SolarPower Europe: position paper on the revision of State aid guidelines

PRELIMINARY REMARKS

Public support has been central to the deployment and competitiveness of solar in Europe.

Recently, solar has achieved important cost reductions, reaching LCOEs of between $32 and $44/MWh[1]. Utility-scale solar is now more cost-competitive than all conventional energy sources, including coal, gas and nuclear. In 2019, we even saw an increasing number of tenders and PPAs around subsidy-free solar projects in Europe[2].

Solar is now in a position to play a major role in supporting the European energy transition, as the cleanest, cheapest, and most accepted power generation source worldwide: from 4% of Europe's electricity generation today, solar could represent 36% of the total electricity generation in Europe by 2050 according to Bloomberg New Energy Finance's latest scenarios[3]. Solar installations are already growing exponentially in Europe, with the solar market expected to increase by at least 80% in 2019 compared to 2018, and up to 110% for EU-28 alone[4].

Despite these positive developments, public support will still play a role to back the development of the solar sector after 2022, for the following reasons in particular:

- **National regulatory frameworks vary significantly across EU member states and can critically impact investment costs for solar project developers.** Evidence has shown that a stable regulatory environment leads to a Weighted Average Cost of Capital (WACC) of around 3-4%, as is the case for the UK or Germany, whereas in countries which have implemented retroactive measures between 2010 and 2013, such as Spain and the Czech Republic, we can still find WACCs of up to 12%. Other parameters such as burdensome permitting and administrative procedures, or restricted grid access and connection, can also trigger higher investment costs, thereby reducing the cost-competitiveness of solar projects compared to conventional energy sources.

- **The increased volatility of market prices impacts investor's long-term visibility and their ability to estimate revenues and return on investments.** The progressing penetration of zero marginal cost electricity sources in the electricity mix means wholesale market prices face downward pressure during

[1] Lazard Bank, Levelized Cost of Energy Analysis – Version 12.0

[2] Examples include the BayWa.re "Don Rodrigo" 175 MW solar PPA in Spain and "Barth V" 8.8 MW solar PPA in Germany, or the EnBW/Energiekontor 85 MW solar PPA in Germany.

[3] Blomberg New Energy Outlook 2018

[4] SolarPower Europe's forecasts, in SolarPower Europe (2019), Global Market Outlook 2019 - 2023

periods of high solar production (the so-called 'cannibalisation effect'). Until energy markets start valuing solar energy as a source of flexibility[5], and the business case for energy storage becomes mainstream, market-based support mechanisms will continue to be needed to provide the "revenue stabilisation" and visibility which will help trigger investment decisions.

- **While utility-scale solar installations are becoming the most affordable source of electricity generation, smaller solar projects remain more expensive to deploy**. This is especially the case for self-consumption projects, where the co-location of solar with battery storage increases investment costs. Public support can help trigger investments at scale to further reduce costs for small solar installations and facilitate access to solar energy for all types of consumers – industrial, commercial, and residential. Smaller installations provide benefits that are complementary to utility-scale solar. They sustain local jobs, support the decarbonisation of the European building stock[6], provide local grid flexibility and empower the consumer to take part in the energy transition.

In short, public support in the post-2022 era can help to:

- Accelerate investment in large volumes of renewable energy generation assets, ensuring a stable revenue stream for solar developers in the medium term.
- Support further cost reduction for smaller projects, and new business models which have not yet reached financial maturity but unlock other benefits (thereby providing local employment and grid flexibility).
- Enable a balanced energy transition in terms of geographical location, grid integration and installation size.

The next European State aid guidelines for energy and environment will also need to address new challenges and in particular:

- **They must be flexible enough to be compatible with an ever-changing space, incorporating new technology developments and business models** (single and collective self-consumption, renewable PPAs, hybrid plants etc.).
- **They must allow for upgrades to existing solar power plants,** notably revamping, repowering and hybridisation.
- **They must support the deep decarbonisation of the European economy**, notably through the acceleration of renewable-based electrification. For transport in particular, the EEAG should support the uptake of renewable mobility solutions (solar charging stations, charging solutions with solar PPAs, etc.) and clarify the compatibility of such frameworks with existing support to renewable generation.

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[5] SolarPower Europe (2018), Grid Intelligent Solar – Unleashing the Full Potential of Utility-Scale Solar Generation

[6] Responsible for 40% of EU emissions today

1 - DESIGNING MODERN AND FUTURE-PROOF COMPETITIVE BIDDING PROCESSES

Today, competitive bidding processes, or tenders, have become the main tool to allocate public support to renewable projects.

Tenders have enabled the deployment of solar, adapting to cost and technological evolutions while decreasing the level of subsidies, as shown in a recent report by CEER[7]. For example, in France, the latest auctions have reached an average price of €56.80/MWh for ground-mounted solar and €93.28/MWh for building solar installations[8].

Yet, we must stress that competitive bidding processes put pressure on bidders with a selection process exclusively articulated around reaching the lowest prices. This can have the following negative implications:

- **Speculative bidding behaviours** (bids reflecting unrealistic costs to secure and resell grid connection rights, leading to a low realisation rates of awarded projects).
- **Market concentration/barriers to entrance**: new entrants, or smaller project developers, are unable to compete with the bids of bigger developers, which benefit from better financing conditions and are able to accept lower profit margins to secure market shares.
- **Inability to generate a market value for positive externalities** such as, responsible land use or 'grid-friendliness' (capacity to provide grid services, reduce the need for grid reinforcement or congestion). Smarter tender designs are key to efficiently allocating public support while effectively deploying renewables and rewarding innovation in solar projects.

To address this, future tender designs should respect the following principles:

1) Competitive bidding processes require sufficient bids.

Clarity and visibility on auction schedules and the volumes up for tender are essential to allow the largest number of players to participate in the auction. Other measures can support the creation of a level-playing field between larger and smaller project developers: for example, reducing the administrative burden associated with securing access to land, through the systematic implementation of a one-stop shop to channel all authorisation and permit administrative procedures required prior to the participation in the tender (including for land access), would help increase the participation of new entrants.

2) Penalties for failure to build projects to prevent speculative behaviours.

The introduction of a guarantee mechanism like in France, Germany or Spain, or the introduction of penalties for unrealised projects, should prevent speculative bidding. However, these mechanisms should be designed to avoid generating an additional barrier to entry for smaller players: for example, by setting guarantee or penalty levels

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[7] CEER (2018) Status Review of Renewable Support Schemes in Europe for 2016 and 2017

[8] Commission de regulation de l'énergie, Délibérations n°2019-007 and n°2019-088

too high. The introduction of project milestones, with realistic, concrete deadlines that must be respected by the developers could also ensure a better project realisation rate. When developers are not able to meet their obligations and build their projects, the volume of unrealised projects should be auctioned off during the next tender year.

3) Competitive bidding processes should not have a size cap.

Utility-scale solar is becoming the most cost-efficient path to Europe’s 32% renewable energy target. Breakthrough innovations in system management, providing ancillary services using advanced power electronics, and the increasing use of energy storage, allow large-scale solar plants to be a significant provider of flexibility, reliability, and balancing services. The technology is ready, but Europe is lagging behind many other regions in the world (Middle East, US, Asia, Australia) in the deployment of utility-scale solar plants.

To address this, limitations on plant sizes (size caps) in competitive bidding processes, where in place, should be removed. Provided that bidders demonstrate the appropriate permits, developers should be allowed to present different types of projects to maximise competition and drive costs down through economies of scale.

4) Installations below 3 MW should be exempt from competitive bidding processes.

Competitive bidding processes for smaller installations put a lot of pressure on smaller bidders and new entrants who cannot compete with larger actors and are unlikely to engage in a costly and time-consuming bidding process[9]. A tender process creates an inherent remuneration uncertainty that smaller actors cannot bear at reasonable costs. This means that only established and larger actors end up participating in smaller tenders, to the detriment of smaller actors. This prevents healthy competition in the EU market.

This applies to residential projects, but also to commercial and industrial projects below 3 MW. Exempting smaller projects from tendering procedures will help them compete on an equal footing and will encourage the diversification of renewable projects, notably in the commercial and industrial market.

5) Sliding premiums and Contracts for Difference should be favoured over fixed premium mechanisms.

Fixed premiums (where the solar plant always receives a fixed premium on top of the market price, no matter the price level) require bidders to forecast the upfront costs of their project components, power prices (including negative price periods), and curtailment levels. This complicates the bidding process, increases risks associated with

[9] For example, the French tenders for rooftop PV (100 to 1 MW) and for PV self-consumption (100 kW to 500 kW) both subject solar installations to competitive bidding processes as low as 100 kW. This resulted in undersubscription and notably the suspension of the tender for self-consumption installations in May 2019 by the energy regulator due to an under-subscription of the auctions (15.3 MW was subscribed out of a total capacity of 50 MW).

unpredictability and fuels the so-called 'winner's curse' where the most optimistic forecasts allow for the lowest bids, which might be too low to allow for a profitable solar project.

On the contrary, in a sliding premium, or Contract for Difference model, the solar plant operator signs a contract with the government agreeing to a guaranteed strike rate for the generated solar electricity. This means that if the solar power is sold (market price) at a lower price than the strike price, the government grants a premium to meet the strike price; if the market price is higher than the strike price, the solar plant operator pays back the difference to the government. This model limits uncertainty in the bidding process by avoiding errors in power price forecasting.

6) Competitive bidding tenders should reflect the tendering authority's need for a secure and cost-effective energy transition: they should be both price and need-based (load-profile, land use, etc.)

As renewable energies become more and more cost-competitive, **price-based/technology-neutral tenders become the norm to ensure that ambitious investments in renewables can be triggered at the lowest LCOE (levelised cost of energy production).**

Yet, as highlighted in article 4 of the Renewable Energy Directive, member states should be able, through tendering schemes, to guarantee the reliability of their energy mix and address specific geographical conditions by combining various load profiles in line with market conditions or system needs. **In doing so, such tenders should also encourage competition amongst technology options, to ensure that the energy transition happens at the lowest cost to European consumers**.

Technology innovation in renewables flexibility (power electronics, digitalisation, hybridisation) is redefining the offering and differentiation of existing renewable technologies. They no longer compete only on the basis of technology and cost profiles but on their effectiveness in meeting specific energy demand needs.

In this regard, SolarPower Europe suggests **introducing the notion of competitive tenders on "load specificity" (ex: grid friendliness, load profile)** in line with the Renewable Energy Directive, article 4.2.

Such tenders could value projects which are able to **supply a certain generation profile or provide ancillary services to the grid** (so-called "grid intelligent solar" as defined in SolarPower Europe's Grid Intelligent Solar report[10]). This could be satisfied by a **specific technology** (wind, solar, depending on the existing generation load) or a **combination of technologies** (hybrid plant combining wind+solar+storage or upgraded with power electronics). Such tenders already exist in islands or in areas with poor interconnectivity in order to ensure investment in energy capacities capable of meeting the resource adequacy constraints of the territory. This would support investment in flexible clean energy such as hybrid plants.

It could also value a **smart grid location** (ex: a plant located close to consumption points, thereby reducing the need for network reinforcement). Such criteria have been developed

[10] SolarPower Europe report "Grid Intelligent Solar – Unleashing the Full Potential of Utility-Scale Solar Generation"

in Canada (valuing the connection to the distribution grid instead of the transmission grid) or in China (valuing the shorter distance between the solar installation and the load point, enabling an internalisation of the future grid reinforcement costs).

7) Additional bonus criteria on environmental performance should be permitted, if transparent, clearly defined, non-discriminatory and technology-neutral, and if not introduced or changed retroactively.

While price-based tenders remain the main driver for the allocation of public support, bonus criteria can allow authorities to value specific solar project benefits while also rewarding the cheapest projects.

These bonus criteria should not be prioritised over price or load criteria, and should be weighted properly. They should be transparent, clearly defined and in line with WTO rules. It should remain optional for member states to introduce such bonuses where it makes sense, addressing a (country-)specific need (e.g. to reorient projects to certain types of land etc.) In addition, they should not be introduced retroactively or be changed between the different calls for a tendering programme.

Examples of appropriate environmental performance bonus criteria include:

- **Environmental performance recognised in the current preparatory work on ecodesign and ecolabel for PV panels and inverters.** Unlike the "**carbon evaluation criterion"** implemented in France, the current methodology for applying ecolabel or ecodesign criteria on PV panels and inverters covers all steps of the product's lifecycle, including the most carbon-intensive.
- A "**land use criterion**" which values projects which are built on degraded land. The notion of "degraded land" should be well defined and refer to existing criteria used by relevant public authorities. In France, land is considered degraded when qualified by relevant French administrative authorities as a polluted site, a former industrial site, a former quarry or mine where rehabilitation is not possible, a former air or maritime port, a former waste storage site, a body of water or a dangerous area.

2 - STATE AID AND INDUSTRIAL STRATEGY: SUPPORTING THE UPTAKE OF INNOVATIVE SOLAR TECHNOLOGIES.

Breakthrough solar cells, such as PERC cells, innovative photovoltaic technologies, such as Building-Integrated PV, or innovative application such as floating solar or agri-PV, even after demonstration phase, come at additional costs due to their lack of maturity which makes them uncompetitive in price-only tenders.

Specific tenders for innovative technologies should therefore be allowed by the State aid guidelines. This would help reward innovative projects that would otherwise not be competitive in tenders and support their market deployment. However, they should be accompanied by transparent and well-defined criteria. In addition, they should not go above a certain threshold: in France, for example, the tender for innovative technologies is capped at 5 MW for ground-mounted projects and 3 MW for building projects.

3 - PREPARING FOR THE NEXT GENERATION OF SOLAR: REVAMPING, REPOWERING AND HYBRIDISATION.

The first European solar systems will be reaching their end-of-life in the next decade: they might therefore be subject to revamping (component replacement without substantial change to nominal power of the plant) and repowering (component replacement leading to increased nominal power of the plant). In addition, due to the decreasing price of batteries, solar installations could be subject to hybridisation where battery storage is added to the plant.

At the moment, repowering is not incentivised by the EEAG and can be downright forbidden in certain member state for sites which are still under feed-in tariff schemes. A change in philosophy within the EEAG could change that and lead to very cost-effective renewable deployment in the short to medium-term in Europe.

Bearing the above in mind, the EEAG should consider developing a set of interpretative guidelines to clarify the relevant framework applicable to power plants that undergo substantial structural changes, resulting in revamping, repowering or hybridisation.

4 - SUPPORTING A BALANCED ENERGY TRANSITION WITH AN ADEQUATE FRAMEWORK FOR SMALL-SCALE SOLAR INSTALLATIONS.

Small-scale solar installations bring important socio-economic benefits[11]. Yet, these remain more expensive and/or difficult to finance when compared with utility-scale installations. Small-scale generators also have limited financial and administrative capabilities compared to larger operators. As acknowledged by the Electricity Market Design Regulation, until energy markets are ready for renewables, exposing them to inadequate aid designs or market obligations would create additional barriers. This could in turn result in a disincentive for smaller operators, thereby slowing down the deployment of smaller systems.

1) **In line with article 11 of the Electricity Market Regulation and article 4 of the Renewable Energy Directive, small-scale renewable installations with a capacity below 400kW should be exempt from market premiums unless the right conditions are in place in terms of market functioning and access, transparency of curtailment rules, congestion management and contribution to the Union's target for renewables.**

Due to their limited capabilities and smaller generation profile, smaller renewable operators will have to resort to third parties to market their energy. These additional requirements create additional burden for smaller developers. In addition, in many EU countries, these third-party markets are not yet fully developed and cannot offer smaller developers competitive services. It is therefore important that the provisions of the Clean Energy Package are fully implemented and that markets are ready for renewables before small-scale installations are exposed to electricity markets.

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[11] See the Small is Beautiful campaign

2) **State aid guidelines should be brought in line with article 4 of the Electricity Market Regulation and provide a derogation to balancing responsibility for small-scale renewable installations with a capacity below 400 kW.**

5 - COMPATIBILITY WITH RENEWABLE POWER PURCHASE AGREEMENTS.

Corporate Renewable Power Purchase Agreements (RES PPAs) are a private contract between two or more legal entities and as such fall outside the scope of State aid provisions.

EU State aid rules should only smallensure that future market-based support mechanisms are compatible with the use of corporate renewable power purchase agreements.

In line with the Renewable Energy Directive, **the design of renewable support mechanisms must be compatible with corporate renewable PPA contracts underpinned with Guarantees of Origin**. This will lead to lower bid prices from renewable energy projects competing in the auctions and result in a better deal for society.

Where such schemes are in place, **the ETS State aid guidelines should ensure that large energy consumers contracting corporate renewable PPAs can benefit from indirect ETS compensation**. The pricing of a corporate renewable PPA is based on the expected future wholesale power price which include carbon costs.

6 - CAPACITY MECHANISMS: A LAST RESORT TO ADDRESS SYSTEM ADEQUACY AND SUPPLY CONCERNS WHICH MUST COMPLY WITH THE PARIS AGREEMENT.

The State aid guidelines should be fully in line with the new provisions of the Electricity Market Design Regulation on capacity mechanisms.

In particular:

- **Capacity mechanisms should be introduced as a last resort mechanism and be preceded by a thorough evaluation of the potential of alternative, clean technologies**.
  Capacity mechanisms should be introduced only upon the identification of a resource adequacy concern through a European resource adequacy assessment that may be complemented by national assessments. These assessments should appropriately take into account the contribution of all resources, including energy storage, sectoral integration, demand response, as per article 19.4.c of the Electricity Market Regulation.
  In addition, when a resource adequacy concern has been identified, member states must publish an implementation plan for adopting measures in order to solve the adequacy problem, subject to the review and the monitoring of the European Commission[12].

[12] Electricity Market Regulation, article 18.2 and 3

- **If introduced, capacity mechanisms should be effectively open and accessible to all technologies, including storage and aggregation[13].** Renewable energy generation, such as solar, is variable but it is also flexible when combined with simple day-ahead forecasting. These clean generation assets must be allowed to play a role in grid resilience and flexibility. This means they must be allowed to play their role not only in the EU's electricity mix, but also in its balancing and capacity markets to ensure alignment with the Paris Agreement and a secure electricity to EU citizens. The revised EEAG must allow and encourage investment in grid intelligent renewable assets.

- In line with the State Aid Guidelines on Energy and Environment, point (233), **capacity mechanisms should give preference to low-carbon generators in case of equivalent technical and economic parameters. They must also comply with the Environmental Performance Criteria introduced in the Electricity Market Regulation, article 18b, paragraph 4.** This double threshold prevents the most polluting generation capacities from participating in capacity markets.

[13] Electricity Market Regulation, article 18b.1.h