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# Regulating utilities: Using public finance mechanisms to promote sustainable energy markets in the European Union

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## Abstract

Public interest values which were once pursued via public ownership are now embodied in the regulation of privatised energy industries. Together with security of supply, 'environmental sustainability' is a touchstone concept in the design of the European Union (EU) energy policy programme. Both goals are especially well served by the development of renewable energy sources. State regulation is indispensable to spur a market shift towards greener sources and public finances play a decisive role in fulfilling this objective.

This paper draws on the contemporary debate on electricity market regulation in the EU with resource to public finance mechanisms to promote a sustainable development path. This kind of public regulatory intervention faces several challenges. On one hand, the regulatory environment in the European Union has undergone significant changes. These concerned the means and terms of public action and the rationale informing public action, *i.e.*, the applicable concept of 'public interest'. On the other hand, some goals brought forward in political programmes enclose potential conflicting rationalities. Achieving the targets set by the EU for renewable energy requires strong public financial intervention, whilst competitive market rules demand careful restriction of state aids.

Careful handle of the current regulatory toolbox is required to conciliate potential conflicting goals within energy policy. Two different regulatory frameworks place particular constraints on EU member States intervention via tax instruments to promote renewable energy sources, namely the one aimed at spinning energy market competition and the one directed at stimulating more sustainable energy consumption. This paper analyses how EU regulation deals with the referred conflict taking as reference point the Directive n. 2003/96/CE, 27.10.2003, on energy taxation, and the Community guidelines on State aid for environmental protection.

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## 1. Regulation and 'public interest' in energy policy

Today the government is expected to regulate rather than to take part in the economic game. By 'regulation' we take the 'sustained and focused control exercised by a public agency over activities that are valued by a community' (Selznick, 1985: 363-7). The concept of public interest is used in this context to justify regulatory intervention into private activity, limiting the exercise of private power, in pursuit of objectives valued by the community (Feintuck, 2004: 6).

To fulfil this role public authorities intervene mainly through soft regulation. Three aspects define the relationship of the 'post-social State' or 'regulatory State' with the economy. First, privatisation of public utilities, being the ownership of the organisational structure transferred from the State to privates. Second, liberalisation of the provision of public services, being these sectors opened to the market. And, third, there is a deregulation of activities previously regulated by public law, often followed by a re-regulation. In Europe, energy services have been going through this change since the early 1990s.

Energy policy is among the most relevant public policies for sustainable development. Therefore, regulatory policies in energy markets are touchstones in environmental strategies. These policies can work both as facilitators of environmental goals and as obstacles to such goals' fulfilment. Due to this interconnection and for the sake of policy coordination it is necessary to align objectives pursued and means used within each of the referred policies.

Security of energy supply and sustainable development rely on an important part of energy supply being from renewable energy sources[2]. The electricity market is one of the most promising fields for renewable energy development, according to the International Energy Agency (1998: 51). Social benefits will depend on utilities which, though provided in a free market and complying with capital profit requirements, are able to fulfil public priorities. If investment on renewable energy projects still lacks enough financial attractiveness for private agents, it is up to the government to create conditions to make those energies competitive.

Tax expenditures are broadly used in energy policy and in environmental policy. Since their regulatory role in these two policy fields is increasingly overlapping, it is important to analyse possible interactions between energy goals and environmental goals. Moreover, legal frameworks for implementing both goals have been constraining governments' manoeuvring space not always considering for the just-mentioned potential overlap. It might hence proof useful to convene both perspectives, the energy policy one and the environmental policy one, to assess the case of renewable energy sources in the European Union.

[2] On energy security please check the report prepared for DGTREN, 'Study on Energy Supply Security and Geopolitics', January 2004.

Guidelines shaping public governance, *i.e.*, market liberalisation and fulfilment of public interest, can be made compatible ('social liberalism'). Within energy policy this is a major challenge to be faced, since tilting the market towards public interest requires more public intervention, whilst further liberalisation might come at the cost of public interest. Achieving the targets set by the European Union for renewable energy[3] (12% from renewable energy sources by 2010[4], with an indicative figure of 22.1% for electricity[5]) requires strong public financial intervention, whilst competitive market rules demand careful restriction of state aids.

EU institutions have taken important steps to make the referred contrasting rationales compatible by building up a regulatory framework where the government is expected to set the rules rather than play the game, providing for appropriate coordination and oversight[6]. Public authorities shall promote public interest by assuring renewable energy projects are financially attractive for private agents, witnessing therefore 'the centrality of state law to regulation' (Scott, 2004: 145).

At the European Union level, this project has been formally pursued by levelling the playing field to allow renewable energy projects to develop and become competitive with traditional energy sources. There is some pressure towards reducing explicit and implicit subsidies to traditional energy sources[7]. And subsidies to renewable energy sources are allowed under strict conditions[8]. Public intervention via tax instruments is therefore framed by instruments aimed at spinning energy market competition[9] and stimulating more sustainable energy consumption.

## 2. Public finances and the promotion of renewable energy sources

Energy markets have never been free markets, therefore renewable energy sources face several obstacles to enter the market. Some of these are related to their own idiosyncrasies whilst others arise from the institutional context. Renewable energy sources require public support to become competitive due to several reasons. First, they compete with traditional fuels which are advantaged by the *status quo*. Second,

[3] COM(95) 682, COM(96) 576, COM(97) 599, COM(2000) 769, European Parliament's Resolution P5-TA-PROV(2004)0276, and Directive 2003/30/CE.

[4] European Commission, Energy White Paper, 1997. This overall target includes heating and transport alongside electricity.

[5] In May 2004, the Commission produced a draft report (COM(2004) 366 final, 26.05.2004) evaluating the effects of these policies on the share of renewable energies in the EU. In the report, the Commission suggested proposals for further actions but refrained from proposing targets for 2020, saying the 22.1% target would not be met under existing policies. Rather, it said, the policies would probably result in between 18 to 19% share of electricity from renewable energy sources in 2010 (compared with 14% in 2000). EurActiv, 22.06.2005, http://www.euractiv.com/Article?tcmuri=tcm:29-141320-16&type=News.

[6] Lodge, 2004: 141; 'regulatory State' or 'post-social State', Montesi, 1997: 278-279; Silva, 1996: 127; Wilks, 1997: 291; Garcia, 2001: 76-77, 82; Moreira and Maçãs, 2003: 9-10, 53.

[7] See article 87 EC Treaty and Directive 2003/96/CE, 27.10.2003, on energy taxation.

[8] Community guidelines on State aid for environmental protection, OJ C 37, 03.02.2001, 3-15.

[9] Directives 96/92/CE, 98/30/CE and 2001/77/CE.

renewable energy industry is still an infant industry and, third, it requires high initial investments to cope with its technological intensiveness.

**Factors advantaging traditional energy sources**

Traditional energy sources are favoured by the institutional context (*e.g.*, infrastructures are paid by the State and there is a strong lobby from traditional energy dependant industry), the stage of market development reached (economies of experience and of scale, as well as capital investment already paid off), the financial system (low spread for loans due to reduced investment risk) and the tax system (non-internalisation of external costs and tax benefits to traditional fuels, *e.g.*, reduced VAT tax rate for gas). Furthermore, energy subsidies tend to be assigned to centralised systems, with intensive capital and large dimension. These conditions favour traditional energy sources (*e.g.*, big hydrological projects and oil refineries)[10].

A touchstone in the discussion over EU official targets concerning renewable energy sources is the amount of subsidies Member States provide to their coal and nuclear industries[11]. According to Greenpeace and European Renewable Energy Council (EREC), one third of electricity can be generated from renewable energy sources in 2020 with a combination of legally binding targets, support mechanisms and phase-out of subsidies for fossil and nuclear energy[12]. Producers of renewable energy currently lack the long term investment security required to expand this industry.

The Commission Green Paper on security of energy supply[13] drew attention to the "opaque nature of state aid in the energy sector". The Commission has decided to draw up an inventory on this issue, which resulted in a follow-up inventory study on subsidies[14] able to "provide the starting point for a reform of national and EU aid schemes" in the energy sector. Reporting on state aid to the energy sector is also required under article 8 of the Directive 2001/77/EC, 27.09.2001, which requested the Commission to consider "the impact of public support granted to electricity production" in a report to be handed in before 31 December 2005[15].

Among the institutional aspects favouring traditional energy, market evolution deserves special attention. Free energy markets resulted in a decline and volatility of

[10] Pershing and MacKenzie, 2004: 3-4, Union of Concerned Scientists, European Research News Centre website, 2002, *Revealing the hidden costs of energy*, 07.11.2002, URL http://europa.eu.int/comm/research/news-centre/en/env/02-10-env02.html, 19.10.2004, with reference to World Bank data.
[11] In the USA examples are often associated to fossil fuels, see Milne and Hasson, 1996.
[12] EurActiv, 17.06.2005, http://www.euractiv.com/Article?tcmuri=tcm:29-141133-16&type=News. Further information can be found in Eurelectric, 2004.
[13] COM(2002) 321 final, 26.06.2002.
[14] *Inventory of public aid granted to different energy sources*, Commission Staff Working Paper, SEC(2002)1275, 22.11.2002.
[15] COM(2005)624 final, 09.12.2005.

electricity prices. Traditional energy sources and nuclear energy financed by public monies and with investments already completely recovered have lower marginal costs than renewable energy sources. Therefore, investment projects in traditional energy and nuclear energy are in better conditions to respond to decreasing energy prices. Moreover, electricity prices in the EU-15 tend to consider only marginal costs of existent productive capacity, ignoring capital costs of used capacity or investment necessary to replace it (EAA, 2004: 8).

Projects involving renewable energy sources commonly take a relatively long period of time to start to pay out. These energy sources face technical restrictions, namely limits concerning possible project location and production intermittency. Moreover, during the initial development stage, technical barriers create financial barriers. High investment costs are spurred by expensive technologies to which it is also associated a high credit risk. Therefore, government intervention might proof necessary to attain further development stages where economies of scale and of experience allow the reduction of marginal costs (Pershing and MacKenzie, 2004: 14)[16].

**Public finances role in creating contestable energy markets**

Public finances play a major role in creating contestable energy markets, since direct control (quantitative limits) represent more intrusive ways of attaining such goal. Understanding the reason why the market is itself unable to promote the development of renewable energy sources helps us to identify the kind of public intervention which best suits the objective pursued. Financial instruments available for the government to level the playing field in the energy market run from taxation to public expenditure, being subsidies the most common ones.

Through tax instruments production and consumption costs which are not considered in traditional energy sources are internalised in their price. On the other hand, public subsidies allow the internalisation of positive externalities from renewable energy sources which the market is unable to attend. Moreover, state aids are useful to support the expansion of renewable energy markets allowing them to attain economies of scale and of experience on which their ability to compete with traditional energy sources depends.

Therefore, to level the playing field the government has to tax traditional energy sources or provide state aids to renewable energy sources. The first way faces stronger resistance from stakeholders since costs involved are more visible and concentrated than potential benefits. However, providing state aids to industry contrasts with the EU project for a single market. Liberalisation of energy markets is high in the EU agenda.

[16] There are already some cases of positive evolution experienced in production costs within subsidised markets. For instance, data on price of electricity produced from wind in the USA wholesale market seem to provide some evidence that the gap between cost and price is closing – Milne, 2005: 229.

## 3. Renewable energy sources in the Internal Energy Market

The European Union has started the liberalization of the electricity market in 1996 (Directive 96/92/CE, 19.12.1996, OJ L 27, 30.01.1997, followed by Directive 98/30/CE, 22.06.1998, OJ L 204, 21.07.1998, for natural gas). Both named directives were a follow-up on Directives of 1990 and 1991 on transit of electricity and gas and represented a considerable opening of the electricity markets, including international trade in the context of third party access to the electricity network (Welfens *et alter*, 2001: 80).

This step was directed at creating a new 'regulatory space' (Hancher and Moran, 1989), the common energy market (Internal Energy Market – IEM), baring in mind two main goals, *i.e.*, security of supply and sustainable development (COM(95) 682 final). According to the White Paper on Energy Policy for the European Union, EU energy policy is based on deregulation and market integration, with efficient and effective government intervention. Moreover, EU energy policy shall pursue the public interest and contribute to sustainable development, consumer protection and economic and social cohesion.

Today in the European Union, the context of this public regulatory intervention is undergoing significant changes which deserve special attention. Difficulties in making the internal energy market a reality have delayed the adoption of necessary measures to transpose relevant directives[17] into national law[18]. In 2005, a common energy market was already a fact in part of the EU territory, namely in Scandinavia[19], whereas in other regions it was still under construction[20].

Moreover, whilst for traditional energy sources (*e.g.*, oil, natural gas and electricity) there is a movement towards freer markets, for renewable energy sources (RES) it is generally accepted the importance of adopting protective strategies. Therefore, in the European energy market it is expected that two systems will coexist for a while. The coexistence of these two different regulatory approaches might proof problematic[21]. Furthermore, the adoption of protective strategies might also clash with the Polluter Pays Principle.

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[17] The relevant legal framework comprises yet Directives 2003/54/EC, 26.06.2003, OJ L 176/37, 15.07.2003, 2003/55/EC, 26.06.2003, OJ L 176/57, 15.07.2003, 2003/87/EC, 13.10.2003, OJ L 275, 25.10.2003, 2004/8/EC, 11.02.2004, OJ L 052, 21.02.2004, and 2004/67/EC, 26.04.2004, OJ L 127, 29.04.2004.

[18] This has been the case, *e.g.*, in the Directive 2004/67/EC of the European Parliament and of the Council of 26.04.2004 concerning measures to safeguard security of gas supply (Cameron, 2005: 1).

[19] Norway and Sweden created the 'Nord Pool' in 1996. Finland joined them in 1998 – Houmöller, 2000: 52-79.

[20] In 2004, Portugal and Spain created the Iberian Electricity Market (IBELM/MIBEL), but in April 2006 several aspects were still holding back its operation.

[21] "Recently there has been a shift away from concerns about security of supply towards moves to introduce competition in the traditional monopolistic energy sector. This approach seems to be in direct

Potential overlap is highly probable especially in the electricity market, where the strongest chock between the two contrasting approaches is expected to happen. Electricity market is not only the energy market offering the highest potential for exploration of renewable energy sources (specially, wind, waste and biomass[22]), but also the one where the project for a single market is more developed. Aforementioned clashes might be reduced via their conciliation through clearly defined rules, as well as their approximation via the introduction of competition within state aid regimes.

Governments should aim at contestable markets which allow renewable energy projects to proceed to dimensions and development levels where their marginal costs start decreasing and being competitive with the ones of traditional energy sources. An effort to maximise support for renewable energies with simultaneous minimisation of state dirigisme can be served with more 'market rationale' within the instruments design. In this process, idiosyncrasies of each energy source have to be considered for an effective and efficient public intervention.

Market liberalisation and promotion of renewable energy sources are not always concurrent rationales[23]. Therefore, there is some space for an improvement of the regulatory regime with double gains, both for market liberalisation and environmental protection. A liberalised electricity market involves new risks and new strengths for an agenda on renewable energy promotion. On one hand, it pressures for energy price reduction, which works against energy efficiency. On the other hand, it allows for an expansion of renewable energy projects, facilitating economies of scale, learning curves and reduction of intermittence problems.

On 21.06.2004, the European Parliament's Industry, Research and Energy Committee has called on the Commission to set a 25 per cent binding target for renewable energy sources in total energy consumption by 2020[24]. In giving their support to the Turmes Report, members of the European Parliament have called for several actions which involve further energy market liberalization, namely, fair grid access for electricity produced from renewable energies and end to distortions in the energy market (subsidies to coal and nuclear, as well as ownership unbundling). Moreover, they have also supported the award of special tax treatment to renewable energy sources in order to level the playing field ("tax cuts to encourage renewables and in particular, biomass").

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disagreement with the need to intervene more in the market to deal with greenhouse gas emissions" – Collier, 1993: 131.

[22] IEA, 1998: Vol. II, 51.

[23] However, national governments tend to resist joining both goals by fearing to subsidise non-national producers. See on the Dutch debate, Kramer, 2005: 211.

[24] The Parliament's Industry, Research and Energy Committee on 21 June adopted the report on renewable energies by Claude Turmes (Greens/EFA, Luxembourg) by 26 votes for, 5 against and 15 abstentions. Although legally non-binding, the vote is an indication to the Commission that MEPs are supportive of additional measures to bolster renewable energies in the EU. In April 2004, the Parliament had already adopted a resolution (P5_TA(2004)0276, which was presented in the conference which took place in Bonn, June 2004), calling for a 20% binding target in 2020. EurActiv, 08.06.2004.

## 4. Impact of liberalised energy markets on renewables' performance

European electricity liberalisation is the logical extension to public utilities of the principles of the single market. This is a departure from the economic rationale that electricity production was a natural monopoly, due to growth in demand and technological advances. The deregulation argument is especially evident at the generation stage, as well as at the retailing stage, since, at the transmission stage, the case for natural monopoly and continued regulation remains relatively strong, in part due to environmental regulation (Griffin and Puller, 2005: 2-4).

EU electricity and gas directives were expected to remove market impediments to efficient trade and improve competitiveness of Europe in global markets (Newbery, 2002: 2). Following energy security concerns and environmental concerns, energy governance has evolved into a coexistence of two regimes within the same market: liberalisation in traditional energy sources and protectionism in renewable energy sources. These have been supported mainly by an EU carbon emission trading system (from 01.01.2005 onwards), as well as price support mechanisms (*e.g.*, green certificates) and carbon taxes at the national level.

According to the International Energy Agency, liberalization of electricity markets already affected public policies used to promote renewable energy sources, constraining the means available to the government for such purpose (IEA, 1998: Vol. II, 51). Furthermore, increased competition was expected to lead to lower energy prices (*e.g.*, UK and Scandinavia), with consequent increase in consumption (JO 08.02.2002, point 6.4.9.2). Therefore, the International Energy Agency concluded that market liberalization might have a negative impact on the development of renewable energy sources (*ibidem*).

However, compared to the United States, many European Union countries lack the necessary legislative and regulatory power to mitigate generator market power. Therefore, unless markets are made more contestable, transmission capacity expanded and adequate generation capacity ensured, liberalisation may lead to higher prices rather than lower ones as argued in pro-reform discourses (Newberry, 2002: 1). This would constrain consumption and promote efficiency.

Apparent cross-subsidization of larger industrial consumers by smaller customers in Germany (discriminatory prices), following the opening of the retail market to competition in 1998, might be useful to exemplify the referred problem (Littlechild, 2003: 64). However, results assumedly obtained here come at odds with the way advised by environmental economists, since the incentive to improve performance is eased exactly on most intensive consumers, who are also potentially the most efficient environmental cost reducers.

Despite not in terms of reduced consumption and improved efficiency, in a 'lower energy price' scenario it is still possible to envisage some potential environmental

gains. Low wholesale prices may cause some inefficient and polluting plants to close and be replaced by gas, while the economics of new nuclear power stations would look unattractive (Vaitilingam, 1999: 260) due to cost-imposing regulation and unfavourable investment climate (Gordon, 1982: 270). Though, high wholesale prices in some countries may encourage excess and inefficient entry, therefore also hastening closure of coal mines (*idem*, 261). Switch to gas works in favour of the environment as far as carbon dioxide emissions are concerned.

Falling energy prices can be compensated by higher energy taxes, which would work in favour of the tax shift proposed by advocates of an environmental tax/fiscal reform. Such tax approach would have a further merit. It would reduce the fierce competition faced by renewable energy sources within a 'lower energy price' scenario. Higher marginal production costs of these sources when compared to the ones associated to traditional energy sources make renewable energy sources more vulnerable than traditional ones to price reductions.

Furthermore, there are also positive environmental impacts directly associated to energy market liberalisation. At the present technological development stage, an electricity system cannot be mainly supported by renewable energy sources due to their intermittent characteristic, since power cannot be stored economically. Ancillary services are therefore crucial in a market characterised by highly variable demand. Restructured power systems require markets for reliability services that can quickly adjust to unexpected demand changes (Griffin and Puller, 2005: 6).

These features reduce the attractiveness of renewable energy resources and the use of the latter increases the relevance of reserve capacity and extra generating capacity. It is not consensual which is the maximum amount of renewable energy a system can cope with, varying the limits indicated between 5 and 25 per cent of the total amount of electricity provided. This problem, which is still a minor one since most systems fall short of the lower limit, can be better addressed within the context of an enlarged (common) energy market (composed of countries with diverse natural endowments) with improved interconnectivity.

Notwithstanding potential environmental gains to harvest from more integrated energy markets, there might also be some opportunities for improvements which cash both for the environment and the efficiency of the market in a narrower sense. It is worth mention here the fact that some regulatory environments support economies of scale which favour traditional energy sources and do it whilst contradicting market liberalisation objectives.

For instance, in the Spanish electricity market, in January 2006, prices were still set by the government and involved consumer price cross-subsidisation. This feature hinders not only market competition, representing an obstacle to the IBELM/MIBEL, but also development of more sustainable energy markets. The Spanish government has hence been wasting the opportunity to provide a positive stimulus to big energy consumers and economic agents especially able to improve environmental performance associated to energy consumption.

Article 7 of Directive 2001/77/CE, 27.09.2001, harness the elimination of any discriminative condition in the access to the grid based either on physical or financial criteria. Preferential conditions are however allowed for green electricity. Reforming the method used to calculate the price to access the grid can serve liberalization purposes, to the advantage of both renewable energy sources and a common energy market. For instance, being the supply of renewable energy sources often intermittent, green producers will support higher average costs to provide electricity than traditional plants if access to the grid is charged on a permanent basis.

## 5. Conciliating energy market liberalisation and public support for renewable energy sources

### 5.1. First level conciliation: establishing legal rules

The EU aims at pursuing the public interest of having traditional energy sources replaced for cleaner ones with the minimum possible distortion of competition. In fact, the goal is to limit State intervention to level the playing field between the two kinds of energy, neutralising the bias of the system towards traditional energy sources.

Moreover, there is a strong concern to avoid any favour to renewable energy sources, either towards conventional forms of energy or among different kinds of renewable energy sources or producers of the same renewable energy source. The idea is to maximise competition within state aid regimes and minimise market distortions, keeping them to the minimum required to put renewable energy sources and traditional ones on equal footing.

#### a) The EU energy tax Directive

Directive 2003/96/EC, 27.10.2003, on energy taxation introduced a set of rules which pursues a balance between two conflicting interests, *i.e.*, implementing a common energy market and promoting renewable energy sources[25]. This directive aims at a framework of rules to restructure and harmonise national tax systems within the context of the Single Market while widening the scope beyond mineral oils to include competing energy sources, such as coal, lignite and natural gas as well as electricity, so as to strengthen incentives for a more efficient and less

[25] On the political background of this legal proposal, *e.g.*, Delbeke and Bergman, 1998: 256-258, and specifically on biofuels Deketelaere, 2005: 120-125.

polluting use of energy[26]. This is pursued via the internalization of both external costs and benefits.

Positive externalities associated to electricity produced with renewable energy sources can be internalised through either total or partial exemption or reduction in the taxation level or refunds to producers of some or all the tax paid by consumers on electricity. In the face of EU law these measures are state aids and shall follow the regime on State aid for environmental protection[27]. Article 15 of the EU energy tax Directive[28] provides Member States with criteria used by the Commission to decide on those aids. Member States have, thus, further reference points to help them designing tax expenditure measures within their energy taxation system.

Furthermore, the Directive allows Member States to exempt or reduce excise duties to promote bio-fuels. The objective is to level the playing field. Therefore, possible distortions to competition are minimised via periodical adjustments of the incentive provided by national governments taking into account changes in raw material prices and the evolution experienced in production costs. However, the absence of a similar consideration for price evolution in motor fuels, heating fuels and electricity taxation raises some criticism[29].

Article 5 of the Directive allows Member States to apply differentiated tax rates when these are directly linked to product quality. This enables tax differentiation according to environmental criteria. However, when the use of different energy sources to produce the final energy product does not affect its final characteristics, as in the production of electricity, tax differentiation is not allowed by the Directive. The lack of equivalence between differentiation based on products' characteristics and differentiation based on processes' characteristics, common to the GATT/WTO regime, is adopted by this directive.

This regime could work against the use of renewable energy sources in electricity production, since these sources involve higher production costs. However, the Directive provides means to ensure a level playing field. Member States are allowed to exempt energy products and electricity used to produce electricity. But if, for environmental reasons, they decide to tax these products, this can be done without respecting the minimum levels of taxation. Moreover, in such case, taxation of the mentioned products shall not be taken into account for the purpose of satisfying the minimum level of taxation on electricity laid down in article 10 (art. 14/1, a). Therefore, Member States who decide to tax inputs used to produce electricity are not free from taxing electricity according to the minimum taxation levels set in the Directive.

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[26] Jos Delbeke, DG Environment, European Commission, International Conference on The challenge of implementing new regulatory initiatives: State of affairs and critical issues of EU Climate Change Policy, 18.09.2004, Leuven.

[27] OJ 2001/C 37/03, 03.02.2001.

[28] Directive 2003/96/EC, 27.10.2003.

[29] For further developments on this aspect, Claudia Dias Soares, 'Energy and Taxation: Some critical implementation issues', (on print).

Inputs taxation cannot be used to split the total tax burden levied on electricity, being rather an add-on to the latter. Attending to articles 5 and 14/1(a), the solution remains on being tax differentiation only at the output level, and not at the input level. Furthermore, article 15/1(b), allows Member States to apply total or partial exemptions or reductions in the level of taxation to electricity obtained from renewable energy sources. To facilitate trade in electricity produced from renewable energy sources, promoting these at the national level without hindering the internal market, as well as to increase transparency for consumer was created a guarantee of origin (art. 5, Directive 2001/77/EC, 27.09.2001).

This system enabled the application of different tax regimes to electricity based on the energy sources used for its production, which previously was only possible at the domestic level. Moreover, green certificates can also be used to provide state aid. Through these certificates renewable energy producers may benefit indirectly from guaranteed demand at a price above the market price for conventional power. This system is accepted by the EU Commission under certain conditions. The latter aim to restrict the regulatory intervention to the minimum required to level the playing field and to maximise the elements of competition within the support scheme, as developed in the next section.

**b) Community guidelines on State aid for environmental protection**

To level the playing field between renewable energy sources and traditional ones, public aid granted to different renewable energy sources was addressed by the EU Community guidelines on State aid for environmental protection (OJ 2001/C 37/03, 03.02.2001). This regime, which lapses on 31.12.2007, especially dealt with state aids to promote renewable energy sources. The Commission considered subsidies to these energies justified under very precise conditions. In spite of its effort to be as rigorous as possible avoiding excessive or unnecessary disruption of competition, there might still be some space for regulatory improvement.

It is accepted that the State interferes with the market to correct its failures, synchronising competition with public interest in the use of cleaner energy sources. Therefore, state aids are accepted when aimed at removing or reducing market-access barriers to clean energies and only until that limit. Moreover, the regime is set in such a way that competition within support schemes is maximised and interference with relative market positions of different kinds of renewable energy sources and different producers of the same renewable energy is avoided.

The Commission's framework allows the coexistence in the internal market of different kinds of support mechanisms to renewable energy projects. This might hinder free market competition (between renewable energies), since the production of cheaper (subsidised) green electricity by one State reduces market opportunities for renewable energy producers located in other member States. The Commission

has already ruled out state aids to renewable energies based on this logic (Process n. 153/98, United Kingdom)[30].

Renewable energy sources tend to face high initial investment costs which usually producers are not allowed to pass to consumers. Operating costs from plants producing renewable energy can be subsidised as long as public aid is limited to the extra costs the production of this kind of energy involves compared to traditional energy sources. If the plant produces other kinds of energy, these do not qualify for the aid. Any amount granted that exceeds the limit set must be appreciated by the Commission in the light of the state aid regime and, if accepted, reinvested by the firms in renewable sources of energy (point 63).

Any operating aid may be granted only for plant depreciation. However, the aid may also cover a fair return on capital if Member States proof this is indispensable given the weaker competitiveness conditions of certain renewable energy sources. For a special case where investment costs are relatively less but operating costs are relatively higher, the biomass case, the Commission will accept operating aid exceeding the amount of investment where Member States can show that aggregate costs borne by the firm after plant depreciation are still higher than market prices of the energy (point 60).

Where green certificates or tenders constitute state aid, the Commission's authorisation depends on the proof that support is essential to ensure the viability of the renewable energy sources concerned, does not in the aggregate result in overcompensation for renewable energy and does not dissuade renewable energy producers from becoming more competitive. To fulfil this last condition, it is recommended the insertion of competition elements in the support scheme.

Elements of competition can be inserted in any of the main support schemes (*i.e.*, feed-in tariffs or pricing system and market quotas, either via green certificates or tendering systems)[31]. In the 2001 Community guidelines, in order to control the fulfilment of these criteria, the Commission made known its intent to authorise these aid systems for a period of ten years, after which it shall assess whether the support measure needs to be continued (point 62).

The Commission also accepts payments to new plants producing renewable energy calculated on the basis of the external costs avoided. In spite of the classification of these as 'operating aid' (point 67), in fact they are rather a payment done by the society to power producers for positive externalities. This fact is particularly clear when we consider the calculation method used to assess the amount of payment authorised. The regulation of these cases within the Community guidelines on State aid might be explained by the tradition being not forcing the internalisation of external costs.

[30] European Commission, 1998: 70.

[31] For a comparative analysis of the instruments from an EU law perspective, *e.g.*, Franco and Herrera, 2005: 177-189.

'External costs avoided' (point 63) are environmental costs that society would have to bear if the same quantity of energy were produced by a production plant operating with conventional forms of energy. These shall be calculated on the basis of the difference between, on one hand, the external costs produced and not paid by renewable energy producers and, on the other hand, the external costs produced and not paid by non-renewable energy producers. Furthermore, this calculation shall be carried out based on internationally recognised methods.

In spite of not being mentioned in the Community guidelines, for the calculus of the external costs avoided should be considered factor 'time'. Public intervention can anticipate the attainment of economies of scale and of experience by the renewable energy industry. Quantifying the external benefits of having lower environmental costs induced by a faster pace in the introduction of these energies would allow subsidies to be made explicit and defensible.

The Commission clearly demands Member States to provide a reasoned and quantified comparative cost analysis, together with an assessment of competing energy producers' external costs, "so as to demonstrate that the aid does genuinely compensate for external costs not covered" (point 63). Therefore, within these limits there is not an effective state aid. The payment levels the playing field via the positive side (internalising external benefits). Moreover, the analysis of the EU guidelines might even disclose a less favourable treatment provided to renewable energy sources.

Level the playing field requires, *inter alia*, a (full) internalisation of net external costs associated to power production. This tends to be a positive amount ('payment' or 'tax') in the case of traditional energy sources and a negative amount ('subsidy') for renewable energy sources. If the above-defined 'external costs avoided' sum up more than EUR 0,05 per kWh, the Commission itself creates an obstacle to level the playing field, favouring traditional energy sources. Since at any event the amount of aid granted to the renewable energy producer must not exceed EUR 0,05 per kWh (*ibidem*)[32].

In spite of the flaw already mentioned, the Commission expresses a special concern for any distortion of competition contrary to the common interest (which we understand as in agreement with the concept of sustainable development). Therefore, the aid shall result in an overall increase in the use of renewable energy sources at the expense of conventional ones, being unacceptable a simple transfer of market shares between renewable energy sources.

[32] The adoption by the Commission of a maximum limit has its roots in the huge difference observed in the amount of state aid provided by EU member states to renewable energy sources (ranging from 0.4 cents per kilowatt-hour in Finland to 6.2 cents per kilowatt-hour in Germany). This raised protests from industry fearing for trade distortions, since in 2001 direct subsidies to these energy sources reached approximately Euros 3.3 billions in EU-15, and are expected to be Euros 11.5 billions when renewable sources represent a quota of 22% of the total amount of electricity consumed, being then the total expenditure circa Euros 22 billions. Environment Daily, 20.01.2004, Eurelectric Press Conference, Environment Daily, 06.02.2004, Eurelectric, 2004: 14. This problem was also acknowledged on the EU Green Paper on Energy efficiency, adopted by the European Commission on 22.06.2005, p. 19.

In order to attain this result the Commission demands that the aid granted forms part of a scheme which treats firms in the renewable energy sector on an equal footing. The scheme provides for aid to be granted without discrimination as between firms producing the same kind of renewable energy and must be re-examined by the Commission every five years (point 64).

### 5.2. Second level conciliation: designing financial instruments

Observing some of the support schemes available around the world for renewable energy sources it is possible to track down tendencies (Piscitello and Bogach, 1998: 10). On one hand, whilst designing public policies regulators increasingly consider the amount of costs involved and their distribution, as well as the degree of effectiveness associated to public intervention. Effectiveness of public intervention depends, *inter alia*, on its impacts on installed capacity and production cost function (*e.g.*, attainment of economies of scale and experience), as well as on regional and industrial policy.

On the other hand, new regulatory policies are marked by transitory measures which allow flexibility and aids based on performance to encourage efficient resource allocation. Furthermore, elements of competition are explicitly or informally inserted within support schemes to induce a reduction of the costs involved in project development. Dissemination of production costs and prices can contribute towards the desired direction of promoting efficient public resource allocation.

Production of renewable energy sources compared to traditional ones involves a greater amount of marginal financial costs. Adapting support schemes to this particularity requires state aids to attend to market evolution, namely, evolution of market shares and resources' costs[33]. This element seems to have been relevant for the positive evolution experienced in solar energy projects (Piscitello and Bogach, 1998: 19-21).

Another important aspect to consider is that production costs of renewable energy sources can be reduced in protected markets with a lower degree of market distortion when some kind of competition is inserted within the state aid regime. For instance, systems based both on pricing and market quotas can gain economic rationality if economic agents have to bid for public support. Furthermore, this method allows the attainment of public objectives at a lower cost for the government.

Higher efficiency in the use of public resources can also be attained if some degree of economic rationality is inserted in the support schemes during the selection

[33] The new German system, revised in 2000, allows the revision every two years of the payments done to new projects. Among the main criteria considered are the kind of technology, dimension of the installed capacity and geographical location of the project. Usually the aid is calculated based on effective production costs.

phase. In Germany, *e.g.*, wind projects were only eligible for state aid if they effectively delivered at least 60 per cent of the expected profit[34]. The low side of this approach is that some of the main reasons explaining public support for renewable energy sources (*i.e.*, high 'start-up' costs coupled with small initial market shares) will then work to exclude some projects from such intervention and discriminate between different kinds of renewable energy according to their production cost structure[35].

Most common support schemes are the so-called *feed-in law* or *pricing system* and quota systems, being successful interventions often associated to the first kind. This is so since pricing systems are more prone to induce reduced production costs and the required stability for the development of consistent and credible markets. These are two essential conditions to obtain support from the financial sector to new investments (Sawin and Flavin, 2004: 4).

Whilst in a pricing system prices are set and generation capacity is left to the market, in quota system things work in the inverse direction. Public authorities set a production target for renewable energy sources usually connected to the grid and leave the price to the market. Usually production targets are defined according to a specific objective in terms of installed capacity for the whole market at a certain time, amount which can evolve along the time, being the price defined by a bid system.

The pricing system could at first sight run against the EU State aid regime. Legislation of a Member State which, first, requires private electricity supply undertakings to purchase electricity produced in their area of supply from renewable energy sources at minimum prices higher than the real economic value of that type of electricity, and, second, allocates the financial burden arising from such obligation amongst those electricity supply undertakings and upstream private electricity network operators, could constitute state aid within the meaning of article 92/1 of the EC Treaty. This is problematic since economic effects of these rules would be very similar to a tax (charged on the purchaser) combined with a state aid (paid to the vendor).

However, the obligation imposed on private electricity supply undertakings to purchase electricity produced from renewable energy sources at fixed minimum prices does not involve any direct or indirect transfer of State resources to undertakings producing that type of electricity. Therefore, the allocation of the financial burden arising from that obligation for those private electricity supply undertakings as between them and other private undertakings cannot constitute a direct or indirect transfer of State resources either. In those circumstances, according to the jurisprudence of the European Court of Justice, the fact that the purchase

[34] Erneuerbare-Energien-Gesetzes (EEG), adopted on 17.06.2004.

[35] In the German case, 9% of wind fields were expected to be excluded from public financial aid due to the new law. Apparently, the German law has also taken a clear choice among different kinds of renewable energy projects: whilst subsidies to offshore wind fields and solar and biomass projects were increased, funds available to onshore wind mills were reduced. Bunr, 2004.

obligation is imposed by statute and confers an undeniable advantage on certain undertakings is not capable of conferring upon it the character of state aid within the meaning of article 92/1 of the EC Treaty[36].

**Contrasting different kinds of state aid**

The kind of public expenditure measure used conditions the effects obtained. Tax benefits granted to the consumption of renewable energy sources inserted in excise duties provide an indirect incentive to investment in such energy sources via a relative increase in their demand. Tax credits and accelerated depreciations, as well as tax exemptions or tax rate abatements in sales taxes charged on acquisition of equipment dedicated to renewable energy production or use, on their turn, provide a direct incentive to the referred kind of investment[37]. This occurs as a consequence of the reduction on the final price (after-tax) of the equipment.

Tax credits inserted in corporate profit taxes, tax exemptions for investment funds and tax holidays for income obtained from renewable energy sale provide an investment incentive via a release of financial resources for investment (Duff, 2003: 53). These expedients reduce the gross payback rate (pre-tax) required for the investment to take place. Apart from the intervention mode assumed by each kind of tax expenditure measure, other aspects affect the results obtained.

On one hand, 'start-ups' subsidies are the kind of state aids favoured by the European Commission in the reform process underway to reduce this kind of market intervention. And, on the other hand, financial support to reduce high initial investment costs associated to the production of renewable energy is among the most useful kinds of state intervention in this field.

The high initial costs of the technology necessary to develop renewable energy sources tend to constrain significantly the evolution of their market-share. Therefore, financial support measures which reduce initial investment costs either directly (*e.g.*, reducing capital costs) or indirectly (*e.g.*, attenuating investment risks) can represent useful tools to promote these energies with market distortion reduced to the minimum required. For instance, in Germany special credit lines managed by the banking system but financed by the government allowed to minimise market distortions associated to the provision of state aids. Credit was given according to market criteria but at lower costs and for longer periods than market rules would allow (Sawin and Flavin, 2004: 20-21).

To alleviate the higher production costs renewable energy industries bare due to intensive capital investment requirements, public authorities can also use accelerated depreciation regimes. However, it is preferable to reduce firms' tax obligation in a

[36] Judgment of the Court of 13 March 2001, PreussenElektra AG v Schhleswag AG, Case C-379/98. Chico, Grau and Herrera, 2005: 195.
[37] On property tax relief to encourage renewable energy, Kreiser and Sprohge, 2005: 172.

fix amount per unit of production capacity rather than as a percentage of the investment cost. For instance, tax benefits based on the amount of energy produced are preferable to investment subsidies, since the first are more effective in reaching the pursued goal whilst the latter are not able to guaranty the acquisition and use of the most efficient technological solution available in the market (Sawin and Flavin, 2004: 19). The drawback is that, depending on the amount of disposable income and the time horizon of the decision, 'fix amounts' can push economic agents towards the cheapest solution which may not necessarily be the most efficient one.

The characteristics of the energy source are quite important to access at which level public intervention is most needed. Biomass, for instance, requires relatively less investment but brings higher operating costs. Therefore, aids limited to investment costs may proof insufficient. Furthermore, positive effects obtained with financial support provided for start-up investment can be neutralised by energy market regulation. Therefore, it is important to assess the regulatory impact of any instruments (especially, norms, taxes and subsidies) along the whole energy production and distribution cycle, attending to the effects they have, *inter alia*, in consumption prices.

Start-up costs can be reduced via investment aids or subsidies based on production results. Tax benefits directed to the reduction of investment costs provide an important incentive to build up installed capacity. However, they are unable to assure an optimal level of investment or an efficient and effective use of such capacity. Likewise, subsidising some technologies does not contribute to the choice of the most adequate technological solution available in the market. Fine-tuning public financial interventions to reduce identified potential problems involves higher costs due to increased complexity. Therefore, Sawin and Flavin (2004: 19) recommend subsidies output based.

Tax benefits assigned according to production levels tend to increase investment payback rates and reduce the period of time necessary for capital recovery. The most efficient renewable energy producers will be the main gainers from the system. Furthermore, when the subsidy induces economic agents to change their production structure increasing fixed costs, it creates transition costs (Beers and Moor, 2001: 66-68). Once these emerge, there will be an economic cost if the subsidy is withdrawn. Therefore, resistance to subsidies reform will increase and there will be a higher probability of persistent perverse subsidies. Investment subsidies might be more propitious to spur transition costs than output based subsidies due to their emphasis on the acquisition of technological solutions.

Direct subsidies might proof more adequate to small scale projects than income tax deductions. Reasons for this preference are twofold. On one hand, the single-contact relationship with the Administration subjacent to a direct subsidy involves lower administrative costs than the continuous information interchange process underpinning the income tax system. On the other hand, tax expenditure measures accommodated in the income tax distort investment decisions. Investment management can therefore be influenced at two levels: project choice and timing.

Pushing investments towards the end of the tax period can harm the continuity of the projects.

Very generous tax deductions coupled with no specification of eligible technologies and processes can induce fraud and use of low quality equipment. Within such context inexperienced economic agents might skim the market from public resources and flood it with technologies and methods not tested. This might have a very negative effect on the promotion of renewable energy sources since bad experiences impact severely in the reputation of technological solutions. Possible early benefits will not be sustainable over the long run[38].

## Concluding remarks

Public finances play a decisive role promoting the development of renewable energy sources due to market failures caused, on one hand, by both government action and inaction, and, on the other, by intrinsic characteristics of the referred energy sources. Traditional energy markets, based on fossil fuels, benefit from important economies of scale and public subsidies, either via direct grants and tax expenditure measures or deficient public policies to internalise externalities. These conditions coupled with high energy price volatility raised barriers to market penetration of cleaner energy sources (IEA, 2004: 8). The great amount of resources required for the initial investment in renewable energy technology and the high risk associated to such investment add further obstacles to the development of this new market.

Therefore, this is a field where liberalism and protectionism confront each other. To overcome the contrast between these two tendencies, maximising the results obtained from the application of public resources to energy policy goals and minimising market distortions, it is recommended the introduction of elements of competition within support schemes. And this insertion should be both at legislative level and instruments' design level. Liberalization of energy markets works here in two directions. On one hand, it constrains the power of European Union member States to intervene in the market towards the promotion of renewable energy sources. On the other hand, a common energy market offers higher potential for the marketing of these energy sources due to their characteristics.

Along this paper we drew some criticisms over the two main legal regimes framing the topic: the EU energy tax Directive and the Community guidelines on State aid for environmental protection. Our conclusion was that further competition and level playing field rules could be inserted within both regimes with potential gains for a free common energy market and the promotion of renewable energy sources. Furthermore, the analysis of some specific support measures contrasted their weaknesses and strengths as instruments of energy policy. Aspects enhanced might

[38] This was the case of wind industry in California, where tax credits ranged from 66 to 95 per cent of the total amount of the investment – Sawin and Flavin, 2004: 18.

be useful to help public decision-makers to pick the instrument most adequate to each objective, as well as to inform them about limitations associated to each kind of public expenditure measure.

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