



# Energy Track and Trace

Partner Meeting 5 – December 2022

European partnership on next generation energy tracking.

December 15<sup>th</sup>.



## Agenda

### Intro

1. Welcome
2. Energy Track and Trace

### Product Development

1. Status
2. Interaction with EnergyTag standard
3. Roadmap 2023
4. Proof and Validation

### Conceptual Development & Scaling

1. Compliance with EU GO scheme
2. Closing and goodbye





# Energy Track & Trace

Introduction

***Concerns over greenwashing are leading lenders to try and attach more demanding performance metrics to their borrowing terms.***

*(Source: The Global Treasurer)*

***To overcome the risk of greenwashing, some companies have committed to around-the-clock carbon-free energy (24/7 CFE).***

*(Source: World Economic Forum)*

# The 24/7 CFE journey of energy buyers

## 1. Education

- **Learn** what, why and how to run 24/7 CFE projects
- **Get** C-level approval to engage



## 2. Baselining

- **Understand** your starting point and identify your hourly gaps
- **Calculate** your current 24/7 CFE performance score in all regions

## 3. CFE Strategy

- **Run** hourly matching procurement scenarios for optimization (together with your energy supplier)
- **Plan** 24/7 CFE procurement strategy and roadmap, prioritizing countries

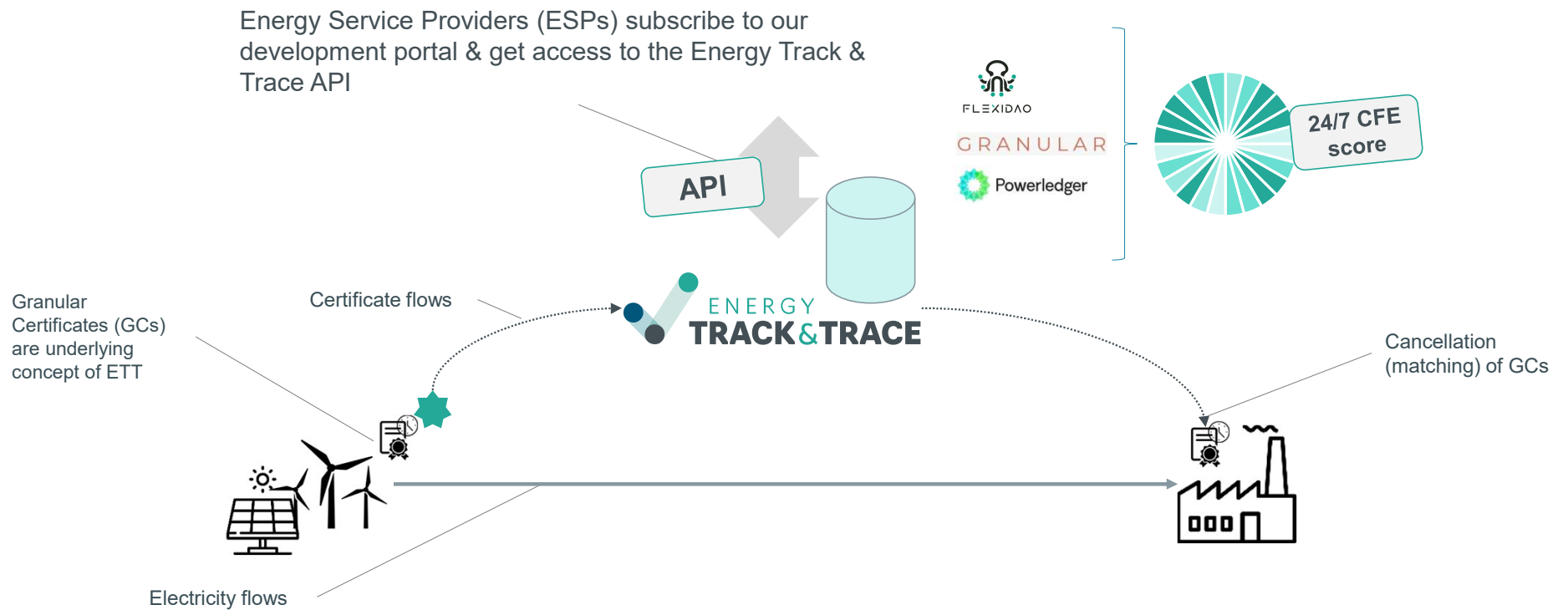
## 4. CFE Procurement

- **Sign** 24/7 CFE procurement contracts with energy suppliers in specific countries.

## 5. Accounting and reporting

- **Claim** the hourly match.
- Energy Track & Trace is a trustworthy, API-based tracking system, provided by European TSO's.

# What is Energy Track & Trace?



# Who is Energy Track & Trace?



## Trilateral TSO set-up to provide the tracking system

**Purpose:** Development of a **granular tracking solution** for 24/7 Carbon-Free Energy (CFE) that is applicable on European scale and includes cross-border exchange.



*East Germany and Belgium*



*Estonia*



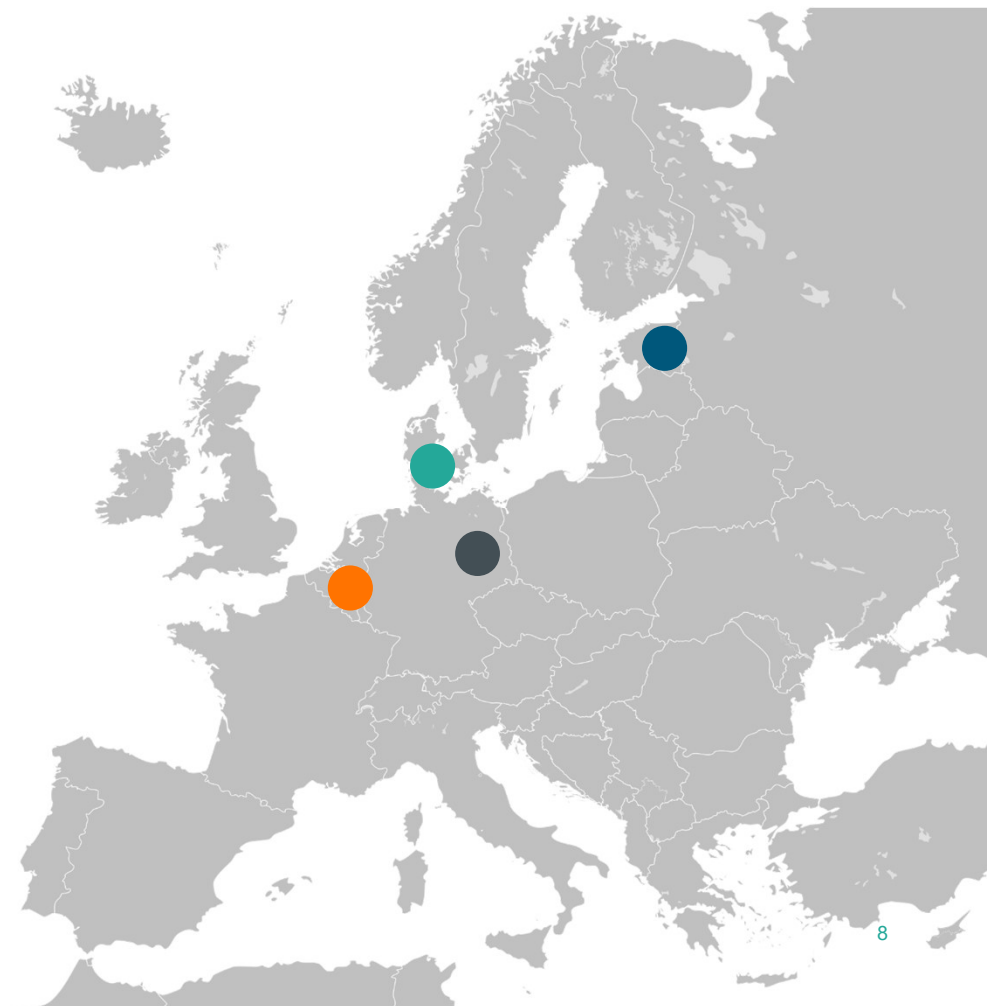
*Denmark*

## And a strong group of partners

**Energy Suppliers** that provide clean energy and want to offer 24/7 CFE products.

**Energy Buyers** that develop and execute 24/7 CFE procurement strategies.

**Service providers** that offer market solutions, management systems and matching algorithms for Granular Certificates (GCs).





# When: ETT product phases

## 2023: Testing & Maturation phase.

- APIs exposed for testing ETT registry operations
- Development of new product features (such as energy storage, GO compliance, cross-border functionality)

## 2024 onwards: Live-phase as voluntary product

- Front-end and APIs for registry operations to allow **trustworthy 24/7 CFE claims**
- (Automated) integration into GO scheme(s) for compliance
- Cross border functionality and storage integration
- Product governance & on-boarding of new parties (TSO's or IB's)

External Events:

**A shifting regulatory landscape: EU enables Member States to issue GOs with higher granularity (?)**



**A shifting accounting & reporting landscape: WRI publishes revision of the GHG protocol...**



**Green hydrogen must be produced with locational and temporal matching**



2023

2024

2025

2026

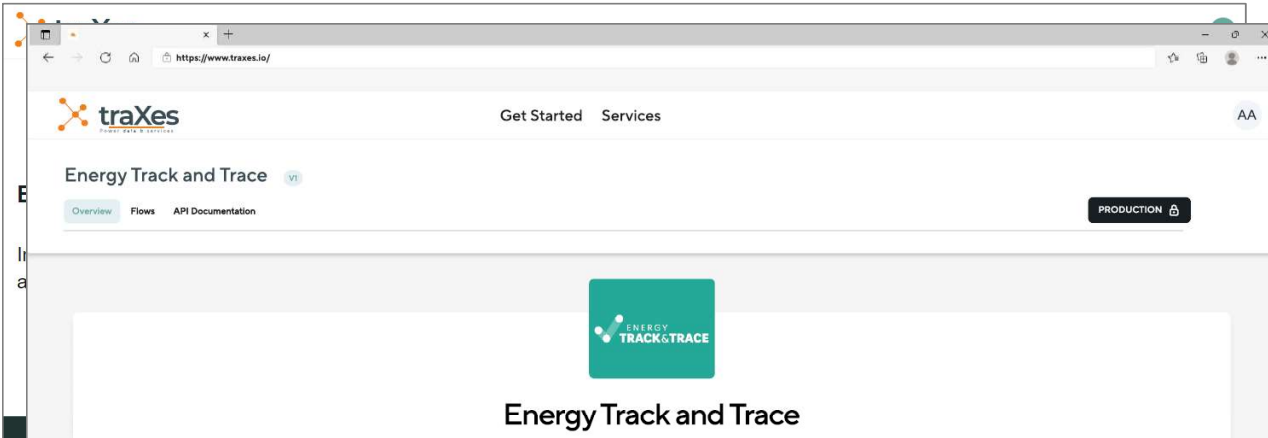
2027

# Product Development

1. Status
2. Interaction with EnergyTag standard
3. Roadmap 2023
4. Proof and Validation

# Status of the products

> Local registry open for pilot users



## Powered by Elia Group traXes

- Energy Track & trace is a service built and published on the Elia group traXes developer portal.
- Alpha version of the ETT service released in Nov to first external pilot users.

**Getting started**

In this documentation, we will guide you through the whole process, from asset onboarding up to cancellation of production and consumption certificates against each other (creating the full traceability from energy production up to consumption). The whole process can be divided into four steps:

- Onboarding assets
- Generating granular certificates
- Transferring certificates
- Cancellation

We assume that you are registered as a user. If not, please request user access and credentials at the product owner, Michaël Piron (Michael.Piron@elia.be). We will then provide you with the required **API bearer token**, as well as your **user ID**.

### 1 Onboarding assets

### Energy Track & Trace - API documentation (v2022-11-20)

Download OpenAPI specification: [Download](#)

This is a draft version of the API specification for the Energy track & Trace service. You can find more information about the project at <https://energytrackandtrace.com>. Our architectural specification can be found on the website. Architectural concepts and insights. We will soon evolve from a static specification document towards a public documentation repository, that reflects new concepts and functionalities as they are validated. More to come.

In the near future, we will bring this Energy track & trace API specification in line with the **EnergyTag 4C Registry API Specification**. A v1 of this specification was published on Sept 20th 2022 and can be consulted here: <https://energytag.org/publications/>.

This version has been shared with you in confidence. Please don't distribute this API specification. Any feedback is encouraged and welcomed. Please contact the product owner at the group: [Michael.Piron@elia.be](mailto:Michael.Piron@elia.be)

#### UserMetricDataUploadV1

Allows the user to upload Metric Data

AUTHORIZATIONS	bearer
REQUEST BODY SCHEMA	application/json
headers	
- apiKeyCode	string
- apiKeyCodeType	string
- headers	Array of objects (MetricEnergyUsageV1)

Responses

```
200 application/json
```

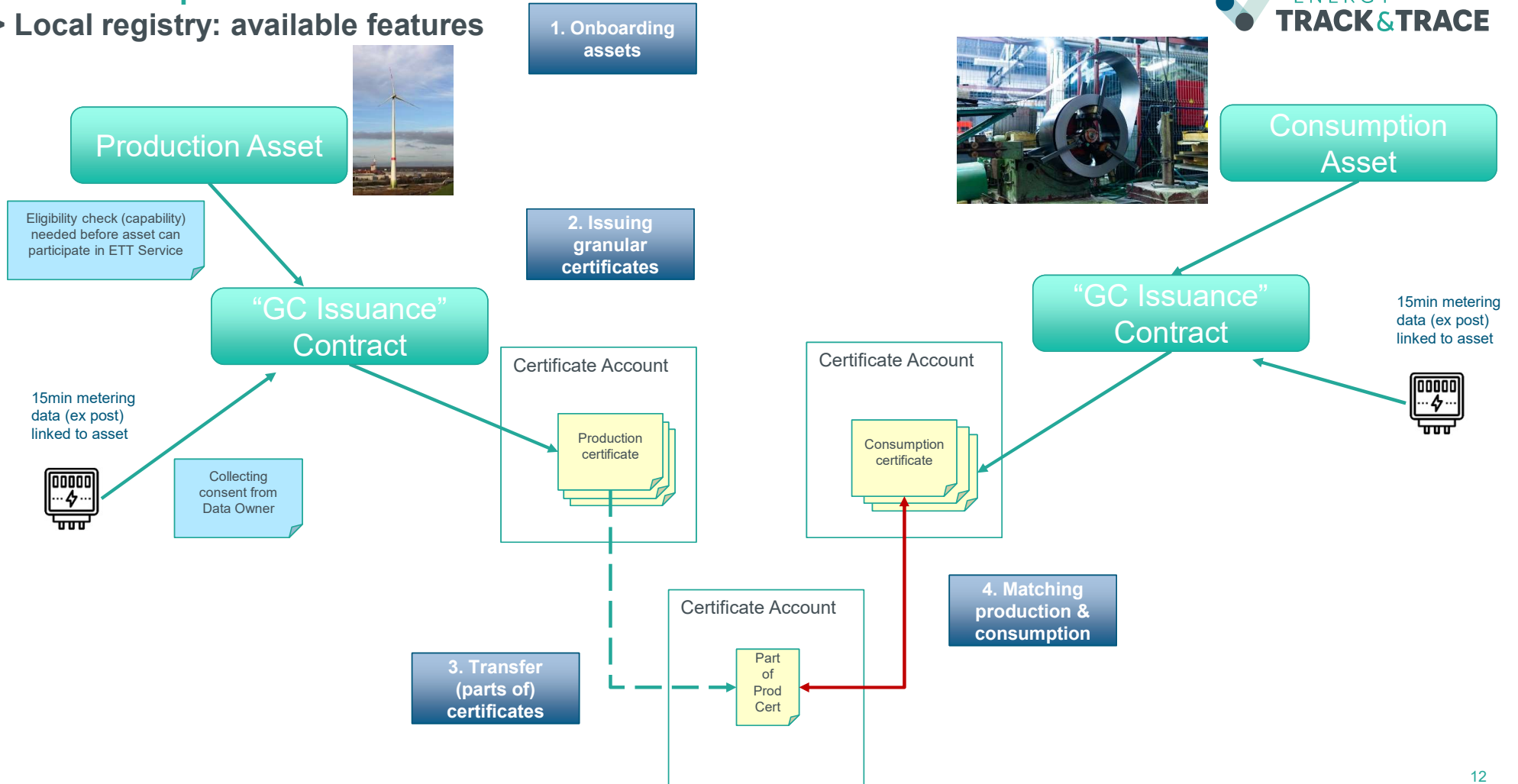
Request samples

```
POST /user/metric/registry/UserMetricDataUploadV1
```

```
{
  "apiKeyCode": "string",
  "apiKeyCodeType": "string",
  "headers": [
    + (-)
  ]
}
```

# Status of the products

## > Local registry: available features



# Energy track & Trace API

API: Interactions with Energy track & trace registry will be mainly machine-to-machine (service provider portals talking to the registry).

Our aim is to align & team up with EnergyTag regarding the development of an API standard for Granular Certification



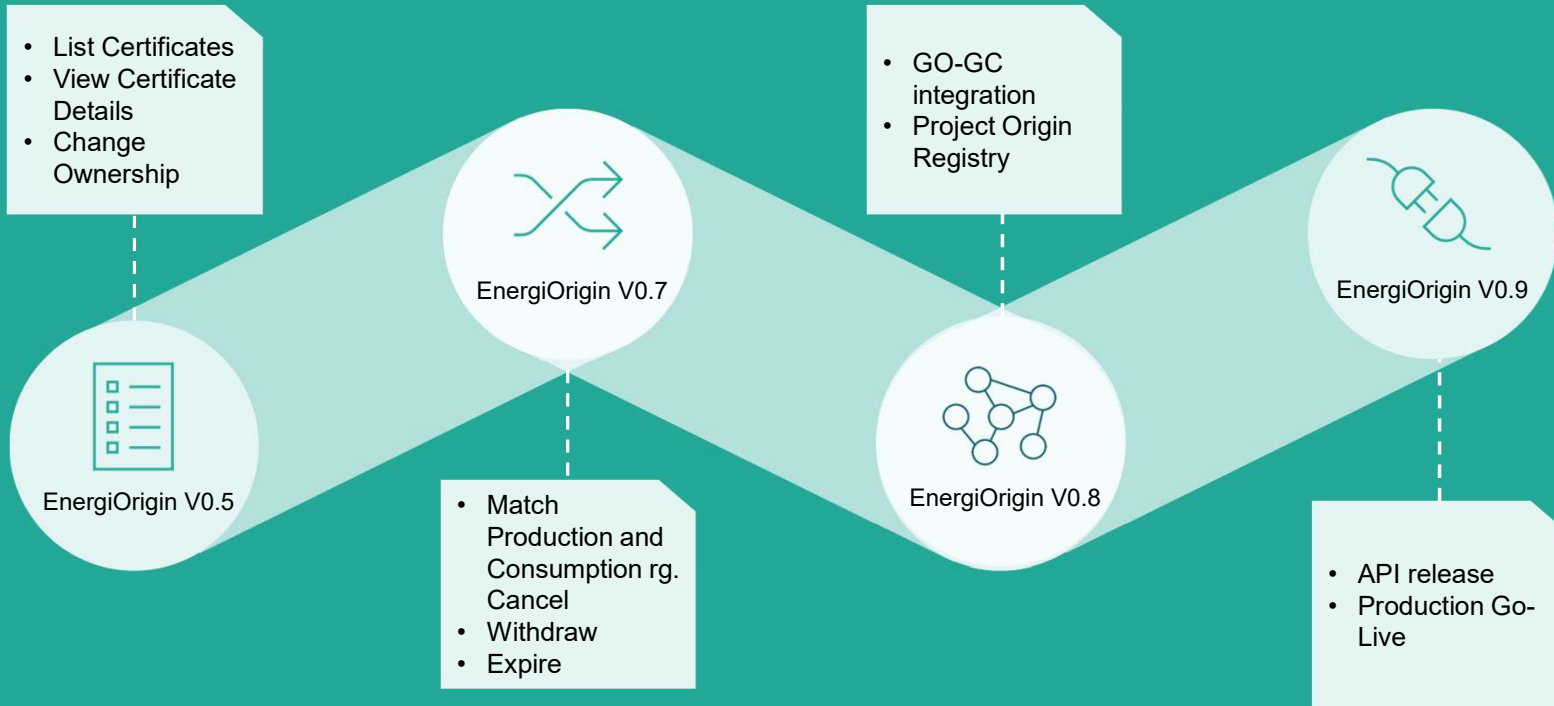
## GC Registry API

Published on 29 September 2022  
 This work, performed with data science contractor Future Energy Associates, proposes a v1 of the EnergyTag GC Registry API Specification. The documents are open for comments and suggestions - a v2 will be published later, based on feedback.

[Download](#)



# Development roadmap Energinet

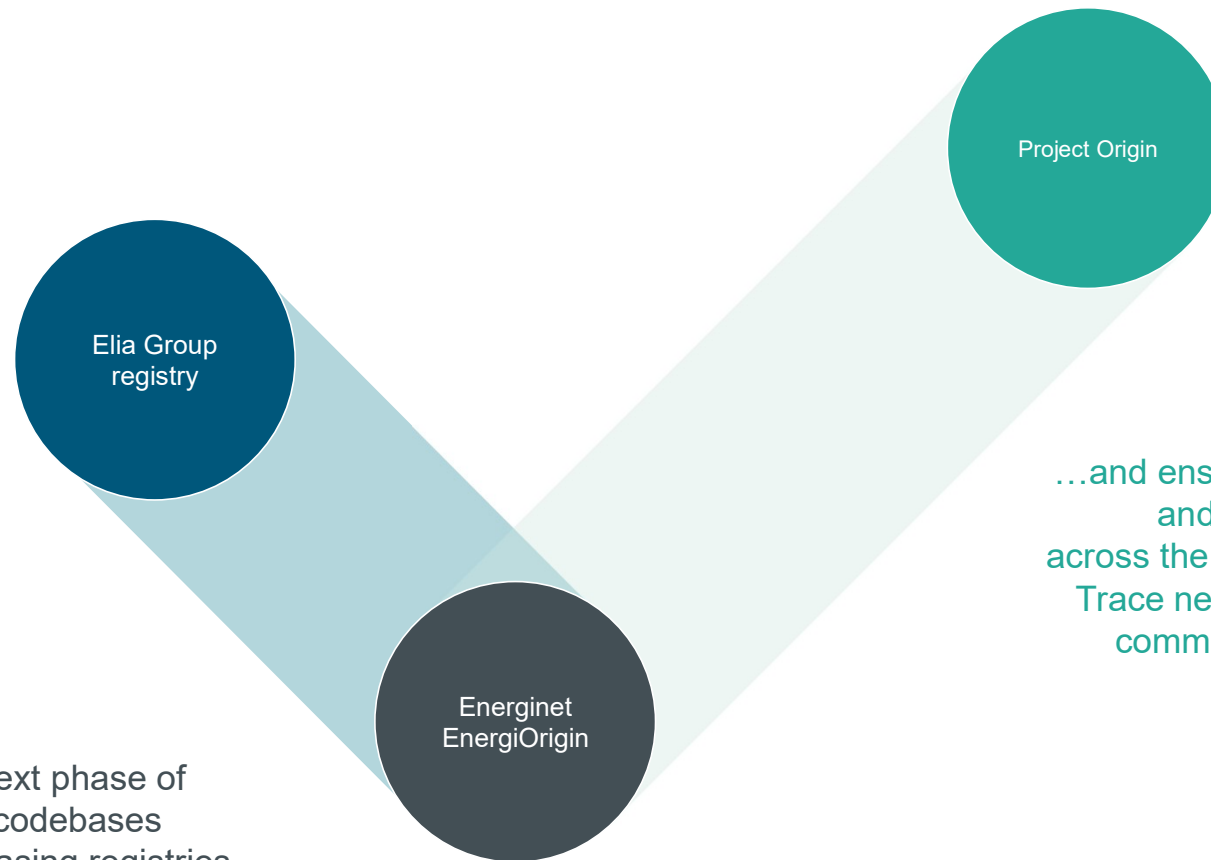


Access to test of 3rd party API's for development		
Project Origin Integration	GO GC	Cross boarder
Q2 2023	Q3 2023	Q4 2023

## Product teams Elia Group & Energinet team up



In the past 6 months, the project teams aligned on concepts and architecture



We now step into the next phase of development: bringing codebases together, aiming at releasing registries in BE, GER, DK that work in the same way & share the same API...

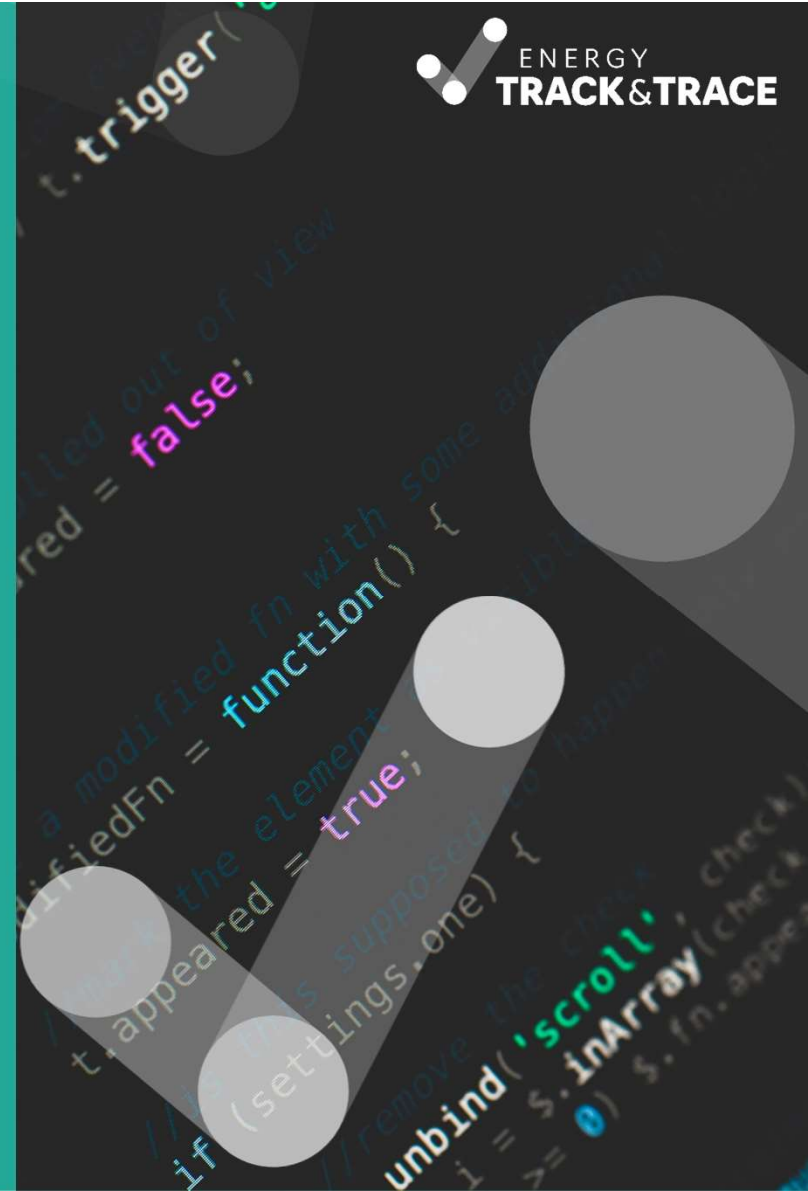
...and ensuring immutability and validation across the Energy Track and Trace network, through a common proof layer

# If you want to test or setup a pilot project



**Belgium/Germany:**  
Michaël Piron  
Product Owner  
[michael.piron@elia.be](mailto:michael.piron@elia.be)

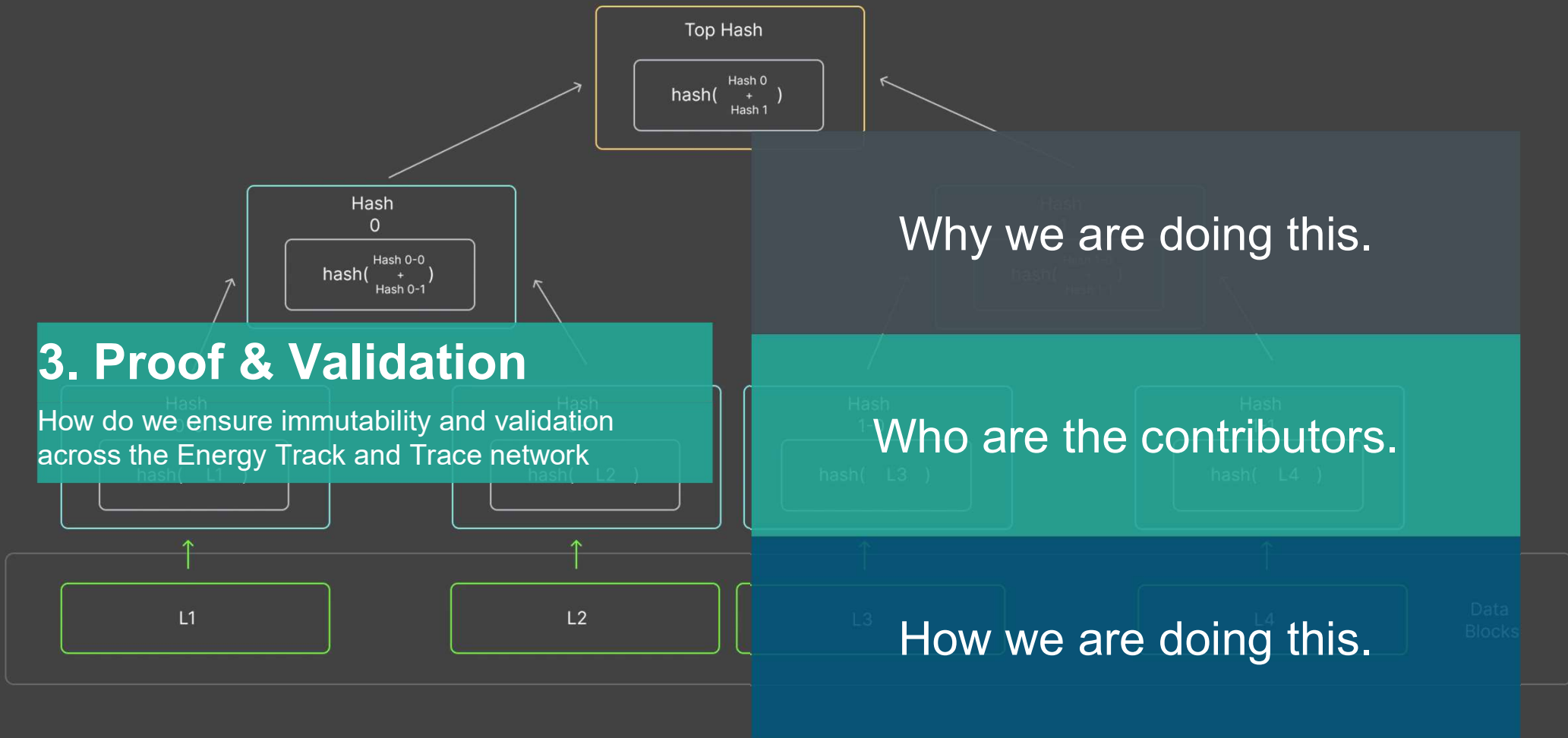
**Denmark:**  
Søren Pedersen  
Product Owner  
[datahub@energinet.dk](mailto:datahub@energinet.dk)





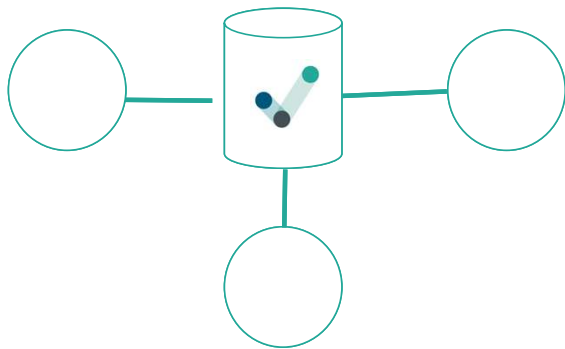
### 3. Proof & Validation

How do we ensure immutability and validation across the Energy Track and Trace network

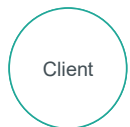
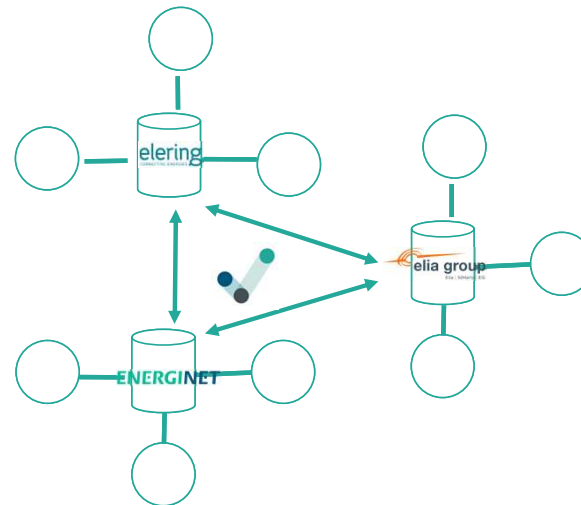


## Why are we doing this.

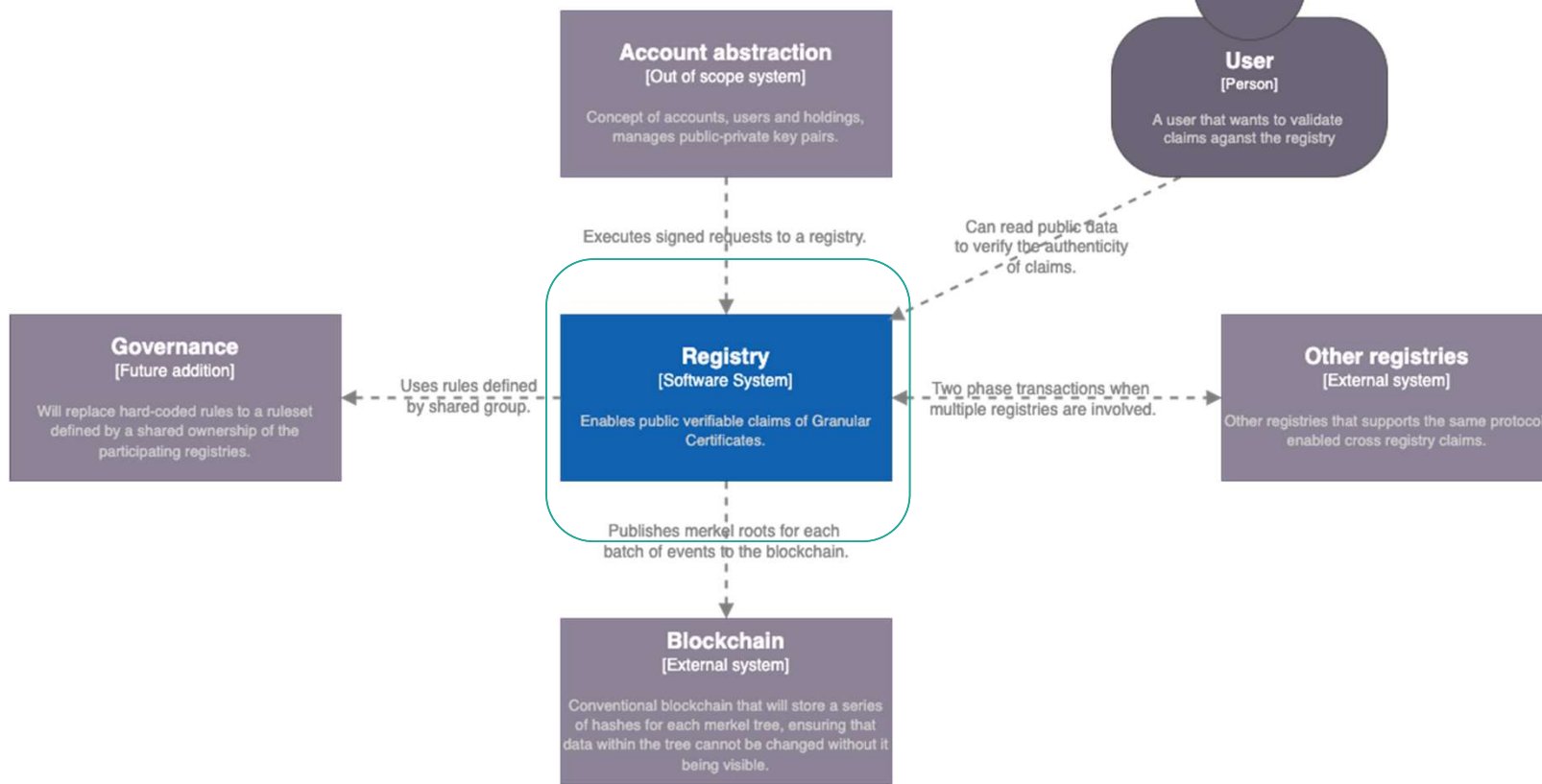
- Hub and spoke model
- State is stored in a centralized database



- Decentralized model
- State is decentralized – how do we ensure state convergence in the network?



= Producers / Consumers / Service providers



## Proof and validation of transactions

### WHAT

1. Ensuring Uniqueness
2. Providing privacy and GDPR compliance
3. Minimizing registry operational requirements
  - Domain knowledge and definition is the only configuration necessary from the issuer.
  - Tamperproof implementation for documentation validity
  - Auditable
  - Can be added to any database infrastructure

### HOW

1. A collaborative endeavor between ETT and several other companies in an open-source library
2. Deep technical insights:
  - Cryptography (Aarhus University - DK)
  - Software Architecture (20+ years of exp)
3. Defined and specific problem space
4. Scalable solution
5. A generic utility piece of software that can be applied across sectors and industries



<https://github.com/project-origin/registry>

# Functionality

## – Merkle Proofs

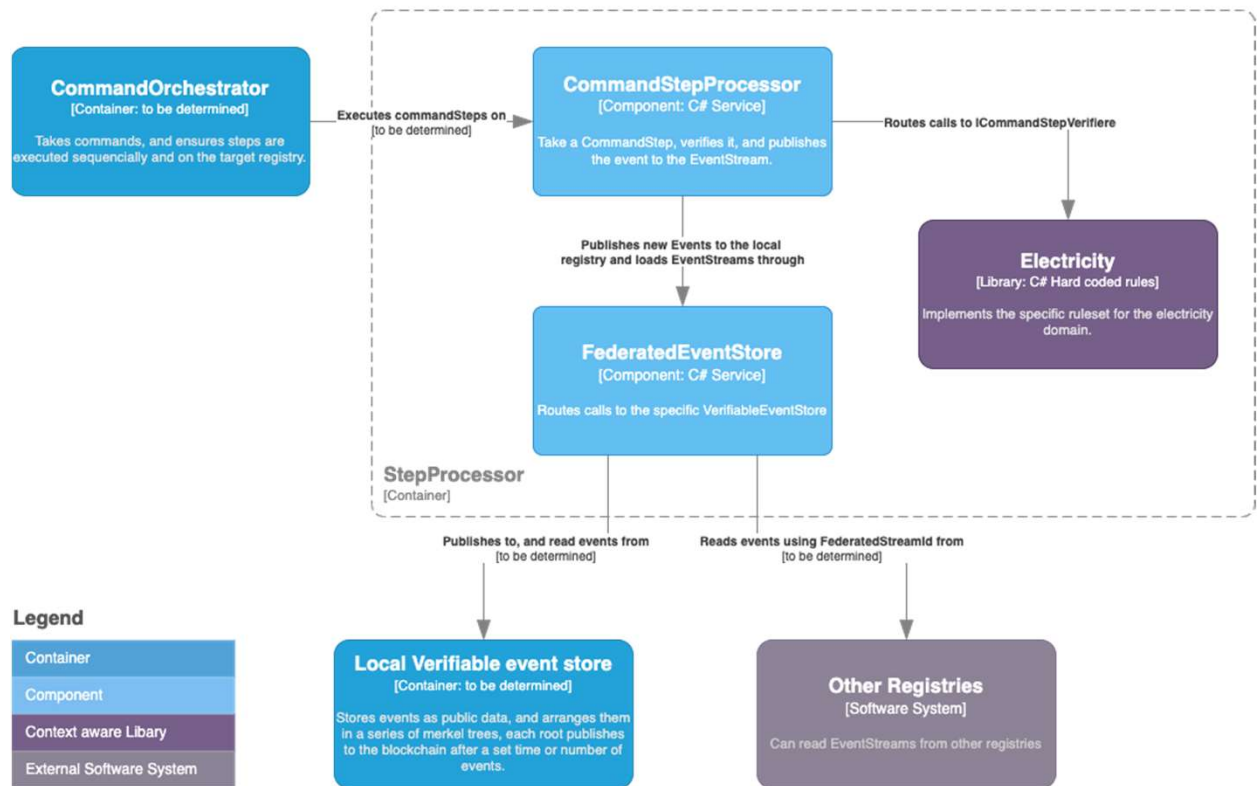
- Uniqueness, immutability and auditable
- Each transaction is stored in one hash and published to a log or blockchain
- Each transaction can be validated (independent)

## – Pedersen Commitments

- Obfuscates quantities so consumption is not known publicly.
- Ensures double claims are not possible
- Zero-knowledge proofs for ease of operation of registries.

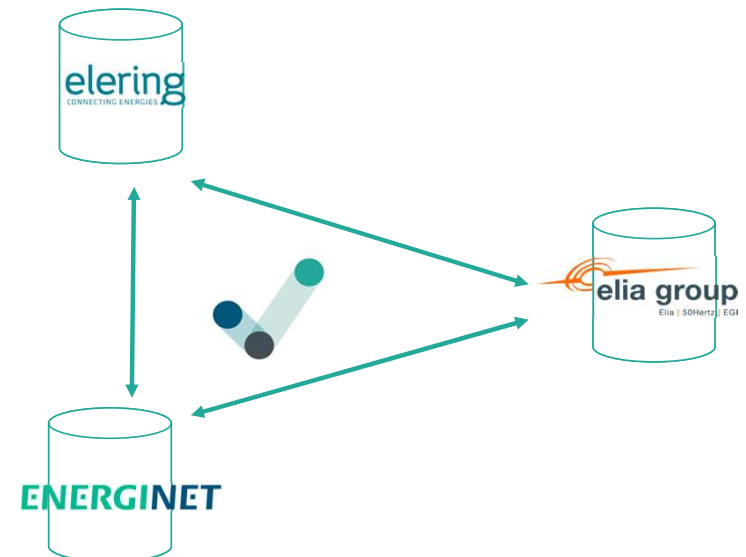
### [Components] CommandStepProcessor

Validates commandSteps and ensures that the events are valid and allowed based on the logic and rules.



## What is the impact of the functionality

- Leveraging the institutional trust from TSO's to data-driven documentation of origins of energy
- Millions of transactions in one public verifiable hash (Merkle proof)
- Facilitating validation between varying infrastructures
  - using low coupling
- Provides a real-time health indicator for each registry



# Conceptual Development

1. Compliance with EU GO scheme



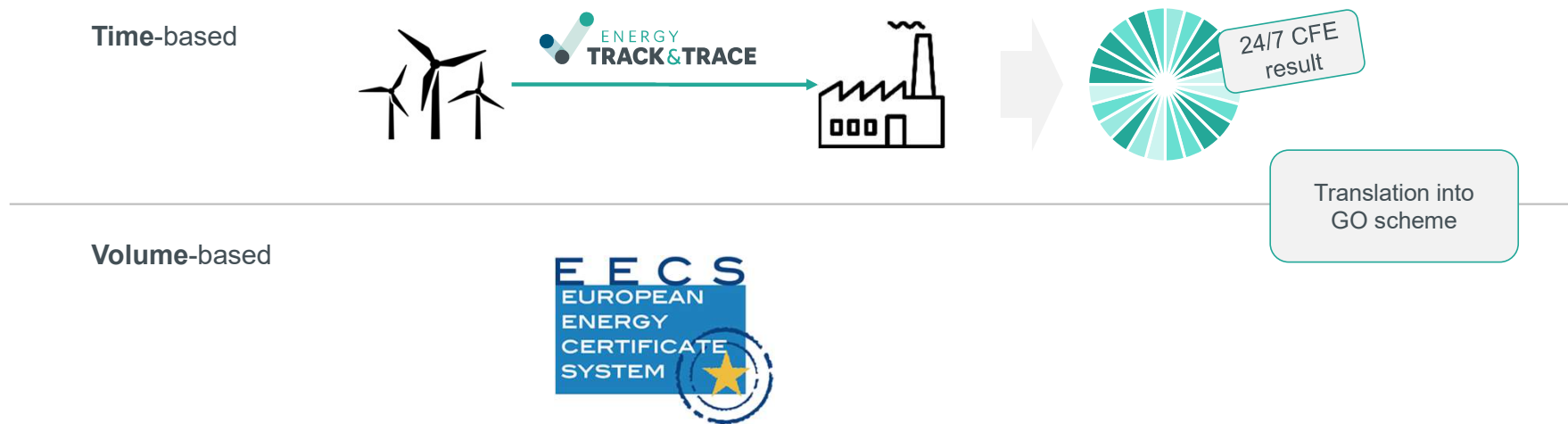
# Coordinating ETT with the EU Guarantees of Origin scheme



## General Statements

In order to provide immediate value to our customers, ETT has been designed as a **voluntary certification product** that coexists with the EU Guarantee of Origin (GO) scheme (EnergyTag configuration #2).

Compliance with the EU GO scheme is the **legal basis** for all claims made with ETT.



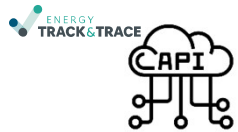


# Coordinating ETT with the EU Guarantees of Origin scheme

## Principles to ensure compliance with the EU GO scheme.

Throughout the year (ie. 2024), the **focus of all actions (transfer operations) is the ETT scheme.**

- GCs can be traded and transferred **independently from GOs.**
- Production units registered in ETT **don't sell and transfer GOs** throughout the year (revenue is created by selling GCs).



After each year, ETT **translates the results** into a corresponding list of transfers of GOs

- Due to different operating principles (time-based vs. volume based) a certain discrepancy cannot be avoided
- The transfers of GO's must be **executed by each producer.**
- Energy suppliers (or consumers) **receive GOs automatically** and cancel them.

ETT (**automatically**) **verifies** if the if the yearly report has been fully executed by each user and **enables GC cancellation** subsequently.

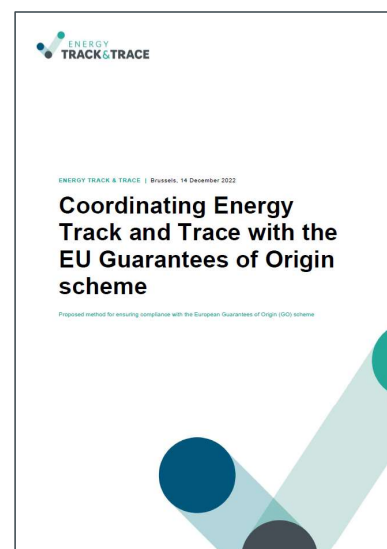
## Time for feedback

Join at  
**slido.com**  
**#351 179**



## Find more info in our paper

<https://energytrackandtrace.com/>



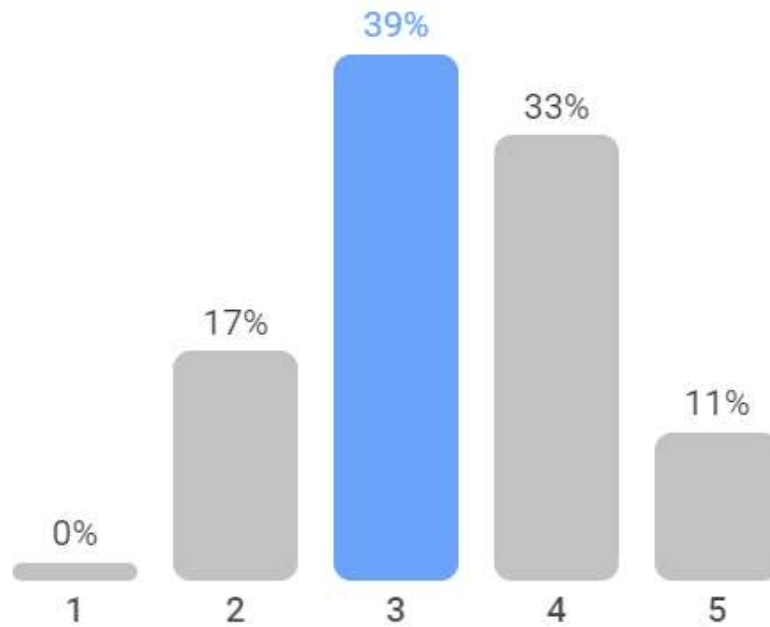


How feasible is our method for compliance with the EU GO scheme

18 



Score: ★ 3.4



## How can the method be improved?



- *Inherently make it impossible that the beneficiary claim of the GO lands with another consumer than the GC beneficiary claim*
- *Things will change anyway. Learn and adapt while deploying*
- *Get more producers and suppliers involved (improve the balance in the audience) to address market signaling / price signaling concerns*
- *As a next step: coordination with national GO registry operators; working out contractual implications on who can cancel GOs in different national GO systems (e.g. only energy suppliers v.s all registry account holders incl. consumers)*
- *I think one issue is the ex-post reliance on producers cancelling the corresponding GO's, this seems to me to present some risk*
- *Working on a case study with current issuing body of GO to do automatic interaction (I.e., Energinet 😊)*
- *What is The journey From yearly to quarterly to real time?*
- *Have an issuing body on board that assures avoided double claims of the GO and GC*
- *Good method for a first approach, surely more learnings on how to improve market signals in terms of time and locational matching will arise from the first pilots*
- *Automatic (trustworthy) interface between GC and GO registry*
- *Prove it through a POC / Pilot*

2023 will be a year of testing and new learnings

It will be a year with new partners, external speakers and 4 more webinars

It will be a year of rolling out first products

We look forward to see you all again, March 23<sup>rd</sup>  
2023 – 15:00 to 16:30

**[Registration link](#)**

**Thank you for supporting us in 2022!!**



• H A P P Y • N E W • Y E A R •