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Tax incentives to promote green electricity: An overview of EU-27 countries

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ABSTRACT

This paper provides a comprehensive overview of the main tax incentives used in the EU-27 member states (MSs) to promote green electricity. Sixteen MSs use tax incentives to promote green electricity simultaneously with other promotion measures, especially quota obligations and price regulation. However, not all available technologies are promoted. For example, six MSs (Germany, Romania, Slovak Republic, Denmark, Sweden and Poland) have included an exemption on the payments of excise duties for electricity when the electricity is generated from renewable energy sources (RES). This tax incentive is the most widely used. Limited tax incentives in personal income tax are available in Belgium, France, Czech Republic and Luxembourg. In corporate tax, tax incentives consist mainly of a deduction in the taxable profit (Belgium, Greece, Czech Republic and Spain). Lower tax rates in VAT are applied in three MSs, France, Italy and Portugal. Only Spain and Italy use effective tax incentives in property tax. As a great diversity of tax incentives has been used to promote green electricity, this adds another difficulty to the EU objective of providing a renewable energy policy framework, but also it offers a useful set of case studies which can be used to inform EU policy development.

1. Introduction

From its present global levels, electricity production is expected to almost double by 2020. Compared with existing electricity generation, observers have pointed out that the global electricity industry should reduce its carbon emissions[1] (the superscript numbers refer to endnotes, not footnotes) more than 30% by 2020 together with reduced costs. Therefore, the electricity sector is likely to become a prime target in any future world where greenhouse gas (GHG) emission controls are implemented and GHG mitigation is valued.

Following Sims et al. (2003), several broad methods for mitigation of carbon dioxide emissions exist: (a) more efficient conversion of fossil fuels, (b) switching to low-carbon fossil fuels and suppressing emissions, (c) decarbonisation of fuels and flue gases, and carbon dioxide sequestration, (d) increasing the use of nuclear power and (e) increasing the use of renewable energy sources.

As the International Energy Agency (2009a) acknowledges, energy sourced from modern renewable technologies is increasing more rapidly than gas and will constitute the second-largest source of electricity, behind coal,[2] soon after 2010. Excluding biomass, non-hydro renewable energy sources – wind, solar, geothermal, tidal and wave energy – together grow faster than any other source worldwide, at an average rate of 7.2% per year. Most of the increase occurs in the power generation sector. The percentage of non-hydro renewable energy as a function of total power generation is expected to grow from 1% in 2006 to 4% in 2030. Hydropower output has increased, but its share of electricity has dropped two percentage points to 14%.[3] During this period, in the OECD, the increase in the renewable-based power generation exceeds that of fossil-based and nuclear power generation combined (an annual average rate of 2.4% versus 1.9%, respectively).[4] As International Energy Agency (2009a) has recently pointed out, part of renewable energies' growth is due

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[1] Determined to combat climate change, the EU is committed to reducing its own emissions by at least 20% by 2020. It also calls for the conclusion of an international agreement which will oblige developed countries to reduce their greenhouse gas emissions by 30% by 2020. In the framework of this agreement, the EU would set itself a new objective of reducing its own emissions by 30% compared with 1990 levels.

[2] In relation to actual world electricity production, coal continues to have the largest percentage of total production, 38%, followed by renewable (principally hydro power) at 20%, nuclear at 17%, natural gas at 16% and oil at 9%. In the renewable area, hydropower is projected to grow by around 60%, mainly in China and other Asian countries. New renewable energies have expanded substantially throughout the 1990s in absolute terms, including wind by 21% per year and solar photovoltaic (PV) by 30% per year. Biomass and geothermal projects are also experiencing good growth.

[3] Although the average cost of large-scale hydro power makes this type of RES a competitive one compared with plants powered by fossil fuels or nuclear materials, for the world as a whole, the construction of large hydro plants has stagnated due to environmental concerns. Canada and Turkey are the main exceptions. See International Energy Agency (2006) and Brower (1992).

[4] See International Energy Agency (2009b).

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to strong policy support, so the proliferation of renewable energy sources should be primarily a political issue.

The European Commission (EC) Green Paper on renewable energy sources (RES; EU 1996 (European Commission (EC), 1996)) set a target to double the contribution of those energy sources to the national gross energy consumption in fifteen years. Since then until the most recent Renewable Energy Directive, included in the 2008 European Union Climate and Energy Package, has been developed and implemented an important activity around the production of RES (EP&C, 2001; EC, 2006, 2007). This Directive confirmed its commitment of cutting GHG emissions by at least 20%, reducing energy consumption by 20% through improving energy efficiency and by increasing the share of RES in EU final energy to 20% by the end of 2020.

Focussing on renewable electricity consumption, the last European Directive of 2001 on this subject stated that all MSs must reach a target whereby renewable electricity accounts for 21% of total electricity consumption by the end of 2010. Although this was the common target, each country had a different target depending on that country's capacities and real production levels in 1997 (reference year). In 2007, the EU-27 MSs achieved a 14.93% contribution of renewable energy to gross electricity consumption (Eurobserv'ER, 2008).

In order to increase the percentage of the renewable electricity as a function of total consumption, the promotion of green electricity in the EU has been essentially based on three instruments: (i) quota regulations in terms of quota obligations, which are linked to the trade of certificates, (ii) statutory entitlement of RES electricity plants to connection to, and usage of, the grid in many countries, and (iii) price regulation.[5] The third instrument can be implemented in terms of feed-in tariffs, quota obligations/green certificates or bidding systems.[6]

Apart from these promotion instruments, subsidies, financial incentives, green funds and tax incentives are also used. Some of these measures are applied simultaneously but the same generic scheme may show different design features in each country. In fact, a large range of initiatives in tax incentives exist in several MSs.

The tax initiatives in EU countries to promote the implementation and use of renewable energies have been justified as a source of environmental benefits due to the reduction of GHG emissions. In relation to environmental benefits, the EC has estimated that by switching to renewable energies, the EU could cut consumption of fossil fuels by 200–300 m tonnes per year and reduce CO_2 emissions by 600–900 m tonnes a year. The promotion of renewable energies can also have other benefits such as contributing to net employment.[7] In fact, the use of environmental taxes produces two types of benefits, known as the double dividend (Goulder, 1995). The first and most direct benefit, called the green dividend, is to preserve the environment. The second, called the blue dividend, can be obtained in several ways, including the positive impact on employment levels, due to the tax reform associated with the environmental taxes that reduce labor taxes (De Mooij, 1999). In that sense, most OECD countries have established environmental taxes to encourage energy conservation and to preserve the environment, being aware that the reforms also produce additional positive effects.

This paper provides a comprehensive overview of the main tax incentives used in the MSs to promote green electricity. Preceding works, e.g., Del Río and Gual (2004) and Uyterlinde et al. (2003) [8] referred to the UE-15. The initiative of the German Federal Ministry for the Environment, named 'Legal sources on renewable Energy' must also be mentioned as an interesting source. This paper contributes to the specialized literature on renewable energies by analyzing the main tax incentives that are used in EU-27 countries to promote green electricity. This offers a useful set of case studies which can be used to inform EU policy development.

The paper is structured as follows. Section 2 shows the European regulation of tax incentives for green electricity and the actual share of RES in gross electricity consumption in the UE-27 area. In Section 3, the main tax incentives considered in direct taxes are presented. Section 4 shows how tax incentives have been introduced in indirect taxes and Section 5 focuses on pigouvian and other taxes. Section 6 concludes the paper.

2. Regulation of tax incentives and actual share of RES in gross electricity consumption in the UE-27 area

The Green Paper (European Commission (EC) 1996), which was the first attempt at establishing a common policy on renewable energies in the European Union, set down the goal of doubling the contribution of RES to the gross domestic energy consumption in 15 years. This would mean that the RES will increase to 12% in 2012. In this document, the Commission committed itself to mobilize all the instruments and policies of the States and the Community that affect the development of RES and, specifically, fiscal, agrarian, environmental, energy and innovation policies. In the same year, the Directive (European Parliament and the Council (EP&C), 1996) about common rules for the internal electricity market declared that electricity generation based on renewable energies is a high priority. This Directive is based on the security of electricity supply and environmental protection.[9]

From 1996 until the present, the European Union has developed an intense activity involving regulations around the promotion of RES. This activity has always taken into account the three objectives established in the White Paper (European Commission (EC), 1997) that sets down a strategy and a community action plan for RES,[10] with special reference to the exemption from, or reduction in, the taxation of energy products resulting from RES.

In addition, the community guidelines about state aid to benefit the environment (European Commission (EC), 2001) recognize the necessity of public aid to promote RES and the necessity of internalizing external costs of electricity generation.[11] Fossil fuels and nuclear generation enjoy a competitive advantage over RES, because these sectors have lower marginal costs than new renewable technologies and are able to cope better with downward price pressure. As a consequence, electricity price in Europe reflects the marginal costs of production from existing capacity, but does not include the capital cost of the capacity used or the cost necessary for replacing the existing capacity as a consequence of depreciation.[12] Price volatility and

[5] See Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit (2008).

[6] See Del Río and Gual (2004).

[7] See Caldés et al. (2009).

[8] Uyterlinde et al. (2003) refers also to Norway.

[9] See article 3.2 from the Directive 96/92/CE of the European Parliament and Council of 19 December 1996 concerning common rules for the internal market in electricity (DO noL027, 30 January 1997, pp. 20–29).

[10] Three basic objectives are established in this plan: reducing dependency on energy imports, which would lead to an increase in the security of supply; protecting the environment, by reducing CO_2 emissions to the atmosphere; and the economic and social cohesion related to the development of national industry and the promotion of employment in the renewable energy sector.

[11] An interesting report in this area is contained in 'New Energy Externalities Development for Sustainability' published in 2008 on www.needs-project.org

[12] Nevertheless, in relation with the diversity of costs, it should take into account that for example the cost of R&D is a significant additional expense for