

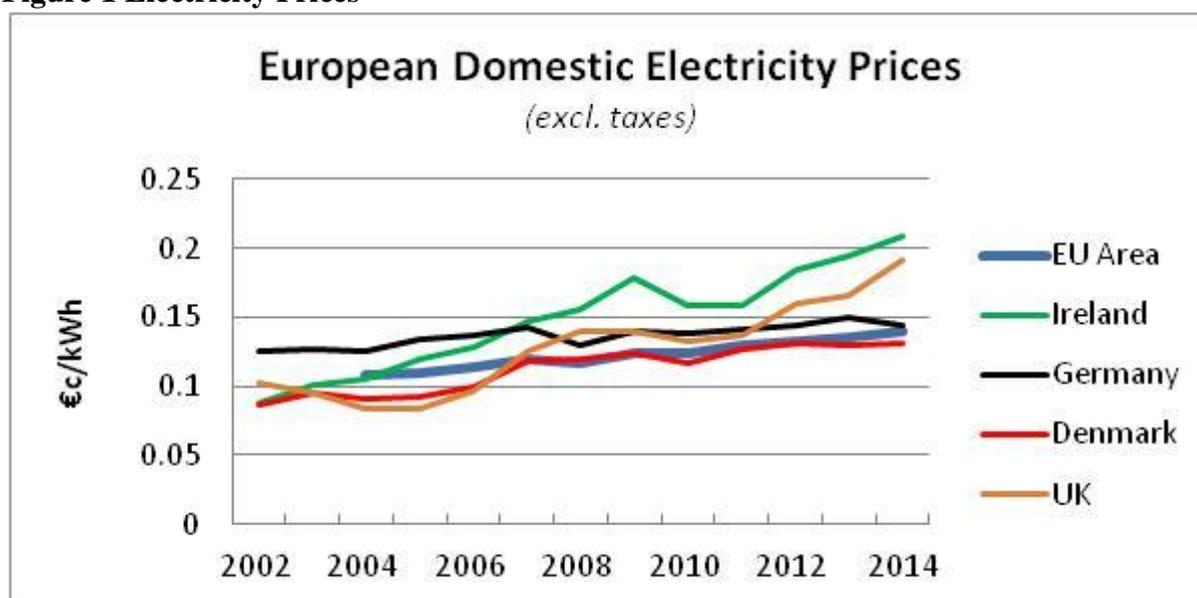
## Ireland's Energy Crisis – what's to be done?

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### Introduction

Ireland is not really facing an energy crisis – at least not in the supply of electricity. It easily has enough generating capacity. The problem is that it has amongst the highest prices for power in Europe but has set itself the target of generating 40% of all its electricity from renewable sources by 2020. This may well be feasible but I question whether it is the cheapest way to “go green”. If a cheaper technology comes along, surely it is worth examination? That is surely what is to be done.

**Figure 1 Electricity Prices**



Source: Eurostat, June 2015

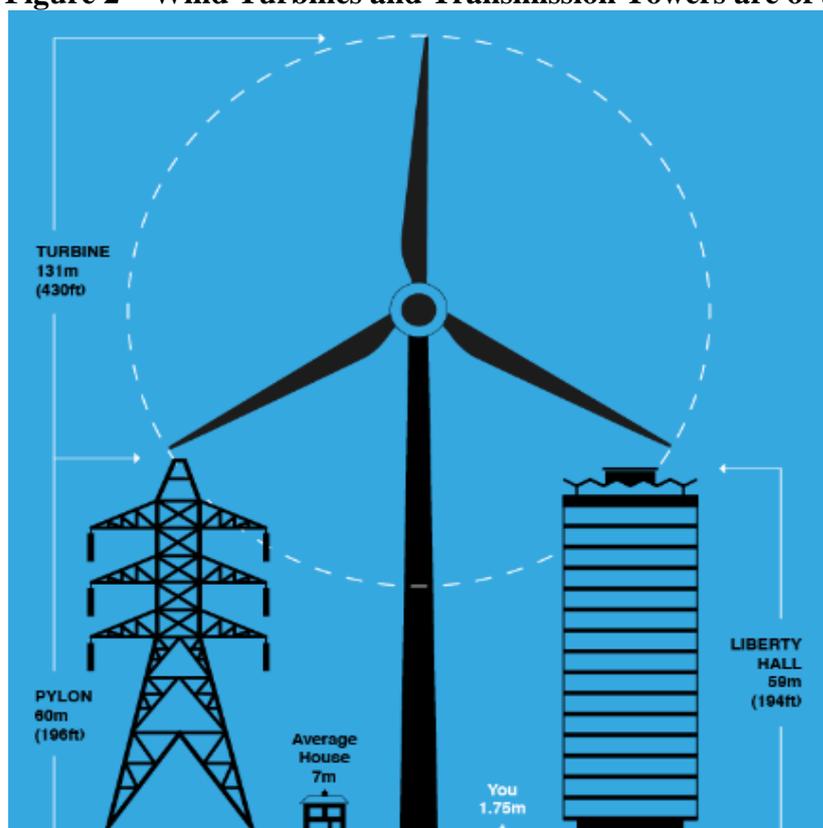
In the next few minutes I will explain that converting the largest single producer of green house gases in Ireland, namely the Moneypoint coal fired power station, to burn sustainable biomass is cheaper than building and operating yet more wind farms. In addition, it would not put at risk Ireland's world famous tourism and bloodstock industries, on account of the need to pepper the countryside with industrial scale wind turbines and transmission towers.

### Current Policy

Ireland's renewables strategy was effectively established in 2007 when it was decided to promote wind power as the major source of renewable electricity. Since then around 200 wind farms have been completed and Ireland's renewable generation accounted for 20.9% of gross electricity consumption in 2013, so that is just over half way to the 40% target. As such, the strategy should be seen as a success. However, whether continuing with this “all wind” approach is sensible is a completely different matter. Attainment of the 40% target will require another 200 wind farms,

700km of new transmission lines and hundreds of new towers to carry these lines. These transmission reinforcements alone will cost up to €3.9bn, according to EirGrid. What is more, these towers and turbines are not small, as shown in Figure 2 below. The concerns of the Irish bloodstock industry that directly employs over 14,000 people and contributes Euro 1.3 billion a year to the rural Irish economy have been clearly voiced by Anne-Marie O’Brien of the legendary Coolmore stud. In her December 2014 Irish Field article she complained: ‘It is obvious to anyone who works with horses that industrial scale wind farms and pylon lines are simply not compatible with the rearing, breeding and racing of thoroughbred racehorses’.

**Figure 2 – Wind Turbines and Transmission Towers are of an Industrial scale**



## System Costs

However, accommodation of more wind onto the transmission system needs more than just transmission lines and towers; it requires changes in the way the other power stations operate to cope with the variable output from the wind. These system costs may well have been low when wind accounted for less than 20% of consumption on average. For low “penetration” of wind, it is the variations in demand for electricity that determines how EirGrid tells the other gas and coal stations to operate. However, if wind is to provide 40% of generation on average, that means that, on many occasions, it will be changes in the wind that causes power stations to change their operation, rather than demand. This means that the wind will cause additional “system costs”. The Irish Academy of Engineers estimated that these hidden costs amount to around €30/MWh, a figure recently confirmed by the Industry group of the Single Electricity Market of this island. So, if we add the cost of keeping the system in balance, in other words “keeping the lights on”, then the cost of wind power is not just the payment made to wind generators, which is set by the Government’s tariff, called REFIT, at €70/MWh, but is €100/MWh, over 40% higher. Moreover,

when these power stations have to change their output in order to accommodate the wind, they cannot operate at their optimum level, so their efficiency falls. It is akin to the fuel consumption of a car going up in heavy traffic, but falling when travelling at a constant speed along a motorway. This leads to an increase in the greenhouse gas emissions from these fossil stations needed to accommodate the wind. In other words, wind power is neither free nor zero carbon.

## **Drax & Moneypoint**

One option not available to Ireland in 2007 was that of sustainable biomass. Quite simply, there was no large scale supply chain of sustainable biomass. “Sustainable biomass”, is material made from branches, tops of trees and other low grade product that is often left to rot, as well as saw dust and chips. In the mid 2000s, demand for this type of product had not been established to any great extent. However, utilities in Europe started trying to burn wood products “co-fired” in conventional coal fired power stations as the power produced from the biomass could count as being “renewable” and so receive incentive payments. Various technical problems were encountered but quickly overcome. The rules for auditing and “verifying” that the products were produced “sustainably” were established within the EU and the international biomass market grew in volume. So much so that, in 2012 Drax, Europe’s largest coal fired power station, decided to convert half of its units to burn sustainable biomass and signed long term fixed price contracts for delivery of the biomass. Drax is a 6 x 660 MW power station and the first two units were converted by 2014. The conversions went to time and cost. The performance has exceeded expectations as there has been negligible degradation in output or efficiency. Environmental assessments have found that the CO<sub>2</sub> emissions at Drax fell by over 85% when the boilers switched from coal to sustainable biomass. This analysis took into account the consumption of fossil fuels used to collect and process the forestry waste to make the pellets and their transport by sea to Drax.

Moneypoint is an excellent candidate for conversion to biomass as it is situated on the coast, can take deliveries directly from the exporting countries. Drax, on the other hand, receives the bulk of its biomass from the US and so the biomass pellets are shipped to North East of the UK, transhipped to rail cars which then have a 60 mile journey to Drax. Therefore the cost of supplies of biomass to Moneypoint are likely to be lower than to Drax. Based on the actual cost at Drax, Moneypoint could be converted for around €380m –i.e. just about 1/10<sup>th</sup> the cost of the transmission reinforcements for the “more wind” option. In addition, unlike the case for “more wind”, there will be no additional system costs. On this basis, the cost of generating electricity from biomass at Moneypoint is likely to be lower than from “more wind”.

## **Carbon Abatement**

Coal is one of the most carbon intensive power generation fuels (peat is even ‘dirtier’ with 10% more CO<sub>2</sub> emissions than coal). When coal is burnt to generate electricity it releases twice as much CO<sub>2</sub> as gas when burnt in a modern combined cycle gas turbine. Therefore, displacing coal with sustainable biomass at Moneypoint is far more effective at lowering emissions than building additional wind turbines. Preliminary assessments demonstrated that the cost of carbon abatement, i.e. how much more customers will have to pay to achieve lower emissions, is around €135/tCO<sub>2</sub> for new wind, compared to around €60/tCO<sub>2</sub> for biomass. Given that the biomass option imposes lower costs on consumers, avoids the need to pepper the countryside with giant wind turbines and massive transmission towers which would threaten the tourist and equine industries, why continue with more wind?

## **Conclusion**

Ireland is not facing an energy crisis, in that it has enough generating capacity. The problem is the wish to decarbonise by switching to renewables. Customers are already suffering from amongst the highest power prices in Europe and it is surely madness to carry on and build yet more wind when there is a cheaper alternative. “What to do” is convert the single largest producer of greenhouse gases in the country to sustainable biomass, saving money and avoiding unnecessary risk to the rural economy. Indeed, it might even spark a resurgence in Ireland’s forestry industry.

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