UK'S RENEWABLE ENERGY STRATEGY - DRIVING ECONOMIC GROWTH IN A POST-CRISIS MARKET

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Abstract

By using more and more sustainable energy sources, the environmental and energy security issues can be solved, but a new opportunity arises: economic growth. Supporting investments and innovation generates sector growth that eventually leads to economic growth. Through cross-cutting actions and a well-constructed incentive scheme, the UK has managed to create an emerging performant sector: renewable energy.

Keywords: *Renewable energy, sustainability, energy security, investments, economic growth.*

JEL classification: *Q28*

1. Introduction

Renewable energy reffers to any type of energy source that naturally regenerates over a short period of time, and is directly deriving from solar and other types of energies and environmental mechanisms like wind, hydro, biomass, geothermal, tidal or any other energy that does not derive from fossil fuels.

Climate change is one of the most important problems of the twentieth century society, it's main driver being human activity: industry, agriculture, transport, etc; each one of these contribute to a level of carbon dioxide 40% higher than before the industrial revolution (Royal Society, 2010). It is hard to have sustainable development when the environment is in constant

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degradation, because negative effects on the environment deeply affect economic growth (Hogendorn, 1996).

Sustainability refers to promoting the conservation and regeneration of natural resources, technological development, growth of production and orienting investments in correlation with the present needs of the population without compromising future generations' possibilities to satisfy their own needs (Cămășoiu, 1994). Limitless availability of renewable energy makes it perfectly sustainable, unlike fossil fuel derived energy, that will eventually run out.

Another important issue regarding renewables is energy security, especially for the EU member states that are dependent on Russian resources. Energy security, amongst with food, transport, communications, financial, commercial and infrastructure security is part of a broader concept of national security, economic security (Băhnărean, 2010). In order to ensure affordable energy, regardless of the geopolitical situation, EU member states can invest or stimulate investments in renewable energy, these investments eventually leading to the ultimate purpose: economic growth.

2. UK's policies and legal framework on renewables

With a 4.0% share of renewable energy consumption in 2012, the United Kingdom positions itself in the last 3 EU member states in this matter. Only Luxembourg and Malta have a smaller share of 2.9 and 2.0 percent (European Comission, 2013). At the same time, UK is one of the big polluters of the planet, according to World Resources Institute (2010).

Large energy consumption makes the UK sensible to price fluctuations of fossil fuels, given the fact that oil and gas imports will reach levels of 50 and 55% respectively through 2020 (if the present trends are kept) according to the Department of Energy and Climate Change (2011). The same DECC says that a fifth of the current energy producing capacity will be lost in the next decade because of the closing of nuclear and coal facilities.

These threats, alongside the obligation to achieve EU standards (2009/28/EC Directive), have lead to UK's Renewable Energy Strategy, a commitment to increase the deployment of renewable energy across the UK in the sectors of electricity, heat and transport. The key policies and measures to increase renewables' deployment include:

- financial incentives to bring forward and support renewable energy;

- identifying and removing the most significant non-financial barriers to renewables deployment (these include facilitation of access to the grid, ensuring long term investment certainty, overriding pre and post consent delays, supporting the development of supply chains, ensuring sustainable bioenergy feedstock supply and encouraging innovation);
- promoting business opportunities in the renewables sector to overcome supply chain blockages. (DECC, 2011)

The financial incentives used to support and promote green sources of energy are: Renewables Obligation (RO), Feed-in Tariffs (FiT), Renewable Transport Fuel Obligation (RTFO), Renewable Heat Incentive (RHI), and the Renewable Heat Premium Payment (RHPP).

Renewables Obligation (RO) was first introduced in April 2002, and is consists of an obligation of electricity suppliers to have a specific and annually increasing proportion of electricity from renewable energy sources, or face a penalty. Eligible renewable sources include wind energy, wave and tidal, landfill gas, sewage gas, deep geothermal, hydro, photovoltaics, biomass, anaerobic digestion. Suppliers are therefore incentivised to increase the level of energy obtained from renewable sources and to contribute to the strategic targets.

Ofgem (Office of Gas and Electricity Markets) is in charge of implementing the ROs, and issues Renewables Obligation Certificates (ROCs) to eligible energy generators. These ROCs may be sold directly to licensed electricity suppliers and traders that need to demonstrate their compliance with the obligation. This virtuous circle assures a flow of capital from conventional energy generators to those who use renewable sources, supporting investment in green energy solutions.

At first, 1 ROC was awarded for each MWh of renewable electricity generated, regardless of the technology used, but in 2009 the so called 'banding' was introduced. Banding means that different technologies or sources receive different numbers of ROCs depending on several factors, mainly costs and potential for large scale deployment and development. As it is shown in the table below, banding is constantly reviewed to ensure that developers receive an appropriate level of financial support necessary to maintain investments as market conditions and in-sector innovation evolves.

Table 1: Support rates for key technologies between 2009 and 2016/17

Band	2009 banding support (ROC/MWh)	13/14 support (ROC/MWh)	14/15 support (ROC/MWh)	15/16 support (ROC/MWh)	16/17 support (ROC/MWh)
Anaerobic digestion	2	2	2	1.9	1.8
Advanced gasification/pyrolysis	2	2	2	1.9	1.8
Standard gasification/pyrolysis	1	2	2	1.9	1.8
Biomass Conversion (station or unit)	New band	1	1	1	1
Dedicated biomass	1.5	1.5	1.5	1.5	1.4
Dedicated biomass with CHP	2	2	2	1.9	1.8
Energy from waste with CHP	1	1	1	1	1
Onshore wind	1	0.9	0.9	0.9	0.9
Offshore wind	2	2	2	1.9	1.8
Solar PV - Building mounted	2	1.7	1.6	1.5	1.4
Solar PV - Ground mounted	2	1.6	1.4	1.3	1.2
Tidal stream	2	5	5	5	5
Wave	2	5	5	5	5

Source: UK Renewable Energy Roadmap Update 2013

Feed-in Tariffs (FiTs) are a financial support scheme aimed for small-scale instalations that use eligible low-carbon electricity technologies and have a total installed capacity of no more than 5 MW. It was first introduced in April 2010 and it has been confirmed as a success by the 2013 Update of the Renewable Energy Roadmap, with over 400,000 installations being certified by the Central Feed-in Tariff Register at the end on June 2013.

Through FiTs, Small-scale generators using anaerobic digestion, solar photovoltaic, small hydro and wind energy are being awarded generation tariffs by the electricity suppliers. Also, the generators that produce electricity in excess of their own consumption are guaranteed to obtain a certain amount of money per every kWh of their electricity that gets exported to the grid. Generation tariffs are adjusted, sometimes as often as every three months, for inflation and other key factors.

Renewable Transport Fuel Obligation (RTFO) was launched in April 2008, and is requiring road transport fuel suppliers with sales of more than 450,000 litres of fossil petrol, diesel or renewable fuel per annum to the UK market to ensure that a certain proportion of their overall fuel sales are from a renewable source. Gradual targets of 2.5% (by volume) for 2008/09, 3.25 for 2009/10, 3.5 for 2010/11, 4.0 for 2011/12 and 4.5 per cent in 2012/13 were applied.

Renewable Transport Fuel Certificates (RTFCs) are awarded to owners of biofuel at the duty points, one for every litre of biofuel, or kilogram of biomethane supplied. Certaind biofuels are also eligible for double counting, like fuels derived from wastes and residues, ligno-cellulosic and non-edible cellulosic material. The volume of biofuels owned does not count, meaning that the RTFCs are a potential revenue for even the smallest suppliers. RTFCs can be traded between suppliers, and at the end of the year, fossil fuel producers can buy (at market price, as there is no set value for the RTFCs) the necessary number of RTFCs to meet their biofuel obligation.

Renewable Heat Incentive (RHI) was started in November 2011. It provides support for commercial, industrial and community renewable heating installations to save up to 44 million tonnes of carbon by 2020. The financial aid in this scheme is provided for a long-term (20 years) to help businesses, NGOs and the public sector meet the cost of installing renewable heat technologies like biomass, heat pumps, geothermal, solar thermal and biomethane or biogas.

For the moment the RHI is only available for the non-domestic sector, but households will soon be eligible with the opening of a new incentive scheme starting spring 2014, after the closing of the Renewable Heat Premium Payment (RHPP) in 31 March.

Renewable Heat Premium Payment (RHPP) is a one-off grant scheme opened for applications in August 2011 in order to support installation of eligible renewable heat technologies, until the domestic RHI will be

introduced. It is currently in phase 2 of implementation, after phase 1 ran from August 2011 to March 2012. In this second phase, all voucher values were increased, for each of the four eligible technologies: air-to-water heat pumps are now awarded £1,300 (instead of £850), solar thermal grant values rose from £300 to £600, ground-source or water-source heat pumps now get funded with £2,300 (from £1,250), and the vouchers for biomass boilers doubled their worth from £950 to £2,000.

Although the actions taken by the authorities are designed to support all types of renewable energy harnessing technologies, they are mainly focused around 8 technologies that have great potential to develop in a cost effective and sustainable way: *onshore wind, offshore wind, marine energy,biomass electricity, biomass heat, ground source and air source heat pumps and renewable transport.*

Evolution of these technologies is closely monitored and reported through Renewable Energy Roadmaps, updated annualy, to ensure a good progress towards 2020 targets and constantly adjust areas where there is need for improvement.

3. Investments and economic growth

UK's Renewable Energy Strategy is based, as it is proven in the introduction of the Renewable Energy Roadmap, on three major pillars:

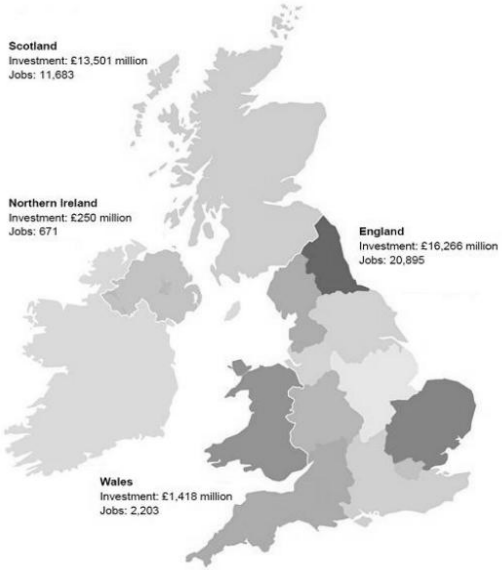
a) ***Energy security*** - "This [*reaching the strategic objectives*] will make the UK more energy secure, will help protect consumers from fossil fuel price fluctuations";
b) ***Environmental awareness*** - "Renewables will be a key part of the decarbonisation of the energy sector"; and
c) Economic growth - "Driving investment in new jobs and businesses".

Economic growth can be achieved through investments that engage both people and capital and can generate long-term profits, and the Department of Energy and Climate Change expect renewables to play a key part in this growth. The renewable energy sector is an attractive market for investors and is supporting jobs and investment also throughout the supply chain.

As it is shown in the figure below, since 2010, over £31 billion in private investment in renewable electricity have entered UK's market, supporting over 35,000 jobs: England has the advantage in all areas, whether

it's capital intake (over £16.2bn) or job output (20,895 jobs); Scotland is closely behind with £13.5 worth of private investments and over 11,600 jobs. Wales and Northern Ireland have a cummulated total investment of over £1.6bn that support almost 3,000 jobs. According to the Renewable Energy Association (2012), if we consider all the renewables sector, covering electricity, heat and transport, renewables support around 110,000 jobs directly and in immediate supply chains, and another 160,000 jobs further down the supply chain. By 2020, these figures could go up to 400,000 direct and supply chain jobs.

Figure 1: Recorded investment and jobs by country



Source: UK Renewable Energy Roadmap Update 2013

Many of these investments represent inflow of foreign capital, UK Trade and Investment has recorded 71 renewable energy Foreign Direct Investment projects in 2011/12 which generated or safeguarded 2,625 jobs, and an extra 46 projects for 2012/13 with a job contribution of 2,514, representing the largest source of inward investment among advanced engineering and environmental technology sectors.

Should we consider an example, a foreign joint venture between DONG Energy (Denmark), E.ON (Germany) and Masdar (Abu Dhabi) developed 'London Array', the world's largest offshore wind farm with a total installed capacity of around 630 MW. The project was started in 2009, the last turbine was installed in December 2012 and in July 2013 was officially opened by David Cameron, the Prime Minister of the United Kingdom. Some key facts and figures tell us that over 75 organisations contributed to its construction, with over 6,700 men and women involved, up to a 1,000 working on site for over 5,000,000 man hours. Also, community benefits include a community fund, an environmental fund, and support for local schools and a university bursary scheme. If we analyse further economic impact and benefits, over 120 local companies and organisations were contracted for over £20 million.

All across the UK, local companies make up the sector's supply chain, winning contracts for all kinds of works and services. As seen in the UK Renewable Energy Roadmap Update 2013, 3sun Group, Harland and Wolff, Steel Engineering, Ridgeway Renewables or Hughes Sub Surface Engineering are just a few of these small and medium-sized enterprises that benefit from investments in renewables.

4. Case study - "Gwynt y Môr", a 2 billion euro investment in North Wales

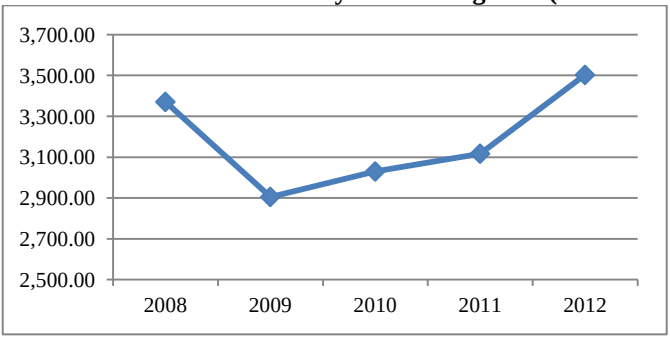
Gwynt y Môr (Sea Wind) is an under-construction offshore wind site 18km off the coast of North Wales, consisting of 160 turbines, each with a generating capacity of 3.6 MW. Once operational, it will be capable of supplying aproximately 400.000 homes with it's total capacity of 576 MW. Construction on the site began in Januray 2012, and thru mid-2014 the investment will have reached an impressive 2 billion EURO.

The project is developed by a joint-venture between 3 german companies, RWE Innogy (60%), Stadwerke Munchen (30% of the shares) and Siemens (10%), meaning that the investment made is 100% foreign, good news regarding the fact that Wales and especially the region in discussion is one of the poorest areas in the whole UK in terms of GDP and GDP per capita. For 2012, the latest data available from StatsWales, GDP per capita in Wales was £15,401, and for Conwy and Denbighshire (the region in North Wales where the project is situated in) a lower figure of £13,555 (that is correspondent to 18,989, respectively 16,713 EURO using the average yearly

exchange rate). In comparison, Eurostat reports a per capita Gross Domestic Product for UK of over 28,000 EURO.

The figure below can also give us an image on the evolution of the GDP in the region of Conwy and Denbighshire for the last 5 years, and also a clue about the impact of the present investment on local economy, given the fact that it's projected value is circa 65% of 2011's local GDP (3.1 billion EURO). Also, it will imply the creation and sustainment of over 1,500 jobs for construction, deployment, maintenance, operation, etc., most of them indirect through supply chains and local companies contracted for on-site works.

Figure 2: Evolution of GDP in Conwy and Denbigshire (millions of Euro)



Source: StatsWales, conversion to EURO by yearly average exchange rate

It is visible from Figure 2 that Gwynt y Môr has already had a strong positive impact on local economy, influencing a 12.35% raise of GDP from 2011 to 2012. Of course, GDP per capita had a similar evolution, from £12,922 (14,896 EURO) in 2011 to £13,555 (16,713 EURO) in 2012.

Further positive impact is expected, as local companies contract more and more works and services at Gwynt y Môr, more than £200 million were poured into the UK supply chain and more than £70 million awarded to local Welsh companies, with more contract announcements to be made. Local and national contractors include: Prysmian Cables&System, Cammell Laird, Port of Mostyn, Global Marine and the National Grid. A larger share of the investment, roughly £1 billion is destined to the purchase of the turbines from Siemens, but the ripple effect of this goes throughout the supply chain to fund other European and British companies that are contracted by the manufacturer, contributing to growth on all levels: local, national, European.

Local businesses are not the only ones who benefit from the project, also local communities will have the chance to access a Community Fund totaling around £20 million across the lifetime of the project, in yearly payments of £768,000. Although there isn't a clear direction of investment for the Fund, it is expected to support local NGOs and offer scholarships to local students that want to pursue a career in engineering at Gwynt y Môr. Also, a Tourism Fund of £690,000 will be available to increase tourism opportunities across Conwy and Denbighshire.

Even though the project is not operational yet, it has already contributed to local and regional economic growth, with the prospect of continuing it's positive influence throughout it's 25-year operational life by contributing to the lowering of carbon emissions while offering sustainable (and possibly cheaper?) energy to North Wales.

5. Conclusions

European Union regulations and climate change problems, along with energy security issues are the main drivers of member states' energy strategies. They have to be more efficient, decrease their carbon emissions and try to obtain energy in a sustainable way, to offer a perspective beyond fossil fuels. The UK recognised the threats and assumed a Renewable Energy Strategy that would solve many of those problems and also drive economic growth after an extended period of recession.

Through cross-cutting actions and efficient incentive schemes, UK's authorities managed to attract over £31 billion worth of investment projects in renewable electricity in the last 3 years, with a potential of sustaining over 35,000 jobs. Moreover, the entire renewables sector is estimated to support over 110,000 direct jobs and an additional 160,000 in supply chain jobs, with a perspective of 400,000 for 2020.

Important investments drive local economic growth, like the case of Gwynt y Môr that has generated a 12.35% increase in GDP in the first year of deployment, by contracting local and national companies for on-site works, transportation and other related services. Many more advantages for local communities and businesses are to come, and will certainly continue to drive the economic growth of Conwy and Denbighshire, with effects for the Welsh, UK and European economy.

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