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Increased auctioning in the EU ETS and trade in guarantees of origin for renewables: A comparison of the impact on power sector producer rents

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Abstract

The European Commission is currently reviewing two major policy instruments which will pose major economic challenges and opportunities for EU power producers. First, the European Emissions Trading Scheme (EU ETS) is likely to include a high percentage of auctioning. Second, support schemes for electricity from renewable energy sources may involve open private-actor trade of guarantees of origins (GO). This paper provides a first coarse comparison of the impacts of these policy changes on power sector producer rents. The results suggest that the losses in producer rents from increased auctioning in the EU ETS may be offset by additional producer rents from private-actor based GO trade for renewable electricity.

Introduction and Objective*

Following the spring 2007 decisions of the Council of the European Union[1] there are two important policy proposals currently under development by the European Commission (EC) which pose vital challenges for power producers in the EU:

First, to help achieving the EU's greenhouse gas (GHG) emission reduction target of 20% (30%) in the year 2020 (compared to 1990 levels) the EC is currently reviewing the EU core climate policy measure, the European Union Emissions Trading Scheme (EU ETS). One of the likely outcomes of the review is a significant increase in the share of allowances that companies covered by the EU ETS have to purchase in the third phase of the EU ETS starting in 2013. While the share of allowances that Member States may auction off in the second phase (2008-2012) is limited to 10 percent, the EC intends to increase the auctioning share to two-thirds for the third phase.[2] Among other things, auctioning will address "windfall profits", in particular for power producers. Because power demand is fairly inelastic and competition from outside the EU is weak, power producers manage to pass on a large share of the additional costs associated with GHG emissions (i.e. the price of allowances) to customers. If allowances are allocated for free, extra profits (producer rents, often termed "windfall profits") accrue. Independent of whether allowances are allocated for free or auctioned off, power producers not covered by the EU ETS such as nuclear, small fossil and - depending on the support scheme in place - also renewable power plants also enjoy additional producer rents from higher power prices.

Second, the EC is currently preparing a renewable energy Directive to provide further clarification and assistance on the achievement of 20% renewable energies in total final energy consumption by the year 2020. Thus, 2020 renewable

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1 Council of the European Union, 7224/1/07, REV 1.

2 PointCarbon (12 December 2007) cites Jos Delbeke, a senior official within the EC, DG Environment as follows: "We estimate that two-thirds of the allowances, approximately, will be auctioned".

energy targets for individual Member States as well as accompanying policy measures will be proposed. In particular, this will involve the introduction of a flexibility mechanism to better match, in particular, renewable electricity (RES-E) potentials to Member State targets, while striving for a cost-effective exploitation of RES-E at the European level in the future.[3] Most likely, these targets will be based on a flat rate approach, which includes the same percentage point increase for each country and a modulation by the level of a Member State's GDP. A prominent proposal[4] involves trade of Guarantees of Origin (GO) on a private level to increase the Member States flexibility in reaching their targets both domestically and via imports from other countries.5 While trading of GO may result in cost-efficient RES-E deployments, it may also generate significant producer rents. Unless there are technology-specific GOs a uniform European GO price for all RES-E options would be set based on the marginal cost of the most expensive technology (marginal producer) necessary to meet the aggregate target for RES-E deployment in the EU. Producer rents accrue for all renewable electricity generators with generation costs below those of the marginal producer.[6]

Figure 1 illustrates generically the possible producer rents (surplus) arising from such a technology-neutral support scheme for producers of renewable electricity. The violet line reflects a cost-resource curve of the additional realisable potential for renewable electricity. The whole basket of available RE technologies is clustered into several bands, indicated by their (long run) marginal generation cost and the corresponding realisable future potential. Low-cost options such as biowaste incineration, biomass co-firing or most preferable sites for wind onshore are on the left part of the merit order curve, followed by moderate RES-E options – e.g. wind onshore at moderate sites, wind offshore, small-scale hy-

3 The paper focuses on RES-E and abstracts from effects that may arise if large-scale renewable heat would also be included in such a trading scheme.

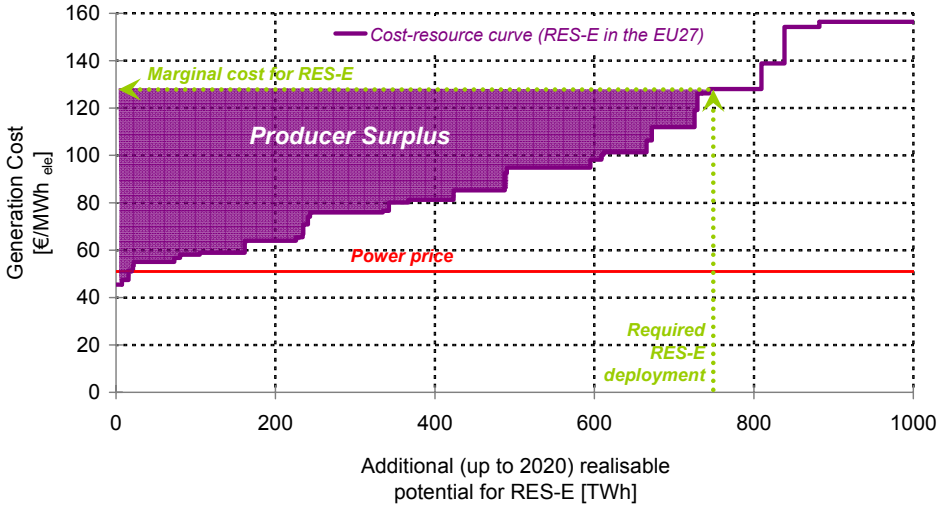
4 Ecofys (2007).

5 An alternative to GO-trade on private level is GO-trade on Member State level, which is favoured by several renewable energy associations and different Member States. This proposal would have significantly different effects compared to a proposal based on private trade. In particular, a large increase in producer profits for renewable generators would not appear in a scenario where only Member States were allowed to trade, and where the trade involved the surpluses or deficits of RES-E targets, while national RES-E support schemes remained undistorted.

6 For these (and other) reasons the UK government is currently considering technology banding for the UK renewable obligation certificate (ROC) market.

dropower or large-scale biomass plants. On the margin with regard to the required additional RES-E deployment up to 2020 are large-scale agricultural biogas and medium-range biomass plants. Consequently, a mandatory technology-neutral GO trading scheme is expected to result in significant producer rents, which are shown in Figure 1 as the violet area above the cost-resource curve.

Figure 1: Producer surplus arising from technology-neutral GO trade (illustration)



The purpose of this paper is to offer a first tentative assessment and comparison for the net impact of these two pending policy proposals on the producer rents[7] of power producers in the European Union (EU-25).

7 Gross of corporate income taxes etc.

Methodology and Results

We start with calculating the changes in producer rents for different auctioning shares within the ETS based on the following assumptions:

- The (implied) allocation budget for the power sector will be 25 % lower than projected CO_2-emissions for the third phase of the EU ETS, which is assumed to last from 2013 to 2017.[8] Allocation for the fourth phase (2018-2022) will be 30% lower than projected emissions. For the second phase (2008-2012), the budget is assumed to be 20 % lower.[9]
- The power sector will have to purchase allowances for 75 % of its implied allocation budget in the third phase, and 100 % in the fourth phase.[10] As a benchmark, we use an auctioning share of 5 % for the second phase.[11]
- The future price for EU allowances (EUAs) is 25 €/t for the second, third and fourth phase (expressed in 2005 €).[12]
- The "pass-through rate", which reflects the extent to which the additional costs of carbon result in an increase in the power price, is 80 %.[13]

8 We assume that the trading periods continue to last for five years. However, the next period may also be longer and last for eight years until 2020.

9 These are very rough estimates, based on the following. a) The need to achieve the EU emission reduction target for 2020: the implied reduction efforts are in line with differences between the baseline scenario and the efficiency scenario in Mantzos et al. (2006), but adjusted to achieve the 20% reduction target in 2020. b) The need for the power sector to reduce disproportionably for cost-efficiency reasons. c) Implied reduction efforts for the second phase of 16% compared to projected emissions for all installations covered by EU ETS (see Schleich et al. (2007)). d) Since emissions projections are based on estimated emissions for the power sector (thermal power plants) in Mantzos et al. (2006), they also include emissions from installations not covered by the EU ETS, such as power installations with a capacity of less than 20 MWth.

10 Of course, these figures are somewhat arbitrary, but nevertheless in the range of the likely outcomes. According to the EC, a very high percentage of auctioning is planned for the power and energy sectors (PointCarbon from 12 December 2007 citing Jos Delbeke, a senior official within the EC, DG Environment).

11 In phase two only about 3-4% of allowances will be auctioned off or sold on the secondary market. However, the power sector is assumed to have contributed more than in proportion to the auctioning budgets through a tighter allocation of free allowances.

12 If banking between phases is allowed, prices for EUAs should be about equal in absence of any unexpected demand or supply shocks. A price of 25 €/t is in line with the current future price for 2012.

13 This figure is in line with estimates for pass through rates in EU MS presented in Sijm et al. (2006).

Based on these assumptions the impact of the auctioning of emission allowances has been estimated. The producer rents captured through auctioning are shown as the blue line in Figure 2 (all monetary values are expressed in 2005 €).

To calculate the producer rents for a European wide mandatory and private-party based trading scheme for renewable guarantees of origin (GO) we assume the following:

- "Export restrictions (by Member States) of GOs will be limited to a minimum" as stated in the paper by Ecofys (2007). In this case, profit-maximizing RES-E generators will aim for the highest support level offered in any of the Member States. This will put pressure on current support schemes to align. Eventually, technology-differentiated support schemes will be replaced by a uniform EU-wide trading system (Ecofys, 2007, p. iv). For our calculations, such a uniform price for tradable GOs was allowed to emerge endogenously from 2010 on for all new RES-E deployment. For each year, this price reflects the cost of the marginal RES-E option to meet the linearly interpolated annual aggregated RES-E target for all EU-25 MS.
- The majority of future investments will be made by corporate European power companies. This assumption can be justified from the experiences in countries, which base their support system on tradable green certificates, where large corporate investors turned out to be better suited to deal with higher investor risks (Mitchell et al. 2006).
- Although arguable, no risk premium (reflecting investor's risk under a trading scheme to incorporate uncertainty on future earnings) was added to the model-based assessment.[14]

14 Based on the experience with trading systems in the UK, risk-premiums would increase prices for RES-E.

Producer rents resulting from mandatory private-actor based GO trade are calculated by the Green-X model, which contains a detailed representation of costs and potentials for renewable energy sources in the EU Member States[15]. In particular two scenarios were calculated for this analysis:

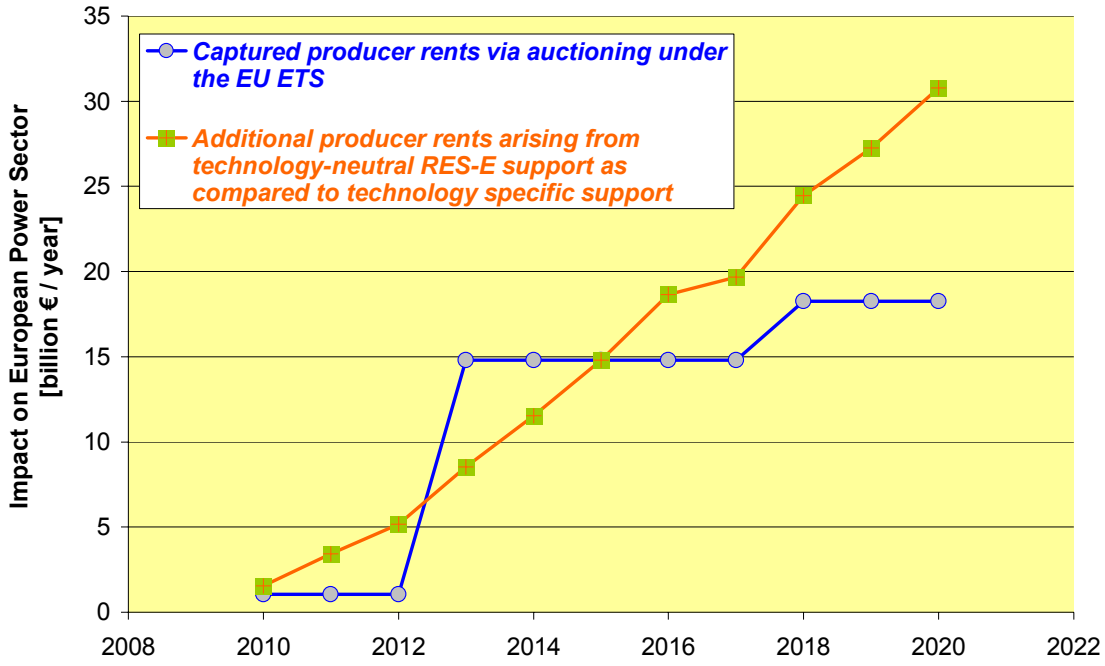
- Scenario I: In order to reflect the effect of mandatory private-actor based GO trade a harmonised non-technology-specific support of renewable electricity was modelled, which leads to one uniform price of GOs all over Europe (see above).
- Scenario II: The second case represents a cost-reflective support for renewable electricity as currently implemented or planned in the vast majority of EU Member States.[16] To reduce producer rents, these systems include technology-specific feed-in-tariffs with step-wise rates mimicking the cost-reductions for individual technologies over time.

The derived results comprise the transfer payments arising from the applied RE policy schemes, defined as the direct financial transfer from the consumer to the RE producer In a last step the additional producer profits occurring in the case of an unlimited private actor based trade policy have been calculated by subtracting the transfer payments occurring in both scenarios I and II. The result of this calculation is also portrayed in Figure 2 as the orange line (expressed in 2005 €).

15 For details on the Green-X model and assumptions used in these calculations see www.green-x.at and www.optres.fhg.de. The assumptions on the future development of electricity demands and energy prices in these calculations are based on the energy efficiency scenario in Mantzos et al. (2006): “European Energy and Transport Trends to 2030” - update 2006.

16 In particular all feed-in or premium systems offering differentiated tariffs for individual (clusters of) RES-E technologies as well as the planned banding in the UK ROCs system represent such technology-specific support schemes.

Figure 2: Impact of captured producer rents via auctioning under the EU ETS and additional producer rents arising from technology-neutral RES-E support as compared to technology specific support on the European power sector (EU25)



Conclusions

The results derived in this paper suggest that captured producer rents due to auctioning of EUAs under the EU ETS and new producer rents due to certificate-based renewable energy trading are of similar quantitative order of magnitude.

Thus, from a purely distributional perspective, the introduction of a private-actor based GO trade for renewable electricity may largely offset the reduced producer rents in the European power sector due to auctioning increasing shares of CO_2-emission allowances.

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