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Back to the future? Rethinking auctions for renewable electricity support

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ABSTRACT

The effectiveness and cost-effectiveness of two main types of instruments (feed-in tariffs and quotas with tradable green certificates) have usually been compared in the literature on renewable electricity promotion. Due to negative past experiences with a third instrument (auctions), this instrument has been broadly dismissed in academics and, until recently, also in policy practice. However, and based on an in-depth review of experiences with auction schemes for renewable electricity around the world, this paper argues that some of the problems with auctions in the past can be mitigated with the appropriate design elements and that, indeed, auctions can play an important role in the future implementation of renewable electricity support instruments around the world. The paper provides a proposal for the coherent integration of several design elements.

Contents

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1. Introduction

The effectiveness and cost-effectiveness of two main types of instruments, feed-in tariffs (FITs) and quotas with tradable green certificates (TGCs) have usually been compared in the literature on renewable electricity promotion. Effectiveness refers to increases in deployment of renewable electricity (RE) projects. Cost-effectiveness refers to minimisation of generation and support costs (€/MWh) (see [1]). Although usually treated separately, administrative and transaction costs are also part of the cost-effectiveness criterion. Other relevant (and interrelated) criteria include dynamic efficiency concerns (mostly related to the ability of instruments to encourage innovation, technology cost reductions and technological diversity) and social acceptability, which is mostly related to the not-in-my-backyard (NIMBY) phenomena, but also to the total costs of RE support.

The literature has traditionally focused on the comparison between FITs and TGC schemes and has shown that FITs have been more effective and cost-efficient than TGCs in Europe. Support levels minus generation costs (€/MWh) have been greater in countries with TGCs than in countries with FITs and, in the later countries, deployment levels (adjusted by the resource potentials) have also been larger [2–6]. This is (partly) attributed to the high risk and volatility and high TGC prices (e.g., [7]). In addition, mature technologies have been oversupported with TGC schemes, since, typically, all technologies receive the TGC price, which is set by the marginal technology needed to comply with the RE quota [8,9]. In contrast, FITs have provided greater revenue certainty and stability and, since they usually are technology-specific, support is generally better adjusted to generation costs, although this has sometimes not been the case with immature or expensive technologies with large (yet uncertain) potential for cost reductions, such as solar PV. In turn, auctions, although featuring low prices, have not delivered in terms of installed power (see Section 2). Some countries (e.g. Ireland, China, and the UK) have moved from auctions or TGC to FIT-based systems. Auctions have been broadly dismissed in academics and, until recently, also in policy practice.

However, a deeper review does not provide such a clear-cut picture. There are counter-examples of well-functioning TGC systems, such as the Texas Renewable Portfolio Standards (RPS) [10,11], and, although tendering schemes have proven ineffective in the past, this might be related to the design elements chosen (see Sections 2 and 3). In fact, a sensible conclusion of this review is that instrument choice is very context-dependent, but also that the critical element is not the type of instrument, but its design: as usual, the devil is in the details. FIT systems with low support levels resulted in very little installed power (e.g. Greece, see [12]). When the tariff was too high, or adjusted too slowly (PV in Spain) the scheme created a bubble that burst with significant collateral damage.

Auctions and FITs share some advantages. In contrast to TGCs, both ensure a reliable, long-term income for RE investors and they also allow regulators to know in advance the level of support provided. In fact, auctions allow them to know the quantity and the price, and therefore the total cost, whereas FIT only reveal the price, but not the quantity, unless complemented with a quantity cap. Under tendering schemes, the total amount of support provided can be more easily capped than under either FIT or TGCs, allowing investors to compete until the whole budget is gone.[1] FIT schemes for solar PV in the past (Spain, Czech Republic, Italy, among others) led to a dramatic increase in the total costs of support and reduced the social legitimacy for all renewables. Volume (capacity) control is easier under tendering. In addition, auctions deal better with the asymmetric information problem, i.e., they perform better than FITs when trying to know the true level of support required, especially for those technologies with large uncertainties about their cost trends, like offshore wind. Auctions reveal better the reduction in the costs of technologies over time and allow the support to be adapted accordingly. This ideally brings more efficiency into the system by preventing RE producers to be overcompensated. It also encourages competition between RE generators. Banded bidding schemes with pay-as-bid mechanisms allow support to be tied to generation costs, in contrast to TGC schemes (whether banded or not).

An additional argument for auctions is Weitzman's [13], which states that, under uncertainty, when cost curves are rather flat (the usual assumption for most RE technologies, see e.g., [14]), quantity instruments are better than price instruments, since potential mistakes in achieving a predetermined target are smaller.

Unfortunately, these theoretical advantages of auctions come at a cost. Due to the complexity of the bureaucratic procedures, and also to the planning required ahead, auctions have higher transaction costs [15] which, together with uncertainties on the final price and the tendering schedule, deter participation by smaller firms, resulting in a low degree of competition [16] and creating opportunities for market power. In turn, this may eliminate the higher theoretical efficiency of this instrument.

Moreover, if transaction costs are passed through to the final bid price, the cost of support increases. Dynamic efficiency (incentive for innovation) might also be lower than under FITs (see Section 2). Finally, particularly when the bid price is not the only criterion, the auction process is more opaque than the FIT. In turn, the lower cost of participation of FIT has also allowed for a more inclusive distribution of the benefits [17], particularly at the local level [18], thus promoting regional development and typically increasing the social acceptability of this instrument. In contrast, [19] argues that auctions encourage concentration of RES in certain locations and, thus reduces social acceptability. However, this can also happen with FIT, and in fact, auctions can do better here, by incorporating regional–national coordination mechanisms (see Section 4).

One usually cited disadvantage of auctions is that they do not give the right market signals to RE producers, which are therefore not encouraged to produce in peak times, to focus maintenance on lower demand seasons, or, generally, to increase operational efficiency. However, this is not a problem exclusive of auctions, it can also happen with FIT when the tariff is fixed.

Therefore, auctions present advantages and disadvantages compared to FITs and TGCs. However, many of these issues may be minimized by a careful design. In Section 2 the past experiences with auctions are reviewed and the major problems encountered. Accordingly, solutions are offered in Section 3. The aim is thus to identify key design elements of auctions which would likely result in an effective and cost-effective deployment of RE. This will become even more relevant in the future, due to the coming challenges for RE policy, particularly in Europe: the

[1] It can be argued that, since RE generation is capped under TGCs, the total amount of support would also be capped. However, this is not the case, since total support depends on the amount of RE generation times the level of support, which depends on the a priori unknown interactions between the demand and supply sides in the TGC market.