites & allocation details (if applicable) **Appendix B** – Auditor's verification certificate

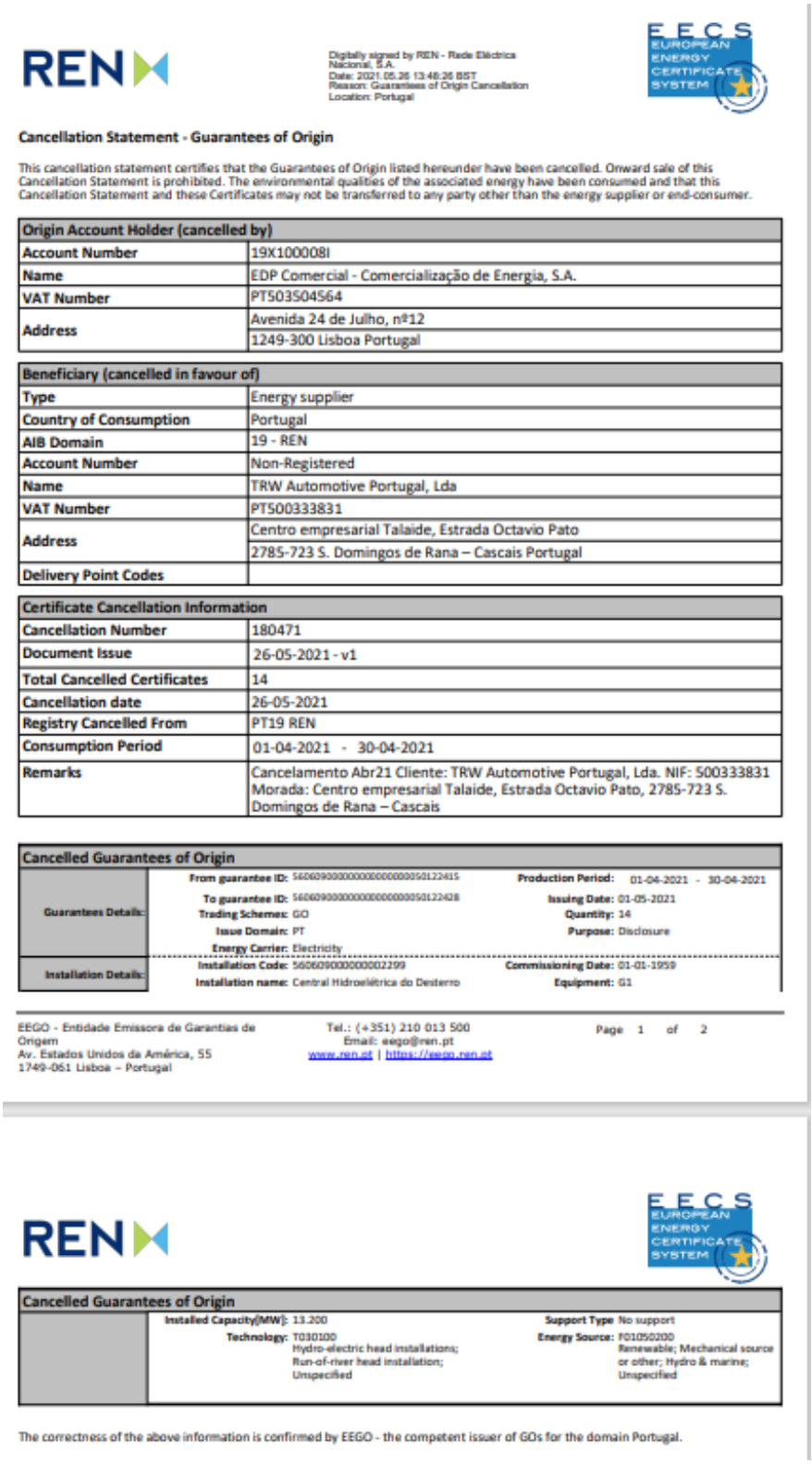
Supplier Declaration
We, **[legal name of supplier]**, hereby confirm that we have used **100 % green electricity** within the scope indicated above for the reporting period stated, in full conformity with the **ZF Supplier Guide & FAQ on Green Energy.** We further attest that all requested information and evidence have been provided completely and accurately to the independent, registered auditor.
The attached **verification certificate (Appendix B)** evidences that the selected verification approach (see table) was performed with a positive conclusion.

Signed by the legal representatives of the Supplier in the required signing majority:

Name / Position	Signature	Date / Place
_____	_____	_____
_____	_____	_____

Appendix 3 Examples of Cancellation Statements

EXAMPLE GoO-Europe:



REN

Digitally signed by REN - Rede Elétrica Nacional, S.A.
Date: 2021.05.26 13:48:26 BST
Reason: Guarantees of Origin Cancellation
Location: Portugal

EECS EUROPEAN ENERGY CERTIFICATE SYSTEM

Cancellation Statement - Guarantees of Origin

This cancellation statement certifies that the Guarantees of Origin listed hereunder have been cancelled. Onward sale of this Cancellation Statement is prohibited. The environmental qualities of the associated energy have been consumed and that this Cancellation Statement and these Certificates may not be transferred to any party other than the energy supplier or end-consumer.

Origin Account Holder (cancelled by)	
Account Number	19X100008I
Name	EDP Comercial - Comercialização de Energia, S.A.
VAT Number	PT503504564
Address	Avenida 24 de Julho, nº12 1249-300 Lisboa Portugal

Beneficiary (cancelled in favour of)	
Type	Energy supplier
Country of Consumption	Portugal
AIB Domain	19 - REN
Account Number	Non-Registered
Name	TRW Automotive Portugal, Lda
VAT Number	PT500333831
Address	Centro empresarial Talaide, Estrada Octavio Pato 2785-723 S. Domingos de Rana – Cascais Portugal
Delivery Point Codes	

Certificate Cancellation Information	
Cancellation Number	180471
Document Issue	26-05-2021 - v1
Total Cancelled Certificates	14
Cancellation date	26-05-2021
Registry Cancelled From	PT19 REN
Consumption Period	01-04-2021 - 30-04-2021
Remarks	Cancelamento Abr21 Cliente: TRW Automotive Portugal, Lda. NIF: 500333831 Morada: Centro empresarial Talaide, Estrada Octavio Pato, 2785-723 S. Domingos de Rana – Cascais

Cancelled Guarantees of Origin

Guarantees Details:	From guarantee ID: 560609000000000000000050122415	Production Period: 01-04-2021 - 30-04-2021
	To guarantee ID: 560609000000000000000050122428	Issuing Date: 01-05-2021
	Trading Schemes: GO	Quantity: 14
	Issue Domain: PT	Purpose: Disclosure
	Energy Carrier: Electricity	
Installation Details:	Installation Code: 560609000000002299	Commissioning Date: 01-01-1959
	Installation name: Central Hidroelétrica do Desterro	Equipment: G1

EEGO - Entidade Emissora de Garantias de Origem
Av. Estados Unidos da América, 55
1749-061 Lisboa – Portugal

Tel.: (+351) 210 013 500
Email: eego@ren.pt
www.ren.pt | https://eego.ren.pt

Page 1 of 2

REN

EECS EUROPEAN ENERGY CERTIFICATE SYSTEM

Cancelled Guarantees of Origin

	Installed Capacity(MW): 13.200	Support Type: No support
	Technology: T030100 Hydro-electric head installations; Run-of-river head installation; Unspecified	Energy Source: F01050200 Renewable; Mechanical source or other; Hydro & marine; Unspecified

The correctness of the above information is confirmed by EEGO - the competent issuer of GOs for the domain Portugal.

EXAMPLE I-REC :



THE INTERNATIONAL REC STANDARD

This Redemption Statement has been produced for

[redacted]

by

[redacted]

confirming the Redemption of

19 936

I-REC Certificates, representing 19 936 MWh of electricity generated from renewable sources

This Statement relates to electricity consumption located at or in

[redacted]

in respect of the reporting period

2021-01-01 to 2021-12-31

The stated Redemption Purpose is

Retired for the benefit of [redacted] - 2021

Evident

QR Code Verification

Verify the status of this Redemption Statement by scanning the QR code on the left and entering in the Verification Key below

Verification Key

[redacted]

https://evident.app/public/certificates/en/i44Cy559yi1/tQTcjNJmfODAbf1NdxOUKbmULIVoz0=

Appendix 4 Energy Efficiency Measures

Improving energy efficiency in manufacturing and facility management is crucial for reducing costs, enhancing productivity, and minimizing environmental impact. It will also ensure lower carbon footprint of the product alongside the whole value chain.

Energy Efficiency measures shall be established after analysis of main energy contributors, processes, and technologies in line with the International Energy Management System ISO 50001. Understanding the processes' specifics and on-site set up (e.g. the core and auxiliary processes) is crucial to define the energy demand and establish realistic levers for its reduction.

Energy Efficiency can be achieved through the **strategies** (as part of the ISO 50001):

- Investment in energy-efficient machinery and equipment, such as high-efficiency motors, variable speed drives, and advanced heating and cooling systems (HVAC),
- Electrification (e.g. electric vehicles, electrical resistance heating, heat pumps, induction, arc furnace, etc. Industry Decarbonization | Understand Energy Learning Hub),
- Use of more efficient (smaller, simpler) and fewer components and materials,
- Waste Heat Recovery: implement systems to capture and reuse waste heat from industrial processes. This can significantly reduce the need for additional energy inputs,
- Other.

The below Energy Efficiency measures are recommended as the **'quick fix'** solutions:

- Compressed Air Management approach inc. heat recovery to save energy and costs,
- Demand Management and Peak Load Management guidance to save energy and costs; it improves correlation between energy consumed and level of production,
- Compressed Air Management/ Air Leaks approach to minimize air demand, reduce compressed air use by implementing alternative means, e.g. detectors, repair air leaks (account for 10-30% of the air demand),
- Introduce quick replacement/ innovations such as improved insulation, new equipment, and new gas burners,
- Energy shutdown system to define shutdown plans for public holidays, weekends, etc.
- Monitoring system for electricity, gas, compressed air, energy monitoring software,
- Upgrade to energy-efficient lighting (e.g., LED),
- Process Optimization: Streamline manufacturing processes to reduce energy consumption. This includes optimizing production schedules, reducing idle times, and improving process control.

Additional **behavioral measures** leading towards Energy Efficiency:

- Raising Energy Awareness:
  - initiatives changing behavior: Energy Efficiency Campaign with tool - box talks, regular inspections with feedback, energy efficiency posters,
  - nominate responsible; Energy Champion/ Energy Efficiency Community to drive the lower energy consumption, etc.
- Behavioral incentives available on the market (e.g., tax credits and rebates, public information, programs and local funds),
- Other.

Appendix 5 Energy Performance Indicators EnPI

Energy Efficiency involves implementing strategies and technologies (measures described above) to reduce energy consumption while maintaining operational effectiveness. Energy Performance Indicators (EnPIs) are essential for measuring these strategies. Here are some of the key EnPIs examples:

- Energy Intensity: Measures the amount of energy used per unit of production or activity. For example, energy consumption per square meter in buildings or per unit of product in manufacturing.
- Energy Consumption per Time: Tracks the total energy consumed over a specific period, such as monthly or annually.
- Normalized Energy Consumption: Adjusts energy consumption data for variables like weather, production levels, or occupancy to provide a more accurate comparison over time.
- Energy Cost: Track the monetary value of energy consumed.
- Renewable Energy Usage: Monitors the proportion of energy obtained from renewable sources such as solar, wind or hydro - power.
- Energy Efficiency Ratio (EER): Calculates the reduction in energy use due to efficiency measures, often expressed as %. Can be used in e.g. HVAC systems to measure the cooling output divided by the electrical input (see chapter below)
- Other.

For more information on Energy Performance Indicators please refer to Vert Energy Group article.

How to calculate Energy Efficiency?

One of the Energy Performance Indicators is the Energy Efficiency Ratio. It measures how effectively energy is converted into useful work, so it will help to check the efficiency of the equipment and track performance.

It is typically expressed as a percentage and calculated using the formula:

Energy Efficiency %= (Energy Output/ Energy Input) *100%

For example, if a machine uses 1000 Joules of energy and produces 700 Joules of useful work, the efficiency would be: $\eta = (700\ J / 1000\ J) \times 100\% = 70\%$. This means the machine is 70% efficient, with the remaining 30% of energy likely lost as heat, sound, or other forms of waste energy.

Step by step:

Identify the system: determine the boundaries of the system you are analyzing. This could be a machine, process, or any other system where conversion takes place. Break it down into the core and auxiliary process identifying all sources of power.

1. Determine Input Energy: This is the total energy supplied to a system or device. It could be in forms like electrical energy, thermal energy, or mechanical energy.
    - Electrical Systems: Use a power meter or multimeter to measure the electrical energy supplied to the system. This is typically measured in kilowatt-hours (kWh) or joules (J) e.g. in bulbs, computers and electric motors,

- Mechanical Systems: Use a dynamometer or force sensors to measure the mechanical work output, often in joules (J) or kilowatt-hours (kWh), e.g. in. wind turbines, engines,
- Thermal Systems: Use calorimeter or temperature sensors to measure the heat energy produced, also in joules (J) or kilowatt-hours (kWh), e.g. in heating systems, engines, industrial processes.
- For Fuel-Based Systems: Measure the amount of fuel consumed and its energy content. For example, if using gasoline, you can use the energy content per liter (e.g., megajoules per liter). Units: Joules (J), Kilowatt-hours (kWh), etc.

2. Measure Useful Output Energy: This is the energy that performs the desired work (e.g., mechanical work, light, heat). Measure in the same way as energy input. (Units: the same as input energy units.)
3. Divide Output by Input: Divide the useful energy output by the total input energy to get the efficiency ratio.
4. Convert to Percentage: Multiply the efficiency ratio by 100 to express it as a percentage.

Appendix 6 International Energy Efficiency Legislation

China

has a comprehensive framework for energy efficiency legislation, which has evolved significantly over the years such as The National Energy Conservation Law promoting energy efficiency and its benefits or Energy Efficiency Standards and Labels to improve the efficiency of appliances and equipment.

The substantive gains in technical energy efficiency can be attributed to reinforcement of the mandatory TOP 10 000 scheme in the industrial sector. Top 10,000 Programme is a significant energy efficiency initiative in China, targeting the country's most energy-intensive enterprises. Enterprises under the program are required to establish energy conservation working groups, conduct energy audits, develop energy conservation plans, and implement energy management systems. They must also report their energy use and savings to local governments.

The United States

has a robust framework for energy efficiency legislation, aimed at reducing energy consumption and promoting sustainable practices. The foundational legislation is Energy Policy and Conservation Act (EPCA), which established energy conservation programs, including standards for industrial equipment.

mandates the establishment of minimum energy efficiency standards for a wide range of consumer products and industrial equipment. These standards are designed to reduce energy consumption and promote the use of energy-efficient technologies. The act also requires the development of standardized test procedures to measure the energy efficiency of appliances and equipment. These procedures ensure that products meet the established efficiency standards.

ENERGY STAR for Industry is a program by the U.S. Environmental Protection Agency (EPA) that helps industrial facilities improve their energy efficiency and reduce greenhouse gas emissions. The program offers tools for benchmarking energy performance, allowing facilities to compare their energy use with similar facilities and identify opportunities for improvement.

The Better Plants Program is another key initiative by the U.S. Department of Energy (DOE) aimed at improving energy efficiency in the industrial sector. Participating manufacturers commit to reducing their energy intensity by 25% over a ten-year period across all their U.S. operations and must report their energy performance annually to the DOE. This includes tracking and documenting energy use and savings.

Mexico

adopted for industrial motors (electric motors used in industrial applications to power machinery, equipment, etc.) Minimum Energy Performance Standards 'NOM-008-ENER-2001' 'Normas Oficiales Mexicanas de Eficiencia Energética'at the IE3 level (high efficiency) matching those across North America.

Moreover, while Mexico does not mandate industrial energy efficiency improvements, it has created a framework for voluntary agreements with industry for agreed improvements in energy efficiency.

Framework for Voluntary Agreements (Comisión Nacional para el Uso Eficiente de la Energía (CONUEE)) in energy efficiency is designed to encourage industries to adopt energy-saving measures without mandatory regulations. The framework targets some of the most energy-intensive sectors, including cement, steel, glass, and automobiles.

Energy Efficiency Mechanisms

There are also mechanisms allowing to verify the energy performance improvement as follows, yet the main energy audit remains EN 16247, which can be applied internationally as supporting ISO 50001. Yet, ZF Suppliers are recommended to familiarize themselves with the local standards.

In China we can differentiate the following mechanisms:

Energy Audit	China
General Principle for Energy Audits on Industrial and Commercial Enterprises (GB/T 17166)	This is China's national standard for energy auditing, which came into effect in 1998. It outlines the principles, content, methods, and procedures for conducting energy audits.
Energy Auditing Guidelines for Specific Industries	The Ministry of Industry and Information Technology (MIIT) has developed specific guidelines for energy auditing in industries such as iron and steel and building materials. It is mandatory under programs like Top 10,000. Microsoft Word - Energy auditing guidelines for iron and steel enterprises and building materials enterprises_FINAL_281013

While there is no single mandatory federal requirement for energy audits in the USA industrial sector, these various state, local, and voluntary programs play a significant role in promoting energy efficiency through regular energy assessments

Energy Audit	USA
ASHRAE 211-2018	Comprehensive guidelines for conducting energy audits in commercial buildings, which can also be adapted for industrial facilities
Industrial Energy Audit Guidebook:	This guidebook offers comprehensive guidelines for conducting energy audits in industrial facilities. It covers preparation, data collection, analysis, and reporting.
BPA Industrial Audit Guidebook	This guidebook provides a structured approach for performing walk-through energy audits of industrial facilities. It includes detailed procedures for assessing various systems such as lighting, motors, compressed air, steam, and refrigeration
DOE Industrial Assessment Centers (IACs)	The IACs follow specific protocols for conducting energy audits in small and medium-sized manufacturing facilities. These protocols include detailed procedures for data collection, analysis, and reporting.

In Mexico, energy audits are guided by specific standards to ensure thorough and effective evaluations. One key standard is:

Energy Audit	Mexico
NMX-J-SAA-50001-ANCE-IMNC-2018	This standard is based on the ISO 50001:2018 Energy Management Systems standard. It provides a framework for organizations to establish, implement, maintain, and improve an energy management system. Energy Audits For Commercial And Industrial Facilities - Mexico Energy Partners LLC

Appendix 7 International programs and initiatives

There are several programs and initiatives designed to provide financial support and incentives to enhance energy efficiency in manufacturing worldwide. Here are some notable examples:

In the EU:

Program	EU
European Green Deal	This comprehensive plan aims to make Europe the first climate-neutral continent by 2050. It includes various funding mechanisms and regulatory frameworks to support energy efficiency and sustainability in manufacturing. EU scales up green subsidies: How you can benefit from new support for clean investments | Global law firm | Norton Rose Fulbright
Horizon Europe	This research and innovation funding program supports projects that accelerate Europe's transition towards clean energy and climate neutrality. It includes funding for energy-efficient technologies in manufacturing EU funding possibilities in the energy sector
Innovation Fund	Managed by the European Climate, Infrastructure and Environment Executive Agency (CINEA), this fund supports investments in cutting-edge low-carbon and net-zero technologies. It funds projects in energy-intensive industries, carbon capture, renewable energy, and energy storage.

In the USA:

Program	USA
ENERGY STAR Program	This program offers a range of incentives for commercial and industrial facilities to improve energy efficiency. It includes technical assistance, financial incentives, and resources to help manufacturers reduce energy consumption and lower greenhouse gas emissions Energy Efficiency Programs and Incentives | ENERGY STAR
Property Assessed Clean Energy (PACE) Financing	Property Assessed Clean Energy (PACE) Financing: This program allows manufacturers to finance energy efficiency and renewable energy improvements through property tax assessments. It provides long-term, low-cost financing that is repaid over time through property taxes.
Other	See Appendix 5

In China:

Program	China
China Energy Efficiency	This World Bank project aims to improve energy efficiency in medium and large-sized industrial enterprises. It provides financial support and technical assistance

Financing (CEEF) Project	to help these enterprises implement energy-saving measures. China-China-Energy-Efficiency-Financing-P084874-Implementation-Status-Results-Report-Sequence-11.pdf

In Mexico:

Program	Mexico
Investment Programs and Projects (IPP)	the Mexican government is allocating specific funding to contribute to an efficient consumption of electric energy in the Electricity Federal Commission (CFE) buildings and production processes, through energy saving projects.

Appendix 8 Additional Support on Energy Efficiency

For more information on Energy Efficiency definition please refer to:

- Energy Efficiency | Understand Energy Learning Hub
- Energy Efficiency - Lesson - TeachEngineering

For more information related to **Energy Efficiency standards** please refer to:

- What is … EN 16247? - EnExpert
- ISO - ISO 50001 — Energy management
- New Energy Efficiency Directive published - European Commission

For more information related to **Energy Efficiency calculation** please refer to:

- Efficiency Calculator
- Energy: Efficiency, Power and Measurement | Planète Énergies
- PowerPoint Presentation (Energy modeling tools)

For more information on **Energy Efficiency measures** development and real case studies, please refer to the below:

- Energy Efficiency | Understand Energy Learning Hub:
- Carbon Trust Manufacturing-guide.pdf
- Best practices for small and medium enterprises: Energy Savings Tips for Small Businesses: Small and Medium Manufacturers | ENERGY STAR
- For information on successful ISO 50001 implementation, review the case study from Monterrey in Mexico on ISO 50001

Appendix 9 Allocation Declaration templates

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Allocation Declaration

Green Electricity allocated to the production of ZF parts

Template A: Self-generated and self-consumed renewable electricity (no EACs issued)

Supplier (legal name)	
Reporting period	01 January to 31 December _____
Beneficiary	ZF Friedrichshafen AG, Löwentaler Str. 20, 88046 Friedrichshafen, Germany

The Supplier declares, in respect of renewable electricity generated from its own (owned or leased) facility/ies and self-consumed during the reporting period, for which no Energy Attribute Certificates are issued, as follows:

Generation facility / location	Technology	Meter reading (start)	Meter reading (end)	Quantity self-consumed, allocated to ZF (MWh)

1 **Source.** The renewable electricity stated above was generated by our own facility/ies and self-consumed at the location(s) during the reporting period. No Energy Attribute Certificates have been or will be issued for this quantity that could be claimed by any party.

2 **Quantity and partial coverage.** At least the quantity stated above was generated and self-consumed. This quantity is the amount allocated to ZF under this declaration and need not cover the full electricity attributable to the production of ZF parts.

3 **Exclusive allocation, no double counting.** The stated quantity, and any environmental attributes associated with it, is allocated exclusively to ZF. It has not been and will not be used, sold, transferred or claimed again, by us or by any other party, towards any other customer, reporting, audit, accounting, environmental claim, label or mandate, now or in the future.

4 **Completeness and reliance.** The information and the attached evidence (generation and meter records) are complete and correct to the best of our knowledge and belief. We understand that the independent auditor and ZF Friedrichshafen AG rely on this declaration, which is provided solely for the verification of the Green Electricity Share related to ZF parts production and for no other purpose.

5 **Notification of changes.** We will notify ZF Friedrichshafen AG and the auditor without undue delay of any change that affects the reported green electricity share or the supporting evidence.

Signed by the legal representative(s) of the Supplier in the required signing majority.

Name / Position	Signature	Date / Place