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Is the answer blowin' in the wind (auctions)? An assessment of the Italian support scheme

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ABSTRACT

This article proposes a quantitative data-based assessment of the onshore wind auctions conducted in Italy from 2012 to 2016. Our objective is to provide new insights in the ongoing debate on policy measures to promote renewable energy sources. Italian wind auction design is examined by firstly investigating its overall outcomes in terms of cost efficiency and policy effectiveness. Determinants affecting awarded tariffs are then empirically analysed further to explore the role of project-related and firm-specific factors as well as different auction design elements. The extreme simplicity of the auction design undoubtedly has promoted competition, encouraging many project developers to bid and reducing support both in static and dynamic terms. Results provide evidence that localisation factors did not constitute a competitive constraint. From a policy perspective, the administratively setting of ceiling prices is a major issue when wind resources are widely available and auctioned capacity is not sufficiently high. While not limiting competition, the effects of pre-qualification criteria on the realisation rate deserve further analysis. However, doubts emerge on the policy effectiveness of the current support scheme which makes difficult to control the total amount of support provided thus likely causing stop-and-go cycles of financing and potentially favouring distorted bidding behaviour.

1. Introduction

This article provides a quantitative data-based assessment of the onshore wind auctions conducted in Italy from 2012 to 2016. More specifically, this paper investigates the policy effectiveness and cost efficiency of onshore wind auction schemes and explores the determinants of the incentives granted in accordance with current auction arrangements. Our objective is to provide new insights in the ongoing policy debate on policy measures for the promotion of renewable energy sources (RES). A growing number of countries have held auctions to encourage the generation of electricity from onshore winds as well as from other renewable sources in the last few years (Frankfurt School-UNEP Centre/BNEF/BNEF, 2016; IRENA and CEM, 2015; Wigand et al., 2016). The increasing popularity of this method can be explained: they provide the opportunity of ensuring the increasing penetration of RES in a transparent, economical and well-planned manner (Maurer and Barroso, 2011). The number of countries utilising tendering mechanisms increased to 64 in 2015 from just 9 in 2005 (REN21, 2016). Reliance on these competitive procurement methods is also growing more common in the European Union despite negative experiences, like the United Kingdom's Non-Fossil Fuel Obligation (NFFO), while many winning projects that have not been followed up or completed initially limited their implementation (Butler and Neuhoff, 2008; Mitchell and Connor, 2004). Auctions to purchase long-term contracts were recently held in France, Germany, Italy, and Spain. In its *Guidelines on State Aid for Environmental Protection and Energy for 2014–2020* (European Commission, 2014), Member States were asked to introduce auctioning or competitive bidding processes for RES as a means of leading to cost-efficient support levels and to the gradual phasing out of subsidies.

Much of the literature on RES support mechanisms to date has focused on feed-in-tariffs (FITs) and renewable portfolio standards (RPS) (Haas et al., 2011; IEA, 2011; Mahalingam, 2014; Sun and Nie, 2015). As a consequence of their growing popularity, studies of experiences with auction programmes for providing electricity from RES are rapidly increasing; they aim to assess their environmental effectiveness and cost efficiency, both in static and dynamic terms, as well as to provide guidance on how best to auction RES technologies (Ausubel and Cramton, 2011a; Mastropietro et al., 2014; Wigand et al., 2016). The main finding of the extant literature on RES auctions is that, while auctions can ensure comparatively lower and steadily falling over time, positive outcomes are highly dependent on context and technology: no one-size-fits-all solutions exist (del Río and Linares, 2014).

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Major drawbacks are still potential failure to start operating commercially and difficulties in attaining the initial capacity target (Azuela and Barroso, 2011; Butler and Neuhoff, 2008; Kreiss et al., 2016). As a result, there is still room for further in-depth analysis, especially for finding out which factors make the success of RES auctions more likely and how and whether different design elements influence auction results in the light of overall RES policy objectives. Additionally, the lack of suitable data on RES auctions gives limited opportunities for comprehensive research and there are few empirical studies based on quantitative analysis (Shrimali et al., 2016).

In July 2012, a descending price auction scheme was introduced in the Italian electricity system as a part of a new incentive regime for supporting electricity generation by RES plants. The main driver of the reform was the opportunity to reduce the overall direct and indirect costs of RES support for electricity consumers by introducing more cost-reflective incentive schemes and by constraining RES deployment volumes (Cassetta and Monarca, 2013; Monarca et al., 2015). The rather generous incentive schemes previously adopted, together with the prolonged fall in final electricity demand caused by the economic crisis, have resulted in overcompensation and excessive demand for new installations as well as in growing difficulties (and rising costs) in ensuring the operational security of the power generating system, which contains an increasing proportion of intermittent RES. The tendering scheme applies to RES plants which exceed a given installed capacity threshold and to limits set by yearly annual quotas of supported capacity for each technology. Incentives are awarded to bidders that offer the highest tariff reduction from the preset ceilings. There were three initial rounds after the introduction of the new support scheme (2012–2013–2014) and a fourth round was held in 2016 after the capacity cap and price ceiling were reviewed.

Onshore wind power auctions are especially interesting since they have been perceived as enormously successful, while there is growing doubt regarding the realisation rate of winning projects (GSE, 2015; Tiedemann et al., 2016). The Italian experience of onshore wind auctions allows a preliminary quantitative data-based assessment of their results to be made which provides valuable insights into the design and use of auction procedures to promote RES. More specifically, using an original database created from the results of the Italian onshore wind renewables energy auctions held in the period from 2012 to 2016, integrated with accurate information about the bidding firms, our study investigates how different design elements, bidders and the economic characteristics of the projects, as well as other contextual and technological factors, may affect award incentives and hence the overall outcome of the auction procedures in addition to the determinants of the base tariff selected by the auction participants. Our results may have potential applications in designing tendering mechanisms for RES support.

The remainder of this paper is organised as follows: in Section 2, the literature background is presented and the design elements of Italian onshore auction schemes are briefly overviewed while, building on this conceptual background, Section 3 presents the empirical strategy and data sourced, Section 4 discusses the results and their implications and Section 5 draws conclusions and provides some policy implications.

2. Renewables auctions: theoretical background

2.1. Literature background

In the last few years a number of studies have investigated the different RES support schemes to evaluate their performance in terms of environmental effectiveness and cost efficiency (Batlle et al., 2012; Breeze, 2012; Cassetta and Surdi, 2011; Fouquet and Johansson, 2008; Haas et al., 2011; IEA, 2011; Lewis and Wiser, 2007; Linares et al., 2013; Mahalingam, 2014; Sun and Nie, 2015; Verbruggen and Lauber, 2012). Nevertheless, mostly because of the random use made of these schemes around the world compared with feed-in-tariffs (FITs) and renewable portfolio standards (RPS), far too little attention has been paid to RES auction schemes. As observed, the opportunity to control the costs of RES support and deployment volumes as well as recent positive results achieved in some countries explain a renewed interest in auction programmes both at government and scientific level as a means for procuring supplies of renewable energy (Becker and Fischer, 2013; Cozzi, 2012; European Commission, 2013; IRENA, 2013; Kreycik et al., 2011; Shrimali et al., 2016).

Literature traditionally places auction-based approaches among quantity-driven as opposed to price-driven policy instruments, though they often include some characteristics of the latter (IRENA and CEM, 2015; Verbruggen and Lauber, 2012; Weitzman, 1974). Indeed, RES auction schemes are usually applied as follows (Haufe and Ehrhart, 2016; IRENA, 2013; Meier et al., 2015): a public authority sets an RES target, either technology-specific or technology-neutral (IRENA, 2015); a tendering procedure is then set up to select from different RES projects meeting predetermined technical and financial criteria those able to produce electricity at the lowest prices per unit. Sealed bid or descending clock auctions are the types which have been commonly used, although many types of auctions can be conceived (Ausubel and Cramton, 2011b). Public authorities may also consider including additional criteria, such as the project's contribution to local industrial development, technological specifications and environmental requirements. A long-term contract for the production of renewable electricity is then offered to the winning bidder, often for between 15 and 20 years and based on the prices it proposes.

Extant studies have emphasised some theoretical features of RES auction schemes which are particularly attractive for both government and RES producers (del Río et al., 2015; Haufe and Ehrhart, 2016). The origin of the concept was that it gave the opportunity of taking advantage of the efficiency gains deriving from the competition that auctions create among producers of large scale renewable projects, which are relatively standardised products (Ausubel and Cramton, 2011a). Assuming a competitive market and to the extent that auctions are properly designed and conducted, auction-based approaches are better means of managing the uncertainty and asymmetry of information about production costs and other relevant variables, i.e. the LCOE, Levelised Cost of Electricity; they help to minimise the total cost of RES support and to prevent potential windfall profits not to speak of underpayments (Ausubel et al., 2014; Klemperer, 2002; Maurer and Barroso, 2011; Mcafee and McMillan, 1987; Schäfer and Schulten, 2015; Weitzman, 1974). As reported by McCrone et al. (2017), an average reduction of 30% in renewable energy project tariffs has been achieved when a country moves from a feed-in tariff or green certificate programme to its first auction. Moreover, competition among RES developers provides incentives for the better exploitation of RES in terms of technologies and local availability as well as for minimising costs throughout their supply chains (Conti, 2012). By revealing the reduction in the costs of technologies, auctions can also enable adjustments to be made to RES support costs over time, especially when a clear schedule for the new power capacity is provided (del Río and Linares, 2014). As for FIT approaches, long-term contracting provides RES producers with a guaranteed income, thus limiting investment risk, but auction schemes also allow governments better to manage the total amount of support they give; the exponential increase in the cost of support is one of the main reasons for the reduced political feasibility and social acceptability of RES deployment in many countries, e.g. Italy and Spain (del Río and Linares, 2014)

Major pitfalls of RES auction schemes arise when RES developers do not succeed in delivering the contracted capacity on a commercial basis because they have underbid, or as a result of planning restrictions, such as building and environmental permits (Mitchell and Connor, 2004). Underbidding may depend on what auction theorists call the “winner's curse”, which reflects the danger that the RES developers offering the lowest prices are likely to be those having overestimated their ability to finance and realise the project (Ausubel and Cramton, 2011a; Klemperer, 1999). In turn, this may result in governments not hitting the RES capacity target initially set (Butler and Neuhoff, 2008). High bureaucratic and administrative costs, including those required for making plans in advance when there is uncertainty about project costs