

Account Holders workshop and technical meeting with the issuing bodies

Regional GO Registry Project – Energy Community Secretariat
Vienna 25.5.2022

Workshop Agenda

Morning Session

- **9.30 – 9.40:** Welcome addresses
- **9.40 – 10.30:** Project overview, European GO system, Regional Scheme (EnC), AIB
- **10.30 – 10.50:** Account Holder functionalities in G-REX
- **10.50 – 11.30:** Market developments in 2021 – an EECS review
- **11.30 – 12.00:** QA & Concluding remarks

12.00 – 13.00 Lunch

Afternoon Session

- **13.00 – 14.00:** Regional Scheme, Disclosure law, AIB
- **14.00 – 16.00:** Registry Training and Feedback
- **16.00** Concluding remarks



Grexel – Company Presentation

Leading energy certificate registry provider

- 30 professionals in 3 countries, HQ in Finland
- Used in 15 countries by over 10 000 companies
- ISO 27001 certified for IT security
- Carbon neutral

GO registries for all energy carriers

- Electricity, biogas, hydrogen and heating & cooling
- Continuously updated for many clients collectively
- Compliance with EECS, CEN 16325 and RED I & II
- 20 years' experience in EECS, GOs and disclosure

Part of European Energy Exchange Group

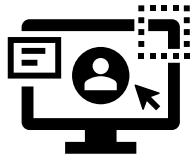
- Grexel can contribute to greater energy market infrastructure (exchange and clearing).



- 9 EECS-GO electricity registries
- 5 Biogas certificate/GO registries
- 2 Heating and cooling GO registries
- 1 Support certificate registry
- 1 Hydrogen certificate registry
- 1 GO auction platform
- 1 Carbon removal registry
- **18 registries in 15 countries**

Project GOAL:
EECS, RED-II and CEN EN-16325
compliant GO Registry
for all
Energy Community Countries

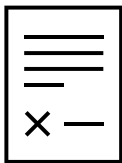
Main goals of the project



1. **Establish a national electricity GO registry in each domain:**
 - GOs internationally transferrable among the Energy Community domains
 - Fulfills EECS, RED I&II, CEN requirements now and in the future.
 - System extendable to all energy sources and energy carriers (RED II).



2. **Training and knowledge transfer:**
 - Train all competent bodies as proficient registry users before go-live
 - Familiarize other users of the system (future Account Holders)
 - Knowledge transfer beyond what is strictly in the scope of the project
 - GOs, residual mix, disclosure, markets, EECS DP



3. **Continuation framework after project:**
 - Developed national registries will be kept ready until June 2023
 - Direct agreement made available for competent bodies and ready for signing



4. **Prepare for AIB Membership:**
 - Compatibility and hub connection maintenance guarantee
 - Enables a stepwise approach for international transfers

What happens next? – Up to you

- Grexel's offer has already undergone ECS public tendering (best price & quality)
- Compatibility guarantee for now and future
 - AIB, CEN-16325, RED I&II
 - Also non-renewable and all energy carriers
- We are ready when you are, let's start!
 - Notify 1 month beforehand to go live
- First international transfer of GOs within the Energy Community to take place in July 2022?!



European GO system

Basics of a de-linked tracking system

Mission of GOs – Consumer driven energy transition

- Main drivers:
 - Climate change, renewable energy, consumer choice and empowerment
 - Electricity market liberalization and need for differentiation by suppliers
 - Way to ensure reliability of green products offerings
- Consumers should be able to...
 - Choose the origin of their energy
 - Take responsibility over their impact on environment and be able to influence it
 - Trust that electricity tracking works and leads to no double counting
 - Understand how to affect the environment with energy purchase decisions.

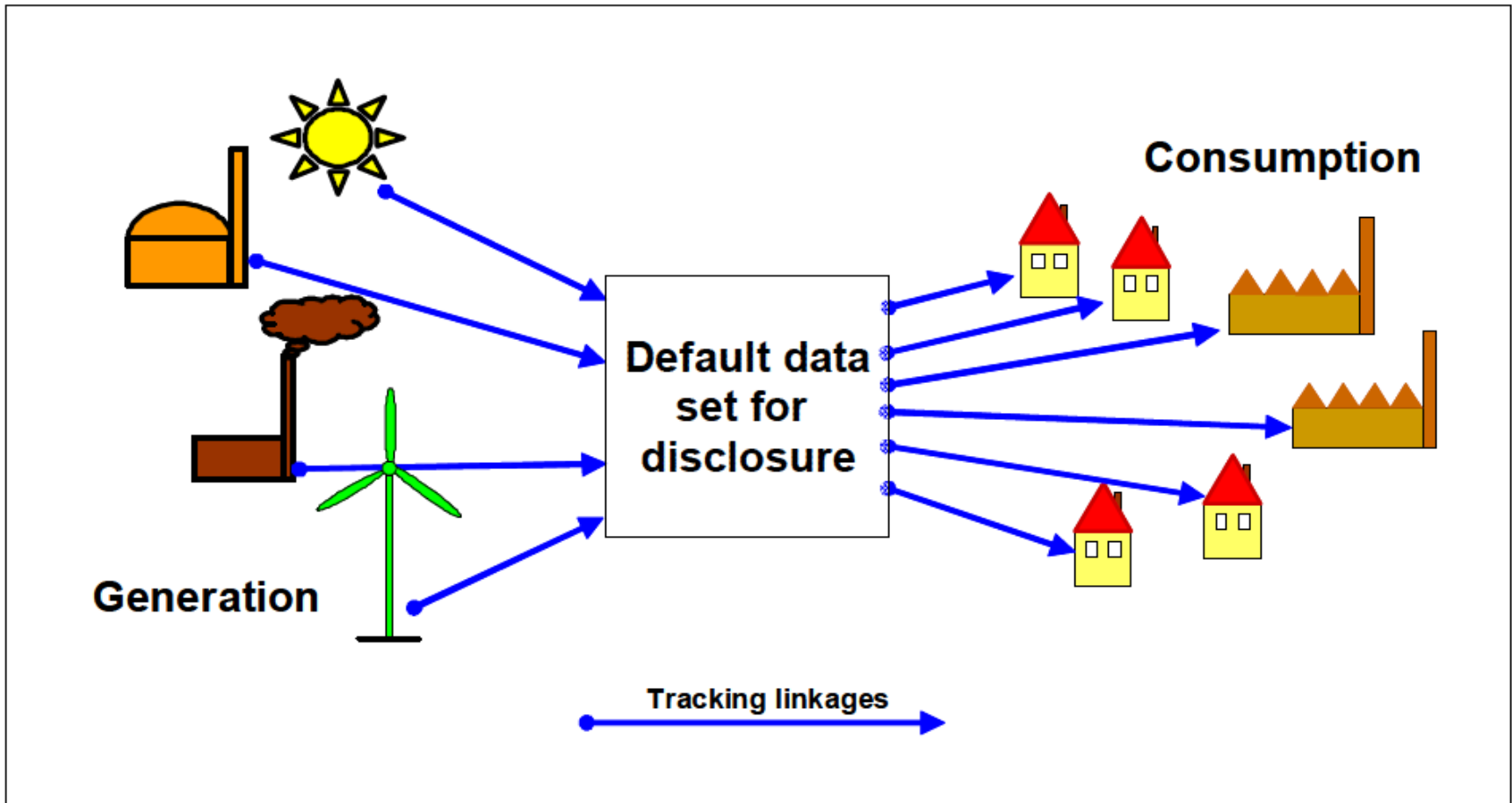


But why GOs?
Isn't there an easier way?

No tracking

Tracking options:

- ~~• No tracking~~
- Physical tracking
- Commercial tracking
- De-linked tracking

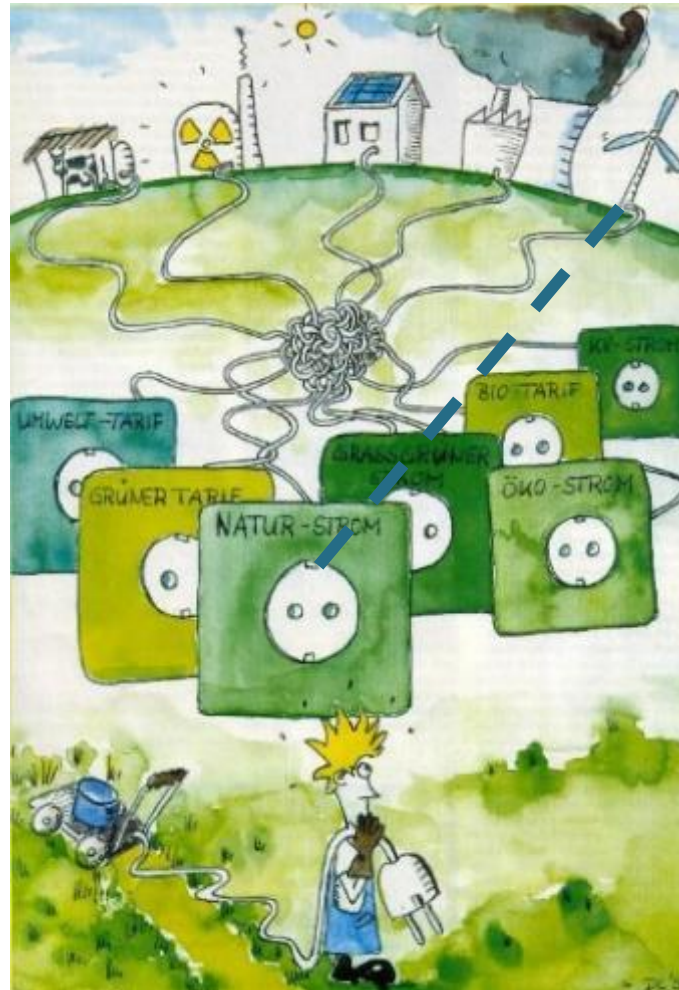


No consumer choice

Physical tracking

Tracking options:

- ~~No tracking~~
- ~~Physical tracking~~
- Commercial tracking
- De-linked tracking

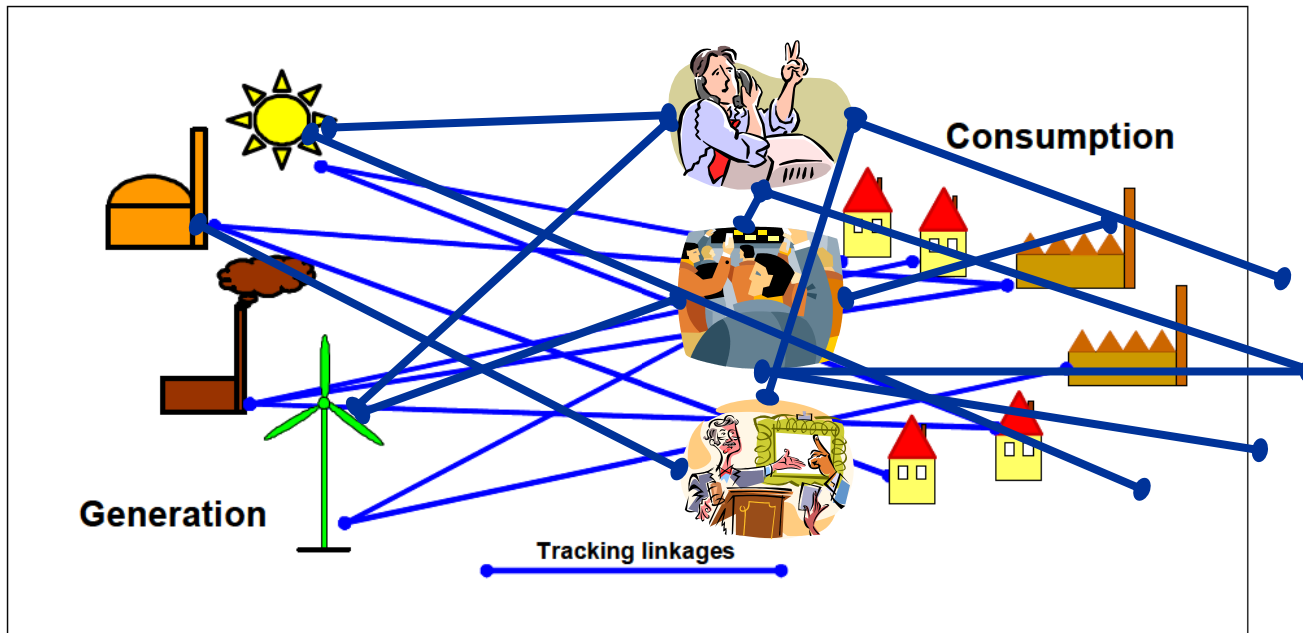


Not possible

Commercial tracking

Tracking options:

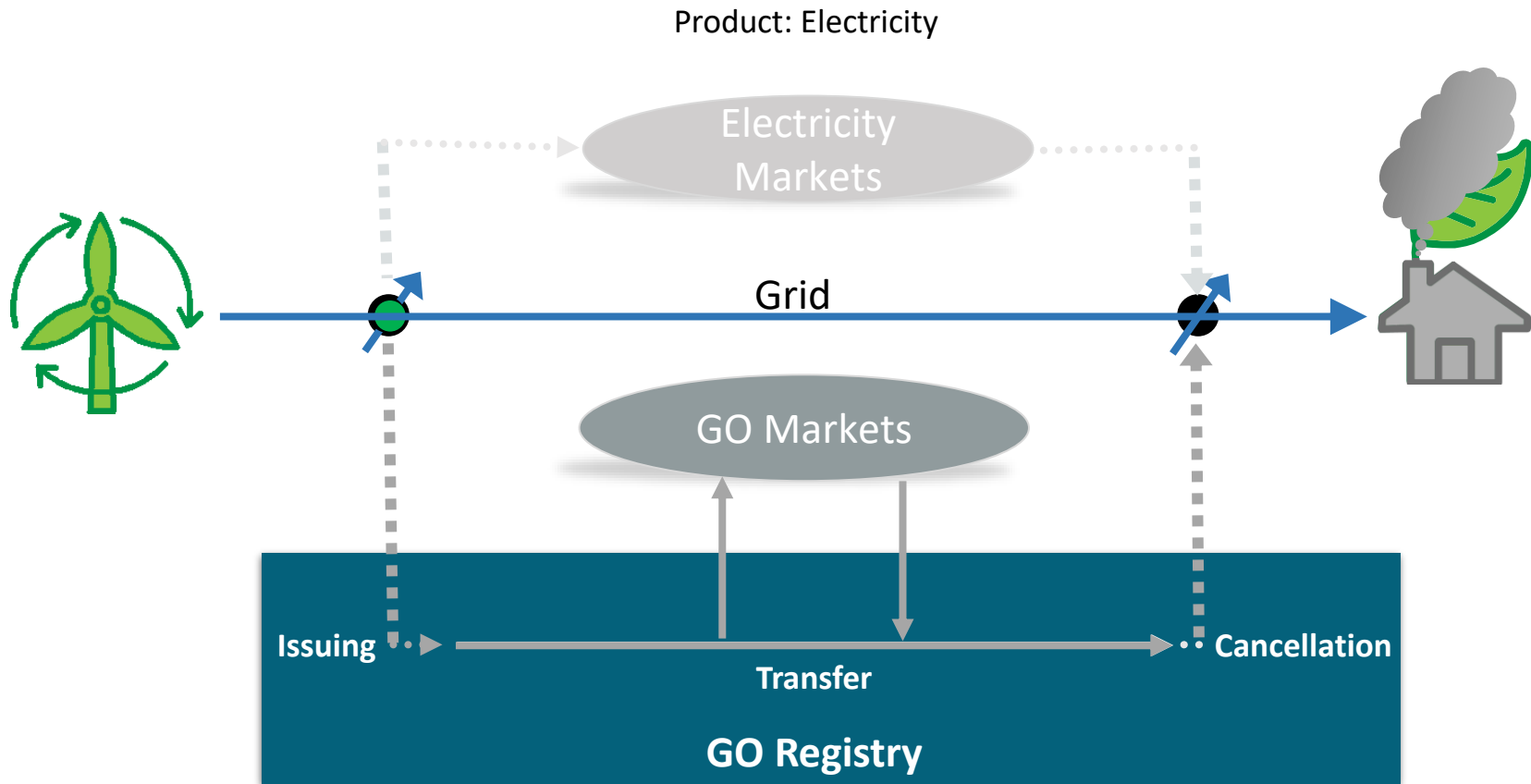
- ~~No tracking~~
- ~~Physical tracking~~
- ~~Commercial tracking~~
- De-linked tracking



No supervision and hampers the underlying market

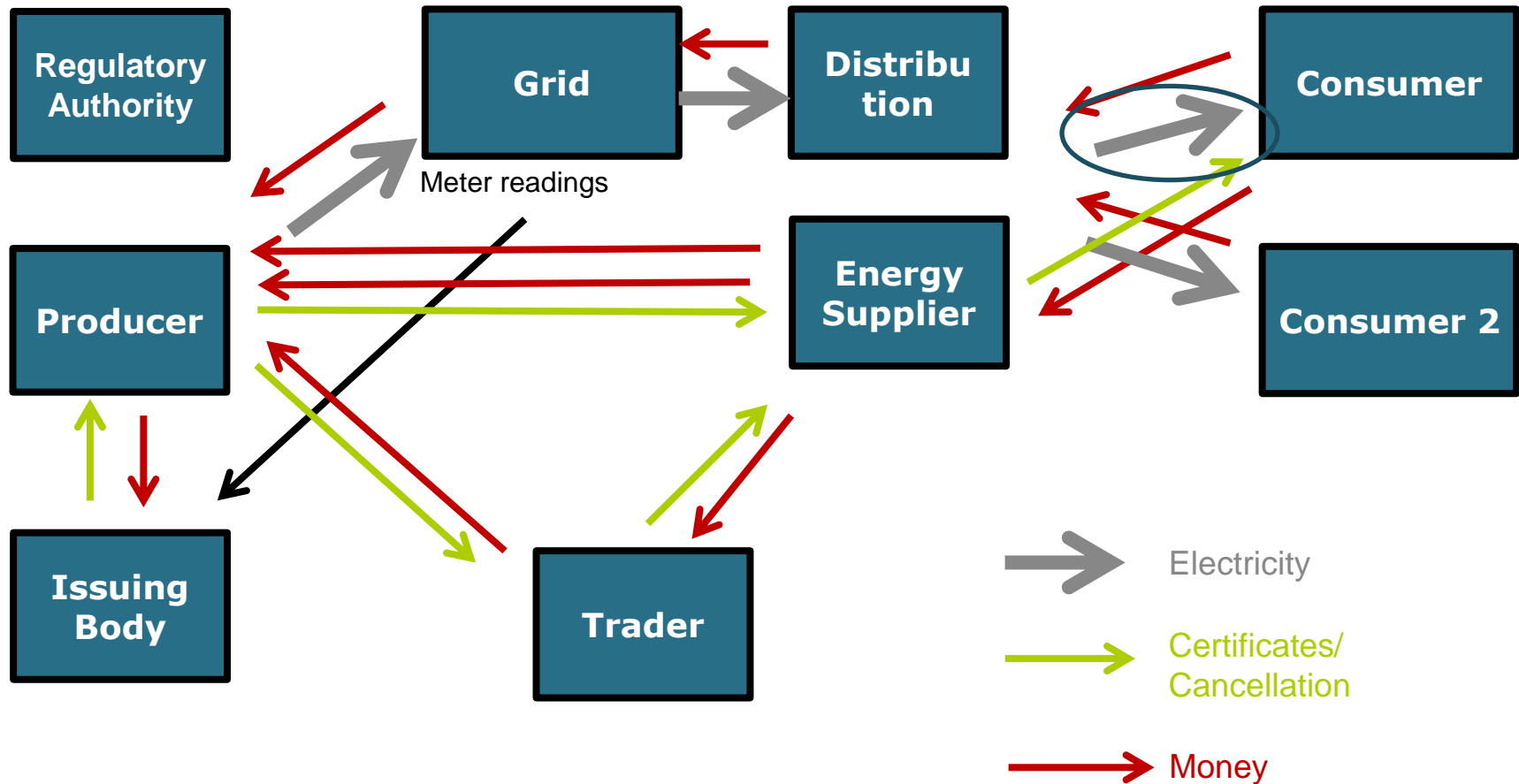
Basic GO process – De-linked tracking of electricity

A guarantee of origin can be transferred, independently of the energy to which it relates (2018/2001/EC)



Product: Energy Origin (wind, domestic, small-scale, PV, Eco-labeled etc...)

Simplified GO process diagram



European GO system

What makes a GO market and what are the benefits of GOs for:

1. The society
2. Account Holders
3. Issuing Bodies

What makes a GO market?

- Demand for GOs comes from disclosure:
 - *“Suppliers shall specify in bills the contribution of each energy source to the electricity purchased by the final customer...” (2019/944/EC, Annex 1)*

- GOs are the sole instrument for disclosure:
 - *“Where an electricity supplier is required to demonstrate the share or quantity of energy from renewable sources ... it **shall do so** by using guarantees of origin...”* (2018/2001/EC)*

- The GO and disclosure system shall be reliable:
 - *The regulatory authority ... shall ... ensure that the information ... is reliable... (2019/944/EC, Annex 1)*
 - *Double counting and disclosure of guarantees of origin should be avoided.*

Supply and demand



Reliable Product

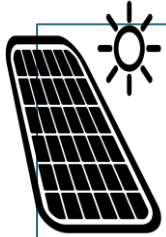


Rules and supervision



Energy disclosure is the ultimate and only purpose of GOs

Energy Certification Benefits – Consumer engagement in the energy transition



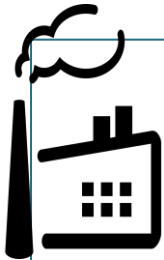
Producers

- Increased revenue
- Incentive to invest in renewables
- Healthy energy market



Suppliers

- Branding / Differentiation
- Premium products
- Customer loyalty



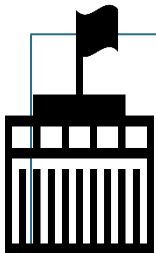
Industry

- Green differentiation
- CO2 Footprinting
- Zero-carbon roadmaps



Consumers

- Sit on driver's seat
- Participate in RES support
- Personal footprinting



Government

- Hassle-free support instrument
- Insight on consumers' WTP
- Green value export revenue



Environment

- More green power
- Accountable industry
- Consumer driven energy transition

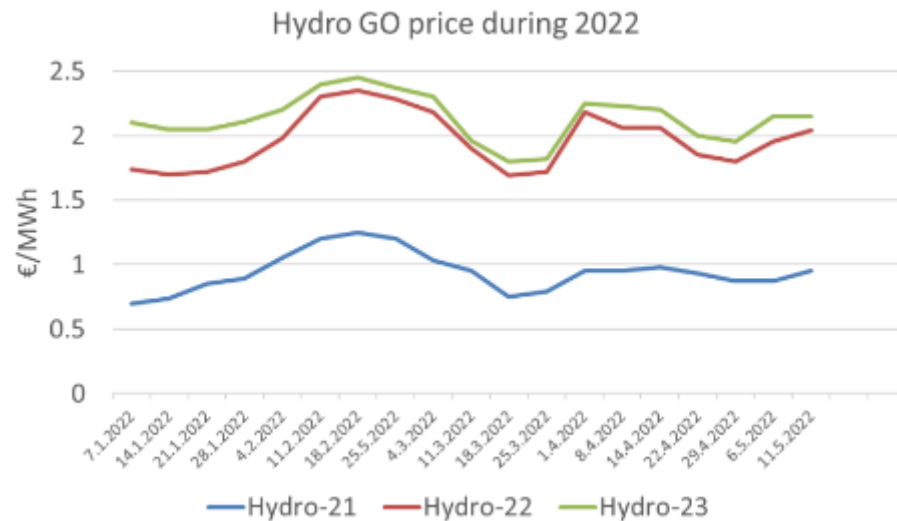
What's in it for me as an Account Holder Company?



Current price levels for spot and forwards

- For “bulk” hydro 1-2€/MWh. Wind & Solar closer to 2€/MWh. (REC MM 2022)
 - In a recent survey published by Greenfact* 90% of the respondents believed that generic hydro GO prices would remain above 1.4€/MWh in the future (current price 1.7€/MWh)
- Graph for cheapest renewable (large hydro)

- Price determining factors:
 - Energy Source
 - Public Support
 - Commissioning year
 - Environment labels

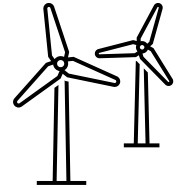


Source: Gasum 2022 (Info-letter on GOs)

4 Main Value Creation Strategies for Suppliers

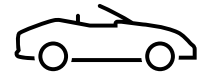
1. Green Premium Products (e.g. fair-trade, certified palm oil...)

- Those willing to pay extra, get green electricity, others get grey



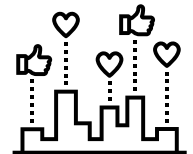
2. “Dark green offering” (Toyota vs. Mercedes)

- Buying the product directly leads to more renewable production (additionality)
 - E.g. green energy labels: Ekoenergy, Eugene, Bra Miljöval, Nature Made, OK Power, WindMade



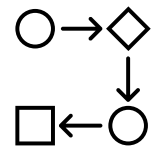
3. Greening of all sales “for free”

- For increased customer loyalty and market share

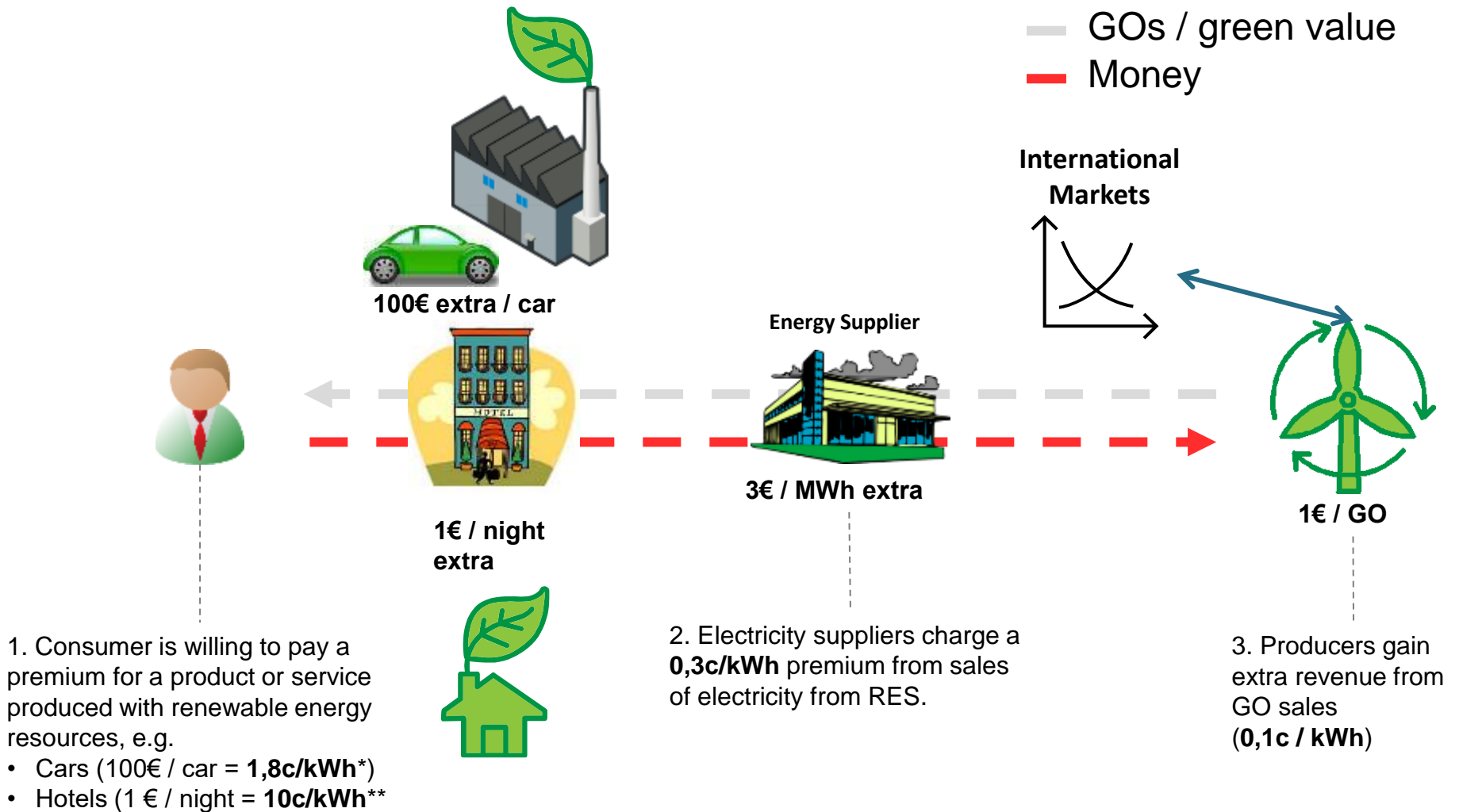


4. Added value to other (non-energy) services or products

- Claim higher price from product or service produced using green power
- Execution in compliance with standards (GHG Protocol)



4. Added-value in non-energy products



- 1. Consumer is willing to pay a premium for a product or service produced with renewable energy resources, e.g.
- Cars (100€ / car = **1,8c/kWh***)
- Hotels (1 € / night = **10c/kWh****)

2. Electricity suppliers charge a **0,3c/kWh** premium from sales of electricity from RES.

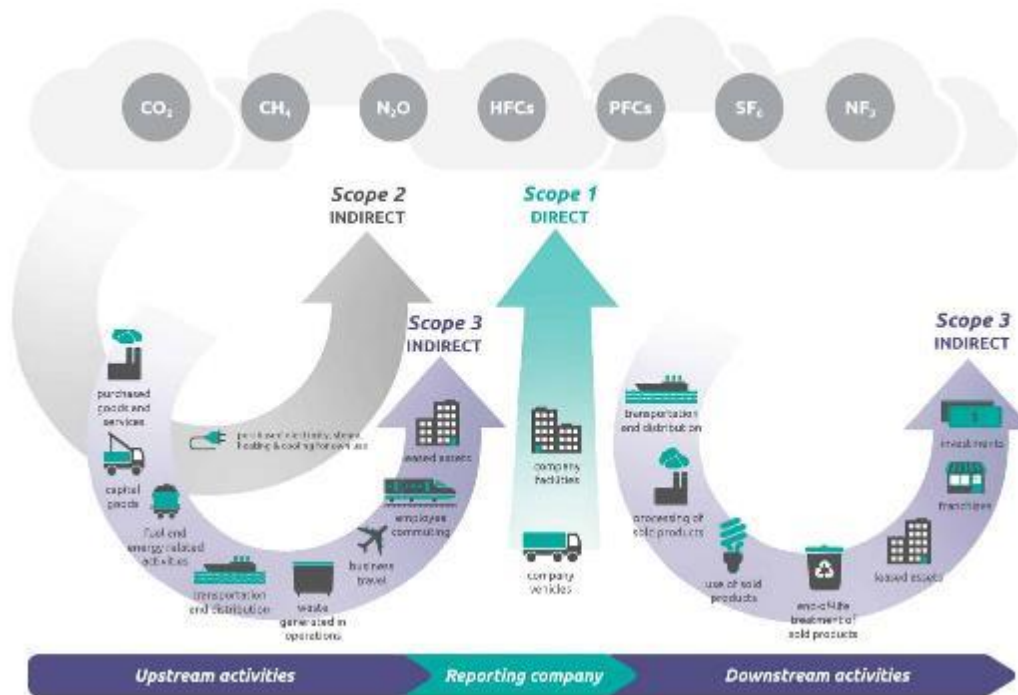
3. Producers gain extra revenue from GO sales (**0,1c / kWh**)

* Requires 5556 kWh to produce a car: http://portal.unesco.org/education/en/file_download.php/a01355752c9e869a63cc5651084cfa30Cars+and+energy.pdf

** Consumption of 10 kWh per room per day

The Greenhouse Gas Protocol

- The most widely used international accounting tool to understand, quantify, and manage greenhouse gas emissions
- Clearly recognizes GOs as the sole method to purchase renewable (CO2 free) power in Europe



Scope 1 – Direct emissions
Emissions from sources owned and controlled by the reporting company

Scope 2 – Indirect emissions
Emissions from energy (electricity, heat, steam, etc.) purchased or acquired and consumed by the reporting company

Scope 3 – Indirect emissions
Upstream and downstream value chain emissions

What's in it for me as Issuing Body?



GO service prices in AIB

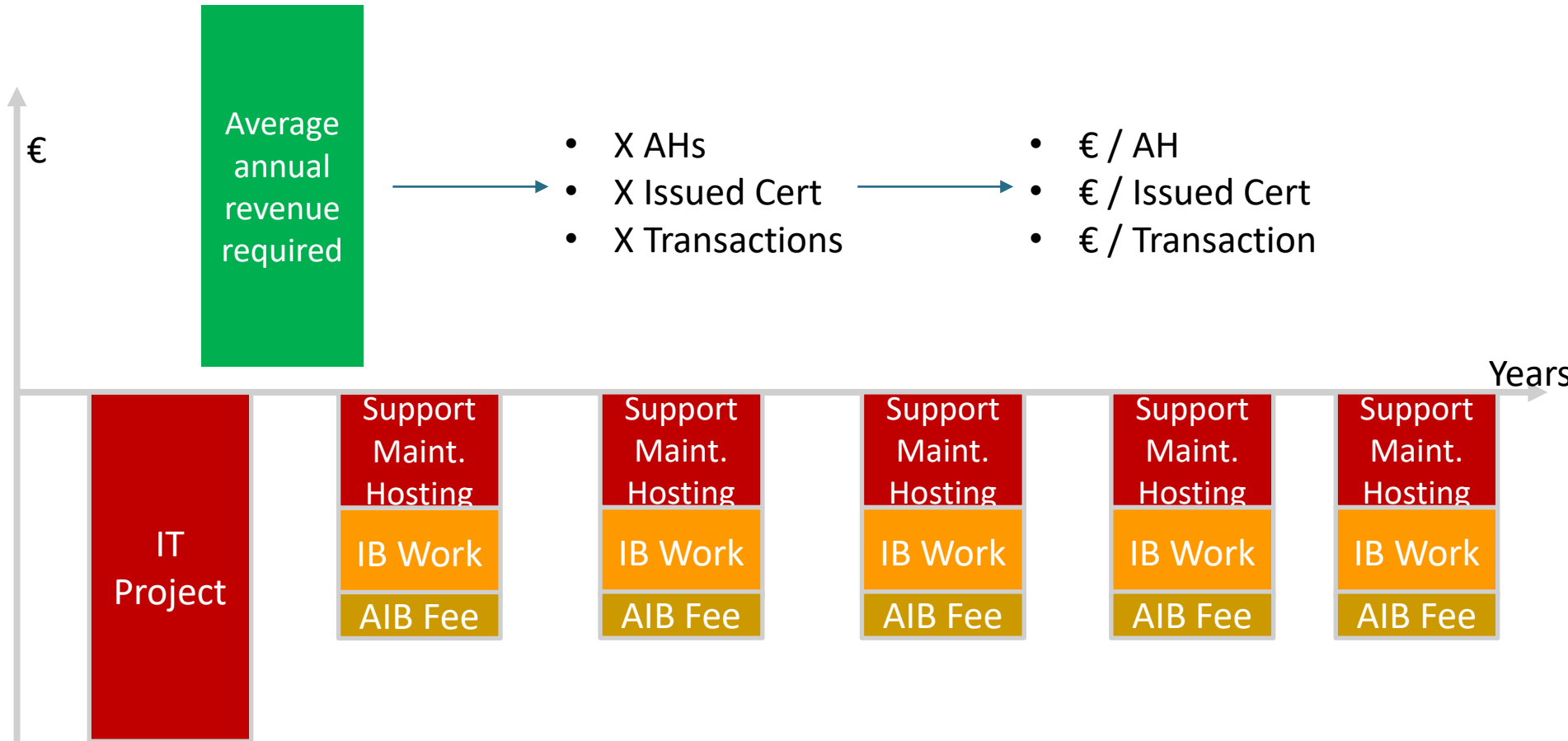
- Most common fee components (most domains having fees)*:
 - **Annual Account Holder fee:** average range: 500 – 2000€/a
 - **Certificate issuing fee:** average range: 0,5 – 4 c/MWh
 - **Imports/Exports:** average range: 0,5 – 1,5 c/MWh

- Quite frequent fee components (less than half of domains having fees)*:
 - Production Device registration: average range: 100-400€/PD
 - Transfers (domain internal): average range: 0,5 – 1 c/MWh
 - Cancellations: average range: 0,5 – 1,5 c/MWh

- Key questions to consider:
 - Should the revenue and expense of the Issuing Body for GOs be balanced? Under what period?
 - Can income from GOs be used to finance other operations of the IB or vice versa?
 - Can GOs generate reasonable (WACC-based) profit for the IB?
 - Can the Issuing Body freely set prices and make profit from GOs?

* 6 countries have no costs or divide incurred annual cost after the year to all market actors (AT, BE, GR, IE, SI, ES).

How to balance cost and income from GOs? – Traditional IT in theory

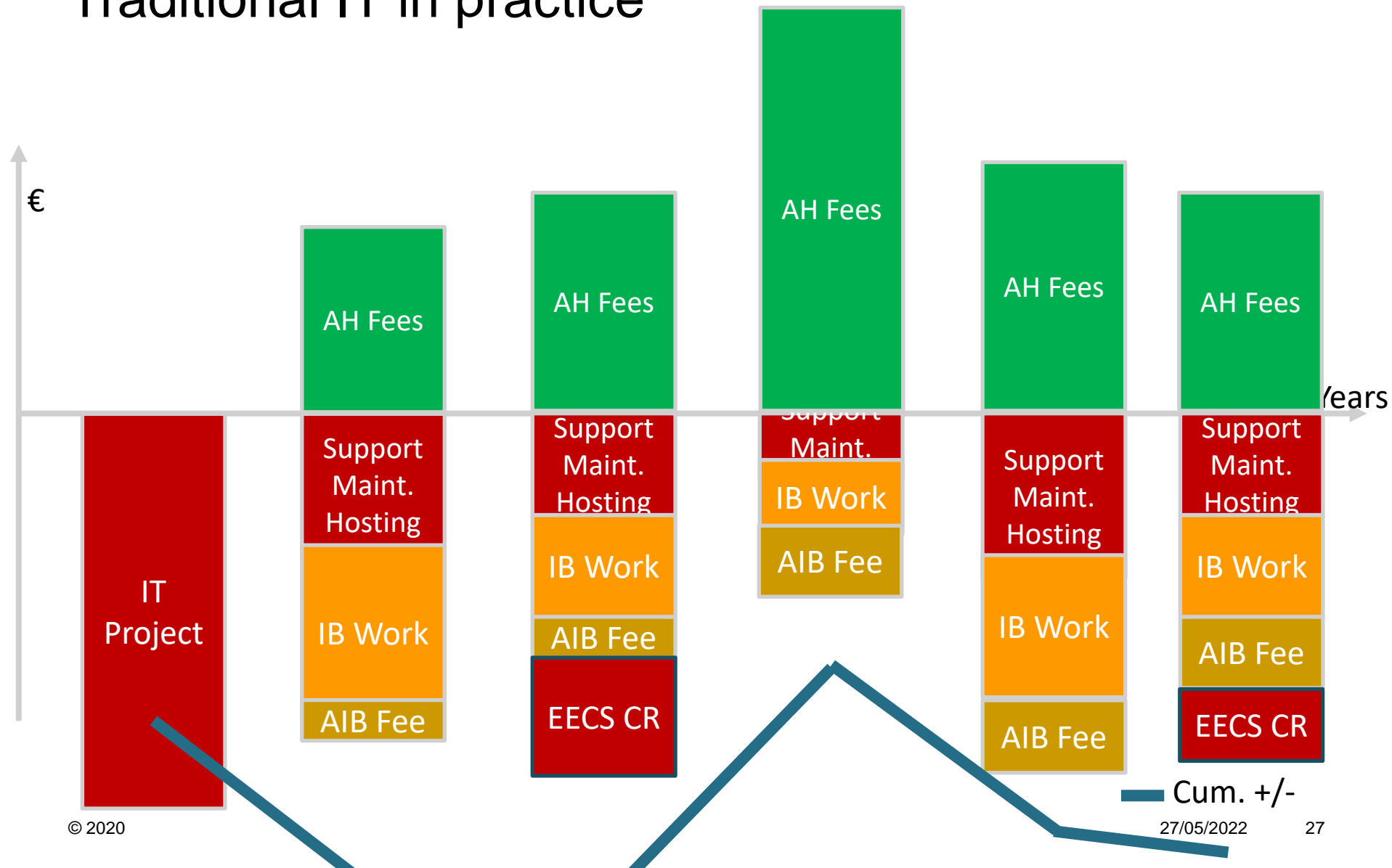


HW&SW specifications, planning, change management, implementation, CAT...

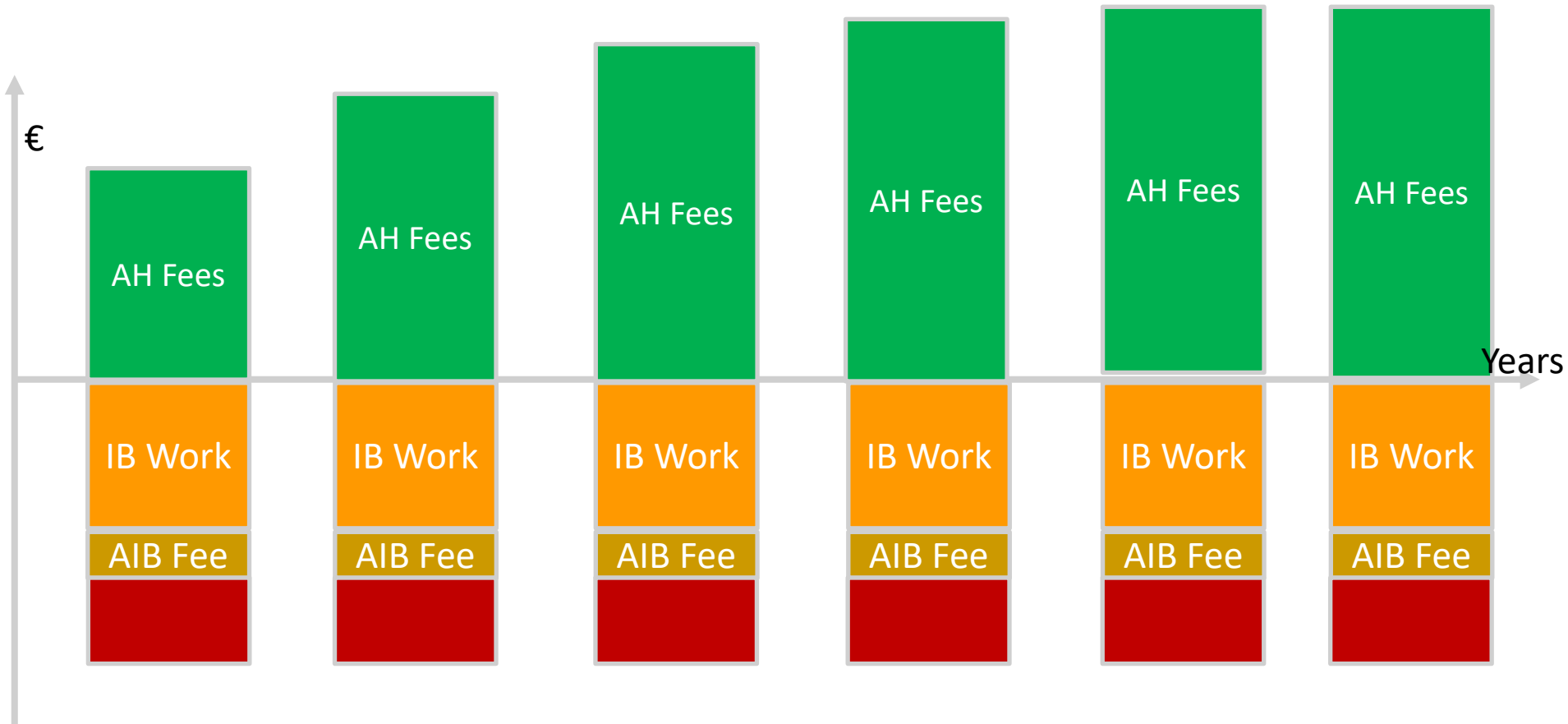
IB Checklist for RED II → Changes coming!


- New energy carriers
- New GO data content
- Expiry time handling
- Energy Carrier conversion support
- Co-existence with support schemes
- GO exclusivity for disclosure (electricity)
- Registry
 - Energy carriers and conversion
 - New data fields
 - New data protocol
 - New rules
- Updated links to other regulation
 - RED II Article 3 (Union targets)
 - Directive 2012/27/EU (Energy Efficiency) Article 14(10) HC-GO (electricity)
 - RED II Article 23 RE-HC targets (heating/cooling)
 - RED II Article 24 DHC RES-% disclosure (heating/cooling)
 - RED II Article 25 Transport sector targets
 - RED II Article 29 Sustainability and GHG savings criteria
 - IME Annex I (5) Disclosure (electricity)

How to balance cost and income from GOs? – Traditional IT in practice



Outsource all risk to Grexel!



 = Registry service, Hosting&Maintenance, Support for IB, long-term partner
 EECS compliance, connection to AIB Hub

Summary: IB Checklist for RED II

- New energy carriers
- New GO data content
- Expiry time handling
- Energy Carrier conversion support
- Co-existence with support schemes
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Service pricing: a basic example excel

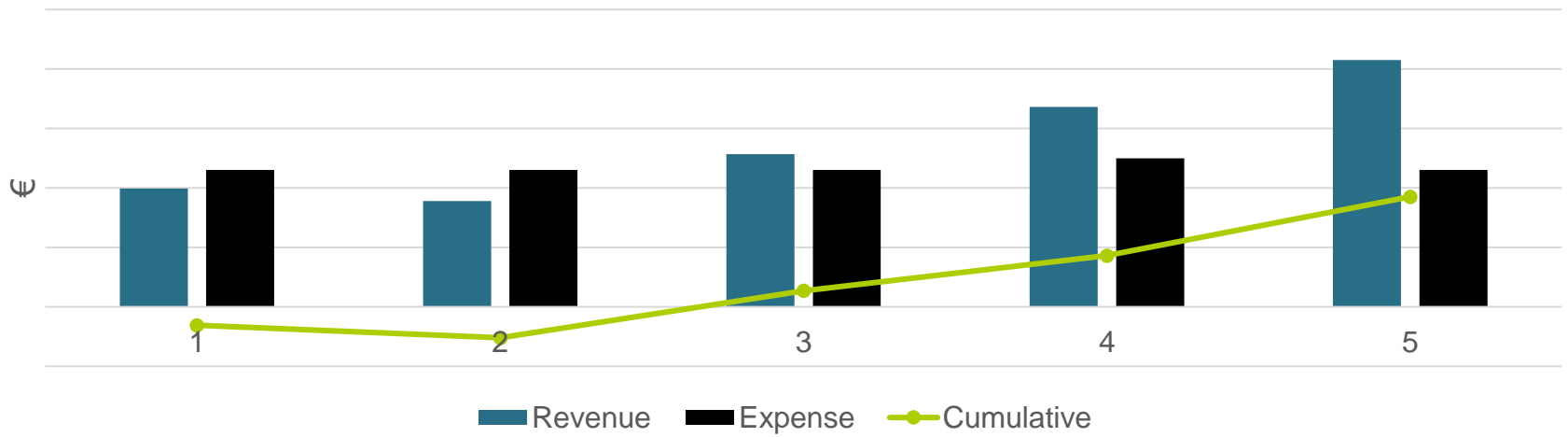
Income	Registration	Yearly fee
Account Holder		1 500
Production Device Issued / imported	1 000	200
		0,030

Year	Volumes	1	2	3	4	5
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Based on own estimates and service fees

- Expense**
- Registry
- Own personnel
- Buffer

Based on own estimates and service fees



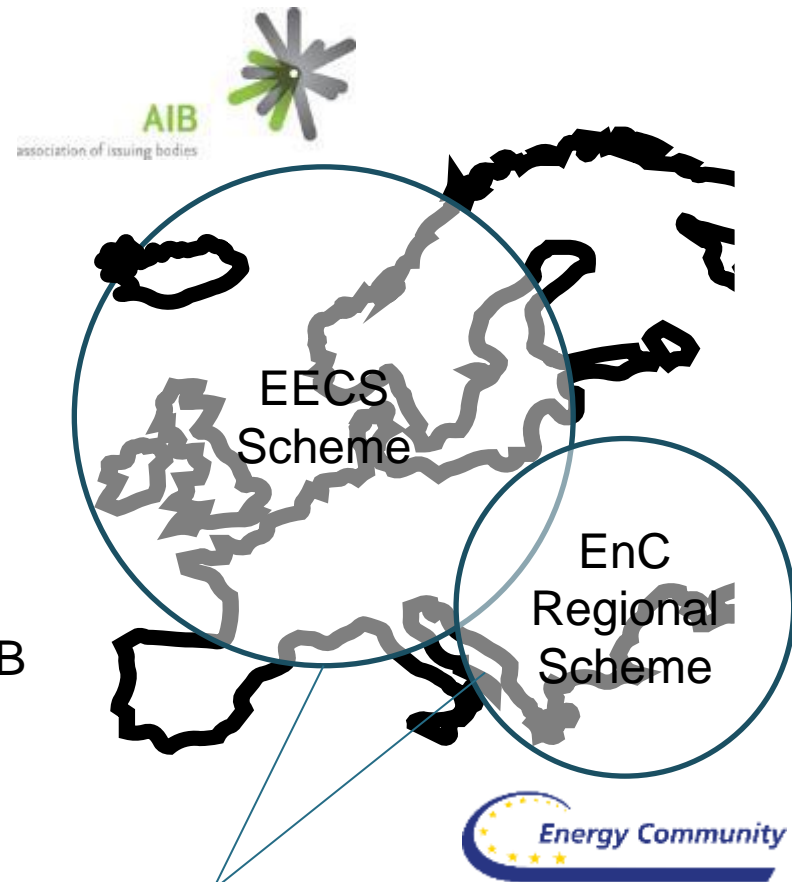
Energy Community Regional Scheme and Association of Issuing Bodies

Brief intro to AIB and the envisioned Energy Community Scheme



Regional GO Scheme - Intro

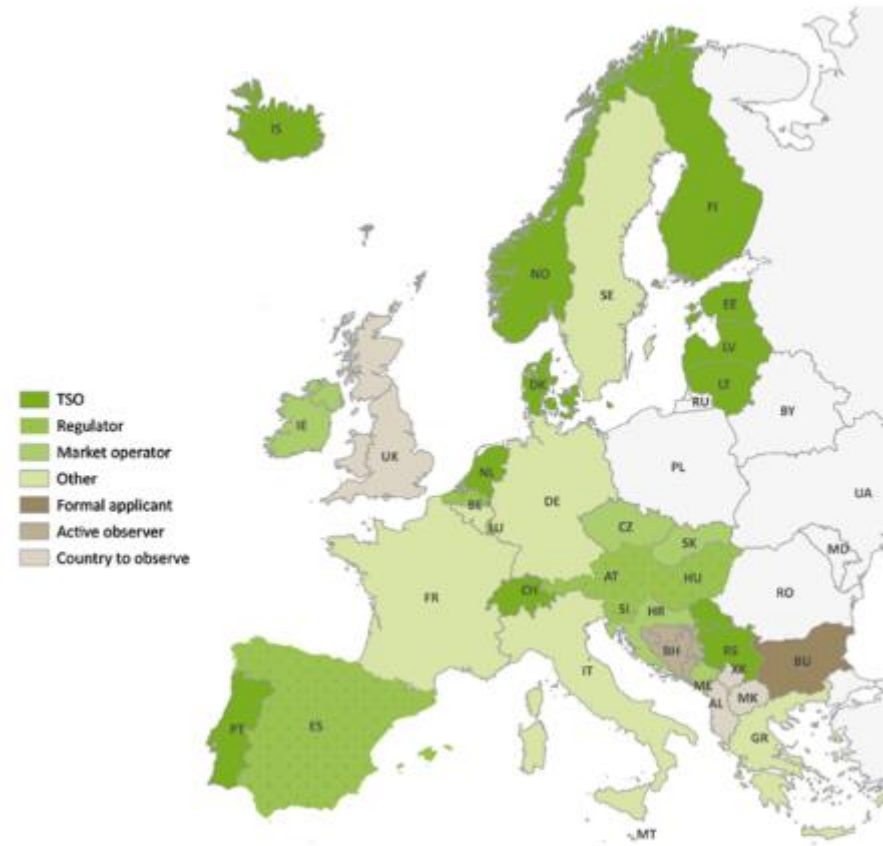
- Based on EECS technical framework to ensure compliance.
- Technical implementation according to the new EECS V80 schema
- EnC GOs freely transferrable in the region.
- When an Energy Community country joins AIB electricity scheme group, it may be part of both schemes: EECS and EnC.



100% technical compliance

Association of Issuing Bodies (AIB)

- A non-profit International scientific association
- Manages the European Energy Certificate System - **EECS**.
- Manages the **AIB HUB** which is the interface between national registries
- 27 Countries connected to the AIB HUB
- 1 Issuing Body member per domain and energy carrier.



Recognition of GOs from Energy Community

Conditions for recognition from RED II Art. 19, p. 11:

- *Agreement between the European Union and the country on recognition*
- *Guarantee of origin system in that country is compatible to EU systems*
- *Direct import or export of energy.*

Compatibility

- Start with the local scheme, build a market and gain experience
- Work on GO practices and especially disclosure
- Secure high-level sponsorship if legislative changes are needed

AIB

- Nothing prevents joining the AIB
- Sign-up as Observer or Member for knowledge and contacts
- Prepare material needed for joining (e.g. DP) in English

Approach EU as a group

- The possibility for recognition is clearly there
- Keep the momentum after this project
- Arrange seminars and events locally and internationally

Summary of main messages

1. GOs enable energy consumers to reliably choose their energy origin in modern markets.
 2. GOs represent a major business opportunity for market actors and IB.
 3. GOs are a fundamental part of EU's renewable energy legislation since 2001
- Grexel offers:
 - State of the art, cloud-based registry with highly competitive (tendered) service cost
 - Ready-made system customized for your domain in your language
 - Guaranteed compliance with European standards and protocols
 - Expertise of Grexel at your hand



This project is key step towards compliance with RED in the Energy Community. Keep the momentum!

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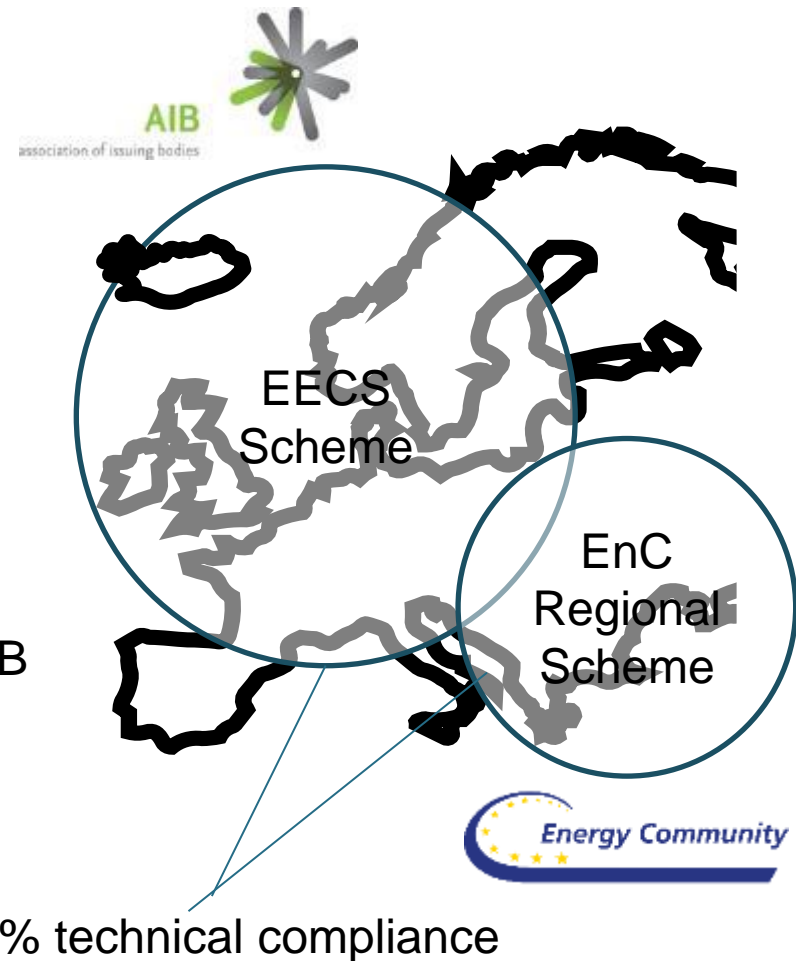


Regional system for guarantees of origin in the Energy Community

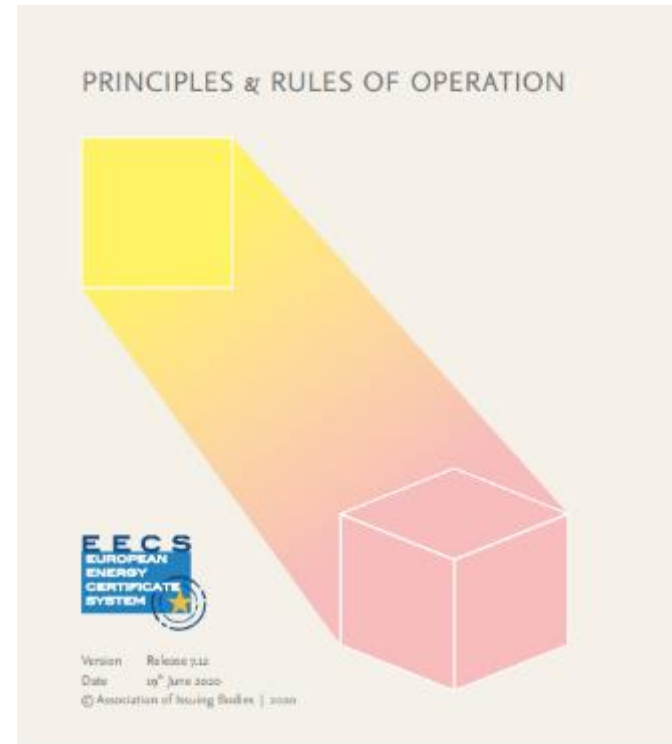
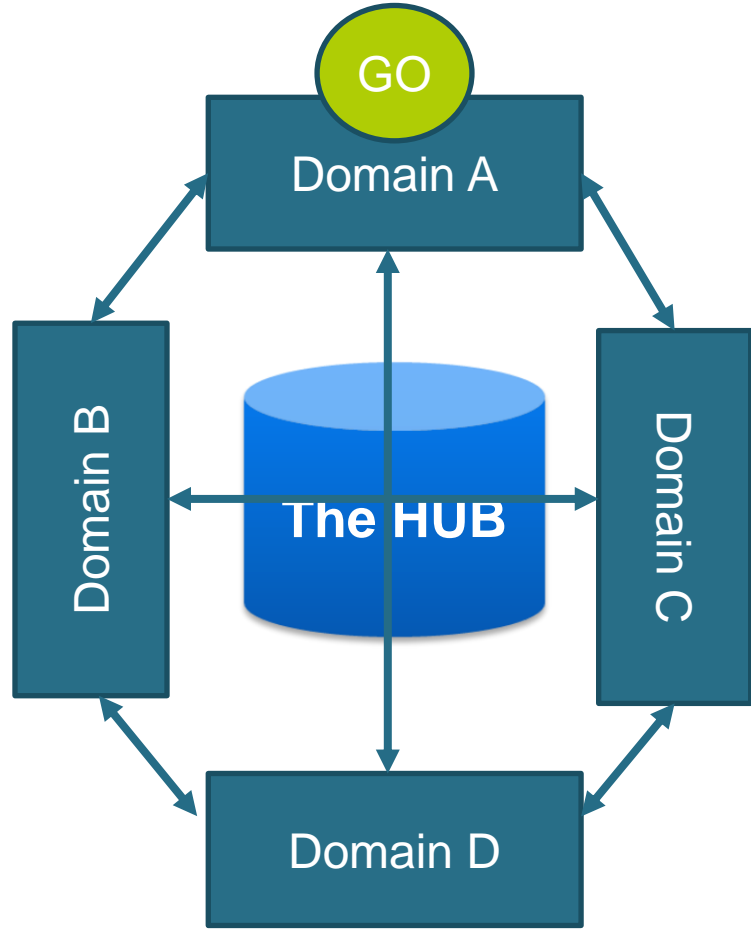
1. Energy Community GO Regional Scheme (EnC)
2. Disclosure law proposal

Energy Community Regional GO Scheme - Intro

- Based on EECS technical framework to ensure compliance.
- Technical implementation according to the new EECS V80 schema
- EnC GOs freely transferrable in the region.
- When an Energy Community country joins AIB electricity scheme group, it may be part of both schemes: EECS and EnC.



EECS is Technical and Quality Standard



Technology: HUB and V80 Hubcom

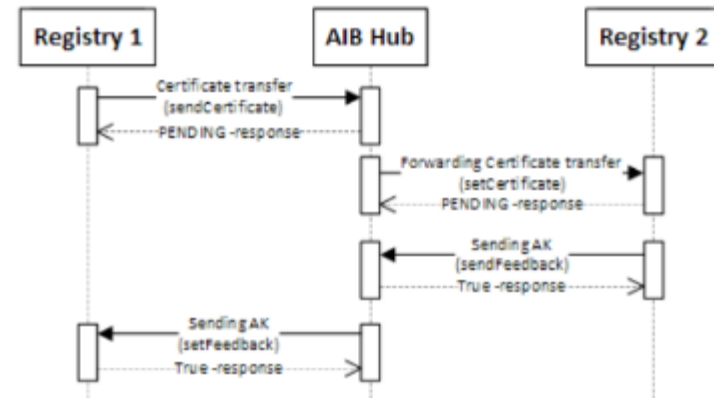
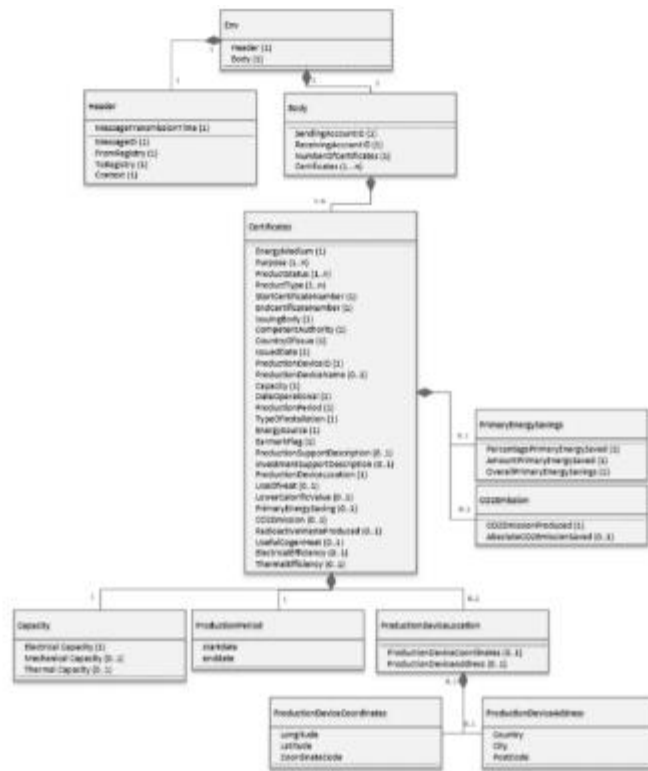



Figure 1 Basic Data Transmission Protocol – asynchronous AK


```

<?xml version="1.0" encoding="UTF-8"?>
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  </xs:element>
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```


Quality: Main building blocks of a reliable GO and disclosure system according to EECS Rules

- 


Account Holder Registration

 - Reliable entry procedures for companies (e.g. KYC)
 - Commitment to contractual clauses and Domain Protocol
- 


Production Device Registration

 - Verification and maintenance of accurate plant data.
 - Measurement and Issuing process.
- 


GO issuing

 - Issuing based on Measurement Body (T/DSO) data
 - Verification of fuel declarations
- 

GO transfer

 - Secure and electronic transfer of GOs
 - Use standard GO format (immutable and unique).
- 

GO cancellation

 - GOs as the sole instrument to sell renewable energy.
 - Set expiry rules and enable withdrawal by IB
- 

Electricity disclosure

 - Obligation to do disclosure by suppliers
 - Calculate and require use of the residual mix
 - Competent Body to supervise disclosure claims

Competent Body Supervision

Energy Community Scheme (EnC) and EECS

Scope of EECS

Legal Harmonization



Requirements

- 2018/2001/EC, Art.19
- 2019/944/EC, Annex 1
- CEN 16325

EECS

- Required, audited at membership and re-audits

EnC

- To be audited at AIB Membership

Quality Harmonization



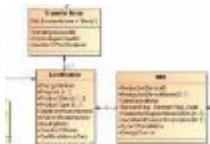
- Registration of companies and plants
- Measurements and data verification
- GO Processes
- Disclosure**

- EECS Rules
- Domain Protocol*
- Standard Contracts
- Hub Participant Agreement and insurance
- Articles of Association

- To be audited at AIB Membership

Scope of EnC

Technical Harmonization



- GO Fields
- Coding structure
- HUB Messaging format

- V72
- V80

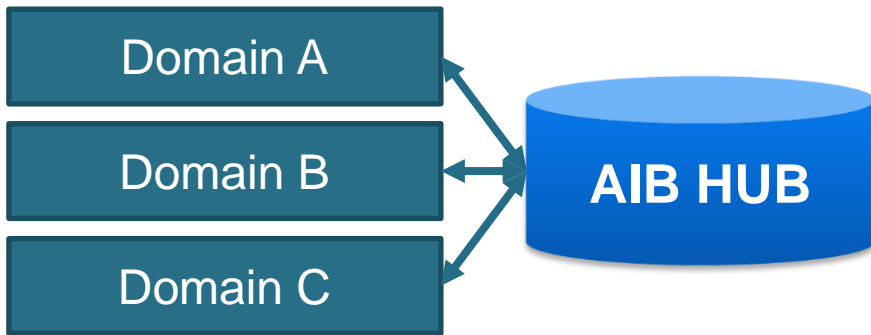
- V80

* Domain Protocol is a key document in the membership process. It describes how the EECS Framework is fitted in the context of the country and lists possible deviations

** Electricity Disclosure needs to be robust in legislation in order for AIB membership to be possible.

Stage 1: Purely regional system

AIB Domains

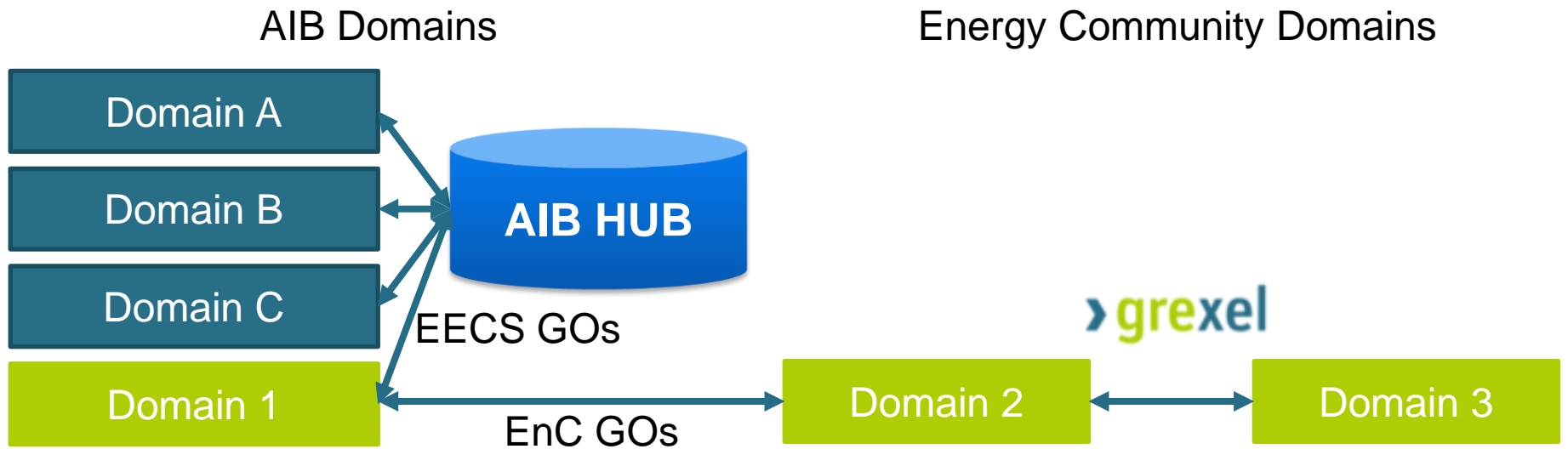


Energy Community Domains



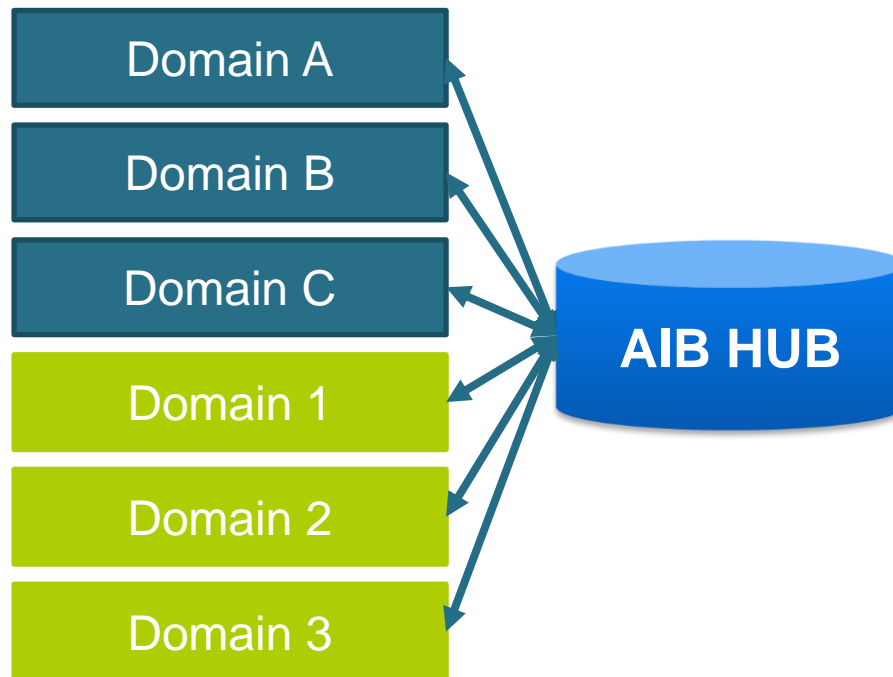
- EnC GOs technically compatible with EECS GOs, but the legal environment and the procedural quality of EnC domains has not been audited.
- EnC domains take EECS Rules as basis of the quality standard of the system, but it is not a requirement for Scheme membership.
- EnC GOs freely transferrable across EnC domains.
- Possible transfer restrictions applied bilaterally.

Stage 2: Hybrid system



- GOs can be issued in Domain 1 for either EECS or EnC according to rules in EECS Domain Protocol.
 - Scheme may not be altered at any point of the GOs lifetime (no conversion)
 - EnC GOs may not enter the AIB HUB.
 - EECS GOs may not be transferred to a non-EECS domain or to a non-EECS Account Holder in an EECS domain.
- Choice of Scheme may be made at Account Holder or even at Production Device level.
 - However, easiest to describe if all GOs issued after AIB Membership are issued as EECS GOs.
- Account Holders, which are participants of both schemes, may transfer both types of GOs

Stage 3: All Energy Community have joined the EECS Electricity Scheme Group



AIB Electricity Scheme Membership Process

Internal setup

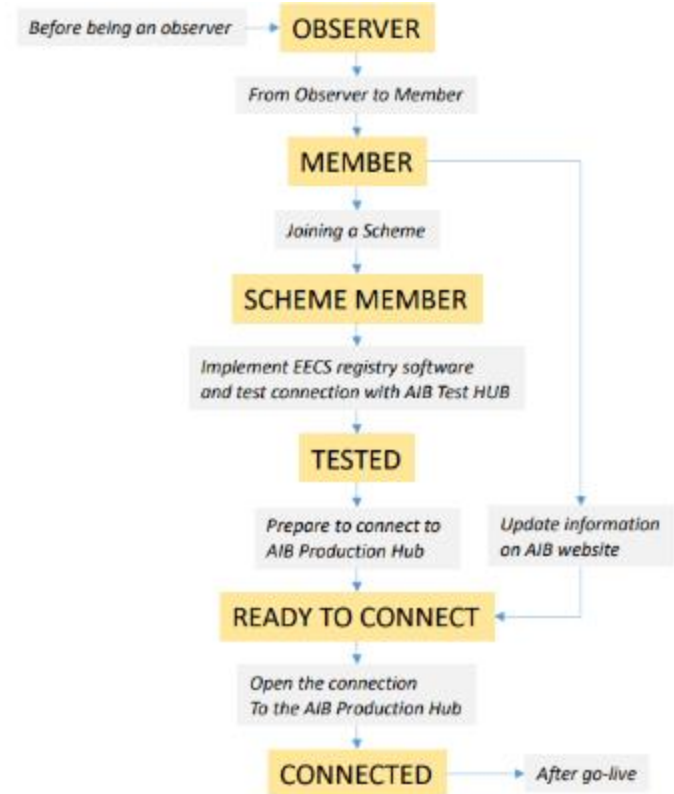
- Appoint Issuing Body and Plant Registrar
- Select and implement registry software
- GOs and **disclosure** in legislation

Prepare domain scheme

- Domain Protocol
- Cross-ref matrix
- Standard Terms and Conditions for market parties
- Hub Participant Agreement for Issuing Body
- Questionnaires

Apply

- Send Domain Scheme documentation for review
- Sign Hub Participant Agreement and find insurance
- Test Registry Software against HUB



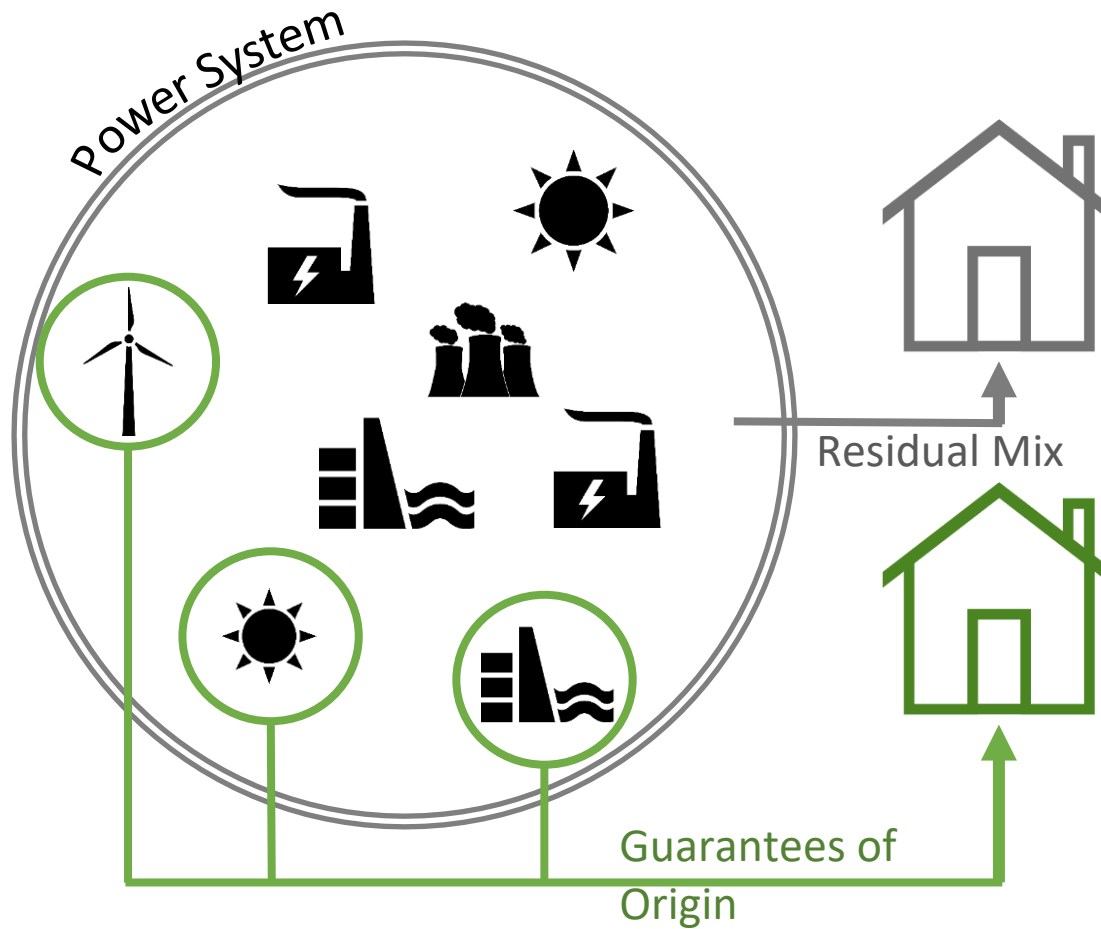
Adapted from: <https://www.aib-net.org/aib/how-join>

Other tips and tricks for AIB compliance

- Start preparations for disclosure law early on!
- Use the Domain Protocol template to guide you in the preparation of the GO scheme.
- Use AIB reviewers' feedback, don't try to get everything right on the first go.
- Remember that you can deviate from the EECS Rules, just note the deviations and see if they will pass
 - However deviations from disclosure rules won't pass
- Don't make the system too administrative, e.g. there is no requirement to physically audit each device, the possibility to do so is often enough.
- Use Grexel for help!

Electricity Disclosure

Basic principle – Disclosure in a nutshell



4 basic principles for reliable electricity disclosure

1. **Disclosure** of the energy origin, CO₂ and radioactive waste content of electricity **is mandatory** for electricity suppliers*.
2. **GOs are the only way** to explicitly prove the (renewable) origin of electricity.
3. A **residual mix is calculated and used**. Its use is mandatory for any disclosure of sold/consumed energy for which a GO is not cancelled.
4. A **Competent Body for disclosure** is named with the responsibility of supervising the correctness of disclosure information as well as provision of needed figures and methodologies. The body is independent from energy companies.

See EECS Rules Section N9

1. Obligation to disclose energy origin (2019/944/EC, Annex 1)

- Suppliers shall specify in bills the contribution of each energy source* to the electricity purchased by the final customer in accordance with the electricity supply contract (electricity product level disclosure).

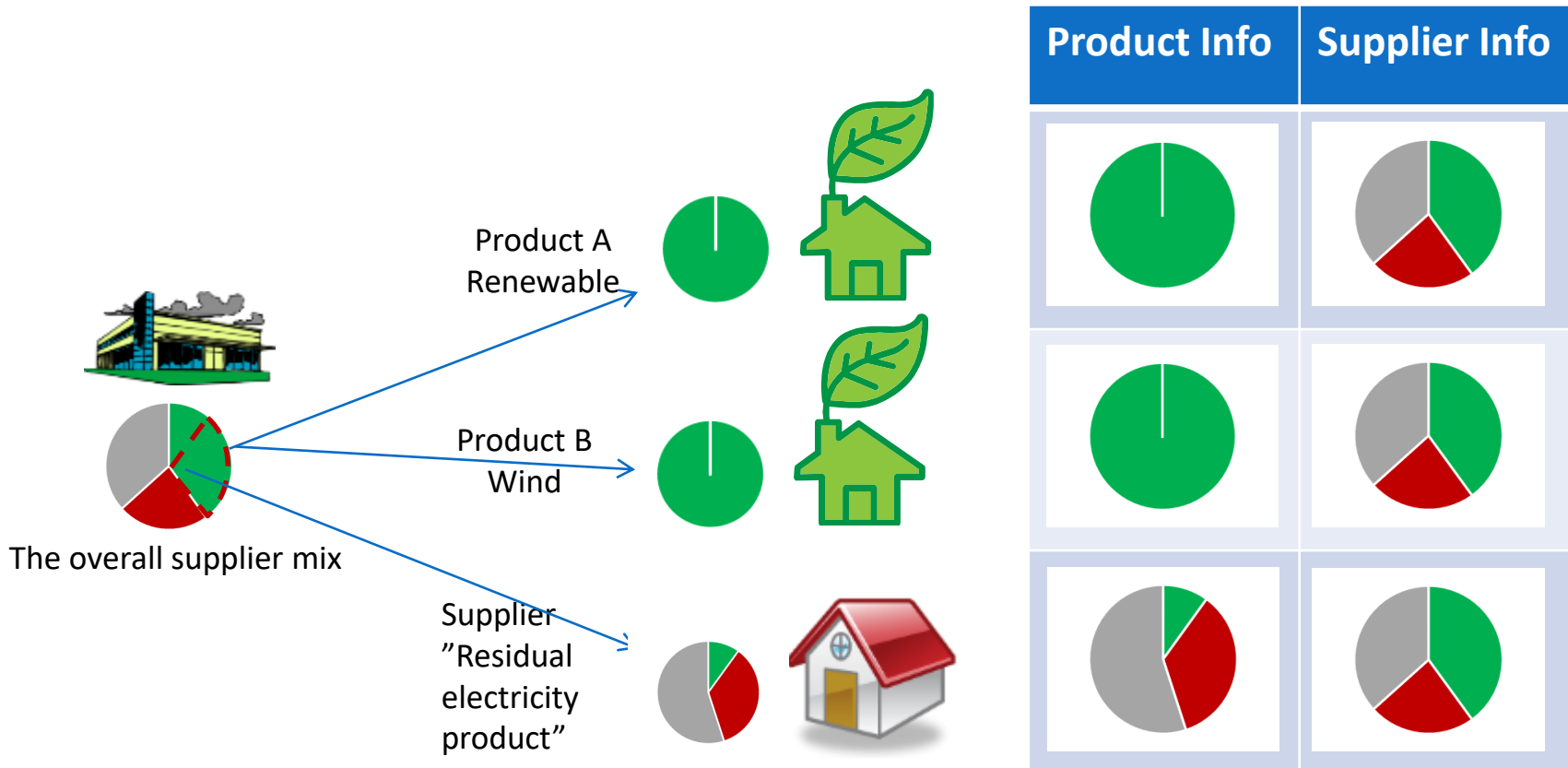
- The following information shall be made available to final customers in, with, or signposted to within their bills and billing information:
 - (a) the contribution of each energy source to the overall energy mix of the supplier** over the preceding year in a comprehensible and clearly comparable manner;
 - (b) information on the environmental impact, in at least terms of CO2 emissions and the radioactive waste*** resulting from the electricity produced by the overall energy mix of the supplier over the preceding year.

**Separation of energy sources in disclosure should be at least at the level of: Renewable, Fossil and Nuclear energy.*

*** at national level, namely in the Member State in which the electricity supply contract has been concluded, as well as at the level of the supplier if the supplier is active in several Member States*

******It is highly recommended to disclose the environmental impact for both electricity product and the overall energy mix although not specifically required by the directive. (see principle 2)***

Disclosure of both product and supplier levels



- Both Product and supplier info should include CO2 and radioactive waste content of the sold electricity

2. Definitions and GO exclusivity

Known and unknown energy origin:

- **Electricity of Known Origin:** A guarantee of origin **is** cancelled for that electricity unit by the set DL*
- **Electricity of Unknown Origin:** A guarantee of origin is **not** cancelled for that electricity unit by the set DL*
 - Electricity of Unknown Origin needs to be disclosed with the most recent residual mix**.

Electricity product and the “remaining” residual electricity product of a supplier:

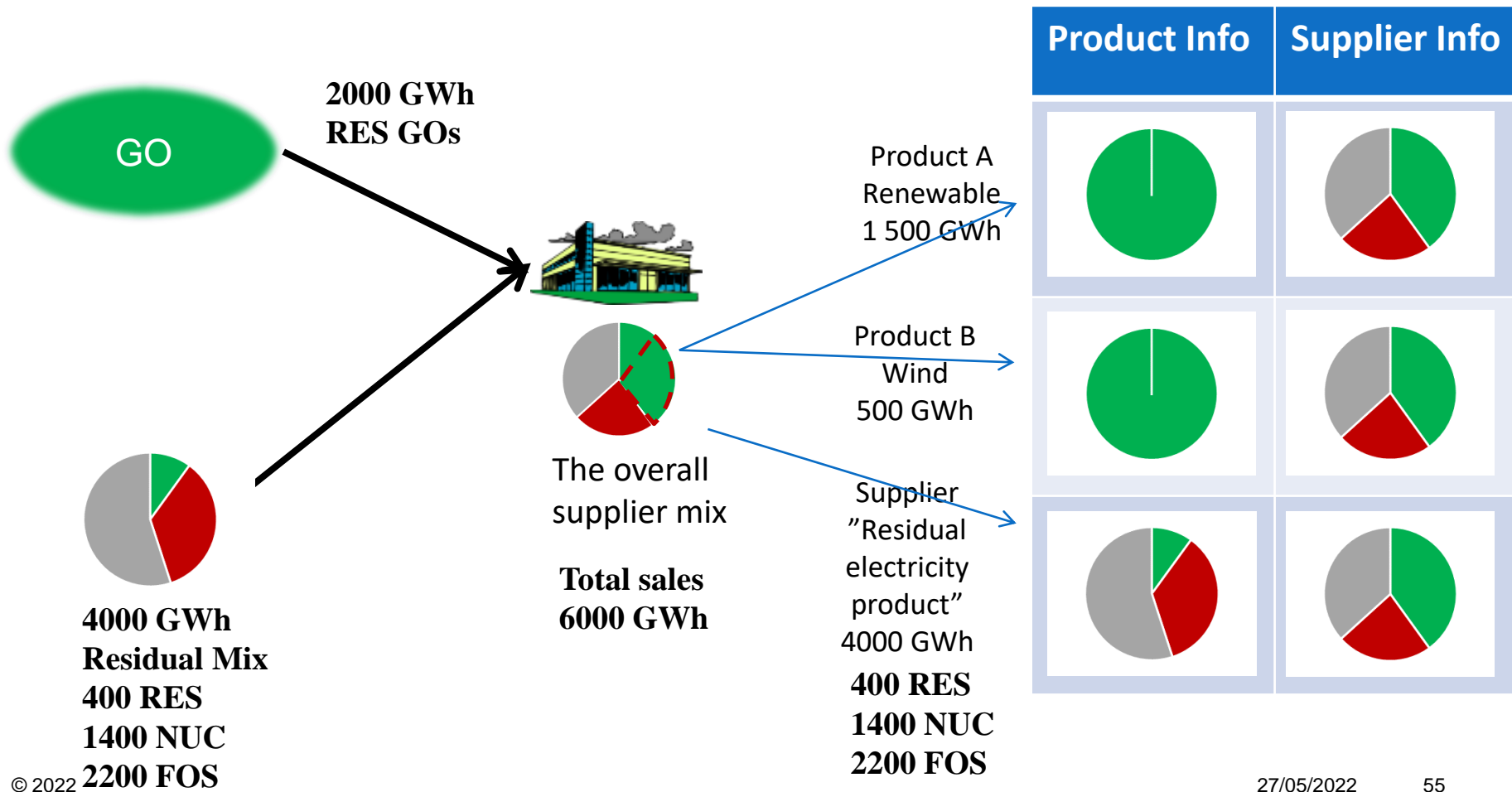
- **Electricity Product:** Electricity sold by suppliers **with** predefined claims regarding production attributes of the electricity.
 - Electricity suppliers must use electricity of known origin for the disclosure of electricity products.
- **Residual Electricity Product:** Electricity sold by suppliers **without** predefined claims regarding production attributes of the electricity.
 - Disclosure information of a supplier’s residual electricity product may consist of electricity of known and unknown origin.

* Most commonly the deadline for cancellations is set at 31.3 of the following calendar year.

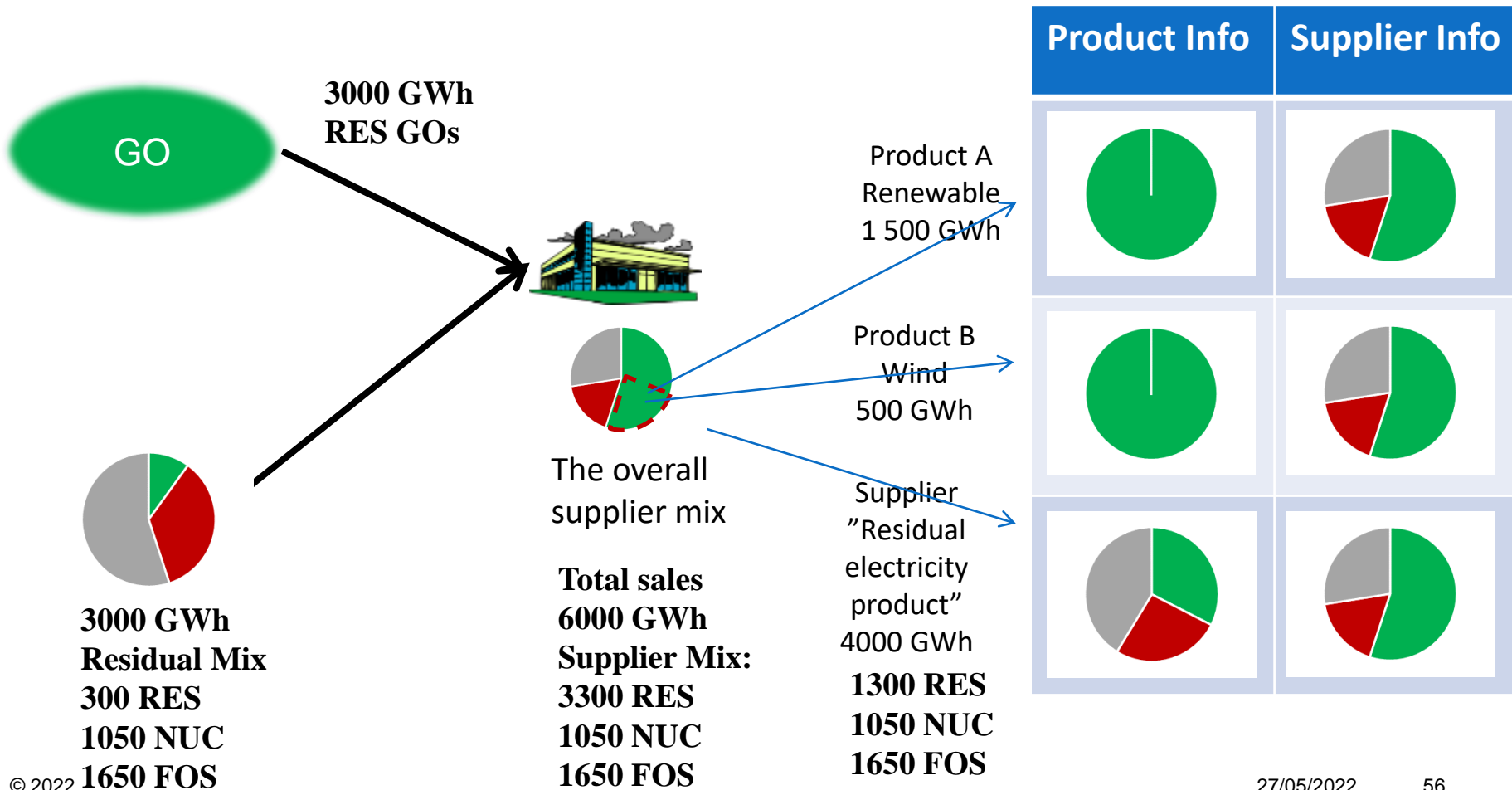
** Most commonly residual mix calculated by the Energy Regulator by 31.5 and obligatory to use by electricity suppliers for disclosure of unknown origin by 1.7 of the following calendar year

Disclosure based on GOs and Residual Mix

GOs cancelled only for electricity products



It is also possible to use GOs to improve the supplier mix / residual electricity product



3. Residual Mix

Principles:

- The Energy Authority shall yearly determine and publish the national residual mix. When forming the residual mix it should be guaranteed that each energy unit is considered only once. This also relates to energy units represented by guarantees of origin, which have been exported out of the domain.
- The domestic residual mix shall be calculated by deducting issued guarantees of origin from and adding expired guarantees of origin to electricity production in year X. (See AIB for details: [European Residual Mix | AIB \(aib-net.org\)](#))
- The Energy Authority should publish the residual mix of the country for year X by 31.5.X+1.

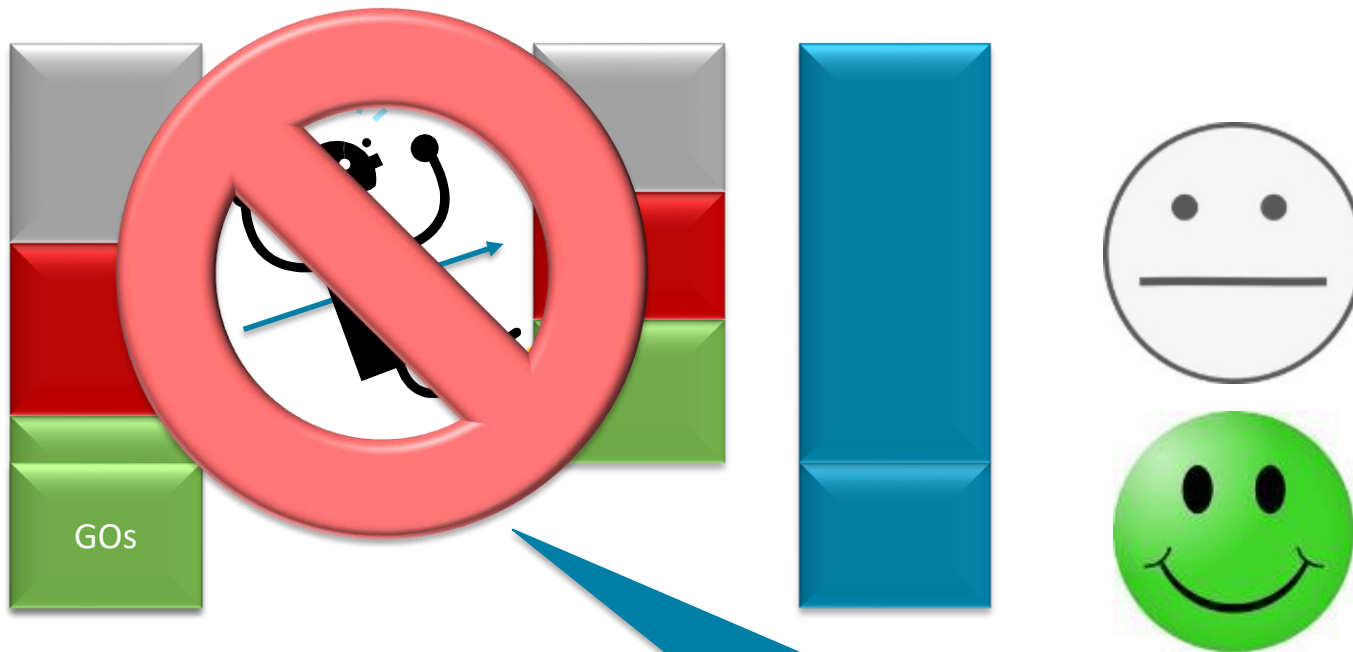
Detailed methodology (optional):

- If the obtained energy volume in the domestic residual mix is less than year X electricity consumption minus the volume of guarantees of origin cancelled during 1.4.X – 31.3.X+1, the deficit should be added to the domestic residual mix from the European Attribute Mix.
- The National Energy Authority should collaborate with other competent bodies of electricity disclosure for the determination of the European Attribute Mix or use a generally accepted EAM.
- Physical transfer of electricity between the country and other European countries is reflected in residual mix calculation by the balancing of attributes through the EAM.
- The physical transfer of electricity between the country and countries, which are not considered in EAM, should be reflected in residual mix calculation by adding imported attributes to and subtracting exported attributes from the domestic residual mix.

3. Residual mix

Producers

Consumers



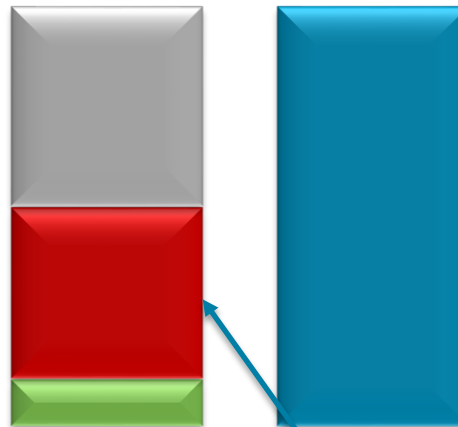
NO! If you're gonna track electricity, you need to pay the price!

3. Residual mix

Producers



Consumers

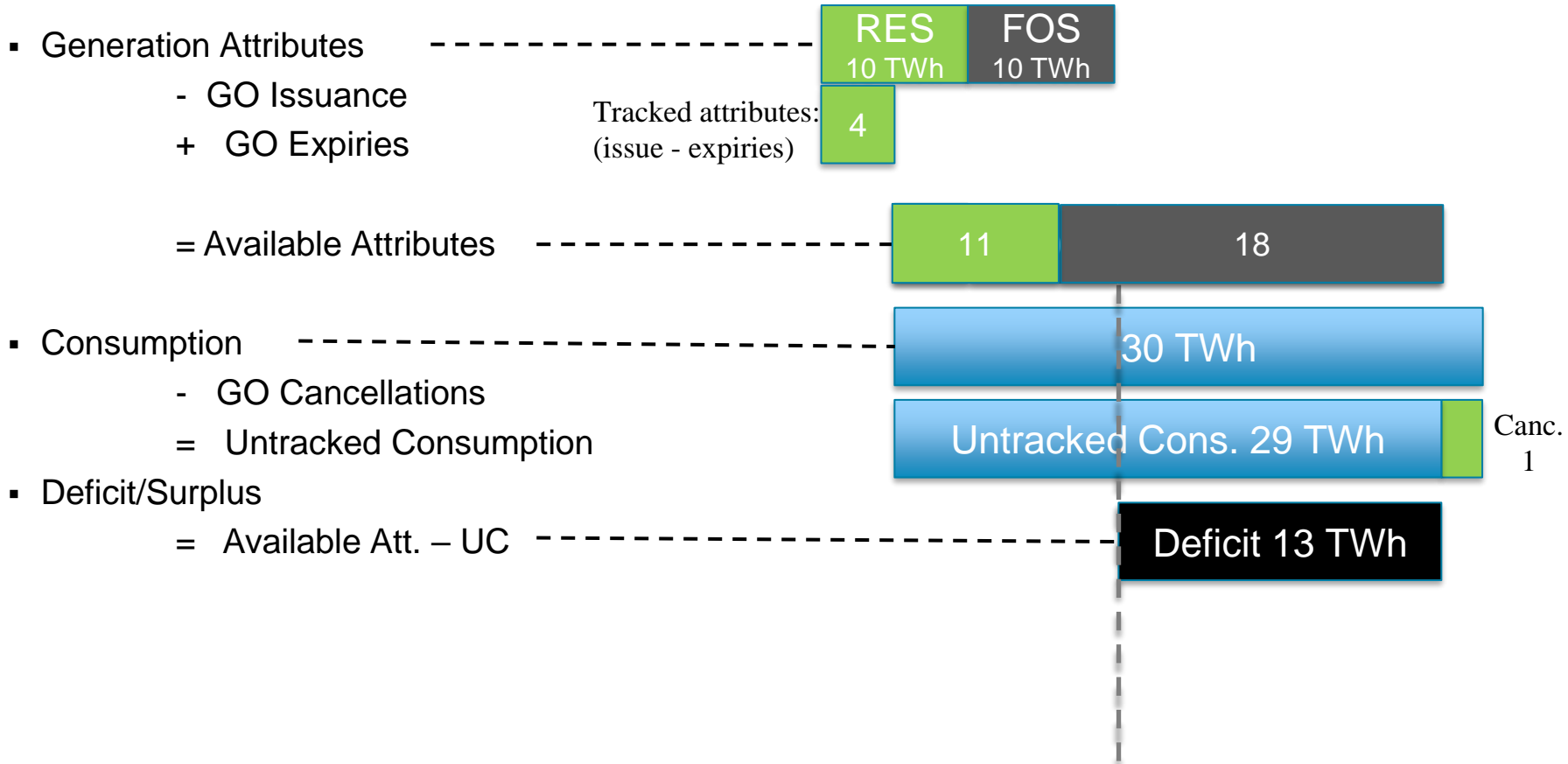


And the price is the residual mix

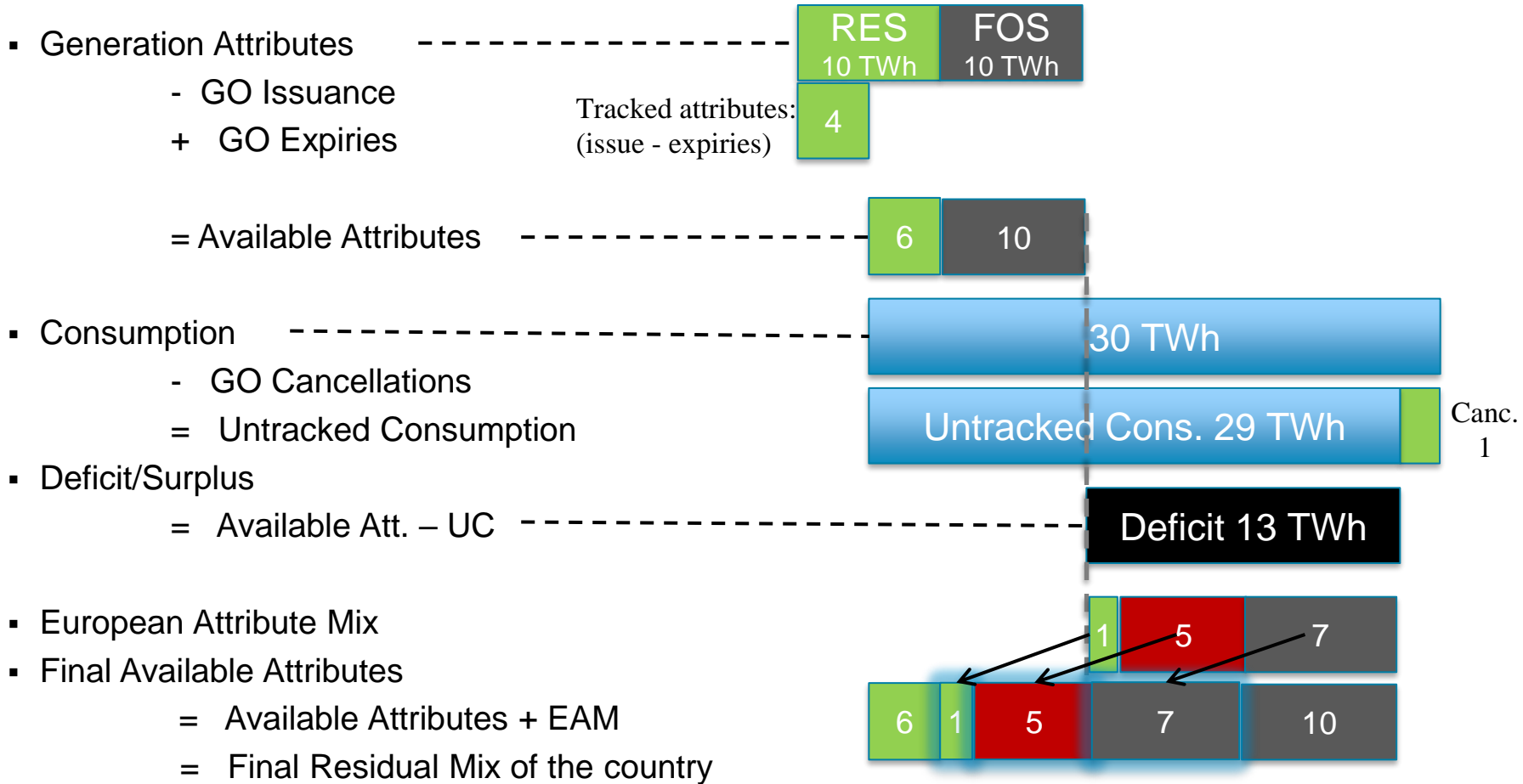


A residual mix is a logical consequence of implementing energy tracking as it ensures that the attributes represented by GOs are not double disclosed to other consumers through an implicit mix

Calculation Methodology in Short

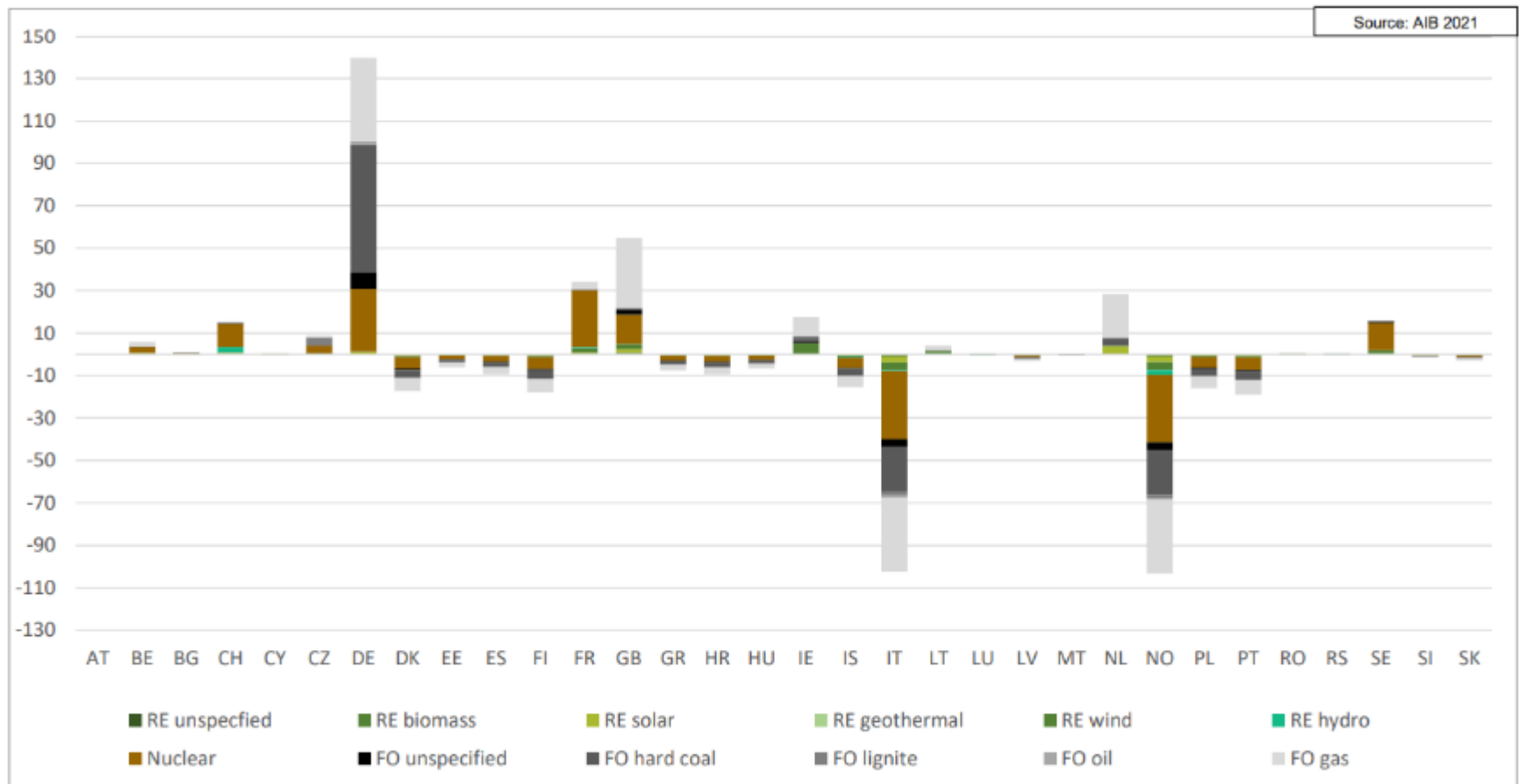


Calculation Methodology in Short



European Attribute Mix balances attribute imbalance from cross-border trading of electricity and GOs

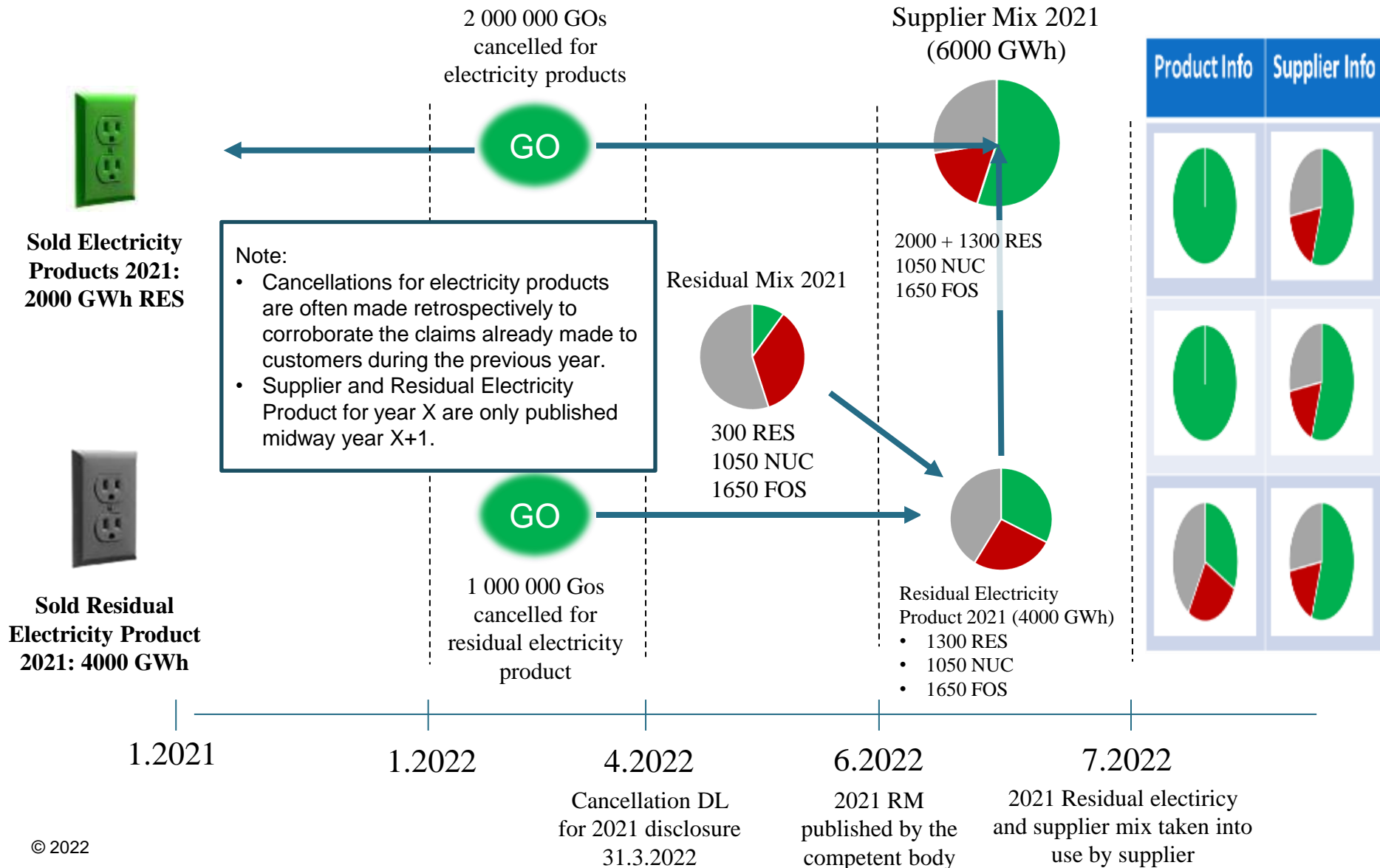
Figure 3: Attributes [TWh] to(positive)/from(negative) the European Attribute Mix 2020⁴



4. Supervision

- The Energy Authority is responsible to ensure that the information given by electricity suppliers to final customers regarding electricity disclosure, is reliable and is provided, at national level, in clearly comparable manner.
- To that end, electricity suppliers must submit their disclosure calculation to the Energy Authority for each calendar year by deadline defined by the Energy Authority. The disclosure calculation shall include at least the following information:
 - Volume of electricity sold or consumed during the year.
 - Volume of each electricity product sold or consumed during the year.
 - Volumes and energy sources of guarantees of origin cancelled for electricity products and where applicable, residual electricity product.
 - Disclosure information presented to customers buying electricity products and residual electricity product.
- Same requirements should be in place for consumers that source their electricity without suppliers

Disclosure timeline from a supplier's perspective



1.A Disclosure of both product and supplier mix

Highly recommended specification:

- If an electricity supplier is, according to the contract between the supplier and customer, selling an electricity product to the customer, the electricity supplier discloses to the customer information regarding both the electricity product as well as the overall fuel mix of the supplier.
- If an electricity supplier is, according to the contract between the supplier and customer, selling residual electricity product to the customer, the electricity supplier discloses to the customer information regarding both the residual electricity product of the supplier as well as the overall fuel mix of the supplier.
- Disclosure information of a supplier's residual electricity product may consist of electricity of known and unknown origin.

4.A. Extension to businesses

Optional but recommended specification:

- Electricity consumers, who purchase electricity from electricity suppliers, must use the disclosure information given by the supplier, when making claims in their business, about the origin, energy source or any other production attribute of the used electricity
- Electricity consumers, who do not purchase electricity from electricity suppliers, can use both electricity of known and unknown origin, and the corresponding disclosure information, when making claims in their business, about the origin, energy source or any other production attribute of the used electricity
- Similar reporting principles apply as for suppliers in regard to data delivered to the Authority

References

- Disclosure best practices:
 - RE-DISS Best Practices for disclosure: http://www.reliable-disclosure.org/upload/222-RE-DISS_Best_Practice_Recommendations_v2.4_Final.pdf
- Residual mix calculation methodology:
 - <https://www.aib-net.org/facts/european-residual-mix>
- Legal references for GOs and disclosure:
 - <https://www.aib-net.org/facts/national-datasheets-gos-and-disclosure>
- Some of the most recent law:
 - Finland (2022): <https://www.finlex.fi/en/laki/kaannokset/2021/en20211050.pdf>
 - France (2021): <https://www.legifrance.gouv.fr/codes/id/LEGISCTA000031748701/> (use page translator)
 - Latvia (2020): <https://likumi.lv/ta/id/289409-noteikumi-par-informaciju-elektroenergijas-un-dabaszegz-galalietotajiem> (use page translator)
 - Serbia Regulation for guarantees of origin:
http://www.ems.rs/media/uploads/2018/Garancije%20porekla/Regulation_on_Guarantee_of_Orig.pdf
 - Serbia Disclosure rules:
http://www.ems.rs/media/uploads/2018/Garancije%20porekla/Disclosure_Regulation_Serbian_Do.pdf

Workshop Agenda

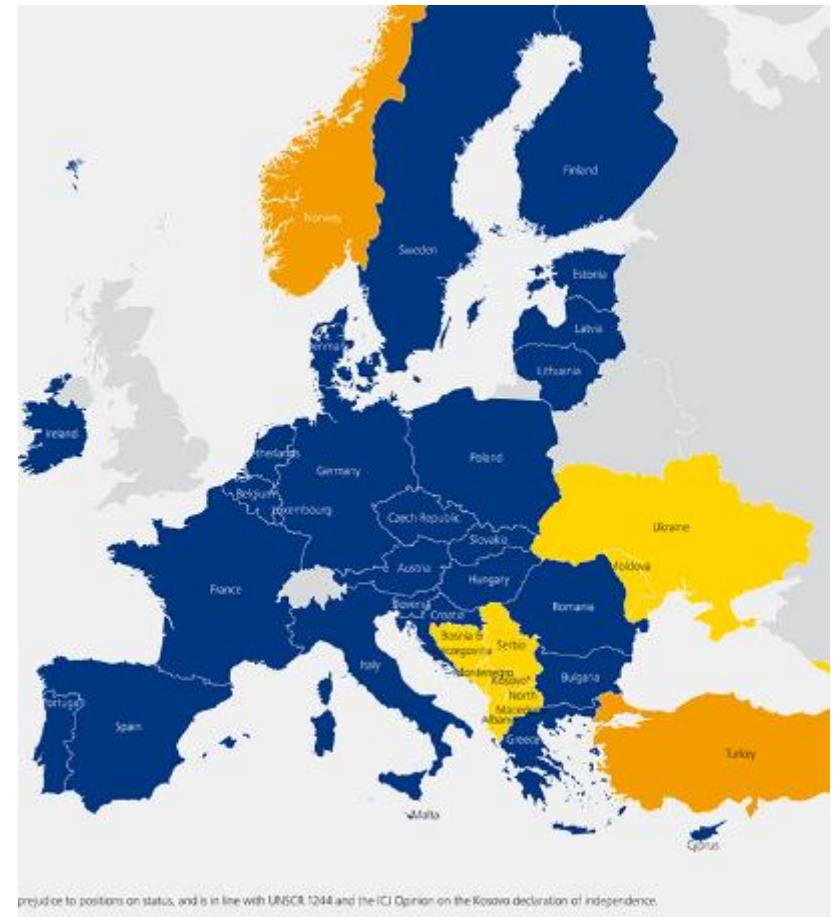
Morning Session

- **9.30 – 9.40:** Welcome addresses
- **9.40 – 10.30:** Project overview, Regional Scheme (EnC), European GO system, AIB
- **10.30 – 10.50:** Account Holder functionalities in G-REX
- **10.50 – 11.30:** Market developments in 2021 – an EECS review
- **11.30 – 12.00:** QA & Concluding remarks

12.00 – 13.00 Lunch

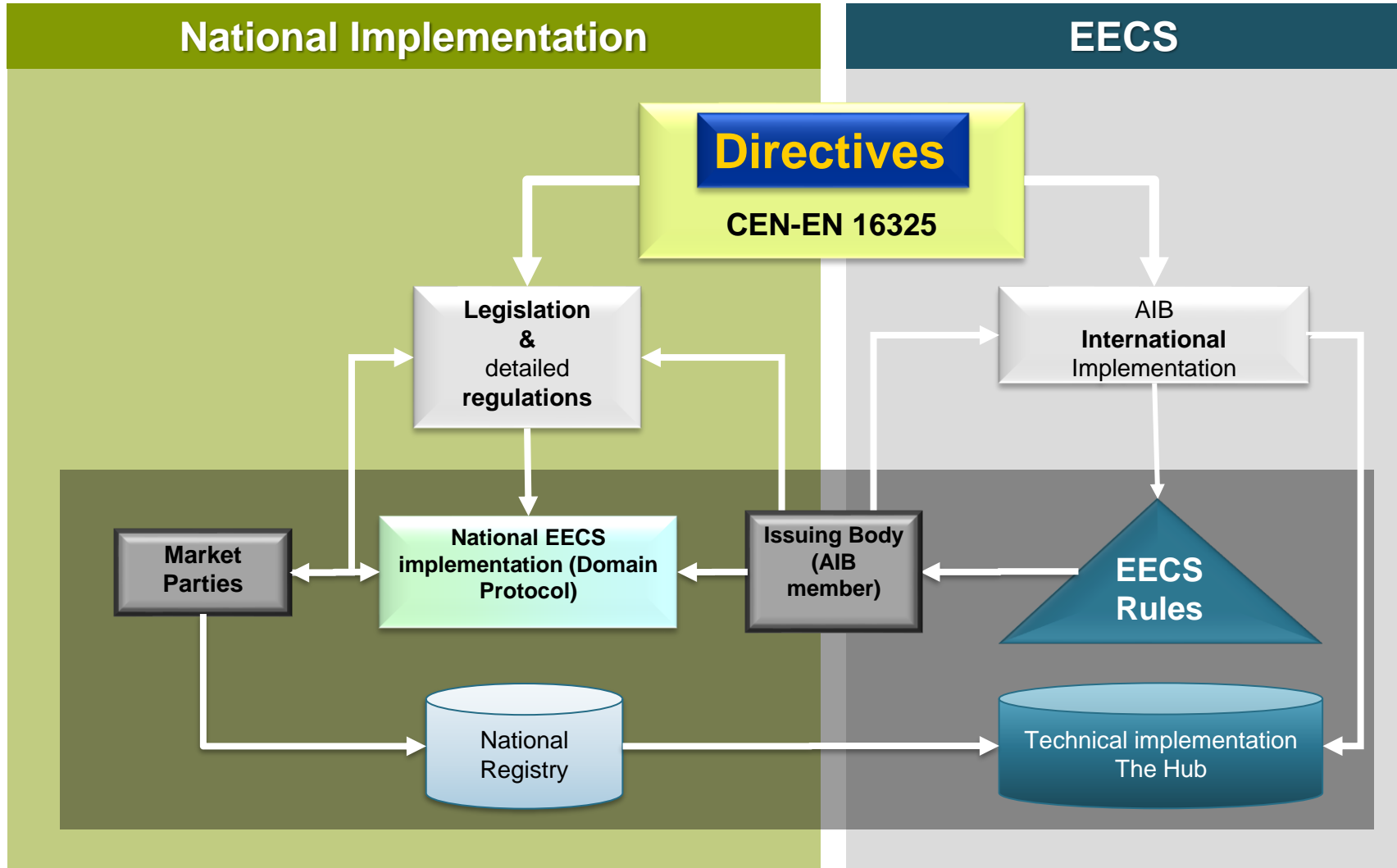
Afternoon Session

- **13.00 – 14.00:** Regional Scheme, Disclosure law, AIB
- **14.00 – 16.00: Registry Training and Feedback**
- **16.00** Concluding remarks



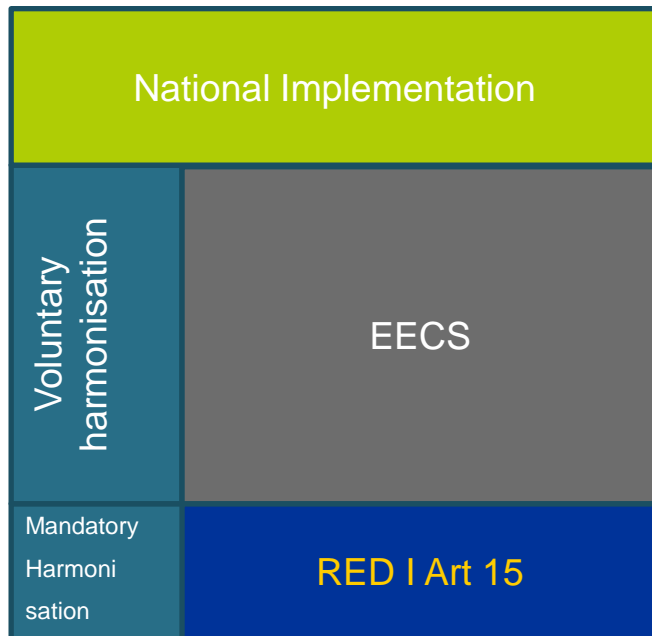
Extra material

Harmonisation by Industry Agreement - EECS

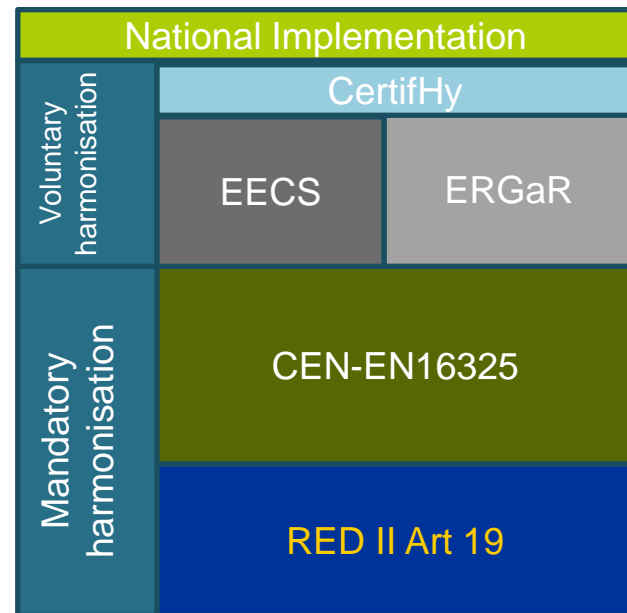


EECS is a voluntary harmonization tool to standardize national implementation of GOs

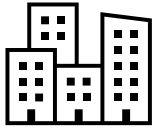
RED I (2009/28/EC)



RED II ((EU) 2018/2001)

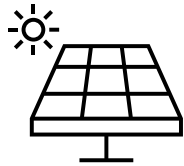


In the future mandatory harmonization will increase with the compulsory CEN-EN16325 Standard



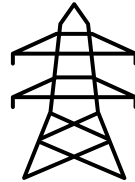
Organization Management

- Create and manage organizations and licenses
- Task management



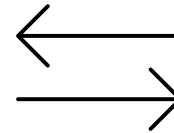
PD Management

- Manage PD version history
- Manage PD details and aggregation
- Approval workflow
- Task management



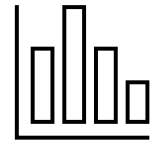
Energy Management

- Receive meter readings (REST API, XML)
- Support multiple meters
- Declarations (fuel, CHP, dissemination level)
- Approval workflow management



Transactions

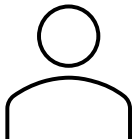
- Instant, recurring and scheduled transactions
- 4-eye approval
- Blocking of imports



Public Reports

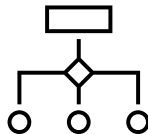
- Account Holders
- Production Devices
- Transactions
- Public cancellation statements

Support processes



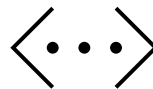
User and Access Management

- Manage users and roles
- Role-based authorization
- One user to many organizations logic
- Strong MFA



Admin and Generic Features

- Dynamic certificates attribute model
- Multi-domain management
- Audit data
- Multi-language registry



System integration, APIs

- All functionality available with APIs
- Issuing Body API
- Account Holder API
- Public API (reports and AIB Hub statistics)
- Hub connection
- Calculate fees and export invoice files



Certificate Account Management

- Account statements
- Subaccounts
- Search and select certificates
- Search transactions
- Approval workflow.



Private Reports

- Activity log
- All data available in pdf and xls
- Transaction report
- Cancellation statement report
- Pre-issuing statistics

Re-cap: GO history in a nutshell

Electricity market liberalization

- Consumers free to choose their supplier.
- Competition → differentiation

First green energy certificates

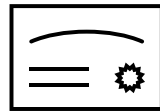
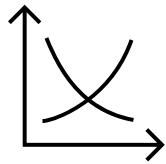
- Voluntary RECS certificates
- GOs established in 2001/77/EC, Art.5 without clear purpose

RED I

- GOs are for disclosure (2009/28/EC, Art.15)
- Standard size and format of GOs
- Freely tradable in EU

RED II

- GOs for new energy carriers and non-RES.
- Official status for the residual mix
- 2018/2001/EC, Art.19
- 2019/944/EC, Annex 1

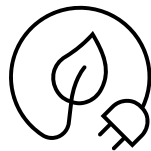


1990

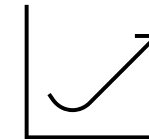
2000

2010

2020



GO?



Green electricity products emerge

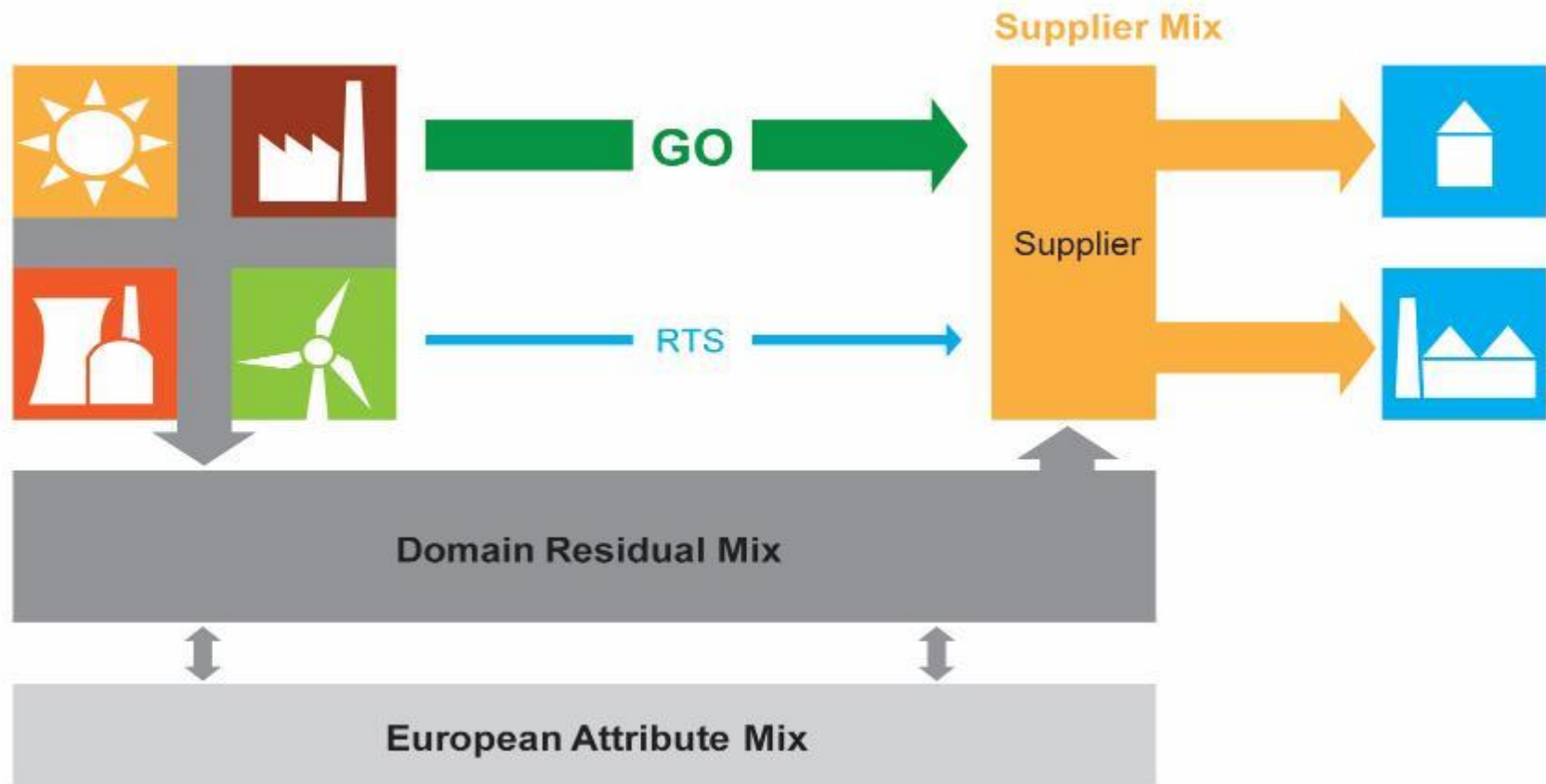
- Electricity suppliers sell renewable power to differentiate from competitors.
- Completely unreliable!

The big GO debate

- Are GOs used for Disclosure, Targets, Support?
- Electricity disclosure 2003/54/EC, Art.3,p.6
- AIB Founded 2002

Market Growth and Stability

- GO technical harmonization (EECS)
- AIB grows and is detached from RECS
- Specific Rules for disclosure and residual mix (RE-DISS)



- RM is an international allocation mechanism for electricity generation attributes, which are not explicitly tracked by instruments such as Guarantees of Origin

1. Deduct issued GOs from electricity production (=Available Attributes).
2. Compare Available Attributes with the volume of sold electricity without GO.
3. Balance missing/excess energy origin with the European Attribute Mix
4. Apply to disclosure

(...or skip steps 1-3 and use residual mixes calculated by Grexel

