EnergyTag

Granular Certificate Matching Standard

Version 1

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Note on Qualifying Language

Note: the guidance *shall* qualify the stringency of statements with the following terms (RFC 2119 compliant):

"Shall"	This word, or the terms "required" or "must", mean that the definition is an absolute requirement of the Standard.
"Shall not"	This phrase, or the phrase "must not", means that the definition is an absolute prohibition of the Standard.
"Should"	This word, or the adjective "recommended", means that there may exist valid reasons in particular circumstances to ignore a particular item, but the full implications must be understood and carefully weighed before choosing a different course.
"Should not"	This phrase, or the phrase "not recommended", means that there may exist valid reasons in particular circumstances when the particular behavior is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behavior described with this label.
"May"	This word, or the adjective "optional", means that an item is truly optional. One actor may choose to include the item because a particular marketplace requires it or because the vendor feels that it enhances the product, while another actor may omit the same item. An implementation which does not include a particular option must be prepared to interoperate with another implementation which does include the option, though perhaps with reduced functionality. In the same vein, an implementation which does include a particular option must be prepared to interoperate with another implementation which does not include the option (except, of course, for the feature the option provides).
"Could"	This word, or "*can*", implies that the person to whom it pertains has the power to do such a thing.

Chapter 1
GC Matching Standard

A Granular Certificate (GC) compliant with EnergyTag is a Certificate relating to the characteristics of energy produced during a period of one hour or less, Issued in compliance with the requirements and rules of operation of the EnergyTag GC Scheme Standard. The EnergyTag GC Scheme Standard is a separate Standard that lays out the requirements that must be met in order to create an EnergyTag compliant GC Scheme.

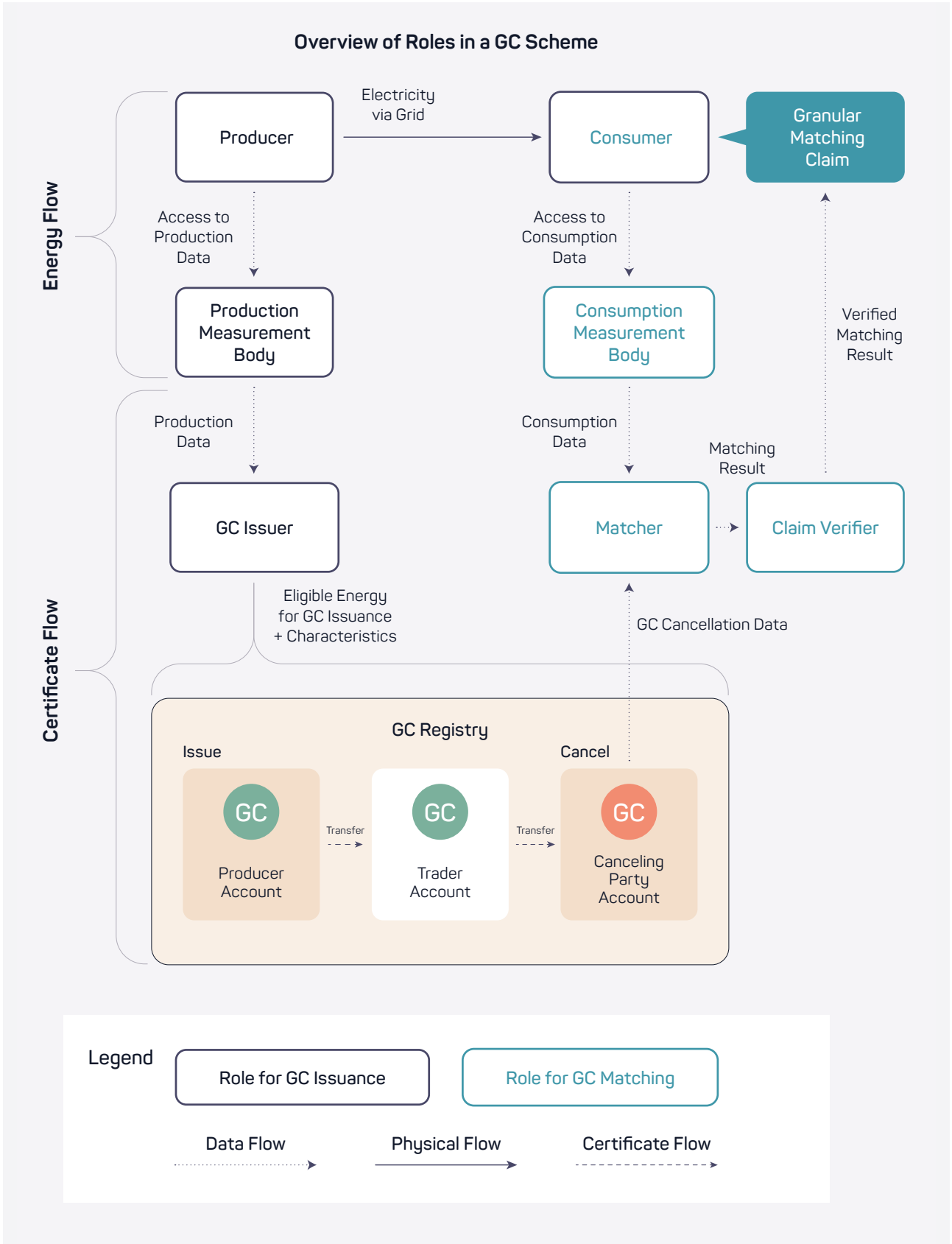
This document constitutes the GC Matching Standard that specifies a mechanism for matching GCs with consumption to enable temporal, geographic and attribute matching so that consumers can demonstrate compliance with regulations or meet their own voluntary goals.

Currently, this GC Matching Standard is focused on GC Matching for electricity. Other energy carriers may be under consideration in future versions.

1.1 Roles

Context and Definitions

This Chapter defines the mandatory and voluntary Roles of the operational participants needed to perform GC Matching Claims, and lists the requirements for each. Each Role represents a liable entity in a GC Scheme. For each Role, the Standard requirements refer to both the parent organization and its affiliates. Roles that are not involved in Matching Claims, are explained in the Annex with Definitions, and their requirements are elaborated in the GC Scheme Standard.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Issue
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GC
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Transfer
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Trader Account
Canceling Party Account
Legend
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Role for GC Matching
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Certificate Flow

Requirements

There are various Roles involved in the administration of a GC Scheme.

- Unless explicitly stated otherwise, these *may* or *may not* be vested in the same party. Where they are vested in several parties, attention *shall* be given to the interaction between the various Roles, with some interactions being mandatory to ensure trust in the Scheme.

Measurement Body

A Measurement Body:

- *shall* exist and be identified in all GC Schemes,
- *shall* hold responsibility for the accuracy and reporting of measurement data, such that:
  - a Production Measurement Body is responsible for reporting accurate measurement data to the GC Issuer for the produced energy that is eligible for GCs, and
  - a Consumption Measurement Body is responsible for reporting to the Matcher accurate measurement data regarding the consumed energy to which canceled GCs are matched, and
- *shall* either be independent of production, trade and supply, OR be subject to regular independent third party audits to confirm the accuracy of the reported meter data.

Matcher

The Matcher:

- *shall* match energy consumption to GC Cancellation in accordance with a specified Matching Framework as laid out in 1.2 Matching GCs with Energy Consumption to determine the GC Matching Claim,
- *shall* ensure that GCs are Canceled against energy consumption measured at the relevant Consumption Points based on the Requirements for GC Matching in 1.2 Matching GCs with Energy Consumption,
- *shall* record the characteristics of the Energy Consumption to which a GC Matching Claim relates according to 1.2 Matching GCs with Energy Consumption,
- *shall* calculate the proportion of energy consumption that has been matched according to the Matching Framework,
- *shall* be identified by the Consumer/Supplier where a GC Matching Claim is made,
- *shall* ensure that the Consumer/Energy Supplier grants them adequate access to any information processing facilities (e.g. databases and cloud support where relevant), and
- *shall* document its procedures for Matching in order to enable verification by the Claim Verifier.

Claim Verifier (CV)

The CV:

- *shall* verify the GC Matching Claim by a Consumer/Supplier as matched by the Matcher,
- *shall* be identified by the Consumer/Supplier where a GC Matching Claim is made (e.g. see Temporal Matching and Geographical Matching in 1.2 Matching GCs with Energy Consumption),
- *shall* testify the percentage of temporal matching, the level of geographical matching, and which other attribute matching criteria are met. It *shall* also ensure the matching percentage claims and applied methodologies are accurate,
- *shall* confirm the uniqueness of the claim where GCs are canceled to claim the Attributes of specified energy consumption,
- *shall* be independent of the Consumer or Supplier whose Matching Claim is being verified,
- *shall* confirm the type of matching applied in relation with a specific claim of the Attributes of consumed energy (see types of matching laid out

in 1.2 Matching GCs with Energy Consumption),

- where the underlying EAC is distinct from the GCs issued for the same energy, the CV *shall* confirm that the EAC beneficiary either is the same as the GC beneficiary (config 2 or 3) or further allocates its claim to the beneficiary of the GCs (config 2),
- *shall* confirm whether there is a EAC Consumption Verifier in the respective Domain, and if this is the case, *shall* ensure that the EAC beneficiary recorded by that body, is the same as the beneficiary of the GCs or further allocates his claim to the beneficiary of the GCs,
- *shall* deploy appropriate methodologies and technical expertise to evaluate the quality of the data sets required for the relevant type of GC Matching,
- *shall* elaborate prevention and detection measures for measurement and matching errors and for Matching Fraud,
- *shall* put in place procedures for appropriate follow-up of any matching errors and/or Matching Fraud if detected,
- *shall* have procedures in place regarding liabilities of the parties they interact with for the verification of the GC Matching Claim,
- *shall* document its methodologies for verifying the matching and keep records of the verifications performed in the past 5 years. Such documentation may or may not be published but enables the auditability of the CV's methods and records, and
- *shall* ensure that the Consumer/Energy Supplier and the Matcher grant them adequate access to any information processing facilities (e.g. databases and cloud support where relevant).

Product Verification Body (PVB)

The PVB:

- *may* be a Role where product offerings[1] based on the GC Scheme are being made and used for claims by consumers,
- *shall* be independent of the body being audited, and
- *may* require substantiated claims to be of specific eligible sources of supply and comply with several product specifications and protections against double counting.

Consumer/Supplier

- A party who consumes or supplies energy and *may* make a claim regarding the Granular Matching of production Attributes to energy consumption,
- When such a claim is made, this *shall* comply with the requirements laid out in 1.2 Matching GCs with Energy Consumption.

EAC Consumption Verifier

- A party charged with the responsibility of verifying that the correct amount and type of EACs are adequately canceled for claims of the Attributes of consumed/supplied energy in a specific Domain,
- Where an EAC Consumption Verifier exists, in Configuration 2 and 3, it is essential to ensure consistency between the claim registered in relation with canceled EACs and the claim associated with canceled GCs. This is especially the case where legislation assigns such a role. See above: responsibilities of Claim Verifier.

Accreditation

Certain roles require accreditation in accordance with the EnergyTag Accreditation Process in order to be eligible for claims of EnergyTag compliance. See "Accreditation" section on the EnergyTag website.

[1] *A product could be, for example, a supplier offer which promised 80% 24/7 Carbon Free Energy over a year. Verification of the product would require information like GC Cancellation statements and production data.*

Permitted Role Combination in Matching Scheme

Each role in the Matching Scheme must be held by a party or entity, with certain role combinations being allowed while others are forbidden:

	GC Issuer/ Delegated GC Administrator	Matcher	Claim Verifier	Consumer/ Supplier
Responsibilities	Administers GC throughout its lifetime	Matches energy consumption to GC Cancellation	Verifies GC matching Claim as performed by Matcher	Makes GC Matching Claim
Role combination allowed	Matcher Not Consumer/ Supplier	Claim Verifier, Consumer/ Supplier, GC Issuer, Software Provider	Matcher Not Consumer/ Supplier	Matcher Not GC Issuer Not Claim Verifier

Explanatory Note #1: Combining Roles and Responsibilities

Role definition by responsibilities

Roles are defined by their responsibilities. This document does not exhaustively list all actions and tasks for a specific role. The actions undertaken under a Role, may depend on the way the responsibilities are implemented in practice.

Combination of Roles

Roles are defined in a way that identifies the key responsibilities. This enables each role to be performed by a separate party. Unless explicitly forbidden, it is possible that several roles are performed by the same party.

Conditional combination of Roles

For certain Roles, there may be conditions under which a combination of Roles works better. For example, the general idea is that the coexistence of the Matcher and Claim Verifier Roles covers the whole spectrum of actions related to quality assurance of the consumer's matching claim. While the Claim Verifier shall be independent of the Consumer, the Matcher may be the same organization as the Consumer, the Claim Verifier or completely independent. The role of Matcher could also be taken up by the same party as the GC Issuer. The implementation of the responsibilities may vary depending on the combination of roles in a single organization. For example, if GC Issuer and Claim Verifier are a governmentally appointed organization, independence between them is unlikely to be relevant. In general, the conditions under which a combination of Roles is or is not desirable will benefit from experience in the market.

1.2 Matching GCs with Energy Consumption

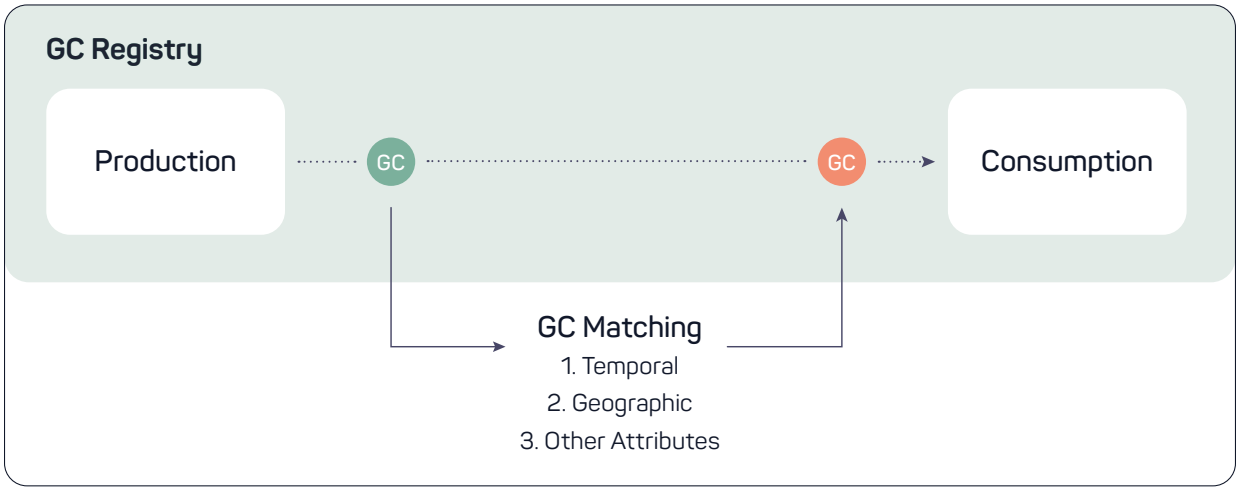
Context and Definitions

i) Context - Drivers for GC Matching

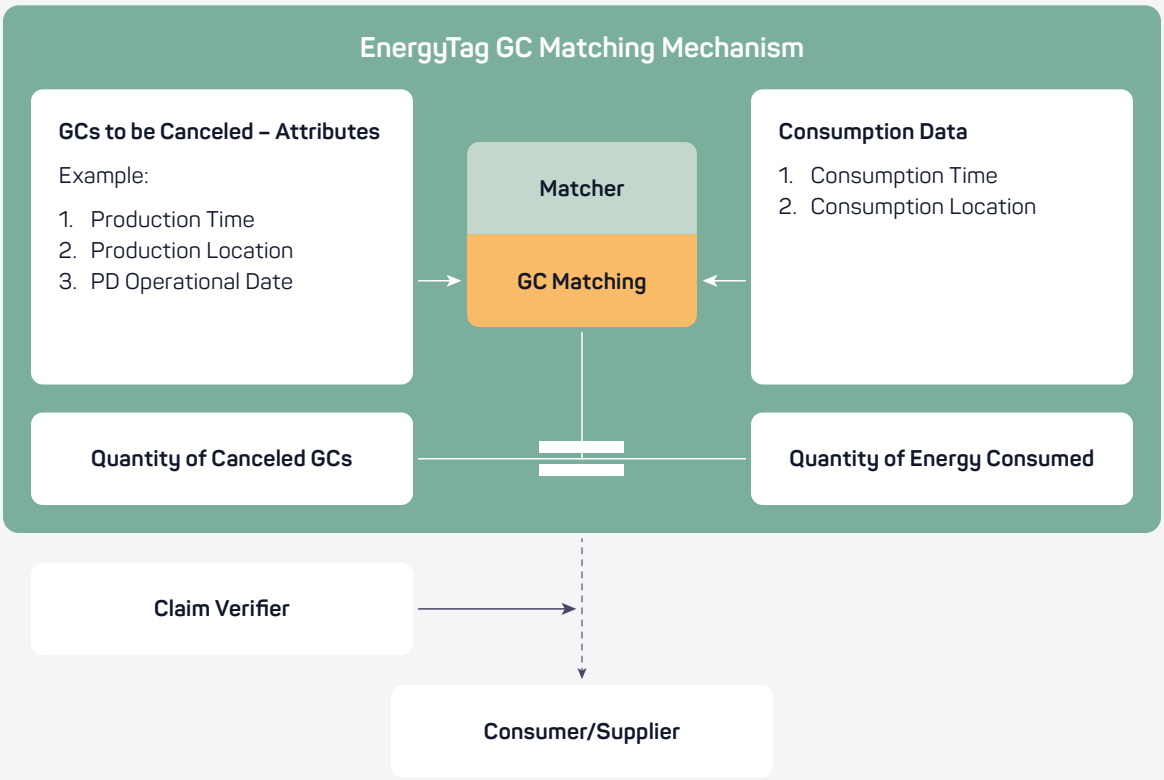
Some key drivers for Matching the Attributes of GCs to energy consumption include:

1. Corporate/Individual Goals: Several organizations have established Temporal and/or Geographical Matching goals (e.g. "100% or 24/7 Carbon Free Energy"),
2. Regulatory/Standard Compliance: adhering to a regulation or industry standard in order to gain recognition of product class or quality.

GC Matching Schematic



EnergyTag GC Matching Mechanism



Example GC Matching Claim *(By Consumer/Supplier)*

80% of consumption (i.e 5 TWh) in 2024 matched under the Matching Framework:

1. Temporal Matching Interval: 1 hour
2. Geographical Matching: Intra-Bidding Zone
3. Attribute Matching: Production Devices operational less than 3 years

ii) Definitions

GC Matching (or Granular Matching) = allocating Attributes of canceled GCs to a corresponding quantity of consumed energy, for well-specified Matching Features.

Matching Framework

The following Matching Features are elaborated:

GC Temporal Matching = GC Matching, whereby the (sub)hourly time period of energy production as recorded on the canceled GCs, *shall* at least on an hourly basis coincide with the hourly time period of energy consumption to which these GCs are allocated.

GC Geographical Matching = GC Matching, whereby the geographical area of energy production as recorded on the canceled GCs, shall relate to the geographical area of energy consumption to which these GCs are allocated. There are multiple categories of geographical matching; this Standard provides a language for identifying them in Annex 2 Geographical Matching Options.

GC Attribute Matching = GC Matching, whereby the Attributes of energy production as recorded on the canceled GCs, are attributed to the energy consumption to which these GCs are allocated.

Requirements

Requirements for consumer and/or supplier

Where an energy consumer or supplier makes a GC Matching Claim for a specific quantity of energy consumption, then they *shall* be transparent by communicating:

- how the Matching Framework is defined for each Matching Feature, including:
  - the Temporal Matching granularity (i.e. time interval length),
  - the Geographical Matching granularity (i.e Deliverability boundary),
  - which other Attributes are being matched to the respective quantity of energy consumption (e.g. date when the Production Device became operational).
- the proportion of energy consumption that has been matched according to the Matching Framework in the period being reported.

Requirements for GC Matching to consumption

Where GC Matching to energy consumption takes place:

- GC Matching *shall* be done as an ex-post process, after the measurement data of the respective energy consumption has become available, and after the relevant GCs have been acquired,
- Temporal Matching *shall* be demonstrated by proving that energy consumption volumes (i.e. Wh) are covered by the volume of Canceled GCs that have been issued for energy production in the same time interval,
- The energy consumption time interval *shall* at least on an hourly basis coincide with the production period for which the GC has been issued.

Where GC *Geographical* Matching is claimed:

- The Matching Framework communicated in the claim of the consumer/supplier, *shall* clarify the boundaries of the geographical area of production in relation to the geographical area of consumption of the energy represented by the GCs,
- The Matching Framework *may* be defined as in Annex 2 Geographical Matching Options, but may also be defined differently, depending on the relevant context for Geographical Matching set out in voluntary standards or in regulation.

Where GC *Attribute* Matching is claimed:

- The Matching Framework communicated in the claim of the consumer/supplier, *shall* clarify the

criteria that are complied with in the match, as follows from the Attributes of Canceled GCs (e.g, Production Device commissioning dates no earlier than a certain date, absence of public support granted to production of the energy, compliance with specific label scheme criteria, etc.).

1.3 Consumption Metering and Registration Data for Matching

Context and Definitions

This Chapter addresses the consumption data requirements where GCs are being used for Matching of Attributes of production to specific consumption of energy (e.g. Temporal and/or Geographical Matching).

Hourly or sub-hourly production and consumption data is a prerequisite for Temporal Matching.

Requirements

Consumption Data

- For GC matching, (sub)hourly consumption data is required, ideally of the same interval length as the time interval recorded on the GCs that are canceled for matching,
- In all cases where hourly (or sub-hourly) consumption data exists from a utility or energy network operator's metering or sub-metering system, that data *shall* be utilized,
- It *shall* be indicated whether the measured consumption for Matching is registered by a party independent from the consumer. If the meter-reading is done by a party that is not independent from the consumer, the Claim Verifier shall verify the meter quality and the registered consumption quantities.

However, given that hourly consumption data is not yet everywhere measured for all grid access points, there are two main options for practical implementation of matching:

- Hourly data from sub-metering systems along with monthly billing data *should* also be acceptable.[2] All data *shall* be of sufficient quality for hourly matching, with less than 0.5% inaccuracy during the matching period.
- The use of load profiles to estimate the distribution of (monthly or annually measured) consumption over specific (sub)hourly consumption periods *shall* only be allowed for a transition period and cannot be the long-term goal of a granular matching exercise. If hourly (or sub-hourly) metering data becomes available for a Consumption Point, that data should be utilized within 12 months of becoming available.

Consumption data reported to the Claim Verifier shall include:

- At the time of registration of the Consumption Point:
  - Customer ID,
  - Billing address,
  - Meter ID,
  - Meter type (utility, submeter),
  - Meter serial number (for auditability of the meter),
  - Indication of the relative location of the consumption meter compared to the grid access point and to various on-site consumers, Storage Systems, and Production Devices, if present, and
  - Where consumption matching is executed at the level of an aggregator or supplier to multiple consumers, the identification of this aggregator or supplier, in connection with the relevant consumption meters.
- Per measurement reporting:
  - Meter ID,
  - Timestamp (UTC "YYYY-MM-DDThh:mm:ssZ" interval starting, e.g. "2023-10-03T00:00:00Z"),

[2] *Monthly data is necessary to ensure that the sub-metering data is consistent with the consumption measured by the utility system operator.*

- Timestamp (UTC "YYYY-MM-DDThh:mm:ssZ" interval ending, e.g. "2023-10-03T00:14:95Z"),
- Quantity of energy consumption in the (sub) hourly consumption interval (Wh)[3],
- Monthly energy consumption (from billing) (Wh)[4], and
- If load profiles are used to generate the hourly data, load profile data and documentation should be included.

Data Transfer

- Consumption data shall be made available to the Matcher and the Claim Verifier on at least on an annual basis.

1.4 Fraud Detection and Prevention

Context and Definitions

Fraud is a major risk in designing and managing EAC, GC and consumption matching Schemes, due to the serious consequences of fraud on system integrity and trust. Therefore, in order to build knowledge and awareness, this chapter provides context and definitions of the key aspects of fraud prevention. The key questions that should be addressed when considering fraud prevention are: what risks are induced by GCs being exchanged between countries in different systems? Also, in cases where GCs and EAC are Issued on separate systems, what are the additional fraud risks?

It should be noted that international and national legislation will override any EnergyTag Standard in the context of fraud protection and prevention.

Fraud could happen at various parts of the process and in multiple forms. Some of the risks are:

- Metering data fraud at the consumption site. This could take place during either the measurement or the reporting process and involves the possibility of metering data manipulation, which could be used to improperly Cancel GCs. For instance, claiming that consumption took place at a time of day when energy is either cheaper or less carbon intensive.
- Matching Fraud, being defined as:
  - Deliberately incorrect Matching Claims,
  - Matching Claims that are intentionally not backed by adequate GCs.

Requirements

Metering data fraud at the consumption site

- Similar controls to those relating to metering data fraud at the production site are appropriate, and are likely to be in place for EACs. These should also be in place for GCs.

Improper amendment of Registry data

- Improper access and manipulation of GC Registry data should be avoided by adopting strict data security rules,
  - including: regular (ideally annual) systems penetration testing and the resulting enhancement of systems, restricting physical access to data, careful definition and assignment of Roles and procedures, regular updating of systems software, recording and auditing all changes to computer systems, effective controls over access rights and passwords etc.

Matching Fraud

- Deliberately incorrect Matching Claims *shall* be prevented by all parties involved in GC Matching and Claim making. Their detection shall be an essential aspect of the work of the Claim Verifier,
- Matching Claims that are intentionally not backed by adequate GCs *shall* be reported to EnergyTag.

[3] *If metering data are not available in Wh, kWh data will be acceptable.*
[4] *Only necessary if submetering systems are used.*

Chapter 2
Annexes

Annex 1

Glossary and Acronyms

This Annex is an integral part of the EnergyTag Standard, as it defines the terms being used in the Standard.

Glossary of Terms

Account	A record of the Certificates held on a Registry by a company or individual.
Account Holder	The person in respect of whom an Account is maintained on a GC Registry.
Attribute	A data item on a Certificate specifying the characteristics of an energy unit produced by a Production Device in terms of the input(s) used and/or the details of that Production Device and production process.
Avoided Emissions	Emission reductions that occur outside a product's life cycle or value chain, but as a result of the use of that product.
Beneficiary	The person (usually the consumer) that ultimately benefits from EAC/GC Cancellation.
Bidding Zone	The largest geographical area within which market participants are able to exchange energy without capacity allocation. For example, Bidding Zones in Europe are currently defined according to differing criteria. While the majority are defined by national borders (e.g. France or the Netherlands), some are larger than national borders (e.g. Austria, Germany and Luxembourg or the Single Electricity Market for the island of Ireland), while others are smaller zones within individual countries (e.g., Italy, Norway or Sweden). In the US, Bidding Zones are analogous to market zones where the locational marginal price is the same (e.g. NYISO-Zone D in NYISO).
Cancel	To remove a Certificate from an Account, either 1. as proof of the Attributes (source, production time, etc.), to prevent it from being used again for this purpose, and to prevent it from being Transferred to another Account, or 2. to Reserve it for transitioning into another Certificate system. *Note: where Cancellation of Certificates relates to claims of the Attributes of supplied energy, In Europe, the term Cancellation for Disclosure is used, while in the US "Retire" is normally used, while the I-REC Standard uses "Redeem.*
Cancellation Statement	A non-transferable or printed receipt for providing evidence of the Attributes at the time of Cancellation of Certificates acquired by an Account Holder.
Certificate	A record or guarantee (in any form, including an electronic form) in relation to the Attributes of the energy consumed, and/or the method and quality used, in the production of a quantity of energy.

Claim Verifier (or GC Claim Verifier)	An organization checking that Granular Certificates (GCs) are Canceled against the energy consumption measured at one or a group of multiple Consumption Points in compliance with the Matching rules in this Standard and the guidelines in the GC Use Case Guidelines.
Config3 GC Issuer	A GC Issuer who issues GCs within the restrictions of Configuration #3 as set out in GC Scheme Standard in 1.2 Scheme Configurations.
Consumer	The final beneficiary of GC/EAC Cancellation and potentially the user of associated consumed energy.
Consumption Point	Location of energy consumption. For the electricity Energy Carrier, the Consumption Point is a separately measured grid access point at which electricity is consumed.
Consumption Verification Area	The geographic area or market sector containing the Consumption Points for which a Claim Verifier has responsibility for verifying that Granular Certificates (GCs) have been Canceled against consumption.
Delegated GC Administrator	Entity, approved by EnergyTag, to which the GC Issuer may delegate the responsibility to administer GCs and the registration of the GC ownership throughout their lifetime.
Disclosure	Provision of information regarding a quantity of consumed or supplied energy as having specific Attributes.
Domain	The geographic area and/or market sector containing the Production Devices for which an EAC Issuing Body and/or a GC Issuer has responsibility for a Certificate system.
Double Counting	See detailed definition in 1.2 Scheme Configurations of the GC Scheme Standard.
EAC Issuing Body	An organization responsible for the administration of the existing EAC Scheme within a Domain for an Energy Carrier, that operates regardless of any interrelationship with EnergyTag.
EAC Consumption Verifier	A party charged with the responsibility of verifying that the correct amount and type of EACs are adequately Canceled for claims of the Attributes of consumed/supplied energy in a specific Domain. Such parties may be assigned by a government, the consumer or any other stakeholder.

EAC Scheme	The arrangements for the creation, administration, and usage of Energy Attribute Certificates.
e-Fuel	Fuels that are made by storing energy from renewable sources in the form of liquid or gaseous fuels.
Emission Factor	A unique value for determining an amount of a greenhouse gas emitted for a given quantity of activity (e.g. metric tons of carbon dioxide emitted per barrel of fossil fuel burned).
Energy Attribute Certificate (EAC)	A generic term for a unique Transferable electronic record or guarantee created to provide to a consumer evidence of the characteristics of a specific unit of energy conveyed by an Energy Carrier which may include the method and quality of its production. Examples include Guarantees of Origin (GO), Renewable Energy Certificates (RECs), and Emission Free Energy Certificates (EFECs).
Energy Carrier	Means of conveying energy – this can be electricity, gas, hydrogen, or heating/cooling.
EnergyTag	The organization that administers the EnergyTag Standard: EnergyTag Ltd being a non-profit entity registered in the United Kingdom.
Expire	To make a Certificate ineligible for Transfer or Cancellation as a consequence of the passage of a given period of time since the production of the associated energy.
Export	Transfer of Certificates from an Account Holder in one Registry to an Account Holder in another Registry. Consequently, the Attributes of the energy represented by the respective Certificates are no longer in the Exporting Registry and are uniquely represented in the receiving Registry.
Face Value	Specific quantity of energy production represented by a certificate.
Geographical Matching (or GC Geographical Matching)	Associating the geographical location of energy production or storage which has been recorded on a GC at its Issuance, with the geographical location of energy consumption and for which the GC is Canceled. For example, Geographical Matching may take place within physically interconnected zone(s) or Bidding Zone(s).

Geographical Matching Granularity Level	The three levels of Geographical Matching granularity, starting with the highest level of granularity moving to the lowest: • Single Bidding Zone Level, • Aggregated Bidding Zone Level, • Interconnected Zone Level.
GC Matcher (or GC-Consumption Matcher) (or Matcher)	An organization who matches the Attributes of Canceled GCs to a specific quantity of energy consumption of a specific Consumer/Supplier, with a view to determine the content of a GC Matching Claim.
GC Matching (or Granular Matching or Matching)	Allocating Attributes of Canceled GCs to a corresponding quantity of consumed energy, for well-specified Matching Features.
GC Matching Claim (or Matching Claim)	A statement by a Consumer or Supplier of energy regarding the proportion of their consumption being matched to GCs, and the resulting Attributes allocated to this consumption.
GC Scheme Protocol	A document that sets out all procedures and liabilities in relation with the operation of a GC Scheme.
Granular Certificate (GC)	A Granular Certificate compliant with EnergyTag is a Certificate relating to the Attributes of energy produced during a period of one hour or less, Issued in compliance with the requirements and rules of operation of the EnergyTag GC Scheme Standard.
Granular Certificate Consumer	An energy consumer, a supply company or any other party on their behalf, for whom GCs are Canceled to prove the Attributes of their energy consumption.
Granular Certificate Issuer (GC Issuer)	A Granular Certificate Issuer is an organization responsible for the administration of the Granular Certificates within a Domain for an Energy Carrier, ensuring the avoidance of Double Counting of the Attributes represented by the Granular Certificates it administers throughout their lifetime.
Granular Certificate Platform	A software service which maintains and/or accesses a GC Registry to provide GC market enabling services such as inventory management, consumption matching or trading.
Granular Certificate Platform Operator	A person responsible for administering a GC Platform.

Granular Certificate Scheme (GC Scheme)	The arrangements for the creation, administration, and usage of Granular Certificates.
Granular Certificate Validity Period	The period of time, ex-post, in which participants may buy, Cancel and make claims using GCs.
Guidelines	Refers to the EnergyTag GC Use Case Guidelines.
Import	Receipt of Certificates by an Account Holder in one Registry from an Account Holder in another Registry. Consequently, the Attributes of the energy represented by the respective Certificates are in the Importing Registry and no longer in the Exporting Registry.
Issue / Issuance	The process of creating a GC/EAC as a record on a Registry.
Market Zone	A set of geographical zones and/or virtual zones often having the same zonal electricity price. This could be a single bidding/price zone or potentially an aggregation of contiguous bidding zones.
Matcher (or GC-Consumption Matcher)	See GC-Consumption Matcher.
Matching	See GC Matching or Granular Matching.
Matching Framework	A set of parameters for the various Matching Features as laid out in 1.2 Matching GCs with Energy Consumption of the GC Matching Standard.
Measurement Body	An organization responsible for measuring the energy produced by or input to a Production Device, and/or the energy consumed at a Consumption Point.
Price Node	Location identifier in a wholesale electricity price formation mechanism in which the price paid in a particular zone is calculated by the zone's physical node. The Price Node can be an actual location where transmission lines converge, or it could simply mean the last point in the grid where supply and demand are balanced; this is typically at the consumer level.
Producer	The owner of a Production Device which is valid for GC Issuance.
Product Verifier (PV)	An optional Role (similar to a Claim Verifier) describing an organization that verifies products based on Granular Certificates.

Production Device	Separately measured facility for Transferring energy from a primary energy source into an Energy Carrier or from one Energy Carrier to another – for instance, a power station or a gasifier.
Production Granular Certificate	A GC Issued directly to a Production Device as opposed to a Storage Discharge GC.
Production Registrar	An organization responsible for assessing applications to register Production Devices for the purposes of issuing the relevant Certificates, reporting to the Issuer.
Power-to-X / PtX	The term is used to describe applications where electricity is converted into another energy form/carrier, X being Hydrogen, Steam or an e-Fuel.
Redeem	(I-REC term - in Europe "**Cancel**" is normally used, while in the USA "Retire" is used). See definition of "**Cancel**".
Registry / GC Registry / EAC Registry	A database administered by an EAC Issuing Body or GC Issuer, recording the characteristics of the Production Devices for which that Issuing Body or GC Issuer is responsible, and the Accounts and the Certificates held in such Accounts.
Reserve	Certificate disposition without claiming the represented Attributes. The result is that the Certificates end their life in a Reserved status. A Reserve transaction has the objective of transitioning the respective Certificates into another Certificate system. Reserved Certificates cannot be unreserved, or transfered.
Reservoir	Refers to the Storage System's inventory of records at time "*i*" resulting from record charging that are available for allocation to Storage Discharge Records. This mechanism is needed to record the information of the SDRs that are used to prove the Attributes of the energy input into storage.
Residual Mix	The (sub)hourly or temporal Residual Mix (RM) is the mix of Attributes for energy consumption that is not covered by Canceled Granular Certificates or other EACs.
Retire	(US term - in Europe "**Cancel**" is normally used, while I-REC uses "**Redeem**"). See definition of **"Cancel**".
Role	A liable entity in a GC Scheme.
Round Trip Efficiency	The ratio of the net total output energy in the discharging process to the net total input energy in the charging process.

Standard	Refers to the EnergyTag GC Scheme Standard.
Storage Charge Record (SCR)	Registry record of energy charged to storage in a time interval.
Storage Efficiency Factor or Efficiency Factor:	Factor that quantifies storage losses based on round-trip efficiency, being the efficiency of a full cycle of charging and discharging.
Storage System (or Energy Storage System)	Separately measured system for storing energy where the energy carrier of the input into storage is of the same type as the energy carrier for the output of storage.
Storage Discharge Record (SDR)	Registry record of energy discharged from storage in a time interval.
Storage Discharge Granular Certificate (SD-GC)	A GC Issued following Storage discharge in compliance with all necessary requirements in both the Standard and Guidelines.
Temporal Matching (or GC Temporal Matching)	Associating the period of time during which energy is produced or stored and which has been recorded on the GC at its Issuance with the corresponding time at which the GC is Canceled and the energy is consumed. The time interval is equal to or less than 60 minutes and evidence of energy production and consumption is provided by GCs.
Timestamp	The date and time when an event happened in the format (UTC "YYYY-MM-DDThh:mm:ssZ" e.g. "2023-10-03T00:00:00Z").
Transfer	The handover of a Certificate from one Account to another, whether on the same or on another Registry.
Use Case	A scenario of a possible usage of GCs.

Acronyms

AML	Anti-Money Laundering
API	Application Programming Interface
CFT	Combatting the Financing of Terrorism
CV	Claim Verifier
EAC	Energy Attribute Certificate
EECS	European Energy Certificate System
EU ETS	European Union Emissions Trading System
GC	Granular Certificate
GHG	Greenhouse Gas
GO	Guarantee of Origin
GPS	Global Positioning System
I-REC	The International REC Standard
KYC	Know-Your-Customer
LEA	Law Enforcement Agency
MTIC	Missing Trader Intra-Community
PPA	Power Purchase Agreement
PtX	Power-to-X
PVB	Product Verification Body
REC	Renewable Energy Certificate
RECS	Renewable Energy Certificate System
SCR	Storage Charge Record
SDR	Storage Discharge Record
SD-GC	Storage Discharge Granular Certificate
UTC	Coordinated Universal Time

Annex 2

Geographical Matching Options (Informative)

The aim of this Informative Annex is to provide language for options of Geographical Matching referred to in Chapter 1.2. It is acknowledged that more options are possible than the ones listed in this Annex.

Defining Geographical Matching Boundaries

When considering how best to define Geographical Matching boundaries, EnergyTag uses current electricity market boundary definitions as a basis. In these Guidelines, the "zonal" concept is used to define the accepted area over which electricity is physically "deliverable". This "deliverability" can be considered at various levels of granularity, and hence several types of zones are considered: Physically Interconnected Zone, and Market Zone.

Case 1: Physically Interconnected Zone

Physically Interconnected Zones have at least some level of physical interconnection between the location of energy production and the location of energy consumption for which the GC is Canceled (e.g. EU Wide Grid, continental US grid or any other grid worldwide where there are known interconnectors).

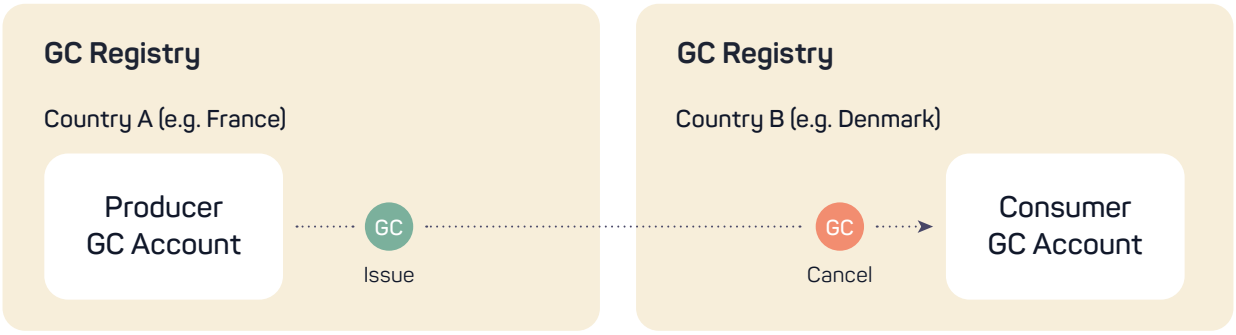
Case 2: Market Zone

Beyond the minimum guidelines of ensuring physical interconnection, the zonal granularity can be increased to facilitate consumers/Use Cases requiring a higher level of linkage between GC and Physical energy flows. Market Zones definitions are based on local energy market boundary definitions.

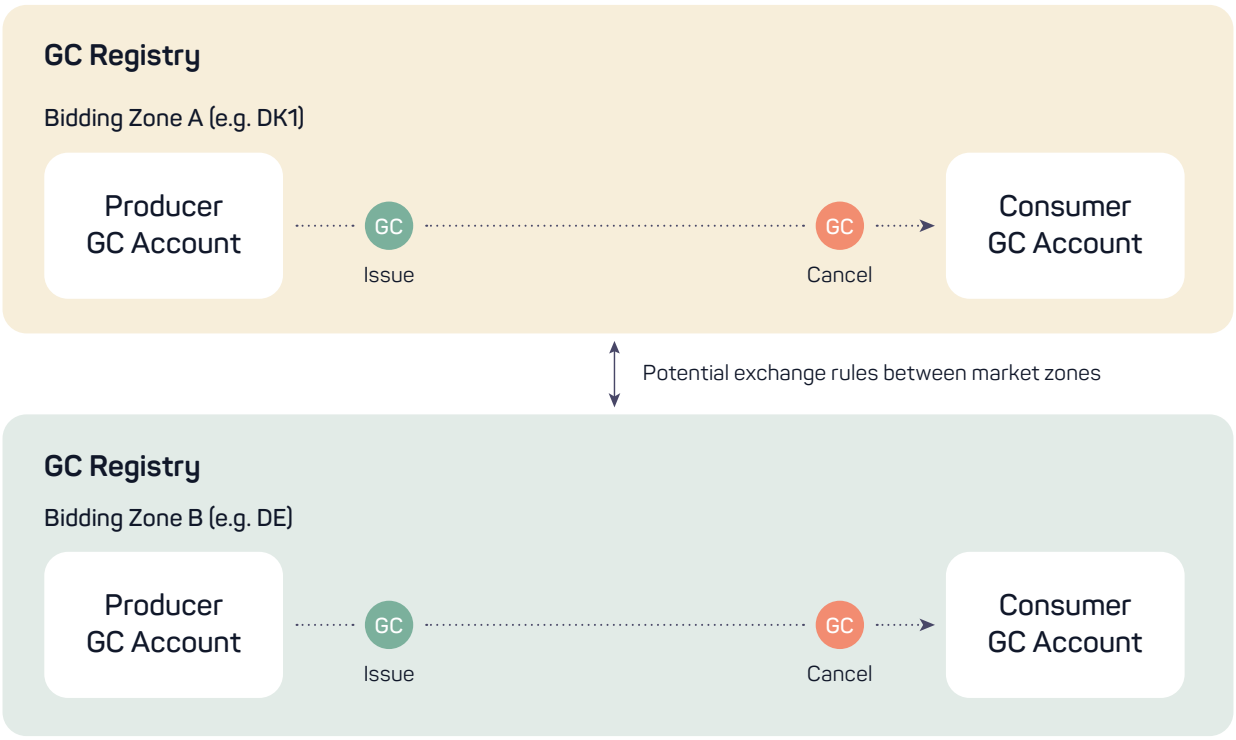
A Bidding Zone is determined as the largest geographical area within which market participants are able to exchange energy without capacity allocation, and is deemed to be the most granular Market Zone currently considered. For example, a Market Zone could be defined at the level of:

- 'Single Bidding Zone' (e.g. FR, DK1 in Europe or NYISO-Zone D in the US),
- 'Aggregated Bidding Zone' (e.g. DK in Europe or NYISO in the US).
- 'Nodal Location Matching', bases itself on the Node nearest to the production device, to support geographic matching in Nodal Markets.

Physically Interconnected Zone Matching



Bidding Zone Level Matching



Demonstration Linkage of GC Flows with Physical Energy Flows

The link between GCs and physical energy flows increases in granularity as we refine the definition of a Market Zone, with single Bidding Zone matching deemed more granular than aggregated Bidding Zone matching. However, the GC/Physical flow link may also be demonstrated between Market Zones where there is physical interconnection and provided that a credible exchange mechanism[5] is in place to ensure that GC flows do not surpass physical energy flows between markets in a given (sub)hourly interval. Therefore, once such a mechanism exists, Market Zone level matching across Bidding Zones may be considered as having an equivalent granularity as 'single' Bidding Zone matching. The levels of granularity to be considered in Geographical Matching are defined below.

Geographical Matching Granularity Level

The "Geographical Matching Granularity Level" is defined at three levels, starting with the highest level of granularity moving to the lowest.

1. Single Bidding Zone Level[6],
2. Aggregated Bidding Zone Level,
3. Interconnected Zone Level.

[5] The establishment of such interconnection mechanisms is challenging but there are several organizations working on this. EnergyTag may provide guidelines on this in the future once harmonization emerges.

[6] or in a connected Bidding Zone with credible allocation and proof or corresponding physical energy flows once these exist.

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