I-REC STANDARD

Understanding EAC Schemes and Roadmaps for Their Development

THE INTERNATIONAL REC STANDARD FOUNDATION

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I-REC STANDARD

THE I-REC STANDARD FOUNDATION SUBMITS THIS REPORT AS PER THE AGREEMENT BETWEEN THE FOUNDATION AND THE UNITED NATIONS DEVELOPMENT PROGRAM. THE SECRETARIAT OF THE I-REC STANDARD FOUNDATION REMAINS AVAILABLE TO UNDP OFFICERS TO DISCUSS THIS REPORT AND OTHER TASKS SET OUT IN THE RELEVANT CONTRACT.

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1 Abbreviations and definitions

1.1 Abbreviations

CDP	Carbon Disclosure Project
EAC	Energy Attribute Certificate
EECS	European Energy Certificate System
GHGP	Green House Gas Protocol
GO	Guarantee of Origin
I-REC	International Renewable Energy Certificate
MNC	Multinational Company
NGO	Non-Governmental Organisation
REC	Renewable Energy Certificate
RPS	Renewable Portfolio Standard

1.2 Definitions

ATTRIBUTE

Data specifying the characteristics of energy produced by a Production Device.

CANCEL

To mark, at the request of an end-user or their representative, an EAC as having been consumed so that its attributes cannot be claimed by another end-user.

COMPETENT BODY

A body duly authorised under the laws and regulations of any state to exercise or discharge any legislative, governmental, regulatory, administrative or supervisory function associated with the administration of a National EAC Scheme.

DISCLOSURE

The provision of information to a final customer on the share or quantity of the energy supplied to them as having specific Attributes.

EXPIRY

The point at which an EAC is no longer eligible for transfer, and subsequently, Cancellation, as a consequence of the passage of a given period since the production of the associated energy.

ISSUANCE

The process of creating an EAC and providing it to an energy generator.

ISSUING BODY/ISSUER

A Competent Body responsible for the issuance and tracking of EACs. Issuing bodies manage with the registration of Production Devices.

LABEL

A data field/attribute on an EAC reflecting that the certified unit of energy conforms to a specific set of qualities defined in a Label Scheme.

LABELLING SCHEME

A scheme that confirms that a unit of energy, to which an EAC relates, conform to specific criteria which are in addition to, and independent of the requirements of a given EAC Standard.

OVER-THE-COUNTER

Also known as 'off-exchange', is a bi-lateral trade done directly between two parties, without the supervision of an exchange.

PRODUCTION DEVICE

A device that can generate energy for which an EAC can be issued. Production devices register through the local Issuing Body and must follow their rules and fees before entering the market.

REGISTRY

A database operated by an Issuing Body or its agent, comprising:

a. Accounts and the EACs in those accounts;
b. Details of Production Devices and information provided to the Issuing Body or a third party on its behalf in connection with the registration of those Production Devices; and
c. Details of EACs which have been transferred out of that Registry.

REGISTRY PROVIDER

An entity responsible for the creation and operation of an EAC registry on which ownership of EACs are registered,traded and redeemed. A registry provider can be any type of organisation and ensures the registry is reliable, secure and cost-effective.

RESIDUAL MIX

The attributes of the energy mix which remain after certified attributes are taken out of the mix as a result of cancelling an EAC.

2 Introduction to EAC schemes (systems,standards and markets)

Through the use of Energy Attribute Certificates (EACs), end-users around the world can make reliable claims about their energy usage such as: "my factory runs on 100% renewable energy", "our products are made with 100% wind energy" and "our global electricity usage causes zero end-of-pipe emissions". Without the use of EACs, it would be impossible to make these reliable claims because electricity is not a tangible product that can be boxed and sent from the producer to the consumer. Instead, a producer injects an electrical charge into the grid in one place and somewhere else, a consumer takes the same amount of charge off the grid. There is no way to track electrons through a grid. Therefore, the only reliable mechanism for making claims about the use of a specific charge that was taken off the grid is a system that books all injected charges as unique units (megawatt-hours (MWh)). These booked, unique units can be traded independently from the underlying electricity and only the person or entity that 'cancels' (see below) this unique unit can claim the usage of that specific MWh. This mechanism is called a book-and-claim system and is the cornerstone of EACs worldwide. It is an accounting instrument that certifies the production of a MWh of electricity along with factual characteristics of how, where and when the electricity was produced. These units can then be transparently traded and cancelled.

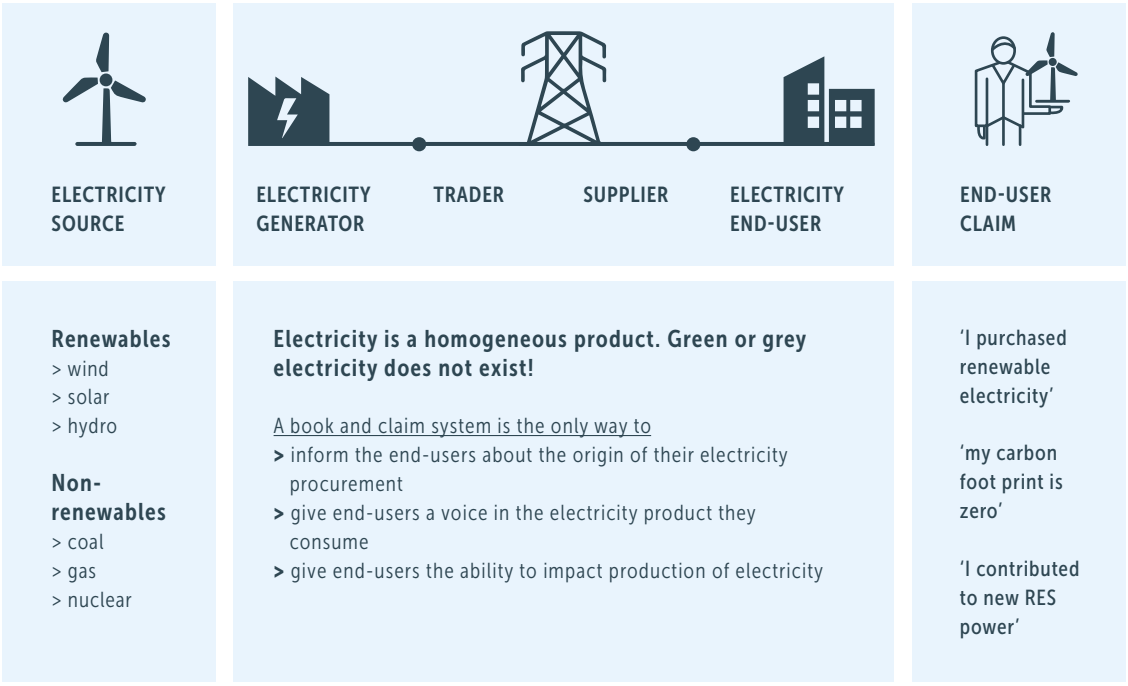

FIGURE 1: BASIC FRAMEWORK EAC SCHEMES

EAC schemes can accelerate a country's energy transition by putting an additional, marketable value on the production of renewable energy. Producers of renewable energy can sell both the energy and the related EAC. By providing a complementary income stream, the trade of EACs can reduce the reliance on national public renewable energy support schemes for renewable energy producers seeking to ensure the economic viability of their projects. This means that any public money that is available for supporting renewable energy generation can go to those projects in most need of it, and/or can be spread across more projects.

The use of an EAC scheme to support the generation of renewable energy should not necessarily mean that governments should invest less in the generation of renewable energy.

Market participant's use of a given EAC scheme is either voluntary or mandated by national authorities. Voluntary EAC schemes allow, but don't require, market participants to trade EACs and/or to cancel EACs in order to make a claim about the use of renewable energy. Currently, most national EACs schemes are voluntary, for example, the schemes used in the European internal market. Mandated EAC schemes are often referred to as "compliance" markets. Generally, in such schemes, a national authority requires market participants to sell or purchase a given volume or percentage of renewable energy and prove that activity through the trade and/or cancellation of EACs. EAC compliance markets are seen in some US States, where they are the tool for meeting a Renewable Portfolio Standard (RPS). EAC schemes can differ based on their legal footing, but the underlying principles of their operation – the issuance, trade and cancellation of certificates that allow end-users to claim the use of a given unit of energy – are the same.

EAC schemes are made up of three core elements

1. EAC Standards – The rules and regulations which govern a scheme
2. EAC Systems – The mechanisms which facilitate a scheme
3. EAC Markets – The means through which a scheme creates value

2.1 Distinguishing EAC Standards, Systems and Markets

EAC STANDARDS

EAC Standards are the rules and regulations that govern EAC schemes across the whole life cycle of an EAC (see figure 1). For the early phase of the life cycle, standards specify the requirements that must be met for registering a generation device and how that generation must be measured and validated. For the middle phase of the life cycle, standards set out when, how and with what information EACs can be issued to ensure the uniqueness of each EAC. In all internationally recognised EAC Standards, the information on an EAC includes the energy source, the capacity of the device, the location, the year it became operational, along with a myriad of other required data. These environmental and social characteristics of a standardised energy unit are called attributes. In this middle phase, standards will also set out how the EAC market should operate, including how certificates are traded and redeemed (cancelled) by, or on behalf of, an end-user. In the final phase of the life cycle, standards define the rules under which end-users can claim the use of a unit of energy and when an unclaimed EAC should expire from use. Standards also set out how the Residual Mix should be calculated.

Standards are often written independently from national regulations. Standards clarify how stakeholders and market players should use an EAC scheme in ways that adhere to that Standard. Chapter 3 outlines three internationally recognised standards in more detail. Standards can be created by various types of organisations, but are most often developed by a public authority, a non-profit organisation, or a combination of the two.

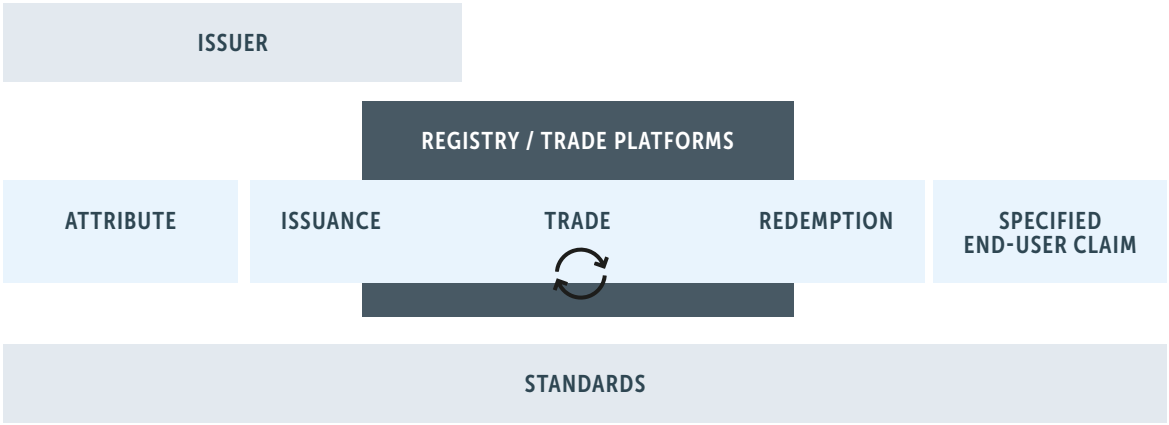

FIGURE 2: THE EAC LIFE CYCLE

EAC SYSTEMS

As much as EAC standards are extremely important for the robustness of an EAC scheme, an EAC system is also indispensable, as it organises the ownership and trade of EACs to ensure that a single user can claim the use of a unique unit of energy. An EAC system is an IT-based system, often called a Registry, that ensures the correct issuance, trade and redemption of EACs in adherence with the standard.

In the early days of EAC schemes, such as Europe during the early 1990s, simple ledger sheets were used to log the position of certificates within the system. As these schemes grew, more complex systems were needed to track EACs, and evolved into precise accounting systems which ensure the status of any given EAC is clear at all times. In order to remain accurate, these systems and their certificates must adhere to the overarching standard's rules on issuance, trade and redemption/cancellation. This accuracy is essential to maintain user confidence in EAC schemes and to ensure that EAC backed claims can be internationally recognised and accepted for Scope 2 greenhouse gas emissions reporting.

EAC MARKETS

EAC markets arise when an EAC product is created based on an accepted and recognised standard and a system is in place to organise ownership of that product. The value of an EAC is informed by the supply and demand dynamic and is ultimately set by how much a given consumer is willing to pay to claim the use of a given certified unit of energy. The EACs themselves have no value – what is being paid for is the ownership of the attributes that the certificate specifies. More than 95% of EACs are traded through OTC (Over-The-Counter Markets). In the EU, some Member States have recently introduced auctioning of EACs. As yet, it is too early to assess the relative merits of auctioning EACs in comparison to OTC trading.

2.2 The functions that EAC schemes perform

DEFINING THE ATTRIBUTES OF A UNIT OF ENERGY

The characteristics of a unit of electricity production that is certified, booked and eventually claimed through an EAC scheme are called attributes.

These attributes are facts which, in most well-developed EAC schemes, are specified through data fields on:

1. the technology used to generate the energy (e.g. solar PV, combined cycle gas turbine)
2. the underlying energy source, if any (e.g. gas, coal)
3. the start and end dates of production
4. the identity and location (e.g. a unique identifying number)
5. the capacity of the generating installation (in megawatts or gigawatts)
6. the year the generating installation was built
7. the date on which the generating installation became operational
8. if the installation received public support (e.g. feed-in-tariff, investment support)

The above list is a baseline of the essential information that should be included in an EAC. A given scheme may require additional information to further specify a unit of energy. Most importantly, all included information must be both factual and verifiable through an audit. One example of an additional data field that an EAC scheme may want to include is whether an EAC complies with the requirements of a labelling scheme. These labelling schemes operate in addition to the EAC system and use the information on an EAC, along with other information the labelling scheme may require, to identify EACs with a particular quality. These labelling schemes operate similarly to the Fairtrade Foundation for food, for example.

TRACKING THE ATTRIBUTES OF A UNIT OF ENERGY

EAC markets were created because, as illustrated in figure 3, electricity cannot be tracked between generators and end-users. Electricity is not a tangible product that can be physically transported to a single buyer. Instead, it is a charge that must be maintained on a grid. Even if power is purchased from a specific producer, the power cannot be boxed and directly delivered to the end-user. As mentioned in the introduction, the electrical charge is injected into the grid in one place and end-users can take the same amount of charge off the grid somewhere else. System operators work to maintain a balance between the injection and off-taking of power. Without this balance, the grid will fail and lead to blackouts.

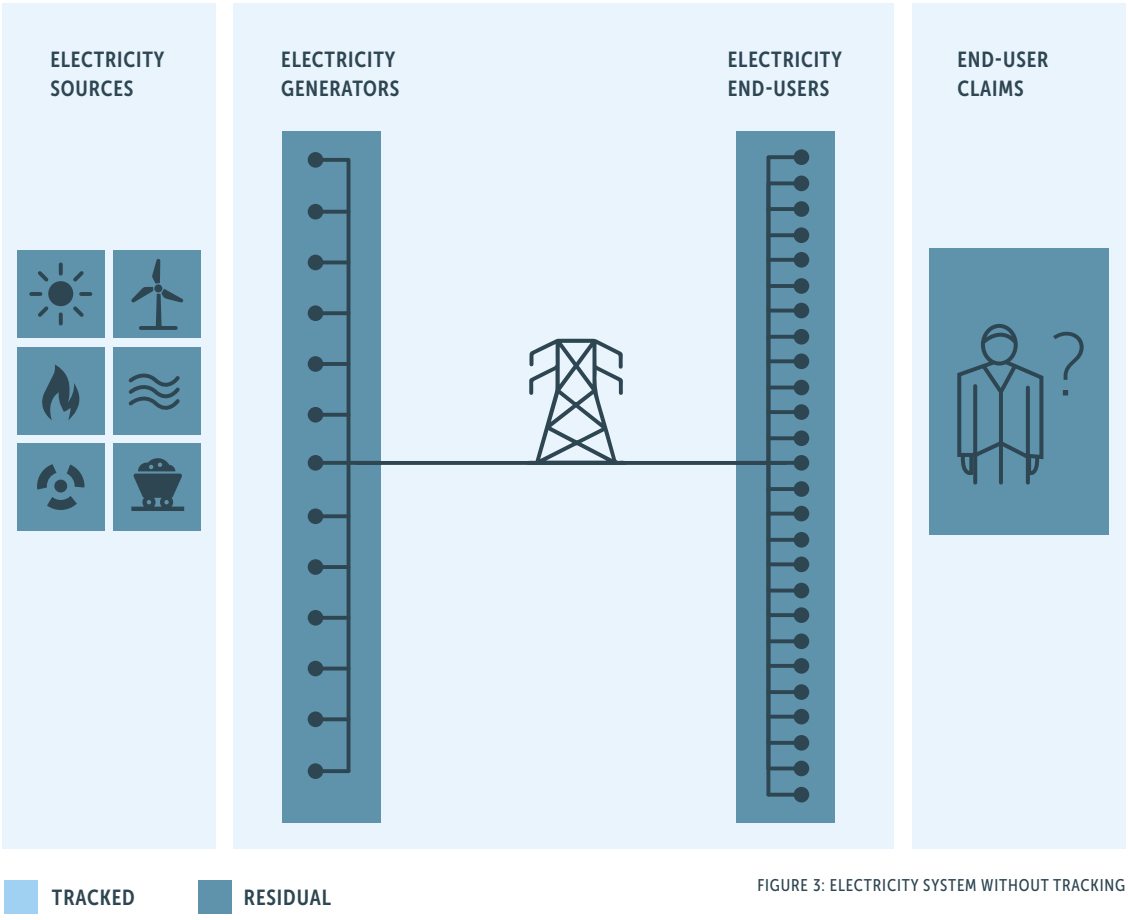

FIGURE 3: ELECTRICITY SYSTEM WITHOUT TRACKING

When buying electricity, a consumer is buying the right to remove a given amount of charge from the grid. The only way to track a unit of energy from the point of production to the point of consumption is by using book and claim accounting principles.

Under an EAC book and claim scheme, generators book how much electricity they generate and inject into the grid and receive certificates to verify this was done. These certificates can be traded and cancelled by market participants to claim the use of that unit of energy. These certificates are issued based on data from the Production Device meter. Once a certificate is issued, its trade and use (redemption/cancellation) can be completely independent from the associated electricity.

While the regulations and procedures for tracking the attributes of a unit of energy might differ between EAC schemes, all such schemes share a similar basic approach to energy attribute tracking:

1. A producer generates a unit of energy (generally this is 1 megawatt-hour (MWh)).
2. For each eligible MWh of energy produced within an EAC scheme, an EAC can be requested from the Issuing Entity.
3. Such EACs can be traded between market participants through registries with the ultimate aim of selling it to a consumer (also known as an end-user).
4. The end-user or their representative consumes the EAC by cancelling it so that it cannot be used again. Without cancellation, there is a risk that the associated claims related to attribute ownership can be claimed twice (known as double counting).
5. After cancelling the EAC, the end-user can claim to have consumed the attributes of the unit of energy that were specified in the EAC.

The ultimate goal of EAC systems is to have all energy generation, renewable and non-renewable, booked and all energy consumption claimed through the use of EACs. Such schemes are called 'Full Disclosure' schemes and look like the situation shown in figure 4. Full Disclosure provides full transparency over who claims what energy attributes.

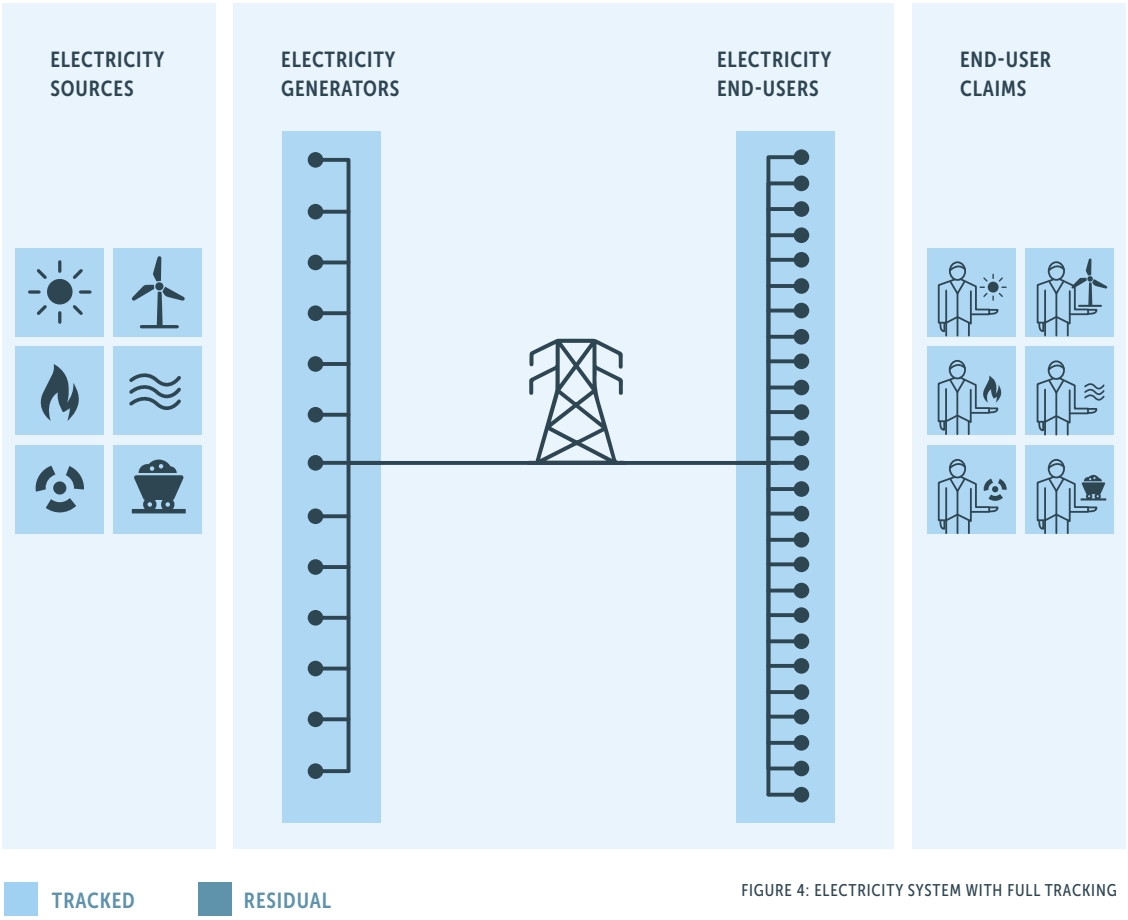

FIGURE 4: ELECTRICITY SYSTEM WITH FULL TRACKING

PROVIDING A RELIABLE WAY TO MAKE CLAIMS ABOUT ENERGY USE

Many energy consumers, from large organisations to individual households, want to be able to state that they consume renewable energy. These statements, known as claims, can only be made if the consumer, or a supplier on behalf of the consumer, cancels an EAC so the associated attributes contained in the certificate cannot be claimed by any other user. Large customer-facing organisations are often the most visible consumers to make claims about the use of renewable energy. The desire of such organisations to make reliable and verifiable claims is visible when looking at the number of companies actively reporting under the Carbon Disclosure Project (CDP) and/or being members of the RE100 initiative. Currently, over 8,400 companies are reporting to CDP[1] which includes reporting of company emissions from energy use - also known as Scope 2 reporting under the GHG Protocol[2] . These 8,400+ companies are voluntarily choosing to disclose how, when, where, etc. the energy they consume, was generated. Members of the RE100 initiative are committed to using 100% renewable electricity[3]. There are already over 240 RE100 members and include some of the largest companies in the world. Any organisation disclosing its Scope 2 emissions under the CDP or as a member of RE100 must use EACs to prove their consumption.

Consumers use EACs to match their energy consumption over a specific period. This period can be as short as an hour, or as long as over a year. In the case of commercial consumers wanting to buy 100% renewable energy, an end-use will often:

1. Estimate their consumption for a year (e.g. 1000 MWh);
2. Buy enough certificates in advance to cover a large proportion of that annual consumption (e.g. 90% or 900 MWh)
3. Then, at the year-end, determine their exact consumption for that year and buy the remaining required certificates to cover the outstanding consumption (e.g. 100 MWh if their original assessment was correct).

1. www.cdp.net/en/info/about-us/what-we-do / 2. www.ghgprotocol.org/scope_2_guidance / 3. www.there100.org/re100

FIGURE 5. SOME OF THE MEMBERS OF RE100

Such a consumer may buy certificates through different means – for example using long-term contracts (e.g. PPAs) to buy the initial large proportion and one-off trades (Single delivery) to buy the outstanding balance of certificates. Some purchasing strategies may be affected by what is termed a 'market boundary' which is described under paragraph 4.5. While this was an illustration of a common purchase strategy, commercial consumers display a variety of purchase patterns and often work with market players to determine a strategy that is both cost efficient and ensures they receive the electricity product of their choice. Other purchasing strategies might include purchasing solely through single delivery contracts, purchasing more certificates than needed to cover annual consumption, and selling the surplus, or entering into a long term contract.

2.3 EAC scheme stakeholders

To fully understand how EAC schemes, made up of standards, systems and markets, function in practice, it is important to understand the key stakeholder groups that are engaged in them.

END-USERS

The term end-user is a broad concept that covers every entity that consumes energy. The term encompasses the smallest household, the largest multinational corporation (MNC) and everything in between. Every end-user can make a claim about where their energy came from as long as an EAC was cancelled by the end-user or through a market player acting on their behalf. Depending on the energy consumption volume and general interest in sustainability issues, some end-users will be aware of how EAC systems, standards and markets work while others will not be aware of EAC schemes at all. A household is often not aware of the underlying standards and systems that allow them to buy renewable energy, but this should not matter as long as households can trust the underlying system that provided them their renewable energy. In contrast to households, many MNCs are very active in EAC markets and are very aware of the standards and systems that make EAC schemes robust tools that facilitate reliable claims.

EAC schemes adhering to internationally recognised standards benefit end-users by providing:

1. **Access to reliable information about the origin of energy sources on offer to them**
   Energy in general, and electricity in particular, are homogeneous products without different transmission and distribution systems for specific types of energy. Once injected into a grid or a pipeline it is no longer possible to separate one unit of energy from another. Without an EAC scheme, end-users can't make reliable and unique claims about the use of attributes of a given unit of energy.
2. **A choice about what specific energy product they paid for**
   Without a reliable EAC system, an end-user can only decide whether to consume energy or not. EAC schemes allow end-users to specify the energy they want by contracting with generators who produce that type of energy.
3. **The opportunity to influence the energy industry**
   When buying tracked energy, an end-user can choose what type of energy they want to consume, and can thereby provide a signal to the market to generate more of their chosen type of energy. Furthermore, the price for a specific energy product may increase when that product is in greater demand. This could result in more motivation among developers to bring more of the in-demand type of generation online.

MARKET FACILITATORS

PUBLIC AUTHORITIES

National or international authorities (such as the EU) can have an active or passive role in an EAC scheme. It is possible to have a functioning EAC scheme without any state involvement because the whole life cycle of an EAC can be created and completed through independent entities. However, state involvement can make an EAC scheme more robust and integrated into existing structures. Public authorities can facilitate an EAC scheme as follows:

Acknowledging / Endorsing an EAC scheme

The trust from market players in a specific EAC scheme and hence their willingness to use an EAC scheme may increase when a national authority acknowledges the existence of the voluntary mechanism. The most important aspect of such acknowledgement is recognising only one EAC scheme within a country. Having more than one scheme can create confusion and distrust among scheme users. Limited competition in the facilitation of an EAC scheme is generally seen as a good thing. This shifts the competitive element towards the underlying energy attributes, the certificates, instead of the mechanism that facilitates the market. The creation of a well-functioning EAC scheme is often a step-by-step approach and having a national authority acknowledging a scheme is an ideal first step which requires very little effort from the government.

Appointing or becoming a national issuer

A further step for a public authority to take would be to become or appoint an organisation, whether this be a governmental or private entity, to take the role of issuance of EACs. The most reliable and robust national scheme would have only one publicly recognised EAC scheme with only one accepted issuer defined in national legislation as the Competent Issuing Body for the scheme.

Using the EAC scheme as a tool to achieve policy goals, including by

a. Providing a reliable means to report the use of renewables. In many developed EAC markets, legislation states that an end-user can only claim the use of a given set of energy attributes if they cancel the related EACs. Without such rules, different, potentially competing means of claiming the use of renewable energy could be used, reducing confidence in each claim. In such a scheme, any consumer not cancelling EACs to claim the consumption of energy attributes can only report their use of the Residual Mix[4].
b. Providing a means for measuring progress towards a renewable energy target. As noted above, the use of EAC schemes can be voluntary or mandatory. Mandatory schemes require that either suppliers supply a given amount or proportion of their energy as renewable, or that consumers consume a given amount or proportion of their energy from renewables.

4. The Residual Mix of EECS GOs is calculated by taking the corrected volume of energy generated, adding expired attributes, and subtracting issued attributes. This calculation is referred to as an 'issuance based' residual mix. The EECS area recently adopted this calculation following criticism of its previous 'transaction-based' residual mix which was calculated by taking the corrected volume of energy, adding imported attributes, subtracting exported attributes, and further subtracting cancelled attributes. The details behind these methodologies, and the reasons for which the European Energy Certificate System (EECS) moved to the former from the latter are set out in detail on the website of the Association of Issuing Bodies (https://www.aib-net.org/facts/european-residual-mix)

When mandating such market activity, a country can use an EAC scheme to measure progress towards its achievement.

c. Complementing a national support scheme. A well functioning EAC scheme can complement public support for renewable energy. As noted above, by providing an additional income stream to renewable energy producers, EACs allow any public money that is available for supporting renewable energy generation to go to those projects in most need of it, and/or to be spread across more projects. Achieving such complementarity can be challenging. For example, fully replacing public support with income from EACs can easily lead to market stagnation and a failed implementation of the tracking scheme as there is limited use of the associated market. EACs may not provide sufficient support either because they are unable to command high enough prices, or are unable to sell in sufficient numbers to achieve the income required to support the generation of renewable energy.

d. Reducing the use of the most polluting energy sources. Just as EACs can promote the development of in-demand technologies by showing the extent to which consumers are willing to pay for them, they can also show when consumers do not want to use a given type of energy. Generally, energy types that are low in supply compared to the demand for them will be, according to basic market principles, more valuable and as such better able to compete against other technologies, particularly those that may have high supply compared to the demand for them such as coal. Full disclosure (the practice of certifying every unit of energy) could mean that not only the in-demand energy types benefit financially from EAC trading but out of demand energy forms are also penalised, having to reduce their price to a point at which a consumer is willing to buy them to the possible extreme of negative prices. In this way, EAC markets can provide both price incentives for in-demand technologies and price disincentives for technologies that are actively seen as undesirable.

ISSUERS/ISSUING BODIES

As defined above, an EAC Issuer is a Competent Body responsible for the issuance and tracking of EACs. Their role is bound to the geographic area of the scheme for which they are given responsibility. As a facilitator of the market, an issuer must create a level playing field for all generators and, as such, cannot engage in the generation of electricity or the trade of certificates. As long as the independence of the issuer can be guaranteed and the issuer has the capabilities to perform the role as issuer, it does not matter whether an issuer is a for-profit, non-profit, public or private organisation. Often, an issuer is a grid operator, energy regulator or other (semi) public entity. The figures below (fig. 6-8) show the issuers active in 3 large and well established EAC schemes.

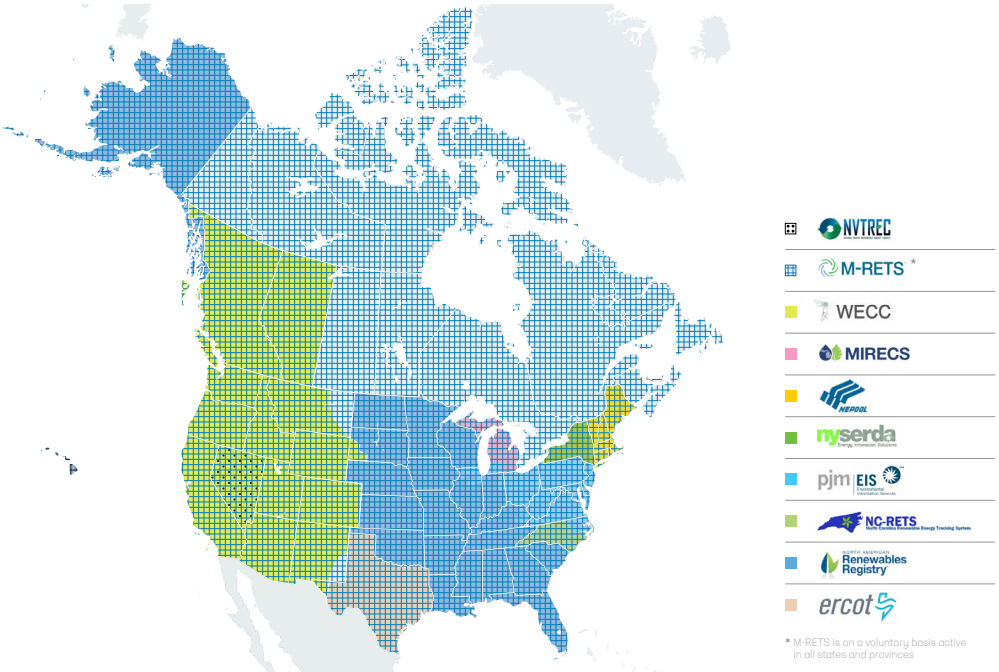

FIGURE 6: ISSUERS IN NORTH AMERICA

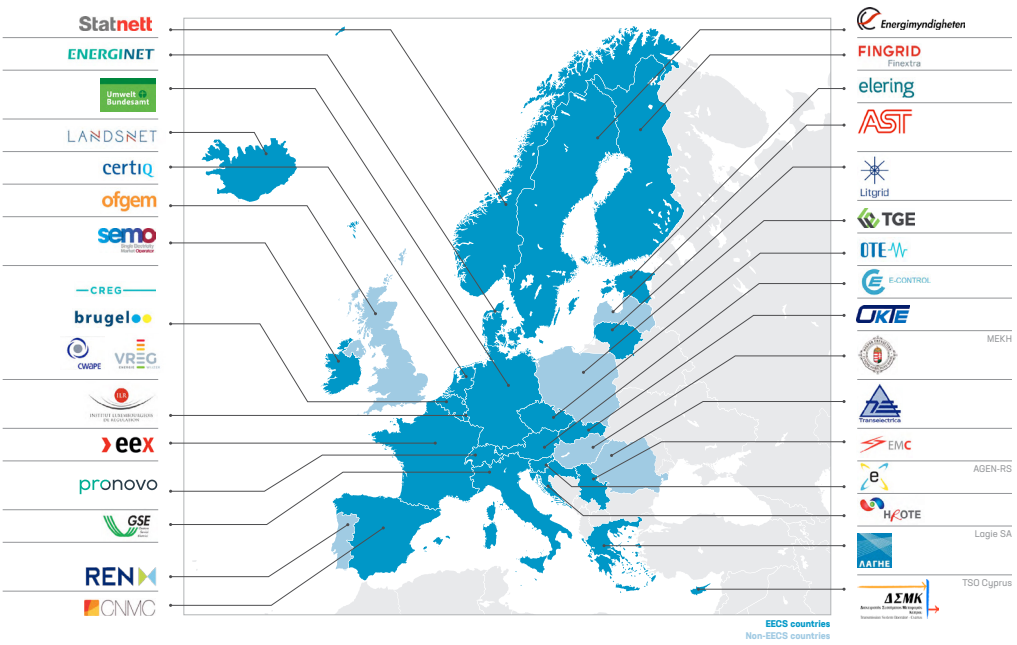

FIGURE 7: ISSUERS IN EUROPE

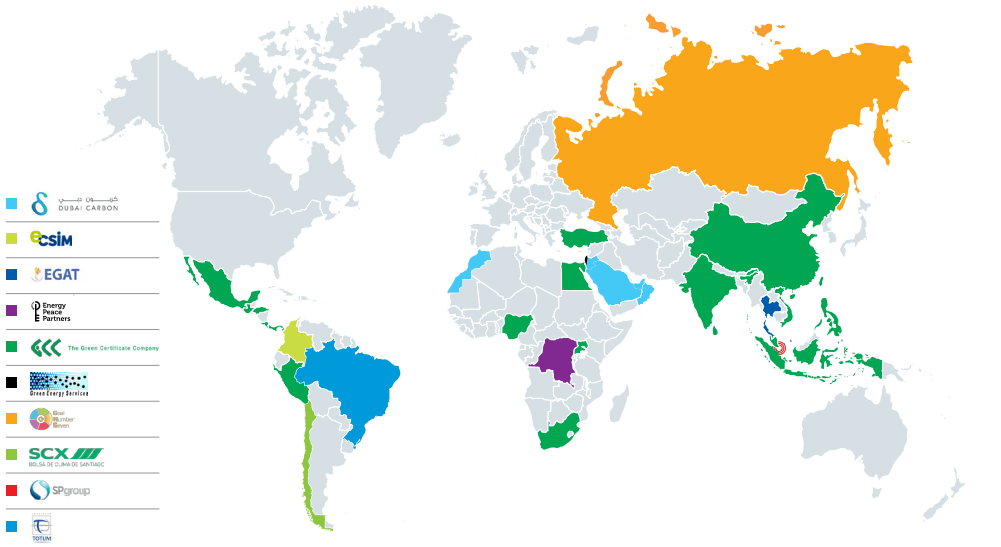

FIGURE 8: ISSUERS UNDER THE I-REC STANDARD

MARKET PLAYERS

GENERATORS/GENERATION PLANT OWNERS

These market players own generation plants or act on behalf of generation plant owners. These entities must register their devices on the Registry through the local Issuer and must comply with the rules and fees of the local Issuer. Once registered, these entities periodically send data to the local Issuer indicating their electricity output, and they receive EACs in return. The collection and management of this data must comply with the scheme's rules and should be available for audit. Registered entities will have an advantage over unregistered competitors – those entities not registered in the tracking scheme - by being able to receive and trade EACs and the resulting additional income that cannot be collected by these unregistered competitors.

ELIGIBILITY

As EAC schemes register facts of how a specific MWh was generated, all generation plants (all energy sources, grid connected or not) can be eligible for registration on an EAC scheme. EAC schemes are neutral, in that they do not make any judgement as to whether one source of energy is better or worse than another. Once an EAC is issued, end-users can choose what type of energy they want to consume, based on the information provided in the certificates.

Nevertheless, individual schemes may apply rules that limit issuance, for example by not issuing certificates to production devices that are not connected to a public grid, or that benefit from a public support scheme, or that do not produce renewable energy. Each scheme can develop different rules on the eligibility of a production device to be issued EACs.

COSTS

An overview of the issuance costs charged to generation plant owners operating under the EECS scheme and the I-REC Standard respectively can be found in the footnote [5,6].

THIRD PARTIES/TRADERS/BROKERS

Some proportion of both end-users and generators will not, and need not, engage in the details of how a given EAC scheme works. Instead, they can use a third party, also known as suppliers/traders/brokers, to act on their behalf. These third parties have extensive knowledge of how EAC schemes work and can support the trade of EACs between market participants.

3 Legal frameworks for EAC schemes

3.1 An introduction to EAC legal frameworks

The most developed EAC schemes are established within, and underpinned by, a legal framework. However, while a legal framework can strengthen an EAC scheme, it is not a prerequisite. This chapter introduces the legal framework of three internationally recognised EAC systems. Figure 9 below shows how legal frameworks can underpin EAC schemes.

Legislation or regulations can set the foundations of the scheme (lefthand green bar). The daily operation of the scheme is governed by the EAC system's standards (central green bar). The claims that are made based on the EAC scheme are governed by consumer claims standards (righthand green bar).

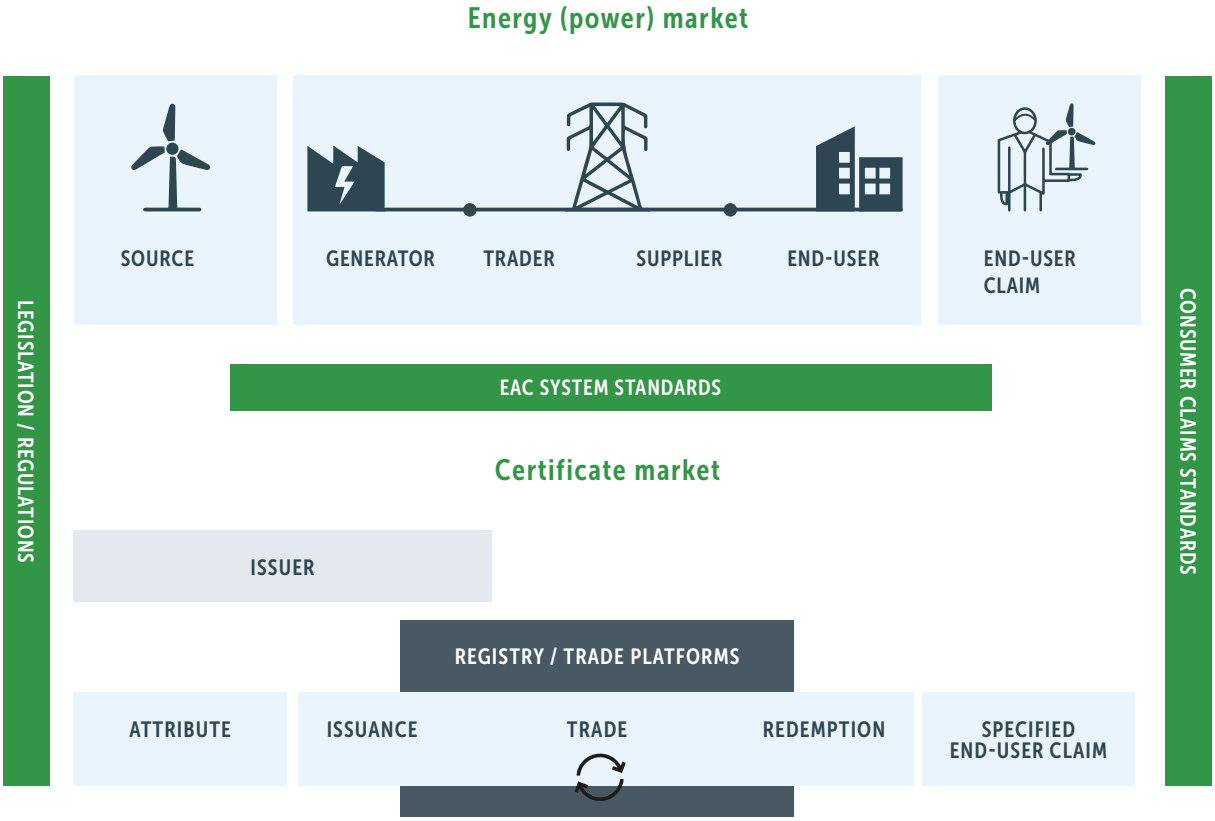

FIGURE 9: GRAPHIC REPRESENTATION OF EAC SCHEMES

5. https://www.aib-net.org/facts/aib-member-countries-regions/aib-member-tariffs
6. https://www.irecstandard.org/fee-structure-for-market-players/

3.2 US Renewable Energy Certificate scheme(s)

In the United States, EACs are known as Renewable Energy Certificates (RECs). Since Iowa enacted a law on alternative energy in 1983 [7] and since the first mention of certificate trading in 1995 [8] , much has changed in the US regarding renewable energy goals and how they are achieved. US REC schemes are governed at both the federal and state level.

FEDERAL LEVEL

U.S. FEDERAL TRADE COMMISSION

The U.S. Federal Trade Commission provides guidance on the use of environmental marketing claims. Paragraph 260.15 on making renewable energy claims states that any renewable energy claim must be matched by RECs. It further specifies that, "If a marketer generates renewable electricity but sells renewable energy certificates for all of that electricity, it would be deceptive for the marketer to represent, directly or by implication, that it uses renewable energy" [9],[10].

ENVIRONMENTAL PROTECTION AGENCY (EPA)

The EPA also recognises RECs as the only instrument through which renewable energy claims can be made. The EPA describes a REC as "a market-based instrument that represents the property rights to the environmental, social and other non-power attributes of renewable electricity generation" [11].

U.S. FEDERAL ENERGY REGULATORY COMMISSION (FERC)

The FERC states that energy contracts do not necessarily include environmental attributes unless this is specified in the contract or determined by state law. The FERC recognises that environmental attributes can be traded separately from the energy through RECs [12].

FEDERAL ENERGY MANAGEMENT PROGRAM (FEMP)

The FEMP operating under U.S. Department of Energy (DOE) also recognises that RECs "represent the environmental attributes of the power produced from renewable energy projects and are sold separately from commodity electricity" [13] .

OFFICE OF FEDERAL SUSTAINABILITY COUNCIL ON ENVIRONMENTAL QUALITY

The Office of Federal Sustainability Council on Environmental Quality states that each REC represents ownership of the environmental and other non-power attributes of one MWh of renewable generation and that they can be traded [14].

STATE LEVEL

A distinction can be made between States with voluntary REC Markets that allow the use of RECs and States with compliance REC Markets that require suppliers to ensure that a given proportion of the energy they supply comes from renewable sources in line with a Renewable Portfolio Standard.

COMPLIANCE MARKETS WITH RENEWABLE PORTFOLIO STANDARD (RPS)

30 US States, Washington D.C. and three territories have renewable energy targets in the form of an RPS that requires electricity suppliers to provide their customers with a stated minimum share of electricity from eligible renewable resources [15]. The individual states decide how ambitious their target will be and can limit the type of certificate that can be used to meet the standard – for example by only allowing certificates from energy generated in their state or neighbouring states. Some states also set a technology-specific sub-target, known as a carve-out. Measuring compliance towards these RPS targets is done through the trade and cancellation of RECs. Even in States where an RPS is in place, consumers can make additional purchases of renewable energy through the cancellation of RECs. These purchases of renewable energy that are over and above that which is supplied under an RPS are referred to as regulatory surplus.

VOLUNTARY MARKETS

A further 7 US States maintain voluntary REC markets. While these voluntary systems can differ slightly, they are all based on the cancellation of RECs to claim the use of renewable energy. They also follow the principle of RECs being separated from the underlying energy.

7. https://www.ncsl.org/research/energy/renewable-portfolio-standards.aspx / 8. https://www.epa.gov/greenpower/history-voluntary-markets
9. https://www.ftc.gov/sites/default/files/attachments/press-releases/ftc-issues-revised-green-guides/greenguides.pdf
10. https://www.ftc.gov/system/files/documents/plain-language/Environmental%20Claims%20Summary%20of%20the%20Green%20Guides.pdf
11. https://www.epa.gov/greenpower/renewable-energy-certificates-recs
12. https://resource-solutions.org/wp-content/uploads/2015/07/The-Legal-Basis-for-RECs.pdf
13. https://www.energy.gov/eere/femp/federal-site-renewable-energy-purchases-and-renewable-energy-certificates
14. https://www.sustainability.gov/pdfs/federal_rec_guide.pdf / 15. https://www.eia.gov/energyexplained/renewable-sources/portfolio-standards.php

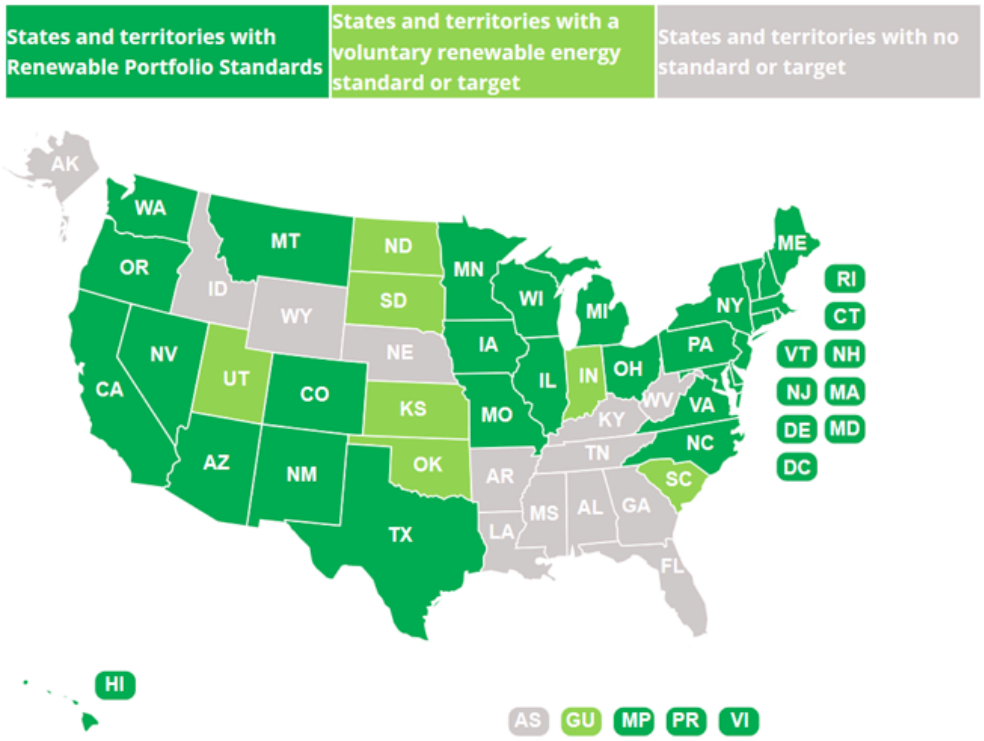

FIGURE 10 : OVERVIEW REC USUAGE PER STATE [16]

3.3 European Guarantee of Origin scheme(s)

In Europe, EACs are known as Guarantees of Origin (GOs). As in the United States, there are different levels of legal frameworks for European GOs. Unlike in North America, all European GO schemes are voluntary.

EUROPEAN LEVEL

In 2001, the European Union legislated for the development of GO schemes in a Directive on the promotion of the use of energy from renewable sources (2001/77/EC). GO schemes did exist in Europe before 2001, but functioned without a supporting EU legal framework. In the period since 2001, EU law on GO schemes has been developed through revisions of the Renewable Energy Directive. In 2009, the original directive was amended and subsequently repealed with Directive 2009/28/EC taking its place. This amended Renewable Energy Directive, known as RED-1, further specified the use of GOs by making them the tool through which suppliers must disclose information on the fuel mix they are delivering to consumers, as per the Internal Electricity Market Directive (2003/54/EC).

Despite providing this more robust legal basis for GOs, the RED-1 also states that GOs shall have no function in terms of a Member State's compliance with EU renewable energy targets.

EU law on GOs was further revised in 2018 with Directive 2018/2001, known as RED-2. This law further strengthened European GO schemes by declaring GOs to be the sole instrument for claiming the use of electricity generated from renewable sources. This directive extended the use of GOs from renewable electricity alone to all renewable energy sources and allowed for the issuance of GOs from all other energy sources [17].

NATIONAL LEVEL

EU law differs between regulations and directives. While regulations have binding legal force throughout every Member State, directives lay down certain results that must be achieved but leave each Member State free to decide how to transpose a directive into national law. This means that even under the RED-2, differences exist between the GO schemes of different EU Member States (and internal market countries to whom EU law also applies).

16. https://www.ncsl.org/research/energy/renewable-portfolio-standards.aspx
17. RECS International published a detailed analysis of EU law on GOs, : https://www.recs.org/news/guide-to-redii-article-19-implementation

These differences between schemes that are using the same GOs can lead to inefficiencies in the market. However, article 19.6 of the RED-2 states that GO schemes in the European internal market must comply with a European standard (CEN – EN 16325). This requirement should limit the differences between GO schemes. The standard is in the process of being updated (2019-2021) to reflect changes between RED-1 and RED-2.

SIGNIFICANT NON-LEGAL FRAMEWORKS

The Association of Issuing Bodies (AIB) is an umbrella organisation of European GO issuing bodies. Membership of the AIB is voluntary, and the AIB is not an EU body. However, the AIB's membership is now made up of issuing bodies from 24 EU Member States. The AIB and its members maintain and follow a highly developed GO scheme known as the European Energy Certificate System (EECS). The revision of the European Standard on GOs is closely related to the EECS rules. More details can be found under paragraph 4.3.

3.4 International REC Standard adherent scheme(s)

Due to the international nature of the I-REC Standard adherent EAC scheme(s), the legal footing varies from country to country. Due to the lack of an overarching authority in all these countries, the legal basis is often contractual rather than regulatory. In nearly all countries in which the I-REC Standard is in use, there has been approval from national authorities for the completion and facilitation of the market. In addition, many national authorities have authorised the use of the Standard in their respective jurisdictions through the appointment of an issuer. For some jurisdictions, there are REC Standards to which the I-REC Standard complies in order to facilitate the market in line with national regulations. As described, the broader legal footing within the I-REC Standard arises from the use of various legal agreements in hierarchial order.

STANDARD LEVEL

Unlike other EAC Standards which often focus on one form of energy, electricity, the I-REC Standard was designed to be energy neutral. In other words, the I-REC Standard was designed to enable reliable claims being made regardless of the specific energy type that was used. This was done by laying out definitions, basic principles and a general set of rules that apply to the tracking of any energy product, whether this be electricity, gaseous fuels, heating and cooling or other technologies. Subsequently, specific rules for the tracking of particular products, such as electricity, are written to ensure adherence to general principles, definitions and rules of the overarching Standard and ensuring a defined level of perceived quality as mandated by the I-REC Standard Foundation.

CODE LEVEL

A Code is the implementation document for the creation of a tracking system for a specific energy source, such as electricity. The code document [18] is subject to accreditation by the I-REC Standard Foundation board and must comply with the principles and requirements mandated in the Standard. The relevant code for this document is owned and operated by I-REC Services for the tracking of electricity RECs adherent to the I-REC Standard, I-RECs. This code regulates, among other things, what procedures and evidence must be completed for the registration of electricity generation plants, how legal ownership of I-RECs is regulated and how the issuance, transfer and redemption of these I-RECs must be executed on the registry.

NATIONAL LEVEL

An Issuer is responsible for the national implementation of a specific Code in line with local regulations. The implementation can be stakeholder led or implemented by national authorities in case the Issuer was appointed by a governmental body.

Prior to the acceptance of an organisation as Issuer, the board of the International REC Standard Foundation requires the potential Issuer, among other things such as a fee structure, complete a Local Working Instructions (LWI) that entails how the Code will be implemented within the relevant jurisdiction. The LWI gives clear guidance on what responsibilities the issuer has and how they will execute their tasks in line with the Code and, consequently, the Standard.

18. The Code document and Code Subsidiary Documents (CSD) can be accessed through https://www.irecstandard.org/facilitation-of-the-market/

This includes instructions on how to verify the authenticity of market players, what supporting documents (e.g. Know your customer regulations or verification reports on the device being registered or MWhs being generated) from production device owners are required and what checks needs to be done in line with nationally available data before the issuer is secured as to the underlying electricity for which certificates will be issued. The reason this must be written and regularly updated by the issuer on national level is that information systems, metering systems or national regulations can change the way these checks must be fulfilled to be compliant with the associated Code and Standard.

3.5 Non-standardised national systems

The legal framework of non-standardised national systems is often poorly defined or not in line with market player/end-user expectations. The lack of standardisation of national systems often leads to inconsistencies with sustainability standards or leads to difficult understanding of the relevant rights associated with the EAC scheme. National systems often use the same terms and concepts as internationally recognised standards, such as RECs, but often the similarities with standardised systems are limited to the use of the term itself. The functions behind those terms, such as an EAC scheme being an information system that facilitates reliable claims about one's energy usage, are often implemented in a way that can lead to unnecessary market restrictions or a lack of clarity on topics such as the legal ownerships of EACs and or the associated claims for which they should convey.

4 Further comparison of different EAC schemes

Chapter 3 highlighted the legal framework underpinning EAC Schemes in different countries, illustrated in the figure below in the green bar 'Legislation/Regulations'. This chapter focuses on the 'EAC system Standards' illustrated as the green bar in the middle of figure 11 below.

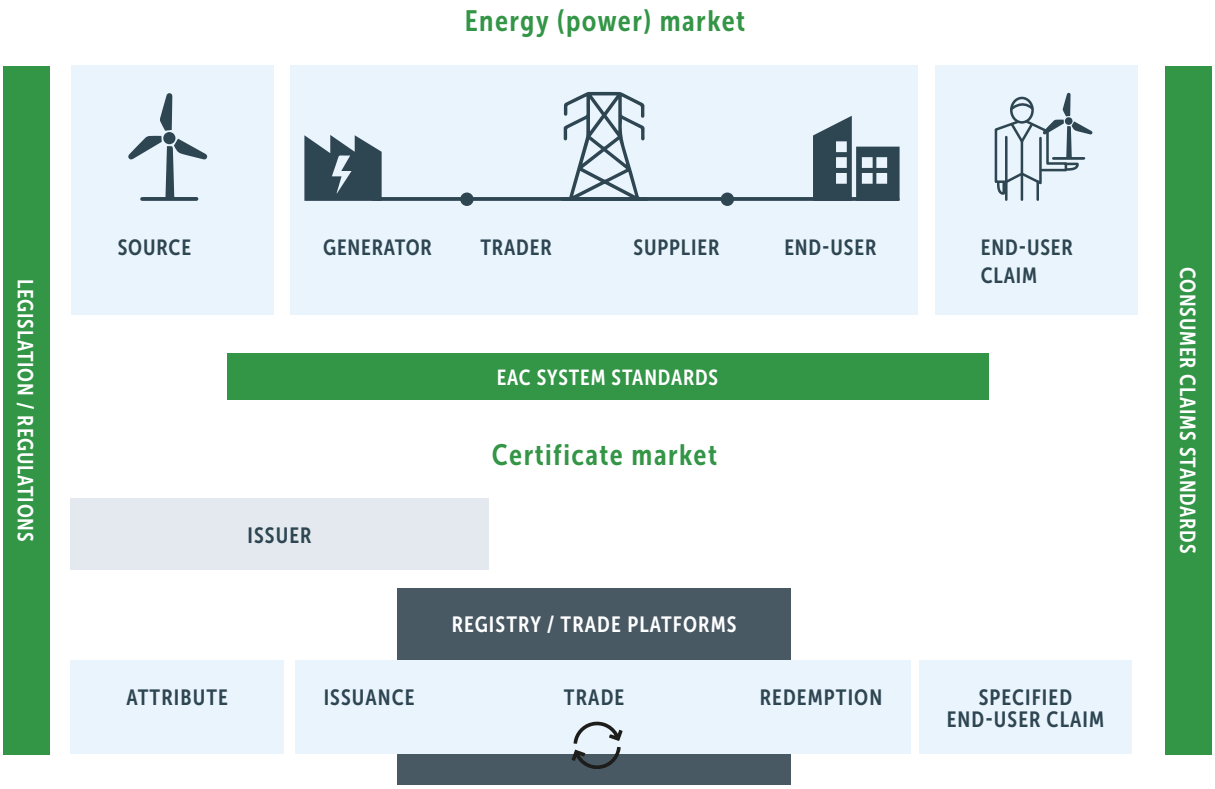

FIGURE 11 (REPEATED): GRAPHIC REPRESENTATION OF EAC SCHEMES.

4.1 Internationally (un)recognised Standards

As previously mentioned there are three internationally recognised EAC Standards that can be used for reporting under CDP and RE100. These standards are also accepted by the Green House Gas Protocol (GHGP) for Scope 2 reporting:

- US REC Standard as defined in various US legislative documents;
- EECS Standard maintained by the Association of Issuing Bodies (AIB), and;
- International REC Standard (I-REC Standard) written by the International REC Standard Foundation.

Beyond these internationally recognised standards, several countries have also established national standards. Given the number and variety of national standards, it is not possible to provide a blanket statement on their quality or robustness. Some may be as strong as the international standards, while others may be significantly weaker. There are however advantages to internationally recognised systems.

FACILITATES ENGAGEMENT OF MARKET PARTICIPANTS

The development of EAC schemes benefits from the positive engagement of market participants. This positive engagement is more likely to be achieved through the use of tried and tested internationally recognised systems. This is particularly the case for market participants with operations in more than one jurisdiction, who benefit from clarity and uniform rules between national EAC schemes. Multinational corporations are more likely to participate in a scheme that they understand and know they can use based on previous experience, than an entirely new national scheme that they would have to invest a significant amount of time to understand and verify the trustworthiness of. Internationally recognised schemes are also less likely to be subjected to undue influence by powerful market participants in a given jurisdiction.

Due to their multi-jurisdictional nature, these internationally recognised schemes also have greater liquidity, because greater volumes of EACs are available for trade and use between market participants.

This can contribute to the development of more stable and transparent prices than is often possible within stand-alone national EAC schemes. Greater and more predictable EAC market activity can also stimulate foreign direct investment in renewable energy developments in a country that adopts an internationally recognised EAC scheme.

REDUCES IMPLEMENTATION AND MANAGEMENT PROBLEMS FOR NEW SYSTEMS

The rules and regulations underpinning internationally recognised EAC schemes have been iteratively developed over 20 years. During that time, teething problems have been eliminated and these schemes have become very robust. Even when learning from this experience, new national systems risk repeating some of the early errors of internationally recognised systems. Such mistakes could reduce the effectiveness of a new national market. While there is no reason to completely reinvent the wheel of EAC schemes, it would remain possible for a new national scheme to base itself closely on an international scheme, and also make some adjustments to reflect national circumstances. In doing so, a national standard may develop an amended approach that could be picked up at the international level.

CAN REDUCE OR EVEN ELIMINATE COSTS AROUND IMPLEMENTING AN EAC SYSTEM

Because EAC markets function on trades between market participants, a voluntary market can be implemented based on an existing standard quickly, easily, and cheaply without the need for supporting national legislation. To set up a national compliance market would require some legislation and regulation to clearly define, for example, who must participate in the compliance market, with what objective they must comply, and how their compliance should be verified.

ATTRACTS OTHER STAKEHOLDERS IN THE DEVELOPMENT OF MORE RENEWABLES

The benefits of adhering to internationally recognised EAC standards also accrue to stakeholders who are not market participants. International Non-Governmental Organisations (NGOs), such as labelling organisations, benefit from common market rules and processes as this reduces the investment required to analyse an EAC scheme before deciding whether and how to interact with it.

Labelling organisations play an important role in EAC schemes. They promote the use of EACs with their label on it among end-users, which leads to an additional demand for EACs in general. They may also increase the value of some types of EACs because those to which a given label has been awarded may be worth more to end-users than an un-labelled EAC. This is because an EAC recognised by a labelling scheme will have met certain social or environmental criteria, branding it a more impactful purchase, a more sustainable choice and/or better in any other aspect the labelling organisation specifies. The approval of a labelling organisation for EACs adds value similar to when products such as wood, are labelled under a scheme such as the Forest Stewardship Council (FSC) or bananas labelled under the Fairtrade Foundation.

4.2 North American RECs

There is not one unified REC scheme in the US, but a series of different schemes that are developed and managed at the state level. While some of these schemes share rules and practices, others do not. Overall there is less standardisation between REC schemes in North America than schemes using GOs or I-RECs. As was seen in Figure 6 above, there are 10 different issuers in the US and Canada, each of which has a separate registry that operates in one or more state. Depending on the state's REC schemes, these registries are either used for RPS compliance market RECs, voluntary market RECs or both. Due to the lack of standardisation between REC registries, some only recognise RECs from their own states, while others only from a limited number of other states. Also, recognition is not necessarily mutual, which can lead to a situation in which registry A recognises RECs coming from registries X, Y and Z while none of these registries recognises RECs from registry A. Therefore, EAC schemes in North America contrast those in the EU because North America lacks the shared legal basis and interoperability that exists in Europe.

4.3 GOs and the EECS rules

The EU's RED-2, as described above, mandated that every EU Member State must have a functioning GO registry. However, while each renewable energy directive has further defined the requirements of national GO schemes, the latest directive is still not necessarily prescriptive in all cases and leaves significant room for the Member States to set the parameters of their EAC schemes. As a result, EAC schemes in the European internal market are only slowly moving towards greater standardisation. This has reduced the efficiency of trades of GOs between the Member States.

To address this lack of official standardisation, the Association of Issuing Bodies (AIB) created a voluntary set of rules that standardise the issuance, trade and cancellation of GOs under the name of the European Energy Certificate System (EECS). National registries can choose to become a member of the AIB and adhere to these detailed EECS rules. Market participants in member countries can trade more efficiently through a central hub maintained by the AIB, because their registries follow the same rules and processes. The EECS rules and related documents can be accessed through www.aib-net.org, the EECS rules are at https://www.aib-net.org/eecs/eecsr-rules and related documents are at www.aib-net.org/eecs/subsidiary-documents. In figure 7 above showing the European issuing bodies, the dark blue countries adhere to EECS rules and the light blue countries do not.

4.4 I-RECs under the I-REC Standard

As previously mentioned (paragraph 3.4), the legal footing is found in the hierarchial structure of documentation and regulations as organised by the International REC Standard.

The electricity Code adhering to the overarching I-REC Standard is similar to the EECS rules used in many European countries. Both sets of rules regulate everything between the registration of electricity production devices to the redemption of EACs. The electricity Code contains several documents including the main code document [19] and subsidiary documents [19] .

19. https://www.irecstandard.org/facilitation-of-the-market

4.5 Market boundaries

The rules concerning what EACs can be cancelled for the consumption of energy in a given geographical area are known as market boundaries rules. Such rules are generally set by third parties, such as RE100 or CDP and not by the EAC scheme itself.

From the perspective of EAC schemes, there is a general allowance for certificates issued within that scheme to be cancelled in any location to demonstrate the consumption of renewable energy in any market. This means that EACs issued to a production device in Lebanon could be redeemed for use in Lebanon, Jordan, Syria, or even Brazil. It is not the role of an EAC scheme to place a market boundary on the use of the certificates it issues. Rather, EAC schemes simply facilitate the issuance of standardized EACs that can then be used by market players to meet their energy consumption needs. However this does not mean that market boundaries do not influence the use of certificates among end-users.

Rules on market boundaries are instead commonly set by consumer claim standards. End-users can disclose their scope 2 emissions (emissions related to the consumption of energy that is generated off-site) using EACs to organizations such as CDP and RE100. To have these disclosures accepted, reporting must follow their rules and/or their guidelines. CDP and RE100 have both developed rules, which differ to some extent, to set market boundaries on the use of EACs. Typically, they require that reporting companies only use EACs issued for energy that was generated in the market for which they are consuming that energy. A market is generally limited to a country or legally defined economic area (e.g. the European Single Market). Some end-users choose to self-impose market boundary limits on their consumption as they are not comfortable saying that they are consuming renewable energy in one market, when the certificates they are cancelling to make those claims have been issued for energy that was generated in an entirely different market.

4.6 Technical requirements of EAC systems

Most EAC standards place requirements on the EAC systems as well as the organizations responsible for the operation of that system.

The organization responsible for the operation of an EAC system generally must provide evidence of the methods and tools used in the development, implementation and management of the system. Among other things, this includes the functional specifications, data flow diagrams, test reports, maintenance protocols, change control and source code management protocols.

Such systems must meet the needs of the scheme, and association standard, they serve. This means, in most cases, that the systems must provide an accurate, auditable and permanent record of the life cycle of all certificates on the tracking registry. There are also generally defined minimum requirements for adequate storage back-up and disaster recovery arrangements as well as requirements regarding data sharing, data protection and data storage.

Different functionalities must be developed for each Standard including the creation of various user functions (for example registrants, participants, issuers in I-REC specific terminology).

5 lessons learned from national implementation

5.1 National experience: The Netherlands

The Netherlands first introduced a voluntary EAC system in 2001, following requests from stakeholders. The Netherlands was one of the first countries to join a standardised European EAC scheme, which was a precursor to the current EECS system.

The stakeholder requests for a Dutch EAC scheme were primarily led by market players and electricity system operators who created RECS International[20], which had stakeholders from both groups in its membership, to advocate on their behalf. Therefore, the organisation decided to split its functions and governance, with market participants staying in RECS International and system operators creating the Association of Issuing Bodies. During this early period, RECS International had developed and maintained an EAC standard that was the basis for the voluntary Dutch market. The system was run by CertiQ as the issuer. However, the 2009 EU Renewable Energy Directive (RED-1) required EU Member States to replace independently established EAC schemes, such as the one in the Netherlands, with government-mandated schemes. As such, the Netherlands made the switch from its EAC scheme to the European GO scheme. The Dutch EACs and GOs accomplished the same purpose, the only difference was that the EAC scheme was an independent and voluntary instrument and the GO schemes, while still voluntary to use, is the required system in Europe for proving any end-user claim about the use of renewable energy.

As with all European internal market countries, the Netherlands must apply both EU and national law. In addition, as regards its EAC scheme, the Netherlands has voluntarily chosen to adhere to the EECS Standard, held by the AIB. This all means that the the Dutch EAC scheme is legislatively and structurally integrated into wider relevant Dutch law and systems. There are strong links between wider Dutch energy policy and practices and the use of EACs to track energy use and product choice. This integration helps to give Dutch consumers confidence that when they buy renewable energy their money goes to renewable energy producers. Indeed, thanks in part to its robust EAC scheme, the Netherlands has one of the highest uses of renewable electricity, on a per capita usage basis, of all countries in the world. An estimated 70% of Dutch energy consumers use renewable electricity. Due to this high demand, some 99% of renewables energy producers in the Netherlands request the issuance of guarantees of origin for their energy production.

The Netherlands continues to be a pioneer in the development of EAC schemes. A full disclosure scheme is one in which it is mandatory for market participants to prove the origin of all units of energy they consume through the cancellation of an EAC [21]. As of January 2020, Dutch electricity suppliers are obliged to prove the origin of all electricity they physically supply – a requirement known as full supplier disclosure.
This requirement means that consumers will know where every unit of the electricity they consume comes from, and will be able to make choices about their consumption based on that knowledge.

5.2 National experience: Thailand

As in the Netherlands, the Thai EAC scheme was introduced following local stakeholder requests. The Thai authorities chose to make the country's EAC scheme adherent to the I-REC Standard. The first I-RECs were issued in Thailand in 2017 and, as of today, there is more than 500MW of installed capacity registered with the International REC Standard and eligible to have I-RECs issued for its production. More than 50% of this installed capacity is solar - more than 50 separate registered production devices. The Thai I-REC market is growing by over 100% year per year.

Stakeholders continue to play a significant role in the development and growth of the I-REC scheme in Thailand. The I-REC Standard Foundation encourages the use of a national issuer of I-RECs, and in mid-2020 EGAT, the Electricity Generation Authority of Thailand, took over this role for the country. EGAT is the vertically integrated grid operator of Thailand and will now become the responsible entity for the facilitation of the country's I-REC based EAC scheme. As the vertically integrated operator, EGAT has been required to ensure independence in the facilitation of the market to ensure a fair, competitive environment for other organisations in the country. This has involved the International REC Standard Foundation making specific requirements, including that devices owned under the EGAT umbrella are registered by a different issuer for the same cost as EGAT charge local parties.

20. RECS International is now the leading non-profit organization supporting the understanding and development of EAC schemes around the world (www.recs.org)
21. For more details on full disclosure see https://www.recs.org/news/full-disclosure-2-pager

In addition, the I-REC Standard Foundation Secretariat provides increased facilitation and support for national market players. Within the Thai EAC scheme that is adhering to the I-REC Standard, Thai stakeholders such as PTT Public Company Limited are developing additional instruments that support local asset trading. PTT Public Company Limited is developing a platform, which will be in direct connection with the I-REC registry, through which Thai market players can directly purchase and redeem I-RECs without the necessity of having an active registration on the I-REC registry. This will be beneficial for, in particular, smaller end-users as it lowers the threshold to purchase renewables for all end-users.

5.3 National experience: Japan

Japan has had limited success with the introduction of reliable attribute tracking systems. The Japanese market is not adherent to an international standard and, despite attempts from the government, there have been significant failures in the introduction of a widely used mechanism to procure renewable electricity.

As a result, in 2020, many end-users are demanding renewable electricity that cannot be supplied because of a failure in government policy and a lack of adequate market infrastructures. The primary issue with Japan is that there is no single system through which renewables can be reliable tracked and consumed by end-users. In the past, there has been a Green Energy Certificate (GEC) scheme and a so-called 'J-Credit'. Neither of these schemes were in and of themselves EAC schemes, rather they were schemes owned by private organisations for different purposes [22].

Often the criteria for registration under the GEC or J-Credit schemes were so strict that very few production devices could adhere to the requirements. As such, GEC and J-Credit could be better compared to a label system and not a more neutral EAC scheme. Recognising these limitations, the Japanese government is introducing a new system, called the Non-fossil Certificate (NFC) scheme, that will largely make older schemes obsolete. The NFC was designed as a subsidy replacement mechanism in which the tracking of attributes was a secondary objective. The objective of primarily being a subsidy replacement mechanism undermines the ideals of an EAC by focusing on the financial aspects, rather than the information aspects, of a tracking instrument. It also limits the markets, as shown by the fact that NFCs can only be purchased via an auction organised by JEPX. A recent report[27] from RE100 acknowledges these issues and states clearly that "NFCs cannot be used as unbundled attribute certificates, as voluntary buyers cannot purchase certificates directly from JEPX." Beyond the fact that they cannot be used as attribute certificates, there are economic issues that make its usage impossible. As a result of the complex national market design and the lack of a reliable and robust EAC system, the Japanese renewable market is yet to succeed. This lack of success has resulted in significant end-user revenue not reaching renewable energy producers in the country and undermining the goal of the government to increase the percentage of renewable energy in Japan and reduce the financial impact of subsidy schemes.

6 Establishing an EAC scheme in Lebanon

Efforts to establish an efficient and well-functioning EAC scheme are more likely to succeed if a recognised international standard is used as the starting point and if the scheme is implemented in a step-by-step manner. It is essential to generate demand for EACs by building confidence in the scheme. This can be done, for example, by appointing a local issuer or a respected international issuer, and by keeping the market voluntary as Lebanese market participants become familiar with the scheme. Only once the voluntary scheme is well established and has the confidence of all stakeholders would we recommend making it a mandatory tool to achieve policy goals. Moving too far, too fast, risks overloading the scheme and crippling it.

22. https://www.there100.org/media.virbcdn.com/files/28/dcf62df1869a1abd-RE100JapanMarketBriefingJanuary2020-use.pdf for description of the GEC and J-Credit schemes.

6.1 Keep it simple

The recent Renewable Energy Outlook for Lebanon, published by IRENA in June 2020 [23], provides some insight which supports the development of a functioning EAC scheme in Lebanon. It highlights, for example, that Lebanon currently relies on gasoline, fuel oil, and gas oil, all of which are entirely imported – to the extent that fuel oil import costs account for nearly a quarter of the national budget deficit. Lebanon is already undertaking significant power sector reforms, and IRENA recommends a series of further reforms in its report. The country is also experiencing significant growth in energy demand since the population has grown from around 4 million in 2008 to over 6 million in 2017 owing to the influx of refugees from neighbouring countries. However, IRENA also notes that Lebanon has ample renewable energy sources that may be utilised to achieve the country's target of meeting 30% of total primary energy consumption (electricity and heating demand) from renewables by 2030.

Given these significant challenges and ambitious plans, it is particularly important, in the opinion of The I-REC Standard Foundation, for Lebanon to take a simple and stepwise approach to the introduction of an EAC scheme. The I-REC Standard Foundation is cognisant of how challenging it has been for policy-makers in countries around the world to implement strong local renewable energy consumption requirements for businesses or consumers. Therefore, The I-REC Standard Foundation advises that Lebanon seek to minimise costs and regulatory burden and maximise engagement from market participants, including MNCs. This approach has the greatest potential, we believe, to provide much-needed income and investment for renewable energy generators through the development of renewable energy installations and consumption of the energy they produce. Lebanon should do this by basing any Lebanese EAC scheme on an existing international standard, such as the I-REC Standard, and on making the scheme entirely voluntary in the short to medium term.

6.2 Market facilitation

ADHERING TO THE I-REC STANDARD

As stated above, The I-REC Standard Foundation recommends that Lebanon adheres to the I-REC standard. The International REC Standard Foundation (I-REC Standard) is a non-profit organisation that provides a robust attribute tracking standard for use around the world. This standard requires local stakeholders and government authorities to facilitate national implementation in adherence with local or national regulations.

Based upon the I-REC Standard codes and associated documents – the blueprints for the attribute tracking standard – I-REC independent and local issuers can implement robust and transparent attribute tracking schemes. This ensures high-quality tracking and adherence to best practices for the avoidance of double counting, double certificate issuance and double attribute claiming. The I-REC Standard governing board regulates the use of the I-REC code and associated documents. As a result, all decisions are made by the board of the non-profit organisation. As previously mentioned, the I-REC Standard also ensures that all the RECs issued nationally are completed in adherence with all major international guidelines and standards including the Greenhouse Gas Protocol Scope 2 Guidance, disclosure rules of the CDP and RE100 and the ISO on energy attribute tracking, amongst others.

The International REC Standard Foundation Secretariat is broadly tasked with supporting the development of new countries implementing EAC schemes adherent to the I-REC Standard. Nevertheless, the national process is always led by local stakeholders who are needed to provide information for a country report that goes to the I-REC Standard Foundation Board for approval[24]. At the time of approval, an issuer is chosen who will facilitate the development of the market. An EAC system based on the I-REC Standard can be implemented in a country at no cost and with minimal effort as long as the standard is followed without significant deviation.

23. https://irena.org/-/media/Files/IRENA/Agency/Publication/2020/Jun/IRENA_Outlook_Lebanon_2020.pdf
24. I-REC Standard country reports are available through the I-REC Standard Foundation website: https://www.irecstandard.org/

ROLE OF BLOCKCHAIN IN ATTRIBUTE TRACKING

A number of projects seek to use blockchain technologies to further develop energy attribute tracking [25]. RECS International has published a detailed paper on blockchain and energy attribute tracking.The paper was developed through questionnaires and phone interviews with market participants using blockchain technologies to offer energy attribute tracking products.

'Blockchain' is a broad term that describes a method of data storage. More specifically, they are distributed ledger technologies - spreadsheets (ledgers) that are held, replicated, and synchronised on different nodes (computers). The best-known distributed ledger technologies (DLT) are public ones, like those which support cryptocurrencies. Perhaps counterintuitively, the more public a DLT is the more secure it is. This is because in public ledgers the data can be held on more computers, reducing the risk of data loss, and can be verified by more users, increasing the verification of data. More private, or permissioned, distributed ledgers grant permission to a limited number of users to work on them. This means that the data can be handled more flexibly, even being corrected if necessary. However, it also reduces the transparency and security upon which distributed technology ledgers have made their name as there is not "neutral" external verification of the claims made. In the end blockchain is less about a process of creating data and is more about the way in which that data is stored. It should be noted that EAC schemes also use secured databases to hold EAC data. There is no reported case of these existing secure databases being compromised. It can be asked, therefore, what is the 'problem' that using DLTs in attribute tracking would solve.

In particular blockchain systems for attribute tracking are defined as "asset-based blockchains" and are fundamentally different than asset-free blockchains such as those used for cryptocurrencies. Such currencies do not rely on an underlying asset for their creation, rather the block is in and of itself the commodity. In contrast, asset-based blockchains for energy tracking are reliant upon the creation of a MWh of electricity as the basis for the block's creation.

Blockchain related attribute tracking systems can provide a potential refinement of established national or regional systems. However, as they add a degree of complexity, they should only be instituted/ allowed within schemes that are already based on robust practices such as GO, RECs, and the I-REC. It is only appropriate to add blockchain projects in energy tracking systems/markets where a clear local framework is in place based on national legislation and/or internationally recognized standards, such as the EECS Standard or I-REC Standard. Where blockchain projects can build on and add value to existing attribute tracking systems they could be supported as long as they adhere to well established market norms and practices.

THE ROLE OF THE ISSUER AND POTENTIAL ISSUERS FOR LEBANON

Several organisations in Lebanon could take on the role of the national issuer, which is explained above. There are two types of issuers: 1. The central issuer for the I-REC Standard, the Green Certificate Company (GCC) [26] performs this role for many I-REC authorised issuance countries [27], and could do so for Lebanon; 2. a local issuer (either a local governmental or non-governmental organisation) that is mandated to do this for the local market. The I-REC Standard, as stated above, recommends using a local issuer as it contributes more to a local economy, and can improve acceptance and understanding of the scheme. However, the I-REC Standard also recognises that selecting a local issuer and training them to execute the role requires time and effort. As such, Lebanon could choose to have GCC perform this function while the market is being established before having a local issuer take over as and when this is possible. In such cases, the GCC can prime the market and then withdraw to allow a new local issuer to take over a functional and profitable local system. The criteria for a local issuer are as follows:

ISSUER INDEPENDENCE

The local issuer is a market facilitator, not a market player. This means that the Issuer must be an independent party that is not actively involved in the generation, purchase, sale or trade of I-REC certificates.

25. https://www.recs.org/news/recs-publishes-opinion-paper-on-blockchain
26. https://gcc.re/
27. https://www.irecstandard.org/world-map

FEES LEVIED BY THE ISSUER

The Issuer has the right to levy fees on those registering production devices or requesting I-REC issuance (I-REC 'registrants'). These fees must be negotiated together with the I-REC Standard. The local issuer can determine the best strategy for setting issuance fees. In some countries, it will be logical to consider a cross-subsidisation strategy between registration and issuance fees to allow for the participation of smaller production devices on the market for little or no price.

CONTACT PERSON

It is important that the I-REC Standard board and the I-REC registrants have a single point of access and contact with the local issuer. Usually, this means there will be an individual within the local issuing organisation that has the authority to conduct issuance services on behalf of the local issuer, access the I-REC registry and answer client questions. This person also informs the I-REC Standard board of changes in legislation and activity in the market. The major benefit of a local issuer is they are local representatives of the market. It is also considered beneficial that a local organisation can benefit economically from the development of a new national EAC market.

POTENTIAL LOCAL ISSUERS FOR LEBANON

The I-REC Standard Foundation has identified four organisations who could take on the role of the local issuer in Lebanon:

- Ministry of Energy and Water (MEW)
- Electricité du Liban (EDL)
- LIBNOR (Lebanese Standards Institution)
- The Electricity Regulatory Authority (ERA)

When a country adheres to the I-REC Standard, the I-REC registry is made available at no cost. The registry is used by issuers and market players and can provide relevant information on the use of the market to local government officials upon request.

6.3 Legislative requirements

As is set out above, it is recommended to introduce a voluntary EAC scheme in Lebanon, at least in the first instance. This would require no national legislation.

If Lebanon seeks to introduce a mandatory EAC scheme, then significant legislative acts would be needed. The I-REC Standard Foundation could provide advice on such legislation, but would not be able to develop the legislation on behalf of local lawmakers.

6.4 The role of stakeholders

As mentioned above, the engagement and support of local stakeholders are critical to the success of an emerging national EAC scheme. It is particularly important to secure the understanding and interest of local producers so that they request the issuance of EACs for their production. Without these requests for issuance, there can be no trade of EACs. It is also important to motivate energy consumers in Lebanon to buy EACs to prove that they are consuming renewable energy. The first buyers could be international organisations with operations in Lebanon who are committed to buying 100% renewable energy across their business, but who have not been able to buy Lebanese renewable energy before the introduction of the EAC scheme.

Focusing on these groups of consumers early in the life of a national EAC system can create a positive cycle of renewable energy production receiving EACs → which are sold to multinational corporate consumers → which generates a new income stream for renewable energy producers → which can then be invested in the development of more renewable energy capacity.

7 Further contact

UNDP officers can contact the secretariat of the International REC Standard Foundation **secretariat@irecstandard.org** to clarify sections of the report or to discuss the content of the report.