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RENEWABLE ENERGY SOURCES IN ROMANIA – A STATISTICAL APPROACH

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Abstract

Biodiversity is in decline globally and major ecosystems are placed under increasing pressure. Global poverty persists; the Millennium Development Goals would need major efforts to be achieved. This paper will explore the perspective for a new energy sector economy in relation to climate change and the sustainable development objectives.

All renewable energy technologies are not appropriate to all applications or locations, however. This paper identifies some of the key environmental and economic benefits associated with renewable technologies. It is also analyzed in a comparative manner the current situation of energy from renewable sources in Romania and the EU Member States.

Keywords: renewable energy, global warming, hydrogen economy, energy production

Introduction

At the end of 2008, three crises became apparent, affecting the economy, the environment and resources. They share common roots in failures of the market economy, including insufficient information and transparency, not recognizing hidden and external costs, mispriced products, short-termism and ignoring early warnings. Together these failings have led to large and increasing financial and ecological debts. Over the crises, everybody knows that climate change is also one of the greatest threats facing the planet. The costs of failure to act are becoming unthinkable. Yet we know now that if developed countries agree to cut their collective emissions by 30% by 2020, annual economic growth would be trimmed by less than 0.2% – a small price to pay to avoid the potential long-term costs of climate change. Moreover, it is easy to appreciate the positive value of other benefits such as reduced air pollution, security of energy supply at predictable prices, and improved competitiveness through innovation. Now, for the growing number of enterprises and investors committed to combating climate change with renewable energy technologies, here at last is a minutely detailed analysis of the opportunities and obstacles involved in developing a coherent and effective business strategy. In the current state of global awareness, the European Union has taken by far the largest steps in tackling the enormous problems entailed by climate change, she explores in unprecedented detail the various “green” energy incentives and support schemes available under various programs available both at EU level and in each of the 27 Member States.

In April 2009 the European Commission presented a White Paper setting out a framework for adaptation measures and policies to reduce the European Union's vulnerability to the impacts of climate change. It outlines the need to create a clearing house by 2011 to

facilitate the exchange of information on climate change risks, impacts and best practices between governments, agencies and organizations working on adaptation policies.

The use of renewable energy sources is seen as a key element in energy policy, reducing the dependence on fuel from nonmember countries, reducing emissions from carbon sources, and decoupling energy costs from oil prices. The second key element is constraining demand, by promoting energy efficiency both within the energy sector itself and at end-use. In order to meet the increasing requirements of policy makers for energy monitoring, Eurostat has developed a coherent and harmonized system of energy statistics. Annual data collection covers the 27 Member States of the EU and the candidate countries.

Environmental Benefits of Renewable Energy

Power plant air emissions are responsible for approximately one-third of nitrogen oxide emissions, two-thirds of sulfur dioxide emissions, and one-third of carbon dioxide emissions nationally. Renewables can avoid or reduce these air emissions, as well as reduce water consumption, thermal pollution, waste, noise, and adverse land-use impacts. Moreover, renewables are sustainable energy resources: they avoid depletion of natural resources for future generations.

Renewables in a utility's generating mix can also reduce clean air compliance costs and make a region a more attractive place to do business by avoiding the imposition of costly emission-control measures in both the utility sector and in other industries and transportation (Cămășoiu, Caragea, 2010). Failure to capture cost-effective reductions in the utility sector will therefore require more stringent reductions from transportation and/or other industrial sectors, simply shifting rather than reducing costs. Because emission sources in those sectors are generally smaller and more numerous, they are generally more expensive to control. Moreover, most conventional emission-abatement measures in all sectors impose costs with no offsetting savings; renewables, on the other hand, produce fuel savings over their operating lives that cover some or all of their initial costs.

These environmental benefits can reduce the cost of complying with future environmental regulations as well. The science of environmental and health impacts of different pollutants develops unevenly. In addition, environmental regulators, faced with limited resources, must prioritize their activities. For these reasons, at any given moment environmental regulatory attention tends to be focused on a narrow range of environmental problems, or a single pollutant.

To meet incremental and piecemeal regulation of this kind, industry naturally turns to the compliance option with the lowest short-run incremental cost, most often a bolt-on technology designed solely to mitigate the problem at hand. That technology then becomes a sunk cost which does not enter into cost-effectiveness calculations for responding to the next priority pollutant. Renewables, by contrast, especially zero-emission technologies, avoid these kinds of costs once and for all.

The risks of future environmental regulatory costs are not insignificant or unexpected, especially with respect to fine particulates and carbon dioxide. A growing body of public health research has found that emissions of particulates smaller than 2.5 microns are a major cause of premature deaths from air pollution. As the scientific consensus grows, and the costs of inaction are more closely understood, the likelihood of future regulations increases.

The same is true of global warming gases, especially carbon dioxide.

Renewables are particularly valuable in mitigating these risks and, consequently, in mitigating the risk of future expenditures to reduce heat-trapping gas emissions by other means. Carbon emission controls are not available by any known technology, and while

natural gas plants emit only about half as much carbon dioxide as coal, they still contribute significantly to the problem and offer no long-term solution. Renewables, on the other hand, including sustainably managed biomass, result in virtually no net carbon emissions. The availability of significant quantities of zero-emitting renewables could help to mitigate the environmental impacts of energy use, now and in the years to come.

How Renewable Energy Investments Help the Economy?

There are two main reasons why renewable energy technologies offer an economic advantage: (1) they are labor intensive, so they generally create more jobs per monetary unit invested than conventional electricity generation technologies, and (2) they use primarily indigenous resources, so most of the energy costs could be reduced.

Investment in locally available renewable energy generates more jobs, greater earnings, and higher output than a continued reliance on imported fuels. Economic impacts are maximized when an indigenous resource or technology can replace an imported fuel at a reasonable price and when a large percentage of inputs can be purchased in the state. Statistical estimation¹ illustrates that, overall, renewables create three times as many jobs as the same level of spending on conventional fuels. For states with insufficient conventional energy reserves, there is a simple trade-off: import fossil fuels from out-of-area suppliers, which means energy spending *or* develop indigenous renewable resources, which creates jobs for local workers in the construction, operation, and maintenance of non-fossil power plants and associated industries.

The macroeconomic effects, as a result of investments in renewable energy technologies, there are of three different types:

1. *Direct effects* — these are on-site jobs and income created as the result of the initial investment; the people who assemble wind turbines at a manufacturing plant, for example.
2. *Indirect effects* — these are additional jobs and economic activity involved in supplying goods and services related to the primary activity; people such as the banker who provides loans to the plant's owners, and the workers who supply parts and materials to the turbine assemblers.
3. *Induced effects* — this is employment and other economic activity generated by the re-spending of wages earned by those directly and indirectly employed in the industry; jobs created by the manufacturing plant workers spending their wages at the local grocery store, for example.

In other words, the advantages of renewable energy investments are becoming increasingly clear, even in areas that have traditionally favored fossil fuels.

A Comparative Analyze of Renewable Energy between Romania and EU Member States

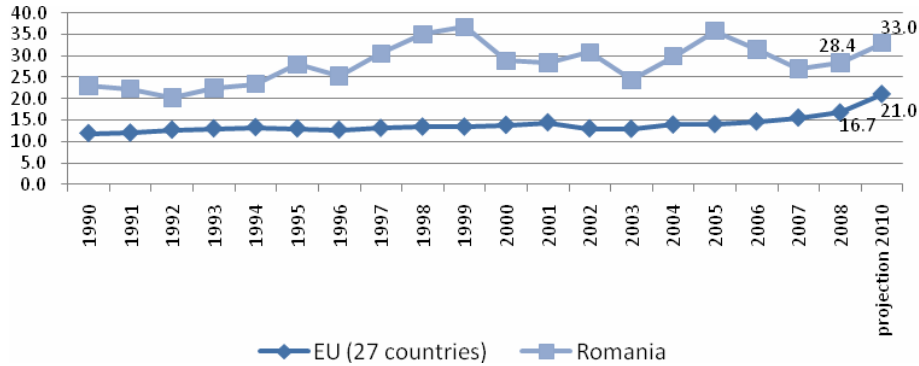
In Romania, the level of energy from renewable sources increased in 2008 compared to the previous year (5.4 million toe in 2008, 4.7 in 2007), as well the share of renewable energy (figure 1.). The same positive trend is registered for the average of European countries (from 14.0 to 14.8 million toe in 2008, comparing with 2007).

¹ According to Eurostat

The projection for 2010 shows share of renewable will increase for each Member States, at an average of EU-27 by 21%.

The share of electricity generated by renewable sources has also a sinusoidal trend in the reference period 1990-2008. Compared with the EU figures, the indicator has a substantially higher value in Romania (28.8% compared with EU27, 16.7%, in 2008).

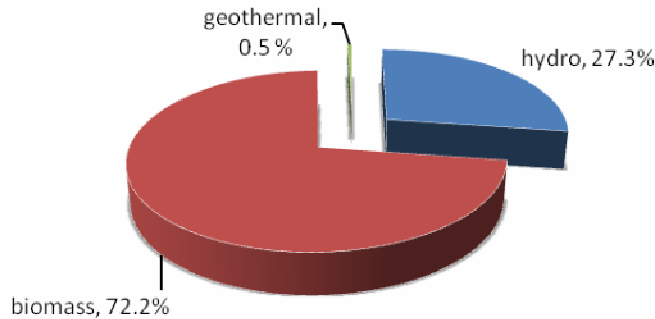
Figure. 1. Share of electricity generated by renewable sources in EU and Romania, in 1990-2008 and projection for 2010



Source: Eurostat : http://epp.eurostat.ec.europa.eu/portal/page/portal/energy/data/main_tables, 2010

The most important sources of primary energy production from renewable in Romania are biomass (72.2%) and hydro (27.3%), over the European values (69.1% - biomass, respectively, 19.0% - hydro). The solar and wind energy is almost insignificant in our country.

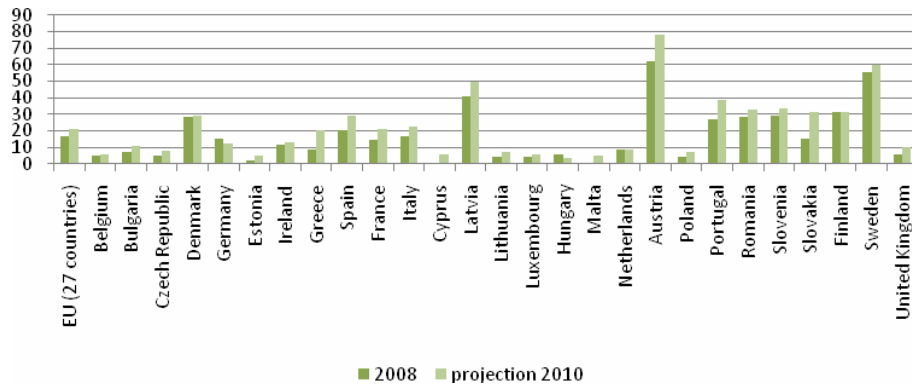
Figure. 2. The structure of primary energy production from renewable in Romania, by sources, in 2008



Source: Eurostat : http://epp.eurostat.ec.europa.eu/portal/page/portal/energy/data/main_tables, 2010

In 2008, the highest share of renewable energy between Member States is registered in Austria (62%), Sweden (55.5%) and Latvia (41.2%). At the opposite side are situated the following countries: Malta, Cyprus and Estonia.

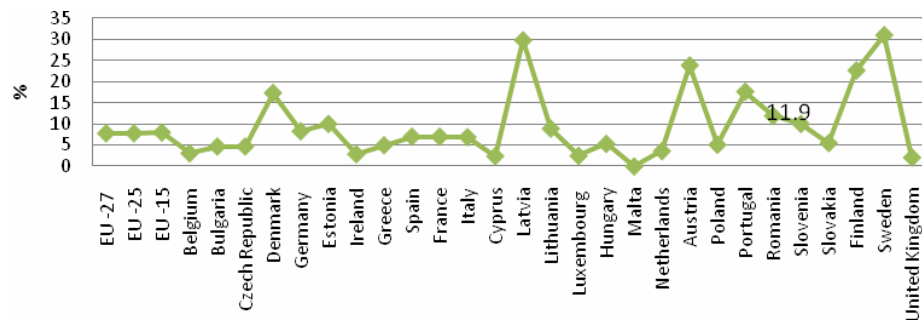
Figure 3. Share of electricity generated by renewable sources in EU Member States, in 2008 and projection for 2010



Source: Eurostat : http://epp.eurostat.ec.europa.eu/portal/page/portal/energy/data/main_tables, 2010

The EU-27 consumption of renewable energy sources as a whole increased at the significant average rate of 3,2 % per year during the 1990s. Nevertheless, due to the low starting point, the long lead times needed to build up capacity and the relatively high growth rate of gross inland consumption over recent years, the share of renewables has increased by only 0.18 percentage points per year since 2000, reaching a level of 6,7 % in 2005 and a level of 7,8% in 2007, far from the 2010 target of 12 % (fig.4).

Figure 4. Share of renewable energy in primary energy consumption in European Union (%), in 2009



Source: European Environment Agency data set and Eurostat, 2010

Currently, approximately 53% of the EU energy consumption is imported. The EU is highly dependent on oil (82%) and natural gas (58%) and the forecasts show the same trend for the

next decades. Furthermore, there is an accelerating decline in the resources of fossil fuels which are concentrated in few producing countries.

In 2008, the highest energy dependence rates were found in Malta (100%), Luxembourg (98.6%) and Cyprus (97.5%). The Member States the least dependent on energy imports were the United Kingdom (26.1%), the Czech Republic (27.6%), Poland (30.4%); the dependence rate for **Romania** was 32.0% lower than the figure registered in 2007 (27.7 %). Denmark is a net exporter of energy and therefore has a negative energy dependence rate (-22,3%).

Conclusions

The Earth's climate is changing and the impacts are already being felt in Europe and across the world. Today, the majority of Europeans agree that the environment has a significant impact on their quality of life and that global trends play a significant part in this. They want to see the environment, as well as economic and social needs, taken into account in decisions about transport, energy, housing, agriculture, fish, food and health.

One of the most important benefits of renewable energy is the fact that it's non-polluting. These environmental benefits can reduce the cost of complying with future environmental regulations as well. And of course as the name tells us it is renewable and does not use resources that can never be replaced. Renewable energy has a much lower environmental impact than conventional sources of energy. But there are other advantages to using renewable sources of energy. The benefits of renewable energy could also stimulate the economy and creating job opportunities. There are also many job opportunities for professionals who can invent ways of using renewable energy easily and efficiently in our homes and businesses. The more products that are available the cheaper they will become. There are many benefits of renewable energy to the ordinary citizen and business owner. Homeowners will reap rewards from using renewable energy and energy-efficient appliances by saving money in the long run and reducing environmental impacts. It also renders us able to fuel our homes independently in many cases. Using renewable fuels makes us less dependent. On the other site, small business owners will also reap the benefits of renewable energy. They will save money on utilities. Even providers of electricity can benefit from selling clean power.

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