policy recommendations

"…CONTRIBUTE TO SUSTAINABLE ECONOMIC GROWTH, HIGH QUALITY JOBS, TECHNOLOGY DEVELOPMENT, GLOBAL COMPETITIVENESS AND INDUSTRIAL AND RESEARCH LEADERSHIP."

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At a time when governments around the world are in the process of liberalising their electricity markets, the increasing competitiveness of renewable energy should lead to higher demand. Without political support, however, renewable energy remains at a disadvantage, marginalised by distortions in the world's electricity markets created by decades of massive financial, political and structural support to conventional technologies and the failure to internalise environmental and social costs in price of energy. Developing renewables will therefore require strong political and economic efforts, especially through laws that guarantee stable tariffs over a period of up to 20 years.

At present new renewable energy generators have to compete with old nuclear and fossil fuelled power stations which produce electricity at marginal costs because consumers and taxpayers have already paid the interest and depreciation on the original investments. Political action is needed to overcome these distortions and create a level playing field.

The following is an overview of current political frameworks and barriers that need to be overcome in order to unlock renewable energy's great potential to become a major contributor to global energy supply. In the process it would also contribute to sustainable economic growth, high quality jobs, technology development, global competitiveness and industrial and research leadership.

renewable energy targets

In recent years, as part of their greenhouse gas reduction policies as well as for increasing security of energy supply, an increasing number of countries have established targets for renewable energy. These are either expressed in terms of installed capacity or as a percentage of energy consumption. Although these targets are not often legally binding, they have served as an important catalyst for increasing the share of renewable energy throughout the world, from Europe to the Far East to the USA.

A time horizon of just a few years is not long enough in the electricity sector where the investment horizon can be up to 40 years. Renewable energy targets therefore need to have short, medium and long term steps and must be legally binding in order to be effective. They should also be supported by mechanisms such as the "feed-in tariff". In order for the proportion of renewable energy to increase significantly, targets must be set in accordance with the local potential for each technology (wind, solar, biomass etc) and according to the local infrastructure, both existing and planned.

In recent years the wind and solar power industries have shown that it is possible to maintain a growth rate of 30 to 35% in the renewables sector. In conjunction with the European Photovoltaic Industry Association, the European Solar Thermal Power Industry Association and the European Wind Energy Association[17], Greenpeace and EREC have documented the development of those industries from 1990 onwards and outlined a prognosis for growth up to 2020.

reference

17 SOLAR GENERATION (EPIA), CONCENTRATED SOLAR THERMAL POWER - NOW! (GREENPEACE), WINDFORCE 12 (EWEA), GLOBAL WIND ENERGY OUTLOOK 2006, GWEC

image VOLTAGE METRE GAUGE.

demands for the energy sector

Greenpeace and the renewables industry have a clear agenda for changes that need to be made in energy policy to encourage a shift to renewable sources. The main demands are:

- Phase out all subsidies for fossil and nuclear energy and internalise external costs
- Establish legally binding targets for renewable energy
- Provide defined and stable returns for investors
- Guarantee priority access to the grid for renewable power generators
- Strict efficiency standards for all energy consuming appliances, buildings and vehicles

Conventional energy sources receive an estimated $250-300 billion[18] in subsidies per year worldwide, resulting in heavily distorted markets. The Worldwatch Institute estimates that total world coal subsidies are $63 billion, whilst in Germany alone the total is $21 billion, including direct support of more than $85,000 per miner. Subsidies artificially reduce the price of power, keep renewable energy out of the market place and prop up non-competitive technologies and fuels. Eliminating direct and indirect subsidies to fossil fuels and nuclear power would help move us towards a level playing field across the energy sector. The 2001 report of the G8 Renewable Energy Task Force argued that "re-addressing them [subsidies] and making even a minor re-direction of these considerable financial flows toward renewables, provides an opportunity to bring consistency to new public goals and to include social and environmental costs in prices." The Task Force recommended that "G8 countries should take steps to remove incentives and other supports for environmentally harmful energy technologies, and develop and implement market-based mechanisms that address externalities, enabling renewable energy technologies to compete in the market on a more equal and fairer basis."

Renewable energy would not need special provisions if markets were not distorted by the fact that it is still virtually free for electricity producers (as well as the energy sector as a whole) to pollute. Subsidies to fully mature and polluting technologies are highly unproductive. Removing subsidies from conventional electricity would not only save taxpayers' money. It would also dramatically reduce the need for renewable energy support.

This is a fuller description of what needs to be done to eliminate or compensate for current distortions in the energy market.

1. removal of energy market distortions

A major barrier preventing renewable energy from reaching its full potential is the lack of pricing structures in the energy markets that reflect the full costs to society of producing energy. For more than a century, power generation was characterised by national monopolies with mandates to finance investments in new production capacity through state subsidies and/or levies on electricity bills. As many countries are moving in the direction of more liberalised electricity markets, these options are no longer available, which puts new generating technologies, such as wind power, at a competitive disadvantage relative to existing technologies. This situation requires a number of responses.

internalisation of the social and environmental costs of polluting energy

The real cost of energy production by conventional energy includes expenses absorbed by society, such as health impacts and local and regional environmental degradation - from mercury pollution to acid rain – as well as the global negative impacts from climate change. Hidden costs include the waiving of nuclear accident insurance that is too expensive to be covered by the nuclear power plant operators. The Price- Anderson Act, for instance, limits the liability of US nuclear power plants in the case of an accident to an amount of up to US$ 98 million per plant, and only 15 million per year per plant, with the rest being drawn from an industry fund for up to US$ 10 billion – an after that taxpayer pays[19]. Environmental damage should as a priority be rectified at source. Translated into energy generation that would mean that, ideally, production of energy should not pollute and that it is the energy producers' responsibility to prevent it. If they do pollute they should pay an amount equal to the damage the production causes to society as a whole. The environmental impacts of electricity generation can be difficult to quantify, however. How do we put a price on lost homes on Pacific Islands as a result of melting icecaps or on deteriorating health and human lives?

An ambitious project, funded by the European Commission - ExternE – has tried to quantify the true costs, including the environmental costs, of electricity generation. It estimates that the cost of producing electricity from coal or oil would double and that from gas would increase by 30% if external costs, in the form of damage to the environment and health, were taken into account. If those environmental costs were levied on electricity generation according to their impact, many renewable energy sources would not need any support. If, at the same time, direct and indirect subsidies to fossil fuels and nuclear power were removed, the need to support renewable electricity generation would seriously diminish or cease to exist.

reference
18 UNDP REPORT
19 HTTP://EN.WIKIPEDIA.ORG/WIKI/PRICE-ANDERSON_NUCLEAR_INDUSTRIES_INDEMNITY_ACT

introduce the "polluter pays" principle

As with the other subsidies, external costs must be factored into energy pricing if the market is to be truly competitive. This requires that governments apply a "polluter pays" system that charges the emitters accordingly, or applies suitable compensation to non-emitters. Adoption of polluter pays taxation to electricity sources, or equivalent compensation to renewable energy sources, and exclusion of renewables from environment-related energy taxation, is essential to achieve fairer competition in the world's electricity markets.

2. electricity market reform

Renewable energy technologies could already be competitive if they had received the same attention as other sources in terms of R&D funding and subsidies, and if external costs were reflected in power prices. Essential reforms in the electricity sector are necessary if new renewable energy technologies are to be accepted on a larger scale. These reforms include:

removal of electricity sector barriers

Complex licensing procedures and bureaucratic hurdles constitute one of the most difficult obstacles faced by renewable energy projects in many countries. A clear timetable for approving projects should be set for all administrations at all levels. Priority should be given to renewable energy projects. Governments should propose more detailed procedural guidelines to strengthen the existing legislation and at the same time streamline the licensing procedure for renewable energy projects.

A major barrier is the short to medium term surplus of electricity generating capacity in many OECD countries. Due to over-capacity it is still cheaper to burn more coal or gas in an existing power plant than to build, finance and depreciate a new renewable power plant. The effect is that, even in those situations where a new technology would be fully competitive with new coal or gas fired power plants, the investment will not be made. Until we reach a situation where electricity prices start reflecting the cost of investing in new capacity rather than the marginal cost of existing capacity, support for renewables will still be required to level the playing field.

Other barriers include the lack of long term planning at national, regional and local level; lack of integrated resource planning; lack of integrated grid planning and management; lack of predictability and stability in the markets; no legal framework for international bodies of water; grid ownership by vertically integrated companies and a lack of long-term R&D funding.

There is also a complete absence of grids for large scale renewable energy sources, such as offshore wind power or concentrating solar power (CSP) plants; weak or non-existant grids onshore; little recognition of the economic benefits of embedded/distributed generation; and discriminatory requirements from utilities for grid access that do not reflect the nature of the renewable technology.

The reforms needed to address market barriers to renewables include:

- Streamlined and uniform planning procedures and permitting systems and integrated least cost network planning;
- Fair access to the grid at fair, transparent prices and removal of discriminatory access and transmission tariffs;
- Fair and transparent pricing for power throughout a network, with recognition and remuneration for the benefits of embedded generation;
- Unbundling of utilities into separate generation and distribution companies;
- The costs of grid infrastructure development and reinforcement must be carried by the grid management authority rather than individual renewable energy projects;
- Disclosure of fuel mix and environmental impact to end users to enable consumers to make an informed choice of power source.

priority grid access

Rules on grid access, transmission and cost sharing are very often inadequate. Legislation must be clear, especially concerning cost distribution and transmission fees. Renewable energy generators should be guaranteed priority access. Where necessary, grid extension or reinforcement costs should be borne by the grid operators, and shared between all consumers, because the environmental benefits of renewables are a public good and system operation is a natural monopoly.

support mechanisms for renewables

The following section provides an overview of the existing support mechanisms and experiences of their operation. Support mechanisms remain a second best solution for correcting market failures in the electricity sector. However, introducing them is a practical political solution to acknowledge that, in the short term, there are no other practical ways to apply the polluter pays principle.

Overall, there are broadly speaking two types of incentive to promote deployment of renewable electricity. Others exist for renewable heating, but the experiences in this sector are unfortunately not as long as in the electricity sector. These are Fixed Price Systems where the government dictates the electricity price (or premium) paid to the producer and lets the market determine the quantity, and Renewable Quota Systems (in the USA referred to as Renewable Portfolio Standards) where the government dictates the quantity of renewable electricity and leaves it to the market to determine the price. Both systems create a protected market against a background of subsidised, depreciated conventional generators whose external environmental costs are not accounted for. Their aim is to provide incentives for technology improvements and cost reductions, leading to cheaper renewables that can compete with conventional sources in the future.

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The main difference between quota based and price based systems is that the former aims to introduce competition between electricity producers. However, competition between technology manufacturers, which is the most crucial factor in bringing down electricity production costs, is present regardless of whether government dictates prices or quantities. Prices paid to wind power producers are currently higher in many European quota based systems (UK, Belgium, Italy) than in fixed price or premium systems (Germany, Spain, Denmark).

fixed price systems

Fixed price systems include investment subsidies, fixed feed-in tariffs, fixed premium systems and tax credits.

investment subsidies are capital payments usually made on the basis of the rated power (in kW) of the generator. It is generally acknowledged, however, that systems which base the amount of support on generator size rather than electricity output can lead to less efficient technology development. There is therefore a global trend away from these payments, although they can be effective when combined with other incentives.

fixed feed-in tariffs (FITs), widely adopted in Europe, have proved extremely successful in expanding wind energy in Germany, Spain and Denmark. Operators are paid a fixed price for every kWh of electricity they feed into the grid. In Germany the price paid varies according to the relative maturity of the particular technology and reduces each year to reflect falling costs. The additional cost of the system is borne by taxpayers or electricity consumers.

The main benefit of a FIT is that it is administratively simple and encourages better planning. Although the FIT is not associated with a formal Power Purchase Agreement, distribution companies are usually obliged to purchase all the production from renewable installations. Germany has reduced the political risk of the system being changed by guaranteeing payments for 20 years. The main problem associated with a fixed price system is that it does not lend itself easily to adjustment – whether up or down - to reflect changes in the production costs of renewable technologies.

fixed premium systems, sometimes called an "environmental bonus" mechanism, operate by adding a fixed premium to the basic wholesale electricity price. From an investor perspective, the total price received per kWh is less predictable than under a feed-in tariff because it depends on a constantly changing electricity price. From a market perspective, however, it is argued that a fixed premium is easier to integrate into the overall electricity market because those involved will be reacting to market price signals. Spain is the most prominent country to have adopted a fixed premium system.

tax credits, as operated in the US and Canada, offer a credit against tax payments for every kWh produced. In the United States the market has been driven by a federal Production Tax Credit (PTC) of approximately 1.8 cents per kWh. It is adjusted annually for inflation.

renewable quota systems

Two types of renewable quota systems have been employed - tendering systems and green certificate systems.

tendering systems involve competitive bidding for contracts to construct and operate a particular project, or a fixed quantity of renewable capacity in a country or state. Although other factors are usually taken into account, the lowest priced bid invariably wins. This system has been used to promote wind power in Ireland, France, the UK, Denmark and China.

The downside is that investors can bid an uneconomically low price in order to win the contract, and then not build the project. Under the UK's NFFO (Non-Fossil Fuel Obligation) tender system, for example, many contracts remained unused. It was eventually abandoned. If properly designed, however, with long contracts, a clear link to planning consent and a possible minimum price, tendering for large scale projects could be effective, as it has been for offshore oil and gas extraction in Europe's North Sea.

tradable green certificate (TGC) systems operate by offering "green certificates" for every kWh generated by a renewable producer. The value of these certificates, which can be traded on a market, is then added to the value of the basic electricity. A green certificate system usually operates in combination with a rising quota of renewable electricity generation. Power companies are bound by law to purchase an increasing proportion of renewable input. Countries which have adopted this system include the UK, Sweden and Italy in Europe and many individual states in the US, where it is known as a Renewable Portfolio Standard.

Compared with a fixed tender price, the TGC model is more risky for the investor, because the price fluctuates on a daily basis, unless effective markets for long-term certificate (and electricity) contracts are developed. Such markets do not currently exist. The system is also more complex than other payment mechanisms.

Which one out of this range of incentive systems works best? Based on past experience it is clear that policies based on fixed tariffs and premiums can be designed to work effectively. However, introducing them is not a guarantee for success. Almost all countries with experience in mechanisms to support renewables have, at some point in time, used feed-in tariffs, but not all have contributed to an increase in renewable electricity production. It is the design of a mechanism, in combination with other measures, that determines its success.

It is too early to draw final conclusions on the potential impacts of the full range of policy options available since more complex systems, such as those based on tradable green certificates, are still at an experimental phase. More time and experience are needed to draw credible conclusions on their ability to attract investments and deliver new capacity. The choice of framework at a national level also depends on the culture and history of the individual countries, the stage of development for renewables and the political will to produce results.