

# The supply & demand of certified European renewable electricity



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## Introduction

Some stakeholders consider the market for certified European renewable electricity generation to be chronically, perhaps even structurally, oversupplied and therefore not living up to its potential. From this viewpoint, they suggest that the market will struggle to fulfil its mission of supporting an acceleration of the energy transition because certificate prices are too low to encourage new investments in renewables.

This received wisdom can be challenged for three reasons. Firstly, markets for certified renewable energy are not only about providing income to producers that can be invested into new generation capacity; they are also about giving information that allows consumers to decide what kind of electricity they want to use. Secondly, the gap between supply and demand has shown consistent signs of narrowing in recent quarters, particularly in the wind and solar sectors, to the extent that a structural shift may be taking place. Thirdly, there are clear ways of further boosting demand for certified renewable energy, including the implementation of full disclosure schemes, possible incentives for buying certified renewable energy, and even the introduction of compliance markets.

This positive outlook should nevertheless be tempered by the fact that uncertified, latent, renewable electricity supply remains in the European power system. In 2018, while over 700 TWh of certified renewable energy was consumed through Guarantees of Origin (GOs) more than 500TWh of generation went uncertified. Non-certification can occur for both market and regulatory reasons. Generators may not request the issuance of GOs for their electricity if they do not think the price, they can secure is worth the effort of obtaining and marketing the potential GOs. This latent supply could come into the market if prices start to rise but would thereby temper the rate of such price rises.

Separately, some EU Member States choose not to issue GOs to generators who benefit from a public support scheme such as a feed-in tariff. This is possible under the current EU Renewable Energy Directive (RED-2). However, in July 2021 the European Commission published a proposal to revise this directive into a new RED-3. The main proposed change to article 19 on GOs is to require the issuance of GOs to all generation, whether it benefits from a public support scheme or not. This proposed law will be debated in both the European Parliament and European Council before the three institutions come back together to decide on the final law. The process could take around 2 years, and even when the final law enters into force it would likely include an implementation period during which Member States have a further period to transpose it into national law. Therefore, if all renewable generation were to be certified with GOs, the market would have plenty of time to adjust.



Therefore, with tentative signs that the GO market is shortening, and recognising that there is more potential supply available, the goal of increasing demand remains crucial to boosting GO markets. This paper will show that GO markets are dynamic, evolving, and increasingly important for supporting renewables. However, it also recognises that the GO market will need demand to continue to grow if it is to achieve true equilibrium with supply and deliver GO prices that can more effectively support and sustain an accelerated energy transition.

## Key findings

RECS International has described the basic aims of certified renewable energy markets elsewhere<sup>1</sup>. Therefore, this paper presents data for the supply and demand of certified renewable electricity which shows that:

1. While the overall market for *certified* renewable energy in Europe has been historically oversupplied, it is now **coming into balance**.
2. **Certified supply only outstrips demand for some renewable energy, most notably hydropower**, the oldest renewable energy technology, and the largest block of installed renewables capacity in Europe.
3. **Wind and solar GOs are in strong demand**, to the extent that demand for power from these new technologies now outstrips certified supply.

While recognising some cause for caution given that certified supply will likely continue to rise, there are also reasons for optimism. Voluntary demand continues to grow<sup>2</sup>, not least because of growing recognition that GOs form the basis of all reliable claims and renewable Power Purchase Agreements<sup>3</sup>. In addition, regulatory changes, such as the growing use of full disclosure can support the active choice of consuming renewables.

While breaking down the European certified renewable energy market, this paper still looks at the large aggregated market segments of hydropower, bioenergy, wind, and solar power. Some specific certified renewable energy products have been in high demand for some time, such as Dutch wind power. This high demand has led to Dutch wind being consistently the highest priced form of European certified renewable energy – often valued 10 times higher than Nordic hydropower. This difference alone shows the potential positive impact of consumer demand for sources of renewable energy.

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1 [www.recs.org/public-information/](http://www.recs.org/public-information/)

2 <https://balkangreenenergynews.com/record-high-demand-for-guarantees-of-origin-in-2020-in-eu/>

3 <https://windeurope.org/newsroom/news/guarantees-of-origin-are-key-to-a-cost-effective-energy-transition/>



## Background

The European Guarantee of Origin (GO) market is often described as ‘oversupplied’ or ‘long’, meaning that there is more renewable energy for sale in the form of energy attribute certificates being offered by suppliers or producers than consumers are interested in buying. An oversupplied product, for which there is more supply than demand, loses value as producers and traders must lower their prices to compete for the relatively limited number of interested consumers.

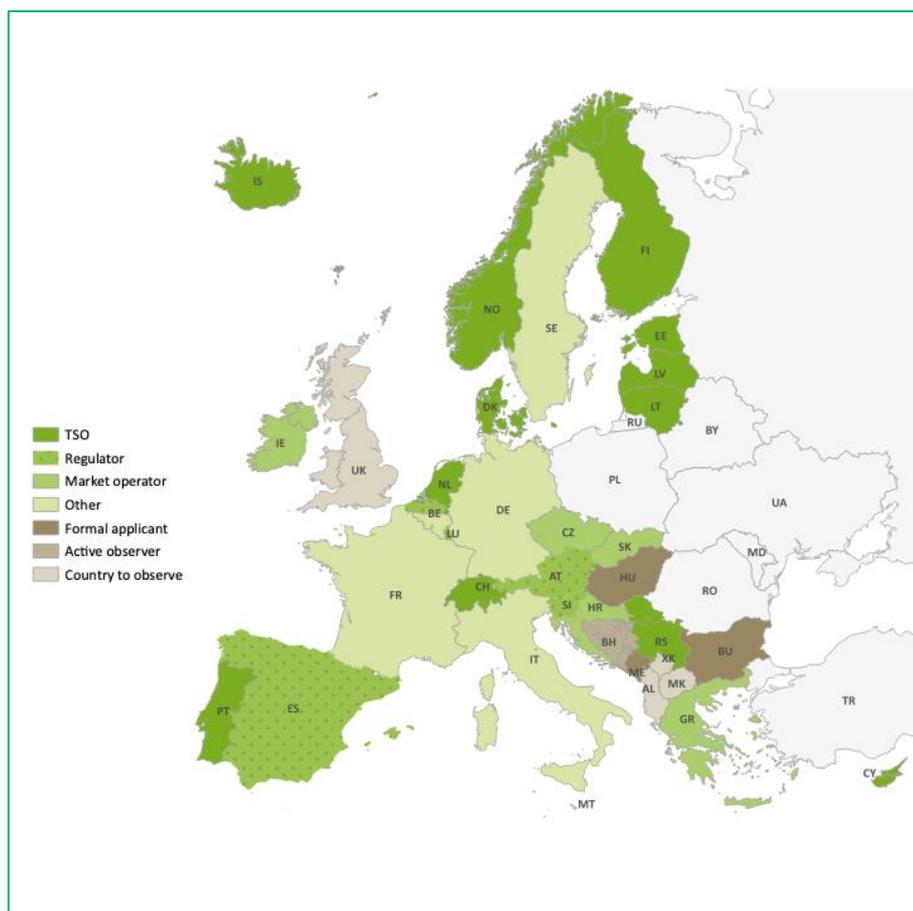
Such oversupply is a particular challenge in renewable energy markets because demand for GOs should show electricity generators that consumers want to buy renewables. The GO market exists to encourage the supply of, and demand for, certified renewable electricity. But if that market cannot find equilibrium because demand is consistently below supply then is the market broken?

This is a question that stakeholders frequently ask of RECS International and one to which this paper seeks to provide a considered response.

## European renewable energy market data

A European consumer can only claim to be consuming renewable electricity if they cancel GOs to cover that consumption or have GOs cancelled on their behalf. The GO schemes in European single market countries are governed by national legislation that implements the EU Renewable Energy Directive and other relevant EU laws. In addition to this obligatory legal basis, there is an additional set of rules that countries volunteer to adhere to – the European Energy Certificate System rules. The Association of Issuing Bodies (AIB) is the European umbrella organisation of national competent bodies (the organisations that manage national GO schemes, including the issuance of GOs) that develops and maintains the European Energy Certificate System rules. GOs issued by EECs member countries (see below) are known as EECs GOs. The [AIB maintains a detailed database](#) of how these GOs are issued, traded, and cancelled or allowed to expire. The information in this database can be aggregated at the European level, or interrogated in detail, for example by generation technology, year, and county of issuance or cancellation. The membership of the AIB overlaps closely, but not completely with the Membership of the European Single Market. The map below shows AIB Membership in detail. All countries in green are AIB members, with the different shades of green denoting the type of organisation of the national Issuing Body in each country.





Therefore, when referring to ‘European’ certified renewable electricity this paper is referring to the geographic coverage of AIB and not to the European single market or all countries on the European continent. This paper’s findings on the supply and demand of European certified renewable electricity are based on AIB data. The data in the graphs are presented in pairs of years: ’13-’14, 14’-15, ’15-’16 and so on. This is done to balance out fluctuations in issuance and cancellation data between years as a result of the lifecycle of a GO which allows issuance and cancellations referring to year X to be made either in year X or in year X+1. The full database is available from the AIB<sup>5,6,7</sup>; this paper only seeks to show the historic development of supply and demand for certified renewable energy in Europe over the past decade.

4 <https://www.aib-net.org/facts/aib-member-countries-regions>

5 The data presented here is transactional data because it is easier to gather and compare transactional data than issuance data.

6 The data has been corrected to account for the export and import from GOs from non-AIB countries and shows total issuance + (import – export).

7 <https://www.aib-net.org/facts/market-information/statistics/activity-statistics-all-aib-members>

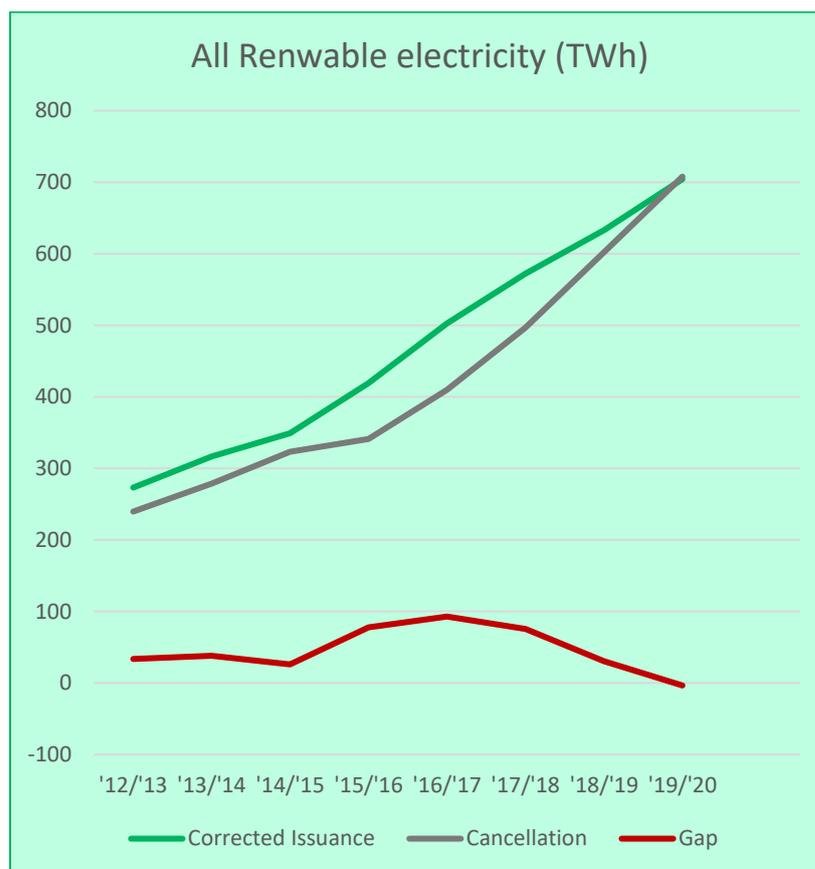


# Overall supply & demand of European RES

In recent years, the European certified renewable energy market has been oversupplied – there have been more GOs offered than there have been GOs cancelled. This is not to say that all products in the market have been oversupplied – as noted above, some products, such as Dutch wind, have been in high demand for several years and have therefore commanded a relatively high value. Nevertheless, the overall, aggregate, market gap climbed to almost 100TWh in the period 2016-2018. The scale and duration of this market gap still inform the thinking of many market observers, and leads to the question that gave rise to this paper – is the European GO market fundamentally broken?

Our answer is no, and the overarching evidence for this answer is below. The market gap between the supply and demand of all certified renewable energy in Europe has been falling steadily since its peak in 2016-17. In the last year full years of data, the market gap for certified renewable energy disappeared altogether. We can see the main drivers of this balancing by looking at the dynamics of supply and demand for each of the main renewable electricity technologies, in the following section.



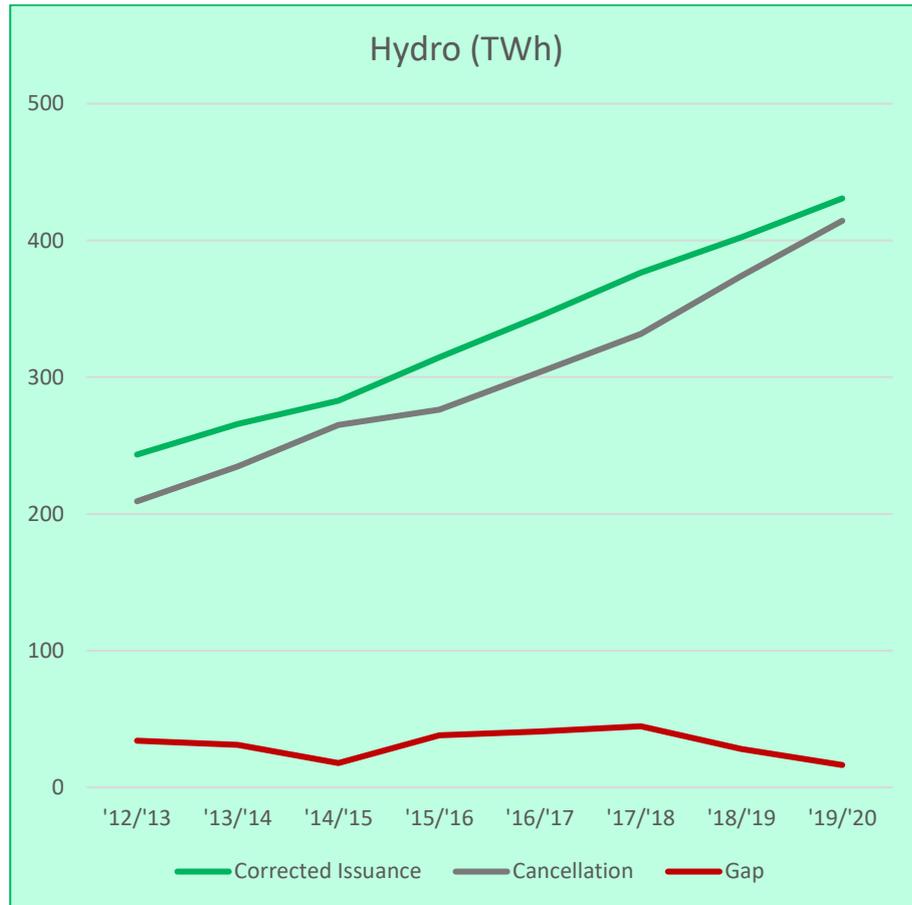


## Technology specific supply & demand

### *Hydropower*

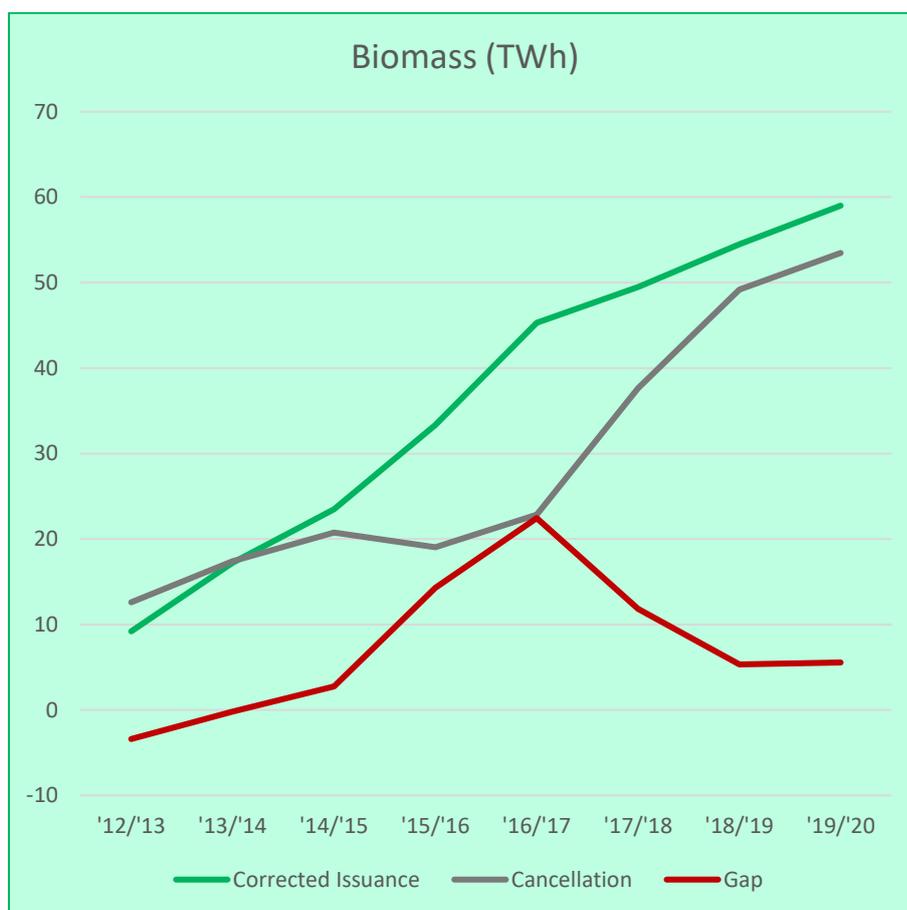
Hydropower accounts for the largest share of European renewable energy generation issued with Guarantees of Origin, with a strong supply of over 400 TWh of certified hydropower entering the market annually in recent years. Demand for this form of renewable energy has not kept this pace, with between 15TWh and 45TWh not being bought by end-users and cancelled to prove their consumption of renewable energy – as represented by the market gap for each pair of years. Hydropower certificates are a notable part of the oversupply in the GO market.





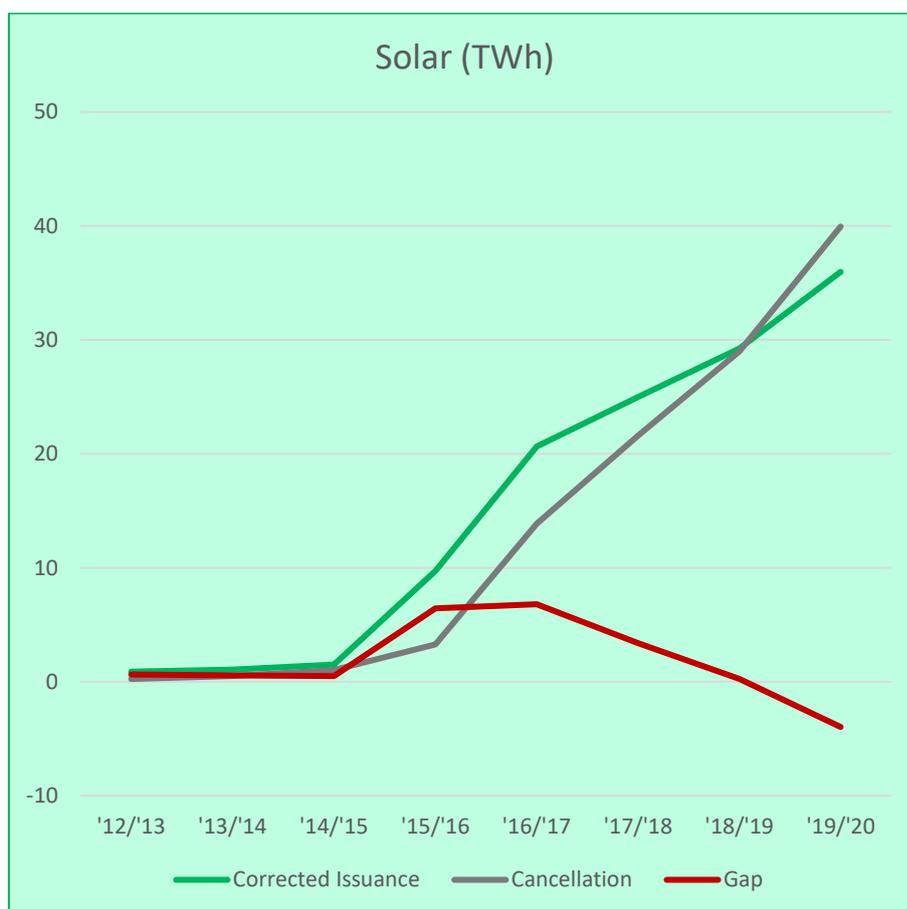
### Bioenergy

The market for GOs certifying electricity generated from biomass is much smaller than that for hydropower, despite having grown from under 10TWh of issuance in '12-'13 to around 60TWh of issuance in '19-'20. As a result, the absolute size of the oversupply of certified biomass power is small but it remains noteworthy, especially in comparison to other generation technologies, like wind and solar which are assessed below. In recent years, the oversupply in this segment of the European renewable energy market has risen to over 20TWh in a year but is more typically below 10TWh.



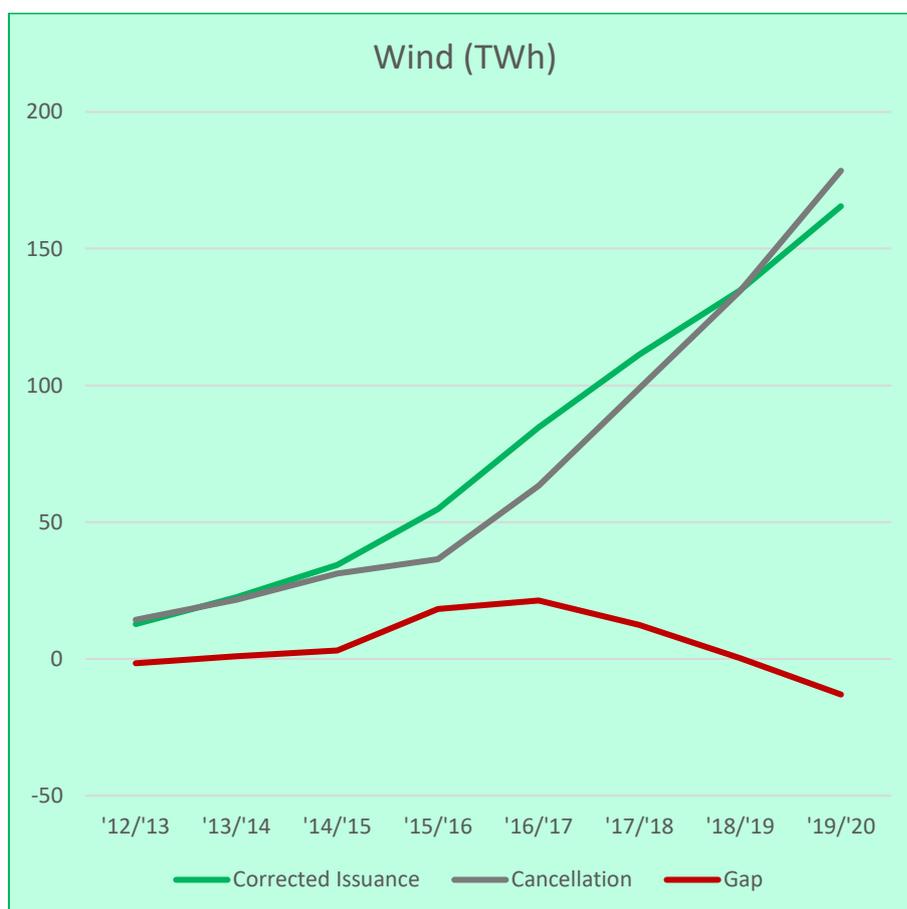
### Solar power

Solar power falls below hydro and wind but above biomass in its contribution to the overall size of the market for certified European electricity. The balance of the solar GO market falls into three distinct phases over the last decade. In the period 2012-15 there was very little market activity, with almost no supply, or therefore demand, of solar GOs. From 2015-18 the market grew rapidly, with new supply outstripping demand by around 5TWh a year, adding to the general oversupply of the European GO market in this period. However, from 2018-20, the period with the latest full-year data, demand has caught up and surpassed supply with the market gap becoming slightly negative in 2019-20. It is possible to temporarily have more GOs cancelled than issued for a given technology in a given year because of this report's use of transactional data which means that the date of the issuance and cancellation is used rather than the date on which the electricity was generated. This could lead to a GO being counted for the issuance statistics in year X and for the cancellation statistics in year X+1.



### Wind power

Wind power is the largest source of variable certified renewable energy generation in Europe, having grown to over 150TWh of issued certificates in 2019-20. However, as with certified solar power generation, this growth is relatively recent. In the period 2012-15 there was very little market activity, with almost no supply, or therefore demand, of wind GOs. From 2015-18 the market for wind GOs grew rapidly, with new supply outstripping demand by around 15TWh a year, adding three times as many surplus GOs to the general European GO oversupply of this period as did the solar market. However, as with solar, from 2018-20, demand caught up and has now surpassed supply with the market gap becoming slightly negative in the last year. It should be noted that there will always be some lag in the market, as certificates can be issued up to 15 months before they are cancelled. This report averages out this data over pairs of years to provide a clearer historic understanding of the market than could be gained from a snapshot assessment.



## Conclusion

The received wisdom of the European GO market is that it is chronically oversupplied, that this oversupply keeps prices low, and that low prices undermine the capacity of GO markets to accelerate the energy transition by only providing a trickle of additional investable income to renewable electricity generators.

This paper's key findings show that GO markets are dynamic, evolving, and increasingly important for supporting renewables:

1. While the overall market for *certified* renewable energy in Europe has been historically oversupplied, it is now **coming into balance**.
2. **Certified supply only outstrips demand for some renewable energy, most notably hydropower**, the oldest renewable energy technology, and the largest block of installed renewables capacity in Europe.
3. **Wind and solar GOs are in strong demand**, to the extent that demand for power from these new technologies now outstrips certified supply.

While this analysis shows there is cause for optimism that the newfound balance in GO markets can be achieved, this optimism needs to be tempered by the understanding the availability of latent supply could further delay the achievement of market equilibrium. A balanced market is one in which prices are likely to rise, especially compared to an oversupplied market. Higher prices for renewable electricity should add new impetus to the energy transition at exactly the moment when it is most needed – as the European Union raises its 2030 renewable energy targets. Therefore, demand for certified renewable energy must be further encouraged by all stakeholders.

## Next steps

As noted above, caution is needed. Not only is there latent certified renewable energy supply that could enter the market due to price rises or regulatory changes, but new supply will also enter as new generation comes online. Therefore, now is not the moment for complacency. Market participants, policymakers, and civil society must continue to encourage the consumption of certified renewable energy. For its part, RECS International will re-double its efforts to provide the knowledge, motivation, and confidence needed to buy



100% renewable energy. These efforts include calling for compliance markets and full disclosure, specifically full consumption disclosure<sup>8</sup>.

The EU could significantly increase the uptake of renewable energy by moving from the current voluntary market mechanism to a compliance market that places a requirement on suppliers to ensure that a given proportion of the energy they sell come from renewables. The requirement could also be placed on consumers to ensure that a given proportion of the energy they consume comes from renewables. Were such markets introduced, RECS International would work to ensure that their relevant mandates be increased over time as the supply of renewables rises so that demand-side pressure is maintained.

As an intermediary step to compliance markets, the EU should require GOs to be issued for all energy sources, including non-renewable sources. Such a requirement would move the EU to a full disclosure system in which the origin of energy from all sources can be guaranteed. The current Renewable Energy Directive allows EU Member States to implement full disclosure but does not require them to do so. Full consumption disclosure ensures a level playing field between renewable and non-renewable sources since currently only renewable energy consumers must meet the requirements of a GO scheme to prove their use of renewables. If all end-users had to actively purchase energy attributes and prove the origin of their energy consumption, we would all know where our comes from – and its environmental impact. This would likely boost the consumption of renewables. Different forms of full disclosure exist, but the most effective is likely to be full consumption disclosure, which requires that a certificate must be cancelled for every MWh consumed.

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<sup>8</sup> Full disclosure is explained in more detail on the [www.recs.org](http://www.recs.org) website, in [a detailed paper](#) which sets out what full disclosure is and why it is so important before making the case for full consumption disclosure schemes, in which a certificate must be cancelled for every MWh consumed.

