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Energy and climate hand-in-hand: Financing RES-E support with carbon revenues

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HIGHLIGHTS

- Making electricity consumers pay for RES-E support is highly questionable.
- Italy's "A3" RES-E surcharge is markedly regressive.
- A non-ETS carbon tax would be less regressive than the A3 surcharge.
- A €20 non-ETS carbon tax would enable a significant cut of the A3 surcharge.

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ABSTRACT

In Italy, the cost of support for renewable electricity (RES-E) is largely recovered through the "A3 surcharge", which weighs heavily on electricity bills. Using household survey data, we show the A3 surcharge is markedly regressive. Carbon taxation in the non-ETS sector is envisaged as a means to reduce CO_2 emissions cost-effectively and generate revenue to lower the A3 surcharge. A non-ETS carbon tax would be less regressive than the A3 surcharge and its cost would be more evenly distributed across households. We calculate the revenue of a €20/tCO_2 non-ETS carbon tax would have allowed a cut in the A3 surcharge of about 68% in 2011, and 39% in 2012. The impact of the carbon tax plus the reduced A3 surcharge would have been less regressive, but the cost higher for most households. The restrictions imposed in the simulations mean the results are only appropriate to render first-round effects of the reform.

Policy relevance: In the vast majority of the EU Member States, the cost of RES-E support is largely paid by electricity consumers, most often through specific surcharges. Rising electricity prices are a common concern given the implications for competitiveness and equity. The Member States facing this issue could conveniently address it through environmental tax reforms consistent with the Climate and Energy Package. Replacing RES-E surcharges with carbon taxes in the non-ETS sector would permit cost-effective reduction of CO_2 emissions while allocating the cost of RES-E support more equitably. The difference in regressivity would stem from the different consumption patterns of home fuels (including electricity) and motor fuels across income distribution. A cross-country comparison of energy household budget shares proves the structural nature of this difference between home fuels and motor fuels. Moreover, the notion that electricity consumers should pay for RES-E support is questioned on the grounds that electricity is a basic necessity good and RES-E support is a means of providing public goods, notably energy security and climate protection.

1. Introduction

Under the Climate and Energy Package (C&EP), the EU is committed to binding targets both for greenhouse gas (GHG) emissions and renewable energy: a 20% reduction in emissions from the 1990 level and renewable energy production covering 20% of energy consumption by 2020. While the EU Emission Trading Scheme (EU ETS) is the prime instrument for achieving the first target, various schemes at the national level, including feed-in tariffs, green certificates, tender systems, tax benefits and

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investment subsidies, are used to incentivise renewable energy sources (RES). Following the economic crisis, the relevance of RES support relative to the EU ETS greatly increased: while the price of emission allowances progressively fell, RES support, especially support for renewable electricity (RES-E), reached significant levels in many Member States.[1]

RES-E support, in the EU, is largely paid by electricity consumers. According to a report of the Council of European Energy Regulators, this is the case for 20 of the 22 Member States considered there (CEER (2012)). The cost of feed-in tariffs and tenders is recovered through specific surcharges, while that of green certificates is passed through from conventional generators to consumers via the electricity market. In either case, making electricity consumers pay is questionable from the equity standpoint. Electricity consumption is a basic necessity and therefore price increases are regressive: on average, the burden is proportionately greater for the poor than for the rich.[2] More fundamentally, as RES-E support is a means of providing public goods such as energy security and climate protection, the case is strong for it to be State funded (Chawla and Pollitt, 2013, Newbery, 2014).

Different factors explain why the cost of RES-E support is largely placed on electricity consumers as opposed to being State funded. First, the existing constraints on public finances do not leave sufficient margins for public spending. Second, as they are not directly dependent on budgetary decisions, electricity surcharges and green certificates (with guaranteed minimum price) provide higher investment security (Neuhoff et al. (2013)). Third, both with surcharges and green certificates, electricity consumer prices are higher than they would be otherwise, which promotes energy efficiency (Koutstaal et al. (2009)). A shift of the burden from electricity consumption to government budgets thus seems unlikely to occur. Nonetheless, a system for allocating the cost of RES-E support more equitably remains desirable.

The rising cost of electricity due to RES-E support is a question debated in many European countries, including Germany, England, Spain, Italy, among others. Some proposals for addressing the related distributional effects have been made, but so far with little or no influence on policies. With reference to Germany's RES-E surcharge, Neuhoff et al. (2013) noted the burden could be redistributed by removing at least part of the exemptions to industry. Batlle (2011) recommended the cost of RES support in Spain be spread over all forms of non-renewable energy consumption. Farrell and Lyons (2014) showed Ireland's RES-E surcharge would be less regressive if the current flat-rate were turned into a fixed per-unit rate.

With reference to Italy, this paper contributes to the debate on the financing of RES-E support. Italy provides a striking example of rapidly rising RES-E investment and growing cost of the relative support schemes, whose annual cost directly weighing on electricity consumers is estimated to have reached €12.5bn in 2014 (AEEGSI, 2014a). This cost is largely recovered through a surcharge called “Componente tariffaria A3” (hereafter, “A3 surcharge”), which at present represents about a fifth of household electricity expenditures and even greater shares of electricity costs incurred by small and medium enterprises. To lighten this burden, the Italian government has recently gone so far as to impose retroactive changes to a set of existing RES-E contracts.

The issue of financing RES-E support more equitably could be approached differently, taking account of the C&EP and in consistency with its strategy. As this includes national targets for GHG emissions outside the EU ETS, a carbon tax applied to fossil fuels consumption in the non-ETS sector (i.e., exempting the activities regulated by the EU ETS) would be a means to meet those targets cost-effectively. In addition, the carbon tax would generate revenue that could be used to finance a cut in the A3 surcharge. Given different patterns of energy consumption for domestic uses (including electricity) and for private transportation across income distribution, such a tax swap would reallocate the cost of RES-E support more equitably. The paper focuses on this distributional implication of the reform.

Using microdata of the national household expenditure survey, we estimate the cost of the A3 surcharge for Italian households in 2011 and compare it to those of a non-ETS carbon tax in counterfactual scenarios. Two simulations are performed. In the first, the rate of the carbon tax is determined so that the burden on the household sector equals that of the A3 surcharge. This allows to highlight the difference in distributional incidence between the carbon tax and the A3 surcharge. In the second, we extend the analysis to consider the partial replacement of the A3 surcharge with a €20/tCO_2 non-ETS carbon tax. Crucially, in our simulations, the entire economy is unresponsive to the carbon tax. Therefore, the comparisons between the scenarios are only appropriate to render first-round effects of the reform. Finally, we examine the patterns of household energy expenditure in the other Member States to show the analysis conducted for Italy may be more generally relevant.

The paper is organised as follows. Section 2 illustrates RES-E support in Italy with respect to the main support schemes, their cost and cost recovery. Section 3 compares the A3 surcharge and hypothetical carbon taxes with respect to distributional incidence. Section 4 inspects the patterns of energy budget shares across income distribution in the other Member States. Section 5 concludes.

2. RES-E support in Italy: schemes, cost and cost recovery

Under the Renewable Energy Directive (28/2009), Italy must produce renewable energy for an amount equal to 17% of total energy consumption by 2020. Most efforts so far have been concentrated in RES-E support. RES-E generation quickly expanded, reaching almost 34% of electricity consumption in 2013. The take-off of RES-E generation was driven by an investment boom in photovoltaics (PV): in 2011, 9.3 GW of new capacity was installed, more than anywhere else in the world.[3] The PV boom was induced by a generous feed-in scheme, the cost of which weighs on electricity bills through the A3 surcharge. For more than two decades, RES-E investment in Italy has been mainly incentivised through a combination of generation-based schemes, including feed-in tariffs, feed-in premiums, green certificates and, recently, a tender system.[4,5] The cost of these is recovered through the A3 surcharge[6] and rose to the point that, in 2012, the government set an annual ceiling: €6.7bn for PV support and €5.8bn for non-PV support. The former was reached in 2013, meaning new PV installations are not eligible for the feed-in premiums previously granted, and the latter is close to being reached. The cost of RES-E support recovered through the A3 surcharge is estimated to have reached €12bn in 2014 (AEEGSI 2014a). As the contracts with RES-E generators have long duration, typically of 15 to 20 years, this cost will not start declining before a few years: it is should stabilise at

[1] For an overview of RES-E support schemes in Europe, see Held et al. (2014).

[2] What is more, it is mainly wealthy households who directly benefit from RES-E incentives becoming small RES-E producers (Grösche and Schröder, 2014, Lamp, 2014).

[3] Fig. A1, in the Appendix, shows the patterns of RES-E capacity and generation, by technology.

[4] Public funds granted to RES-E support in the form of investment contributions and tax expenditures are not negligible, but effectively impossible to quantify.

[5] For a brief description of these schemes, see Verde and Pazienza (2013). For a guide to legislation concerning RES-E support, see APER (2012a, 2012b). For an overview of energy law in Italy, see Di Porto (2011).

[6] In the last few years, the market of green certificates has exhibited a persistent excess of supply. Unsold certificates are first purchased by a state-owned entity and their cost is subsequently recovered through the A3 surcharge.