

WindEurope response to the expert consultation on State Aid Guidelines for Environment & Energy and on the General Block Exemption Regulation.

Attachment to EEAG questionnaire

July 2019

Introduction

WindEurope is the voice of the wind industry, actively promoting wind power in Europe and worldwide. We have over 400 members, active in over 35 countries. In addition to wind turbine manufacturers with a leading share of the world wind power market, our membership encompasses component suppliers, research institutes, national wind and renewables associations, developers, contractors, electricity providers, finance and insurance companies, and consultants.

State aid rules are of utmost importance for the development of the wind energy sector as they represent the tool used by the European Commission to assess the compatibility of national support mechanisms for renewable energy with internal market rules.

WindEurope welcomes the possibility to input to the revision of the Environment and Energy State Aid Guidelines (EEAG). This paper provides the wind industry's views on State aid for energy and environment. It complements WindEurope answers to the online questionnaire.

Wind energy in Europe

With 189 GW installed across Europe, wind energy today supplies already 14% of the total European electricity demand.

The wind energy sector brings local value and creates jobs and growth: contributing €36bn to the EU Gross Domestic Product with €8bn exports, the wind energy sector employs 300,000 people across all regions of Europe¹.

Investing in wind energy brings also other significant benefits for society. It offers citizens and businesses clean, local and affordable energy. Covering already 14% of the total European power demand, wind energy helps save €10bn/year in fossil fuel imports savings.

Onshore wind is today the cheapest form of new power generation in Europe, thanks to technological developments and economies of scale. Offshore wind energy is not far behind: its costs have fallen 60% in three years only.

Higher ambition on renewables beyond 2020 will offer even greater social and macro-economic benefits. By 2030, and with the right policies sustaining the European industry's competitiveness, the

¹ *Local Impact, Global Leadership*, WindEurope and Deloitte (2017). Estimates on jobs creation are the latest WindEurope figures.

sector could employ up to 569,000 people. This goes together with benefits for related sectors: every €1,000 invested in wind creates €250 value for the wider supply chain e.g. chemicals, steel, construction.

Reaching the intermediary 2030 climate and energy objectives means that 50% of the European electricity will come from renewables. This requires €254 bn of private investment in the electricity sector alone according to the European Commission. Well-designed competitive bidding processes will have a critical role in attracting private financing and enabling the shift towards a renewable energy system cost-effectively.

Contracting of wind energy is also key to maintain a competitive European industrial base. Individual projects rely on the available regulatory framework at the time of the investment decision. But decisions to invest in factories, test facilities, logistics, skills development, research and innovation rely on multiple projects moving to construction over several successive years.

Visibility over the volumes to be allocated to wind energy is therefore crucial to the development of the wind power industry, including its vast supply chain. The National Energy and Climate Plans play now a major role in providing predictability to the sector, but the current draft plans are lacking substantial details as to the policies and measures to put in place to secure more renewables and higher penetration in the overall energy system and markets. In many cases, the draft Plans are even lacking the 2030 targets for wind energy. This goes against legally binding provisions of the Renewable Energy Directive and constitutes an important barrier to the development of the sector.

WindEurope considers that technology-specific bidding processes are the best way to secure this visibility for the industry while at the same time allowing Governments to reach an optimal and diversified power mix that reaps the benefits of complementary technologies, optimizing the integration between generation and infrastructure. It is crucial that Member States maintain the flexibility to limit competitive bidding processes to specific technologies as per Art. 4 of the new Renewable Energy Directive.

[The importance of a well-designed competitive bidding process](#)

An optimised competitive bidding processes design is necessary to secure cost reduction alongside build-out. Since 2017 Member States have an obligation to launch competitive bidding mechanisms to allocate public support to wind energy, as prescribed by the EU's State aid guidelines and with some exceptions, i.e. in case of very small installations, where competitive bidding processes would lead to higher costs or in case of risk of low project realisation. The transition towards competitive bidding processes has not been straightforward: many countries have struggled with competitive bidding processes design and have enacted changes in view of accommodating different policy objectives beyond the price-only award criterion. In smaller markets with low liquidity and no homogenous bidding structure competitive bidding processes might not even be an effective support allocation mechanism. EU Governments and industry are still learning and additional practice will be necessary to make competitive bidding processes fit national circumstances.

Competitive bidding processes have certainly contributed to driving costs down but these processes need to be carefully designed to make sure public resources are best allocated. Below are a series of recommendations that we believe will help achieving this result.

- **Visibility on auctions/tenders rounds:** forward stability and transparency on competitive bidding processes rounds are key to industrial planning. This allows the wind industry to realise long-term investments in factories, infrastructures (e.g. ports, shipyards, roads), skills development, test facilities, research and innovation. Investments create jobs and deliver revenues to national budgets. But also optimise economies of scale and efficiencies across the supply chain that allow the industry to drive costs down. The quick implementation of a long-term schedule for public support allocation over multiple years, including the timing, capacity and budget for competitive bidding processes as prescribed in the post-2020 Renewable Energy Directive², should be a top priority for national governments in view of tapping into the economic benefits of wind energy and enabling a cost-effective energy transition.

Competitive bidding processes should be organised on a regular basis, at reasonable notice and should provide visibility on the size and overall budget to be awarded over multiple years.

Avoiding stop-and-go bidding rounds allows for better planning in the research and production of components, the deployment of infrastructure (e.g. ports, power grids), the planning of the supply chain and finally on the deployment of the wind farms. Such coordination and visibility allows for an efficient industry, more competition and thus for greater cost reduction.

- **Clear and stable auctions and tenders design and rules:** the more complex the competitive bidding processes design is, the more risk a participant must reflect in his bid thus increasing final prices. Transparency, simplicity and clarity of design and support allocation rules instead go a long way in attracting bidders and cutting costs. The stability of the rules implemented is very important also in the time between the launch of the bidding process and the award of it.

The design of the competitive bidding processes should envisage consultation and open dialogue between governments and investors. Through an iterative process, sides should strive to secure simple and straightforward selection criteria (e.g. payment arrangements, price-finding mechanisms) and clear features of the remuneration scheme.

- **Price-only should be the preferred award mechanism.** It offers an objective comparison between bids as opposed to qualitative assessment between projects. Quantitative criteria also reduces the risk of court appeals.
- **Competitive bidding processes should be technology-specific** to optimize the deployment of generation assets at the least cost for society. The main assumption behind technology-neutral bidding processes is that all technologies compete against each other on a level playing field. In reality, none of the technologies using a different power source is competing on equal grounds even if potentially they have similar generation costs: for example, permit requirements and permitting lead time are different across technologies. The generation profile also varies significantly across technologies using different resources and technology-specific competitive bidding processes are essential to guarantee balance from a system perspective.

² Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources

Allowing different technologies to compete against each-other purely on price, technology neutral competitive bidding processes often result in one technology dominating the results in a specific geographical area. Experience has shown that the design features (assumptions on technologies) of technology-neutral bidding processes have a huge impact on the results. For instance, using generic full-load hours for different technologies to convert it to final support (e.g. Spain) led to wind or solar to take the full support basket. Within green certificates, we see that governments eventually have decided to apply different minimum guarantee prices per technology, and they have applied factors to increase/decrease the demand for specific technologies (e.g. Belgium).

The transition towards a power system with a broad mix of technologies with different generation profiles, which complement each-other, avoids to incur in integration challenges that would arise if the system relies on a concentration of a few generation technologies only (see for example the so-called "[California duck curve](#)" effect caused by over-generation during peak solar hours).

Without prejudice to the recommendation above, bidding processes - be they technology-specific or technology-neutral - should take into account the technical characteristic of technologies (e.g. risk profile, generation profile, project lead times, permitting requirements, size) and put into competition comparable technologies only.

Should member states opt for renewable energy hybrid competitive bidding processes (e.g. co-location of two renewable generation technologies such as wind and solar with or without onsite storage), it is important to design these as hybrid-specific competitive bidding processes as the hybrid characteristics do not compare to stand-alone wind or solar plants (no level playing field competition).

- The design of competitive bidding processes should ensure **coordination between different administrative levels** responsible for renewable projects deployment. Streamlining planning and permitting procedures will decrease transaction costs, ensure better territorial distribution of projects and could contribute to diminish public opposition to wind projects. In this regard, a correct transposition of Art. 16 and 17 of the 2018 Renewable Energy Directive and subsequent implementation at the national level will be key.
- **Prequalification criteria:** competitive bidding processes are only successful if contracted volumes get built. This should be guaranteed by pre-obtained permits ensuring that bidders are competing against each other on a level playing field. This should also guarantee that wind projects will be delivered in a timely manner.

Mandatory permitting is of particular importance to onshore wind and should be applied under normal conditions. It minimizes the risks of project non-realisation or delays resulting from lengthy approval between different administrative levels and reduces the risks of claims before courts. Governments should apply flexibility on compulsory permitting for offshore wind due to longer lead times, in particular in the project feasibility phase.

The simplification of administrative and permitting procedures is a prerequisite to investors' ability to bid in competitive bidding rounds. Burdensome procedures should be streamlined and include at the very least a **one-stop-shop** arrangement that coordinates multi-level authorisation process.

National authorities should aim to shorten permitting timelines and align them with the national schedules for public support allocation.

- **Set construction times:** concrete realisation deadlines are a best practice in some EU countries. They guarantee the construction of wind farms under short periods of time to reach specific government objectives.

Art. 4 of the Renewable Energy Directive foresees that for support allocated via competitive bidding, Member States set clear dates for the delivery of the projects. Lead times could ensure that there would be no mismatch between the latest technology available on the market and what is installed on the ground.

Reducing project realisation time for winning bids would help mitigating the effects of possible changes in the set of requirements imposed by the Transmission System Operators through Grid Codes. The lack of clarity regarding future grid connection requirements undermines the ability of developers to realise their projects at the costs foreseen in their bids today.

The consequences of missing construction deadlines because of external events (i.e. out of the control of the wind developer, such as changes in regulatory frameworks, court trials, grid connection delays) should be calibrated and should not result in disproportionate penalties for the developers. A potential solution could be the possibility to expand the realization time in case of force-majeure conditions (e.g. legal action against permitted projects).

Considerations for the future design of competitive bidding processes

Future auctions/tenders design should consider:

- **Repowering:** a significant portion of the EU installed wind energy fleet will come to the end of its operational lifetime between 2020 and 2030. The decommissioned assets will not count for the delivery of the EU 2030 renewable energy target. Facilitating repowering of wind turbines means using efficiently the wind energy resources located at the best sites, using the best available technologies with the least use of land – i.e. producing more clean electricity at the least cost for society while increasing social acceptance.

Future bidding processes should ensure that decommissioned volumes are added on top of the yearly national announced bidding rounds and that **repowered projects can compete on par with new installations in competitive bidding processes or other state aid-compatible systems**. Failing to do so would artificially push development of new projects when repowered projects would be a better solution for the society.

- **Cross-border competitive bidding processes:** cross-border tendering or auctioning remains an option for experimentation between Member States in line with the increased emphasis on regional cooperation in the post-2020 European legislation for renewables. The industry considers that voluntary opening of support schemes could serve as a first step for exploring new ways of deploying wind energy in the EU. One could also test competitive bidding processes where two export cables from an offshore wind farm to two different countries are part of the scope – hence creating an interconnector at the same time. However, cross-border competitive bidding should

tackle the impact of different regulatory regimes on the competitiveness of projects if they are to be viable to attract bidders and ensure balanced deployment across EU Member States.

- A general consideration relates to the case of undersubscribed bidding processes, i.e. those cases where the bids participating do not cover the total amount of capacity auctioned/tendered by the state. One of the last technology specific competitive bidding for wind energy in Germany and France were under-subscribed, due to reasons dependent on the national contexts (permitting process, mainly).

Undersubscription of tenders and auctions is a sign of poorly designed policies and a phenomenon that should not happen. If the competitive bidding reveals scarcity of supply and therefore the resulting demanded support level is high, Member States should not create artificial competition *ex-post* but rather act upon removing the barriers that stifle competition in the first place. In many cases the burdensome and lengthy authorisation procedures and the lack of resources in the competent administrative bodies decreases the level of confidence in project realisation, leading ultimately to low-participation in bidding. Clearing national existing obstacles to renewable energy development is as much of a priority as designing good competitive bidding processes.

Revenue stabilisation mechanisms for bid winners

Once contracted in the competitive bidding process, producers should receive a stable revenue based on the energy produced. WindEurope considers that a well-designed energy- and market-based revenue stabilization mechanism such as **two-sided Contract for Difference (CfD) or sliding market premium** is the best way support to renewable energy investors.

These mechanisms must strike the right balance between investors' need for certainty and lower costs for society. A way to do so is to limit extraordinary revenues by setting a cap to the incentive received and/or allowing the premium to become negative such as in a two-sided CfD. The design of revenue stabilization mechanisms should in all cases allow for flexibility to address national circumstances.

The two-sided CfD has also the advantage that participants to the bidding process do not have to forecast power prices for long timeframes. The need for long run forecasts leads to the so-called winners curse and favors those with a better capacity to foresee market changes. The most optimistic forecasts enable the lowest bids, which could lead to stranded investments. But they also have a negative effect as they lead to very high financing costs and thus high costs for society.

Other important considerations

Zero bids

The results of competitive bidding processes cannot be directly transferred across-technologies or across-markets. Cost reductions are possible in every European market with the appropriate regulatory framework in place. But their scale will differ as country-specific support mechanism design, permitting procedures, wind resources, cost of capital have huge impact on return-on-investment risk and are incorporated differently into bids. Strike prices are also not directly comparable as the design of competitive bidding processes provide for distinct project commissioning and delivery times, grid connection rules and inflation indexation regime that affect the economics of projects.

Zero bids are an exception to the rule rather than the new normal. They are only possible in certain markets and under specific conditions. These include – but are not limited to – the location of the

project, the scalability of offshore wind, the optimization of the value chain and exploited synergies between existing infrastructure and transmission system assets, long lead times and expected decline in technology costs. The pre-development of sites by national authorities, including the grid connection, and a one-stop-shop for administrative procedures (e.g. the Netherlands) have incentivized winning companies / consortiums to offer offshore wind build-out with zero direct financial support.

Member States should ensure that zero bid tender design is compatible with the provisions of the 2018 Renewable Energy Directive and provide for a transparent process. The State Aid Guidelines on Energy and Environment should be fully aligned with that.

Member States should allow the possibility to develop a fully merchant project without going through a competitive bidding process.

Corporate Renewable Power Purchase Agreements (RES PPAs)

Corporate Renewable Power Purchase Agreements (RES PPAs) are a private contract between a renewable energy generator and an end consumer, without an intermediary supplier. As such, they **fall outside the scope of state aid provisions**.

Corporate renewable PPAs are an important tool for revenue stabilization of renewable energy operators while allowing energy intensive industries to source clean electricity at a fixed and competitive price. They come with certain benefits for generators to hedge the volatility of their revenues. Price visibility over a long period of time and a guaranteed off-take are important to lower the cost of debt financing.

Corporate renewable PPAs to date is still a niche market and not to the scale necessary to replace other policy driven revenue stabilisation mechanisms. Such contracts are still limited to a handful of countries. The Nordic region, followed by the UK and the Netherlands are the biggest market for such deals. These markets share a good track record in renewable energy development, coupled electricity markets, sufficient demand for green electricity from corporates and, most importantly, a lack of explicit regulatory barriers to sign corporate renewable PPAs.

Although the optimal design of a competitive bidding process would be a mechanism covering the full capacity and lifetime of a project with no additional revenue stream required, it is key is to ensure that future revenue stabilisation mechanisms allows for the **revenue from a corporate renewable PPA to stand in conjunction with any form of Government support**. To ensure there is no double compensation when placing the bids, project owners factor in both the expected revenue of the PPA and the Guarantees of Origin (GO).

Guarantees of origin are a critical tracing mechanism for corporates with internal sustainability targets and they should be the reference system to ensure traceability of green power underpinning the PPAs.

Energy Intensive Industries (EIUs)

Energy Intensive Users (EIUs). The current formulation of the SAG foresees exemptions enabling EIUs to pay a minimum of 15% of the renewable energy surcharge, whereas the remaining share is borne by other energy users. In this case state aid is given to boost European enterprises' competitiveness and avoid relocation in non-EU countries.

It is critical that the EU carries out an energy transition while maintaining the competitiveness of its industry via-à-vis international competition. EUIs have an important role to play in this transition, including by taking concrete measures to decarbonise their production processes. **State aid rules should factor in energy procurement strategies, notably corporate renewable Power Purchase Agreements, amongst the conditions for exemptions from the renewable energy surcharges.**

Negative prices

The current version of the state aid guidelines requires that *“measures are put in place to ensure that generators have no incentive to generate electricity under negative prices”*.

In principle, support during times of negative prices should not occur. However it is important to understand the root cause of those negative hours periods. In Germany negative prices occurred 149 hours in the first half of 2019 alone. This is 3.4% of hours over a year. While in these hours high wind energy generation occurred, another root cause for the occurrence of negative prices was that conventional baseload power plants continued to feed power into the grid, either due to must-run obligations (e.g. to provide ancillary services or heat cogeneration) or for economic ones because the ramping costs would have exceeded the payments from selling electricity at negative prices.

Financial support to wind power was suspended during those hours due to a general lack of flexibility in the system. Thus support for production in times of negative prices should be phased out hand in hand with regulatory requirements that increase system flexibility.

Member States have created rules to suspend the financial support to wind power generators during these hours while still trying to protect them from a high revenue uncertainty that leads to higher financing costs, which hurts Member States’ objective to reduce the cost of the energy transition. The attempts to minimise the impact on financing costs by Germany, UK, the Netherlands adopting the so-called “six-hour rule”, whereby operators keep their premium up to six consecutive hours of negative prices, failed to reduce the volume risk and created undesired outcomes. Amongst these outcomes: the so-called Winners’ Curse in renewable energy bidding, whereby participants that play down the volume risk have higher chances to win the bid); an increase in the amount of negative price events, as the premium payments are still paid for the first six hours of negative prices; large amounts of wind turbines being curtailed at the same time, leading to high energy imbalances (the so-called Wind Eclipse phenomenon). In Denmark there is a “one-hour rule”, but combined with support given for a number of full-load hours over the lifetime of the project. This means that the support otherwise given in the hour with negative prices is not lost, but rather postponed. France has adopted a different approach in which wind farm operators will receive no premium on top of the market price only for the first 20 hours of negative prices in a year.

We believe that these rules are helpful on their own but they lead to market fragmentation when they are not harmonized across all countries. Having a different duration (6 hours vs 1 hour) creates a competitive disadvantage to those generators that need to be curtailed after one hour.

Only the French approach provides investors with limited uncertainty and more investment security. If such scheme or similar was applied homogeneously across all countries (i.e. same number of hours) it would help reducing market distortions. Such homogeneous rule shall follow the logic applied by the new Renewable Energy Directive in the context of curtailments due to grid constraints by reducing the non-controllable volume risk to a minimum.

New and innovative technologies

In the context of operating aid for renewable electricity, the GBER foresees that “aid shall be granted to new and innovative renewable energy technologies in a competitive bidding open to at least one such technology” and for no more than “5% of the planned new electricity capacity from renewable energy sources per year” (Art. 42.4).

A new and innovative technology in our sector is for example floating wind energy. There is no reference to the methodology used to define a “new and innovative technology” and this is likely to pose interpretation problems in the future. WindEurope would welcome a clear definition.

Storage

The progressive replacement of fossil fuel installations (coal, fuel) by wind and other renewable comes along with a growing need of flexibility and storage. Whilst large pump hydro still represents over 95% of the available energy storage in the system, there is a rapid growth of both small mobile batteries and stationary utility-scale storage projects, mostly used as stand-alone installations. The latter include batteries, flywheels, power-to-gas, thermal storage and compress air energy storage. The number of projects used in combination with wind farm (the so-called co-located wind and storage projects) or in renewable hybrid power plants (e.g. wind, PV solar, hydro and/or storage) is increasing too.

Stand-alone energy storage systems should be treated as any other technology that offers services to the electricity system. As a principle there should not be a preferential or differentiated treatment for technologies in the market. This includes prequalification criteria and procurement rules. TSOs should make system needs transparent and launch competitive bidding processes for system services (without prescribing a technology). Market parties can respond with storage or other solutions. For example, if storage is to offer flexibility to the electricity system by offering balancing services, it should follow the same general principles on product and procurement rules than any other technology. Likewise, market rules should not preclude energy storage participation. For other services than balancing, the markets still needs to be developed; where products first must be defined and subsequently (wherever possible) procured through markets.

In the case of co-located wind and storage projects, **wind energy asset owners should not need to reapply for support schemes when adding energy storage to an existing wind farm.** As most of the co-location wind energy with storage projects are on existing wind farms, these assets have already cleared all permitting and administrative procedures to obtain a support scheme. However, as soon as the renewable installations incorporate an onsite storage device they need to re-apply for their support scheme. This is for example the case in Germany and in the UK. Regulators fear that operators claim electricity absorbed from the grid by the storage device as wind power-generated, hence receiving compensation from non-renewable electricity. Therefore, **regulators should clarify rules on metering** so that developers do not need to reapply for the support instrument.

When storage technologies form part of a renewable hybrid power plant (e.g. a battery system controlled in combination with a power plants including wind turbines and PV systems, or any other combination of two renewable energy generation technologies), the full scope of the power plant should follow the same rules and principles adopted for the support of any other renewable generation technology. However, the specific competitive bidding process might need to be tailored-made to ensure a level playing field among the various energy technologies (see also previous section on the

design of the competitive bidding processes). For the renewable hybrid power plant there should be a one single permitting process.

Capacity Remuneration Mechanisms (CRMs)

The assessment on the needs of system adequacy measures should be performed on a European basis, as mandated by Art. 21 of the recently adopted Electricity Regulation. In case of concerns on system adequacy, capacity remuneration mechanisms (CRMs) should always represent a last-resort option and be designed in such a way to support clean and flexible energy resources, including renewables. As stressed by the current SAGs, CRMs may also contradict the objective of phasing out environmentally harmful subsidies, including fossil fuels.

Upgrading the EU electricity grid and its operational rules to enable high renewables penetration thanks to a market built around renewables and where flexibility is properly incentivised is a key structural reform needed at the European level. CRMs should be introduced as a last resort if all other measures and reforms planned and introduced (such as increasing cross-border market coupling and improving trans-national grid interconnections) still do not guarantee solving system adequacy and supply security concerns. Member States should also remove all barriers to renewables participation in key markets to provide system adequacy services. Wind turbines can provide ancillary services to maintain system stability and should therefore participate in those markets on a level-playing field with other technologies.

Hydrogen, synthetic fuels and low carbon gas

Over 94% of the current hydrogen production is fossil-fuel based, but an increasing amount of this gas should be produced via electrolysis powered by wind energy and other renewable energy sources in order to support the decarbonisation of key industrial sectors as well as transport.

WindEurope believes that in order to achieve a truly European market for renewable electricity-based hydrogen (i.e. guaranteeing level playing field across countries) it is necessary to reach a Europe-wide definition. Such definition would simplify and speed up the adoption of similar regulatory frameworks (e.g. exemption of environmental taxes, contribution to the 2030 transport targets, etc.) across Member States and would facilitate the implementation at the national level of Environmental and Energy state aid.

Undertakings investing into the production and distribution of renewable-electricity based hydrogen (produced via electrolysis) are often faced by high OPEX-costs, in particular environmental taxes such as national surcharges and levies. This is for instance the case in Germany, where producers of green hydrogen are subject to EEG-surcharges.

As the main cost component of producing renewable-electricity based hydrogen is the electricity price, exposure to high network charges and high electricity levies makes the production of this hydrogen rather unattractive and thus also hinders the scaling-up of renewable-electricity based hydrogen to a commercial level. In order to reflect upon the role that power-to-gas installations and renewable electricity-based hydrogen can play in the energy transition, state aid policies should factor in the main cost drivers of producing and distributing renewable electricity-based hydrogen. These include electricity taxes and levies for which exemptions should be considered. This regime should ensure that the economics of direct electrification are not undermined, as direct electrification will deliver the bulk

of the energy transition. The electrolyser will also act as a form of demand flexibility and can support the integration of variable renewables into the grid.

The EEAG put non-renewable energy-based hydrogen – e.g. the hydrogen produced from natural gas and making use of Carbon Capture and Storage (CCS) - in a more favourable position as compared to renewable electricity-based hydrogen. National subsidies to CCS that are compatible with section 3.6 of EEAG, in particular to cover additional costs of capture, transport and storage of CO₂ emitted according to §165 EEAG could put non-renewable energy-based hydrogen in an economical more favourable position than the production of renewable electricity-based hydrogen.

The 2018 Renewable Energy Directive foresees that the hydrogen produced via electrolysers that are directly connected to wind generation installations can claim Guarantees of Origin (GOs) and will count towards fuel supplier obligations, but there is no clear provision for the hydrogen that is produced by electrolysers that are directly connected to the grid. A clear and unambiguous definition at the European level would ease the interpretation of the State Aid guidelines and thus would facilitate a market uptake of renewable electricity-based hydrogen.