

EAC - Global challenge with local solutions
World Kinect Energy Services

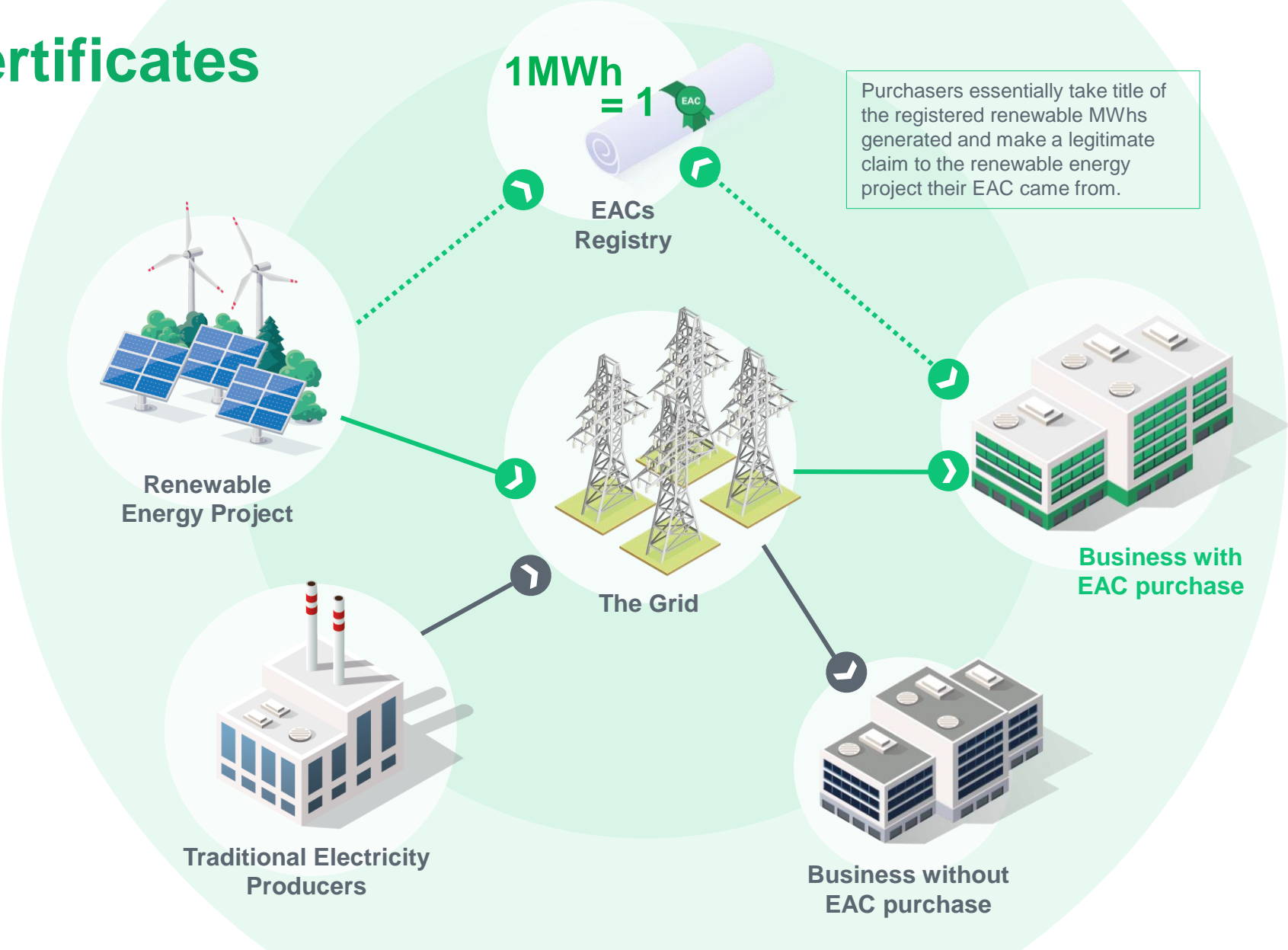
Energy Attribute Certificates

How they work.

Energy Attribute Certificates (EACs) allow any electricity user (in Scope 2) to make a conscious and evidence-based choice for electricity consumption.

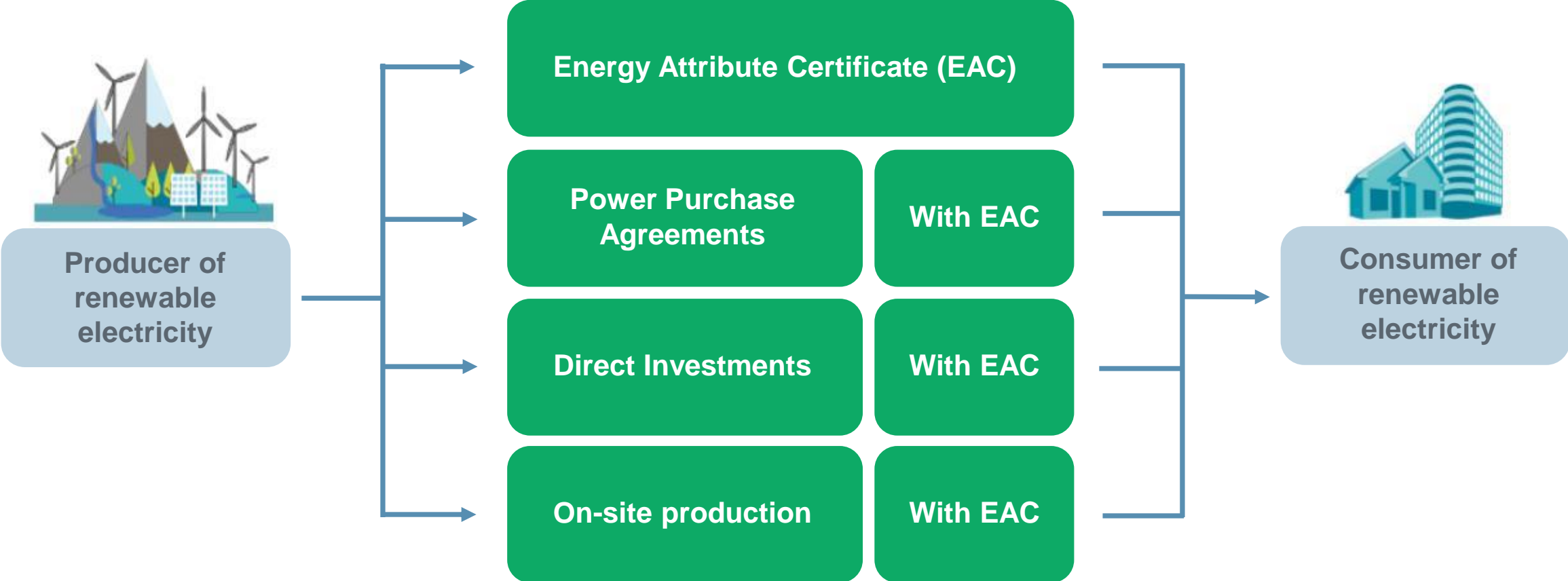
Traceable, unique & unduplicable, EACs provide assurance as to the origin of electricity.

1 EAC
is created for every
1MWh of renewable
electricity generated



Reducing Scope 2 Emissions

Prevalence of EACs



Energy Attribute Certificates are the **underlying mechanism** for tracking the production and consumption of renewable electricity. They can be sold together with an electricity contract (bundled) or on their own (unbundled).



Energy Attribute Certificates

How price is determined.



Prices ranges vary due to a variety of factors such as:

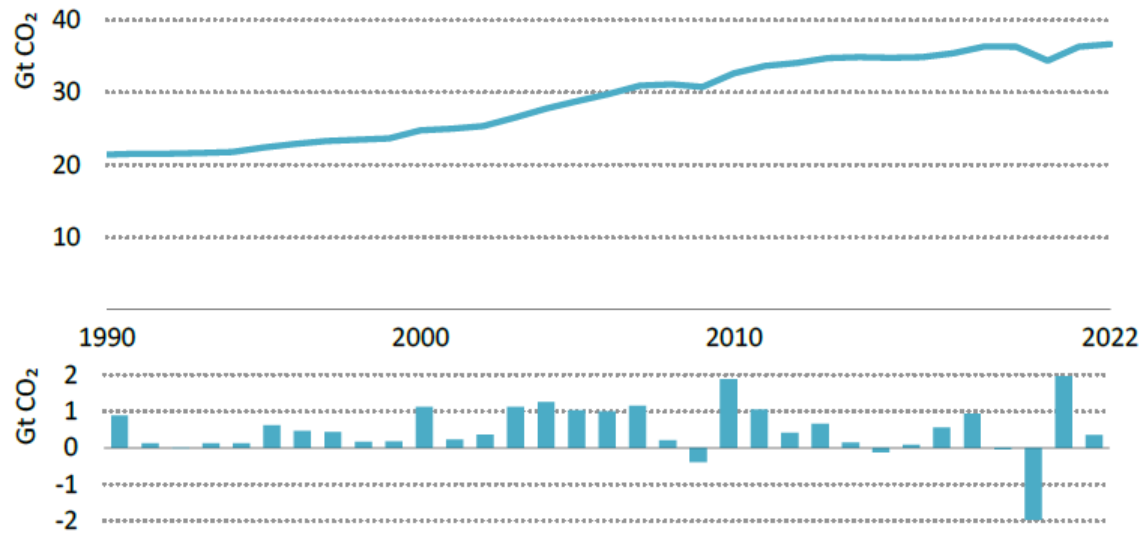
- Country
- Vintage
- Production period
- Technology
- Quantity
- Market trends, demand & availability
- Eco-label & additionality features

Globally, EAC prices tend to increase in all countries, with more and more customers willing to compensate their Scope 2 emissions



IEA: Where is the momentum?

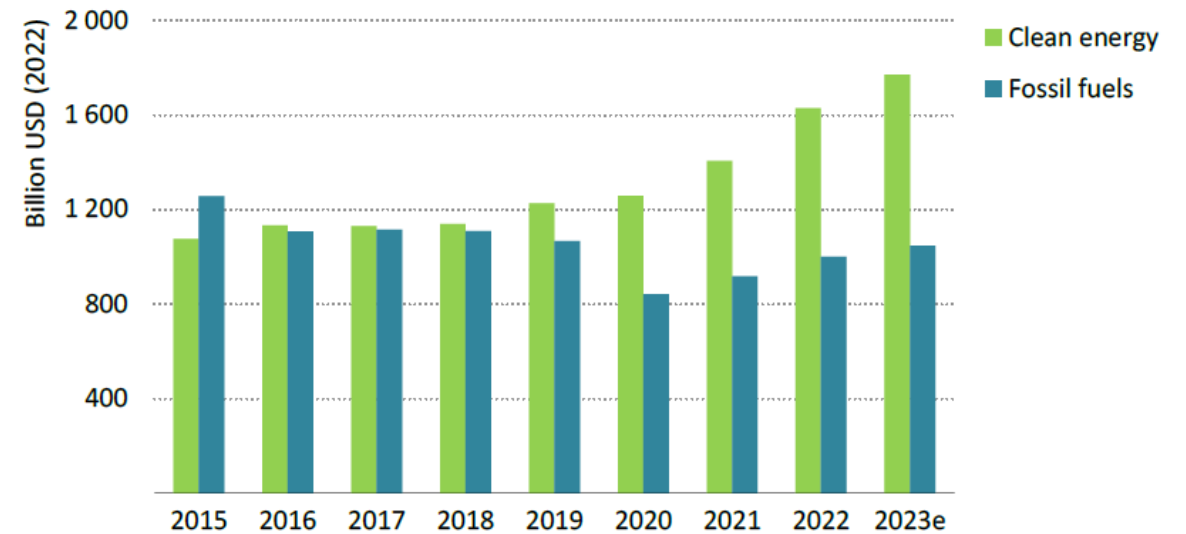
Figure 2.2 ▶ Annual change in global CO₂ emissions from energy combustion and industrial processes, 1990-2022



IEA. CC BY 4.0.

Energy-related CO₂ emissions rose 1% in 2022, and are expected to rise by a similar amount in 2023

Figure 2.3 ▶ Global energy investment in clean energy and fossil fuels



IEA. CC BY 4.0.

For every USD 1 spent on fossil fuels, USD 1.8 is now being spent on clean energy; five years ago this ratio was 1:1

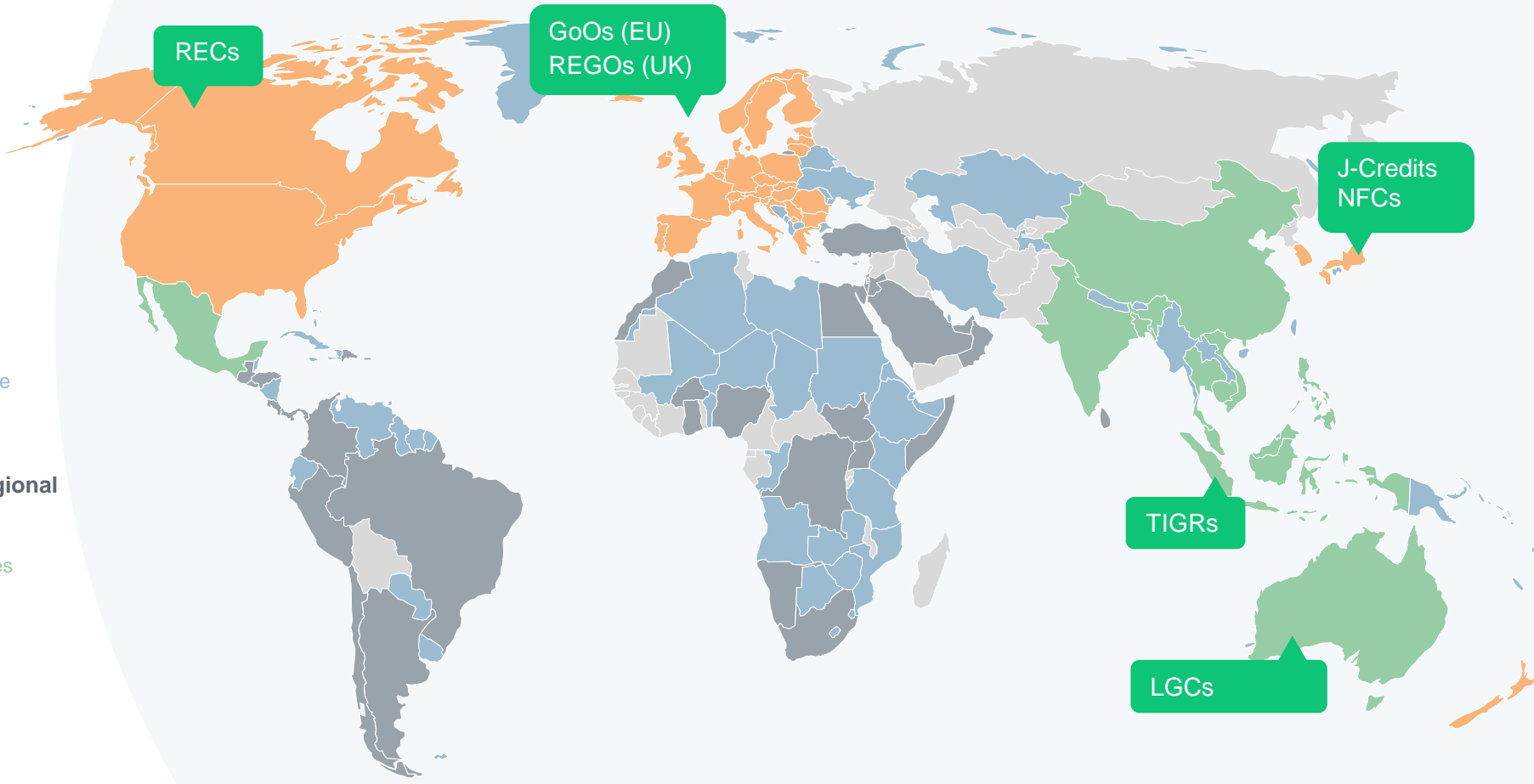
Notes: 2023e = estimated values for 2023. Numbers are in real 2022 US dollars.



Energy Attribute Certificates

EACs have different names around the world

- **National | Regional scheme(s)**
REC: Renewable Energy Certificate
GoO: Guarantee of Origin
NFC: Non-Fossil Certificate
- **I-REC Interconnected Countries**
I-REC: International Renewable Energy Certificate
- **THE INTERNATIONAL REC STANDARD & National | Regional scheme(s)**
LGC: Large-scale Generation Certificate
TIGR: Tradable Instrument for Global Renewables
- **THE INTERNATIONAL REC STANDARD**
- **EACs not available**



Focus on Europe

Underlying complexity behind unified system

Local products:

- **AIB GOs:** grid-connected EECS GOs
- **REGOs:** United Kingdom
- **Local GOs:** Poland, Romania, Energy community

Local frameworks:

- **France:** monthly cancellation
- **Germany:** cancellation through local supplier
- Etc.

AIB Member Countries and Issuing Body Type of Organisation

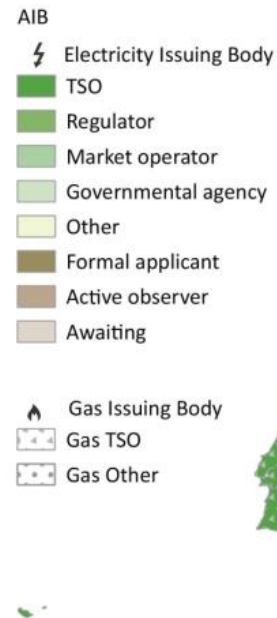


Image source: [AIB Member Countries / Regions | AIB \(aib-net.org\)](https://www.aib-net.org/)



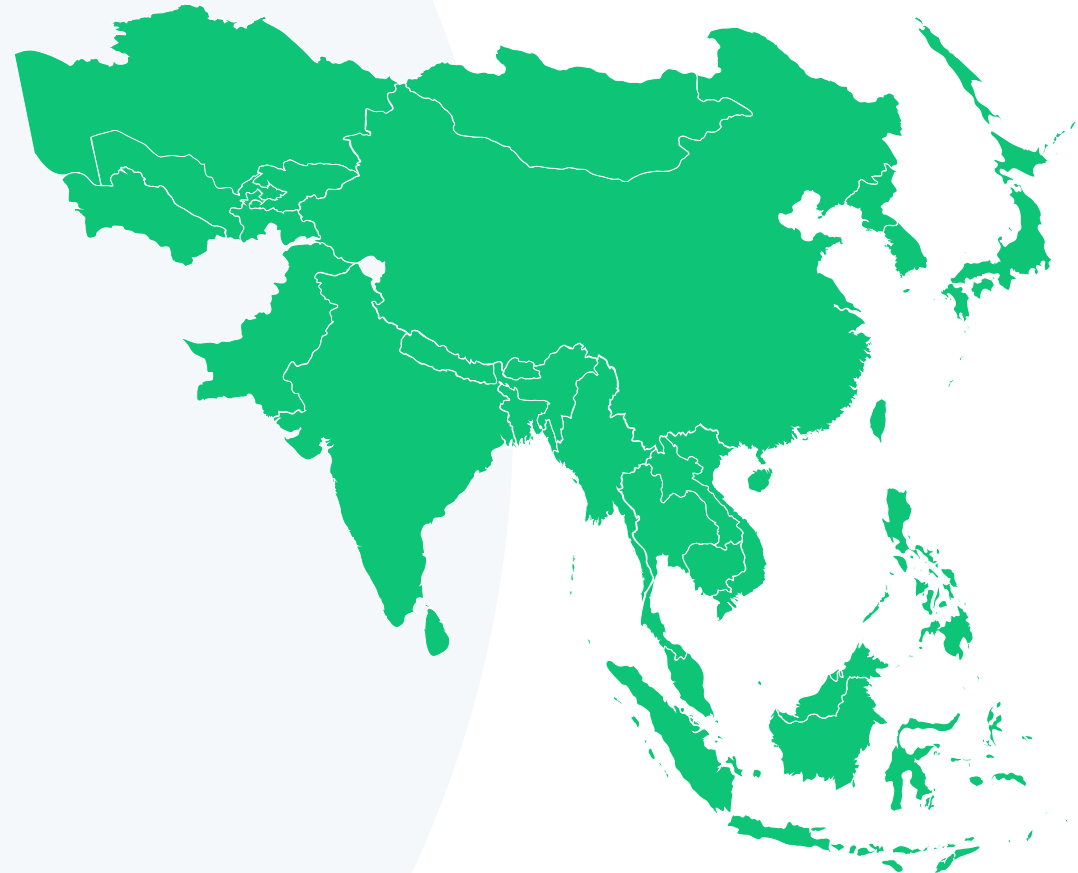
Focus on APAC

Developing at a high pace

Market trends:

- More and more countries are trying/willing to launch their National EACs scheme
 - ✓ Indonesia (temporary EACs issuance suspension)
 - ✓ Philippines (PREMS)
 - ✓ Malaysia (Restrictions for RE exports)
 - ✓ China (GEC)
 - ✓ Korea (K-REC)
 - ✓ Japan (J-Credits/NFCs)
- Some countries are facing supply scarcity due to the low renewables electricity share in their Electricity Matrix, which leads to very high prices:
 - ✓ Singapore
 - ✓ Taiwan
 - ✓ Japan
 - ✓ Indonesia & Malaysia (to a lesser degree)

➔ **The APAC EAC market has been experiencing significant growth in recent years and is in a consolidation phase.**



Focus on APAC

Developing at a high pace



China

EACs available: TIGRs, I-RECs, GECs

Market Specificity: 1st I-REC Country for Issuances/Redemptions
Important price delta between Hydro vs. Solar/Wind



Thailand

EACs available: I-RECs, TIGRs

Market Specificity: High price delta between Hydro vs. Solar/Wind
Supply Availability



India

EACs available: I-RECs, TIGRs

Market Specificity: Large supply, 3rd largest I-REC country in terms of issuances
High Price delta btw Hydro vs. Solar/Wind



Indonesia

EACs available: I-RECs, TIGRs

Market Specificity: Mostly Hydro/Biogas/Biomass, undersupply



Malaysia

EACs available: I-RECs, TIGRs

Market Specificity: Mostly Biogas/Biomass, undersupply



Korea

EACs available: KRECs (reserved for local players), Chinese I-RECs as substitute

Market Specificity: Local certificates very difficult supply access for international companies



Focus on North America

A well-established market with product fragmentation

Market trends:

- ✓ Over 8 million US energy consumers purchased about 244 TWh of renewable energy last year. This equals 5% of all US retail electricity sales
- ✓ In 2010, the demand was only 37 TWh. This equals a growth of approximately 560% in 11 years
- ✓ At the same time, ongoing renewables projects are being put on hold due to supply chain issues and the general costs on materials are increasing
- ✓ This has had a significant effect on the price of unbundled RECs

Market Drivers

Policy

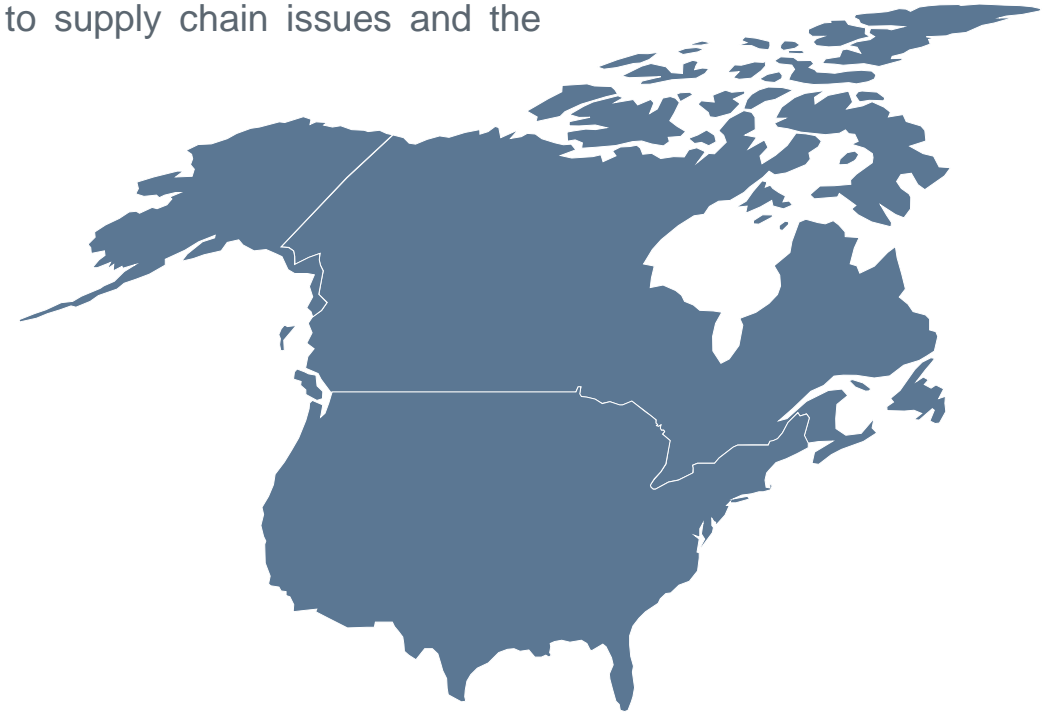
SEC disclosure, Tax incentives, and Energy Policy can impact supply of RECs in the market and demand from corporations.

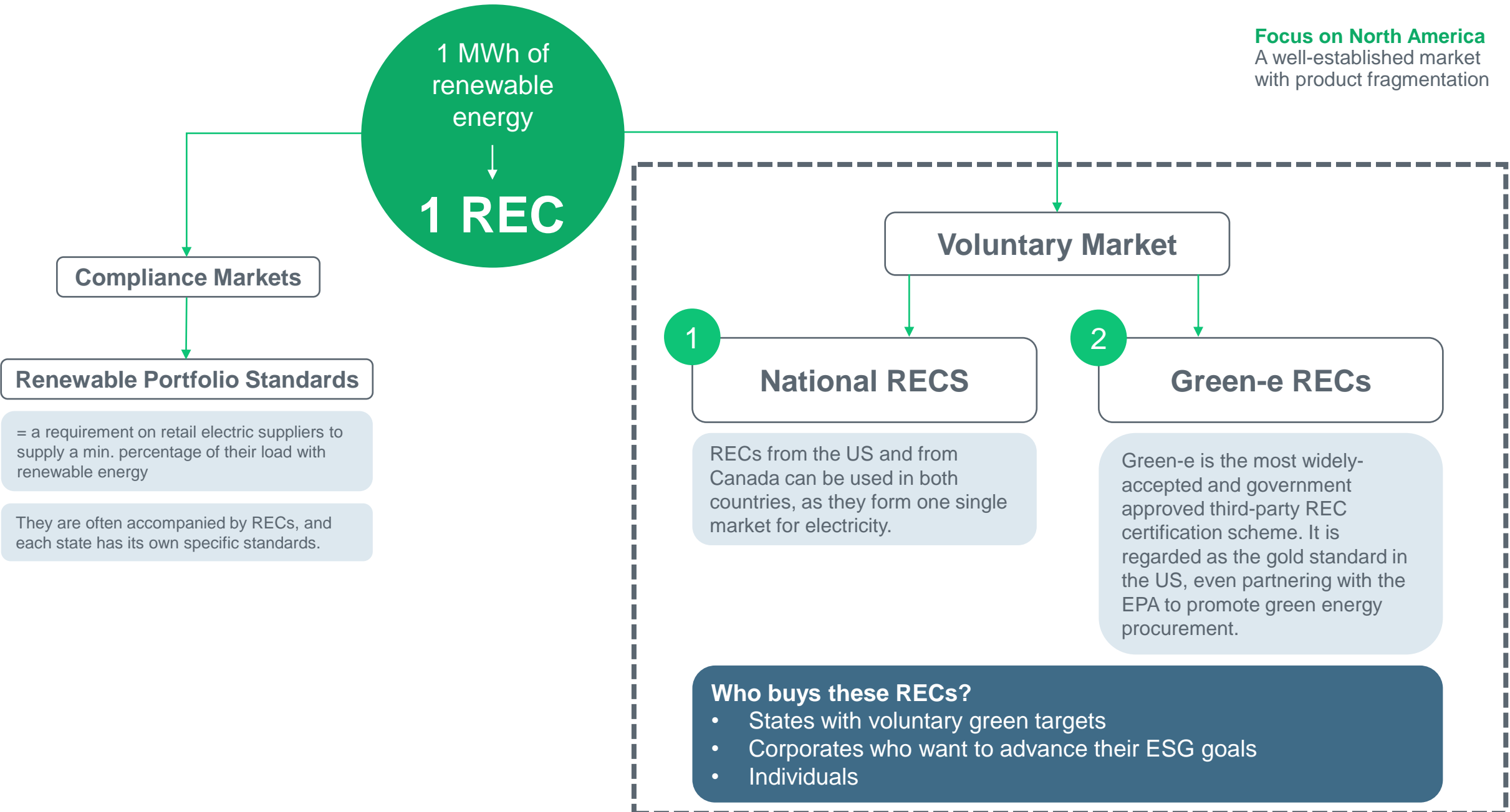
Standards

Changing production requirements is putting upward price pressure on RECs.

ESG

Increasing corporate focus on public-facing sustainability actions increases demand for RECs.

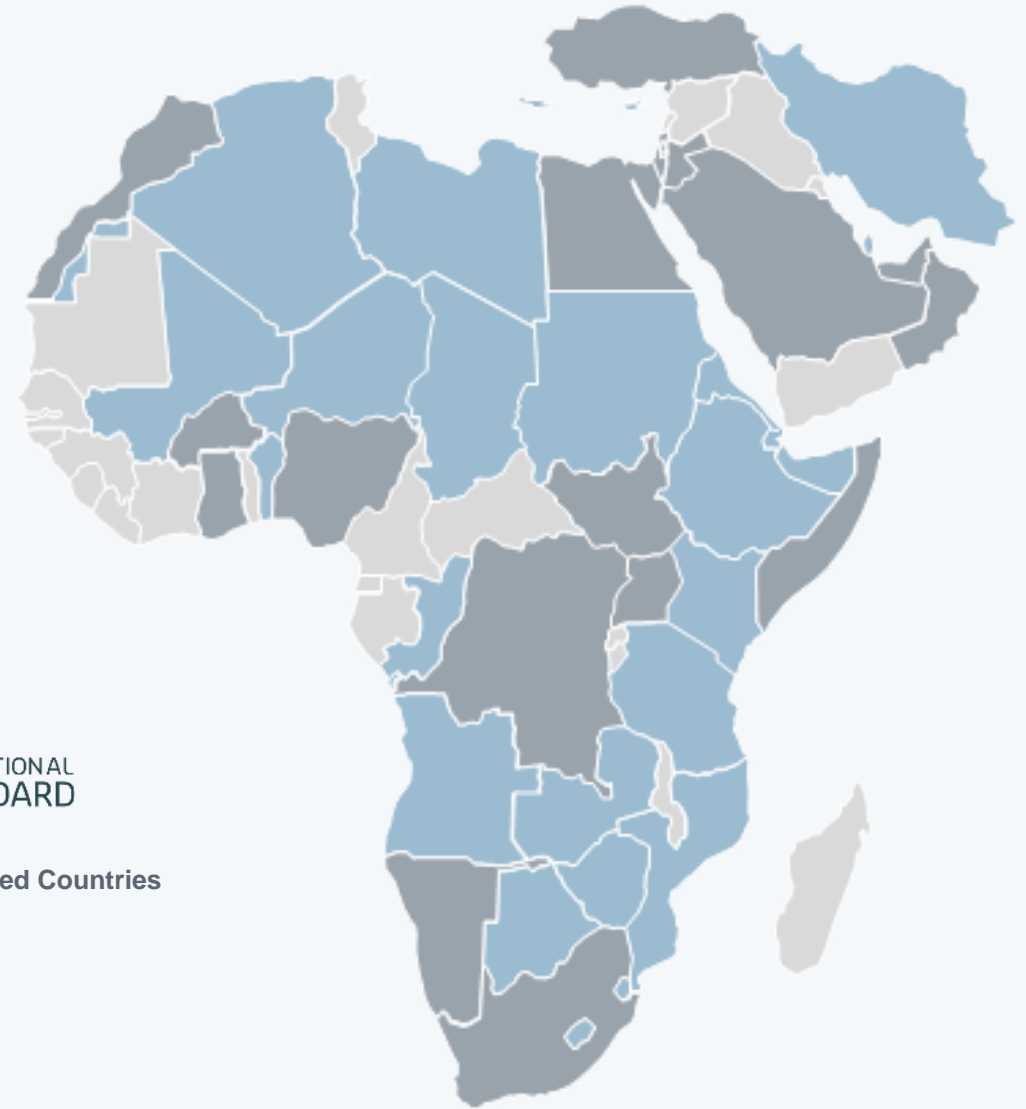




Focus on MEA

Market trends:

- ✓ MEA markets are the least developed globally
- ✓ They are heavily constrained on the supply side
- ✓ The Middle East and Turkey have the best regional I-REC availability
- ✓ Current push for I-RECs with additional benefits (e.g. P-RECs)



Focus on LATAM



Market Trends:

- ✓ Overall oversupplied markets (Chile, Brazil...) that are slowly rebalancing supply with demand
- ✓ Local scheme in Mexico (CELs) for mandatory market
- ✓ Good availability of renewable resources leads to easy supply
- ✓ Can experience high volatility over short period of time

➔ **The LATAM EAC market is expanding to new markets and territories and is slowly finding the right supply / demand balance.**

International certificate standards – Stakeholder view

What is important to whom:

- Ease of use vs control
- National regulations vs out of the box
- Availability
- Credibility of claim

