Executive Summary

The Case for a Wider Energy Policy Mix in Line with the Objectives of the Paris Agreement

Shortcomings of Renewable Energy Auctions Based on World-wide Empirical Observations

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Commissioned by: Energy Watch Group, World Future Council / Global Renewables Congress & Haleakala Stiftung

Suggested citation:

Jacobs, D., Grashof, K., Del Río, P., Fouquet, D. (2020), The Case for a Wider Energy Policy Mix in Line with the Objectives of the Paris Agreement: Shortcomings of Renewable Energy Auctions Based on World-wide Empirical Observations. Executive Summary. IET – International Energy Transition, IZES, Spanish National Research Council (CSIC), Becker Büttner Held. A study commissioned by Energy Watch Group (EWG), World Future Council / Global Renewables Congress (WFC/GRC), and Haleakala Stiftung

1.1 Paving the way for an unprecedented scaling up of renewables

The global average mean surface temperature has already increased by 1.3°C compared with pre-industrial levels (Copernicus Climate Change Service/ECMWF 2020). This leaves us little more than a decade to decarbonize the worldwide economy and energy systems in or- der to meet the 1.5°C target laid down in the Paris Agreement and avoid catastrophic climate change.[1] A number of studies have shown that a 100% renewable energy-based electricity system is technically and economically feasible on a global scale (Bogdanov et al., 2019; Brown et al., 2018; Jacobson et al., 2019). Other studies have found that very high shares of electricity from renewables can already be achieved by 2035, as shown by the case of the USA (Phadke et al., 2020).

Even though the exact timeline for full decarbonization and the precise share of renewables in the worldwide electricity and energy mix vary from one scenario to the next, there is a broad consensus around two central facts:

- **First, renewables will need to provide the lion's share of electricity, heating, cooling and transport-related needs.**
- **Second, renewables need to be scaled up at an unprecedented rate to achieve this objective. Even to decarbonise the world economy by 2050, it is estimated that global deployment rates of renewables will need to increase at least six-fold (IRENA 2018).**

The current growth trajectory of renewables is linear rather than exponential, and recent years have seen a stagnation of capacity additions (see Section 2.2). This indicates that **the current renewable energy policy mix is failing to deliver.** The deployment targets for renewables and the associated **procurement levels of capped auctions are far too low to meet the objectives of the Paris Agreement.** Thus, in order to achieve the required level of growth in renewables, **a fundamental rethink of the current policy toolkit is needed.**

In previous decades, the renewable energy policy debate was frequently dominated by the debate between quota-based instruments and feed-in tariffs (in the 1990s and 2000s) and between auctions and feed-in tariffs (or feed-in premiums) in the 2010s. **These dichotomies need to be overcome.**

Now that renewables have become least-cost in many markets around the world, the traditional argument about needing to constrain their growth in order to protect ratepayers no longer stands: accelerating the growth of renewables can provide individuals and businesses worldwide with cheaper and cleaner energy. What is ultimately needed are policy frameworks that will **simultaneously incentivize investment from all types of actors and investors, across a wide range of technologies and project sizes.** This can enable a ramping up of renewables at an unprecedented rate, triggering the exponential growth needed for climate protection. In order to achieve this, a new and more diverse mix of policies will be necessary.

1 To meet the 1.5°C objective of the Paris Agreement, a remaining carbon budget of 580 Gt was estimated in 2018 (IPCC 2018). For Europe and Germany, for instance, this would require carbon neutrality by 2035 (SRU 2020).

This report analyses policy instruments for grid-connected renewable energy deployment in the electricity sector, focusing on the shortcomings of auctions and novel ways of combining them with administratively set feed-in premiums or feed-in tariffs.[2] The report therefore focuses on the most widely used policy instruments for the deployment of renewable energy in the electricity sector, with both instruments being used in more than a hundred jurisdictions worldwide.

We state the case for a broader policy mix, including feed-in tariffs for small and medium sized projects and auctions for large-scale installations. The question is no longer about the right choice of one policy instrument in the policy toolbox, but rather about the right combination of a variety of instruments, taking into consideration the advantages and shortcomings of both auctions and feed-in tariffs.

1.2 Shortcomings of auctions based on empirical observations

Auctions have become an important ingredient in the renewable energy policy toolkit. However, while acknowledging that all policy instruments have their strengths and weaknesses, in this report we focus on the shortcomings of renewable energy auctions in order to counter widespread overestimates of their capacity to achieve their goals. Sufficient time has passed since auctions were first introduced in a large number of countries. Accordingly, conclusions can now be drawn on a broad basis of empirical knowledge.[3] This empirical evidence needs to be recognized and more widely-known if the renewable energy policy debate is to retain its claim that it is evidence-based. (see below)

2 Other relevant parts of the policy design, including grid integration, market design and sector coupling, are not discussed in this report, nor do off-grid policies for renewable energy deployment form part of the analysis.

3 The analysis of the shortcomings of auctions was based on empirical findings in a large number of countries and regions around the world, including Argentina, Australia, Brazil, Chile, Colombia, Denmark, France, Germany, India, Italy, Jamaica, Japan, Mexico, the Netherlands, Peru, Portugal, Spain, Saudi Arabia, South Africa, Taiwan, the United Kingdom, and the United States.

DIVERSITY OF ACTORS

Auctions fail to provide fair access to everyone and deter small-scale actors

Auctions have shown a tendency to favour large-scale actors. This is in line with theoretical expectations due to transaction costs, economies of scale favouring larger projects, the need to bear the sunk costs of unsuccessfully bid projects and the costs of capital, all of which create competitive advantages for the larger actors.

DIVERSITY OF PROJECT SIZES

Auctions do not promote a variety of project sizes, as the larger projects are typically successful in outbidding the smaller ones; small and medium-size projects are therefore frequently excluded

Auctions will typically steer investors towards the largest possible projects because these allow project developers to achieve higher economies of scale. Experience from jurisdictions around the world confirms that auctions have been broadly unsuccessful at encouraging different project sizes simultaneously.

MARKET CONCENTRATION

By favouring financially strong and large actors, auctions foster market concentration

While the participation of small actors in the renewable energy sector is generally acknowledged to be an important ingredient of a just and fair energy transition, small actors have difficulties entering the sector via auctions for a number of reasons. The available evidence shows that auctions lead to higher market concentrations of a few incumbent firms and international project developers, to the detriment of small or new actors.

PUBLIC ACCEPTANCE

In deterring small actors, auctions impair important conditions that support the acceptance of new projects

The further expansion of renewables, in particular onshore wind, depends on sufficient accep- tance among local stakeholders and the surrounding communities. Small actors like community energy groups frequently cannot spread the risk of potentially unsuccessful bids due to small project portfolios and a weak capital base. Economies of scale are limited because the projects are generally rather small, and such actors mostly limit their search for land to a close regional area. However, well-conducted community energy projects can support local acceptance by em- phasizing procedural and distributive fairness (e.g. allowing local citizens to participate in plan- ning decisions and to invest). Such projects also permit an easier integration of local concerns and adaption to local conditions.

TARGET ACHIEVEMENT

Auctions often suffer from undersubscription, project cancellations or delays, hampering the timely achievement of renewable energy expansion targets

Many countries around the world have established targets for renewable energy deployment. The empirical evidence shows that auctions have a poor track record in achieving such deployment targets. Ineffectiveness refers to both the auctioned volume being undersubscribed (so-called “ex-ante ineffectiveness”) and to delays and underbuilding (so-called “ex-post effectiveness”). In contrast to their image as policy instruments guaranteeing firm political control over expansion levels, auctions set maximum targets which in reality are frequently missed. Theoretically, capped

policy instruments could lead to the necessary deployment of renewables if only the deployment targets and schedules were in line with the objectives of the Paris Agreement. However, empirical evidence shows that currently deployment targets are far below the necessary deployment in line with the Paris Agreement.

COST REDUCTION

Contrary to received wisdom, auctions do not guarantee low remuneration levels, nor have they caused the recent cost reductions of renewables

Instead, a surge in the global deployment of renewable energy (and the associated experience curves), combined with the unprecedented decline in global interest rates, drove the bulk of the cost declines we experienced during the last decade. It is these declines that were subsequently reflected in auction results around the world.

1.3 Auction shortcomings cannot simply be overcome by design modifications

Many countries have implemented auctions, often replacing feed-in tariffs wholly or partially, assuming that auctions can deliver the same results, but in a more efficient manner. However, the assessments in sub-sections 3.1 to 3.6 show that auctions have certain inherent shortcomings that are difficult to be overcome by changes to their design. Design modifications always entail trade-offs, and an attempt to overcome one deficiency is often made at the expense of increasing another. In other cases, design modifications have simply failed to achieve their goals (see Section 5.1).

Accordingly, we argue that the shortcomings of auctions analysed in this report cannot simply be eliminated by changes in auction design. Instead, they demon-strate the need to implement a combination of policy instruments (see Couture et al., 2015; IEA RETD 2016b, del Río 2014).

1.4 Shortcomings of feed-in tariffs and feed-in premiums re-visited

Administratively set remuneration schemes, such as feed-in tariffs and premium feed-in tariffs, also have their shortcomings. In the 2000s, the main criticisms of administratively set remuneration approaches made by conservative policymakers were (Cointe & Nadaï, 2018):

1. The difficulties of setting the right tariff levels, given the well-known problem of asymmetric information
2. leading to difficulties in managing market growth in schemes without capacity caps
3. … leading to difficulties in controlling the overall policy costs

These shortcomings of feed-in tariffs and premiums led policymakers around the world to reconsider their policy options and switch to auctions. However, in the past decade several aspects of the renewable energy technology sector have changed, in the process mitigating many of the previous shortcomings of feed-in tariffs. These developments are opening the door to a re-assessment of their potential merits, for instance, for small and medium-scale projects. An overview is given in the following table.

Table 1. Shortcomings of feed-in tariffs re-visited

	Perceived shortcomings of feed-in tariffs in the 2000s	Re-visiting shortcomings of feed-in tariffs in the 2020s
Managing market growth	• Rapidly growing shares of renewable energy capacity in countries without annual capacity caps, exceeding conservatively formulated political goals in some instances • Sharp increases in installed capacity, especially in the case of solar PV, due to short lead times, modularity and large potential for cost reductions along the learning curve which was perceived as problematic due to policy costs	• Higher market growth required due to Paris Agreement objectives • Availability of design options like tariff degression, growth corridors, etc.
Cost control	• High costs of solar PV, leading to high policy costs • The financial crisis of 2008 increased policymakers' concerns as regards the cost burdens on rate-payers • Policymakers pulled back, looking for options that allowed for stricter control of costs and market growth	• The cost of rapidly deployable technologies (solar PV) has fallen rapidly, but the pace of the cost reductions has slowed down • Solar PV and other renewable energy technologies are now least-cost technologies • Therefore, exceeding deployment targets will no longer lead to excessive costs for rate-payers
Setting tariffs appropriately	• Challenges resulting from information asymmetries between project developers and policymakers, especially for technologies (PV) with rapidly declining costs • Difficulties to adjust tariff levels fast enough • Limited data for tariff calculation because of rather small markets	• Improved data availability due to larger national and international markets • Data collection effort by IRENA and research institutes • Availability of auction results to inform tariff-setting • Improved implementation of automatic tariff reduction elements

Source: authors

1.5 Overcoming the old dichotomies: Combining auctions with feed-in tariffs in more innovative ways

A better understanding of the shortcomings of auctions should enable policymakers to calibrate the mixture of renewable energy policy instruments more effectively, to identify the comparative advantages of auctions, and to use them in particular contexts. This can allow policymakers to support a wider range of investor types, project sizes and renewable energy technologies simultaneously.

A particular weakness of the current policy landscape is that it is failing to create viable investment opportunities in medium-sized projects (which, depending on the definitions used, can range from 1-10MW up to 60MW). Creating an additional market segment ba- sed on medium-sized projects (remunerated via administratively set feed-in premiums or feed-in tariffs) has a number of potential be- nefits (as discussed in section 2.3):

- Easing grid integration
- Fostering regional diversity and distribution of projects
- Enhancing actor diversity and public acceptance
- Counterbalancing market concentration
- Easing access to capital for regional actors, and increasing local value creation
- Increasing the speed of renewable energy deployment

Globally and nationally, an over-reliance on auctions can entail insufficient RE deployment levels. Deployment targets which are reflected in procurement schedules under capped auctions are too low to meet the objectives of the Paris Agreement. In order to address this, more open-ended (i.e. less "volume-constrained") renewable energy development is needed, in particular for small and medium-sized projects.

We therefore propose to use different policy instruments for different market segments:

- Continued use of auctions for large-scale projects
- Use of feed-in tariffs or feed-in premiums for small and medium sized projects
- Use of self-consumption policies for very small-scale projects

This is only a starting point for a debate we deem necessary. Other criteria may also be appropriate in determining the relative suitability of feed-in schemes or auctions, such as the intended degree of local participation, the level of transaction costs for particular projects, instances where the application of renewables is mandatory (for instance, on the rooftops of new buildings) or other aspects.

1.6 Balancing the shortcomings of auctions through a parallel use of feed-in tariffs and feed-in premiums

The shortcomings of auctions we have identified can be balanced by applying feed-in tariffs and feed-in premiums for small- and medium-sized projects in parallel (see Section 5.4):

> **Increasing effectiveness: Meeting ambitious deployment targets on time**
A combination of capped auctions with uncapped or flexibly capped feed-in tariffs can be a solution to balancing the advantages and disadvantages of the two approaches

> **Increasing the diversity of project sizes: Supporting small, medium, and large-scale projects simultaneously**
By using auctions for large-scale projects and feed-in tariffs or feed-in premiums for small and medium-sized projects, the diversity of project sizes (and actor diversity) can be increased

> **Increasing actor diversity: Activating investments by all potential stakeholders**
We have not found any evidence that auctions have been able to sustainably promote a diversity of actors, even with modifications to auction design. However, there is widespread evidence that feed-in tariffs have been able to promote actor diversity and the participation of community projects in a number of countries.

> **Increasing efficiency: Keeping short-term prices low**
Combinations of auctions and feed-in tariffs or feed-in premiums can help increase the efficiency of remunerating renewable energy projects. This can be done, for instance, by running auctions and feed-in tariffs in parallel, using administratively set remunation to determine ceiling prices for auctions, and using auction results to inform remuneration levels for feed-in tariffs.

> **Increasing local and national value creation: Development of domestic industry and local value creation**
Especially in emerging markets, the implementation of auctions can lead to a situation in which new national actors cannot beat the low bids of international project developers. Policymakers can establish an additional market segment by focusing on medium-scale projects with remuneration based on feed-in tariffs or feed-in premiums, to be realized by local domestic actors.

1.7 Increasing policy options for member states in the European Union

In order to achieve the energy transition outlined by the European Green Deal to achieve climate neutrality by 2050, an immediate and rapid uptake of renewable energies is necessary. This is creating an urgent need to improve the current framework of support to renewable energy projects in the EU.

- Scrutinizing state aid should be restricted, and member states should regain full flexibility when giving state aid support to use, e.g., feed-in premium mechanisms without time-consuming and imposed auctioning systems.

- Member states should recognise that producing energy from renewables is a most important public service and should be recognised as Public Service Obligation – hence the need to remove scrutiny of state aid.