

White Paper

Understanding and creating impacts with Renewable Energy Certificates

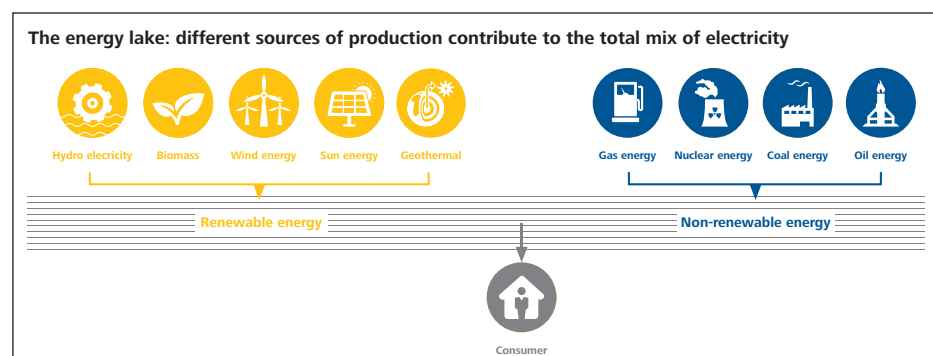
Renewable energy is at the top of corporate and political agendas. Companies wish to mitigate their exposure to energy risk and play an active part in the energy transformation taking place in our society. A transformational shift is taking place, with major corporates such as [Microsoft](#), [Google](#) and [ING](#) joining the [RE100](#), a global initiative of influential businesses committed to 100% renewable electricity. Other initiatives, like the “Corporate Buyers’ Principles” and the “Breakthrough Energy Coalition” - launched at the COP21 Paris climate conference by [Bill Gates](#), [Mark Zuckerberg](#) and [Sir Richard Branson](#) - further cement the importance of sourcing 100% renewable energy for progressive companies wanting to get #readyfor2020, secure future business and help the planet.

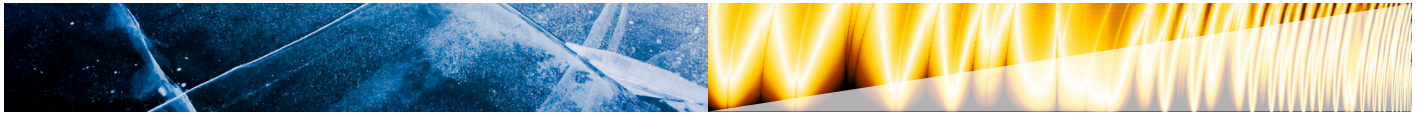
Despite there being a great deal of discussion around sourcing and using renewable energy, how this is actually done remains an enigma to many. When drawing electricity from the plug, we usually do not know where and how the electricity was produced. It might be coming from sources as diverse as nuclear power, burning coal, or hydropower, prompting consumers to question the origins of their electricity. With the topic of renewable energy high on corporate and public agendas, appropriately identifying electricity sources has become a necessity.

Where does produced electricity go and what is a renewable energy certificate (REC)?

When electricity is produced it is fed into the network and becomes part of the “lake of energy”. Figuratively speaking, this lake is like a reservoir for the entirety of the produced electricity. In this context, no distinction is made on the source of electricity: renewable energies (e.g. wind, solar energy, hydro and biomass) feed the lake just like nuclear power and fossil fuels do (e.g. oil, natural gas or coal). However, the electricity generated by renewable energy sources also holds a so-called ecological added value. A wind farm, for instance, emits a lot less CO₂ than a coal-fired power plant. A hydroelectric power plant with a fish passage does more to protect the local ecosystem when compared to a hydro dam project.

But how can customers get hold of this added value if they are only able to have access to power via the large “lake of energy”? The answer lies in the concept of the proof of origin. For each megawatt hour that a power plant- either conventional or renewable- feeds into the electricity network, a proof of origin is issued. Proofs of origin of electricity generated by renewable energy sources are called “**Renewable Energy Certificates**” (RECs) and in Europe these are called renewable energy “**Guarantees of Origin**” (GoOs). A REC represents the property rights to the environmental, social, and other non-power qualities of renewable electricity generation (Source: [EPA](#)).





A REC lifecycle

The regulations for RECs vary from country to country. However, the lifecycle of RECs – such as the issuance, transfer, export/import, retirement or expiry – is similar across various REC schemes and can be summarised as follows:

A power station has to be certified before it can produce RECs. A certifying body such as an accredited auditor carries out the inspection of the power plant. Once a power plant is certified, it can report the production of electricity to an issuing body. The issuing body controls the production and issues one certificate for each megawatt-hour of electricity delivered to the grid.

The information about these certificates includes attributes such as the power plant ID and the production period of the electricity. They are credited to the producer's account in the national, regional or international registry. As soon as the RECs are issued to the producer's account, they become tradable.

The registry makes sure that transactions are performed correctly and avoids double counting. No certificate can be issued or cancelled more than once for the same megawatt of electricity. A trading company can buy the RECs from the producer and transfer them to their own account. The trading company will then cancel the certificates in the name of a consumer or sell them to someone else.

Canceling certificates means that they will be permanently retired and cannot be used elsewhere. When an entity has consumed one megawatt-hour of electricity, it will need to cancel one REC to claim the use of renewable energy. To confirm the cancellation of a certificate, the consumer receives a receipt. Unused RECs expire.

The life span of RECs are restricted and vary from country to country. In general, RECs often expire after one year. After a certificate expires, it becomes invalid and can no longer be cancelled. Utilities also buy RECs from producers. Utilities cancel RECs to disclose their energy mix to their clients. The consumers will then typically receive this information in their energy bill.

Many countries, many RECs



In Europe, the European Energy Certificate System (EECS) oversees 21 national schemes governing GoOs. National registries are connected with each other through an infrastructure that is operated under the Association of Issuing Bodies (AIB). This infrastructure enables the import and export of GoOs from and to other national registries. The EECS currently has 21 schemes connected to its infrastructure. A Swiss utility could therefore purchase and import GoOs from hydro sources in Norway to offer 100% renewable energy in Switzerland, even though the local energy mix in Switzerland includes nuclear power.

In the USA, RECs are issued, traded and retired in 9 different [electronic tracking systems](#) that partly reflect regional electricity grids available in the USA. Some registries are interconnected with each other while others are not.

National REC schemes also exist in various countries: The Japanese Green Energy Certificates (GECs) are issued under the Japanese Green Power Scheme, South Africa has a voluntary zaRECs scheme developed in accordance to EECS rules, Brazil launched the “Certificado de Energia Renovável” scheme in 2012, Australia has a voluntary program called GreenPower underpinned by Large Scale Generation Certificates, and finally India runs Renewable Purchase Obligation Schemes with RECs.

Finally, for other countries, mainly developing countries or countries with economies in transition, two global REC standards are applied: the International REC Standard and GoldPower.





What are eco-labels and how do they relate to RECs?

Eco-labels are labels that help in providing additional information on RECs. RECs typically disclose the energy source, production period, plant ID, plant location and type, capacity of the plant, the associated support schemes, date on which the facility became operational, the date and country of issue, as well as a unique identification number. For certain consumers, these attributes are not sufficient and they require additional information. They may not just want to purchase certificates solely from renewables, but from renewables with special attention to ecological friendliness. This information is missing on the certificates and this is where eco-labels can add value.

Eco-labels certify power plants with additional attributes not present in the original certificate. One could think of an eco-label as being an annex of a certificate. Consequently, a power plant wishing to issue labeled certificates has to fulfill additional requirements. Therefore, labeled certificates are sold for a higher price to premium customers. While some labels focus on additional ecological attributes, others are only certifying renewable power plants with a certain maximum age or emphasis on other qualities. In Europe, the most popular eco-labels are Naturemade (basic and star), TÜV SÜD EE+ label, EkoEnergy and OKPower. In North America, Green-e is the mostly used eco-label, while GoldPower is the first eco-label for developing countries.

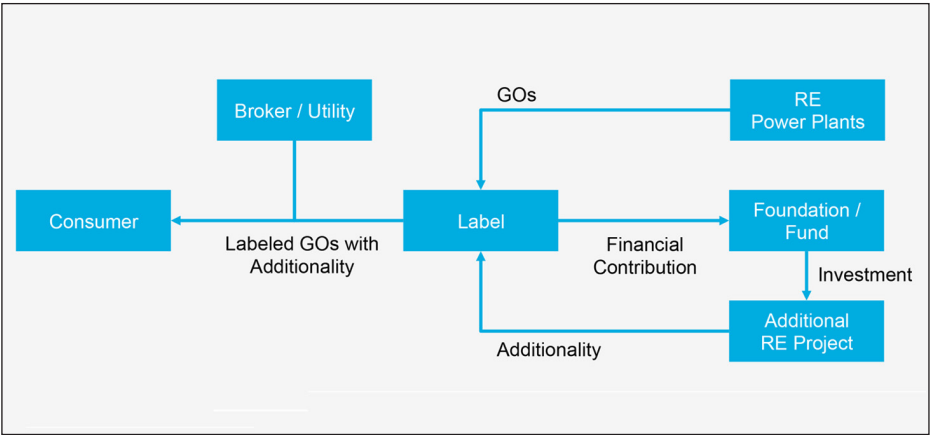
How to make an impact with RECs: The concept of additionality



In many established RECs markets, such as the European system, the demand for renewable certificates was lower than the supply in recent years. Due to an oversupply of renewable energy certificates, there is no market incentive to build additional capacity from renewables. Furthermore, purchasing and cancelling certificates does not reduce greenhouse gas emissions, because the physical mix of electricity remains the same. This drawback will continue to exist until the demand of RECs is higher than the supply. In this scenario, the undersupply of RECs results in higher REC prices, which create a market incentive to build new renewable power plants. The share of renewable energy in the grid will increase and as a result, the average emissions resulting from power production will decline. In this context, the concept of “additionality” is of utmost importance.

We define additionality as an attribute of a REC that promotes the development of new renewable energy projects. In other words, funds from renewable energy purchases lead to the generation of energy that would not otherwise have been generated. There are however structures that address this problem in four ways:

- 1 Through a **fund model**, a defined portion of the eco-label price paid by the purchaser is reinvested in new renewable energy plants. As shown in the figure below, for each certificate, a part of the revenue is contributed to a fund. The fund is only invested in projects that would not have been realised without the particular investment. This model is applied for example by TÜV SÜD EE01 and EKOEnergy GoOs (marked as GOs in this diagram):





- 2 When applying restrictions on the **maximum age of the plants**, an eco-label only supports renewable power plants that are new or that have been recently constructed. Only “young” power stations will receive a share of the premium paid by consumers. When a power plant passes the age limit, it will have to resign from financial incentives. The funds then go to other newly built renewable power plants. This model is applied by Green-e and GoldPower, TÜV SÜD EE01 and OK Power (with restrictions from 6 to 14 years of plant age).

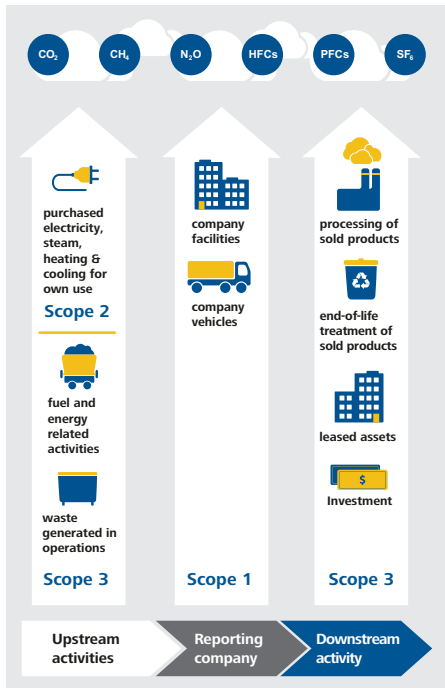
Example: Power Plant Age max 3 years	2015	2016	2017	2018	2019
RE plant “A” build in 2013		◆ End of support for plant A, new “additional” RE project supported for 2016.			
RE plant “B” build in 2015				◆	
RE plant “C” build in 2016					◆

For example: TÜV Süd EE, OK-Power Händlermodell

- 3 When RECs are generated by renewable energy plants that were certified as “additional” by a third party auditor, as well as the Gold Standard Foundation and or the UNFCCC, the certification is obtained only once the power plants show that they would not have reached financial closure without the revenues from the sale of environmental attributes. **GoldPower**, for example, applies this model.
- 4 Big corporations or communities can build their own renewable power sources with **direct investments**, or they can source electricity with Power Purchase Agreements (**PPAs**). When a company signs a renewable energy PPA, bundled with RECs, for a long term (5-15 years) with the owner of a new or recent renewable energy plant, it effectively contributes to the emission reductions of that specific plant. Similarly a company can provide equity or loans for the construction of a new renewable energy plant at or nearby its premises and thus become the owner of the resulting RECs and electricity. However, bundled PPAs and direct investments are more risky, difficult to negotiate and require higher liquidity than purchases of unbundled high quality RECs and eco-labels. Additionally, setting up PPAs is not the core business of companies wanting to source renewable energy. That is why some of them refrain from deciding for this option.



Reporting renewable energy purchases



Once companies purchase renewable energy they typically have an interest to report such purchases under existing sustainability frameworks. Below we evaluate how such purchases can be reported under the GHG Protocol, CDP and RE100:

The **GHG Protocol Scope 2 Guidance** released in January 2015 states that the reporting of renewable energy purchases must be done under two methods: the location-based approach and the market-based approach. Utilities selling renewable energy to their clients must back-up their renewable energy claim with RECs or other eligible contractual instruments. Under the so-called market-based approach, the electricity matched with contractual instruments -such as RECs- can be reported with emission factor zero, as long as these instruments meet eight quality criteria. The quality criteria are listed below.

The geographic location of eligible instruments (Criterion 5) is prone to various interpretations. After discussing with the [World Resource Institute](#), the entity in charge of the GHG Protocol Guidance, we sum up this criterion as follows:

- Guarantees of Origin: GoOs from any country connected to European Energy Certificate System can be used to match electricity consumption anywhere in Europe
- North American RECs: RECs from anywhere in USA/Canada can be used to match US/ Canadian electricity consumption
- International RECs: I-RECs generated anywhere in a region (e.g. Asia, Latin America) can be used to match electricity consumption in that region
- GoldPower: GoldPower RECs generated in same country of electricity consumption or from a country, which is grid-connected to the place of electricity consumption
- National REC schemes: country-by-country match, hence Brazilian RECs to match electricity consumption in Brazil, Indian RECs in India etc.

Table 1 Scope 2 Quality Criteria

All contractual instruments used in the market-based method for scope 2 accounting shall:

1. Convey the direct GHG emission rate attribute associated with the unit of electricity produced.
2. Be the only instruments that carry the GHG emission rate attribute claim associated with that quantity of electricity generation.
3. Be tracked and redeemed, retired, or canceled by or on behalf of the reporting entity.
4. Be issued and redeemed as close as possible to the period of energy consumption to which the instrument is applied.
5. Be sourced from the same market in which the reporting entity's electricity-consuming operations are located and which the instrument is applied.

In addition, utility-specific emission factors shall:

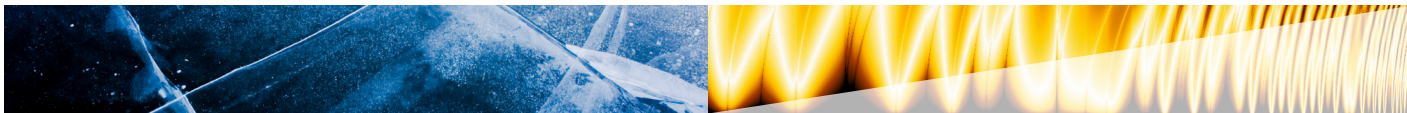
6. Be calculated based on delivered electricity, incorporating certificates sourced and retired on behalf of its customers. Electricity from renewable facilities for which the attributes have been sold off (via contracts or certificates) shall be characterized as having the GHG attributes of the residual mix in the utility or supplier-specific emission factor.

In addition, companies purchasing electricity directly from generators or consuming on-site generation shall:

7. Ensure all contractual instruments conveying emissions claims be transferred to the reporting entity only. No other instruments that convey this claim to another end user shall be issued for the contracted electricity. The electricity from the facility shall not carry the GHG emissions rate claim for by a utility, for example, for the purpose of delivery and use claims.

Finally, to use any contractual instrument in the market-based method requires that:

8. An adjusted, residual mix characterizing the GHG intensity of unclaimed or publicly shared electricity shall be made available for consumer scope 2 calculations, or its absence shall be disclosed by the reporting entity.



The **CDP Climate Performance Leadership Index** lists companies that excel in combating climate change. CDP has fully incorporated the GHG Protocol Scope 2 criteria into their own [guidance](#) published in December 2015. Renewable energy contractual instruments reported under the market-based method can be included as emissions reductions activities. Thus, contractual instruments such as RECs will help reduce Scope 2 emissions and obtain higher scores in the CDP Carbon Performance Leadership Index.



The Technical Criteria by **RE100** define what counts as 100% renewable electricity for the purpose of participation in the RE100 campaign. The criteria can be revised based on inputs of RE100 signatories, among others.

Specifically, for utilities' green products the Technical Criteria require electricity suppliers to purchase and retire RECs on behalf of the company making the claims. In countries where no tracking systems are available, the transfer of attributes shall be specified in a contract or via an alternative system that ensures claims are unique and there is no double counting of attributes.

For unbundled REC purchases, the Technical Criteria state that: "Companies can claim the environmental benefits of renewable energy production by acquiring electricity attribute certificates issued by renewable electricity generators operating within the same market boundary as the claimant. Companies may purchase unbundled certificates like RECs (North America), Guarantees of Origin (Europe) and I-RECs (other regions) separately from electricity to match with their electricity consumption from non-renewable sources."

As the market boundary is not defined, it can be assumed that the same definition as for Criterion 5 of the GHG Protocol above applies for RE100.

Consumers want it green

According to a survey of consumer attitudes towards energy by [Vimentis](#) from 2011, 53% of the participants considered environmental compatibility as the most important criterion concerning energy, followed by security of supply. However, only 10% mention "low price" as the most important criterion. According to a study regarding consumer expectations in terms of green energy and subsequent consequences for green energy labels, conducted by [Forsa](#) in Germany, in 2011, 69% of those polled stated the purchase of green energy should lead to an increase in new facilities, in order to make the share of renewable energy grow. In short: electricity still comes from the plug – but a growing number of customers want to make sure that it has entered the plug in a climate friendly manner. Companies willing to invest in renewable energy do well to report and communicate their engagement to the above mentioned sustainability frameworks, their customers, as well as other stakeholders, in order to derive maximum benefit for their organisation.

