From GOs to PPAs:
Unraveling Corporate Decarbonization Practices

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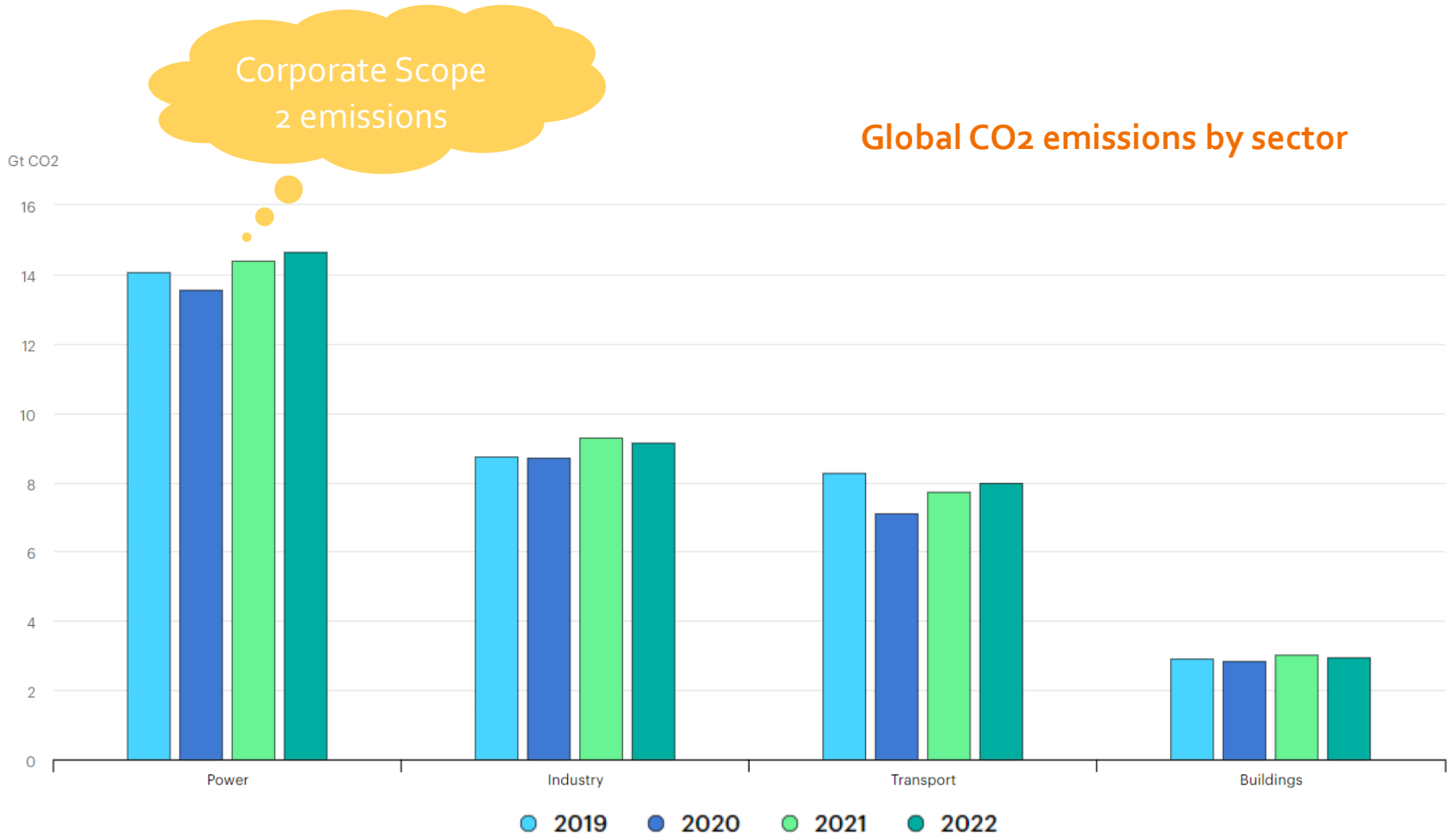
Introduction

Corporate Decarbonization
Carbon Accounting
Energy Attribute Certificates (EACs)

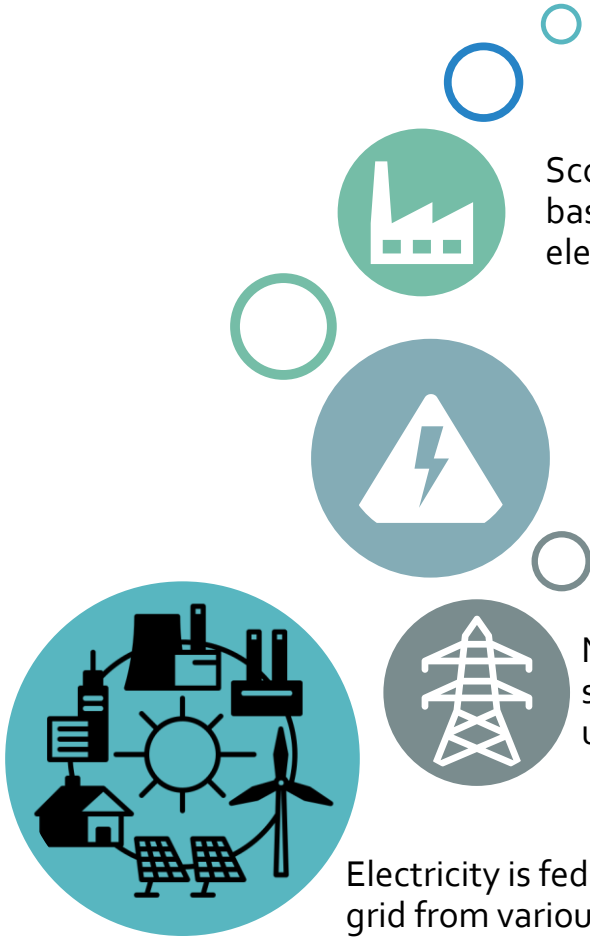
Corporate Decarbonization is Crucial for Sustainability and Climate Action

The largest contribution to CO_2 emissions comes from electricity and heat generation.

- Emissions reached their highest-ever level in 2022, mostly due to gas-to-coal switching
- In 2019 industrial sector accounted for 42% of electricity consumption
- GHG Protocol categorizes GHG emissions connected to industrial purchases or acquired energy as Scope 2.



Source: IEA, GHG Protocol
*GHG – Greenhouse Gas



Scope 2 emissions are calculated based on grid-connected electricity consumption

Corporates supply their operations with electricity from the national grid

National grid emission factor shows the amount of CO_2 per unit of electricity generated

Electricity is fed to the national grid from various sources

Two methods for measuring Scope 2 emissions:

1) **Location-based:** assigns emissions based on the average emission intensity of the grid(s) in which an organization operates;
2) **Market-based:** assigns emissions based on the specific electricity purchase decisions an organization. This approach accounts efforts organizations make when procuring renewable electricity **by recognizing use of Energy Attribute Certificates (EACs),** commonly referred to as **Guarantees of Origin (GOs) in Europe**.

Corporates measure and report Scope 2 emissions to:

- Demonstrate transparency and accountability towards their stakeholders in reaching sustainability targets.
- Recently adopted CSRD and CBAM regulations also enforce reporting of GHG emissions, including Scope 2.

Scope 2 Emissions

are indirect GHG emissions associated with the purchase of electricity, steam, heat, or cooling.

What are EACs?

They are a contractual instrument that represents information about the ***origin of the energy generated****. Therefore, it allows tracking of each MWh from renewable assets and permits consumers to use them to make credible renewable energy claims.*

Features:

- Each EAC acquired and then retired certifies the use of a 1 MWh of renewable electricity
- Enable companies to claim renewable energy consumption without **physically sourcing it**

  → **Electricity and EAC markets are separated**

EACs can be purchased:

1. **"Bundled"** (electricity and EAC are sold and delivered together), or
2. **"Unbundled"** (EAC are purchased separately from any specific purchase of physical electricity)

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Procuring EACs

Main Considerations
Sourcing Approaches
Types of Off-site PPAs

Defining which EACs to buy

Question 1: Where does my Company operate and is there a recognized tracking system that ensures credibility of my renewable energy (RE) claims?

Question 2: To whom my Company reports to and are there any specific EAC Quality criteria to comply with?

Question 3: Which EAC Sourcing approach fits my Company needs the best?

Question 1: Ensuring Credibility of RE

Credibility is achieved by:

- **purchasing** the exact number of EACs to match electricity consumption for a given consumption period at a specific location,
- **cancelling/retiring** purchased volumes at the relevant national registry on behalf of a specific company name; and
- **reporting it transparently** to assure the credibility of the claims.

Tracking Systems that Ensure Credibility:

1	AIB GO in Europe
2	REGO in the UK
3	REC in N. America
4	I-REC as an international standard
5	TIGRs, T-RECs in Asia

+ If not available in country of operation, alternatives are local EAC systems and direct renewable energy contracts

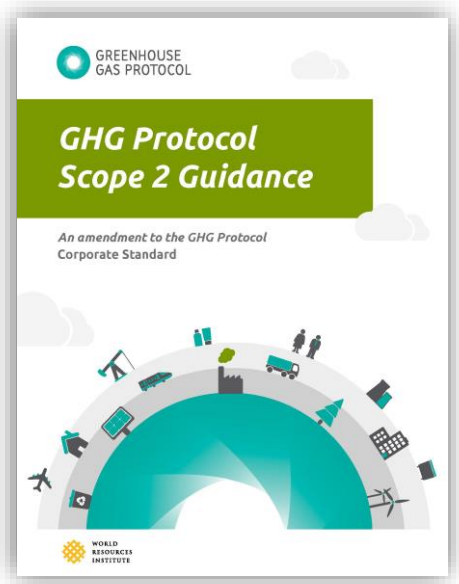
Question 2: Reporting Frameworks and EAC Quality Criteria

How to know which EAC quality you need?

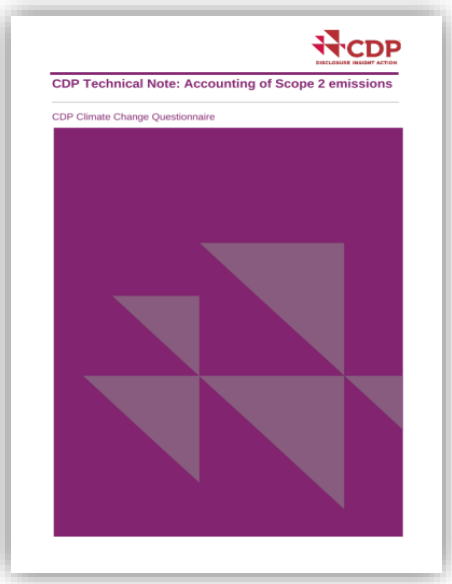
1) Check your reporting requirements
2) Check which EAC quality criteria is prescribed by that reporting standard

Usual EAC quality criteria:

- Generation data and all attributes
- Vintage (Generation Date)
- Geography (Market Boundary)
- Age of the asset and Additionality
- Subsidized assets yes or no
- Technology



General Accounting Framework for Scope 2 Emissions.



Influential global sustainability disclosure system.

In 2023, 23,000 companies disclosed through CDP

Gathers businesses committed to 100% RE.

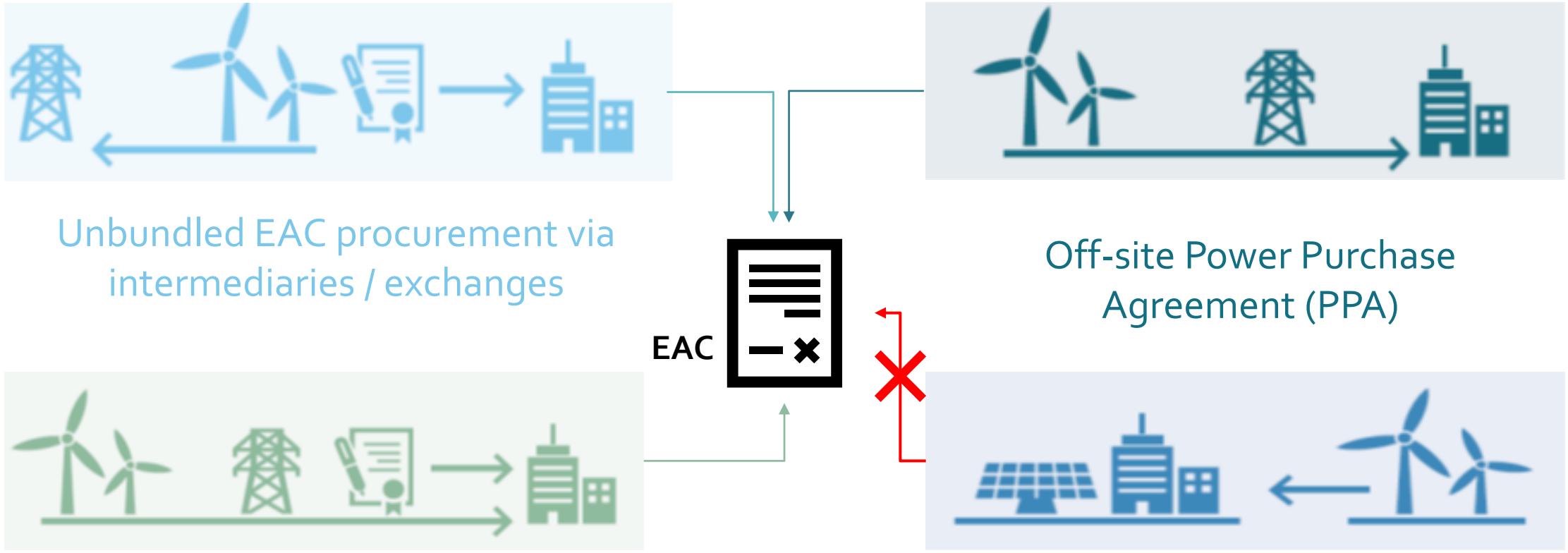
Currently, 428 companies report to RE100

Basic **EAC quality criteria**

Most influential <u>voluntary</u> standards with additional **EAC quality criteria**

Source: GHG Protocol, CDP and RE100

Question 3: Corporate EAC Sourcing Mechanisms



Unbundled EAC procurement via intermediaries / exchanges

Off-site Power Purchase Agreement (PPA)

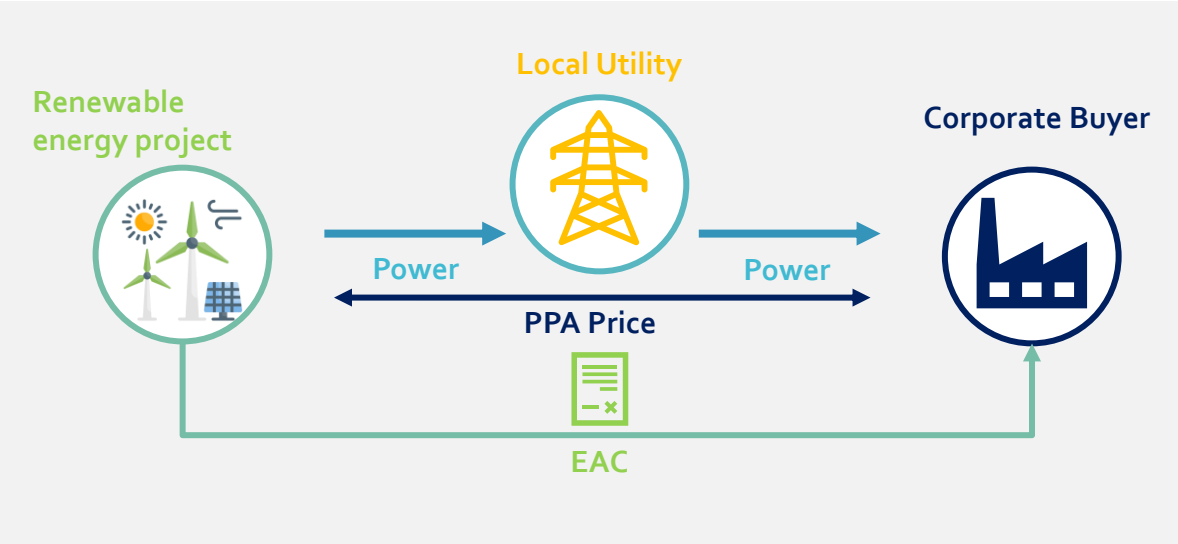
Renewable energy offerings from utilities/electric suppliers

Production for self-consumption (incl. on-site PPA)

Source: *IRENA (2018)- REmade Index 2018.*

Off-site PPAs: Physical vs. Virtual

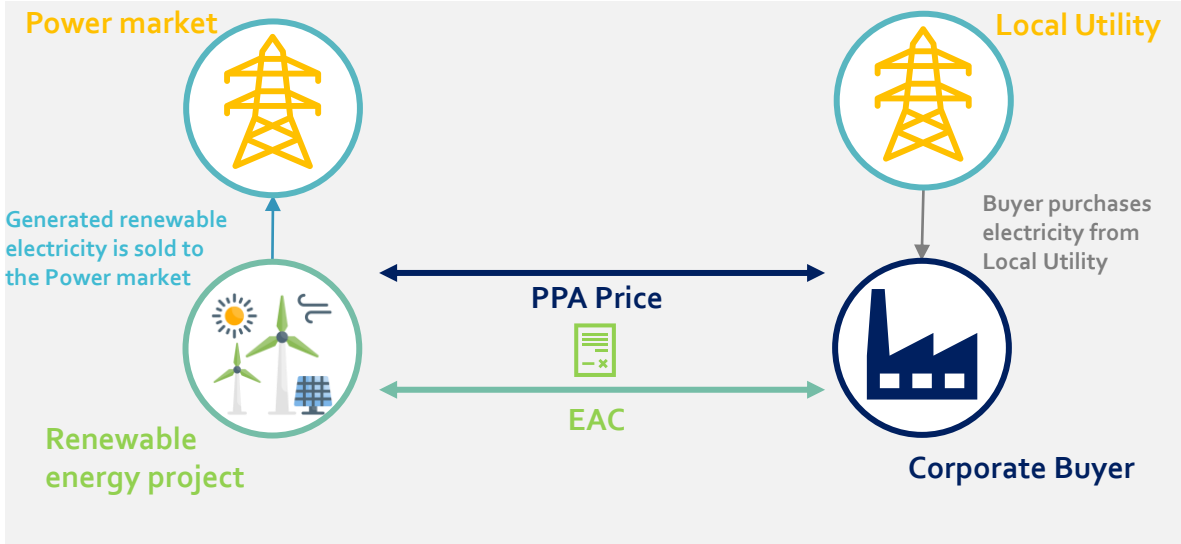
Physical PPA



- Physical delivery of electricity is included
- Derivative and lease accounting can be avoided

- More complex to source:
  - Multiple counterparties – buyer, seller and sleeving party
  - Can be expensive due to sleeving fees
  - Not available in all markets, especially in less mature ones
- Lower volume coverage:
  - 20-50% of coverage per country/signing entity
  - Not easily scalable as PPA asset and a plant must be in the same country → negotiating PPA contract per country takes a lot of time

Virtual PPA



- Higher volume coverage
  - Usually up to 80% of demand
  - Scalable solution as PPA asset can be in a different country then a plant (multi-country PPA in AIB/EU) → Supports faster volume coverage
- Less complex to source
  - Less counterparties – only buyer and seller
  - First contract structure to develop in certain country

- No physical delivery of electricity → cash net-settlement
- Financial derivative accounting can be triggered under IFRS

- Complex aspect
- Advantage

How to chose a right approach?

	Physical PPA	Virtual PPA	Elec. Suppliers	Intermediaries
Category	Bundled	Unbundled	Bundled	Unbundled
Commitment	Long-term	Long-term	Mid-term	Short-term
Simplicity	Complex	Complex	Easy	Easy
Accounting	Complex	Complex	Easy	Easy
Flexibility	Low	Low	Medium	High
Industry Approval	High	High	Low	Low
Market Availability	Mature	Mature	Emerging	Emerging
Cost impact	Potential Savings	Potential Savings	Ongoing Costs	Ongoing Costs
Price Volatility Impact	High	High	Low	Low

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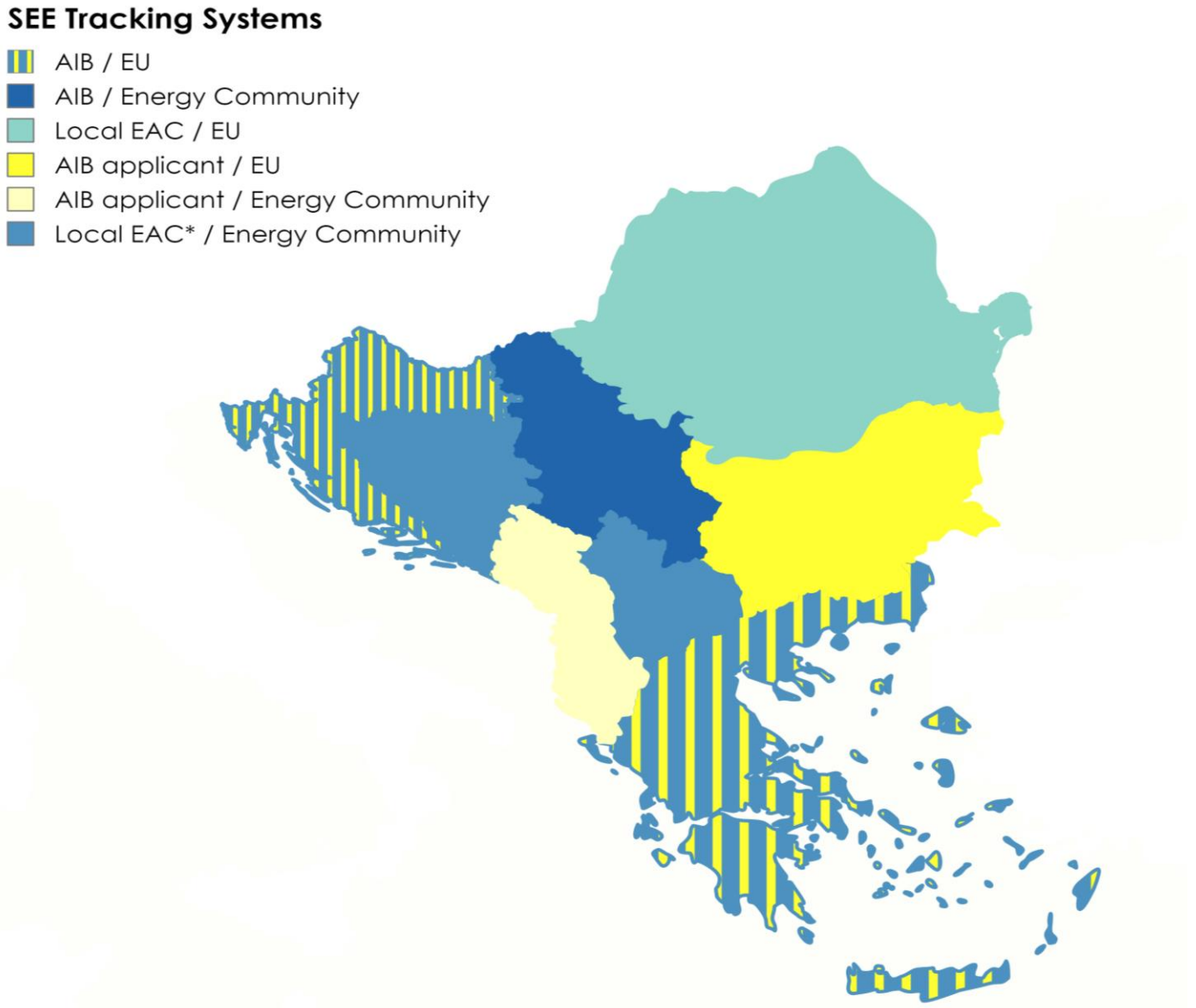
Focus on South East Europe (SEE) Region

SEE Markets:

1) Different tracking systems → Fragmentated EAC procurement
2) EU and non-EU countries → Different regulatory and reporting requirements
3) Mostly emerging and immature electricity markets → Not many corporate PPA deals



*In line with UNSCR 1244 and the ICJ Opinion on the Kosovo declaration of independence

Notable SEE corporate PPAs

Off-taker	Seller	Size	PPA type	Country
Croatian Telekom	Professio Energia	50 GWh/pa	vPPA	Croatia
Orange Romania	Engie Romania	30 GWh/pa	vPPA	Romania
Urus Breweries	Enery	50 MWp	vPPA	Romania
A1	Renalfa	20 GWh/pa	pPPA	Bulgaria
PPF Telecom Group	Electrohold Trade	N/A	N/A	Bulgaria
Billa	Electrohold Trade	N/A	N/A	Bulgaria
KCM AD	Enery	N/A	N/A	Bulgaria
Thessaloniki Water Supply	Terna Energy	53 MWp	vPPA	Greece
Mytilineos	Egnatia Group, EDF renewables, Karatzis	548 MW	N/A	Greece
Amazon	Unknown	24 MW	vPPA	Greece
Viohalco, Titan	PPC	N/A	pPPA→ vPPA	Greece