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NET ZERO INITIATIVE for energy

Understanding the role of the energy sector in the global net zero effort

Speakers

Rodrigo Baranna

Senior Manager
Carbone 4, Neutrality Team

Gabriel Follin-Arbelet

Manager
Carbone 4, Neutrality Team

Killian Daly

Expert
EnergyTag

Agenda

Introduction	• Presentation of NZI and NZI4Energy / *Rodrigo Baranna* • Introduction and challenges of carbon accounting for electricity markets / *Killian Daly*	**15 min**
Presentation of the guide	• Objectives of NZI4Energy 2023-2024 / *Gabriel Follin-Arbelet* • Part 1 – Low-carbon electricity market and carbon accounting systems / *Gabriel Follin-Arbelet* • Part 2 – Methodological proposals for new accounting rules and introduction of spatio-temporal consistency / *Gabriel Follin-Arbelet*	**30 min**
Discussion	• Q&A with participants	**15 min**

Presentation of NZI and NZI4Energy

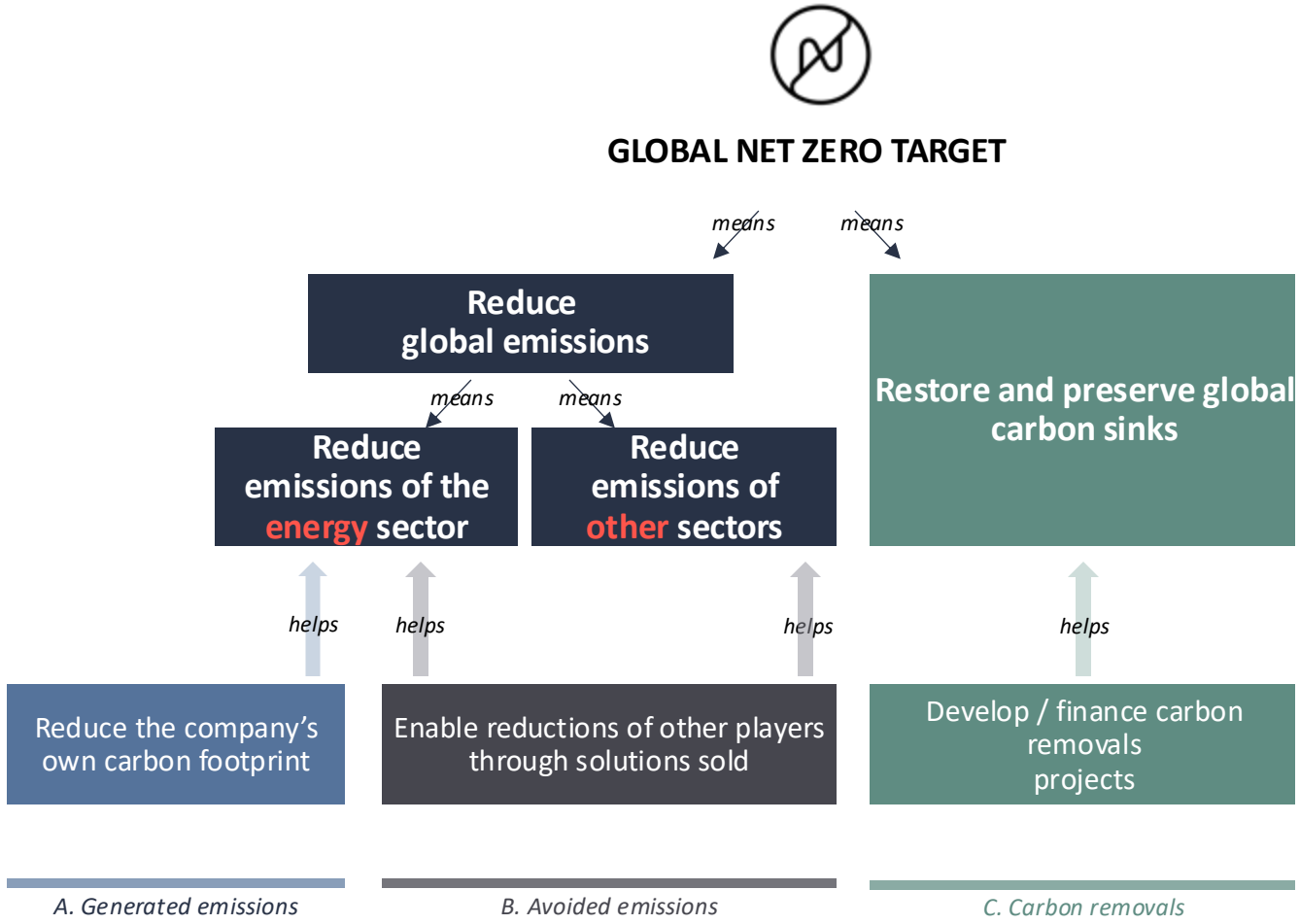
Rodrigo Baranna
Senior Manager
Carbone 4, Neutrality Team

What role should energy play in the global net zero effort?

Energy companies must reduce their emissions, but not only

On a global scale,
society must cut emissions and develop carbon sinks

From an energy company point of view,
the company must contribute to the global goal by reducing its carbon footprint, enabling other players (in or out of the sector) to decarbonize, and participating in the global carbon sink development effort



1/ Or removals

Introduction and challenges of carbon accounting for electricity markets

Killian Daly
Expert
EnergyTag

Presentation of the guide

Gabriel Follin-Arbelet
Manager
Carbone 4, Neutrality Team

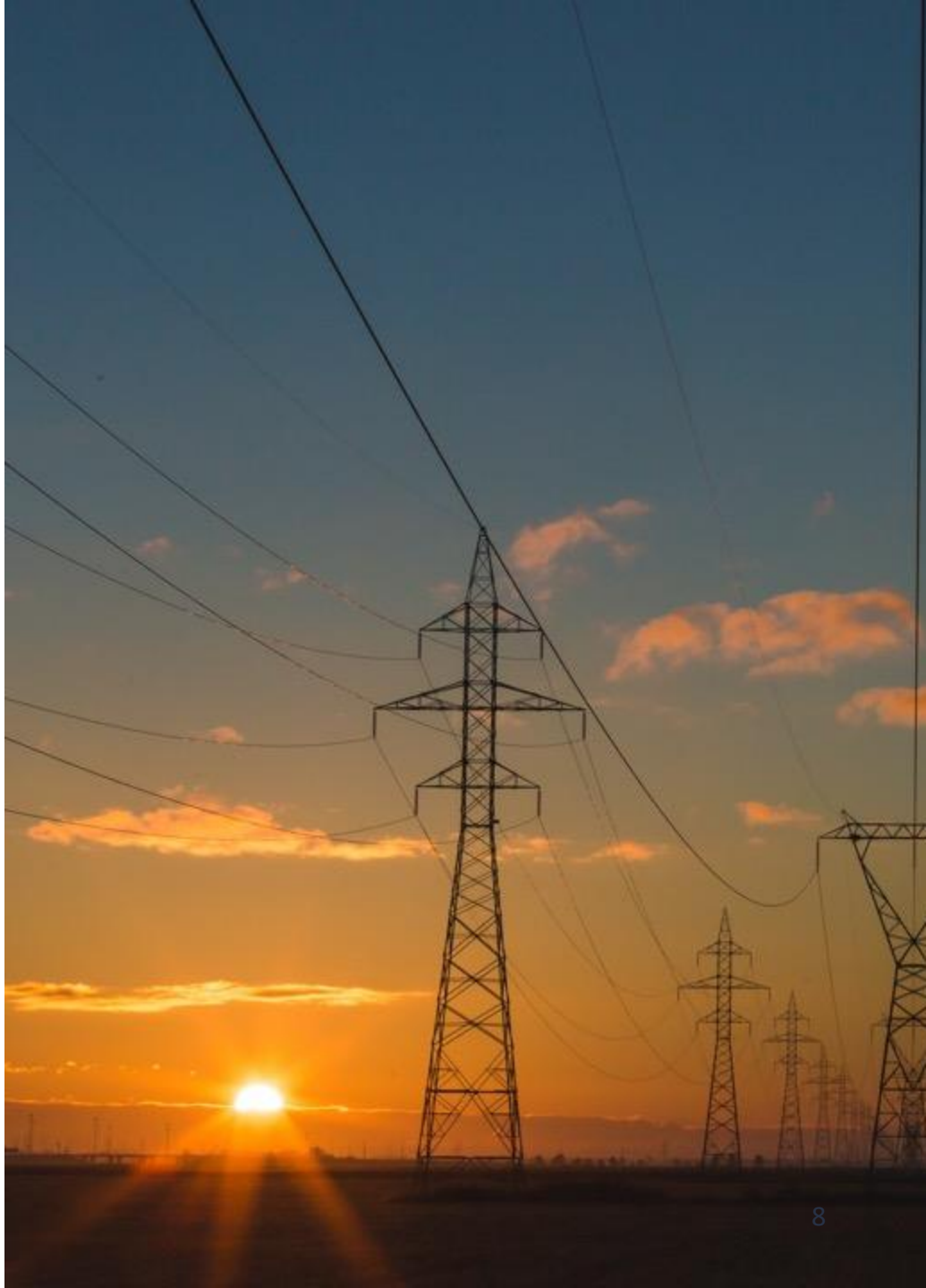
NZI4Energy 2023-2024 | Can carbon accounting help to accelerate the decarbonization of electricity production?

Under which conditions does an electricity procurement contract really help to decarbonize the electricity on which an organization depends?

Can current carbon accounting reflect this? If not, how could it evolve to do so?

Guidance on the carbon accounting of renewable electricity purchases

1. **Low-carbon electricity market and carbon accounting systems**
   - Types of electricity supply or contracts
   - Types of accounting for renewable electricity purchases
2. **Methodological proposals for new accounting rules and introduction of spatio-temporal consistency**



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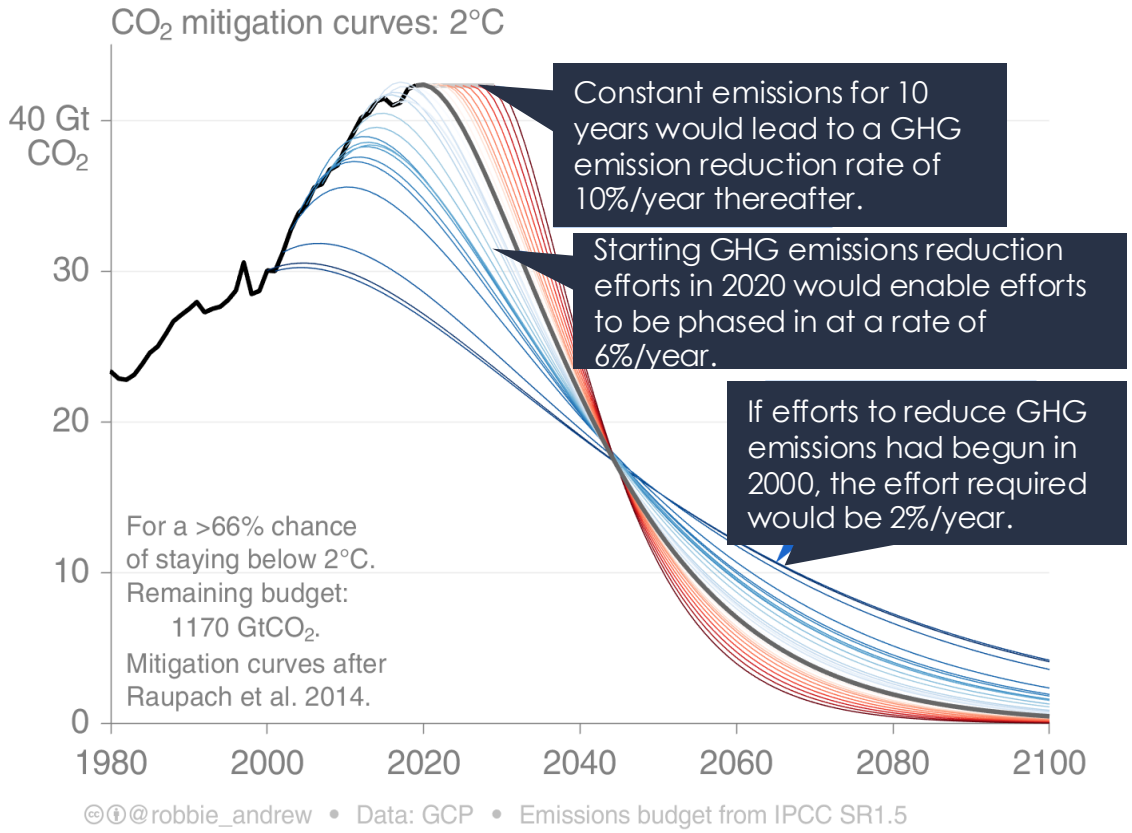
Part 1 – Low-carbon electricity market and carbon accounting systems

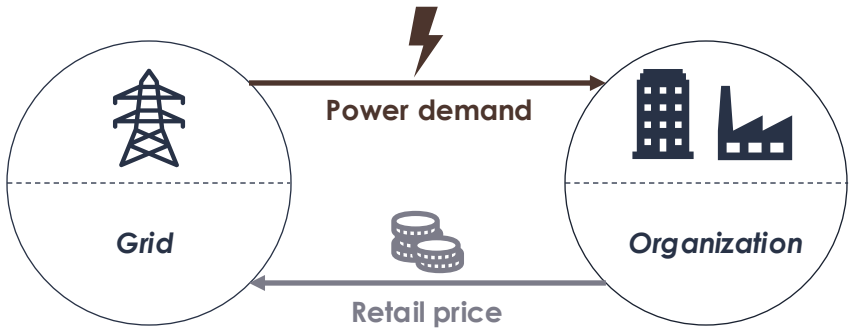
Context | Companies must drastically and rapidly reduce all their emissions to keep global warming below 2°C, and reduce their dependence on fossil fuels



Source: Robbie Andrew, Global Carbon Project

Context | Companies must drastically and rapidly reduce Scope 2 emissions from their electricity consumption to keep global warming below 2°C, and reduce their dependence on carbon-based-electricity

Organizations are connected to the grid for power demand

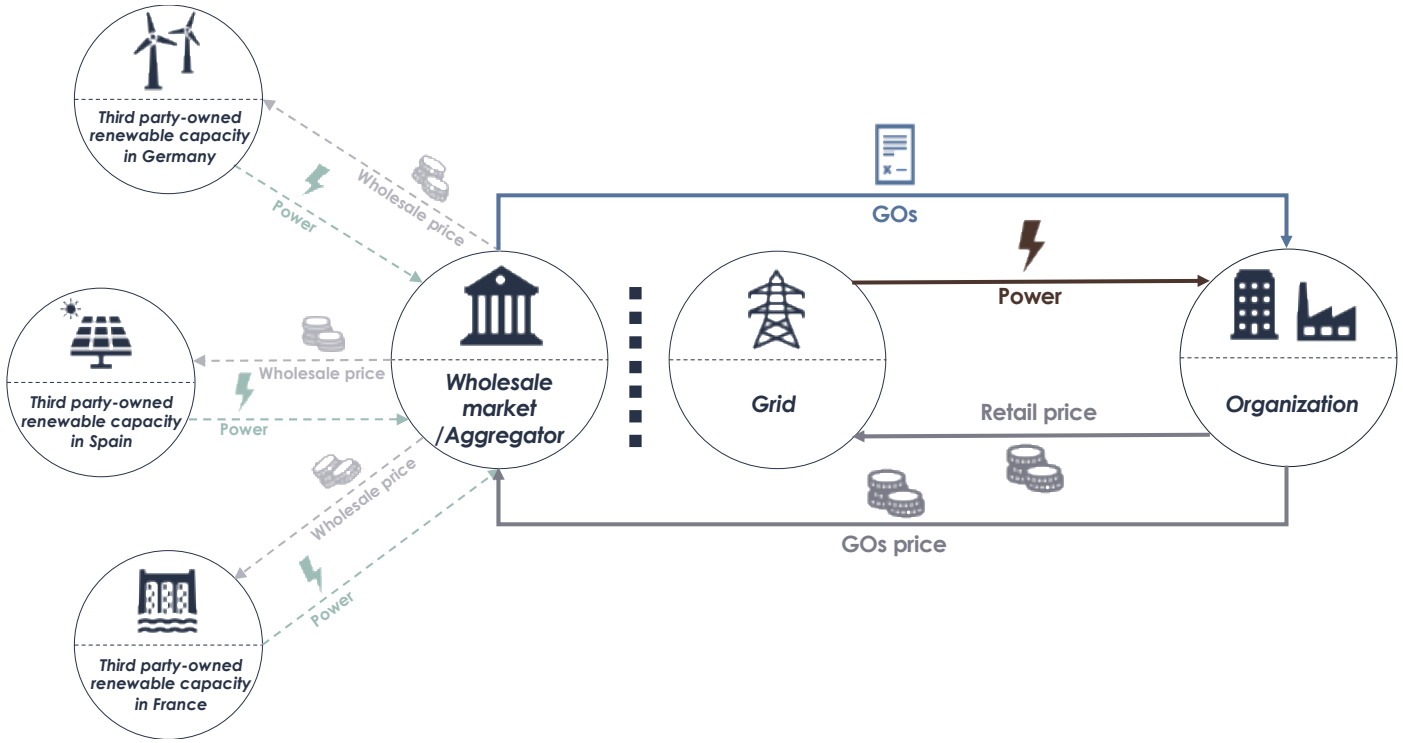


To reduce emissions from electricity consumption, companies can :

- Reduce their electricity consumption (*Sobriety*)
- Reduce carbon intensity of their electricity consumption :
  - Directly, if they switch to a lower-carbon electricity supply (ex : developing new renewable capacities)
  - Indirectly, if they reduce the carbon intensity of their grid's electricity supply

Context | Organizations can buy Energy Attribute Certificates on electricity markets to "choose" the electricity they consume

Organizations are connected to the grid for power demand and to the wholesale market for electricity certificates



Energy Attribute Certificates (EACs) include Renewable Energy Certificates in the United States (RECs) and Guarantees of Origin in Europe (GOs). They work as follows:

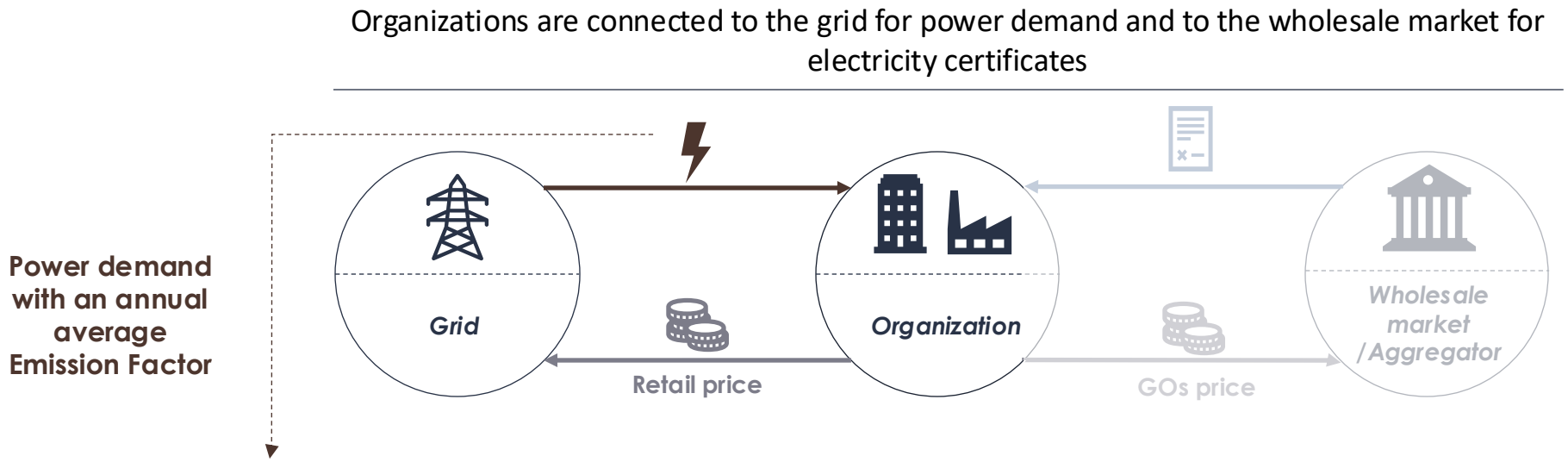
GOs/EACs /RECs

1. The electricity producer indicates the quantity of electricity produced and fed into the grid.
2. The electricity producer receives certificates.
3. These certificates can then be traded and cancelled by market players to claim the use of the energy produced.

➢ **Energy Attribute Certificates can be traded on wholesale markets and are claimed to reduce carbon intensity of electricity consumption even if there's no physical link between the producer and the consumer of the certificate.**

(1) Langer, Lissy and Brander, Matthew and Lloyd, Shannon M. and Keles, Dogan and Matthews, H. Damon and Bjørn, Anders, *Does the purchase of voluntary renewable energy certificates lead to emission reductions? A review of studies quantifying the impact* (November 17, 2023).

Market-based and Location-based accounting both have limits to accelerate the decarbonization of electricity production on which companies depend



- **<u>Location-based accounting</u> uses the annual average emission factors (EF) of the grid** and is mandatory for emissions accounting.
  - *It **does not distinguish between consumption profiles over the course of the year and the day**, whereas electricity generation sources are likely to vary greatly over time.*
  - ***It does not value efforts and investments of companies** that pay additional fees for renewable electricity contracts.*

(1) Langer, Lissy and Brander, Matthew and Lloyd, Shannon M. and Keles, Dogan and Matthews, H. Damon and Bjørn, Anders, *Does the purchase of voluntary renewable energy certificates lead to emission reductions? A review of studies quantifying the impact* (November 17, 2023).

Market-based and Location-based accounting both have limits to accelerate the decarbonization of electricity production on which companies depend

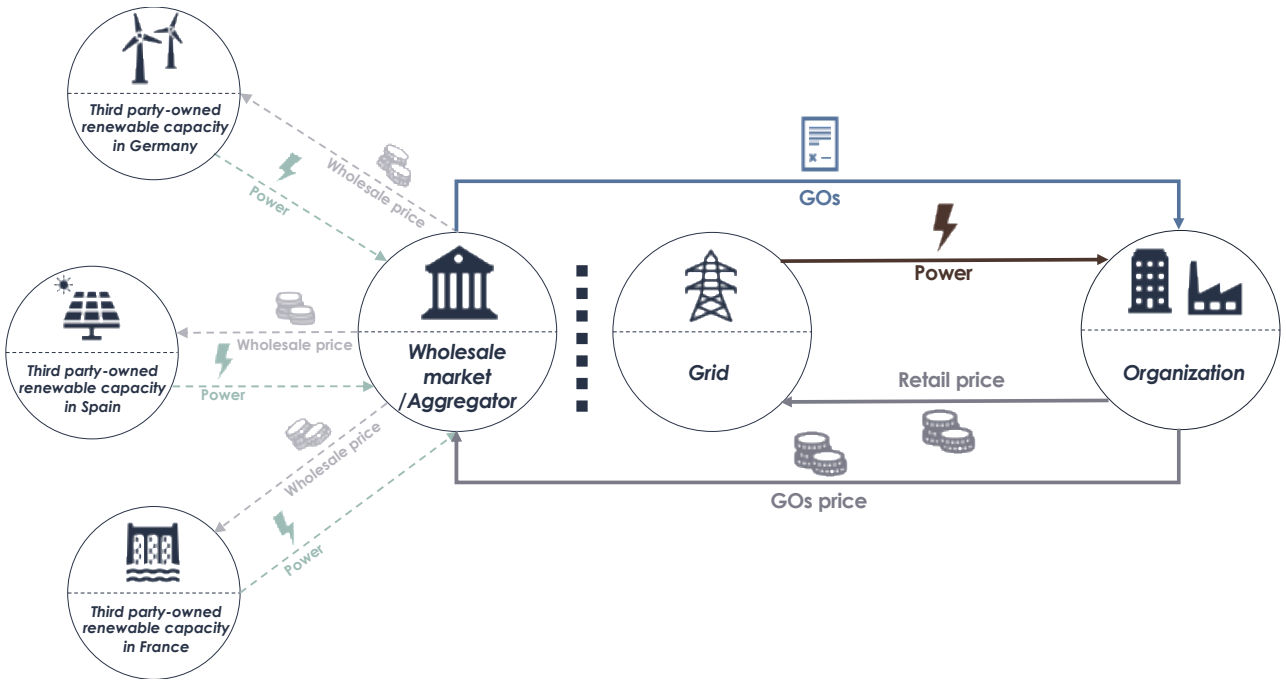
Organizations are connected to the grid for power demand and to the wholesale market for electricity certificates

- **Market-based accounting uses the emission factor of the renewable electricity purchased with a certificate.**
  - ***It allows claims of emissions reduction without effect on the electricity consumed*** *by the organization*
  - *Studies on the impact of Guarantees of Origin (GO) on electricity markets indicate that* ***without hourly matching, their impact is very low****, if not negligible(1)*
  - *In 2022, the average price of a GO in France was €4.1/MWh(2), compared to €63/MWh(3) for the cost of producing additional renewable electricity*

(1) Langer & al., *Does the purchase of voluntary renewable energy certificates lead to emission reductions? A review of studies quantifying the impact* (November 17, 2023).
(2) 2022 GO global results - EEX
(3) World Energy Outlook 2023 – International Energy Agency

A German organization that consumes electricity on a winter's night can claim for ‘solar renewable electricity’ in market-based accounting, thanks to summer photovoltaic production in Spain

Example of purchase of Guarantees of Origin on the European wholesale market



- **Spatial and temporal inconsistency of energy certificates slows down the real decarbonization of electricity** and provides misleading information for buyers about the nature of the electricity consumed.
- **It masks the necessary efforts to make the electricity network more flexible** (storage capacity, adaptation of demand)[(1)].
- At European level, the market is flooded with low-cost Guarantees of Origin where renewable electricity production is easy and substantial. As local players are also likely to claim low-carbon electricity for this same production with location-based accounting, **it entails a risk of double-counting.**

Maxence Cordiez - Institut Montaigne, Décarbonation : corriger le système des garanties d'origine électriques : https://www.institutmontaigne.org/expressions/decarbonation-corriger-le-systeme- des-garanties-dorigine-electriques

Carbon accounting methods for electricity purchases are currently called into question and discussed, and need for rigorous and ambitious proposals

- **Robust carbon accounting methods is key to assess the real contribution of electricity purchases** in companies' carbon footprints, and to claim them fairly in climate strategies
- **Current accounting methods** that were established in the 1990s **are now being called into question** and the GHG Protocol has undertaken to update its methods by 2026.
- The Financial Times(1) recently highlighted the **controversial example of GAFAMs,** which are used to make 'carbon neutral' claims. They are both **the biggest consumers of these certificates and major funders of the GHG Protocol,** and have very different views.

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Key questions :

- **Under which conditions does an electricity procurement contract really help to decarbonize the electricity on which an organization depends?**
- **Can current carbon accounting reflect this? If not, how could it evolve to do so?**

(1) https://www.ft.com/content/2d6fc319-2165-42fb-8de1-0edf1d765be3?accessToken=zwAGINAQkj5Qkc8tb8MZIWVC-9ON4Q7fHXZb4w.MEQCIG8iTTQA5k0h-1_0wVSVk20bOO1nr9rEvC6uIF9eKRXAAiBcJEE9ERyROH3AD0vxdKUqoanBjWzfe8ZLGWtSXEFMzQ&sharetype=gift&token=4bae29a6-39d7-4012-b2e9-92373cbcc4da

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Part 2 – Methodological proposals for new accounting rules and introduction of spatio-temporal consistency

Spatial coherence | The buyer's facilities and the renewable installation should be on a connected network and limited to bordering countries/states to account for emission reductions in market-based accounting

- **Despite interconnections** between grids of various countries, states, or provinces**, the amount of electricity transferring from one grid to another is often limited,** particularly when the grids are not adjacent to each other.

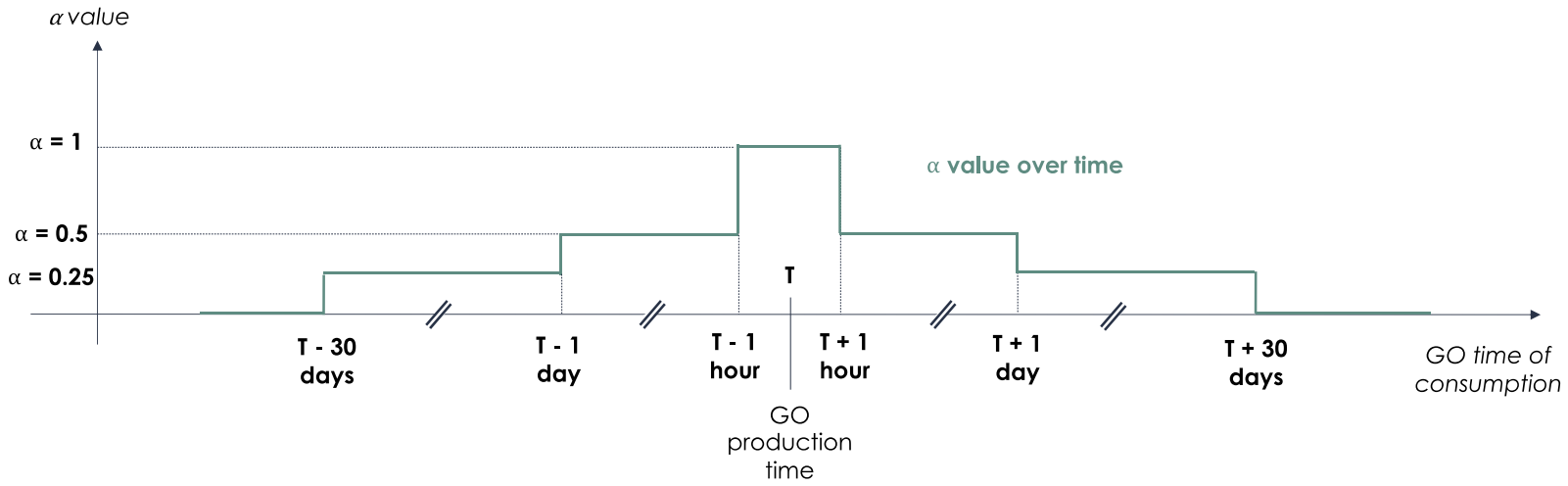
- **The development of electricity interconnections** is one of the energy priorities of European Union and other region, but it **requires major infrastructure**.

- **The interconnection capacity target** for each country **in EU** (with its bordering countries) **has been set at** 10% of its installed capacity in 2020 and **15% in 2030**, a long way from an electricity network where electrons would cross the continent as easily as on the market.

RTE, *SDDR 2019 Chapitre 05 - Les interconnexions : https://assets.rte-france.com/prod/public/2020-07/SDDR%202019%20Chapitre%2005%20-%20Les%*

Temporal coherence | Consumption must take place within 30 days of GO production time (monthly matching) and emissions reduction in market-based accounting depends on the level of temporal coherence

Emission reductions acceptance rate depending on the temporal coherence of Guarantees of Origin



- 100% of emission reductions can be accounted for with hourly matching.
- 50% of emission reductions can be accounted for with daily matching.
- 25% of emission reductions can be accounted for with monthly matching.
- No reductions can be accounted for if coherence is greater than one month.

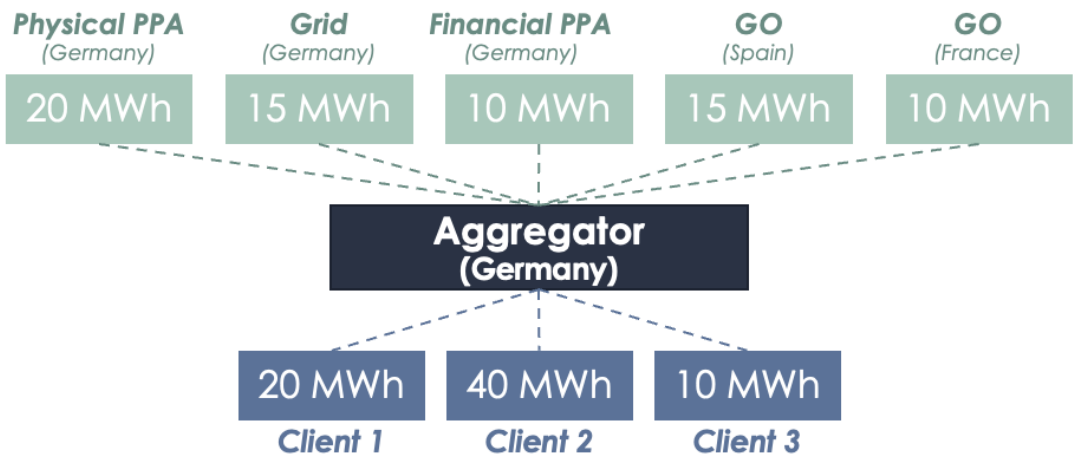
For Guarantees of Origin **that respect these spatio-temporal conditions, the EF in market-based accounting depends on the level of temporal coherence**:

$$EF_{GO} = \alpha \times EF_{prod.} + EF_{residual}(1 - \alpha)$$

where α varies according to temporal coherence (see figure above).

Spatio-temporal coherence | These spatio-temporal rules should be applied to each type of contracts bundled with GOs (like PPAs), and be aggregated at aggregators' level if necessary

Example of production sources and consumers of an aggregator



- **Organizations can procure their electricity from a specialized renewable energy aggregator :**
  - An aggregator can secure renewable electricity through diverse contractual arrangements, such as GOs and various PPAs.
  - They build up portfolios of electricity purchase contracts according to the needs of the end buyers
  - They play an important role in maintaining a balance between production and consumption.

- **NZI recommends calculating average 'Acceptance Rates' at the aggregator level.**

Challenges | Hourly matching poses technical challenges as energy markets do not currently facilitate precise tracking

- To date, **information generally available** for buying and selling Guarantees of Origin in Europe **is monthly production data.** This makes it very complex to reduce completely Scope 2 emissions with spatio-temporal conditions in market-based accounting.

- But **various initiatives exist to develop more granular tracking :**
  - **More precise daily data is already available in some countries** (Norway and Sweden, for example).
  - **Some initiatives and standards are underway** to develop energy certificates **with hourly granularity**(1).
  - Metering data from **certain contracts** (such as PPAs) **can also provide access to more granular** electricity production **data to end-buyers.**

(1) Tüv Süd Standard : "Product 002 - Certification of electricity products from renewable energy sources with simultaneous generation and supply"
Or Granular Certificate Scheme Standard of EnergyTag

Recommendations | This guide recommends a temporary approach allowing partial accounting conditions for daily or monthly matching

Recommendations:

1. Ultimately, **strict hourly matching conditions should be established for accounting GOs in a few years' time.**

2. This is seen as a **transitional phase to encourage actors** to improve their temporal coherence **and support ongoing initiatives**, **until conditions allow for more achievable hourly matching**

3. The development of an **accurate and harmonized tracking system of the residual mix emission factor** (at country and at region level) is crucial to make market-based accounting reliable.

4. Regardless of the methodology, it is necessary to **transparently report the spatial and temporal coherence of the renewable certificates** cancelled by organizations against their consumption.

Avoided Emissions | Energy certificates that have not been used to reduce Carbon Footprint can be used to claim avoided emissions

- **Estimating avoided emissions in Pillar B necessitates the use of a counterfactual scenario, describing the system as it would have been without the project.**
  - If establishing a counterfactual scenario is not feasible, avoided emissions can be estimated by comparing emissions from renewable electricity generation with the country's average EF. This method is generally conservative.
  - If a more specific counterfactual scenario can be proposed, the buyer is encouraged to do so but must provide evidence of its legitimacy and follow the guidelines and principles laid out by the NZI Pillar B and WBCSD avoided emissions guides.

- **In addition, an allocation of avoided emissions must be made pro rata to the financing of new renewable capacity** made possible by the sale of electricity through the contract**.** The « financing factor » is calculable for a given country (i.e. 6.5% in France) or could also be calculated at company level by using the actual price paid by the company for electricity.

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CONTACTS

Gabriel Follin-Arbelet *Gabriel.follin-arbelet@carbone4.com*
Rodrigo Baranna *rodrigo.baranna@carbone4.com*
Alexandre Joly *Alexandre.joly@carbone4.com*
Baptiste Rouault *Baptiste.rouault@carbone4.com*